

From *Why* to *How* Subnational Jurisdictions are Mitigating Climate Change

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I. INTRODUCTION

Thinking Globally, Acting Locally looks anew at why some cities and other subnational jurisdictions are seeking to limit climate change, a question that has attracted the interest of legal scholars, political scientists, and others since the 2000s.¹ The starting premise for this literature is that subnational actions to reduce greenhouse gas (GHG) emissions are puzzling because these policies may impose costly obligations on local actors that mostly benefit people elsewhere.² By itself, no jurisdiction can secure its own climate; any jurisdiction’s efforts to reduce GHG emissions could be cancelled out by the choice of another jurisdiction to increase its emissions. So why would any city, state, province—or even country—spend money reducing its GHG emissions?³

¹ See the sources from the 2000s cited in Daniel A. Farber, Yuichiro Tsuji, & Shiyuan Jing, *Thinking Globally, Acting Locally: Lessons from the U.S., Japan, and China*, 83 OHIO ST. L.J. 953, 1013 nn.503–04 (2021). Local government efforts to reduce GHG emissions started in the 1990s. HARRIET BULKELEY, CITIES AND CLIMATE CHANGE 110 (2013).

² See Farber, Tsuji & Jing, *supra* note 1, at 956. The literature suggesting that subnational actions are puzzling implicitly views the actions of subnational governments through a rational actor framework; this framework assumes that governments act based on self-interest. See, e.g., Jack L. Goldsmith & Eric A. Posner, *Introduction: Rational Choice and International Law*, 31 J. LEGAL STUD. S1, S1 (2002) (defining the essence of rational choice theory and realism).

³ To be sure, there are perspectives from which subnational actions to reduce GHG emissions are not puzzling. For example, if jurisdictions are thought to act based on something other than economic self-interest, then the willingness of subnational governments to pass laws that impose costs within their borders for the benefit of others is less striking. Even if jurisdictions are assumed to act based solely on economic self-interest, subnational actions to reduce GHG emissions are not puzzling if they are not costly for local actors. In this vein, there is evidence that at least some subnational climate policies are not imposing significant costs within subnational borders. For example, there is a large “gap”

Thinking Globally innovatively draws on the experiences of subnational jurisdictions in China and Japan, as well as the American cities and states on which U.S. legal scholars have generally focused. Professors Daniel Farber, Yuichiro Tsuji, and Shiyuan Jing suggest a way to understand why some subnational jurisdictions seek to limit their GHG emissions: by thinking of these jurisdictions as engaged in a form of “peer production.”⁴ The jurisdictions that choose to reduce their emissions might be analogized to the people who contribute to Wikipedia; conversely, the lagging jurisdictions that do little work to reduce their emissions are like people who use Wikipedia without giving to it—free-riding on the efforts of the more industrious.⁵ Within a rational actor framework, the contributors to Wikipedia may derive a distinct benefit from their efforts; similarly, the subnational efforts to reduce GHGs might be attributed to distinct benefits that these jurisdictions receive. These benefits might include: a reputational benefit as a climate leader, an environmental co-benefit such as lower local air pollution levels, or an industrial benefit such as spawning new GHG-reduction industries.⁶ On the other hand, the lagging jurisdictions might not perceive any benefits to reducing emissions. Maybe their economies are based on fossil fuel extraction, or their populations are more focused on more tangible issues, such as hunger, housing, or economic growth, than the seemingly more abstract challenge of climate change.⁷

Thinking Globally’s explanation of why some subnational units act while others lag rings true. It might also be extended to explain why some countries and supranational organizations, such as the European Union (EU), act while

between the commitments that cities have made and their actual achievements in reducing GHG emissions. SARA HUGHES, *REPOWERING CITIES: GOVERNING CLIMATE CHANGE MITIGATION IN NEW YORK CITY, LOS ANGELES, AND TORONTO* 39–41 (2019); *see also* SAM MARKOFF, INÈS M.L. AZEVEDO, MARK MURO & DAVID G. VICTOR, *BROOKINGS INST., PLEDGES AND PROGRESS: STEPS TOWARD GREENHOUSE GAS EMISSIONS REDUCTIONS IN THE 100 LARGEST CITIES ACROSS THE UNITED STATES* (2020), <https://www.brookings.edu/research/pledges-and-progress-steps-toward-greenhouse-gas-emissions-reductions-in-the-100-largest-cities-across-the-united-states/#footnote-2> [<https://perma.cc/WNC6-5J8M>]; BULKELEY, *supra* note 1, at 117. On a personal note, I participated in a study of a 2019 New York City law that will cap GHG emissions from large buildings in the city beginning in 2024. The study found that, under certain conditions, the law could actually save large buildings money on average between 2024 and 2050. *See generally* DANIELLE SPIEGEL-FELD ET AL., *CARBON TRADING FOR NEW YORK CITY’S BUILDING SECTOR: REPORT OF THE LOCAL LAW 97 CARBON TRADING STUDY GROUP TO THE NEW YORK CITY MAYOR’S OFFICE OF CLIMATE & SUSTAINABILITY* (2021), <https://guaranicenter.org/issues/cities/buildings/> [<https://perma.cc/57LY-RBF5>].

⁴ Farber, Tsuji & Jing, *supra* note 1, at 1024.

⁵ *Id.* at 1022.

⁶ *Id.* at 1023–24; *see also* BULKELEY, *supra* note 1, at 137. As is evident from the text, I regard the environmental co-benefits of GHG emission reductions, such as reductions in local air pollution, as a form of self-interested benefits that are functionally similar to the benefits that seem to drive people to contribute to forms of peer production such as Wikipedia.

⁷ Farber, Tsuji & Jing, *supra* note 1, at 971, 1024.

others lag. National action to address the quintessential global collective action problem of climate change is also puzzling if countries compete with each other similar to the way cities, states, and provinces compete for industry and residents. For example, if countries act out of self-interest, it is not self-evident why the EU continues to devote so much time and effort to reducing its own GHG emissions when EU Member States account for an increasingly smaller share of international emissions.⁸ Indeed, in some contexts, national action to address climate change might be more puzzling than subnational action. In an authoritarian country such as China, significant local actions to address climate change are likely done with the permission of national leaders and might be in response to incentives or orders from the central government.⁹ The development of emissions trading programs in leading Chinese cities and provinces under national auspices is not the equivalent of actions undertaken by California or New York City in open defiance of United States presidents hostile to addressing climate change, such as Donald Trump.¹⁰ It is doubtful that a local Chinese leader would survive politically for long if they openly implemented a policy that contravened the policy preferences of President Xi Jinping.¹¹ Thus, the more interesting questions in the Chinese context may be why the Chinese leadership has decided that climate change warrants some political focus, and how choices are made in the authoritarian system about which subnational

⁸ Ian Tiseo, *Emissions in the EU – Statistics & Facts*, STATISTA (Aug. 4, 2021), <https://www.statista.com/topics/4958/emissions-in-the-european-union/#dossierKeyfigures> [<https://perma.cc/4HUN-CBZH>] (referring to the reductions in the EU’s emissions over time and the EU’s new GHG reduction targets); Steven Mufson & Brady Dennis, *Chinese Greenhouse Gas Emissions Now Larger than Those of Developed Countries Combined*, WASH. POST (May 6, 2021), <https://www.washingtonpost.com/climate-environment/2021/05/06/china-greenhouse-emissions/> [<https://perma.cc/JPG7-6NLT>] (“In 2019, China was the leading source of GHG emissions, and the EU was the fourth largest source.”).

⁹ Farber et al. refer to the dominance of the central government in China, while also suggesting there is leeway for locally initiated climate action. Farber et al., *supra* note 1, at 958, 970, 973.

¹⁰ See BULKELEY, *supra* note 1, at 135 (contrasting the emergence of local initiatives to reduce GHG emissions in U.S. cities “in the late 1990s and early 2000s” when the federal government was not leading climate change initiatives with the local initiatives in “Japan and China” and other nations that were incentivized by national governments). The pilot emissions trading programs in Chinese cities and provinces were launched by the National Development and Reform Commission. See generally Ling Xiong, Bo Shen, Shaozhou Qi, Lynn Price & Bin Ye, *The Allowance Mechanism of China’s Carbon Trading Pilots: A Comparative Analysis with Schemes in EU and California*, 185 APPLIED ENERGY 1849 (2017).

¹¹ See Chris Buckley & Keith Bradsher, *Marking Party’s Centennial, Xi Warns that China Will Not Be Bullied*, N.Y. TIMES (Nov. 11, 2021), <https://www.nytimes.com/2021/07/01/world/asia/xi-china-communist-party-anniversary.html> [<https://perma.cc/6R59-TYJL>] (describing the authoritarian leadership of President Xi and predicting he and the Chinese Communist Party will remain in power indefinitely).

jurisdictions will take the lead in implementing innovative climate policies.¹² Perhaps EU states and other countries engaged in reducing GHG emissions should be regarded as undertaking a form of worldwide peer production from which they, like some subnational jurisdictions, are deriving particular benefits.¹³

The remainder of this short comment moves away from the question of why subnational jurisdictions are acting to limit climate change. It focuses instead on a question implicitly raised by *Thinking Globally*'s excellent—and all too rare—thick descriptions of subnational efforts to limit climate change in China, Japan, and the United States: *How* are leading subnational jurisdictions in the three largest economies in the world seeking to limit climate change? In the book *Repowering Cities*, political scientist Professor Sara Hughes suggests that the question of how cities are seeking to mitigate climate change has received less scholarly attention than why cities are acting, so it warrants more analysis.¹⁴ Although *Thinking Globally* is framed as addressing the “why” question, the fascinating descriptions that it offers of subnational and national efforts in Asia and the U.S. to limit climate change suggest some interesting patterns about the ways these jurisdictions are approaching decarbonization.

¹² On the question of how Chinese cities are chosen for pilot programs, Farber et al. cite this interesting article: Zhao Hui, Zhu Xufeng & Qi Ye, *Fostering Local Entrepreneurship Through Regional Environmental Pilot Schemes: The Low-Carbon Development Path of China*, 14 CHINA: INT'L J. 107 (2016) (cited by Farber, Tsuji & Jing, *supra* note 1, at 958 n.31).

¹³ Within a rational actor framework, the EU's continuing actions to reduce GHG emissions might be explained partly on the basis that the EU might enact a border carbon adjustment through which it would lever reductions in other countries that have so far lagged in reducing their emissions. The EU's own efforts to reduce GHG emissions might help it justify imposing such an adjustment mechanism. Jack Ewing, Stanley Reed & Liz Alderman, *How Europe's Ambitious New Climate Agenda Will Affect Business*, N.Y. TIMES (Oct. 29, 2021), <https://www.nytimes.com/2021/07/14/business/european-union-climate-change.html> [<https://perma.cc/2MZC-U278>]; David Kleimann & William C. Eacho, *Who Is Afraid of the EU's Carbon Border Adjustment Plan?*, HILL (Oct. 13, 2021), <https://thehill.com/opinion/energy-environment/576637-who-is-afraid-of-the-eus-carbon-border-adjustment-plan> [<https://perma.cc/KB9X-N4D3>]; *Total Greenhouse Gas Emission Trends and Projections in Europe*, EUR. ENV'T AGENCY (Nov. 18, 2021), <https://www.eea.europa.eu/ims/total-greenhouse-gas-emission-trends> [<https://perma.cc/W7FR-X6GK>]; *EU Greenhouse Gas Emissions Kept Decreasing in 2018, Largest Reductions in Energy Sector*, EUR. ENV'T AGENCY (May 29, 2020), <https://www.eea.europa.eu/highlights/eu-greenhouse-gas-emissions-kept> [<https://perma.cc/5MSB-SJ7C>].

¹⁴ HUGHES, *supra* note 3, at 5 (“While significant scholarly attention has been given to the question of *why* city governments are committing to address climate change, and to the obstacles and barriers they face, much less has been given to the question of *how* cities can or do proceed in governing GHG emissions.”) (emphasis in original); *see also* BULKELEY, *supra* note 1, at 92–98 (identifying “[m]odes of governing climate change in the city”).

II. PATTERN #1: THE SUBNATIONAL CHOICE OF REGULATORY INSTRUMENT

One pattern concerns the subnational choice of regulatory instruments to reduce GHG emissions. For several decades, technocrats have argued that governments should use emissions trading or taxes rather than the prescriptive forms of environmental regulation.¹⁵ Emissions trading and taxes have often been portrayed as alternatives to prescriptive regulation, which is frequently denominated, somewhat dismissively, as “command-and-control” regulation.¹⁶ The traditional rationale for using trading and taxes is that these economic approaches would lower the cost of achieving a given pollution-reduction objective compared with prescriptive regulation.¹⁷ Trading has since been adopted by the EU and at the national level in a number of countries to reduce GHG emissions.¹⁸ *Thinking Globally* underscores that trading is also used at the subnational level to lower emissions. It mentions pilot GHG emissions trading programs in Shenzhen and seven other subnational jurisdictions in China,¹⁹ the GHG trading program established by the Tokyo Metropolitan Government addressing buildings,²⁰ the California cap-and-trade program, and the Regional Greenhouse Gas Initiative in the northeastern United States.²¹

¹⁵ See generally William Boyd, *The Poverty of Theory: Public Problems, Instrument Choice, and the Climate Emergency*, 46 COLUM. J. ENV'T L. 399 (2021).

¹⁶ *Id.* at 423–24.

¹⁷ See *id.* at 404 (referring to the argument about the cost-saving advantages of emissions trading and taxes).

¹⁸ *ICAP ETS Map*, INT'L CARBON ACTION P'SHIP, <https://icapcarbonaction.com/en/ets-map> [<https://perma.cc/NES6-K5EK>] (visual depiction of the countries and regions that have adopted, are developing, or are considering emissions trading programs).

¹⁹ Farber, Tsuji & Jing, *supra* note 1, at 955, 964–70.

²⁰ *Id.* at 983–87. Saitama also has a GHG trading program that is linked to Tokyo's. DAVID MILLER, SOLVED: HOW THE WORLD'S GREAT CITIES ARE FIXING THE CLIMATE CRISIS 55 (2020); ASHA BRUNDAGE-MOORE, THE TOKYO EMISSIONS TRADING SCHEME: LESSONS FROM A PIONEERING JURISDICTION 2 (July 2019), https://guarinicenter.org/wp-content/uploads/2019/07/Tokyos-Emission-Trading-Program-_Issue-Brief-July-19.pdf [<https://perma.cc/24LH-8XXX>].

²¹ Farber, Tsuji & Jing, *supra* note 1, at 1003–04. Farber et al. also mention the ill-fated Transportation and Climate Initiative, a multi-state proposal to create an emissions trading program to reduce GHG emissions from transportation fuels; the proposal does not appear to be going forward. See *id.* at 958; Sarah Shemkus, *With Regional Transportation Pact Stalled, What's Next for Massachusetts' Climate Strategy?*, ENERGY NEWS NETWORK (Dec. 2, 2021), <https://energynews.us/2021/12/02/with-regional-transportation-pact-stalled-whats-next-for-massachusetts-climate-strategy/> [<https://perma.cc/N22J-REYH>]. Washington state also has passed legislation to establish a GHG cap-and-trade program. WASH. REV. CODE § 70A.65 (2021). Unlike in China and Japan, no local government in the U.S. has established a GHG emissions trading program. However, New York City has studied the potential to implement such as program to help reduce GHG emissions from buildings. See generally SPIEGEL-FELD ET AL., *supra* note 3.

The ubiquity of GHG emissions trading programs might seem to suggest that emissions trading has been so mainstreamed that the longstanding technocratic goal of replacing traditional prescriptive regulation with economic approaches has been realized at the subnational as well as the national level. However, the descriptions of how subnational jurisdictions seek to limit GHG emissions in *Thinking Globally* and other sources suggest that existing emissions trading programs are best regarded as merely a component of a multi-pronged strategy to reduce GHG emissions that includes other policy tools, such as prescriptive regulation and subsidies. Indeed, some have suggested existing GHG emissions trading programs have contributed little to reducing GHG emissions so far, and other policy tools have been much more important in reducing emissions to date. Danny Cullenward and David Victor argue California's cap-and-trade program has been responsible for fewer GHG emission reductions than other policies California has implemented.²² Tokyo's emissions trading program also saw little trading of credits in the first compliance period,²³ suggesting the trading component has not been a major spur to GHG emission reductions (as opposed, perhaps, to the building level emissions limits). The pilot emissions trading programs established in eight Chinese cities as a prelude to the launch of China's national GHG emissions trading program in 2021²⁴ also may not have experienced that much trading, at least among covered buildings.²⁵

The seemingly small contributions of GHG emissions trading programs to reducing GHGs suggest the role of emissions trading in limiting climate change should be reframed in academic scholarship. Rather than suggesting that governments face a choice between emissions trading and standard prescriptive regulation, it might be more accurate for scholarship to present governments as assembling a basket of tools to reduce GHG emissions that might include emissions trading. Trading might provide regulated actors with some flexibility for where and when they achieve the government's GHG reduction objectives, but not displace other policy instruments. This flexibility might be especially valuable when governments adopt stringent GHG emission reduction objectives. The recognition of the limited—but still potentially valuable—role

²² See generally DANNY CULLENWARD & DAVID G. VICTOR, MAKING CLIMATE POLICY WORK 10, 23-24, 119 (2020). Farber et al. mention some of the other policies that have been key to state and local decarbonization efforts in the U.S., including legal mandates to increase the share of electricity coming from renewables, transition fully to renewable energy, reduce the GHG emissions from new cars sold in states (through states adopting GHG emission standards for new cars set by California), and reduce a jurisdiction's economy-wide GHG emissions. Farber et al., *supra* note 1, at 1003–07.

²³ BRUNDAGE-MOORE, *supra* note 20, at 4.

²⁴ INT'L CARBON ACTION P'SHIP, CHINA NATIONAL ETS 1 (2021), https://icapcarbonaction.com/en/?option=com_etsmap&task=export&format=pdf&layout=1ist&systems%5B%5D=55 [<https://perma.cc/LEQ2-FMQ4>].

²⁵ Xiangnan Song, Yujie Lu, Liyin Shen & Xunpeng Shi, *Will China's Building Sector Participate in Emissions Trading System? Insights from Modelling an Owner's Optimal Carbon Reduction Strategies*, 118 ENERGY POL'Y 232, 234 (2018).

for emissions trading might defuse some of the controversy about emissions trading in the U.S. and elsewhere. However, understanding the role of trading in this light is unlikely to completely address the concerns of critics of trading, such as those from environmental justice communities who are concerned that GHG trading could concentrate emissions of local air pollutants, such as PM_{2.5}, NO_x and SO_x, in communities of color and low-income neighborhoods.

III. PATTERN #2: GOVERNING STRATEGIES

A second pattern that can be discerned from *Thinking Globally*'s case studies concerns what Hughes calls the “governing strategies” that underpin climate change mitigation policies.²⁶ As Hughes explains, “Significant, transformative change in a city—such as those implicated by climate mitigation—is not solely or primarily the product of progressive policies.”²⁷ Governments—whether city, state, provincial or national—must establish “capacities” (for example, to track GHG emissions)²⁸ and “institutions” (such as new agencies)²⁹ to effect change, and there must be “coalitions” who support change.³⁰ In American legal scholarship, Professor Shelley Welton similarly argues that decarbonizing society is a “social project,” not merely a technocratic exercise to be resolved using the economically optimal policy instrument.³¹ The Green New Deal in the U.S., the European Green Deal,³² and the discussion of making a “just transition”³³ all seem to respond to a similar sense that there must be a social consensus—or, at least, a broad-based political coalition—to eliminate dependence on fossil fuels.

²⁶ HUGHES, *supra* note 3, at 66.

²⁷ *Id.*

²⁸ *Id.* at 71–73.

²⁹ *Id.* at 68–69.

³⁰ *Id.* at 69 (“For city governments to move forward they need buy-in from, and coordination with, the private sector, residents, decision makers, and key stakeholder groups.”).

³¹ See, e.g., Shelley Welton, *Electricity Markets and the Social Project of Decarbonization*, 118 COLUM. L. REV. 1067, 1068 (2018).

³² *A European Green Deal: Striving to Be the First Climate-Neutral Continent*, EUR. COMM’N, https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en [<https://perma.cc/YN22-Q8CK>].

³³ See, e.g., Ann M. Eisenberg, *Just Transitions*, 92 S. CAL. L. REV. 273, 273 (2019); Sharon B. Jacobs, *Agency Genesis and the Energy Transition*, 121 COLUM. L. REV. 835, 838, 857 (2021) (referring to Colorado’s Office of Just Transition in its Department of Labor and Employment); Press Release, NYSEERDA, DEC and NYSEERDA Announce Members of “Just Transition” Working Group to Support Implementation of State’s Nation-Leading Climate Law (Aug. 25, 2020), <https://www.nyserda.ny.gov/About/Newsroom/2020-Announcements/2020-08-25-dec-and-nyserda-announce-members-of-just-transition-working-group-to-support-implementation-of-states-nation-leading-climate-law> [<https://perma.cc/DPZ5-9DKK>] (announcing the appointment of members to the New York State’s Just Transition Working Group).

The case studies in *Thinking Globally* underscore that the subnational jurisdictions that are able to implement GHG reduction policies have supporting infrastructures in the form of capacities, institutions, and coalitions. In discussing the reasons for California's leadership on climate mitigation, Farber et al. refer to the regulatory capacity and institutions the state has built up from decades of innovative efforts to regulate air pollution.³⁴ California regulators also have demonstrated political skill in assembling political coalitions to support their regulatory initiatives. Farber et al. refer to an agreement that the California Air Resources Board (CARB) creatively struck with several carmakers that helped CARB outfox the Trump Administration's efforts to undermine the state's GHG emissions standards for cars.³⁵ The article also offers an interesting negative example of the significance of the absence of supportive political coalitions. Its discussion of the obstacles to building wind power facilities in rural Japan illustrates how the lack of political support from key constituencies can stymie efforts to decarbonize.³⁶

The need for political support, regulatory capacity, and institutions is perhaps intuitive in democracies such as Japan and the United States, where policies cannot simply be imposed by administrative fiat. Yet *Thinking Globally's* discussion of subnational climate mitigation efforts in China also suggests the need for some degree of supportive infrastructure for decarbonization in an authoritarian context. The Chinese central government's use of mechanisms to motivate local officials, such as the cadre evaluation system and funding from the center, underscore the center's recognition that local officials need to be brought onside to implement climate mitigation policy.³⁷ The absence of opposition from key economic sectors also seems to be important for environmental progress. Farber et al. stress the obstacles that powerful state-owned enterprises (SOEs) can present to reducing GHG emissions at the local level, given the influence that these SOEs wield with local officials; the article hypothesizes the absence of powerful SOEs makes climate mitigation more feasible.³⁸ Elsewhere, Yifei Li and Judith Shapiro argue China will not be able to address its environmental problems by relying only on targets to incentivize local officials.³⁹ They argue China needs to empower people

³⁴ Farber, Tsuji & Jing, *supra* note 1, at 1017. The states that established the Regional Greenhouse Gas Initiative also had a prior history of collaborating to combat air pollution. *Id.* at 1018.

³⁵ *See id.* at 1002, 1004–05.

³⁶ *Id.* at 987–99. New York State, which has legislatively committed to decarbonizing electricity, has created a new office and established tools to facilitate siting of “renewable energy facilities.” Jacobs, *supra* note 33, at 854–55, 897–98; *see also* Kevin Rogers & Jennifer Coghlan, *Court Dismisses Challenge to ORES Regulations for Large-Scale Renewables*, SIVE PAGET RIESEL (Nov. 5, 2021), <https://sprlaw.com/court-dismisses-challenge-to-ores-regulations-for-large-scale-renewables/> [<https://perma.cc/5THW-E366>].

³⁷ Farber, Tsuji & Jing, *supra* note 1, at 970–75.

³⁸ *Id.*

³⁹ YIFEI LI & JUDITH SHAPIRO, CHINA GOES GREEN: COERCIVE ENVIRONMENTALISM FOR A TROUBLED PLANET 56–65 (2020).

outside the state—citizens and advocates—to address its environmental problems, even though such openness to public input would seem to run counter to the inclinations of the Chinese leadership.⁴⁰ While they do not frame their argument quite this way, Li and Shapiro also seem to think environmentalism is a social project, not one that can be achieved in a top-down manner, and they convincingly demonstrate the dangers of the authoritarian approach to environmentalism on display in China today.⁴¹

* * *

In sum, although Farber et al. set out to explain why some subnational jurisdictions are reducing GHG emissions, their case studies also provide a basis for thinking about how some of these jurisdictions are going about decarbonization. They suggest jurisdictions are taking multi-pronged strategies that include market-based approaches to emissions trading, but generally in a subsidiary role. The case studies also emphasize the need for subnational jurisdictions to have a supportive infrastructure for climate mitigation policy, including capacities, institutions, and support from key constituencies. Extending this point about the need for supportive infrastructure to implement climate mitigation policy, the efforts of cities, states, and provinces to reduce GHG emissions might seem to help build the infrastructure necessary for national leadership to emerge to decarbonize. In the twentieth century, the efforts of local and state governments in the U.S. to address air and water pollution were insufficient to address these consequences of industrialization; the subnational failures were an important impetus for the federalization of American environmental law in the 1960s and 1970s.⁴² Thinking optimistically, the subnational efforts to reduce GHG emissions may similarly help to generate the political coalitions—and some of the capacities and institutions—for comprehensive national climate mitigation policy in many countries.

IV. CONCLUSION

The unfortunate reality is that the sort of subnational efforts that Farber et al. chronicle are unlikely to be sufficient on their own to stave off significant climate change, partly because increasing emissions in lagging jurisdictions can always cancel out the benefits of reductions in leading ones. Moreover, even under the most optimistic scenario about how many GHG emissions will be abated going forward, some degree of climate change is already occurring and

⁴⁰ *Id.* at 64–65, 198–205.

⁴¹ *Id.*

⁴² Katrina M. Wyman & Danielle Spiegel-Feld, *The Urban Environmental Renaissance*, 108 CALIF. L. REV. 305, 318–323 (2020) (explaining why environmental law was federalized in the latter twentieth century).

will continue in the years to come.⁴³ Thus, jurisdictions will inevitably need to adapt to climate change much more than they have to date, while also trying to limit further climate change.⁴⁴

Within a rational actor framework, subnational jurisdictions, such as cities, are generally assumed to have a strong incentive to adapt to climate change because jurisdictions reap the benefits of adapting in the form of maintaining, and perhaps expanding, their economies.⁴⁵ Whereas reducing GHGs is usually thought to confer a public good, adaptation might be characterized as a private good to which the adapter secures the benefits.⁴⁶ However it is characterized, adaptation requires resources that even the wealthiest subnational jurisdictions likely lack, which means that subnational jurisdictions will probably not be able to adapt without assistance from other governments.⁴⁷

Although primarily focused on subnational efforts to reduce GHGs, *Thinking Globally* refers to examples of innovative actions to encourage local governments to adapt to climate change, most notably Japan's Climate Change Adaptation Act.⁴⁸ Building on *Thinking Globally's* innovative comparative examination of subnational mitigation efforts in the three leading world economies, future scholarship might analyze the efforts of subnational jurisdictions in China, Japan, and the United States to adapt and extrapolate general patterns and dissonances.⁴⁹ Adaptation, like mitigation, is an area ripe

⁴³ Brady Dennis & Sarah Kaplan, *5 Takeaways from the Latest United Nations Climate Change Report*, WASH. POST (Feb. 28, 2022), <https://www.washingtonpost.com/climate-environment/2022/02/28/ipcc- united-nations-climate-change-takeaways/> [https://perma.cc/3CE8-9KSD] (stating climate change has detrimental effects and hypothesizing the effects are “all but certain to continue”).

⁴⁴ Historically, climate change mitigation has received a lot more attention than adaptation. *See, e.g.*, BULKELEY, *supra* note 1, at 143. There may be an inverse relationship between relying on subnational efforts to reduce GHGs and investments in adaptation: The more countries default to subnational mitigation efforts instead of acting aggressively at the national level to reduce GHG emissions, the less likely the world may be to decarbonize quickly or at all. Consequently, governments may need to make greater efforts to adapt to the resultant higher level of climate change.

⁴⁵ *See, e.g.*, MATTHEW E. KAHN, ADAPTING TO CLIMATE CHANGE: MARKETS AND THE MANAGEMENT OF AN UNCERTAIN FUTURE 7 (2021).

⁴⁶ *See* Mizan R. Khan & Sirazoom Munira, *Climate Change Adaptation as a Global Public Good: Implications for Financing*, 167 CLIMATIC CHANGE 1, 2 (2021) (noting that adaptation had been framed as a private good but should be understood as a global public good).

⁴⁷ The local need for assistance to adapt is particularly acute in developing countries, but also evident in developed countries. *See, e.g.*, BULKELEY, *supra* note 1, at 150–51 (discussing lack of capacity of cities in developing countries to adapt to climate change); *id.* at 180 (discussing lack of “resources” as a barrier to local efforts to adapt to climate change); *see also* Farber, Tsuji & Jing, *supra* note 1, at 982–83 (referring to lack of resources in cities in Japan to fund adaptation and noting differences between resources available to large and small cities).

⁴⁸ Farber, Tsuji & Jing, *supra* note 1, at 977–83.

⁴⁹ As it happens, I am one of the editors of a forthcoming book that examines how several major cities around the world are addressing four environmental issues, one of which

for comparative analysis because different jurisdictions have to confront challenges from higher temperatures, rising seas, fires, and other consequences of global warming.

is adapting to climate change. GLOBAL SUSTAINABLE CITIES: CITY GOVERNMENTS AND OUR ENVIRONMENTAL FUTURE (forthcoming 2023) (co-edited with Danielle Spiegel-Feld and John Coughlin).