U.S. City Climate Commitments: Obstacles and Opportunities in the Building Sector Post-Paris Agreement

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I. INTRODUCTION

All eyes are on cities like New York, San Francisco, Seattle, and Chicago as the United States government pulls away from involvement in the Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC). A picture is starting to emerge of what it looks like for cities in the United States to mitigate and adapt to climate change. The balance between state and local authority frames these pictures, determining what sectors cities can regulate to drive reductions in greenhouse gas (GHG) emissions. The built environment is an important sector, located at the intersection between significant emissions reductions potential and local control. This article will discuss opportunities for cities to reduce emissions in the building sector and the legal frameworks that facilitate and pose challenges to transforming the sector.

Non-state actors, particularly United States cities and states, have increased their involvement in international cooperation around climate change.[1] These government units have also become more

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1. *See* Karin Bäckstrand, Jonathan W. Kuyper, Björn-Ola Linn & Eva Lövbrand, *Non-State Actors in Global Climate Governance: From Copenhagen to Paris and Beyond*, 26(4) ENVTL. POL. 561 (2017), https://doi.org/10.1080/09644016.2017.1327485.

important as the international regime has shifted from the top-down structure of the Kyoto Protocol to the bottom-up approach represented in the Paris Agreement.[2] Focus has also shifted from the federal government to states and cities in the United States as the Trump administration has initiated withdrawal from the Paris Agreement.[3]

The efforts of U.S. subnational governments and their leaders have earned international attention.[4] Indeed, the United Nations appointed then-governor of California Jerry Brown as Special Advisor for States and Regions for the 23rd Conference of the Parties (COP23) to the UNFCCC in November 2017.[5] Michael Bloomberg, former Mayor of New York City, was named the United Nations Secretary-General's Special Envoy for Cities and Climate Change in March 2018.[6] U.S. cities and states had been making climate commitments both on the domestic and international stages even before President Trump announced that the United States would withdraw from the Paris Agreement.[7] Once the intention to withdraw was formalized, states and cities affirmed their commitments to pursue GHG reductions to mitigate climate change while also adapting to it.[8] States, counties, and cities in the United States are operating as climate policy laboratories given the lack of federal action to reduce GHG emissions and active efforts to undo existing climate policies.

2. *Id.* at 563.

3. *President Trump Announces U.S. Withdrawal From the Paris Climate Accord*, WHITE HOUSE (June 1, 2017), https://www.whitehouse.gov/articles/president-trump-announces-u-s-withdrawal-paris-climate-accord/.

4. *See* Max Boykoff et al., *Univ. of Colo., A Review of Media Coverage of Climate Change and Global Warming in 2017*, at 26, https://sciencepolicy.colorado.edu/icecaps/research/media_coverage/summaries/2017_special_issue.pdf (last visited May 6, 2019).

5. *California's Governor Brown Joins COP23 Team*, COP 23, https://cop23.com.fj/californias-governor-brown-joins-cop23-team/ (last visited Mar. 1, 2019).

6. Press Release, António Guterres, Secretary-General, Secretary-General Appoints Michael R. Bloomberg of United States Special Envoy for Climate Action, U.N. Press Release SG/A/1791 (Mar. 5, 2018), https://www.un.org/press/en/2018/sga1791.doc.htm.

7. *See, e.g.*, Tony Barboza, *L.A., Houston, Philadelphia Mayors Vow More Action on Climate Change*, L.A. TIMES (Sept. 22, 2014), https://www.latimes.com/science/sciencenow/la-sci-sn-mayors-climate-agenda-20140921-story.html.

8. *See* WE ARE STILL IN, https://www.wearestillin.com/ (last visited Apr. 21, 2019); *About America's Pledge*, AMERICA'S PLEDGE, https://www.americaspledgeonclimate.com/about/ (last visited Apr. 21, 2019).

The Non-State Actor Zone for Climate Action (NAZCA) portal, created during COP20 in Lima, Peru in 2014, allows subnational governments and other non-state actors, like corporations, to record climate action pledges.[9] Looking at the portal, six U.S. states and thirteen counties have made commitments alongside 177 U.S. cities.[10] A rough survey of those pledges reveals a range of different types of commitments, for example, funding or incentivizing actions that mitigate climate change.[11] The Fourth National Climate Assessment found that "…at least 455 cities support emissions reductions in the context of global efforts, including 110 with emissions reduction targets."[12] Many of the U.S. cities that have registered commitments to reduce GHG emissions by a certain percentage by a certain year are part of cooperative efforts based in the United States like America's Pledge and We Are Still In, as well as the Global Covenant of Mayors for Climate & Energy, which is an international cooperative effort to reduce GHG emissions in major cities.[13]

The Global Covenant of Mayors for Climate & Energy includes both the EU Covenant of Mayors for Climate and Energy and the Compact of Mayors, the former is specific to the European Union and the latter is global.[14] The Global Covenant of Mayors "serves cities and local governments by mobilizing and supporting ambitious, measurable, planned climate and energy action in their communities by working with city/regional networks, national governments and other partners to achieve our vision."[15] A key feature of the Covenant is the emphasis on tracking progress toward objectives, meaning that

9. *About NAZCA*, GLOBAL CLIMATE ACTION: NAZCA, http://climateaction.unfccc.int/views/about.html (last visited Apr. 21, 2019).

10. *See Interactive Map*, GLOBAL CLIMATE ACTION: NAZCA, http://climateaction.unfccc.int/views/map.html (last visited Apr. 21, 2019).

11. *See id*.

12. Jeremy Martinich et al., *Reducing Risks Through Emissions Mitigation*, in IMPACTS, RISKS, AND ADAPTATION IN THE UNITED STATES: FOURTH NATIONAL CLIMATE ASSESSMENT 27, 29 (David Reidmiller et al. eds., 2018), https://nca2018.globalchange.gov/chapter/29/.

13. *About America's Pledge*, AMERICA'S PLEDGE, https://www.americaspledgeonclimate.com/about/ (last visited Apr. 21, 2019); WE ARE STILL IN, https://www.wearestillin.com/ (last visited Apr. 21, 2019); *History of the Global Covenant*, GLOBAL COVENANT OF MAYORS FOR CLIMATE & ENERGY, https://www.globalcovenantofmayors.org/about/history-compact-of-mayors/ (last visited Apr. 21, 2019).

14. *History of the Global Covenant*, GLOBAL COVENANT OF MAYORS FOR CLIMATE & ENERGY, https://www.globalcovenantofmayors.org/about/history-compact-of-mayors/ (last visited Apr. 21, 2019).

15. *Vision and Mission*, GLOBAL COVENANT OF MAYORS FOR CLIMATE & ENERGY, https://www.globalcovenantofmayors.org/about/vision-and-mission/ (last visited Apr. 25, 2019).

cities are asked to report emissions data according to a common reporting framework to "…showcase achievements while tracking progress transparently—and thus advocate for better multilevel governance of climate and energy issues and for improved technical and financial support."[16] America's Pledge is focused almost exclusively on data collection and reporting to "…aggregate and quantify the actions of states, cities and businesses and other non-national actors in the United States to drive down their greenhouse gas emissions consistent with the goals of the Paris Agreement."[17] Accordingly, cities that have joined either one of these agreements and report their commitments and data make great choices to study.

II. EMISSIONS FROM ENERGY USE IN BUILDINGS AND THE POTENTIAL IMPACT OF BUILDING POLICIES

As states, counties, and cities create plans to comply with their climate mitigation goals, the building sector is an important area where these governments can make progress toward reducing emissions. Residential and commercial buildings consume over 70% of the electricity produced in the United States and that figure has been quite static since 2000.[18] Breaking that down to a subnational level, buildings are the largest consumer of energy and thus responsible for the largest share of GHG emissions in almost all urban areas,[19] with transportation often in second place.[20]

16. COMMON GLOBAL REPORTING FRAMEWORK, GLOBAL COVENANT OF MAYORS FOR CLIMATE & ENERGY, https://www.globalcovenantofmayors.org/common-global-reporting-framework/ (last visited Apr. 21, 2019).

17. *About America's Pledge*, AMERICA'S PLEDGE, https://www.americaspledgeonclimate.com/about/ (last visited Apr. 21, 2019).

18. *Electricity Explained: Use of Electricity*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/energyexplained/index.php?page=electricity_use (last updated Apr. 30, 2018); U.S. DEP'T OF ENERGY, 2011 BUILDINGS ENERGY DATA BOOK, tbl. 1.1.1, https://openei.org/doe-opendata/dataset/buildings-energy-data-book/resource/3edf59d2-32be-458b-bd4c-796b3e14bc65 (last updated June 11, 2015); U.S. ENERGY INFO. ADMIN., STATE ENERGY CONSUMPTION ESTIMATES 1960 THROUGH 2016, tbls. CT3, CT4 & CT5 (2018), https://www.eia.gov/state/seds/archive/seds2016.pdf. *See also* Ben Kroposki & Rob Pratt, *U.S. Dep't of Energy, Building-to-Grid Technical Opportunities*, 2 (2014), https://www.energy.gov/sites/prod/files/2014/03/f14/B2G_Tech_Opps—Grid_Perspective.pdf (noting that "over 70% of the nation's current total use of electricity (3856 billion Kilowatt-hours) is consumed by 117 million households and 5.5 million commercial buildings…").

19. Kevin Robert Gurney et al., *Chapter 4: Understanding Urban Carbon Fluxes*, *in* SECOND STATE OF THE CARBON CYCLE REPORT (SOCCR2): A SUSTAINED ASSESSMENT REPORT 189, 198, 207 (N. Cavallaro et al. eds., 2018), https://doi.org/10.7930/SOCCR2.2018.Ch4 ("Carbon emissions from energy use in buildings can contribute as much as 80% of a city's total and primarily are controlled by private building owners."). *See*

The potential for GHG reductions from buildings comes into focus when we examine the historic and current carbon footprint of buildings. Building-related emissions account for about one-third of global GHG emissions and could double by 2050.[21] In the United States, buildings are responsible for over 30% of the nation's CO_2 emissions, specifically 36% in 2017 between electricity consumption and fossil fuel combustion for heating and cooking in buildings.[22] Emissions associated with buildings have started to trend downwards in the United States in recent years, decreasing 3.7% from 2013 to 2017, despite continued increases in population and construction of new homes and buildings.[23] The 2019 Greenhouse Gas Emissions Inventory, which uses data from 2017, found that the decrease in CO_2 emissions from the residential and commercial sectors could be largely attributed to the 14% decrease in days below 65°F when buildings are generally heated, known as "heating degree days."[24] The Environmental Protection Agency (EPA) also attributes the decrease to an overall reduction in energy use due to "an increase in energy efficiency standards and the use of energy efficient products in residential and commercial buildings...."[25] EPA did not discuss whether warm days, when air conditioning is likely to be used, had increased or decreased and how that may have affected energy use in buildings and associated emissions.

Much has been written about decarbonizing the energy sector and many scholars, researchers, and policymakers have produced detailed plans for reducing the carbon intensity of our electricity system.[26] The discussion here is complementary to that work and is

also Municipal Building Efficiency, C40 CITIES, https://www.c40.org/networks/municipal-building-efficiency (last visited Apr. 21, 2019) ("Energy consumed in buildings accounts for around 50% of C40 city emissions, on average, and as much as 75% for many cities.").

20. *See* Gurney et al., *supra* note 19, at 198. *See also* CITY OF N.Y., MAYOR'S OFF. OF SUSTAINABILITY, *Inventory of New York City Greenhouse Gas Emissions in 2016*, at 4 (2017), https://www.dec.ny.gov/docs/administration_pdf/nycghg.pdf. *See also Transportation & Urban Planning Initiative: Mass Transit*, C40 CITIES, https://www.c40.org/networks/mass-transit (last visited Apr. 21, 2019) ("One third of greenhouse gas emissions from C40 cities come from transport….").

21. *Why the Building Sector?*, ARCHITECTURE 2030, https://architecture2030.org/buildings_problem_why/ (last visited Apr. 21, 2019).

22. U.S. ENVTL. PROTECTION AG., *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2017*, at 12, tbl. ES-3 (2019), https://www.epa.gov/sites/production/files/2019-02/documents/us-ghg-inventory-2019-main-text.pdf.

23. *Id.* at 2-11–2-12.

24. *Id.* at 2-11.

25. *Id.* at 2-11–2-12.

26. *See, e.g.*, ASHLEY LAWSON, CTR. FOR CLIMATE & ENERGY SOLUTIONS, DECARBONIZING U.S. POWER (2018), https://www.c2es.org/document/decarbonizing-u-s-

responsive to some of the strategies advanced in those plans. Exploring options for electricity decarbonization raises the question of how our end uses of electricity should change in order to facilitate a larger transition. The answer to that question is complex and may vary across the country, but it involves reducing energy demand and usage despite continued growth and incorporating smart technologies to track and potentially moderate our energy use to accommodate the intermittency of renewable resources.[27] Buildings are a logical place start given that they consume the vast majority of electricity produced in the United States.

This is a crucial moment for designing super-efficient buildings that are capable of generating energy on-site and/or being responsive to the demands of the electric grid. By employing existing technologies in a forward-looking manner, we can transform and create a built environment that supports the transition to a low to no carbon future. Buildings provide an opportunity to take the long view as commercial buildings have lifespans of 50 to 100 years and their footprints include the energy embodied in materials, as well as energy consumed during their operation.[28] The U.S. Department of Energy (DOE) estimates that 75% of buildings in the country will be new or renovated by 2035.[29]

Building energy codes, also called energy conservation codes, are the most readily available and affordable policy tool for improving the energy efficiency of buildings at crucial points in their

power/; Rachel Cleetus et al., *The US Power Sector in a Net Zero World: Analyzing Pathways for Deep Carbon Reductions* (Union of Concerned Scientists, Working Paper, 2016), https://www.ucsusa.org/sites/default/files/attach/2016/11/UCS-Deep-Decarbonization-working-paper.pdf; *Renewable Portfolio Standards and Feed-In Tariffs*, ENERGY INNOVATION, https://www.energypolicy.solutions/policies/feed-in-tariffs/ (last visited Apr. 21, 2019).

27. JAMES H. WILLIAMS ET AL., *Pathways to Deep Decarbonization in the United States* 22–25 (2015), http://usddpp.org/downloads/2014-technical-report.pdf.

28. Embodied energy is the energy contained in the materials used to construct new buildings. Embodied energy includes emissions from resource extraction, processing, material production, building construction, building deconstruction, and disposal, as well as transportation for those activities. Of the total energy consumed in a building's life cycle, embodied energy accounts for 10% to 38% of total energy use for conventional buildings and 9% to 46% for more energy-efficient buildings. Cassandra L. Thiel et al., *A Materials Life Cycle Assessment of a Net-Zero Energy Building*, 6 ENERGIES 1125, 1127 (2013), http://www.mdpi.com/1996-1073/6/2/1125/htm. *See also* U.S. GREEN BUILDING COUNCIL, *Buildings and Climate Change* (2018), https://www.eesi.org/files/climate.pdf.

29. *Building Energy Codes Program*, OFF. OF ENERGY EFFICIENCY & RENEWABLE ENERGY, https://www.energy.gov/eere/buildings/building-energy-codes-program (last visited Apr. 21, 2019).

lives—at the time of initial construction and renovation.[30] These moments are also when potential savings are at their highest and it is cost effective to improve their efficiency.[31] When thoughtfully executed and combined with other policy initiatives, building energy codes can be a powerful force for change.[32] These codes are adopted at the state and/or local levels in the United States, which is why buildings sit squarely in the crosshairs of subnational control and high potential for reducing energy use today and into the future.[33]

Zero Energy Buildings, also called Net Zero Energy Buildings, are perhaps the most high-profile movement in the building sector to reduce energy consumption and boost renewable generation.[34] DOE has proposed a common definition for a Zero Energy Building: "an energy-efficient building where, on a source energy basis, the actual annual delivered energy is less than or equal to the on-site renewable exported energy."[35] Although technical-sounding, the definition simply describes a highly efficient building connected to the electric grid that generates enough energy within the building's footprint to export it and offset any electricity consumed from the grid. The most recent inventory of residential Zero Energy Buildings in the United States and Canada, performed for 2017, reflects a 70% increase over 2016, reaching 6,059 buildings and 1,153 projects for a total of 13,906 units.[36] The New Buildings Institute, a verifier of Zero

30. *Why Building Energy Codes?*, OFF. OF ENERGY EFFICIENCY & RENEWABLE ENERGY, https://www.energycodes.gov/about/why-building-energy-codes (last visited Apr. 21, 2019); *Building Codes and Appliance Standards*, ENERGY INNOVATION, https://www.energypolicy.solutions/policies/building-codes-appliance-standards/ (last visited Apr. 21, 2019).

31. OFF. OF ENERGY EFFICIENCY & RENEWABLE ENERGY, *supra* note 30 ("As a building's operation and environmental impact is largely determined by upfront decisions, energy codes present a unique opportunity to assure savings through efficient building design, technologies, and construction practices. Once a building is constructed, it is significantly more expensive to achieve higher efficiency levels. Energy codes ensure that a building's energy use is including as a fundamental part of the design and construction process; making this early investment in energy efficiency will pay dividends to owners and occupants for years into the future.").

32. *Building Codes and Appliance Standards*, ENERGY INNOVATION, https://www.energypolicy.solutions/policies/building-codes-appliance-standards/ (last visited Apr. 21, 2019).

33. *Adoption*, OFF. OF ENERGY EFFICIENCY & RENEWABLE ENERGY, https://www.energycodes.gov/adoption (last visited Apr. 21, 2019).

34. For example, the American Institute of Architects' (AIA's) 2030 Challenge envisions all new buildings and major renovations resulting in carbon-neutral operation by 2030. *The 2030 Challenge: All New Buildings, Developments, and Major Renovations Shall Be Carbon-Neutral by 2030*, ARCHITECTURE 2030, http://architecture2030.org/2030_challenges/2030-challenge/ (last visited Apr. 21, 2019). *See also* Roger Grant et al., *A Common Definition for Zero Energy Buildings* 2 (2015), https://www.energy.gov/sites/prod/files/2015/09/f26/A%20Common%20Definition%20for%20Zero%20Energy%20Buildings.pdf.

35. Grant et al., *supra* note 34, at 1, 4.

36. NET-ZERO ENERGY COALITION, *To Zero and Beyond*, 3 (2017), https://netzeroenergy

Energy Buildings in the United States and Canada, has reported 482 commercial Zero Energy Buildings have been verified or are in the lead-up to verification between 2017-2018.[37] Commercial buildings are generally larger and more energy intensive than residential buildings, and commercial buildings seeking zero energy verification are trending larger in square footage.[38] Most recently, the Net Zero Carbon Buildings Commitment was announced at the Global Climate Action Summit in California in September 2018.[39] It is a commitment for new buildings to operate at net zero carbon by 2030 made by twenty-two cities and six states and regions, including New York City, Los Angeles, Portland, San Francisco, San Jose, Santa Monica, Washington, DC, and Newburyport, MA.[40]

Grid-interactive Efficient Buildings are another innovative concept in the building energy realm, which DOE defines as "an efficient, connected and smart building with a portfolio of interoperable technologies that can adjust demand up or down and shift, store, or dispatch electric load in response to grid and building needs."[41] The premise of the Grid-interactive Efficient Building is to provide valuable flexibility for the electricity system by employing or increasing energy efficiency measures, often with smart building technology, when electricity usage is peaking at certain times of the day.[42] This concept has not been incorporated into any regulations yet, but it could become a consideration for states and cities as more renewable energy resources are added to the grid.

This article will review of the structure of state authority over building standards and how states share that authority with local governments in their jurisdictions. The nature of the state's legal framework shapes the potential for local action to improve building energy performance. The article will examine three cities, Austin,

coalition.com/resources/zero-energy-inventory/.

37. NEW BUILDINGS INST., *2018 Getting to Zero Status Update* 4 (2018), https://newbuildings.org/wp-content/uploads/2018/01/2018_GtZStatusUpdate_201808.pdf.

38. NEW BUILDINGS INST., *supra* note 37, at 7 ("The majority of Verified ZE buildings (roughly 80%) are smaller than 25,000 square feet, reflecting the early trend of small demonstration projects getting to zero, but…In the 2018 Emerging List more than 40% of all buildings and 88% of the total floor space of ZE Emerging buildings are 50,000 sf or larger.").

39. *The Net Zero Carbon Buildings Commitment*, WORLD GREEN BUILDING COUNCIL https://www.worldgbc.org/thecommitment (last visited Apr. 21, 2019).

40. *Id.*

41. U.S. DEP'T OF ENERGY, OFF. OF ENERGY EFFICIENCY & RENEWABLE ENERGY, *Grid-Interactive Efficiency Buildings Overview*, 7 (2018), https://www.energy.gov/sites/prod/files/2018/07/f54/steab-july12_bto_geb.pdf.

42. *Id.* at 7–8.

TX, Boulder, CO, and Chicago, IL, as case studies for how state/local authority frameworks facilitate or limit municipal action to reduce GHG emissions associated with building energy use. The article will outline current policies and programs in Austin, Boulder, and Chicago for new, existing, and municipal buildings in accordance with their climate goals. This article will then look to the European Union's efforts to improve the energy efficiency of buildings to explore their strategies as well as the challenges posed by the division of authority between the EU and its Member States.

The article will reflect on the policies and strategies in Austin, Boulder, and Chicago with the understanding that there is no one-size-fits-all approach that can be implemented for all cities given their differing current codes, histories of energy efficiency efforts, state/local authority frameworks, geographical particularities, and how they may need to prioritize reductions based on their building stocks and other factors. That said, there are some key elements to consider when assessing whether a city is maximizing potential GHG reductions in the building sector today and into the future: the current building energy code, consistency in improving efficiency over time, the city's policy for requiring upgrades in existing buildings, the city's policy for municipal buildings, and efforts related to broader decarbonization like supporting zero energy buildings, distributed energy resources, and grid flexibility.[43] The article will review whether and how the cities include these elements in their efforts and conclude by looking at lessons learned from the EU's efforts to increase building energy efficiency.

III. AUTHORITY OVER THE BUILDING SECTOR: STRUCTURE OF STATE AND LOCAL AUTHORITY IN THE UNITED STATES

The Tenth Amendment to the U.S. Constitution reserves "[t]he powers not delegated to the United States by the Constitution, nor prohibited by it…to the States respectively, or to the people."[44] The Tenth Amendment does not specify which of the powers beyond those delegated to the federal government belong to the states and which belong to "the people." This potential division of powers between the states and the people, perhaps as represented by their local governments, has long been the subject of legal scholarship and

43. *See Building Codes and Appliance Standards*, ENERGY INNOVATION, https://www.energypolicy.solutions/policies/building-codes-appliance-standards/ (last visited Apr. 21, 2019).

44. U.S. CONST. amend. X.

debate.[45] Justice Thomas has written that he reads the Amendment as containing intentional ambiguity, "[w]ith this careful last phrase, the Amendment avoids taking any position on the division of power between the state governments and the people of the States...."[46] It should be noted that the Supremacy Clause and protections for individual rights in subsequent amendments supersede the Tenth Amendment.

State police powers are widely understood to fall within or be synonymous with states' "residuary sovereignty"[47] enshrined in the Tenth Amendment.[48] These powers evolved out of English common law principles and existed during the colonial period, preceding the Constitution.[49] The Supreme Court, in its *Lochner* opinion, described an early conception of police powers as "…certain powers, existing in the sovereignty of each State in the Union, somewhat vaguely termed police powers, the exact description and limitation of which have not been attempted by the courts. Those powers, broadly stated, and without, at present, any attempt at a more specific limitation, relate to the safety, health, morals, and general welfare of the

45. Gary Lawson & Robert Schapiro, *The Tenth Amendment,* NAT'L CONST. CTR, https://constitutioncenter.org/interactive-constitution/amendments/amendment-x (last visited Apr. 25, 2019); *see, e.g.*, Lindsey Cowen, *What Is Left of the Tenth Amendment*, 39 N.C. L. REV. 154 (1961), http://scholarship.law.unc.edu/nclr/vol39/iss2/2; Donald L. Beschle, *Defining the Scope of State Sovereignty under the Tenth Amendment: A Structural Approach*, 34 DEPAUL L. REV. 163 (1984), https://via.library.depaul.edu/law-review/vol34/iss.1/5; David J. Barron, *A Localist Critique of the New Federalism*, 51 DUKE L.J. 377 (2001), https://pdfs.semanticscholar.org/ec5c/5618a5c102e18a152bcf98881c4f9b8c45b2.pdf; Jake Sullivan, *The Tenth Amendment and Local Government*, 112 YALE L.J. 1935 (2003), http://digitalcommons.law.yale.edu/ylj/vol112/iss7/9; Kurt T. Lash, *The Original Meaning of an Omission: The Tenth Amendment, Popular Sovereignty and "Expressly" Delegated Power*, 83 NOTRE DAME L. REV. 101 (2008), https://scholarship.richmond.edu/law-faculty-publications/1462/; Elizabeth Anne Reese, *Or to the People: Popular Sovereignty and the Power to Choose a Government*, 39 CARDOZO L. REV. 6 (2018), http://cardozolawreview.com/wp-content/uploads/2018/08/REESE.39.6.2-2.pdf; Gary Lawson, *A Truism with Attitude: The Tenth Amendment in Constitutional Context*, 83 NOTRE DAME L. REV. 469 (2008), http://scholarship.law.nd.edu/ndlr/vol83/iss2/1.

46. U.S. Term Limits, Inc. v. Thornton, 514 U.S. 779, 848 (1995) (Thomas, J., dissenting).

47. THE FEDERALIST No. 62, at 320 (James Madison) (George W. Carey & James McClellan eds., 2001) ("[T]he equal vote allowed to each state, is at once a constitutional recognition of the portion of sovereignty remaining in the individual states, and an instrument for preserving that residuary sovereignty.").

48. David A. Thomas, *Finding More Pieces for the Takings Puzzle: How Correcting History Can Clarify Doctrine*, 75 U. COLO. L. REV. 497, 510 (2004), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1185722.

49. D. Benjamin Barros, *The Police Power and the Takings Clause*, 58 U. MIAMI L. REV. 471, 478–79 (2004), http://repository.law.miami.edu/umlr/vol58/iss2/2; *see also* Thomas, *supra* note 48, at 502–14.

public."[50] After decades of jurisprudence refining the contours of the police powers, they can generally be understood as the authority of the states to "…promote the public health, morals or safety, and the general well-being of the community[,]… enact and enforce laws for the promotion of the general welfare[,] … regulate[] private rights in the public interest[, and] … extend[] [measures] to all great public needs."[51]

State police powers are the basis for land use planning authority, whether exercised solely by the state or shared with local government units.[52] This brings into sharp focus the importance of whether and how states delegate aspects of their police powers to counties and/or cities for land use planning. The framework of authority is shaped by whether the state operates according to Dillon's Rule, Home Rule, or a hybrid of both.

Most states embrace aspects of both Dillon's Rule and Home Rule to create their own hybrid systems that balance the freedoms of Home Rule with the constraints of Dillon's Rule.[53] Dillon's Rule emerged from an opinion by Judge John F. Dillon in the Iowa Supreme Court in 1868 and was distilled in his treatise on the law of municipal governments in 1872.[54] The tenets of the rule are that a municipal government can exercise only the powers explicitly granted to it, powers that are necessarily implied in the express

50. Lochner v. New York, 198 U.S. 45, 53 (1905), *overruled by* W. Coast Hotel Co. v. Parrish, 300 U.S. 379 (1937).

51. LOCAL GOV'T COMM'N, PENN. GEN. ASSEMBLY, PENNSYLVANIA LEGISLATOR'S MUNICIPAL DESKBOOK 75 (5th ed. 2017), http://www.lgc.state.pa.us/deskBook.cfm.

52. Thomas, *supra* note 48, at 544.

53. Rick Su, *Have Cities Abandoned Home Rule?,* 44 FORDHAM URB. L.J. 181, 191 (2017), https://digitalcommons.law.buffalo.edu/articles/138 ("Advocates of Home Rule did not seek to overturn the underlying legal premise of Dillon's Rule—they did not, for example, assert that cities possessed inherent powers independent of the state. Yet Home Rule sought to rebalance the city-state relationship by tweaking how power and entitlements were allocated between the two. If Dillon's Rule held that cities drew all of their power from state delegation, Home Rule expanded that delegation to include nearly all the powers that the state could delegate with respect to local affairs. If Dillon's Rule imagined that cities were creations of state law, Home Rule gave cities the power to draft their own charters and determine for themselves the powers they wished to exercise, the responsibilities they wished to assume, and the governmental structure within which they operated. And if Dillon's Rule imagined that states might preempt local legislation, Home Rule imposed limits on the situations and contexts in which they could do so."). *See also id.* at 193 (noting that courts have been reluctant to abandon Dillon's Rule, it serves as a kind of backstop where states continue to set limits on local power even for Home Rule localities.").

54. City of Clinton v. Cedar Rapids & Missouri River R. R. Co., 24 Iowa 455 (1868); JOHN FORREST DILLON, TREATISE ON THE LAW OF MUNICIPAL CORPORATIONS (1st ed. 1872).

powers, and powers that are essential and indispensable to its objects and purposes.[55] Dillon's Rule was upheld by the U.S. Supreme Court in 1907 and 1923.[56]

Home Rule emerged from concerns about state involvement in local matters, corruption, and ambiguity around the authority of local governments that surfaced just before and just after the Civil War.[57] States adopted Home Rule by amending state constitutions or passing legislation to give cities and counties sufficient autonomy to create their own governments with authority to provide local services in the face of growing needs.[58] In 1875, Missouri was the first state to include a provision in its constitution that allowed for municipal charters.[59] Thirteen other states followed Missouri's lead between 1879 and 1912, either adopting constitutional amendments or laws to allow for Home Rule through a local charter.[60] Home Rule is difficult to define because it varies in each state, but it can generally be described as "…the ability of a local government to act and make policy in all areas that have not been designated to be of statewide interest through general law, state constitutional provisions, or initiatives and referenda."[61] Even though Dillon's Rule is thought of as the narrow approach to local authority and Home Rule is thought of as the expansive approach,[62] they are arguably two sides of the same coin. Both approaches seek to define the boundaries of local control within the realm of state power.

States and local governments have authority over building construction standards, including energy-efficiency requirements and performance standards. State authority in this area is nested within the states' police powers to promote the health and welfare of its citizens.[63] There is the potential for shared authority between state

55. *Cities 101—Delegation of Power*, NAT'L LEAGUE OF CITIES (Dec. 13, 2016), https://www.nlc.org/resource/cities-101-delegation-of-power.

56. Hunter v. City of Pittsburgh, 207 U.S. 161 (1907); Trenton v. New Jersey, 262 U.S. 182, 187 (1923).

57. DALE KRANE, PLATON N. RIGOS & MELVIN B. HILL, JR., HOME RULE IN AMERICA: A FIFTY-STATE HANDBOOK 11 (2001); *see also* Su, *supra* note 53, at 190–91.

58. KRANE, RIGOS, & HILL, *supra* note 57, at 12.

59. *Id*. at 11.

60. *Id*. The states are California (1879), Washington (1889), Minnesota (1896), Colorado (1902), Virginia (1902), Oregon (1906), Oklahoma (1907), Michigan (1908), Arizona (1912), Ohio (1912), Nebraska (1912), and Texas (1912).

61. KRANE, RIGOS, & HILL, *supra* note 57, at 2.

62. *Cities 101—Delegation of Power*, NAT'L LEAGUE OF CITIES (Dec. 13, 2016), https://www.nlc.org/resource/cities-101-delegation-of-power.

63. ADVISORY COMM'N ON INTERGOVERNMENTAL RELATIONS, BUILDING CODES: A PROGRAM FOR INTERGOVERNMENTAL REFORM 1 (Jan. 1966), https://library.unt.edu/gpo/acir/

and local governments, as the state may decide to delegate some or all of this power to counties and/or cities to exercise over their respective jurisdictions.[64] Indeed, most states delegated authority over building codes to local governments until the late 1960s and early 1970s when states started to impose minimum statewide standards where local standards were insufficient.[65] Today, states generally adopt multiple building-related codes for statewide application, like plumbing, electrical, and mechanical codes, often using international model codes as the foundation with amendments to suit the state's needs.[66] Counties and/or municipalities may then be allowed to adopt more energy efficient amendments, perhaps through a "stretch code"[67] orchestrated by the state[68] or they may be able to adopt different codes entirely, including a more recent version of a model code used by the state, that reflect a policy of reducing energy consumption or are responsive to unique geographic issues. Alternatively, counties may adopt building codes and municipalities may or may not have the ability to adopt modifications to that code.

One of the many codes a state may adopt is a building energy code, focused on energy efficiency of building components and operations. A state's building energy code is generally based on a model energy code that states can adopt in full or tailor to the state's goals and requirements.[69] Two model codes are most commonly used for energy efficiency in buildings: the International Energy Conservation Code (IECC) and ANSI/ASHRAE/IES Standard 90.1.[70]

Reports/policy/A-28.pdf; James Jay Brown, *Building Codes and Construction Statutes in Missouri*, 13 URB. L. ANN. 81, 82 (1977), http://openscholarship.wustl.edu/law_urbanlaw/vol13/iss1/5.

64. Brown, *supra* note 63, at 82.

65. *Id.*

66. To name a few: The International Building Code, International Residential Code, International Mechanical Code, International Plumbing Code, International Fuel Gas Code, International Green Construction Code, and International Property Maintenance Code.

67. A stretch code is a voluntarily adopted, "locally mandated code or alternative compliance path that is more aggressive than base code, resulting in buildings that achieve higher energy savings." *Stretch Codes*, NEW BUILDINGS INST., https://newbuildings.org/code_policy/utility-programs-stretch-codes/stretch-codes/ (last visited Apr. 21, 2019).

68. *See, e.g.*, *id.* (describing stretch codes for New York and Massachusetts).

69. *Status of State Energy Code Adoption*, OFF. OF ENERGY EFFICIENCY & RENEWABLE ENERGY, https://www.energycodes.gov/status-state-energy-code-adoption (last visited Apr. 21, 2019).

70. *Id.* American National Standards Institute (ANSI), American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), Illuminating Engineering Society (IES) Standard 90.1.

Despite some technical differences between the codes for various building types over various climatic zones, they provide almost the same performance outcomes (within 1% of each other).[71]

With regard to residential building energy codes, four states have adopted energy codes that are more efficient than the 2012 or 2015 IECC, seven states and the District of Columbia have adopted the 2012 or 2015 IECC or equivalent, and twenty-eight states have adopted the 2009 IECC or a code between the 2009 and 2012 or 2015 IECC.[72] In terms of efficiency, the 2015 IECC can provide a 15% increase in energy savings compared to the 2009 IECC.[73] The 2018 IECC has recently been released and jurisdictions that regularly adopt the latest IECC are considering it.[74] There has also been some speculation that the 2018 IECC could be an opportunity for those states that have codes like the 2009 IECC in place to jumpstart their efforts in the building sector and adopt the new 2018 version.[75] The 2018 IECC is yet to be analyzed in comparison to the 2015 IECC, but estimates put it between 2-5% more efficient.[76]

For commercial buildings, five states have a code that is more energy efficient than ASHRAE 90.1 2013, five states have adopted ASHRAE 90.1 2013 or equivalent, and eight states and the District of

71. For an in-depth comparison of the two standards, see JIAN ZHANG ET AL., PAC. NW. NAT'L LAB., ENERGY AND ENERGY COST SAVINGS ANALYSIS OF THE 2015 IECC FOR COMMERCIAL BUILDINGS, app. B (2015), https://www.energycodes.gov/sites/default/files/documents/2015_IECC_Commercial_Analysis.pdf.

72. *Status of State Energy Code Adoption, Residential: Current*, OFF. OF ENERGY EFFICIENCY & RENEWABLE ENERGY, https://www.energycodes.gov/status-state-energy-code-adoption (last visited Apr. 21, 2019).

73. *See* Ryan Meres, *2015 IECC: What You Need to Know*, BUILDER (Nov. 18, 2014), http://www.builderonline.com/building/code/2015-iecc-what-you-need-to-know_o. For a discussion of the difference between the 2009 IECC and the 2012 IECC, see TERRY S. MAPES & DAVID R. CONOVER, PAC. NW. NAT'L LAB., GUIDE TO THE CHANGES BETWEEN THE 2009 AND 2012 INTERNATIONAL ENERGY CONSERVATION CODE (2012), https://www.energycodes.gov/sites/default/files/documents/Comparison_2009to2012_IECC.pdf.

74. *See, e.g.*, *2018 Illinois Energy Conservation Code Announcement*, ILL. CAP. DEV. BOARD, https://www2.illinois.gov/cdb/business/codes/Pages/2018-IECC-Announcement.aspx (last visited Apr. 21, 2019).

75. *Looking Forward to 2018 IECC Code*, EVERBLUE TRAINING INST., https://www.everbluetraining.com/blog/looking-forward-2018-iecc-code (last updated Apr. 20, 2018).

76. *See* NEVADA GOVERNOR'S OFFICE OF ENERGY, *Significant Changes to the 2018 IECC* 1 (2018), http://energy.nv.gov/uploadedFiles/energynvgov/content/Programs/TaskForces/2017/2015%20v%202018%20IECC%20Summary%20%20GOE%20Final%20w%20sources.pdf.

Columbia have adopted a code between ASHRAE 90.1 2010 and 2013.[77] Twenty-one states have commercial building codes between, and including, ASHRAE 90.1 2010 and 2007.[78]

States and cities may also choose to incorporate building rating systems into their codes or requirements, like the Leadership in Energy and Environmental Design (LEED) or Energy Star certification systems. Buildings can be certified as meeting a LEED standard (Certified, Gold, Silver, or Platinum, with Platinum being the highest level) by the U.S. Green Building Council after earning certification points from a wide range of actions involving the building's location, water use reduction, indoor environmental quality, and materials used to construct the building.[79] The LEED certification system requires a few actions in the Energy and Atmosphere category, including minimum energy performance and fundamental refrigerant management.[80] The Energy and Atmosphere category also offers the most potential points toward certification and includes actions related to energy efficiency, demand response, and renewable generation on-site.[81] A building can be certified as earning the Energy Star by EPA and DOE if it performs better than at least 75% of similar buildings nationwide in terms of its operational energy efficiency.[82] Energy Star for buildings benchmarking is incorporated into the factors for LEED certification.[83]

One important aspect of the overlapping authority over the building sector between states and cities is that cities have a high degree of control over municipal buildings that are owned by the city or to be constructed by the city. Cities can implement stringent

77. *Status of State Energy Code Adoption, Commercial: Current*, OFF. OF ENERGY EFFICIENCY & RENEWABLE ENERGY, https://www.energycodes.gov/status-state-energy-code-adoption (last visited Apr. 21, 2019).

78. *Id.*

79. LEED FOR NEW CONSTRUCTION AND MAJOR RENOVATIONS (V4), U.S. GREEN BUILDING COUNCIL, https://www.usgbc.org/dopdf.php?q=scorecard/new-construction/v4 (last visited May 5, 2019); *see also LEED*, U.S. GREEN BUILDING COUNCIL, https://new.usgbc.org/leed (last visited Apr. 21, 2019).

80. *LEED for New Construction and Major Renovations* (V4), U.S. GREEN BUILDING COUNCIL, https://www.usgbc.org/dopdf.php?q=scorecard/new-construction/v4.

81. *LEED V4 Building Design + Construction Guide, Energy and Atmosphere*, U.S. GREEN BUILDING COUNCIL, https://www.usgbc.org/credits/new-construction/v4/energy-%26-atmosphere (last visited Apr. 21, 2019).

82. *ENERGY STAR Certification for Your Building*, ENERGY STAR, https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification (last visited Apr. 21, 2019).

83. *Green Buildings and ENERGY STAR*, ENERGY STAR, https://www.energystar.gov/buildings/reference/green-buildings-and-energy-star (last visited Apr. 21, 2019).

requirements like committing to use 100% renewable energy[84] for municipal buildings or building extremely efficient or Zero Energy Buildings,[85] provided they can justify any increased costs of taking such steps. It is arguably easier for cities to pilot new approaches and demonstrate what is possible with municipal buildings before imposing new standards on the private sector in their jurisdictions. Twenty-one states require certain or all new public buildings to meet or exceed LEED Silver certification, and many also require the same for renovations.[86] The state mandates vary and may also be triggered by the new building or renovation exceeding a certain square footage or cost threshold.[87] Twenty-nine cities require some form of LEED certification for new and/or renovated buildings for municipal buildings and/or construction above a specific square footage.[88] A close look at how the states and cities describe LEED-related requirements reveals that buildings may or may not actually have to be certified by the U.S. Green Building Council. Some states merely require that a building be built so that it *could* achieve LEED certification of a specific level[89] or list LEED as one of several ways to demonstrate the building was designed for energy efficiency.[90] Requiring that buildings be designed to achieve LEED certification, but not requiring actual certification is a way of using LEED as a guideline without paying for the certification, but the buildings could not represent themselves as LEED certified or display a LEED certification plaque.

84. Will Driscoll, *Seven U.S. Cities to Power Municipal Operations with Renewables*, PV MAG. (June 20, 2018), https://pv-magazine-usa.com/2018/06/20/seven-u-s-cities-plan-to-power-city-government-operations-with-renewables/.

85. *See, e.g.*, *Park City Council Adopts Net Zero Energy Standards for Municipal Facilities*, UTAH CLEAN ENERGY (Oct. 19, 2017), https://utahcleanenergy.org/issues/stop-energy-waste/item/419-park-city-council-adopts-net-zero-energy-standards-for-municipal-facilities; CITY OF NEW YORK, ONE CITY: BUILT TO LAST 37 (2014), https://www1.nyc.gov/assets/builttolast/downloads/OneCity.pdf.

86. *Public Buildings Policy*, BUILDING CODES ASSISTANCE PROJECT, http://bcapcodes.org/policy-action-toolkit/public-buildings (last visited May 1, 2019).

87. *Id.*

88. *Cities Requiring or Supporting LEED,* EVERBLUE TRAINING INST., http://www.everbluetraining.com/blog/cities-requiring-or-supporting-leed-2015-edition (last updated Oct. 17, 2018) (listing city ordinances and requirements that involve LEED certification).

89. *See, e.g.*, 20 ILL. COMP. STAT. 3130/15 (2009) ("Green Buildings Act"), http://www.ilga.gov/legislation/ilcs/ilcs3.asp?ActID=3109&ChapterID=5 ("…facilities *must be designed to achieve*, at a minimum, the silver certification of the Leadership in Energy and Environmental Design's rating system…or an equivalent standard…." (emphasis added)).

90. *Id.*; *see, e.g.*, Executive Order 08-14, Establishment of Energy Efficient State Building Initiative, 08 Ind. Reg. 541 (July 9, 2008), http://www.in.gov/legislative/iac/20080709-IR-GOV080541EOA.xml.pdf.

A. Efforts in Three Cities to Reduce Emissions from the Buildings Sector

Austin, TX, Boulder, CO, and Chicago, IL offer examples of the complexity of the legal framework surrounding building energy codes and how they can be harnessed for GHG emissions reductions. The cities selected are from three different states, each with a different Dillon's Rule/Home Rule system for its local governments and building code regime. These cities are part of the Compact of Mayors so they have created and submitted climate action plans.[91] All three have submitted data that pulls back the curtain on their emissions, broken down by sector, so that the public can evaluate their progress toward their goals.[92]

The legal frameworks can provide both obstacles and opportunities for cities as state-level codes may not contain requirements that can deliver the emissions reductions cities are hoping to achieve in the building sector, but may allow cities to adopt additional requirements to forge their own paths toward their goals. There are some examples of innovative and ambitious standards at a state level in California and at a local level in Hawaii.[93] In many cases, however, state-level standards fall short of the cutting-edge.[94]

91. *Austin*, GLOBAL COVENANT OF MAYORS FOR CLIMATE & ENERGY, https://www.globalcovenantofmayors.org/cities/austin/ (last visited Apr. 21, 2019); *Boulder*, GLOBAL COVENANT OF MAYORS FOR CLIMATE & ENERGY, https://www.globalcovenantofmayors.org/cities/boulder-2/ (last visited Apr. 21, 2019); *Chicago*, GLOBAL COVENANT OF MAYORS FOR CLIMATE & ENERGY, https://www.globalcovenantofmayors.org/cities/chicago/ (last visited Apr. 21, 2019).

92. *Austin*, *supra* note 91; *Boulder*, *supra* note 91; *Chicago*, *supra* note 91.

93. California's 2019 standards, effective in January 2020, will raise the bar for energy efficiency and facilitate the state's goal for zero net energy consumption in newly constructed residential buildings by 2020. *See* CAL. ENERGY COMM'N, 2019 BUILDING ENERGY EFFICIENCY STANDARDS FOR RESIDENTIAL AND NONRESIDENTIAL BUILDINGS (2019), https://www.energy.ca.gov/2018publications/CEC-400-2018-020/CEC-400-2018-020-CMF.pdf. Hawaii has adopted the 2015 IECC with state-specific amendments, including requiring solar water heating systems for new single-family residential construction and lighting systems with occupant sensors and time-sensitive controls. However, state level adoption only applies the code to state government projects, each county must individually adopt the code and enforce it- the County of Kauai has already done so and the three other counties are expected to do so in 2019. *See* HAWAII DEP'T OF ACCT. & GEN. SERVS., *State Energy Conservation Code*, https://ags.hawaii.gov/wp-content/uploads/2012/09/StateEnergyConservationCode-20170331.pdf; HAWAII STATE ENERGY OFFICE, *IECC 2015 with Hawaii Amendments: Frequently Asked Questions* (2018), https://energy.hawaii.gov/wp-content/uploads/2018/08/Energy-Code-FAQs_June2018.pdf.

94. *Status of State Energy Code Adoption*, OFF. OF ENERGY EFFICIENCY & RENEWABLE ENERGY, https://www.energycodes.gov/status-state-energy-code-adoption (last visited Apr. 21, 2019) (showing that majority of states have commercial building energy standards from 2010 or earlier and almost half of the states have residential building energy standards from 2009 or earlier).

Municipalities may seek to establish their own standards that go beyond the state standards in order to reach their goals, thereby testing the limits of what is permissible within the state's legal framework.

1. Austin, Texas

Cities in Texas belong to one of two categories that delineate city government authority: general-law or home-rule cities.[95] General-law municipalities only have the authority to act according to state statutes that set out their powers and duties.[96] Such cities essentially operate according to Dillon's Rule and cannot act beyond the express or implied powers granted to them by the state. Texas separates general-law cities into three types (A, B, C) and state law even prescribes government structures for the various types– an aldermanic or a commission form of government.[97] Home-rule is authorized by Article XI, Section 5, of the Texas Constitution and home-rule municipalities can take any action not prohibited by state law or the state constitution.[98] In order to operate according to home-rule, the city's population must exceed 5,000 people and a city charter, establishing the city government structure with attendant powers and duties, must be approved by majority vote in a city election.[99]

Municipalities in Texas can regulate development within their boundaries which includes adopting building codes.[100] Municipalities "…can also regulate some development within their extraterritorial jurisdictions to ensure that it meets minimum standards, works in conjunction with infrastructure investments, and minimizes impacts on natural resources."[101] Home-rule cities can also annex areas outside their limits and had the ability to do so without consent in many circumstances until 2017, when some constraints were imposed

95. TEX. LOC. GOV'T CODE ANN. §§ 5.001–5.005, https://statutes.capitol.texas.gov/Docs/LG/htm/LG.5.htm#5. There are also special-law municipalities that operate according to municipal charter that was adopted under a special act of the legislature or the Congress of the Republic of Texas. Given the rarity and unique quality of special-law municipalities, they are excluded from this discussion.

96. TEX. MUN. LEAGUE, 2017 HAND BOOK FOR MAYORS AND COUNCILMEMBERS 10–15 (2017), https://www.tml.org/DocumentCenter/View/66/2017-Handbook-Mayors-Council-Members-PDF.

97. *Id.*

98. TEX. CONST. art. XI, § 5.

99. *Id.*; *see also* TEX. MUN. LEAGUE, *supra* note 96.

100. CITY OF AUSTIN, IMAGINE AUSTIN COMPREHENSIVE PLAN 75 (2012), https://www.austintexas.gov/sites/default/files/files/Planning/ImagineAustin/webiacpreduced.pdf.

101. *Id.*

on this power.[102] Austin has extraterritorial jurisdiction over unincorporated land within five miles of the city limits, as long as it is not within the limits of another city or extraterritorial jurisdiction of another city.[103] Austin's extraterritorial jurisdiction extends into five nearby counties: Williamson, Travis, Hays, Bastrop & Caldwell.[104] Austin describes its extraterritorial jurisdiction and its annexation authority as a way of tracking its "future tax base and municipal service area" and states that "[b]y expanding the territory subject to city ordinances, regulations and codes, annexation improves the city's economic base and enables Austin to manage growth & development."[105]

Counties in Texas have less authority over development matters and can only regulate subdivisions, on-site sewage systems, floodplain development, and water supply.[106] The state's Local Government Code provides certain counties with authority to regulate some environmental and safety matters, allowing Travis County, one of the counties where Austin is located, to "require stormwater management, impose fire codes, and develop standards for water wells to prevent groundwater contamination."[107] However, Travis County and other counties cannot enact building codes or zoning ordinances.[108] The limitations on county authority have created a challenging situation for cities who wish to work with the county where they are located or other nearby counties to manage development regionally.[109]

Texas has a statewide building energy code for single-family homes: the energy efficiency chapter (Chapter 11) of the 2015 International Residential Code (IRC).[110] The applicable code for all other residences and commercial and industrial buildings is the 2015 IECC.[111] The State Energy Conservation Office is responsible for

102. TEX. MUN. LEAGUE, *supra* note 96, at 12–13.

103. *Annexation*, AUSTIN, TEXAS, http://www.austintexas.gov/department/annexation (last visited Apr. 21, 2019).

104. *Id.*

105. *Id.*

106. TEX. MUN. LEAGUE, *supra* note 96, at 29.

107. *Id. See also* TEX. LOC. GOV'T CODE ANN. § 233.061, https://statutes.capitol.texas.gov/Docs/LG/htm/LG.233.htm; TEX. LOC. GOV'T CODE ANN. § 573.001. https://statutes.capitol.texas.gov/Docs/LG/htm/LG.573.htm.

108. CITY OF AUSTIN, *supra* note 100, at 75.

109. *Id.*

110. TEX. HEALTH & SAFETY CODE ANN. § 388.003(a), https://statutes.capitol.texas.gov/Docs/HS/htm/HS.388.htm#388.003.

111. *Id.* § 388.003(b).

state energy codes and it is permitted to adopt the latest versions of the energy efficiency chapter of the IRC and IECC based on findings related to its stringency and according to timing requirements.[112] The State Energy Conservation Office also establishes energy and water conservation design standards for state buildings that are new or undergoing major renovation, including buildings at state-supported institutions of higher education.[113] Currently, such new buildings or major renovations must comply with ASHRAE Standard 90.1 (2013) or 2015 IECC.[114]

Texas allows municipalities to adopt amendments to its statewide codes that provide more, equally, or even less stringent requirements with one limitation- amendments may not result in less stringent requirements than the energy efficiency chapter of the IRC or IECC in non-attainment and affected counties.[115] The Energy Systems Laboratory (a division of Texas A&M University) determines the relative impact of proposed local amendments to the energy code, at the request of a municipality or county, including whether the amendments are substantially equal to or less stringent than the unamended code.[116] Code changes that are determined to be as stringent or more stringent than the state code may be adopted in affected and nonattainment counties.[117] On its face, state law seems to allow other jurisdictions to adopt less stringent requirements given that only amendments in affected and nonattainment counties must be equally or more stringent than the statewide codes.[118] Indeed, the Energy Systems Laboratory must submit an annual report "identifying the municipalities and counties whose codes are more stringent than the unamended code, and whose codes are equally stringent or less stringent than the unamended code…."[119]

112. *Id.* § 388.003(a)–(b).

113. *Id.* § 447.004(a)–(f).

114. *Id.* § 19.32(a)(1).

115. TEX. HEALTH & SAFETY CODE ANN. § 388.003(d)–(e). The definitions of "affected county" and "nonattainment area" appear in Texas Health and Safety Code Section 386.001(2) and (8). An "affected county" is one designated as such by the Texas Commission on Environmental Quality because of deteriorating air quality. A "nonattainment area" is an area designated under Section 107(d) of the federal Clean Air Act as not in attainment with the National Ambient Air Quality Standards. *Id.* § 386.001.

116. *Energy Code Adoption*, STATE ENERGY CONSERVATION OFF., https://comptroller.texas.gov/programs/seco/code/adoption.php (last visited Apr. 21, 2019).

117. *Local Ordinances*, STATE ENERGY CONSERVATION OFFICE, https://comptroller.texas.gov/programs/seco/code/ordinances.php (last visited Apr. 21, 2019).

118. TEX. HEALTH & SAFETY CODE ANN. § 388.003(d), https://statutes.capitol.texas.gov/Docs/HS/htm/HS.388.htm#388.003.

119. *Id.* § 388.003(e)(2).

Regardless, municipalities that have established procedures to adopt local amendments in the first place must also periodically review and consider revisions to the energy efficiency chapter of the IRC and IECC for adoption.[120] This serves as an opportunity for ambitious jurisdictions to consider adopting the newest codes and may encourage others to implement more demanding requirements.

The City of Austin follows the 2015 editions of the International Building Code,[121] International Existing Building Code,[122] and IRC with local amendments.[123] Austin also follows the 2015 IECC with local amendments to meet its targets of reducing energy use by 75% in all new buildings and by 65% in new single-family homes, as set in the 2007 Austin Climate Protection Plan.[124] In accordance with those targets, the city council adopted the Energy Conservation Audit and Disclosure (ECAD) ordinance in November 2008, which set a series of energy efficiency improvement targets for the city's existing residential and commercial buildings.[125] Austin required cost-effective improvements[126] be made prior to or within one year of the closing of the sale of residential properties, with goal percentages steadily increasing each year starting in June 2009 at 25% and reaching 85% after June 1, 2013.[127] The ordinance also set a goal of installing cost-effective improvements in 80% of all multifamily units according to deadlines based on the year of construction of the unit.[128] The city also offered special increased rebates for significant improvements to multifamily units and directed the City Manager to collect and rank their energy usage data for publication.[129] Finally,

120. *Id.* § 388.003(f).

121. AUSTIN, TEX., LAND DEV. CODE ch. 25-12, art. 1 (2018), https://library.municode.com/tx/austin/codes/land_development_code?nodeId=TIT25LADE_CH25-12TECO ("Building Code").

122. *Id.* art. 10 ("Existing Building Code").

123. *Id.* art. 11 ("Residential Code").

124. *Id.* art. 12 ("Energy Code"); *see also Energy Code Stringency,* AM. COUNCIL FOR AN ENERGY-EFFICIENT ECON., https://database.aceee.org/city/energy-code-stringency (last visited Apr. 21, 2019).

125. Austin, Tex., City Council Res. No. 20081106-048 (Nov. 6, 2008), http://www.ci.austin.tx.us/edims/document.cfm?id=123402.

126. *Id.* § 1 ("The term 'cost-effective improvements' means those energy efficiency improvements recommended by an energy audit under Chapter 6-7, up to a total cost of one-percent of the sale price or appraised value – as deemed by the City Manager to be appropriate – for residential facilities, that will likely generate a return in electric bill savings equal to or greater than the cost of the improvements, after applicable rebates, within seven years.").

127. *Id.* § 2.

128. *Id.* § 3.

129. *Id.* §§ 4–5.

the city set goals for commercial facilities to increase their energy efficiency using the Energy Star system and improvements in energy efficiency scores according to a timeline. The city aimed to have 80% of its commercial square footage reach an Energy Star score of fifty or greater, or achieve a 20% improvement in energy efficiency if the building already had a score of fifty.[130]

The last ECAD report from November 2014 showed that the multifamily compliance rate ranged from 58-80% annually, covering 831 properties, and the residential compliance rate ranged from 49-70% annually, covering 10,777 properties, between 2011-2013.[131] The commercial compliance rate also ranged over time, but by 2014, compliance rates were between 31-62% with 1610 buildings subject to the ordinance.[132]

Austin created the nation's first green building rating system in 1990, the Austin Energy Green Building Program.[133] The program covers single family homes, multifamily units, and commercial buildings and "encourages the design and construction of buildings that are durable, comfortable, healthy, energy and water efficient, as well as economical to operate…."[134] The voluntary rating system also "rewards best construction practices, leads to higher performing buildings and incorporates these measures in city codes to help meet Austin's climate protection goals."[135] This is coupled with efforts to educate construction and design professionals, even consulting assistance for projects.[136]

130. *Id.* § 6.

131. COUNCIL COMM. ON AUSTIN ENERGY, UPDATE ON THE ENERGY CONSERVATION AUDIT AND DISCLOSURE (ECAD) ORDINANCE, 4 (Nov. 13, 2014) https://austinenergy.com/wcm/connect/6a9aadc7-404e-4689-b846-9d3fc31172d3/CES_ECAD_11+13+14+for_CCAE+Updated+11062014.pdf?MOD=AJPERES&CVID=kNhnpET&CVID=kNhnpET&CVID=kNhnpET&CVID=kNhnpETCVID=kNhnpET&CVID=kNhnpET.

132. *Id.* at 5.

133. *What Is the Austin Energy Green Building Program?*, AUSTIN ENERGY GREEN BUILDING, https://greenbuilding.austinenergy.com/aegb/about (last updated July 13, 2017).

134. *Goal: Maintain 100% Compliance with LEED Silver Certification for City Capital Improvement Projects*, AUSTINTEXAS.GOV, https://performance.austintexas.gov/stat/goals/bdfm-9s3k/4pdx-y6qp/vstw-ua4t (last visited Apr. 21, 2019).

135. *Id.*

136. *Id.*; *see also*, *e.g.*, *Commercial Green Building Program*, AUSTIN ENERGY GREEN BUILDING, https://greenbuilding.austinenergy.com/aegb/programs/commercial (last updated Jan. 24, 2019) ("We are partners in your commercial developments and consultants invested in your success. Our experienced professionals guide you through the design and construction process, and review, rate, and market your project.").

The city also has a history of mandating energy conservation and sustainability standards for municipal buildings. In June 2000, Austin passed a resolution, which required all future public building projects be built to achieve LEED Silver.[137] The city adopted another resolution in November 2007 that specified two criteria for triggering LEED achievement for new buildings and stating that Silver certification was a minimum: (1) the project includes work in the five major LEED categories: sustainable sites, water efficiency, energy and atmosphere, materials and resources, and indoor environmental quality, and (2) the project has construction costs of $2 million or more.[138] In addition, smaller renovations, additions, and interior finishing costing $300,000 or more and requiring work in the LEED energy and atmosphere, material and resources, and indoor environmental quality categories must also achieve LEED Silver certification at a minimum.[139] The city has complied fully with its LEED Silver certification goals as of December 2017.[140]

In 2015, Austin set the goal of net-zero community-wide greenhouse gas emissions by 2050.[141] The city released a Community Climate Plan which includes a Climate Action Plan organized by sector with strategies and actions. Austin has outlined several efforts to reduce emissions that involve buildings: continuing to improve energy efficiency of buildings, increasing transparency of energy costs in multifamily and commercial buildings, and powering all City-owned buildings with 100% renewable energy.[142] The city is in a unique position "[b]ecause the City of Austin owns its electric utility and can guide generation planning decisions, [so] City Council can set the direction to achieve significant emissions reductions."[143] Its utility, Austin Energy, has been working to meet a demand side management target of 900 megawatts "…through energy efficiency programs and rebates, the Energy Conservation Audit and Disclosure Ordinance (ECAD), the Green Building Program, energy code updates, and research and early adoption of smart grid

137. Austin, Tex., City Council Res. No. 000608-43 (June 8, 2000), http://www.cityofaustin.org/edims/document.cfm?id=59126.

138. Austin, Tex., City Council Res. No. 20071129-045 (Nov. 29, 2007), http://www.austintexas.gov/edims/document.cfm?id=110795.

139. *Id.*

140. *Goal: Maintain 100% Compliance with LEED Silver Certification for City Capital Improvement Projects*, *supra* note 134.

141. CITY OF AUSTIN, AUSTIN COMMUNITY CLIMATE PLAN 2 (2015), http://austintexas.gov/sites/default/files/files/Sustainability/OOS_AustinClimatePlan_032915_SinglePages.pdf.

142. *Id.* at 6, 24.

143. *Id.* at 38.

technologies."[144] As of 2017, Austin Energy's package of efficiency and demand response programs had resulted in 659 megawatts of demand savings.[145]

Austin still aimed to decrease energy use in new and existing buildings in its 2015 Climate Action Plan although it recognized that existing policies had made progress on reducing energy demand and increasing efficiency.[146] The Plan set out phase one actions to "[c]reate a new minimum standard for existing building energy use; enforce the new standard" and "[p]romote specific high-impact strategies including envelope improvements (biggest impact), lighting retrofits (LEDs), HVAC improvements, water heating efficiency, and plug load reduction."[147] However, the Plan expressed some concern about the difficulty of adopting minimum standards for existing buildings to spur retrofitting work, concluding "…such standards would represent a significant change for the local building sector and may require phase-in over the long term."[148] The Plan also signaled that the city is relying on its efforts to reduce the carbon intensity of its electricity generation to drive continued GHG reductions from the building sector, noting that as the grid takes on more renewable energy sources "…the effectiveness of building strategies in reducing greenhouse gases will be diminished…"[149]

It seems like Austin is not planning to undertake significant changes to its building code anytime soon, beyond possibly raising the minimum standard for existing buildings, but it is preparing for future initiatives to drive additional reductions.[150] For example, it proposes to "[e]xplore financing mechanisms to enable energy efficiency, demand response, distributed generation and energy storage."[151] Another goal is to "…enable large amounts of private sector retrofits include Property Assessed Clean Energy (PACE) and Warehouse for Energy Efficiency Loans (WHEEL), and privately financed on-bill repayment."[152] The city also proposes to "[e]xpand the availability and use of automated demand response to more and

144. *Id.* at 24.

145. *Energy Efficiency Solutions*, AUSTIN ENERGY, https://austinenergy.com/ae/about/environment/energy-efficiency-solutions (last visited Mar. 18, 2019).

146. CITY OF AUSTIN, *supra* note 141, at 39.

147. *Id.* at 39–40.

148. *Id.* at 39.

149. *Id.*

150. *Id.*

151. *Id.*

152. *Id.*

new technologies."[153] The city will also "[c]onsider the potential for net-zero new construction of residential and commercial buildings" and "[p]hase-in requirements to submeter new commercial office space as new permits are issued."[154]

2. Boulder, Colorado

In Colorado, local governments have a substantial amount of authority and independence. The state constitution provides for home rule in Article XX, requiring a city or town to have a population of at least 2,000 people and to adopt a charter in an election.[155] The state constitution is clear about the scope of home rule:

> It is the intention of this article to grant and confirm to the people of all municipalities coming within its provisions the full right of self-government in both local and municipal matters and the enumeration herein of certain powers shall not be construed to deny such cities and towns, and to the people thereof, any right or power essential or proper to the full exercise of such right.[156]

The constitution also delineates state and local authority under home rule, stating that "[t]he statutes of the state of Colorado, so far as applicable, shall continue to apply to such cities and towns, except insofar as superseded by the charters of such cities and towns or by ordinance passed pursuant to such charters."[157]

Building codes are adopted on the local level in Colorado and local governments had complete freedom over their codes, or lack of a code, until 2007.[158] In 2007, the state adopted two laws impacting the building code realm: HB 07-1146 and SB 07-051. First, HB 07-1146 requires all cities and counties with building codes to adopt and enforce a relatively up-to-date building energy code, specifically referencing the 2003 IECC as a minimum.[159] The law also authorizes

153. *Id.* at 40.

154. *Id.* at 39–40.

155. COLO. CONST. art. XX, § 6 ("The people…are hereby vested with, and they shall always have, power to make, amend, add to or replace the charter…which shall be its organic law and extend to all its local and municipal matters.").

156. *Id.* § 6(h).

157. *Id.*

158. *State Adoptions: Colorado*, INT'L CODE COUNCIL, https://www.iccsafe.org/about-icc/government-relations/map/colorado/ (last visited Apr. 21, 2019).

159. COLO. ENERGY OFFICE, 2007 LEGISLATIVE SUMMARY (2007), https://www.colorado.gov/pacific/sites/default/files/atoms/files/2007%20Legislation.pdf.

the state's Department of Local Affairs to provide grants to cities, counties, and non-profit organizations for training and technical assistance related to building energy codes and new construction that exceeds minimum energy code requirements.[160] For example, the Colorado Energy Office and Department of Local Affairs created a program to assist counties and municipalities with adopting the 2009 IECC.[161] Today, almost 85% of homes in Colorado are covered by the 2009 IECC or better.[162] Second, SB 07-051 requires state agencies or departments embarking upon a substantial renovation, design, or construction of a state-assisted facility of more than 5,000 square feet to pursue LEED Gold certification, as long as construction costs can be recovered from decreased operational costs within fifteen years.[163]

As of December 2015, thirty-four communities in Colorado have adopted the 2012 IECC and approximately 50% of all new construction activity in the state occurs in jurisdictions with the 2012 IECC or 2015 IECC.[164] Almost 90% of the new construction in the state has occurred under the 2009 IECC or newer.[165] The cities of Boulder, Fort Collins, and Telluride and the counties of Eagle, Summit, and Boulder have also adopted residential green building programs.[166] Indeed, Boulder County has adopted a Build Smart Code, which:

> [S]erves the County's stated goals of promoting and encouraging high performing, sustainable residential development and redevelopment in the unincorporated areas of Boulder County by: promoting development that will create energy efficient structures that reduce both the production of greenhouse gases from residential buildings and the amount of material sent to

160. *Id.*

161. *Building Energy Codes Program: Colorado*, OFF. OF ENERGY EFFICIENCY & RENEWABLE ENERGY, https://www.energycodes.gov/adoption/states/colorado (last visited Mar. 18, 2019).

162. *Id.*

163. S.B. 07-051, § 24-30-1305(b) (Colo. 2007), https://leg.colorado.gov/sites/default/files/images/olls/2007a_sl_129.pdf.

164. *Energy Codes*, COLO. ENERGY OFF., https://www.colorado.gov/pacific/energyoffice/energy-codes (last visited Mar. 19, 2019).

165. *Id.*

166. Stephanie Gripne, J.C. Martel & Brian Lewandowski, *A Market Evaluation of Colorado's High-Performance Commercial Buildings*, 4(1) J. SUSTAINABLE REAL ESTATE 123, 135 (2012).

> landfills; conserving water and other natural resources in the homebuilding process; and insuring proper indoor air quality.[167]

BuildSmart also "furthers the goals and measures outlined in the Colorado Climate Action Plan and the county's Sustainable Energy Plan."[168] The Code contains mandatory on-site renewable generation offsetting requirements for homes and buildings that have fireplaces, fire pits, heated pools and hot tubs.[169]

In 2017, the city of Boulder set an overall goal of reducing its greenhouse gas emissions by 80% or more below 2005 levels by 2050.[170] Boulder has adopted the IECC's 2012 codes, with local amendments in Title 10 of the Boulder Revised Code.[171] Boulder also adopted the City of Boulder Energy Conservation Code in 2013, known as the Accelerated Net-Zero Energy Code.[172] It prescribes minimum energy efficiency and conservation standards for new buildings, as well as additions and alterations to existing buildings, with a goal of new and remodeled residential and commercial buildings achieving net-zero emissions by 2031.[173] The city made some adjustments to the Code in 2017 "…to improve usability and compliance, while maintaining or increasing energy efficiency."[174]

The city's 2015 GHG inventory revealed that over half of its emissions footprint came from the city's commercial and industrial buildings, more than 3,700 buildings in total.[175] An analysis of energy data showed that the city had potential savings opportunities of 94,000 $MTCO_2e$ in the largest buildings in that portion of the building sector alone.[176] The analysis also projected that these

167. BOULDER COUNTY, BOULDER COUNTY BUILDSMART CODE (2017), https://assets.bouldercounty.org/wp-content/uploads/2017/03/buildsmart-code-2015.pdf.

168. *Id.*

169. *Id.*

170. CITY OF BOULDER, BOULDER'S CLIMATE COMMITMENT 2 (2017), https://www.globalcovenantofmayors.org/wp-content/uploads/2017/11/City_of_Boulder_Climate_Commitment_5.9.2017-FINAL.pdf.

171. *Codes and Regulations*, CITY OF BOULDER, COLO., https://bouldercolorado.gov/plan-develop/codes-and-regulations (last visited Apr. 24, 2019).

172. *Energy Conservation Code*, CITY OF BOULDER, COLO., https://bouldercolorado.gov/plan-develop/energy-conservation-codes (last visited Apr. 26, 2019).

173. *Id.*

174. *Id.*

175. CITY OF BOULDER, *Boulder Building Performance Program 2015/2016 Report*, 4 (2017) https://www-static.bouldercolorado.gov/docs/Buildings-Performance-Report-Boulder-FINAL-1-201706010950.pdf.

176. *Id.* at 3.

reductions would "require approximately $25 million in energy efficiency investments, and could result in $10 million in energy cost savings annually…and the creation of over 120 jobs."[177] Boulder has been working to reduce emissions through energy efficiency measures since 2002 with a wide variety of different programs and strategies.[178] But the city decided to dramatically ramp up its efforts to reduce the GHG emissions associated with the commercial and industrial buildings, as well as city-owned buildings given its 80% emissions reduction by 2050 goal.[179]

In 2015, the Boulder City Council adopted the Boulder Building Performance Ordinance to go beyond its robust voluntary programs[180] and set requirements for these existing buildings to reduce energy use.[181] The City Manager is responsible for adopting rules to interpret, further define, and/or implement the provisions of the Building Performance Ordinance.[182] The ordinance is now codified in the city's Municipal Code and requires privately-owned commercial and industrial buildings and city-owned buildings to: (1) rate & report building energy use annually[183] and (2) implement efficiency requirements,[184] including: performing energy assessments every ten years; performing retro-commissioning every ten years and implementing cost-effective measures within two years of the study; and implementing one-time lighting upgrades.[185]

177. *Id.*

178. Carolyn Brouillard & Sarah Van Pelt, *A Community Takes Charge: Boulder's Carbon Tax* 1 (Working Paper, Feb. 2007), https://www-static.bouldercolorado.gov/docs/boulders_carbon_tax-1-201701251557.pdf.

179. CITY OF BOULDER, *supra* note 171, at 12.

180. *Boulder Building Performance Ordinance (No. 8071)*, BUILDINGRATING, https://www.buildingrating.org/policy/boulder-building-performance-ordinance-no-8071 (last visited Apr. 26, 2019).

181. Boulder, Colo., Ordinance 8071 (Oct. 20, 2015); BOULDER, COLO., MUNICIPAL CODE ch. 7.7 (2018), https://library.municode.com/co/boulder/codes/municode.com/com/co/boulder/codes/municipal_code?nodeId=TIT10ST_CH7.7C0INENEF ("Commercial and Industrial Energy Efficiency of the Municipal Code").

182. *See, e.g.*, City Manager Rules for Building Performance Ordinance, CITY OF BOULDER, COLO., https://www-static.bouldercolorado.gov/docs/CMRs_FINAL_for_posting-1-201607131200.pdf (last visited Mar. 28, 2019).

183. *Boulder Building Performance Rating & Reporting*, CITY OF BOULDER, COLO., https://bouldercolorado.gov/sustainability/boulder-building-performance-rating-reporting (last visited Apr. 26, 2019).

184. *Id.*

185. BOULDER, COLO., MUNICIPAL CODE ch. 7.7 (2018), https://library.municode.com/co/boulder/codes/municipal_code?nodeId=TIT10ST_CH7.7COINENEF ("Commercial and Industrial Energy Efficiency of the Municipal Code").

Deadlines for compliance with the aforementioned requirements depend on the square footage of the building and whether it is new, existing, or city-owned.[186]

The city also has a serious enforcement policy– if the owner of a building subject to the requirements above fails to comply, it can "…result in fines of $0.0025 per square foot up to $1,000 per day of non-compliance."[187] Tenants who fail to provide building owners with relevant information for compliance purposes can also be subject to fines.[188]

The first period for rating and reporting energy data began in 2016 for existing buildings over 50,000 sq. ft., new buildings over 10,000 sq. ft. and city buildings over 5,000 sq. ft.[189] Specifically, this first round included 165 buildings, representing over sixteen million square feet and nearly 50% of the total city-owned and private commercial and industrial square footage in the city.[190] The city achieved 100% compliance at the end of the reporting period in 2018 for the first round with five buildings exempted.[191] The second period began in 2018 with buildings 30,000 sq. ft. and larger required to rate and report their energy use.[192] This second round includes an additional 159 buildings, representing over twelve million sq. ft.[193] Buildings that have been reporting over the last three years of the program have reduced their energy use by 1% over all three years and 3% in the past year, 2018.[194] The city achieved 99% compliance in 2018.[195]

The City of Boulder offers rebates for energy assessments to help offset the costs for commercial and industrial building owners who are subject to the Building Performance Ordinance.[196] The

186. *Boulder Building Performance Program*, CITY OF BOULDER, COLO., https://bouldercolorado.gov/sustainability/boulder-building-performance-home (last visited Apr. 26, 2019).

187. *Id.*

188. *Id.*

189. *Id.*

190. CITY OF BOULDER, *supra* note 175, at 3.

191. *Id*.

192. CITY OF BOULDER, *Boulder Building Performance Program 2017/2018 Report Update*, 5 (2019), https://www-static.bouldercolorado.gov/docs/Buildings-Performance-Report-Boulder-2018_FEB_2019-1201902261333.pdf?_ga=2.52998062.768435740.1551705203-672433133.1551705203.

193. *Id.*

194. *Id.* at 11.

195. *Id.* at 2.

196. CITY OF BOULDER, *City of Boulder Rebate Application: Building Performance Ordinance Level II Energy Assessment* (2016), https://www-static.bouldercolorado.gov/docs

earlier the energy assessments are performed before the compliance deadline, the larger the rebate.[197] The city also offers a robust compliance assistance program for building owners and property managers.[198]

Boulder has also made significant improvements in the energy efficiency of its municipal buildings. After a comprehensive energy assessment in 2010, the city developed a strategy that led to an $11 million project to install energy efficiency measures in its buildings like new light fixtures, building controls, and mechanical systems as well as renewable energy generation.[199] The city has reduced emissions in its facilities by over 40% through improving energy performance in forty-three buildings, which adds up to a reduction of over 8,000 metric tons of GHGs and saves the city $700,000 in energy costs annually.[200] The city's goal is to reduce emissions from its facilities by 80% or more by 2030 through continued efficiency measures and renewable capacity installment.[201]

3. Chicago, Illinois

Illinois allowed home rule for the first time in the Illinois Constitution of 1970.[202] Cities that govern according to home rule in Illinois can adopt a charter with any powers not explicitly denied to them by the state.[203] A municipality automatically becomes a home rule unit when its population reaches 25,000 or greater.[204] A municipality with a population under 25,000 can become a home rule unit if approved by a majority vote in a local referendum.[205] Today, only 215 of Illinois' nearly 7,000 municipalities have chosen to adopt home rule, but that includes 48 of the 50 most populous cities and accounts for over two-thirds of the state's population.[206]

/Rebate_Application_Level_II_EA-1201706201116.pdf?_ga=2.74509842.1841840731.1543962158-1068505832.1543615849.

197. *Id.* The rebates available are: "2016-2017: Up to 30% of total cost … 2018: Up to 20% of total cost … 2019: Reduced rebates may be available." *Id.* at 1.

198. *SmartRegs Steps to Compliance*, CITY OF BOULDER, COLO., https://bouldercolorado.gov/plan-develop/smartregs-steps-for-action (last visited Apr. 26, 2019).

199. CITY OF BOULDER, *supra* note 171, at 15.

200. *Id.*

201. *Id.*

202. *See* ILL. CONST. art. VII § 6.

203. *Id.* § 6(a).

204. *Id.*

205. CITIZEN ADVOCACY CTR., *Home Rule and You* (2004), https://www.citizenadvocacycenter.org/uploads/8/8/4/0/8840743/homerulebrochure.pdf.

206. *Home Rule Municipalities*, ILL. MUN. LEAGUE, https://www.iml.org/page.cfm?key=2 (last visited Mar. 29, 2019).

Additionally, there is only one home rule county, but it is Cook County, surrounding Chicago, which is home to 40% of the state's population.[207] The Illinois General Assembly can preempt home rule by declaring exclusive jurisdiction or denying concurrent powers of local and state government by a three-fifths vote.[208]

Illinois has an Energy Conservation Code that covers state funded buildings, commercial buildings, and residential buildings.[209] The Code requires all new residential and commercial buildings that apply for permits from a municipality or county to comply with the latest published edition of the IECC (currently 2015) with Illinois-specific amendments.[210] For commercial buildings, this also includes "…any addition, alteration, renovation, or repair to an existing commercial structure…" and the IECC applies to "…the portions of that structure that are being added, altered, renovated, or repaired."[211] The Code requires state-funded buildings to comply with the latest adopted ASHRAE Standard 90.1 (currently 2013) with Illinois-specific amendments.[212] The Illinois Capital Development Board's Division of Building Codes and Regulations acts as an advisory body, as designated by the state legislature, streamlining building requirements and considering adoption of the latest codes.[213] The Capital Development Board has provided notice that the 2018 IECC with amendments will be adopted as part of the Energy Conservation Code in 2019.[214]

Illinois also passed a Green Buildings Act in 2009 that mandated that "all new State-funded building construction and major renovations of existing State-owned facilities must be designed to achieve, at a minimum, the silver certification of the Leadership in

207. CITIZEN ADVOCACY CTR., *supra* note 205; *see QuickFacts: Illinois; Cook County, Illinois,* U.S. CENSUS BUREAU, https://www.census.gov/quickfacts/fact/table/il,cookcountyillinois/PST045217 (last visited Mar. 29, 2019).

208. ILL. CONST. art. VII, § 6(g).

209. ILL. ADMIN. CODE tit. 71, §§ 600.300, 600.400 (2016), http://www.ilga.gov/commission/jcar/admincode/071/07100600sections.html.

210. *Id.*

211. Energy Efficient Building Act, 20 ILL. COMP. STAT. 3125/20(a), http://www.ilga.gov/legislation/ilcs/ilcs3.asp?ActID=2614&ChapterID=5.

212. ILL. ADMIN. CODE tit. 71, § 600.200 (2016), http://www.ilga.gov/commission/jcar/admincode/071/071006000B02000R.html.

213. *Building Codes & Regulations*, ILL. CAP. DEV. BOARD, https://www2.illinois.gov/cdb/business/codes/Pages/BuildingCodesRegulations.aspx (last visited Apr. 26, 2019).

214. *Notice of Proposed Rules, Illinois Energy Conservation Code Amendments*, ILL. CAP. DEV. BOARD, https://www2.illinois.gov/cdb/announcements/2018/Documents/NOTICE%20OF%20PROPOSED%20RULES%20\%20Illinois%20Energy%20Conservation%20Code.pdf (last visited Apr. 26, 2019).

Energy and Environmental Design's rating system…or an equivalent standard, including, but not limited to, a two-globe rating in the Green Globes USA design program."[215] Major renovations were defined as "a project with a construction budget that equals 40% or more of the building's current replacement cost."[216]

Local governments can adopt more stringent, but not less stringent, standards for commercial buildings, as compared to the statewide standards.[217] However, the statewide Energy Conservation Code limits home rule authority over residential standards, such that counties and cities (besides Chicago) that did not adopt the 2006 IECC or an equivalent or more stringent standard on or before May 15, 2009 are blocked from adopting more stringent standards now.[218]

The Chicago Building Code[219] contains energy conservation requirements based on and incorporating the 2015 IECC. The code's energy conservation requirements are applicable to new buildings and can be triggered for existing buildings by additions.[220] If an addition increases the building's floor area by 25% or less, the new construction must conform to the city's current building code.[221] If an addition increases the building's floor area by more than 25%, the entire building must conform to the city's current building code.[222]

Chicago's overall goal is to reduce greenhouse gas emissions by 80% below its 1990 level by 2050.[223] In its 2008 Climate Action Plan, Chicago made buildings one of its key areas for reductions after finding that buildings account for 70% of the city's emissions.[224]

215. Green Buildings Act, 20 ILL. COMP. STAT. 3130/15, http://www.ilga.gov/legislation/ilcs/ilcs3.asp?ActID=3109&ChapterID=5.

216. *Id.* § 10.

217. ILL. ADMIN. CODE tit. 71, § 600.340 (2016), http://www.ilga.gov/commission/jcar/admincode/071/071006000C03400R.html ("[N]othing…prevents a unit of local government from adopting an energy efficiency code or standards that are more stringent than this Code.").

218. *Id.* § 600.440 (providing an exemption for "a municipality with a population of 1,000,000 or more").

219. *Building Code*, CITY OF CHI., https://www.cityofchicago.org/city/en/depts/bldgs/provdrs/bldg_code.html (last visited Mar. 28, 2019).

220. CHI., ILL., MUN. CODE ch. 13-200, http://library.amlegal.com/nxt/gateway.dll/Illinois/chicago_il/title13buildingsandconstruction/chapter13200rehabilitationcode?f=templates$fn=default.htm$3.0$vid=amlegal:chicago_il$anc=JD_Ch.13-200 ("Rehabilitation Code").

221. CHI., ILL., MUN. CODE ch. 13-200, art. 250(a).

222. *Id.*

223. *Introduction*, CHI. CLIMATE ACTION PLAN, http://www.chicagoclimateaction.org/pages/introduction/10.php (last visited Mar. 27, 2019).

224. *Energy Efficient Buildings*, CHI. CLIMATE ACTION PLAN, http://www.chicagoclimateaction.org/pages/buildings/12.php (last visited Mar. 27, 2019).

Chicago adopted eight actions to be taken in the building sector, leading up to 2020, and calculated the reduction it expects each action will achieve in million metric tons of CO_2 equivalent ($MMTCO_2e$) for a total reduction of 4.6 $MMTCO_2e$.[225] First, to retrofit 50% of commercial and industrial buildings, resulting in a 30% reduction in energy use which would be a reduction of 1.3 $MMTCO_2e$.[226] Second, to retrofit 50% of residential buildings to also achieve a 30% reduction in energy used, adding up to 1.44 $MMTCO_2e$ of reduction.[227] Third, to update Chicago's Energy Conservation Code with the latest international standards to achieve 1.13 $MMTCO_2e$ reduction.[228] Finally, to establish guidelines for all building renovations to mandate compliance with green standards to attain a .31 $MMTCO_2e$ reduction.[229]

In 2010, the city reported that over 20,000 buildings had been retrofitted and the Chicago Housing Authority had improved per unit energy efficiency by 55%, among other achievements.[230] Based on its 2010 emissions inventory, Chicago had achieved 22% of its 2020 emissions reduction goal related to energy efficient buildings.[231] In March 2012, the city proposed creation of the Chicago Infrastructure Trust, to fund infrastructure improvements in accordance with the city's climate and sustainability goals.[232] One of the trust's projects is investing in energy efficiency in municipal buildings.[233] The proposal was anticipated to save more than $20 million each year in energy

225. *Id.*

226. *Id.*

227. *Id.*

228. *Id.*

229. *Id.*; *see also Strategy 1. Energy Efficient Buildings*, *in* CITY OF CHICAGO, CHICAGO, CLIMATE ACTION PLAN 19, 19–24, http://www.chicagoclimateaction.org/filebin/pdf/finalreport/EnergyEfficientBuildings.pdf.

230. CHI. CLIMATE ACTION PLAN, CHICAGO CLIMATE ACTION PLAN DASHBOARD (2010) http://www.chicagoclimateaction.org/filebin/pdf/CCAPDashboard2010v2.pdf; *see also* CHI. CLIMATE ACTION PLAN, CHICAGO CLIMATE ACTION PLAN: PROGRESS REPORT, FIRST TWO YEARS (2010), http://www.chicagoclimateaction.org/filebin/pdf/CCAPProgressReport/v3.pdf.

231. CITY OF CHI., SUSTAINABLE CHICAGO ACTION AGENDA 12 (2012) https://www.cityofchicago.org/content/dam/city/progs/env/SustainableChicago2015.pdf.

232. *Id.*

233. *Id.*; *see Municipal Buildings Retrofit*, CHI. INFRASTRUCTURE TRUST, http://chicagoinfrastructure.org/initiatives/construction-underway-municipal-buildings-retrofit/ (explaining that the project was completed in July 2015).

costs, generate up to 2,000 jobs, and "…reduce carbon dioxide emissions equivalent to removing 30,000 cars from the road annually."[234]

The Sustainable Chicago Action Agenda, released in September 2012, built on the goals in the 2008 Climate Action Plan and set new goals to be reached by 2015.[235] It proposed two goals related to buildings. The first goal was to improve citywide energy efficiency by 5%.[236] The city launched a three pronged program called Retrofit Chicago that targeted energy efficiency improvements in residential, municipal, and commercial buildings.[237] Three other key actions to support this goal were to double the number of LEED-certified buildings, enhance local policies to support greater transparency in energy use and building energy performance, and update the energy code for new construction and significant renovations.[238]

The second goal was to improve overall energy efficiency in municipal buildings by 10%.[239] For years, Chicago has mandated LEED certification for its new municipal buildings and developed the first LEED Platinum municipal building.[240] The city set some specific action items to accelerate energy efficiency gains in municipal buildings. Specifically, the city sought to double the number of LEED-certified public buildings, track and report energy consumption at city facilities, target ten million square feet of municipal buildings for an energy use reduction of 20% and improve energy efficiency in all Chicago Public Schools by at least 10%.[241]

In September 2013, the city adopted the Chicago Energy Benchmarking Ordinance, which requires existing commercial, municipal, and residential buildings larger than 50,000 square feet to measure whole-building energy use and report it annually.[242] Reported data is verified on a three-year cycle, starting with

234. *Id.*

235. *Id.* at 4.

236. *Id.* at 13.

237. *Id.*; *see also Retrofit Chicago*, CITY OF CHI., https://www.chicago.gov/city/en/progs/env/retrofit_chicago.html (last visited Apr. 29, 2019).

238. CITY OF CHI., *supra* note 231, at 13.

239. *Id.*

240. *Id.*

241. *Id.*

242. *Chicago Energy Benchmarking Ordinance Background*, CITY OF CHI.: MAYOR RAHM EMANUEL, https://www.chicago.gov/city/en/depts/mayor/supp_info/chicago-energy-benchmarking/ChicagoEnergyBenchmarkingOverview.html (last visited Apr. 29, 2019).

verification for the first year.[243] The buildings covered by the ordinance[244] represent 20% of carbon dioxide emissions citywide.[245] The ordinance has led to improvements in energy performance, resulting in a collective savings of more than $39 million in energy costs over three years.[246]

In September 2018, Chicago achieved LEED for Cities[247] Platinum certification which recognizes the city's efforts to benchmark and communicate its progress on sustainability initiatives.[248] The U.S. Green Building Adoption Index ranked Chicago the nation's greenest city in 2018, for the second year in a row, with almost 20% of its building square footage certified by a green building certification system.[249]

In 2019, Chicago is implementing the Chicago Energy Rating System, which will assign a zero to four-star energy performance rating to all properties subject to the Energy Benchmarking Ordinance based on their reported data.[250] The new rating system will require covered buildings "…to post ratings in a prominent location on the property, and share this information at the time of sale or lease listing."[251] This system builds on the success of Retrofit Chicago and the Energy Benchmarking Ordinance and will be the first system of its kind in the United States.[252]

243. *Id.*

244. *Chicago Energy Benchmarking - Covered Buildings*, CHI. DATA PORTAL, https://data.cityofchicago.org/Environment-Sustainable-Development/Chicago-Energy-Benchmarking-Covered-Buildings/g5i5-yz37/data (last visited Apr. 29, 2019).

245. Mayor's Press Office, *Mayor Emanuel Releases the 2017 Chicago Energy Benchmarking Report*, CITY OF CHI.: MAYOR RAHM EMANUEL (Feb. 13, 2018), https://www.chicago.gov/city/en/depts/mayor/press_room/press_releases/2018/February/EnergyBenchmarking.html.

246. *Id.*

247. *LEED for Cities and Communities*, U.S. GREEN BUILDING COUNCIL https://new.usgbc.org/leed-for-cities (last visited Apr. 29, 2019).

248. Amanda Komar, *Mayor Emanuel Announces Chicago Achieved LEED for Cities Platinum Certification*, U.S. GREEN BUILDING COUNCIL (Sept. 20, 2018), https://www.usgbc.org/articles/mayor-emanuel-announces-chicago-achieved-leed-cities-platinum-certification.

249. CBRE & MAASTRICHT U., U.S. GREEN BUILDING ADOPTION INDEX 2018, at 4, 7 (2018), https://www.cbre.com/about/corporate-responsibility/pillars/environmental-sustainability/green%20building%20adoption%20index (including certification under LEED, Energy Star, the Living Building Challenge, BOMA 360, Green Globes, WELL, Fitwel, and Wired).

250. Mayor's Press Office, *supra* note 245.

251. *Id.*

252. *Id.*

Chicago has become increasingly active in national and international cooperative city efforts to address climate change and has coupled its activism with more ambitious goals. In April 2017, Chicago Mayor Rahm Emanuel committed the city to using 100% renewable energy in all municipal buildings by 2025.[253] In June 2017, the Mayor also signed an Executive Order committing the City to achieve the goals of the Paris Agreement.[254] The Order highlighted the fact that the city had achieved a 7% reduction in greenhouse gas emissions from 2010 to 2015, "…while at the same time expanding the population and economy of Chicago."[255] In September 2017, Chicago reported it was 40% of the way to meeting its Paris Agreement target, a citywide goal of reducing GHG emissions by 26-28% from 2005 levels by 2025.[256]

In December 2017, the City of Chicago hosted the North American Climate Summit in partnership with the Global Covenant of Mayors for Climate and Energy and C40 Cities Leadership Group.[257] The Summit brought together over 50 municipal leaders from across the United States, Canada, and Mexico to articulate commitments to the Paris Agreement.[258] Specifically, the Summit promoted the Chicago Climate Charter, whereby cities pledge to take a variety of actions including to "achieve a percent reduction in carbon emissions in line with the Paris Agreement."[259]

253. Mayor's Press Office, *Mayor Emanuel Announces City Buildings to be Powered by 100 Percent Renewable Energy by 2025*, CITY OF CHI.: MAYOR RAHM EMANUEL (Apr. 9, 2017), https://www.cityofchicago.org/city/en/depts/mayor/press_room/press_releases/2017/april/RenewableEnergy2025.html.

254. Rahm Emanuel, Mayor, City of Chicago, Executive Order No. 2017-1 (June 7, 2017), https://www.cityofchicago.org/content/dam/city/depts/mayor/Press%20Room/Press%20Releases/2017/May/ParisAccordEO.pdf.

255. *Id.*

256. Mayor's Press Office, *Mayor Emanuel Announces Chicago Has Met 40 Percent of Paris Climate Agreement Commitments*, CITY OF CHI.: MAYOR RAHM EMANUEL (Sept. 18, 2017), https://www.chicago.gov/city/en/depts/mayor/press_room/press_releases/2017/september/40PercentParisAgreement.html.

257. Mayor's Press Office, *Mayor Emanuel and Global Mayors Sign the Chicago Climate Charter at the North American Climate Summit*, CITY OF CHI.: MAYOR RAHM EMANUEL (Dec. 5, 2017), https://www.chicago.gov/city/en/depts/mayor/press_room/press_releases/2017/december/ChicagoClimateSummitCharter.html; *see also* NORTH AM. CLIMATE SUMMIT, https://northamericanclimatesummit.splashthat.com/ (last visited Mar. 1, 2019).

258. *Id.*

259. CHICAGO CLIMATE CHARTER (Dec. 2017) https://www.cityofchicago.org/content/dam/city/depts/mayor/Press%20Room/Press%20Releases/2017/December/ChicagoClimateCharter.pdf.

IV. AUTHORITY OVER THE BUILDING SECTOR: COMPARISON TO THE EUROPEAN UNION

The European Union (EU) has been engaged in ambitious work to improve energy efficiency in buildings for many years, providing an opportunity to study lessons learned. Recognizing that the EU and its Member States function according to their own legal system and constraints as a political and economic union of sovereign nations, their approach nonetheless illustrates how to strike a balance between setting standards to be applied across the EU and providing flexibility for Member States. Reviewing the EU's policies provides a backdrop for comparison to consider both the balance of authority between governments in the United States at various levels, and the challenges of trying to respect those delicate balances and make progress toward specific goals. This comparison is also relevant for imagining what it would have been like if the United States had passed the American Clean Energy and Security Act of 2009 (Waxman-Markey bill),[260] which would have created national building standards, and if Congress were to consider a similar approach in the future perhaps as part of a Green New Deal.[261]

The European Union adopted the Energy Performance of Buildings Directive (EPBD) in 2002.[262] This directive establishes standards for buildings that all Member States were required to incorporate into their national building regulations and introduced energy certification schemes for buildings.[263] In 2010, a revised version of the EPBD (EPBD recast)[264] was adopted by the European Parliament and Council of the EU. The EPBD recast requires that "(a) by 31 December 2020, all buildings are nearly zero-energy buildings; and (b) after 31 December 2018, new buildings occupied and owned by public authorities are nearly zero-energy buildings."[265] The nearly zero-energy building occupies a middle ground between a traditional building and a zero-energy building. The EPBD recast stopped short of defining what constitutes "nearly zero" and instead provides a broad definition coupled with factors to be considered by Member States in establishing their own definitions. The broad

260. H.R. 2454, 111th Cong. Subtitle A—Building Energy Efficiency Programs (2009).

261. H.R.J. Res. 109, 116th Cong. (2019).

262. Council Directive 2002/91, 2003 O.J. (L 1) 65 (EC); Council Directive 2010/31, 2010 O.J. (L 153) 13 (EU).

263. Council Directive 2002/91, *supra* note 262.

264. Council Directive 2010/31, *supra* note 262.

265. *Id.* art. 9. This includes all residential, commercial, and industrial privately-owned buildings.

definition is "a building that has a very high energy performance…. The nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby…."[266]

The EPBD recast instructs Member States to "draw up national plans for increasing the number of nearly zero-energy buildings…[that] may include targets differentiated according to the category of building."[267] Member States must set minimum energy performance requirements for components of the building envelope[268] according to a cost-optimal methodology.[269] Member States must also set standards for technical building systems, equipment for heating, cooling, ventilation, and hot water, in existing buildings based on overall energy performance, including requirements for replacements and upgrades, and may do the same for new buildings.[270] Both the EPBD and the EPBD recast cover new and existing buildings, using a "major renovation" as a triggering event to upgrade an existing building's energy efficiency.[271] Under the EPBD recast, a major renovation is defined as:

> the renovation of a building where: (a) the total cost of the renovation relating to the building envelope or the technical building systems is higher than 25% of the value of the building, excluding the value of the land upon which the building is situated; or (b) more than 25% of the surface of the building envelope undergoes renovation;[272]

Member States may choose whether to adopt a definition in terms of value or size of the renovation.[273]

266. *Id.* art. 2.

267. *Id.* art. 9.

268. The "building envelope" is defined as "the integrated elements of a building which separate its interior from the outdoor environment." *Id.* at art. 2(7).

269. *Id.* art. 4.

270. *Id.* arts. 2, 8.

271. Council Directive 2002/91, *supra* note 262, at art. 6; Council Directive 2010/31, *supra* note 262, art. 7.

272. Council Directive 2010/31, *supra* note 262, at art. 2; *see also* Council Directive 2002/91, *supra* note 262, recital 13 (setting out a similar definition that was refined in the 2010 recast).

273. Council Directive 2010/31, *supra* note 262, recital 16.

The EU employs energy performance certificates (EPCs) as a key information tool in the EPBD and the EPBD recast to measure the energy performance of buildings and encourage improvements.[274] EPC certification procedures and registration processes vary by country, but adhere to the general principles for EPCs set out in the EPBD and the EPBD recast.[275] The EPCs provide building energy performance information to building owners, tenants, prospective owners, and the public to facilitate comparisons between buildings and cost-effective improvements.[276]

Tracking the progress of the EPBD and the EPBD recast reveals some of the challenges inherent in their approach. As of 2016, not all Member States had adopted detailed definitions for nearly zero energy buildings, some had adopted draft definitions or nothing at all.[277] This raises the question of what will be achieved by 2020, the deadline for all buildings to be nearly zero-energy.[278] The deadline for publicly-owned buildings was December 31, 2018, and compliance analyses should be forthcoming.[279] Perhaps due in part to lagging compliance, the European Commission updated the EPBD again in November 2016 "…to streamline existing rules and accelerate building renovation," particularly to encourage incorporation of smart technology in buildings.[280] The Commission also released the EU Building Stock Observatory, a database with information on the energy performance of buildings in Europe and launched a public-private partnership program to fund energy efficiency and renewable energy in buildings, the Smart Finance for Smart Buildings initiative.[281] Looking at the database, some

274. Council Directive 2002/91, *supra* note 262, at art. 7; Council Directive 2010/31, *supra* note 262, at art. 11.

275. ALEKSANDRA ARCIPOWSKA ET AL., BUILDINGS PERFORMANCE INST. EUR., ENERGY PERFORMANCE CERTIFICATES ACROSS THE EU: MAPPING OF NATIONAL APPROACHES, 7–8 (2014), http://bpie.eu/publication/energy-performance-certificates-across-the-eu/.

276. Council Directive 2002/91, *supra* note 262, at art. 7; Council Directive 2010/31, *supra* note 262, arts. 11, 12.

277. CONCERTED ACTION ENERGY PERFORMANCE OF BUILDINGS DIRECTIVE, 2016 IMPLEMENTING THE ENERGY PERFORMANCE OF BUILDINGS DIRECTIVE, 59 (2015), http://www.epbd-ca.eu/outcomes/2011-2015/CA3-BOOK-2016-A-web.pdf; *see also nZEB Definitions by Country*, ZEBRA 2020 DATA TOOL http://www.zebra-monitoring.enerdata.eu/nzeb-activities/panel-distribution.html#nzeb-definitions-by-country.html (last visited Apr. 29, 2019).

278. Council Directive 2010/31, *supra* note 262, art. 9(1)(a).

279. *Id.* art. 9(1)(b).

280. *Energy Performance of Buildings*, EUR. COMM'N, https://ec.europa.eu/energy/en/topics/energy-efficiency/energy-performance-of-buildings (last visited Apr. 21, 2019).

281. *Id.*; *EU Buildings Database*, EUR. COMM'N, https://ec.europa.eu/energy/en/eu-buildings-database (last visited Apr. 21, 2019).

countries, like the Netherlands, are clearly prioritizing these efforts and making impressive progress, but there are a lot of gaps in information as many countries have not yet reported their data.[282]

On June 19, 2018, the European Commission amended the EPBD recast and Directive 2012/27/EU on energy efficiency[283] with a new directive that entered into force on July 9, 2018.[284] The new efficiency directive is based on a reassessment of the EU's targets, expressed in the Energy and Climate Policy Framework for 2030.[285] The EU is committed to reducing GHG emissions by at least 40% below 1990 levels by 2030, increasing its share of renewable energy, and achieving energy savings.[286] The EU is taking a hard look at what it will take to reach its goal of decarbonizing its building stock by 2050 in line with its 2030 reduction target and its 2050 goal of reducing GHG emissions by 80-95% compared to 1990.[287] Member States have until March 10, 2020 to incorporate the new directive's provisions into their national laws.[288]

The new efficiency directive's revisions to the EPBD recast and directive on energy efficiency include reinforcing the financing framework, supporting smart building technologies, and accelerating the renovation of existing buildings now and into the future with long-term planning.[289] According to the European Commission's recent climate and energy policy framework for 2020-2030, the building renovation rate will need to be above 2% annually, up from 1.4% on average today, to maximize energy efficiency in a cost-effective manner.[290] To that end, the amendments to the EPBD recast require Member States to "…establish a long-term renovation strategy to support the renovation of the national stock of residential and non-residential buildings, both public and private, …facilitating

282. *EU Buildings Database*, EUR. COMM'N, https://ec.europa.eu/energy/en/eu-buildings-database (last visited Apr. 21, 2019).

283. Council Directive 2012/27, 2012 O.J. (L 315) 1 (EU).

284. Council Directive 2018/844, 2018 O.J. (L 156) 75 (EU).

285. *Id.* recital 1.

286. *Id.*

287. *Id.* art. 1(2).

288. *Id.* art. 3(1).

289. *Id.* recital 2.

290. Communication from the Commission to the European Parliament and the Council, Energy Efficiency and its contribution to energy security and the 2030 Framework for climate and energy policy, Sec. 3.2, EUR. COMM'N (July 23, 2014) https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52014DC0520.

the cost-effective transformation of existing buildings into nearly zero-energy buildings."[291] The renovation strategies must include information like:

> the identification of cost-effective approaches to renovation relevant to the building type and climatic zone, considering potential relevant trigger points, where applicable, in the life-cycle of the building… policies and actions to stimulate cost-effective deep renovation of buildings, including staged deep renovation, and to support targeted cost-effective measures and renovation…policies and actions to target all public buildings.[292]

The long-term renovation strategy must also set out "…a roadmap with measures and domestically established measurable progress indicators…[and] include indicative milestones for 2030, 2040 and 2050, and specify how they contribute to achieving the Union's energy efficiency targets…."[293]

With regard to smart building technology, Member States must include "an overview of national initiatives to promote smart technologies and well-connected buildings and communities…" in their long-term renovation strategies for existing buildings.[294] For new buildings, they are to require "…self-regulating devices for the separate regulation of the temperature in each room…," where technically and economically feasible or a designated heated zone in the building.[295] The same self-regulating devices are also to be required for existing buildings, where technically and economically feasible, using replacement of heating systems as a trigger.[296] In terms of financing, Member States are directed to:

> …link their financial measures for energy efficiency improvements in the renovation of buildings to the targeted or achieved energy savings, as determined by one or more of the following criteria…[1] energy performance of the equipment or material used for the renovation…[2] the improvement achieved due to such

291. *Id.* art. 1(2).
292. *Id.*
293. *Id.*
294. *Id.*
295. *Id.* art. 8(1).
296. *Id.*

> renovation by comparing energy performance certificates issued before and after renovation…[3] the results of an energy audit…

among other possible metrics.[297] By connecting financing to performance-related metrics, Member States can hopefully work to ensure that funding only flows to those projects that deliver real improvements in energy efficiency.

This new efficiency directive is "…the first of the 8 legislative acts in the Clean Energy for All Europeans package to be adopted."[298] Clean Energy for All Europeans is a new energy policy framework that the EU is rolling out to meet targets toward compliance with the EU's Paris Agreement commitments.[299]

The EPBD is the backbone of the EU's building efforts and the EPBD recast has enhanced energy efficiency strategies and compliance timelines. The most recent directive continues to drive efficiency by seeking to integrate new building technologies, accelerate renovation of the existing building stock, and deploy the financing to make it possible for the EU to reach its emissions reductions goals. All three directives allow Member States to go above and beyond their requirements according to different framing.[300] Also, in all three directives, the EU reserves the right to step in and adopt measures for the Member States to meet the directive's requirements, if necessary.[301] And all three directives rest

297. *Id.* art. 1(6).

298. *New Energy Performance in Buildings Directive Comes into Force on 9 July 2018*, EUR. COMM'N (June 19, 2018), https://ec.europa.eu/info/news/new-energy-performance-buildings-directive-comes-force-9-july-2018-2018-jun-19_en.

299. *Clean Energy for All Europeans*, EUROPEAN COMM'N, https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/clean-energy-all-europeans (last visited Apr. 29, 2019).

300. Council Directive 2002/91, *supra* note 262, recital 21 ("…detailed implementation should be left to Member States, thus allowing each Member State to choose the regime which corresponds best to its particular situation. This Directive confines itself to the minimum required in order to achieve those objectives. . .."); Council Directive 2010/31, *supra* note 262, art. 1(3) ("The requirements laid down in this Directive are minimum requirements and shall not prevent any Member State from maintaining or introducing more stringent measures…compatible with the Treaty on the Functioning of the European Union…[and] notified to the Commission."); Council Directive 2010/31, *supra* note 262, art. 10(7) ("The provisions of this Directive shall not prevent Member States from providing incentives for new buildings, renovations or building elements which go beyond the cost-optimal levels."); Council Directive 2018/844, *supra* note 284, recital 42 ("This Directive should not prevent Member States from setting more ambitious energy performance requirements for buildings and for building elements as long as such requirements are compatible with Union law.").

301. Council Directive 2018/844, *supra* note 284, recital 43; Council Directive 2010/31,

on the same principles that animated the first one: to improve the energy efficiency of buildings in order to "…seek a cost-efficient equilibrium between decarbonising energy supplies and reducing final energy consumption" to thus reduce GHG emissions.[302]

V. REFLECTING ON THE EFFORTS OF AUSTIN, BOULDER, AND CHICAGO

It is difficult, if not impossible, to prescribe a strategy for reducing GHG emissions from the building sector for all U.S. cities across varying climate zones, political environments, and state/local legal frameworks. As stated earlier, there are some key elements that can indicate whether a city is maximizing potential GHG reductions in the building sector today and into the future. This section will review the cities' consistency in improving efficiency, policies for requiring upgrades in existing buildings, policies for municipal buildings, and efforts related to broader decarbonization like supporting zero energy buildings, distributed energy resources, and grid flexibility.[303] This section will also discuss some of the challenges these cities face in advancing their efforts and some suggestions for how they can borrow strategies from one another.

A. Consistent Improvements in Efficiency

All three cities have been working to improve energy efficiency in buildings for many years. A trajectory of incremental improvement is visible in each city's work to address the building sector even though this article focuses on relatively recent activity.

Austin has been working consistently to increase efficiency and sustainability standards for new buildings. The city is working to reduce and eventually eliminate GHG emissions upstream in its electricity generation,[304] which will reduce almost all of the emissions associated with the building sector. The city has also worked to improve the energy efficiency of existing residential and commercial

supra note 262, recital 33; Council Directive 2002/91, *supra* note 262, recital 21.

302. Council Directive 2002/91, *supra* note 262, recitals 3, 6, 12; Council Directive 2018/844, *supra* note 284, recital 6.

303. *See Building Codes and Appliance Standards*, ENERGY INNOVATION, https://www.energypolicy.solutions/policies/building-codes-appliance-standards/ (last visited Mar. 1, 2019).

304. CITY OF AUSTIN, *supra* note 141, at 38.

buildings with its ECAD ordinance.[305] Austin is continuing to pursue reductions in building energy use through financing, incentive, and behavioral change mechanisms.[306]

Boulder has employed a multi-pronged approach to the building sector to improve efficiency in new and existing buildings. The city has adopted a forward-looking code for new and remodeled buildings that applies energy efficiency and conservation standards with a view toward net-zero emissions by 2031.[307] The Building Performance Program has focused on large commercial, industrial and municipal buildings to gather more information about their energy usage and spur incremental improvements over time.[308]

Chicago has been steadily improving building energy efficiency since its 2008 Climate Action Plan, which set out retrofitting goals targeting certain percentages of building types to achieve reductions.[309] The city also updated its building code and adopted guidelines to continue to drive upgrades through renovations.[310] The city has continued to make progress through retrofitting efforts and its more recent benchmarking program with plans to keep driving efficiency through its energy rating system.

B. Policies to Upgrade Efficiency in Existing Buildings

All cities examined here, and even some of the states, have sought to upgrade the energy efficiency of existing buildings either by requiring that they make cost-effective upgrades according to a timeline or by making the most of opportunities when there are large renovation projects. Taking advantage of renovations is not only cost effective, but wise given that the investment in a renovation both indicates and facilitates a longer building lifespan, locking in a rather consistent level of electricity consumption (excluding the possibility of appliance and equipment upgrades in the future).[311]

305. Austin, Tex., City Council Res. No. 20081106-048 (Nov. 6, 2008), http://www.ci.austin.tx.us/edims/document.cfm?id=123402.

306. *Id.* at 39.

307. *Energy Conservation Code*, CITY OF BOULDER, COLO., https://bouldercolorado.gov/plan-develop/energy-conservation-codes (last visited Apr. 26, 2019).

308. *Boulder Building Performance Program*, CITY OF BOULDER, COLO., https://bouldercolorado.gov/sustainability/boulder-building-performance-home (last visited Apr. 26, 2019).

309. *Energy Efficient Buildings*, CHI. CLIMATE ACTION PLAN, http://www.chicagoclimateaction.org/pages/buildings/12.php (last visited Mar. 27, 2019).

310. *Id.*

311. Richard Paradis, *Retrofitting Existing Buildings to Improve Sustainability and Energy Performance*, WHOLE BUILDING DESIGN GUIDE, https://www.wbdg.org/resources/retr

Austin's reluctance to create a new minimum standard for existing buildings, beyond the standards from the ECAD ordinance, is understandable given the ambition of that ordinance and some of the compliance and enforcement issues it faced.[312] If Austin ultimately decides to move forward with a new standard, it could look to Chicago's approach for applying updated standards to existing buildings using an addition or renovation as a triggering event to bring the entire building up to date.[313] Austin may also consider enhancing the building energy performance portion of its Green Building Program to increase the level of improvement above the existing Austin City Energy Code that buildings should achieve or make certification under the program mandatory for specific types of renovations and/or mandate a specific compliance pathway in the building energy performance section.[314]

Boulder's Building Performance Program works with large existing buildings to improve efficiency and is starting to produce results as buildings begin to implement energy efficiency measures.[315] However, Boulder may want to examine and address the increased use of natural gas in the covered buildings that has occurred as electricity use has fallen.[316] Boulder may also assess existing residential buildings once it has maximized reductions in existing commercial buildings, depending on the age and efficiency of its housing stock. It could use Austin's efforts as a guide, prescribing a range of cost-effective improvements to be made and using the sale of a property as the triggering event to require those upgrades. Alternatively, it could adapt its Building Performance Program for residential buildings and require improvements according to a timeline.

ofitting-existing-buildings-improve-sustainability-and-energy-performance (last updated Aug. 15, 2016).

312. *See* CITY OF AUSTIN, *supra* note 141, at 39; COUNCIL COMM. ON AUSTIN ENERGY, *supra* note 131.

313. CHI., ILL., MUN. CODE ch.13-200, art. 250(a), http://library.amlegal.com/nxt/gateway.dll/Illinois/chicago_il/title13buildingsandconstruction/chapter13-200rehabilitationcode?f=templates$fn=default.htm$3.0$vid=amlegal:chicago_il$anc=JD_Ch.13-200.

314. AUSTIN GREEN BUILDING PROGRAM, 2016 COMMERCIAL RATING GUIDEBOOK, 12–13 (2016), https://austinenergy.com/wcm/connect/271a252e-1bf3-40ff-934a-b1ddb496ce03/AEGB_2016_Commercial_Guidebook.pdf?MOD=AJPERES&CVID=mkZYeDn&CVID=mkZYeDn.

315. CITY OF BOULDER, *supra* note 192, at 11.

316. Specifically, the 139 buildings that have been reporting for the last three years have reduced electricity use by 11 percent but increased natural gas consumption by nine percent over the same period. *Id.* at 11.

Chicago's approach to existing buildings has combined its requirements for additions, retrofitting initiatives, and benchmarking programs.[317] Chicago's retrofitting programs have led to widespread reductions in energy use and its benchmarking program has led to reductions in some of the largest buildings in the city. Its new energy rating system will take the next step toward increasing the transparency of building energy performance in the city and has the potential to drive further reductions.

C. Policies for Municipal Building Efficiency

Both Austin and Chicago have incorporated LEED certification into their policies to reduce municipal building energy consumption, but it bears noting that LEED is a flexible system where different features earn points that add up to reach certification requirements. There are required elements in the Energy and Atmosphere category, like minimum energy performance and fundamental refrigerant management, but LEED certification is not a guarantee that a building will have specific energy-efficiency features or be as efficient as possible. One advantage to LEED mandates in the municipal building context is the city, as the building owner, can prioritize certain categories and features to maximize energy efficiency.

Austin has a long history of requiring LEED certification for its municipal buildings, including new buildings as well as renovations, additions, and interior completion projects. Austin is also currently running all of its municipal buildings on 100% renewable energy.[318]

Boulder has set an impressive example with its municipal facilities. After overhauling its buildings in 2010, Boulder is now exploring how to reduce emissions from its facilities by 80% or more by 2030 through continued energy efficiency measures and renewable capacity installment.[319]

Chicago set the goal of improving energy efficiency in municipal buildings by 10% and targeted a specific portion of municipal building square footage for 20% improvement between 2012 and 2015. The city reported in 2015 that it had completed energy retrofitting of sixty municipal buildings and was "tracking

317. *See Energy Efficient Buildings*, CHI. CLIMATE ACTION PLAN, http://www.chicagoclimateaction.org/pages/buildings/12.php (last visited Mar. 27, 2019); CITY OF CHI., *supra* note 232, at 12.

318. *See* CITY OF AUSTIN, *supra* note 141, at 24.

319. CITY OF BOULDER, *supra* note 170, at 15.

toward 20% energy reduction within [five] years…."[320] Beyond those specific targets, Chicago requires LEED certification for new municipal buildings[321] and both its energy benchmarking ordinance and energy rating system apply to municipal buildings, disclosing building energy use and allowing the public to track improvements over time.[322]

D. Other Policies that Support Decarbonization

In order to facilitate its net zero goal, Austin could move forward with considering a net-zero code for new construction of commercial and residential buildings in order to align buildings with the broader community goal and ensure that the building sector successfully supports other goals like increasing distributed energy resources.[323] Austin has more control over its emissions than most other cities, given that it has control over its energy generation through its own utility, but reducing energy use now and into the future will be beneficial to its upstream decarbonization efforts.

Boulder has adopted an innovative Net-Zero Energy Code for its residential buildings to ensure they can successfully interface with the grid and generate energy from distributed energy resources on site to offset usage.[324] To continue to stay on the cutting-edge, Boulder could go beyond net-zero and consider the potential for grid-interactive buildings, which are meant to be a flexible component of the grid, able to send energy, store energy, reduce consumption, all when needed and requested by the grid operator.[325] To the extent that some of those features are not included in the Net-Zero Energy Code, Boulder could consider whether these measures fit with its vision for the future.

320. CITY OF CHI., SUSTAINABLE CHICAGO ACTION AGENDA: 2012-2015 HIGHLIGHTS AND LOOK AHEAD, 7 (2015), https://www.chicago.gov/content/dam/city/progs/env/Sustainable_Chicago_2012-2015_Highlights.pdf.

321. CITY OF CHI., *supra* note 231, at 13.

322. *Chicago Energy Benchmarking - Covered Buildings*, CHI. DATA PORTAL, https://data.cityofchicago.org/Environment-Sustainable-Development/Chicago-Energy-Benchmarking-Covered-Buildings/g5i5-yz37/data (last visited Apr. 29, 2019). Mayor's Press Office, *supra* note 245.

323. CITY OF AUSTIN, *supra* note 141, at 26.

324. *Energy Conservation Code*, CITY OF BOULDER, COLO., https://bouldercolorado.gov/plan-develop/energy-conservation-codes (last visited Apr. 26, 2019).

325. U.S. DEP'T OF ENERGY, *supra* note 41, at 7.

Chicago has planned to increase its solar capacity on publicly-owned and privately-owned properties by removing barriers to installations.[326] Chicago could consider how it will integrate smart building technologies in order to ensure the installation of new solar capacity also provides grid flexibility benefits. The goal of increasing the installation of smart meters in homes and businesses is another important step toward transforming the building sector into a cooperative resource for the grid.[327]

Across Austin, Boulder, and Chicago, embodied energy remains largely ignored beyond its appearance in the LEED certification system in material credits,[328] but it is difficult for local governments to address upstream emissions. This issue highlights the limits of local action as it would be much easier for the state or federal government to take a more holistic view of all of the emissions that contribute to the sector and take action upstream to lower emissions in other industries.

VI. REFLECTING ON THE EFFORTS OF THE EUROPEAN UNION

Despite the differences between the United States and the European Union, there are common challenges to reducing emissions from the building sector. In the wake of earlier EU directives on building energy efficiency, some countries have engaged in ambitious efforts to reduce energy use in the building sector and move toward nearly zero-energy buildings and others have taken few steps toward compliance.[329] Despite these implementation issues, the EU has still experienced an overall reduction in final energy consumption in the residential sector as a result of its directives.[330] Yet, an assessment of Member States' progress on energy efficiency, produced in 2017, noted that "[c]ontinued efforts are needed to renovate existing buildings…" and suggested improving financing

326. CITY OF CHI., *supra* note 231, at 13.

327. *Id.*

328. *Reducing Embodied Energy in Masonry Construction*, U.S. GREEN BUILDING COUNCIL, https://www.usgbc.org/education/sessions/reducing-embodied-energy-masonry-construction-5811951 (last visited Apr. 26, 2019).

329. CONCERTED ACTION ENERGY PERFORMANCE OF BUILDINGS DIRECTIVE, *supra* note 276, at 59 (2015).

330. *Report from the Commission to the European Parliament and the Council: 2016 Assessment of the Progress Made by Member States in 2014 Towards the National Energy Efficiency Targets for 2020 and Towards the Implementation of the Energy Efficiency Directive 2012/27/EU as Required by Article 24(3) of the Energy Efficiency Directive 2012/27/EU,* at 7, COM (2017) 56 final (Feb. 1, 2017), https://ec.europa.eu/commission/sites/beta-political/files/report-energy-efficiency-progress_en.pdf.

conditions for efficiency investments.[331] The new efficiency directive from 2018 responds to those recommendations by expanding the regime for existing building renovations. It requires Member States to undertake concrete planning efforts and include specific elements in their planning processes.[332] The increased specificity of the mandates in the EU's most recent directive tracks with the increased ambition of the Union's climate mitigation targets.[333] The emphasis on renovations parallels with efforts to improve the energy efficiency of existing buildings in Austin, Boulder, and Chicago. The new directive instructs Member States to identify approaches to renovation that are cost effective and consider trigger points in a building's lifecycle to take advantage of opportunities for improvements.[334] This allows Member States to select an approach to renovations whether using the cost of the renovation, the amount of floor space affected or added, or when the building was built or some other metric. Austin, Boulder, and Chicago have all employed different approaches to requiring improvements to existing buildings, triggered by renovations, retrofitting programs, property sales, and mandated timelines. The variation in the cities' policies demonstrates the importance of providing flexibility to tailor approaches according to specialized factors like the age and composition of the building stock and GHG reduction timelines.

The new efficiency directive also emphasizes smart building technology, which tracks with how states and cities in the United States will likely incorporate standards, and even mandates, for smart thermostats, wireless sensors and controls to monitor energy use and lighting, as well as distributed energy generation and storage.[335] The EU's efforts to provide funding to support the incorporation of these technologies is similar to actions by states like Colorado and cities like Boulder that combine regulatory mandates with training and compliance assistance.[336] Austin is also exploring increased financial

331. *Id.* at 3.

332. *See* Council Directive 2018/844, *supra* note 284, art. 1(2).

333. Over the years, the European Commission has steadily increased the level of detail in its directives to Member States on building energy efficiency. *See* Council Directive 2002/91, *supra* note 262; Council Directive 2010/31, *supra* note 262; Council Directive 2018/844, *supra* note 284.

334. *See* Council Directive 2018/844, *supra* note 284, art. 1(2).

335. *See* RESEARCH & MARKETS, INTELLIGENT CRE FOR ENTERPRISE: SMART BUILDINGS, INTELLIGENT WORKPLACE, AND MANAGEMENT SYSTEMS 2018-2023 (2018), https://www.researchandmarkets.com/research/95mfgt/intelligent?w=5 (concluding that North America will lead the smart building market with 36% share by 2023).

336. *See* Council Directive 2018/844, *supra* note 284, art. 1(3); COLO. ENERGY OFFICE, *supra* note 159; CITY OF BOULDER, *supra* note 190, at 5.

mechanisms to support continued efficiency improvements. The EU's new efficiency directive provides a model for these jurisdictions with its mandate to connect financing measures to energy performance results.[337]

The EU also serves as a comparable model for potential federal energy efficiency standards for new and existing buildings. The recent resolution calling for a Green New Deal proposes "…upgrading all existing buildings in the United States and building new buildings to achieve maximal energy efficiency, water efficiency, safety, affordability, comfort, and durability, including through electrification."[338] Looking to a future where the U.S. government might set building standards to be implemented by states and local governments, the EU illustrates the challenges of setting minimum guidelines, yet providing flexibility for jurisdictions to create programs tailored to their unique needs and allowing for more stringent standards to exist or be adopted. On that note, it is interesting that the level of detail in the EU directives to Member States on building energy efficiency seems to have increased over time.[339] In the United States, the process of implementing federal standards at the state and/or local levels could face similar issues to the EU directives and national laws in terms of incomplete or inconsistent implementation. If the United States only adopts broad goals on a federal level with a lot of flexibility for states to translate those goals into standards, the EU provides a clear example of the risks inherent in that approach. And yet, building standards require a level of sensitivity to local issues and conditions so any future U.S. approach will necessarily rely on state and local expertise. It will be interesting to see how future U.S. policy in this area might seek to thread this needle of tailoring standards to local needs while driving significant efficiency improvements.

VII. CONCLUSION

The efforts of U.S. cities to reduce emissions either in accordance with the one-time U.S. commitment under the Paris Agreement or their own goals reveal the challenges with the scale of local level efforts without oversight or pressure from the federal government. Although these cities are acting in coordination with

337. *See* Council Directive 2018/844, *supra* note 284, art. 1(6).

338. H.R.J. Res. 109, 116th Cong. (2019).

339. Council Directive 2002/91, *supra* note 262; Council Directive 2010/31, *supra* note 262; Council Directive 2018/844, *supra* note 284.

international efforts, local governments do not face the international political pressure that national governments face when they have to work with other countries across a range of issues. Global political pressure is a unifying force that helps hold the UNFCCC together, given that the UNFCCC lacks provisions like those in the Montreal Protocol that could result in trade sanctions in the case of non-compliance.[340] When the federal government drops its end of an agreement under the UNFCCC it risks losing trust and tarnishing its reputation in the international community, leading to potential consequences with important allies or trade partners.[341] State and local governments rarely, if ever, interact with foreign powers and do not face the same reputational stakes as the federal government. Or do they?

In an increasingly global world, local governments and specifically, cities can be considered "…simultaneously subordinate domestic governments and independent international actors."[342] Cities are taking on an increasingly visible international role as C40 Cities and other organizations elevate them and promote their sustainability efforts on an international level.[343] The United Nations has recognized the role of non-state actors, like cities, and encouraged their cooperation in international climate action through initiatives like the NAZCA Portal, 2050 Pathway Platform, and Marrakech Partnership for Global Climate Action.[344] U.S. states have also been involved—California hosted a Global Climate Action Summit in September 2018 with experts and participants from around the world, including foreign leaders and officials.[345]

340. Montreal Protocol on Substances that Deplete the Ozone Layer, art. 4, Sept. 16, 1987, 1522 UNTS 3; 26 ILM 1550 (1987).

341. *See, e.g.*, Daniel B. Baer et al., *Why Abandoning Paris Is a Disaster for America,* FOREIGN POL'Y (June 1, 2017), https://foreignpolicy.com/2017/06/01/why-abandoning-paris-climate-agreement-is-bad-for-america-trump/.

342. Gerald E. Frug & David J. Barron, *International Local Government Law*, 38(1) URBAN LAWYER 1, 2 (2006), https://www.jstor.org/stable/27895606.

343. *About*, C40 CITIES, https://www.c40.org/about (last visited Apr. 29, 2019).

344. Sue Biniaz, *Act Locally, Reflect Globally: A Checklist of Options for U.S. Cities and States To Engage Internationally In Climate Action*, SABIN CENTER FOR CLIMATE CHANGE LAW 4–6 (May 2017), http://columbiaclimatelaw.com/files/2017/05/Biniaz-May_2017-Act-Locally-Reflect-Globally-.pdf; *see also* Karin Bäckstrand et al., *Non-state Actors in Global Climate Governance: From Copenhagen to Paris and Beyond,* 24(4) ENVTL. POL. 561 (2017), https://doi.org/10.1080/09644016.2017.1327485; *Cities, Towns, Regions Partner to Help Achieve Paris Goals*, UNITED NATIONS CLIMATE CHANGE, https://unfccc.int/news/cities-towns-regions-partner-to-achieve-paris-goals (last visited Mar. 6, 2019).

345. *About the Summit*, GLOBAL CLIMATE ACTION SUMMIT, https://www.globalclimateactionsummit.org/about-the-summit/ (last visited Apr. 9, 2019); *Featured Speakers*, GLOBAL

For many U.S. cities, the gap left by the federal government's move to withdraw from the Paris Agreement has incited a renewed sense of dedication to reducing GHG emissions. Cities that have a history of action in the building sector have reassessed their efforts whether doubling down on efforts like transparency and green certification like Chicago or looking at the high level of ambition in existing codes and dedicating themselves to reducing emissions upstream at the point of energy generation like Austin. Relative newcomers to building energy efficiency, like Boulder, are taking bold steps to reduce emissions via the built environment, equipped with data and a cost-effective approach. These three cities demonstrate what is possible for cities who find themselves navigating somewhat analogous legal landscapes of state law with similar goals. And yet, the question remains of whether the actions of U.S. cities and states will be sufficient to achieve the Paris Agreement commitment of reducing GHG emissions to 26-28% below 2005 levels by 2025 made by the U.S. in 2016.[346] America's Pledge has projected that commitments in place in 2018 from cities, states, businesses, and other actors "will drive U.S. emissions to 17% below 2005 levels by 2025, roughly two-thirds of the way to the original U.S. target."[347] There is still the potential to achieve a nearly 26% reduction by 2025[348] and the power to reach that target is in the hands of cities, states, and the private sector, and potentially a new Presidential administration in 2021.

CLIMATE ACTION SUMMIT, https://www.globalclimateactionsummit.org/speakers/ (last visited Mar. 6, 2019).

346. UNITED STATES OF AMERICA, FIRST NATIONALLY DETERMINED CONTRIBUTION SUBMISSION TO THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE SECRETARIAT (Sept. 3, 2016), https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/United%20States%20of%20America%20First/U.S.A.%20First%20NDC%20Submission.pdf.

347. BLOOMBERG PHILANTHROPIES, FULFILLING AMERICA'S PLEDGE: HOW STATES, CITIES, AND BUSINESSES ARE LEADING THE UNITED STATES TO A LOW-CARBON FUTURE 9 (2018), https://www.bbhub.io/dotorg/sites/28/2018/09/Fulfilling-Americas-Pledge-2018.pdf.

348. *Id.*