Winter 2017

Twenty-first Century Energy Policy Making in New Hampshire: Lessons for Collaboration

Henry Phillip Herndon
University of New Hampshire, Durham

TWENTY-FIRST CENTURY ENERGY POLICY MAKING IN NEW HAMPSHIRE: LESSONS FOR COLLABORATION

BY

HENRY PHILLIP HERNDON
Baccalaureate of Arts, Political Science, University of New Hampshire, 2015

THESIS

Submitted to the University of New Hampshire
in Partial Fulfillment of
the Requirements for the Degree of

Master of Science
in
Natural Resources: Environmental Conservation

December 2017

This thesis has been examined and approved in partial fulfillment of the requirements for the degree of Master of Science in Natural Resources: Environmental Conservation by:

Thesis Director, Dr. Catherine M. Ashcraft,
Assistant Professor, Natural Resources & the Environment

Dr. Clayton R. Mitchell, Esq.
Lecturer, Natural Resources & the Environment

Dr. Michael E. Swack
Research Professor, Carsey School of Public Policy

Date of Defense: December 1, 2017

Original approval signatures are on file with the University of New Hampshire Graduate School.

For Mom and Dad.

ACKNOWLEDGMENTS

Thank you to the public servants, utility workers, distributed energy resource providers, environmental advocates, and local energy leaders of the Granite State. You welcomed me into your community and made it possible for me to learn so much more than I ever could have in a classroom or laboratory.

Thank you to the University of New Hampshire Department of Natural Resources for supporting me and providing me with the opportunity to work and teach alongside the many excellent members of your community. Thank you especially to Wendy Rose and Dr. Pete Pekins for making the James Hall and the Natural Resources Department a wonderful place to work.

Ganz herzlichen Dank an Prof. Dr. Schreurs und an das Forschungszentrum für Umweltpolitik an der Freien Universität Berlin, die mir geholfen haben die deutsche Perspektive der Energiewende zu verstehen.

To Dr. Stacy VanDeveer, thank you for the years of mentorship. To my committee member Dr. Michael Swack, thank you for your wisdom and guidance and for the example you set in all you have done for the state of New Hampshire. And to my advisor, Dr. Catherine Ashcraft – you created for me opportunities that will forever shape my professional and personal development.

Thank you to the Robert and Patricia Switzer Foundation, who not only provided me with funding to complete this work, but also gave me affirmation that my vision of a sustainable energy future is shared and bolstered my commitment to making that vision a reality.

Most especially, thank you, Dr. Clay Mitchell, Esq. Your relentless commitment to making a difference is inspiring a generation.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS

ACEEE: American Council for an Energy-Efficient Economy

AMI: Advanced Metering Infrastructure (smart meters)

AMR: Advanced Meter Reading (dumb meters)

BATNA: Best Alternative to a Negotiated Agreement

BIA: Business & Industry Association

CEA: Consumer Energy Alliance

CLF: Conservation Law Foundation

CoL: City of Lebanon

COSR: Cost of Service Regulation

DE: Docket Electric

DER: Distributed Energy Resource

DES: Department of Environmental Services

DG: Distributed Generation

DOER: Department of Energy Resources (Massachusetts)

DPU: Department of Public Utilities (Massachusetts)

DR: Demand Response

DSM: Demand-side Management

EAP: Electric Assistance Program

ECT: Electricity Consumption Tax (nonbypassable charge)

ED: Electric Division (PUC Staff)

EE: Energy Efficiency

EEI: Edison Electric Institute

EERS: Energy Efficiency Resource Standard

EESE Board: Energy Efficiency and Sustainable Energy Board

EFCA: Energy Freedom Coalition of America

EM&V: Evaluation, Measurement & Verification

EV: Electric Vehicle

IOU: Investor-Owned Utility

IR: Investigative Review

ISO: Independent System Operator

ISO-NE: Independent System Operator – New England

kWh: kilowatt-hour

LDAC: Local Distribution Adjustment Charge

LRAM: Lost Revenue Adjustment Mechanism

MW: Megawatt

NECEC: Northeast Clean Energy Council

NEEP: Northeast Energy Efficiency Partnerships

NERA: New England Ratepayers Association

NHSEA: New Hampshire Sustainable Energy Association

OCA: Office of the Consumer Advocate

OEP: Office of Energy and Planning

PBR: Performance-Based Regulation

PSNH: Public Service Company of New Hampshire

PUC: Public Utilities Commission

PURPA: Public Utilities Regulatory Policy Act (1978)

RAP: Regulatory Assistance Project

RESA: Retail Energy Supply Association

RGGI: Regional Greenhouse Gas Initiative

RPS: Renewable Portfolio Standard

SBC: System Benefit Charge (nonbypassable charge)

SED: Sustainable Energy Division (PUC Staff)

SCRC: Stranded Cost Recovery Charge (nonbypassable charge)

TASC: The Alliance for Solar Choice

TNC: The Nature Conservancy

TOU: Time of Use (rates)

TVR: Time-Variant Rates

TWH: The Way Home

ABSTRACT

TWENTY-FIRST CENTURY ENERGY POLICY MAKING IN NEW HAMPSHIRE: LESSONS FOR COLLABORATION

By

Henry Phillip Herndon
University of New Hampshire, December 2017

In this thesis I investigate the organizational field that is New Hampshire's energy policy-making community as it engages with the state regulatory institution, the Public Utilities Commission, to grapple the challenges of designing a 21st century electricity marketplace.

The Public Utilities Commission structure and function are evolving. Historically, the Commission has used adjudicative proceedings to carry out a ratemaking function for monopoly utilities. The Commission's adjudicative process is evolving to become increasingly collaborative as it begins to carry out its new function of 21st century electricity market design. I analyze both the new structure (collaboration) and the new function (21st century electricity market design) of the Commission through three in-depth case studies of dockets (policy-making processes): Energy Efficiency Resource Standard, Electric Grid Modernization, and Net Metering.

My findings identify ways in which the Public Utilities Commission structure for making energy policy decisions is flexible and may be shaped by stakeholders engaging in policy processes. Stakeholders have the power to collectively design regulatory proceedings to incorporate greater opportunities for collaboration to better suit the challenges posed by a 21st century electricity sector. I provide recommendations on *how* that redesign should occur.

CHAPTER I – INTRODUCTION

Vision of a 21st Century Energy System

Imagine a bustling New Hampshire city with a population of 20,000. Like many New Hampshire communities, this one is centered on a river. Its downtown mill buildings are tastefully refurbished and humming with a healthy mix of residential and commercial spaces – apartments and businesses and breweries and restaurants, the latter two stocked near exclusively with locally sourced menu items. But food is not the only societal system that has undergone extensive localization in recent years. The city produces 50% of its electricity as well. The year is 2030 and the electricity system is finally catching up with the 21st century.

Ten years prior, municipal leaders from the energy committee and city council, motivated by commitments to fiscal conservatism and the principles of sustainability, worked together to establish the city's first Energy Efficiency and Clean Energy District.[1] Within the district, several 21st century energy companies have since financed millions of dollars of clean energy and energy efficiency improvements for residential, commercial, and municipal establishments alike. Investments cover the gamut from building weatherization and LED lighting upgrades, to solar installations and air source heat pumps, to Tesla Powerpacks and electric vehicle charging infrastructure, to combined-heat-and-power gas-fired microturbines in some of the larger establishments. This symphony of distributed energy resources (DERs) is conducted via internet-connected automation, communication, and control systems, which synchronize real-time responses to changes in electric grid conditions. Homeowners, businesses, and municipal

[1] See New Hampshire RSA 53-f.

facilities alike generate much of their own electricity, and are credited for excess energy fed into the grid and consumed by their neighbors. The city's growing smart grid helps the larger electric system keep costs down by managing electricity demand, and by providing other technical services such as voltage and frequency regulation. The energy savings and revenues from 21st century energy services are shared between the energy companies and citizens.

Day by day this vision of a localized, sustainable 21st century smart city energy system moves closer towards reality. Over the past decade, and with increasing intensity in recent years, the iterative cycle of policy change and market development has set in motion the remaking of our electricity systems. At the turn of the millennium, the 21st century smart grid may have seemed more science fiction than reality, but today, in 2017, New Hampshire communities from Dover to Warner to Lebanon are laying the foundation on which this vision will be realized.

My focus in the pages to come will be on the electricity sector disruption associated with expanding markets for distributed energy resources (DERs) – a category which includes distributed generation (e.g., rooftop solar, microturbines), geothermal energy systems, smart energy metering technology, energy efficiency, management of electricity demand, energy storage, electric vehicles, electric vehicle charging infrastructure, and Internet of Things synchronization of aforementioned technologies. My research examines the three major New Hampshire regulatory policy processes addressing 21st century electricity market design through DER integration:

- DE 15-137: Electric and Gas Utility Energy Efficiency Resource Standard (EERS) (Chapter 2)
- IR 15-296: Investigation into Electric Grid Modernization (Grid Mod) (Chapter 3)

- DE 16-576: Development of New Alternative Net Metering Tariffs and/or Other Regulatory Mechanisms and Tariffs for Customer Generators (Net Metering) (Chapter 4)

The remainder of this chapter is organized as follows: I first contextualize New England's evolving energy landscape by reviewing recent policy and market trends across the region. I then describe the series of 21st century electricity system policy challenges and introduce the community of actors grappling with these challenges in New Hampshire's energy policy-making arenas. Next, I introduce the New Hampshire Public Utilities Commission (PUC), the state institution charged with regulating electric utilities and now newly tasked with resolving energy policy disputes between utilities and DER affiliates. I then review New Hampshire energy policy reports calling on the PUC to abandon adversarial dispute resolution and adopt a more collaborative approach to making energy policy decisions. Next, I review the literature to introduce and contrast adjudicative and collaborative approaches to dispute resolution. Finally, I present my research design and methodology for answering my overarching research question: How does the PUC process limit or support opportunity for collaboration? The purpose of my research is to provide insight into how the NH energy policy-making community may adopt a more collaborative approach towards solving 21st century energy system policy challenges.

New England's Evolving Energy Landscape

Growing DER markets represent the convergence of the three overarching trends reshaping New England's electricity landscape: (1) increasingly competitive electricity markets; (2) increasing decentralization of energy resources; and (3) accelerating deployment of lower- and zero-carbon energy resources. These trends are a result of a combination of local, state,

regional, and federal policies and macroeconomic, technology-driven factors including the U.S. natural gas revolution and the dramatic cost declines in industries like wind and solar. Actively embracing and encouraging trends towards competitive, distributed, sustainable electricity systems has obvious economic, social, environmental, and national security advantages for policy makers, but redesigning the path-dependent electricity system of decades long past into one more compatible with 21st century society raises dauntingly complex policy challenges.

The New England states have collectively implemented a multitude of policies geared towards promoting a competitive, decentralized, and sustainable electricity market. Table 1.1 illustrates the volume of renewable energy and energy efficiency incentive policies across New England. The regional market for solar photovoltaics (PV) has grown dramatically in recent years, as illustrated by Fig. 1.1 and is projected to continue to expand in the years to come. Energy efficiency programs in New England are some of the most ambitious in the nation and region-wide funding for energy efficiency has been steadily increasing, as illustrated by Fig. 1.2. ISO New England, the not-for-profit independent system operator for New England's regional electric grid, projects that from 2021 to 2026, the six states will collectively invest $1.2 billion annually in energy efficiency programs (ISO New England, 2016). The New England states are also beginning to explore extensive regulatory overhauls of their electric utility systems in an effort to further guide the trends towards competition, decentralization, and decarbonization. Table 1.2 presents an illustrative selection of policies contributing to the evolution of the regional energy sector.

Table 1.1 – Number of Distinct State Incentive Programs for
Renewable Energy and Energy Efficiency in the New England States

State	Number of Distinct Incentive Programs for Renewable Energy and Energy Efficiency (as of September 2017)
Massachusetts	99
Connecticut	67
New Hampshire	62
Vermont	49
Rhode Island	46
Maine	31

Source: Database for State Incentives for Renewables & Efficiency, 2017

Table 1.2 – Selection of New England Policies Supporting Competition,
Decentralization, and Decarbonization in the Electricity Sector

Policy	Description	Applicable In
Electric Utility Restructuring	Legislation directing utility divestiture of generation fleets to introduce competition in power generation markets	CT, ME, MA, NH, RI
Regional Greenhouse Gas Initiative (RGGI)	Cap and trade program for regional power sector; in effect, puts a price on emissions from the power sector contributing to climate change	All New England States
Renewable Portfolio Standard (RPS)	Legislation directing utilities to procure increasing portions of their electricity mix from renewable sources and providing incentives for investments in renewables	All New England States
Net Metering	Owners of distributed generation systems (e.g., rooftop solar) may receive credits for excess generation fed into grid from utilities	All New England States
Energy Efficiency Resource Standard (EERS)	Mandated energy savings targets for electric (and in some cases gas) utilities and incentives for energy efficiency investments	All New England States
Electric Grid Modernization[2]	Regulatory reform initiatives seeking to remake electric utility incentive structures and encourage market-based DER deployment	CT, MA, NH, RI, VT

[2] See in particular CT PURA 17-06-02 (Section 103 of June Special Session Public Act 15-5); MA Grid Mod (D.P.U. 12-76-B); MA Smart Grid Pilot Programs; MA Energy Storage Initiative; NH Grid Mod (PUC IR 15-296); NH Net Metering Alternatives Order No. 26,029 (PUC DE 16-576); RI Renewable Energy Growth Program (Chapter 26.6 of Title 39 of RI General Laws); RI Power Sector Transformation Initiative (PUC Docket No. 4600); and VT Review of Utility Regulation (PSB Case No. 17-3142-PET).

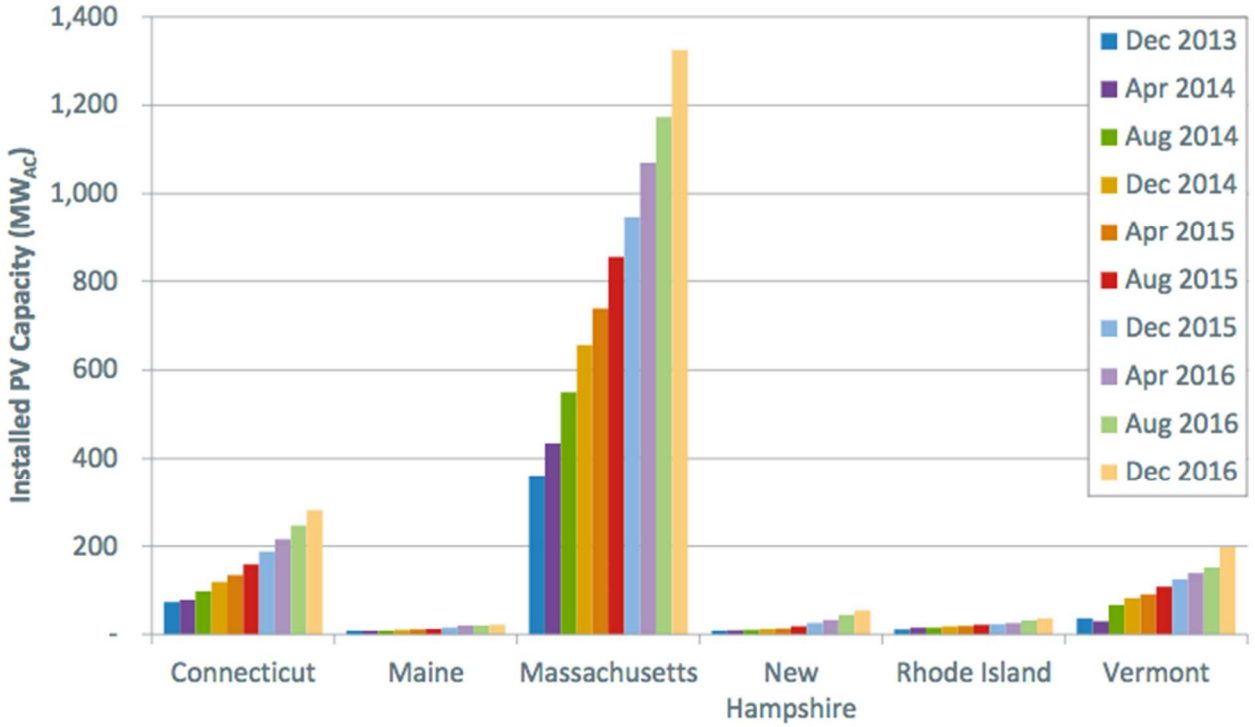


Figure 1.1 – Historical Installed PV Capacity Survey Results: December 2013 – December 2016 (MW_{AC}) (Source: ISO New England, 2017b)

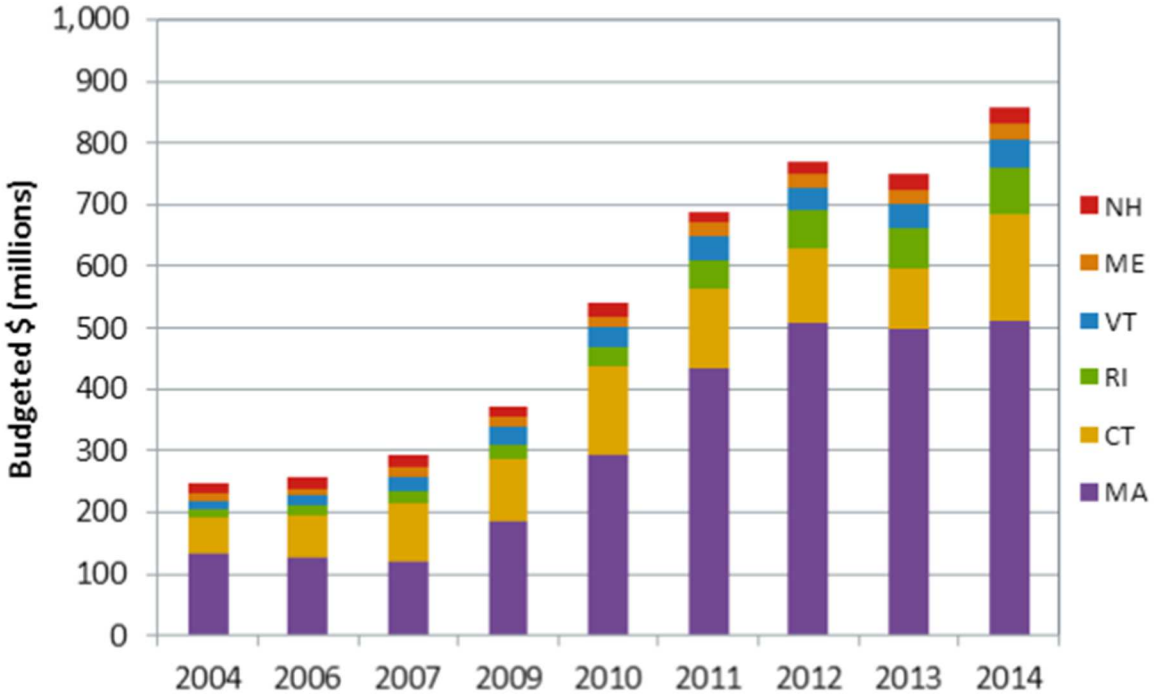


Figure 1.2 – 2004-2014 Trends in Energy Efficiency Funding in the Six New England States (Source: ISO New England, 2016)

Despite the wave of activity, continuing the progress towards a 21st century electricity system requires that policy makers address further policy challenges. Policy action and evolving markets can have an iterative, circular relationship: policy and advancing technology feed innovation and market transformation, which raise new questions and challenges about how the market should continue its evolution, which in turn calls for further policy action. This is particularly the case for electricity markets, which, importantly, have never resembled anything close to a free, unregulated market, save perhaps for the brief years following their inception in the mid-19th century. The past decade of policy action and concurrent technological advancements have largely succeeded in creating scalable DER markets, but in doing so have given rise to questions about how such markets should be designed and integrated with the existing monopolistic market for electricity services.

21st Century Energy Policy Challenges

Energy policy making can occur through legislative, executive, judicial, and administrative/regulatory processes.[3] The focus of my thesis is entirely on the administrative/regulatory policy design processes, which occur at the New Hampshire Public Utilities Commission (referred to as either the Commission or PUC). The overarching challenge for energy policymakers is how to guide existing market trends toward competition, decentralization, and decarbonization. The following seven examples provide further detail of the current policy challenges.

[3] Some might argue the administrative/regulatory branch of government is a subsidiary of the executive branch. New Hampshire's three regulatory Commissioners are appointed to six-year terms by the Governor (who serves a two-year term) and approved by the Executive Council. But the interests of the Governor's office are represented in PUC proceedings by the Office of Strategic Initiatives (formerly Office of Energy and Planning). For this reason, and because of the compelling case made by McCraw 1984 that there are in fact four, not three, branches of American governance, I distinguish between the executive and the administrative/regulatory.

Policy Challenge #1: Widespread DER adoption is inherently incompatible with the traditional business model of regulated monopoly electric utilities. How can policy makers reconcile the conflict between DER adoption and traditional utility business models?

In January 2013, the Edison Electric Institute (EEI), the trade association representing all U.S. investor-owned electric utility companies, released a report warning that unchecked growth in DER markets would inevitably erode the financial well-being of the electric utility industry (Kind, 2013). The danger for utilities, according to the report, is that as DER adoption accelerates it sets in motion a positive feedback loop, a vicious cycle in which customers opting for DERs amplify the conditions driving DER adoption in the first place. DER adoption allows customers to extricate themselves from previously compulsory participation in the pool of customers paying for utility costs. As DER adoption spreads, the pool of customers covering the utility's costs becomes smaller and smaller and the portion of those costs apportioned to each remaining customer grows larger and larger, thus driving more and more customers into the open arms of the DER industry. Fig. 1.3 from the EEI report depicts this vicious cycle (colloquially referred to as the utility death spiral) (EE: energy efficiency; DR: demand response). Because of the conflict between the traditional utility business model and widespread DER adoption, questions about DER integration are an inevitable source of tension and disagreement between the two colliding industries.

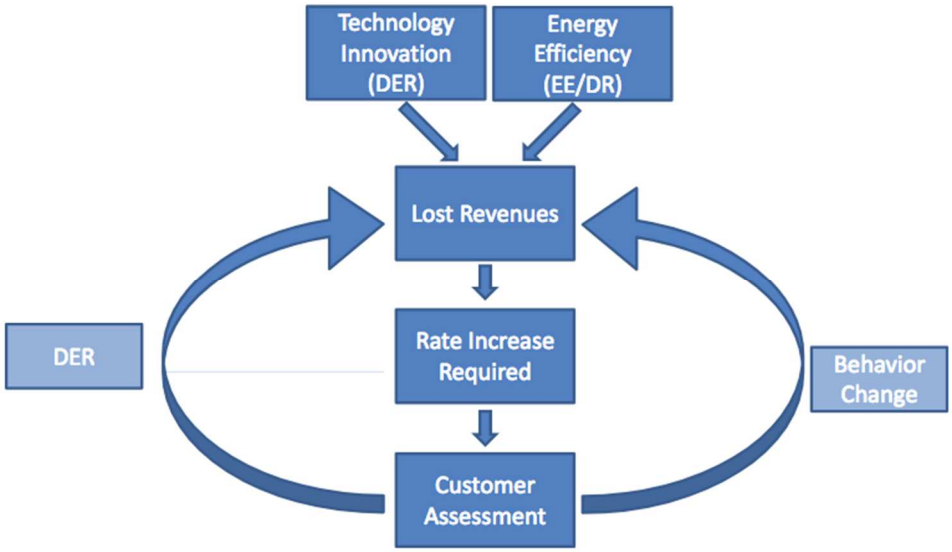


Figure 1.3 – Vicious Cycle of Utility Lost Revenue from Disruptive Forces (Source: Kind 2013)

Policy Challenge #2: How can policy makers introduce competition into monopoly markets for retail electricity services?

> *Regulation is acquired by the industry and is designed and operated primarily for its benefit… Every industry… that has enough political power to utilize the state will seek to control entry… and retard the rate of growth of new firms.*
> – George Stigler (1971)

> *The price of monopoly is upon every occasion the highest which can be got. The natural price, or the price of free competition, is the lowest which can be taken.*
> – Adam Smith (1776)

The history of the electric power system is the history of the struggle between monopoly control and competitive market forces (Hirsh, 1999; Lambert, 2015). Gradually, beginning in the 1970s and continuing over subsequent decades, competition was introduced to *bulk generation* of electricity in *wholesale markets*, despite intense anti-competition lobbying from incumbent utilities (Hirsh, 1999). However, transmission and distribution systems remain tightly controlled utility monopolies, which discourages competition in *retail markets*. The competitive nature of

electricity *generation* is important to understand because there are lessons to be drawn for the current challenge of competitive DER integration. Competition in *bulk generation* and *wholesale electricity markets* was accomplished by allowing competitive power generators equal access to monopoly-owned *transmission* infrastructure. Competition can similarly be brought to the *distributed generation* and *retail electricity markets* by allowing DER providers equal access to monopoly-owned *distribution* infrastructure (see Fig 1.4).

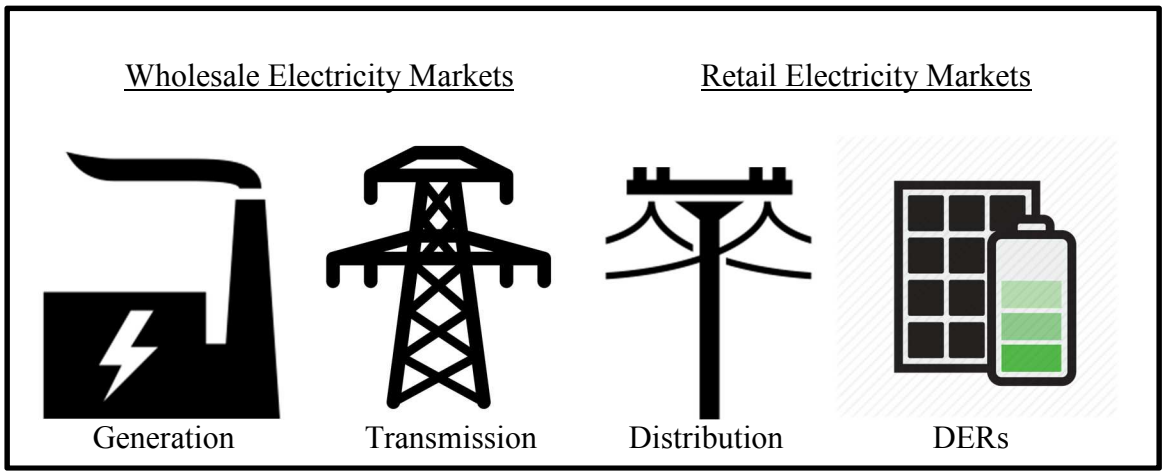


Figure 1.4 – Components of the Electricity System

The electricity industry in the United States was founded on what Hirsh (1999) calls the utility consensus. The utility consensus posited that in order to achieve the greatest economies of scale to allow for rapid and low-risk proliferation of cheap electricity to the furthest corners of America, a single vertically integrated corporation should receive exclusive franchise rights to own and operate *generation*, *transmission*, and *distribution* infrastructure in a given geographic area, free of competition. In exchange for the exclusive monopoly franchise, the utility corporation subjects itself to government regulation to ensure it does not abuse its monopoly power to extort exorbitant profits from the public.

The consensus was largely designed by the first great utility robber baron, Samuel Insull, who realized, "In the long run, regulation means protection" (Lambert, 2015, p. 18). Importantly, while utility managers often construe government regulation as onerous and burdensome, the reality is that these same utility managers are responsible for the construction of the regulatory system and simultaneously one of its greatest beneficiaries. Government regulation legitimizes the utilities' right to monopoly control and helps to insulate the system from competition (Hirsh, 1999). One consequence of the binary relationship between regulators and monopolies is regulation often tends to function as a protective device rather than as a promotional or developmental one. Regulation often suppresses rapid industrial change and innovation (McCraw, 1984).

New Hampshire is famous (or not) for a very special section of a very special law passed by the United States Congress in the wake of the 1970s energy crisis: President Carter's Public Utility Regulatory Policies Act of 1978 (PURPA). Prior to the passage of PURPA, utility corporations enjoyed comfortable vertical integration: one company owned and operated the entire system of *generation*, *transmission*, and *distribution* of electricity (see Fig. 1.4). PURPA opened up opportunity for states to bring competition to the *generation* of electricity. The introduction of competition to the generation of electricity allowed the country to diversify its energy portfolio, reduce costs, and create a more efficient marketplace.

Wheelabrator-Frye, a New Hampshire power company operating cogeneration plants (electricity and heat), and its ally Senator John Durkin of New Hampshire, lobbied the U.S. Congress to include in PURPA a provision that revolutionized the competitive nature of wholesale electricity markets (Hirsh, 1999). Prior to PURPA, utility monopolies owning transmission infrastructure could squeeze all competitive generation companies out of the market

by charging them excessive access fees for the use their transmission highways. Without transmission highway access, there was no competition in the generation of electricity. Consumers had no choice but to consume the electricity generated from power plants owned by the vertically integrated utility, even if third-party competitive generators could produce electricity more cheaply. In just a few years after the passage of PURPA and its special section (thanks to Granite Staters), more than half of the utility industry's annual generation capacity additions came from competitive, independent power producers, dramatically reshaping electric power markets across the country (Hirsh, 1999). This is referred to in the industry as *restructuring* and/or *deregulation*.

Today, ISO-New England, the independent system operator for the regional electric system, coordinates a symphony of competitive energy generators, calling power plants online through a merit order bidding system in which the cheapest producers are at the front of the line and the most expensive are at the back. Wholesale prices are based on real-time and forecasted demand for electricity. Almost all New England utilities have divested of their generation fleets, becoming poles and wires companies only. Open access to transmission infrastructure and price signals based on demand created a competitive market for electricity generation.

Competition in *bulk* or *wholesale* generation of electricity, supplied by equal access to *transmission* infrastructure and price signals based upon real-time demand for electricity, is a very different thing from competition in *retail* electricity services, which would require equal access to *distribution* infrastructure and similar real-time price signals. In this way, *retail* markets are less competitive than *wholesale* markets. Much of the controversy surrounding *distributed* energy resource (DER) integration is wrapped up in the challenge of expanding competitive access to the *distribution* system and *retail electricity markets*. Competitive access

to distribution infrastructure and price signals based on demand can create competitive retail electricity markets, much in the way competitive access to transmission infrastructure and price signals based on demand created a competitive wholesale electricity market (see Fig. 1.4).

Policy Challenge #3: How can policy makers redesign electricity markets to send more accurate price signals that optimize economic efficiency?

> Economic Efficiency: an economic state in which every resource is optimally allocated to serve each individual or entity in the best way while minimizing waste and inefficiency… In terms of production, goods are produced at their lowest possible cost, as are the variable inputs of production (Investopedia, 2017).

Due to the regulated, command-and-control nature of the 20th century utility monopoly, the retail electricity market is devoid of economically efficient price signals. Prices, rather than reflecting the equilibrium of supply and demand as is the case in competitive markets, are set by bureaucrats and utility managers, "accountants in a dark room" pouring over spreadsheets in the "hard-to-penetrate, rate-setting place" of the Public Utilities Commission (PUC) (NH Interview 1, 2016). Imagine the stereotypical archetype of U.S.S.R. central planners circa 1965, sitting in their drab, gray office parks, flipping through abaci and carefully penciling out prices for the next five-year plan of biscuits and boots. Today, in 2017 America, retail electricity prices are set in much the same fashion, and have little to do with supply and demand.

The old system typically uses *flat rates* for retail electricity prices, rates that remain unchanged regardless of time of consumption and regardless of the relative demand at the time of consumption. Flat rates are "inappropriate and misleading… [and] fail to recognize real costs" (Lazar and Gonzalez, 2015, p. 9). A kilowatt-hour (kWh) consumed at 3pm on the hottest day of summer when air conditioners are blasting away and the electric grid is running at maximum capacity is the same price to the average customer as a kWh consumed at times of low electricity

demand. However, the true costs imposed on the system by these two examples of electricity consumption, are, in the long run, dramatically different; peak-time summer electricity consumption, when demand is at its highest, drives overall systems costs to a much greater extent than consumption at times of low demand. By the same logic, a kWh *saved* during times of high electricity demand provides a much greater value to the electric system as a whole. But the current system, with its flat rate structure, does nothing to communicate to consumers the true costs and benefits of their electricity consumption patterns.

An economically efficient electricity market would communicate the nuances associated with supply and demand at the time of consumption and production to consumers and producers of electricity. Offering *smart rate* options to consumers, rates that more accurately communicate the true cost of electricity consumption based on demand, would allow the engaged customer to reduce her individual electricity costs and simultaneously reduce costs for all system users by improving the economic efficiency of the system as a whole. These smart rate offerings are an essential prerequisite for the deployment of the 21st century energy vision. Without smart rates, the very real value associated with the symphony-like city smart grid will remain unrealized. Regulators, utilities, and other stakeholders are beginning to grapple with the challenges of designing and implementing such smart rates to improve economic efficiency across the system (see Lazar and Gonzalez, 2015; NARUC, 2016; and Convery et al., 2017).

Policy Challenge #4: How can 21st century electric utilities be fairly compensated for their services?

As illustrated by policy challenge #1, efficiency and DER adoption erode the financial well-being of the traditionally regulated electric utility. This is because the traditional, 20th century electric utility is compensated through two primary mechanisms: (1) volumetric sales, and (2) regulated return on investment on capital expenditures. In other words, the utility "wants" to sell more electricity, and the utility "wants" to spend cash on expensive system upgrades and expansion. If states wish to advance a 21st century energy system and wish to keep their electric utilities from going bankrupt, they must reconsider approaches to electric utility compensation.

Many states have undergone regulatory overhauls and made their utilities indifferent to volume of electricity flowing through their wires. This regulatory shift is known as decoupling and is one potential remedy for the discord between the traditionally regulated utility and an efficient, decentralized 21st century energy system (see Lazar, 2015; NREL, 2009; NARUC, 2007; Moskovitz, et al., 1992).

The second traditional component of a utility's compensation, the incentive to prioritize capital expenditures on grid expansion, presents a similar obstacle to DER integration. When the utility makes capital expenditures on poles, wires, substations, etc., it expands the base from which it earns its return on investment. The more the utility spends on infrastructure expansion, the larger the number on which the utility earns its percentage rate of return, and the happier the utility shareholder.

But DER competitors argue implementation of their technologies can meet electric system planning, design, and maintenance needs at lower costs and with greater efficiency than traditional utility solutions. DER providers are jockeying for the opportunity to supplant the need for conventional utility solutions by deploying *non-wires alternatives*, i.e., coordinated systems

of DERs. If DERs can offset the need for the utility to make investments in traditional grid expansion, the utility loses out on a core profit opportunity. Policy makers must find solutions that reward utilities for acting as a platform to facilitate competitive DER solutions.

Policy Challenge #5: How can DERs be fairly compensated for their services?

The smart rates discussed in policy challenge #3 present one solution to this challenge. Smart rates can send more accurate price signals which, for example, can tell an automated washing machine to run when electricity prices are lowest, or tell a fleet of batteries when demand is high and compensate them accordingly for a discharge of stored energy into the grid. But, in addition to their *temporal* benefits, DERs can also provide *geographic* benefits to the electricity system.

Current compensation methodologies for DERs are primitive. The primary policy mechanism for compensating distributed generation (e.g., rooftop solar), is net metering. Net metering is a primitive compensation method for the same reason flat rates send poor price signals to consumers; owners of distributed generation are compensated at the flat, retail rate for electricity, i.e., the same rate they pay to consume electricity from the grid. Flat rate net metering leads to random solar deployment, which is great for the individual who wishes to take control of his energy use, but limited in its ability to optimize the systemic redesign of the electric grid. A solar array plopped in a field miles away from a congruous day-time electricity load is much less valuable than a solar array powering a commercial center whose energy use patterns roughly correspond with the array's production profile. Twenty-first century smart grid solutions will

compensate DERs for *locational* as well as *temporal* values. The question remains, what are these values, and how do we compensate DERs for them?

Policy Challenge #6: There is a lack of data informing decisions. What is the best way to collect and share data about when, where, and how electricity is produced and consumed across the system in order to better resolve many of the previously discussed policy challenges?

DER integration is fraught with uncertainty. For the past century, the traditional electric utility system, immune to competitive pressures, has coasted along indifferent to innovative opportunities presented by advancing technology, namely, computers, the Internet, and associated data processing capabilities. While many tech-savvy industries of the modern age are racing to collect, process, and capitalize on reams of data, utility monopolies have made shockingly little progress in collecting and using data to optimize their systems. Utility customers have, until now, scarcely had the option of leaving their monopoly electricity provider for one offering more modern solutions and because of this, there has been no impetus for utilities to innovate and enter the world of big data optimization.

Twenty-first century energy solutions require data, and lots of them. The synchronized city smart grid will rely on data about when, where, and how energy is used, consumed, and generated across the network. Without those data, questions about the value of DERs and smart grid resources are impossible to answer and it is impossible to accurately compensate those resources for the services they can provide to the system. Collecting data and creating a granular baseline understanding about how electricity and DERs interact across the system is an essential component of constructing a 21st century energy system.

***

To summarize, policy and market developments are catalyzing significant shifts in electricity markets towards competition, decentralization, and decarbonization. These shifts in turn raise a series of new policy challenges. Old utility business/regulatory models are economically inefficient and conflict with 21st century smart grid optimization. New competitive actors are challenging unilateral monopoly control. Current electricity rate structures are primitive and inhibit progress. While the old utility model is clearly obsolete, it is less clear what its future replacement will look like. Policy makers have yet to establish economically efficient methods for capturing the *temporal* and *locational* values of DERs. And all of the above issues are compounded by the absence of necessary data about when, where, and how electricity is produced and consumed across the system. Further confounding this issue, the utility controls access to the very data that may enable the undoing of its torpid, century-long hegemony.

These six challenges, Herculean in their own right, are further exacerbated by one final and overarching challenge. It is from this final policy challenge that I derive my research question.

Policy Challenge #7: Twenty-first century electricity market design requires numerous and diverse parties to engage in inter-organizational decision making. This vastly increases complexity of decision-making processes, which are encumbered by antiquated 20th century practices. How can we re-design the decision-making process to facilitate collaboration among the diversity of actors?

The three policy processes examined in my research involve dozens of organizations colliding with one another in PUC proceedings, each vying to achieve its individual interests. Figure 1.5 and Table 1.3 provide a brief overview and description of many, but not nearly all, of the various organizations engaging in NH PUC regulatory proceedings for 21st century electricity market design. Broadly speaking, actors can be divided into five categories: (1) the state; (2) the investor-owned utilities; (3) the local DER affiliates; (4) the national interest groups; and (5) miscellaneous actors. None of the aforementioned challenges can be adequately addressed without first deciding *how* this community of actors should go about addressing them.

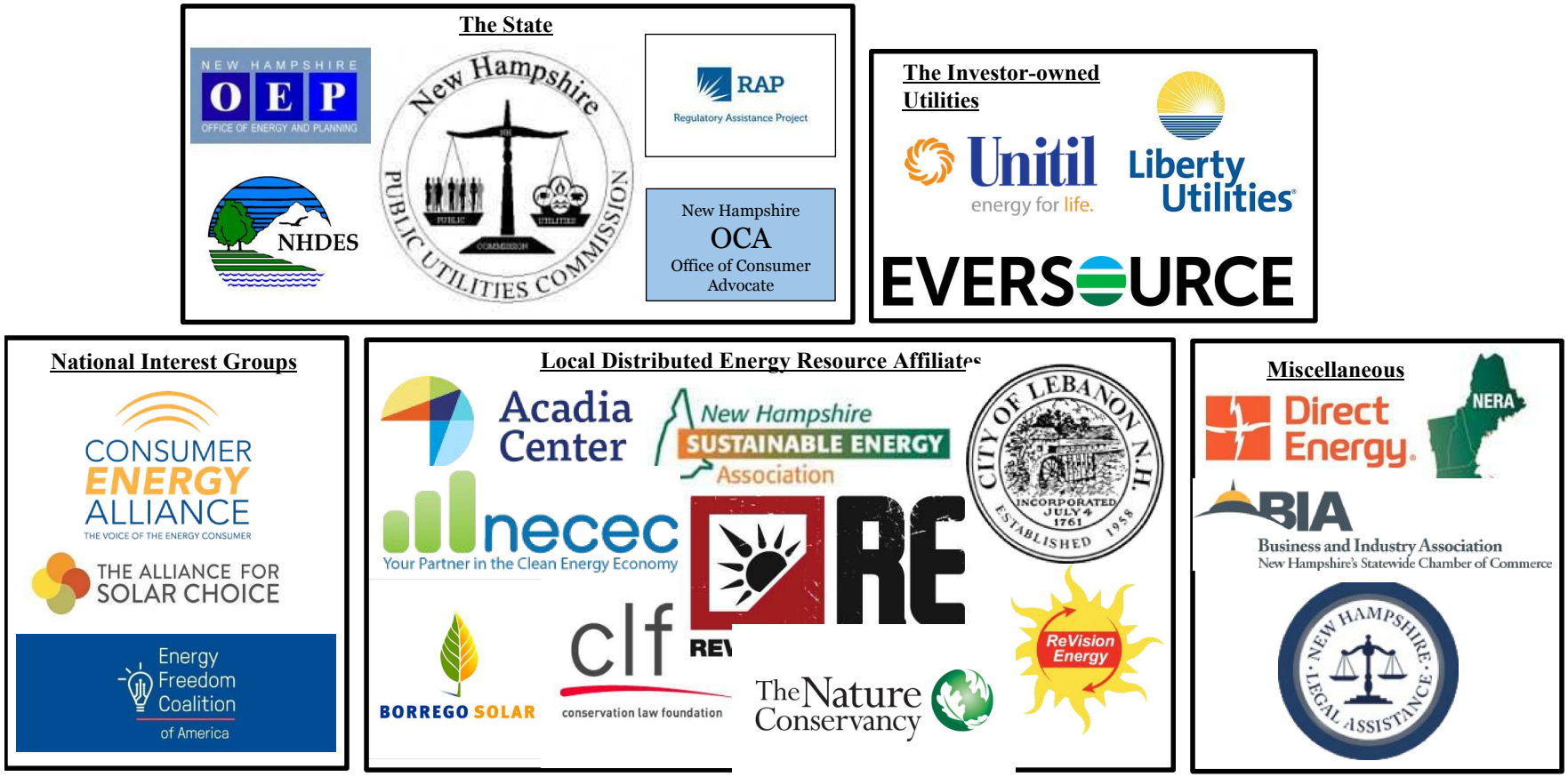


Figure 1.5 – New Hampshire's Energy Policy-making Community

Table 1.3 – New Hampshire's Energy Policy-making Community

Category	Organization	Description
The State	Department of Environmental Services (DES)	Representatives from the Air Resources Division of DES intervene in dockets with specific environmental outcomes (e.g., efficiency, electric vehicles, grid modernization).
	Office of Energy and Planning (OEP)	Arm of the Governor's office. (Under the Sununu administration, OEP was renamed Office of Strategic Initiatives (OSI). I refer to it as OEP because that is what it was called during the majority of this research.)
	Public Utilities Commission (PUC)	Commissioners: • The arbiters and final decision makers. Relevant Divisions: • Electric Division: Executes cost-of-service regulation for monopoly electric utility corporations. Managed the EERS docket unilaterally; managed the Net Metering docket in partnership with the Sustainable Energy Division. • Legal Division: Supports other divisions in all manner of affairs. Often plays facilitation role. • Sustainable Energy Division: Oversees implementation of state sustainable energy programs. Managed the Net Metering docket in partnership with the Electric Division. Administratively Attached Agencies: • Office of the Consumer Advocate (OCA): Represents the collective interests of New Hampshire's energy consumers. Consultants to the Commission: • Raab Associates: Expert in consensus building for utility regulation, facilitated the Grid Modernization Working Group. • Regulatory Assistance Project (RAP) (nonprofit): Experts on all things utility regulation whose mission is to accelerate the transition to a clean, reliable, efficient energy future.
Investor-Owned Utilities	Eversource Energy	The largest electric utility in New England with over 320 million customers. Formerly Public Service Company of New Hampshire (PSNH).
	Liberty Utilities	New Hampshire's smallest electric utility and a subsidiary of Algonquin Power & Utilities Corp. Liberty also operates a gas business.
	Unitil Corporation	Small electric and gas utility (gas company: Northern Utilities).

Local Distributed Energy Resource Affiliates	Acadia Center	Dedicated to advancing the clean energy future in the Northeast. Intervened in the three dockets that are the subject of this thesis.
	Borrego Solar	One of the largest commercial-scale solar developers in the region. Intervened in the Net Metering docket.
	City of Lebanon (CoL)	Represented by former PUC Commissioner, former State Senator, former State Representative, current City Councilor of Lebanon, Clifton Below.
	Conservation Law Foundation (CLF)	Intervened in all three dockets as part of regional strategy to mitigating climate change.
	New Hampshire Sustainable Energy Association (NHSEA)	Represents the interests of over 90 New Hampshire-based DER companies.
	Northeast Clean Energy Council (NECEC)	Regional advocate for clean energy. Supports NHSEA regularly in regulatory matters.
	Patricia A. Martin	Retired electrical engineer and Grid Mod collaborator.
	ReVision Energy	Northern New England's largest solar company.
	Revolution Energy	A pioneer in the business and policy innovation of DER integration. Represented by the author in Grid Mod and Net Metering dockets.
	The Nature Conservancy (TNC)	Environmental advocate.
National Interest Groups	Consumer Energy Alliance (CEA)	Trade association representing fossil fuel industries masquerading as a pro-solar advocate in Net Metering docket.
	Energy Freedom Coalition for America (EFCA)	Advocated on behalf of Tesla Inc. and subsidiary SolarCity in Grid Mod and Net Metering dockets.
	The Alliance for Solar Choice (TASC)	Advocates on behalf of U.S. solar industry.
Miscellaneous	Business & Industry Association (BIA)	Statewide chamber of commerce.
	Competitive Energy Suppliers	Direct Energy, Standard Power of America, etc.
	New England Ratepayers Association (NERA)	Anti-DER advocates.
	Granite State Hydropower Association	Represents New Hampshire hydropower industry.
	NH Legal Assistance	Advocates on behalf of low- and moderate-income groups.

The Public Utilities Commission – Regulatory Evolution for the 21st Century

The role of regulators is to bring the interests of the public and those of the corporations into identity.
– Charles Francis Adams Jr., 1870s (as cited in McCraw, 1984, p. 32)

Every U.S. state has a Public Utilities Commission or the equivalent thereof. The Public Utilities Commission (PUC) is the institution that lies at the center of New Hampshire's energy policy-making community. It is both the physical space within which organizations convene to address policy challenges and the final decision maker. Because of its central importance, I will devote a few paragraphs to the PUC.

The PUC, not by design but by default, has become the authority responsible for resolving 21st century energy policy challenges and facilitating the integration of solar, batteries, demand response, and other DERs into the electric system. Facilitating DER integration represents a dramatic departure from the traditional role of the Commission: monopoly ratemaking.

Historically, Commissions have played the role of neutral arbiter, an impartial judge presiding over evidence-based contests between utilities and consumer advocates to ensure monopoly power is not abused to extort exorbitant profits from the general public. The PUC's mandate includes the responsibility for ensuring decisions reflect the public interest. Commissions also check monopoly power and balance the interests of utility shareholders and electricity consumers much in the way a judicial body uncovers the truth: through adversarial legal contests between utility lawyers on the one side and regulators and consumer advocates on the other with the goal of arriving at Goldilocks outcomes, rates that are not too high and not too low but just right.

Three important points to acknowledge and consider regarding the role of the PUC:

1. In the absence of another state agency with the resources, expertise, and mandate to manage 21st century electricity market design, the onus to do so has fallen on the Commission as the most practical of a limited number of available candidates (despite requiring it to diverge from its original function of setting monopoly energy rates).
2. While energy policy making occurs through Commission proceedings, the Commission itself is not the policy designer, but rather the final rule-making arbiter who, after all of the evidence has been presented, after the last witness has said his piece, decides the final outcome. Special interests, utilities, solar companies, environmental and consumer advocates, and fossil fuel lobbying groups provide the content on which final rulings are based.
3. The traditional PUC process for resolving disputes, while providing opportunities for collaborative approaches to decision making, invariably leads to an adversarial hearing in which opposing coalitions are pitted against one another. The traditional, adversarial process was designed for monopoly ratemaking and not for managing competitive DER integration and resolving 21st century energy policy challenges.

Today, the PUC must adapt to take on its new responsibility of resolving 21st century energy policy challenges, but it remains encumbered by an adversarial architecture designed for its 20th century function of monopoly utility ratemaking. PUC adjudication is ill-suited for addressing 21st century energy policy challenges. Like the energy sector surrounding it, the Commission is in a state of evolution. In order to successfully carry out its new function, the Commission must reassess its regulatory strategy.

The following excerpt from Thomas K. McCraw's Pulitzer Prize-winning history of regulation summarizes his core thesis and provides valuable lessons for regulators:

> More than any other single factor, the underlying structure of the particular industry being regulated has defined the context in which regulatory agencies have operated… The industry may be regarded as the dog, the regulatory agency only as the tail. Yet many students of regulation have assumed that tails wag dogs and, further, that one standard type of tail can wag whatever breed of dog may be attached. Such observers… have missed a larger truth: the industries that these similarly-structured commissions regulated were extremely diverse. Thus these observers have duplicated the errors made historically by many regulators themselves, who often paid more attention to legal processes and administrative procedures than to the greater task of framing strategies appropriate to the particular industries they were regulating. For all parties who seek to understand regulation, the most important single consideration is the appropriateness of the regulatory strategy to the industry involved (McCraw, 1984, p. 305–306).

McCraw's argument is that regulatory strategies must be designed to match the underlying structure of the particular industry they propose to regulate. His central point is that the careless transposition of a regulatory strategy from one industry to the next without consideration of the differing structures of the industries is synonymous with failure. The danger at present is, as Commissions across the country pivot to face the disruptive challenges due to the proliferation of DERs, they may ignore McCraw's warning and attempt to meet these challenges with the same tools and mindsets that served them in regulating monopoly utilities. A more effective method would be for regulators to study and acknowledge the dramatic differences between the structure of the centralized, monopolistic, and unimaginative utility industry of the 20th century and the decentralized, competitive, and ever-innovating DER industry of the 21st century.

Today's context of burgeoning DER markets and traditional utility sector disruption call for new regulatory approaches. Sonia Aggarwal, a leading thinker in 21st energy policy issues, articulates well the obsolescence of old approaches to regulation:

> Traditional regulation was quite effective when we were trying to build out the power grid to meet growing demand for electricity and provide universal access to electricity. Now, we are in a period of flat or even declining electricity demand, and the old utility value engine is running out of gas. Costs have plummeted for new technologies, offering new opportunities for utilities to

> optimize energy use. At the same time, third parties are taking advantage of those new technologies to offer products and services directly to customers—effectively competing with utility business and eroding sales. This is all happening amidst a growing imperative to clean up emissions from the power system – for reasons of national security, economic stability, public health, and climate change. Utilities are important institutions intended to serve the public interest cost-effectively. And a new regulatory approach… can help keep utilities financially healthy as they deliver customer and societal value during this time of transition (Aggarwal, 2016, p. 1).

A 2017 report from Lawrence Berkeley National Laboratory is similarly critical of adjudication, siting, "litigated process, poor communications, relationships that do not build trust, and a lack of consensus about outcomes" as key impediments to the alignment of utility incentives and public policy goals (LBNL, 2017, p. 75). The 21st century electricity system will have to incorporate and integrate the expertise and interests of both the utility sector and the DER sector, but strict adjudicatory contests are not conducive to the integration of these two camps and the production of creative, mutual-gain solutions.

Alternatively, collaborative processes, mediation, and consensus building are more likely to allow the stakeholders to collectively answer the difficult and complex policy challenges presented by today's energy environment. In New Hampshire specifically, numerous stakeholders and several studies have already recommended the PUC adopt a more collaborative approach to better address the challenges of the day (Vermont Energy Investment Corporation [VEIC], 2011; New Hampshire Office of Legislative Budget Assistant [NHLBA], 2012; Hatfield, et al., 2013; VEIC, 2013; NH Office of Energy and Planning [NHOEP]).

In general, energy policy disputes can be managed according to one of two approaches: adjudication or collaboration. Adjudication is the conventional structure of regulatory energy policy-making proceedings and it has historically fulfilled a cost-of-service ratemaking function for monopoly utilities. In 2011, a legislatively commissioned study of New Hampshire energy policy issues found the PUC's "adjudicated regulatory proceedings are perhaps the least effective forum for contemplating program design changes, and reaching agreement on how effective they

will be at market development and transformation" (Vermont Energy Investment Corporation [VEIC], et al., 2011, p. 1-10). Similarly, a 2013 energy policy report by former Governor Hassan's Energy and Environment Transition Team found "regulatory processes are outdated," and a PUC that is "reactive and not goal oriented… hampered by a long tradition of a standard approach" in which "innovation is suppressed" (Hatfield, et al., 2014, p. 2, 7, 7). The report continues, "all processes are adversarial" and leave "no institutional capacity for collaboration" (Hatfield, et al., 2014, p. 7). The report recommends a number of remedies for what it views as an outmoded and inadequate regulatory approach to modern challenges, namely adapt the PUC to function as "a forum that is more conducive to collaboration and less focused on litigation" (Hatfield, et al., 2014, p. 7). Additionally, the report argues, "innovation and collaboration require a stable and coordinated government-supported foundation upon which the private sector can build" (Hatfield, et al., 2014, p. 1).

Contrasting Collaborative and Adjudicative Dispute Resolution

Collaborative approaches to dispute resolution have been used to address contentious and complex electric utility regulatory issues in the past and have been shown to improve utility regulation (Raab, 1994). In this section I will contrast collaborative and adjudicative approaches to dispute resolution according to three types of characteristics: basis for dispute resolution; process design; and process outcome. Table 1.4 summarizes the characteristics of the two approaches to dispute resolution. The table represents the theoretical types of collaborative and adjudicative processes. In practice, all processes embody characteristics of both types in varying degrees and will fall somewhere in between these two ends of the spectrum.

Table 1.4 – Characteristics of Collaborative and Adjudicative Processes

	Collaborative	Adjudicative
Basis for Dispute Resolution	Characterized by integrative interest-based negotiation	Characterized by positional and rights-based bargaining
	Information used as a common resource	Information used to further each side's position
Process Design	Process tailored by stakeholders	Process prescribed, same for all cases
	Procedures position parties as joint problem solvers	Procedures position parties as adversaries
Process Outcomes	Produces mutual gain solutions	Produces winner-take-all outcomes
	Promotes positive relationships	Damages relationships
	Collaboration institutionalized	Maintains silos of actors

Basis for Resolving Disputes

Standard energy policy-making processes, such as PUC adjudication, often follow rights-based approaches in which independent standards of fairness or legitimacy are used to evaluate a dispute. A third-party neutral entity presides over disputes and makes a ruling on who is right (Raab, 1994; Rogers, et al., 2013). In New Hampshire, the Commission acts as the neutral arbiter and decision maker. Rights-based approaches to dispute resolution result in positional bargaining (Rogers, et al., 2013). Parties come to the table with their positions already established and miss the opportunity to collectively brainstorm various creative approaches to both the process and the solutions. Parties are also likely to take extreme positions in anticipation that their opposition will do the same, which can obscure each party's true interests and antagonize their opponents. Extreme positions also lead to costly and time-consuming negotiations in which high amounts of energy are devoted to achieving small concessions. Furthermore, when parties bargain over positions, they become attached to and defensive about positions, which limits their ability to consider alternatives that might equally or better satisfy their interests (Lewicki, et al., 2011;

Fisher & Ury, 2011). In positional bargaining, parties make no effort to understand each other's interests except in order to undermine or discredit them. In traditional adversarial dispute resolution processes, parties often enlist their own experts to cherry pick evidence supporting their own positions and discrediting the positions of their opponents. Each party comes to the table with their own sets of facts (Matsuura and Schenk, 2017).

In collaborative processes for dispute resolution, sometimes referred to as integrative negotiation or problem-solving negotiation, stakeholders begin by communicating their interests rather than attempting to achieve positions. This focus on *interests*, rather than *positions*, allows for learning and creative brainstorming of various possible solutions to satisfy interests. Stakeholders assign differing levels of value to different issues and trade across differences, rather than working to discredit the position of their opponent in order to win favor for their own position (Fisher & Ury, 2011).

Emerson, et al. (2011) identifies *principled engagement* as one of three key aspects of any successful collaborative process. Principled engagement is comprised of four elements: discovery, definition, deliberation, and determination. *Discovery* refers to participants sharing their interests and concerns and learning about the interests and concerns of each other. Through sharing and learning, participants develop shared *definitions* of problems and can *deliberate* the key issues that the process will seek to address. Finally, discovery, definition, and deliberation produce initial *determinations* about the focus and objectives of the process (Emerson, et al., 2011).

Specifically in utility regulation, collaborative processes have succeeded in allowing parties to jointly seek out and share the best technical information and use it as a common resource (Raab, 1994). Joint fact-finding challenges all parties to collaboratively generate shared

sets of facts for decision making. There are four key steps in joint fact-finding (Matsuura and Schenk, 2017):

1. Parties define information needs (i.e., data needed to make the best decision)
2. Parties translate needs into research questions
3. Parties partner with respected, trusted technical experts to devise and conduct research and study
4. Parties jointly receive the results and consider implications.

Joint fact-finding allows parties to use information as a common resource rather than as a weapon to attack one another.

Process Design

Conventional approaches to dispute resolution do not take into consideration the unique circumstances of each dispute but rather follow the same generic procedure regardless of the case (Innes & Booher, 2003). Disputants have no role in designing the approach to resolving disputes. Agendas tend to be prescribed by an external authority or decision maker. Rituals, routines, habits, and procedures of the conventional system constrain participants and stifle creativity. The rigid boundaries of what can and cannot be a topic of discussion limit the range of possible solutions (Forester, 1997; Innes & Booher, 2003; Rogers, et al., 2013; Ulibarri, 2015). Conventional rights-based processes limit face-to-face contact among disputants to rule-bound and adversarial contexts (Gray, 1989).

Alternatively, collaborative processes are designed by the stakeholders to meet the unique circumstances on a case-by-case basis (Rogers, et al., 2013; Schenk & Stokes, 2013). Through collaboration stakeholders contribute to the designing of the process. Furthermore, the design

phase of the process is not a one-and-done occurrence at the beginning of the process: it is an iterative process of designing and redesigning. Throughout the duration of the collaboration stakeholders must be able to follow the conversation where it leads and not be confined by rules about what can or cannot be discussed or what can or cannot be changed (Innes & Booher, 2003). The flexibility of such inclusive collaboration empowers stakeholders to tap into all of their knowledge and creativity in solving any number of interrelated problems rather than focusing on issues in isolation from one another. In utility regulation, collaboration allows parties to bypass confining or dated precedents and legal restrictions in favor of more practical and flexible solutions (Raab, 1994). Bypassing the obstacles of traditional legal process enables parties to jointly work out technical details at a granular level that is near impossible in contested cases (Raab, 1994).

Process Outcomes

Most of the research addressing environmental conflicts and environmental conflict resolution comes in the form of single descriptive case studies, making generalizability difficult. Additionally, outcomes of environmental conflicts tend to be difficult to measure (Emerson, et al., 2003). This is particularly true for my three case studies: because of the current nature of the cases there has not been sufficient time to attempt to measure the environmental outcomes of the decisions. Instead, I focus on stakeholder perceptions of the process and its outcomes.

Rights-based adjudicative processes often result in winner-take-all outcomes, leaving at least one party feeling like the loser and thus more inclined to pursue costly appeals or litigation (Ury, et al., 1988; Fisher & Ury, 2011; Rogers, et al., 2013; Schenk & Stokes, 2013). Winner-take-all results can strain or damage relationships, foster bitterness and resentment among

parties, and increase the likelihood of dispute recurrence (Gray, 1989; Ury, et al., 1988; Fisher & Ury, 2011; Rogers, et al., 2013; Schenk & Stokes, 2013). Conversely, interest-based collaborations allow for solutions that meet the interests of all parties, which in turn deters further disputes, and reduces long-term transaction costs (Ury, et al., 1988; Rogers, et al., 2013). Integrative bargaining creates space for positive-sum games in which one party's gain does not necessitate another party's loss (Fisher & Ury, 2011).

Collaborative processes require that stakeholders engage with one another constructively and learn about each other's interests. As participants learn about the other parties they also build mutual trust, understanding, and respect, and thus build positive interpersonal relationships. Conversely, stakeholders tend to conceal interests in adjudicative processes. Rather than engaging openly and freely, interactions are often relegated to formal hearings and adversarial courtroom settings where stakeholders are positioned as opponents, which is more likely to negatively impact relationships.

In Emerson et al. (2011), a key aspect in successful collaborations is *shared motivation*, which also consists of four elements: mutual trust, understanding, internal legitimacy, and commitment. Here we see the beginning of relationship building, a phenomenon many have identified as an outcome of collaborative processes (Fisher & Ury, 2011; Forester, 1997; Baumann & White, 2013; Walker, et al., 2006; Innes & Booher, 2003; Rogers, et. al., 2013). Shared motivation has also been referred to as social capital (Emerson, et al., 2011). As collaborative processes build social capital among the diversity of parties engaged, they improve the ability of institutions to respond collaboratively to future challenges.

Finally, collaborative processes, and the positive impacts they can have on relationships, can foster new networks, organizations, forums, and institutions that continually grow and adapt

in a complex and changing world (Forester, 1997). As stakeholders move through collaborative processes, learn about each other, deliberate together, and build new relationships, they also begin the work of developing new institutions to support repeated use of collaborative governance. Stakeholders develop procedural and institutional arrangements to ensure the capacity and the infrastructure for continued interactions and collaborations over time (Emerson, et al., 2011). New institutions tend to be less hierarchical and more networked than their older, conventional counterparts. Flexible and networked structures empower stakeholders to challenge the status quo, which is essential in developing creative and innovative solutions to problems (Innes & Booher, 2003).

I do not intend to suggest collaborative processes are always superior to adjudicative processes for reaching decisions. Adjudication has the benefits of providing all stakeholders with a voice and ensuring policy proposals are supported by detailed evidentiary exhibits. Furthermore, just because stakeholders reach agreement on a policy does not necessarily mean the policy is in the best interests of all stakeholders or the broader public. An adjudicator can be held accountable to ensure the public interest is reflected in decision outcomes, in a way stakeholders cannot. Finally, adjudication can limit some power imbalances that could allow a more powerful group to out-manoeuver and impose an outcome on a less powerful group.

Research Design and Methodology

My overarching research question is: How does the New Hampshire Public Utilities Commission (PUC) process limit or support opportunity for collaboration? I answer this question by conducting an in-depth case study of the PUC as it grapples with the new policy challenges of distributed energy resource (DER) integration and 21st century electricity market design. To identify institutional opportunities and barriers, I analyze three PUC dockets:

- DE 15-137: Electric and Gas Utility Energy Efficiency Resource Standard (EERS) (Chapter 2)
- IR 15-296: Investigation into Electric Grid Modernization (Grid Mod) (Chapter 3)
- DE 16-576: Development of New Alternative Net Metering Tariffs and/or Other Regulatory Mechanisms and Tariffs for Customer Generators (Net Metering) (Chapter 4)

I selected these cases because they represent all of the PUC dockets occurring between 2015 and 2018 that bring together utilities and DER affiliates to address policy challenges of DER integration.

Case studies are an appropriate method for detailed qualitative studies of contemporary phenomena within their real-life context, especially when the boundaries between the phenomena and their context are unclear (Yin, 2014). The boundary between the policy processes addressed in the study and the context of an evolving energy sector is murky at best, making the subject well suited for a case study approach. This research is a single case study with three embedded units of analysis, the three dockets. Figure 1.6 depicts a timeline of the dockets.

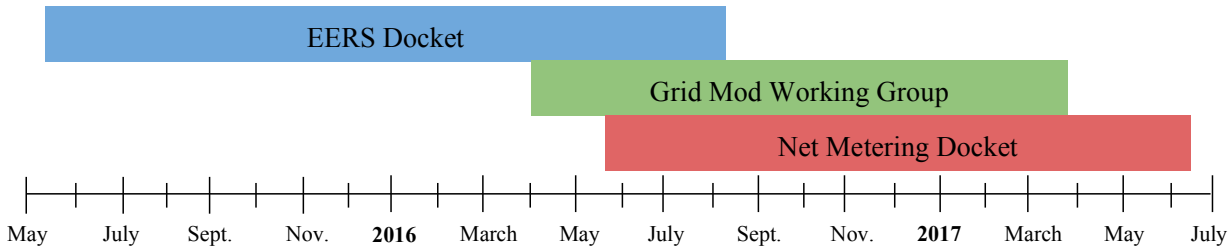


Figure 1.6 – Timeline of EERS, Grid Mod, and Net Metering Dockets

I break each docket into process stages and analyze each stage to identify collaborative and adjudicative characteristics. I also analyze the interaction among the individuals and organizations involved in the PUC policy processes. I call this organizational field New Hampshire's Energy Policy-making Community (see Fig. 1.5, p. 20). There are two accepted analogies for organizational fields: the game analogy and the ecological community analogy (Scott, 2008). According to the game analogy, rules govern relations among players who compete in an arena of conflict to win stakes. According to the ecological community analogy, organizations existing in the same geographic space and carrying out related functions develop relationships and interdependencies, much as organisms in an ecosystem might develop competitive or symbiotic characteristics (Scott, 2008).

Both analogies are helpful in conceptualizing New Hampshire's energy policy-making community/arena. However, the game analogy is too simplistic to capture the complexities of 21st century thinking. For this reason I prefer the ecological community analogy. I find it useful in reimagining the nuances of organizational relationships, the potential for a horticulturist to carefully coax and cultivate his garden towards a healthy symbiosis among organisms, a climax equilibrium.

Figure 1.7 is a model of the PUC's adjudicative process. The model represents the forum within which New Hampshire's energy policy-making community engages in policy design. The

model can be thought of as the arena in which the players of New Hampshire's energy policy-making game compete to win victories over one another. Alternatively, it can be thought of as the ecosystem within which the organisms comprising New Hampshire's energy policy-making community coexist and create structure for ecosystem functioning. For two of the three dockets explored in the coming chapters – the Energy Efficiency Resource Standard (EERS) (Chapter 2) and Net Metering (Chapter 4) – the Commission employed the adjudicative process depicted in Fig 1.7 to design policy and resolve disputes. I use Fig. 1.7 to create detailed process maps for the EERS (Fig. 2.1, p. 50), Grid Mod (Fig. 3.1, p. 87), and Net Metering (Fig. 4.2, p. 107) dockets; the descriptions below may be useful when deciphering these process maps. Electric Grid Modernization (Chapter 3) is an *investigative* docket, not an *adjudicative* docket; investigative dockets are used to study an issue and do not follow the model of the adjudicative process.

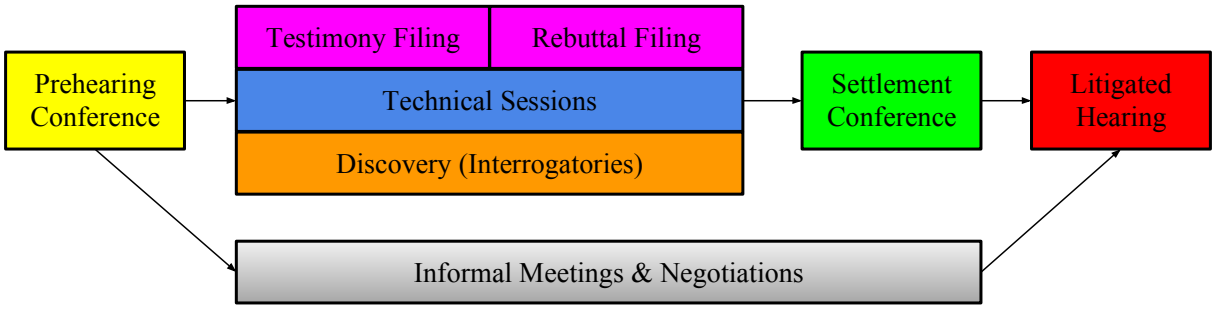


Fig. 1.7 – Model of the PUC Adjudicative Process

Below are brief descriptions of each stage of the adjudicative process:

The prehearing conference: The initial gathering of stakeholders (intervenors) and the Commissioners at the outset of a docket. Intervenors have the opportunity to formally comment on how the docket process should be conducted and articulate preliminary positions.

Testimony filing: Parties submit evidence or policy proposals for the Commission to consider when making its final ruling.

Rebuttal filing: Testimony that directly addresses the testimony of other intervenors or defends initial testimony against criticism.

Discovery: Intervenors subject one another other and their testimonies and rebuttal testimonies to written questions soliciting further information, data, etc. In addition to gathering information, the purpose of discovery is to build a record of evidence prior to the hearing by highlighting particular aspects or weaknesses in the testimony of others.

Technical sessions**:** Meetings in which intervenors set procedural schedules, hear presentations from experts, deliberate policy options, discuss discovery and discovery responses, or address a wide range of other issues throughout each docket.

Settlement conferences**:** The final opportunity for parties to negotiate a consensus agreement, or to negotiate consensus for a select number of issues prior to the hearing. Negotiations are confidential and in cases in which a settlement agreement is not reached, parties cannot present confidential settlement material as evidence in the hearing.

Informal meetings and negotiations: Intervenors negotiate with one another outside of official PUC meetings.

Hearing: The culmination of the adjudicative process. Evidence is entered into the record. Parties call witnesses to testify in defense of their proposals or in opposition to the proposals of others. Witnesses are subjected to cross-examination.

Table 1.5 – Characteristics for Collaborative and Adjudicative Processes (operationalized)

	Collaborative	Adjudicative
Basis for Dispute Resolution	Characterized by integrative interest-based negotiation	Characterized by positional and rights-based bargaining
	Information used as a common resource	Information used to further each side's position

	• Identify conflict management frames using interest and position frames identified in the literature. Examples:
	  o Interest: "We can agree on this, if you can agree that…"
	  o Position: "We insist on…"; "I won't go any lower than…"
	• Do stakeholders use information to clarify and solve problems or to support or undermine positions?
	• Identify intent of process component (Example: learn, brainstorm, deliberate, create record of evidence).
	• Identify explicit decision rules and stakeholders' decision-making goals.
	  o Do parties strive to reach decisions by consensus or by prevailing?	

Process Design	Process tailored by stakeholders	Process prescribed, same for all cases
	Procedures position parties as joint problem solvers	Procedures position parties as adversaries

	• Identify process as typical or unique based on participants' perception.
	• Identify process decisions (order, function of steps) and agenda decisions (range of issues) as either collective, unilateral, or set by authority.
	  o Example: Does process recommendation result from stakeholder dialogue and consensus or from only one stakeholder?
	• How do procedures organize stakeholder interactions?
	  o Example: Does one party direct interaction (verbal, written) or do multiple parties engage in free-flowing exchange?	

Process Outcomes	Produces mutual gain solutions	Produces winner-take-all outcomes
	Promotes positive relationships	Damages relationships
	Collaboration institutionalized	Maintains silos of actors
	• Does final decision meet the interests of multiple parties or only some? • Identify characterization frames o Example: How do parties perceive their relationships or attribute blame for problems? • Are new formal or informal collaborative procedures and institutions created?	

Table 1.5 combines the characteristics of collaborative and adjudicative policy-making processes and provides specific indicators for identifying them. I use table 1.5 to analyze

stakeholders' discourse (verbal, nonverbal, and electronic), proposals, and proceedings through participant observation, document analysis, and personal interviews during each component of the PUC process laid out in Fig 1.7. I also analyze the outcomes of each of the three cases (a policy ruling by the PUC in EERS and Net Metering, and a report in Grid Mod) using Table 1.5. In other words, I identify characteristics listed in Table 1.5 – Characteristics of Collaborative and Adjudicative Processes – within each component depicted in Figure 1.7 – Model of PUC Adjudicative Process – to identify opportunities and barriers for collaboration within the PUC process.

Although my findings are specific to New Hampshire, they may be applicable in other states grappling with the same energy policy challenges. Every U.S. state has an equivalent to the New Hampshire PUC, as does each Canadian province and territory, many U.S. territories, and many countries around the world. These Commissions generally serve the same function: cost-of-service ratemaking for monopoly utility corporations. Each Commission employs some form of adjudication as the tool for executing cost-of-service ratemaking and other functions. More than half of U.S. states have EERS policies (American Council for an Energy Efficiency Economy, 2017); more than half of U.S. state PUCs have addressed net metering in some form (Advanced Energy Economy, 2017); and 37 U.S. states took some form of policy action relating to grid modernization in 2017 (Trabish, 2017).

Data Collection

Table 1.6 summarizes my data collection methods for each of the three cases. For the three dockets collectively, I conducted participant observation over an 18-month period at PUC

technical sessions, working group meetings, settlement conferences, and hearings, and Energy Efficiency and Sustainable Energy (EESE) Board meetings.

I conducted 22 in-person and two telephone call in-depth interviews with stakeholders engaged in these energy policy-making processes (I list 30 interviews in Table 1.6 because several interviews addressed content for multiple dockets). Interviews are broken down by sector in Fig. 1.8. Interviewees represent state regulatory, energy, and environmental agencies, electric utility companies, business and trade associations, nonprofits, energy project developers, environmental advocates, and state legislators. I purposively selected stakeholders based on their participation in the three dockets and by using snowball sampling, meaning I asked each interviewee to recommend other interviewees they felt would contribute to the research. The personal in-depth interviews followed a semi-structured format, meaning I came to each interview with a set list of questions, but also allowed the interview to veer away from those questions in certain cases. Interviews lasted between 1 and 2.5 hours. Interviews took place at offices, coffee shops, and restaurants. In some instances, and with the interviewee permission, I digitally audio-recorded the interviews. I transcribed recorded interviews. I took either handwritten or typed notes immediately before, during, and immediately after each interview. Quotations from interviews are only attributed to individuals in cases where they gave explicit consent or they are public record. A sample interview protocol can be found in Appendix C. I did not interview PUC Commissioners. Commissioners were prohibited from engaging with me outside of official hearings due to my status as official intervenor in the Net Metering docket. Participant observation, interviews, and document analysis enabled me to triangulate my findings.

Table 1.6 – Summary of Data Collection Methods

Docket	Researcher's Role	Research Activities
EERS	Member of the public	• Attended 5 EESE Board meetings • Attended 4 technical sessions • Conducted 10 interviews • Reviewed documents & email communications
Grid Mod	Work Group Member	• Attended 8 Work Group meetings • Coordinated with Work Group members outside of meetings to complete homework assignments and draft language for the Final Grid Mod Report • Conducted 8 interviews • Reviewed documents & email communications
Net Metering	Intervenor	• Attended 5 technical sessions • Attended 5 confidential settlement conferences • Attended 3 days of litigated hearings • Attended 1 extracurricular stakeholder meeting • Conducted 12 interviews • Reviewed documents & email communications

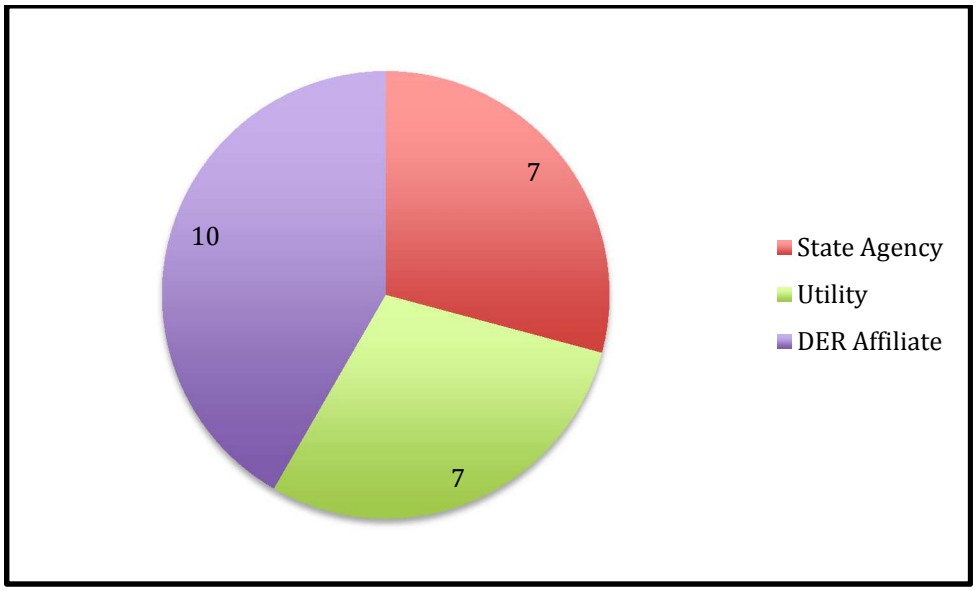


Fig. 1.8 – Interviews by Sector

I did not interview PUC Staff representing the Electric Division. Nor did I interview Commissioners. My formal roles as a Working Group Member in the grid modernization docket and as an intervenor in the net metering docket prohibited the Commissioners from having *ex parte* communications with me. For this reason they declined to be interviewed. I was able to gather data regarding the perspectives of these stakeholders through participant observation and document reviews of their official statements.

In addition to the three subcases of New Hampshire's PUC policy-making processes, I conducted eight interviews in Berlin, Germany with experts and professionals involved in both Berlin's and Germany's energy transitions, or *Energiewende*. Interviewees included consultants involved in designing the Erneuerbare-Energien-Gesetz (Germany's legislative policy mechanism guiding national deployment of renewable energy technologies), experts from prominent German energy think tanks, and professionals employed by Berlin's DER and utility sectors. Germany, the largest economy in Europe and the fourth largest economy in the world, is widely considered a leader in the sustainable energy transition, both for its high deployment of wind and solar energy technologies and for its ambitious emission reduction goals (Baake, 2013; Laes, et al., 2014). There are significant differences between Germany's energy policy context and New Hampshire's, such as the role of the federal government and state government over the electric power sector, differing German and American manners of regulation of public utility corporations and electricity markets, and fundamental disagreements regarding the role of government intervention in the economy. Nevertheless, Germany grapples with similar 21st century energy policy challenges as New Hampshire and the rest of the United States. The information gathered from these interviews provided useful insights to broaden my perspective of 21st century energy policy challenges and solutions and is summarized in Appendix D.

Analysis

I coded all documents, field notes, personal interview data, and electronic communications manually for recurring themes, following the approach described in Campbell, et al. (2013).

Based on the variables presented in Table 1.5 I created a preliminary codebook. In the codebook I listed preset codes and definitions and examples for each. Examples of codes include "information used to attack/undermine," "positional bargaining," "interest sharing," "flexible agenda," and "joint problem solvers." I initially used the codebook to code a semi-randomly selected transcript. Each transcript was numbered by line. I coded the transcript for both preset and emergent codes by bracketing a unit of data (i.e., word, phrase, sentence, paragraph) in the left-hand margin and writing the actual name of the code or codes for the unit of data in the right-hand margin. Brackets, delineated by line numbers, and codes were recorded and organized in an Excel workbook.

In duplicate copies of the Excel workbook, I removed codes leaving only line-numbers marked by brackets representing each unit of data receiving a code. A fellow researcher coded the same transcript with uncoded brackets using my codebook. Code reliability was calculated by dividing the number of agreeing codes by the total number of data segments coded.

After calculating inter-coder reliability the team discussed codebooks and made recommendations on codes and code definitions. We then discussed specific instances of coding disagreement and sought to reconcile differences. The discussion focused on why codes were selected and how they related to the literature, research designs, and the data. I revised the codebook iteratively, adding emergent codes, deleting codes, integrating multiple codes, disaggregating single codes into multiple codes, and rewriting code definitions.

Early inter-coder reliability testing produced 23% reliability in codes, meaning that 23% of coded segments were coded for the same theme by myself and by the secondary coder. After discussion of disagreements and revision of codebook, subsequent inter-coder reliability tests produced 60% reliability in coding, a high reliability according to Campbell, et al. (2013).

***

The coming chapters are organized as follows. In chapter two I provide an overview of energy efficiency policy and review the PUC docket process for designing an Energy Efficiency Resource Standard (EERS). In chapter three I provide an overview of electric grid modernization and review the PUC docket process investigating the topic. In chapter four I provide an overview of net metering and review the PUC docket process for revising the state's net metering rate. In each chapter I analyze the process and outcomes for opportunities and barriers to collaboration. In chapter five I present a cross-case analysis, summary findings, recommendations, and a conclusion.

CHAPTER II: ENERGY EFFICIENCY RESOURCE STANDARD

In this chapter I provide a brief overview of energy efficiency and energy efficiency policy in New Hampshire. I then provide an overview of the New Hampshire Public Utilities Commission (PUC) docket for establishing an Energy Efficiency Resource Standard (EERS), a central policy for achieving statewide energy savings. Next, I describe each stage of the docket process in greater detail and analyze them for opportunities and barriers to collaboration. I then review the content of the EERS policy decision and analyze it according to stakeholder outcomes. I close the chapter with a discussion.

What is Energy Efficiency?

Energy efficiency means using less energy to provide the same service. Common examples of energy efficiency investments include replacing incandescent lighting with compact fluorescent lighting, replacing dated fuel-guzzling boilers with modern ones, replacing older energy-hungry appliances with efficiency-certified ones, and improving building envelopes with better insulation. Energy efficiency is a passive distributed energy resource.

Investments in energy efficiency result in positive economic externalities. In addition to the monetary benefit of a quick return on investment for the individual investing in energy efficiency (often three to four years), there are additional benefits to the energy system, other ratepayers, the state economy, and the environment. Investments in energy efficiency bring down overall demand for energy, which reduces price by reducing overall system use and stress and deferring costly investments in system expansion. Efficiency helps mitigate the upward trend in

electricity prices for all ratepayers. Efficiency also provides environmental and public heath benefits by reducing air pollution (e.g., sulfur compounds, oxides of nitrogen, particulate matter, mercury) and greenhouse gas emissions that contribute to climate change. Because of these positive externalities, it is the policy of the state to support energy efficiency programs. For more on the benefits of energy efficiency, see Lazar & Colburn (2013) and VEIC (2013).

NHSaves is the utility-administered energy efficiency program in New Hampshire that distributes rebates and offers financing options for energy efficiency upgrades to qualifying individuals, businesses, and municipalities. The Energy Efficiency Resource Standard (EERS) is a policy that expands funding for existing energy efficiency programs and sets specific energy savings targets.

Energy Efficiency Policy in New Hampshire

Four of the six New England states rank in the top six most energy efficient in the nation. Of the six New England states, New Hampshire ranks least energy efficient. In 2018, it will be the last of the six to implement an EERS, a policy that sets binding energy savings targets for regulated utilities (gas and/or electric). New Hampshire's energy savings targets under the newly established EERS are the least ambitious of the New England states, as illustrated by Table 2.1. Twenty-six U.S. states are currently implementing EERS policies and all of the top 15 energy-saving states in 2015 had adopted EERS policies (ACEEE, 2017).

Table 2.1 – New England State EE Ranking & EERS Electricity Savings Goals as of 2017

State	National EE Ranking	EERS Electricity Savings Goals
Massachusetts	1	Average incremental savings of 2.93% percent of electric sales for 2016–2018.
Vermont	3	Average incremental electricity savings of about 2.1% per year from 2015–2017.
Rhode Island	4	Incremental savings of 2.5% in 2015, 2.55% in 2016, and 2.6% in 2017.
Connecticut	5	Average incremental savings of 1.51% of sales from 2016 through 2018.
Maine	11	Electric savings of 20% by 2020, with incremental savings targets of ~ 1.6% per year for 2014–2016 and ~2.4% per year for 2017–2019.
New Hampshire	21	0.8% incremental savings in 2018, ramping up to 1.0% in 2019 and 1.3% in 2020.

Source: (ACEEE, 2017)

The EERS docket differed from standard PUC adjudications in several important ways. A typical PUC adjudication is initiated when a regulated utility petitions the Commission and files a proposal to adjust its rates or take some other action that requires regulatory approval. Participation is generally limited to a single utility, the Office of the Consumer Advocate (OCA), and Commission Staff. After the utility files its proposal, Staff and the OCA scrutinize the appropriateness of the requested action, extract further data and information through the discovery process, seek to resolve any disagreement through settlement negotiations, and finally engage in a litigated hearing to contest the proposal before the Commissioners who would make the final ruling.

The EERS docket differed from the typical PUC docket in origin, participation, content, and process. While most dockets are initiated by a utility filing, the Commission initiated the EERS docket in response to repeated recommendations and numerous studies insisting that the state revise and improve its energy efficiency policy (GDS, 2009; VEIC et al., 2011; VEIC,

2013; Hatfield et al., 2013; NH OEP, 2014). The EERS drew the attention and involvement of significantly more parties than the typical PUC docket. Its purpose, rather than to approve or disapprove the actions of a single regulated utility, was to design a complex statewide policy affecting all three investor-owned utilities. And finally, as will be shown, the EERS process differed from standard PUC procedure.

EERS Docket Process

In this section I provide a brief overview of the entire Public Utilities Commission (PUC) docket process for designing New Hampshire's EERS. I then analyze each stage of the process – including pre-docket planning, prehearing conference, technical sessions, testimony filings, discovery, settlement, external negotiations, and hearings – and identify opportunities and barriers for collaboration within each stage of the process.

The docket began when the Commission issued its order of notice on May 8, 2015 and convened a prehearing conference on June 3, 2015. Approximately 15 parties intervened (formally participated) in the docket. Following the prehearing conference stakeholders met in a series of technical sessions to hear presentations from technical experts, administrators of other New England EERS programs, and professionals from New Hampshire's utilities and to discuss policy options. After these sessions, three stakeholder groups filed different sets of testimony: the joint utilities (Eversource, Liberty Utilities, and Unitil), the Electric Division Staff, and the ad hoc Sustainable Energy Group (New Hampshire Sustainable Energy Association [NHSEA], Conservation Law Foundation [CLF], the Jordan Institute, Northeast Clean Energy Council [NECEC], and The Nature Conservancy [TNC]). Parties then conducted discovery on testimony filings. The joint utilities, the Sustainable Energy Group, Acadia Center, and the Office of

Consumer Advocate (OCA) then filed rebuttal testimony. Following testimony filings and discovery, the stakeholders engaged in settlement negotiations, both at official PUC meetings and at meetings hosted by non-PUC stakeholders. Following a settlement deadline extension, 20 parties filed a unanimously supported EERS proposal with the Commission. A panel of witnesses, comprised of representatives from Liberty Utilities, Eversource Energy, Department of Environmental Services (DES), PUC Electric Division, Acadia Center, and NHSEA, defended the consensus proposal in a hearing before the Commissioners. The Commission issued Order No. 25,392 on August 2, 2016, approving the settlement proposal in its entirety. The order directs the Energy Efficiency and Sustainable Energy (EESE) Board to take on a new function as advisory council to EERS implementation planning. Figure 2.1 maps the EERS docket process.

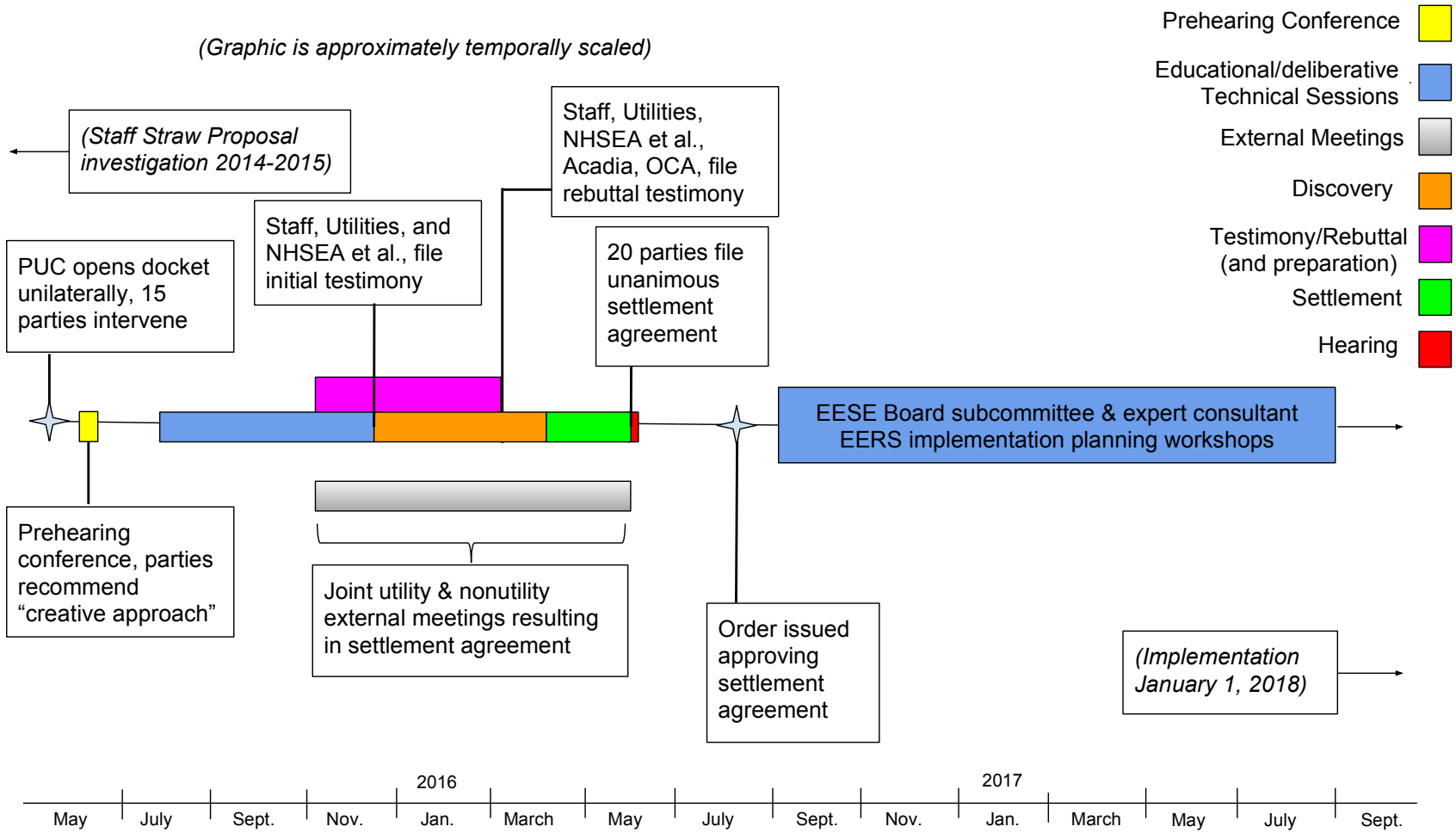


Figure 2.1 – EERS Docket Process Map

In this section I analyze each of the stages of the EERS docket process for opportunities and barriers to collaboration using Table 2.2. Table 2.2 comes directly from Table 1.5, p. 38 of my research design and is repeated here for the reader's convenience.

Table 2.2 – Characteristics of Collaborative and Adjudicative Processes

	Collaborative	**Adjudicative**
Basis for Dispute Resolution	Characterized by integrative interest-based negotiation	Characterized by positional and rights-based bargaining
	Information used as a common resource	Information used to further each side's position
Process Design	Process tailored by stakeholders	Process prescribed, same for all cases
	Procedures position parties as joint problem solvers	Procedures position parties as adversaries

Stage #1: Pre-docket Staff Investigation and EERS Straw Proposal

The PUC began planning for an EERS over a year in advance of the adjudicated docket. Between 2014 and 2015 Electric Division Staff conducted an *investigatory* docket. Over the course of a year Electric Division Staff distributed a questionnaire to the various stakeholder groups with an interest in state energy efficiency policy and followed up by conducting one-on-one interviews with each interested party. Interviewees included industry representatives, utility Core program administrators, energy efficiency product vendors, sustainable energy and energy efficiency advocates, relevant state agency representatives, representatives of specialist research institutions, Federal government agencies, and neighboring state experts. The Electric Division made an effort to keep an open door policy and encouraged members of the public to participate. Based on these efforts, the Electric Division produced an EERS Straw Proposal (NHPUC, 2015c).

Analysis – Process Design

The EERS investigation did not embody characteristics of a collaborative process. The procedures of the investigation prevented stakeholder interaction. While a stated goal of the Straw Proposal was to "further advance existing discussions among various stakeholders over implementation of a state-wide energy efficiency resource standard (EERS)" (NHPUC, 2015c, p. 3), the one-on-one interview format by which it was produced failed to create a free-flowing exchange of ideas among stakeholders. Electric Division Staff unilaterally made process and agenda decisions in the pre-docket investigation, which prevented stakeholders from coming together to discuss issues.

Several stakeholders would have preferred a different kind of process. For example, one representative of a state agency would have preferred an "open stakeholder process with education modules" rather than the one-on-one interview format (NH Interview 3, 2016). The same public servant commented, in reference to the Straw Proposal process, the "biggest frustration… we wasted a whole year of not being able to talk as a group and bat around ideas… We lost a year and we could have been having some level of group discussion" (NH Interview 3, 2016). The interviewee suggested the PUC should have enlisted a facilitator to conduct the process instead of relying on Electric Division Staff.

The process of the Straw Proposal allowed Electric Division Staff to learn, but failed to build any capacity among the stakeholders to interact or learn from one another. Multiple interview respondents reported that stakeholders did not have the opportunity to come together to discuss the EERS and therefore felt they missed an opportunity for collective learning. Utility and nonutility stakeholders referred to the yearlong Staff investigation and subsequent EERS Straw Proposal that preceded the actual EERS docket as "not collaborative at all," "a complete

failure" in which "a year was wasted" (NH Interviews 3, 4, 6, 2016). The manner in which the pre-docket Staff investigation was conducted limited opportunity for collaboration.

Table 2.3 – Pre-docket Staff Investigation and EERS Straw Proposal Analysis Summary

Basis for Dispute Resolution	Not applicable
Process Design	Not collaborative; face-to-face interaction limited; process and agenda decisions made unilaterally by PUC Staff

Stage #2: The Prehearing Conference: An Opportunity to Shape the Process

The prehearing conference is the first official meeting and marks the beginning of each PUC adjudication. It is also the last time the intervening parties, aside from PUC Staff, will have any direct interaction with the Commissioners until final hearings, many months later. Strict *ex parte* rules preclude the Commissioners from participating in technical sessions or engaging with intervenors outside of official hearings. This feature is designed to insulate the Commissioners from any illicit lobbying influence and to preserve their neutrality. During the yearlong process between the prehearing conference and the final hearings, the Commissioners' only source of information comes via official written testimony, evidentiary exhibits, and other legal filings, and through the counsel of their Staff who attend these meetings and interact with intervenors.

During the prehearing conference for the EERS, Commissioner Martin Honigberg explicitly invited stakeholders to share preliminary positions regarding the EERS, and, more importantly, solicited stakeholder input about *how* the EERS docket should proceed (NHPUC, 2015a).

PUC Staff initially suggested the Electric Division take the lead in EERS policy design by filing an initial policy proposal (testimony) for an EERS. However, a coalition of other stakeholders conveyed a decidedly different vision about the best way to design an EERS. Representatives from the Office of Energy and Planning (OEP), DES, and CLF delivered a

coordinated message advocating for an alternative PUC process, one that did not begin with a proposal from the Electric Division (NH Interview 3, 2016; NHPUC, 2015a).

OEP, DES, CLF, and other allies used the unique opportunity of the prehearing conference to engage with the Commissioners and outline an alternative to traditional adjudication. They suggested Electric Division Staff lacked the expertise and technical resources necessary to design something as complex and intricate as an EERS. They encouraged the Commission to seek outside assistance and tap the expert resources of organizations such as the Regulatory Assistance Project (RAP), Northeast Energy Efficiency Partnerships (NEEP), and professionals from more experienced neighboring states. They advised the Commission to begin the process with educational meetings and workshops to establish a base of information, instead of the standard approach in which parties begin by filing competing policy proposals and contesting aspects of one another's proposals. The parties suggested their alternative "creative approach" might better afford the group opportunity to develop one consensus-based proposal with the support of experts (NHPUC, 2015a).

Analysis – Process Design

The prehearing conference embodied characteristics of a collaborative process. It provided the stakeholders an opportunity to design the EERS docket process in a way different from typical PUC dockets. In contrast to the "very litigious filings" (FN., EERS, 2015) typical of the start of many PUC dockets, EERS stakeholders coordinated their efforts to collectively create a process to fit the unique circumstances of the EERS. The coalition of OEP, DES, CLF, and others suggested the Commission revise the order and function of the steps in the process to delay testimony filings and first convene a series of educational technical sessions. The coalition

created a process where the intended purpose of the early steps was to allow stakeholders to learn and to brainstorm options, rather than take positions or focus on creating a record of evidence. The Commissioners used the prehearing conference to invite free-flowing exchange of ideas by directing all intervenors present to, one-by-one, share ideas about how the process should proceed. The prehearing conference represented an opportunity to shape the process towards collaboration.

Table 2.4 – Prehearing Conference Analysis Summary

Basis for Dispute Resolution	Not applicable
Process Design	Collaborative; stakeholders are invited to make process recommendations; stakeholders make process recommendations to create space for collective learning and deliberation

Stage #3: Educational and Deliberative Technical Sessions

In response to the suggestion by OEP, DES, CLF, and other stakeholders, the Commission began the docket with a series of educational and deliberative technical sessions. Stakeholders from utilities, state agencies, environmental organizations, energy efficiency firms, and more convened over several months to hear from experts from RAP, NEEP, the investor-owned utilities, and administrators of efficiency programs in other New England states. Topics addressed in technical sessions included guiding principles and messaging, energy savings targets, program funding, rate structures, regulatory process, and stakeholder involvement.

Analysis – Basis for Dispute Resolution

The educational and deliberative technical sessions embodied characteristics of a collaborative process. The technical sessions allowed stakeholders to engage in dialogue, share interests, and learn from experts and from each other. Stakeholders gathered information for the purpose of clarifying issues, not for the purpose of undermining each other's positions. One

stakeholder felt, "[the technical sessions] helped us to get at questions like, 'why do utilities feel they can't do efficiency?'" (NH Interview 26, 2017). One DES representative described the technical sessions as follows:

> During numerous technical sessions, as well as some external EESE Board meetings, parties were able to hear from EERS experts… and administrators of other New England EERS programs, as well as experts from our utilities. The information imparted by these experts helped to educate all parties on the docket… Having the experts at the table during this whole process is what led us to all reach an informed group settlement. And I can't stress the importance of that enough (NHPUC, 2016a).

Stakeholders felt the addition of educational technical sessions was an essential process stage contributing the eventual unanimous consensus agreement. Experts assisted the stakeholders throughout the process, not only at discrete instances.

Analysis – Process Design

One participant commented that beginning with educational technical sessions was highly unusual (NH Interview 4, 2016). Another commented that the technical sessions, "Increased the level of understanding of all participants… [and] absolutely increased my understanding…" (NH Interview 26, 2017). The intended purpose of the technical sessions was to learn and to "create a basis of information" (NHPUC, 2015a), positioning parties more as joint problem solvers and less as adversaries. The technical sessions provided an opportunity for stakeholders to engage in collective learning prior to taking formal positions.

Table 2.5 – Technical Sessions Analysis Summary

Basis for Dispute Resolution	Collaborative; information and technical expertise shared among stakeholders to build collective understanding; parties able to brainstorm and share interests without formally taking positions; experts participated throughout process
Process Design	Collaborative; stakeholders agreed on process and agenda decisions; created space for free-flowing exchange of ideas

Stage #4: Testimony Filing, Discovery, and Rebuttal Filing

Following the educational technical sessions, three groups filed testimony: the joint utilities, the Sustainable Energy Group, and the Electric Division Staff. In testimony filings, parties take positions in the form of recommendations for how the Commission should design the EERS. Table 2.6 highlights some examples of the positions taken in initial testimony.

Table 2.6 – Example Positions from Initial Testimony

	Issue Area and Position Taken		
Stakeholder Group	**Cumulative Savings Targets as % of Sales for years 2017–2019**	**Program Administration**	**Utility Lost Revenue Recovery**
Electric Division Staff	Electric Savings: 2.04% of sales Gas Savings: 2.39% of sales.	Utility-administered efficiency programs should collaborate with permanent EESE Board EERS Advisory Council.	Adoption of LRAM for initial three-year period to be replaced in the future by full decoupling.
Joint Utilities	No explicit position	Utility-administered programs with input from EESE Board EERS Advisory Council.	LRAM preferred; decoupling requires full ratecase.
Sustainable Energy Group	Electric Savings: 3.1% of sales Gas Savings: 2.25% of sales of sales.	There may be benefits from transitioning some or all program delivery to a statewide program administrator.	Full decoupling is preferable to an efficiency-specific LRAM.

After initial testimony, the Sustainable Energy Group, the joint utilities, Electric Division Staff, OCA, and Acadia Center filed rebuttal testimony. Rebuttal testimonies addressed positions and issues raised in the initial testimony of others. Parties may not raise new issues in rebuttal. All testimony and rebuttal testimony are subject to discovery requests from other parties.

Analysis – Basis for Dispute Resolution

Testimony filing, discovery, and rebuttal were all characteristic of adversarial, rights-based dispute resolution. Parties took positions oftentimes in opposition to the positions of others. Information in testimony filings was used to shore up one's own position in preparation

for the contested, adversarial hearing. The intent of testimony filing was to provide each stakeholder group an opportunity to present evidence in support of their position and to create a record of evidence in preparation for the final hearing.

The Sustainable Energy Group's rebuttal testimony depicted a clear effort to undermine and discredit the position of other stakeholders, in this case, the Electric Division. The rebuttal testimony called attention to the "inconsistency of the [Electric Division] Staff's position" in designing calculations for program cost recovery, claiming "[Electric Division] Staff did not research this issue" and that "[Electric Division] Staff's proposal includes several 'adjustments' to the calculation of lost revenue that are… either unnecessary or inappropriate" (Loiter, 2016, p. 7, 8, 9). The author of the rebuttal testimony stated, "I have never seen an adjustment like this. I believe this adjustment is inappropriate and that it demonstrates a lack of understanding regarding energy efficiency programs and utility load forecasting" (Loiter, 2016, p. 10). One representative from the joint utility coalition commented that, from the point of view of the utilities, the Sustainable Energy Group's rebuttal testimony was "spot on" and that the Sustainable Energy Group is "able to say things that the utilities can't really say" (NH Interview 4, 2016). Positional framing and an effort on the part of stakeholders to use information to undermine one another's positions characterize this example of rebuttal testimony. Efforts were focused on one party prevailing over another, and not on reaching consensus.

Analysis – Process Design

Testimony filings are typical of PUC adjudication. However, testimony filings are usually the first step in PUC adjudication. In the case of the EERS docket, stakeholders designed the process so that testimony filings were postponed until after deliberative and educational

technical sessions, and in this sense, testimony filings were characteristic of collaborative processes.

The procedure of testimony filing was both collaborative and adjudicative. The three coalitions – the joint utilities, the Electric Division, and the Sustainable Energy Group – each filed a competing proposal making a case for their own vision of the final policy. In this way, procedures positioned parties as adversaries. However, parties who join in coalitions – as NHSEA, CLF, the Jordan Institute, NECEC, and TNC did (all of which are DER affiliated organizations) – can be positioned as joint problem solvers.

Rebuttal testimony is typical of traditional PUC adjudication. Procedures organize stakeholder interactions to be one-directional, as opposed to a multi-lateral free-flowing exchange of ideas.

Table 2.7 – Testimony, Discovery, and Rebuttal Filing Analysis Summary

Basis for Dispute Resolution	Not collaborative; characterized by positional/rights-based bargaining; information used to further own position and undermine positions of others
Process Design	Mixed; stakeholders collectively re-ordered process steps to delay testimony filing until after collective learning and interest sharing; one-directional attacks on positions, as opposed to free-flowing exchange

<u>Stage #5: Joint Utility and Nonutility External Meetings</u>

After the educational and deliberative technical sessions, and in parallel to PUC settlement conferences convened at the PUC, sustainable energy advocates and utilities met outside of formal meetings to negotiate a settlement proposal.

Analysis – Basis for Dispute Resolution

Multiple interview respondents underscored the fact that stakeholders convened informal meetings outside of the PUC because they felt Electric Division Staff were acting as a barrier to

reaching consensus (NH Interviews 3, 4, 5, 6, 7, 14, 2016). One utility stakeholder described the process as, "Two ends of the spectrum [utilities and sustainable energy advocates] agreeing and the regulators in the middle upsetting things, making it harder to reach agreement" (NH Interview 5, 2016). An environmental advocate commented, "Utilities and other stakeholders had shared interests that PUC [Electric Division] Staff did not necessarily share, and because of this, there were these [informal] meetings" (NH Interview 13, 2016). The decision-making goal of external negotiations was to reach consensus, something stakeholders felt they were not able to accomplish during formal meetings.

Analysis – Process Design

Utility representatives and sustainable energy advocates felt Electric Division Staff were making process and agenda decisions unilaterally. In response, the groups collectively made their own process decision to host their own meetings, thus designing their own collaborative process. According to one stakeholder,

> A lot of collaboration goes on not at the PUC, not at scheduled meetings. Some non-Staff participants in this are frustrated that we haven't gotten further than we have, and we've been holding our own meetings to see can we put together a consensus on some major items so areas of litigation are reduced. A number of interveners and utilities are having sidebar conversations because we know we are not agreeing with PUC [Electric Division] Staff… How [Electric Division] Staff runs meetings is the reason others have decided to have our own meetings. [Electric Division] Staff hasn't let us choose our own topics. If we have more to talk about we have more to talk about. [Informal negotiations] are very necessary, very productive. In two hours, two weeks ago [during informal negotiations], we made more progress than this whole process has made in five months. It is important for all parties to have conversations outside of formal settings (NH Interview 3, 2016).

Stakeholders designed their own informal negotiations and used them as an opportunity to work together as joint problem solvers and thereby minimized the number of issues decided in the hearing. Typically, when settlement is not reached and there are competing sets of testimony, the hearing positions parties as adversaries where each side cross-examines witnesses in an effort

to discredit and undermine the positions of others. In the case of EERS, the stakeholders' informal meetings allowed them to avoid the typical scenario of engaging as adversaries in the hearing.

Table 2.8 – Joint Utility and Nonutility Informal Meetings Analysis Summary

Basis for Dispute Resolution	Collaborative; intent to reach consensus; created space for free-flowing exchange of interests and collective learning
Process Design	Collaborative; stakeholders made process and agenda decisions collectively

Stage #6: Settlement

The PUC convened a series of settlement conferences in April 2016. On April 16, twenty parties filed a unanimously supported settlement agreement. The settling parties include Liberty Utilities, Unitil, Eversource, the New Hampshire Electric Cooperative, PUC Electric Division Staff, OCA, DES, OEP, New Hampshire Community Action Association, The Way Home, CLF, the Jordan Institute, Acadia Center, TRC Energy Services, New Hampshire Community Development and Finance Authority, and NECEC.

Analysis – Basis for Dispute Resolution

The intent of settlement is to reach consensus and avoid litigation. According to one stakeholder, "everyone's desire is to not have this litigated. In an ideal world, we would have a settlement with no litigation… no cross-examination. We would simply go to the PUC and say, 'here is our agreement'" (NH Interview 3, 2016).

One utility stakeholder commented,

> [Electric Division] Staff were excluded from the settlement agreement at first in EERS. Some parties did not want Staff to be included in the discussions. They were frustrated with Staff, they felt Staff was stuck in their ways and they didn't want to deal with them. We brought staff in at the end and were basically like, "here is our agreement, sign it or don't" (NH Interview 14, 2016).

Multiple interview respondents perceived Electric Division Staff as rigidly clinging to their positions and thus convened their own settlement negotiations outside of formal meetings, as described previously. However, once the utility and sustainable energy advocate stakeholders reached agreement, they approached the Electric Division Staff using positional framing.

Analysis – Process Design

One stakeholder commented, in reference to settlement conferences, "[Electric Division] Staff like to be in charge of [meetings], they like to control the agenda, control the questions. Staff like to monopolize these meetings and this give others no time to be productive. It gave us all a reason to have other meetings" (NH Interview 13, 2016). Some stakeholders perceived Electric Division Staff as making process and agenda decisions unilaterally during official settlement conferences.

Table 2.9 – Settlement Analysis Summary

Basis for Dispute Resolution	Mixed; while intent was to reach consensus, stakeholders felt formal settlement conferences were insufficient to share interests, learn, and reach consensus
Process Design	Not collaborative; broad stakeholder perception that Electric Division Staff made process and agenda decisions unilaterally

Stage #7: Hearing

On the day of the hearing, a witness panel comprised of representatives from Liberty Utilities, Eversource Energy, DES, the PUC Electric Division, Acadia Center, and NHSEA took the stand to testify on behalf of the unanimously supported settlement agreement. The witnesses explained the contents of the settlement agreement to the Commissioners. The Commissioners asked clarifying questions and engaged the witnesses in dialogue.

Analysis – Basis for Dispute Resolution

Because of successful efforts to build a consensus, beginning in technical sessions and continuing through settlement and informal negotiations, parties were able to avoid the adversarial nature of a contested hearing. In place of the typical adversarial hearing, stakeholders used the EERS hearing as an opportunity to explain the details of their proposal to the Commissioners. The Commissioners engaged the parties with questions and dialogue for the purpose of learning and bettering their understanding of the agreement. At the hearing, the settling parties used information to clarify issues for the Commissioners, not to undermine anyone's position.

Table 2.10 – Hearing Analysis Summary

Basis for Dispute Resolution	Collaborative (because consensus agreement reached); Commissioners asked questions and used information to clarify issues, not to undermine or attack positions
Process Design	Not applicable

Content of the EERS Policy

In this section I review the content of the EERS policy decision and analyze the decision according to whether or not it produced predicted stakeholder outcomes of collaborative processes, according to Table 2.11. Table 2.11 comes directly from Table 1.5, p. 38 of my research design and is repeated here for the reader's convenience.

Table 2.11 – Stakeholder Outcomes of Collaborative and Adjudicative Processes

	Collaborative	**Adjudicative**
Process Outcomes	Produces mutual gain solutions	Produces winner-take-all outcomes
	Promotes positive relationships	Damages relationships
	Collaboration institutionalized	Maintains silos of actors

Some of the issues addressed in the EERS docket are:

- Energy savings targets
- Funding
- Program cost recovery and utility lost revenue recovery
- Program administration and stakeholder involvement
- Evaluation, Measurement, and Verification (EM&V)

The following subheadings describe each of these issues in greater detail.

Energy Savings Targets

The Commission-approved settlement agreement puts forth the following energy savings targets as a percentage of 2014 delivered sales:

YEAR	ELECTRIC	GAS
2018	0.80%	0.70%
2019	1.0%	0.75%
2020	1.3%	0.80%

Efficiency savings are cumulative, meaning that by the end of the first three-year period, New Hampshire should have saved 3.1% of 2014 delivered electricity sales and 2.25% of 2014 delivered gas sales. This means, according to the 2018–2020 implementation plan, that customers will save more than $838 million dollars in energy expenses over the initial three-year period of the program (NHSaves, 2017).

Funding

The Commission-approved settlement agreement directs for ratepayer-funded energy efficiency programs. Efficiency programs are funded in part by a small surcharge on electric and

gas bills referred to respectively as the System Benefits Charge (SBC) and Local Distribution Adjustment Charge (LDAC). For example, prior to the EERS, Eversource electric bills included an SBC of 0.333 cents per kilowatt-hour (kWh). This 0.333 cents per kWh of electricity paid by Eversource customers goes into a pot of money to fund rebate programs that assist energy consumers in covering the cost of energy efficiency upgrades.

The EERS directs for incremental increases in Eversource's SBC from 0.333 cents per kWh in 2016 to 0.850 cents per kWh in 2020 and directs similar increases for the other utilities, virtually doubling the funding available for energy efficiency rebates for New Hampshire residents and businesses. As a result, by 2020 the average Eversource residential customer monthly bill will increase cumulatively by $3.25 or 2.8% and the average Eversource commercial & industrial (C&I) customer monthly bill will increase cumulatively by $51.97 or 3.1% in order to pay for the increase in funding (NHPUC, 2016a).

Program Cost Recovery and Utility Lost Revenue Recovery

The monies generated from the SBC are divided into three categories:

1. The Electric Assistance Program (EAP), which provides electric bill discounts for income-eligible customers (0.150 cents per kWh for Eversource in 2020). The EAP surcharge remains unchanged by the EERS;
2. Customer-wide energy efficiency rebate programs and their administration (0.609 cents per kWh for Eversource in 2020); and
3. A Lost Revenue Adjustment Mechanism (LRAM) to allow utilities to recover the lost revenue they experience due to the energy saved. In 2020, 0.091 cents per kWh paid by Eversource customers will compensate the company for an estimated $7.16 million in

lost revenues due to energy efficiency investments (Settling Parties in DE 15-137, 2016b).

Energy efficiency is the enemy of the traditional utility. Under the traditional regulatory/business model, energy efficiency reduces utility sales and revenues (National Renewable Energy Labs [NREL], 2009; National Association of Regulatory Utility Commissioners [NARUC], 2007; Moskovitz, 1992). This relationship between volume of electricity sold and revenue is called the *throughput incentive* and it is an important concept to understanding the conflict between utilities and distributed energy resource (DER) affiliates.

In order to obtain utility buy-in for energy efficiency programs, regulators allow utilities to collect subsidies from ratepayers for the revenue they lose due to energy efficiency programs. Under New Hampshire's EERS, utilities collect these subsidies through the LRAM referenced in the third bullet above. Subsidization of lost revenue is the priority issue for utilities.

Stakeholders designing the EERS considered two mechanisms to address utility lost revenue: LRAM and a decoupling mechanism. During the very first educational meeting to follow the EERS prehearing conference, one of the Regulatory Assistance Project's (RAP) utility regulation experts gave a presentation on why decoupling was the better option to addressing utility lost revenue (Lazar, 2015). A decoupling mechanism makes the utility financially indifferent to the volume of electricity it sells, whereas LRAM does not (Moskovitz et al., 1992; Gilleo et al., 2015;). In a simplified example, decoupling regulates utilities so their rates periodically adjust (increase or decrease) according to fluctuations in actual sales. If the utility is under-earning, its rates increase accordingly. If the utility is over-earning, its rates decrease accordingly. A decoupling mechanism ensures that energy efficiency is no longer the enemy of

the utility (Moskovitz, 1992; NARUC, 2007; NREL, 2009). Decoupling is the "superior solution" to the throughput incentive (Lazar, 2015).

Under LRAM, stakeholders estimate the amount of revenue a utility might lose due to investments in energy efficiency and allow the utility to collect subsidies for estimated lost revenue through a surcharge spread across all customers. Through this mechanism, utilities still experience a financial benefit from selling higher volumes of electricity and still experience financial losses due to lower electricity sales. The LRAM allows utilities to collect subsidies based on estimated energy savings, while still experiencing increased revenues from higher volumes of sales. Therefore, "for the utility… the way to play the [lost revenue adjustment] game is to maximize measured savings but not to actually save anything at all" (Gilleo et al., 2015). Commission Staff expressed concern that "unintended windfall profits" could accrue to the utility as a result of the LRAM (Cunningham, et al., 2015). One stakeholder involved in the EERS process describes the LRAM as "heads I win, tails you lose regulation… a toss of a coin in which utilities are compensated for a certain level of lost revenue regardless of whether that revenue was actually lost" (NH Interview 9, 2016).

The majority of nonutility stakeholders, excluding the Electric Division of the PUC, advocated for a decoupling mechanism to address utility lost revenue instead of an LRAM. However, according to the joint utility rebuttal testimony, "full decoupling… encompasses all aspects of an individual distribution company's business, not just its energy efficiency programs" and thus "can only properly be implemented following individual company full rate cases" (Davis E., et al, 2016). The settlement agreement addresses the compromise over LRAM and decoupling in this way:

> The Settling Parties agree that the LRAM for each utility will cease when a new decoupling mechanism, or another mechanism as an alternative to the LRAM, is implemented. The Settling Parties further agree that each of the Utilities shall seek approval of a new decoupling

> mechanism, or another mechanism as an alternative to the LRAM, in its next distribution rate case following the first triennium of the EERS, 2018–2020 (Settling Parties in DE 15-137, 2016a).

Evaluation, Measurement, and Verification (EM&V)

The Commission will hire an independent third party to audit energy savings calculations and lost revenue calculations.

Program Administration and Stakeholder Involvement – A New Advisory Role for the Energy Efficiency & Sustainable Energy Board

In many ways, the Commission's ruling is only the beginning of the EERS in New Hampshire. The Commission-approved settlement agreement stipulates that the utilities will continue to administer state energy efficiency programs through NHSaves, but it also directs the Energy Efficiency and Sustainable Energy (EESE) Board, in coordination with an expert consultant, to take on an advisory role to EERS implementation planning. The EERS will begin on January 1, 2018.

The Energy Efficiency and Sustainable Energy (EESE) Board was established in 2008 pursuant to RSA 125-O:5-a "to promote and coordinate energy efficiency, demand response, and sustainable energy programs in the state." The Board meets monthly and is comprised of representatives from a broad swath of organizations.[4]

A 2012 audit of the PUC and its administratively attached agencies, including the EESE Board, found that, "the EESE Board was not able to operate effectively, due primarily to a lack

[4] EESE Board members include representatives from: PUC; OEP; OCA; DES; the Department of Administrative Services; NH Municipal Association; NH Legal Assistance; Homebuilders and Remodelers Association of NH; two members of the House Science, Technology, and Energy Committee; one member of the Senate Energy and Natural Resources Committee; the Business and Industry Association (BIA); electric and gas utility efficiency programs; efficiency contractors; sustainable energy contractors; and a member of the investment community.

of resources and authority" and that because of these limitations, "in general had not fulfilled its statutory obligations" (NH LBA, 2012). In spite of the documented shortcomings of the volunteer board, the unanimously supported and Commission-approved EERS settlement agreement provides that the EESE Board take on the role of advisory council to final EERS design and implementation. The settlement also calls for the Commission to allocate funding to hire an expert consultant to assist the EESE Board in fulfilling this function. Over the course of 2017, a newly established subcommittee of the EESE Board worked with the consultant to host a series of workshops and to provide input to the utilities draft program implementation plans. The plans will be finalized in fall 2017 and EERS implementation will begin in 2018.

Analysis – Process Outcomes

Table 2.12 illustrates some of the issue areas and interests and positions of utility and DER stakeholders as they relate to these issue areas.

Table 2.12 Partial EERS Stakeholder Assessment Table

	Issue Area		
	Funding	*Lost Revenue/Cost Recovery*	*Program Administration*
Utilities	-Interest: Avoid lost revenue from energy efficiency funding -Position: Increase System Benefit Charge (SBC) to allow for lost revenue recovery consistent with energy efficiency funding	**PRIORITY ISSUE** -Interest: Avoid lost revenue from energy efficiency -Position: Recover subsidies for lost revenue through LRAM	-Interest: Retain control of energy efficiency programs -Position: Utility administered programs
DER Affiliates	**PRIORITY ISSUE** -Interest: Maximize funding for energy efficiency -Position: Increase System Benefit Charge (SBC) to increase funding for energy efficiency	-Interest: eliminate utility aversion to energy efficiency -Initial position: implement decoupling mechanism -Final position: Implement LRAM	-Interest: Gain influence over program administration -Initial position: Transfer program administration to independent 3rd party -Final position: Establish stakeholder advisory board

Produces Mutual Gain Solutions

The EERS policy decision was largely an integrative agreement. The agreement met interests of the utilities on their priority issue by allowing them to collect subsidies for lost revenue due to energy efficiency through the LRAM. The agreement also contains language directing that utilities seek approval for a decoupling mechanism, or other mechanism, following the first triennium of the EERS. By addressing utility concerns over *lost revenue recovery* with LRAM and including language directing future action to address *perverse utility incentives* with decoupling, the agreement meets both utility and DER interests as they relate to these two issues. Finally, the agreement meets priority issues of the DER stakeholders by increasing statewide funding for energy efficiency and by setting mandatory energy savings targets for the electric and gas utilities.

The EERS process produced many of the predicted outcomes of collaborative processes. The ruling met the interests of all parties to a certain degree, as made apparent by the unanimously supported consensus agreement. However, consensus does not necessarily mean all stakeholder interests were equally met. Power imbalances can cause parties to arrive at consensus not because the agreement meets their interests to the fullest, but rather because the agreement is perceived as the best they can achieve considering the circumstances.

One example of how a power imbalance resulted in a consensus that favors some stakeholder interests over others has to do with ability of the utilities to shape the debate over whether to collect subsidies for lost revenue via LRAM or decoupling (p. 66-67). One public employee commented, “In [rebuttal testimonies] you see the utilities and [NHSEA] are pretty much in agreement related to LRAM [and in] consolidated disagreement with [Electric Division] Staff” (NH Interview 3, 2016). This agreement only occurred after utilities succeeded in framing

the negotiation by making the case that LRAM, not decoupling, would be the mechanism used by utilities to collect subsidies for lost revenue. The utilities successfully made the case that decoupling could only be addressed in a full rate case, should be excluded from the EERS process, and thus eliminated the priority policy option of DER affiliates from the negotiation. The utilities succeeded in removing decoupling as a policy option, despite many expert accounts that decoupling is the superior policy option (Moskovitz, 1992; NREL, 2009; Lazar, 2015; Gilleo et al., 2015). The ability of the utilities to shape the negotiation agenda in their own favor highlights the power imbalance between utilities and DER stakeholders.

Utilities derive power from their familiarity with both the PUC process and their technical expertise in the details of utility regulation. In this case, the utilities' power made them more effective at tailoring the agenda of the process to best suit their interests. Utilities have played the game of PUC adjudication for more than a century. Better still, the utilities constructed the game of PUC adjudication. They are the dominant, established species of the ecosystem. Their DER counterparts are amateurs, zealous but inexperienced and only beginning to understand the rules and strategies of the game.

This particular power imbalance has important implications. The final agreement was a product of consensus, but only after utilities succeeded in eliminating the priority policy option of the DER affiliates (decoupling) from the scope of the negotiation. Because of this, while the final agreement is a consensus, it still meets the interests of some stakeholders more fully than others. Utility interest in collecting subsidies for estimated lost revenues was fully met by the agreement, as their preferred mechanism of LRAM was agreed upon. DER interest in eliminating utility aversion to energy efficiency was not fully met through LRAM. LRAM was necessary in acquiring utility acquiescence to increased funding for energy efficiency, a priority

issue for DER stakeholders, but the underlying perverse incentive for utilities to maximize volumetric sales, a priority issue for DER affiliates, remains unaddressed.

Collaboration Institutionalized

In accordance with predicted outcomes of collaborative processes, the EERS process resulted in the creation of further space for utility and nonutility stakeholders to continue to work together to plan for EERS implementation in the form of the new advisory function of the EESE Board. Many different stakeholder groups met regularly to plan for EERS implementation over the course of 2017, causing further integration of utility and DER actors. One stakeholder described the EESE Board implementation workshops as a forum where utilities, Commission Staff, and other interested stakeholders work collaboratively. In describing the post-docket EESE Board implementation-planning phase, one stakeholder commented,

> [we] worked really collaboratively with PUC Staff and utilities to host workshops and info sessions… The utilities were really listening to people's thoughts and ideas on how we can take things from the status quo and grow them, move them in a different direction to get to the higher [energy] savings targets… The utilities did a fantastic job listening and participating… I think there is a really good working relationship between interested parties, utilities and [Commission] Staff (NH Interview 26, 2017).

Parties perceived the outcome of the EERS docket to improve relationships among the different stakeholder groups by creating a new forum for cross-sector collaboration in the EERS Advisory Board.

The outcome of the EERS docket also incorporated equity considerations, thus meeting the interests of the Consumer Advocate and New Hampshire's low-income communities. During the final hearing a representative from The Way Home, a low- and moderate-income advocacy organization, praised the settlement agreement for increasing the percentage of overall total efficiency program budget apportioned to the Home Energy Assistance Program from 15.5% to

17%. The increase in funding for low- and moderate-income groups is projected to result in 300 additional low- and moderate-income homes being weatherized in the first year and an additional 300 each year after that. The equity considerations of the settlement agreement highlight just one aspect of diverse stakeholders achieving their interests through the settlement (NHPUC, 2016a).

Table 2.13 – EERS Stakeholder Outcomes Analysis Summary

Process Outcomes	Reflective of predicted results of collaborative process; met utility interests (obtain subsidies for lost revenue) and DER interests (increase funding for energy efficiency); further institutionalized collaboration between utility and DER stakeholders through EESE Board advisory role in implementation planning

Discussion

In many ways, the EERS process embodied characteristics of a collaborative approach to dispute resolution. However, the collaboration was made possible not because of any longstanding institutional structure, but because of concerted efforts from a coalition of stakeholders at the outset to redesign that process to better suit the needs of the issues at hand. The OEP-led coalition assisted the Commission in adapting its process to fit to the complex and novel circumstances of the EERS, both in formal and informal meetings. The PUC structure, while not inherently conducive to collaboration, proved sufficiently flexible to allow for stakeholders to bend it towards collaboration.

Beginning with the prehearing conference, non-PUC stakeholders drove decision making that delayed proposal filings in favor of educational and deliberative meetings and the incorporation of expert resources which may otherwise have remained absent. The resulting technical sessions provided an opportunity for parties to better understand the complexities of utility financial incentives, and allowed utility and nonutility stakeholders to gain a better understanding of each other's interests. Importantly, this learning occurred before parties took formal positions through testimony filings.

The same OEP-led coalition that took charge of shaping the process from the outset also convened the informal negotiations between the sustainable energy advocates and utilities. These external meetings were essential in creating space for the free-flowing exchange that allowed parties to work together towards the eventual consensus agreement. It was through these informal meetings between utility and nonutility stakeholders that the parties came to reach the unanimous consensus agreement.

Table 2.14 – Summary of Characteristics of EERS Docket Stages

Process Stage	**Basis for Dispute Resolution**	**Process Design**
Pre-docket Staff Investigation and EERS Straw Proposal	Not applicable	Not collaborative; face-to-face interaction limited; process and agenda decisions made unilaterally by PUC Staff
Prehearing Conference	Not applicable	Collaborative; stakeholders are invited to make process recommendations; stakeholder process recommendations create space for collective learning and deliberation
Technical Sessions	Collaborative; information and technical expertise shared among stakeholders to build collective understanding; parties able to brainstorm and share interests without formally taking positions	Collaborative; stakeholders agreed on process and agenda decisions; created space for free-flowing exchange of ideas
Testimony, Discovery, and Rebuttal Filing	Not collaborative; characterized by positional/rights-based bargaining; information used to further own position and undermine positions of others	Mixed; stakeholders collectively re-ordered process steps to delay testimony filing until after collective learning and interest sharing; one-directional attacks on positions, as opposed to free-flowing exchange
Joint Utility and Nonutility External Meetings	Collaborative; intent to reach consensus; created space for free-flowing exchange of interests and collective learning	Collaborative; stakeholders made process and agenda decisions collectively
Settlement	Mixed; while intent was to reach consensus, stakeholders felt formal settlement conferences were insufficient to share interests, learn, and reach consensus	Not collaborative; stakeholders perceived Electric Division Staff as making process and agenda decisions unilaterally
Hearing	Collaborative (because consensus agreement reached); Commissioners asked questions and used information to clarify issues, not to undermine or attack positions	Not applicable

One emergent finding was the widespread dissatisfaction stakeholders felt towards Electric Division Staff of the PUC. Many stakeholders felt Electric Division Staff were neither equipped with the appropriate technical knowledge nor the appropriate facilitation skills to successfully manage the EERS docket process and steer the group towards a consensus agreement. Stakeholders from utilities, sustainable energy advocates, and state agencies alike repeatedly called attention to what they perceived to be the Electric Division's inability to successfully guide a collaborative and inclusive policy-making process, beginning with the pre-docket straw proposal and continuing through technical sessions, testimony filing, and settlement conferences. Stakeholders perceived formal PUC meetings led by the Electric Division as a barrier to reaching the collective goal of consensus and thus circumnavigated them through joint external meetings.

The EERS process is also suggestive of a power imbalance among the stakeholder groups. Utilities, being more familiar with the process and technical details of the PUC arena, succeeded in eliminating decoupling, a priority policy option for DER affiliates, from the negotiations. Power differentials can cause some stakeholder groups to be more or less effective at tailoring process agendas to suit their needs.

Finally, the outcomes of the EERS docket were concurrent with the predicted outcomes of collaborative processes. The interests of all stakeholders were satisfied to a high degree: utilities obtained LRAM subsidies for lost revenues and DER stakeholders obtained increased funding for efficiency and mandatory energy savings targets. While interests of DER stakeholders could have been better satisfied if the underlying perverse utility incentive to maximize volumetric sales were eliminated through a decoupling mechanism, they at least succeeded in including language in the decision that directs utilities to seek decoupling approval

following the first EERS triennium. Additionally, the final ruling directed for further collaboration between utility and DER stakeholders through the EESE Board advisory role in EERS implementation planning, further institutionalizing a collaborative approach to decision making.

The EERS docket represented an early attempt to shift the standard adversarial PUC adjudication towards a more collaborative approach better suited to address the challenges of 21st century electricity market design. But the collaborative path came about not as a product of the Commission's standard institutionalized procedure, but as a result of non-PUC leadership working to help the Commission redesign its process. The EERS process was successful in producing a consensus agreement because of the leadership of the individuals who were dedicated to corralling the broad range of viewpoints into one unanimously supported policy proposal. Stakeholders from across the spectrum, from public servants to utility managers to sustainable energy advocates, were dedicated to working together to build consensus and avoid litigation.

The EERS docket was a learning process for many stakeholders who came into the docket with varying degrees of experience and knowledge about both the PUC and the nuances of utility regulation. Many of the stakeholders who engaged in the EERS docket went on to participate in grid modernization (chapter 3) and net metering (chapter 4) dockets.

As will be shown in the coming chapter, the investigation into grid modernization lacked a similar commitment by stakeholders to reach across sectors to build consensus, especially outside of official working group meetings. While a collaborative process in name, the final grid modernization report is replete with contradictory recommendations highlighting the inability of the group to reach consensus on what grid modernization means for New Hampshire.

CHAPTER III – ELECTRIC GRID MODERNIZATION

Traditional cost of service regulation… is unlikely… to capture potential benefits from grid modernization for consumers and society.
–(Lawrence Berkeley National Laboratory, 2017, p.75)

In this chapter I provide an overview of electric grid modernization and explain some of the topics addressed by the Grid Modernization Working Group. I then provide an overview of the PUC docket process for investigating the topic of electric grid modernization. Next, I describe each stage of the investigative docket in greater detail and explain some of the concepts of grid modernization. I analyze each stage of the grid modernization investigation for opportunities and barriers to collaboration. I then analyze the outcome of the docket, the final grid modernization working group report, according to stakeholder outcomes. I close the chapter with a discussion.

What is Electric Grid Modernization?

Electric grid modernization aims to fundamentally remake the utility regulatory model so it may better facilitate the value-based proliferation of distributed energy resources (DERs). It is about making the electric grid more competitive and efficient. This goal can be accomplished by using new technologies to empower customers to reduce their energy costs while simultaneously reducing overall electric system costs.

Under the current regulatory structure the monopoly utility alone is responsible for electric grid planning and for making investments in electric system upgrades. However, with the advent of DERs, new players are vying for a chance to compete to make investments that add

value to the electric grid. These investments cover the range of DERs – from distributed solar, to battery storage, to management of electricity demand – but in order to capture the value of these resources, new regulatory approaches are needed. Utilities are unlikely to invest in grid modernization because, even though it may be the cheapest, most efficient option for electric system planning, it is often counter to their financial wellbeing (Lawrence Berkeley National Laboratory [LBNL], 2017).[5]

Two of the main categories of grid modernization topics laid out in the PUC order on scope and process and addressed by the grid modernization working group are:

(1) Utility cost recovery and incentives; and

(2) Customer engagement with DERs (including rate design, data issues, and customer education).

In this section I will first explain why traditional utility financial incentives are antithetical to grid modernization. I will then discuss issues of grid modernization through customer engagement with DERs, and more specifically (1) issues of utility and customer data; and (2) issues of time-variant rate (TVR) design.

The New Hampshire Grid Modernization Working Group spent considerable time and resources addressing issues of customer engagement with DERs, which makes up 16 pages of content in the report. Conversely, sections addressing distribution system planning and utility cost recovery make up a combined five pages of content in the report. For this reason, I will focus more attention on the issue of customer engagement with DERs.

[5] Recall the *throughput incentive* (the incentive for the utility to increase volume of sales). This is one of the components of the traditional regulatory model that prevents the utility from embracing grid modernization. Decoupling is therefore a key component of grid modernization, but because decoupling was addressed in the EERS settlement it was not addressed by the Grid Modernization Working Group (Chapter 2, p. 65–68).

Utility Cost Recovery and Financial Incentives

In order to understand the challenge of grid modernization, it is important to first understand the perverse financial incentives of the traditionally regulated utility.

According to Lawrence Berkeley National Laboratories [LBNL], 2017, p. 75, "financial incentives for regulated utilities are misaligned with public policies... traditional regulation does not incent utilities to support increased customer sovereignty." Again, customer sovereignty, or customer engagement and empowerment through access to DERs, was the major focus of the New Hampshire Grid Modernization Working Group, the idea being that customers can be empowered to adopt new technologies to reduce their own costs and to optimize the electric grid. The problem is that increased customer sovereignty in this sense is antithetical to the utility's bottom line under traditional regulatory approaches.

The most apparent perverse utility incentive is the *throughput incentive*, or the direct positive relationship between volumetric sales of electricity and utility revenue (chapter 2, p. 66). Another perverse utility incentive is a colloquially referred to as the incentive to *gold plate the rate base*. Because of its regulated monopoly status, the utility has a financial incentive to engage in excessive capital accumulation and to increase capital expenditures above economically efficient levels (Averch & Johnson, 1962; NHPUC, 2016b). This is because the utility's rate of return is set by central planning regulation and not by market forces. The regulators set a rate of return for the utility, and the utility then generates that rate of return on the value of its *rate base.* The rate base comprises all of the assets the utility owns for which it receives a regulated return on investment. The rate base may be comprised of power plants, transmission lines, substations, distribution poles and wires, meters, etc. The higher the total value of the utility's rate base, the greater its earnings. Thus the regulatory trope: *gold plating the*

rate base. If the utility invests in gold-plated substations, the value of its rate base will increase and so will its earnings. The incentive is formally known as the Averch-Johnson (A-J) effect.

Because of the A-J effect, it is counter to the financial interests of the utility to accommodate third party DERs as alternative solutions to grid needs, regardless of the ability of such alternatives to meet grid needs at competitive costs. If DERs can offset the need for the utility to make large capital expenditures on rate base expansion, the utility loses out on an opportunity to increase its earnings (NHPUC, 2016b). One can imagine a case in which demand management, energy efficiency, distributed generation, or energy storage, empowered through economically accurate price signals, might displace the need for a utility to invest in traditional poles and wires grid expansion (e.g., substation upgrade, transmission extension). However, it is against the financial interests of the utility to support these *non-wires alternatives* that offset the opportunity for it to grow its rate base. The challenge of grid modernization is aligning the financial incentives of utilities and third party DER providers so the deployment of DERs is beneficial to the utility, the third-party, the user, and the grid as a whole.

Customer Engagement with DERs (Data Issues and Rate Design)

The PUC order on scope and process emphasized customer engagement and suggested customers can be educated and empowered to reduce both their own energy costs and overall system costs through smart metering technology, access to real-time information, and DER integration (NHPUC, 2016b). Third-party access to utility and customer data and time-variant rates (TVR) are the two main customer engagement approaches addressed by the New Hampshire grid modernization working group. These two issues are also the source of the most disagreement between utility and nonutility stakeholders.

Data Issues

DER providers and utilities have conflicting interests when it comes to data collection and sharing issues. DER providers want to compete with utilities to make distribution system investments, but in order to do so they require equal access to utility data (see policy challenge #6, p. 17). Table 3.1 from the final Grid Modernization Report (and originally from a SolarCity white paper) (SolarCity, 2016)) illustrates the types of data DER providers seek access to. SolarCity – represented by the Energy Freedom Coalition of America (EFCA) in both the grid modernization and net metering dockets – contends that if DER providers, such as itself, have access to *temporal* and *geographic* data about utility distribution systems (i.e., daily, monthly, annual electricity demand/load profiles of individual segments of the distribution system (circuits/feeders)), then they will be able to deploy DERs to meet distribution system needs more cost effectively than traditional utility investments.

Table 3.1 – Data to Foster Engagement in General Grid Design and Optimization

Data Need	**Description**
Circuit Model	The information required to model the behavior of the grid at the location of grid need.
Circuit Loading	Annual loading and voltage data for feeder and SCADA line equipment (15 min or hourly), as well as forecasted growth
Circuit DER	Installed DER capacity and forecasted growth by circuit
Circuit Voltage	SCADA voltage profile data (e.g., representative voltage profiles)
Circuit Reliability	Reliability statistics by circuit (e.g., CAIDI, SAIFI, SAIDI, CEMI)
Circuit Resiliency	Number and configuration of circuit supply feeds (used as a proxy for resiliency)
Equipment Ratings, Settings, and Expected Life	The current and planned equipment ratings, relevant settings (e.g., protection, voltage regulation, etc.), and expected remaining life.
Area Served by Equipment	The geographic area that is served by the equipment in order to identify assets, which could be used to address the grid need. This may take the form of a GIS polygon.

Source: Grid Modernization Working Group, 2017

Utilities tend to disagree with the premise that entities other than they should have much to do with making distribution system investments, as exhibited by the following excerpt from Unitil's comments submitted after the final Grid Modernization Report:

> Unitil sees itself as responsible for implementing enabling technologies supporting both traditional electric company operations and new smart grid capabilities… Unitil's business model is changing in order to become an 'enabling platform' supporting diverse activities by third parties and electricity customers… A fundamental premise in the development of this reliable system is that one entity, the utility, is responsible for its planning. While traditional utility planning will evolve to incorporate new technologies, new services and the input and needs of new stakeholders… the planning, design and operation of the distribution system is the responsibility of the utilities and needs to remain as such (Epler, 2017).

Unitil's comments highlight one of the central challenges of grid modernization: who will be able to partake in the planning and deployment of DERs, to what degree, and in what form? In one breath, Unitil assures the Commission that the company is becoming "an 'enabling platform' supporting diverse activities by third parties and electricity consumers" while firmly maintaining, "one entity, the utility, is responsible for… the planning, design and operation of the distribution system" (Epler, 2017). The counterargument from SolarCity and other DER providers is that the utility can only become an enabling platform by empowering third parties and electricity consumers to participate in the planning, design, and operation of the distribution system by providing access to utility data.

Rate Design

> *If utility customers could be persuaded through price signals to reduce their consumption (or to shift consumption to off-peak hours), then existing plants could better serve their needs. New construction could be delayed, perhaps defeated altogether.*
> –Thomas K. McCraw (1984)

The second key to grid modernization through customer empowerment is rate design, specifically, time-variant rate (TVR) design. TVR is not a novel concept in utility regulation, but the emergence of DERs has brought the TVR debate back to center stage.

Amidst the energy crisis of the 1970s, economist Alfred E. Kahn, the newly appointed Chair of New York's Public Service Commission, famously responded by implementing TVR to more accurately communicate to energy consumers the real costs of their consumption. In place

of typical flat rates (rates that remain unchanged regardless of demand at the time of consumption) Kahn established time-of-day price differentials with ratios as high as 12:1. Electricity was priced at 3.5 cents/kWh on a normal summer day, 2.5 cents/kWh during the night, and 30 cents/kWh on hot days summer days when demand for air-conditioning skyrocketed. Until this incorporation of economically accurate price signals, gluttonous demand for artificially cheap air-conditioning drove significant system cost increases, as it required utilities to invest in expensive system expansion (McCraw, 1984).

The point of TVR is to communicate to consumers, and particularly peak-time users, the reality of the costs they impose upon the system and to reward off-peak users for helping to realize a higher economic efficiency in overall system usage. In the time of Kahn, these price signals applied only to *consumption* of electricity. Today, the same principles can be applied to the *distributed generation* of electricity and across the plethora of DERs. For example, in the same way Kahn used TVR to communicate the *cost* of peak-time energy consumption, TVR can also be used to communicate the *value* of peak-coincident distributed generation and the services of other DERs. The challenge lies in designing TVR that address utility cost recovery concerns *and* create a value-based DER marketplace.[6, 7]

***

Three of the core issues of grid modernization are: (1) perverse utility financial incentives that make grid modernization antithetical to the current utility bottom line; (2) access to utility and customer data as a necessary component of grid modernization; and (3) how time-based rate

[6] Remember, because of the *throughput incentive* (Chapter 2, p. 66) utilities "want" to grow demand, and because of the *A-J effect* (Chapter 3, p. 79–80), utilities "want" to accumulate excessive capital through system expansion.

[7] Recall, states used real-time pricing and access to *transmission* infrastructure to make *bulk generation* and *wholesale* electricity markets competitive and more economically efficient. Similar principles apply to *distributed generation*, *distributed* energy resources, and *retail* electricity markets (Chapter 1, p. 9–12)

design for consumption, distributed generation, and energy management can empower grid users to realize a more efficient and competitive marketplace. Table 3.2 illustrates utility and DER interests as they relate to these three issue areas.

Table 3.2 – Partial Grid Modernization Stakeholder Assessment Table

	Issue Area		
	Utility Incentives and Cost Recovery	*Data Issues*	*Rate Design*
Utilities	**PRIORITY ISSUE** Interest: Avoid risk and uncertainty Position: Traditional incentives foundational to utility revenue; new business models are risky and uncertain	Interest: Minimize time and resources for data collection and sharing Position: Distribution system planning should be responsibility of utility alone; 3rd-party investments remove profit opportunity	Interest: Know effect on utility revenue Position: Using coincident and non-coincident peaks to inform TVR is complicated -Closely tied to utility incentives and cost recovery
DER Affiliates	Interest: Foster competitive markets for retail energy services Position: Traditional incentives antithetical to DER integration	**PRIORITY ISSUE** Interest: Foster competition, consumer choice, and grid efficiency Position: Data collection and sharing are needed	**PRIORITY ISSUE** Interest: Promote more efficient energy consumption/production patterns Position: TVR will stimulate markets for DER

The issues of most importance to utility stakeholders are utility incentives and cost recovery, which dictate utility profitability. The priority issues for DER affiliates are data collection and sharing issues and rate design issues, because DER affiliates believe data driven, time-based rates will animate markets for their services. An integrative agreement is one that would allow utilities to achieve their interests in cost recovery, while also allowing DER affiliates to achieve their interests regarding data and rate design. However, as will be shown, utility and DER stakeholders were unable to reach an integrative agreement that allowed each to achieve their interests on their priority issue.

In the coming section I will analyze each stage of the Grid Modernization Working Group process – including pre–working group planning and data gathering; working group

meetings (technical sessions); joint utility and nonutility informal meetings; and separate utility and nonutility caucusing – and identify opportunities and barriers for collaboration within each using Table 3.3. Table 3.3 comes directly from Table 1.5, p. 38, of my research design and is repeated here for the reader's convenience.

Table 3.3 – Characteristics of Collaborative and Adjudicative Processes

	Collaborative	**Adjudicative**
Basis for Dispute Resolution	Characterized by integrative interest-based negotiation	Characterized by positional and rights-based bargaining
	Information used as a common resource	Information used to further each side's position
Process Design	Process tailored by stakeholders	Process prescribed, same for all cases
	Procedures position parties as joint problem solvers	Procedures position parties as adversaries

Electric Grid Modernization Docket Process

In many ways, the New Hampshire grid modernization investigation built upon the foundation laid in Massachusetts several years prior. The Massachusetts working group embodied one of the first attempts in the U.S. to define the scope of grid modernization and started from a virtually blank slate.

The New Hampshire grid modernization docket was an *investigative* docket, as opposed to an *adjudicative* docket, making it different from the Energy Efficiency Resource Standard (EERS) docket (Chapter 2) and Net Metering docket (Chapter 4). The EERS and Net Metering *adjudicative* dockets, through testimony filings, settlement negotiations, and litigated hearings, produced official rulings setting forth imminent and impactful policy. In contrast, the grid modernization *investigation* took the form of a collaboratively facilitated working group and produced a report with policy recommendations. Unlike adjudicative dockets, investigations do not result in any policy changes. Investigations are solely for the purpose of studying an issue.

Because the grid modernization docket was an investigation and not an adjudication, its process does not conform to the model of a PUC process depicted in Figure 1.7 in Chapter 1 (p. 36).

House Bill 614 directed the PUC to open a docket on electric grid modernization. Between August 2015 and April 2016 the PUC collected data and comments from interested stakeholders on grid modernization. The PUC incorporated information from this pre-docket stage into the subsequent order on scope and process for the docket. The PUC also enlisted consultants Raab Associates and Synapse Energy Economics to facilitate the forthcoming working group process.

Seventeen organizations and individuals submitted requests to participate in the grid modernization working group and all requests were granted. Investor-owned utility participation was required. Between April 2016 and February 2017, facilitators Raab Associates and Synapse Energy Economics convened eight official working group meetings (which are, for all intents and purposes, the same as technical sessions). Stakeholders also convened in ad hoc groups outside of official working group meetings to draft recommendations and language for the report. Some ad hoc meetings convened both utility and nonutility stakeholders. The majority of ad hoc meetings consisted of separate utility and nonutility caucusing. Raab Associates submitted the final report to the Commission in March 2017. Figure 3.1 maps the grid modernization docket process.

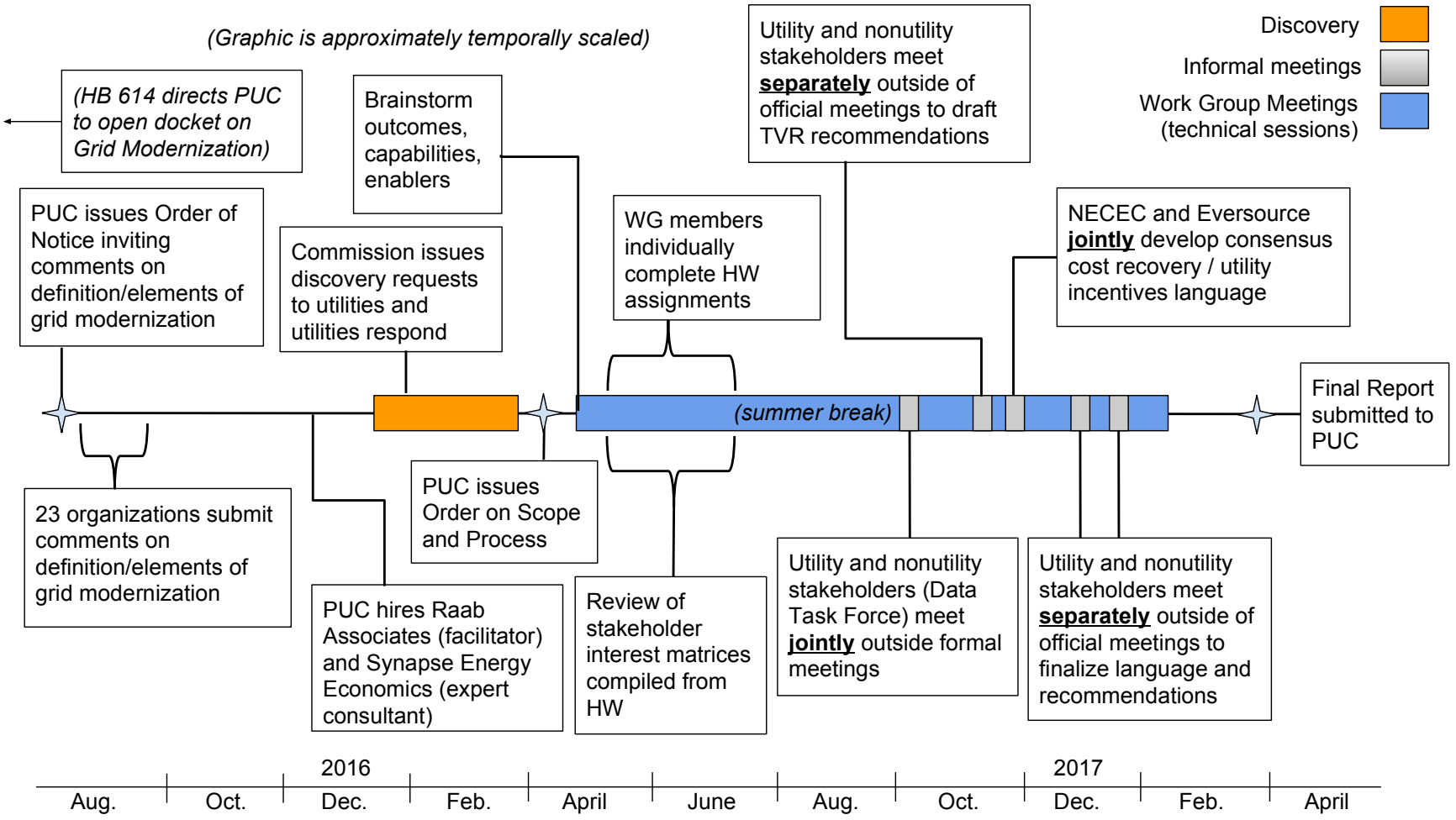


Figure 3.1 – Electric Grid Modernization Docket Process Map

Stage #1: Pre–Working Group Planning and Data Gathering (August 2015 – March 2016)

The first step in the New Hampshire grid modernization process was for the Commission to solicit stakeholder input on the definition and elements of the subject through written comments. Twenty-three organizations and individuals submitted written comments for the PUC's consideration.

The Commission also issued a round of discovery to the investor-owned utilities, soliciting information regarding the automation and communication capabilities of their metering and distribution systems (number and percent of smart meters, automated substations, etc.). The utilities (Eversource, Unitil, and Liberty) complied with the discovery requests.

In April 2016, the Commission, in partnership with consultants Raab Associates and Synapse Energy Economics (who had previously facilitated the Massachusetts grid modernization working group), authored and issued a detailed order on scope and process for the docket and invited stakeholder participation in the working group. Information from discovery requests was included in the Commission's order on scope and process and shared publicly.

Analysis – Basis for Dispute Resolution

This stage of the process embodied characteristics of a collaborative process in that information was collected to be used as a common resource, and not to further any one stakeholder's position or undermine the positions of others. The Commission collected information from interested parties through the comment process with the intent of using the information to inform the scope and process of the working group. Importantly, the Commission also collected information using the discovery process to determine what the current utility

infrastructure was capable of accommodating in terms of grid modernization and shared the information among all interested parties.

Analysis – Process Design

During the pre–working group planning and data-gathering phase the Commission and its consultants made agenda decisions after soliciting input from all interested parties, as is characteristic of a collaborative process. However, the procedures of the pre-investigation planning and data-gathering phase organized stakeholder interactions as one-directional. Stakeholders did not have an opportunity to meet face-to-face and engage in dialogue.

Table 3.4 – Pre–Working Group Planning and Data Gathering Analysis Summary

Basis for Dispute Resolution	Collaborative; collected information from interested stakeholders to inform scope and process; Commission shared information among stakeholders to be used as common resource
Process Design	Mixed; Commission invited input regarding process agenda, but no opportunity for face-to-face dialogue among stakeholders

Stage #2: Working Group Meetings (Technical Session) (April – February 2016)

Consultants Raab Associates and Synapse Energy Economics facilitated eight daylong New Hampshire Grid Modernization Working Group meetings (technical sessions). Table 3.5 lists the membership of the Grid Modernization Working Group. See Appendix

In initial meetings of New Hampshire's grid modernization investigation stakeholders were encouraged to brainstorm ideas about how they could build upon the foundation laid by the Massachusetts process. Early meetings also consisted of presentations from various stakeholder groups including the utilities, New Hampshire Sustainable Energy Association (NHSEA), and Retail Energy Supply Association (RESA). Stakeholders engaged in dialogue, shared their

interests, and deliberated in an effort to reach consensus on the many facets of grid modernization.

Table 3.5 – New Hampshire Grid Modernization Working Group Members

Organization / Individual	**Category of Actor**
Acadia Center	DER Affiliate
City of Lebanon, NH	DER Affiliate
Conservation Law Foundation (CLF)	DER Affiliate
Energy Freedom Coalition of America (EFCA)	DER Affiliate
Eversource Energy	Utility
Liberty Utilities	Utility
New Hampshire Department of Environmental Services (DES)	State Agency
New Hampshire Legal Assistance	Low Income Advocate
New Hampshire Office of Energy and Planning (OEP)	DER Affiliate
New Hampshire Office of the Consumer Advocate (OCA)	State Agency
New Hampshire Public Utilities Commission Staff (*ex officio*)	State Agency
New Hampshire Sustainable Energy Association (NHSEA)	DER Affiliate
Northeast Energy Efficiency Partnerships (NEEP)	DER Affiliate
Patricia Martin, Retired Engineer	DER Affiliate
Retail Energy Supply Association (RESA)/Direct Energy	Competitive Supplier
Revolution Energy	DER Affiliate
The Jordan Institute	DER Affiliate
Unitil Energy Systems Inc.	Utility

In between each of the first several meetings stakeholders were asked to complete homework assignments designed to identify different stakeholder interests. The facilitators compiled stakeholder interests into tables to share with the entire group to illuminate potential areas of agreement and disagreement. Facilitators then worked to reconcile disagreements during working group meetings.

Analysis – Basis for Dispute Resolution

The goal of the Grid Modernization Working Group, according to the ground rules laid out by Raab Associates and agreed to by all working group members, was to "make substantive

recommendations by unanimous agreement (i.e., consensus) of the Working Group members (organizations) where possible" (Raab, 2016), as is characteristic of collaborative processes.

Utilities and DER affiliates mixed interest and positional framing throughout working group meetings. For example, when addressing rate design and TVR, stakeholders individually completed homework assignments designed to discover different parties interests as they related to TVR. The working group facilitators compiled rate design interests in matrices and shared the matrices with the entire working group to be discussed. During working group meetings, facilitators worked to translate those interests into consensus recommendations for the report, but were often unable to do so.

The rate design section of the final Grid Modernization Report contains ten sets of dissonant recommendations labeled "utility recommendation" and "nonutility recommendation" (see Grid Modernization Working Group, 2017, p. 13–23). Below is an example of one such opposing recommendation:

> **Utilities**: Time-Variant Rates (TVR) for distribution services is not practical to implement, because distribution costs do not vary with time of use.
>
> **Nonutility Stakeholders**: Time-Variant Rates (TVR) [for distribution services] using simple on-peak and off-peak [Time of Use] periods should be implemented for all customers in the near future (Grid Modernization Working Group, 2017).

TVR design must take into consideration *costs* associated with energy demand and the *benefits* associated with DERs that can manage that demand. These costs and benefits apply differently to energy supply (*generation*), the *transmission* system, and the *distribution* system.[8] Much of the utility cohort takes the position that there is no time-of-use benefit or cost to the distribution and transmission systems. All other stakeholders take the position that there are time-of-use benefits to the transmission and distribution system associated with DERs.

[8] Figure 4.3, p. 117 is useful in understanding how utility rates are divided among these categories of costs.

Working group meetings were characterized by sharing of interests in an effort to reconcile them and reach consensus recommendations. When interests could not be reconciled, parties reverted to opposing positions.

Analysis – Process Design

The open dialogue format of working group meetings allowed stakeholders to engage in a free-flowing exchange of ideas and interests and thus positioned the parties as joint problem solvers. During early meetings, utility and nonutility stakeholders alike agreed by consensus to expand the list of desired grid modernization outcomes established by Massachusetts. For example, the New Hampshire Working Group included "customer engagement and empowerment" as a desired grid modernization outcome. This new and collectively agreed upon outcome then became the central focus of the entire working group process. In this way, stakeholders collectively made agenda decisions, as is characteristic of a collaborative process.

Table 3.6 – Working Group Meetings (Technical Session) Analysis Summary

Basis for Dispute Resolution	Collaborative; intent of process was to achieve consensus; experts enlisted to facilitate interest sharing; parties brainstormed, engaged in dialogue, shared interests; parties reverted to positional bargaining only when interests could not be reconciled
Process Design	Collaborative; stakeholders collectively made agenda decisions

Stage #3: Joint Utility and Nonutility External Meetings

During the working group process there were at least two instances of utility and nonutility stakeholders collaborating outside of official working group meetings to draft consensus language for the report. In one instance, representatives from the Northeast Clean Energy Council (NECEC) and Eversource worked together to draft language regarding utility

cost recovery and incentives. However, this section of the report is vague and lacks substantive recommendations. This is in part due to the way utility incentives were addressed in the EERS ruling. The EERS ruling directs utilities to recover lost revenue from efficiency through the LRAM and further directs utilities to consider *decoupling* after the first triennium of the EERS (see Chapter 2, p. 65–68). Because of this, utilities argue that the topic of correcting perverse utility incentives is outside the scope of the grid modernization discussion.

A second instance of joint utility and nonutility external collaboration occurred in the form of a volunteer subgroup task force on data issues. This task force met outside of official meetings and reached consensus language on principles of utility and customer data. Task force membership was self-selected and included both utility and DER affiliated stakeholders. Table 3.7 shows the data task force membership.

Table 3.7 – Grid Mod Data Task Force Membership

David Littell (facilitator)	Regulatory Assistance Project (RAP)
Melissa Birchard	Conservation Law Foundation (CLF)
Brianna Brand	New Hampshire Sustainable Energy Association (NHSEA)
Jim Brennan	Office of Consumer Advocate (OCA)
Justin Eisfeller	Unitil
Kate Epsen	New Hampshire Sustainable Energy Association (NHSEA)
Todd Griset	Energy Freedom Coalition of America (EFCA)
Mark Hanks	Direct Energy
Pat Martin	Retired Engineer
Kevin Sprague	Unitil

The data collection task force reached consensus on final report language pertaining to "Customer and Utility Data Principles," which include:

1. Sharing of data with the market (including third-party providers) can encourage market competition for the provision of advanced energy technologies.
2. In general, use of standards and protocols for data sharing can facilitate interoperability, empower third parties, and provide the opportunity for customers to reduce their costs or system costs. (Examples of data standards include: Standard Energy Services/Usage Data, Green Button, and "Connect My Data.")
3. Security is an inherent risk related to the sharing of customer data and must be addressed.

4. Interval data enables time varying rates, demand response, innovation, and can allow third-party service providers the opportunity to offer ways to reduce system costs, or for customers to reduce their own costs.
5. Aggregated customer information can be made available if certain protocols to protect individual customer usage and identity are adopted.
6. Individual customer data should be made available consistent with the requirements and protections set forth in RSA 363:38.
7. An individual customer is always free to share the customer's data with third parties, but utilities and third parties should take care to make customers aware of the risks created by such sharing (Grid Modernization Working Group, 2017).

While the data task force was successful in crafting consensus principles on utility and customer data, the working group as a whole was unable to reach consensus on many specific data recommendations. Where interests could not be reconciled to produce consensus language, the utility and nonutility stakeholders composed their own recommendations in which they defined their positions, but also explained the reasoning and interests behind those positions (See Grid Modernization Working Group, 2017, p. 25–26).

Analysis – Basis for Dispute Resolution

Utilities and DER affiliates mixed interest and positional framing when discussing data collection, access, and usage issues. Compiling the data requested requires intensive time and resources from the utilities and, thus, they view it as against their interests to do so. Additionally, as previously discussed, it may be damaging to the utility bottom line if third parties can take data and use them to invest in grid optimization. This combination of utility interests predisposes utilities to take the position articulated in Unitil's post-report comments: it is the perogative of the utility, and only the utility, to plan, design, and invest in distribution system upgrades.

Nevertheless, it is in the interest of the DER affiliates to obtain access to utility data because they believe the data would allow them to calculate more accurately the value their resources provide to the grid, thus allowing them to expand investment and growth opportunities

for their businesses. DER affiliates, therefore, take the position that utilities should collect and disclose temporal and geographic data about electricity usage across the electric distribution system.

Analysis – Process Design

The procedure of a volunteer task force meeting outside of official meetings positioned the stakeholders as joint problem solvers and resulted in consensus language regarding data principles. The task force convened at the recommendation of the facilitator, but membership was self-selected and in this way the task force was tailored by the stakeholders, as is characteristic of a collaborative process.

Table 3.8 – Joint Utility and Nonutility External Meetings Analysis Summary

Basis for Dispute Resolution	Collaborative; intent to share interests and learn with goal of consensus; when interests cannot be reconciled stakeholders revert to positional bargaining
Process Design	Collaborative; process decisions made collectively by group; group membership self-selected and representative of major stakeholder perspectives

Stage #4: Separate Utility and Nonutility Caucusing Outside Formal Meetings

Towards the end of the process, nonutility and utility stakeholders caucused separately outside of official working group meetings in several instances to craft recommendations and language for the report. When the two caucuses reconvened in official meetings, the facilitators attempted to reconcile positions into consensus recommendations but in many cases were unsuccessful.

The Joint Stakeholders (nonutility stakeholders) – including Acadia Center, City of Lebanon (CoL), Conservation Law Foundation (CLF), Northeast Energy Efficiency Partners (NEEP), Energy Freedom Coalition for America (EFCA), Department of Environmental Services (DES), New Hampshire Legal Assistance, The Jordan Institute, and Revolution Energy

– convened on several occasions in person and via conference call. The group made no effort to include utility stakeholders in these extracurricular meetings. Similarly, extracurricular meetings among the utility representatives made no effort to involve the perspectives of the nonutility stakeholders.

Analysis – Basis for Dispute Resolution

Separate utility and nonutility stakeholder caucusing set the stage for positional bargaining in the final months of the working group process. DER affiliates and utility stakeholders caucused separately and took opposing positions on final report recommendations. Parties opted to forgo the goal of consensus in favor of making recommendations more suited to their coalition's interests. The intent of the informal meetings hosted by DER affiliates was to craft recommendations that would allow them to better achieve their goals. The DER coalition did not make substantive efforts to reach out to the utility stakeholders during these meetings to seek consensus recommendations.

Analysis – Process Design

External caucusing that separately convened DER and utility stakeholders served to further the already well-established division between these two stakeholder groups. The traditional regulatory paradigm inherently sets utility and DER stakeholders at odds with one another in a zero-sum game where, without creatively redesigning regulatory approaches, one's gain necessitates another's loss. Without changes to the status quo utility business model, DERs serve to erode utility revenue. This inherent conflict was exacerbated by the separate stakeholder caucusing, which defined the final months of the grid modernization process. Rather than

seeking to learn from one another and strive towards mutual gain solutions, the two camps only became further entrenched in their existing adversarial positioning.

Table 3.9 – Separate Utility and Nonutility Caucusing Analysis Summary

Basis for Dispute Resolution	Not collaborative; led major stakeholder groups (utilities and DER affiliates) to become entrenched in oppositional positions
Process Design	Not collaborative; positioned major stakeholder groups (utilities and DER affiliates) as adversaries, not as joint problem solvers

Grid Modernization Process Outcomes

As of this writing there are no policy outcomes associated with the grid modernization investigation. For this reason, analyzing process outcomes is problematic. The only outcome is the final working group report to the Commission. In this section I review the content of the final Grid Modernization Report and analyze the report according to whether or not it produced predicted stakeholder outcomes of collaborative processes, according to Table 3.10. Table 3.10 comes directly from Table 1.5, p. 38 of my research design and is repeated here for the reader's convenience.

Table 3.10 – Stakeholder Outcomes of Collaborative and Adjudicative Processes

	Collaborative	**Adjudicative**
Process Outcomes	Produces mutual gain solutions	Produces winner-take-all outcomes
	Promotes positive relationships	Damages relationships
	Collaboration institutionalized	Maintains silos of actors

The final report contains consensus language from all parties, consensus recommendations from all parties, and separate recommendations of utility and nonutility stakeholders. In this way, the interests of all parties were represented in the final report, either as consensus language or as divergent recommendations. The process promoted understanding, as all parties had the opportunity to learn about the various components of grid modernization

collectively.

I have insufficient data to determine whether most stakeholders perceived their relationships to be affected by the grid modernization docket, but, from personal experience as an active member of the working group, the grid modernization docket improved my own relationships with both DER and utility stakeholders.

It is too early to say whether or not grid modernization will produce further institutionalization of collaborative procedures, as the Commission has not yet indicated any next steps for grid modernization. However, the net metering ruling, discussed in the next chapter, includes next steps associated with data collection and rate design, two of the central issues of grid modernization. It is plausible that the final Grid Modernization report helped inform the Commissioners as they made their ruling in the net metering docket, which, as will be shown in the coming chapter, most certainly did create further forums for continued collaboration around grid modernization. In this sense, the grid modernization docket may have contributed to the development of new formal collaborative procedures.

Table 3.11 – Stakeholder Outcomes Analysis Summary

Process Outcomes	Reflective of predicted results of collaborative process; all interests represented in final report; potential to further institutionalize collaborative policy making

Discussion

Table 3.12 – Summary of Characteristics of Grid Modernization Docket Stages

Stage	Basis for Dispute Resolution	Process Design
Pre–Working Group Planning and Data Gathering	Collaborative; collected information from interested stakeholders to inform scope and process; Commission shared information among stakeholders to be used as common resource	Mixed; Commission invited input regarding process agenda, but no opportunity for face-to-face dialogue among stakeholders
Working Group Meetings (Technical Session)	Collaborative; intent of process was to achieve consensus; experts enlisted to facilitate interest sharing; parties brainstormed, engaged in dialogue, shared interests; parties reverted to positional bargaining only when interests could not be reconciled	Collaborative; stakeholders collectively made agenda decisions
Joint Utility and Nonutility External Meetings	Collaborative; intent to share interests and learn with goal of consensus; when interests could not be reconciled stakeholders reverted to positional bargaining	Collaborative; process decisions made collectively by group; group membership self-selected and representative of major stakeholder perspectives
Separate Utility and Nonutility Caucusing	Not collaborative; led major stakeholder groups (utilities and DER affiliates) to become entrenched in oppositional positions	Not collaborative; positioned major stakeholder groups (utilities and DER affiliates) as adversaries, not as joint problem solvers

One stakeholder representing a DER-affiliated organization described the overall grid modernization docket as, “Useful… an opportunity to share information and to learn collectively… We can have stakeholder discussions to create shared knowledge and understanding of the positions and that is valuable...” (NH Interview 13, 2016). The working group was a rare opportunity to convene utility and DER stakeholders for an extensive crash course in the regulatory, technical, and financial complexities of the electricity system. This learning occurred primarily through interested-based sharing and dialogue occurring during formal meetings and facilitated by expert consultants.

Yet despite the enlistment of expert facilitators to manage a collaborative process, the Grid Modernization Working Group was unsuccessful in producing a broad consensus on what

grid modernization means for New Hampshire. The final Grid Modernization Report contains 14 separate instances of contradictory recommendations labeled “utility” and “nonutility” (Grid Modernization Working Group, 2017). What was lacking in the grid modernization docket was a commitment by utility and DER stakeholders to work jointly beyond formal PUC meetings. Working group members diligently attended meetings, completed homework assignments, and in a few discrete instances (and at the direction of the facilitators) convened diverse task forces in an effort to hash out consensus on particular issues. But neither of the two coalitions made a serious effort to engage and collaborate with the other beyond formal working group meetings. Instead, utilities and DER affiliates opted to caucus separately with members of their respective tribes. Even during working group meeting lunch breaks the two tribes unfailingly self-segregated, forgoing opportunities to build relationships and understanding across the divide. The importance of extracurricular meetings and informal gatherings cannot be overlooked, yet these grid modernization meetings served to reinforce existing divisions.

According to Meredith Hatfield, the former director of OEP and the driving force behind the success of the Energy Efficiency Resource Standard (EERS) process, leadership is “about finding common ground and collaborating to create solutions that work for everyone—and seeing how often you can achieve better outcomes by incorporating diverse views” (Hatfield, 2016). Hatfield’s leadership in pulling together utility and DER perspectives outside of formal PUC procedure was essential in realizing the EERS consensus agreement. Unfortunately for the Grid Modernization Working Group, no similar such leadership emerged to take advantage of the opportunity to further bridge the division between utilities and DER affiliates.

External meetings serve an essential function in PUC processes because they can free stakeholders from the formal and suppressive litigious atmosphere of official meetings, meetings

that literally take place in a hearing room. External meetings are an opportunity for stakeholders to engage on their own terms and in alternative settings, which can be more conducive to candid exchanges and relationship building. But this opportunity is squandered when external meetings reinforce tribal divisions between utility and DER participants, as was the case for much of grid modernization.

Two factors contributed to the lack of stakeholder commitment and capacity to collaboration in the grid modernization case. First, each coalition's *best alternative to a negotiated agreement* (BATNA) was acceptable. Because the docket was an investigation with no immediate policy actions, the stakes were lower than in the EERS and net metering cases, and thus there was less risk associated with a non-consensus outcome. Second, the grid modernization investigation occurred at the same time as the net metering adjudication, which, as will be discussed in the coming chapter, required high levels of time and resources from all parties. The high stakes of net metering demanded that stakeholders allocate their resources to that docket, which lessened stakeholder capacity to pursue consensus in the grid modernization case.

The grid modernization investigation showed that the PUC process is just one component of successful collaboration. In chapter two we learned how stakeholders can work together to shape both the formal PUC process and informal extracurricular meetings towards collaboration. In the EERS docket, when official PUC meetings proved insufficient to allow stakeholders to reach a consensus agreement, the parties convened on their own terms outside of the PUC. Stakeholder commitment to reaching an agreement that worked for all parties proved equally, if not more important, than the procedures employed by the Commission. The burden of achieving consensus and fostering collaboration is only in part the responsibility of the PUC and the

facilitator, whether that facilitator is a PUC Staff Attorney or a professional consultant. Much of the responsibility lies with the stakeholders, the utilities, DER affiliates, and other parties engaging in the policy process.

CHAPTER IV: NET METERING

In this chapter I first provide an overview of net metering. I then provide an overview of the PUC docket process for revising the net metering policy. Next, I describe each stage of the docket process in greater detail and analyze each for opportunities and barriers to collaboration. I then describe in greater detail the content of the Net Metering policy decision and analyze it according to stakeholder outcomes. I close the chapter with a discussion.

What is Net Metering?

Net Metering is the reason there is a solar industry in the United States. It is a policy that allows distributed generation (e.g., rooftop solar) to sell excess electricity not consumed at the site of production into the electric grid. This excess generation turns the electricity meter backwards as it flows out to the grid to be consumed by a neighboring point of demand. At the end of the billing cycle, the meter is billed for the net amount of energy that passes from the grid to the customer. If the distributed generation system exports an equal amount of energy onto the grid as is imported from the grid, the volumetric portion of the customer's bill will equal zero. The customer will still pay the fixed monthly customer charge (e.g., $12.89 for residential Eversource customers in New Hampshire) (see Fig. 4.1). When exported electricity to the grid exceeds imported electricity from the grid (e.g., in summer months) the customer is credited for the difference and can then tap into that credit in later months when imports exceed exports (e.g., winter months). A well-sized solar array will offset the customer's annual electricity load, leaving them only with fixed monthly charges, virtually zeroing out their bill.

Net metering is a hotly contested issue in states across the country. Net metering proponents argue that solar power and other forms of distributed generation (DG) provide economic, social, and environmental benefits, as well as benefits to the electrical grid, and should be compensated accordingly. Utilities argue that by allowing customers to zero out their bills, the policy affords net metering customers free access to the electrical grid and shifts costs for maintaining the grid onto ratepayers who cannot or will not invest in distributed generation. Net metering, like energy efficiency, reduces utility revenue.[9]

Net Metering Docket Process Overview

In this section I provide an overview of the PUC docket process for revising New Hampshire's net metering rate, or the rate of compensation for rooftop solar and other DG. I then analyze each stage of the process – including prehearing conference; testimony, discovery, and rebuttal; settlement; prehearing technical session and hearing – and identify opportunities and barriers for collaboration within each stage of the process.

The Net Metering docket occurred at the direction of the bipartisan HB1116, "An Act Relative to Net Metering," which directed the PUC to open a docket and to establish a new net metering rate within ten months. This ten-month timeline proved untenable, and the Commission amended the procedural schedule several times and extended the deadline by three months to allow the participants adequate time to complete the process.

The PUC issued an order of notice and opened the docket on May 19, 2016. Dozens of stakeholders from across the state and several from across the country filed motions to intervene (formally participate in the docket). In initial technical sessions, the parties agreed it would be

[9] For an informative debate over net metering in New Hampshire, see The Exchange (2017).

useful to conduct a preliminary round of discovery on the utilities to collect data to be used in official testimony. After initial discovery, twelve of the 30 intervening parties filed testimony. The parties then conducted a round of discovery on one another's proposals. Eleven parties, including the Commission Staff (who did not file initial testimony), then filed rebuttal testimony. Staff's rebuttal testimony summarized the positions of the parties and provided commentary and recommendations based upon the record of evidence up to that point. Parties conducted a round of discovery on rebuttal testimony.

The Commission then convened a series of settlement conferences. The Energy Future Coalition (EFC) – initially comprised of The Alliance for Solar Choice (TASC), Conservation Law Foundation (CLF), Energy Freedom Coalition of America (EFCA), New Hampshire Sustainable Energy Association (NHSEA), and ReVision Energy – filed an initial confidential settlement proposal. The Utility Consumer Coalition (UCC) – initially comprised of Eversource, Liberty, and Unitil – offered a counterproposal. The two coalitions negotiated back and forth and reached agreement on some issues but not others. Both coalitions expanded to include more stakeholders (see Fig 4.1). The Commission cancelled the first week of hearings to allow the parties further time to explore settlement and narrow the scope of issues. The two coalitions filed distinct but similarly structured settlement agreements. The Commission granted a "motion in limine to focus issues at hearing," which limited issues to an agreed upon list of 16 in order to manage the scope of the hearing. All major parties formally supported limiting the scope of issues to be addressed at hearings (Birchard, M., 2017; Below, C., 2017; Sheehan, M., 2017).

The Commission held three full days of hearings in late March 2017, one devoted to the EFC proposal, one devoted to the UCC proposal, and one to hear from Commission Staff and the City of Lebanon (CoL), neither of which signed on to a settlement agreement. On June 23, 2017,

the Commission issued an order establishing a new net metering rate to be effective as of September 1, 2017. The order also set in motion a number of work groups to address pilot projects, data collection issues, and a value of distributed energy resources (DER) study. Figure 4.2 depicts a detail map of the PUC net metering docket process.

By the final hearing of the net metering docket, parties had narrowed down their positions from an original twelve separate policy proposals to two dueling settlement agreements supported by the following coalitions:

> The Energy Future Coalition (EFC): Acadia Center, The Alliance for Solar Choice (TASC), Borrego Solar Systems, Inc., Conservation Law Foundation (CLF), Energy Freedom Coalition of America, LLC (EFCA), New Hampshire Sustainable Energy Association (NHSEA), ReVision Energy, Granite State Hydropower Association, Sunraise Investments LLC, Solar Endeavors LLC, and Revolution Energy, LLC.
>
> The Utility Consumer Coalition (UCC): Eversource, Liberty, Unitil, the Office of the Consumer Advocate (OCA), New England Ratepayers Association (NERA), Consumer Energy Alliance (CEA), the Office of Energy and Planning (OEP), and Standard Power of America, Inc.

The City of Lebanon (CoL) was the only party that filed initial testimony but did not sign with either of these two coalitions. Commission Staff did not sign with either of the two settlement agreements.

Fig. 4.1 – Dueling Settlement Agreements: A First for the Commission

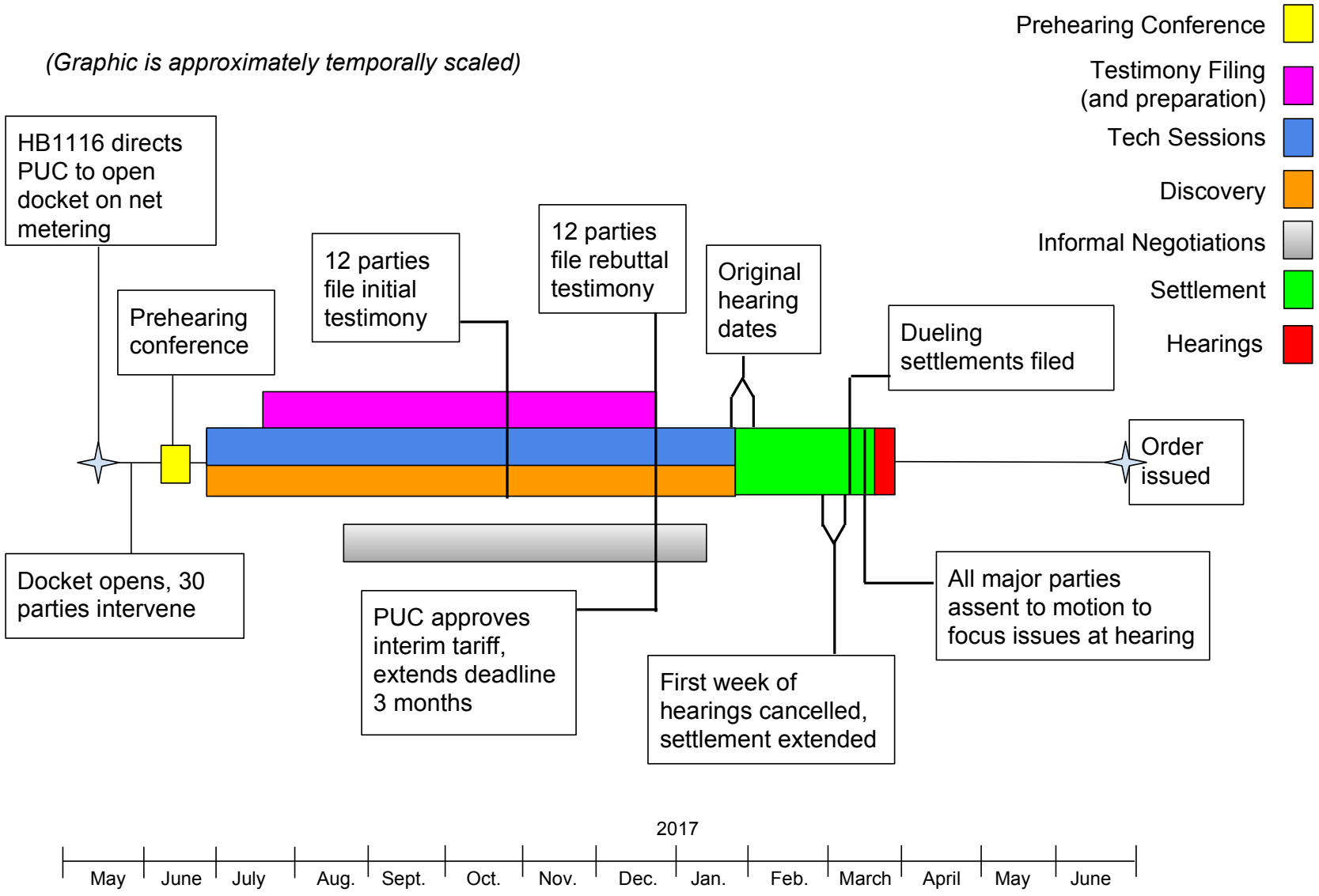


Figure 4.2 – Net Metering Docket Process Map

I now analyze each of the stages of the net metering docket process for opportunities and barriers to collaboration in accordance with Table 4.1. Table 4.1 comes directly from Table 1.5, p. 38 of my research design and is repeated here for the reader's convenience.

Table 4.1 – Characteristics of Collaborative and Adjudicative Processes

	Collaborative	**Adjudicative**
Basis for Dispute Resolution	Characterized by integrative interest-based negotiation	Characterized by positional and rights-based bargaining
	Information used as a common resource	Information used to further each side's position
Process Design	Process tailored by stakeholders	Process prescribed, same for all cases
	Procedures position parties as joint problem solvers	Procedures position parties as adversaries

Stage #1: Prehearing Conference and Opening Technical Session (June 10, 2016)

Table 4.2 lists organizations and individuals appearing at the prehearing conference for the net metering docket.

Table 4.2 – Appearances at Net Metering Prehearing Conference

Unitil	City of Lebanon (CoL)
Liberty Utilities	Barrington Power
Eversource	Norwitch Technologies
Borrego Solar Systems	Standard Power of America
Granite State Hydro Association	New Hampshire Sustainable Energy Association (NHSEA)
Office of Energy and Planning (OEP)	Energy Emporium
The Jordan Institute	Revolution Energy
ReVision Energy	The Alliance for Solar Choice (TASC)
City of Nashua	Representative Lee Oxenham
Freedom Energy Logistics	Pentti Aalto
Acadia Center	Business and Industry Association (BIA)
Conservation Law Foundation (CLF)	PUC Staff (Legal, Electric, Sustainable Energy)
Regulatory Assistance Project (RAP)	Presiding Commissioners

The utilities, OCA, and Staff were invited to give preliminary statements of their positions regarding net metering. Following the prehearing conference, intervening parties met in a technical session to establish a procedural schedule.

Analysis – Process Design

Chairman Honigberg made clear during the prehearing conference that while both the statute directing PUC action on net metering and the order of notice put forth by the Commission set out many of the issues that would be addressed by the docket, "the schedule is completely open at this point, and you will be developing the schedule" in the forthcoming technical session (NHPUC, 2016d, p. 6). In this docket, the legislature and the Commission made agenda decisions, but the collective stakeholders were presented with opportunities to mold process decisions in initial technical sessions. In this way, the prehearing conference and following technical session were characteristic of a collaborative process.

Table 4.3 – Prehearing Conference and Initial Technical Session Analysis Summary

Basis for Dispute Resolution	Not Applicable
Process Design	Collaborative; stakeholders provided with opportunity to make process decisions from the outset

Stage #2: Technical Sessions

During early technical sessions parties collectively agreed upon a procedural schedule. The schedule outlined a series of deadlines beginning with an opportunity for parties to conduct a round of discovery on the utilities. Several parties suggested the process begin with discovery and not testimony so that information gleaned from discovery could inform testimony. Subsequent technical sessions were for the purpose of discussing issues related to discovery, testimony, and rebuttal. Unlike the Energy Efficiency Resource Standard (EERS) docket, net metering technical sessions were not used to hear presentations from experts, or to deliberate policy options with the intent of moving the group towards consensus. Instead, technical sessions were organized around the more adversarial stages of PUC process.

Analysis – Process Design

Early technical sessions allowed stakeholders to make process recommendations and collectively agree upon a procedural schedule. The agreed upon procedural schedule consisted of a series of deadlines for discovery requests, discovery responses, testimony, and rebuttal.

Table 4.4 – Technical Sessions Analysis Summary

Basis for Dispute Resolution	Not Applicable
Process Design	Collaborative; stakeholders collectively make process decisions and design a procedural schedule

Stage #3: Testimony Filings, Discovery, and Rebuttal – Building a Cache of Ammunition (June 2016 – January 2017)

All parties vomit onto the table their positions… It's overwhelming.
- NH Utility Manager (NH Interview 15, 2017)

The first eight months of the docket were dedicated to discovery, testimony filing, and rebuttal filings. Twelve parties filed initial testimony by the October 24 deadline. These filings were comprised of 32 documents and over 1,000 pages. Filings included written testimony, spreadsheets, cost benefit analyses, and various studies assessing the value of solar and other DG to the electric grid, each with widely varying conclusions. Many parties filing testimony did so in partnership with their individual expert consultants. Almost all filings were accompanied by resumes and CVs building the credibility of the party filing and highlighting long and distinguished careers in the energy sector. Commission Staff did not file initial testimony or policy proposals. Table 4.5 breaks down the volume of initial testimony.

Testimony submitted as part of PUC proceedings is held to a high standard of credibility. For example, the Consumer Energy Alliance (CEA) withdrew its testimony from the record due to a deposition request filed by EFCA and assented to by CLF and TASC (Brown, 2017). The

deposition request accused CEA of having "jeopardized the orderly and systematic presentation of evidence and argument" in the case "by providing apparently unsupported and inadmissible information" (Buxton, 2017).

Table 4.5: Initial Testimony Filing Breakdown

Party	Documents Filed	Pages Filed
CEA	2	68
CLF	2	93
CoL	2	43
EFCA	2	69
Eversource	4	50
Liberty	2	29
NERA	1	30
NHSEA	6	292
OCA	2	76
OEP	1	4
TASC	2	95
Unitil	6	173
Total	**32**	**1,022**

Two weeks after initial testimony filings, a flood of emails inundated the Net Metering service list with 80 new documents and over 1,000 discovery requests. One public servant responded to the surge of discovery by stating the following in an email to the service list:

> I am concerned that the massive amount of discovery requests now in circulation and the ten-day timeline present an untenable situation… We confront over 300 questions... Many of the questions are unhelpfully argumentative; in my judgment, attention at this phase of the docket is best devoted to finding common ground rather than engaging in combat disguised as discovery (FN., 2017).

Another stakeholder representing a DER affiliate shared a similar perspective, stating, "nobody can process all of the data generated from discovery and filings. It is overwhelming" (NH Interview 16, 2017).

All parties are obligated to answer discovery questions to the best of their ability. And so, two weeks after all interrogatories were submitted, the responses came gushing through the service list in an even more impressive aftershock of 218 documents. Initial filings, discovery

requests, and responses totaled over 300 documents and thousands if not tens of thousands of pages by mid-November.

After discovery on initial filings, eleven parties filed rebuttal testimony. Rebuttal testimony is an opportunity for parties to defend against attacks made on their filings and to rebuke positions of opponents (NH Interview 14, 2016). Parties may not introduce any new issues into the record during rebuttal. They may only respond to issues that have already come up in the previous round of testimony. Table 4.6 breaks down the volume of rebuttal testimony.

Table 4.6: Rebuttal Testimony Filing Breakdown

Party	Documents	Pages
Acadia	2	36
CLF	1	48
CoL	2	32
EFCA	2	37
Eversource	2	34
NERA	3	186
NHSEA	5	115
OCA	1	8
Staff	2	165
TASC	2	66
Unitil	4	146
Total	**26**	**873**

The discovery process was repeated after the filing of rebuttal testimony. Parties subjected one another's rebuttal testimonies to a similarly overwhelming glut of discovery requests and responses as described for initial testimony. All told, initial and rebuttal testimonies and discovery requests and responses to those testimonies generated many thousands of pages of content.

Analysis – Basis for Dispute Resolution

The net metering docket started out embodying many of the characteristics of a typical adversarial adjudication, particularly during testimony filing, discovery, and rebuttal

components. Early in the process parties took positions by filing testimony and policy proposals in preparation for a rights-based contest in which they would strive to win a favorable decision from the Commission.

Multiple parties described the discovery and rebuttal processes as opportunities to attack and undermine the positions of others (NH Interview 9, 2016; NH Interview 14, 2016). A less common but perhaps more appropriate label for discovery is *interrogatory*. The purpose of discovery is to afford the parties equal opportunity to interrogate one another's proposals, to subject them to rigorous scrutiny. Participants use the discovery and rebuttal processes to highlight weaknesses in the positions of others and to create a written record of those weaknesses that may then be used as ammunition to discredit their opponents in the coming hearing. In the case of net metering, the discovery component of the process was about stockpiling ammunition that would help individual parties achieve favorable rulings over each other in preparation for the litigated hearing.

Analysis – Process Design

The testimony, discovery, and rebuttal components of the process are typical of PUC adjudication. Stakeholders extract information from one another in a one-directional fashion, rather than a free-flowing dialogue with an exchange of ideas. In this way, parties are positioned as adversaries, not as joint problem solvers.

There is value in the adversarial nature of testimony, discovery, and rebuttal components of the process. These components afford all parties equal opportunity to be heard, and all stakeholders did collectively agree to a procedural schedule based around discovery, testimony, and rebuttal. These phases of the process also allow for transparency and lend legitimacy to the

positions of the parties. Parties have the opportunity to formally draw attention to questionable testimony, as was the case with the requested deposition of CEA by EFCA and others, which resulted in CEA withdrawing the testimony in question.

But this phase of the process is resource intensive, requiring large expenditures of money and time on expert consultants, on drafting testimony, discovery, and rebuttal, and on responding to discovery. One utility manager had the following to say in the immediate aftermath of the discovery/testimony/rebuttal storm:

> My participation in [the net metering docket] is nothing short of a burden… And I look at the Staff and they are in so many different dockets and then the legislature gives us a 10-month window and they have a mountain of paper work… I can commiserate with them. This is brutal. When we go to hearing, what am I going to do? Say [to our attorney], 'ok [sic], develop cross-examination for 12 different parties who submitted hundreds of pages of testimony each'?! (NH Interview 15, 2017).

At roughly the same point in time a member of the DER affiliates described the process as, "personally nerve-wracking", an "enormous power struggle" akin to a "high stakes poker game" (NH Interview 17, 2017). Many parties, ranging from state agencies to utilities to DER affiliates, expressed similar dismay at the burdensome quality of this portion of the process, especially in the case of twelve separate sets of testimony and the amount of discovery that comes with them (NH Interview 12, 2016; NH Interview 14, 2016; NH Interview 15, 2017; NH Interview 16, 2017).

Table 4.7 – Discovery, Testimony, and Rebuttal Analysis Summary

Basis for Dispute Resolution	Not collaborative; characterized by ammunition stockpiling in preparation for adversarial, rights-based contest; information used to support own position and to attack and undermine positions of others
Process Design	Mixed; as result of early stakeholder dialogue, parties agreed to schedule of discovery, testimony, and rebuttal; stakeholder interactions one-directional, not free-flowing exchange

Stage #4: Joint Utility and Nonutility External Meetings

Throughout much of the process utility and DER affiliate organizations met informally outside of PUC meetings to negotiate a potential agreement. These external negotiations failed to achieve any level of agreement between these two major coalitions. I do not have sufficient data to adequately analyze these meetings.

Stage #5: Settlement – Where the Magic Happens (Late January – March 2017)

Commission Staff began convening settlement conferences in late January 2017, eight months after the start of the docket. At the start of settlement Staff reminded all parties:

> Pursuant to PUC 203.20(a), 'all participants in settlement conferences shall treat discussions at settlement conferences as confidential and shall not disclose the contents of such discussions to third parties or seek to introduce them into evidence.' As a result of these confidentiality restrictions, only parties and their authorized representatives may attend the settlement discussion portions of the technical sessions (FN., 2017).

Very little progress was made during the initial two meetings with "a lot of posturing on both sides" (NH Interview 21, 2017). The coalition of solar interest groups, led by Energy Freedom Coalition of America (EFCA), insisted that in order to quantify the value that solar provides to the electric grid, the utilities need to collect and make available a year's worth of temporally and geographically granular data regarding their distribution systems. The utilities expressed skepticism that such an expensive and laborious undertaking would produce any worthwhile findings. Towards the end of the first day of settlement, Unitil addressed the solar coalition and made the position of the utilities explicit: "We are not hearing anything that makes us have any reason to believe we will do better in a settlement than in a hearing… We are not going to be able to agree to full retail net metering less the non-bypassable charges [SBC, ECT, SCRC]. You need to put more on the table" (FN., 2017) (see Fig. 4.3).

At the third settlement conference, occurring on February 14 2017, the solar coalition arrived early and representatives from The Alliance for Solar Choice (TASC), EFCA, ReVision Energy, New Hampshire Sustainable Energy Association (NHSEA), and SolarCity positioned themselves in the front of the room facing everyone else (see Fig. 4.4). At Staff's direction they opened the meeting with a coordinated overview of their settlement proposal, which they – along with Conservation Law Foundation (CLF) – had formally filed four days prior. The proposal stressed the importance of "collecting the necessary data" in order to send "improved price signals [that] more accurately reflect the locational and temporal value and costs of [DERs]" (Culley, et al., 2017). The proposal included a series of pilot projects to test out new rate designs as a bridging step, which would eventually inform a more data-driven approach, referred to as "Phase II" (Culley, et al., 2017).

OCA praised the proposal and suggested it could be improved by including provisions expanding DER access to low- and moderate-income communities. CoL noted the proposal failed to address utility lost revenue concerns, but indicated he might support the proposal if it were expanded to include his proposed real-time pricing and municipal aggregation pilot. Liberty expressed concern that the Liberty's billing and metering systems are not capable of accommodating such a proposal. Eversource expressed a desire for more clarity about how and when the transition to the theoretical Phase II would occur.

Fig 4.3 – A Typical NH Monthly Electricity Bill

Customer Charge ……..…… (fixed) ……..…….		$12.89
Generation Supply Charge (energy service) …	600kWh * $0.110 ……	$66.00
Distribution Charge ……	600kWh * $0.042 ……	$25.20
Transmission Charge ……..…….……....	600kWh * $0.024 ……	$14.40
Stranded Cost Recovery Charge ….……	600kWh * $0.001 ……	$00.60
System Benefits Charge ……..……	600kWh * $0.003 ……	$01.98
Electricity Consumption Tax ……..	600kWh * $0.00055 ……	$00.33
		Total = $121.40

Under net metering, customer-generators who produced 600kWh during the month pay only the fixed customer charge.
Non-bypassable charges: Stranded Cost Recovery Charge (SRCR), System Benefits Charge (SBC), and Electricity Consumption Tax (ECT).

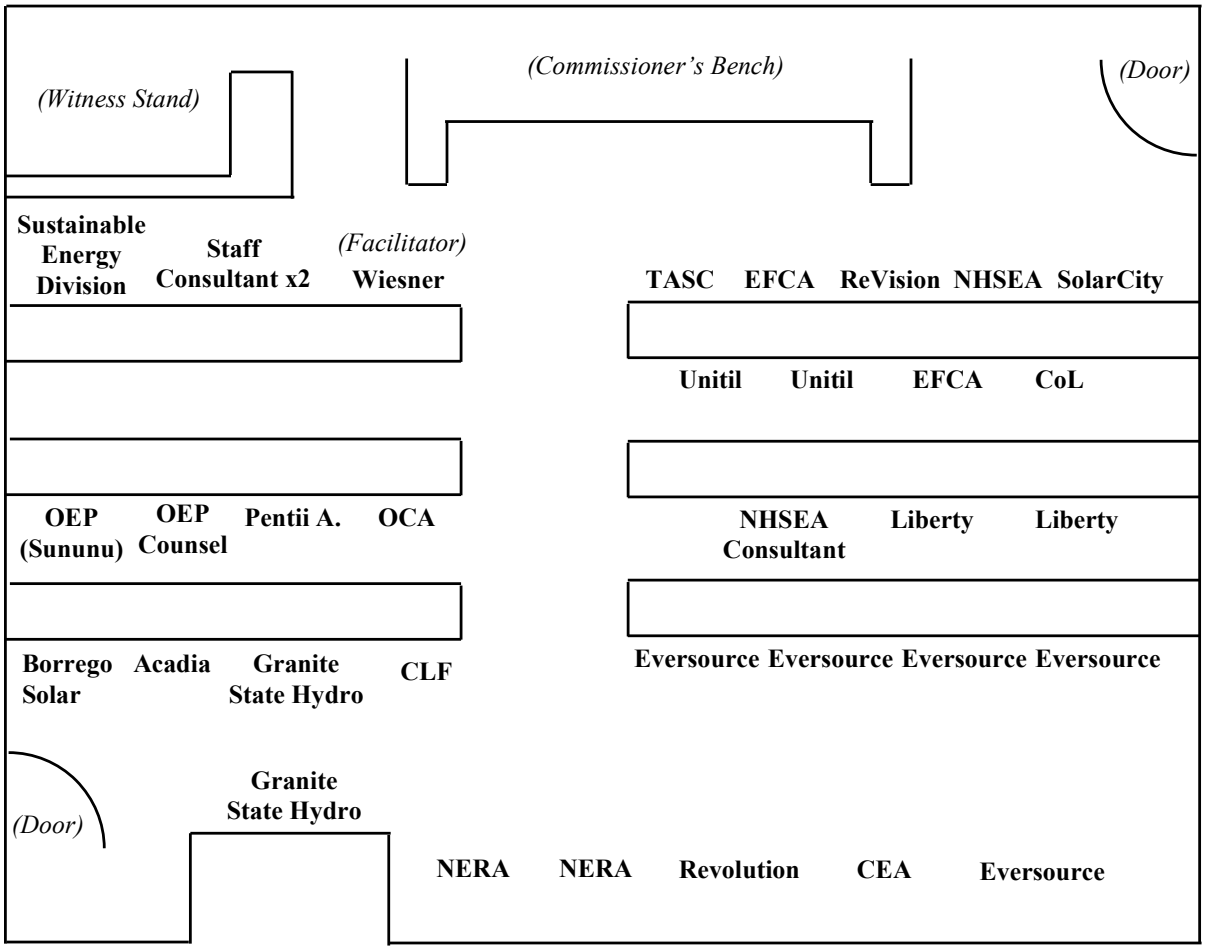


Fig. 4.4 – Map of PUC Hearing Room A, Net Metering Settlement Conference #3, 2/14/17

In the third-to-last settlement meeting the utility coalition presented its counterproposal to the solar coalition's proposal. This meeting was scheduled last minute by Staff in a last ditch attempt to achieve a consensus agreement before the hearing. One stakeholder said the meeting "saw a lot of movement" on both the utility and solar side of the issue (FN., 2017).

Staff opened the penultimate settlement conference by stating the following: "Today is a critical day – time is running out. I expect it will be helpful to, throughout the day, take breaks, have breakout groups and caucuses – perhaps staff can circulate and facilitate these frank discussions as we go" (FN., 2017).

The solar coalition circulated a rushed counter-counterproposal and SolarCity's representative took the floor stating the following: "We sincerely appreciate the efforts of the utilities in this counterproposal. We feel that we are not too far off [from an agreement]. However, here are our concerns…" (FN., 2017). He went on to list the lack of a clear direction towards time-based rate design, the absence of the four pilot programs the solar coalition, OCA, and CoL have been fighting for, and, perhaps most importantly, the lack of any compensation for distribution charges (see Fig. 4.3). As a compromise, he suggested instead a "gradualist approach" in which the distribution rate be reduced by 10% each year until sufficient data allows for more accurate pricing of distributed energy resources (DERs).

During the first half of the day conversations were fast-paced, parties alert and energetic. There was an air of excitement in the room and for the first time some dared to hope a settlement agreement might be possible. At 10:30 we broke for caucusing and the utility coalition and the solar coalition retreated to separate quarters.

Parties reconvened after about an hour and Liberty took the floor on behalf of the utilities to announce the utilities had made a number of "concessions" (FN., 2017). They conceded to

extend grandfathering from 15 to 20 years. They conceded on the establishment of task forces to address various pilot projects. They conceded on a data collection task force. They conceded and agreed to support a value of DER study. But on the issue of the distribution charge, they held their ground. The utilities maintained net metering customers should receive no compensation for the distribution charge portion of the retail electric rate (see Fig. 4.3).

At the end of the day, Staff closed the meeting as follows:

> Everyone should take some time tonight and tomorrow morning to review with their coalitions and be ready to come back at 10:00am tomorrow. I don't think we are ready to give up on this settlement yet. So tomorrow, we will give it one more shot and if we decide we need to go to hearing we can discuss the logistics of that as well (FN., 2017).

One member of the solar coalition who works mostly outside of New Hampshire reflected on the final day's settlement conference in the following way:

> [Someone] actually bought like 15 pizzas on the last day of settlement for everyone. We had made what was basically our final proposal and Staff was playing shuttle diplomacy between our room and the utility room and everyone was sitting around eating pizza while we were waiting around until the end of the day. And then the clock ran out and nobody blinked. But we all stuck it out until the end… I have been active in similar cases in Maine and I will say that people in New Hampshire are way more engaged, way more involved. I really enjoy working here quite a bit. New Hampshire people have just been so great (NH Interview 22, 2017).

Analysis – Basis for Dispute Resolution

During settlement conferences, conflict management frames were largely interest based. Stakeholders asked questions, made suggestions, responded respectfully and politely to the concerns of other stakeholders, and worked to understand one another's needs in an effort to reach a consensus agreement. Stakeholders used information gained about each other to clarify and to work to find creative solutions that would meet all parties' interests. No effort was made to use information to undermine positions of others. The explicit decision-making goal was consensus.

The free-flowing exchange of settlement allowed parties to better understand the complexity of the issues and allowed parties to learn about which issues were most important to each of them. In some cases, some issues were of higher importance to one party than another. For example, utilities were willing to concede on issues such as grandfathering, pilot projects, and the value of DER study, which were of higher importance to the solar coalition but did not have much importance to the utilities. However, other issues, such as whether solar and other DG should receive compensation for distribution charges, were addressed using positional bargaining.

Analysis – Process Design

Stakeholders had the opportunity to collectively shape agenda decisions during settlement. The solar coalition filed the first settlement proposal and set the agenda of the following settlement conference by explaining their proposal to the other parties. Parties then provided constructive commentary on how the proposal might be improved to better include a greater range of interests. The utility coalition then had the opportunity pick up agenda design where the solar coalition left it by submitting their counterproposal. The group collectively designed and redesigned the agenda during settlement.

One intended purpose of settlement was to learn about the interests of others and learn whether those interests could be met through brainstorming, deliberation, and integrative negotiations. Settlement conferences are confidential; only once a settlement agreement has been formally filed with the Commission does it become fair content for the hearing. The confidentiality of the settlement conferences created space for creative brainstorming of a wide

range of issues as it freed parties from the fear that their words or ideas would be used against them in the hearing and allowed parties to engage as joint problem solvers.

Table 4.8 – Settlement Analysis Summary

Basis for Dispute Resolution	Collaborative; characterized by sharing of interests, dialogue; confidentiality allowed information to be used for learning, not undermining and attacking
Process Design	Collaborative; stakeholders collectively made agenda and process decisions by sharing and revising settlement proposals; interactions characterized by free-flowing exchange of ideas and information

Stage #6: Prehearing Technical Session, Hearing Design, and Hearing (March 2017)

After the close of official settlement negotiations, Staff canceled the first week of hearings to "provide parties a greater opportunity to develop and file settlement proposals and to prepare for hearing" (FN., 2017). Staff reasoned, "in view of the likelihood that one or more settlement agreements will be filed in this docket… the scope of the hearings therefore should be more focused and limited" (FN., 2017). In other words, parties should "set guard rails" for the hearing by leaving their initial positions from initial testimony at the door and limiting the issues at hearing to differences between the two settlement proposals (FN., 2017).

The City of Lebanon (CoL) applauded the decision to cancel the first week of hearings in the following email to the net metering service list:

> To the extent that very substantive issues are at stake in settlement agreements, this modest amount of additional time may well give the parties a very meaningful opportunity to better think through and flesh out their settlement proposals and perhaps find more common ground and thus further narrow the issues to be addressed at hearing. Thank you! (FN., 2017).

The following week, the Energy Future Coalition (EFC) and the Utility Consumer Coalition (UCC) filed "dueling" settlement agreements (see Fig. 4.1), a first for the Commission. Staff then convened a prehearing technical session in which stakeholders collectively agreed upon the format and scope that the hearings would take. A Unitil representative offered up a road map for the hearing and other stakeholders agreed to these provisions:

1. All prefiled and rebuttal testimony are submitted into the record as evidence;
2. Each of the two coalitions calls a panel of witnesses to defend their settlement agreements; panels subject to cross-examination;
3. Each of the two coalitions calls a panel of witnesses to critique the other settlement agreement; panels subject to cross examination;
4. Each coalition may submit other exhibits into evidence.

Staff, OCA, and CLF drafted a "motion to focus issues at hearing" which both coalitions formally endorsed (Birchard, 2017). The Commission held three days of hearings in late March. One day was dedicated to the EFC settlement proposal, one day was dedicated to the UCC settlement proposal, and one day was dedicated to the CoL and Commission Staff testimony. The Commission deliberated in isolation for the next two months and issued its final order in late June.

Analysis – Basis for Dispute Resolution

Preparation for the hearing was characterized by interest-based issue framing. Parties communicated their shared interest in creating a manageable hearing process, listened to the suggestions of one another, and collectively agreed upon a hearing format.

Hearings are all about undermining the positions of your opponents and supporting your own positions so they may prevail in the final ruling. Contested hearings have no room for interest sharing. Stakeholders cross-examine each other in an effort to extract information that will discredit their positions. The explicit goal of the hearing is to emerge victorious over your opponents. Hearings are textbook adversarial rights-based contests.

Analysis – Process Design

Staff extended the deadline once more by cancelling the first week of hearings (Wiesner, 2017). In the end, only three days of hearings were necessary and by cancelling the first week, the parties were afforded still further time to narrow issues and file settlements. Once settlements were filed, the parties collaborated again to design the format and content of the hearing (Howland, 2017). A majority of parties formally endorsed the motion to focus issues at hearings, further simplifying and streamlining the process (Birchard, 2017; Below, 2017; Sheehan, 2017). The prehearing technical session provided parties opportunity to collaboratively design the agenda and prepare for the hearing.

Table 4.9 – Prehearing Technical Session, Hearing Design, and Hearing Analysis Summary

Basis for Dispute Resolution	Not collaborative; adversarial, rights-based contest; cross-examination as tool to attack and undermine positions
Process Design	Collaborative; stakeholders collectively designed agenda and process of hearing together as joint problem solvers before engaging as adversaries in the actual hearing

Content of Net Metering 2.0 Policy – Remember Data and Rate Design?

The new rates [for net metering in New Hampshire] are essentially a mashup of utility- and solar-backed proposals, and represent a more collaborative approach to developing new net metering rates. –Walton (2017)

In this section I review the content of the net metering policy decision and analyze the decision according to whether or not it produced predicted stakeholder outcomes of collaborative processes, according to Table 4.10. Table 4.10 comes directly from Table 1.5, p. 38 of my research design and is repeated here for the reader's convenience.

Table 4.10 – Stakeholder Outcomes of Collaborative and Adjudicative Processes

	Collaborative	**Adjudicative**
Process Outcomes	Produces mutual gain solutions	Produces winner-take-all outcomes
	Promotes positive relationships	Damages relationships
	Collaboration institutionalized	Maintains silos of actors

A New Net Metering Rate

The final order from the Commission made the following decision regarding the new net metering rate:

> Customer generators will receive monthly excess export credits equal to the value of kWh charges for energy service and transmission service at 100 percent and distribution service at 25 percent, while paying non-bypassable charges, such as the system benefits charge, stranded cost recovery charge, other similar surcharges, and the state electricity consumption tax, on the full amount of their imports from the grid (NHPUC, 2017a).

The most significant change, in terms of economic impact, is the reduction in the distribution credit received by net metering customers from 100% to 25% (see Fig 4.1). This was one of the issues that divided the solar and utility coalitions. The Commission made the ruling to reduce the distribution rate even when finding that neither coalition provided a "significant record of evidence supporting the amount of the reduction proposed or the actual net benefits of [distributed generation] energy exports to the utility distribution system" (NHPUC, 2017a). Some stakeholders suggested that this reduction, despite the lack of evidence justifying it, was in part due to the influence of legislative expectation that the rate should be reduced, a political consideration that played a role in the decision making of the Commission (FN., 2016; FN., 2017; NH Interview 17, 2017; NH Interview 20, 2017). The perceived danger was that if the Commission ruled to leave the rate unchanged, they risked legislative retaliation in the form of HB518, a bill that, if passed, would reduce the rate received by net metering customers to a level that would destroy the economic value proposition of solar (FN., 2017; NH Interview 20, 2017).

In addition to setting a new net metering rate, the order also set in motion work groups that will take on two of the main issues investigated by the Grid Modernization Working Group: data collection and rate design.

Data Collection and Value of Distributed Energy Resources Study

Both Commission Staff and the solar coalition made the lack of sufficient utility data available to accurately quantify the costs imposed by DER or the value that DER provides to the electric grid an issue of central importance in the docket (Faryniarz, 2016; NHPUC, 2017b). Accordingly, the Commission ordered the collection of the necessary utility data to inform a value of DER study by an independent party. The Commission directed that the utilities:

> should collect and make available load shape data for individual distribution circuits, or at least for a selected sample of distribution circuits, as well as customer load data on an hourly or shorter interval basis for at least a representative sample of customers, provided that the privacy of any customer-specific information is adequately protected (NHPUC, 2017a).

Furthermore:

> the utilities should propose data collection plans in the first instance, including detailed current cost estimates. Those plans would then be reviewed and discussed with interested stakeholders through a working group process... Following the completion of the working group process, final detailed plans for data collection and dissemination should be prepared and implemented. If necessary to resolve disputed issues that cannot be worked out by the stakeholders, the data collection and dissemination plans may be submitted to the Commission for review and determination (NHPUC, 2017a).

The Commission delegated data collection responsibility to the utilities under the condition that the utilities collaborate with interested parties in the data collection planning. If the parties cannot agree upon data collection efforts, they can bring their disagreement before the Commission for further adjudication.

Pilot Projects – Time-Variant Rates (TVR), Non-wires Alternatives, and Equity Considerations

In addition to the new rate, the data collection efforts, and the value of DER study, the Commission ordered the utilities, in collaboration with other stakeholders, to implement a series of pilot projects to explore alternative methods of DER integration. One key argument of the solar coalition was that accurate valuation of the benefits of DER requires *dynamic* or *time-variant rate design* (TVR), an issue of key importance to grid modernization. The data generated by the pilot projects "should be made available to a broad range of interested stakeholders, as well as Staff and Commission consultants" (NHPUC, 2017a). The pilot projects include:

- A time-of-use (TOU) pilot that will be available to both customer generators (e.g., customers with solar) and nonsolar customers;
- The City of Lebanon municipal aggregation through real-time pricing pilot (Below, 2016);
- A pilot that expands the benefits of distributed generation to low- and moderate-income communities; and
- A "non-wires alternative" in which "the utilities should identify all distribution circuits or substations that are planned for upgrades within the next 5 years, the reason for the planned upgrades, the reliability criteria and benefits of the planned upgrades, and the estimated costs of the planned upgrades" (NHPUC, 2017a)

The order reads on:

> With respect to the pilot program development process, we believe that the utilities should propose pilot program designs and related evaluation, measurement, and verification (EM&V) plans in the first instance, to be reviewed and discussed with interested stakeholders through a working group process similar to that contemplated for the value of DER study design (NHPUC, 2017a).

Analysis – Process Outcomes

Table 4.11 illustrates utility and DER interests and positions as they relate to a subset of net metering issues, namely, which volumetric bill components should distributed generation (DG) receive compensation for (see Figure 4.3 for typical customer bill).

Table 4.11 – Partial Net Metering Stakeholder Assessment Table

	Issue Area (Volumetric Bill Components)				Issue Area
	Energy Supply (Generation) (~$0.11/kwh)	*Transmission (~$0.02/kwh)*	*Distribution (~$0.04/kwh)*	*Nonbypassable Charges (>$0.01/kwh)*	*Work Groups*
Utilities	-Interest: Pass-through charge, does not affect utility revenue -Position: DG receives credit for 100% for exports	-Interest: Pass-through charge, does not affect utility -Position: DG receives 100% credit for exports	**PRIORITY ISSUE** -Interest: Source of utility revenue -Position: DG receives no credit for exports	-Interest: Collective charges for social programs and energy efficiency -Position: DG receives no credit for exports	-Interest: Minimize costs associated with data collection and pilot projects
R DER Affiliates	-Interest: Protect profit; avoid precedent of DG compensation decreasing below retail[10] -Position: DG receives 100% of Supply rate	-Interest: Protect profit; avoid precedent of DG compensation decreasing below retail -Position: DG receives 100% of Transmission rate	-Interest: Protect profit; avoid precedent of DG compensation decreasing below retail -Position (post settlement negotiation): Ratchet down rate of compensation for Distribution charge in 2019 by 10% and 2020 by 10% pending PUC V-DER study results	-Interest: Collective charges for social programs and energy efficiency -Position: DG receives no credit for exports	-Interest: Collect data to better inform DER compensation based on temporal and locational values

The learning that occurred through settlement negotiations revealed that the priority issue for utilities is the rate of compensation for distribution charges. Across the other three volumetric

[10] Retail electricity rates are equal to the sum of per kWh charges for Generation, Transmission, Distribution, and Nonbypassable rates. See Figure 4.3, p. 117 for typical bill breakdown.

components of energy rates (energy supply/generation, transmission, and nonbypassable charges) utility and DER stakeholder interests did not conflict. However, in regard to the distribution rate component, stakeholders were unable to imagine a creative solution that allowed them to resolve interests that appeared to be in direct conflict.

The outcomes of the Net Metering docket met a diverse array of interests. The ruling on the new rate may have tipped in the favor of the Utility Consumer Coalition by reducing the distribution rate received by DG to 25% of retail, but the reduction to the rate is unlikely to significantly damage the solar industry. The ruling also directed that data collection and pilot project work groups be established, thus meeting interests of the Energy Future Coalition.

The Commission ordered utility and DER affiliates to address two main issues from the grid modernization docket: data collection and rate design. In addressing next steps for data collection and rate design, the Commission directed the creation of further forums for collaboration between utility and DER stakeholders. In August 2017, utilities and DER stakeholders began reconvening to establish workgroups to address data collection issues, and value of DER study, and four pilot projects. These work groups represent a further institutionalization of collaborative opportunities for utility and DER stakeholders.

Table 4.12 – Net Metering Stakeholder Outcomes Analysis Summary

Process Outcomes	Reflective of predicted results of collaborative process; produced mutual gain solutions; further institutionalized collaboration; effect on relationships unclear

Discussion

Table 4.13 - Summary of Characteristics of Net Metering Docket Stages

Stage	Basis for Dispute Resolution	Process Design
Prehearing Conference and Initial Technical Session	Not applicable	Collaborative; stakeholders provided with opportunity to make process decisions from the outset
Technical Sessions	Not applicable	Collaborative; stakeholders collectively agreed upon procedural schedule
Discovery, Testimony, and Rebuttal	Not collaborative; characterized by ammunition stockpiling in preparation for adversarial, rights-based contest; information used to support own position and to attack and undermine positions of others	Mixed; as result of early stakeholder dialogue, parties agreed to schedule of discovery, testimony, and rebuttal; stakeholder interactions as one-directional, not free-flowing exchange
Joint Utility and Nonutility External Meetings	Insufficient data	Insufficient data
Settlement Conferences	Collaborative; characterized by sharing of interests, dialogue; confidentiality allowed information to be used for learning, not undermining and attacking	Collaborative; stakeholders collectively made agenda and process decisions by sharing and revising settlement proposals; interactions characterized by free-flowing exchange of ideas and information
Prehearing Technical Session, Hearing Design, and Hearing	Not collaborative; adversarial, rights-based contest; cross-examination as tool to attack and undermine positions	Collaborative; stakeholders collectively designed agenda and process of hearing together as joint problem solvers before engaging as adversaries in the actual hearing

Testimony filing, discovery, and rebuttal, the components which dominated the docket for the first eight months, embodied characteristics of adversarial processes. The purpose of these components of the process was to stake out a position, to critique the positions of opponents, and to stockpile ammunition that could be used in the hearing to help win the case. Conversely, settlement conferences, the component of the process that is relegated to the last few weeks before the hearing, embodied characteristics of collaborative processes. In settlement, parties made creative proposals, learned about each other's interests and priorities, and sought agreement on issues, rather than attacking each other's positions. It was during settlement that

nearly all of the substantive decision making that went into the Commission's final ruling took place.

Again, as was the case in the Energy Efficiency Resource Standard (EERS) docket, from the outset stakeholders were provided with an opportunity to design their own procedural schedule. However, unlike the EERS in which stakeholders designed a process around collective learning, the net metering docket was designed around the litigious process of testimony, discovery, and rebuttal. The net metering docket showed how a collaborative process design without a collaborative basis for dispute resolution is insufficient to foster true collaboration. The basis for dispute resolution found in discovery, testimony, and rebuttal stages lacked any collaborative characteristics. It was only during settlement conferences, which embodied collaborative characteristics of both basis for dispute resolution and process design, that successful integrative negotiations occurred. Particularly, dialogue, information sharing, and learning were missing from discovery, testimony, and rebuttal.

Testimony, discovery, and rebuttal did serve an important function: they allowed all parties an equal opportunity to make an evidence-based argument in favor of their desired outcomes. They also helped ensure only high-quality data and evidence were being considered in the decision making process. But they were also burdensome, time and resource intensive, and divisive. Conversely, settlement conferences allowed parties to leave behind their initial positions and creatively brainstorm solutions that would meet the needs of each. While parties did not reach a unanimous consensus, they did reach consensus on many of the issues at stake and were able to leave behind the extreme positions taken in testimony in favor of a more integrative agreement.

CHAPTER V: CROSS-CASE ANALYSIS, SUMMARY FINDINGS, DISCUSSION, AND CONCLUSION

The Decentralization of Power

The most important new sources of competitive advantage in today's rapidly changing electricity sector are not technology or market position; they are the ability of innovators to work efficiently and effectively in complex multi-stakeholder environments. Shifting the electricity sector will require engagement and innovation across traditional institutional boundaries.
–Rocky Mountain Institute (2017)

One of the fundamental legal concepts in these United States is the idea that the adversarial process that you find in courts… is one of the best processes to get to the truth. There is this general underlying belief that the adversarial process is beneficial because it enables people to get to what the facts actually are. But it doesn't always work… I think that there are some cases, probably Net Metering being one of them, EERS, Grid Mod, anywhere you are trying to set policy across a wide spectrum, I think you need to lean more towards a collaborative process. Having 30 parties present 30 different ideas and attack each of those ideas, by the time we are done with all this stuff, assuming its fully adjudicated and we argue all this stuff out to the nth degree, is anybody going to feel any smarter? Is anyone going to feel like they got to the truth of what solar can provide to the system? What the system's needs really are?
–NH Utility Manager (NH Interview 15, 2017)

The three dockets analyzed in this research depict a Public Utilities Commission (PUC) beginning to grapple with the challenges of 21st century energy system design. The standard PUC process, a process designed to set rates for monopoly corporations, has been deemed inappropriate for addressing this new challenge (VEIC, 2011; NHLBA, 2012; Hatfield, et al., 2013; VEIC, 2013; NHOEP, 2014; LBNL, 2017). In contrast, the cases I have observed, which embody the new policy challenges of DER integration, provide examples of opportunities for collaboration, but also examples of continued barriers to collaboration. Table 5.1 presents a cross-case summary of the analyses of the three docket processes.

Table 5.1 – Cross Case Summary of Docket Characteristics

	EERS		Grid Modernization		Net Metering	
Process Stage	Basis for Dispute Resolution	Process Design	Basis for Dispute Resolution	Process Design	Basis for Dispute Resolution	Process Design
Pre-docket Planning	Not applicable	Not collaborative; EERS Straw Proposal process limited face-to-face interaction; process and agenda decisions made unilaterally by Electric Division	Collaborative; collected info from stakeholders to inform scope and process; info used as common resource	Mixed; PUC invited input regarding process/agenda, but no opportunity for face-to-face dialogue among stakeholders	Not applicable	Not applicable
Prehearing Conference	Not applicable	Collaborative; parties made process recommendations; recommendations created space for collective learning, deliberation	Not applicable	Not applicable	Not collaborative; select parties provided positional framing	Collaborative; parties had opportunity to shape process
Technical Sessions	Collaborative; info and technical expertise shared among stakeholders to build collective understanding; brainstorming and interest sharing	Collaborative; parties agreed on process/agenda decisions; created space for free-flowing exchange of ideas	Collaborative; goal = consensus; expert facilitators; brainstorming, dialogue, interest sharing, learning	Collaborative; parties collectively made agenda decisions	Not applicable	Collaborative; stakeholders collectively agreed upon procedural schedule
Testimony, Discovery, Rebuttal	Not collaborative; characterized by positional/rights-based bargaining; info used to further own position and undermine positions of others	Mixed; stakeholders collectively re-ordered process steps to delay testimony filing; one-directional attacks on positions, as opposed to free-flowing exchange	Not applicable	Not applicable	Not collaborative; ammunition stockpiling; info used to support own position and to attack and undermine positions of others	Mixed; parties agreed to procedural schedule; interactions one-directional, not free-flowing exchange
Settlement Conferences	Mixed; intent – consensus, but insufficient to share interests, learn, and reach consensus	Not collaborative; Electric Division made agenda decisions unilaterally	Not applicable	Not applicable	Collaborative; interest sharing, dialogue; info used for learning	Collaborative; process set collectively; free-flowing exchange
External Meetings	Collaborative; goal = consensus; allowed for free-flowing exchange, learning	Collaborative; process set collectively	Mixed; collaborative when joint IOU & DER; adversarial when separate	Mixed; collaborative when joint IOU & DER; adversarial when separate	Insufficient data	Insufficient data
Hearing	Collaborative (b/c consensus settlement); info used to clarify, not to attack/undermine	Not applicable	Not applicable	Not applicable	Adversarial; rights-based contest; cross-examination to attack/undermine	Collaborative; process set collectively

In this section I organize my cross-case findings into three categories: (1) findings about the structure of the PUC process; (2) findings about the function of the PUC process stages; and (3) emergent findings.

Findings about the Structure of the PUC Process

The structure of the PUC process is flexible. Better still, the broader energy policy-making community has the power to contribute to the shaping of the PUC process.

In the EERS case stakeholders constructively contributed to shaping PUC process in two important ways. First, at the prehearing conference they encouraged the Commissioners to begin the docket with educational and deliberative technical sessions, which the Commission obliged. The prehearing conference represents a rare opportunity for stakeholders to engage directly with the Commissioners and in this instance the opportunity was well capitalized on. Second, when stakeholders felt they were unable to find common ground in formal settlement conferences, they brought together DER and utility stakeholders in informal meetings to work out an agreement. In this case leadership, particularly OEP leadership, brought about collaboration. These two components of the process structure, educational technical sessions and joint DER and utility informal negotiations, were identified as critical components to achieving consensus in the EERS case.

The grid modernization investigation provided a valuable contrast to the way the structure of informal stakeholder meetings can influence a process. In this case, informal meetings, which divided utility and DER stakeholders into opposing caucuses, were counterproductive to reconciling the interests of these two groups. Those who wish to cultivate a greater consensus among the sectors of New Hampshire's energy policy-making community will

note the contrasting lessons of EERS and grid modernization informal meetings and seek to bring together utility and DER stakeholders beyond the walls of PUC proceedings.

Paradoxically, the standard structure of the PUC process as applied to the net metering case appears to have contributed to bringing the stakeholders to the negotiation table with a strong desire to seek consensus. Each party's *best alternative to a negotiated agreement* (BATNA) was a fully contested litigation among dozens of parties and 13 sets of testimony, something all parties wished to avoid due to the risk and burden it would entail. By the time settlement negotiations were convened, many key parties were more than ready to seek common ground in order to avoid the risks of a courtroom showdown, in which a decision could go against their interests. In contrast, the grid modernization investigation, in which the stakes were lower due to lack of immediate policy actions resulting from the process, had no similar motivation to seek common ground in order to avoid a risky legal contest. In the grid modernization case, each coalition's BATNA, a report containing non-consensus recommendations, was acceptable, far more so than their net metering BATNA of a risky multiparty litigation, which lessened the incentive to collaborate.

In net metering, the standard PUC process convened settlement only after the long and resource-intensive period of adversarial ammunition stockpiling of testimony filing, discovery, and rebuttal, which limited opportunities for creative joint problem solving to the tail end of the process. Hosting confidential settlement negotiations earlier in the process has the potential to help parties avoid repeating the exhaustive ordeal of testimony, discovery, and rebuttal depicted in the net metering case.

It is important for those stakeholders just beginning to engage in PUC proceedings and those long familiar with the institution to think critically about the way things are done and the

way things might be done differently to better meet the needs of the challenges at hand. The cases of EERS, grid modernization, and net metering make clear that the structure of the PUC process can be molded and shaped by those with the leadership and commitment necessary to tackle the energy challenges of our modern era.

Findings about the Functions of the PUC Process Stages

Different stages of PUC process serve different functions. If the Commission wishes to achieve the policy goal of creating a more collaborative approach to decision making it will expand the role of those stages that serve the functions associated with collaborative processes. I refer primarily to technical sessions (work groups), settlement conferences, and informal collaboration between utilities and DER affiliates.

EERS technical sessions served the function of creating space for collective learning, sharing of interests, and deliberation between utility and DER groups. These technical sessions also allowed stakeholders to incorporate perspectives from a wide range of expertise. Contributions from experts were used to create a shared basis of understanding, as opposed to expert contributions during testimony and discovery, which were used by some stakeholders to shore up their own positions and attack the positions of others. Additionally, informal meetings convening utility and nonutility stakeholders in the EERS case provided the parties with supplementary negotiation space when formal meetings proved insufficient. Informal meetings served the important function of creating space for creative exchanges and deliberation.

Again in grid modernization, working group meetings served much the same function as EERS technical sessions. Stakeholders convened to learn about issues together, engage in dialogue and creative exchanges, and work jointly to craft a report for the Commission. The

Commission enlisted technical and facilitation experts to help the working group serve these collaborative functions. While the final product was not a consensus, the process itself fostered collective learning between DER and utility stakeholders.

Settlement conferences served the collaborative function in the net metering case. These meetings create space for interest-based exchanges among the parties and allowed for creative brainstorming of policy solutions and joint problem solving. A key factor in the ability for settlement conferences to serve these functions was their confidential nature. The confidential nature of settlement freed stakeholders from the fear that their words would be used as a weapon against them in future hearings. During settlement, utility and DER stakeholders reached consensus on many issues, even if in the end they submitted dueling settlement agreements.

The three key process stages that serve collaborative functions are educational technical sessions, confidential settlement conferences, and joint informal meetings between utilities and DER stakeholders. Each serves a related but distinct function. Technical sessions were used primarily for learning, dialogue, and incorporation of expert resources for the collective. Settlement conferences allowed parties to take the next step in crafting creative agreements and trading across issues. Informal negotiations provide for the more candid and free-flowing exchanges that are not always easily achieved in formal proceedings. Each stage represents an opportunity for the Commission to expand its ability to foster a collaborative decision making environment.

Emergent Findings

PUC process alone, while necessary to achieving collaborative and innovative energy policy solutions, is insufficient to reaching consensus. In my research I identified other critical

variables, including stakeholder leadership and stakeholder commitment to guiding New Hampshire's energy policy-making community towards mutually beneficial policy solutions.

The EERS and net metering cases illustrate two starkly different drivers of collaboration. In the former case, OEP Director Meredith Hatfield and other leaders took charge of shaping the process, both formal and informal, towards collaboration. In the latter case, the coercive threat of a chaotic and risky multiparty litigation brought stakeholders to the negotiation table during settlement. Both factors, leadership and the risky BATNA of an uncertain courtroom showdown, helped motivate the parties and instill in them a commitment to collaboration.

The grid modernization case embodied neither the positive motivator of strong leadership nor the negative motivator of a weak BATNA. This case, while professedly collaborative, was less successful than EERS and net metering in reaching consensus, highlighting the importance of stakes, leadership, or some other motivating force to foster collaborative problem-solving between utilities and DER affiliates.

Finally, the cases make clear that the Commission is no longer merely an institution necessary for "controlling the evils that result from monopoly [utility] corporations" (Meunier, 1932). The disruption caused by DER proliferation has thrust a new responsibility upon the Commission, the responsibility of guiding the evolution of our energy system towards competition, decentralization, and sustainability. But this responsibility also falls to the energy policy-making community as a whole. Leaders representing the state, solar and other DER businesses, environmental advocates, utilities, and other interest groups must share the weight of this responsibility, not only in redesigning our energy policies, but also in redesigning the Commission itself as it evolves to take on a new role for a new century.

Recommendations

The following is a list of recommendations for the Commission and for stakeholders from New Hampshire's energy policy-making community who engage in Commission proceedings and wish to continue to cultivate a more collaborative approach to 21st century electricity market design.

Recommendations for the Commission

- The Commission should structure future proceedings addressing 21st century energy challenges to incorporate collaborative functions early on and throughout dockets.
- The Commission should make hosting educational and deliberative technical sessions the norm, prior to proposal filings.
- The Commission should consider hosting confidential settlement conferences earlier in the process.
- The Commission should enlist expert resources such as RAP regularly to assist in educating stakeholders and facilitating processes.
- The Commission should strengthen the capacity for facilitation of dockets, for example through facilitation and mediation training for Staff and/or regularly employing a facilitator.
- The Commission should conduct investigative dockets addressing 21st century energy policy challenges using working groups, educational modules, or other formats that bring utility and DER stakeholders together for the purpose of collective learning.
- The Commission should reassess the roles and mandates of both the Sustainable Energy Division and the Electric Division in light of the new challenges presented by 21st century

energy sector disruption and consider avenues to further integrate and expand the functions of these two divisions.

Recommendations for New Hampshire's Energy Policy-making Community

- Stakeholders should approach the prehearing conference strategically and in concert with one another and use it to make process recommendations to suit the needs of each docket's unique circumstances.
- Stakeholders convening extracurricular meetings should include both DER and utility representatives.

The outcomes of EERS and of Net Metering set in motion further collaborative opportunities and forums dedicated to the task of DER integration. The EERS decision directed the EESE Board to take on a new role as a stakeholder advisory board to the energy efficiency implementation plan. During the post-docket implementation planning phase, utility stakeholders, efficiency professionals, OCA, DES, and other stakeholders continued to work together in preparation for the policy rollout in 2018. In the Net Metering decision, the Commission ordered their staff to convene multiple working groups comprised of utility and DER stakeholders: one to assist in the development of the Value of DER Study through data collection efforts, and others to design pilot DER projects. These forums are *critical* opportunities for the state, the utility industry, and the DER coalition to build upon the progress that has been made over the past two years. And it is as we look forward to these new opportunities that I provide my concluding recommendations.

These recommendations are not directed at the Commission, for there is only so much we can collectively ask of them as we design the distributed grid of the 21st century. These recommendations are directed at New Hampshire's community of energy professionals, the utilities and DER affiliates alike who have only just begun the hard work of decentralizing the power system. Dr. Raab (1994) writes of integrative negotiation that, "This somewhat radical concept is based on the assumption that we can better satisfy our own interests only through seeking to better satisfy the interests of our opponents." I challenge the DER interest groups engaging in these new forums to learn as much as they can from their utility counterparts and then to use that knowledge to find solutions that satisfy the interests of the utility as well as their own. I challenge the utility managers to strive to make New Hampshire a national leader in dynamic and competitive DER markets in such a way that will simultaneously earn the utilities preeminence in their industry.

I see in New Hampshire a state that has often led the nation in power sector innovation. Its cities were some of the first on Earth to be lit with electric light. New Hampshire played essential roles in the introduction of competition to the national energy sector, both in bulk power generation as made possible by PURPA, and in competitive retail electricity supply. Now, New Hampshire has an opportunity to again lead the nation by bringing innovation to markets for retail electricity services through competitive DER integration. The Energy Efficiency Resource Standard, Grid Modernization, and Net Metering dockets, while foundational in bringing the new structure and function of the Commission to the fore, are only the beginning. The hardest work is yet to come. It is up to this community to determine whether to proceed through an adversarial power struggle, or through a collaborative commitment to realize a collective benefit for us all.

List of References

LIST OF REFERENCES

Advanced Energy Economy. (2017) Power Suit Docket Dive: state commission addressing net metering and value of solar. Retrieved from https://powersuite.aee.net/

Aggarwal, S. (2016, March 30). Q&A on performance-based regulation with Energy Innovation's Sonia Aggarwal [interview by Jennifer Christiansen]. *Great Plains Institute*. Retrieved from http://www.betterenergy.org/blog/qa-energy-innovations-sonia-aggarwal.

Agora Energiewende. (2008). Transparenzdefizite der Netzregulierung. Retrieved from https://www.stiftung-mercator.de/media/downloads/3_Publikationen/Agora_Transparenzdefizite_der_Netzregulierung.pdf

American Council for an Energy Efficient Economy. (2017) Policy Brief: State energy efficiency resource standards. Retrieved from http://aceee.org/sites/default/files/state-eers-0117.pdf.

Averch, H., Johnson, L. (1962). Behavior of the firm under regulatory constraint. *The American Economic Review Vol. 52, No. 5 (Dec., 1962), pp. 1052-1069.* Published by: American Economic Association. Retrieved from http://www.jstor.org/stable/1812181.

Baake, Rainer. (2013). Germany's Energiewende: The Prospects of a Grand-Scale Project. *Georgetown Journal for International Affairs, Vol. 14, No. 1, pp. 17-25*. Georgetown University Press.

Baumann, C., White, S. (2012). Making better choices: a systematic comparison of adversarial and collaborative approaches to the transport policy process. *Transport Policy Vol. 24, pp. 83–90*.

Below, C. (2016). NHPUC DE 16-576 City of Lebanon direct testimony. Retrieved from http://www.puc.state.nh.us/Regulatory/Docketbk/2016/16-576/TESTIMONY/16-576_2016-10-24_LEBANON_CVR_LTR_DTESTIMONY_C_BELOW.PDF.

Below, C. (2017). NHPUC DE 16-576 Response to "Motion to Focus Issues at Hearing". Retrieved from http://www.puc.state.nh.us/Regulatory/Docketbk/2016/16-576/MOTIONS-OBJECTIONS/16-576_2017-03-24_LEBANON_RESPONSE_CFL_MOTION_FOCUS_OCA_MOTION_IN_LIMINE.PDF.

Birchard, M. (2017). NHPUC DE 16-576 motion to focus issues at hearing. Retrieved from http://www.puc.state.nh.us/Regulatory/Docketbk/2016/16-576/MOTIONS-OBJECTIONS/16-576_2017-03-23_CLF_MOTION_FOCUS.PDF.

Brown, P. (2017). NHPUC DE 16-576 Energy Freedom Coalition of America notice of agreement with Consumer Energy Alliance, notice to withdraw testimony and report, and withdraw revised request to authorize depositions of James Voyles and David Holt. Retrieved from http://www.puc.state.nh.us/Regulatory/Docketbk/2016/16-576/LETTERS-MEMOS-TARIFFS/16-576_2016-12-21_EFCA_NOTICES_AGREEMENT_CEA_WITHDRAWS_TESTIMONY_REV_REQUEST_DEPOSE.PDF.

Buxton, A. (2017). NHPUC DE 16-576 Energy Freedom Coalition request to authorize deposition of James Voyles and David Holt. Retrieved from http://www.puc.state.nh.us/Regulatory/Docketbk/2016/16-576/LETTERS-MEMOS-

TARIFFS/16-576_2016-12-21_EFCA_NOTICES_AGREEMENT_CEA_WITHDRAWS_TESTIMONY_REV_REQUEST_DEPOSE.PDF.

Campbell, J., Quincy, C., Osserman, J., Pedersen, O. (2013). Coding in-depth semistructured interviews: problems of unitization and intercoder reliability and agreement. *Sociological Methods & Research, 42(3) 294–320, 2013*.

Convery, F.; Mohlin, K.; Spiller, E. (2017). Policy Brief—Designing Electric Utility Rates: Insights on Achieving Efficiency, Equity, and Environmental Goals, *Review of Environmental Economics and Policy*, Volume 11, Issue 1, 1 January 2017, Pages 156–164, https://doi.org/10.1093/reep/rew024

Culley, T., Birchard, M., Buxton, A., Emerson, E., Hinchman, S. (2017). NHPUC DE 16-576 CONFIDENTIAL settlement outline.

Cunningham, J., Dudley, J., Stachow, L. (2015). NHPUC DE 15-137 Staff direct testimony. Retrieved from http://www.puc.state.nh.us/Regulatory/Docketbk/2015/15-137/TESTIMONY/15-137_2015-12-11_STAFF_REV_DTESTIMONY_JCUNNINGHAM_JDUDLEY_LSTACHOW.PDF.

Davis, E., Asbury, K., Carroll, C., Woods, C., Stanley, E., Tebbetts, H., Bisson, R. (2016). NHPUC DE 15-137 Joint Utilities rebuttal testimony. Retrieved from http://www.puc.state.nh.us/Regulatory/Docketbk/2015/15-137/TESTIMONY/15-137_2016-03-01_JT_UTILITIES_JT_RTESTIMONY_KASBURY_CCARROLL_CWOODS_ESTANLEY_HTEBBETTS_RBISSON_EDAVIS.PDF.

Emerson, K., et al. (2003). The Challenges of Environmental Conflict Resolution. In R. O'Leary and L. Bingham (Eds.), *The Promise and Performance of Environmental Conflict Resolution*.Washington, DC: Resource for the Future.

Emerson, K., Nabatchi, T., Balogh, S. (2011). An Integrative Framework for Collaborative Governance. *Journal of Public Administration Research and Theory, 22, 1–29, 2011*.

Epler, G. (2017). NHPUC IR 15-296 Unitil Energy Systems comments. Retrieved from https://www.puc.nh.gov/Regulatory/Docketbk/2015/15-296/LETTERS-MEMOS-TARIFFS/15-296_2017-05-22_UES_COMMENT.PDF.

Eversource Energy. (2016, January). *Annual 10-K Filing to the United States Securities and Exchange Commission for Fiscal Year Ended December 31, 2015*. Retrieved from https://www.sec.gov/Archives/edgar/data/13372/000007274117000007/a201610kdocument.htm.

Faryniarz, S. (2016). NHPUC DE 16-576 Rebuttal testimony of Stan Faryniarz on behalf of Commission Staff. Retrieved from http://www.puc.state.nh.us/Regulatory/Docketbk/2016/16-576/TESTIMONY/16-576_2016-12-21_STAFF_RTESTIMONY_S_FARYNIARZ.PDF.

Fisher, R., Ury, W. (2011). *Getting to yes: Negotiating agreement without giving in*. New York, NY: Penguin Books.

FN. (2016-2017). Field Notes.

Forester, J. (1997). Beyond Dialogue to Transformative Learning: How Deliberative Rituals Encourage Political Judgment in Community Planning Processes. In Borri, D., Khakee, A., Lacirignola, C.

(Eds.), *Evaluating Theory-Practice and Urban-Rural Interplay in Planning* (pp. 81-103). Kluwer Academic Publishers. E-book.

GDS Associates, Inc. (2009). *Additional opportunities for energy efficiency in New Hampshire: prepared for the New Hampshire Public Utilities Commission.* Retrieved from https://www.puc.nh.gov/Electric/GDS%20Report/NH%20Additional%20EE%20Opportunities%20Study%202-19-09%20-%20Final.pdf.

Germany Interview 1. (2016).
Germany Interview 2. (2016).
Germany Interview 3. (2016).
Germany Interview 4. (2016).
Germany Interview 5. (2016).
Germany Interview 6. (2016).
Germany Interview 7. (2016).
Germany Interview 8. (2016).

Gilleo, A., Kushler, M., Molina, M., York, D. (2015). Valuing efficiency: A review of lost revenue adjustment mechanisms. *ACEEE*. Retrieved from http://aceee.org/node/3078?id=5222.

Grid Modernization Working Group. (2017). *Grid Modernization in New Hampshire: Report to the New Hampshire Public Utilities Commission*. Retrieved from https://www.puc.nh.gov/Regulatory/Docketbk/2015/15-296/LETTERS-MEMOS-TARIFFS/15-296_2017-03-20_NH_GRID_MOD_GRP_FINAL_RPT.PDF.

Hatfield, M., Casey, J., Merrill, A., Mitchell, C., Morales, A. (2013). *Governor Hassan energy and environment transition team notes and findings*.

Hatfield, M. (2016, September 1). Getting to know Barr's new clean energy program officer: Six questions for Meredith Hatfield. *Barr Foundation*. Retrieved from https://www.barrfoundation.org/blog/get-to-know-new-barr-foundation-clean-energy-program-officer.

Helms, Thorsten. (2016). Asset Transformation and the Challenges to Servitize a Utility Business Model. *Energy Policy: Vol 91, pp. 98-112*.

Hirsh, R. (1999). *Power Loss: The origins of deregulation and restructuring in the American electric utility system*. Cambridge, MA: MIT Press.

Howland, D. (2017). NHPUC DE 16-576 secretarial pre-hearing instructional letter [filed March 23, 2017]. Retrieved from http://www.puc.state.nh.us/Regulatory/Docketbk/2016/16-576/LETTERS-MEMOS-TARIFFS/16-576_2017-03-23_SEC_LTR_INSTRUCTIONAL.PDF.

Innes, J., Booher, D. (2003). Collaborative Policymaking: Governance Through Dialogue. In Hajer, M., Wagenaar, H. (Eds.), *Deliberative Policy Analysis: Understanding Governance in the Network Society (pp. 33–59)*. Cambridge University Press.

ISO New England. (2016). ISO New England Energy Efficiency Forecast Background Report. Retrieved from: https://www.iso-ne.com/system-planning/system-forecasting/energy-efficiency-forecast

List of References

ISO New England. (2017a). *2015 ISO New England Electric Generator Air Emissions Report*. Retrieved from: https://www.iso-ne.com/static-assets/documents/2017/01/2015_emissions_report.pdf

ISO New England. (2017b). *Solar Power in New England: Concentration and Impact*. Retrieved from https://www.iso-ne.com/about/what-we-do/in-depth/solar-power-in-new-england-locations-and-impact

Jacobsson, S., & Lauber, V. (2006). The politics and policy of energy system transformation—explaining the German diffusion of renewable energy technology. *Energy Policy*, *34*(3), 256–276. http://doi.org/10.1016/j.enpol.2004.08.029

Kind, P. (2013). "Disruptive challenges: Financial implications and strategic responses to a changing retail electric business." Edison Electric Institute. Retrieved from http://www.eei.org/ourissues/finance/documents/disruptivechallenges.pdf.

Laes, E., Gorissen, L., Neens, F. (2014). A comparison of energy transition governance in Germany, The Netherlands, and the United Kingdom. *Sustainability, Vol. 6, pp. 1129-1152, 2014*.

Lambert, J. (2015). *The power brokers: The struggle to shape and control the electric power industry*. Cambridge, MA: MIT Press.

Lawrence Berkeley National Laboratory. (2017) Regulatory incentives and disincentives for utility investments in grid modernization. *Future Electricity Regulation Series No. 8*. Retrieved from https://emp.lbl.gov/sites/default/files/feur_8_utility_incentives_for_grid_mod_rev_062617.pdf.

Lazar, J. (2015). *The basics of decoupling: a superior solution to the throughput incentive*. Retrieved from http://www.raponline.org/wp-content/uploads/2016/05/rap-lazar-nheese-decoupling-2015-june-19.pdf.

Lazar, J. and Gonzalez, W. (2015). Smart Rate Design for a Smart Future. Montpelier, VT: Regulatory Assistance Project. Retrieved from: http://www.raponline.org/document/download/id/7680

Lazar, J. and Colburn, K. (2013, September). Recognizing the full value of energy efficiency: what's under the feel-good frosting of the world's most valuable layer cake of benefits. *Regulatory Assistance Project.* Retrieved from http://www.raponline.org/wp-content/uploads/2016/05/rap-lazarcolburn-layercakepaper-2013-sept-9.pdf.

Lewicki, R., Saunders, D., Barry, B. (2011). *Essentials of Negotiation – Fifth Edition*. Boston, MA: McGraw-Hill Global Education Holdings, LLC.

Liberty Consulting Group. (2013). NHPUC IR 13-020 Report on Investigation into Market Conditions, Default Service Rate, Generation Ownership and Impacts on Competitive Electricity Market [prepared jointly by Staff of the NHPUC and The Liberty Consulting Group]. Retrieved from: https://www.puc.nh.gov/Electric/IR%2013-020%20PSNH%20Report%20-%20Final.pdf

Liberty Utilities. (2016, January). *Annual 10-K Filing to the United States Securities and Exchange Commission for Fiscal Year Ended December 31, 2015*.

Loiter, J. (2015). NHPUC DE 15-137 Direct testimony of Jeffrey Loiter on behalf of New Hampshire Sustainable Energy Association, Conservation Law Foundation, The Jordan Institute, Northeast Clean Energy Council, and The Nature Conservancy. Retrieved from

http://www.puc.state.nh.us/Regulatory/Docketbk/2015/15-137/TESTIMONY/15-137_2015_12-09_NHSEA_ET_AL_DTESTIMONY_J_LOITER.PDF

Loiter, J. (2016). NHPUC DE 15-137 Reply testimony of Jeffrey Loiter on behalf of New Hampshire Sustainable Energy Association, Conservation Law Foundation, The Jordan Institute, New England Clean Energy Council, and The Nature Conservancy [March 1, 2016]. Retrieved from: http://www.puc.state.nh.us/Regulatory/Docketbk/2015/15-137/TESTIMONY/15-137_2016-03-02_NHSEA_ET_AL_REPLY_TESTIMONY_JLOITER.PDF

Lovins, A.B. (1976). Energy strategy: the road not taken? *Foreign Affairs.* Retrieved from: http://courses.washington.edu/pbaf595/Readings/Lovins_1976.pdf

Lovins, A.B. (1985). Saving gigabucks with negawatts. *Public Util. Fortn.; (United States)*, *115:6*.

Matsuura, M. and Schenk, T. (2017). *Joint Fact-finding in Urban Planning and Environmental Disputes*. New York, NY: Routledge.

McCraw, T. (1984). *Prophets of regulation*. Cambridge, MA: Belknap Press.

Meunier, Lionel. (1932). "Control of Public Utilities in New Hampshire." Durham, NH: University of New Hampshire. Thesis.

Moskovitz, D., Harrington, C., Austin, T. (1992). *Decoupling vs. lost revenues: regulatory considerations*. Regulatory Assistance Project. Retrieved from http://www.raponline.org/wp-content/uploads/2016/05/rap-moskovitz-decouplingvslostrevenues-1992-05.pdf.

National Association for Regulatory Utility Commissioners. (2007). *Decoupling for electric & gas utilities: frequently asked questions*. Retrieved from http://pubs.naruc.org/pub/536EF203-2354-D714-51DC-D6E578C43238.

NARUC. (2016). *Draft NARUC Manual on Distributed Energy Resources Compensation*. Prepared by the Staff Subcommittee on Rate Design, National Association of Regulatory Utility Commissioners, Washington, DC.

National Association of State Legislatures. (2016). *State net metering policies.* Retrieved from http://www.ncsl.org/research/energy/net-metering-policy-overview-and-state-legislative-updates.aspx.

National Renewable Energy Labs. (2009). *Decoupling policies: options to encourage energy efficiency policies for utilities*. Retrieved from http://www.nrel.gov/docs/fy10osti/46606.pdf.

Navigant Research. (2015). *Distributed energy resources global forecast*. Retrieved from https://www.navigantresearch.com/newsroom/installed-distributed-energy-resources-capacity-is-expected-to-reach-530-7-gw-in-2024.

New Hampshire Office of Energy and Planning. (2014). *10-Year state energy strategy.* Retrieved from https://www.nh.gov/oep/energy/programs/documents/energy-strategy.pdf.

New Hampshire Office of Legislative Budget Assistant. (2012). State of New Hampshire Public Utilities Commission and its Administratively Attached Agencies: Performance Audit. Retrieved from

https://www.puc.nh.gov/EESE%20Board/LBA%20Audit/LBA%20Performance%20Audit%20Report%20April%202012.PDF.

New Hampshire Public Utilities Commission. (2015a). DE 15-137 [transcript of prehearing conference June 3]. Retrieved from http://www.puc.state.nh.us/Regulatory/Docketbk/2015/15-137/TRANSCRIPTS-OFFICIAL%20EXHIBITS-CLERKS%20REPORT/15-137%202015-06-23%20TRANSCRIPT%20OF%20HEARING%20HELD%20ON%2006-03-15.PDF.

New Hampshire Public Utilities Commission. (2015b). *NHPUC Biennial Report: July 1, 2013 – June 30, 2015*. Retrieved from https://www.puc.nh.gov/Home/AboutUs/Bien%2013-15%20112515.pdf

New Hampshire Public Utilities Commission. (2015c). Energy Efficiency Resource Standard: A Straw Proposal for New Hampshire [report prepared by Electric Division Staff of PUC]. Retrieved from http://www.puc.state.nh.us/Electric/EERS%20Straw%20Proposal.pdf

New Hampshire Public Utilities Commission. (2016a). DE 15-137 [transcript of hearing May 2]. Retrieved from http://www.puc.state.nh.us/Regulatory/Docketbk/2015/15-137/TRANSCRIPTS-OFFICIAL%20EXHIBITS-CLERKS%20REPORT/15-137_2016-05-20_TRANSCRIPT_05-02-16.PDF.

New Hampshire Public Utilities Commission. (2016b). IR 15-296 Order No. 25,877 order on scope and process. Retrieved from https://www.puc.nh.gov/Regulatory/Docketbk/2015/15-296/ORDERS/15-296_2016-04-01_ORDER_25877.PDF.

New Hampshire Public Utilities Commission. (2016c). DE 16-576 Order No. 25,972 order granting motion for the adoption of an interim net metering tariff. Retrieved from http://www.puc.state.nh.us/Regulatory/Docketbk/2016/16-576/ORDERS/16-576_2016-12-21_ORDER_25972.PDF.

New Hampshire Public Utilities Commission (2016d). DE 16-576 [transcript of prehearing conference held on 6/10/16]. Retrieved from https://www.puc.nh.gov/Regulatory/Docketbk/2016/16-576/TRANSCRIPTS-OFFICIAL%20EXHIBITS-CLERKS%20REPORT/16-576_2016-06-29_TRANSCRIPT_06-10-16.PDF

New Hampshire Public Utilities Commission. (2017a). NHPUC DE 16-576 Order No. 26,029 accepting settlement provisions, resolving settlement issues, and adopting a new alternative net metering tariff. Retrieved from http://www.puc.state.nh.us/Regulatory/Docketbk/2016/16-576/ORDERS/16-576_2017-06-23_ORDER_26029.PDF.

New Hampshire Public Utilities Commission. (2017b). NHPUC DE 16-576 [transcript of hearing held on 03/27/17 – Day 1 morning session]. Retrieved from http://www.puc.state.nh.us/Regulatory/Docketbk/2016/16-576/TRANSCRIPTS-OFFICIAL%20EXHIBITS-CLERKS%20REPORT/16-576_2017-03-31_TRANSCRIPT_03-27-17_DAY1_AM.PDF.

NHSaves. (2017). 2018-2020 New Hampshire Statewide Energy Efficiency Plan Draft. Retrieved from https://www.puc.nh.gov/EESE%20Board/NHSaves%202018-2020%20Draft%20EE%20Plan.pdf.

NH Interview 1. (2016).
NH Interview 2. (2016).
NH Interview 3. (2016).

NH Interview 4. (2016).
NH Interview 5. (2016).
NH Interview 6. (2016).
NH Interview 7. (2016).
NH Interview 8. (2016).
NH Interview 9. (2016).
NH Interview 10. (2016).
NH Interview 11. (2016).
NH Interview 12. (2016).
NH Interview 13. (2016).
NH Interview 14. (2016).
NH Interview 15. (2017).
NH Interview 16. (2017).
NH Interview 17. (2017).
NH Interview 18. (2017).
NH Interview 19. (2017).
NH Interview 20. (2017).
NH Interview 21. (2017).
NH Interview 22. (2017).
NH Interview 23. (2017).
NH Interview 24. (2017).
NH Interview 25. (2017).
NH Interview 26. (2017).

Obama, B. (2017). The irreversible momentum of clean energy. *Science, 10.1126/science.aam6284 (2017)*

Raab, J. (1994). *Using consensus building to improve utility regulation*. Washington, DC: American Council for an Energy-Efficiency Economy.

Raab, J. (2016). NHPUC Grid Modernization DRAFT Ground Rules. Retrieved from http://www.raabassociates.org/main/projects.asp?proj=143

Rocky Mountain Institute. (2017). Electricity Innovation Lab. Retrieved from https://rmi.org/our-work/electricity/elab-electricity-innovation-lab/.

Sackett, E. (1976). *Fifty years of service: A history of Public Service Co. of New Hampshire*. Lee, NH: Captial Offset Co., Inc.

Schenk, T., Stokes, L. (2013). The Power of Collaboration: Engaging All Parties in Renewable Energy Infrastructure Development. *IEEE Power & Energy Magazine.*

Scott, R. (2008). *Institutions and organizations*. Thousand Oaks, CA: SAGE Publications.

Scott, T. (2015). Does Collaboration Make Any Difference? Linking Collaborative Governance to Environmental Outcomes. *Journal of Policy Analysis and Management, Vol. 34, No. 3, 537–566*.

Settling Parties in De 15-137. (2016a). Docket No. De 15-137 Settlement Agreement. Retrieved from http://www.puc.state.nh.us/Regulatory/Docketbk/2015/15-137/LETTERS-MEMOS-TARIFFS/15-137_2016-04-27_STAFF_PARTIES_SETTLEMENT_AGREEMENT.PDF.

Settling Parties in DE 15-137. (2016b). Docket No. DE 15-137 Electric Attachment A. Retrieved from http://www.puc.state.nh.us/Regulatory/Docketbk/2015/15-137/LETTERS-MEMOS-TARIFFS/15-137_2016-04-27_STAFF_PARTIES_ATT_SETTLEMENT_AGREEMENT.PDF.

Sheehan, M. (2017). Docket No. De 16-576 Settling Parties Response to Conservation Law Foundation Motion to Focus Issues at Hearing. Retrieved from http://www.puc.state.nh.us/Regulatory/Docketbk/2016/16-576/MOTIONS-OBJECTIONS/16-576_2017-03-24_SETTLING_PARTIES_RESPONSE_CLF_MOTION_FOCUS.PDF.

Smith, A. (1776). *An inquiry into the nature and causes of the wealth of nations.* London: W. Strahan and T. Cadell,

SolarCity. (2016). *A pathway to the distributed grid: Evaluating the economics of distributed energy resources and outlining a pathway to capturing their potential value*. Grid Engineering. Retrieved from http://www.solarcity.com/sites/default/files/SolarCity_Distributed_Grid-021016.pdf.

Solar Energy Industry Association. (2017). *Solar spotlight: New Hampshire.* Retrieved from http://www.seia.org/sites/default/files/2017%20Q1%20NH.pdf.

Stigler, G. (1971). The theory of economic regulation. *The Bell Journal of Economics and Management Science, 2(1), 3-21.* http://www.sjsu.edu/faculty/watkins/stigler.htm.

The Exchange. (2017, February 3). Net metering: Energy providers clash on cap, utility rates [debate between Jack Ruderman of ReVision Energy and Rick Labrecque of Eversource, moderated by Laura Knoy and Sam Evans-Brown]. *New Hampshire Public Radio*. Retrieved from http://nhpr.org/post/net-metering-energy-providers-clash-cap-utility-rates#stream/0

Trabish, H. (2017, March 31). More than 30 states embrace grid modernization, new policy tracker finds. *UtilityDive.* Retrieved from http://www.utilitydive.com/news/more-than-30-states-embrace-grid-modernization-new-policy-tracker-finds/443702/.

Ulibarri, N. (2015). Tracing process to performance of collaborative governance: A comparative case study of federal hydropower licensing. *The Policy Studies Journal, Vol. 43, No. 2, 2015*

Unitil Corporation. (2016, January). *Annual 10-K Filing to the United States Securities and Exchange Commission for Fiscal Year Ended December 31, 2015*. Retrieved from https://www.sec.gov/Archives/edgar/data/755001/000119312516440721/d110360d10k.htm.

Ury, W., Brett, J. M., & Goldberg, S. B. (1988). *Getting disputes resolved: designing systems to cut the costs of conflict*. Jossey-Bass.

Vermont Energy Investment Corporation, Jeffrey H. Taylor & Associates, Inc., Optimal Energy, Inc. (2011). *Independent study of energy policy issues.* Retrieved from https://www.puc.nh.gov/Sustainable%20Energy/Reports/NH%20Independent%20Study%20of%20Energy%20Policy%20Issues%20-%20Final%20Report%209-30-2011.pdf.

Vermont Energy Investment Corporation, Jeffery H. Taylor & Associates, Inc., GDS Associates, Inc. (2013). *Increasing energy efficiency in New Hampshire: realizing our potential*. Retrieved from https://www.nh.gov/oep/resource-library/energy/documents/nh_eers_study2013-11-13.pdf.

Walker, G., Senecah, S., Daniels, S. (2006). From the Forest to the River: Citizens' Views of Stakeholder

Engagement. *Human Ecology Review, Vol. 13, No. 2.*

Walton, R. (2017, June 26). New Hampshire regulators approve new net metering rate. *UtilityDive*. Retrieved from http://www.utilitydive.com/news/new-hampshire-regulators-approve-new-net-metering-tariffs/445796/.

Wiesner, D. (2017) NHPUC DE 16-576 Staff request for modification of procedural schedule [filed March 2, 2017]. Retrieved from http://www.puc.state.nh.us/Regulatory/Docketbk/2016/16-576/LETTERS-MEMOS-TARIFFS/16-576_2017-03-02_STAFF_REQ_MOD_PROC_SCH.PDF.

Wüstenhagen, R., & Bilharz, M. (2006). Green energy market development in Germany: effective public policy and emerging customer demand. *Energy Policy*, *34*(13), 1681–1696. http://doi.org/10.1016/j.enpol.2004.07.013

Yin, R. (2014). *Case study research design and methods: fifth edition.* Thousand Oaks, CA: SAGE Publications.

APPENDIX A – INSTITUTIONAL REVIEW BOARD APPROVAL LETTER

University *of* New Hampshire

Research Integrity Services, Service Building
51 College Road, Durham, NH 03824-3585
Fax: 603-862-3564

15-Dec-2015

Herndon, Henry
NREN, James Hall G04
Durham, NH 03824

IRB #: 6377
Study: Collaboration in Energy Transition Policy Processes: What can New Hampshire Learn?
Approval Date: 11-Dec-2015

The Institutional Review Board for the Protection of Human Subjects in Research (IRB) has reviewed and approved the protocol for your study as Expedited as described in Title 45, Code of Federal Regulations (CFR), Part 46, Subsection 110.

Approval is granted to conduct your study as described in your protocol for one year from the approval date above. At the end of the approval period, you will be asked to submit a report with regard to the involvement of human subjects in this study. If your study is still active, you may request an extension of IRB approval.

Researchers who conduct studies involving human subjects have responsibilities as outlined in the attached document, *Responsibilities of Directors of Research Studies Involving Human Subjects.* (This document is also available at http://unh.edu/research/irb-application-resources.) Please read this document carefully before commencing your work involving human subjects.

If you have questions or concerns about your study or this approval, please feel free to contact me at 603-862-2003 or Julie.simpson@unh.edu. Please refer to the IRB # above in all correspondence related to this study. The IRB wishes you success with your research.

For the IRB,

Julie F. Simpson
Director

cc: File
Ashcraft, Catherine

APPENDIX B – INSTITUTIONAL REVIEW BOARD RENEWAL APPROVAL LETTER

University *of* New Hampshire

Research Integrity Services, Service Building
51 College Road, Durham, NH 03824-3585
Fax: 603-862-3564

18-Nov-2016

Herndon, Henry
NREN, James Hall G04
Durham, NH 03824

IRB #: 6377
Study: Collaboration in Energy Transition Policy Processes: What can New Hampshire Learn?
Review Level: Expedited
Approval Expiration Date: 11-Dec-2017

The Institutional Review Board for the Protection of Human Subjects in Research (IRB) has reviewed and approved your request for time extension for this study. Approval for this study expires on the date indicated above. At the end of the approval period you will be asked to submit a report with regard to the involvement of human subjects. If your study is still active, you may apply for extension of IRB approval through this office.

Researchers who conduct studies involving human subjects have responsibilities as outlined in the document, *Responsibilities of Directors of Research Studies Involving Human Subjects*. This document is available at http://unh.edu/research/irb-application-resources or from me.

If you have questions or concerns about your study or this approval, please feel free to contact me at 603-862-2003 or Julie.simpson@unh.edu. Please refer to the IRB # above in all correspondence related to this study. The IRB wishes you success with your research.

For the IRB,

Julie F. Simpson
Director

cc: File
Ashcraft, Catherine
,

APPENDIX C – SAMPLE INTERVIEW PROTOCOL

1. What is your current position? How long have you held this position and can you tell me how you became involved in this work? Could you talk briefly about your professional background and your current role with *(insert organization here)*?
2. Could you describe your role/*(insert organization here)* role in New Hampshire's energy policy-making process?
3. How and when does *(insert organization here)* interact with other stakeholder groups throughout the process?
    a. During the various policy design processes you have participated in, do you engage with/collaborate with other stakeholders outside of formal meetings and procedural steps? Explain.
4. Are there examples of times where you and other stakeholders in the process have been able to "think outside the box", i.e. develop/brainstorm new policy options that surprised you (even if ideas did not end up being adopted)?
5. In what ways, if any, does the process foster collaboration?
6. In what ways, if any, does the process make it hard to collaborate with other stakeholders?
7. What do you see as the benefits/limitations of adjudication? Of collaboration?
    a. Can you talk about the benefits and limitations of discovery?
    b. Can you talk about the benefits and limitations of technical sessions?
    c. Can you talk about the benefits and limitations of settlement conferences?
    d. Can you talk about the benefits and limitations of litigated hearings?
8. During the process do stakeholders tend to share or conceal information/interests? Explain.
9. To what degree to you think different stakeholders in the process understand each other's interests and positions? Can you provide examples?
10. What about the process do you feel is successful? Could you provide examples?
11. Can you describe frustrations or challenges you have experienced with the process? Could you provide examples?
12. What kind of changes do you think would do most to improve the process?

APPENDIX D – OBSERVATIONS FROM GERMANY

During the summer 2016 I visited Berlin as a guest research at the Freie Universität Berlin. During my visit I conducted eight interviews with experts and professionals involved in both Berlin's and Germany's energy transitions, or *Energiewende*. Interviewees included consultants involved in designing the Erneuerbare-Energien-Gesetz (Germany's legislative policy mechanism guiding national deployment of renewable energy technologies), experts from prominent German energy think tanks, and professionals employed by Berlin's DER and utility sectors. Below is a summary of some observations from Germany that helped to broaden my perspective of the energy policy challenges the world is currently facing.

Germany, the largest economy in Europe and the fourth largest economy in the world, is widely considered a leader in the sustainable energy transition (Baake, 2013; Jacobsson, 2004). Through its pioneering adoption of stable, long-term public policy support for clean energy under the Renewable Energy Act (Erneuerbare Energien Gesetz) (EEG), Germany has become a global center for research and investment in renewable energy technologies and a testing ground for technologies, policies, and regulatory models. (Wüstenhagen, 2004; Laes, et al., 2014). Berlin, the largest urban center in Germany and one of the 16 German länder (internal federal states of Germany), plays an important role in this leading nation's overall energy transition.

Germany is facing many of the same policy challenges as New Hampshire and the rest of the United States. The country is grappling with a surge of new technologies, and the associated challenges of redesigning its utility sector and energy marketplace to accommodate these new technologies. Below I summarize some observations from my research in Germany.

How to Compensate 21st Century Utilities for their Services?

The high levels of DERs in Germany that have resulted from the EEG feed-in tariff highlight the conflict between deployment of these new energy technologies and the conventional electric utility business model. Since 2008, European electric utilities have faced extreme financial losses equal to more than half of their one trillion euro company value (Helms, 2016). As a result, German utilities are scrambling to remake their business models to be more innovative, customer centric, and service oriented (e.g., distributed generation, micro-grid services, energy performance contracting, energy efficiency, demand response, and smart communication technologies) (Helms, 2016). The financial losses of German utilities highlight the risk posed to American utilities if they fail to address 21st century energy policy challenges and emphasize the need for utilities to remake their business models and discover new revenue streams.

How to Compensate DERs for their Services?

One 21st century energy policy challenge relates to determining appropriate methods to compensate DERs including distributed generation (DG) such as solar. In contrast to net metering policies in the US, which in general terms compensate DG at retail electricity prices, similar systems in Germany receive compensation via a feed-in tariff established by the EEG. The feed-in tariff is a policy that sets prices per kWh for renewable energy technologies. Early feed-in tariff prices paid to renewables were as high as 40-50 cents per kWh, or 250% as much as retail electricity rates (Germany Interview 7, 2016). By comparison, distributed solar in the

continental U.S. is compensated at retail prices of no more than 18 cents per kWh, and oftentimes closer to 10 cents per kWh.

In the US, policy makers are considering more sophisticated DER compensation approaches such as time-variant rates. Alternatively, Germany has shifted its approach from the feed-in tariff to a reverse auction for renewable energy projects.

How to Design Adaptive Policies?

Rapidly advancing technologies and markets pose another challenge to 21st century energy policy makers. In order to keep up with the pace of technology, Germany's EEG is constantly being amended and revised as technologies improve and markets evolve. One German energy expert commented, "the EEG has been changed sometimes twice in one parliamentary period" (German Interview 6, 2016). The German model raises interesting questions about how to address the need for policy revisions in a rapidly changing environment.

How to Manage Dispute Resolution Between New Market Actors and Utilities?

Policy disputes between German utilities and DER affiliates are addressed by the Clearingstelle EEG, an institutional alternative dispute resolution mechanism that helps to avoid regular legal contests between the two sectors (German Interview 6, 2016).

How to Address Issues of Data Access?

Unlike their American counterparts, German energy market operators are not neutral and independent of the companies owning and operating power plants, transmission systems, and distribution systems within their territories (Germany Interview 3, 2016). The absence of an

independent and neutral market operator in German markets likely contributes to the relative lack of transparency found in those markets.

To quote from the Agora Energiewende report Transparenzdefizite der Netzregulierung (Transparency Deficits of Network Regulation),

> The level of transparency in [German electricity markets] is highly insufficient. While countries such as Norway, UK and the Netherlands publish detailed data on the regulatory process and its results, German regulatory authorities have published no information on the results of their activities, not even aggregate data on distribution network costs. This broad lack of transparency and the resulting lack of data is problematic in several respects: Firstly, it hinders political decision making by effectively withholding data needed to evaluate economic effects of necessary decisions in light of the "Energiewende" (energy transition). Secondly, it considerably limits participation by consumers and thus precludes meaningful evaluation of the success (or failure) of electricity network regulation while raising the risk of regulatory capture. Thirdly, without sufficient transparency of the regulatory process and its results, new and innovative market players will hesitate to enter the market. Yet the observed lack of transparency doesn't primarily result from inadequate or absent legal provisions. Rather… relevant provisions are either not effectively enforced or not adhered to (Agora Energiewende, 2008).

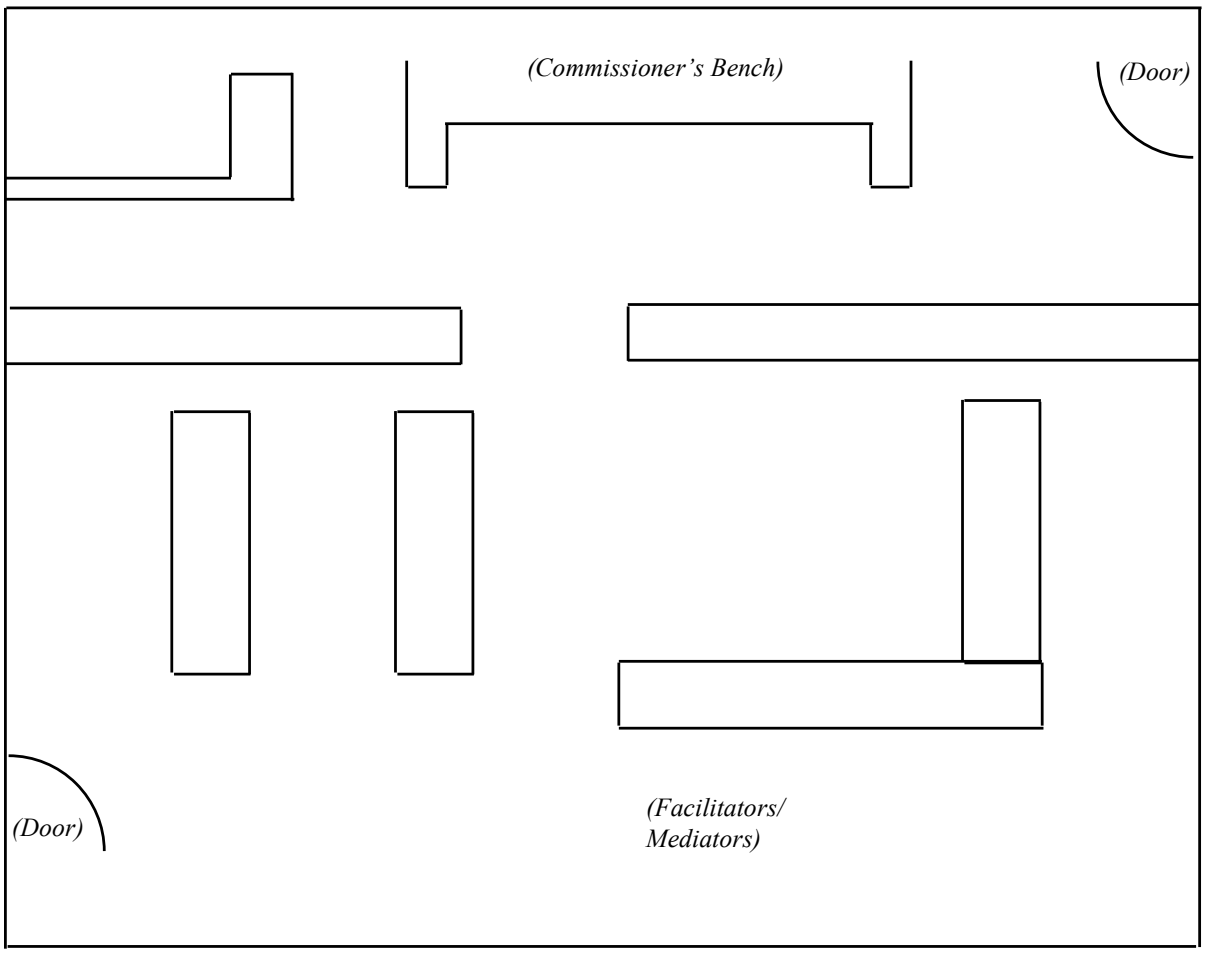
As is the case in New Hampshire, transparency and access to data regarding the electricity system are of central importance to German energy policy challenges. Transparency deficiencies in German regulatory proceedings exacerbate this challenge.

What is the Role of Public Participation in Energy Policy Making?

The major policy addressing 21st century energy challenges in Berlin is the 2016 Energy Transition Act (EEC), which stipulates that by 2050 Berlin should reduce overall CO_2 emissions by 85% relative to a 1990 baseline. The Berlin Energy and Climate Program 2030 (BEK) is the action plan that accompanies the legal framework of the EEC. The BEK is a result of a year of participatory processes (e.g., city forums, public comment sessions, public workshops) including hundreds of stakeholders from different areas of expertise. Three German energy professionals, two DER affiliates and one utility manager, said they expected little to come of the participatory processes that resulted in the BEK, and dismissed it as a toothless report (Germany Interviews 1,

2, 8, 2016). Other major efforts to address 21st century energy policy challenges in Berlin include initiatives to obtain cooperative ownership of Berlin's power grid. The organizations leading these efforts, Bürger Energie Berlin and Berliner Energietisch, are backed by significant public, financial, and political support. Comparable cooperative utility models in the US include the Sacramento Municipal Utility District and Colorado's city of Boulder utility municipalization efforts. These examples raise questions about the how to account for and accommodate public participation and engagement in 21st century energy policy decision making.

APPENDIX E – GRID MODERNIZATION ROOM CONFIGURATION DIAGRAM



During the grid modernization investigation, facilitators reconfigure the meeting room space to create a more conducive atmosphere for dialogue, learning, and free-flowing exchanges among the stakeholders.