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Clean Energy Policy Analyses: Analysis of the Status and Impact of Clean Energy Policies at the Local Level

S. Busche

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NREL's Clean Energy Policy Analyses (CEPA)

The CEPA suite of analyses and activities explore clean energy development and policy implementation at the regional, state, and local levels and disseminate that information to interested stakeholders. The activities gauge the effectiveness of and interactions between clean energy policies, provide insight into regional activities, investigate the interactions between local and state-level policies, and convene leading thought leaders to develop innovative regional, state, and local clean energy policies. The goal is to provide information to decision makers, researchers, and other stakeholders regarding the status of, barriers to, and possibilities for increased energy efficiency and renewable energy development at various levels of governance. For more information, see http://www.nrel.gov/cepa.

List of Acronyms

ARRA	American Recovery and Reinvestment Act
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers
BCAP	Building Codes Assistance Project
CCP	Cities for Climate Protection
DSIRE	Database of State Incentives for Renewables and Efficiency
GHG	greenhouse gas
ICLEI	ICLEI Local Governments for Sustainability (formerly International Council for Local Environmental Initiatives)
IECC	International Energy Conservation Code
NASEO	National Association of State Energy Officials
PACE	Property Assessed Clean Energy
RE	renewable energy
RPS	renewable portfolio standard
SAC	Solar America Cities
USMCPA	U.S. Mayors Climate Protection Agreement

Executive Summary

Interest in facilitating the adoption of energy efficient and renewable energy (henceforth, "clean energy") technologies has grown rapidly in recent years throughout the United States at all levels of government. Policy is one of the tools available to governments to address barriers to clean energy adoption and to drive market transformation, and the local, state, and federal governments have employed a variety of policies to support clean energy adoption. While substantial research on state level clean energy policies and local level climate change initiatives exists, to date there has been no comprehensive analysis of the effectiveness of local clean energy policy action.[1] This report aims to provide an initial overview of the current local clean energy policy landscape to develop a better understanding of the current policy environment and identify areas for further research.

Local governments can play an important role in developing an environment conducive to clean energy adoption because decentralized policy development allows for policies to be designed to better meet the unique needs of various municipalities. Decentralized policy development also provides an opportunity for greater policy experimentation than policy development does at the federal level alone. Furthermore, local governments are uniquely positioned to frame the clean energy discussion in a way that connects it to the values of local citizens, building support for clean energy technology adoption. Policy development at the local level may also be initially more effective than pursuing policy development at the state or federal levels because it could be easier to address social acceptance issues on a smaller scale. While local governments can play an important role in driving market transformation, policy implementation at both the state and federal level continues to be important. As such, complementary policy development at multiple levels of government is critical to developing a consistent market for clean energy.

State governments are implementing policies to drive market transformation in the clean energy sector through the adoption of market transforming clean energy policies. Between 2008 and 2010, there was a nearly 30% increase in the number of states that had implemented all three renewable energy market transformation policies (renewable portfolio standard, interconnection standards, and net-metering policies) with 28 states having implemented the policies as of February 2010, as shown in Table ES-1 (DSIRE 2010). As of July 2010, 13 states had adopted the most energy efficient commercial building codes (ASHRAE Standard 90.1-2007 or better) and 10 had adopted the most energy efficient residential building codes (2009 IECC or better) (BCAP 2010a; BCAP 2010b).

Table ES-1. Number of States that have Implemented All Three Renewable Energy Market Transformation Policies

2008	2009	2010
22	24	28

[1] Local clean energy policies have been addressed in many reports as they relate to climate mitigation strategies (e.g., Betsill and Bulkeley 2007) and in other studies focusing on specific local policy types such as those driving green job growth (e.g., Hess et al. 2010). However, to date the author is unaware of a published research that comprehensively analyzes local clean energy policies in depth.

While climate change policies and energy policies are not one in the same, an overview analysis of local action in the climate change arena is included due to the limited data on local clean energy policies. It appears that local governments in states supporting clean energy policy tend to be more likely to adopt climate change mitigation goals. For example, of the 1,042 signatories to the U.S. Mayors Climate Protection Agreement (USMCPA), 77% of the signatories are municipalities in states that have implemented the three renewable energy market transformation policies above. As research on the effectiveness of local climate change initiatives rather than just the adoption of climate initiatives is just beginning to be published, the data on signatories to the USMCPA is used as a proxy to represent local climate mitigation action although signing the agreement does not necessarily translate into actions.[2]

Currently, local clean energy policies are not tracked comprehensively. The Database of State Incentives for Renewables & Efficiency (DSIRE), which tracks over 2,400 state, federal, local, and utility clean energy policies, tracks only a limited number of local policies because local policies are beyond the scope of the DSIRE project. Of the 156 local policies tracked, 61 are categorized as financial policies and 95 are categorized as "rules, regulations, or policies" (DSIRE 2010). Only 28 states are represented by the local governments implementing these policies. It is unclear if this is a reflection of the methodology of DSIRE's local data collection or if the actual incentives are concentrated in these states. Comprehensive data on local clean energy policy implementation is necessary to better understand the interaction between state and local clean energy policy development.

To augment the limited data currently available, a questionnaire was sent to officials in 54 different local governments. The local governments were chosen to represent cities of various sizes, from different regions, and with different state clean energy policy environments. The main information gleaned from the responses includes:[3]

- Local government officials and/or departments and community members have been the main entities driving the adoption of clean energy policy at the local level.
- Clean energy options are typically framed as a way to reduce energy related costs and to mitigate climate change.
- The major barrier to the adoption of clean energy continues to be related to cost, and local governments are often using funds received through the American Recovery and Reinvestment Act 2009 to offer financial incentives to address this barrier as well as tapping into state and federal funding assistance.
- Substantial interaction between local governments occurs on clean energy policy development. The interaction of local governments with state governments varies greatly, with only a few local governments interacting frequently with their state government.

Local governments are in a position to drive clean energy technology adoption and are active in promoting clean energy through policy; however, little is known about the extent and effectiveness of this activity. Further research is necessary to understand the influence that state clean energy policies have on the development of local policies and vice versa. This knowledge will be critical as policy activity at the local level has increased rapidly in recent years.

[2] An in-depth analysis of the effectiveness of local climate change initiatives is beyond the scope of this report.
[3] There was a 31% response rate to the questionnaire.

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Introduction

Interest in energy efficiency and renewable energy (henceforth, "clean energy"[4]) has grown rapidly in recent years throughout the United States at all levels of government. There are multiple barriers to the deployment of clean energy technologies, many of which can be addressed through policy. Historically, clean energy policy research has focused on policy development, implementation, and effectiveness at the state and national level, with limited effort focused on the local clean energy policy arena (e.g., Carley 2009; Fischlein et al. 2010; Menz 2005; Peterson and Rose 2006). Although it is more difficult to track the myriad clean energy policies instituted throughout the nearly 20,000 cities and towns and over 3,000 counties (USCB 2010) than it is to track and therefore analyze state and federal policy development, developing a better understanding of local policy development and interaction with state and federal policies is critical to a full understanding of the role of policy in clean energy development.

The role of local governments in supporting clean energy is critical because they often have authority over policy areas such as transportation, land-use planning, building codes, and other areas that impact community-wide energy use (Coenen and Menkveld 2002).[5] Local governments often own or manage a substantial amount of infrastructure and can provide public education to inform residents of the impacts of personal energy choices (van Staden and Musco 2010). Although state governments can also employ public education campaigns, local governments are uniquely positioned to develop a campaign that more directly resonates with local citizens because it can be tailored to the local circumstances.

Furthermore, there has been a substantial increase in clean energy activity in local governments throughout the country over the last year due to the increase in federal funding for clean energy under the American Recovery and Reinvestment Act of 2009 (ARRA).[6] This increase in activity amplifies the importance of better understanding how energy policies at one level of governance (e.g., state) impact the development of policies at other levels (e.g., local), as they can be complementary or in conflict with each other (Betsill and Rabe 2009; Doris et al. 2009a).

This report aims to provide an initial overview of the current local clean energy policy landscape to develop a better understanding of the current policy environment and identify areas for further research. Research for this report was conducted in the summer and fall of 2010. The first section provides background on the role that local governments play in clean energy policy development. The second section provides an overview of the current status of clean energy policy at the state level and of climate change and clean energy policies at the local government level. The third section presents results from a questionnaire sent to local government officials to provide insight into the clean energy policy environment from the local government perspective. The report concludes with a discussion of further research opportunities to understand the role of local policy in clean energy development.

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[4] This report is limited to the discussion of policies addressing clean electricity and does not include a discussion of clean fuels for the transportation sector.

[5] The authority that a local government has in these and other areas is determined by the constitution of the state in which the locality is located (Betsill and Rabe 2009).

[6] For more information on ARRA funded programs, see http://www.recovery.gov/Pages/home.aspx.

Multi-level Governance: The Pros and Cons of Decentralized Policy on Clean Energy Deployment

Summary of Main Points

- Decentralized policy development allows for policies to be designed to better meet the unique needs of various municipalities and provides an opportunity for greater policy experimentation.
- Local governments are uniquely positioned to frame the clean energy discussion in a way that connects it to the values of local citizens.
- Complementary policy development at the multiple levels of government is critical to developing a consistent market for clean energy.

Policy levers can be implemented at multiple levels of government to address barriers to clean energy development. Decentralized policy—that is, policy implemented at any sub-national level—can provide many benefits when compared to purely national-level policy implementation, as seen in Table 1. For example, local policy development allows for greater experimentation as each government designs the policy to best fit the locality's unique context (Lutsey and Sperling 2008). In contrast, a policy developed at the state or national level to be implemented by local governments may not provide sufficient flexibility or funding to best fit the local context, resulting in reduced policy effectiveness. Implementing the appropriate and complementary policy at each level of government, based on each government's competencies, allows for the creation of a synergistic policy environment that addresses multiple barriers to clean energy development. Furthermore, policy experimentation at the local level can provide insight into the effectiveness of innovative policies and unique policy design components that can be adopted by other governments, at the local, state, or federal levels. While decentralized policies can refer to those implemented at any sub-national level (e.g., local, state, or regional), this report focuses specifically on policies implemented by local governments.

Table 1. Pros and Cons of Decentralized Policy Development (Lutsey and Sperling 2008)

Pros	Cons
Greater experimentation by a variety of policymakers	Increased administrative burden on industry as a result of a patchwork regulatory environment
Policies tailored to specific local needs and constituent preferences	Potential for redundant enforcement requirements or jurisdictional confusion over which level of government is responsible for enforcement
Testing grounds for innovative policies	Cross-boundary pollution issues can require multiple jurisdictions to implement coordinated policies
Learn from local enforcement expertise and experience	Relocation of operations to avoid more stringent regulations

Relying solely on local governments to implement policy, however, can have negative outcomes (Lutsey and Sperling 2008). Negative outcomes can include inconsistent requirements for industry, difficulties in enforcement due to policy overlap and uncertainty, and potential relocation of operations to localities with less stringent requirements, negatively impacting economic efficiency. Furthermore, if the various levels of government are not sufficiently aware of policies developed by other levels of government, policies can be established that are duplicative of existing policies, wasting valuable time and resources. As such, it is critical that policies implemented at all levels of government complement each other and, like any other issue, all levels of government develop appropriate policies based on their realm of authority.

Barriers to clean energy adoption can be financial, technical, social, or policy issues that inhibit technology adoption and behavior change. Technical and financial barriers are perhaps the barriers that are most often discussed. However, the barriers to clean energy development also include social and cultural aspects that can be just as difficult to overcome because these barriers impact how citizens and policymakers alike weigh in on the clean energy debate (Sovacool 2009). The current dialogue often does not include an adequate discussion of how our existing energy system interacts with the environment nor the impact this has on the present and future economy, thus, the national discussion surrounding the comparison of clean energy and conventional sources often occurs on an unlevel playing field (Wüstenhagen et al. 2007). Framing the dialogue around clean energy to demonstrate how benefits of clean energy technologies link to local social and cultural imperatives, which are often difficult if not impossible to quantify, may be a solution to address some of these barriers. Local governments are uniquely positioned to do so because of their knowledge of local social and cultural issues, which vary by locality.

As the framing of the clean energy discussion can impact the adoption of clean energy technologies, a few questions arise regarding local government's role in framing the discussion:

- For localities that experience high levels of support for clean energy, is this in part due to the clean energy discussion being framed at the local level to address core local government imperatives and local values?
- Do localities that experience high levels of support for clean energy have unique core imperatives that make clean energy options more attractive?
- How can reframing the issue at the local level influence the clean energy discussion at the state and federal levels? How can it impact the framing of clean energy discussions in other local governments?

Further research is necessary to better understand the role local governments play in reframing the clean energy discussion. Understanding this is important for technology and policy development because both are subject to social acceptance barriers (Wüstenhagen et al. 2007). As such, policy development at the local level may be *initially* more effective in addressing some barriers than pursuing policy development at only the state and federal level because it may be easier to achieve social acceptance on a smaller scale. Framing the issue as a local issue increases citizen involvement in the clean energy discussion because they have the ability to be more directly involved in the local decision-making process than they often do at the federal level (Saha 2009). Furthermore, powerful lobbies frequently have less influence over state and local governments, allowing for greater citizen influence of policy development at the local level (Byrne et al. 2007). As social acceptance of clean energy grows in many localities, it may then become easier to implement clean energy policies at the state and national levels. This is not to say that action at the state and federal levels is unimportant, but simply that local governments may be uniquely positioned to impact the framing of the clean energy discussion by the actions they take at the local level.

Not only are local governments increasingly active in implementing clean energy policies, but they are uniquely positioned to play a complementary role in driving clean energy technology adoption. Policy implementation at the local level allows for greater flexibility to meet local needs. Local governments' knowledge of their constituents' needs can help frame the local discussion surrounding clean energy in a way that demonstrates the potential benefits it can have to address local issues. Citizens are also more likely to interact directly with their local government, providing greater opportunities for addressing local social acceptance issues by gaining support for local clean energy programs.

Influences on Local Clean Energy Policy Development

Summary of Main Points

- States are developing markets conducive to clean energy through implementation of market transforming policies.
- Substantial analysis of state clean energy policies and local climate change initiatives exists, but there has not been any comprehensive analysis of local clean energy policies on their own.
- Based on the limited data available, it appears that localities that are implementing local clean energy policies tend to be in states that have adopted renewable energy market transformation policies.
- Further research is necessary to understand the influence that state clean energy policies have on the development of local policies and vice versa. Tracking local policy development and implementation activities will be necessary to conduct this research.

The Status and Influence of State Clean Energy Policies

Analysis of state clean energy policies has grown rapidly in recent years. Until recently, there have not been sufficient data points to conduct statistical analyses of state-level clean energy policies because these policies were new in many states and there were a limited number of states implementing clean energy policies. In the last few years, however, statistical analyses of individual state clean energy policies have been published (e.g., Carley 2009; Doris et al. 2009b). Perhaps the most comprehensive analysis of state clean energy policies can be found in the National Renewable Energy Laboratory's annual *State of the States* report, now in its third edition (Doris and Gelman *Forthcoming*). Based on the data analyzed in the 2010 *State of the States* report, this report identifies states that may be developing an environment through policy selection and implementation that enables localities to further clean energy deployment.

While there are a wide variety of clean energy policies that are currently implemented at the state level, four appear to target large scale, as opposed to incremental, market change toward clean energy development (also called "market transformation" policies):[7]

- Renewable portfolio standards (RPS)
- Net-metering policies
- Interconnection policies
- Energy efficient building codes

[7] Project financing policies (e.g., grants, rebates, loans, loan guarantees) also have the ability to transform markets, as they reduce the barrier to the high first cost of new technologies and the high initial capital cost of energy efficiency and renewable energy technologies when compared to some traditional technologies. These policies, however, vary greatly in their design, application, and effectiveness and are therefore not included in this assessment of a state's policy environment. For additional information, please see *State of the States 2010*, a companion report to this analysis, at www.nrel.gov/cepa.

Table 2 illustrates the growing number of states that have implemented the three market transforming policies (RPS, interconnection, and net metering) that apply to renewable energy. The data on renewable energy market transformation policies was collected from the Database of State Incentives for Renewables and Efficiency (DSIRE).[8] As of 2010, 28 states have implemented all three policies, suggesting that these states are developing a policy environment that is supportive of renewable energy.[9] Figure 1 shows the number of these policies in place in each state in 2010.

Table 2. States (including the District of Columbia) with Renewable Portfolio Standards, Interconnection, and Net-metering Policies (DSIRE 2010)

Number of Renewable Energy Market Transforming Policy Types in Place	2008	2009	2010
3	22	24	28
2	14	13	14
1	7	6	5
0	8	8	4

[8] www.dsireusa.org

[9] The data on RPS, interconnection, and net-metering policies was collected in February of 2010 for the *2010 State of the States* report. To maintain consistency with the companion report, the same data is used here. The data for the *State of the States* is collected at the same time each year to maintain consistent analyses between years.

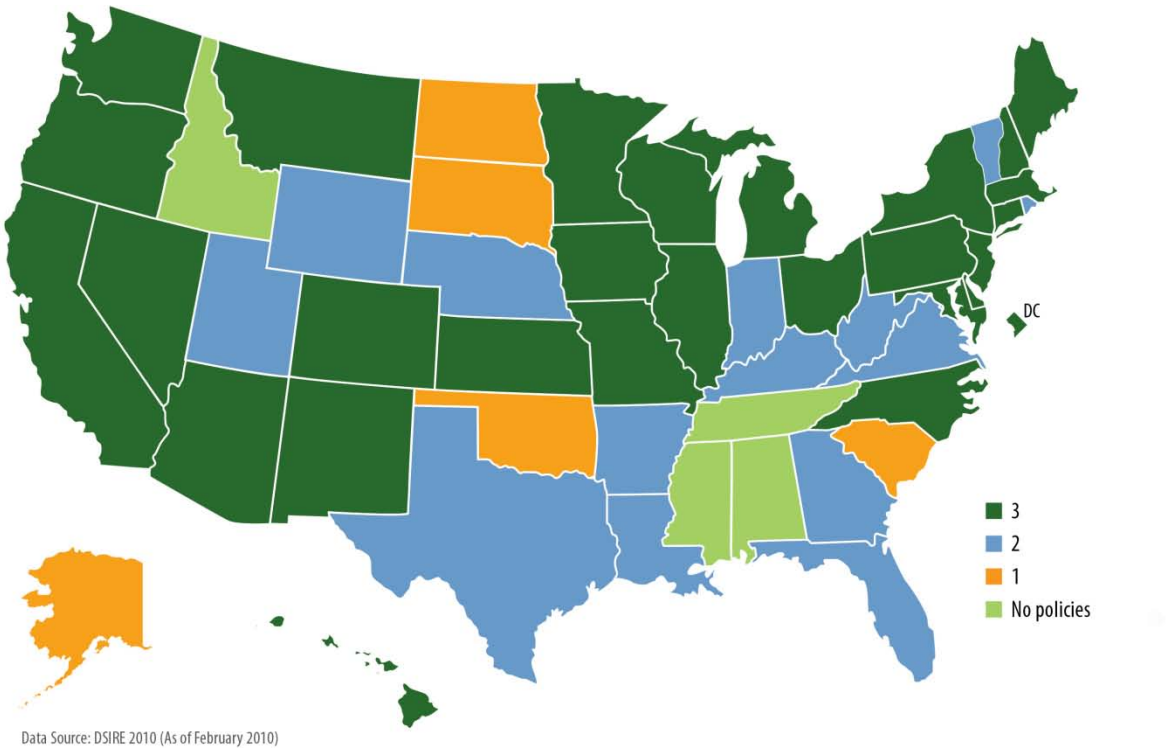

Figure 1. Number of market transformation policy types for renewable energy in each state in 2010

While the three policies mentioned above are specific to renewable energy market transformation, building codes are considered to be market transformational policies for energy efficiency. The Building Codes Assistance Project (BCAP) tracks state-level adoption of building codes, identifying which states have adopted the most stringent national building codes.[10] Table 3 lists the number of states in each year that implemented the most efficient building code to date (BCAP 2010a; BCAP 2010b).[11] For 2010 commercial building codes, BCAP defines the most efficient codes as those that meet or exceed ASHRAE Standard 90.1-2007 or equivalent (BCAP 2010a). For 2010 residential codes, BCAP defines the most efficient codes as those that meet or exceed 2009 IECC or equivalent. The standards for the most efficient codes vary by year, becoming increasingly stringent based on the most efficient code recognized at the national level (see Table 3 for further explanation). Due to this, the number of states having implemented the most efficient building codes in 2009 is low because it often takes a while for states to adopt the newest available codes. As of 2010, 10 states had implemented the most progressive energy building codes for both commercial and residential buildings.

[10] The most up-to-date information on state-level building code implementation can be found at http://bcap-energy.org/.

[11] The BCAP data was collected in July 2010 and is the same data used in the *2010 State of the States* report. To maintain consistency with this companion report, the same data is used here. The data for the *State of the States* is collected at the same time each year to maintain consistent analyses between years and is based on when updates are made available by the data sources.

Table 3. States with Progressive Building Codes (BCAP 2010a; BCAP 2010b)

	State Implementation of the Most Efficient Building Code (including District of Columbia)		
	Commercial	Residential	Both
2008	25	20	19
2009	2	0	0
2010	13	10	10

Based on the BCAP ranking of state energy efficiency codes in the respective year:

2008: Commercial: Meets or exceeds 2006 IECC/ASHRAE Standard 90.1-2004 or equivalent; Residential: Meets or exceeds 2006 IECC or equivalent

2009: Commercial: Meets or exceeds 2009 IECC/ASHRAE Standard 90.1-2007 or equivalent; Residential: Meets or exceeds 2009 IECC or equivalent

2010: Commercial: Meets or exceeds ASHRAE Standard 90.1-2007 or equivalent; Residential: Meets or exceeds 2009 IECC or equivalent

Figure 2 and Figure 3 illustrates the diversity of building code adoption at the state level. For additional information on the status of renewable energy and energy efficiency policy at the state level in 2010, please see Doris and Gelman (*Forthcoming)*.

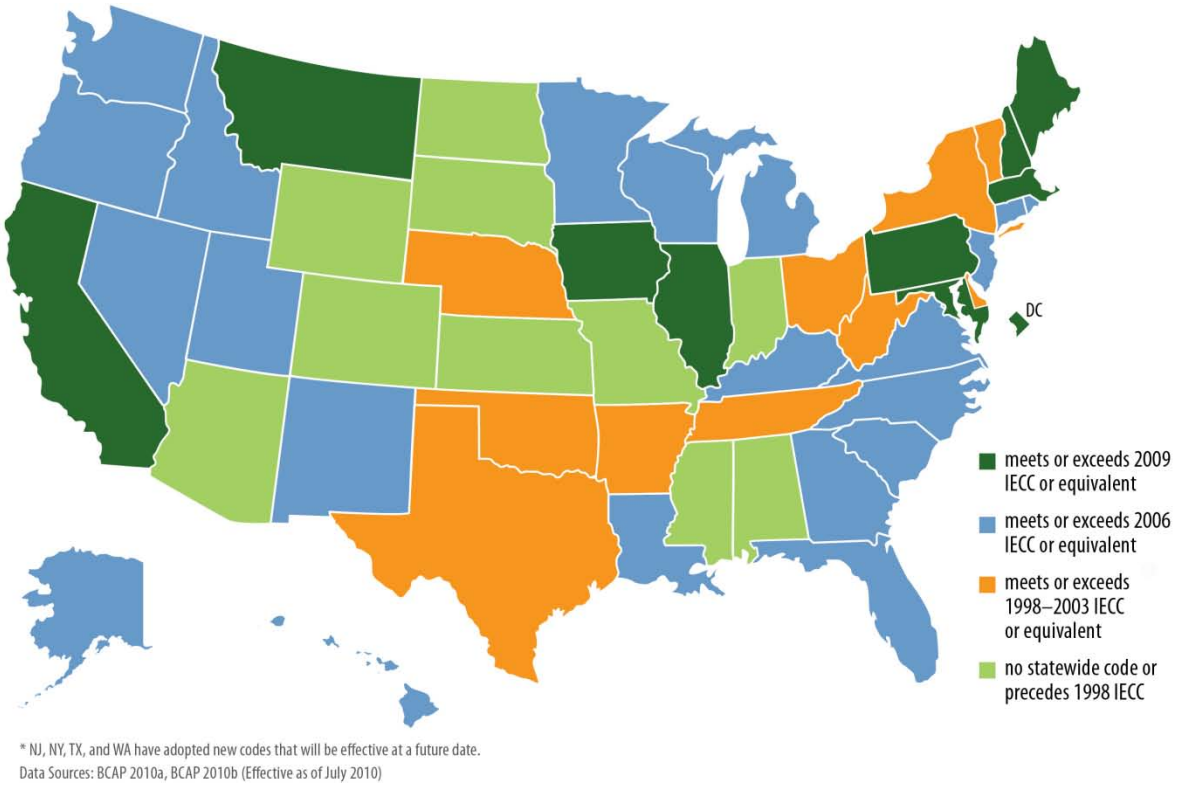

Figure 2. Residential building codes

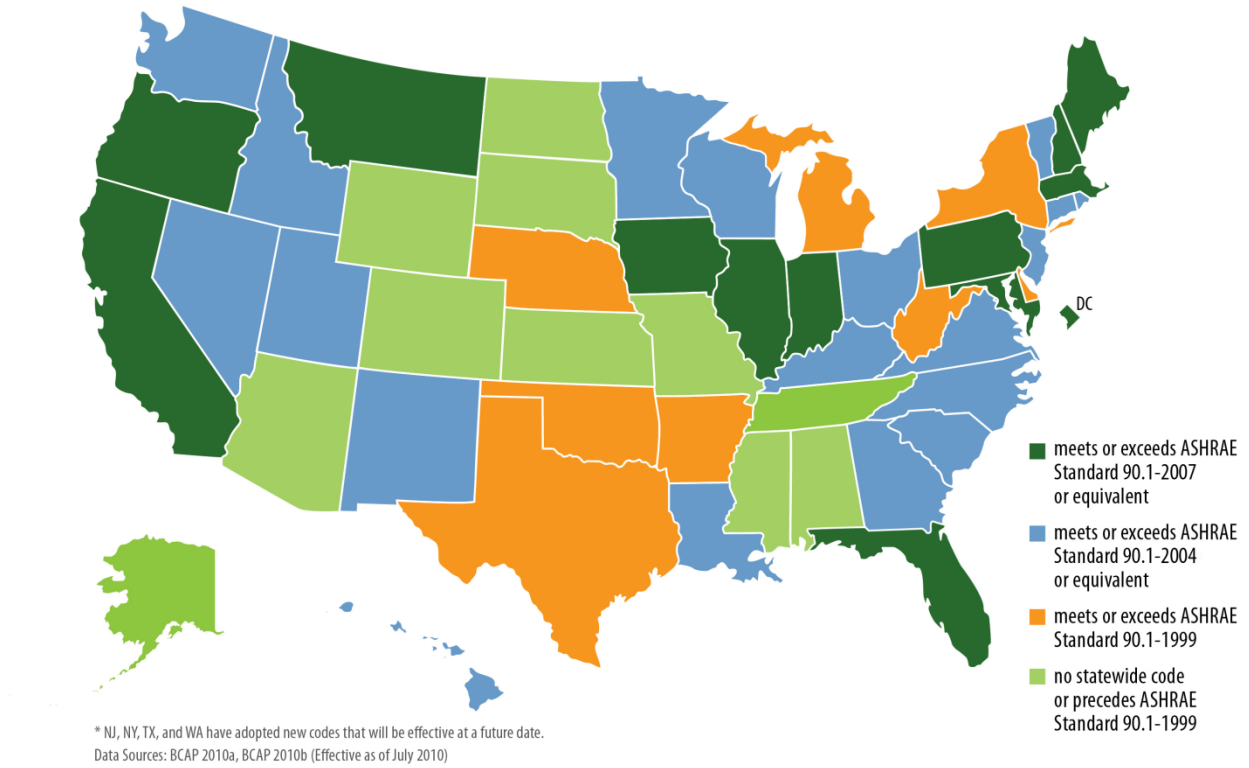

Figure 3. Commercial building codes

States are clearly taking action to facilitate the development of clean energy projects by adopting market transformational policies such as RPSs, net metering, interconnection, and progressive building codes. As state policies continue to evolve and further analysis is completed, valuable insight into the effectiveness of state-level policies will be revealed. Developing a better understanding of local clean energy policies and the interaction between policies at multiple levels will enhance the ability of local, state, and federal governments to develop complementary policies and provide information on how state policy clean energy implementation impacts local policy development and vice versa.

The Status and Influence of Local Climate Change Mitigation Policies

With little action at the national level, state and local governments have led the way in climate change policy in the United States (Byrne et al. 2007). These actions have included the promotion and adoption of clean energy technologies. While there is limited published research on local clean energy policy in the United States, there has been extensive research on climate change policy and sustainability in cities (e.g., Byrne et al. 2007; Krause 2010; Lindseth 2004). Although energy policy can be, and often is, a central part of any government's climate change policy, they are not one and the same, and policies affecting energy use often exist beyond those in climate change initiatives. The research that does cover local clean energy policy development focuses on it as a component of broader climate change policies. As there is limited published research on clean energy policies alone, the following section provides an overview of the status of local climate policy, finding that localities in states that support clean energy policy may be more likely to develop local climate policies. This section is not meant to be a comprehensive

analysis of local climate change policies but is included to provide additional insight into the policy environment within which clean energy policies are being developed.

Two of the main programs referenced as demonstrations of the growth of local action on climate change are ICLEI's Cities for Climate Protection (CCP) campaign and the U.S. Mayors Climate Protection Agreement (USMCPA). The CCP program, which was launched in 1993, grew out of the recognized need for local governments to take an active role in mitigating and adapting to climate change (ICLEI 2010). The CCP is a voluntary program under which members commit to achieving ICLEI's five milestones designed to guide a community towards reducing carbon emissions. There were 166 U.S. member cities in the CCP program in 2005, at which point it evolved into other ICLEI programs (Ode 2010).

Similarly, the USMCPA is a voluntary agreement that commits signatories to reduce their emissions by 7% from 1990 levels by 2012. The USMCPA, with 1,042 signatories as of July 2010, has the largest membership of any domestic municipal climate change program (Betsill and Rabe 2009; USCM 2010). There is at least one signatory from each state as well as Washington, D.C., Puerto Rico, and the Northern Marianas Islands (see Table 4). The total population represented by the signatories is over 87 million citizens, with individual signatory populations ranging from 80 to over 8 million (USMCPA 2010).

Table 4. U.S. Mayors Climate Protection Agreement Signatories (USMPCA 2010)

State	# of Signatories	% of Total Signatories	State	# of Signatories	% of Total Signatories
CA	136	13.1%	NM	10	1.0%
NJ	109	10.5%	NH	9	0.9%
FL	78	7.5%	AL	7	0.7%
IL	51	4.9%	ID	7	0.7%
NY	47	4.5%	KY	7	0.7%
MN	45	4.3%	SC	7	0.7%
NC	42	4.0%	TN	7	0.7%
IA	34	3.3%	AK	5	0.5%
WA	34	3.3%	AR	5	0.5%
MA	32	3.1%	HI	5	0.5%
MI	31	3.0%	MT	5	0.5%
OH	31	3.0%	NV	5	0.5%
TX	31	3.0%	LA	4	0.4%
MO	22	2.1%	MS	4	0.4%
PA	22	2.1%	RI	4	0.4%
CT	20	1.9%	UT	4	0.4%
WI	20	1.9%	WV	4	0.4%
PR	19	1.8%	NE	3	0.3%
CO	17	1.6%	DE	2	0.2%
IN	16	1.5%	ND	2	0.2%
OR	16	1.5%	OK	2	0.2%
ME	15	1.4%	SD	2	0.2%
AZ	13	1.2%	VT	2	0.2%
MD	13	1.2%	D.C.	1	0.1%
KS	12	1.2%	MP	1	0.1%
VA	11	1.1%	WY	1	0.1%
GA	10	1.0%			

While the program's reach is noteworthy, over 50% of the cities are in just eight states (highlighted in blue in Table 4). These states are located in different regions, have varied

renewable resource availability, and have varied needs for energy efficiency. Although current research of the CCP and USMCPA focuses on the number of members and not the effectiveness in driving measurable greenhouse gas (GHG) emissions reductions, these programs currently provide the best proxy data to determine local interest in climate change mitigation and, therefore, possibly clean energy deployment. A number of different ways to identify the breadth of action on climate change initiatives at the local level was considered for this report. Because there is not a comprehensive analysis of the actions that either the CCP or USMCPA programs have led to, it was decided to use the number of USMCPA signatories as a data point for better understanding the breadth of interest in climate change mitigation activities.

Analyzing the state clean energy policies in the states with the greatest number of USMCPA signatories reveals that these states have created an environment supportive of clean energy deployment. Of the eight states, all but Florida and Illinois had the three market transforming policies for renewable energy (RPS, interconnection, and net metering) in place in 2008, 2009, and 2010. As of 2010, only Florida had not implemented all three policies. However, Florida is the only of these states to be ranked by BCAP as having the most efficient commercial building codes in place in 2008, 2009, and 2010 (see Table 5). Furthermore, 77% of the signatories are municipalities in states that had adopted the three renewable energy market transforming policies as of February 2010. This suggests that local governments in states that support clean energy through policy implementation are more likely to take a proactive role in supporting climate policy at a local level, although further research is necessary to confirm this hypothesis.[12] It has not yet been investigated whether or not the local governments' actions are influencing the state government's actions or vice versa.

Table 5. States with the Most Efficient Building Codes (BCAP 2010a; BCAP 2010b)

	2008–2010	2009–2010	2010
Commercial	*Florida*	*Florida*, Massachusetts	*California*, District of Columbia, *Florida*, Indiana, *Illinois, Iowa*, Maine, Maryland, Massachusetts, Montana, New Hampshire, Oregon, Pennsylvania
Residential	None	None	*California*, District of Columbia, *Illinois, Iowa*, Maine, Maryland, Massachusetts, Montana, New Hampshire, Pennsylvania

Italics indicate states which are one of the top 8 states listed in Table 4. The combined percentage of total USMCPA signatories in the 8 states represent over 50% of all USMCPA signatories. The top 8 states in order of percentage of signatories are CA, NJ, FL, IL, NY, MN, NC, IA.

[12] The number of total municipalities in each state was also analyzed to see if it might explain why these states have the greatest number of signatories. However, only two of the states (New Jersey and California) were in the top 10 states in terms of percentage of municipalities that are USMCPA signatories (ranked 8th and 9th, respectively). The other states are ranked as follows: Florida – 11th, North Carolina – 16th, New York – 17th, Minnesota – 21st, Illinois – 24th, and Iowa – 26th. The state populations were not analyzed to determine if there is a relationship between state population and the number of USMCPA signatories because this report is interested in the number of signatories not the total number of people that reside in municipalities that are signatories, and it is not expected that a state's population will impact the number of USMCPA signatories there are in a single state.

Recent analysis of these programs, and more generally, of the action taken by local governments to reduce GHG emissions, is critical of their ability to achieve significant reductions (e.g., Portney 2009; Betsill and Rabe 2009; Saha 2009). While both the CCP and USMCPA have increased the awareness of climate change mitigation at the local level, neither necessarily results in implementation of clean energy policies, and therefore, adoption of these initiatives should not be equated with deployment of clean energy technologies.

At the local level, climate change and clean energy policies are often intertwined because emissions from the combustion of fossil fuels represents 79% of the country's global warming potential weighted GHG emissions, 42% of which is a result of fossil fuel combustion to generate electricity (EPA 2010). Interestingly, though, of the main policies included in city sustainability plans, the least action has occurred in promoting renewable energy deployment (Saha 2009).[13] This is contrasted with the fact that the majority of plans call for an increase in clean energy. For example, in an analysis of 40 climate action plans adopted by U.S. cities, Tang et al. (2010) found that 80.0% of the plans called for increasing the use of renewable energy and 82.5% identified increased energy efficiency as part of their strategy to reduce GHG emissions.

Local Clean Energy Policy

State clean energy policies and a local desire to have policies mitigating climate change are not the only motivators for local clean energy policies. In the National League of Cities 2008 survey of municipal officials, 51% of city officials stated that *fuel* and *energy costs* were a "major" problem for their community (NLC 2008).[14] The survey also revealed that local government officials believe that their ability to fund other programs has been negatively impacted by increased and volatile energy-related costs. To minimize the impact, city governments are implementing strategies to reduce energy use. According to the same survey, 43% of cities increased restrictions on public vehicle use, 32% increased the use of alternative fuels and "green technologies," and 25% increased the use of alternative transportation, including bicycles. While the results of the NLC study highlight local government action in reducing transportation-related energy use more than in reducing electricity use or generating electricity with renewable source, it demonstrates that local governments are concerned with energy costs.

Unlike for state clean energy policies, there is not currently a database that extensively tracks local government clean energy policies. Tracking policy developments at the local level would be difficult due to the sheer number of local governments and the increasing role that local governments are taking to deploy clean energy through policy measures. Although tracking local government policies is undoubtedly difficult, it is an increasingly important task to tackle since it is necessary to our understanding of local policy impact on clean energy development.

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[13] There is a common belief that cities with municipal utilities are more easily able to take action to increase the amount of renewable energy generated and reduce the GHG emissions within their community, and therefore, are more likely to do so. However, current research is questioning this theory. In fact, according to a recent report, statistical analysis of the factors impacting whether or not a city joined the USMCPA indicate that there is actually a negative relationship between cities that have a municipal electric utility and their propensity for joining the USMCPA (Krause 2010). While the cities with municipal utilities may be better positioned to implement changes that would increase clean energy deployment in their service area, it is unclear whether or not they are taking these actions at a greater rate than cities without a municipal utility.

[14] The NLC survey is an annual survey of local officials. A random sample, a total of 1,617 local officials, was sent surveys and the response rate was 23%.

Local clean energy policies vary in design and implementation. Examples of common local clean energy policies currently implemented in the United States include:

- Financial incentives (e.g., grants, rebates, loans, and tax incentives)
- Green power purchasing requirements
- Building energy codes
- Permitting standards
- Energy standards for public buildings.

DSIRE tracks a limited number of local clean energy policies. DSIRE's methodology for tracking local incentives is to include policies from municipalities and counties with large populations and those that are especially innovative in an effort to capture the most important policies. As of July 2010, DSIRE has 61 local financial incentives and 95 local rules, regulations, and policies tracked on their Web site, compared to over 950 state clean energy policies (DSIRE 2010).[15] While this is a limited sample, it is the most comprehensive database of local incentives available and is therefore used in this review. In order to develop a better understanding of the diversity and breadth of local clean energy policy development, it is imperative that some type of a tracking mechanism be designed.

The majority of local clean energy policies focus on rebates, green building, and green power purchasing programs (Figure 4 and Figure 5). While a variety of sectors (e.g., commercial, residential, industrial, and non-profit) are eligible for most of the local financial incentives tracked by DSIRE, about 50% of the rules, regulations, and policies apply only to local governments. These policies typically set some type of requirement to increase either energy efficiency or renewable energy generation in municipal operations. They are often called "lead-by-example" policies because they do not set any requirements for energy use in the broader community but are instead used as a tool to improve energy efficiency or increase renewable energy generation in municipal operations. While effective in altering energy use in municipal operations, which can be a substantial impact on energy use as many local governments own considerable infrastructure, lead-by-example policies do not mandate change in the broader community. They are often valuable in demonstrating the benefits and feasibility of implementing clean energy projects, which can lead to successful adoption of community-wide mandates in the future, but the policies themselves do not result in direct community-wide energy savings.

Of the 61 financial incentives, 60% are either rebates or incentives offered for green building (Figure 4). Of the 95 rules, regulations, and policies, 55% are for green power purchasing or energy standard requirements for public buildings (Figure 5). Only 16 states are represented by the local financial incentives and only 26 states are represented by the local rules, regulations, and policies as tracked by DSIRE (Table 6). It is unclear if this is a reflection of the methodology of DSIRE's local data collection or if the actual incentives at the local level are concentrated in

[15] DSIRE tracks over 2,450 clean energy policies in total, including federal, local, and utility incentives and policies, updating policies at least once a year and adding new policies as they are implemented. The municipal utility policies that DSIRE tracks are not included in this analysis because they are not technically local government policies as they are offered by a utility.

these states and may be a combination of both factors. In order to develop a better understanding of the diversity, breadth, and impact of local clean energy policy development, it is imperative that there is some type of comprehensive tracking of local clean energy policies.

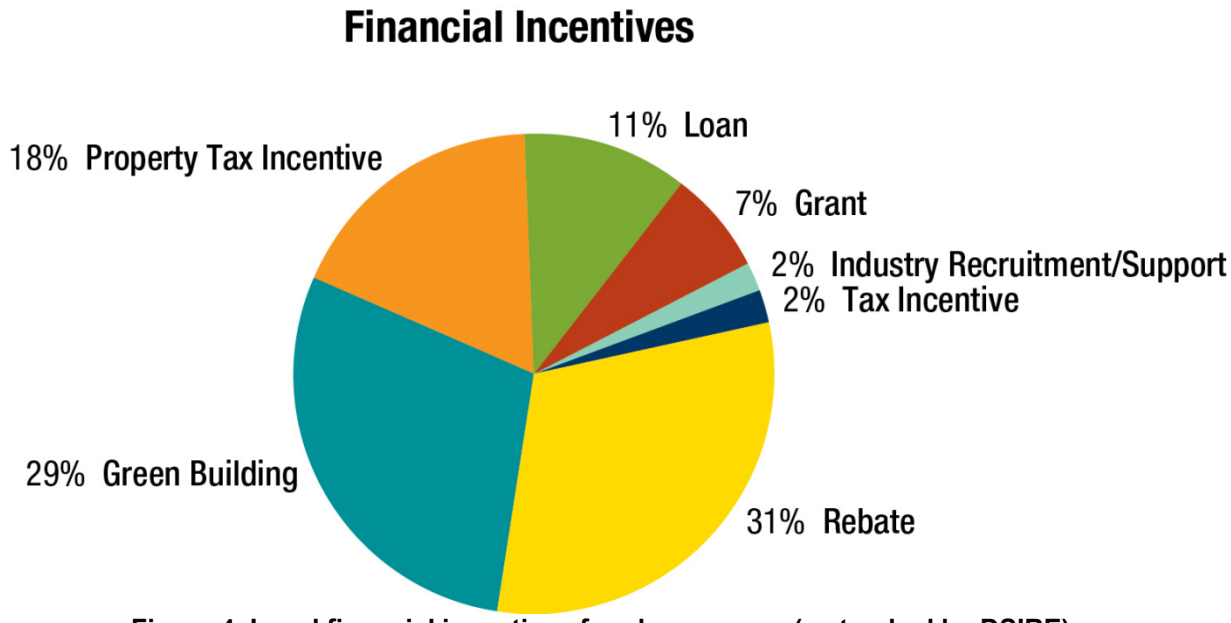

Figure 4. Local financial incentives for clean energy (as tracked by DSIRE)

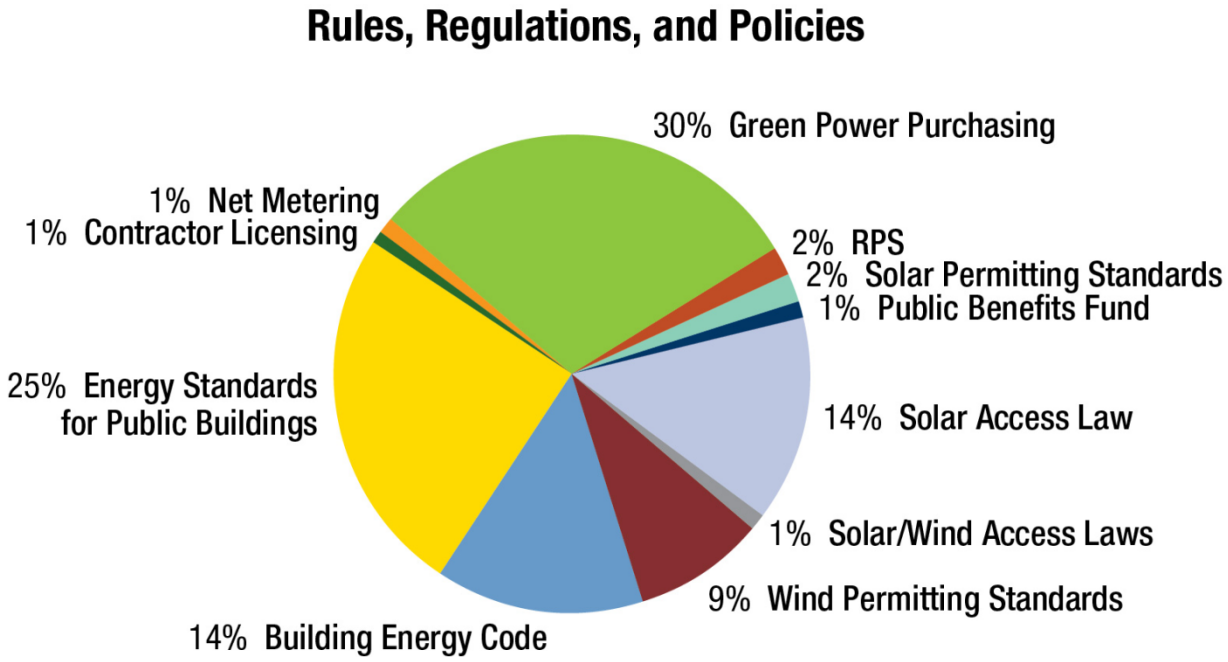

Figure 5. Local rules, regulations, and policies for clean energy (as tracked by DSIRE)

It is difficult to determine if there are any trends between state and local clean energy policy developments due to the limited data. While it appears that there may be a connection between states developing a policy environment supportive of clean energy technology deployment and local governments promoting climate change mitigation (see the State Clean Energy Policy sub-

section above), more comprehensive data on local clean energy policies is necessary to analyze potential relationships between local and state clean energy policy development. Of the local policies tracked by DSIRE, 75% of the financial policies are in states that have had all three renewable energy market transformation policies in place from 2008–2010, but only 38% of the financial policies are in states that had adopted the most efficient building code by 2010 (see Table 6 and Table 7). For the local rules, regulations, and policies, 65% are in states that have had all three renewable energy market transformation policies in place from 2008–2010, and 27% are in states that had adopted the most efficient building code by 2010. Initial analysis of this data seems to say that localities in states supporting renewable energy through policy are themselves implementing policies to support renewable energy. However, without comprehensive tracking of local policies, it is difficult to draw conclusions based on this data.

Table 6. States with Local Policies Tracked by DSIRE (BCAP 2010a; BCAP 2010b; DSIRE 2010; Doris and Gelman *Forthcoming)*

	States with Local Financial Incentives Tracked by DSIRE	States with Local Rules, Regulations, & Policies tracked by DSIRE	Renewable Energy Market Transformation Policies in Place in 2008, 2009, & 2010	Most Energy Efficient Building Codes (2010)* (Commercial & Residential)
AZ	X	X		
CA	X	X	X	X
CO	X	X	X	
CT		X	X	
FL	X	X		
GA		X		
HI	X		X	
IL	X	X		X
IN		X		
KS		X		
LA		X		
MD	X	X	X	X
MA	X	X	X	X
MI		X		
MO		X	X	
NM		X	X	
NY	X	X	X	
NC	X	X	X	
OH	X			
OR	X	X	X	
PA		X	X	X
SC		X		
TN		X		
TX	X	X		
UT				
VA	X		X	
WA	X	X	X	
WI	X	X	X	

*For comparison purposes, data on 2010 Energy Efficiency codes is used instead of data on 2008–2010 energy efficiency codes as BCAPs requirements to meet the most efficient code were increased in 2009.

Table 7. Local Clean Energy Policies in States Supporting Clean Energy

	Percentage of Local Policies in States with:	
	RPS, Net-metering, and Interconnection in Place 2008–2010	The Most Energy Efficient Building Code in 2010
Financial Incentives	75%	38%
Rules, Regulations, and Policies	65%	27%

Further research on why local governments in these states are using policy to promote clean energy may provide insight on the interaction between state government clean energy policies and those at the local government level. While analysis of the effects of horizontal policy diffusion at the local government level exist, there is little research on the vertical interaction between state and local governments in any area, energy, climate, or otherwise and its impact on policy diffusion (Betsill and Rabe 2009). As there is increasing activity at the local level in clean energy policy implementation, it would be useful to better understand the vertical impacts of policy diffusion.[16] In their analysis of vertical diffusion of anti-smoking policies, Shipan and Volden (2006) find that there is both a positive and negative impact associated with policy development at the local level. Their research found that in states with professional legislatures[17] or strong interest groups, policy development at the local level is likely to lead to development at the state level. However, in other states, policy development at the local level is likely to obstruct development at the state level because the local policies are sufficient to decrease the pressure from the local constituents (serve as a substitute for state-level policy). The literature review completed for this report did not reveal any published research analyzing vertical policy diffusion of clean energy policies in the United States or elsewhere.

[16] State and local governments interested in implementing Property Assessed Clean Energy (PACE) policies are currently experiencing the impacts of local, state, and federal policy interactions as Fannie Mae and Freddie Mac have raised concerns about PACE financing options, effectively bringing state and local PACE programs to a halt. As this issue is currently evolving, it will be intriguing to see how it plays out.

[17] Professional legislatures are typically associated with such features as higher salaries for legislators, larger staffs, and longer session lengths.

Questionnaire Results

Summary of Main Points

- Local government officials, departments, and community members have been the main entities driving the adoption of clean energy policy at the local level.
- Clean energy options are typically framed as a way to reduce energy related costs and to mitigate climate change.
- The major barrier to the adoption of clean energy continues to be related to cost, and local governments rely on offering financial incentives to address this barrier.
- There is substantial interaction between local governments on clean energy policy development. The interaction with state governments varies greatly with only a few local governments interacting frequently with their state government.

The majority of research on local government sustainability initiatives continues to focus on the municipalities that are considered to be sustainability leaders, such as Boulder, Colorado, Portland, Oregon, and Austin, Texas (Saha 2009). Due to this, the author made an effort to get input from a broader group of communities, including those not typically considered as leaders in sustainability. To augment the limited information available on local clean energy policy, a short questionnaire was developed and sent to a number of local government officials representing communities of various sizes, regions, and involvement in existing sustainability and clean energy organizations.

Methodology

Questionnaires were sent to one official in 54 different local governments (see the Appendix for the list of local governments that were contacted).[18] The cities and towns were chosen based on the following:

- All cities with a population over 500,000 were included.
- A random sample of cities with populations of 30,000–100,000 and 100,000–500,000 (see Table 8) was chosen in order for the questionnaire participants to broadly represent the following:
    - U.S. states
    - National Association of State Energy Officials (NASEO) regions
    - States with all three market transformation policies for renewable energy in place from 2008–2010
    - States with the most efficient building codes in 2010

[18] Seven of the largest counties were also contacted. However, as only one response was received, the answers from this recipient are not included in the results below because they cannot be compared with the results from other counties.

- USMCPA members
- Solar America Communities (SAC) members.[19]

Energy issues are not institutionalized in the same manner across local governments. For some local governments, it was difficult to determine what department or individual was the appropriate person to contact as energy policy is intertwined with the activities of many different municipal departments (e.g., planning and development, transportation, waste management, and sustainability departments). The author searched city Web sites to determine the most relevant department to contact and, in the cases where it was not obvious, queried the most likely department for suggestions on the best individual to contact.

There was a 31% response rate, with 15 questionnaires returned and 2 personal interviews completed. However, some respondents did not answer every question. While the majority of respondents provided input through the questionnaire, two preferred to be interviewed personally.

Table 8. Distribution of Localities Contacted and Responses

	Total	States	NASEO Regions	Population Size**	State RE Market Transformation Policies (2008–2010)	State Adoption of Most Efficient Building Codes (2010)	USMCPA Member	SAC* Member
Contacted	54	36 [AK, AL, AR, AZ, CA (4), CO, D.C., DE, FL, GA, HI, ID (2), IL, IN, KY, MA (2), MD, ME, MI (2), MN, NC, NH, NM, NY, OH (2), OK, OR (3), PA (2), TN (2), TX (6), UT, VA (2), VT, WA (2), WI, WV]	Northeast = 6 Mid Atlantic = 8 Southeast = 8 Midwest = 8 Central = 8 Northwest = 9 Southwest = 7	S = 10 M = 12 L = 24 XL = 8	Yes = 27 No = 27	Yes = 13 No = 41	Yes = 47 No = 7	Yes = 17 No = 37
Response Received*	17	13 [AZ, OK, NM, CA, MA, ME, MD, TX (2), WA (2), DE, PA, MI, NY]	Northeast = 3 Mid Atlantic = 3 Southeast = 0 Midwest = 1 Central = 3 Northwest = 2 Southwest = 3	S = 3 M = 3 L = 7 XL = 2	Yes = 9 No = 6	Yes = 5 No = 12	Yes = 13 No = 2	Yes = 7 No = 8

*There were two responses received for which the locality was not identified.
**S = 30,000-100,000; M = 100,001-500,000; L = 500,001-1,000,000; XL = 1,000,001+

[19] For information on the SAC program, see EERE 2010.

Results

The results from the questionnaire are meant to provide a representation of clean energy policy development at the local government level. Local governments vary greatly, and these limited results are not meant to represent the experience for most local governments, but to act as a snapshot of the current environment. The responses are those of a single individual and reflect his or her individual opinion. If a different individual from the same local government were to respond to the same questions, they may provide unique responses. The questions focus on local clean energy policy adoption and address the following topics:

- Main proponents driving clean energy policy adoption
- How support for clean energy is framed in the community
- The identification of barriers to clean energy policy adoption
- How barriers are addressed
- Interaction with the state government
- Interaction with other local governments
- Other support that aids local governments in developing policies to support clean energy.

As the number of respondents to each question varied, the number of completed responses is listed in parentheses next to each topic below.

Main Proponents (17)

When asked what entities were considered to be the main proponents driving the promotion of clean energy policy in their locality:

- 13 (76%) stated that local government, either individuals in the government or departments, were the main drivers
- 8 (47%) identified the community and/or non-profit organizations
- 2 (12%) cited the state government
- 1 (6%) cited the federal government
- 1 (6%) identified local utilities.

It is interesting to see that only two respondents mentioned that the state government was a driver for clean energy development at the local level. As demonstrated earlier, the majority of USMCPA members are in states that, through policy, have developed a positive environment for clean energy. This implies that local governments in states that support clean energy development tend to be supportive of climate change mitigation. However, the results from this questionnaire reveal that the majority of these respondents do not view the state as a main driver for clean energy development at the local level. A broader analysis of policy development at the local level would provide more robust data to better understand this interaction.

Framing Clean Energy (17)
When asked how support for clean energy has been framed in the local community:

- 10 (59%) stated as a way to reduce costs associated with energy use
- 10 (59%) said as a part of a local climate change initiative
- 8 (47%) said in terms of economic development
- 4 (24%) identified quality of life or other sustainability ideals
- 1 (6%) said as a part of a local strategic energy plan.

Not surprisingly, most of the local communities are framing clean energy as a way to reduce future energy costs associated with conventional sources as well as a way to mitigate climate change.

Identifying Barriers (17)
When asked to identify the main barriers to the development of clean energy policy at the local level:

- 13 (76%) identified cost and economic concerns with promoting clean energy
- 3 (18%) said there were clean energy acceptance issues
- Other barriers identified by only 1 respondent each include split incentives,[20] a lack of unbiased information, opposition from organized interests, abundance of cheap energy from other sources, and a lack of skilled labor.

Beyond cost and economic concerns, each community is experiencing unique barriers to the development of clean energy in their locality. This points to the difficulties that a single state or federal policy will have in addressing myriad barriers that can vary greatly between communities. To overcome this, it is preferable for local, state, and federal governments to work together to develop complementary policies with the flexibility to address varying barriers. This, however, can be very difficult. Surprisingly, only 18% of the respondents identified local acceptance issues as a barrier because acceptance issues continue to be a barrier to clean energy development (Sovacool 2009; Wüstenhagen et al. 2007).

Overcoming Barriers (17)
When asked to identify how the local government has overcome these barriers, the responses focused mainly on innovative funding mechanisms:

- 8 (47%) said innovative funding mechanisms, such as grant programs and energy performance contracting
- 5 (29%) named education, information, and outreach programs

[20] The term split incentives, also known as a "principal-agent" problem, describes a situation where the different entities making decisions that affect energy use have different incentives impacting their choices. For example, a landlord may be incentivized to purchase the least expensive appliances regardless of their energy efficiency because the tenant is responsible for the costs associated with the use of those appliances. In reverse, a tenant is not likely to invest in energy efficiency improvements in the residence because they do not own the home and will not likely reap the long-term financial benefits of the investment.

- Other ways cited for overcoming barriers identified by only 1 respondent each include developing partnerships with other entities, providing job training, and through developing policy.

The responses tended to focus on overcoming barriers to clean energy *project* development rather than just clean energy *policy* development (e.g., financial incentive programs are policies designed to support project development). Only one respondent identified policy as a tool for addressing existing barriers, potentially signifying that local officials are not aware of the policy tools, such as adopting more stringent energy codes and improving permitting processes, which exist to drive the development of clean energy.

Interaction with State Government (16)

When asked to identify the type and extent of interaction with their respective state government on clean energy:

- 6 (38%) said the majority of interaction is through financial support from the state
- 5 (31%) said that they have only limited interaction with the state
- 2 (13%) said they have no interaction with their state government
- 1 (6%) said that their state is very supportive and they interact frequently.

Forty-four percent of the respondents said they have little to no interaction with their respective state government on clean energy issues; although, every state has implemented some sort of policy to promote clean energy. This lack of interaction between state and local governments could result in conflicting or duplicative policies.

Interaction with Local Governments (15)

When asked to explain the extent of interaction they have with other local governments on clean energy:

- 15 (100%) said that they do interact with other local governments, although 2 said only on a limited basis
- 6 (46%) responded that they interact with local governments across the country
- 4 (29%) said they interact with neighboring governments
- 2 (13%) said that they interact mostly with similarly sized cities
- Other interactions listed by only 1 respondent each included through Council of Governments, Clean Cities, SAC, and ICLEI.

It appears that local governments are reaching out to each other to learn from each other's experiences and share information on developing clean energy policy, be it through one-on-one interactions or through more formalized organizations like ICLEI. This type of interaction can lead to horizontal policy diffusion, increasing support for clean energy at the local level. This type of broad support sends the market signal that clean energy support is becoming increasingly more stable.

Additional Support (15)

When asked to identify the areas in which additional support would be the most beneficial, most focused on financial support, which was identified by the majority of respondents as a main barrier to clean energy:

- 9 (60%) identified financial support
- 6 (40%) said general technical assistance
- 3 (20%) said state support in general or through specific policy development
- A variety of others were identified by only 1 respondent each, including the need for a federal renewable energy policy, standardization of certifications for energy efficiency paraprofessionals, a uniform way to measure GHG emissions reductions, and opportunities for networking with other local governments.

Conclusion

Local governments are in a position to be a driver in the deployment of clean energy technologies. They are uniquely able to demonstrate how clean energy can address some of the issues specific to their local constituents, such as job growth, increasing the use of local energy resources, and improving environmental quality. Where federal or state policies must be broad enough to be applicable across multiple municipalities, local policies can be designed to meet local needs and fit the local context. If the multiple levels of government work together to implement complementary policies, a synergistic policy framework can be established that addresses multiple barriers to clean energy development.

Many states have created an environment conducive to the development of clean energy projects by implementing a suite of market transformative policies: RPS, interconnection, net metering, and advanced building energy codes. Using the data on the number of municipalities that have signed the USMCPA as a proxy to determine the interest and support for climate change mitigation in municipalities, it appears that a substantial portion of the signatories are in states that have implemented the clean energy market transformative policies. While simply signing onto the USMCPA does not signify that the municipality actually takes any action, it is interesting to see there may be a relationship between the state in which a municipality resides and whether or not the municipality is supportive of reducing GHG emissions. Conversely, it may be that the clean energy market transformative policies are adopted in states in which the municipalities have adopted climate change mitigation initiatives. Additional analysis is necessary to delve into this interaction and determine if there is a causal relationship in one direction or the other.

The surveys completed by local officials to supplement the limited data on local clean energy policies revealed that a variety of municipalities are implementing clean energy policies, often associated with ARRA funds. At the local level, support for clean energy is predominantly framed as a way to reduce energy-related costs, mitigate GHG emissions, and increase local economic development. Localities continue to face barriers, particularly in regard to a lack of financial resources and information on the costs and benefits of clean energy. And, although many municipalities interact with other local governments when developing clean energy policies and programs, only one local official responded that their city interacted frequently with the state government. This indicates that there may be a disconnect between state and local policy development, making it difficult to ensure that the policies developed at multiple levels are complementary and not duplicative.

While the questionnaire submitted to local governments revealed they are interacting with other local governments through a variety of arenas, the literature review for this report identified no research on clean energy policy innovation[21] and diffusion (although similar studies exist on smoking bans, gun laws, and other regulatory policies; Krause 2010). Understanding how and why some local governments adopt certain policies that other governments have already implemented may reveal important trends in how clean energy policies are spreading across local governments and what the policy adoption barriers are in specific contexts.

[21] Policy innovation refers to policies that are adopted by one government after they were implemented in another locality. Policy invention is defined as the development of a completely new policy.

Although understanding the interaction between local, state, and federal policies is critical to developing a complementary policy environment, to date there has been no analysis of these types of interactions in regard to clean energy policy (Betsill and Rabe 2009). Moreover, across public policy in general, political scientists have focused research on horizontal policy diffusion, and little research has been completed on vertical policy diffusion from the bottom up (Shipan and Volden 2006). Further analysis on vertical policy diffusion and interaction between policies at various levels of government may reveal important insight on the impact and development of local clean energy policies. Although the data on local clean energy policies remains sparse, understanding the impact that local clean energy policy development has on state and federal policies will improve the ability of policymakers to develop an environment supportive of clean energy development.

This report identifies a gap in the existing knowledge: there is insufficient analysis of local clean energy policy beyond climate change initiatives to understand the relationship between state- and federal-level policies and local-level policies. This is likely in part due to the fact that there is no comprehensive tracking system for local clean energy policy activities. While DSIRE tracks a limited number of local policies, it is currently beyond the scope of their project to track all local policy development. The development of a similar tracking mechanism for local policies would allow for in-depth analysis of the impact and effectiveness of local clean energy policies. Furthermore, as local policy activity increases, it is important for the research on clean energy policy to move from reporting the policies and goals that are adopted to understanding policy interactions, identifying best practices in local policy design, and analyzing the reasons that some policies are successfully implemented in certain localities while not in others. The first step in this process will require comprehensive data collection of local clean energy policies.

Other potential next steps in the nascent clean energy policy arena include:

- Analyzing the relationship between local clean energy policy implementation in "home rule"[22] states as compared with other states. Are localities in home rule states more likely to adopt clean energy policies?
- Analyzing the interaction between state and local clean energy policy adoption and implementation. This research could provide insight on how to best develop complementary policies based on jurisdictional competencies and existing policy environment.
- Delving deeper into the role that local governments can play in reducing energy use through transportation initiatives. Research on the interaction between the policies of neighboring municipalities may provide information on the importance of complementary policies as alternative fuel infrastructures are developed.
- Determining how municipal utility incentives interact with local policies and the impact that they have on driving clean energy adoption.

[22] "Home rule" refers to the degree to which the state delegates power to sub-state units of government (NLC 2010). Some states allow for local governments to have more autonomy than do other states, resulting in local governments in home rule states having greater freedom to develop and implement local policy.

This report provides an initial overview of the current local clean energy policy landscape to develop a better understanding of the current policy environment and identify areas for further research. While there is a lot of activity in the policy arena at the local level, the current research continues to focus on either state and federal clean energy policy development or on local climate initiatives. Developing a better understanding of the potential impact of local clean energy policies and the complementary role they can play with state and federal policies will provide local governments with information necessary to designing more appropriate and impactful clean energy policies. Furthermore, state and federal governments can benefit from lessons learned in decentralized policy development as local governments may be implementing innovative policies that can be replicated by other local and state governments or even the federal government. As clean energy policy development continues to expand at the local level, it will become increasingly important for policymakers to better understand the role that local policy plays in supporting the development of clean energy technologies.

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Appendix A: Local Governments Contacted for Survey

Table A-1. Local Governments Contacted

City	State	NASEO Region	Population	State w/ RPS, Net-metering, and Interconnection Policies (2008–2010)	USMPCA Member	Solar America City Member	Response Received*
Albuquerque	NM	Southwest	528,497	Y	Y	N	Y
Allentown	PA	Mid-Atlantic	107,815	Y	Y	N	Y
Anchorage	AK	Northwest	286,174	N	Y	N	N
Ann Arbor	MI	Midwest	112,852	N	Y	Y	Y
Atlanta	GA	Southeast	540,921	N	Y	N	N
Austin	TX	Central	786,382	N	Y	Y	Y
Baltimore	MD	Mid-Atlantic	637,418	Y	Y	N	Y
Bellingham	WA	Northwest	80,055	Y	Y	N	Y
Bend	OR	Northwest	76,621	Y	Y	N	N
Birmingham	AL	Southeast	230,130	N	N	N	N
Boise City	ID	Northwest	205,707	N	Y	N	N
Boston	MA	Northeast	645,169	Y	Y	Y	N
Burlington	VT	Northeast	38,647	Y	Y	N	N
Charleston	WV	Mid-Atlantic	50,267	N	Y	N	N
Charlotte	NC	Southeast	709,441	Y	N	N	N
Chicago	IL	Midwest	2,851,268	N	Y	N	N
Coeur d'Alene	ID	Northwest	43,805	N	N	N	N
Columbus	OH	Midwest	769,360	N	Y	N	N
Concord	NH	Northeast	42,463	Y	Y	N	N
Dallas	TX	Central	1,299,543	N	Y	N	N
Denver	CO	Central	610,345	Y	Y	Y	N
Detroit	MI	Midwest	910,920	N	Y	N	N
Dover	DE	Mid-Atlantic	36,560	Y	Y	N	Y
El Paso	TX	Central	620,447	N	Y	N	N
Fort Smith	AR	Southeast	85,544	N	Y	N	N
Fort Worth	TX	Central	727,575	N	Y	N	N
Gresham	OR	Northwest	102,295	Y	Y	N	N
Honolulu	HI	Northwest	374,701	Y	Y	N	N
Houston	TX	Central	2,257,926	N	N	Y	Y
Indianapolis City	IN	Midwest	807,584	N	Y	N	N
Jacksonville	FL	Southeast	813,518	N	Y	N	N
Las Vegas	NV	Southwest	567,641	Y	Y	N	N

Los Angeles	CA	Southwest	3,831,868	Y	Y	N	N
Louisville/Jefferson County metro government	KY	Southeast	566,503	N	Y	N	N
Lowell	MA	Northeast	104,400	Y	Y	N	Y
Lynchburg	VA	Mid-Atlantic	73,933	Y	N	N	N
Manchester	NH	Northeast	109,395	Y	Y	N	N
Memphis	TN	Southeast	676,640	N	N	N	N
Milwaukee	WI	Midwest	604,133	Y	Y	Y	N
Minneapolis	MN	Midwest	385,542	Y	Y	Y	N
Nashville-Davidson metropolitan government	TN	Southeast	605,473	N	Y	N	N
New York	NY	Northeast	8,391,881	Y	Y	Y	Y
Oklahoma City	OK	Central	560,332	N	N	N	Y
Philadelphia	PA	Mid-Atlantic	1,547,297	Y	Y	Y	N
Phoenix	AZ	Southwest	1,601,587	N	Y	N	N
Portland	ME	Northeast	63,008	N	Y	N	Y
Portland	OR	Northwest	566,141	Y	Y	Y	N
Richmond	VA	Mid-Atlantic	204,451	Y	Y	N	N
Salt Lake City	UT	Southwest	183,171	N	Y	Y	N
San Antonio	TX	Central	1,373,668	N	Y	Y	N
San Diego	CA	Southwest	1,306,301	Y	Y	Y	N
San Francisco	CA	Southwest	815,358	Y	Y	Y	N
San Jose	CA	Southwest	964,695	Y	Y	Y	Y
Seattle	WA	Northwest	617,334	Y	Y	Y	Y
Springfield	MA	Northeast	155,575	Y	Y	N	N
Toledo	OH	Midwest	316,238	N	Y	N	N
Tucson	AZ	Southwest	548,555	N	Y	Y	Y
Washington	DC	Mid-Atlantic	599,657	Y	Y	N	N
*There were two responses received for which the locality was not identified.							
Population Color Key: 30,001–100,000; 100,001–500,000; 500,001–1,000,000; > 1,000,001							

Appendix B: Survey Questions

This questionnaire is part of a project to assess the development of renewable energy and energy efficiency policies at the local level throughout the United States. Thank you for taking the time to respond to this short questionnaire; we greatly value your responses. Your responses will be kept confidential. If you have any questions, please contact Sarah Busche at sarah.busche@nrel.gov.

Question #1
Has your community implemented any renewable energy or energy efficiency policies?

Question #2
What group has been the driver for developing renewable energy and/or energy efficiency policy in your locality? (For example, has it been community-driven; state-driven or mandated; or driven by an individual within the government, etc.)

Question #3
How has the promotion of renewable energy and energy efficiency been framed within your community? (For example, has the need to promote clean energy arisen as a result of a need to mitigate climate change, or to increase energy security, or for economic development purposes, etc.)

Question #4
What have been the major barriers to implementing renewable energy and energy efficiency policy in your locality?

Question #5
How has the local government overcome these barriers?

Question #6
What type of support and/or interaction do you have with your state government for developing and implementing renewable energy and energy efficiency policy in your community?

Question #7
Does your local government interact with other local governments to learn from each others' efforts in developing and implementing renewable energy and energy efficiency policy? If so, please explain. Also, do you interact mostly with neighboring communities or with communities in other regions?

Question #8
What type of support would be most helpful to your local government in developing and implementing renewable energy and energy efficiency policy at a local level? (For example, technical assistance, information, support from your state or the federal government, etc.).

Question #9
While your responses will be kept confidential, could you please list your city and state for recording purposes? Also, if you wouldn't mind being contacted for follow-up questions, please include your contact information below.

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This report takes a broad look at the status of local clean energy policies in the United States to develop a better understanding of local clean energy policy development and the interaction between state and local policies. To date, the majority of clean energy policy research focuses on the state and federal levels. While there has been a substantial amount of research on local level climate change initiatives, this is one of the first analyses of clean energy policies separate from climate change initiatives. This report is one in a suite of reports analyzing clean energy and climate policy development at the local, state, and regional levels.

15. SUBJECT TERMS
clean energy; renewable energy; policy; energy efficiency; building codes; local government; state government; federal government; climate change; DSIRE

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