TOOLKIT FOR INTEGRATING CLIMATE CHANGE INTO TEN HIGH-ENROLLMENT LAW SCHOOL COURSES

BY

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Lawyers practicing in many areas require knowledge and skills related to climate change. While climate-related laws, regulations and cases appear in environmental and natural resources law courses and are the focus of seminars in some schools, these offerings reach relatively few law students. Most law courses do not include climate-related cases and other materials even when such resources would be useful in teaching fundamental competencies and skills in the subjects. Consequently, many current law students do not understand the challenges of and responses to climate change, affecting many aspects of the American governments, society, economy, and environment. Environmental law professors and, to a lesser extent, practitioners could help other faculty integrate climate change into the curriculum of at least ten basic or other high-enrollment, widely-offered law courses—contracts, property, torts, civil procedure, constitutional, business associations and securities, tax, administrative, land use planning, and international law. This Article describes the basis for this initiative, presents a toolkit of climate-related cases and other readings organized by law school course subject, proposes questions to guide students in the readings and class discussions, and suggests actions for law professors and lawyers around the United States and globally.

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I. INTRODUCTION

The American Bar Association (ABA) in 2003 recognized that addressing climate change[1] and other sustainable development[2] challenges requires understanding, developing, and applying legal mechanisms that are cross-functional and integrate a variety of legal specialties.[3] A 2015 report by an ABA task force observed that sustainability "is a growing part of law practice . . . in virtually every practice area" that "involves a wide range of knowledge and skills."[4] By 2019, climate change impacts, mitigation actions, and adaptation programs pervaded many areas of legal practice. Effective lawyering requires understanding threats from changing environmental conditions and laws, navigating complex regulatory mechanisms, developing innovative transactions and litigations, guiding corporations in considering

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1 INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, GLOBAL WARMING OF 1.5°C: SUMMARY FOR POLICYMAKERS 6, 11 (2018), https://perma.cc/C83H-PVMJ.

> Human activities are estimated to have caused approximately 1.0°C of global warming above pre-industrial levels, with a likely range of 0.8°C to 1.2°C. Global warming is likely to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate. (high confidence) . . . Climate-related risks to health, livelihoods, food security, water supply, human security, and economic growth are projected to increase with global warming of 1.5°C and increase further with 2°C.

Id. See generally 1 U.S. GLOB. CHANGE RESEARCH PROGRAM (USGCRP), CLIMATE SCIENCE SPECIAL REPORT: FOURTH NATIONAL CLIMATE ASSESSMENT (NCA4) (2017), https://perma.cc/22NE-MQNE (offering an authoritative assessment on the science of climate change).

2 In defining "sustainable development," an ABA report accompanying a House of Delegates resolution in 2013 stated:

> [i]n a world with a growing economy and population, widespread poverty, and growing environmental degradation and *greenhouse gas emissions*, sustainable development will be increasingly important to lawyers and their clients. Thus, looking ahead, an understanding of and an appreciation for sustainability concepts and principles will be critically important for the legal profession. Sustainability is best understood as a framework (or a perspective, lens, or approach) for the integration or balancing of environmental protection, economic development and social justice.

AM. BAR ASS'N, REPORT ACCOMPANYING RESOLUTION 105 ON SUSTAINABLE DEVELOPMENT 1 (2013), https://perma.cc/BJ2Z-7RE8 (emphasis added); *see also* UNITED NATIONS, TRANSFORMING OUR WORLD: THE 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT 3, 5 (2015), https://perma.cc/QW5J-88QB [hereinafter UN SDGs] ("We are committed to achieving sustainable development in its three dimensions—economic, social and environmental—in a balanced and integrated manner. . . . Climate change is one of the greatest challenges of our time and its adverse impacts undermine the ability of all countries to achieve sustainable development.").

3 AM. BAR ASS'N, REPORT ACCOMPANYING RESOLUTION ON SUSTAINABLE DEVELOPMENT (2003) https://perma.cc/CKT9-K4TL (ABA resolutions for adopting, promoting and urging international, state, local, tribal, and territorial bar associations to adopt similar resolutions for sustainable development).

4 Memorandum from Lee A. DeHihns, III, Chair, Task Force on Sustainable Dev., to William C. Hubbard, President, Am. Bar Ass'n, and Alpha M. Brady, Dir., Admin. Div., Am. Bar Ass'n (July 30, 2015), https://perma.cc/Y8RH-PB7L (discussing and enclosing the ABA Task Force on Sustainable Development's final report) [hereinafter ABA TASK FORCE].

and disclosing climate-related measures and risks, planning land uses for resiliency and lower emissions, and other activities demanding knowledge and skills absent from most law courses.

Although clients demand more climate-related capabilities from many lawyers across practice areas, most graduating law students are unprepared for these professional responsibilities. Climate-related laws, regulations, and cases appear in environmental and natural resources law courses and are the focus of seminars in some schools. Yet, these offerings reach relatively few law students. When a climate-related case is included in other courses, it is usually presented without much teaching on climate change and its impacts. The many students who intend to practice in fields other than environmental law fail to recognize that their work will require these competencies. Most law courses are taught by professors who trained before climate change became so important to practicing law, and these instructors do not follow such developments, which they mistakenly characterize as solely the province of specialized environmental lawyers.

This Article addresses the climate-competency shortfall in legal education in three parts. Part II explains the reasons for integrating climate change into the curriculum of many law courses. It describes the need for climate-aware lawyers in many practice areas as well as lawyers' ethical responsibilities to provide services in climate change mitigation and adaptation. Part III has ten subparts that are organized by course subject, present climate-related cases and other materials that could be used to teach fundamental competencies in these subjects, explain how these materials could inform students on important climate-related legal developments, and propose questions to guide students in these readings and class discussions. The ten courses covered (with more possible) are contracts, property, torts, civil procedure, constitutional, business associations and securities, tax, administrative, land-use planning, and international law. Part IV appeals to environmental law professors and practitioners to take the initiative in working with other faculty to integrate climate change into these courses. While all faculty should be supportive and collaborative, many environmental lawyers are competent with the climate resources, are aware of interesting recent developments in climate cases and laws, see the relevance across a range of practice areas, and could team-teach with or help prepare the professors teaching these courses.

II. REASONS FOR INTEGRATING CLIMATE CHANGE INTO THE CURRICULUM OF MANY LAW COURSES

Work related to climate change is not reserved to atmospheric scientists, geologists, botanists, emergency responders, civil engineers, and urban planning professionals. Rather, like professionals in healthcare, insurance, finance, real estate, energy, accounting, social work, and other fields, lawyers practicing in many areas require knowledge and skills related

to climate change.[5] Furthermore, the impacts of climate change on practicing law are not limited to the small number of lawyers engaged in headline-grabbing climate activities, such as filing claims for payments after natural disasters with the Federal Emergency Management Agency (FEMA) or National Flood Insurance Program (NFIP), drafting agreements to coordinate government agencies for emergency responses to heatwaves, acquiring property to resettle people from low-lying Pacific islands displaced by rising sea levels, or obtaining authorizations for export and delivery of food to Sub-Saharan African areas suffering from drought. Instead, climate change has been affecting a wide range of cases, agreements, plans, laws, regulations, and legal counseling in the United States for many years.[6] Unfortunately, this influence will continue to grow amidst increasingly complex legal frameworks and threatening environmental conditions. Accordingly, students need training for competency to practice law in the world of climate change.

In many resolutions and reports going back to a commitment to sustainable development in 1991,[7] the ABA pointed to broad engagement of lawyers and law school courses in matters related to climate change. In 2008, the ABA House of Delegates noted that "climate change presents significant" environmental as well as security, economic, and social "risks to this and future generations."[8] Importantly, the ABA recognized *current* and widespread impacts from climate change—demands for services by lawyers with climate competencies are not limited to the projected worsened conditions in 2100 or 2050.[9] Five years later, the ABA House of Delegates recommended reforms to legal education to address climate change and other challenges "to help promote a better understanding of the principles of sustainable development in relevant fields of law."[10]

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5 According to a 2017 report surveying forty-one professional societies, the deep and wide-ranging impacts of climate change on practitioners' skills and decisions require that "climate change become a core component of the culture and educational curriculum of nearly every profession." MISSY STULTS & SARA MEEROW, PROFESSIONAL SOCIETIES AND CLIMATE CHANGE 2 (2017), https://perma.cc/9W6Y-B7SZ; *see also* Warren Lavey, *Teaching the Health Impacts of Climate Change in Many American Higher Education Programs*, 20 INT'L J. SUSTAINABILITY HIGHER EDUC. 39, 44 (2019).

6 *See* AM. BAR ASS'N, *supra* note 2, at 1–2 (generally stating that the legal profession will have to adapt to changes in the legal system from climate change and sustainable development); Celeste Hammond, *The Evolving Role for Transactional Attorneys Responding to Client Needs in Adapting to Climate Change*, 47 J. MARSHALL L. REV. 543, 586–96 (2013); Margaret Grossman, *Climate Change and the Individual*, 66 AM. J. COMPARATIVE L. 345, 347–48 (2018).

7 John C. Dernbach et al., *The Growing Importance of Sustainability to Lawyers and the ABA*, 44 TRENDS 21, 22 (2013) ("The American Bar Association House of Delegates has enacted and approved 11 resolutions dating back to 1991 that have continuously reaffirmed the commitment of the ABA to sustainable development.").

8 AM. BAR ASS'N, ADOPTED BY THE HOUSE DELEGATES, FEBRUARY 11, 2008, RECOMMENDATION 2 (2008), https://perma.cc/X6UW-GD3K.

9 *Id.* at 3, 5.

10 AM. BAR ASS'N, *supra* note 2.

This resolution led to a 2015 report by the ABA's Task Force on Sustainable Development, which observed the need to improve training of lawyers throughout practice areas:

> Sustainability is a growing part of law practice, and in virtually every practice area. Sustainability is affecting, or will affect, tax law, insurance, banking, finance, real estate development, environmental and energy law, among other fields. It also involves a wide range of knowledge and skills, including litigation, commercial transactions, client counseling, advocacy before governmental agencies and other bodies, and legislative drafting. . . . [F]irms and other law organizations have a growing recognition that sustainability requires lawyers to have the requisite knowledge and skills. *Many lawyers are concluding that the lack of sustainable development knowledge and skills means they will not be able to provide clients with all of the services that clients need.*[11]

According to this ABA Task Force, not only are legal issues, disputes, and problems "increasingly framed by sustainability concepts and objectives,"[12] but also sustainability challenges mean that new "tools, processes and institutions are increasingly needed, and legal issues arise across the board as they emerge or evolve."[13]

As examples of clients' demands for climate-related legal skills, wind and solar power systems (which produce electricity without emitting greenhouse gases (GHGs)) are surging around the nation, aided by federal, state and local laws providing production tax credits, renewable energy portfolio standards, property assessed clean energy, and zoning for rooftop solar, wind turbines and community solar farms;[14] with increasing flooding

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11 ABA TASK FORCE, *supra* note 4, at 2–3, 4 (emphasis added); *see* Dernbach et al., *supra* note 7, at 4, 5 ("Going forward, lawyers will need to become involved in an even broader range of sustainability issues. Clients in business, industry, government, and nongovernmental organizations are increasingly committed to sustainability and increasingly expect their lawyers to have the same commitment and understanding."); *see also* John C. Dernbach, *Sustainable Development in Law Practice: A Lens for Addressing All Legal Problems*, 95 DENV. L. REV. 123, 126–27 (2017) ("Sustainable development has . . . influenced the development and implementation of law in various ways and contexts, including brownfields redevelopment, smart growth, public access to information, recycling, biodiversity conservation, and green building." (footnotes omitted)). *See generally*, John C. Dernbach, *The Essential and Growing Role of Legal Education in Achieving Sustainability*, 60 J. LEGAL ED. 489, 502–03 (2011) (arguing that future lawyers "need to understand the contextual framework that sustainability embodies"); ROBERT MELTZ, CONG. RESEARCH SERV., CLIMATE CHANGE AND EXISTING LAW: A SURVEY OF LEGAL ISSUES PAST, PRESENT, AND FUTURE (2014), https://perma.cc/CY2Y-X2PR (outlining new legal issues presented to lawyers as a result of climate change).

12 ABA TASK FORCE, *supra* note 4, at 3.

13 *Id.* at 4; *see also* Kiren Jahangeer, *Mitigating Climate Change: Greenhouse Gas Emissions and Attorney Efforts at Federal, State and Local Levels*, 24 PUB. LAW. 1, 3 (2016) (arguing that "swift action" by attorneys is necessary to combat climate change); Steve Harvey, *Climate Change: Time to Act*, PHILA. LAW., Winter 2015, at 18, 21 (stating that people ask "why lawyers?" and the response is that "the problem is so important and urgent that it deserves the attention of our profession").

14 *See Renewable Electricity Production Tax Credit (PTC)*, ENERGY.GOV, https://perma.cc/SSM2-4F29 (last visited Apr. 13, 2019) (tax credit applying to wind, solar, geothermal, and closed-loop biomass systems); *see also State Renewable Energy Resources*,

from severe storms and sea level rise affecting most states (in 2017, NFIP paid $8.7 billion for losses),[15] governments nationwide are installing natural and artificial defenses using acquired properties and easements along coasts and rivers, expanding stormwater systems, and revising floodplain maps and building codes;[16] hundreds of U.S. corporations publicly report their GHG emissions and actions to reduce them, and are increasingly disclosing their vulnerabilities to climate change in securities filings;[17] ten states apply market-based (cap-and-trade) programs to reduce GHG emissions from coal and natural gas electricity power plants and some other sources, with auctions and trading in credits;[18] cities, counties, and states on the West and East Coasts and in the Rocky Mountains filed lawsuits against suppliers of fossil fuels and electric power companies alleging federal and state public nuisance, private nuisance, and trespass;[19] and at least five states require that environmental assessments consider climate change effects for major land development permits and other agency actions.[20]

Law faculty should not assume that their students received the requisite training on climate change as undergraduates. A 2018 analysis of curriculum at ninety U.S. universities estimated low probabilities of undergraduates

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U.S. ENVTL. PROTECTION AGENCY, https://perma.cc/3YQ3-75AQ (last visited Apr. 13, 2019) (discussing state policies to support renewable energy); *Database of State Incentives for Renewables & Efficiency*, N.C. CLEAN ENERGY TECH. CTR., https://perma.cc/59FW-GFBN; Amanda Levin, *2017 Clean Energy by the Numbers: A State-by-State Look*, NAT. RESOURCES DEF. COUNCIL (Feb. 28, 2018), https://perma.cc/QQ8M-AEP9 (discussing trends in renewable energy); *see also* GREG LEVENTIS ET AL., U.S. DEP'T OF ENERGY, LESSONS IN COMMERCIAL PACE LEADERSHIP: THE PATH FROM LEGISLATION TO LAUNCH 1 (2018), https://perma.cc/R4L5-8ZMX (discussing property assessed clean energy financing from legislation to program launch); BLOOMBERG NEW ENERGY FIN. ET AL., 2018 SUSTAINABLE ENERGY IN AMERICA FACTBOOK 1, 7–12, 14–15 (2018), https://perma.cc/6PTA-YBKY (showing growth in renewable energy jobs); Warren G. Lavey, *Overcoming Conceptual and Practical Hurdles to Market-Based Discovery of Prices for Utility Procurements from Rooftop Solar Systems*, 25 TULANE ENVTL. L.J. 289, 291 (2012).

15 *Loss Dollars Paid by Calendar Year*, FED. EMERGENCY MGMT. AGENCY, https://perma.cc/ZF2A-FX5C (last visited Apr. 13, 2019).

16 *See infra* Parts III.B, III.C, and III.D.

17 Letter from Cynthia Williams, Osler Chair in Bus. Law, Osgood Hall Law Sch., York Univ., & Jill Fisch, Saul A. Fox Distinguished Professor of Bus. Law, Univ. of Pa. Law Sch., to Brent J. Fields, Sec'y, Sec. & Exch. Comm'n (Oct. 1, 2018), https://perma.cc/D7FM-YGGD ("Climate change is not a purely environmental issue, of course: It is also an issue that poses material risks and opportunities to companies in most industries.") (enclosing a rulemaking petition to the Securities and Exchange Commission) [hereinafter Williams & Fisch]; *Companies and Organizations: Greenhouse Gas Protocol Provides the World's Most Widely Used Greenhouse Gas Accounting Standards for Companies*, GREENHOUSE GAS PROTOCOL, https://perma.cc/DGJ6-SALR (last visited Apr. 13, 2019); Letter from Sustainability Accounting Standards Board to Brent J. Fields, Sec'y, U.S. Sec. & Exch. Comm'n (July 1, 2016), https://perma.cc/WJT4-XSPY; CERES, TURNING POINT: CORPORATE PROGRESS ON THE CERES ROADMAP FOR SUSTAINABILITY 6 (2018), https://perma.cc/Y38N-PCLJ.

18 *Elements of RGGI*, REG'L GREENHOUSE GAS INITIATIVE https://perma.cc/4FAW-KJCJ (last visited Apr. 13, 2019) (showing states with market based programs regulating CO_2 emissions); *Cap-and-Trade Program*, CA. AIR RESOURCES BOARD, https://perma.cc/7PS7-ELPJ (last visited Apr. 13, 2019) (showing California's Cap-and-Trade Program).

19 *See infra* Part III.C; Jeremy Hodges et al., *Climate Change Warriors' Latest Weapon of Choice is Litigation*, BLOOMBERG (May 24, 2018), https://perma.cc/MP2S-7776.

20 *See infra* Part III.I.

taking at least one course with climate change in the course description, about 2% in the social sciences and 7% in the natural sciences.[21] Even if a law student has a basic understanding of GHGs, the absence of climate change from law school courses leads students to believe that their clients will not look to them for representation, analysis and counseling on climate-related conditions, actions and policies. Law school courses must help students connect the dots in what the ABA recognized many times as pressures on and responsibilities of lawyers amidst current and future environmental as well as security, economic, and social impacts.

Although climate-related laws and cases appear in environmental and natural resources law courses[22] and as the focus of seminars in some schools,[23] these offerings are electives that reach relatively few law students. These offerings are important training for students intending to make this area a substantial portion of their practices, or who recognize the benefits of such knowledge in many practice areas. However, generally, students intending to practice in tax, business associations and securities, real estate, litigation, or many other fields do not choose these electives. Their counselors and first-year professors typically never give them a peek at the influences of climate change on practicing law. Moreover, these electives generally do not teach that climate change affects a wide range of practice areas. When climate-related cases appear in other courses, such as to teach standing, takings, or statutory interpretation, often they are presented without information on the threats from climate change, relevant legal frameworks, and implications for transactions, litigation, and legal counseling.

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21 David Hess & Brandi Collins, *Climate Change and Higher Education: Assessing Factors That Affect Curriculum Requirements*, 170 J. CLEANER PROD. 1451, 1455 (2018); *see also* Laura M. Hill & Deane Wang, *Integrating Sustainability Learning Outcomes into a University Curriculum: A Case Study of Institutional Dynamics*, 19 INT'L J. SUSTAINABILITY HIGHER EDUC. 699 (2018); David Gosselin et al., *Integration of Sustainability in Higher Education: Three Case Studies of Curricular Implementation*, 3 J. ENVT'L STUD. & SCI. 316, 316, 320 tbl.2, 328 tbl.6 (2013) (discussing climate change curriculum in institutional settings).

22 *See generally* CHRISTINE A. KLEIN ET AL., NATURAL RESOURCES LAW (4th ed. 2018) (discussing climate-related laws and cases); TODD AAGAARD, ET AL., PRACTICING ENVIRONMENTAL LAW 271–98 (2017) (discussing cases related to air pollution and climate change); ROBERT PERCIVAL, ET AL., ENVIRONMENTAL REGULATION: LAW, SCIENCE, AND POLICY 1187–1244 (7th ed. 2013) (discussing global protection of the environment as it relates to U.S. statutes and cases); F. BOSSELMAN, ET AL., ENERGY, ECONOMY AND THE ENVIRONMENT: CASES AND MATERIALS 722–832 (3rd ed. 2010); MICHAEL GERRARD & JODY FREEMAN, GLOBAL CLIMATE CHANGE AND U.S. LAW (2nd ed. 2014) (discussing U.S. statutes, cases, and climate change).

23 For examples of climate change seminar courses, see, e.g., *Climate Change and the Law Course Description*, DUKE L., https://perma.cc/EK5H-QMUP (last visited Apr. 13, 2019); *Georgetown Law Curriculum Guide*, GEO. L., https://perma.cc/3XWT-DB5Y (last visited Apr. 13, 2019); *Climate Change Law and Policy*, HARV. L. SCH. https://perma.cc/5PD4-F4FT (last visited Apr. 13, 2019); *Developing a Federal Framework for Climate Change Policy Course Description*, STANFORD L. https://perma.cc/D225-QYWV (last visited Apr. 13, 2019); *Climate Change Law & Policy*, UNIV. CA. SAN DIEGO L., https://perma.cc/K4H7-TEJV; *Climate Change Specialization*, VERMONT L. SCH., https://perma.cc/T878-QDDC (last visited Apr. 13, 2019).

Finally, law students require more extensive training on climate change legal issues in order to fulfill their ethical responsibilities to society.[24] Substantial legal work is needed on "climate justice," referring to the disproportionate health, economic, social, and cultural climate change impacts borne by disadvantaged groups, as well as the under-representation of such groups in related decision making.[25] The ABA Task Force on Sustainable Development noted that lawyers were already doing legal work related to sustainability in pro bono, human rights, and diversity representations, and that lawyers could make important contributions to furthering the goals of sustainability.[26] Additionally, the International Bar Association (IBA) Task Force on Climate Justice sounded the alarm on climate change from the perspective of lawyers' responsibilities in protecting human rights.[27] Their report "recommend[ed] that the IBA integrate climate justice training and courses into its existing platform for legal education."[28]

Facing a similarly pervasive influence of climate change on their services, societies of healthcare professionals and healthcare organizations urged immediate actions to train students on climate change.[29] The goals for

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[24] According to the ABA's Model Rules of Professional Conduct, lawyers have ethical responsibilities as public citizens and members of a learned profession to "seek improvement of the law," "cultivate knowledge of the law beyond its use for clients," "work to strengthen legal education," and "use civic influence to ensure equal access to our system of justice for all." *Model Rules of Professional Conduct: Preamble & Scope*, AM. BAR ASS'N (Aug. 15, 2018), https://perma.cc/56HN-HWTM. More generally, the 2017 Declaration of Ethical Principles in Relation to Climate Change adopted by the United Nations Educational, Scientific and Cultural Organization (UNESCO) urged training professionals with regard to climate change challenges and solutions. UNESCO, DECLARATION OF ETHICAL PRINCIPLES IN RELATION TO CLIMATE CHANGE 10 (2017), https://perma.cc/LY8N-BR9U; *see also id.* at 5–6 ("Justice in relation to climate change requires fair treatment and meaningful involvement of all people. . . . It is important for all to take measures to safeguard and protect Earth's terrestrial and marine ecosystems, for present and future generations. . . . In response to the adverse effects of climate change, and to climate change mitigation and adaptation policies and actions at the national level, effective access to judicial and administrative proceedings, including redress and remedy, should be provided as stipulated in the 1992 Rio Declaration and according to national laws.").

[25] *See generally* CLIMATE JUSTICE: CASE STUDIES IN GLOBAL AND REGIONAL GOVERNANCE CHALLENGES (Randall S. Abate ed., 2016); INT'L BAR ASS'N ET AL., ACHIEVING JUSTICE AND HUMAN RIGHTS IN AN ERA OF CLIMATE DISRUPTION 2 (2014), https://perma.cc/L5SW-DPHU [hereinafter IBA TASK FORCE] (noting how populations that are most impacted by climate change are also the "least well placed to respond" to the crisis).

[26] ABA TASK FORCE, *supra* note 4, at 3 ("A sustainability-aware practice of law can thus help shape behavior as well as laws and regulations that are supportive of sustainable development."); *see Major U.S. Law Firms Come Together to Contribute $15 Million in Pro Bono Services to Advance Sustainability*, GLOBAL CLIMATE ACTION SUMMIT (Sept. 14, 2018), https://perma.cc/JNH9-S7ML (providing an example of how attorneys can lend their expertise to advance sustainability).

[27] *See* IBA TASK FORCE, *supra* note 25, at 48 ("[C]limate change undermines human rights thus creating injustice. But responses to climate change can also risk further injustice if not informed by human rights.").

[28] *Id.* at 18.

[29] *See generally* Jeanne Leffers & Patricia Butterfield, *Nurses Play Essential Roles in Reducing Health Problems Due to Climate Change*, 66 NURSING OUTLOOK 210 (2018); WORLD HEALTH ORG., SECOND GLOBAL CONFERENCE HEALTH & CLIMATE: CONFERENCE CONCLUSION AND

climate-trained healthcare professionals start with improving patient care and extend to educating the public on climate change risks and advocating for mitigation and adaptation actions.[30] Panels of faculty and students in medicine and other healthcare professions have made important progress in developing new competencies, curricula, and course materials for this training.[31]

III. CLIMATE-RELATED CASES AND OTHER MATERIALS FOR TEN MAJOR LAW SCHOOL COURSES

This Part presents cases and other materials related to climate change that could be used to teach core competencies and skills in ten major law school courses. The toolkit starts with materials for four courses that are

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ACTION AGENDA 4 (2016), https://perma.cc/5SQR-L86C (calling for developing the capacity of the health workforce to address climate risks "through mainstreaming climate change and health topics into medical and public health training"); Diana Madden, Michelle McLean & Graeme Horton, *Preparing Medical Graduates for the Health Effects of Climate Change: An Australasian Collaboration*, 208 MED. J. AUSTL. 291 (2018).

30 The American Medical Association's policy on Global Climate Change and Human Health "supports educating the medical community on the potential adverse public health effects of global climate change and incorporating the health implications of climate change into the spectrum of medical education, including topics such as population displacement, heat waves and drought, flooding, infectious and vector-borne diseases, and potable water supplies." AM. MED. ASS'N, AMA ADVOCACY FOR ENVIRONMENTAL SUSTAINABILITY AND CLIMATE 2 (2016), https://perma.cc/MP2D-RG7Z. Similarly, the American Academy of Nursing calls out that the "nursing profession has not reached full capacity to address the health impacts of climate change because of lack of knowledge and appropriate education and training to achieve greater nurse participation in . . . strategies for climate change." Leffers & Butterfield, *supra* note 29, at 211; *see also Fact Sheet: Health Educators Climate Commitment*, WHITE HOUSE (Dec. 4, 2015), https://perma.cc/P6TF-SQME (collaboration led by the White House in 2015 and signed by 118 schools around the world: "We commit to ensuring that we train the next generation of health professionals to effectively address the health impacts of climate change"); THE MED. SOC'Y CONSORTIUM ON CLIMATE & HEALTH, MEDICAL ALERT! CLIMATE CHANGE IS HARMING OUR HEALTH 19 (2017), https://perma.cc/M8MH-TQQZ ("First and foremost, physicians need to provide care to patients who are experiencing climate-related health effects. Beyond this, doctors can educate the public and policymakers to assure they understand the importance of action. . . . Doctors can also encourage medical education at all levels to incorporate climate change-related coursework into curricula."); RENEE N. SALAS ET AL., 2018 LANCET COUNTDOWN ON HEALTH AND CLIMATE CHANGE BRIEF FOR THE UNITED STATES OF AMERICA 1 (2018), https://perma.cc/UA6B-GNEV (identifying "key threats" that climate change presents to human health).

31 *See, e.g.*, GLOBAL CONSORTIUM ON CLIMATE & HEALTH EDUC., CORE CLIMATE AND HEALTH COMPETENCIES FOR HEALTH PROFESSIONALS 1–6 (2018), https://perma.cc/PTN3-X7GB (outlining climate and health competencies for students in the health profession); *see also* Jeffrey Shaman & Kim Knowlton, *The Need for Climate and Health Education*, AM. J. PUB. HEALTH, Apr. 2018, Supplement 2, at S66 (discussing the need to develop resources related to the "climate-health nexus"); ARIANNE TEHERANI, A HEALTH PROFESSIONS CURRICULUM ON SUSTAINABLE HEALTHCARE EDUCATION: DENTISTRY, MEDICINE, NURSING, AND PHARMACY 3 (2017), https://perma.cc/3H2W-RV87 ("propos[ing] a curriculum in sustainable healthcare education"); ALL. OF NURSES FOR HEALTHY ENV'TS, ENVIRONMENTAL HEALTH IN NURSING, at v (Jeanne Leffers et al. eds., 2017), https://perma.cc/93X6-HML2; INT'L FED'N OF MED. STUDENTS' ASS'NS, TRAINING MANUAL: CLIMATE CHANGE & HEALTH 6 (2016), https://perma.cc/T8FR-V5WK (discussing the relationship between health and climate change to better educate students).

basic components of the first-year law school curriculum: contracts, property, torts, and civil procedure. With each subject, the discussion identifies one to three specific topics that would likely be taught using cases that do not address climate change or without providing the climate relationship for a case; describes the facts and holdings in climate-related cases on those topics; explains how using these cases would not only teach those course topics but also give students important understandings of climate-related legal issues, regulatory mechanisms, and developments; and suggests questions to guide students' readings and class discussions. The toolkit then describes climate-related cases and other materials for topics in six other high-enrollment, widely-offered law school courses: constitutional, business associations and securities, tax, administrative, land use planning, and international.[32]

The climate-related resources for these ten courses demonstrate the feasibility and benefits of this approach to integrating such cases and other materials into major law school courses so that all law students gain a better understanding of these challenges and developments. The resources were chosen so that all ten courses could integrate them without redundancy. Yet, the training of law students would improve even if such resources appeared in only a few courses for a few topics. The resources are drawn from many states throughout the United States, so that students will come to appreciate the vast scope of these developments. Also, the cases and materials refer to some foreign and international developments.

The need and opportunity to integrate climate change cases and other materials into law courses is broader than this list of ten subjects. As examples, professors teaching comparative law could use materials presented in the sections on constitutional (including cases decided by Ireland's High Court[33] and a Dutch appellate court)[34] and tax (including statutes and regulations adopted by Canada and the Province of British Columbia);[35] and instructors in intellectual property could use materials presented in the section on international (technology transfers).[36] More generally, climate change cases and laws could be used to illustrate current developments related to the subjects covered by most courses, including banking, bankruptcy, election law, evidence, health, insurance, local government, as well as trial advocacy.

A. Contracts

Two decisions by courts in California could be used to teach students skills in drafting and interpreting contractual provisions, specifically

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[32] Of course, these resources could also be used in environmental law courses, but the focus of this approach is to provide knowledge on climate-related law to the many students who do not enroll in environmental law electives.

[33] *See infra* Part III.E.

[34] *See infra* Part III.E.

[35] *See infra* Part III.G.

[36] *See infra* Part III.J.

language allocating change-of-law risks between the parties. These materials could be used to replace or supplement sections of major contracts casebooks dealing with interpretation and construction of performance obligations, conditions of exchange, and changed circumstances and excuses for nonperformance.[37] Studying these cases would also help students learn about the goals and mechanisms of two laws aimed at reducing GHG emissions (one a system of emission allowances adopted by a state, and the other a land use restriction adopted by a municipality), health effects of climate change, and climate justice impacts.

1. Contracts Case Involving New State Law Limiting Emissions and Pricing Allowances

In 2016, a California state court of appeals decided a dispute over a change-of-law provision in a long-term, fixed price contract.[38] The parties were the operator of an electricity generating plant (independent power producer) and a utility that purchased power and transmitted it to consumers.[39] The parties executed the contract on March 28, 2006.[40] The disputed provision stated that the plant operator must "comply with all applicable requirements of Law . . . relating to the Facility" and "be responsible for procuring and maintaining, at its expense, all Governmental Approvals and emissions credits required for operation of the Units throughout the Service Term. . . .";[41] the contract defined "Law" to include a statute or regulation "enacted, amended, or issued after the Execution Date [of the contract] and which becomes effective during the Contract term."[42] Key to this case, in September 2006, California enacted the Global Warming Solutions Act of 2006 (AB 32),[43] a landmark in targets and programs to mitigate climate change.[44]

AB 32 required California to reduce its GHG emissions to 1990 levels by 2020.[45] The legislature recognized that climate change threatened California's economy, public health, natural resources, and environment, and addressing climate change required national and international actions.[46] Finding benefits to California from restricting the state's GHG emissions, the legislature directed the California Air Resources Board to design and implement regulations to achieve the maximum technologically feasible and cost-

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37 IAN AYERS & GREGORY KLASS, STUDIES IN CONTRACT LAW 681–707, 808–58, 862–99 (9th ed. 2017); STEVEN BURTON & CHRISTOPHER DRAHOZAI, PRINCIPLES OF CONTRACT LAW 417–52, 482–506, 594–617 (5th ed. 2018).

38 Panoche Energy Ctr., LLC v. Pacific Gas & Electric Co., 1 Cal. App. 5th 68, 71, 85 (2016).

39 *Id.* at 72.

40 *Id.* at 73.

41 *Id.* at 84.

42 *Id.* (internal quotation marks omitted).

43 Assemb. B. 32, 2005–2006 Reg. Sess., ch. 488 (Cal. 2006).

44 *See* Robert N. Stavins, *AB 32: The Whole World is Watching*, 30 ENVTL. FORUM, Nov./Dec. 2013, at 14 (expressing the importance of AB 32's outcome for future commitments across a broad range of jurisdictions).

45 CAL. HEALTH & SAFETY CODE § 38550 (West 2007).

46 *Id.* § 38501(a), (d).

effective GHG emission reductions.[47] In December 2008, this agency adopted a "cap-and-trade" mechanism as well as other measures, and the program was launched in 2013.[48] As applied to power plants, the regulation implemented a "polluter pays" principle by establishing limits on the generators' annual emissions, distributing annually declining numbers of emission allowances to operators, and requiring operators to purchase allowances (priced by the market) if they could not cut their emissions sufficiently to comply with the limits.[49] The objectives were to reduce emissions from power plants by establishing financial incentives for operators to choose less-polluting technologies, forcing operators of high-polluting plants to bear costs that would make their electricity less competitive than power from cleaner producers, raising the price of electricity from their plants so that consumers would use less, and generating revenues that could be used to improve air quality and other purposes.[50]

California's cap-and-trade program was linked or harmonized with the Canadian provinces of Ontario and Québec, pursuant to agreements signed in 2013[51] and 2017.[52] Similarly, since 2008 the Regional Greenhouse Gas Initiative by Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont auctioned GHG emissions allowances for the power sector in those states.[53] Also planning to apply a cap-and-trade mechanism, nine Northeast and Mid-Atlantic states and Washington, D.C. announced in 2018 a program to reduce transportation

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47 *Id.* §§ 38501(a), (d), (e), (h), 38562; *see also* LOUISE BEDSWORTH ET AL., CALIFORNIA'S FOURTH CLIMATE CHANGE ASSESSMENT: STATEWIDE SUMMARY REPORT 13 (2018), https://perma.cc/K4MH-DJUE ("California is one of the most 'climate-challenged' regions of North America and must actively plan and implement strategies to prepare for and adapt to extreme events and shifts in previously 'normal' averages. . . . Increasing temperatures and rising sea-levels will have direct impacts on public health and infrastructure. Drought, coastal and inland flooding, and wildfire will continue to affect people's livelihoods and local economies.").

48 *See* CAL. AIR RES. BD. FOR THE STATE OF CAL., CLIMATE CHANGE SCOPING PLAN: A FRAMEWORK FOR CHANGE, at ES-3 to ES-4 (2008) https://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf (initial plan mandated by the California Global Warming Solutions Act of 2006 for the achievement of the Act's goals and requirements); *California's Cap-and-Trade Program Step by Step*, ENVTL. DEF. FUND, https://perma.cc/HGE7-2JG9 (last visited Apr. 13 2019) (discussing the scope determination of California's cap-and-trade system).

49 *See* TONY DUTZIK ET AL., ENV'T CAL. RESEARCH & POLICY CTR., CLEANER, CHEAPER, SMARTER: THE CASE FOR AUCTIONING POLLUTION ALLOWANCES IN A GLOBAL WARMING CAP-AND-TRADE PROGRAM 18 (2007) https://perma.cc/Y5GU-V4M5 (describing the "polluter pays" principle).

50 *Id.* at 10–12.

51 The Harmonization and Integration of Cap-and-Trade Programs for Reducing Greenhouse Gas Emissions, Cal.–Que., Sept. 27, 2013, https://perma.cc/7QWU-2KPH.

52 Agreement on the Harmonization and Integration of Cap-and-Trade Programs for Reducing Greenhouse Gas Emissions art. 1, Sept. 22, 2017, https://perma.cc/633F-AXEG (Government of California, Government of Ontario, and Gouvernement du Québec).

53 *Elements of RGGI*, REGIONAL GREENHOUSE GAS INITIATIVE, https://perma.cc/PL5C-CDB8 (last visited Apr 13, 2019).

emissions.[54] Additionally, the European Union introduced its Emissions Trading System in 2005,[55] and China launched carbon markets in 2013.[56]

Returning to the contract in dispute, the system of GHG emission allowances, brought about by the change in law, imposed over $100,000 in new annual costs on the electricity sold by the operator to the utility.[57] The question was which party had to pay for allowances to cover the GHG emissions of this electricity.[58] The operator argued that it should be able to raise its price to reflect the new costs.[59] Along with claiming financial hardship, the operator asserted that the long-term, fixed price contract would undermine the legislative intent to send consumers price signals to reduce demand for electricity generated at high-polluting facilities.[60] The arbitrators and appellate court found that, even though the agreement did not mention GHG emissions, the parties negotiated the contract aware of the possibility that such compliance costs would arise from a new law during the contract term; similar GHG reductions and mechanisms appeared in 2005 in a California executive order and legislative proposals.[61] Also, evidence of the contract negotiations showed that the operator initially resisted, but eventually agreed to take, the risk of such costs at the fixed price in order to win the bidding.[62] The appellate court affirmed the arbitrators' declaratory ruling that the contract assigned responsibility for the GHG emissions costs to the operator.[63]

Analyzing this case would teach contracts students about the role, negotiation, drafting, and interpretation of change-of-law provisions. Additionally, this case would inform students about the impacts of climate change, some states' initiatives to reduce their GHG emissions, cap-and-trade mechanisms of emission allowances, and variation in GHG emissions across sources of electricity. Some questions for students in reading these materials or class discussion are shown in the footnote.[64]

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54 TRANSP. & CLIMATE INITIATIVE, TRANSPORTATION & CLIMATE INITIATIVE STATEMENT (2018), https://www.georgetownclimate.org/files/Final_TCI-statement_20181218_formatted.pdf.

55 EUR. COMMISSION, EU ETS HANDBOOK 4 (2015) https://perma.cc/S8Z3-P4DN; EUR. COMMISSION, REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL: TWO YEARS AFTER PARIS—PROGRESS TOWARDS MEETING THE EU'S CLIMATE COMMITMENTS 6 (2017), https://perma.cc/N36Z-ES3A; *see also* EUR. COMMISSION, THE EU EMISSIONS TRADING SYSTEM (EU ETS) (2016) https://perma.cc/D3UU-29T8.

56 *See* ENVTL. DEF. FUND, THE PROGRESS OF CHINA'S CARBON MARKET 4 (2017) https://perma.cc/9WVY-NMZZ (stating between 2013 and 2014, seven pilots were launched which culminated in the 2017 plan).

57 *Panoche Energy Ctr., LLC*, 1 Cal. App. 5th 68, 83 (2016).

58 *Id.*

59 *Id.* at 77–78.

60 *Id.* at 78.

61 *Id.* at 73, 85.

62 *Id.* at 85–87.

63 *Id.* at 110.

64 Questions related to *Panoche Energy Ctr* include:

1) Why did the California Global Warming Solutions Act and related regulations impose new costs on producers of electricity?

2) What information did the arbitrators and court use in deciding which party to the contract should bear the costs of emission allowances? Consider:

2. Contracts Case Involving New Municipal Ordinance that Restricted Use of Property in Transporting Fossil Fuels

In 2018, the United States District Court for the District of Northern California decided a dispute over a different change-of-law provision in a contract between a municipal government and a property developer.[65] In 2012 and 2013, the City of Oakland entered into agreements with the developer to build a bulk goods shipping terminal on city-owned land adjacent to a port.[66] As in many long-term development agreements between local governments and developers, the city agreed to freeze most existing zoning and land use regulations applicable to the site.[67] Such provisions provide developers some certainty as to unexpected government regulations that could stymie their projects.[68] An exception to this freeze in Oakland's contract allowed the city to apply a new regulation to the project if the "City determines based on substantial evidence and after a public hearing that a failure to do so would place existing or future occupants or users of the Project, adjacent neighbors, or any portion thereof, or all of them, in a condition substantially dangerous to their health or safety."[69] In 2015, the developer made public its plans to transport annually about 5 million metric tons of coal, coke, or both through the terminal.[70] The contract dispute concerned an Oakland ordinance adopted in 2016 to prohibit the storage and handling of coal and coke at bulk material facilities or terminals in the city.[71]

The court characterized this ordinance as driven by Oakland's concerns about climate change, including harms to human health and safety.[72] In 2016,

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- Terms of the agreement
- Evidence on the intent of the parties
- Other information on the development of the law and regulations

3) Under the relevant law and regulations, how was the program of allowances designed to reduce GHG emissions? Did the decision on allocating the costs of emission allowances further that goal? Consider the effects on
   - Costs borne by the producer that would encourage it to reduce its emissions
   - Prices to the utility that would encourage it to choose electricity generated from low-emissions producers
   - Prices to end users that would encourage energy efficiency

65 Oakland Bulk & Oversized Terminal v. Oakland, 321 F. Supp. 3d 986 (N.D. Cal. 2018).

66 *Id.* at 989.

67 *Id.* at 990.

68 *Id.* at 992.

69 *Id.*

70 *Id.* at 989–90.

71 *Id.* at 991; *see* Oakland, Cal., Ordinance 13385 (July 20, 2016), https://perma.cc/D26M-MS4K [hereinafter Oakland Ordinance 13385] ("An Ordinance (1) Amending the Oakland Municipal Code to Prohibit the Storage and Handling of Coal and Coke at Bulk Material Facilities or Terminals Throughout the City of Oakland and (2) Adopting California Environmental Quality Act Exemption Findings.").

72 *Oakland Bulk & Oversized Terminal*, 321 F. Supp. 3d 986, 1008 (N.D. Cal. 2018) ("The hostility toward coal operations in Oakland appears to stem largely from concern about global warming. To be sure, shipping coal for use in other countries will make some contribution to

burning coal accounted for a large portion of U.S. anthropogenic GHG emissions.[73] The accumulation of GHGs in the atmosphere is "the greatest threat to public health today," according to the American Public Health Association, with increased deaths and illnesses from more extreme heat, wildfires, poor air quality, vector-borne diseases, intense storms and flooding, and other conditions.[74] Oakland's 2012 Energy and Climate Action Plan expressed concerns about the city's vulnerabilities to climate-related health impacts, including deaths, injuries, and illnesses from flooding as sea levels rise.[75] One year before the developer announced its plans to transport coal, the Oakland City Council adopted a resolution opposing the transportation of coal and other fossil fuels through the city.[76] This resolution pointed to harms from coal dust blown onto areas of Oakland from these operations as well as the GHG impacts of subsequent combustion, and cited moratoria and resolutions against such terminals in many communities in California, Washington, Oregon, and New York.[77]

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the accumulation of greenhouse gases in the earth's atmosphere, and climate change is detrimental to public health and safety.").

73 *Energy and the Environment: Where Greenhouse Gases Come From*, U.S. ENERGY INFO. ADMIN., https://perma.cc/9J6X-VUW4 (last visited Apr. 13, 2019) ("In 2016, emissions of carbon dioxide (CO2) produced from burning fossil fuels for energy were equal to 76% of total U.S. anthropogenic GHG emissions (based on global warming potential) and about 94% of total U.S. anthropogenic CO2 emissions. . . . In 2017, about 45% of U.S. energy-related carbon dioxide emissions came from burning petroleum fuels, 29% came from burning natural gas, and 26% came from burning coal."); *see also* Craig D. Zamuda et al., *Energy Supply, Delivery, and Demand*, *in* 2 USGCRP, IMPACTS, RISKS, AND ADAPTATION IN THE UNITED STATES: FOURTH NATIONAL CLIMATE ASSESSMENT, 174, 176 (2018), https://nca2018.globalchange.gov/downloads/NCA4_2018_FullReport.pdf (explaining that around 30% of energy generation comes from coal).

74 AM. PUB. HEALTH ASS'N, CLIMATE CHANGE AND HEALTH STRATEGIC PLAN 1 (2016), https://www.apha.org/~/media/files/pdf/topics/climate/apha_climate_change_strategic_plan.ashx; *see also* AM. PUB. HEALTH ASS'N, CLIMATE CHANGE THREATENS HUMAN HEALTH AND WELL-BEING n.p., n.d., https://perma.cc/96WP-DXBS (extreme heat leads to "[d]ehydration, heatstroke[,] aggravated respiratory and cardiovascular illnesses"; increased frequency of wildfires leads to "[i]ncreased respiratory illness and hospitalizations"; poor air quality leads to "[i]ncreased allergy-related illnesses[,] respiratory and asthma complications"; vector-borne disease leads to "[i]ncreased risk of Lyme disease, dengue fever, West Nile virus"; and more intense storms and flooding leads to "[i]njury and death[,] displacement-related mental health problems[, and] waterborne illness"); Kristie L. Ebi et al., 2 IMPACTS, RISKS, AND ADAPTATION IN THE UNITED STATES: FOURTH NATIONAL CLIMATE ASSESSMENT, https://perma.cc/42SJ-27B5; WORLD HEALTH ORG., COP24 SPECIAL REPORT: HEALTH & CLIMATE CHANGE 13 (2018), https://perma.cc/TCC5-XPLA ("[T]he Paris [Climate] Agreement is potentially the strongest health agreement of this century."); GEORGE LUBER & JAY LEMERY, GLOBAL CLIMATE CHANGE AND HUMAN HEALTH 14 (2015) (explaining the variety of ways in which climate change has been identified); NAT'L RESEARCH COUNCIL ET AL., HIDDEN COSTS OF ENERGY 4–5 (2010) (describing the health damages associated with air pollution).

75 *See* CITY OF OAKLAND, ENERGY AND CLIMATE ACTION PLAN 39 (2012), https://perma.cc/ZR8U-B68G (explaining that certain groups are particularly vulnerable to different climate impacts, such as the elderly to poor air quality, those living in Oakland Hills to fires, and facilities in low-lying area to flooding).

76 Oakland City Council, Res. 85054 (Cal. 2014), https://perma.cc/U7LX-94PV.

77 *Id.* at 1–2. Prominently in this line of actions, Portland, Oregon adopted a resolution in 2015 opposing projects for transporting or storing fossil fuels to, among other goals, reduce that

Oakland's ordinance was drafted with the intention of applying to the terminal developer that previously entered into agreements that protected it against most changes in laws. To apply, the ordinance had to fit within the contractual provision exempting new regulations for conditions that were "substantially dangerous" to the health or safety of the terminal's neighbors based on "substantial evidence."[78] The ordinance relied on consultant and expert reports concluding that a coal terminal in that city would impair local health.[79] The ordinance and reports found health impacts near a coal terminal from toxins in coal dust blown during handling, railcar transport, and storage.[80] These documents also pointed to adverse health impacts in Oakland from burning the transported coal anywhere in the world because of the incremental increase in climate change and the vulnerabilities of low-income and other Oakland residents.[81]

The developer argued that Oakland's 2016 ordinance should not restrict its use of the property because of the contract's change-of-law provision.[82] The court agreed that this provision protected the developer against the post-signing ordinance prohibiting coal terminal operation because the city did not satisfy the narrow exception to the freeze.[83] The court found that the city's consultant presented unreliable estimates of emissions from coal operations, by ignoring the developer's offer to commit contractually to take

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city's contribution to GHGs and climate change; the city later adopted zoning code amendments that prohibited, with some exceptions, new fossil-fuel terminals. Colum. Pac. Bldg. Trades Council v. City of Portland, 412 P.3d 258, 267 (Or. Ct. App. 2018) (upholding zoning code amendments against a federal constitutional challenge based on the dormant Commerce Clause).

78 Oakland City Council, Res. 86234, at 4 (Cal. 2016) https://perma.cc/PRF7-G7BT.

79 *Id.* at 4–5; ENVTL. SCI. ASSOC., REPORT ON THE HEALTH AND/OR SAFETY IMPACTS ASSOCIATED WITH THE TRANSPORT, STORAGE, AND/OR HANDLING OF COAL AND/OR COKE IN OAKLAND, INCLUDING AT THE PROPOSED OAKLAND BULK AND OVERSIZED TERMINAL IN THE WEST GATEWAY AREA OF THE FORMER OAKLAND ARMY BASE 5–9 (2016), https://perma.cc/CK6Z-3JB2 (outlining the effects of fugitive coal dust); PUB. HEALTH ADVISORY PANEL ON COAL IN OAKLAND, AN ASSESSMENT OF THE HEALTH AND SAFETY IMPLICATIONS OF COAL TRANSPORT THROUGH OAKLAND 4 (2016) [hereinafter OAKLAND PUBLIC HEALTH PANEL], https://perma.cc/5H43-XVNF (explaining that "any increase in exposure to environmental hazards related to the coal exports will likely have an adverse health impact on the West Oakland population").

80 *See* OAKLAND PUBLIC HEALTH PANEL, *supra* note 79, at v.

81 Oakland Ordinance 13385, *supra* note 71, at 2 ("WHEREAS, Storing or Handling coal and coke negatively impact the environment, including because . . . [they] cause carbon dioxide emissions, which fuel climate change and are contrary to Oakland and California's climate change reduction goals, resulting in local climate change-related impacts to Oakland's residents and its already vulnerable populations . . . ."); OAKLAND PUBLIC HEALTH PANEL, *supra* note 79, at vi ("If climate change continues to progress, it will cause significant impacts on the health of Oakland residents. These impacts include increased heat and ground level ozone-related mortality and morbidity, displacement and economic insecurity due to storm surges, and sea level rise, and flooding, especially in West Oakland, increased respiratory and cardiovascular illnesses caused by air pollution from more frequent wildfires, food insecurity resulting in worsened nutrition, and migration of disease vectors into the Oakland area as environmental conditions change."); ENVTL. SCI. ASSOC., *supra* note 79, at 4–5.

82 *Oakland Bulk & Oversized Terminal*, 321 F. Supp. 3d 986, 1009–10 (N.D. Cal. 2018).

83 *Id.* at 1010–11.

actions that reduce coal dust.[84] Also, the court pointed to restrictions that could be imposed by the Bay Area Air Quality Management District to address the city's concerns about coal dust.[85] Finally, the court found "facially ridiculous" the claim that coal transported via this terminal and burned in other countries would "in the grand scheme of things, pose a substantial global warming-related danger to people in Oakland."[86]

Again, a climate-related case could teach contracts students about the role, drafting, interpretation, and application of a change-of-law provision. This court found that the local health impacts of climate change attributable to coal transported through this one terminal would be insufficient to satisfy the criteria in the contract's change-of-law provision.[87] Nevertheless, the students could learn from the concerns about climate change impacts that led cities in several states to adopt similar land use restrictions. Moreover, this case could be used to teach students that other courts have held that agencies must consider the impacts of various facilities' GHG emissions in determining whether to issue construction permits under the National Environmental Policy Act[88] (NEPA) and other laws.[89] This case and related climate materials support interesting questions for contracts students.[90]

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84 *Id.* at 994.

85 *Id.* at 996–97.

86 *Id.* at 1008. Similarly, a district court in 2014 in Washington, D.C. pointed to the uncertainty of current climate science in not allowing for specific linkage between particular GHG emissions and particular climate impacts; the court found that the U.S. Bureau of Land Management adequately considered climate change impacts in leasing land for a coal mine. WildEarth Guardians v. Bureau of Land Mgmt., 8 F. Supp. 3d 17, 35–36 (D.D.C. 2014). For a court decision accepting the linkage between operating one coal mine and incremental adverse impacts from climate change, see *Gloucester Resources Limited v Minister for Planning* [2019] NSWLEC 7, at ¶¶ 525, 688, 699, https://perma.cc/X25L-FZW2 (Land and Environment Court of New South Wales, Australia, refused an application for a new coal mine based on several environmental harms including the climate change impacts of the GHG emissions of the mine and burning its coal).

87 *Oakland Bulk & Oversized Terminal*, 321 F. Supp. 3d 986, 1010–11 (N.D. Cal. 2018).

88 National Environmental Policy Act of 1969, 42 U.S.C. §§ 4321–4370h (2012).

89 *See, e.g.*, Mont. Envtl. Info. Ctr. v. U.S. Office of Surface Mining, 274 F. Supp. 3d 1074, 1090–99 (D. Mont. 2017) (rejecting proposed expansion of coal mine operating under a federal lease; agency failed to take a hard look at the indirect and cumulative effects of coal transportation and combustion); High Country Consv. Advocates v. U.S. Forest Service, 52 F. Supp. 3d 1174, 1189–93 (D. Co. 2014) (environmental impact statement for a coal mine was inadequate because the agency failed to analyze closely the GHG impacts from burning the coal); WildEarth Guardians v. Zinke, Case 1:17-cv-00080-SPW (D. Mt. 2019), https://perma.cc/DJ4A-2H2Z (same); Sierra Club v. F.E.R.C., 867 F.3d 1357, 1374 (D.C. Cir. 2017) ("We conclude that the [environmental impact statement] for the Southeast Market Pipelines Project should have either given a quantitative estimate of the downstream greenhouse emissions that will result from burning the natural gas that the pipelines will transport or explained more specifically why it could not have done so. As we have noted, greenhouse-gas emissions are an indirect effect of authorizing this project, which FERC could reasonably foresee, and which the agency has legal authority to mitigate. . . . The EIS accordingly needed to include a discussion of the 'significance' of this indirect effect . . . as well as 'the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions.'" (citations omitted)); Communities for a Better Env't v. City of Richmond, 184 Cal. App. 4th 70, 90–96 (2010) (discussing a proposed refinery); WildEarth Guardians v. Zinke, Civ. Action No. 16-1724 (RC), at 36, 43, 56 (D.D.C. 2019), https://perma.cc/GKG3-YDZA (Bureau of

B. Property

In addition to harming human health, climate change damages properties.[91] This Part describes cases from Florida, Texas, and Louisiana in which properties were affected by sea level rise, hurricanes, and flooding, leading to disputes over property boundaries and takings of easements. Property boundaries, public rights, nuisance, public easements, zoning, and takings are common topics in property casebooks and courses,[92] but they are usually not taught in the context of erosion as well as other damage from actions to mitigate and measures to adapt to climate change.[93] Wildfires have also increased with climate change—spurred by more drought, heat, and insect infestations—and raise issues that could be integrated into property courses.[94] Further materials on property issues will be discussed in connection with torts, constitutional, and land use planning courses.[95]

1. Property Boundaries Cases in Eroding Coastal Areas

Cases from Florida and Texas dealt with privately-owned waterfront (littoral) properties affected by erosion from rising sea levels and storms. The Florida dispute concerned the boundary at the high-tide line between privately-owned properties adjacent to the ocean and the land submerged or

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Land Management failed to take a hard look at the climate change impacts of oil and gas leasing in Wyoming, Utah and Colorado by failing to quantify and forecast aggregate GHG emissions from the program, including downstream emissions and cumulative effects). *See infra* discussion Part III.I.

[90] Questions related to *Oakland Bulk & Oversized Terminal* include:

1) Why did Oakland attempt to restrict the operations of the terminal? How did the development agreement affect the framing of Oakland's actions?
2) What information did the court use in applying the development agreement's exception to the freeze on local regulations? Consider
   - Terms of the agreement
   - Evidence before the City Council
   - Other information on alternatives and impacts
3) The court held that the agreement did not allow the City to restrict the facility owner based on the local health impacts of related GHG emissions. Under what conditions should a facility's GHG emissions be considered in deciding whether to issue a permit? What criteria should apply?

[91] *See* Stacy Morford, *Climate Change Will Cost U.S. More in Economic Damage Than Any Other Country But One*, INSIDE CLIMATE NEWS (Sept. 24, 2018), https://perma.cc/DP6B-4G2Z.

[92] *See, e.g.*, THOMAS W. MERRILL & HENRY E. SMITH, PROPERTY: PRINCIPLES AND POLICIES 255–87, 937–81, 983–1027, 1067–1106, 1219–1336 (3rd ed. 2017); EDWARD H. RABIN, ET AL., FUNDAMENTALS OF MODERN PROPERTY LAW 475–94, 607–34, 637–58, 665–93, 697–753 (7th ed. 2017).

[93] *See generally* Kate Galloway, *Sustainability in the Real Property Law Curriculum: Why and How*, 8 J. LEARNING DESIGN, 2015, at 31 (highlighting that sustainability principles are not implemented into higher education uniformly).

[94] *See* Bob Berwyn, *How Wildfires Can Affect Climate Change (and Vice Versa)*, INSIDE CLIMATE NEWS (Aug. 23, 2018), https://perma.cc/X8KD-7DB7 (discussing the relation between climate change and increased wildfires).

[95] *See infra* Parts III.C, III.E, III.I.

between the low- and high-tide lines that is state owned.[96] Under Florida common law, the private owner has title to gradual accretions of dry land to the property, such as when the water recedes and the high-tide line moves seaward.[97] However, this common law also provides that sudden changes to the high-tide line ("avulsions") do not change the boundary between private and state-owned properties.[98] A Florida statute established a program pursuant to which municipalities set erosion-control lines and dumped sand on submerged properties (beach nourishment), creating new state-owned dry land such that private properties no longer touched the water.[99] The Florida state courts and U.S. Supreme Court decided the private owners' assertion that the government's actions and claims to this land amounted to an uncompensated taking.[100]

In a case arising out of waterline moves in the opposite direction, a 2012 Texas Supreme Court decision dealt with the state's claim to a public beachfront easement on a private property under Texas common law and the Texas Open Beaches Act.[101] After a hurricane moved the vegetation and high-tide line landward, a private owner challenged the state's claim that the public easements "rolled" landward without compensation into areas where the owner previously excluded public entry.[102]

Coastal areas are affected by climate change as sea levels rise from melting glaciers and thermal expansion of water, and as storms grow in intensity and frequency.[103] Coastal states and communities have been responding to and planning for climate-related flooding, erosion, and other changes in waterfront conditions.[104] According to the U.S. Global Change Research Program's Third National Climate Assessment, "[t]here are basically three types of adaptation options to rising sea levels: protect (such as building levees or other 'hard' methods), accommodate (such as raising structures or using 'soft' or natural protection measures such as wetlands

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96 Stop the Beach Renourishment, Inc. v. Fla. Dep't of Envtl. Prot., 560 U.S. 702, 711–12 (2010).

97 *Id.* at 709.

98 *Id.* at 708–09.

99 *Id.* at 709–11.

100 *Id.* at 732–33.

101 Severance v. Patterson, 370 S.W.3d 705, 708 (Tex. 2012); TEX. NAT. RES. CODE § 61.011(a) (2015).

102 *Id.* at 712.

103 Jeffrey Payne et al., *Coastal Effects*, *in* 2 IMPACTS, RISKS, AND ADAPTATION IN THE UNITED STATES: FOURTH NATIONAL CLIMATE ASSESSMENT, 322, 329 (2018), https://nca2018.globalchange.gov/downloads/NCA4_2018_FullReport.pdf; *Is Sea Level Rising? Yes, Sea Level is Rising at an Increasing Rate.*, NAT'L OCEAN SERV., https://perma.cc/E4PE-88U7 (last visited Apr. 13, 2019).

104 *See* Sierra Club v. Von Kolnitz, No. 2:16-cv-03815-DCN, 2017 WL 3480777, at *1, *3 (D.S.C. Aug. 14, 2017) (South Carolina legislature authorized sea walls; the district court observed "[c]ertainly, protecting coastal real estate from sea level rise and extreme climate events such as hurricanes is an important state policy"); Borough of Harvey Cedars v. Karan, 70 A.3d 524, 527, 544 (N.J. 2013) ("massive" project funded by federal, New Jersey, and local governments for beach restoration and storm protection, involving extending the shoreline seaward by 200 feet, beach nourishment, and dune construction; just compensation to landowner for the dune construction should reflect benefits to property from increased storm protection).

restoration), and retreat."[105] In 2018, Florida state agencies found that sea level rise and climate change will increasingly impact communities' infrastructure and finances as well as homes, beaches, and everyday life; a guidebook provides tools for communities to use in vulnerability assessment, adaptation planning, and implementation.[106] Miami-Dade County engaged in beach restoration as well as the acquisition and management of more than 22,000 acres of environmentally endangered lands to support climate change adaptation, including through mangrove forests.[107] Similarly, a collaboration of federal, state, and local agencies, together with other experts, developed a Texas coastal resiliency master plan that includes actions for beach and dune restoration.[108] The Texas General Land Office reported that 64% of Texas' coast is eroding at an average rate of about six feet per year (with some locations losing more than thirty feet annually).[109]

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105 Lynne M. Carter et al., *Southeast and the Caribbean*, *in* CLIMATE CHANGE IMPACTS IN THE UNITED STATES: THE THIRD NATIONAL CLIMATE ASSESSMENT 396, 402 (2014) http://s3.amazonaws.com/nca2014/low/NCA3_Full_Report_17_Southeast_LowRes.pdf?download=1. According to the Fourth National Climate Assessment in 2018,

> Communities have focused more on actions that address current variability and recent extreme events than on actions to prepare for future change and emergent threats. Communities are currently focused more on capacity building and on making buildings and other assets less sensitive to climate impacts. Communities have been less focused on reducing exposure through actions such as land-use change (preventing building in high-risk locations) and retreat.

Jeffrey Arnold et al., *Reducing Risks Through Adaptation Actions*, *in* 2 IMPACTS, RISKS, AND ADAPTATION IN THE UNITED STATES: FOURTH NATIONAL CLIMATE ASSESSMENT, 1315, 1317 (footnote omitted).

106 FLA. DEP'T OF ENVTL. PROT., FLORIDA ADAPTATION PLANNING GUIDEBOOK, at III, 23 fig.16 (2018), https://perma.cc/G63J-8KXG; *see also* FLA. OCEANS & COASTAL COUNCIL, CLIMATE CHANGE AND SEA-LEVEL RISE IN FLORIDA: AN UPDATE OF THE EFFECTS OF CLIMATE CHANGE ON FLORIDA'S OCEAN & COASTAL RESOURCES, at v–vi, 11 (2010), https://perma.cc/7L9A-5CZU (discussing the lack of adaptability in vast majority of Florida's current coastal infrastructure, and positing that it will need to be replaced to adapt to the rising sea levels, which are unlikely to stabilize); SE. FLA. REG'L CLIMATE CHANGE COMPACT, REGIONAL CLIMATE ACTION PLAN 2.0: ABRIDGED VERSION 21, 22 (2017), https://perma.cc/TT4G-RWY5 (comprehensive action plan including hundreds of actions and special adaptation action areas).

107 MIAMI-DADE CTY., MAYOR'S RESPONSE TO COUNTY COMMISSION'S RESOLUTIONS ON SEA LEVEL RISE 6 (2016), https://perma.cc/6E5R-WYCE (discussing importance and effect of mangrove forest restoration and preservation in combatting the effects of climate change in southern Florida); *Climate Change Action Plan*, MIAMI-DADE CTY., https://perma.cc/P7Y3-TU5N (last visited Apr. 13, 2019) ("Florida is considered one of the most vulnerable areas to climate change, with Southeast Florida especially susceptible to impacts such as rising sea levels.").

108 TEX. GEN. LAND OFFICE, TEXAS COASTAL RESILIENCY MASTER PLAN: EXECUTIVE SUMMARY 9, 11–12 (2017), https://perma.cc/B9EF-SCYJ ("Erosion is a threat to public beach use and access, public and private property and infrastructure, fish and wildlife habitat, and public health and safety. The combined effects of erosion are amplified by coastal population growth and increased development."); EYE OF THE STORM: REPORT OF THE GOVERNOR'S COMMISSION TO REBUILD TEXAS, at iv (2018), https://perma.cc/AKX6-RC6E (discussing Hurricane Harvey's "enormous toll on individuals, businesses and public infrastructure" and "the *urgent* need to 'future–proof' the Gulf Coast—and indeed all of Texas—against future disasters" via federal, state, and local cooperation).

109 *Coastal Management: Coastal Erosion*, TEX. GEN. LAND OFF., https://perma.cc/WM9D-ULXA (last visited Apr. 13, 2019) (discussing the average and high-end rate of erosion in Texas,

Other coastal states and cities with climate action plans targeting beach and shoreline protection include Washington State,[110] Massachusetts,[111] California,[112] New York City,[113] and Charleston, South Carolina.[114]

Returning to the Florida case involving beach nourishment, the Florida state courts and U.S. Supreme Court held that littoral property owners do not have rights to the filled land or to have their property maintain contact with the water.[115] The filling of submerged areas was treated as an avulsion, with no taking of private property.[116] As for the Texas landward change in the high-tide line caused by a hurricane, the Texas Supreme Court held that a public easement does not "roll[] onto previously unencumbered beachfront property" due to this avulsive event; takings compensation would be required for such new public easement.[117] The Texas court distinguished these facts from conditions under which public easements in dry beach "are

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coastal erosion's detrimental effects to property, people, and the economy, as well as what Texas is doing to fight coastal erosion).

110 J. JOHANNESSEN ET AL., WASHINGTON STATE AQUATIC HABITAT GUIDELINES PROGRAM: MARINE SHORELINE DESIGN GUIDELINES 4–6 (2014), https://perma.cc/GMW4-Y8TX (discussing various beach protection techniques, from armoring to low-lying berms targeted towards overwash).

111 MASSACHUSETTS CLIMATE CHANGE ADAPTATION REPORT 107–108, 113–114 (2017), https://perma.cc/393W-7QXG (discussing coastline engineering for shoreline protection and the existing resources, vulnerabilities, and protection strategies involved).

112 CAL. NAT. RES. AGENCY, SAFEGUARDING CALIFORNIA PLAN: 2018 UPDATE 175, 176 (2018), http://resources.ca.gov/docs/climate/safeguarding/update2018/safeguarding-california-plan-2018-update.pdf ("Eighty percent of the California coastline is actively eroding, and the risk of beach loss is increasing. Projected impacts of climate change will accelerate sea level rise and coastal erosion, and likely make storms more frequent and powerful. . . . California must look to nature-based infrastructure adaptation measures to ameliorate the climate risks related to coastal erosion, sea level rise, and ecosystem degradation."). *See generally* CAL. COASTAL COMM'N, RESIDENTIAL ADAPTATION POLICY GUIDANCE: INTERPRETIVE GUIDELINES FOR ADDRESSING SEA LEVEL RISE IN LOCAL COASTAL PROGRAMS (2018), https://perma.cc/7TP3-Z3ED (detailed draft of comprehensive plan to address shoreline protection and restoration issues in California).

113 CITY OF N.Y., LOWER MANHATTAN CLIMATE RESILIENCE STUDY 6–9, 40–41, 46 (2019) https://perma.cc/B8P5-9C4K ("New York City, like many other cities around the world, is facing the complex reality of climate change and its severe impacts on the urban environment."; considering plans to extend the Manhattan shoreline and raise the coastal edge to protect against tidal inundation and storm surge through new land creation using landfill, involving "a highly complex permitting and public coordination process to implement"); DEP'T OF CITY PLANNING CITY OF N.Y., VISION 2020: NEW YORK CITY COMPREHENSIVE WATERFRONT PLAN 102, 110–11 (2011), https://perma.cc/WP83-KH6H (discussing protection strategies for New York City's shoreline, including retractable water-tight gates, seawalls, "soft edges," raising the elevation of land, dikes and levees, storm-surge barriers, breakwaters, as well as restored or constructed wetlands, beaches, barrier islands, and reefs).

114 CITY OF CHARLESTON S.C., SEA LEVEL RISE STRATEGY 1, 3, 5 (2015), https://perma.cc/YT87-4MZT (discussing the protection of South Carolina Coastline via reinvestment, response, and readiness to address the risk of rising sea levels: "[b]y 2045, the City is projected to face nearly 180 tidal floods per year").

115 *Stop the Beach Renourishment Inc.*, 560 U.S. 702, 730, 732 (2010).

116 *Id.* at 732.

117 *Severance*, 370 S.W.3d 705, 726–27 (Tex. 2012).

dynamic, as natural forces cause the vegetation and the mean high tide to move gradually and imperceptibly."[118]

In many geographic areas, climate change undermines assumptions in property law about stationarity, gradual movements, or movements that could go in different directions over time without a dominant trend.[119] Rising sea levels cause long-term changes in shorelines; increased hurricanes alter features of properties; and governmental actions to address some threats affect property interests.[120] The takings analysis also applies to wildfires, such as when a government agency intentionally burns or thins timber on a claimant's property (before or absent imminent danger of a conflagration) in order to eliminate potential fuel for a wildfire.[121] Property law practitioners should understand the new framework of conditions brought about by climate change. Although neither the Florida nor the Texas case discussed climate change, teaching these cases along with materials on the coastal

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118 *Id.* at 732.

119 J. Peter Byrne, *Rising Seas and Common Law Baselines: A Comment on Regulatory Takings Discourse Concerning Climate Change*, 11 VT. J. ENVTL. L. 625, 626–27 (2010) (arguing that judicial privileging of common-law principles threatens "the ability of the appropriate public authorities to respond to sea level rise in an environmentally responsible manner"); Robin Kundis Craig, *"Stationarity is Dead"—Long Live Transformation: Five Principles for Climate Change Adaptation Law*, 34 HARV. ENVTL. L. REV. 9, 37 (2010) (explaining that climate change undermines basic assumptions in the law regarding ecological attributes); J.B. Ruhl, *General Design Principles for Resilience and Adaptive Capacity in Legal Systems—With Applications to Climate Change Adaptation*, 89 N.C. L. REV. 1373, 1393 (2011) (arguing that "[c]limate change will cause numerous natural . . . systems to depart from settled patterns and ranges of variability, and thus to behave in ways beyond the control or prediction of many legal instruments and institutions").

120 *See* Lucas v. S.C. Coastal Council, 505 U.S. 1008, 1019 (1992) (state regulation that prohibited development on barrier islands that provided protection to coastal communities and were likely to flood was a taking that required compensation); Koontz v. St. Johns River Water Mgmt., 570 U.S. 595, 612–14 (2013) (offset requirements for development permits require takings compensation).

121 *See* TrinCo Inv. Co. v. United States, 722 F.3d 1375, 1380 (Fed. Cir. 2013) (property owner stated sufficient facts to support a takings claim, alleging that, absent imminent danger, U.S. Forest Service intentionally lit fires directly on and adjacent to claimant's properties in order to reduce unburned timber, which might fuel a series of wildfires); Elias Kohn, Chapter, *Wildfire Litigation: Effects on Forest Management and Wildfire Emergency Response,* 48 ENVTL. L. 585, 591 (2018) (describing prescribed burning as a tool used by the government to reduce wildfire risks); Justin Pidot, *Natural Baselines for Wildfire Takings Claims*, 75 M.D. L. REV. 698, 700 (2016) (discussing doctrinal approaches to wildfire takings claims); Ryan B. Stoa, *Droughts, Floods, and Wildfires: Paleo Perspectives on Disaster Law in the Anthropocene*, 27 GEO. INT'L ENVTL. L. REV. 393, 404 (2015) (explaining that widespread fire suppression as a forest management policy preference is a contributing factor to larger, uncontrollable fires); Charles H. Oldham, *Wildfire Liability and the Federal Government: A Double-Edged Sword*, 48 ARIZ. ST. L.J. 205, 208 (2016) (discussing tort liability for prescribed burns); Robert B. Keiter, *Wildfire Policy, Climate Change, and the Law*, 1 TEX. WESLEYAN J. PROP. L. 87, 99 (2012) (explaining that most observers believe that mechanical thinning is preferable to prescribed burns); Dana Nuccitelli, *The Many Ways Climate Change Worsens California Wildfires*, YALE CLIMATE CONNECTIONS (Nov. 13, 2018), https://perma.cc/2KDJ-WV6S (noting that forest management plays a role in creating wildfire fuel).

impacts of climate change would facilitate interesting discussions for property law students.[122]

2. Takings Easement Case from Flooding Along Government-Built Channel

A 2018 decision by the Federal Circuit Court of Appeals dealt with takings claims against the federal government for flooding houses during Hurricane Katrina in New Orleans in 2005.[123] Starting in the 1950s, Congress authorized channel and other barrier construction projects to control flooding from hurricanes in this area.[124] The plaintiffs alleged that their properties in New Orleans were flooded because "the construction, operation, and improper maintenance of . . . [a] channel . . . increased storm surge along the channel."[125] The claimants asserted an "inverse condemnation" without compensation of a flowage easement.[126] According to a U.S. Supreme Court decision holding that government-induced flooding of limited duration may be compensable, the taking depends on a factual inquiry into whether the physical invasion of property is intended by the government or the foreseeable result of authorized government action, the character of the land at issue, and the owner's reasonable investment-backed expectations regarding the land's use.[127]

Climate change increases the frequency and intensity of flooding because of more heavy downpours, storm surges due to sea level rise, and rapid spring snowmelt.[128] For extreme weather events, meteorological

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122 Questions related to *Stop the Beach Renourishment* and *Severance* include:

1) What types of flooding protection actions on beaches undertaken in Florida and other states—such as nourishing beaches, restoring dunes, planting mangroves, or installing rock breakwaters—comprise takings of littoral property that require compensation to the private owners?
2) Should courts characterize a six-foot (or greater) average annual beach erosion from sea level rise and sub-hurricane storms as a gradual and imperceptible move that supports a rolling public easement onto privately-owned land (applying the Texas facts and holding), or have coastal areas entered into an era of annual avulsive events requiring takings compensation for relocated easements?
3) Climate change is causing the value of many beachfront properties to decline. UNION OF CONCERNED SCIENTISTS, UNDERWATER: RISING SEAS, CHRONIC FLOODS, AND THE IMPLICATIONS FOR US COASTAL REAL ESTATE 2–3 (2018), https://perma.cc/TT7H-AH4X. As local, state, and national governments plan ways to adapt to climate change, how should privately owned beachfront properties and public easements affect the processes, weighing of costs and benefits, and governmental actions?

123 St. Bernard Par. Gov't v. United States, 887 F.3d 1354, 1360, 1363 (Fed. Cir. 2018).

124 *Id.* at 1357.

125 *Id.* at 1357–58.

126 *Id.* at 1359.

127 Ark. Game & Fish Comm'n v. United States, 568 U.S. 23, 38–39 (2012).

128 Thomas Johnson et al., *Water*, *in* 2 IMPACTS, RISKS, AND ADAPTATION IN THE UNITED STATES: FOURTH NATIONAL CLIMATE ASSESSMENT 145, 159 (2018), https://nca2018.globalchange.gov/downloads/NCA4_2018_FullReport.pdf ("[H]eavy precipitation events in most parts of the United States have increased in both intensity and frequency since 1901 and are projected to continue to increase over this century."); NAT'L ACAD. OF SCI. ET AL., ATTRIBUTION OF EXTREME WEATHER EVENTS IN THE CONTEXT OF CLIMATE CHANGE 19 (2016) (explaining that "[e]xtreme weather is one way that people experience climate change").

studies and simulations indicated that climate change added to the flooding in New Orleans from Hurricane Katrina,[129] and to the intensity of rainfall from Hurricane Harvey in 2017, which flooded more than 120,000 structures in and around Houston.[130] As with beach erosion, governments have been implementing measures to recover from and reduce various forms of flooding.[131] To illustrate, after two flooding events in 2016, Louisiana developed a Master Action Plan to utilize Community Development Block Grant Funds from the U.S. Department of Housing and Urban Development.[132] Damaged and disrupted infrastructure included "levees, roadways and bridges, culverts, utilities, wastewater treatment systems, drinking water treatment and collection systems" (flood basins, etc.).[133] Louisiana planned expenditures for housing, economic revitalization, infrastructure, and vulnerable populations.[134] The state also launched integrated planning for ecosystem restoration and hurricane protection in coastal areas, including a Resiliency Technical Advisory Committee with experts in climate adaptation planning.[135] From 2007 to 2018, numerous Louisiana projects dredged 130 million cubic yards to restore or benefit 41,305 acres of land, constructed sixty miles of barrier islands and berms, improved 297 miles of levees, closed canals, and increased pump station

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129 Jennifer L. Irish et al., *Simulations of Hurricane Katrina (2005) Under Sea Level and Climate Conditions for 1900*, 122 CLIMATIC CHANGE 635, 646–47 (2014); Kevin E. Trenberth et al., *Water and Energy Budgets of Hurricanes: Case Studies of Ivan and Katrina*, 112 J. GEOPHYSICAL RES. D23106 at 9 (2007).

130 *Hurricane Harvey*, HARRIS CTY. FLOOD CONTROL DIST. https://www.hcfcd.org/hurricane-harvey/ (last updated Jan. 29, 2019) (describing Hurricane Harvey as an "unprecedented storm," with over forty inches of rainfall and "a total of 1 trillion gallons of water f[alling] across Harris County over a 4-day period"); Michael Greshko, *Climate Change Likely Supercharged Hurricane Harvey*, NAT'L GEOGRAPHIC (Dec. 13, 2017), https://perma.cc/R2R5-J3G5 (unprecedented storm caused four feet of rainfall within days); ISET-INTERNATIONAL ET AL., HOUSTON AND HURRICANE HARVEY: A CALL TO ACTION 40 (2018), https://perma.cc/9JF8-Z6W2 ("Rather than rely on past conditions, we must begin using regional worst-case historical information coupled with forward-looking climate and development scenarios in our planning."); Memorandum from Jeff Linder, Dir. Of Hydrologic Operations, Harris Cty. Flood Control Distr., & Steve Fitzgerald, Chief Eng'r, Harris Cty. Flood Control Distr., to HCFCD Flood Watch/Partners 3 (June 4, 2018), https://perma.cc/XL7S-5LSH ("Total rainfall amounts ranged from 26 to 47 inches across the county for 4 days."); *see also* Laura Parker, *Hurricane Florence's Rains May Be 50% Worse Thanks to Climate Change*, NAT'L GEOGRAPHIC (Sept. 13, 2018), https://perma.cc/YM9M-Y6PZ (explaining that climate change increases the amount of precipitation during a hurricane).

131 *See About the Flood Control Section*, N.J. DEP'T ENVTL. PROTECTION, https://perma.cc/U7JW-2R38 (last visited Apr. 13, 2019) (showing New Jersey's current flood control and mitigation plan); *Flood Mitigation Planning*, TEX. WATER DEV. BOARD, https://perma.cc/5W8V-8NDY (last visited Apr. 13, 2019) (showing Texas' current flood mitigation program).

132 DISASTER RECOVERY UNIT, LA. OFFICE OF CMTY. DEV., STATE OF LOUISIANA PROPOSED MASTER ACTION PLAN FOR THE UTILIZATION OF COMMUNITY DEVELOPMENT BLOCK GRANT FUNDS IN RESPONSE TO THE GREAT FLOODS OF 2016, at 3 (2016) https://perma.cc/C57R-8G8D.

133 *Id.* at 59.

134 *Id.* at 70–71.

135 *Id.* at 83.

capacity.[136] Minnesota,[137] New Jersey,[138] Texas,[139] and Vermont,[140] among other states, are implementing state flood recovery and mitigation programs that coordinate a large number and range of projects.

In the Louisiana case involving flooding from storm surge along a channel, the Court of Federal Claims found that a temporary taking occurred based on the effects of the channel that were reasonably foreseeable by the U.S. Army Corps of Engineers.[141] In the compensation trial, the court awarded the plaintiffs "$5.46 million based primarily on the replacement cost of improvements to the properties and lost rental value."[142] However, the appellate court reversed because the plaintiffs failed to show causation.[143] More than one government project was intended to control flooding on the plaintiffs' properties, including actions aimed at mitigating the risks from the channel.[144] The court held that "the plaintiffs failed to provide evidence comparing the flood damage that actually occurred to the flood damage that would have occurred if there had been no government action at all," covering not just the channel (a single project) but also the system of levees and entire flood-control program in the area.[145]

In other cases against the U.S. Army Corps of Engineers for temporary flooding from actions along the Mississippi River, courts rejected motions to dismiss because the evidence could show that the federal government had to pay compensation for taking lands or flowage easements.[146] Moreover, even if a government's flood-control program, such as a dam, confers benefits that

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136 COASTAL PROT. & RESTORATION AUTH., INTEGRATED ECOSYSTEM RESTORATION & HURRICANE PROTECTION IN COASTAL LOUISIANA: FISCAL YEAR 2019 ANNUAL PLAN n.p. (2018), https://perma.cc/B5FD-3QD3.

137 MINN. DEP'T OF NAT. RES., MINNESOTA'S FLOOD HAZARD MITIGATION GRANT ASSISTANCE PROGRAM: HELPING BUILD COMMUNITY RESILIENCY SINCE 1987, at 3 (2018), https://perma.cc/29G7-CKUG ("The communities historically most at-risk and experiencing repetitive loss have, with the assistance of the state cost-share program, implemented a host of projects ranging from improved flood mapping and warning systems to capital improvements including diversions, floodwalls, levees, pumping stations, and removal or relocation of at risk structures and facilities.").

138 *About the Flood Control Section*, *supra* note 131.

139 *Flood Mitigation Planning*, *supra* note 131.

140 *River Corridor and Floodplain Protection*, VT. DEP'T ENVTL. CONSERVATION, https://perma.cc/4FBW-JM7A (last visited Apr. 13, 2019) (Vermont's current flood response and protection plan).

141 *St. Bernard Par. Gov't*, 887 F.3d 1354, 1358–59 (Fed. Cir. 2018).

142 *Id.* at 1359.

143 *Id.* at 1360–61 (explaining a compensable taking does not arise from the government's failure to act, such as by not constructing barriers or water collection systems, to protect certain property).

144 *Id.* at 1366.

145 *Id.* at 1363.

146 Quebedeaux v. United States, 112 Fed. Cl. 317, 325 (2013); Big Oak Farms, Inc. v. United States, 131 Fed. Cl. 45, 54 (2017). The Federal Court of Claims decided not to dismiss takings claims related to decisions by the Army Corps of Engineers to open spillways to divert water from the Mississippi River, damaging and/or devaluing plaintiffs' crops, farms, homes, businesses, structures, and equipment.

exceed its costs for the entirety of properties in an area, courts have held that some property owners might deserve compensation for flooding.[147]

Many lawyers nationwide will be dealing with flooded properties and takings claims in light of the climate-related heavier storms and higher sea levels, thousands of government flood-control projects, and government actions in managing waters.[148] With improved climate modeling, a wide range of areas is subject to reasonably foreseeable extreme water conditions.[149] The same climate-related trends for property claims apply to wildfires in drought- and heat-prone areas. Property law students should consider how the elevated likelihood of extreme weather conditions could affect arguments for takings compensation from flooding or wildfires. This exercise would teach about takings claims as well as climate change conditions and responses.[150]

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147 *Quebedeaux*, 112 Fed. Cl. 317, 322 (2013) ("Moreover, defendant is simply wrong in suggesting that a takings cannot occur whenever the benefits associated with a flood control program outweigh its costs."); City of Van Buren, Ark. v. United States, 697 F.2d 1058, 1062 (Fed. Cir. 1983) ("We remain unconvinced, notwithstanding the government's broad references to dam-related improvements which accrue to the public, such as erosion control, that Van Buren has, in the balance, lost nothing by the forced choice between its sewer system, as originally designed, and the benefits of the federal project. The benefits alleged by the government have neither offset nor rendered minimal the damage Van Buren suffered.").

148 Maria L. Banda & C. Scott Fulton, *Litigating Climate Change in National Courts: Recent Trends and Developments in Global Climate Law*, 47 Envtl. L. Rep. (Envtl. L. Inst.) 10,121, 10,121 (2017); Celeste Hammond, *Climate Change: Implications for Commercial Real Estate Clients (and Their Attorneys): Legal Update*, ACREL Papers (Fall 2014) 19, https://perma.cc/TML6-3DZE ("[U]ltimately business clients will push for a legal system that is more responsive to adaptation to climate change.").

149 See *infra* Part III.D, on governmental tort immunity for the design, but not the maintenance, of stormwater systems.

150 Questions for students related to *St. Bernard Par. Gov't* include:

1) As climate change increases the scale of flooding and wildfires that damage and threaten properties, should the government's obligation to compensate property owners for temporary takings decrease?
2) What should be the relevant geographic scope of government actions to determine whether a property owner is entitled to takings compensation?
3) The court in *St. Bernard Parish Government* stated this point of takings law: "On a takings theory, the government cannot be liable for failure to act, but only for affirmative acts by the government." *St. Bernard Par. Gov't*, 887 F.3d 1354, 1360 (Fed. Cir. 2018). However, in a closely-watched case in federal district court in Oregon, the plaintiffs (youths) alleged in 2015 that the federal government's actions for the past fifty years in approving and promoting fossil fuel development and exploitation will effect a complete taking of some of plaintiffs' property interests by virtue of sea level rise. Juliana v. United States, 217 F. Supp. 3d 1224, 1233–34, 1246 (D. Or. 2016). Should the federal government provide takings compensation to property owners affected by sea level rise even if the federal government did not construct levees, dams or other structures in the area?
4) What types of government actions to build resiliency against and respond to wildfires would give rise to takings compensation to property owners? Consider zoning, forest management, lighting backfires, spraying chemicals, and other fire containment and suppression actions.

C. Torts

A series of high-profile cases from around the nation in federal and state courts involve tort claims against fossil fuel companies alleging liability for contributing to GHG emissions and climate change. These cases could be used to teach typical topics in torts courses, including factual causation, damages, trespass to property, public nuisance, and private nuisance.[151] Also, these cases could be used to instruct on more advanced torts topics, including applying federal or state common law, statutory displacement of common law torts, and non-justiciable political questions. In addition to teaching these torts concepts, these cases would increase students' understanding of how fossil fuels contribute to climate change, impacts on coastal and inland cities, governments' costly actions to recover from and adapt to these impacts, and disputes over who pays for these actions. Other climate-related cases could be used in teaching negligence and the "public duty" doctrine in torts courses.[152]

1. New York City Claims Against Fossil Fuels Companies for Nuisance and Trespass

In 2018, the City of New York sued five major multinational oil and gas companies in United States District Court for the Southern District of New York.[153] Filed under state common law, the claims alleged unlawful public nuisance,[154] private nuisance,[155] and trespass on city property.[156] According to

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151 *See, e.g.*, MARC FRANKLIN ET AL., TORT LAW AND ALTERNATIVES: CASES AND MATERIALS 337–94, 685–714, 715–71, 940–46 (10th ed. 2016); DAVID W. ROBERTSON ET AL., CASES AND MATERIALS ON TORTS 37–44, 115–66, 567–74 (5th ed. 2017); GEORGE CHRISTIE & JOSEPH SANDERS, ADVANCED TORTS: CASES AND MATERIALS 7–57, 168–206 (3rd ed. 2018).

152 *See infra*, Part III.D, discussing Wohl v. City of New York, No. 103095/2012, 2014 WL 6092059, at *1 (N.Y.S.3d Oct. 22, 2014) (claim of negligence against municipality in failing to maintain sewers); Tzakis v. Berger Excavating Contractors, No. 09 CH 06159, at *1, *8 (Ill. Cir. Ct. Apr. 3, 2015), https://perma.cc/CMM6-CNUB (homeowners alleged that their properties were damaged because of municipalities' and water districts' failure to maintain and improve sewer infrastructure that was undersized in light of foreseeable dangers of heavy rains and caused flooding damage; case dismissed based on Public Duty Rule applied to the governmental service of maintaining sewers for the public at large); Complaint at 1, 25–28, Ill. Farmers Ins. Co. v. Metropolitan Water Reclamation Distr. of Greater Chi., No. 2014 CH 38809, (Ill. Cir. Ct. Apr. 16, 2014), https://perma.cc/BU9V-KNSU (claims of negligent maintenance and operation of sewer system and negligent failure to remedy a known dangerous condition in light of climate change and increased heavy rainfall; insurance company alleged that the municipalities' failures to implement reasonable stormwater management practices and increase stormwater management capacity caused increased insurance payouts; complaint withdrawn).

153 Amended Complaint at 1, City of New York v. BP P.L.C., No. 18-cv-182-JFK (S.D.N.Y. Mar. 16, 2018) https://perma.cc/5U3N-UWSD [hereinafter *New York Complaint*]; City of New York v. BP P.L.C., 325 F. Supp. 3d 466, 476 (S.D.N.Y. 2018) (claims displaced by the federal Clean Air Act, and would interfere with the separation of powers and foreign policy).

154 *New York City Complaint*, *supra* note 153, at 68–69. Additionally, the following claims were made:

> Defendants' production, marketing, and sale of massive quantities of fossil fuels, and their promotion of pervasive use of these fossil fuels, have . . . contributed to the current

the complaint, the defendants knowingly caused climate change, which is forcing the city to incur costs to address heatwaves, flooding, and other harms to city property, systems and residents.[157] The plaintiff alleged that fossil fuels are the primary cause of climate change; the defendants produced huge quantities of oil and gas products with the knowledge that these products would cause catastrophic harms; and the defendants promoted their products for pervasive use while denying or downplaying the dangers.[158] The city sought money damages for the costs it incurred to protect its infrastructure, property, and residents.[159] In particular, the city referred to its "$20 billion-plus multilayered investment program in climate resiliency across all five boroughs" launched after Hurricane Sandy in

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> and threatened climate change impacts on the City . . . [including] harms to the safety, health, and welfare of City residents and to the City's property and infrastructure from sea level rise, increased flooding and storm surge, higher temperatures, greater heat waves, and increases in the frequency and intensity of precipitation. . . . The City has suffered injuries beyond those of the community at-large. For example, the City has the primary responsibility to elevate, harden, and/or adapt existing municipally-owned infrastructure (much of it on City-owned property) damaged or threatened by climate change, including roads, pumping stations, beaches, parks, sewers, aqueducts, marine transfer stations, and wastewater treatment facilities. The City also has the primary responsibility to build new infrastructure to protect its residents from climate change. The City also protects public hospitals and medical facilities and funds programs to protect New Yorkers from the health consequences of climate change. . . . Defendants have promoted the use of fossil fuels at unsafe levels with knowledge of the hazard that such use would create. Defendants' conduct has been the actual and proximate cause of harm to New York City.

Id.

155 *Id.* at 71–72. Additionally, the following claims were made:

> Defendants' conduct, individually and collectively, has been a substantial factor in causing climate change in New York City, which has caused (and will continue to cause) sea level rise, increased flooding, temperature increases, and the other impacts described above. These injuries are the foreseeable result of Defendants' conduct and Defendants were substantially certain at the relevant times that they would occur as a result of their conduct. . . . Defendants' conduct constitutes a substantial and unreasonable interference with the City's rights to the use and enjoyment of its property. City-owned property has been harmed, is being harmed, and will continue to be harmed in the future by sea level rise, increased storm surge flooding, extreme heat, and other climate change impacts.

Id.

156 *Id.* at 72. Additionally, the following claims were made:

> Defendants' conduct was substantially certain to result in the invasion of property owned by the City, without permission or right of entry, by way of increased heat, sea level rise, storm surge flooding, and flooding from increased intensity and frequency of precipitation. These invasions are now occurring, and will continue to occur onto additional City-owned property in the future. The City has not granted permission to Defendants to engage in these invasions of the City's property, and the invasions were otherwise unjustified.

Id.

157 *Id.* at 62–67.

158 *Id.* at 51.

159 *Id.* at 73–74.

2012,[160] and millions of dollars spent to protect vulnerable people during dangerous weather emergencies.[161]

The first suit in this line of tort cases for GHG emissions was brought against power plant operators and decided by the U.S. Supreme Court in 2011.[162] That case was filed by eight states, the City of New York, and three private land trusts.[163] It alleged interstate nuisance under federal common law and sought injunctive relief through the imposition of emissions caps on defendants.[164] That suit was dismissed on the grounds that the federal Clean Air Act displaced such federal common law claims.[165] The next case in this line was decided by the U.S. Court of Appeals for the Ninth Circuit in 2012.[166] This lawsuit against fossil fuel producers was filed by a coastal Alaskan Native American village located on the tip of a barrier reef.[167] It claimed public nuisance under federal and state common law and sought compensation for property damages caused by past emissions.[168] Again, the court dismissed the claims based on displacement by the federal statute.[169]

In related torts cases brought under state common law, San Mateo County, Marin County, and the City of Imperial Beach in 2017 filed separate suits in California state courts alleging public nuisance, strict liability for failure to warn, strict liability for design defect, private nuisance, negligence, and trespass.[170] Also in 2017, the cities of Oakland and San Francisco filed claims of public nuisance under state common law against major oil and gas producers in state court.[171] Other similar torts cases against major fossil fuel producers for climate-related adaptation costs and compensatory damages

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160 *Id.* at 63 ("These first steps of the City's resiliency effort will take many years to complete, and include constructing levees and seawalls, elevating City facilities and streets, waterproofing and hardening City infrastructure, and modifying or reconstructing sewers and stormwater infrastructure to handle additional stormwater and adapt to interference with outfalls from sea level rise.").

161 *Id.* at 66 ("The City is spending millions of dollars on programs to help vulnerable City residents stay safe during dangerous weather emergencies that will be exacerbated by climate change, and expects these programs will need to grow exponentially in the future because they are critical to saving lives during heat waves and other climate change-related hazards.").

162 Am. Elec. Power Co. Inc. v. Connecticut, 564 U.S. 410, 428–29 (2011).

163 *Id.* at 418.

164 *Id.* at 419.

165 *Id.* at 428–29.

166 *See* Native Village of Kivalina v. ExxonMobil Corp., 696 F.3d 849 (9th Cir. 2012); *see also* AES Corp. v. Steadfast Ins. Co., 725 S.E.2d 532, 538 (Va. 2012) (insurance company not required to provide defense and insurance coverage under commercial general liability policies for damage allegedly caused by insured's contribution to climate change).

167 *Native Village of Kivalina*, 696 F.3d 849, 853 (9th Cir. 2012).

168 *Id.* at 853–55.

169 *Id.* at 858. *See* Pacific Coast Fed'n of Fishermen's Ass'ns v. Chevron Corp., Case No. CGC-18-571285 (Cal. Sup. Ct. Cty. of San Francisco Nov. 14, 2018), https://perma.cc/6FQM-NLBG (complaint by fishermen against fossil fuel companies for climate change impacts on ocean fisheries; alleging nuisance, strict liability for failure to warn, strict liability for design defect, negligence, and negligent failure to warn; seeking compensatory damages, equitable relief including abatement of the nuisance, punitive damages, disgorgement of profits, and attorneys' fees and costs).

170 Cty. of San Mateo v. Chevron Corp., 294 F. Supp. 3d 934, 937 (N.D. Cal. 2018).

171 City of Oakland v. BP P.L.C., 325 F. Supp. 3d 1017, 1021 (N.D. Cal. 2018).

were filed in state courts under state common law by the State of Rhode Island,[172] King County, Washington,[173] three county and municipal entities in Colorado,[174] and the City of Baltimore.[175]

Studying these cases would expose torts students to information on the climate impacts of burning fossil fuels.[176] For example, in *City of Oakland v. BP P.L.C.*,[177] Judge William Alsup summarized the "vast scientific consensus" on GHG emissions and observed "[t]he issue is not over science. All parties agree that fossil fuels have led to global warming and ocean rise and will continue to do so, and that eventually the navigable waters of the United States will intrude upon Oakland and San Francisco."[178] Similarly, the City of

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172 Complaint at 4–5, State of Rhode Island v. Chevron Corp., No. PC-2018-4716 (R.I. Super. Ct. July 2, 2018), https://perma.cc/L4X9-3SRF (claims under public nuisance, strict liability and negligence for failure to warn, strict liability, and negligence for design defect, trespass, impairment of public trust resources, and state Environmental Rights Act), No. 1:18-cv-00395 (D.R.I., removed July 13, 2018).

173 Complaint at 3, 71, King Cty. v. BP P.L.C., No. 18-2-11859-0 (Wash. Sup. Ct. 2018), https://perma.cc/CX8V-KUZ7 (alleging public nuisance and trespass).

174 Complaint, at 1–2, Board of Cty. Comm'rs of Boulder Cty. et al., v. Suncor Energy (U.S.A.), Inc., No. 2018CV030349 (Colo. Dist. Ct. 2018), https://perma.cc/L49Z-HUCU [hereinafter *Boulder Complaint*].

175 Complaint, at 1, 5, Mayor & City Council of Balt. v. BP P.L.C., No. 24-C-18-004219 (Md. Cir. Ct., July 20, 2018), No. 1:18-cv-02357 (D. Md., removed July 31, 2018), https://perma.cc/W5VX-HUAR.

176 The transportation sector and the electric power sector each accounted for 28% of U.S. GHG emissions in 2016, and industry represented 23%. U.S. ENVTL. PROT. AGENCY, FAST FACTS: U.S. TRANSPORTATION SECTOR GREENHOUSE GAS EMISSIONS 1990–2016, at 1 (2018), https://perma.cc/PW38-L9WT. Oil-based fuels—motor gasoline, distillate (largely diesel), and jet—made up almost all of the carbon dioxide emissions from the transportation sector. *See id.* at 3. In electricity generation, coal combustion accounted for 69% of the carbon dioxide emissions in 2017, natural gas 29%, and petroleum 1%. *Frequently Asked Questions: How Much of U.S. Carbon Dioxide Emissions Are Associated with Electricity Generation?*, U.S. ENERGY INFOR. ADMIN., https://perma.cc/5YPE-KZDU (last visited Apr. 13, 2019); *see also Sources of Greenhouse Gas Emissions: Electricity Sector Emissions*, U.S. ENVTL. PROTECTION AGENCY, https://perma.cc/9B9Z-SZRR (last visited Apr. 13, 2019) ("Although coal accounted for about 67 percent of CO_2 emissions from the sector, it represented only about 32 percent of the electricity generated in the United States in 2016."). Burning fossil fuels for energy was the primary category of GHG emissions from industry. *Id.* In terms of global GHG emissions, fossil fuels are large sources of GHGs from the sectors of electricity and heat production, industry and transportation. *See Global Greenhouse Gas Emissions Data*, U.S. ENVTL. PROTECTION AGENCY, https://perma.cc/N6J5-WLCM (last visited Apr. 13, 2019).

177 *City of Oakland*, 325 F. Supp. 3d 1017 (N.D. Cal. 2018).

178 *Id.* at 1020–22, 1026:

> The science acknowledges that causes beyond the burning of fossil fuels are also at work. Deforestation has been and remains a significant contributor to the rise in carbon dioxide. Others include volcanoes and wildfires in greater numbers. Nevertheless, even acknowledging these other contributions, climate scientists are in vast consensus that the combustion of fossil fuels has, in and of itself, materially increased carbon dioxide levels, which in turn has materially increased the median temperature of the planet, which in turn has accelerated ice melt and raised (and continues to raise) the sea level. . . . This order fully accepts the vast scientific consensus that the combustion of fossil fuels has materially increased atmospheric carbon dioxide levels, which in turn has increased the median temperature of the planet and accelerated sea level rise.

New York asserted: "Defendants are collectively responsible, through their production, marketing, and sale of fossil fuels, for over 11% of all the carbon and methane pollution from industrial sources that has accumulated in the atmosphere since the dawn of the Industrial Revolution."[179] Among the impacts at issue in this line of torts cases, students would see some manifestations of climate injustices on low-income, minority, and disadvantaged groups, in coastal as well as inland communities. The affected groups include a Native American village located on land that is eroding, losing the protection of sea ice, and facing destruction by storms and rising sea levels;[180] people living in buildings without air conditioning in New York City[181] and Colorado[182] who face respiratory and cardiovascular mortality and morbidity from increased heat and degraded air quality; as well as African Americans and Hispanics in Oakland who "tend to live at lower elevations most affected by sea level rise and higher storm surges."[183] Additionally, students would learn about adaptation measures and their costs borne by cities, counties, and states, including costs of responding to wildfires and outbreaks of infectious diseases,[184] building seawalls, making hospitals more resilient, expanding stormwater systems, raising and rebuilding roads, and operating cooling centers.[185]

Courses that include these lawsuits would give torts students interesting opportunities to discuss these claims under common law in terms of causation, foreseeable effects, unreasonable interference with a public or private right, harms, standard of care, standing, requested remedies, and other elements.[186] To illustrate, the *City of Oakland* court considered the elements of the public nuisance tort under federal common law, including weighing the gravity of the interference with the public right

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As for oil and gas used to power vehicles, in 2012, the U.S. Court of Appeals for the District of Columbia Circuit found: "EPA determined from substantial evidence that motor-vehicle emissions of greenhouse gases contribute to climate change and thus to the endangerment of public health and welfare." Coalition for Responsible Regulation v. Envtl. Prot. Agency, 684 F.3d 102, 121 (D.C. Cir. 2012).

179 *New York Complaint*, *supra* note 153, at 2.

180 *See Native Village of Kivalina*, 696 F.3d 849, 853–54 (9th Cir. 2012).

181 *New York Complaint*, *supra* note 153, at 31 (110–260 additional heat-related deaths by 2020); *see also* New York City climate action plans, *supra* note 113.

182 *Boulder Complaint*, *supra* note 174, at 63.

183 First Amended Complaint for Public Nuisance at 50, City of Oakland v. BP P.L.C., 3:17-cv-06011-WHA (N.D. Cal. Apr. 3, 2018), https://perma.cc/LDB7-B8K3.

184 *Boulder Complaint*, *supra* note 174, at 33–35, 64–65.

185 *New York Complaint*, *supra* note 153, at 62–67; *see* Dena Adler, *Turning the Tide in Coastal and Riverine Energy Infrastructure Adaptation: Can An Emerging Wave of Litigation Advance Preparation for Climate Change?*, 4 OIL & GAS, NAT. RESOURCES & ENERGY J. 519 (2018).

186 Some questions for students about this line of torts complaints and decisions are:

1) Should municipal and state governments be able to use tort litigation against fossil fuel companies to recover some of their costs in preparing for and responding to climate-related conditions?
2) How would such litigation affect actions to mitigate and adapt to climate change?
3) If such a tort case went to trial, describe the witnesses and testimony that a city or state plaintiff would want to present in its direct case against fossil fuel companies to prove causation and damages.

against the utility of fossil fuels in the modern world's development.[187] Additionally, these cases could lead to valuable examinations in class of the displacement of common law torts by statutes, application of federal or state common law, and non-justiciable political questions.

So far, none of these lawsuits have reached factual findings on the elements of the tort claims. The U.S. Supreme Court held that the federal Clean Air Act displaced claims under federal common law, but left open the possibility of pursuing claims under state common law.[188] Federal district courts are split on whether plaintiffs could pursue claims under state common law, or whether federal common law must apply, as discussed in the next section.[189]

D. Civil Procedure

If there are any silver linings to the mounting years of climate-related litigation, one would be that there is a trove of cases that could be used to teach core topics in civil procedure courses and train students on climate change issues. This Part describes three opportunities to teach many usual civil procedure topics in the context of climate-related litigation, including choosing and ascertaining the applicable law, dismissals and summary judgment, removal and remand, remedies and judgments, and appellate review.[190] Other climate cases that could be used to teach fundamental points of civil procedure are discussed in the Parts on torts and constitutional law.[191]

1. Summary Judgment

Homeowners in Staten Island, New York experienced flooding during a severe rainstorm and hurricane in 2011, and sued the City of New York and

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187 *City of Oakland*, 325 F. Supp. 3d 1017, 1023–24 (N.D. Cal. 2018) ("Without those fuels, virtually all of our monumental progress would have been impossible. All of us have benefitted. Having reaped the benefit of that historic progress, would it really be fair to now ignore our own responsibility in the use of fossil fuels and place the blame for global warming on those who supplied what we demanded? Is it really fair, in light of those benefits, to say that the sale of fossil fuels was unreasonable?").

188 *Am. Elec. Power Co. Inc.*, 564 U.S. 410, 424, 429 (2011); *see also Native Village of Kivalina*, 696 F.3d 849, 855, 858 (9th Cir. 2012) (federal common law displaced by federal statute in claims against energy producers' contributions to climate change and rising sea levels).

189 *Compare City of New York*, 325 F. Supp 3d 466, 471, 476 (S.D. N.Y. 2018) (holding federal common law applies to climate-change tort claims and denying plaintiffs' motions for remand), *and City of Oakland*, 325 F. Supp. 3d 1017, 1028 (N.D. Cal. 2018) (holding federal common law applies to climate-change tort claims and denying plaintiffs' motions for remand), *with Cty. of San Mateo*, 294 F. Supp. 3d 934, 937, 939 (N.D. Cal. 2018) (holding that removal from state court to federal court was not warranted and that state common law claims relating to climate change are not superseded by federal common law).

190 *See, e.g.*, JOEL WM. FRIEDMAN & MICHAEL G. COLLINS, THE LAW OF CIVIL PROCEDURE: CASES AND MATERIALS 204–20, 267–82, 319–62, 597–636, 885–97 (5th ed. 2017); BROOKE D. COLEMAN, ET AL., LEARNING CIVIL PROCEDURE 72–82, 193–242, 347–55, 591–642, 757–96 (3rd ed. 2018).

191 *See* discussion *supra* Part III.C (discussing climate cases in torts); *see also infra* Part III.E (discussing climate cases in constitutional law).

its Department of Environmental Protection for negligence to recover losses to their premises and personal property from water damage.[192] Case precedent established that municipalities were not liable for claims that they negligently designed sewer or storm drainage systems (governmental immunity or public duty).[193] Instead, plaintiffs claimed that the city negligently failed to inspect, clean, and maintain the sewer lines and catch basins at their house.[194] In moving for summary judgment, the city submitted official weather data and an affidavit showing that the rainfall was more than a "5-year storm event" (the level expected to occur on average once in five years), exceeding the storm drainage capacity design criteria.[195] The movant also submitted affidavits and a deposition of city employees reflecting the records of complaints, maintenance, repair, and inspection for sewers near the plaintiffs' house.[196] The court found that "the City met its initial burden of demonstrating, prima facie, that the sole proximate cause of the flooding was the volume of precipitation," rather than any negligence in the city's inspection and maintenance.[197] Finding that this evidence was uncontradicted, the court held that there was no triable issue of fact and granted the city's motion for summary judgment.[198]

Students should consider that climate change is causing increasingly heavy rainfalls, with resulting pressures on municipal stormwater systems.[199] Sewer capacity that was adequate for a five-year (or even fifty-year) storm event thirty years ago is yielding escalating flooding and damages to homeowners.[200] To protect against these harms, municipalities should increase the capacity of their sewer systems.[201] Inadequately-sized systems

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192 *Wohl*, No. 13095/2012, 2014 WL 6092059, at *1 (N.Y.S.3d Oct. 22, 2014).

193 *Id.* at *3; *see also Tzakis*, No. 09 CH 06159, at *1 (Ill. Cir. Ct. Apr. 3, 2015), https://perma.cc/LB2B-5A6B (granting a motion to dismiss on the grounds of governmental immunity in allegations that municipalities' sewer systems had inadequate capacity for heavy stormwaters, causing flooding); *Illinois Farmers Ins. Co.*, No. 2014 CH 38809 (Ill. Cir. Ct. Apr. 16, 2014) (complaint withdrawn, allegations of inadequate stormwater capacity and management practices in light of climate change).

194 *Wohl*, 2014 WL 6092059, at *1.

195 *Id.*

196 *Id.*

197 *Id.* at *3.

198 *Id.* at *4.

199 *See* discussion *supra* Part III.B; CITY OF N.Y., *supra* note 113, at 24 ("By the 2050s, the [New York City Panel on Climate Change] projects that extreme precipitation events could occur with approximately 30% more frequency than they occur today."); CITY OF CHICAGO, RESILIENT CHICAGO 74 (2019) ("As the effects of climate change are realized, the City's infrastructure investments must be made with extreme weather events—such as floods, heat waves, and blizzards—in mind."), https://perma.cc/LCU2-NYHB.

200 *See* CITY OF CHICAGO, *supra* note 199, at 124 ("Disasters can result in loss of life, damage buildings and infrastructure, and have devastating consequences for communities and their well-being. The City will evaluate and integrate best practices as part of its hazard mitigation planning, including the inclusion of more detailed analyses regarding the impacts of climate change.").

201 *See* Water and Wastewater, U.S. CLIMATE RESILIENCE TOOLKIT, https://perma.cc/44KK-L3E3 (last updated Aug., 30 2016); Trisha L. Moore et al., *Stormwater Management and Climate Change: Vulnerability and Capacity for Adaptation in Urban and Suburban Contexts*, 138

make maintenance more critical to reduce flooding.[202] The greater frequency of storms as well as the resulting debris may require increased maintenance of the sewer lines and catch basins. The costs of such increased maintenance are just part of the ways that climate-related extreme weather events strain government budgets; governments also have to find the funds to respond to disasters (like wildfires, heatwaves, and hurricanes), and to make infrastructure more resilient (like raising roads and bridges, and relocating healthcare facilities out of floodplains).

This case would give students an opportunity to analyze the implications of a motion for summary judgment in the context of flooding threats. Homeowners who try to use tort claims to force their cities to expand the sewer systems or pay damages for flooding would face motions to dismiss based on governmental immunity. On the other hand, municipalities could have to make an evidentiary showing for summary judgment or face trials and liability for flooding damages to homeowners in cases where the plaintiffs make claims and present evidence of negligent maintenance of stormwater systems.

The next case involves another decision without trial, resulting in declaratory relief from an appellate court. While the preceding New York case dealt with a factual showing on climate-related damages to property and the preparedness of storm infrastructure, the following Massachusetts case dealt with a statutory requirement and regulatory programs to mitigate climate change by reducing GHG emissions.

2. Declaratory Relief, Judgment on the Pleadings, and Appellate Review

In 2016, the Massachusetts Supreme Judicial Court dealt with a challenge to regulations adopted by the state's Department of Environmental Protection (the Department), brought by three named citizens, an environmental non-profit group, and a consumers alliance.[203] The plaintiffs initially filed a petition with the Department, claiming that its regulations failed to comply with the mandate under the state's Global Warming Solutions Act of 2008 to establish declining annual aggregate emission limits for sources that emit GHGs.[204] The Department concluded that it complied with the statute based on its prescribed limits on sulfur hexafluoride leaks, a regional cap-and-trade market limiting power plant GHG emissions, and a low-emission vehicle program.[205] The plaintiffs then sought from a state superior court declaratory relief or a writ of mandamus.[206] The case was decided on the parties' cross motions for judgment on the pleadings.[207] After

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CLIMATIC CHANGE 491, 499 (2016); Rebecca Kessler, *Stormwater Strategies: Cities Prepare Aging Infrastructure for Climate Change*, 119 ENVTL. HEALTH PERSP. A514, A516–19 (2011).

202 *See* Moore et al., *supra* note 201, at 492.

203 Kain v. Dep't of Envtl. Prot., 49 N.E.3d 1124, 1127 (Mass. 2016).

204 *Id.*

205 *Id.*

206 *Id.*

207 *Id.*

that court ruled in favor of the Department, the plaintiffs appealed to the state's highest court, which granted direct appellate review.[208]

The Supreme Judicial Court found that a declaratory judgment was appropriate because there was a judiciable controversy over an official interpretation of a statute, with no material facts in dispute.[209] Precedent established that while the Department has "wide" discretion under the enabling legislation, "statutory interpretation is ultimately the duty of the courts."[210] After concluding that the Department's interpretation would render the entire provision meaningless and therefore was not entitled to deference, the high court undertook a *de novo* interpretation of the statute.[211] The opinion analyzed in detail the wording and purpose of this statute, other Massachusetts legislation addressing climate change, and the Department's GHG regulations. After interpreting the statutory phrase "desired level[s] of . . . emissions limits," the court held that the Department's GHG regulations fell short of the mandate, and entered a declaratory ruling requiring the Department to promulgate volumetric limits on GHG sources that declined annually.[212]

This case could be used to teach civil procedure points on remedies, disposition without trial, and appellate review. Additionally, this case would expose students to important information on applying legal frameworks to address climate change—a state's policy and legislation to reduce its GHG emissions; various standards and regulatory mechanisms to reduce GHG emissions; and the roles of legislatures, agencies and courts in such programs.

Finally, the next two climate-related cases could be used to teach ascertainment of applicable law, removal and remand.

3. Removal of State Law Claims to Federal Courts

Just a few weeks apart in 2018, two federal judges in the U.S. District Court for the Northern District of California split on the removal of similar state law nuisance claims to federal court.[213] The cases were filed in state

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208 *Id.*

209 *Id.* at 1128 & n.4 (holding that a writ of mandamus was unnecessary because the court could issue declaratory relief).

210 *Id.* at 1132.

211 *Id.* at 1135 n.14.

212 The Supreme Judicial Court remanded the case for entry of a judgment declaring that the statute:

> [R]equires the department to promulgate regulations that address multiple sources or categories of sources of greenhouse gas emissions, impose a limit on emissions that may be released, limit the aggregate emissions released from each group of regulated sources or categories of sources, set emission limits for each year, and set limits that decline on an annual basis.

Id. at 1142. Subsequently, the Department adopted new regulations that were upheld on review. New England Power Generators Ass'n v. Dep't of Envtl. Prot., 105 N.E.3d 1156 (Mass. 2018).

213 *See* California v. BP P.L.C., No. C 17-06011 WHA, No. C 17-06012 WHA, 2018 WL 1064293, at *5–6 (N.D. Cal. Feb. 27, 2018) (holding the plaintiff's nuisance claims were properly removed

courts by California coastal cities and counties against producers of fossil fuels.[214] They alleged that the defendants (fossil fuels companies) knowingly contributed to GHG emissions and climate change, thereby accelerating sea level rise and flooding.[215] Both cases were removed by the defendants to federal courts and the plaintiffs filed motions to remand.[216]

In *California v. BP P.L.C.*, the judge denied the motion to remand based on the inherently federal nature of global warming claims and the federal uniformity benefits of any judicial remedy.[217] In contrast, the judge in *County of San Mateo v. Chevron Corp.* granted the motion to remand based on a finding that this litigation did not satisfy the limited grounds for federal removal.[218] This judge observed that, following decisions by the U.S. Supreme Court and Ninth Circuit, the state common law claims were neither preempted by federal law nor displaced by federal common law.[219] The court then found that removal was not warranted for this case under the doctrine of complete preemption, based on a specific issue of federal law that must be resolved to adjudicate the state law claims, or under any specialized statutory removal provisions.[220]

Like the *City of New York v. BP P.L.C.* case discussed in the Part on torts,[221] these cases would inform students about how burning fossil fuels contributes to GHG emissions, ways that climate change harms cities and counties, and efforts by some governments to recover costs for their

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to federal court); *Cty. of San Mateo*, 294 F. Supp. 3d 934, 937 (N.D. Cal. 2018) (ruling the plaintiff's claims were not governed by federal common law and thus removal from state court was improper).

214 *See California*, 2018 WL 1064293, at *3; *Cty. of San Mateo*, 294 F. Supp. 3d at 934.

215 *California*, 2018 WL 1064293, at *4; *Cty. of San Mateo*, 294 F. Supp. 3d at 937.

216 *California*, 2018 WL 1064293, at *5–6; *see Cty. of San Mateo*, 294 F. Supp. 3d at 937.

217 2018 WL 1064293, at *9–10 ("If ever a problem cried out for a uniform and comprehensive solution, it is the geophysical problem described by the complaints, a problem centuries in the making (and studying) with causes ranging from volcanoes, to wildfires, to deforestation to stimulation of other greenhouse gases—and, most pertinent here, to the combustion of fossil fuels. The range of consequences is likewise universal—warmer weather in some places that may benefit agriculture but worse weather in others, *e.g.*, worse hurricanes, more drought, more crop failures and—as here specifically alleged—the melting of the ice caps, the rising of the oceans, and the inevitable flooding of coastal lands. Taking the complaints at face value, the scope of the worldwide predicament demands the most comprehensive view available, which in our American court system means our federal courts and our federal common law. A patchwork of fifty different answers to the same fundamental global issue would be unworkable. This is not to say that the ultimate answer under our federal common law will favor judicial relief. But it is to say that the extent of any judicial relief should be uniform across our nation."); *see also City of New York*, 325 F. Supp. 3d 466, 472 (S.D.N.Y. 2018) (denying motion to remand and stating "the City's claims are ultimately based on the 'transboundary' emission of greenhouse gases, indicating that these claims arise under federal common law and require a uniform standard of decision").

218 294 F. Supp. 3d at 937.

219 *Id.* (citing *American Electric Power Inc.*, 564 U.S. 410, 424 (2011); *Native Village of Kivalina*, 696 F.3d 849, 857–58 (9th Cir. 2012)) (reasoning that there was no federal common law to displace state common law in this area because the federal Clean Air Act displaced federal common law).

220 *Id.* at 937–38.

221 *See* discussion *supra* Part III.C.

remedial actions. Integrating these cases into civil procedure courses would lead students to analyze the advantages and disadvantages of having federal or state courts adjudicate claims based on such harms, and whether the legal bases for removal and remand are aligned with this balance of interests. Some questions for civil procedure students on these cases are shown in the footnote.[222]

E. Constitutional

Cases under the federal constitution as well as decisions under state and foreign national constitutions are grappling with aspects of climate change.[223] With no mention of climate change or even the environment in the U.S. Constitution, constitutional law courses typically do not expose students to issues related to climate change. While numerous state and foreign national constitutions define environmental protection as a right or include other provisions addressing natural resource conservation and pollution,[224] state constitutional law courses may also miss important

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[222] Questions on these civil procedure cases include:

1) Regarding *Wohl*: Why should governments be entitled to dismissal of claims that they negligently designed stormwater systems, but be subject to a factual showing on whether they negligently maintained a particular drain or sewer line? Why limit the role of tort litigation in spurring governments to protect homeowners from the increased likelihood of heavy rains and flooding with climate change?
2) Regarding *Kain*: The court's declaratory ruling required the Department to comply with the court's interpretation of the statutory provision on establishing annual, declining volumetric limits on emissions. In light of the Department's past failure to comply with what the court determined to be the plain meaning of the statute, what other relief could the court have ordered to ensure that the Department would not frustrate the legislature's intent?
3) Regarding *City of Oakland* and *Cty. of San Mateo*: Is judicial relief workable in these cases alleging liability for fossil fuels suppliers in connection with harms from climate change? Do you agree with the judge in *City of Oakland* that such claims should be removed to federal courts because "the extent of any judicial relief should be uniform across our nation" (2018 WL 1064293, at *10)? Many states and cities have adopted measures to mitigate and adapt to climate change.

[223] *See* John C. Dernbach & Robert B. McKinstry, Jr., *Applying the Pennsylvania Environmental Rights Amendment Meaningfully to Climate Disruption*, 8 MICH. J. ENVTL. & ADMIN. L. 49 (2018); *see also* Jacqueline Peel & Hari M. Osofsky, *A Rights Turn in Climate Change Litigation?*, 7 TRANSNAT'L ENVTL. L. 37, 61–63 (2018).

[224] *See, e.g.*, JAMES R. MAY & ERIN DALY, GLOBAL ENVIRONMENTAL CONSTITUTIONALISM 55–56 (2015); John C. Dernbach et al., Pennsylvania Environmental Defense Foundation v. Commonwealth of Pennsylvania*: Recognition of Environmental Rights for Pennsylvania Citizens*, 70 RUTGERS L. REV. 803 (2018); Jack R. Tuholske, *U.S. State Constitutions and Environmental Protection: Diamonds in the Rough*, 21 WIDENER L. REV. 239, 239 n.3 (2015); David R. Boyd, *The Constitutional Right to a Healthy Environment*, 54 ENV'T: SCI. & POL'Y FOR SUSTAINABLE DEV., July/August 2012, at 3, 4 & n.6; Barton H. Thompson, Jr., *Constitutionalizing the Environment: The History and Future of Montana's Environmental Provisions*, 64 MONT. L. REV. 157, 158–59 (2003); John C. Dernbach, *Taking the Pennsylvania Constitution Seriously When it Protects the Environment: Part II—Environmental Rights and Public Trust*, 104 DICK. L. REV. 97, 99 (1999); Barton H. Thompson, Jr., *Environmental Policy and State Constitutions: The Potential Role of Substantive Guidance*, 27 RUTGERS L.J. 863, 867–68 (1996) [hereinafter *Environmental Policy*].

developments related to climate change.[225] Studying constitutional climate change cases would instruct students on standard topics in federal and state constitutional law courses, including substantive due process and fundamental rights, the dormant Commerce Clause, and judicial review of government actions.[226] Moreover, climate-related constitutional law decisions from state and foreign jurisdictions would expand students' thinking about fundamental rights expressed in constitutions and interpreting constitutional provisions. Additionally, including climate change in constitutional law courses provides opportunities for students to discuss governmental responsibilities for climate justice through the lens of fundamental rights, values and social goals, going beyond statutes and regulations. This Part presents constitutional law cases in two parts, fundamental rights and dormant Commerce Clause issues for state programs.

1. Fundamental Rights

A prominent climate-change federal constitutional lawsuit was addressed by the U.S. Supreme Court twice in 2018, and is pending interlocutory review by the Ninth Circuit Court of Appeals that is staying a trial in the U.S. District Court for the District of Oregon.[227] The plaintiffs, a group of youths, argue that the federal government violated their substantive due process (Fifth Amendment) rights by knowingly allowing GHGs to escalate to dangerous levels, thereby endangering the youths' property, economic livelihood, recreational opportunities, health, and ability to live long, healthy lives.[228] The plaintiffs seek a declaration that their constitutional rights have been violated, and an order directing the government to develop a plan to reduce GHG emissions.[229] In rejecting the defendant's motion to dismiss, the district court observed that "[t]his is no ordinary lawsuit"[230] and "fram[ed] the fundamental right at issue as the right

225 *See* RANDY J. HOLLAND ET AL., STATE CONSTITUTIONAL LAW: THE MODERN EXPERIENCE 753–823 (2nd ed. 2015) (chapter on "state constitutional provisions with no federal counterparts" does not explore environmental protections and rights); ROBERT F. WILLIAMS, STATE CONSTITUTIONAL LAW CASES AND MATERIALS 529–31 (4th ed. 2006) (The chapter titled "State Constitutional Protections Without Equivalent Federal Protection" has a short section on "Environmental and Natural Resource Provisions" where the only reading in this section is from a 1996 law review article (*See Environmental Policy*, *supra* note 224, at 864, 867–68, 880–81, 915–20) that does not mention climate change or global warming).

226 GREGORY E. MAGGS & PETER J. SMITH, CONSTITUTIONAL LAW: A CONTEMPORARY APPROACH 70–108, 295–350, 601–722 (4th ed. 2018); AARON H. CAPLAN, AN INTEGRATED APPROACH TO CONSTITUTIONAL LAW 73–98, 408–34, 858–922, 924–30 (2nd ed. 2015); HOLLAND ET AL., *supra* note 225, at 233–335; WILLIAMS, *supra* note 225, at 241–51 (showing a common approach to substantive due process).

227 *Juliana v. United States: Youth Climate Lawsuit,* OUR CHILDREN'S TRUST*,* https://perma.cc/42BA-QTJE (last visited Apr. 13, 2019).

228 Juliana v. United States, 217 F. Supp. 3d 1224, 1248 (D. Or. 2016). The complaint also states public trust claims. *Id.* at 1252–61.

229 *Id.* at 1233.

230 *Id.* at 1234.

to a climate system capable of sustaining human life" so as to protect against the "constitutionalization of all environmental claims."[231] The court recognized that this case may be groundbreaking, but observed that the judiciary had a role in determining whether the government's actions and inactions have "so profoundly damaged our home planet that they threaten plaintiffs' fundamental constitutional rights to life and liberty."[232] The U.S. Supreme Court twice denied the government's motion for stay.[233] The Ninth Circuit twice denied the government's petitions for mandamus, but granted a temporary stay of the district court proceedings on November 8, 2018 and an interlocutory appeal on December 26, 2018.[234]

Another take on climate-related constitutional rights starts from the environmental provisions in several state constitutions.[235] To illustrate, the Hawaii Supreme Court in 2017 interpreted the state's due process clause in the context of a separate constitutional provision, guaranteeing each person "the constitutional right to a clean and healthful environment, as defined by laws relating to environmental quality."[236] The dispute concerned a purchase agreement for power produced at a plant fired by a mix of coal, petroleum, and bagasse from sugar processing.[237] This power plant allegedly emitted particulate matter, sulfur dioxide, nitrogen oxides, and mercury, as well as GHGs.[238] The analysis relied on a state statute requiring the public utilities

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231 *Id.* at 1250 ("Exercising my 'reasoned judgment,' . . . I have no doubt that the right to a climate system capable of sustaining human life is fundamental to a free and ordered society." (internal citation omitted)).

232 *Id.* at 1261–62; *see also id.* at 1271–72 ("The language of the Due Process Clause does not impose an affirmative obligation on the government to ensure that those interests do not come to harm through other means. . . . However, there is an exception where government action creates the danger. . . . In such cases, deliberate indifference may suffice to establish a due process violation. . . . Deliberate indifference requires creation of a dangerous situation with actual knowledge or willful ignorance of impending harm. . . . Plaintiffs allege that the defendants' action in this case has created a life-threatening situation and that defendants have willfully ignored long-standing and overwhelming scientific evidence of that impending harm to the young and future generations. . . . In this case, the government has allegedly taken action through subsidies, regulations, etc. that creates massive [carbon dioxide] emissions, and has failed to limit such emissions despite a duty to do so."). The Magistrate Judge's Findings and Recommendations were adopted by the court. *Id.* at 1263.

233 United States v. U.S. Distr. Ct. for the Distr. of Or., 139 S. Ct. 1 (2018) ("The Government's request for relief is premature and is denied without prejudice. The breadth of respondents' claims is striking, however, and the justiciability of those claims presents substantial grounds for difference of opinion. The District Court should take these concerns into account in assessing the burdens of discovery and trial, as well as the desirability of a prompt ruling on the Government's pending dispositive motions."); *In re* United States, 139 S. Ct. at 452–53.

234 *In re* U.S., 895 F.3d 1101, 1102–03 (2018) (a *per curiam* order dated July 19, 2018); United States v. U.S. District Court, No. 18-73014, Dkt. 3 (9th Cir. Nov. 8, 2018), https://perma.cc/B59W-XKTK; United States v. U.S. District Court, No. 18-80176 (9th Cir. Dec. 26, 2018), https://perma.cc/5DF7-UZPN.

235 *See, e.g.*, HAW. CONST. art. IX, § 89, XI, § 1; ILL. CONST. art. XI; MONT. CONST. art. II, § 3, IX, § 1; PENN. CONST. art. I, §27; VA. CONST. art. XII, § 1.

236 *See in re* Application of Maui Elec. Co., Ltd., 408 P.3d 1, 9 (Haw. 2017).

237 *Id.* at 9.

238 *Id.* at 9 n.4.

commission to recognize the need to reduce reliance on fossil fuels and to explicitly consider the levels and effect of GHG emissions.[239] The court held that an environmental non-profit organization had a property interest protected by the Due Process Clause requiring a public hearing by the commission to consider the plant's release of GHGs, the long-term consequences of these emissions, and other environmental impacts.[240]

Foreign climate-related constitutional provisions and decisions would also be interesting for students in American constitutional law courses.[241] For example, the High Court of Ireland in 2017 dealt with a county council's issuance of a permit to construct an airport runway that plaintiffs contended would lead to an increase in GHG emissions and accelerate climate change.[242] The Irish Court found "no doubt but that climate change poses a real and immediate risk to, at least, the bodily integrity of [the plaintiffs], as well as to citizens more generally."[243] Turning to the constitutionally protected fundamental rights to life, health, property, and work,[244] the court held that there is "an underpinning, unenumerated personal constitutional right to an environment that is consistent with the human dignity and well-

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239 *Id.* at 14.

240 *Id.* at 21 ("We conclude that . . . the protected property interest in a clean and healthful environment asserted by Sierra Club necessitated a hearing by the Commission to consider the impacts of approving the Agreement on Sierra Club's members' right to a clean and healthful environment, including the release of harmful greenhouse gases by the Pu'unene Plant that would result from the Agreement, whether the cost of the energy under the Agreement was reasonable in light of the potential for harmful emissions, and whether the terms of the Agreement were prudent in light of the potential hidden and long-term consequences of the Agreement."). *But see* Funk v. Wolf, 144 A.3d 228 (Pa. Commw. Ct. 2016), *aff'd*, 158 A.3d 642 (Pa. Super. Ct. 2017) (state constitutional environmental rights provision, PA. CONST. art. I, §27, did not require court to issue writ of mandamus for executive branch rulemaking to reduce GHG emissions).

241 *See* Urgenda Found. v. The State of the Netherlands, C/09/456689, HA ZA 13-1396, ¶ 4.36, 4.39 (Oct. 9, 2018), https://perma.cc/5T9L-WTKV (interpreting Dutch climate policy and the Netherlands' international commitments to reduce its GHG emissions in the context of Article 21 of the Dutch Constitution imposing "a duty of care on the State relating to the liveability of the country and the protection and improvement of the living environment"; court ordered that the State must do more to reduce the Dutch annual GHG emissions by at least 25% at the end of 2020 compared to the level in 1990); *State Must Achieve Higher Reduction in Greenhouse Gas Emissions in Short Term*, DE RECHTSPRAAK (Oct. 9, 2018), https://perma.cc/6GQ5-SQ3B (describing how the Hague Court of Appeals affirmed the District Court's decision); Greenpeace Nordic Ass'n & Nature & Youth v. Nor. Ministry of Petroleum & Energy, 16-166674TVI-OTIR/06, Oslo Distr. Ct., 6, 18–22 (Jan. 4, 2018), https://perma.cc/BQ9E-Z7PX (court found that Article 112 of Norway's constitution, providing that "every person has the right to an environment that is conducive to health" and that natural resources shall be managed based on long-term considerations that "will safeguard this right for future generations as well," did not require Norway to assess the climate-change impacts from GHG emissions caused by burning its exported oil and gas).

242 Friends of Irish Env't v. Fingal Cty. Council, [2017] IEHC 695, ¶ 206 (High Ct. 2017) (Ir.), https://perma.cc/P3MZ-WDJB.

243 *Id.* at ¶ 244.

244 *See id.* at ¶¶ 263–64; *see also* BUNREACHT NA HÉIREANN [CONSTITUTION] Dec. 2018, art. 40, § 3 (Ir.) ("The State guarantees in its laws to respect, and, as far as practicable, by its laws to defend and vindicate the personal rights of the citizen.").

being of citizens at large."[245] The court observed that this constitutional protection carries with it certain enforceable, concrete environmental duties and responsibilities that will be defined over time; however, the court found no violation of this right by the process or impacts of the council's runway decision.[246]

As for teaching about climate change, the breadth of *Juliana, Maui Electric,* and *Friends of Irish Environment* would lead students to discuss how GHG emissions are transforming human lives, property, economic livelihoods, enjoyment of nature, values, and rights. In discussing *Juliana*, students could examine the declarations of climate scientist Dr. James E. Hansen[247] and a youth plaintiff residing in Louisiana whose home and town were devastated by flooding.[248] The *Juliana* complaint addresses past and current government actions, as well as current and future climate impacts. The students would learn about the range and history of government actions that have allegedly caused climate change.[249] Additionally, the students could be encouraged to analyze what actions courts could order in light of climate-related constitutional rights.[250]

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245 *Friends of Irish Env't*, [2017] IEHC 695 at ¶¶ 263–64 (High Ct. 2017). "A right to an environment that is consistent with the human dignity and well-being of citizens at large is an essential condition for the fulfilment of all human rights." *Id.* at ¶ 264.

246 *Id.* at ¶ 264.

247 Ex. A at *30, Juliana v. United States, No. 6:15-cv-01517-TC, 2017 WL 2483705 (D. Or. 2017), https://perma.cc/R5DQ-UT69 ("In order to preserve a viable climate system, our use of fossil fuels must be phased out as rapidly as is feasible. Only government can ensure this will be done. . . . Our government's permitting of additional, new, or renewed fossil fuel projects is entirely antithetical to its fundamental responsibility to our children and their posterity. Their fundamental rights now hang in the balance.").

248 Declaration of Jayden F. in Supp. of Pls.' Opp'n to Defs.' Mot. to Dismiss at *2, Juliana v. United States, No. 6:15-cv-01517-TC, 2017 WL 2483705 (D. Or. 2017), https://perma.cc/2TU8-9BQ9.

249 *See* Unopposed Mot. for Leave to File Br. of *Amicus Curiae* Sierra Club, Juliana v. United States, 884 F.3d 830 (9th Cir. 2018), https://perma.cc/L4HB-FWRU (discussing the federal government's actions in four areas: GHG emissions from vehicles and power plants, emissions from federal coal leases, federal oil and gas leasing and regulation, and creation of a metric for calculating the impacts of GHG emissions).

250 Possible questions for students in studying *Juliana*, *Maui Elec.*, and *Friends of the Irish Env't* include:

1) Regarding *Juliana*: Should the courts recognize "the right to a climate system capable of sustaining human life" as a fundamental right protected by the federal constitution? Is the relief from the court sought by the plaintiffs—a declaration that their constitutional rights have been violated, and an order directing the government to develop a plan to reduce GHG emissions—reasonable as a justiciable claim, or should the court deny the requested relief as an action committed to the legislative and executive branches (in line with the political question doctrine)?
2) Regarding *Maui Elec.*: The court held that, under Hawaii's constitution and public utilities statute, an environmental organization had a due process right to a public hearing by the regulatory commission on a permit for a power plant that would emit GHGs. In light of the constitutional provision guaranteeing each person "the right to a clean and healthful environment, as defined by laws relating to environmental quality," does due process require other government actions to mitigate and adapt to climate change?

2. Dormant Commerce Clause Issues for State Programs

Constitutional law courses could also integrate climate change in teaching the dormant Commerce Clause.[251] Two cases in this field arise from different programs to mitigate GHG emissions, one in Connecticut involving wind and solar energy projects and the other in California involving motor vehicle fuels.[252]

In 2017, the U.S. Court of Appeals for the Second Circuit upheld Connecticut's renewable portfolio standard program against a claim that it violated the dormant Commerce Clause.[253] Under the Connecticut statute, in-state utilities had to procure an increasing percentage of their energy from renewable energy sources, "either by generating the renewable energy themselves, or by purchasing renewable energy certificates" that represent energy produced by a third-party generator.[254] The program required Connecticut utilities to purchase renewable energy certificates from within the electricity grid supplying the state, which is limited to sources in the state or in nearby states and parts of Canada.[255] As policy support for this restriction on purchasing from sources in more distant states, "Connecticut argue[d] that increased in-region renewable energy production would improve air quality for its citizens and protect them from price and supply shocks that could result if, for example, there was a natural gas shortage or a nuclear power plant were to go off-line."[256] In a case brought by the operator of a solar power facility in Georgia that sought to sell renewable energy certificates to Connecticut utilities, the court held that the program did not violate the dormant Commerce Clause.[257] The court found that the Georgia generator provided a different product than power providers in or near Connecticut for the legitimate purposes of the Connecticut program,

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3) Regarding *Friends of the Irish Env't*: Compare the scope of the constitutional right found by the Irish court—a "personal constitutional right to an environment that is consistent with the human dignity and well-being of citizens at large"—to the *Juliana* plaintiffs' request that the court declare a U.S. federal constitutional "right to a climate system capable of sustaining human life."

251 *See* U.S. CONST. art. I, § 8, cl. 3.

252 *See generally* David Hodas, *State Initiatives*, *in* GERRARD & FREEMAN, *supra* note 22, at 303–40.

253 Allco Fin. Ltd. v. Klee, 861 F.3d 82, 86 (2d Cir. 2017).

254 *Id.* at 92; *see Renewable Energy Certificates (RECs)*, U.S. ENVTL. PROTECTION AGENCY, https://perma.cc/C8UY-ZTKN (last visited Apr. 13, 2019); GALEN BARBOSE, BERKELEY LAB, U.S. RENEWABLE PORTFOLIO STANDARDS: 2018 ANNUAL STATUS REPORT 3, 6 (2018), https://perma.cc/4PJC-KT8V (twenty-nine states and Washington, D.C. have renewable portfolio standards (RPS); about half of all growth in U.S. renewable electricity generation and capacity since 2000 is associated with RPS; meeting increasing requirements under RPS will require about a 50% rise in U.S. renewable electricity generation by 2030); *State Renewable Portfolio Standards and Goals*, NAT'L CONFERENCE ST. LEGISLATORS (Feb. 1, 2019), https://perma.cc/86XB-R7DT.

255 *Allco Fin. Ltd.*, 861 F.3d 82, 93 (2d Cir. 2017).

256 *Id.*

257 *Id.* at 86–87, 93.

and therefore the Connecticut program did not discriminate against the Georgia generator.[258]

In another case decided in 2013 under the dormant Commerce Clause, the Ninth Circuit addressed a challenge to California's Low Carbon Fuel Standard for vehicles.[259] California's Air Resources Board acted pursuant to authority under the federal Clean Air Act and the state's Global Warming Solutions Act.[260] As part of a package of regulations to lower GHG emissions from the transportation sector, the standard reduced the quantity of GHGs that could be emitted in the production of transportation fuel consumed in the state.[261] Through a cap on such emissions and a market to trade credits, the California regulators sought to encourage producers to develop fuels with lower carbon intensities for use in California, regardless of whether the producers are located in or outside the state.[262] The court held that this state program did not discriminate against out-of-state crude oil facially, in purpose, or in practical effect.[263] Accordingly, the state's program did not violate the dormant Commerce Clause's prohibition on extraterritorial regulation.[264]

Many national or state programs intended to limit GHG emissions face issues in dealing with products that are supplied across borders, including

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258 *Id.* at 103–08 ("Connecticut's [renewable portfolio standard] program serves its legitimate interest in promoting increased production of renewable power generation in the region, thereby protecting its citizens' health, safety, and reliable access to power." (following General Motors Corp. v. Tracy, 519 U.S. 278, 286 (1997))). The court held that the regional grid legitimately confined Connecticut's program for purchasing renewable energy certificates, and that the purpose outweighed its lessening of potential competition among suppliers of renewable energy certificates nationwide. *Id.* at 108; *see also* Energy and Environment Legal Institute v. Epel, 793 F. 3d 1169, 1174 (10th Cir. 2015) (upholding against dormant Commerce Clause challenge Colorado law requiring electricity generators to ensure that 20% of the electricity they sell to Colorado consumers comes from renewable sources; Colorado imports electricity); Elec. Power Supply Ass'n v. Star, 904 F.3d 518, 525 (7th Cir. 2018) (upholding Illinois' law supporting zero-carbon energy sources). In contrast, the Eighth Circuit Court of Appeals held that certain Minnesota statutory provisions intended to reduce energy sector GHG emissions violated the dormant Commerce Clause because they would regulate activity and transactions by non-Minnesota utilities taking place wholly outside of Minnesota. North Dakota v. Heydinger, 825 F.3d 912, 921 (8th Cir. 2016) (statute prohibited Minnesota utilities from importing electricity generated by a large new energy facility in a transaction that would contribute to or increase "statewide power sector carbon dioxide emissions", including from out-of-state sources).

259 Rocky Mountain Farmers Union v. Corey, 730 F.3d 1070, 1077 (9th Cir. 2013).

260 *Id.* at 1078–79. Thirteen other states and Washington, D.C. have adopted California's vehicle emission standards. *States Adopting California's Clean Cars Standards*, MD. DEP'T ENV'T, https://perma.cc/TW9B-B66Z (last visited Apr. 13, 2019); Colorado Governor, Exec. Order No. B 2018 006 (June 18, 2018), https://perma.cc/4D4A-VR46.

261 *Rocky Mountain Farmers Union*, 730 F.3d 1070, 1107 (9th Cir. 2013).

262 *Id.* at 1079–80.

263 *Id.* at 1078.

264 *Id.*; *see also Colum. Pac. Bldg. Trades Council*, 412 P.3d 258, 267 & n.7 (2018) (rejecting dormant Commerce Clause challenge to zoning amendment that prohibited, with some exceptions, new fossil-fuel terminals; "We do not decide whether the city's interest in restricting the use of its land to prevent potential large fuel-export facilities and, thus, possibly reduce greenhouse gasses, is a legitimate local interest. Rather, we conclude that the amendments have other legitimate putative local health, safety, and land use benefits.").

electricity and motor vehicle fuels.[265] Often, issues arise with regard to "leakage" beyond the program's jurisdictional reach, such as where a program's standards exclude or apply to out-of-state suppliers, or benefit distant sellers who do not have to comply.[266] In teaching the dormant Commerce Clause, these cases would inform students about widespread tools to mitigate climate change through state renewable energy and vehicle emissions standards; uses of certificates, trading markets, and emission allowances as incentives to reduce these emissions; and the reach and impacts of state programs on suppliers of electricity, vehicles, and fuels.[267] Students would also learn about integrating renewable energy sources into regional electricity grids,[268] as well as the lifecycle analysis of vehicle fuels and other products in measuring and reducing GHG emissions.[269]

F. Business Associations and Securities

Law courses on business associations and securities regulation teach about directors' duty of care and corporate disclosures of information that would be material or significant for reasonable investors.[270] For many

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265 *See* U.S. ENERGY INFOR. ADMIN., ENERGY-RELATED CARBON DIOXIDE EMISSIONS BY STATE, 2005–2016 at 6, 12–17, 26 (2019), https://www.eia.gov/environment/emissions/state/analysis/pdf/stateanalysis.pdf; U.S. ENERGY INFOR. ADMIN, REFINERY CAPACITY REPORT (2018), https://perma.cc/RQ5A-XAF8.

266 *See* analysis of carbon taxes, *infra* Part III.G; Rahel Aichele & Gabriel Felbermayr, *Kyoto and Carbon Leakage: An Empirical Analysis of the Carbon Content of Bilateral Trade*, 97 REV. ECON. & STAT. 104 (2015) (discussing the concept of leakage with respect to the Kyoto Protocol); MEREDITH FOWLIE & DANNY CULLENWARD, REPORT ON EMISSIONS LEAKAGE AND RESOURCE SHUFFLING (2018) (California Independent Emissions Market Advisory Committee), https://perma.cc/A8P5-32X6.

267 Possible questions for students on this dormant Commerce Clause case include:

1) Some state legislatures support clean energy programs in part to stimulate jobs and economic growth in the state. *See Future Energy Jobs Act Workforce Development Programs*, ILL. SOLAR ENERGY ASS'N, https://perma.cc/2MG5-NGYF (last visited Apr. 13, 2019). Should this state policy purpose survive a claim that a state's program restricted to in-state sources of renewable energy certificates violates the dormant Commerce Clause?
2) Why should California be concerned about GHG emissions in producing transportation fuels that are consumed in California when the refinery emissions occur in other states? Does the Commerce Clause leave the regulation of such emissions to the originating state or possibly the federal government?
3) Should the Connecticut or California program apply to electricity or fuels produced in that state but sold for consumption outside that state? Who are the stakeholders that would be interested in this aspect of the regulatory program?

268 *See generally* EXEC. OFFICE OF THE PRESIDENT OF THE U.S., INCORPORATING RENEWABLES INTO THE ELECTRIC GRID: EXPANDING OPPORTUNITIES FOR SMART MARKETS AND ENERGY STORAGE (2016), https://perma.cc/T6V9-E62T; GLEN ANDERSEN, NAT'L CONFERENCE OF STATE LEGISLATURES, INTEGRATING RENEWABLE ENERGY (2016), https://perma.cc/W6MN-LYGQ.

269 *See GREET Model*, ARGONNE NAT'L LABORATORY, https://perma.cc/2LUT-P36F (last visited Apr. 13, 2019); *Lifecycle Analysis of Greenhouse Gas Emissions Under the Renewable Fuel Standard*, ENVTL. PROTECTION AGENCY, https://perma.cc/NFR3-EKM4 (last visited Apr. 13, 2019).

270 WILLIAM A. KLEIN ET AL., BUSINESS ASSOCIATIONS: CASES AND MATERIALS ON AGENCY, PARTNERSHIPS, LLCS, AND CORPORATIONS 277–302, 410–67 (10th ed. 2018); LARRY D. SODERQUIST

corporations, the material factors that should be considered by directors in making informed business decisions and disclosed in securities filings[271] include threats or impacts related to climate change, as recognized by federal and state agencies as well as major institutional investors and scholars.[272] The regulations, settlement agreements, complaints, investigations, shareholder resolutions, and other materials in this Part would inform students about how climate change is affecting U.S. corporations and global commerce. Students could also discuss how some government agencies and large investors have used information disclosures to spur corporations to reduce their GHG emissions and vulnerability to climate impacts.

1. Federal Securities Guidance

In 2010, the Securities and Exchange Commission (SEC) published "Commission Guidance Regarding Disclosure Related to Climate Change."[273] In response to petitions for interpretive advice submitted by institutional and other investor groups, the SEC "remind[ed] companies of their obligations under existing federal securities laws and regulations to consider climate change and its consequences as they prepare disclosure documents."[274] Based on four items in Regulation S-K, the agency pointed to various changing conditions supporting this guidance and recognized several types of potential impacts on companies related to climate change.[275] First, legal developments could have significant effects on companies' operating and financial decisions, including capital expenditures to reduce emissions as well as expenses in purchasing (or revenues in selling) allowances in cap-and-trade programs.[276] Second, companies may experience indirect effects in

& THERESA A GABALDON, SECURITIES REGULATION 112–35, 447–77, 501–06 (9th ed. 2018); STEPHEN J. CHOI & A.C. PRITCHARD, SECURITIES REGULATION: CASES AND ANALYSIS 47–94, 161–288 (4th ed. 2015).

271 *See* Aronson v. Lewis, 473 A.2d 805, 812 (Del. 1984) (directors must engage in a process to become adequately informed of all material information reasonably available to make their decision, and make decisions in good faith); Smith v. Van Gorkum, 488 A.2d 858, 872–73, 893 (Del. 1985) (directors failed to inform themselves of all information reasonably available to them and relevant to their decision, and failed to disclose all material information such as a reasonable shareholder would consider important); TSC Industries, Inc. v. Northway, Inc., 426 U.S. 438, 445 (1976) (discussing materiality in securities disclosures); Basic Inc. v. Levinson, 485 U.S. 224, 236 (1988) (following *TSC Industries* on materiality); Matrixx Initiatives, Inc. v. Siracusano, 563 U.S. 27, 38 (2011) (following *TSC Industries* on materiality).

272 *See supra* note 17 and accompanying text; Matthew Morreale, *Corporate Disclosure Considerations Related to Climate Change*, *in* GERRARD & FREEMAN, *supra* note 22, at 205–07.

273 Commission Guidance Regarding Disclosure Related to Climate Change, 75 Fed. Reg. 6,290, 6,291, 6,297 (Feb. 8, 2010).

274 *Id.* at 6,297.

275 *Id.* at 6,290–91. Regulations, state and federal legislation, and international efforts were addressing GHG emissions; there was growing recognition by business leaders of current and potential effects on their companies' performance and operations, both positive and negative; companies provided information about their carbon footprints through various public and private media; and industry-led standards for disclosures were emerging. *Id.*

276 *Id.* at 6,291.

the costs and availability of supplies.[277] Next, the physical manifestations of climate change (including rising sea levels, changing availability and quality of water, and increasing incidence of heavy precipitation events, wildfires, extreme heat, and vector-borne infectious diseases) could affect "a registrant's personnel, physical assets, supply chain, and distribution."[278] Additionally, the SEC pointed to financial risks such as for banks whose borrowers are located in floodplains.[279] The Guidance also acknowledged that companies' emissions of GHGs could cause reputational risks to their businesses.[280]

The SEC returned to the adequacy of climate-related information in 2016 in a Concept Release in connection with the broader topic of disclosures on sustainability matters.[281] Additionally, securities courses could use shareholder resolutions and SEC No-Action Letters on companies' disclosures of their risks and opportunities related to climate change.[282] More resources appear in a high-profile, international task force's recommendations for consistent, comparable, and reliable disclosure of firms' forward-looking strategies with respect to climate change in securities filings;[283] an open letter from institutional investors to governments

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277 *Id.*

278 *Id.*

279 *Id.*

280 *Id.* at 6,296.

281 *See* Business and Financial Disclosure Required by Regulation S-K, 81 Fed. Reg. 23,916, 23,969–73 (Apr. 22, 2016) ("Are existing disclosure requirements adequate to elicit the information that would permit investors to evaluate material climate change risk? Why or why not? If not, what additional disclosure requirements or guidance would be appropriate to elicit that information?"); *see also* U.S. GOV'T ACCOUNTABILITY OFF., CLIMATE-RELATED RISKS: SEC HAS TAKEN STEPS TO CLARIFY DISCLOSURE REQUIREMENTS n.p. (2018) (clarifying disclosure requirements). *See generally* Warren Lavey, *Environmental Sustainability Disclosures: SEC Faces Its Regulation S-K Requirements* (pt. 1), 48 BLOOMBERG SEC. REG. & L. REP. 2282 (2016), (pt. 2), 49 BLOOMBERG SEC. REG. & L. REP. 248 (2017); Robyn Bishop, Comment, *Investing in the Future: Why the SEC Should Require a Uniform Climate Change Disclosure Framework to Protect Investors and Mitigate U.S. Financial Instability*, 48 ENVTL L. 491 (2018) (recognizing that climate risks may be material to investors and financial markets).

282 *See, e.g.*, *CalPERS' Climate Risk Reporting Proposal Passes at Occidental Petroleum*, CALPERS, https://perma.cc/ZRS6-4HHL (last updated May 12, 2017); WESPATH INV. MGMT., CLIMATE CHANGE ASSESSMENT REPORT n.p. (2017) https://perma.cc/6B63-W6XC; Letter from Matt S. McNair, Senior Special Counsel, Div. of Corp. Fin., U.S. Sec. & Exch. Comm'n, to Gene D. Levoff, Apple Inc. (Dec. 21, 2017), https://perma.cc/Q2VR-LQ8F (regarding proposed shareholder resolution requesting the Apple board prepare a report evaluating the potential for the company to achieve net-zero emissions of GHGs in its operations and major suppliers); Letter from David R. Fredrickson, Chief Counsel, U.S. Sec & Exch. Comm'n, to Natasha Lamb, Arjuna Capital (Apr. 11, 2018) https://perma.cc/U3JH-TLUN.

283 TASK FORCE ON CLIMATE-RELATED FIN. DISCLOSURES, FINAL REPORT: RECOMMENDATIONS OF THE TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES, at iv (2017), https://perma.cc/Y3WG-VGSH; TASK FORCE ON CLIMATE-RELATED FIN. DISCLOSURES, STATUS REPORT, at iii (2018), https://perma.cc/M4A9-B6K2; *see also* CERES ET AL., SETTING THE BAR: IMPLEMENTING THE TCFD RECOMMENDATIONS FOR OIL AND GAS METHANE DISCLOSURE 4 (2018), https://perma.cc/38LL-HYJA (recognizing oil and methane gas as a serious risk and the need for disclosure of these substances). *See generally* AUSTRALIAN SEC. & INVS. COMM'N, CLIMATE RISK DISCLOSURE BY AUSTRALIA'S LISTED COMPANIES (2018), https://perma.cc/CDR4-L5KQ (report

supporting "financial frameworks required to improve the availability, reliability and comparability of climate-related information";[284] and a 2018 petition to the SEC for rulemaking on disclosures of climate change and other environmental, social and governance information, which addresses uses of and problems with corporations' voluntary climate disclosures outside of regulated SEC filings.[285]

2. State Securities Actions

Two prominent climate-related initiatives by state attorneys general could be used in teaching states' roles in corporate disclosures to investors. First, under New York's Martin Act,[286] the New York Attorney General entered into a series of settlement agreements with electric power producers and fossil fuel companies requiring additional climate-related disclosures to investors.[287] To illustrate, a 2009 agreement with a company operating coal-fired power plants required disclosures of an analysis of material financial risks from climate change related to present and probable future regulation and legislation, litigation, and physical impacts of climate change; and current carbon emissions, projected increases in carbon emissions from planned coal-fired power plants, company strategies for managing its global warming pollution emissions and expected global warming emissions reductions from these actions, and corporate governance actions related to climate change, including if environmental performance is incorporated into officer compensation.[288]

Second, in 2018 the New York Attorney General filed a complaint against Exxon Mobil alleging that the company made materially false and misleading statements to deceive investors "concerning the company's management of the risks posed to its business by climate change regulation."[289] The alleged deceit included misrepresentations about the company's application of an escalating proxy cost of GHGs (to reflect

containing observations, findings, and recommendations relating to the disclosure of climate risk).

284 Letter from Global Investors to Governments of the G7 and G20 Nations (May 8, 2017), https://perma.cc/6KLU-APUM.

285 Williams & Fisch, *supra* note 17.

286 N.Y. GEN. BUS.. LAW § 352 (2018).

287 *See* Assurance of Discontinuance Pursuant to Executive Law § 63(15), *In re* Xcel Energy Inc. (2008) (No. 08-012), https://perma.cc/WY6F-6LVL; Assurance of Discontinuance Pursuant to Executive Law § 63(15), *In re* Dynegy, Inc. (2008) (No. 08-132), https://perma.cc/ZB8H-79Q3; Assurance of Discontinuance Pursuant to Executive Law § 63(15), *In re* AES Corp. (2008) (No. 09-159), https://perma.cc/Z4XC-SCRP; Assurance of Discontinuance Pursuant to Executive Law § 63(15), *In re* Peabody Energy (2015) (No. 15-242), https://perma.cc/UN2W-R4Q3.

288 Press Release, Andrew M. Cuomo, N.Y. Att'y Gen., Attorney General Cuomo Announces Agreement with Aes to Disclose Climate Change Risks To Investors (Nov. 19, 2009), https://perma.cc/A5WE-ZYXT.

289 Complaint at *1, *7, People of the State of N. Y. v. Exxon Mobil Corp., No. 452044/2018, (N.Y. S. Ct. Oct. 24, 2018), https://perma.cc/42UM-LLQD. The action was brought under New York's Martin Act (securities fraud) and Executive Law § 63(12) (persistent fraud or illegality), and for common law fraud. *Id.* at *7.

expected increasingly stringent climate change regulations) in its investment decisions, business planning, assessments of oil and gas reserves, evaluations of whether long-term assets are impaired, and estimates of future demand for oil and gas.[290] The complaint sought both injunctive and monetary relief.[291] This complaint followed subpoenas and a civil investigative demand (CID) issued in 2015 and 2016 by the Massachusetts and New York Attorneys General in connection with possible climate-related deception by Exxon Mobil to investors and consumers.[292] Among other inquiries, the investigations focused on what and when Exxon Mobil knew about the contribution of its products to climate change and the risks climate change creates for the value of its businesses and assets.[293] In denying the company's request to set aside the CID, the Massachusetts Supreme Judicial Court noted that the effects of climate change "are already being felt in Massachusetts."[294]

These cases and other resources point to the emergence of climate change as a material force in business investments, operations, sales, competition, and capital raising. They also evidence the significance of climate change to the practice of business and securities law. To provide effective counsel on business decisions and disclosures, these lawyers need to understand major governmental mechanisms that target GHG reductions and affect corporations' costs and decisions, such as cap-and-trade systems with declining quantities of emission allowances, renewable portfolio standards, tax incentives for clean energy and energy efficiency, escalating standards for vehicle fuel efficiency and emissions, and environmental assessments of land uses that consider impacts on GHG emissions. Business and securities lawyers also need to participate in identifying material risks for disclosures as businesses, their suppliers, and their customers are exposed to increases in flooding, wildfires, heatwaves, droughts, severe storms, and other adverse conditions. By using climate-related cases and other resources in business associations and securities courses, professors would teach the standard topics of directors' duty to make informed business decisions and disclosures of material information to shareholders. These materials would also train students for the challenges they will face in practicing law in a changing climate.[295]

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290 *Id.* at *21–30.

291 *Id.* at *7 ("The State seeks all appropriate relief to prevent Exxon from making false or misleading claims about its climate change risk management, to compel curative disclosures to investors, and for all appropriate monetary relief for Exxon's fraudulent conduct, including disgorgement of all amounts gained or retained as a result of the fraud, damages, restitution, and costs.").

292 Exxon Mobil Corp. v. Att'y Gen., 94 N.E.3d 786, 790 (2018); Exxon Mobil Corp. v. Schneiderman, 316 F. Supp. 3d 679, 688 (S.D.N.Y. 2018); *see also*, Press Release, Eric T. Schneiderman, N.Y. Att'y Gen., A.G. Schneiderman, Former Vice President Al Gore and a Coalition of Attorneys General from Across the Country Announce Historic State-Based Effort to Combat Climate Change (Mar. 29, 2016), https://perma.cc/4PYA-9LMY.

293 *See Exxon Mobil Corp.*, 94 N.E.3d at 790; *Schneiderman*, 316 F. Supp. 3d at 687–88.

294 *Exxon Mobil Corp.*, 94 N.E.3d at 792.

295 Possible questions to guide the students in studying these business associations and securities cases include:

G. Tax

Taxes and related financial incentives have been a focus of actions to reduce climate change for decades.[296] Federal and state legislatures adopted various tax incentives for producing energy from wind and solar systems, weatherizing homes, buying hybrid and electric vehicles, and other energy conservation and clean energy investments.[297] This Part describes two sets of climate-related resources that could be integrated into tax courses, dealing with carbon taxes and the boundary between taxes and other fees. The design and implementation of climate-related taxes could be used to teach basic competencies in tax courses, including deductions and credits in computing taxable income, tax expenditures, and the processes for enacting

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1) In response to pressures from large investors, some corporations provide substantial information on their GHG emissions and other environmental measures and actions through their corporate sustainability or responsibility reports posted on their websites, submissions in databases tracking hundreds of companies, and other public information outside of forms filed with the SEC. Should the SEC and courts view such disclosures as adequate for reasonable investors?
2) If you are counseling a corporation in drafting its first climate-related disclosures in its SEC Form 10-K annual filing, what questions would you ask and which legal frameworks would you want to consider?
3) The New York Attorney General's complaint against Exxon Mobil alleged fraud in what the company disclosed about the risks posed to its business by climate-related regulation. The investigations by the New York and Massachusetts Attorneys General also inquired into what and when Exxon Mobil knew about the contribution of its products to climate change. How would such information affect potential allegations of violations of securities laws?
4) Choose three types of businesses, identify climate-related risks to their business operations and prospects, and describe how these risks would affect various decisions by their directors.
5) Many government agencies, businesses, and other organizations apply "sustainable" or "green" purchasing practices, which consider the potential suppliers' GHG emissions and other indicators of environmental impacts. *See Environmentally Preferred Products*, U.S. GENERAL SERV. ADMIN., https://perma.cc/R8VL-SZD3; *NASPO Green Purchasing Guide*, NAT'L ASS'N STATE PROCUREMENT OFFICIALS, https://perma.cc/H63D-T3LN. As a business lawyer, how would these purchasing practices affect the advice you give to corporate clients about board decisions, securities disclosures, and material contracts?

296 *See History*, CARBON TAX CTR., https://perma.cc/DM8S-4L6H (last visited Apr. 13, 2019); *Market-Based Strategies*, CTR. FOR CLIMATE & ENERGY SOLUTIONS, https://perma.cc/9SR5-572L (last visited Apr. 13, 2019).

297 *See, e.g.*, Leah C. Stokes & Hanna L. Breetz, *Politics in the U.S. Energy Transition: Case Studies of Solar, Wind, Biofuels and Electric Vehicles Policy*, 113 ENERGY POL'Y 76, 78–83 (2018); Michelle D. Layser, *Improving Tax Incentives for Wind Energy Production: The Case for a Refundable Production Tax Credit*, 81 MO. L. REV. 453, 455 (2016); Severin Borenstein & Lucas W. Davis, *The Distributional Effects of US Clean Energy Tax Credits*, TAX POL'Y & ECON., 2016, at 191, 193–98; Melissa Powers, *Sustainable Energy Subsidies*, 43 ENVTL. L. 211, 222 (2013); ERIC LANTZ & ELIZABETH DORIS, NAT'L RENEWABLE ENERGY LABORATORY, STATE CLEAN ENERGY POLICIES ANALYSIS (SCEPA): STATE TAX INCENTIVES 1, 5, 7–9 (2009), https://perma.cc/7DY3-9ZME.

and administering taxes.[298] Tax courses that consider such provisions would simultaneously give students opportunities to learn about climate change and programs to cut GHG emissions. Students will also see that climate-related tax provisions may have a pervasive influence on many types of governmental, economic, social, and environmental activities.

1. Carbon Taxes

In the United States, taxes on GHG emissions have been proposed at the national level for decades.[299] Recently, prominent carbon pricing proposals were announced by a group of senior conservative Republicans (called the Climate Leadership Council and using the banner "carbon dividends plan" rather than the politically sensitive word "tax," but referring to the levy as a "tax"),[300] and by Democratic and Republican sponsors of bills introduced in the House and Senate.[301] Carbon taxes have also been considered in several states, most prominently in Washington in 2018 via both legislation and a voter initiative (both of which fell short of enactment).[302]

Elsewhere in North America, the Canadian province of British Columbia phased in a tax covering about 70% of its GHG emissions starting in 2008.[303] At the national level, Canada adopted a standard for provincial

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298 *See* JAMES J. FREELAND ET AL., FUNDAMENTALS OF FEDERAL INCOME TAXATION 309–93, 951–58 (19th ed. 2018); MICHAEL J. GRAETZ ET AL., FEDERAL INCOME TAXATION: PRINCIPLES AND POLICIES 42–49, 50–71, 235–69 (8th ed. 2018).

299 *See* William D. Nordhaus, *Optimal Greenhouse-Gas Reductions and Tax Policy in the "DICE" Model*, 83 AM. ECON. REV., May 1993, at 313, 313–14; Donald B. Marron & Eric J. Toder, *Tax Policy Issues in Designing a Carbon Tax*, 104 AM. ECON. REV., May 2014, at 563, 563; *see also* ADELE C. MORRIS & APARNA MATHUR, CTR. FOR CLIMATE & ENERGY SOLUTIONS, A CARBON TAX IN BROADER U.S. FISCAL REFORM: DESIGN AND DISTRIBUTIONAL ISSUES 3 (2014), https://perma.cc/A5X4-X3PJ.

300 JAMES A. BAKER, III ET AL., CLIMATE LEADERSHIP COUNCIL, THE CONSERVATIVE CASE FOR CARBON DIVIDENDS 1–2 (2017), https://perma.cc/2ZZL-EQ57; GEORGE P. SHULTZ & TED HALSTEAD, CLIMATE LEADERSHIP COUNCIL, THE DIVIDEND ADVANTAGE 2–3 (2018), https://perma.cc/538C-Z32G.

301 H.R. 763, Energy Innovation and Carbon Dividend Act of 2019, 116th Cong., https://perma.cc/745J-BX67; S. 2368, American Opportunity Carbon Fee Act of 2018, 115th Cong., https://perma.cc/87MU-3QAD; H.R. 6463, Market Choice Act of 2018, 115th Cong., https://perma.cc/KXL7-CB4L; NOAH KAUFMAN, A COMPARISON OF THE BIPARTISAN ENERGY INNOVATION AND CARBON DIVIDEND ACT WITH OTHER CARBON TAX PROPOSALS (2018), https://perma.cc/8QYH-NMTL.

302 S. Bill Rep. No. 6203, 2018 Reg. Sess. (Wash. 2018), https://perma.cc/GM6F-Q4TU; *Washington Initiative 1631, Carbon Emissions Fee Measure*, BALLOTPEDIA (2018), https://perma.cc/TL5G-2D6K (2018) (last visited Apr. 13, 2019). *See* Marianne Lavelle, *A Carbon Tax Wave? 7 States Considering Carbon Pricing to Fight Climate Change*, INSIDE CLIMATE NEWS (Nov. 29, 2018), https://perma.cc/6DA6-VC5A; Justin Worland, *A Carbon Tax Proposal Failed This Week. But the Fight Is Just Beginning*, TIME (Nov. 8, 2018), https://perma.cc/5V2A-RCJT; Elizabeth Daigneau, *After Carbon Tax Fails in Washington, Focus Turns to 9 Other States*, GOVERNING (Mar. 20, 2018), https://perma.cc/83XD-8RPF.

303 *British Columbia's Carbon Tax*, B.C., https://perma.cc/BV8C-ATBJ (last visited Apr. 13, 2019); *see also* Brian Murray & Nicholas Rivers, *British Columbia's Revenue-Neutral Carbon Tax: A Review of the Latest "Grand Experiment" in Environmental Policy*, 86 ENERGY POL'Y, 674,

carbon pricing systems in 2017 and a federal backstop,[304] enacted the Greenhouse Gas Pollution Pricing Act in June 2018,[305] and adopted regulations implementing the Output-Based Pricing System in October 2018.[306] The national government pointed to significant benefits from carbon pricing, along with Climate Action Incentive payments to households funded by the revenues, to the environment, economy, and most households.[307] Globally, a 2018 World Bank analysis of energy and carbon taxes surveyed 26 carbon taxes primarily implemented at a national level.[308]

To illustrate some of the details of designing carbon taxes, the 2018 legislative plan in Washington State (SB 6203, which was not enacted) would have imposed a "carbon pollution tax" on the sale or use of fossil fuels within the state, and on the sale or use of electricity in the state generated using fossil fuels; started the tax in 2019 at $20 per metric ton of carbon dioxide emissions, and increased it annually at the consumer price index inflation rate plus 3.5%; directed the revenues into accounts to reduce GHG emissions connected to energy use, resilience of natural resources, and

676–77 (2015); CHARLES KOMANOFF & MATTHEW GORDON, CARBON TAX CTR., BRITISH COLUMBIA'S CARBON TAX: BY THE NUMBERS 4 (2015), https://perma.cc/DP6V-CL7M.

304 ENV'T & CLIMATE CHANGE CAN., TECHNICAL PAPER ON THE FEDERAL CARBON PRICING BACKSTOP 6–7 (2017), https://perma.cc/5NY9-6ETF; ENV'T & CLIMATE CHANGE CAN., ESTIMATED RESULTS OF THE FEDERAL CARBON POLLUTION PRICING SYSTEM 1–2 (2018), https://perma.cc/LVZ9-PXVR.

305 Greenhouse Gas Pollution Pricing Act, S.C. 2018, ch. 12, § 186 (Can.), https://perma.cc/4YZ2-Z28K.

306 *Notice Establishing Criteria Respecting Facilities and Persons and Publishing Measures: SOR/2018-213*, GOV'T CAN. (Oct. 19, 2018), https://perma.cc/4DQE-H9M8.

307 *Fall 2018 Update: Estimated Impacts of the Federal Pollution Pricing System*, GOV'T CAN., https://perma.cc/VR3F-U3EK (last updated Jan. 31, 2019) [hereinafter *Canada Estimated Impacts*]; *Department of Finance Announcing Climate Action Incentive Payments and Launch of Fuel Charge Consultations*, GOV'T CAN., (Oct. 23, 2018), https://perma.cc/6NB3-3BWW ("Carbon pollution is not free. Canadians see its effects when extreme weather threatens their safety, their health, their communities, and their livelihoods. They pay for it in the form of structural repairs and higher insurance premiums, food prices, health care costs and emergency services. Climate change is expected to cost Canada's economy $5 billion annually by 2020."); *How We're Putting a Price on Carbon Pollution*, GOV'T CAN., https://perma.cc/9XUM-LYDJ (last updated Nov. 20, 2018) ("Most households in those provinces will receive more in Climate Action Incentive payments than the increased costs they incur from carbon pollution pricing. This incentive will benefit those who adopt practices that lead to less carbon pollution."); *Ontario and Pollution Pricing*, GOV'T CAN., https://perma.cc/AL37-ZLGU. (last updated Feb. 21, 2019).

308 WORLD BANK GROUP, STATE AND TRENDS OF CARBON PRICING 2018, at 8, 39–53 (2018), https://perma.cc/GLQ2-7S9T ("Carbon pricing continues to gain traction and there is progress towards scaling up international climate finance. . . . 51 carbon pricing initiatives have been implemented or are scheduled for implementation . . . [t]his consists of 25 emissions trading systems (ETSs), mostly located in subnational jurisdictions, and 26 carbon taxes primarily implemented on a national level."). *See* OECD, TAXING ENERGY USE 2018: COMPANION TO THE TAXING ENERGY USE DATABASE 3, 12 (2018), https://perma.cc/22PV-S6QP ("Taxes on energy use differ strongly between countries, sectors and fuels, but most are well below where they should be to reflect climate costs alone. . . . Taxes on oil are relatively high, while taxes on coal are often low or zero."); CARBON PRICING LEADERSHIP COAL., REPORT OF THE HIGH-LEVEL COMMISSION ON CARBON PRICES 2 (2017), https://perma.cc/A5UT-KDDJ.

other activities in the state;[309] and "[e]stablished the Clean Energy Investment Program to allow an electric or gas utility to claim a credit . . . against the carbon tax for approved investment[s] . . . that reduce or offset carbon emissions."[310] Among the tax design details were exemptions for aircraft fuel, fuel used solely for agricultural purposes, and biodiesel; taxing fuels and electricity used in the state from out-of-state sources, but exempting fuels or electricity subject to a comparable pollution tax or charge on carbon imposed by another jurisdiction; preemption of comparable local government taxes; and priority to funding projects that benefit low-income communities, communities of color, and indigenous peoples.[311] Like cap-and-trade programs of the Regional Greenhouse Gas Initiative and California—but unlike Canada's Output-Based Pricing System with Climate Action Incentive payments to households or the Climate Leadership Council's proposed carbon dividends[312]—the Washington bill would not have applied all or most of the carbon revenues to provide tax credits or other payments to households of all income levels.[313]

Carbon taxes, like cap-and-trade systems allocating annually declining quantities of emission allowances, are intended to reduce GHG emissions by providing financial incentives to switch to cleaner energy sources and cut energy usage.[314] These carbon pricing systems rely on market mechanisms

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309 *See* S. Bill Rep. No. 6203, *supra* note 302, at 4, 7 (50% to the Energy Transformation Account, going to public and private entities for projects that reduce GHG directly connected to energy use in the state; 35% to the Water and Natural Resource Resilience Account; and 15% to the Transition Assistance Account to assist vulnerable communities (including support for low-income energy assistance) and workers in fossil fuel industries).

310 *Id.* at 1.

311 *Id.* at 3–4.

312 *See supra* notes 48, 53, 306 and accompanying text. The Climate Leadership Council advocated for returning the proceeds from the carbon price to the American people on an equal and monthly basis via dividend checks, direct deposits or contributions to their individual retirement accounts, with the Social Security Administration administering the program. "Public support for pricing carbon is highly dependent on how the revenue is used. By far the most popular use—by a ratio of 3 to 1—is returning the proceeds directly to all citizens in the form of dividends." SCHULTZ & HALSTEAD, *supra* note 300, at 2; *see also* JOSEPH ROSENBERG ET AL., DISTRIBUTIONAL IMPLICATIONS OF A CARBON TAX 7 (2018), https://perma.cc/AZ8H-QLLZ. Other design features of this proposal were a carbon price on fossil fuels beginning at $40 per ton for carbon-equivalent emissions and increasing over time; implementing the tax at the refinery, mine, well, or port; applying border adjustments (rebates and fees) for the carbon content of imports and exports to protect American competitiveness and encourage other nations to adopt carbon pricing; and eliminating regulations over GHG emissions. *See* BAKER ET AL., *supra* note 300, at 1.

313 S. Bill Rep. No. 6203, *supra* note 302, at 4.

314 The Canadian national government points to these benefits of its carbon pricing system:

- Carbon pollution pricing stimulates innovation, which helps Canadian businesses compete in the emerging low-carbon economy. Putting a price on pollution creates an incentive to innovate, develop, and adopt clean technologies and processes. Companies and entrepreneurs that develop new ways to produce goods or provide services less carbon intensively will benefit from access to the rapidly growing global market for clean solutions.
- Pricing carbon pollution also encourages consumers and households to improve energy efficiency. This could include installing better insulation or choosing cleaner

rather than regulatory mandates for technologies or source emission levels, with expected gains in economic efficiency and effectiveness.[315] While carbon-tax proposals have been spurred by climate-change concerns,[316] they have also been framed as a means to raise revenues without raising rates of established taxes, restructure other taxes, reduce regulations on fossil fuels and GHG emitters, reduce subsidies for clean energy, avoid the political and administrative complexities of cap-and-trade systems of allowances, and strengthen the economy.[317]

Carbon taxes pose fundamental issues students learn about as common to many taxes on income, sales of products and services, consumption, imports, licenses, and other categories of levies. These issues include defining the taxable activities, taxation rates, amount of revenue generated, impacts on choices by consumers and producers (including jobs, investments and technologies), equity in distributing burdens, efficiency in collection, points of taxation, credits and dedicated uses of revenues, exemptions and transition measures, public support, processes for administration, and indirect impacts. Students should also discuss which stakeholders would be most affected by a carbon tax, what studies would be helpful in deciding whether to support or oppose a carbon tax, what alternatives should be analyzed, how the levies should be framed in terms of policy goals and impacts, and what effects should be monitored and evaluated.

Carbon tax materials would help students learn about the concerns underlying these proposals regarding GHG emissions and the impacts of climate change. The broad reach of carbon taxes would also help students understand the range of economic activities producing or affected by GHG emissions, the economic and social consequences (pervasively affecting the practice of law) of transitioning to cleaner energy, and climate justice concerns and other complexities in designing and implementing mechanisms to reduce GHG emissions.

2. Fee Not Treated as Tax

A 2017 case would be useful in teaching the limits of government levies that are treated as taxes, while also training students on climate change

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technologies (like high-efficiency furnaces), investments and behaviour changes that can save money over the long term. As new technologies are deployed, costs will fall, helping make new technologies more widely available and effective over time.

Canada Estimated Impacts, *supra* note 307; *see* David M. Driesen, *Emissions Trading Versus Pollution Taxes: Playing "Nice" With Other Instruments*, 48 ENVTL. L. 29, 34 (2018); MORRIS & MATHUR, *supra* note 299, at 3; SCHULTZ & HALSTEAD, *supra* note 300, at 5.

315 BAKER ET AL., *supra* note 300, at 1, 3 (carbon tax eliminates "command-and-control," "heavy-handed climate regulations"); SCHULTZ & HALSTEAD, *supra* note 300, at 4–5.

316 *See* S. Bill Rep. No. 6203, *supra* note 302, at 2 (background for the proposed carbon tax is the state's Clean Air Act, which established GHG emission reduction targets).

317 *Id.* at 9–11; BAKER ET AL., *supra* note 300, at 2–4; MORRIS & MATHUR, *supra* note 299, at 3–4.

issues.[318] The California Chamber of Commerce alleged that the state's cap-and-trade system of GHG emissions allowances was a tax, which under the state's constitution required a supermajority vote of the legislature.[319] The plaintiffs pointed to the revenue generated by the periodic distribution of emission allowances by the state, with some allowances distributed for free but others sold via auction with a reserve price set by the government.[320] A California Court of Appeals found that global warming poses a "serious threat" to the "economic well-being, public health, natural resources, and the environment of California," and that the auction mechanism was part of a regulatory program intended to reduce GHG emissions.[321] After detailed review of the legislation, the auction mechanism, and the hallmarks of a tax, the court concluded that this auction was not a tax.[322] The court based its decision on the characteristics that participation in the auction was voluntary (a company could reduce its GHG emissions and not be required to purchase allowances), and payment at auction for allowance credits provided valuable, tradable commodities to the payor (as opposed to a tax under which the payor received "nothing of particular value for payment").[323]

In pursuing reductions in GHG emissions, state and local governments have adopted various financial incentive mechanisms and other forms of regulations. While both fees treated as taxes and other mechanisms of imposing costs on GHG emissions incentivize cleaner energy and lower energy usage, this case illustrates that classifying certain methods as taxes has consequences under some laws and state constitutions.[324] Moreover, as noted above, the Climate Leadership Council called its proposal for carbon pricing a "carbon dividend" rather than a "carbon tax" for political purposes.[325]

For students in tax courses, the materials on carbon taxes and this case could spur discussions of the boundaries between taxes and other financial incentives, the concerns about climate change that drive the adoption of new fees, and the targets and design details for programs to reduce GHG emissions.[326]

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318 Cal. Chamber of Commerce v. State Air Res. Bd., 10 Cal. App. 5th 604, 613 (2017).

319 *Id.* at 613.

320 *Id.* at 625.

321 *Id.* at 615 (quoting Our Children's Earth Found. v. State Air Res. Bd., 234 Cal. App. 4th 870, 874 (2015)).

322 *Id.* at 614.

323 *Id.*

324 *Accord* GenOn Mid-Atlantic, LLC v. Montgomery County, Md., 650 F.3d 1021, 1022–23 (4th Cir. 2011) (addressing the question whether exaction on carbon dioxide emissions was a tax or a fee, which would determine whether the federal court was deprived of jurisdiction under the Tax Injunction Act).

325 *See* BAKER ET AL., *supra* note 300, at 2.

326 Possible questions to guide students in studying materials on carbon taxes and the characterization of charges imposed on GHG emitters include:

1) Should the revenues from carbon prices go primarily to households, or should a large portion of the revenues be used for energy efficiency, clean energy, workforce training, and other projects? What are the advantages and disadvantages of directing

H. Administrative

Administrative law courses typically analyze many environmental cases for a range of fundamental principles in judicial review of agency decisions, statutory interpretation, administrative procedures, and other topics.[327] These courses often use a landmark 2007 U.S. Supreme Court decision on GHG emissions, *Massachusetts v. U.S. Environmental Protection Agency*,[328] to teach one or more important topics in administrative law;[329] however, even in teaching this key case in climate law, many administrative law courses miss opportunities to train students on related issues in climate change and legal frameworks that affect many areas in practicing law. This Part describes a broader use of *Massachusetts* as well as other cases that could expose students to the typical administrative law topics of standing, judicial review, statutory interpretation, statutory displacement of federal common law, and cost-benefit analyses.[330] The cases would also help students understand climate change impacts, regulatory mechanisms to reduce GHG emissions, and the costs and benefits from such programs.

1. Standing/Statutory Interpretation/Judicial Review

In addressing U.S. Environmental Protection Agency (EPA) regulation of GHG emissions, *Massachusetts* provides a detailed analysis of several important topics in administrative law as well as a lengthy discussion of

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such funds to general revenues accounts to reduce government deficits and the need to raise other taxes?

2) Does one state's carbon price make it less attractive for businesses or households? If so, why would a state government approve such a program? What features of a carbon price could strengthen its attractiveness to a state's politicians and citizens?

3) Would legislators and the public react differently if a price on carbon emissions is characterized as a tax, regulatory charge, carbon dividend, allowance price, or some other fee?

4) Should different legal tests apply depending on whether a carbon price is viewed as having primarily a revenue-generating purpose or a regulatory purpose? Climate-related charges may also be mandated by statutes with other purposes. Consider the Illinois legislation that strengthened the state's renewable energy portfolio standard and, after years of wrangling among diverse stakeholders and groups of legislators, was passed under the name Future Energy Jobs Act. 2016 Ill. Legis. Serv. P.A. 99-906 (West 2018); *see also Future Energy Jobs Act Workforce Development Programs*, *supra* note 267 (describing the employment programs the Act created).

327 *See*, *e.g.*, Solid Waste Agency of N. Cook Cty. v. U.S. Army Corps of Eng'rs, 531 U.S. 159, 159–161 (2001); Whitman v. Am. Trucking Ass'n, 531 U.S. 457, 457–59 (2001); Lujan v. Defs. of Wildlife, 504 U.S. 555, 555–56 (1992); Lujan v. Nat'l Wildlife Fed'n, 497 U.S. 871, 872–74 (1990); Chevron U.S.A. v. Nat. Res. Def. Council, 467 U.S. 837 (1984); Vt. Yankee Nuclear Power v. Nat. Res. Def. Council, 435 U.S. 519, 520–21 (1978); Citizens to Pres. Overton Park v. Volpe, 401 U.S. 402 (1971).

328 549 U.S. 497 (2007).

329 *See*, *e.g.*, PETER L. STRAUSS ET AL., ADMINISTRATIVE LAW: CASES AND COMMENTS 1253–71 (12th ed. 2017); GARY LAWSON, FEDERAL ADMINISTRATIVE LAW 764–72 (7th ed. 2016).

330 STRAUSS ET AL., *supra* note 329, at 59–177, 1047–1298, 1300–69, 1430–43; LAWSON, *supra* note 329, at 501–836, 967–1151.

climate change.[331] Courses that include this case would expose students to some issues in climate change; however, additional materials could be used to strengthen the students' understanding of the related developments in administrative law as well as the environmental, economic, and regulatory context and impacts of this litigation.

To highlight one topic addressed in *Massachusetts*, the Court examined the three-part standing test of "concrete and particularized injury to the plaintiff that is either actual or imminent," injury that "is fairly traceable to the defendant," and "likel[ihood] that a favorable decision will redress that injury."[332] The EPA opposed standing for the Commonwealth of Massachusetts.[333] The EPA argued that GHGs inflict widespread harm and not particularized injuries against this plaintiff, that the EPA's failure to "regulate [GHG] emissions from new vehicles contributes so insignificantly to [plaintiffs'] injuries," and that the requested regulation could not remedy them.[334]

The Court held that Massachusetts had a stake in the outcome of this case that was sufficiently concrete to warrant standing.[335] On injury, the majority pointed to unchallenged affidavits that stated "rising seas have already begun to swallow Massachusetts' coastal land," the state "owns a substantial portion of [its] coastal property," injury will become more severe over the next century, and remediation costs could run into hundreds of millions of dollars.[336] On causation, the Court cited to evidence that the U.S. transportation sector accounts for more than 6% of worldwide and about one-third of U.S. annual carbon dioxide emissions.[337] On the remedy, the Court found:

> While it may be true that regulating motor-vehicle emissions will not by itself *reverse* global warming, it by no means follows that we lack jurisdiction to decide whether EPA has a duty to take steps to *slow* or *reduce* it. . . . Because of the enormity of the potential consequences associated with manmade climate change, the fact that the effectiveness of a remedy might be delayed during the (relatively short) time it takes for a new motor-vehicle fleet to replace an older one is essentially irrelevant. . . . A reduction in domestic emissions would slow the pace of global emissions increases, no matter what happens elsewhere.[338]

In sum, the Court's analysis of the factual basis for standing provides administrative law students with a primer on climate change.

Similarly, the *Massachusetts* decision teaches students about climate change issues in its holdings on statutory interpretation (whether GHG is an

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331 *Massachusetts*, 549 U.S. 497, 516–35 (2007).
332 *Id.* at 517.
333 *Id.*
334 *Id.* at 522–23.
335 *Id.* at 520.
336 *Id.* at 522–23.
337 *Id.* at 524.
338 *Id.* at 525–26.

"air pollutant")[339] and judicial review of an agency's denial of a petition for rulemaking (whether the EPA's action was arbitrary or capricious in light of scientific information linking anthropogenic GHG emissions to climate change).[340]

But administrative law courses should not stop with a few passages from this case. Students would learn about important topics in administrative law and climate change from additional materials related to *Massachusetts*. Readings could include the EPA's post-*Massachusetts* endangerment finding for GHGs and Tailpipe Rule setting GHG emission limits for cars and light trucks, which were upheld in court review.[341] Next, students studying *Massachusetts* should learn about subsequent regulatory attempts to set GHG emission limits for large stationary sources; the analysis could start with the EPA's regulations for new and existing electric power plants (including the Clean Power Plan, which was stayed by the U.S. Supreme Court, subject to an executive order mandating agency review, and addressed in a 2017 EPA rulemaking proposal to repeal the plan),[342] and then

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339 *Id.* at 528–29 ("The Clean Air Act's sweeping definition of 'air pollutant' includes '*any* air pollution agent or combination of such agents, including *any* physical, chemical . . . substance or matter which is emitted into or otherwise enters the ambient air. . . .' Carbon dioxide, methane, nitrous oxide, and hydrofluorocarbons are without a doubt 'physical [and] chemical . . . substance[s] which [are] emitted into . . . the ambient air.'" (internal quotation marks omitted)).

340 *Id.* at 533–34.

> Under the clear terms of the Clean Air Act, EPA can avoid taking further action only if it determines that greenhouse gases do not contribute to climate change or if it provides some reasonable explanation as to why it cannot or will not exercise its discretion to determine whether they do. . . .
>
> . . . .
>
> Nor can EPA avoid its statutory obligation by noting the uncertainty surrounding various features of climate change and concluding that it would therefore be better not to regulate at this time. . . . If the scientific uncertainty is so profound that it precludes EPA from making a reasoned judgment as to whether greenhouse gases contribute to global warming, EPA must say so. . . . The statutory question is whether sufficient information exists to make an endangerment finding.
>
> In short, EPA has offered no reasoned explanation for its refusal to decide whether greenhouse gases cause or contribute to climate change. Its action was therefore "arbitrary, capricious, . . . or otherwise not in accordance with law."

Id. (internal quotation marks omitted).

341 Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66,496, 66,496 (Dec. 15, 2009); Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards, 75 Fed. Reg. 25,324, 25,324 (May 7, 2010) (final rule); Coalition for Responsible Regulation v. Envtl. Prot. Agency, 684 F.3d 102 (D.C. Cir. 2012), *rev'd in part on other grounds sub nom.* Utility Air Regulatory Group v. EPA, 134 S.Ct. 2427 (2014).

342 Standards of Performance for Greenhouse Gas Emissions From New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units, 80 Fed. Reg. 64,510 (2015); Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, 80 Fed. Reg. 64,662 (2015), *on appeal and cases held in abeyance sub nom.* West Virginia v. U.S. Envtl. Prot. Agency, No. 15–1363 (and consolidated cases) (D.C. Cir.); West Virginia v. U.S. Envtl. Prot. Agency, 136 S. Ct. 1000 (2016) (stay); THE WHITE HOUSE,

consider Massachusetts' and other states' attempts to limit such emissions through legislation and regulations (despite the case's finding that the federal Clean Air Act applies to GHGs as well as the interstate and global nature of climate change).[343] Third, students should consider *Massachusetts*' ramifications on the preemption and removal of federal and state tort law claims against fossil fuel and electric power companies (discussed next), which has become a major factor in the evolving climate-related legal framework.[344]

While a deep dive into *Massachusetts* and subsequent developments may not fit into the schedule for many administrative law courses, professors should point to these additional perspectives on the case and perhaps encourage students to explore them in class reports, notes for law reviews, seminar or independent study papers, clinical work, and other projects.

2. Statutory Displacement of Federal Common Law

Teaching the 2011 U.S. Supreme Court decision in *American Electric Power Co. Inc. v. Connecticut* would allow courses to address how a statute that establishes an administrative agency can displace federal common law claims, while also instructing students on climate change.[345] The public nuisance lawsuits filed by several states, the City of New York, and three private land trusts sought an injunction requiring that the defendants (four private power companies and the federal Tennessee Valley Authority) reduce their GHG emissions annually.[346] The opinion summarized the EPA's 2009 finding that GHG emissions from vehicles "cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare."[347] The Court then found that the Clean Air Act displaced federal

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PRESIDENTIAL EXECUTIVE ORDER ON PROMOTING ENERGY INDEPENDENCE AND ECONOMIC GROWTH, Sec. 4 (2017), https://perma.cc/DJ5B-W7FQ; Repeal of Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, 82 Fed. Reg. 48,035 (2017) (proposed rule repealing the Clean Power Plan).

343 For Massachusetts, see *New England Power Generators Ass'n,* 480 Mass. 399 (2018); Massachusetts Global Warming Solutions Act, St. 2008, c, 298; MASS. EXEC. OFFICE OF ENERGY & ENVTL. AFFAIRS, 2015 UPDATE: MASSACHUSETTS CLEAN ENERGY AND CLIMATE PLAN FOR 2020, at 55 (2015), https://perma.cc/7BL2-7GM6; EXEC. OFFICE OF ENERGY & ENVTL. AFFAIRS & ADAPTATION ADVISORY COMM., MASSACHUSETTS CLIMATE CHANGE ADAPTATION REPORT (2011), https://perma.cc/NY73-K5FQ.

For California, see *Cal. Chamber of Commerce*, 10 Cal. App. 5th 604 (2017); California Global Warming Solutions Act of 2006 (Health & Saf. Code, § 38500 et seq.) (AB 32 (2006) and AB 398 (2017)); Clean Energy and Pollution Reduction Act (SB 350) (2015); CAL. AIR RES. BD., CALIFORNIA'S 2017 CLIMATE CHANGE SCOPING PLAN 65–69 (2017), https://perma.cc/T98V-WH7Y.

For Minnesota, see Next Generation Energy Act of 2007, Minn. Stat. §§ 216H.01–.13; MINN. POLLUTION CONTROL AGENCY, GREENHOUSE GAS EMISSIONS IN MINNESOTA: 1990-2016, 7–8, 12–13 (2019), https://perma.cc/N5X4-4T5Z.

344 *See American Electric Power*, 564 U.S. 410, 423 (2011); state, county, municipality, and private plaintiff cases discussed *supra* Parts III.C & III.D.

345 *American Electric Power*, 564 U.S. 410, 416–23 (2011).

346 *Id.* at 415.

347 *Id.* at 416.

common law claims to abate GHG emissions, and that the plaintiffs should seek relief from the EPA.[348] The Court opined that the federal agency, in combination with state regulators, were better suited than the courts for the complex scientific, technical, and other factual inquiries, as well as the assessment of competing interests and options, in reducing GHG emissions.[349] However, the Court left open the possibility of state common law claims on GHG emissions.[350]

In studying this case, students should learn that (through April 2019) the EPA has not been able to implement regulations on power plants' GHG emissions and that multiple lawsuits alleging state common law claims on GHG emissions have been dismissed.[351]

3. Cost/Benefit Analysis Reflecting GHG Emissions

Finally, administrative law courses commonly address the topic of cost-benefit analyses in regulatory actions.[352] A case dealing with GHG emissions could be used to teach how agencies prepare these analyses and also inform students on climate change.

The Ninth Circuit Court of Appeals in 2007 dealt with the average fuel economy standards for vehicles adopted by the National Highway Traffic

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348 *Id.* at 424.

349 *Id.* at 427–28. The Court noted the role of the expert agency:

> The appropriate amount of regulation in any particular greenhouse gas-producing sector cannot be prescribed in a vacuum: As with other questions of national or international policy, informed assessment of competing interests is required. Along with the environmental benefit potentially achievable, our Nation's energy needs and the possibility of economic disruption must weigh in the balance. . . . It is altogether fitting that Congress designated an expert agency, here, EPA, as best suited to serve as primary regulator of greenhouse gas emissions. The expert agency is surely better equipped to do the job than individual district judges issuing ad hoc, case-by-case injunctions. Federal judges lack the scientific, economic, and technological resources an agency can utilize in coping with issues of this order.

Id. at 427; *see also City of Oakland,* 325 F. Supp. 3d 1017, 1022, 1029 (N.D. Cal 2018) ("[T]o standing room only, counsel and their experts conducted a science tutorial for the undersigned judge…. [T]his order accepts the science behind global warming. So do both sides…. The problem deserves a solution on a more vast scale than can be supplied by a district judge or jury in a public nuisance case. While it remains true that our federal courts have authority to fashion common law remedies for claims based on global warming, courts must also respect and defer to the other co-equal branches of government when the problem at hand clearly deserves a solution best addressed by those branches.").

350 *See* discussion *supra* Parts III.C & III.D.

351 *See* discussion *supra* Parts III.C & III.D, and notes 331–344 and accompanying text.

352 *See generally* STRAUSS ET AL., *supra* note 329, at 409–443, 1093–96 (Executive Orders 12866 and 13771); Entergy Corp. v. Riverkeeper, Inc., 556 U.S. 208, 226 (2009); OFFICE OF THE ASSISTANT SEC'Y FOR PLANNING & EVALUATION, U.S. DEP'T OF HEALTH & HUMAN SERVS., GUIDELINES FOR REGULATORY IMPACT ANALYSIS: A PRIMER 1 (2016), https://perma.cc/9EDG-RP43; OFFICE OF MGMT. & BUDGET, CIRCULAR A-4, at 1 (2003), https://perma.cc/PML6-Q388; MAEVE P. CAREY, CONGR. RESEARCH SERV., COST-BENEFIT AND OTHER ANALYSIS REQUIREMENTS IN THE RULEMAKING PROCESS 1 (2014), https://perma.cc/6YHL-5DA2.

Safety Administration (NHTSA).[353] The opinion described the record before NHTSA and the agency's environmental assessment on the relationships tying U.S. vehicles' GHG emissions to climate change affecting sea levels, storms, diseases, plants, animals, ecosystems, and other conditions.[354] However, NHTSA's cost-benefit analysis, pursuant to the Energy Policy and Conservation Act of 1975, did not monetize the benefit of reducing carbon emissions, citing valuation uncertainties.[355] The court held that NHTSA's decision not to monetize this benefit was arbitrary and capricious, and cited the record support for $50 per ton of carbon emissions.[356] Turning to NEPA, the court concluded that NHTSA erred by not evaluating the incremental impact of vehicles' carbon emissions under its standard on climate change, even though climate change is a global phenomenon affected by many actions outside the agency's control.[357]

Students will encounter climate change issues in work by a wide range of federal, state and local agencies. The resources in this Article provide examples in contracts, property, litigation, constitutional, business associations and securities, and land use planning, as well as environmental agencies. Administrative law courses should give students a framework for understanding GHG emissions, climate change impacts, prominent regulatory mechanisms and financial incentives aimed at reducing GHG emissions, government programs targeting climate adaptation, climate justice concerns, as well as the roles of legislatures, regulators, and courts.[358]

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353 Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin., 538 F.3d 1172 (9th Cir. 2007).

354 *Id.* at 1189–91.

355 *Id.* at 1192, 1198–1203.

356 *Id.* at 1199–1202.

357 *Id.* at 1217. For opposing views on climate-related economic benefits from motor vehicle fuel efficiency regulation, compare ENVTL. PROTECTION AGENCY, FINAL DETERMINATION ON THE APPROPRIATENESS OF THE MODEL YEAR 2022–2025 LIGHT-DUTY VEHICLE GREENHOUSE GAS EMISSIONS STANDARDS UNDER THE MIDTERM EVALUATION, 6–7 (2017), https://perma.cc/8LKZ-VN88, with Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022–2025 Light-Duty Vehicles, 83 Fed. Reg. 16,077, 16,078 (2018) (notice and withdrawal), and NAT'L HIGHWAY TRAFFIC SAFETY ADMIN. & ENVTL. PROTECTION AGENCY, PRELIMINARY REGULATORY IMPACT ANALYSIS: THE SAFER AFFORDABLE FUEL-EFFICIENT (SAFE) VEHICLES RULE FOR MODEL YEAR 2021-2026 PASSENGER CARS AND LIGHT TRUCKS 106–08, 124–69 (2018), https://perma.cc/UE3H-MVL6; *see also* cases discussed *supra* note 89; Zero Zone, Inc. v. U.S. Dep't of Energy, 832 F.3d 654, 677–78 (7th Cir. 2016) (approving agency's use of social cost of carbon in analyzing new energy efficiency standards); William D. Nordhaus, *Revisiting the Social Cost of Carbon*, 114 PROC. NAT'L ACAD. SCI. 1518, 1518 (2017); Brad Plumer, *Trump Put a Low Cost on Carbon Emissions. Here's Why It Matters.*, N.Y. TIMES (Aug. 23, 2018), https://perma.cc/LC3H-ZLJB.

358 Possible questions to guide administrative law students include:

1) The dissent in *Massachusetts* by four justices would have rejected as nonjusticiable the challenges to the EPA's denial of a petition for rulemaking, leaving the regulation of GHG emissions to "the Executive and Legislative Branches of our Government, who continue to consider regulatory, legislative and treaty-based means of addressing global climate change." 549 U.S. 497, 512 (2007). Should the court have forced the EPA to address GHG emissions after the "EPA concluded that climate change was so important that unless Congress spoke with exacting specificity, it could not have meant the Agency to address it" (*Id.* at 535)?

I. Land Use Planning

Clean energy production, energy efficiency of buildings and transportation, resilience to climate impacts, preparedness for extreme weather events, and other climate-related measures influence many aspects of land use planning in urban, rural, and suburban areas.[359] Cases and other materials on climate-related land use planning would instruct students on standard topics like zoning, development permits, and building codes.[360] These resources would also help students learn skills as climate concerns influence planning processes and assessments. This Part presents cases and materials on zoning for wind and solar farms, and assessing projects' GHG emissions in permitting. Cases addressing governmental restrictions on land uses for transporting coal and protecting against beach erosion and flooding were analyzed in the Parts on contracts and property,[361] and could also be discussed in land use planning courses.

1. Zoning for Wind and Solar Farms

To reduce GHG emissions from electric power generation, federal and state tax incentives, renewable portfolio standards, and other programs spurred installations of wind and solar power facilities around the country.[362] States, counties and municipalities have been involved in zoning and granting permits for these installations.[363] Land use planning professors could choose among many court decisions reviewing planning boards' actions on applications for wind turbines (including cases from Indiana, Kansas, Michigan, and Vermont)[364] or solar farms (including cases from New

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2) Regarding displacement of federal common law tort claims for climate-related damages by the Clean Air Act, should it matter whether the EPA is actively enforcing limits on GHG emissions and seeking damages from large GHG emitters?

3) In evaluating the costs and benefits of a regulation that affects GHG emissions, should U.S. federal agencies consider only the benefits for people and property located in the U.S., or should benefits flowing outside the country be considered? *See* Katherine Ricke et al., *Country-level Social Cost of Carbon*, 8 NATURE CLIMATE CHANGE 895 (2018).

359 *See Planning and Land Use*, U.S. CLIMATE RESILIENCE TOOLKIT, https://perma.cc/LYW3-7SVW (last visited Apr. 13, 2019); AM. PLANNING ASS'N, POLICY GUIDE ON PLANNING & CLIMATE CHANGE, Sec. 1.1 (2011), https://perma.cc/2MH9-PDL8.

360 *See* JEROME G. ROSE, LEGAL FOUNDATIONS OF LAND USE PLANNING 53–177 (2013); CHARLES M. HAAR & MICHAEL ALLAN WOLF, LAND USE PLANNING AND THE ENVIRONMENT: A CASEBOOK 119–244 (2010).

361 *See* discussion *supra* Parts III.A and III.B.

362 *See supra* note 14 and accompanying text.

363 *Id.*; JESSE HEIBEL & JOCELYN DURKAY, STATE LEGISLATIVE APPROACHES TO WIND ENERGY FACILITY SITING (2016) (National Conference of State Legislatures), https://perma.cc/U2G2-3NKB; PLANNING FOR SOLAR ENERGY (David Morley ed., 2014), https://perma.cc/U7QR-NVMK.

364 *In re* UPC Vt. Wind, LLC, 969 A.2d 144, 147 (Vt. 2009); Zimmerman v. Bd. of Cty. Comm'rs, 218 P.3d 400, 405 (Kan. 2009); Flat Rock Wind, LLC v. Rush Cty. Bd. of Zoning, 70 N.E.3d 848, 851 (Ind. Ct. App. 2017); Tuscola Wind III, LLC v. Almer Charter Twp., 327 F. Supp. 3d 1028, 1033 (E.D. Mich. 2017).

Jersey, North Carolina, and Vermont).[365] These decisions instruct students on the issues for such zoning ordinances and special use permits (zoning of the area, setbacks from property lines and residences, height limits, fencing and lighting, decommissioning and restoration of the land, financial guarantees, fees, etc.); testimony for and against (consistency with master land use plans, aesthetics, contribution to area jobs and economic development, commitment to produce renewable energy in the area, effects on neighboring property values, health and safety impacts, traffic effects, revenues for the county and municipality, disruption to the character of the area, noise or glare, effects on animals and plants, etc.); application processes before zoning boards or planning commissions; and interpreting statutory provisions for zoning and special use permits.

Additionally, these decisions provide opportunities for students to learn about renewable energy systems in the context of reducing GHG emissions and mitigating the harms from climate change. As illustrations, Rutland, Vermont adopted solar facilities siting standards because the town desired to "contribute its proportional share to meeting the renewable energy goals" of its county;[366] and Jackson Township, New Jersey "weighed the need for energy independence and the reduction of carbon emissions as legitimate objectives of zoning," leading the reviewing court to find that the "use of solar energy is an inherently beneficial use, which is of value to the community, serves a public good, and promotes general welfare."[367] Students should also consider the policy reasons and impacts of a state statute that preempts county and local zoning and permitting of wind and solar facilities, as in Washington's Energy Facilities Site Locations Act.[368]

2. Assessing Projects' GHG Emissions in Permitting

A California Supreme Court decision in 2015 could be used to teach environmental impact assessments of land use projects generally.[369] This case would also inform students on planning land uses to reduce contributions to climate change and measuring a proposed development's impacts on GHG emissions.[370] The case dealt with a proposal to develop 12,000 acres in northwest Los Angeles County for residential and commercial uses, and the adequacy of the environmental impact report

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365 *In re* Rutland Renewable Energy, LLC, 147 A.3d 621, 622 (Vt. 2016); Ecoplexus Inc. v. Cty. of Currituck, 809 S.E.2d 148, 151 (N.C. Ct. App. 2017); and Clean Water Action, et al. v. Jackson Twp. Council, et al., No. OCN-L-1251-15 PW, slip op., at 3 (N.J. Super. Ct. June 19, 2017), https://perma.cc/7HU3-Q4YU.

366 *Rutland Renewable Energy*, 147 A.3d 621, at 624 (Vt. 2016).

367 *Clean Water Action*, No. OCN-L-1251-15 PW, slip op., at 12–13 (N.J. Super. Ct. June 19, 2017).

368 Residents Opposed to Kittitas Turbines v. State Energy Facility Site Evaluation Council, 197 P.3d 1153, 1158 (Wash. 2008) (en banc). *See generally* Gwen Ottinger et al., *Procedural Justice in Wind Facility Siting: Recommendations for State-Led Siting Processes*, 65 ENERGY POL'Y 662 (2014).

369 Ctr. for Biological Diversity v. Dept. of Fish and Wildlife, 361 P.3d 342, 346 (Cal. 2015).

370 *Id.* at 349.

prepared pursuant to the California Environmental Quality Act.[371] According to guidelines adopted by the state's Natural Resources Agency, environmental impact reports should, *inter alia*, attempt to estimate the amount of GHGs the projects will emit compared to the existing environmental setting; describe the significance of those effects; and discuss the extent to which the project complies with a state, regional, or local plan for reducing GHG emissions.[372] For any such assessment of large developments, the environmental impact report is prepared in the context of fundamental questions such as the contribution of any land use project to global climate change, and how to accommodate population and economic growth within the state's plan to reduce GHG emissions.[373]

As land use planners integrate climate concerns into regulations and programs, law students should learn about these goals, methods, and standards. In addition to the federal NEPA law, as of April 2019 about sixteen states adopted laws, executive orders, or regulations requiring state agencies to perform environmental assessments for actions having the potential to significantly affect the environment.[374] Some state laws and regulations require environmental assessments to include GHG emissions[375] and climate-change vulnerabilities[376] in issuing permits and other agency actions. For example, New York agencies should analyze project proponents' measures affecting GHG emissions in the categories of building design and operation, efficiency or mitigation for on-site GHG sources, site

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371 *Id.* at 346.

372 *Id.* at 348.

373 *Id.* at 351 ("Given the reality of growth, some greenhouse gas emissions from new housing and commercial developments are inevitable."); *see* Alexander G. Crockett, *Addressing the Significance of Greenhouse Gas Emissions Under CEQA: California's Search for Regulatory Certainty in an Uncertain World*, 4 GOLDEN GATE U. ENVTL. L.J. 203, 207–08 (2011); Openlands v. U.S. Dep't of Transp., 124 F. Supp. 3d 796, 807–08 (N.D. Ill. 2015) (holding that an environmental impact statement for a proposed Illinois-Indiana highway that would encourage urban sprawl around Chicago was inconsistent with regional long-range transportation plans (which seek to direct investment toward strengthening existing communities) and inadequately assessed a "no-build" scenario).

374 *See States and Local Jurisdictions with NEPA-like Environmental Planning Requirements*, U.S. COUNCIL ON ENVTL. QUALITY, https://perma.cc/L2L2-ZPT2 (last visited Apr. 13, 2019).

375 Massachusetts General Laws 30 § 61 (2018) ("In considering and issuing permits, licenses, and other administrative approvals and decisions, the respective agency, department, board, commission or authority shall also consider reasonably foreseeable climate change impacts, including additional greenhouse gas emissions, and effects, such as predicted sea level rise."); MINN. POLLUTION CONTROL AGENCY, DISCUSSING GREENHOUSE GAS EMISSIONS IN ENVIRONMENTAL REVIEW 3 (2011), https://perma.cc/QX56-68J2 (discussing what GHG information should be included in an environmental impact statement); *see* Jessica Wentz, *Assessing the Impacts of Climate Change on the Built Environment: A Framework for Environmental Reviews*, 45 Envtl. L. Rep. (Envtl. L. Inst.) 11015, 11018–20 (2015).

376 *See* WASH. STATE DEP'T OF TRANSP., GUIDANCE FOR NEPA AND SEPA PROJECT-LEVEL CLIMATE CHANGE EVALUATIONS 2–4 (2017), https://perma.cc/ANU4-VVF8; WASH. STATE DEP'T OF TRANSP., CLIMATE IMPACTS VULNERABILITY ASSESSMENT 22 (2011), https://perma.cc/3EEP-7SY4.

selection and design, transportation, and waste reduction and management.[377]

The federal, state, and local governments recognize that urban development decisions, such as high-efficiency buildings, low-carbon transport, and design to reduce transport needs, will have critical impacts on climate change.[378] Major cities and counties have prepared climate action or sustainability plans addressing their vulnerability and actions to enhance their resilience to climate-related disasters as well as strategies to reduce their GHG emissions.[379] Actions at the local level to cut GHG emissions include updating building codes to require energy efficiency and allow solar panels on rooftops; providing financing for energy-conservation retrofits of low-income housing; expanding bus, rail, bicycle, and electric automobile transportation options; encouraging development in areas served by mass transit; and requiring that large buildings measure and report their energy usage.[380]

In the California decision, the court accepted as reasonable the state agency's decision to evaluate the significance of the project's GHG impacts in the context of the state's goals for GHG reductions and to use a "business-as-usual" emissions model for assessing efficiency and conservation efforts.[381] However, the court held that the state agency "abused its discretion in finding . . . no cumulatively significant impact on the environment" by simply comparing the project's expected 31% reduction in GHG emissions (compared to business as usual) against the statewide goal of 29% reduction.[382] Instead, the analysis should have considered efficiency and conservation performance from the perspective of greater potential reductions "from new land use projects than from the state's economy as a whole."[383] Additionally, the court faulted the agency's estimate of vehicle miles traveled using an average residential density factor and other unsupported steps in the analysis that led to its conclusion that the project

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377 N.Y. DEPT. OF ENVTL. CONSERVATION, ASSESSING ENERGY USE AND GREENHOUSE GAS EMISSIONS IN ENVIRONMENTAL IMPACT STATEMENTS (2009), https://perma.cc/LUJ9-H4SM.

378 THOMAS DAY ET AL., NEW CLIMATE INST., OPPORTUNITY 2030: BENEFITS OF CLIMATE ACTION IN CITIES 21, 52 (2018), https://perma.cc/67Y8-6HYZ; Rebecca Lewis et al., *Reducing Greenhouse Gas Emissions from Transportation and Land Use: Lessons from West Coast States*, 11 J. TRANSPORT & LAND USE 343, 344, 348 (2018).

379 *See, e.g.*, *OneNYC: Our Sustainable City*, CITY N.Y., https://perma.cc/28S4-7SVY (last visited Apr. 13, 2019); *The Sustainable City Plan*, CITY L.A., https://perma.cc/VKN3-XE7E (last visited Apr. 13, 2019); *What is the Chicago Climate Action Plan?*, CHI. CLIMATE ACTION PLAN, https://perma.cc/2WQH-7R8Z (last visited Apr. 13, 2019); CITY OF CHICAGO, RESILIENT CHICAGO 74, 99–114 (2019); *The Climate Action Plan*, CITY BOS., https://perma.cc/SV9F-FUKH (last visited Apr. 13, 2019).

380 *See, e.g.*, CITY OF BOSTON MUN. CODE ch. VII, §7–2.2 (2018); MUN. CODE OF CHICAGO, ch. 18–14 (2018).

381 *Ctr. for Biological Diversity*, 361 P.3d 342, 352–54 (Cal. 2015).

382 *Id.* at 354.

383 *Id.* ("Designing new buildings and infrastructure for maximum energy efficiency and renewable energy use is likely to be easier, and is more likely to occur, than achieving the same savings by retrofitting of older structures and systems.").

would have insignificant impacts.[384] According to the court, the statewide plan cannot specify all aspects of meeting GHG reduction goals, and local governments play a key role in evaluating land use proposals and mitigation opportunities.[385]

Land use planning decisions are essential to achieving GHG reductions and resiliency against climate effects. In turn, climate issues have come to pervade many aspects of land use planning law. By integrating climate-related cases into land use planning courses, professors would continue to teach core topics and also prepare students to be more effective practitioners.[386]

J. International Law

Finally, the Paris Agreement on Climate Change (the Paris Agreement) (signed in 2015 and entered into force in 2016)[387] is not only a milestone in efforts to address climate change, but also an excellent case study for central topics in international law.[388] These topics include the law of treaties, international and non-governmental organizations, international agreements in U.S. law, and transborder environmental agreements and harms.[389] International climate and other environmental agreements are often included in international law courses,[390] but additional resources could help

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384 *Id.* at 355.

385 *Id.* at 356–57.

386 Possible questions for students' readings and class discussions on these land use planning materials include:

1) Solar power systems are deployed on rooftops (including thousands of panels on each of several large commercial roofs), brownfields (including closed landfills), lots zoned for commercial use, and agricultural lands. These systems have an expected useful life of twenty or more years. Should laws or site-specific zoning decisions discourage placing these systems on productive farm lands?
2) In May 2018, California adopted building efficiency standards mandating rooftop solar for new houses. "On average, the 2019 standards will increase the cost of constructing a new home by about $9,500 but will save $19,000 in energy and maintenance costs over 30 years." CAL. ENERGY COMM'N, 2019 BUILDING ENERGY EFFICIENCY STANDARDS n.p. (2018), https://perma.cc/GJ9L-CZB5. What are the advantages and disadvantages of such building regulations?
3) How would a carbon tax on motor vehicle fuels affect the need for planning authorities to consider the GHG impacts of proposed highways and other land uses?
4) What climate-related measures are reasonably applicable in determining whether to grant permits for a particular land use development? Consider impacts on GHG emissions from energy used and transportation; flooding, water conservation and stormwater management; parks, natural ecosystems and soil restoration; green infrastructure; waste management; and sustainable construction and maintenance practices. *See* U.S. GREEN BUILDING COUNCIL, GREENSPACE FOR GOOD: USING THE SITES SYSTEM TO ADVANCE RESILIENCE (2018), https://perma.cc/W5ZM-HWKE.

387 *What is the Paris Agreement?*, UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE https://perma.cc/2VVN-332J (last visited Apr. 13, 2019).

388 *See generally* LORI FISLER DAMROSCH & SEAN D. MURPHY, INTERNATIONAL LAW: CASES AND MATERIALS (6th ed. 2014).

389 *See id.* at 117–216, 387–432, 621–732, 1467–507.

390 *See id.* at 1484–506.

students learn more from these lessons on climate change and related legal developments. This Part highlights four features of the Paris Agreement of particular interest to U.S. students of international law: process for joining and withdrawing, nationally determined contributions, Green Climate Fund, and technology transfer. Then, this Part explores materials for broader uses of the Paris Agreement to teach international law and climate change.

1. Process for Joining and Withdrawing

The Paris Agreement illustrates the steps in international agreements for parties to adopt, sign, join, and withdraw.[391] As for joining, Article 21 of the Paris Agreement provided that it entered into force after at least fifty-five parties to the United Nations Framework Convention on Climate Change (UNFCCC) accounting for at least 55% of total GHG emissions "deposited their instruments of ratification, acceptance, approval or accession."[392] The United States joined by executive order,[393] rather than proceeding as a treaty under Article II of the Constitution (with advice and consent by two-thirds of the Senate) or by congressional-executive agreement approved by both houses of Congress.[394] President Obama's action to join relied on the wording of Article 21, the Paris Agreement's voluntary (not legally binding) national emission reduction plans, and legally binding procedural aspects that defined how parties to the UNFCCC (which the U.S. ratified as a treaty) would implement their commitments after 2020.[395]

For withdrawal, Article 28 of the Paris Agreement provides that a party may give written notice any time after three years from the date on which the Paris Agreement was entered into force for that party, and withdrawal would take effect one year after such notice; for the United States, the earliest date for withdrawal under this provision is November 4, 2020.[396] On June 1, 2017, President Trump announced that the United States would immediately "cease all implementation of the non-binding Paris Accord," including implementation of the nationally determined contribution and the Green Climate Fund.[397]

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391 Paris Agreement under the United Nations Framework Convention on Climate Change art. 20–21, 28 (2016) [hereinafter Paris Agreement], https://perma.cc/AF6G-J4DE.

392 *Id.* at art. 21.

393 Tanya Somanader, *President Obama: The United States Formally Enters the Paris Agreement,* WHITE HOUSE (Sept. 3, 2016), https://perma.cc/DW26-XAW2.

394 *See* DANIEL BODANSKY, LEGAL OPTIONS FOR U.S. ACCEPTANCE OF A NEW CLIMATE CHANGE AGREEMENT 13–14 (2015), https://perma.cc/YS3N-B9TR; CONG. RESEARCH SERV., TREATIES AND OTHER INTERNATIONAL AGREEMENTS: THE ROLE OF THE UNITED STATES SENATE, S. DOC. NO. 106-71, at 5, 136, 142 (Comm. Print 2001), https://perma.cc/KJ56-4P7G.

395 Somanader, *supra* note 393; Paris Agreement, *supra* note 391, at art. 6, §§ 1–4, 14, 21.

396 Paris Agreement, *supra* note 391, at art. 28.

397 President Donald Trump & Scott Pruitt, Statement by President Trump on the Paris Climate Accord at the Rose Garden (June 1, 2017), https://perma.cc/VDE9-4VA4.

2. Nationally Determined Contributions

In terms of commitments by the parties to reduce GHG emissions, the Paris Agreement reflected "the principle of common but differentiated responsibilities and respective capabilities, in the light of different national circumstances."[398] Upon joining the Paris Agreement, each party submitted a voluntary, self-defined goal and described actions for mitigating its GHG emissions starting in 2020.[399] (In contrast, the Kyoto Protocol, which came into effect under the UNFCCC in 2005, set legally binding targets for developed countries to limit their GHG emissions and established a compliance system.)[400] The Paris Agreement specified processes for each nation to report to the UNFCCC its plan, emissions, and progress in implementing actions ("transparency framework") and to prepare successive plans reflecting "its highest possible ambition."[401] Generally, developed countries offered absolute economy-wide emissions targets; the U.S. pledged to reduce its emissions 26–28% by 2025.[402] Developing countries offered various approaches including absolute economy-wide targets, reductions in emissions intensity (per unit of gross domestic product or per capita), and decreases from projected "business-as-usual" levels.[403]

3. Green Climate Fund

Article 9 of the Paris Agreement built on the earlier commitment by the UNFCCC parties to provide financial support for climate-change mitigation and adaptation programs in developing countries.[404] In 2009, developed countries agreed to jointly mobilize $100 billion per year by 2020 to address the climate needs of developing countries, but there were no country-

398 Paris Agreement, *supra* note 391, at art. 2, § 2.

399 *Id.* at arts. 3, 4, 7, and 13; *see also* UNFCCC, AGGREGATE EFFECT OF THE INTENDED NATIONALLY DETERMINED CONTRIBUTIONS: AN UPDATE (2016), https://perma.cc/CS7K-3KGQ; *INDCs as Communicated by Parties*, UNFCCC, https://perma.cc/LN8L-DDMG; UNFCCC, PREPARATIONS FOR THE IMPLEMENTATION OF THE PARIS AGREEMENT AND THE FIRST SESSION OF THE CONFERENCE OF THE PARTIES SERVING AS THE MEETING OF THE PARTIES TO THE PARIS AGREEMENT, Draft decision -/CMA.1 (2018), https://perma.cc/N83G-MKAQ.

400 UNFCCC, KYOTO PROTOCOL REFERENCE MANUAL: ON ACCOUNTING OF EMISSIONS AND ASSIGNED AMOUNT 32 (2008), https://perma.cc/PM9R-DVA7.

401 Paris Agreement, *supra* note 391, at art. 3, 4 §§ 2–3, 13 §§ 1–2.

402 UNFCCC, USA FIRST NDC n.p. (2016), https://perma.cc/E2KC-6TJP.

403 *See* UNFCCC, INDIA'S INTENDED NATIONALLY DETERMINED CONTRIBUTION: WORKING TOWARDS CLIMATE JUSTICE 8 (2016) (showing how India has pledged to reduce the emission intensity of its GDP by 20–25% by 2020), https://perma.cc/K2QJ-PSPE; UFCCC, FEDERATIVE REPUBLIC OF BRAZIL INTENDED NATIONALLY DETERMINED CONTRIBUTION TOWARDS ACHIEVING THE OBJECTIVE OF THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE 2 & n.4 (2016) (showing how Brazil has set absolute economy-wide targets, as well as pledged to reduce emissions below "business-as-usual" levels), https://perma.cc/U5UP-DE3P.

404 Paris Agreement, *supra* note 391, at art. 9; UNFCCC, REPORT OF THE CONFERENCE OF THE PARTIES ON ITS SIXTEENTH SESSION § IV.A, U.N. Doc. FCCC/CP/2010/7/Add.1 (Mar. 15, 2011), https://perma.cc/E9NC-JM78.

specific, enforceable commitments.[405] In connection with the Paris Agreement, the UNFCCC parties agreed to extend the $100 billion annual goal through 2025.[406] These agreements established the Green Climate Fund as a stand-alone, multilateral financing entity governed by a twenty-four-member board, with an equal number of representatives of developed and developing countries and decisions made by consensus agreement.[407] Students of international law could analyze and learn from the Green Climate Fund's structure, governance, resource mobilization (financing), policies, strategic plan, and annual reports.[408]

4. Technology Transfer

The Paris Agreement recognized the parties' shared "long-term vision on the importance of fully realizing technology development and transfer in order to improve resilience to climate change and to reduce greenhouse gas emissions."[409] The Paris Agreement referred to the Technology Mechanism established in 2010 under the UNFCCC,[410] and called for a new technology framework to provide strategic guidance.[411] The Technology Mechanism consists of a policy body with twenty technology experts representing developed and developing countries as well as a Climate Technology Centre and Network, which provides technical assistance to developing countries, creates access to information on climate technologies, and fosters collaboration.[412]

The Paris Agreement's technology provisions would help students of international law learn about goals and mechanisms that are central to achieving the United Nations' sustainable development goals,[413] provide an

405 UNFCCC, REPORT OF THE CONFERENCE OF THE PARTIES ON ITS FIFTEENTH SESSION 7, U.N. Doc. FCCC/CP/2009/11/Add.1 (Mar. 30, 2010), https://perma.cc/M4NG-58LM.

406 *Climate Finance*, UNFCCC, https://perma.cc/C4QC-8PG8 (last visited Apr. 13, 2019).

407 *See About the Fund: Governance*, GREEN CLIMATE FUND, https://perma.cc/M3CG-VZGD (last visited Apr. 13, 2019).

408 *Id.* (explaining the structure, governance and strategic plan of the Green Climate Fund); *Who We Are: About the Fund*, GREEN CLIMATE FUND, https://perma.cc/9TVW-9GV5 (last visited Apr. 13, 2019) (explaining the Green Climate Fund's resource mobilization strategies).

409 Paris Agreement, *supra* note 391, at art. 10, § 1.

410 BRIANNA CRAFT ET AL., LEAST DEVELOPED COUNTRIES' EXPERIENCES WITH THE UNFCCC TECHNOLOGY MECHANISM 6–7 (2017), https://perma.cc/G2M4-6LZH; GABRIEL BLANCO ET AL., CLIMATE TECH. & DEV., THE TECHNOLOGY MECHANISM UNDER THE UNFCCC: WAYS FORWARD 1, 3 (2012), https://perma.cc/VW8S-TVQP; *Support for Implementing Climate Technology Activities: Technology Mechanism*, UNFCCC, https://perma.cc/2NM2-HJGA (last visited Apr. 13, 2019) [hereinafter *Support: Technology Mechanism*].

411 Paris Agreement, *supra* note 391, at art. 10, § 4. *See* UNFCCC, SUBSIDIARY BODY FOR SCI. AND TECH. ADVICE, INITIAL DRAFT OF THE TECHNOLOGY FRAMEWORK 4–5 (2018), https://perma.cc/3GAT-V3WB.

412 *Support: Technology Mechanism*, *supra* note 410; *see* CRAFT ET AL., *supra* note 410, at 6; BLANCO ET AL., *supra* note 410, at 4–6.

413 *See generally* UNITED NATIONS, TRANSFORMING OUR WORLD: THE 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT ¶ 70 (2015), https://perma.cc/5QT4-XXHY (announcing the launch of the Technology Facilitation Mechanism, an online platform that will help facilitate the spread of science, technology, and innovative initiatives put forth by the United Nations students); INT'L

important perspective on intellectual property rights, and appear in many international agreements. This aspect of the Paris Agreement could be used in international law courses to illustrate the United Nations' recognition in 1992 that developing countries need favorable access to technologies that protect the environment, are less polluting, and use resources in a more sustainable manner.[414] That agenda called for consideration of the roles of patents and intellectual property rights, cooperation in transfers, technology capacity building in developing countries, and collaboration in research and technology assessment. Similarly, the Convention on Biological Diversity acknowledged the importance of access to and transfer of technologies for the conservation and sustainable use of biological diversity and genetic resources.[415]

The Paris Agreement deserves substantial attention in international law courses because of its usefulness in teaching these fundamentals of international agreements, but even more so because of its importance to global governments and legal frameworks, health, economies, societies, and environments. To highlight the impacts of this agreement and teach related issues of climate change and legal frameworks, two types of additional materials could be integrated into these courses.

First, courses should include case studies on compliance with the Paris Agreement. Case studies would promote discussion of the effectiveness of the Paris Agreement, mechanisms used by various countries to mitigate or adapt to climate change, and what further actions are needed through international agreements. Professors could use annual reports encompassing global performance on GHG emissions[416] as well as country-specific reports and studies from developed as well as developing countries.[417] Less than three years after the Paris Agreement was announced,

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TELECOMMS. UNION, FAST-FORWARD PROGRESS: LEVERAGING TECH TO ACHIEVE THE GLOBAL GOALS 6 (2017), https://perma.cc/3DSL-LXD6 (illuminating how the United Nations is using Information and Communication Technologies to help meet the Sustainable Development Goals).

414 UNITED NATIONS SUSTAINABLE DEV., UNITED NATIONS CONFERENCE ON ENVIRONMENT & DEVELOPMENT – AGENDA 21 ¶ 34.1 (1992), https://perma.cc/WM5N-QQR7; *see* UNITED NATIONS, KYOTO PROTOCOL TO THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE art. 10(c) (1998), https://perma.cc/25QH-2BQN (calling for "policies and programmes for the effective transfer of environmentally sound technologies that are publicly owned or in the public domain and the creation of an enabling environment for the private sector, to promote and enhance the transfer of, and access to, environmentally sound technologies"); Abbe E.L. Brown, *Intellectual Property and Climate Change*, *in* THE OXFORD HANDBOOK OF INTELLECTUAL PROPERTY LAW 8–9 (Rochelle Dreyfuss & Justine Pita eds., 2018), perma.cc/FP6H-3WDK; Ofer Tur-Sinai, *Patents and Climate Change: A Skeptic's View*, 48 ENVTL. L. 211, 244–45 (2018).

415 *Convention: Article 16. Access to and Transfer of Technology*, CONVENTION BIOLOGICAL DIVERSITY, https://perma.cc/E5DF-3XF4 (last visited Apr. 13, 2019).

416 U.N. ENV'T PROGRAMME, EXECUTIVE SUMMARY: EMISSIONS GAP REPORT 2018, at 3 (2018), https://perma.cc/4SKZ-WCS3; ONE PLANET SUMMIT, REVIEW OF THE COMMITMENTS n.p. (2018) https://perma.cc/6RDV-ZSUE.

417 *See, e.g.*, *National Inventory Submissions 2018*, UNFCCC, https://perma.cc/BS65-2SBS (last visited Apr. 13, 2019); *Third Biennial Reports - Annex I*, UNFCCC, https://perma.cc/69GQ-485Q (last visited Apr. 13, 2019). *See generally* NAT'L DEV. & REFORM COMM'N, P.R. CHINA, CHINA'S POLICIES AND ACTIONS FOR ADDRESSING CLIMATE CHANGE (2017), (Oct. 2017), https://perma.cc/W8VY-EYWN; *China Meets 2020 Carbon Target Ahead of Schedule: Xinhua*,

some nations reported shortfalls compared to their early targets (like France, pointing to energy used by vehicles and buildings) and others reported as on course to exceed their early targets (like China, citing a 13.3% increase in the proportion of non-fossil energy sources in 2016 as well as exceeding targets for afforestation and forestry protection). For the United States, despite the announced national withdrawal, the Paris Agreement has become a benchmark for actions by sub-national actors; at least eighteen U.S. states, 412 American cities, and many U.S. companies pledged to uphold the Paris Agreement and tackle climate change issues in the United States.[418]

Next, professors should place the Paris Agreement in the dynamic context of ongoing international efforts to improve mechanisms and commitments to mitigate and adapt to climate change. Part of this learning objective would involve materials on international climate and related agreements and attempts preceding Paris, including the UNFCCC, Kyoto Protocol, Copenhagen Accord, Sustainable Development Goals, and Sendai Framework for Disaster Risk Reduction.[419] Looking forward, courses should cover dynamics both within and related to the Paris Agreement. To achieve deeper GHG emissions cuts in the future, the Paris Agreement is designed with voluntary revisions to the nationally determined contributions every five years.[420] Moreover, the parties agreed to undertake an evaluation of emissions and climate conditions ("global stocktake") every five years.[421] Outside but related to the Paris Agreement are international actions like the 2018 special report of the UN Intergovernmental Panel on Climate Change, warning that the world is already seeing the consequences of 1°C of global warming, and that limiting warming to 1.5°C would require rapid, far-reaching changes in all aspects of society.[422] Other international actions in 2018 involved meetings of leaders at the twenty-fourth Conference of Parties to the UNFCCC, Global Climate Action Summit, and Climate Vulnerable Forum Summit to address issues in implementing the Paris Agreement and other climate conditions.[423]

REUTERS, Mar. 27, 2018, https://perma.cc/PHJ5-TZVX; *Climate Plan*, GOV'T FRANCE, https://perma.cc/KT3W-NR5N (last visited Apr. 13, 2019); *Climate Plan, National Law Carbon Strategy, Multiannual Energy Framework: How France Will Catch Up With The Delay In Its Climate Policy?*, UNION FRANCAISE DE L'ELECTRICITE (Aug. 1, 2018), https://perma.cc/2SJV-TF4A; Emily Green & Phelps Turner, *Is Canada Living Up to Its Global Climate Commitments?*, 33 NAT. RES. & ENV'T 35 (2018); Anupam Jha, *Paris Agreement and India: Dalliance or Serious Alliance?*, 33 NAT. RES. & ENV'T 26 (2018).

418 Kristin McCarthy, *An American (State) in Paris: The Constitutionality of U.S. States' Commitments to the Paris Agreement*, 48 Envtl. L. Rep. (Envtl. L. Inst.) 10,977, 10,981–82 (2018).

419 *See* GERRARD & FREEMAN, *supra* note 22, at 37–79, 747–93; UNITED NATIONS, SENDAI FRAMEWORK FOR DISASTER RISK REDUCTION 2015–2030 (2015), https://perma.cc/8LAN-2XH3.

420 Paris Agreement, *supra* note 391, at art. 4, § 9.

421 *Id.* at art. 14, § 2; *see* UNITED NATIONS SUSTAINABLE DEV., *supra* note 414.

422 INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, GLOBAL WARMING OF 1.5°C 51, 56 (2018), https://perma.cc/AG8H-YM6E.

423 *See Success of COP24 in Katowice – We Have A Global Climate Agreement*, U.N. CLIMATE CHANGE CONF. (Dec. 15, 2018), https://perma.cc/R3FH-RYA3; UNFCCC, *Proposal by the President: Informal Compilation of L-documents* (Dec. 15, 2018), https://perma.cc/5295-KA54; *National Governments Urged to Step Up Climate Action by 2020 at End of Landmark Summit*,

In summary, several aspects of the Paris Agreement would provide international law students with opportunities to learn about provisions applicable to a range of international agreements, as well as training on climate change issues, mechanisms, and developments.[424]

IV. ACTIONS FOR ENVIRONMENTAL LAW PROFESSORS AND PRACTITIONERS TO MOVE FORWARD ON INTEGRATING CLIMATE CASES INTO COURSES

While the preceding toolkit is rich in cases and other materials for integrating climate change into ten high-enrollment law courses, unfortunately it is not self-executing. Much more work needs to be done to bring about these learning experiences for law students. Rather than relying on professors who teach these subjects to grasp the ABA's recommendation for more training on sustainable development and carry the burden of introducing new cases into their curricula, environmental law professors and practitioners should adopt this initiative. This Part describes four reasons for the focus on efforts by environmental lawyers and suggests actions for them. Of course, the active support and collaboration of other law professors is needed and warranted.

First, many environmental lawyers see the reach of climate change into various legal practices, and understand the benefits of lawyers knowing about climate-related impacts and legal mechanisms.[425] Environmental lawyers are more likely to be familiar with this toolkit's cases and other materials than professors teaching these courses. Most law professors in other subjects did not learn about climate change in their undergraduate or legal studies, did not work on such cases in their clerkships or practices, and are not exposed to these developments in their research, readings and conferences. Also, environmental lawyers are more likely to know of the ABA's resolutions and reports on climate change and other sustainable

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GLOBAL CLIMATE ACTION SUMMIT (Sept. 26, 2018), https://perma.cc/8FS6-2T5T; Press Release, Climate Vulnerable Forum, World's First Virtual Leaders' Summit to Raise Climate Ambition and Accelerate Action (June 27, 2018), https://perma.cc/B8YH-YUBZ.

424 Possible questions to guide students regarding the Paris Agreement include:

1) In the absence of emissions standards in the Paris Agreement that are enforceable under international law, what can the parties and other interested groups do to promote satisfaction of nationally-determined contributions and successive plans reflecting each nation's "highest possible ambition"?
2) What types of grants, investments, loans, aid, and other programs should count toward the annual activity in the Green Climate Fund? What could be done to improve its mission, governance, fund raising, and operations? *See* Megan Darby, *8 Takeaways From the Green Climate Fund Meltdown*, CLIMATE HOME NEWS (June 7, 2018), https://perma.cc/ELZ2-DURZ; Joshua S. Hill, *Green Climate Fund Approves $1 Billion For Climate Action in Developing Countries*, CLEAN TECHNICA (Oct. 23, 2018), perma.cc/M99S-7JMQ.
3) How should the UNFCCC evaluate the performance and governance of the Paris Agreement's technology provisions?

425 *See* Robert R.M. Verchick, *What Lawyers Should Know about Adapting to Climate Change*, AM. BAR ASS'N SEC. OF ENV., ENERGY AND RESOURCES (2013), https://perma.cc/93FE-5HWX (last visited Apr. 13, 2019).

development challenges. Accordingly, the burden falls on environmental lawyers to seek out these professors for conversations about introducing climate-related resources into their curricula. The conversations could start with the ABA's recommendations and include a quick analysis of the needs at particular law schools. The needs could include the relatively low portion of students who enroll in an environmental or natural resources law course that studies climate change cases.

Second, professors teaching these courses are unlikely to jump into teaching the toolkit's resources. They lack knowledge of climate change impacts and legal developments. Many environmental lawyers have the requisite knowledge and should offer to collaborate with these professors to help make the instruction possible. The collaboration could take several forms. For student readings on any topic, cases and other resources like those in the toolkit need to be excerpted, possibly updated, and presented with discussion questions along with relevant background readings on climate change. Next, the environmental lawyers should help the professors get comfortable with the readings, discussion questions, and class plans. The environmental lawyers could also suggest video clips that would be useful in presenting the materials in the classroom for particular law schools, such as covering local heatwaves, flooding, wildfires, or beach erosion; operations of nearby freight terminals; emissions from fossil-fuel power plants and roads in the vicinity; and land uses for wind and solar power systems in the state. Another form of collaboration would be team teaching a class, providing students with different perspectives on the materials and developments. In some instances, the environmental lawyers could lead classes in these subjects when discussing climate resources, present recent legal developments, or supervise projects for students who choose to research and write on a climate topic.

Next, environmental lawyers could help the professors and students in individual courses see connections across the climate-related materials. For example, materials for contracts, constitutional, business associations and securities, tax, and international law courses could address different aspects of GHG emissions from power plants. Similarly, flooding from heavy storms and sea level rise could appear in materials for property, torts, civil procedure, administrative, and land use courses. Hopefully, multiple courses at a law school would use some of these resources. It is unlikely that professors teaching the various subjects would work together to develop a systematic approach to integrating climate resources into their courses. As a common resource for these professors, an environmental law professor or practitioner could provide context and unification.

Finally, in addition to helping prepare students to practice law in the world of climate change, the toolkit aims to inspire students to engage in climate change mitigation and adaptation. The students should recognize the burdens of climate injustices and want to provide pro bono representations to disadvantaged people who suffered from or are threatened by climate-related events. They should be eager to help communities adopt zoning ordinances, permits, and programs that facilitate the transition to cleaner

power. The next generation of lawyers should work with business clients to reduce their GHG emissions, increase their operations' resiliency to climate-related events, communicate their climate vulnerabilities and strategies, and support their communities' preparedness for disasters. And so much more. By participating with the toolkit materials in classes, the environmental lawyers could help guide students to opportunities for sustainability work while in law school (perhaps through a campus sustainability group, legal clinic, independent study course, or pro bono project) and in their careers.

In summary, environmental law professors and practitioners should take up the charge of advocacy for integrating climate change materials into many high-enrollment courses, and work with professors teaching these subjects to prepare readings, plan and present classes, and guide students toward engagement in mitigating and adapting to climate change. Of course, this initiative welcomes the support and engagement of law school administrators, other law professors, and sections of the national and state bar associations.

V. CONCLUSION

As the ABA recognized in 2013 and 2015, legal education should do more to provide students intending to practice in many areas with knowledge of climate change impacts and related legal mechanisms. Along with GHGs in the atmosphere and heat and sea levels, the need for lawyers' understanding and competency in this regard increases every year. While environmental and natural resources law courses and climate change seminars provide essential opportunities for deep education on climate change, most law students don't take these courses. Instead, climate-related cases and other materials should be integrated into basic and other high-enrollment courses to teach fundamental topics in those subjects. Students would benefit from these opportunities to learn about climate change and discuss legal developments that are shaping their government, society, economy, and environment. The toolkit presented in this Article demonstrates the feasibility and benefits of this approach for ten major law school courses. Environmental law professors and practitioners should promote this initiative and work with professors teaching these courses to improve legal education for the world of climate change.