

Political resiliency and institutional design

A case study of energy efficiency governance in six North America cases

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Institutions are at the heart of governance for low-carbon transitions. Broadly speaking, ‘institutions’ are the rules, prescriptions, procedures, guidelines and so forth that we as humans develop to organize all types of repetitive interactions between ourselves (Ostrom, 2005). These sets of rules and prescriptions are fundamental to managing the complex systems present in contemporary society. Organizations and other formal, brick-and-mortar structures are often built up around these rules to implement, evaluate, revise, and, in some circumstances, dismantle them. Collectively, institutions, the organizations set up around them, and the various other stakeholders involved in both the design and interpretation of these institutions comprise the governance network for any given policy issue domain.

Resiliency is one of several different “values” we might wish to realize through the design and interpretation of institutions (Hood, 1991). We can define resiliency as the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, and feedbacks (Walker, Holling, Carpenter, & Kinzig, 2004). A resilient institutional framework is thus one that enables the governance network to persist over time, despite ‘shocks’ that could destabilize it. Accordingly, institutional resiliency is integral to the sustainability of low-carbon transitions and the directed interventions taken to realize them. This is increasingly true in a world where populism and “post-truth” politics are leveraged in opposition to such efforts (Fraune & Knodt, 2018).

Understanding the relationship between institutions and resiliency is thus valuable to decision-makers in both existing and emerging institutional and organizational frameworks associated with low-carbon transitions. In this paper, we address this question through reference to the governance of energy efficiency efforts (predominately in the electricity end-use sector, not including transportation) in six separate North American case studies (three US states, three Canadian provinces).

In the sections below, we briefly review the concept of resiliency and its relationship to institutional design and governance of low-carbon transitions, as well as the recognized institutional and funding models of energy efficiency program administration in North America. On the basis of that discussion, we then discuss the challenges in identifying potentially ‘resilient’ cases that are comparable and pertinent to the dimensions of institutional design under consideration here, and explain the rationale by which we chose the cases we did. We then provide short, narrative overviews of the institutional arrangements and disturbance in each of our six cases, followed by a discussion section that investigates the nature of the shock, the impacts and evidence for resiliency, and the question of the relationship between institutions and political resiliency more broadly.

1 ‘RESILIENCY THINKING’ AND INSTITUTIONAL DESIGN

The concept of “system resiliency” can be most relevantly (for the purposes of this paper) associated with the socio-ecological systems literature, which - alongside the study of socio-technical systems - comprises a core body of work in the broader field of transitions studies. Both socio-ecological and socio-technical perspectives share the foundational recognition that the principal ‘unit’ of academic concern is a *complex adaptive system* (Folke, 2016; Grin, Rotmans, & Schot, 2011; Holland, 1992; Holling, 1973). Complex adaptive systems are considered to have “multiple basins of adaptability”, meaning that there is no single, optimal equilibrium point at which the system *should* operate, that the system can be ‘pushed’ by unexpected events to shift to a different equilibrium, and, consequently, that systems are likely to develop along ‘non-linear’ pathways (Folke, 2016). Yet, while these periods of rapid transition do occur, they are exceptional. Accordingly, both schools recognize that the day-to-day evolution of complex systems exhibits a great deal of path dependency, wherein the speed and extent of change is constrained by the past and present patterns of operation, networks of actors, rules and so forth (F. W Geels & Schot, 2007; Frank W. Geels, 2002; F.W. Geels, 2005; Rosenbloom, Meadowcroft, & Cashore, 2019). In extreme cases, this dependency can lead to *lock-in*, characterized as a condition where the system is unable to change (often to its eventual detriment) (Carpenter et al., 2012; Unruh, 2000).

Recognition of the fundamental complexity and uncertainty surrounding the dynamics of such systems gave rise to concept of ‘adaptive management’ in the 1990s, wherein continual observation, learning and readjustment of strategy (i.e., reflexivity) was considered essential to successful governance of the interaction between social and ecological systems (Folke, Hahn, Olsson, & Norberg, 2005; Voß & Bornemann, 2011). The concept of resilience emerged as a way to understand the objective of this interaction; namely, that governance of social-ecological system interactions should aim to maintain or bolster the capacity of these systems to “absorb disturbances and to retain essential functions, structures and feedbacks” (Walker et al., 2004). This was understood to entail both the capacity for *adaptation* (i.e., moving toward a stable equilibrium) as well as for *transformation* (i.e., moving away from stability), since ‘lock-in’ at a poor equilibrium could itself lead eventually to instability or collapse (Olsson, Galaz, & Boonstra, 2014).

“Resiliency-thinking” in the study of institutions and public administration can be traced back to the late-1980s, particularly to the work of Hood on the ‘values’ in administrative design, Shepsle on ‘structure induced equilibrium’ in institutions, and Wildavsky on strategies for dealing with risk (Duit, 2016; Hood, 1991; Shepsle, 1989; Wildavsky, 1985). Hood identified resiliency as one of three possible values that could be expressed through institutional design, the others being efficiency (e.g., emphasizing lean, narrowly-focused, cost-effectiveness), or ‘rectitude’ (i.e., emphasizing transparency, procedural fairness, prevention of corruption). Valuing resiliency entailed institutional design for organizational and resource redundancy and a diversity of perspectives, attained through maintenance of multiple, discreet yet non-compartmentalized units and/or departments, with multiple rather than single objectives, more allowance for mistakes and errors, and thus a higher degree of spare capacity (Hood, 1991).

Shepsle’s work was cited by Elinor Ostrom as influential on her work on institutional analysis and the governance of common-pool resources (Ostrom, 2005). Ostrom has been particularly influential in

bringing in concepts of resiliency and robustness to the study of institutions (owing in part to her participation in a late-1990s “Resilience Alliance” research network with researchers in social-ecological systems studies). While earlier work in social-ecological systems tended to focus more on the resilience of natural systems, Ostrom was interested in understanding the *robustness* of the institutions themselves, a quality which she defines as the capacity of an institution (viz., multi-layered frameworks of rules and responsibilities around the use of a resource) to retain some of its desirable features in the face of external, or internal, shocks or perturbations. Based on her own work and the larger body of literature on the management of common-pool resources (e.g., fisheries, forests), she developed a set of basic “design principles” for building robust institutions (Ostrom, 2005):

- 1) Clearly defined boundaries of the resource system in question, as well as clearly defined rights for individuals / households permitted to access the resource;
- 2) Proportional equivalence between benefits and costs for users of the resource;
- 3) Collective-choice arrangements inclusive of many/most stakeholders involved;
- 4) Monitoring of resource and resource users that is partially accountable to users;
- 5) Graduated sanctions for users who violate the rules;
- 6) Conflict-resolution mechanisms that are expedient, low-cost and local;
- 7) Minimal recognition of rights to organize for local users that are not challenged by external government authorities, and long-term tenure rights to the resource, and;
- 8) For resources part of larger systems, nested enterprises – meaning that appropriation, provision, monitoring, enforcement, conflict resolution, and governance activities are organized in multiple levels (which Ostrom calls “polycentric governance”);

The types of shocks that can threaten robustness, according to Ostrom, including technological change; ‘transmission failures’ (essentially the degradation of the institution); “blueprint thinking” (or the application of uniform solutions not well suited to the local circumstances); corruption and rent-seeking; and a lack of large-scale, supportive institutions for the provision of some resources and information. Importantly, Ostrom stressed that these design principles are only characteristics of institutional arrangements that she (and others) have studied, and that those responsible for creating those institutions rarely if ever set out to create them with these principles in mind.

1.1 CAUTIONARY NOTES

In a recent review of the concept, Duit summarizes the characteristics of a resilient institution accordingly:

“[I]t consists of multiple organizational units in non-hierarchical networks with overlapping jurisdictions and cross-scale linkages; it has spare capacity to use in times of crisis; it relies on multiple types of knowledge (e.g. scientific and experience-based) and sources of information; it encourages stakeholder participation; and it uses trial-and-error policy experiments and social learning to keep the policy system within a desirable stability domain” (Duit, 2016, p. 364)

We find a number of characteristics here that are reminiscent of how resiliency is treated in social ecological systems, indicating how a systems-perspective has been integral to the evolution of the concept. Yet this influence has led some to point the danger in uncritically adopting principles from the

latter for the former (Duit, 2016; Olsson et al., 2014). For one, it is not clear that a “systems perspective” is always amenable - or desirable - in institutional analysis, where it is not always so easy to find non-arbitrary ways of defining the boundaries of analysis. A systems’ perspective also tends to downplay the role of individual actors in coming up with novel or innovative solutions to problems. Neither is it clear that the “feedback signal” from ecosystems to social systems is as strong as it may be in comparatively smaller-scale resource systems, like many common pool resource systems, meaning many that benefit from exploitation of a resource are well insulated from the negative effects of its degradation.

Consequently, resilience thinking (and early transitions literature as well) has been accused of being “politically naïve” (Duit, 2016). According to Duit, this naivety has two dimensions. On the one hand, resilience thinking (and the transitions literature more broadly) heavily emphasizes collaborative, consensus-building governance with extensive stakeholder participation and reliance on local knowledge, social learning and so forth, despite decades of social science research indicating participatory processes are difficult to initiate and sustain, that they are highly sensitive to power asymmetry and elite capture, that policy reforms rarely work as intended, and that outcomes are more often determined by veto players or policy coalitions. The recent rise of populism and ‘post-truth’ politics, often leveraged in opposition to low-carbon initiatives, serves as an example of the challenges facing resilient governance of transitions now and in the near future (Curran, Winfield, & Olszynski, 2018; Fraune & Knodt, 2018).

The other problem is that the governance simply does not admit of the rational, purposeful approach to institutional design and policy making that might be necessary to move more toward the ‘resilient’, reflexive governance model as described above (hence Ostrom’s qualification that principles of robustness have rarely been explicit in the design of robust institutions). There are many internal dynamics that prevent simply ‘fixing’ governance to more effectively attain sustainability, despite the fact that most involved probably recognize the theoretical value in consensus, integration, learning, experimentation and so forth. Politics, in short, is “considerably more messy and ugly” than resiliency thinking may sometimes convey (Duit, 2016, p. 373).

Others have criticised resiliency for its association with flexibility, which can imply a preference for institutional adaptation to changing circumstances over continuity and stability in goal-directedness. Capano and Woo, for example, prefer the concept of policy robustness, which they define as the capacity to maintain a core program definition and to control agenda setting; a capacity to redesign policies in response to negative effects (e.g., through a quality policy advisory system); and the presence of policy procedures, information systems and networks that effectively provide feedback (Capano & Woo, 2017). While policy robustness may indeed be important to the overall success of low-carbon initiatives, we submit that such capacity is nonetheless indicative a different institutional value (i.e., efficiency, visionary, integrated) for the governance of low-carbon transitions than is resiliency (e.g., flexibility, embeddedness, diversity). Consequently, as will be explained in more detail in the section on “identifying resiliency”, we will focus more on institutional resiliency in this paper.

Nevertheless, it is important to note that factors external to institutional design may be more important to the broader success of sustainability transitions. Contrary to Capano and Woo, Rosenblum et al., argue that policy stability is neither attainable or desirable, given the fundamentally transformative nature of low-carbon transitions (Rosenbloom et al., 2019). Instead, these authors suggest the focus

should be on stabilizing the *overall trajectory* of climate policy toward a low-carbon transition by embedding transitions in a broader transformative agenda, building social legitimacy, encouraging the growth constituencies with a material interest in transformation, and creating an ecosystem of supportive institutions.

We see no reason to disagree with this observation. However, for present purposes, we note that it is possible that certain elements of institutional design may be better or worse for accomplishing the objectives noted by Rosenbloom et al. Accordingly, and based on the above review of the literature, we propose the following short list of key institutional characteristics as potentially important for resiliency:

1. Clarity (rights/responsibilities of stakeholders, access to resources, policy objectives and targets)
2. Balance (cost/benefits, participatory & non-hierarchical, graduated sanctions)
3. Flexibility (resources availability, resolution mechanisms, experimental approach);
4. Polycentrism (multi-layered, nested governance)
5. Diversity (knowledge and information, feedback mechanisms)

2 ENERGY EFFICIENCY GOVERNANCE IN NORTH AMERICA

The question we aim to address in this paper concerns the relationship between institutional design and the resiliency of energy efficiency governance, specifically in the electricity, end-use sector (excluding transportation). In this section, we provide background on governance models for energy efficiency in North America, and a short overview of how program administration and funding has evolved in recent years.

Historically, public interest in energy efficiency has been to improve energy security and reduce costs through resource acquisition (pursuing demand-side efficiency savings as akin to supply-side resources) and market transformation (pursuing 'upstream' changes to integrate efficient technologies in markets). Resource acquisition programs have historically been administered by vertically-integrated, often monopoly utility companies, which are encouraged to incorporate efficiency resources in an integrated resource planning process that is overseen by a public utilities regulatory board. Under this model, resource acquisition programs often consist of utility provision of technical assistance, information and financial incentives to end-use customers to invest in efficiency. The direct objective of the program administrator (i.e., the utility company) is to meet energy demand at a lower cost than that of acquiring new generation resources. The costs of such programs are typically borne by utilities and passed on to consumers through approved rate structures. Hence, they are considered customer-funded (i.e., rate-payer) programs.

Deregulation and unbundling in the late 1990s and 2000s prompted evolution in the governance of energy efficiency. The belief at the time was that markets would deliver efficiency resources without the need for regulation and centralized planning and, as a consequence, policy efforts turned increasingly toward market transformation - targeted changes to remove barriers to private investment in energy efficiency, alongside or in place of resource acquisition. Yet, spending on efficiency programming declined dramatically. It soon became clear that markets alone would not deliver efficiency savings at scale. At the same time, growing recognition of the multiple, non-energy benefits of energy efficiency in the early 2000s (e.g., the ability to deliver greenhouse gas reductions), coupled

with increased understanding and acceptance of the science behind climate change, broadened the case for the public good aspect of efficiency investment. Together, these factors led to a renewed emphasis on efficiency in both Canada and the United States.

Many states and provinces across North America have thus taken steps to address the decline in efficiency spending, legislating new efficiency policies and regulations with broader objectives and clearer and more aggressive targets. Some have introduced system benefits charges, dedicated specifically to funding energy efficiency programming, on utility bills and developed cost-recovery policies to lessen the disincentive for utility companies to invest in efficiency. System restructuring has prompted the emergence of multiple different efficiency program administrative models, from those administered by third-party demand-side management (DSM) administrators, to those that remain utility-run, and yet to others run by governments or those utilizing some utility/government/third-party hybrid approach.

Though most states and provinces have stuck with a utility-administered program models, this can belie some underlying complexity in program delivery. According to data collected by the Department of Energy’s Energy Information Administration, the number of distinct parties active in electricity efficiency sector varies widely among states, from 1 in Puerto Rico to 205 in Idaho (with an average of 33 across all states). The ownership structure of these entities varies as well. For instance, in 2017, cooperatives and municipalities comprised the largest share of actors, while investor-owned utilities and DSM administrators contributed the lion’s share of spending.

Table 1) Proportion of US total actors and incremental spending in electricity efficiency by ownership type, 2017

	SPENDING		ACTORS	
	\$ (Millions)	%	#	%
COMMUNITY CHOICE AGGREGATOR	1.4	0.0%	1	0.2%
COOPERATIVE	99.4	1.7%	186	32.9%
DSM ADMINISTRATOR	721.4	12.1%	10	1.8%
FEDERAL	76.2	1.3%	1	0.2%
INVESTOR OWNED UTILITIES	4,505.5	75.6%	112	19.8%
MUNICIPAL	330.3	5.5%	199	35.2%
MUNICIPAL MKTG AUTHORITY	6.1	0.1%	6	1.1%
POLITICAL SUBDIVISION	137.9	2.3%	47	8.3%
STATE	81.1	1.4%	3	0.5%
TRANSMISSION	3.1	0.1%	1	0.2%

Restructuring also led to the creation of energy and capacity markets, the latter in which energy efficiency projects have been permitted to participate in the ISO-New England and PJM system operator regions. Growing concern about climate change has prompted the development of regional and state/provincial cap and trade markets, GHG offset programs, and carbon taxes, which provide yet another potential stream of funding for energy efficiency initiatives. Governments at the federal, state/province and municipal levels have at times developed, administered and funded efficiency programs, sometimes run alongside more conventional utility or public-benefit energy efficiency

programs in the residential and ICI sectors, or independently in the transportation sector. Nevertheless, according to the CEE, rate-payer funding accounted for 95.76% of electric demand-side management funding in 2017 in North America. The remaining four percent came from capacity markets (2%), carbon revenues from Regional Greenhouse Gas Initiative (RGGI) in the US northeast (1.5%), the US federal government’s Weatherization Assistance Program (0.02%), and unidentified sources (2.99%). These alternative funding sources are found mainly in the US electricity sector, however.

Governments continue to play a role in efficiency market transformation initiatives, through research and development programs, development and administration of building and product codes and standards, and through public procurement “lead-by-example” initiatives in public sector buildings and fleets. New, public-private hybrid initiatives such as green banks and property assessed clean energy (PACE) funding are also growing in importance, despite some prominent examples of policy instability (e.g., the UK Green Deal). It is also important to note that efficiency initiatives are often intended to leverage private investment in energy efficiency. Some studies suggest that the ratio of leveraged private investment to government and utility spending on efficiency programming is between 2 and 3 to 1 (Hoffman et al., 2015; International Energy Agency, 2017; Molina, 2014). Accordingly, while rate-payer funding is the principal source of support for resource acquisition programming, tax-payer funding and private investment play an important role as well.

Table 2) Efficiency policy sectors, funding sources and leverage mechanisms (Green highlighted section relevant to this paper)

Energy Efficiency Policy Sector						
	Energy End-Use			Primary / Secondary Energy	Regulatory	
	Res. & ICI	Transportation	Public Sector		Buildings	Products
Relevant policy	Targets (EERS; GHG); Opt-outs; Cost recovery; Low-income;	Fuel economy standards; GHG emissions standards; Electrification & intensity; Low-income programming; Transportation demand management and modal shifts	Energy / climate change plans; Econ. dev. strategy;	Targets (EERS; GHG); Interconnection Standards (CHP);	Codes & standards;	Codes & standards;
Program Examples	Financial incentives (rebates, loans); Technical services (audits, retrofits, training); Behavioural strategies and education campaigns;	Financial incentives (rebates); Public transit; Intermodal, rail freight projects;	Research & Development; Public procurement;	Financial incentives (rebates, loans); Net metering;	Labelling, certification, rating systems; Information programs (energy use transparency, data); Technical services (training)	Labelling, certification, rating systems; Information programs (energy use transparency, data);

Leverage mechanisms		Financial incentives; Green banks; PACE; On-bill financing; Offsets;	Financial incentives;	Offsets;	Financial incentives; Offsets;	Regulation; Information;	Regulation; Information;
Funding Sources	Govt	Gen tax rev; Carbon rev;	Gen tax rev; Carbon rev; Fuel / road tax; Transit funding;	Gen tax rev; Bonds;	Gen tax rev;	Gen tax rev;	Gen tax rev;
	Util.	Rates & system charges; Capacity mkts;	N/A	N/A	Rates & system charges; Capacity mkt;	N/A	N/A
	Priv.	Developers; Consumers;	Freight managers; Consumers;	Consumers;	Developers; Consumers;	Developers; ICI building operators / owners; Consumers;	OEMs; Consumers;

Table 2 summarizes the principal energy efficiency policy sectors, gives examples of programs specific to each sector, notes mechanisms for leveraging private investment, and identifies potential sources of funding. While our focus is specifically on electricity efficiency initiatives in the residential and ICI sectors (i.e., the green highlighted sector), it is likely the case that the broader resiliency of energy efficiency governance is strengthened by the extent of activity in the other sectors noted here as well. Where they are relevant in understanding our case studies, we may point to activity in these other sectors as influential on overall institutional resiliency.

2.1 COMPONENTS OF ENERGY EFFICIENCY GOVERNANCE

Based on the above discussion, we can identify three basic primary administrative models (utility-run, government-run, or third-party run) and three principal sources of funding (rates, taxes, and private spending). While capacity markets and carbon revenues do not neatly align with these funding models, for practical purposes we will consider them as rate-based and tax-based, respectively, since procurement through capacity markets is supported by electricity rates, and carbon revenues most often gathered and managed by governments. However, we have not yet delineated the actual *components* of energy efficiency governance in the end-use sector. Existing literature on program administrative and funding models can be instructive here.

In practice, energy efficiency program administration encompasses several different functions, including general administration and/or coordination (e.g., of budgets, contracts, centralized information); program development, planning and budgeting; program administration and management; program delivery and implementation; and, lastly, program assessment and evaluation. As Blumstein et al., note, not all functions need to be done by one organization, and in many cases are not the responsibility of one organization. Therefore, initial program design contains two choices: what type of entity will serve as the primary administrator, and how much responsibility to assign to it (Blumstein, Goldman, & Barbose, 2005). It is often the case that many responsibilities are contracted to private sector actors, like energy service companies. Therefore, even when a jurisdiction can be classified according to the

aforementioned program administrative models, it may be the case the other stakeholders are also involved in program delivery, assessment, or coordination.

In seeking to evaluate program administration models, both Blumstein et al., and a more recent paper by Richard Sedano at the Regulatory Assistance Project (RAP) identify several criteria that point to the relationship between program administrator and the larger ecosystem of energy efficiency governance. These include compatibility with policy goals (indicating that broader direction and guidance typically come from outside the administrator); accountability and oversight (including factors such as the procedures used to evaluate programs or projects, the frequency of reporting, who conducts assessment and who receives and evaluates it); effectiveness (incentive structures, budget competency, ability to target different localities); and ‘transition issues’, or how programs and program responsibility is renewed and/or transferred (Blumstein et al., 2005; Sedano, 2011).

Table 3) Underlying structures, functions and feedbacks in energy efficiency governance institutions

Structure	Function
Electricity system composition (Internal / External to Efficiency Sector)	Steering (Policy objectives; Planning; Targets)
Actors & stakeholders (Number, Interests, Networks)	Coordination (Budgets, Data, Contracts)
Tools & techniques (e.g., Financial incentives, Total Resource Cost; Program Administrator Cost tests, standards and codes)	Programs (Design, Management, Delivery)
Resources (Funding sources, acquisition methods, leverage strategies)	Assessment (Evaluation, Measurement, Verification)

Incidentally, both Blumstein et al., and Sedano conclude that no one model is best. Sedano goes further, noting that “the more robust ratepayer-funded efficiency programs are less the result of administrative structure per se, than the clear and consistent commitment of policy makers supported by consensus” (Sedano, 2011, p. 28). Nevertheless, these studies highlight a number of different structures, functions and feedbacks that may or may not fall outside the primary program administrator’s responsibility or capacity (see Table 3 for a summary of different governance components), and therefore we should stress that the relationship program administrative model and/or funding models and resiliency is not the focus here. Insofar as resiliency is associated with the capacity of a system to persevere in structure, function and feedbacks in the face of external (or internal) shocks, these are the factors we should consider in assessing the relationship between the broader institutional framework and resiliency.

3 IDENTIFYING RESILIENCY

Continuity of structure, function and feedbacks implies that a resilient institutional framework is one which also manages to deliver some continuity in performance. We might wish to further qualify that as a certain level of *effective* performance (but without wading into the territory of valuing administrative ‘efficiency; (c.f., Hood)). For instance, the American Council for an Energy-Efficient Economy (ACEEE) has conducted annual scoring of state policy and performance on energy efficiency since 2006.¹ If we look at the historical variation in ACEEE scoring in US states going back to 2008², we find that both the top (e.g., California, Massachusetts, Vermont) and the bottom (e.g., North Dakota, Wyoming, Mississippi) performers are generally the most consistent in their ranking. The former states have extensive, long-standing efficiency programs that consistently deliver deep savings, while the latter have little to no well-defined efficiency strategy or policy at all. Looking closely at the latter group for factors contributing to resiliency would likely not be a productive endeavor.

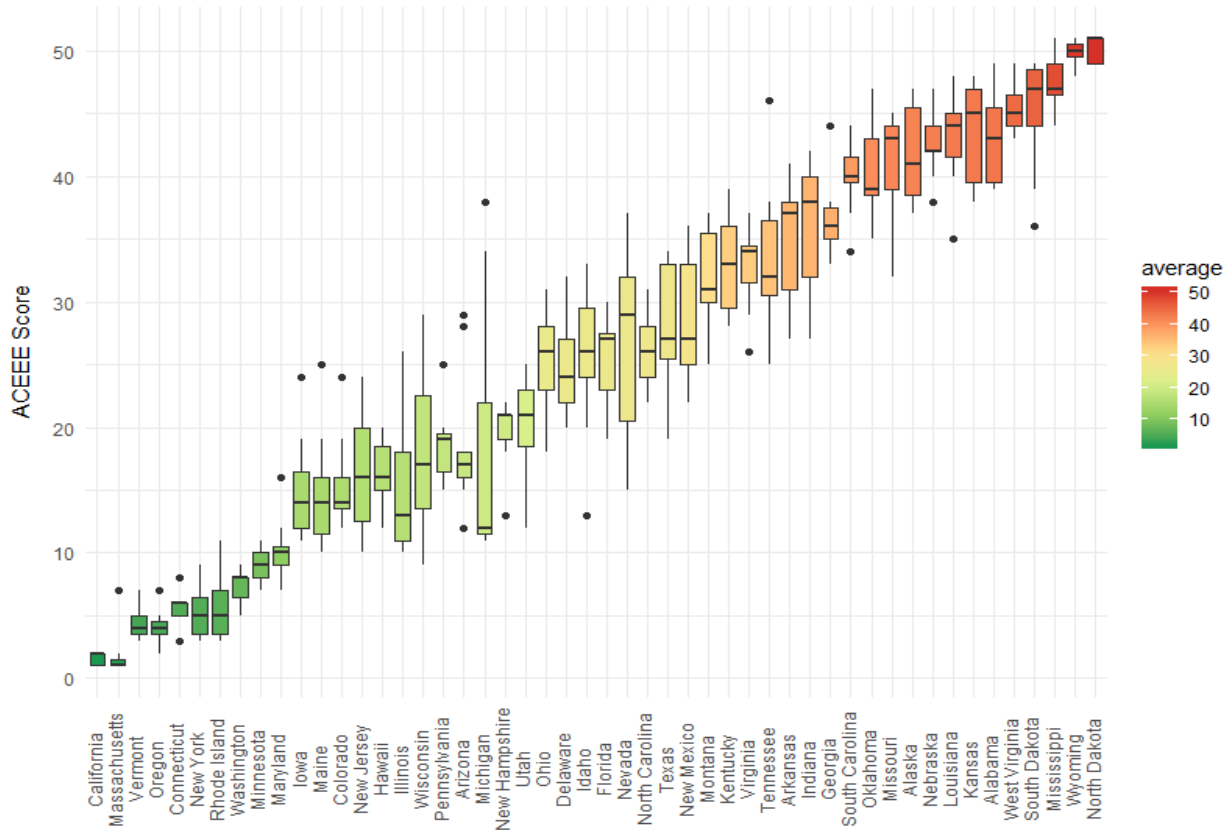


Figure 1) Historical variation in ACEEE efficiency scorecard results, by US State, 2008-2018 (Lower scores are better)

Yet, consistent effective performance may not be a strong indication of resiliency either, as we do not know if those jurisdictions suffered the same level of exposure to the same destabilizing factors as

¹ Scoring considers a number of efficiency policy sectors, including utility spending and savings, state initiatives, building codes and appliance standards, transportation, and combined heat and power.

² Scoring in the 2006 report was capped at 44 points, while reports between 2008 and 2018 had a total of 50 possible points. Therefore, 2006 scores have been excluded in the interest of keeping annual scores comparable.

states/provinces with less consistent, effective performance. Indeed, strong, consistent performance may be better evidence of institutional robustness than of institutional resiliency. For example, one potential source of destabilization is the election of a new government, wishing to differentiate itself by reworking existing programs or, for ideological or political reasons, to defund or dismantle efficiency efforts. Looking again at US states' ACEEE scores, many of the consistent top performers are what might be considered solidly 'blue' states (at least in Presidential elections), while those that have less consistent performance experience more political volatility (*Presidential Voting by State (1992-2016)*, 2016). It thus seems plausible that the consistent, effective performance of the former may be attributable in part to a stable political environment that facilitates policy continuity.

It is also plausible that robustness may simply increase in proportion to the age of the policy initiative (building on the observation that the early stages of institution-building are the most challenging and susceptible to disruption and intervention). Given that the many of the top-performing states also have the longest standing policy commitments and well-entrenched institutions for energy efficiency, using only these as cases for further analysis risks mistaking institutional acceptability or familiarity with resiliency.

Variation in performance may thus be a better indicator that the institutional framework experienced a shock, prompting it to change track toward an alternative arraignment. Generally speaking, states with the highest variation in ACEEE scores - Michigan, Nevada, Texas, Wisconsin, Illinois - score toward the middle, suggesting that an institutional framework for energy efficiency exists, but may be at a state of

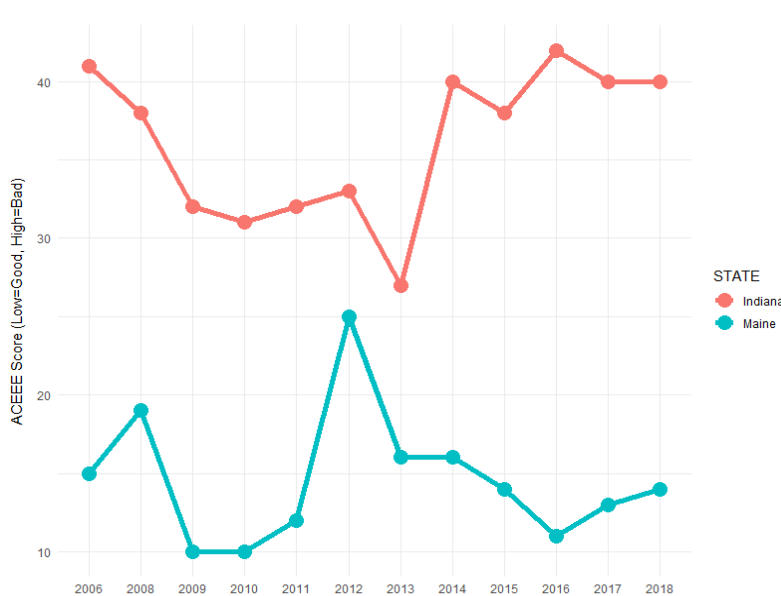


Figure 2) Shock and rebound (or not) in ACEEE scores for Maine and Indiana, 2006-2018

relative infancy compared to the highest performers. Also of note are states with outlier years that were bad (i.e., above its top whisker) and not in the first year or two of data, like Maine (2012) and Pennsylvania (2011), for instance. Significant departures from the average score could suggest a major shock from which the system was able to rebound, which could indicate resiliency.

Yet another strategy is to look for large one-year drops in scores, with or without a 'rebound'. For example, Indiana dropped 13 places in 2014, as did Maine in 2012 (see Figure 2). Though Maine

managed to 'rebound' after its large drop, Indiana remained at a relatively low level, suggesting comparison between both could be informative. Though it is not reflected (yet) in ACEEE scoring, one of the more robust states (Connecticut) experienced a substantial "budget raid" by government in 2018, which seems likely to negatively impact performance in that state moving forward. As a consistently

high-performing state with a long-established efficiency policy framework, Connecticut could thus serve as an interesting contrast.

Unfortunately, scoring of Canadian provinces on energy efficiency performance does not yet exist. Consequently, we have identified Canadian case studies based on the knowledge and experience of the research team to be roughly comparable with the US cases in terms of administration models, duration of current program structure, and with clear examples of ‘shocks’ to the system. The full list of case studies is given in Table 4.

Table 4) Overview of case studies

JURISDICTION	END-USE ENERGY	ADMIN MODEL	RESOURCES	TARGET	PERIOD
Connecticut	30% Elec; 38% NG;	Utility	SBC; ISO-NE Capacity; RGGI;	Electricity (1.5% p.a) & NG (0.61% p.a)	2007 - Present
Maine	19% Elec; 15% NG;	State / Third-party	SBC; ISO-NE Capacity; RGGI; Taxpayers;	Electricity (2.4% p.a) & NG (0.2% p.a)	2009 - Present
Indiana	26% Elec; 43% NG;	Third-party -> Utility	Regulated rates;	None	2009 - Present
British Columbia	36% Elec; 22% NG;	Utility / State	Regulated Rates; Tax-payers;	Electricity (66% of anticipated load growth by 2020)	2007 - Present
Nova Scotia	36% Elec; 63% Other;	Third-party	Regulated Rates; Taxpayers;	None (all cost-effective and reasonably available efficiency and conservation activities?)	2010 - Present
New Brunswick	58% Elec; 40% Other;	State -> Utility	Regulated Rates; Taxpayers;	Electricity (Proposed); - targets seem expenditure based rather than energy savings based.	2005 - Present

4 OVERVIEW OF CASE STUDIES

In this section we will provide short narrative overviews of the basic structure and functions of each case’s electricity efficiency governance framework over the past 10-15 years, as well as the ‘shock’ the system experienced (if applicable) and what, if any, the consequences have been.

4.1 CANADA

4.1.1 Nova Scotia

Nova Scotia has one major private utility company (Nova Scotia Power), owned by Emera, and six independent municipal distribution utilities. Demand-side management programming in the electricity sector is managed by a third-party DSM Administrator, Efficiency Nova Scotia. Since 2014, Efficiency Nova Scotia has operated as a 10-year franchise, currently held by the non-profit corporation, EfficiencyOne. The activities of Efficiency Nova Scotia are overseen by the provincial Utility and Review Board (UARB).

Efficiency Nova Scotia was originally established as an independent, non-profit corporation in 2010, after a protracted public debate and consultation process concerning the implementation DSM programming in the province going back to 2008 (and arguably back even further, to the creation of the government agency *Conserve Nova Scotia* and Nova Scotia Power's first DSM plans in 2006). These earlier initiatives were beset by controversy – concern about patronage appointments the case of the former (Doucette, 2007); lackluster, unambitious efforts in the case of the latter (Haley, 2018). A coalition of stakeholders formed to push for greater accountability in 2007, and for consideration of alternative administrative models. The government eventually agreed to conduct consultations on DSM administration, and Nova Scotia Power indicated it would not push for utility administration either. The consultation process began in February 2008. Industrial consumers briefly pushed for a taxpayer-funded model, while remaining stakeholders pushed for an administration model with more independence from industry and government. The final report and settlement agreement with the UARB called for the creation of a third-party administrator by June 2009, though the provincial election and change in government that year delayed this until November 2009.

Efficiency Nova Scotia was soon confronted with several challenges, including weakening electricity demand in the industrial sector (thereby increasing rates for remaining customers, leading some to call for a pause in efficiency programming), and a tax ruling from the federal Canadian Revenue Agency that increased expenses by ~10%. Nova Scotia suffered from a weak economy in the years following 2010, contributing to mounting political pressure to balance the budget while also minimizing cost of living increases (MacDonald, 2012). In the 2013 election, the Liberal Party was elected, campaigning (in part) on their plan to 'kill the efficiency tax' (the on-bill charge for efficiency programming) as a way to reduce electricity rates.

The Liberal Party's election commitment threatened to completely scrap or significantly reduce energy efficiency efforts. The generation utility (Nova Scotia Power), facing decreasing load growth, was not in favour of further demand side management. However, Efficiency Nova Scotia, as an independent non-profit corporation was able to provide its own advice to government without having to navigate through a government ministry or a utility. Efficiency Nova Scotia and its advocates emphasized the concept of competing against electricity supply, and highlighted the potential for a new model to help resolve the abovementioned tax dispute with the federal government. The organization's independence also enabled it to conduct independent communications, such as op-eds and provide information and support to advocates, such as environmental organizations and energy efficiency contractors.

Rather than doing away with ratepayer funded DSM, the new government emphasized a new model where efficiency would compete with supply and be more affordable and accountable. They

implemented further revisions to the governance structure for efficiency (CBC News, 2014a), some of which addressed challenges the new institutional framework had experienced, others which constrained efficiency efforts moving forward. The new government converted the role of DSM administrator into a franchise (called Efficiency Nova Scotia), which would be held for the first 10 years by EfficiencyOne (formerly the Efficiency Nova Scotia Corporation). Future franchise agreements would be granted by the provincial Ministry of Energy. The on-bill charge for energy efficiency was removed and instead embedded into the electricity rate (CBC News, 2014c; Global News, 2014). New legislation was introduced that obligated Efficiency Nova Scotia to undertake all cost-effective and reasonably available efficiency and conservation activities. However, at the same time, the Liberal government also formalized a requirement for the UARB to take into consideration the ‘affordability of electricity’ when reviewing Efficiency Nova Scotia program plans, and the program budget was capped at an amount below what was estimated to be cost-effective for 2015 as Efficiency Nova Scotia transitioned to its new model.

In the years following these changes, EfficiencyOne and Nova Scotia Power have struggled to independently agree on a budget for efficiency. Both UARB and EfficiencyOne preferred a longer-term perspective, while Nova Scotia Power pushed for a focus on short-term affordability concerns. The Ministry of Energy took Nova Scotia Power’s side in 2016), clarifying to UARB that its ‘affordability’ criterion pertained to costs during the three-year supply agreement. There have also been disputes over the provision of customer data to EfficiencyOne, which ended when regulators ordered Nova Scotia Power to provide residential customer info (NSPower had argued providing data would violate privacy and anti-spam laws) (Withers, 2017).

4.1.2 New Brunswick

There is one provincially-owned utility company in New Brunswick (NB Power), and three municipal electric utilities. Between 2005 and 2015, efficiency programming was administered by a provincial crown-corporation, Efficiency New Brunswick. In 2015, a newly elected Liberal government tabled a bill to dissolve the corporation and transfer DSM administration to NB Power instead. Since 2016, NB Power has administered efficiency programs according to 3-year plans prepared by the utility and overseen by the New Brunswick Energy and Utilities Board.

Efficiency New Brunswick was originally established with an initial budget of \$11.9m by the Conservative government’s 2005 “Energy Efficiency and Conservation Agency of New Brunswick Act”. The Board was to be appointed by the provincial Lieutenant-Governor, as well as the Chief Executive Officer. According to the legislation, the board would prepare annual budgets to estimate the amounts required for operation of the agency, as well as annual reports containing an external auditor’s review and other information requested by the Minister. An election in 2006 resulted in a Liberal party government, led by Shawn Graham, who had campaigned on the “three E’s” of energy, education and the economy. The new government reneged on a commitment to repeal the former government’s tax rebate on energy costs, stating that the policy did not entice the people of New Brunswick to conserve energy (The Canadian Press, 2006). The government released a climate change action plan in 2007 that set an objective of expanding efficiency programming delivered by Efficiency NB, though it refrained from making any larger, substantive changes to the still-young institutional framework.

In late 2009, the Liberal government announced plans to sell the provincial utility company to Hydro Quebec, which (alongside persistent provincial deficits) may have played a part in that party losing the

election in the following year to the Conservative party. Electricity rates were again an issue in this election as well; the Conservatives had promised a three-year rate freeze during the campaign (CBC News, 2010). In 2011, the government released an energy blueprint that reaffirmed a commitment to expanding efficiency programs administered by Efficiency NB, and required provincial utilities to prepare three-year DSM plans in collaboration with Efficiency NB (New Brunswick Department of Energy, 2011). The first such plan was released in July 2014, which called for investment of \$57 million between 2014/15 and 2016/17 (Electricity Efficiency Steering Committee & Dunsky Energy Consulting, 2014, p. 15)

Nevertheless, efficiency efforts in New Brunswick were beset with some controversy under the Conservative government. In 2012, a Conservative member of the legislative assembly, Margaret-Ann Blaney, resigned position to take the CEO job at Efficiency NB, raising concerns about patronage in the organization (CBC News, 2012). In 2014, government budget cuts (approximately \$3m less than proposed in the 2014 efficiency plan) caused Efficiency NB to cancel its residential rebate program (CBC News, 2014b). The Conservatives lost the election later in 2014 to the Liberals, who swiftly introduced legislation to dissolve Efficiency NB and hand responsibility for efficiency to NB Power, and to prevent Blaney from receiving severance and suing the province (“Bill 7 - An Act to Dissolve the Energy Efficiency and Conservation Agency of New Brunswick,” n.d.; CBC News, 2014d; Poitras, 2014). Employees and programming of Efficiency NB were officially merged into NB Power in April 2015 (Government of New Brunswick, 2015).

NB Power released its first three-year DSM plan later in 2015, budgeting a total of \$64.5 million and increased electricity savings (over the previous efficiency plan) for the years 2016-2018 (NB Power & Dunsky Energy Consulting, 2015). Bridge funding provided by the government enabled some residential and commercial programming to address multiple fuels, though only in 2016. The government continued to fund the low-income, multi-fuel program thereafter (though this program was ended in 2018, following the election of a new Conservative government). Concerns have since been raised about the ‘coherence’ of NB Power’s DSM strategy and activities, including a decision to scrap a popular heat-pump incentive program, concerns about whether cost-effectiveness or feasibility are adequately considered, and a record of proposing revenue requirements in rate hearings well in excess of what is eventually spent on DSM (CBC News, 2018).

4.1.3 British Columbia

BC Hydro, a provincially-owned utility company, serves over 95% of all end-use electricity customers in British Columbia. Private utility company FortisBC serves the remaining customers, located in the south-central region of the province. DSM programs are administered by the utilities, going back to the mid-1990s, and – in the case of BC Hydro – are laid out in five-year IRPs.

The BC government, under the leadership of Premier Gordon Campbell, introduced an energy plan in 2007 that set aggressive efficiency targets for BC Hydro, initially requiring BC Hydro to acquire 50% of new/incremental resource needs through conservation by 2020 (Government of British Columbia, 2007). The Act also called for BC Hydro to be able to meet domestic demand with a 3 TWh surplus by 2026, and to cease use of the Burrard Thermal natural gas plant. The BC Utilities Commission (BCUC) rejected BC Hydro’s 2008 long-term acquisition plan because it was deemed not to be least-cost, suggesting that it was the utility board’s judgement that the government’s renewable energy plan would lead to unnecessary increase in costs to consumers.

The response from the government was to pass the 2010 Clean Energy Act, with an explicit goal of making BC a clean energy exporter to the US (Government of British Columbia, n.d.). At the same time, the 2010 Act revised upward the efficiency targets to 66% reduced aggregate demand in electricity by 2020 (FortisBC adopted the target voluntarily and increased it to 80% of load growth by 2023), re-affirmed the self-sufficiency requirement (and moved forward the insurance requirement date to 2020), required BC Hydro to submit its IRPs to the Minister of Energy before the BCUC, and placed limitations on the authority of the utility board to regulate rates and proposed new projects under the plan (notably the proposed construction of the new 'Site C' dam on the Peace River, with a projected capacity of 900 MW).

A number of important developments took place shortly thereafter. In November 2010, Premier Gordon Campbell announced his resignation, and he was succeeded by Christy Clark in March 2011, who sought to pursue a 'family first' policy agenda focused pocketbook issues. In March 2011, the BCUC rejected BC Hydro's revenue requirement application, which had called for rate increases of 52% between 2011 and 2015, and a cumulative rate increase between 2010 and 2020 of just over 100% (Calvert, Lee, Canadian Centre for Policy Alternatives, & BC Office, 2012). The proposed rate increase ran counter to the new government's objectives, thus prompting the 2011 government-led BC Hydro review to assess the utility's rate planning and spending. The Review made a number of recommendations for BC Hydro to cut costs, particularly labour costs, and recommended continued use of Burrard Thermal and reconsideration of the self-sufficiency insurance surplus capacity (Calvert et al., 2012; Hunter, 2011). The Review also noted that construction of Site C was a "reasonable cost alternative to meet load growth" and recommended that BC Hydro re-evaluate DSM plans to reduce overall costs to ratepayers (Dyble, Milburn, & Wenezenki-Yolland, 2011).

The government proceeded to cancel further BCUC hearings on the matter and capped rate increases at 17% over three years. In 2013, the government announced a 10-year rate plan for BC Hydro, directing BCUC to limit rate increases to 15% in the first two years, 10.5% over the following three years, and working with government and BC Hydro ensure rates remain "low and predictable" in the final five years (Bennett, 2013). Despite this, BC Hydro proposed a DSM plan in its 2013 IRP above the minimum required to meet its 2010 Clean Energy Act obligations (though its preferred plan was the least ambitious of three more aggressive plans in considered in the 2013 IRP), but to moderate (i.e., reduce) spending on that plan for the initial two-years, due to an energy surplus condition the utility considered to be short-term.

In the years following, a revised long-term load forecast in 2016 indicated that the energy surplus would continue well into the future. Consequently, BC Hydro proposed continued moderation of DSM spending through to 2019 (plans for Site C continued, however). According to a report prepared by the Program on Water Governance at the University of British Columbia, the cumulative effect of DSM spending reduction between 2013 and 2019 amounts to more than 3000 GWh/year and 600 MW of missed savings by 2024 – more than 50% of Site C's projected annual energy production and capacity, and at roughly 1/3 to 1/2 the cost per MWh (Hendriks, Raphals, & Bakker, 2017). In short, according to the authors of this report, BC Hydro prefers to curtail DSM spending in the interest of reducing short and long-term losses associated with continued energy surpluses.

Nevertheless, even with the moderation in DSM spending, the 2016 IRP stayed on track to meet the legislated reductions of 66% of aggregate demand by 2020. According to BC Hydro's present DSM plan,

detailed in Section 3 of the utility's most recent revenue requirement application, spending on DSM is expected to remain broadly in-line with 2018 levels between 2020 and 2022 (James, 2019).

4.2 UNITED STATES

4.2.1 Connecticut

Connecticut is served by two main investor-owned electric utility companies (Connecticut Light & Power; United Illuminating Company). Municipal electric companies also provide efficiency programs to customers. Efficiency efforts date back to 1998, to the passage of P.A. 98-28, which established the state Renewable Portfolio Standard, an Energy Efficiency Board (EEB) and the Connecticut Energy Efficiency Fund (CEEF). Presently, utility companies prepare plans 'advised and assisted' by the Energy Efficiency Board (EEB), which comprises 15 appointed members representing state agencies and utility companies. The EEB also oversees the CEEF which is largely funded by system benefit charges on customers' bills, and supplemented by funding received by utilities through the forward capacity market and through the RGGI. According to the Regional Energy Efficiency Database, capacity markets contributed 17% of all program funding in 2017, and the RGGI 3% (Regional Evaluation Measurement & Verification Forum, 2019).

Utility plans are subject to regulatory oversight of the Department of Energy & Environment Protection (DEEP), which contains within it the Public Utilities Regulatory Authority (PURA), which also appoints the EEB members. In 2007, the passage of Public Act 07-242 (2007), "Electricity and Energy Efficiency Act", required utilities to procure all cost-effective energy efficiency as their first-priority resource, and to develop Conservation and Load Management (i.e., IRP) plans. The plans assess capacity and energy requirements for 3, 5, and 10 years (annual reviews are conducted as well). However, this act has historically been interpreted "overly restrictively" by regulators, who tend to focus only on addressing projected capacity needs and not pursuing all cost-effective energy efficiency.

In 2017, state lawmakers redirected \$127m over two years out of the CEEF to make up for a budget shortfall (in addition to raids on various other clean energy funds), thus reducing the efficiency budget by 1/3. This forced the EEB to scale back programs (Ahn, 2017; Phaneuf, 2017). The bipartisan budget was passed after a 'budget impasse' lasting 118 days, following a state election in 2016 that substantially reduced the Democratic majority in the House of Representatives (79 D – 72 R) and the Senate (18 D – 18 R). While the split did not take place strictly along party lines, one Republican representative said the budget was a compromise of tax hikes (to appease democrats) and spending/borrowing reforms (to appease republicans) (Phaneuf, Rabe Thomas, & Pazniokas, 2017).

Proponents of clean energy, energy efficiency, and energy contractors reacted negatively, joining forces with a bipartisan group of lawmakers (several on the legislative Energy and Technology Committee) in early 2018 to push for restoration of the funding. The state governor also proposed reinstating at least \$24m (Hladky, 2018a; Phaneuf, 2018). The EEB issued its annual report in March 2018, warning about negative economic and environmental impacts stemming from the raid (Hladky, 2018b). In May 2018, the legislature restored \$10m in funding for 2019 budget, and passed SB-9 to expand the Renewable Portfolio Standard and make administrative changes to protect efficiency funds from future raids (Pilon, 2018).

The state was nevertheless sued by a coalition of different industry and environmental interests, led by Connecticut Fund for the Environment. The plaintiffs' principal argument was that there existed a contract between utilities and ratepayers that funds contributed to the EEF would be used for intended purposes. However, the plaintiffs lost the case, the judge finding that there was no implied contractual right over how the money was spent (Walton, 2018). This decision is currently under appeal to the US Court of Appeals for the Second Circuit (Hladky, 2018c; McMillan & de Mejias, 2019).

4.2.2 Maine

Maine is served by several investor-owned and municipal utilities, though energy efficiency is presently handled by a third-party DSM administrator, the Efficiency Maine Trust. Between 2002 and 2010, administration of energy efficiency programs the responsibility of the Energy Division of the Maine Public Utilities Commission, while RGGI funds were managed by the Energy and Carbon Savings Trust. In 2009, Efficiency Maine Trust was established by the Maine Energy Future Act (PL 372), for the purposes of consolidating efficiency funds for all fuels, pursuing efficiency resources and conducting market transformation activities. The Trust is managed by the independent Efficiency Maine Trust Board (nine-member stakeholder board of trustees) with oversight from the three-member Maine Public Utilities Commission (MPUC) and funded via system benefits charges, capacity markets and the RGGI. Though it is the responsibility of the Board to manage funds necessary to run efficiency programs, funding is proposed to and approved by the state legislature.

Operating under the banner of "Efficiency Maine", the Trust develops and implements a Triennial Plan – a three-year strategic plan for energy efficiency, conservation, and alternative energy resource programs for residential and commercial customers in the state - for both the electric and natural gas sectors. The first plan covered years 2011-2013. The most recent 2017-19 plan targets savings between 2.2 and 2.6 per cent of retail sales. In 2017, capacity markets contributed 13% of electricity program funding. Additional funding has been provided through federal grants (e.g. American Recovery Reinvestment Act), Maine Yankee settlement funds, and renewable portfolio standard alternative compliance payments. However, federal funding contributing a larger share of overall funding between 2010-2013 (34% of total revenues in 2012; 26% in 2013; 12% in 2014, effectively nil in 2015).

In 2012, Maine fell 13 places in ACEEE State Energy Efficiency Scorecard due to legislators not fully funding its Energy Efficiency Resource Standard and the state's slow adoption of more stringent building codes. According to the ACEEE the state's FY 2013 budget allocations fell short approximately \$30 million from projected energy efficiency funding requirements to meet savings targets set by the state statute. In the same year, Governor LePage put forward a bill to increase government oversight of the Efficiency Maine Board, to divert funding elsewhere, and 'make it easier' for government to conduct future budget raids for unrelated purposes (Voorhees, 2012). Though the bill was substantially amended in the legislature, Efficiency Maine was nevertheless assigned additional budget oversight via the passage of PL 637, and required to provide reports to the Legislature biannually on the status of the fund's budget and programs.

In 2013, funding levels and provisions for stability were restored to Efficiency Maine under the Omnibus Energy Act, LD 1559, which retooled and reworked existing energy efficiency efforts and called for the development of new efficiency programs in the state. Governor LePage attempted to veto the bill, but Maine's Senate overrode the decision 35-0. LD 1559 requires utilities to fund Efficiency Maine

adequately to enable the Trust to achieve all cost-effective and reliable electric and natural gas efficiency for commercial, industrial, and residential customers. This is achieved via a fixed system benefit charge, which is capped at 4 per cent of total retail electricity and transmission and distribution sales in the state. According to the Act, energy efficiency programs targeting low income customers must receive at least 10 per cent of the funding collected. Additionally, LD 1559 expanded natural gas efficiency programs and enacted the first direct contract between investor-owned utilities and Efficiency Maine with the purpose of providing energy efficiency initiatives to large industrial customers.

4.2.3 Indiana

Indiana's energy sector consists of 76 municipal electric utilities owned and operated by local governments in Indiana — 9 of which are under the jurisdiction of the Indiana Utility Regulatory Commission (IURC). Additionally, the IURC regulates the five major investor-owned electric utilities in the state: Northern Indiana Public Service Company (NIPSCO), Vectren South, Indianapolis Power and Light, Duke Energy, and Indiana Michigan Power.

In 2009, the IURC ordered the five investor-owned utilities to achieve an annual energy savings goal of 2% within ten years by offering five core programs for delivery through a state-wide administrator.³ The IURC explained the benefits of a hybrid third-party/utility approach as including program uniformity, coordinated utilization of technology and market research, and administrative efficiencies (Indiana Utility Regulatory Commission, 2010). Two third-party administrators were contracted, one to run programs and another to evaluate them. As part of the order, utilities would also need to prepare and submit three-year efficiency plans to the IURC, beginning in 2010, and develop and offer utility-specific programs where needed to meet ascribed savings targets. Utilities worked together with the Office of Utility Consumer Counselor, large industrial consumers, the Indiana Municipal Power Agency and Citizens Action Coalition of Indiana to develop the initial programming (Woods & Schlegel, 2018b). The statewide program was officially launched in 2012 under the brand *Energizing Indiana*. The programs were ratepayer funded via a minimal monthly fee (approximately \$2/month) on the consumer's electricity bill.

Though the initial IURC action had received bipartisan support (Gard & Merritt, 2009), in March 2014 and under new government, the Indiana Senate repealed its EERS and energy efficiency program via the passage of Senate Enrolled Act 340 (SEA 340). The bill began as a simple industrial opt-out bill, but was subsequently amended in the House to end the entire *Energizing Indiana* program. The bill then passed in the Senate with no debate in the legislature or public input (Lydersen, 2014, 2015). An array of business interests opposed the legislation (Kushler, 2014). Incoming Republican Governor Mike Pence neither signed nor vetoed the bill, stating "I could not sign this bill because it does away with a worthwhile energy efficiency program. I could not veto this bill because doing so would increase the cost of utilities for Hoosier ratepayers and make Indiana less competitive by denying relief to large electricity consumers, including our state's manufacturing base" (Foster, 2014). Pence also requested the IURC to make recommendations regarding future, appropriate efficiency goals, analysis of current programs and the cost impact to ratepayers of all possible DSM programs, and for an opt-out provision for large consumers (Mike Pence, 2014).

³ Programs included a Residential Home Energy Audit; Income Qualified Weatherization; School Education Programs; Residential Lighting Rebates; and Commercial & Industrial Prescriptive Rebates.

Some speculated that the large, investor-owned utilities were the principal forces pushing for the expanded bill (Lydersen, 2014; Siegel, 2014). Ed Simcox, acting President of the utility industry group in Indiana, rejected that allegation, but nevertheless wrote an editorial supporting SEA 340, arguing that “pausing” the statewide pursuit of “very aggressive” targets would avoid large cost increases and not lead to the end of utility efficiency programs (Lydersen, 2014; Simcox, 2014). Simcox also noted that most of the ‘low-hanging fruit’ had been picked, that more expensive measures would be needed to meet targets, and thus that a pause was beneficial to allow time to review the costs and benefits of the next steps. Utilities were troubled by the fact that Energizing Indiana was not the result of legislation, but rather crafted and implemented by the IURC.

Martin Kushner, senior fellow at the ACEEE, disagreed with this view, noting the legislation called for programs to end at the end of 2014; “that’s not a pause, that’s a termination”, Kushner stated (Kushler, 2014; Lydersen, 2014). Kushler went on to draw out several lessons from the incident. For one, because the programs and targets originated in a regulatory body and not the legislature, there was a lack of support for efficiency in the latter body and a ‘turf’ issue between the two (the IURC explicitly stated that concerns the programs were “created administratively, not statutorily” led to SEA 340) (Stephan, 2014). Furthermore, the utilities resented that a portion of programs would be delivered by a third-party administrator.

As per SB 340, the IURC released its final status report (prepared by ‘Energy Center of Wisconsin’) in August 2014, and issued its list of recommendations to Governor Pence in October 2014 (Kihm & Lord, 2014; Stephan, 2014). The Commission recommended that, for flexibility purposes, utilities be responsible for setting their own targets through the IRP process, but also that new legislation be introduced requiring utility IRPs to set EE/DSM goals. The Commission declined to make further recommendations then-current utility DSM plans or on the opt-out provision, but did suggest that consideration be given to finding ways to incent large consumers to undertake efficiency initiatives and to consider how to measure and evaluate the effect of those initiatives.

Governor Pence signed into law “replacement” Legislation SB 412, based largely on the IURC’s recommendations (though without any EM&V mechanisms for large, opted-out consumers), in 2015 (Merritt & Head, 2015; Woods & Schlegel, 2018a). This Act required electric utilities to develop their own three-year electricity plans, budgets, and goals and permitted large customers consuming more than a megawatt of energy to opt out of efficiency programs. No efficiency savings targets were set. Beginning 2017, utilities would be required to include energy efficiency into their integrated resource plans and submit to the IURC for regulatory approval every three years. The legislation also specifies that the IURC may not require a third-party administrator to implement efficiency programs, and that the IURC would permit utilities to recover the costs of efficiency programs through retail rates.

5 DISCUSSION

In this section, we will briefly review the case studies discussed for three questions: what was the shock, what was the impact, and what role did institutions play. Follow this, we will identify some key considerations emerging from our analysis for understanding the interplay between institutional design, governance and resiliency.

5.1 WHAT WAS THE SHOCK?

Across our case studies, we encountered several different types of general and specific shocks, or sources of instability external or internal to the efficiency governance network, respectively. Specific shocks include resource constraints (e.g., budget capping or underfunding); resource instability (e.g., budget ‘raids’); political intervention (e.g., to exert control over, weaken, or dismantle existing institutions); and tension between key stakeholders (e.g., utilities and third-party DSM administrators). Interestingly, none of these appear to be the direct consequence of any of Ostrom’s aforementioned types of disturbances (viz., technological change, transmission failures, blueprint thinking, corruption and rent-seeking, and the absence of external, large-scale supportive institutions). Instead, in the cases examined here, specific disturbance all appear to have stemmed from one (or both) of two kinds of general shock: changes in government, and weak economic performance.

Overall, there was more political change in Nova Scotia, New Brunswick, and Maine than there was in British Columbia, Connecticut and Indiana. In the period of interest in this paper, three different political parties formed governments at separate times in Nova Scotia; New Brunswick alternated between three Conservative and two Liberal governments (though, with the exception of the Conservative government 2014-2016, always with slim majorities), and Maine went from solid blue between 2003 and 2010 (all three branches of government controlled by the Democratic party) to all red (Republican) between 2011 and 2012 (when the underfunding took place), and split thereafter. Conversely, British Columbia was governed by the Liberal party between 2001 and 2016, Connecticut has been solidly blue in Congress since the late 1990s (with the exception of a split senate between 2017 and 2019, when the budget ‘raid’ was planned) and has had a Democratic governor since 2011, and Indiana has been solidly red since 2005 (with the exception of a Democratic House between 2007 and 2010).

We should resist drawing any conclusions from this political history regarding the relative friendliness of different political parties toward energy efficiency, since political intervention in efficiency governance has come from governments of all stripes. Intervention does seem to be more likely following an election than in the middle of a government’s tenure, and overall political stability may be beneficial in that regard for the longevity of efficiency institutions, though strong, single-party control may also expose institutions to drastic change without many avenues for prevention or recourse.

In many of the cases, political intervention appears to have been motivated by concerns about the cost of energy for consumers (or at least communicated as such during political campaigns). Generally speaking, cost concerns appear to be more salient during times of slow economic growth, either generally or for specific industries. Political actors mobilize support on the basis of their commitment to reduce such costs, though it is possible that they may reap the benefits of acting on this by simply making the costs of efficiency programming less transparent. It may also be the case that the concerns of large, incumbent economic actors have more influence over decisions made regarding efficiency governance.

Overall, the cases examined here it is important to consider institutional *phase* when assessing risks to, or retrospectively evaluating, resiliency. There appear to be at least three distinct phases: origin / creation, operation / consolidation, and renewal. Origins are relevant for resiliency, insofar as they reflect or later come to effect stakeholder consensus toward and/or acceptance of existing governance arrangements. In this respect, the case of Indiana demonstrates the risk of an institution emerging from

a regulatory action, without significant stakeholder involvement, even with some measure of bi-partisan agreement about the necessity for efficiency programs. Similarly, the origins of the present institutional arrangement in New Brunswick do not inspire much confidence in its long-term political resiliency.

Surprisingly, however, operation and consolidation appears to be the phase in which institutional resiliency is most threatened by political change or intervention. In several of the cases examined here, the initial phase of operation was characterized by rapid increases in spending, particularly in those jurisdictions where the program administrator had a strong mandate to pursue efficiency savings. In Indiana, Maine, and Nova Scotia, rapid scale-up prompted retaliatory political action that led to subsequent retrenchment. Furthermore, while the successful consolidation of an institutional framework over long periods without major political intervention does not appear to prevent political action against it, it does help to build a broader network of stakeholders that can be mobilized to protect it in the event of such intervention (e.g., Connecticut, New Brunswick).

Finally, renewal is an important juncture at which concerns can be voiced and changes implemented, hopefully without radically altering the overall institutional framework. Renewal in efficiency governance takes place at various intervals – from the annual rate request submission to the utility board, to the 3-5 year review and renewal of a larger IRP. It is, in short, a key information feedback with opportunities for the expression of diverse perspectives, and thus important to overall institutional resiliency. In systems without a clear, or sufficiently short, renewal period (e.g., some government-administered programs, as in New Brunswick), the absence of such an outlet could be detrimental.

5.2 WHAT WAS THE IMPACT?

We discussed above in section three the potential implications of too closely associating resilience with robust, effective performance. Nevertheless, consistency of performance is something that we would expect to be reflected in a resilient governance arrangement, even if periodically experiencing a short-term shock and rebound. Despite being a somewhat narrow measure of performance, looking at the record of spending on efficiency per customer in the cases examined here does help to demonstrate the severity and longevity of the impact of political intervention in efficiency delivery (see Figure 3).

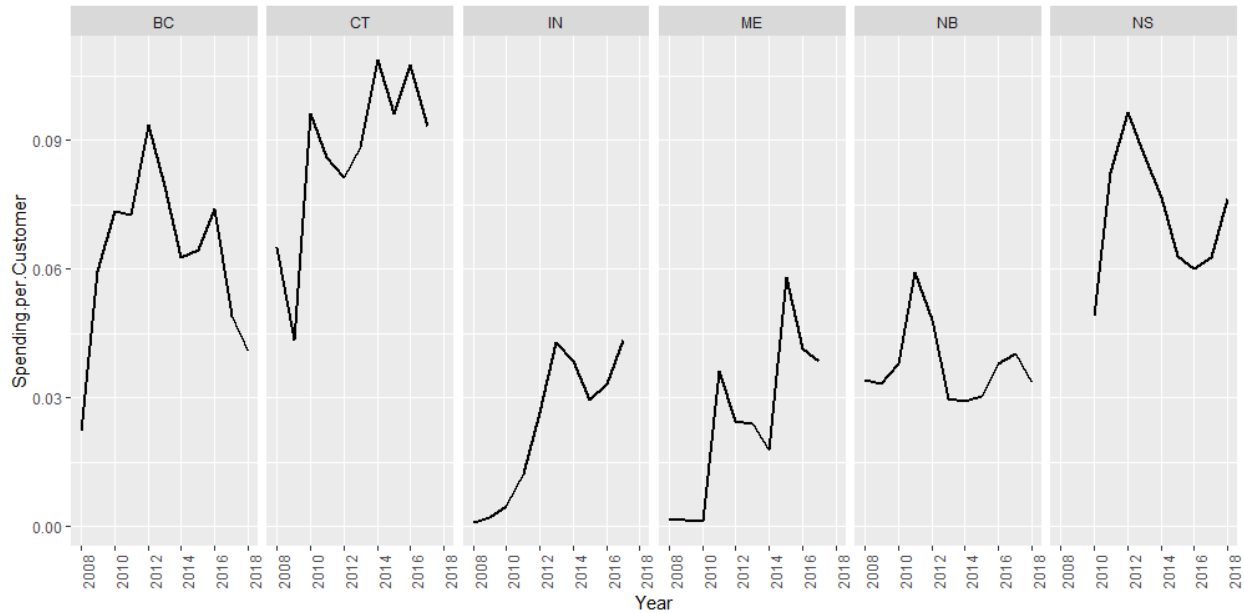


Figure 3) Efficiency program spending by utilities per total electricity customers, 2008-2018

For each case, Figure 3 shows the rise in spending associated with the initial creation and subsequent operation of a new institutional context for efficiency delivery (with the exception of New Brunswick, which shows the tail-end of the previous, government-administered model and its transition to a utility-administered system around 2015). In BC, efficiency targets implemented in 2007 and 2010 prompted a dramatic rise in efficiency spending, peaking and subsequently declining when the government rejected the utility's IRP and constrained DSM budgets. Similarly, in Maine, Indiana and Nova Scotia, we see a rapid increase in spending associated with a new institutional context, followed by a peak and decline in response to political intervention (Maine does rebound shortly thereafter, when legislation was introduced to strengthen and stabilize funding).

In both New Brunswick and Indiana, the transition to utility administration in 2015 and 2014 respectively is associated with what appears to be plateauing efficiency spending. It is too early to see the impact of the budget sweep in Connecticut, though even in this more 'robust' case we see significant variation in year-to-year spending, and a possible plateau in more recent years. The decline in spending in Nova Scotia is particularly steep, though it is unclear whether this can entirely be laid at the feet of the Liberal government intervention as the peak occurs in 2012 and that government did not come into power until 2014. Moreover, performance seems to be rebounding from the nadir in 2016, which could be evidence of resiliency.

Nevertheless, we should be wary of trying to find evidence of resiliency in performance data such as these, as resiliency implies – as noted above – some degree of perseverance in structure and feedbacks, in addition to functions. The complete dismantling of institutional structures and feedbacks in New Brunswick and Indiana are, accordingly, examples of non-resilient arrangements, even though both cases managed to maintain a certain level of functionality thereafter. As no case examined here goes from something to nothing, however, we should also allow for the possibility that intervention and constraint leading to performance plateaus may itself be necessary for longer-term resiliency (if the alternative was to end efficiency programming altogether).

On that note, it is important to remember that resiliency one part of three-part problem, the others being effectiveness and legitimacy (c.f., Hood 1991). Having a resilient system does not mean it will be as effective in realizing policy goals as it could otherwise be, or broadly socially acceptable (particularly if those political goals shift over time). Indeed, the distinction between the resiliency of governance for transitions (i.e., a trajectory toward transformation) and resiliency of an incumbent regime with little interest in transition is critical (c.f., Rosenbloom, et al). In several of the cases examined here, institutions proved more or less resilient in the latter sense, but perhaps not in the former. Emphasizing robustness in place of resiliency does not solve these problems; robustness and resiliency are both aspects of institutional sustainability, but at times could come at the cost of effectiveness and acceptability.

5.3 HOW DID INSTITUTIONS PLAY A ROLE?

The cases examined here represent a range of different institutional designs for the delivery of energy efficiency in the end-use electricity sector. Given that each experienced political intervention that influenced how efficiency was delivered in the jurisdiction - sometimes negatively, sometimes positively - and that the histories of each case exemplify a variety of different institutional strengths and weaknesses, it is not clear that any *particular* institutional arrangement for efficiency is, by design, more resilient than the others. Furthermore, the qualifications concerning the kind of resiliency a system has and its relationship with system transformation noted above suggest that non-institutional factors may be as, if not more important for transitions governance more generally.

Nevertheless, we believe the cases examined here do offer some insight into features of institutional design that influence resiliency in that broader sense, some of which we have touched on in the preceding discussion. Here we summarize them according to the five aspects of resilient institutions identified in section one: clarity, balance, flexibility, polycentrism, and diversity.

5.3.1 Clarity (rights/responsibilities of stakeholders, access to resources, policy objectives and targets)

The cases investigated here suggest that relying on convention is no sure guarantee against political intervention, but also that the extent to which all exigencies can be 'designed for' during the institutional creation phase is limited. Efficiency is not a common-pool resource, akin to fisheries or forests. Instead, rules and responsibilities pertaining to delivery of efficiency savings are more often set by legislation, and thus typically not products of an organic process of institutional emergence around an exploitable resource by interested stakeholders. Consequently, some of the features of robust institutions as outlined by Ostrom may not be fully applicable – without an innate desire to 'exploit' efficiency on the part of some stakeholders, too much clarity regarding their responsibilities to do so can work against overall institutional resiliency.

With that being said, clarity regarding the obligations of separate parties vis-à-vis efficiency delivery is beneficial in minimizing tensions between different actors (e.g., information sharing responsibilities in third-party program administrative models). It can also be beneficial in minimizing the risk of governments 'raiding' efficiency funds (though again, even a clear definition of how funds should be spent may not be an impenetrable bulwark against raiding). Indeed, funds raised through rates and carbon taxes may themselves be more akin to common-pool resources than the efficiency savings they can be used to target. Accordingly, it is important to clarify exactly how funds shall be raised for efficiency purposes and what their express purpose is, how they will be kept separate and directed

toward that purpose, and how the entire process will be accounted for in a transparent and procedurally-acceptable manner for all stakeholders, during the institutional creation and renewal phases.

Finally, the cases investigated also here demonstrate the complexity of the relationship between governments (who set the policy objectives) and program administration and funding. Connection between policy goals and administration is perhaps tightest in a government-administered model, yet also the most exposed to flux when goals change, or other political demands arise that induce governments to constrain efficiency spending. Yet, government leadership may be essential to pushing things forward. As was noted by Sedano et al. above, consensus among stakeholders is perhaps the strongest determinant of institutional resiliency in this regard, though our research suggests that such broad consensus can be difficult to achieve and maintain over the longer-term – pushing too far in any given direction is likely to alienate one or more stakeholder groups, if there is not some kind of institutional flexibility built in as a safety valve.

5.3.2 Balance (cost/benefits, participatory & non-hierarchical, graduated sanctions)

Public costs are more politically salient than private benefits (even if those benefits may actually be public ones masquerading as private benefits). Political actors and the general public are not always cognizant of the benefits associated with efficiency resource acquisition, suggest that the ‘feedback’ from resource exploitation to these actors is not as direct as it possibly could be. Conversely, those with more direct material interests in program delivery can be (and often are) mobilized as vocal advocates for continuity and expansion. From a resiliency standpoint, ensuring that feedback mechanisms exist to strengthen the connection between efficiency programming and private benefits among the general public, and to capitalize on and nurture the relationship with materially-invested private stakeholders, is an important balancing act that institutions for efficiency need to perform. The closer and more direct the relationship between the public and the administrator of efficiency programming, the better the likelihood that the public will not lend its support to populist-like political action to scuttle things in the interest of short-term cost reductions.

In some cases, an adversarial political arrangement can be beneficial for institutional resiliency, even if it may sometimes lead to less ambitious action and/or targets. The US cases investigated here suggest that bi-cameral government structures can prevent or correct in short order actions to scale-back or weaken efficiency institutions. Conversely, unicameral governments that are strong proponents of efficiency are likely to be able to support stronger, more ambitious goals and actions. As with other aspects of efficiency governance, this suggests some trade-off between resilient and robust institutions. Having relatively shorter institutional renewal periods that do not correspond with election cycles (e.g., 3 years) could be a potential solution to this dynamic.

5.3.3 Flexibility (resources availability, resolution mechanisms, experimental approach);

From a flexibility standpoint, our research suggests that while resource diversity may be valuable, it is no panacea; resource stability/certainty is as essential to longer-term institutional resiliency. Often, the additional funding resources used for efficiency programs (i.e., those that are not strictly rate-based) comprise a small share of overall spending, suggesting that they are not sufficient to act as fully supplement reductions in the primary resource. Furthermore, though this was not an issue arising from our research, it should be noted that the amount of funding that will be raised for efficiency in a

capacity markets is not certain (though the amount of savings might be) (International Energy Agency, 2017).

Another complexity of resource diversity is when supplemental resources are provided from ‘outside’ the system in which they are expended. Federal government support is no doubt beneficial, from a polycentric perspective, in shoring up provincial efficiency programming, though (as in Maine) it is possible that the existence of such resources may induce internal actors to mitigate their own actions / spending. If and when that external resource ‘dries up’, it may be difficult to then marshal the additional internal resource to maintain continuity in program spending levels. To the public, and to skeptical political actors, this can appear as a large increase in costs with an unproportioned increase in benefits. Accordingly, external resource provision may be best directed at very broad, universally valuable endeavours (e.g., nation-wide potential mapping services), or at very targeted, supplemental actions to fill niches missed by existing provincial initiatives.

Yet another trade-off in institutional design exists between transformative aims and flexibility for regime, incumbent actors. For example, industrial opt-out provisions may be beneficial in minimizing stakeholder opposition to more ambitious efficiency goals, yet also obviously weakens the transformative potential of the associated initiatives. Similarly, blunt savings targets (e.g., savings of 2% a year, rather than requirements to acquire all cost-effective efficiency), even if based on initial potential studies, may lead to opposition from so--regulated stakeholders. These tensions appear most characteristic of utility-administered programs, as third-party and government-run systems can have a closer link between policy goals and program administration.

5.3.4 Polycentrism (multi-layered, nested governance)

The definition of a polycentric arrangement is one in which actors can organize not one but multiple governing entities at different scales (Ostrom, 2005, p. 283). While most efficiency governance takes place largely at the sub-national, i.e., state or provincial, level, due to the nature of electricity grids and state jurisdiction, polycentric arrangements to come into play and can be important in strengthening resiliency of efficiency institutions.

Some ways in which this is accomplished may be through national-level regulation (e.g., through the Federal Energy Regulatory Commission, or FERC, in the US); through multi-state system operators (e.g., PJM, ISO-NE); or through separate municipal institutions for efficiency delivery. Furthermore, in both Canada and the US, the federal government plays an important role in establishing codes and standards that provinces and states can build upon. In the cases examined here, however, the role of these types of polycentric arrangements did not appear as substantially influential in the course of events, though we see no reason to suspect that they would have done anything but strengthen overall institutional resiliency.

What does arise from the cases examined here is the importance of building broad advocacy networks, and the ability of these networks to articulate their interests in efficiency delivery in multiple different forums (e.g., courts, regulatory boards, legislatures, media and public forums). It is often the case that these networks span multiple different states and/or provinces and include national-level actors like the ACEEE that can help draw national attention to regional developments. Indeed, in the case of Maine in particular, the reduction in the ACEEE score in response to government underfunding appears to have been a resource that efficiency proponents in the state could draw upon to pressure for higher, more-

stable funding. As discussed above, institutional design can work to facilitate the growth of such networks, and so they should not be considered as a wholly separate, non-institutional feature of low-carbon transition resiliency.

5.3.5 Diversity (knowledge and information, feedback mechanisms)

As much of the above discussion suggests, the cases investigated here demonstrate the importance of diverse information and feedback channels to institutional resiliency. These may be particularly important during the institutional creation and renewal phases, as it may be during these phases that acceptance of and consensus around goals, targets and procedures is most effectively established. Clear guidelines for evaluation, measurement and verification, with regular reporting periods during program operation, may also help to mitigate potential political opposition, mobilized on the basis of questionable facts and incomplete information.

Irrespective of program administrative model, designing institutions such that there exists some distinct body, organization or department that has a direct interest in the issue *and* considerable access to and influence over decision-making in the state, province, company or actor network in question, does seem beneficial to long-term institutional resiliency, particularly if mirror departments exist in other stakeholder organizations. Third-party administrative models do seem to provide this interest focus by default, though it is does not seem impossible for utility or government-run institutions to do the same. Indeed, locating the strong proponent voice in government or industry might actually help to prevent inter-organizational tension, which does appear to be characteristic of the third-party models covered here.

6 CONCLUSION

The aim of this paper was to investigate the relationship between institutional design and political resiliency in energy efficiency governance through a comparative analysis of six North American case studies – British Columbia, Nova Scotia, New Brunswick, Connecticut, Maine and Indiana. We began by reviewing existing literature on resiliency in public administration and institutional design, identifying five key features thought to be characteristic of resilient governance: clarity, balance, flexibility, polycentrism and diversity. We then reviewed the history energy efficiency governance as it has been practiced in North America since the 1970s, noting that institutional evolution has produced a variety of different administrative and funding models, and we identified the primary structures and functions of efficiency program administration.

We then discussed the challenges in identifying suitable case studies for comparison, opting in the end to pick cases where there was a clear ‘shock’ to the system, rather than the most consistent, top-performing jurisdictions. We proceeded to offer short narrative overviews of each case. In the following discussion section, we addressed three main questions with regards to the relationship between resiliency and institutions: what was the shock, what was the impact, and how did institutions play a role.

We find that the question of institutional resiliency should be considered in light of the development phase the institution exists, from creation to operation and consolidation and finally to renewal. Somewhat surprisingly, it appears as though the operation/consolidation phase is when an institutional

arrangement is most susceptible to political intervention of the kind that might disrupt its operation. In the cases examined here, overall performance (measured simply by spending per customer) can be observed to have been constrained by stakeholder actions (typically governments) – increasing dramatically in the early years of program operation, but then plateauing and possibly decreasing following actions to limit demand-side initiatives. Only in Maine did we find evidence of significant ‘rebound’ in response to a shock, though the long-term trend is difficult to discern.

In conclusion, we find that consideration of institutional design is an important influencing factor in the overall resiliency of governance for low-carbon transition initiatives, particularly where it facilitates the growth of extra-institutional factors that reinforce the trajectory toward a transformative aim. However, care must be taken to distinguish between resiliency of transformative trajectories, and resiliency of status-quo preserving, incumbent regimes. Accordingly, it is important to recognize the limitations of the concept of resiliency when designing institutions for long-term change, and to seek to balance it with other institutional values such as effectiveness and social acceptability.

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