



PENN: CURRENT RESEARCH ON SUSTAINABLE URBAN DEVELOPMENT

Putting Energy into Implementation

Challenges to Subnational Participation in SDG 7

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The seventh of the 17 Sustainable Development Goals (SDGs) of Agenda 2030 adopted in 2015 is “Ensure access to affordable, reliable, sustainable, and modern energy for all.” The Agenda sets five targets for this Affordable and Clean Energy Goal:

- 7.1 By 2030, ensure universal access to affordable, reliable and modern energy services
- 7.2 By 2030, increase substantially the share of renewable energy in the global energy mix
- 7.3 By 2030, double the global rate of improvement in energy efficiency
- 7.4 By 2030, enhance international cooperation to facilitate access to clean energy research and technology
- 7.5 By 2030 expand infrastructure and update technology for supplying modern and sustainable energy services for all in developing countries

Elsewhere, we have examined the role of cities in meeting national and international energy goals, including the tensions related to intergovernmental collective action problems (Hughes 2017). In this paper, we turn our attention from the alignment challenges of energy policy goals to the implementation challenges of energy policy goals. The good news for cities is that Target 7.3 is the most powerful approach to meeting simultaneously both the affordability and decarbonization dimensions (which can fundamentally conflict) and 7.3 also engages the policy domain in the energy systems over which cities have the most formal and informal control. But even this local span of control is not complete and faces constraints that are significant and underappreciated. We identify and discuss intergovernmental, intersectoral, and internal challenges facing the local implementation of SDG 7 in the United States and discuss practices and policies to alleviate these challenges.

REVIEW OF SDG 7 AND RELATIONSHIP TO NEW URBAN AGENDA

In 2015, countries around the world adopted the 2030 Agenda for Sustainable Development and its 17 associated goals. These SDGs, and their 169 associated targets, were built on the success of the Millennium Development Goals (MGDs), which were set to expire in 2015. Recognizing that the current development model is not economically, environmentally, or socially sustainable, the SDGs form a framework for promoting prosperity while protecting our planet. The power of the framework is built on moving from traditional silos such as poverty, hunger, climate change, gender equality, and clean energy into a set of goals that exploit interlinkages and cross-sectoral approaches. As participating countries develop strategies for implementation, such interlinkages can provide multiple points of entry on related issues.

Though this paper focuses on the implementation challenges associated with SDG 7: Affordable and Clean Energy, it is worth noting the strong and reinforcing relationship between this goal and both SDG 11: Sustainable Cities and Communities and SDG 13: Climate Action. For example, reducing the greenhouse gas emissions from the energy sector is a key objective in SDG 13’s long-term goals and is absolutely critical to the success of combating climate change. Likewise, the incorporation of climate-smart policies at the national and subnational levels make possible the targets of SDG 7 for affordable, reliable, and modern energy services; increases in the share of renewable energy in the global energy mix; and improvements in energy efficiency.

This bidirectional relationship between climate and energy goals takes another dimension when cities are suggested as an adequate or even necessary platform for advancing SDGs, as seen in the New Urban Agenda (NUA). The NUA details specific actions that cities must take to support the implementation of the 2030 Agenda. Nearly half of the 29 energy references in the NUA focus on implementation mechanisms that are partially or fully under the control of a city, such as: building performance codes and standards; renewable portfolio targets; energy-efficiency labelling; and the retrofitting of existing building codes (NUA 2016). However, there is already evidence that cities confront functional barriers to successfully implementing a clean



energy transition that requires more than 'partial control'. In the United States, we are currently witnessing this under the national politics of the Trump Administration, which has resulted in the call for cities and states to lead the way on climate and energy policy. The below discussion draws important and instructive examples of the challenges that can arise when motivated cities and states attempt to implement the targets outlined in SDG 7 and in the New Urban Agenda.

REVIEW OF POLICY ALIGNMENT CHALLENGES

One of the great achievements of the Paris Agreement, which emerged from the 21st Conference of the Parties (COP21) under the United Nations Framework Convention on Climate Change (UNFCCC), was the formal alignment of national climate policies to a common goal (The Paris Agreement). In December 2015, 195 Parties to the UNFCCC agreed, for the first time, to a global mechanism for making voluntary pledges to achieve emissions reductions toward the goal of limiting global temperature rise in this century to 2 degrees Celsius above pre-industrial levels (with an ambition to limit the rise to 1.5 degrees Celsius).

The Paris Agreement also demonstrated the participation and leadership of cities in the UNFCCC process. Organizations such as the C41 Climate Leadership Group (C40), Local Governments for Sustainability (ICLEI), and the Global Covenant of Mayors for Climate and Energy all celebrate their role in both (a) designing key features of and (b) delivering the decisive political support for the adoption of the Paris Agreement. ICLEI estimates that 50 percent of the national pledges made in the Paris Agreement “focus on action at the local or subnational level” (ICLEI 2015). These efforts were reported and praised at the time in the press. For example, *The Economist* wrote, “Local policies can combat emissions where international ones fall short” and *The Atlantic*, “Why Cities Are Key to Success at the Paris Climate Talks” (“Paris Climate Talks...” 2015; Bliss 2015).

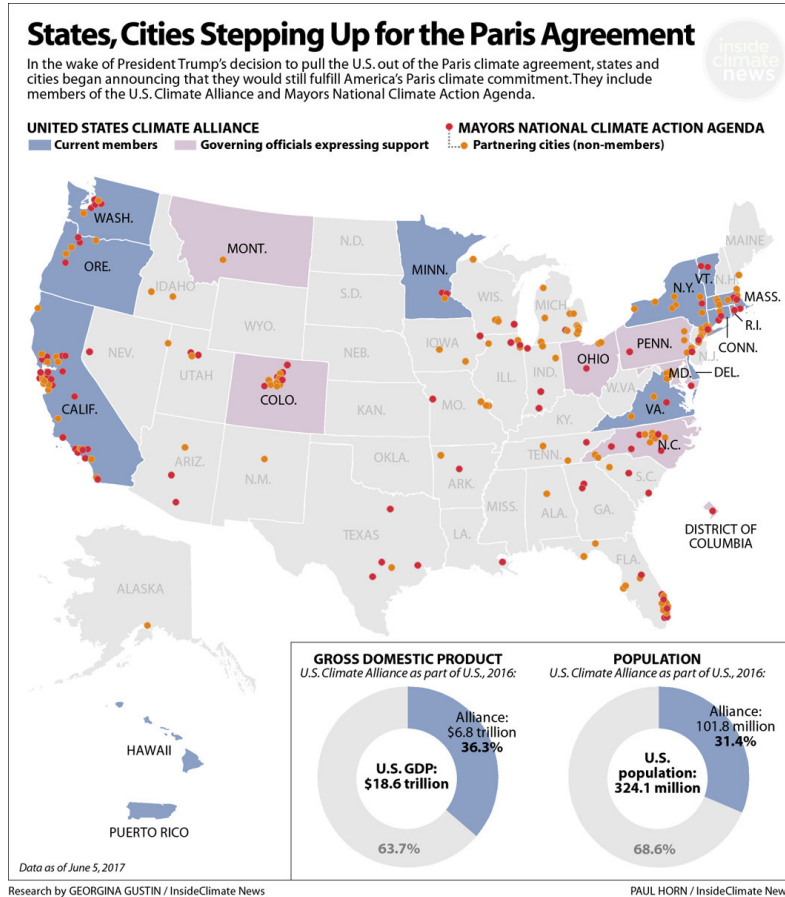
In the months following COP21, subnational governments have maintained their focus on achieving the Paris Agreement commitments and asserted their decisive role as the level of both government and society where implementation matters most (Geiling 2017b). In the United States, this devolution has taken on a special urgency in the wake of the Trump Administration’s denial of the science that serves as the basis for the Paris Agreement, rollback of national policy and regulatory commitments to meet the U.S. pledge toward the Paris Agreement, and stated desire to withdraw from the Paris Agreement. These actions have mobilized citizens, states, cities, companies, and universities around a variety of statements and commitments. For example, the open letter signed by the We Are Still In coalition has attracted 1219 signatories, including 125 cities, nine states, and over 900 companies including 20 of the nation’s largest: Apple, Google, Facebook, Microsoft, Nike, etc.

Elsewhere, we have discussed the various challenges for policy development when policy alignment among national actors is transposed to subnational actors—especially when subnational actors are expected to operate as a substitute for national action, as is the case in U.S climate policy (Hughes, Colijn, and Serpell. 2017a; Hughes 2017). Some alignment challenges are technical. For example, the reporting of effort and progress toward emissions reductions is a key part of the Paris Agreement. The potential for double counting and other errors in emissions inventories among local jurisdictions is rampant. Using electricity to displace gasoline in vehicles is only as clean as the fuel used to generate the electricity drawn from a grid that, in the United States especially, consists of hundreds of generating sources separated by hundreds of miles and dozens of political and regulatory boundaries.

Additionally, some alignment challenges are substantive. For example, the adoption of uniform targets to achieve a common goal is an understandable act of intergovernmental solidarity, and indeed this is what many U.S. states and cities have done in adopting the target of an 80 percent emissions reduction from 2005 levels by the year 2050. (The so-called “80 by 50” target is the overall global emissions reduction that climate models suggest would provide a better than 66 percent likelihood of staying below the 2 degrees Celsius goal of the Paris Agreement.) But while the uniform target is easy to adopt and symbolically understandable, it is highly



unlikely that the efficient path for the United States as a whole to achieve 80 by 50 is for every state (and city and neighborhood, etc.) to achieve 80 by 50. It is far more likely that the efficient path would be for some states to achieve larger reductions and other states to achieve smaller reductions (in accordance with state variation in economies, incumbent energy systems, etc.)



Finally, some challenges are political. For example, just as is well-understood with pollution more generally, collective action problems arise when local citizens are asked to bear all the costs of a policy for which much or most of the benefits are realized by citizens outside the local area. Such positive externalities are well-understood to yield too little of a needed policy over time. These dynamics are an important challenge to sustained policy alignment on emissions reductions among subnational actors that will almost certainly receive small fractions of the benefits their costly actions generate.

In this paper, we seek to shift from the alignment challenges above to a different set of challenges. Even when goals are well-aligned among subnational actors and between subnational and national actors, there are significant and under-appreciated implementation challenges facing subnational governments such as U.S. states and cities.

DISTINGUISHING ALIGNMENT AND IMPLEMENTATION CHALLENGES

Before we dive into several examples of implementation challenges to achieving local energy policy goals, it may be helpful to clarify the difference between implementation and alignment challenges. The latter may be more familiar and are almost certainly more obvious.

Implementation challenges arise with little or no reference to the degree of policy alignment between the jurisdiction of interest and any other jurisdiction. These challenges cannot be mitigated by a greater (nor lesser,



for that matter) degree of policy alignment with a higher level of government. Indeed, it seems often to be the case that a high degree of policy alignment is assumed to sweep aside implementation challenges. This paper is intended as a caution to such assumptions and a first step toward giving implementation challenges the attention they deserve.

Implementation challenges are barriers to achieving policy goals that arise because of insufficient exercise of power. That insufficiency of power may derive from jurisdiction, from resources, or from commitment. Implementation challenges may matter in two ways. First, they would constrain the abilities of subnational actors to achieve policy goals. Second, they would likely distort the policy outcomes that subnational actors do achieve and wreak further havoc on the subnational strategy that hopes to achieve the Paris Agreement despite laggard or hostile national governments. Implementation challenges can take many forms and we identify three types as salient to the implementation of SDG 7.

First, implementation challenges to subnational achievement of energy policy goals may arise from formal barriers such as sovereignty and jurisdiction. As Harvard's Robert Stavins says, "the Constitution of the United States prohibits subnational entities from carrying out meaningful international agreements" (Roberts 2017). Even if potentially productive informal workarounds can be found to such challenges, these would always be vulnerable to a sufficiently opposed national government that sought to disrupt or end the workarounds.

Second, implementation challenges may arise from local politics. It is an article of faith among the celebrants of state and city climate policy innovation that subnational governments are "immune" to the vagaries and toxins of national politics (Bloomberg and Pope 2017: 21). Perhaps. But it does not follow that they are immune to the influence of local political interests. As the choices facing energy and climate policymakers grow more urgent and demanding, the more significant will this influence become. Few local interests may mobilize when a mayor signs a climate pledge about a mid-century emissions target. But when capital budgets are being built, for example, adaptation to local climate impacts may attract more support than mitigation of global climate change. Relying on local policy outcomes to achieve global policy goals is a riskier partnership than may be apparent.

Third, implementation challenges may arise from internal dissent, either from renegade operational discretion or from unresolved policy differences. (We code the latter as different from an alignment challenge because the unresolved policy differences are occurring within a subnational government that has a stated goal, but that goal is being undermined by some internal actor or agency.) This type of barrier may come from a lack of bureaucratic control over the supervision and monitoring of routine performance, which often characterizes under-resourced subnational, and especially city, governments. Or, this type of barrier may derive from too little investment of political capital by leaders on energy policies relative to competing local policy interests and goals. A mayor may well sign a climate pledge that implicates 500 changes in programs and practices under her stewardship, and yet may be staffed on only 50 and have resources to demand change on only five.

In the next section, we provide illustrative examples of implementation challenges to the achievement of energy goals by subnational actors in the United States. While the challenges presented barely scratch the surface of the barriers facing state and local governments, we believe they are sufficient to call into question the efficacy of a subnational strategy and to suggest the importance on refocusing on the necessary role of national actors to achieve energy policy goals tied to the Paris Agreement and other climate change priorities.

DISCUSSION OF POLICY IMPLEMENTATION CHALLENGES AND THEIR CONSEQUENCES

Recently, Portland, Oregon attempted to implement its alignment of city goals with global goals by outlawing new fossil fuel infrastructure within its city limits. This decision garnered international attention, because the city, situated just west of both the Powder River Basin and the Bakken Shale Play, acts as a major global energy port, rail hub, and distribution center.



In 2016, Canadian energy company Pembina Pipeline Corporation proposed a new \$500 million propane export terminal, which was estimated to store 35 million gallons of fuel. Motivated to avoid building new infrastructure that would lock the city into decades of fossil fuel dependence, Portland's City Council took the proposal as an opportunity to unanimously pass a series of ordinances banning such development in the city (Bureau of Planning and Sustainability 2016). The adoption created a new land-use class called "Bulk Fossil Fuel Terminals" and then proceeded to prohibit the construction or expansion of any proposal that met the categorization.

The zoning code change was subsequently challenged by fossil fuel companies and, in July 2017, the ban was reversed by the Oregon Land Use Board of Appeals (LUBA) on the grounds that it violated the Commerce Clause of the U.S. Constitution. The Commerce Clause gives Congress sole power to regulate interstate commerce, and LUBA ruled the ordinances unconstitutional because they delayed and destructed the ability of those outside of Portland from consuming fossil fuels (Sickinger 2017).

The LUBA decision came two months after Oregon joined the We Are Still In coalition, and just one month after the City of Portland announced its pledge to obtain 100 percent of its energy needs from renewable sources by 2050—including electricity, transportation, and industry (Geiling 2017a). This suggests that the current implementation challenge is not whether states, and the cities that are nested in them, are motivated to align their policy direction with international goals (as outlined by the Paris Agreement or in the SDGs). Instead, as seen in Portland, the real implementation challenge is how cities can effect meaningful change when challenged by constitutional barriers that override such motivations.

In addition to the U.S. Constitution, there are statutory challenges to implementation. The conflict between the mandate of the U.S. Federal Energy Regulatory Commission (FERC) and the climate goals of subnational governments illustrates the depth of this challenge.

FERC, which is technically a U.S. Department of Energy agency (though it is given discretion to act independently) received its mandate through the Natural Gas Act of 1938. This legislation charges the Agency with approving interstate infrastructure projects that serve present public convenience or necessity, and with protecting consumers and ensuring fair competition in electricity and gas markets. In practice this mandate gives FERC the jurisdiction to approve and regulate the construction and operation of all liquefied natural gas (LNG) terminals and all interstate natural gas pipelines (Lombardi and Hopkins 2017; Caperton 2013; FERC 2017).

As early as 2013, the EPA began pressuring FERC to evaluate the long-term climate impacts of proposed pipeline projects under the National Environmental Policy Act (NEPA) (Westlake 2016). To date, FERC has maintained that this request is outside of its mandate, raising questions of jurisdictional power between the two agencies. Importantly, when considering the role of subnational governments in implementation, issues of jurisdictional power, like those described above, are increasingly relevant as cities and states make climate commitments that will be impacted by FERC's decisions.

While natural gas is often celebrated as a "clean" fossil fuel that will help us create a bridge towards renewable energy sources, it still significantly contributes to climate change (Zhang et al. 2016). The EPA reports that methane (CH₄) is 25 times more potent than carbon dioxide (CO₂) over a 100-year period (Anderson et al. 2010). In 2014, a group of Cornell geoscientists estimated the amount of methane emitted as a percentage of the lifetime production of a shale gas well (including venting and leakages at the well site, in addition to those during storage and pipeline delivery) could exceed 7.5 percent (Howard 2014). Considering that many gas pipelines have a lifespan of over 50 years, the infrastructure built today will outlive, and potentially endanger, the commitment of cities and states to cut total greenhouse gas emissions by 80 by 50.

Currently there is no mechanism to overcome the statutory limitations that bind states and cities when a FERC-approved project transects its borders. In one 2017 example, New York denied ancillary permits for



pipeline water crossings to two FERC-approved pipeline projects, Constitution and Northern Access, citing the Clean Water Act (Lombardi and Hopkins 2017)—perhaps not surprising coming from a state that banned hydraulic fracturing back in 2015. In June 2017, the denial was dismissed by the U.S. Court of Appeals for the District of Columbia Circuit, stating that FERC can simply override the NY Department of Environmental Conservation denial and proceed (Goldberg 2017). This decision is on the heels of New York Governor Andrew Cuomo's June 1, 2017 Executive Order committing the state to upholding the Paris Agreement, with an interim target of reducing emissions 40 percent by 2030. While the accounting mechanisms of fugitive methane emissions are not yet well-defined under these goals, the basic principle that the state has little legal standing in infrastructure projects that cross its borders remains a potential conflict for implementing subnational agendas.

In addition to constitutional and statutory challenges, interest groups can often undermine implementation in unexpected ways. In November 2016, Washington State proposed Initiative 732—Create Carbon Emissions Tax, which would have regulated the nation's first state-wide price on carbon. Modeled after a successful policy in British Columbia, I-732 proposed a revenue-neutral carbon tax based on an initial \$25 tax per metric ton of carbon dioxide emitted. The generated revenue was slated to fund both tax cuts and tax rebates in a state with a long-criticized regressive tax code. Economist and MIT professor Christopher Knittel called the Initiative the “most aggressive U.S. proposal” he's ever seen (Geiling 2016).

Fossil fuel companies and utilities, like Puget Sound Energy and PacifiCorp, funded a modest opposition campaign, but the fiercest criticism came from within environmental and social justice movements (Storrow 2016). Several interest groups, including the Alliance for Jobs and Clean Energy, the Washington Environmental Council, and the Sierra Club effectively mobilized to block public support of the Initiative. The groups argued that the proposal did not do enough to protect the marginalized communities most at risk from pollution and climate change impacts, nor did it generate the necessary reorganization of energy and transportation infrastructure (i.e. no direct investment in clean energy) needed to fight the battle against climate change (Geiling 2016).

It is because of this opposition that Washington State is left without an effective carbon pricing mechanism. Yet since this decision, the state has adopted goals that include upholding the Paris Agreement and cutting carbon emissions from all sectors of the economy. Washington Governor Jay Inslee went further by co-creating the United States Climate Alliance (with New York Governor Andrew Cuomo and California Governor Jerry Brown) and recently joining the We Are Still In coalition. This is not to suggest that a carbon tax is the only way to achieve subnational climate policy goals, but rather indicates the challenges of implementing state goals and interest group goals, even when such groups share a progressive climate policy platform. This case powerfully indicates the general concern outlined in the previous section that subnational implementation of energy policy goals is simply no more immune to politics than implementation at the national level. It is simply a false economy to assume that subnational actors can break through politics more expeditiously than national actors.

We conclude this section with a bundle of examples drawn from the City of Philadelphia, a government and a city that we are quite familiar with.¹ The City has just completed a new Energy Master Plan as well as an update to the City's sustainability plan, known as Greenworks, which contains energy goals and programs. The following is an admittedly deep dive into the implementation challenges of local energy policy, but necessary to fully appreciate the extent of the implementation challenges. We focus on energy efficiency measures because this policy domain sits largely within the discretion of local governments in the United States.

Like many cities, Philadelphia has recognized that energy efficiency gains are self-financing through savings over time (Ribeiro et al. 2017). One of the easiest efficiencies to finance in this way comes through installation of new lighting technologies that can significantly reduce energy use and thereby reduce operating costs over

¹ Hughes was former Chief Policy Adviser to the Mayor and the founding Director of Sustainability. Both authors have advised the current energy and sustainability offices. Our researchers have also attended all public outreach sessions related to the new Energy Master Plan.

time, quickly exceeding the initial cost of deploying the new technology (Office of Sustainability 2017: 12). One such technology is the substitution of LEDs for older systems used to provide street lighting. Replacing conventional high-pressure sodium lighting with LED technology at all of Philadelphia's 100,000 streetlights would cost tens of millions of dollars, but would reduce the region's annual carbon emissions by 13.7 thousand metric tons of CO₂ equivalent, and would save at least \$6 million a year in energy costs (Montanez 2012; Office of Sustainability 2017: 12; NEEP 2015). Since 2008, the City has proposed making such an investment in energy efficiency. The City's electricity tariff, however, has a special provision for streetlights that charges the City on a per fixture rather than per usage basis (Office of Sustainability 2017: 17). The City and PECO, the local electric utility, have never been able to successfully renegotiate the tariff in a way that would allow the savings from energy efficiency to be realized by the City. There are claims on both sides of the negotiation that are difficult to substantiate and reconcile, and the potential energy efficiency remains instead as energy waste. The implementation challenge here is perhaps limited staff capacity to substantiate claims but more importantly it is the lack of a designated authority willing and able to reconcile negotiating positions that have remained stalemated for years.

The observation that energy efficiency is often self-financing but rarely self-implementing has led many corporations, universities, governments, and others to redesign their capital budgeting practices to induce as much long-term savings from efficiency as possible. In 2008, the budget director and the sustainability director of Philadelphia met with over 30 capital program staff from departments and agencies across the City. By agreement in principle, capital budget requests would be scored to reflect and favor larger initial costs that were compensated by net savings over time. For example, energy-efficient window replacements that cost more to purchase but cost much less to operate over time would not be penalized by a narrow focus on initial cost alone. The departmental capital program managers saw the proposal's advantages and ranged from enthusiastic to indifferent. By 2010, however, the political champions of the policy were both gone from Philadelphia government and the new budget rules were never implemented. The implementation barrier here is the nexus of issue attention span and turnover in local government at the political level.

Even when energy efficiency investments are made (and Philadelphia has many successful examples), they remain vulnerable (Office of Sustainability 2015). When a new energy efficient boiler was installed in a City-owned facility, the local facilities staff found it difficult to operate. After growing discontent from occupants, the local facilities staff removed the new boiler and replaced it with familiar and less efficient equipment. Whether the implementation barrier is described as renegade bureaucratic discretion or insufficient training investment in operators, this case illustrates the difficulties that local governments can face in sustaining policy changes in the course of ongoing operational practices.

Our final Philadelphia anecdote illustrates the fine line between challenge and opportunity. The City of Philadelphia owns the largest municipal gas utility in the United States. This asset position provides opportunities to guide key energy policy strategies: leverage the proximate supply of natural gas from the Marcellus/Utica shale plays in Pennsylvania, deploy natural gas as a decarbonizing transition to a zero-carbon future, devote public infrastructure (LNG and compressed natural gas (CNG) facilities, district energy assets, etc.) to expand and ensure affordable and reliable energy access) as examples of a few possible pathways. There are unresolved internal policy disputes, however, over how to best achieve the City's stated energy policy goals. One informant characterized the dispute like this, "one side sees climate change as a five-year problem and the other side sees it as a fifty-year problem." Neither side, of course, seems to be focusing sufficiently on the City's stated thirty-year problem of meeting the 80 by 50 goal. The implementation challenge appears to be the limited usefulness of 80 by 50 as an organizing goal that helps local political leadership balance tradeoffs between competing interests and priorities. Elsewhere, we have argued that the distribution of local costs and benefits associated with competing energy policies need to be better understood and that an emissions reduction goal alone is wildly insufficient to mobilize and sustain local political support for policy commitment over time (Hughes, Colijn, and Serpell 2017b).



CONCLUSIONS AND RECOMMENDATIONS

Our review of the implementation barriers facing subnational actors on energy policy goals suggests a few conclusions. First, subnational actors and those who advocate their role in meeting national and international goals should be mindful and respectful of the challenges that constitutional, jurisdictional, and functional constraints may place on their efforts. Second, even within a policy domain largely delegated to local government action, such as energy efficiency in buildings, local politics and bureaucratic inertia can generate barriers to better policy outcomes.

Third, given scarcity in local capacity, resources, and commitment, subnational actors might benefit from careful consideration of how national and international targets such as 80 by 50 translate into a distribution of local costs and benefits.

Taking these conclusions together, the importance of national actors on energy and climate policy is hard to dismiss. Many aspects of energy policy, and certainly policies needed to achieve the five targets of SDG 7 and its applicability to the New Urban Agenda, require an authority capable of reconciling competing subnational interests and approaches to achieving even fully aligned policy goals on energy. But even with such an authority in place, only specific aspects of global agreements can be responsibly and efficiently localized. These aspects are limited to those that leverage the jurisdiction, capacity, and the interests of local actors.

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