

ENERGY ASSURANCE PLAN (FINAL/DRAFT)

Recovery Act – Energy Assurance Planning – State of Connecticut

August 2012

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2012 ENERGY ASSURANCE PLAN for Connecticut

Prepared by:

The Connecticut Department of Energy and
Environmental Protection
Bureau of Energy and Technology Policy



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EXECUTIVE SUMMARY

The 2012 Energy Assurance Plan (“EAP”) for Connecticut describes the State’s ongoing efforts towards enhancing energy assurance and securing its energy future. The 2012 EAP is the first for Connecticut and the first developed by the Department of Energy and Environmental Protection (“DEEP”). It fulfills the U.S. Department of Energy (“DOE”) requirements for DOE’s American Recovery and Reinvestment Act of 2009 (“ARRA”) grant allocated to state energy offices. The 2012 EAP presents the State’s efforts -- plans, programs, and initiatives -- that promote energy assurance. The undertakings identified in the EAP will help the State prepare for, respond to, recover from, and mitigate the effects of future energy supply disruption events.

The EAP’s structure is influenced by the four phases of emergency management – preparedness, response, recovery, and mitigation – to present the many energy assurance efforts in which Connecticut is currently engaged. The following are examples of various efforts described within the EAP that have been recently completed or are underway.

Preparedness

- The Governor introduced Connecticut’s Emergency Planning and Preparedness Initiative.¹
- The Connecticut General Assembly passed Public Act No. 12-148, *An Act Enhancing Emergency Preparedness and Response*.²
- The Public Utility Regulatory Authority investigated public service companies’ response to the Two Storms of 2011.³
- The Governor commissioned the Two Storm Panel to create a report about the details of the Two Storm response effort.
- The DESPP/Division of Emergency Management & Homeland Security clarified energy emergency management roles and responsibilities of stakeholders through the State Response Framework and reworking the state-level Emergency Support Function #12 – All Hazards Energy and Utilities Annex.
- The Bureau of Energy & Technology Policy develops policy documents like the Comprehensive Energy Strategy and 2012 Integrated Resource Plan to facilitate long-term energy planning.
- The Connecticut Siting Council requires extensive filings regarding critical energy infrastructure information and the security of siting energy facilities by public utility companies.

¹ Office of the Governor, Press Release, *Gov. Malloy Announces Storm Disaster Preparedness & Recovery Initiatives*, January 11, 2012.

² Conn. Public Act No. 12-148 (2012).

³ PURA Docket No. 11-09-09 (PURA Investigation of Public Service Companies’ Response to 2011 Storms).

- The Public Utility Regulatory Authority requires submission of and reviews various plans and forecasts regarding transmission and distribution line maintenance, natural gas pipeline protection, emergency response, loads and resources, supply and demand, and reliability.⁴
- The State explores opportunities to advance the use of emerging technologies like advance metering infrastructure, renewable resources, and energy efficiency.

Response

- The DESPP/Division of Emergency Management & Homeland Security coordinates the State Emergency Operations Center for a unified response effort.
- The DESPP/DEMHS Commodities & Resource Support Group created the Commodities Distribution Standard Operating Procedure, which includes the Fuel Task Force Standard Operation Procedure, to ensure fuel is available for emergency response.
- The various public service companies, like CL&P and UI, updated their emergency response plans at the direction of the Public Utility Regulatory Authority.⁵
- The Public Utility Regulatory Authority may impose penalties upon public utilities for inadequate response to significant utility disruption events.⁶
- The State studies the potential implementation of Microgrids to mitigate some effects of energy supply disruption events.⁷

Recovery

- The Clean Energy Finance & Investment Authority administers a plethora of financial incentives – for example, PACE financing, loan and rebate programs, tax incentives, building permit fee waivers -- to encourage Connecticut residents and business to build or rebuild in ways that move the State towards its goal of cheaper, cleaner, and more reliable energy systems and financial assistance.

⁴ See generally PURA Docket No. 11-12-13 (PURA Review of Electric Companies' and Electric Distribution Companies' Plans for Maintenance of Transmission and Distribution Overhead and Underground Lines); Public Utility Regulatory Authority, *What is the Gas Pipeline Safety Unit Inspection Program?*, <http://www.ct.gov/pura/cwp/view.asp?a=3363&q=414220> (last updated May 2012); PURA Docket No. 12-06-11 (PURA Review of Connecticut Public Service Company Plans for Restoration of Service that is Interrupted as a Result of an Emergency); PURA Docket No. 12-02-01 (PURA Review of the Connecticut Energy Efficiency Fund's Electric Conservation and Load Management Plan for 2012); PURA Docket No. 10-10-09 (DPUC Review of the Connecticut Gas Utilities Forecasts of Demand and Supply 2011-2015); and PURA Docket No. 12-04-10 (PURA 2012 Annual Report to the General Assembly on Electric Distribution Company System Reliability).

⁵ Connecticut Light & Power, *Emergency Preparedness and Response Plan* (last updated June 30, 2012); United Illuminating, *Emergency Preparedness Plan* (last updated June 29, 2012); Groton Utilities, *Emergency Preparedness Plan* (last updated September 2011); Jewett City Department of Public Utilities, *Emergency Plan* (last updated August 6, 2012); South Norwalk Electric and Water, *Municipal Electric Utility Emergency Plan* (last updated August 6, 2012); Norwalk Third Taxing District Electric Department, *Emergency Plan* (last updated August 26, 2011); Norwich Public Utilities, *Emergency Operations Plan-Electric Emergencies* (last updated September 16, 2011); Wallingford Department of Public Utilities Electric Division, *Emergency Response Plan*; Yankee Gas Services, *Emergency Preparedness and Response Plan* (last updated July 20, 2012); Connecticut Natural Gas and Southern Connecticut Gas, *Emergency Preparedness Plan* (last updated June 29, 2012); Norwich Public Utilities, *Emergency Plan-Gas* (last updated September 28, 2011).

⁶ Conn. Public Act No. 12-148 § 3 (2012).

⁷ Conn. Public Act No. 12-148 § 7 (2012).

- The Clean Energy Finance & Investment Authority and the Energy Efficiency Fund promote renewable energy projects and energy efficiency respectively.

Mitigation encompasses all activities throughout the preparedness, response, and recovery phases of emergency management that attempt to *prevent* energy supply disruptions from occurring or to *reduce* the impact of an energy supply disruption event. Mitigation activities include, for example, enforcing tree trimming standards (preparedness), administering the Lead By Example program (preparedness), building Microgrids in town centers (response), and incentivizing the inclusion of renewable technology during a rebuild of property (recovery).

The 2012 EAP includes an extensive appendix with much of what drives the State's robust energy assurance efforts – including emergency response plans, policy documents, and other reports, among other things. The details of Connecticut's energy assurance plan are embodied in the appendices.

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TABLE OF CONTENTS

EXECUTIVE SUMMARY.....	iii
I. INTRODUCTION	1
A. Background.....	1
B. Purpose & Scope.....	1
C. Organizational Structure	2
D. Authority	4
E. Energy Assurance Definitions	5
II. PRINCIPAL AUTHORITIES AND RELEVANT STAKEHOLDERS.....	7
A. State Authorities.....	7
B. Federal Authorities.....	14
C. Municipal Authorities	18
D. Non-governmental Organizations.....	19
III. STATE ENERGY PROFILE	21
A. Background.....	21
B. Electricity.....	22
C. Natural Gas	24
D. Petroleum	25
E. Renewables	26
F. Energy Use and Expenditures.....	27
IV. ENHANCING RELIABILITY THROUGH CRITICAL INFRASTRUCTURE PROTECTION, SUPPLY EFFORTS, AND DEMAND MANAGEMENT	31
A. Critical Infrastructure Protection	31
1. Compliance with Connecticut Siting Council Energy Proceedings	32
2. Docket 11-12-13: PURA Review of Electric Companies’ and Electric Distribution Companies’ Plans for Maintenance of Transmission and Distribution Overhead and Underground Lines.....	33
3. Docket 12-01-10: PURA Investigation into the Tree Trimming Practices of Connecticut Utility Companies.....	33
4. New England East-West Solution.....	34
5. DESPP/DEMHS-Critical Infrastructure Protection Unit.....	35
6. Call Before You Dig.....	35
7. PURA Gas Pipeline Safety Unit Inspection Program.....	35
B. Electricity Supply & Demand.....	37
1. 2012 Integrated Resource Plan for Connecticut	37
2. Comprehensive Energy Strategy.....	40

3.	ISO Market Study	40
4.	Forecast of Loads and Resources.....	41
5.	Distributed Generation and Combined Heat and Power Systems	43
6.	2012 Conservation and Load Management Plan	43
7.	C&LM Expanded Budget Determination	49
8.	Docket 12-02-01: PURA Review of the Connecticut Energy Efficiency Fund's Electric Conservation and Load Management Plan for 2012	50
9.	ISO New England Demand Response Programs	50
10.	PURA Annual Report on Electric Distribution Company System Reliability	51
C.	Natural Gas Supply & Demand	52
1.	Docket 10-10-09: DPUC Review of the Connecticut Gas Utilities Forecasts of Demand and Supply 2011-201.....	52
2.	Comprehensive Energy Strategy.....	52
D.	Petroleum Supply & Demand	53
E.	Role of Emerging Technologies in Enhancing Reliability	54
1.	Renewables	54
2.	Energy Efficiency	55
3.	Distributed Generation & Microgrids.....	56
V.	ENHANCING ENERGY EMERGENCY PREPAREDNESS AND RESPONSE	57
A.	Public Act 12-148, <i>An Act Enhancing Emergency Preparedness and Response</i>	57
B.	Connecticut's Emergency Planning and Preparedness Initiative.....	62
C.	Cyber Security	66
1.	Docket 10-11-08: DPUC Determination of a Public Service Company-Specific Cyber Security Policy	67
D.	Role of Emerging Technologies in Enhancing Resiliency	68
1.	Renewables	68
2.	Smart Systems & Advance Metering Infrastructure.....	68
3.	Distributed Generation & Microgrids.....	68
VI.	MONITORING DATA AND ANALYSIS	71
A.	Electricity	71
B.	Natural Gas	72
C.	Petroleum	73
VII.	ENERGY SUPPLY DISRUPTION EVENTS	75
A.	Historic Events.....	75
B.	Electricity	77
C.	Natural Gas	78
D.	Petroleum	79

E.	Interdependencies	80
VIII.	RESPONDING TO ENERGY SUPPLY DISRUPTION EVENTS	81
A.	Monitoring and Analysis.....	81
1.	State Emergency Operations Center	81
2.	WebEOC.....	82
B.	Proclamation of an Energy Emergency	83
C.	Response Organization, Management, and Communication.....	86
1.	State Response Framework.....	86
D.	State Response Measures.....	88
E.	Sector-Specific Response Measures	90
1.	Electricity.....	90
2.	Natural Gas	91
3.	Petroleum	92
4.	Cyber Threats.....	93
IX.	RECOVERY.....	95
A.	Recovery Characteristics	95
B.	Financial Incentives	97
1.	Local Rebate Programs	97
2.	PACE Financing	97
3.	Performance-Based Incentives.....	97
4.	Property Tax Incentive.....	97
5.	Sales Tax Incentive	97
6.	State Grant Programs	98
7.	State Loan Programs	98
8.	State Rebate Programs	99
9.	Utility Loan Programs.....	99
10.	Utility Rebate Program	99
11.	Building Permit Fee Waiver	100
C.	Rules, Regulations, and Policies.....	101
1.	Building Code	101
2.	Solar/Wind Contractor Licensing	101
3.	Green Power Purchasing.....	101
4.	Energy Efficiency Resource Standards.....	101
5.	Energy Standards for Public Buildings.....	102
6.	Net Metering	102
7.	New Technologies	102
D.	Funding	103
1.	The Clean Energy Finance and Investment Authority.....	103

2. Public Benefit's Fund	103
E. Conclusion	104
X. APPENDICES.....	105
Appendix A: Connecticut Siting Council, <i>White Paper on the Security of Siting Energy Facilities</i>	
Appendix B: Connecticut Light & Power, <i>Electric Utility Line Maintenance Plan</i>	
Appendix C: United Illuminating, <i>Maintenance Plan for Transmission and Distribution Overhead and Underground Lines</i>	
Appendix D: Public Utility Regulatory Authority, <i>What is Gas Pipeline Safety Unit?</i>	
Appendix E: Department of Energy & Environmental Protection, <i>2012 Integrated Resource Plan for Connecticut</i>	
Appendix F: Department of Energy & Environmental Protection, <i>Comprehensive Energy Strategy</i>	
Appendix G: Department of Energy & Environmental Protection, <i>Study of the Impact of the Regional Independent System Operator on Connecticut Ratepayers and the New England and State Wholesale Electric Power Markets</i>	
Appendix H: Connecticut Light & Power, <i>2012 Forecast of Loads and Resources</i>	
Appendix I: United Illuminating, <i>Report to the Connecticut Siting Council on Loads and Transmission Resources</i>	
Appendix J: Electric and Natural Gas Utility Companies, <i>2012 Electric and Natural Gas Conservation and Load Management Plan</i>	
Appendix K: Department of Energy & Environmental Protection, <i>Final Determination to Approve 2012 Conservation and Load Management Expanded Plan and Budget</i>	
Appendix L: Public Utility Regulatory Authority, <i>2012 Annual Report to the General Assembly on Electric Distribution Company System Reliability</i>	
Appendix M: Department of Energy & Environmental Protection and Department of Administrative Services, <i>Lead By Example Legislative Report July 2012</i>	
Appendix N: Public Act No. 12-148, <i>An Act Enhancing Emergency Preparedness and Response</i>	
Appendix O: Division of Emergency Management & Homeland Security, <i>Proposed Process for Enhancement of State Preparedness Planning</i>	
Appendix P: Governor Malloy Press Release, <i>Gov. Malloy Announces Storm Disaster Preparedness & Recovery Initiatives</i>	
Appendix Q: Witt Associates, <i>Connecticut October 2011 Snowstorm Power Restoration Report</i>	
Appendix R: Public Utility Regulatory Authority, <i>Investigation of Public Service Companies' Response to 2011 Storms Decision</i>	
Appendix S: Two Storm Panel, <i>Report of Two Storm Panel</i>	

- Appendix T: Connecticut Geospatial Information Systems Council, *Storm Response and Recovery Assessment Group Findings Report*
- Appendix U: Division of Emergency Management & Homeland Security, *State Response Framework Version 2.0*
- Appendix V: Division of Emergency Management & Homeland Security, *Connecticut Emergency Support Function #12Draft*
- Appendix W: Division of Emergency Management & Homeland Security, *Local Emergency Support Function #12Template*
- Appendix X: State of Connecticut, *1994 Energy Emergency Plan*
- Appendix Y: Division of Emergency Management & Homeland Security, *Commodities Distribution Standard Operating Procedure*
- Appendix Z: Connecticut Light & Power, *Emergency Preparedness and Response Plan*
- Appendix AA: United Illuminating, *Emergency Preparedness Plan*
- Appendix AB: Groton Utilities, *Emergency Preparedness Plan*
- Appendix AC: Jewett City Department of Public Utilities, *Emergency Plan*
- Appendix AD: South Norwalk Electric and Water, *Municipal Electric Utility Emergency Plan*
- Appendix AE: Norwalk Third Taxing District Electric Department, *Emergency Plan*
- Appendix AF: Norwich Public Utilities, *Emergency Operations Plan-Electric Emergencies*
- Appendix AG: Wallingford Department of Public Utilities Electric Division, *Emergency Response Plan*
- Appendix AH: Yankee Gas Services, *Emergency Preparedness and Response Plan*
- Appendix AI: Connecticut Natural Gas and Southern Connecticut Gas, *Emergency Preparedness Plan*
- Appendix AJ: Norwich Public Utilities, *Emergency Plan-Gas*
- Appendix AK: List of Public Utility Regulatory Authority Dockets Relevant to Energy Assurance
- Appendix AL: List of Bureau of Energy & Technology Policy Filings Relevant to Energy Assurance

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2012 ENERGY ASSURANCE PLAN FOR CONNECTICUT

I. INTRODUCTION

A. Background

In 2011, Tropical Storm Irene and the October Nor'easter tested the effectiveness of emergency response at the state, local, and utility levels. The State learned that emergency planning did not adequately focus on the actions needed in a significant power outage and emergency management roles/responsibilities within the mitigation, preparedness, response, and recovery phases of utility disruption events.⁸ In addition, the two storms' effects demonstrated Connecticut's need to continually improve critical energy infrastructure and to enhance energy system resiliency to prevent or mitigate future energy supply disruptions.

As a result, Connecticut has undertaken a broad array of activities to promote energy assurance throughout all four phases of emergency management-- mitigation, preparedness, response, and recovery. Currently, the State is focused on improving energy systems in Connecticut. The State's renewed its efforts in 2011 with the passage of Public Act 11-80, *An Act Concerning the Establishment of the Department of Energy and Environmental Protection and Planning for Connecticut's Energy Future* ("PA 11-80"). Some of the activities currently underway include energy emergency management improvements -- such as, creating a state-level All-Hazards Energy and Utilities Plan ("SESF-12") as an annex to the State Response Framework ("SRF") and improving communications between local and state government and utilities during emergencies. In addition, energy system improvements -- such as applying stricter performance standards for vegetation management (tree trimming), high Renewable Portfolio Standards ("RPS") goals, and evaluating the benefits of Microgrids -- are also underway.^{9,10} Connecticut aims to become one of the nation's leaders in energy assurance by continually refining its energy policy and incorporating emerging technologies as they become practicable.

B. Purpose & Scope

The 2012 Energy Assurance Plan ("EAP") for Connecticut presents a comprehensive overview of the ongoing efforts within Connecticut to enhance the State's energy system reliability and resiliency and energy emergency response. The 2012 EAP is the first for Connecticut and the Department of Energy and Environmental Protection ("DEEP"). The EAP supplements the State's energy emergency plan; it does not replace it.

The purpose of the EAP is to provide a high-level overview of the policies, practices, and programs occurring in the State that ensure: (1) enhanced energy system resiliency and

⁸ Division of Emergency Management and Homeland Security, *Proposed Process for Enhancement of State Preparedness Planning*, at 1 (2012).

⁹ See Witt Associates, *Connecticut October 2011 Snowstorm Power Restoration Report* (2011). (Inadequate tree trimming around electricity transmission and distribution infrastructure contributed to the system's increased vulnerability to fallen trees and branches during the October Nor'easter.)

¹⁰ CT has the highest RPS goal in New England, which is 20% Class I Renewables by 2020.

reliability across all energy sources; and (2) quick and effective responses to energy emergencies. With this knowledge, state energy and emergency officials will more efficiently review and improve both critical energy infrastructure protection strategies and energy emergency response plans.

The EAP addresses the ongoing activities and efforts by the State and other stakeholders in place to prepare for, respond to, recover from, and mitigate the effects of a potential or actual energy supply disruption event that poses a threat to the health, safety, or welfare of Connecticut's citizens. The EAP's purpose of enhancing energy resiliency, reliability, and emergency response aligns with the state goals of promoting cheaper, cleaner, and more reliable energy, specifically, bringing down the cost of electricity, making CT number one in the nation for energy efficiency, and increasing our use of cleaner renewable power sources.¹¹ Further, the massive power outages experienced after Tropical Storm Irene and the October Nor'easter have prompted the DEEP Energy Branch — that is, the Public Utility Regulatory Authority (“PURA”) and the Bureau of Energy and Technology Policy (“the Bureau”) -- to refocus on improving the electric grid system, increasing scrutiny of utility emergency response capabilities, and fostering the use of Microgrids when the electric grid is down.¹²

C. Organizational Structure

The EAP's organizational structure is guided by the phases of emergency management. Chapters two through six relate to the wide range of preparedness activities, which includes identifying stakeholders to improving the emergency planning process. Chapters seven and eight cover response to an energy supply disruption. Chapter nine addresses recovery activities. Chapter ten is the appendix. The following is the EAP broken down by chapter with a description for each.

I. Introduction — Chapter one describes the purpose, statutory authority, organizational structure, history, and development of the EAP. It also includes EA definitions.

II. Principal Authorities and Relevant Stakeholders – Chapter two is organized by level of government (i.e., state, federal, municipal, non-governmental organization). The relevant energy sectors, general duties/responsibilities, and role with respect to energy assurance are described for each organization.

III. State Energy Profile – Chapter three starts with a brief background of CT's Energy Profile. Then, a brief overview of each energy resource is given (electricity, natural gas, petroleum, & renewables). Finally, energy use and expenditures are presented using graphs and are broken down by sector (i.e., residential, commercial, industrial, & transportation).

IV. Enhancing Reliability Through Critical Infrastructure Protection, Supply Efforts, and Demand Reductions – Chapter four is organized into eight parts: Critical Infrastructure

¹¹ See Department of Energy and Environmental Protection, *2012 Agency Priorities*, at 1 (2012).

¹² See *id.* at 2.

Protection (e.g., Electric Distribution Company Line Maintenance Plans, Division of Emergency Management & Homeland Security Critical Infrastructure Protection Unit, and Public Utility Regulatory Authority Gas Pipeline Safety Unit); Electricity Supply (e.g., Integrated Resource Plan, Forecast of Loads and Resources); Electricity Demand (e.g., Conservation & Load Management, ISO New England Demand Response); Natural Gas Supply (e.g., Forecast of Demand and Supply); Natural Gas Demand (e.g., Conservation & Load Management); Petroleum Supply; Petroleum Demand (e.g., weatherization); Role of Emerging Technologies with respect to Reliability (e.g., Smart Systems, Energy Efficiency, Renewables).

V. Enhancing Energy Emergency Preparedness and Response – Chapter five describes the Governor’s Emergency Planning and Preparedness Initiative (“EPPI”) and the relevant sections of PA 12-148 in detail. The Witt Report, Storm Docket, Two Storm Panel Report, Department of Emergency Services & Public Protection-Division of Emergency Management & Homeland Security Action Plan, Geospatial Information Systems Council Report, and Statewide Exercise are all included in this chapter as parts of the EPPI. This section also addresses how CT is enhancing cyber security and the role of emerging technologies in enhancing resiliency.

VI. Monitoring and Data Analysis -- Chapter six describes the Energy Supply Disruption Tracking Process. It also describes how price, supply, demand, infrastructure, weather, and other data is monitored and analyzed outside of the emergency response process. This chapter also addresses smart systems and advance metering with respect to monitoring and analysis.

VII. Energy Supply Disruption Events -- Chapter seven describes past energy supply disruption events and emergencies in CT and discusses potential causes of an energy supply disruption. This chapter also describes the interdependencies within the energy supply system and how emerging technologies will affect future events.

VIII. Responding to Energy Supply Disruption Events -- Chapter eight describes monitoring and analysis during an event, proclamation of an energy emergency, response organization, management and communication (State Response Framework, Emergency Support Function 12, Emergency Operations Center), and sector-specific response measures (focuses on Independent System Operators’, Electric Distribution Companies’, and Local Distribution Companies’ emergency plans, Petroleum Reserves, and cyber threats).

IX. Recovery -- Chapter nine describes financial incentives and rules, regulations and policies in place to aid in the recovery of and investment in critical energy infrastructure.

X. Appendices -- The appendices will include many of the documents referenced in the EAP. Some of the planned appendices are: Integrated Resource Plan; Comprehensive Energy Strategy; Conservation & Load Management Plan; State Response Framework; CT Emergency Support Function 12; List of Relevant Public Utility Regulatory Authority Dockets; List of Relevant Bureau of Energy & Technology Policy Filings; and Private Sector Response Plans.

D. Authority

The EAP is not mandated by statute; however, it serves as a guide to many policies, plans, and programs that are statutorily required. The EAP satisfies the U.S. Department of Energy's ("DOE") requirement for its American Recovery and Reinvestment Act ("ARRA") grant award.

The 2012 EAP is the first such plan created by DEEP. The EAP does not replace the State's energy emergency plan, which was created in 1975, amended in 1980, and last updated in 1994. Updates to the energy emergency plan are required only when deemed necessary, which is determined by the Commissioner of DEEP. The EAP serves as a policy document that includes discussion of the State's energy emergency plan, among other recently developed plans or documents, such as the Comprehensive Energy Strategy ("CES"), 2012 Integrated Resource Plan ("2012 IRP"), and SESF-12. The EAP is a living document that can change as energy policy and energy emergency management changes in Connecticut.

Pursuant to §16a-9 of the Connecticut General Statutes, the Commissioner of DEEP is charged with preparing or causing to be prepared amendments to the existing energy emergency plan as he may deem necessary.¹³ The Commissioner has broad discretion over what is to be included in the plan. The only mandated inclusions to the plan are the levels of energy emergency established by the Commissioner; however, the statute suggests six inclusions.¹⁴ The EAP does not replace or supersede the existing energy emergency plan.

Pursuant to §6323(e) of the United States Code, the State shall submit to the Secretary of Energy an energy emergency planning program for an energy supply disruption, as designed by the State consistent with applicable Federal and State law.¹⁵ The plan shall include an implementation strategy for dealing with energy emergencies, and submission of the plan shall be for informational purposes only; approval of the Secretary of Energy is not required.^{16,17} There are no federal requirements regarding updates to the energy emergency plan.

¹³ C.G.S. § 16a-9(a)

¹⁴*Id.* (Said plan may include, but not be limited to, the following: (1) Establishment of programs, controls, standards, priorities and quotas for the allocation, rationing, conservation, distribution and consumption of available energy resources, (2) suspension and modification of existing statutes, standards and requirements affecting or affected by the use of energy resources, (3) adoption of measures affecting the type and composition and production and distribution of energy resources, (4) imposition of price restrictions on energy resources, (5) adoption of measures affecting the hours and days on which public buildings and commercial and industrial establishments may be or are required to remain open or closed, and (6) establishment and implementation of regional programs and agreements for the purpose of coordinating energy resource programs and actions of the state with those of the federal government and of other states and localities. Said plan shall include such levels of energy emergency as the commissioner shall establish.)

¹⁵ See 42 U.S.C. § 6323. (Submission of an energy emergency planning program is a prerequisite to federal assistance.)

¹⁶ 42 U.S.C. § 6323(e)

¹⁷ The federal regulatory requirement for an energy emergency plan in 10 C.F.R. § 420.13 duplicates the federal statutory requirement.

E. Energy Assurance Definitions

Understanding the meaning of the following terms as used in the EAP will aid in understanding the goals and purpose of the EAP.

Energy Assurance (“EA”).¹⁸ Energy Assurance describes the efforts engaged in by all levels of government and the private sector to ensure secure, reliable, and resilient energy infrastructure. Energy assurance planning comprises energy emergency response planning and broader critical infrastructure protection efforts to prevent or limit the effects of an energy supply disruption.

Energy Emergency. An energy emergency occurs when an actual or impending acute shortage in usable energy resources threatens the health, safety, or welfare of the citizens of the state.¹⁹ An energy emergency is caused by an actual or impending energy supply disruption event.

Energy Supply Disruption Event. An energy supply disruption event is an interruption or impediment to the availability of usable heat or power.²⁰ It is a broad term that may refer to a wide range of events, such as a minor interruption of electricity distribution to one neighborhood, a regional heating oil shortage, or a major failure of an interstate natural gas transmission pipeline.

Preparedness. Preparedness encompasses all activities that occur before an energy supply disruption event is imminent to ensure a fast and effective response and recovery. Preparedness activities include identifying critical energy infrastructure and key resources, designing and updating energy emergency response plans, training personnel, and conducting exercises that test the effectiveness of response plans.

Response. Response encompasses all activities that occur after a potential energy supply disruption event is detected. Response activities include monitoring events that may affect energy supplies, assessing the severity of disruptions, opening communication channels, coordinating restoration, and tracking recoveries.

Recovery. Recovery encompasses all activities that occur after the immediate needs of an energy supply disruption event are addressed. Recovery activities include repairing damaged infrastructure and rebuilding destroyed property with an effort to build back better to reduce energy supply risks and vulnerabilities.

Mitigation. Mitigation encompasses all activities throughout the preparedness, response, and recovery phases of emergency management that attempt to *prevent* energy supply disruptions from occurring or to *reduce* the impact of an energy supply disruption event. Mitigation activities include, for example, enforcing tree trimming standards (preparedness), building

¹⁸ National Association of Regulatory Utility Commissioners, *Technical Assistance Brief on Critical Infrastructure Protection: A Primer on Energy Assurance for Public Utility Commissions*, at 5.

¹⁹ C.G.S. § 16a-2(e)

²⁰ National Association of State Energy Officials, *State Energy Assurance Guidelines*, at 9 (2009). (Disruptions result from all hazards, such as deliberate attacks, technological failures, or natural disasters.)

Microgrids in town centers (response), and incentivizing the inclusion of renewable technology during a rebuild of property (recovery).

Resiliency. Resiliency is the ability to recover quickly from damage to the energy system. Energy assurance activities (i.e., preparedness, response, recovery, and mitigation) promote the ultimate goal of system resiliency. While damage prevention is an important part of energy assurance planning, resiliency is equally important because energy systems are not 100 percent damage proof.²¹ Enhancing energy system resiliency involves increasing robustness, redundancy, resourcefulness, and rapidity.^{22,23,24,25}

²¹ U.S. Department of Energy, *Enabling States and Localities to Improve Energy Assurance and Resiliency Planning*

²² National Association of State Energy Officials, *State Energy Assurance Guideline*, (V. 3.1 2009) at 9. (Robustness is the inherent strength or resistance in a system to withstand external demands without degradation or loss of functionality.)

²³ *Id.* at 9. (Redundancies are the system properties that allow for alternate options, choices, and substitutions under stress.)

²⁴ *Id.* at 9. (Resourcefulness is the capacity to mobilize needed resources and services in emergencies.)

²⁵ *Id.* at 9. (Rapidity is the speed with which disruption can be overcome and safety, services, and financial stability restored.)

II. PRINCIPAL AUTHORITIES AND RELEVANT STAKEHOLDERS

Almost all state, federal, local, and private organizations play *some* role in energy assurance however small that role may be. This section serves as a guide to many of the key players in energy assurance planning and energy emergency management. This section is divided into state, federal, municipal, and non-governmental organizations, and they are addressed below in that order. Within each group (i.e., state, federal, municipal, non-governmental organization), the organizations are listed alphabetically. For each organization, the information provided is as follows: relevant energy sectors, general duties/responsibilities, and link to energy assurance.²⁶ The information included in this chapter is not exhaustive, that is, many organizations have broader roles than are articulated here and some organizations that play a role are not listed. Also, not all organizations listed in this chapter are discussed later in the EAP; nevertheless, they are still an important part of EA and should be recognized. Other documents, such as the SRF and ESF-12s, provide similar information on the roles and responsibilities of certain organizations.

A. State Authorities

Clean Energy Finance and Investment Authority (“CEFIA”)

- *Energy Sectors:* Renewables; Energy Efficiency
- Develops plan to support renewable energy and stimulate demand; implements strategies to lower the cost of clean energy; and invests in projects and initiatives aimed to finance the clean energy goals of Connecticut.²⁷
- *Link to EA:* CEFIA incentivizes investment in clean energy/renewables, in part, to mitigate the effects of a future energy supply disruption.

Connecticut Energy Advisory Board (“CEAB”)

- *Energy Sectors:* All
- Reports to the General Assembly on the status of programs administered by the DEEP.²⁸
- *Link to EA:* CEAB consult with the Commissioner of Energy and Environmental Protection regarding the Integrated Resource Plan.²⁹

Connecticut Geospatial Information Systems Council (“CGISC”)

- *Energy Sectors:* All
- Coordinates a uniform geospatial information system capacity for municipalities, regional planning agencies, the State, and others as needed.
- *Link to EA:* CGISC provides a system that enables use of detailed CEII to aid other organizations in preparedness, response, and recovery activities.

²⁶ For this chapter, energy sectors are electricity, natural gas, petroleum, renewables, and energy efficiency—although energy efficiency is not an energy sector, it is a major policy focus for the State.

²⁷ See Conn. Public Act No. 11-80 § 99(c) (2011).

²⁸ C.G.S. § 16a-3(b)(1).

²⁹ C.G.S. § 16a-3(b)(2).

Connecticut Military Department/National Guard (“CTNG”)

- *Energy Sectors:* N/A
- Serves as the main source for the Governor in ensuring public safety in a variety of emergencies.
- *Link to EA:* CTNG augments state and local civil authorities in the case of energy emergencies beyond their capabilities.

Connecticut Siting Council (“CSC”)

- *Energy Sectors:* Electricity; Natural Gas; Renewables
- Exercises original jurisdiction over the siting of energy infrastructure, such as electricity generators and transmission lines; requires the filing of Critical Energy Infrastructure Information (“CEII”).
- *Link to EA:* CSC enforces standards that are sufficient to assure the welfare and protection of the people of Connecticut on all proposed projects, which includes requiring public service companies to file CEII and conducting public hearings to ensure proposed projects minimize risks/vulnerabilities and suit the needs of the State and its ratepayers.

Department of Administrative Services (“DAS”), Bureau of Enterprise Systems & Technology (“BEST”)

- *Energy Sectors:* N/A
- Oversees all information technology services within state agencies.
- *Link to EA:* DAS/BEST oversees its Computer Security Infrastructure Team, Cyber Security Awareness Response Team, Digital Forensic Analysis and Investigative Support Team, Facilities Team, Risk Analysis Team, and Threat and Vulnerability Analysis Team, which all strengthen cyber security.^{30,31,32,33,34,35}

³⁰ Department of Administrative Services Bureau of Enterprise Systems and Technology, *Computer Security Infrastructure*, <http://www.ct.gov/best/cwp/view.asp?a=3938&q=464304&bestNav=|> (accessed July, 2, 2012). (Computer Security Infrastructure Team administers Intrusion Monitoring and Prevention Services; and Firewall and Perimeter Security Services.)

³¹ Department of Administrative Services Bureau of Enterprise Systems and Technology, *Cyber Security Awareness and Response*, <http://www.ct.gov/best/cwp/view.asp?a=3938&Q=464498&bestNav=|> (accessed July, 2, 2012). (Cyber Security Awareness Response Team trains and educates state agencies on best practices when using the Internet and the State network infrastructure with programs including such as Security Awareness, Cybersafe, and the Security Newsletter.)

³² Department of Administrative Services Bureau of Enterprise Systems and Technology, *Digital Forensic Analysis and Investigative Support*, <http://www.ct.gov/best/cwp/view.asp?a=3938&Q=464294&bestNav=|> (accessed July, 2, 2012). (Digital Forensic Analysis and Investigative Support Team engages in digital forensic analysis and other related technical support to the Executive Branch Agencies through the following services: (1) Digital forensic analysis; (2) IT evidence seizure, chain of custody consultation, and storage, and; (3) Administrative consultation regarding Information Technology as relevant to investigation; and other related services.)

³³ Department of Administrative Services Bureau of Enterprise Systems and Technology, *DAS-BEST Facilities Support and Security*, <http://www.ct.gov/best/cwp/view.asp?a=3938&Q=464542&bestNav=|> (accessed July, 2, 2012). (Facilities Team ensures a secure environment through the facilitation and coordination of security services and procedures.)

³⁴ Department of Administrative Services Bureau of Enterprise Systems and Technology, *Risk Analysis and Vulnerability Assessment*, <http://www.ct.gov/best/cwp/view.asp?a=3938&Q=464640&bestNav=|> (accessed July, 2, 2012). (Risk Analysis Team produces a comprehensive Risk Analysis following the DAS-BEST Risk Analysis Methodology.)

³⁵ *Id.* (Threat and Vulnerability Analysis Team produces a detailed analysis, following the DAS-BEST Risk Analysis Methodology, of the specific threats and vulnerabilities associated with an IT system's environment and configuration; and they develop an objective list of system vulnerabilities (flaws or weaknesses) that could be exploited by potential threat sources.)

Department of Construction Services (“DCS”), Division of Design and Construction (“DDC”), Energy Unit

- *Energy Sectors:* All
- Administers a program that develops and implements energy retrofit projects in existing state buildings; assists designers with state-owned new construction and major renovation projects eligible for utility design assistance and rebates for energy efficient systems and equipment; and works with other state agencies as well as design professionals and building contractors to develop an information base and “best practices” regarding high performance, or “green,” buildings.^{36,37}
- *Link to EA:* DCS/DDC Energy Unit contributes to energy assurance planning by facilitating the use of renewable and energy efficient technology.

Department of Consumer Protection (“DCP”)

- *Energy Sectors:* Petroleum
- Protects citizens from marketplace fraud, unfair business practices, and physical injury from unsafe items with respect to fuel (i.e., gasoline, home heating oil, and propane).
- *Link to EA:* DCP ensures the petroleum market continues to operate fairly and effectively.

Department of Emergency Services & Public Protection (“DESPP”)

- *Energy Sectors:* N/A
- Comprises six divisions: Division of State Police; Division of Statewide Emergency Telecommunications; Division of Scientific Services; Police Officer Standards and Training Council; Commission on Fire Prevention and Control; and Division of Emergency Management and Homeland Security.
- *Link to EA:* DESPP plays a role in energy emergency preparedness and response mainly through its oversight of the Division of Emergency Management & Homeland Security, but also through its other five divisions.

DESPP/DEMHS Critical Infrastructure Protection Unit (“CIPU”)

- *Energy Sectors:* All
- Enhances protection of the state’s Critical Infrastructure and Key Resources (“CI/KR”) by gathering Critical Energy Infrastructure Information (“CEII”), implementing a long-term risk management program, maximizing the efficient use of resources, and conducting security/vulnerability assessments of CI/KR.

³⁶ Department of Construction Services Division of Design and Construction Energy Unit, *Energy Conservation*, <http://www.ct.gov/dcs/cwp/view.asp?a=4224&q=491260> (last updated July 5, 2012). (Energy retrofit projects range from minor lighting upgrades to complete building HVAC system rehabilitation.)

³⁷ Department of Construction Services Division of Design and Construction Energy Unit, *Sustainable Design and High Performance Buildings*, <http://www.ct.gov/dcs/cwp/view.asp?a=4224&q=491264> (last updated July 5, 2012). (High performance or “Green” Buildings program is intended to promote practices that reduce or eliminate negative impact of buildings on the environment and emphasize positive effects of energy efficiency and renewables.)

- *Link to EA:* CIPU develops and implements strategies in an effort to prevent or mitigate the effects of a deliberate attack on CI/KR by terrorists, but also to strengthen the State's preparedness, response and recovery in the event of an attack, natural disaster, or other emergency.

DESPP/Division of Emergency Management & Homeland Security (“DEMHS”)

- *Energy Sectors:* N/A
- Directs and coordinates the State's emergency management systems to protect the lives and property of the State's residents in the event of an emergency.
- *Link to EA:* DEMHS administers a coordinated, integrated program for state-wide energy emergency management through the SRF and SESF-12.

DEEP/Bureau of Energy and Technology Policy (“BETP” or “the Bureau”)

- *Energy Sectors:* All
- Advises the DEEP Commissioner and the Governor on energy policy matters and directs energy policy within the state to promote the DEEP Commissioner's and the Governor's energy goals.
- *Link to EA:* The Bureau develops and implements the State's EAP, CES, 2012 IRP, Microgrid program, and fuel monitoring, among other activities.

DEEP/Environmental Branches

- *Energy Sectors:* All
- Comprises the Environmental Quality and Environmental Conservation branches; they protect the State's air, land, water, and other natural resources (e.g., wildlife and forests).
- *Link to EA:* DEEP grants waivers of environmental standards and temporary suspensions of permits during an energy emergency if necessary.

DEEP/Public Utilities Regulation Authority (“PURA” or “the Authority”)

- *Energy Sectors:* Electricity; Natural Gas; Energy Efficiency; Renewables
- Regulates Connecticut's public utility companies—among others, the State's two electric distribution companies (“EDCs”) and three local distribution companies (“LDCs”).^{38,39}
- *Link to EA:* PURA requires all public utilities to submit filings regarding emergency response plans and cyber security, in addition to ensuring all companies comply with all performance standards and regulations that minimize the risk of an energy supply disruption.

³⁸ PURA regulates the EDCs--CL&P and UI--with respect to issues involving distribution, transmission and generation rates, wholesale procurement of electricity, energy efficiency, conservation and load management, cost-of-service, rate design, revenue, requirements, metering accuracy, and the safety and reliability of the electric distribution system.

³⁹ PURA regulates the LDCs--YGS, SCG, and CNG--with respect to issues such as cost/rates of gas supply, volatility of gas prices, increased demand for gas, gas supply, constrained pipeline capacity into Connecticut, availability and relatively high cost of liquid natural gas (LNG), affiliate transactions, conservation of natural gas, transportation service, cost-of-service, rate design, revenue requirements, and the safety and reliability of the natural gas local distribution system.

Department of Motor Vehicles (“DMV”)

- *Energy Sectors:* Petroleum
- Regulates drivers, their motor vehicles, and certain motor vehicle-related businesses.
- *Link to EA:* DMV leads/co-leads the Fuel Task Force (“FTF”) and grants Hours-of-Service (“HOS”) waivers.

Department of Public Health, Operations Branch, Office of Emergency Medical Services (“DPH/OEMS”)

- *Energy Sectors:* N/A
- Administers and enforces emergency medical services statutes, regulations, programs and policies.
- *Link to EA:* DPH/OEMS develops the State’s Emergency Medical Services Plan and is involved in coordination of emergency planning with DESPP/DEMHS among others.

Department of Social Services (“DSS”)

- *Energy Sectors:* N/A
- Provides a broad range of services to those who need assistance in maintaining or achieving self-direction, self-reliance, and independent living.
- *Link to EA:* DSS administers the Connecticut Energy Assistance Program (“CEAP”) and the Connecticut Weatherization Assistance Program (“CWAP”).^{40,41}

Department of Transportation (“ConnDOT”)

- *Energy Sectors:* N/A
- Oversees the transportation system and infrastructure within Connecticut.
- *Link to EA:* ConnDOT coordinates efforts to ensure the State’s transportation infrastructure, including waterways, remains operational for energy supply delivery and emergency response personnel.

Energy Efficiency Board (“EEB”)

- *Energy Sectors:* All
- Advises and assists both the public and private sectors in administering energy efficiency programs, including but not limited to the public utility companies and DEEP.
- *Link to EA:* EEB facilitates implementation of energy efficiency programs to reduce demand and relieve stress on energy supply system.

⁴⁰ Department of Social Services, *Winter Heating Assistance Program*, <http://www.ct.gov/dss/cwp/view.asp?a=2353&Q=305194> (last updated August, 2, 2012). (CEAP Winter Heating Assistance Program pays for such heating sources as oil, natural gas, electricity, propane, kerosene, coal and wood.)

⁴¹ Department of Social Services, *Connecticut Weatherization Assistance Program*, <http://www.ct.gov/dss/cwp/view.asp?a=2353&q=305196> (last updated August 1, 2012). (CWAP assists low-income persons to minimize energy-related costs and fuel usage in their homes through retrofits and home improvement measures.)

Institute for Sustainable Energy (“ISE”) at Eastern Connecticut State University

- *Energy Sectors:* All
- Works to identify, develop, and implement the means for achieving a sustainable energy future.⁴²
- *Link to EA:* ISE promotes the use of emerging technologies, which contribute to a more robust energy supply system.

Low-Income Energy Advisory Board (“LIEAB”)

- *Energy Sectors:* Electricity; Natural Gas; Petroleum; Energy Efficiency
- Assists OPM and DSS with all aspects of energy-assistance-related programs/policies and low-income weatherization assistance programs/policies; and advises DEEP regarding the impact of utility rates and policies.
- *Link to EA:* LIEAB helps ensure low-income residents’ access to energy and efficiency programs.

Office of Consumer Counsel (“OCC”)

- *Energy Sectors:* Electricity; Natural Gas; Renewables
- Represents customers of Connecticut’s five regulated utilities-- Electric, gas, water, telephone, and to some extent, cable television--primarily in matters that go before PURA.
- *Link to EA:* OCC ensures Connecticut’s consumers’ needs are taken into account with respect to natural gas and electricity planning and regulation.⁴³

Office of the Governor (“OTG”)

- *Energy Sectors:* All
- Implements Governor’s directives and policies; aids Governor in his duties as head executive.
- *Link to EA:* OTG proclaims energy emergencies and directs implementation of state emergency plan. OTG directs energy policy to ensure continual improvements to energy supply system and energy emergency response.

Office of Policy & Management (“OPM”)

- *Energy Sectors:* All
- Functions as the Governor’s staff agency and plays a central role in state government, providing the information and analysis used to formulate public policy for the State and assisting State agencies and municipalities in implementing policy decisions on the Governor’s behalf.

⁴²Institute for Sustainable Energy, *About Us*, http://www.easternct.edu/sustainenergy/about_us/welcome.html (accessed July 2, 2012). (ISE focuses on matters relating to energy education, energy policy, efficiency conservation and load management, renewable energy, and distributed generation among others.)

⁴³ For example, OCC submitted a brief to PURA regarding the energy emergency response shortcomings of a public utility during the October Nor’easter.

- *Link to EA:* OPM helps administer disaster assistance funds to local governments and disaster victims.

Office of the State Attorney General (“AG”), Energy Department

- *Energy Sectors:* All
- Represents PURA and CSC; defends challenges to CSC’s decisions on placement of facilities, and to rulings by PURA on issues, among others, regarding electric and gas utilities.
- *Link to EA:* AG-Energy provides legal assistance to PURA and CSC in their enforcement of regulatory standards that promote EA.

Office of Statewide Emergency Telecommunications (“OSET”)

- *Energy Sectors:* N/A
- Develops and maintains coordinated statewide emergency service telecommunications for public safety organizations and the residents of the State.
- *Link to EA:* OSET ensures state agencies and residents will be able to communicate effectively in the event of an energy emergency.

State Emergency Response Commission (“SERC”)

- *Energy Sectors:* N/A
- Works to implement the federal Emergency Planning and Community Right-to-Know Act (“EPCRA”) in Connecticut and oversees five Regional Districts (62 Cities/Towns) and 107 Local Emergency Planning Committees (“LEPC”), among other activities.
- *Link to EA:* SERC aids CT’s Regional Districts and LEPCs in Energy Emergency planning, a critical component of EA.

B. Federal Authorities

Energy Information Administration (“EIA”)

- *Energy Sectors:* All
- Collects, analyzes, and disseminates independent and impartial energy information. to promote sound policymaking, efficient markets, and public understanding of energy and its interaction with the economy and the environment.
- *Link to EA:* EIA provides comprehensive data on energy in the U.S. that is used by many public and private energy sector stakeholders.

Federal Emergency Management Agency (“FEMA”)

- *Energy Sectors:* N/A
- Ensures the U.S. is prepared to respond to all potential hazards.
- *Link to EA:* FEMA administers both the National Response Framework (“NRF”) and the National Incident Management System (“NIMS”).^{44,45}

Federal Energy Regulatory Commission (“FERC”)

- *Energy Sectors:* All
- Regulates the interstate transmission of natural gas, oil, and electricity; and natural gas pipeline and hydropower projects.
- *Link to EA:* FERC plays a vital role in ensuring reliability and regulatory compliance within the energy sector.

Nuclear Regulatory Commission (“NRC”)

- *Energy Sectors:* Electricity
- Regulates commercial nuclear power plants and other uses of nuclear materials through licensing, inspection and enforcement of its requirements.
- *Link to EA:* NRC provides information and technical assistance regarding nuclear power plants to keep them operating reliably and/or to return them to normal/safe operating conditions in the event of a disruption.

⁴⁴ Federal Emergency Management Agency. *National Response Framework Webpage*, <http://www.fema.gov/emergency/nrf/aboutNRF.htm> (last updated August 2, 2012). (“The NRF presents the guiding principles that enable all response partners to prepare for and provide a unified national response to disasters and emergencies - from the smallest incident to the largest catastrophe. The Framework establishes a comprehensive, national, all-hazards approach to domestic incident response.”)

⁴⁵ Federal Emergency Management Agency, *National Incident Management System Webpage*, (last updated July 26, 2012). (“The National Incident Management System (NIMS) provides a systematic, proactive approach to guide departments and agencies at all levels of government, nongovernmental organizations, and the private sector to work seamlessly to prevent, protect against, respond to, recover from, and mitigate the effects of incidents, regardless of cause, size, location, or complexity, in order to reduce the loss of life and property and harm to the environment. NIMS works hand in hand with the National Response Framework (NRF). NIMS provides the template for the management of incidents, while the NRF provides the structure and mechanisms for national-level policy for incident management.”)

U.S. Computer Emergency Readiness Team (“US-CERT”)

- *Energy Sectors:* N/A
- Leads efforts to improve cyber security; coordinates information sharing; and manages cyber risks.
- *Link to EA:* US-CERT prepares for and responds to potential cyber security threats/vulnerabilities that can be targeted at the energy supply system.

U.S. Department of Commerce (“DOC”), National Oceanic & Atmospheric Administration (“NOAA”)

- *Energy Sectors:* N/A
- Provides current and forecast weather information and dispersion model forecasts; disseminates critical event information.
- *Link to EA:* NOAA assists in data monitoring and analysis of weather information pertinent to preparing for and responding to a potential energy supply disruption.

U.S. Department of Energy (“DOE”)-Office of Electricity Delivery & Energy Reliability (“OE”)

- *Energy Sectors:* All
- Promotes efforts to modernize the electric grid; enhance security and reliability of critical energy infrastructure; and assist recovery from energy supply disruptions.
- *Link to EA:* DOE-OE works to enhance the reliability of electricity systems to minimize or prevent the effects of an energy supply disruption.

U.S. DOE-OE-Infrastructure Security & Energy Restoration Division (“ISER”)

- *Energy Sectors:* All
- Coordinates DOE’s response to energy emergencies and DHS policies that require DOE to secure the nation’s energy infrastructure; and assists state and local governments with energy assurance planning, energy supply disruption preparedness, and emergency response.
- *Link to EA:* DOE-ISER assists in responding to energy emergencies, acts as a resource for state energy officials, and administers ISERnet.

U.S. DOE-Office of Energy Efficiency & Renewable Energy (“EERE”)

- *Energy Sectors:* All
- Invests in clean energy technologies (i.e., energy efficiency and renewables).
- *Link to EA:* DOE-EERE ensures the U.S. energy supply system continues to move towards a cleaner, more efficient energy future through the use of emerging technologies.

U.S. DOE-Office of Fossil Energy (“FE”)

- *Energy Sectors:* Petroleum; Natural Gas
- Focuses on maintaining viability of our traditional fuel resources in a clean and affordable manner.
- *Link to EA:* DOE-FE administers several high-priority initiatives such as the nation's Strategic Petroleum Reserve (“SPR”) and Northeast Home Heating Oil Reserve (“NHHOR”).

U.S. DOE-Office of Nuclear Energy (“NE”)

- *Energy Sectors:* Electricity
- Promotes nuclear power as a resource capable of meeting energy needs by resolving technical and regulatory barriers.
- *Link to EA:* DOE-NE promotes nuclear power for electricity generation; diversification of generation sources leads to a more resilient energy system.

U.S. Department of Homeland Security (“DHS”)

- *Energy Sectors:* N/A
- Provides the coordinated, comprehensive federal response in the event of a large-scale emergency while working with federal, state, local, and private sector partners; builds a ready and resilient nation through efforts to bolster all aspects of national security, including critical infrastructure.
- *Link to EA:* DHS administers the National Infrastructure Protection Plan (NIPP), which promotes enhancement and protection of critical infrastructure.⁴⁶

U.S. Department of the Interior (“DOI”), Bureau of Ocean Energy Management (“BOEM”)

- *Energy Sectors:* All
- Manages the exploration and development of the nation's offshore energy resources through oil and gas leases, renewable energy development, and environmental reviews and studies.
- *Link to EA:* DOI-BOEM contributes to a diversified energy supply through its development of both fossil fuel and renewable energy sources.

⁴⁶ U.S. Department of Homeland Security, *National Infrastructure Protection Plan Webpage*, http://www.dhs.gov/files/programs/editorial_0827.shtm (last updated February 17, 2012). (“The National Infrastructure Protection Plan (NIPP) provides a unifying framework that integrates a range of efforts designed to enhance the safety of our nation's critical infrastructure. The overarching goal of the NIPP is to build a safer, more secure, and more resilient America by preventing, deterring, neutralizing, or mitigating the effects of a terrorist attack or natural disaster, and to strengthen national preparedness, response, and recovery in the event of an emergency.”)

U.S. Department of Transportation (“DOT”)

- *Energy Sectors:* N/A
- Oversees transportation system and infrastructure.
- *Link to EA:* DOT ensures continuity of energy supply deliveries through regulation of transportation-related matters.

U.S. DOT-Pipeline and Hazardous Materials Safety Administration (“PHMSA”)

- *Energy Sectors:* Natural Gas; Petroleum
- Develops and enforces regulations for the operation of the nation's 2.6 million mile pipeline transportation system and the nearly 1 million daily shipments of hazardous materials by land, sea, and air.
- *Link to EA:* PHMSA ensures critical energy infrastructure will continue operating safely and reliably to limit energy supply disruptions.

U.S. Environmental Protection Agency (“EPA”)

- *Energy Sectors:* All
- Protects human health and the environment through policy efforts and enforcement of regulatory standards.
- *Link to EA:* EPA may waive certain environmental standards affecting energy supply in the event of an energy emergency.

C. Municipal Authorities

Connecticut Conference of Municipalities (“CCM”)

- *Energy Sectors:* N/A
- Represents municipalities at the General Assembly, before state agencies, and in court; provides a wide array of services to members.⁴⁷
- *Link to EA:* CCM helps municipalities improve their energy systems with its Energy Efficiency Program and Solar/PV Program.

Local Emergency Planning Committee (“LEPC”)

- *Energy Systems:* N/A
- Plans for emergency response on a local level; and works to satisfy federal Emergency Planning and Community Right-to-Know Act responsibilities.⁴⁸
- *Link to EA:* LEPC plans and coordinates local emergency response in the event of an emergency.

⁴⁷ See Connecticut Conference of Municipalities, *About CCM*, <http://ccm-ct.org/Plugs/about-ccm.aspx> (accessed August 8, 2012). (“[I]ncluding management assistance, individualized inquiry service, assistance in municipal labor relations, technical assistance and training, policy development, research and analysis, publications, information programs, and service programs such as workers' compensation, liability-automobile-property insurance, risk management, and energy cost-containment.”)

⁴⁸ CT State Emergency Response Commission, *Local Emergency Planning Committees*, <http://www.ct.gov/serc/cwp/view.asp?a=2591&Q=315312&sercNav=|> (last updated June 4, 2012). (Many municipalities have joined together to form regional emergency planning committees or may have even become inactive.)

D. Non-governmental Organizations

ISO/RTO Council (“IRC”)

- *Energy Sectors:* Electricity; Renewables; Energy Efficiency
- Comprises 10 Independent System Operators (“ISOs”) and Regional Transmission Organizations (“RTOs”) in North America; works collaboratively to develop effective methods for improving competitive electricity markets resulting in efficient, robust, and reliable markets.
- *Link to EA:* IRC aids ISOs in providing enhance reliability, green power, and demand response development, among other things.

National Voluntary Organization Active in Disaster (“National VOAD”)

- *Energy Sectors:* N/A
- Facilitates communication and coordination among volunteer organizations (e.g. American Red Cross) with respect to their emergency management plans.
- *Link to EA:* National VOAD helps to ensure the numerous nonprofit organizations involved in disaster response act efficiently and effectively by sharing knowledge and resources to provide coordinated preparedness, response, and recovery efforts.

North American Electricity Reliability Corporation (“NERC”)

- *Energy Sectors:* Electricity
- Ensures reliability of the North American bulk power system by developing and enforcing reliability standards in addition to other activities, such as forecasting adequacy, monitoring the bulk power system, and educating/training industry personnel.
- *Link to EA:* NERC plays a critical role in energy assurance because it is certified by FERC to establish and enforce reliability standards for bulk power systems.

Northeast Energy Efficiency Partnerships (“NEEP”)

- *Energy Sectors:* Energy Efficiency
- Facilitates and maximizes energy efficiency implementation throughout the Northeast and mid-Atlantic states.
- *Link to EA:* NEEP acts as partner with states in the region to increase the use of energy efficient technologies.

Northeast Power Coordinating Council (“NPCC”)

- *Energy Sectors:* Electricity
- Promotes and improves the reliability of the bulk power system in the Northeast.
- *Link to EA:* NPCC develops regional reliability standards and enforces compliance with the regionally-specific criteria to ensure the electricity system will continue operating adequately.

Northeast States Emergency Consortium (“NESEC”)

- *Energy Sectors:* N/A
- Coordinates with federal, state and local governments, and private organizations in the Northeast to ensure adequate emergency management planning.
- *Link to EA:* NESEC works with state directors of emergency management to conduct comprehensive "all-hazards" emergency management activities throughout the Northeast.

US Energy Security Council (“USESC”)

- *Energy Sectors:* Petroleum
- Addresses the petroleum industry’s monopoly over transportation fuel by encouraging competition in the transportation fuel market.
- *Link to EA:* USESC works to increase resiliency with respect to the transportation energy supply system by promoting redundancy in the form of alternative energy sources.

III. STATE ENERGY PROFILE

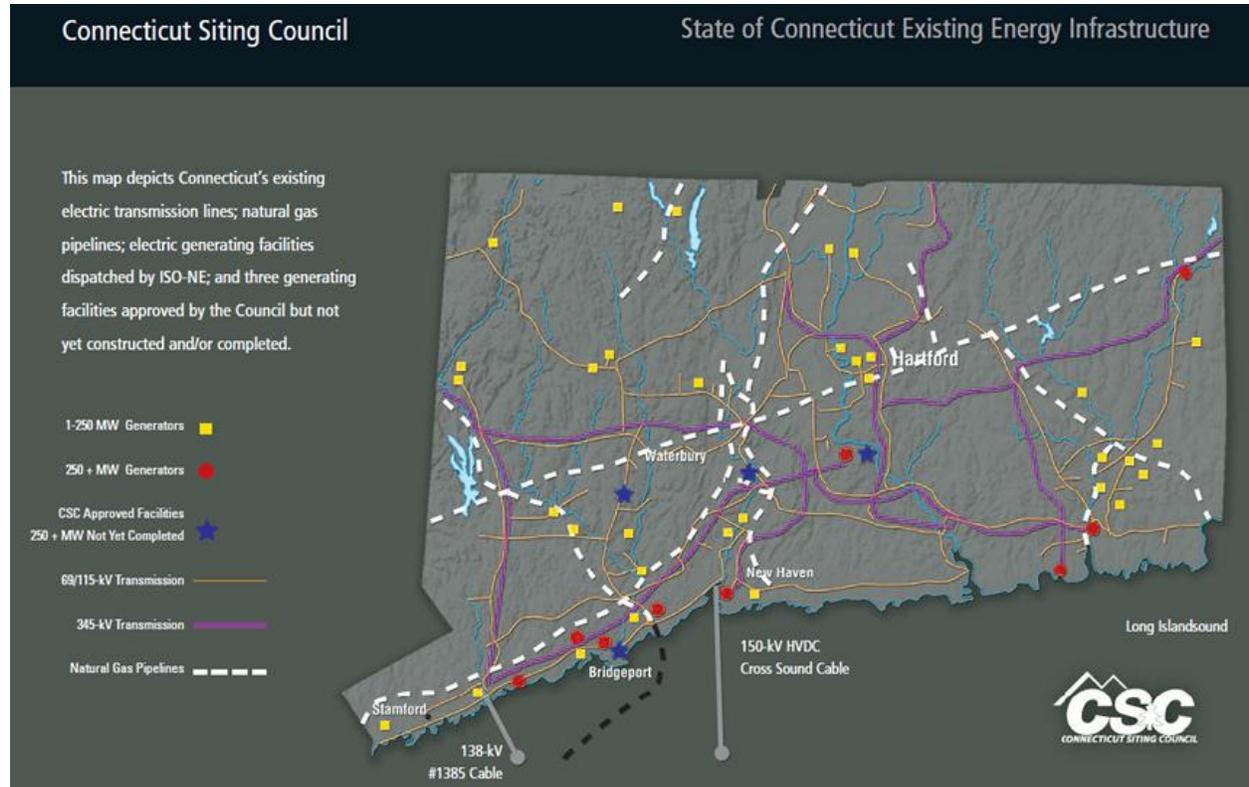
Connecticut's State Energy Profile is an overview of energy markets in the State. The profile provides a snapshot of Connecticut's energy supply and critical infrastructure by resource and expenditures by sector. In addition, the profile addresses the State's historical trends. Most data included in the profile is from the *EIA State Energy System Data* ("SEDS").

A. Background

Connecticut is limited in its energy resources with no petroleum or natural gas reserves naturally occurring in the State. Connecticut imports 100 percent of its fossil fuels. Connecticut spent over \$14 billion on all forms of energy in 2010. According to the EIA, Connecticut's economy is not energy intensive, with the industry sector consuming the least energy.

- Connecticut Population—3.6 million, U.S. Rank 29th (2011)
- Connecticut GDP--\$211.3 billion, U.S. Rank 23rd (2010)
- Total Energy Consumption per Capita—211 million BTU (2010)
- Crude Oil Reserves—none
- Natural Gas Reserves—none
- Natural Gas Use—117.2 Trillion BTU
- Retail Electricity Sales—103.7 Trillion BTU
- Connecticut End-Use Sectors as a percent of total for each U.S. sector (2010):
 - Residential 1.1%, Commercial 1.0%, Industrial 0.2%, Transportation 0.9%

Figure 1



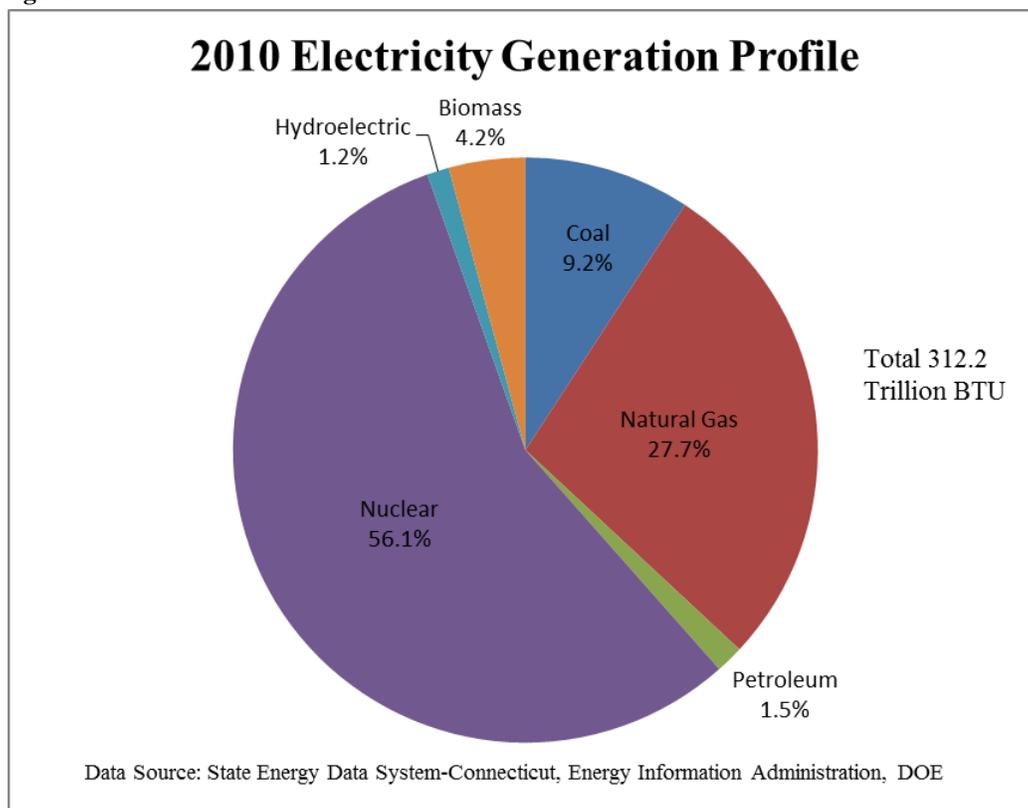
Source: Connecticut Siting Council, http://www.ct.gov/csc/lib/csc/f2008/30208_insert_lr.pdf

B. Electricity

Connecticut power plants can generate a total of 8,284 MW.⁴⁹ There are five major non-nuclear electricity generating plants and one nuclear power plant, which is the State's highest capacity power plant with a capacity of 2,037 MW.⁵⁰

Connecticut's Millstone Nuclear Power Station Units 2 and 3 generated 56.1% of electricity used in Connecticut in 2010.^{51,52} Natural gas fired generation provides 27.7% of the State's electricity generation; coal provides 9.2%; together biomass and hydroelectric resources provide 5.4% of in-state electricity generation.

Figure 2



⁴⁹ Energy Information Administration, *Connecticut Energy Profile-Net summer Capability*, <http://www.eia.gov/state/state-energy-profiles.cfm?sid=CT> (last updated July 2012).

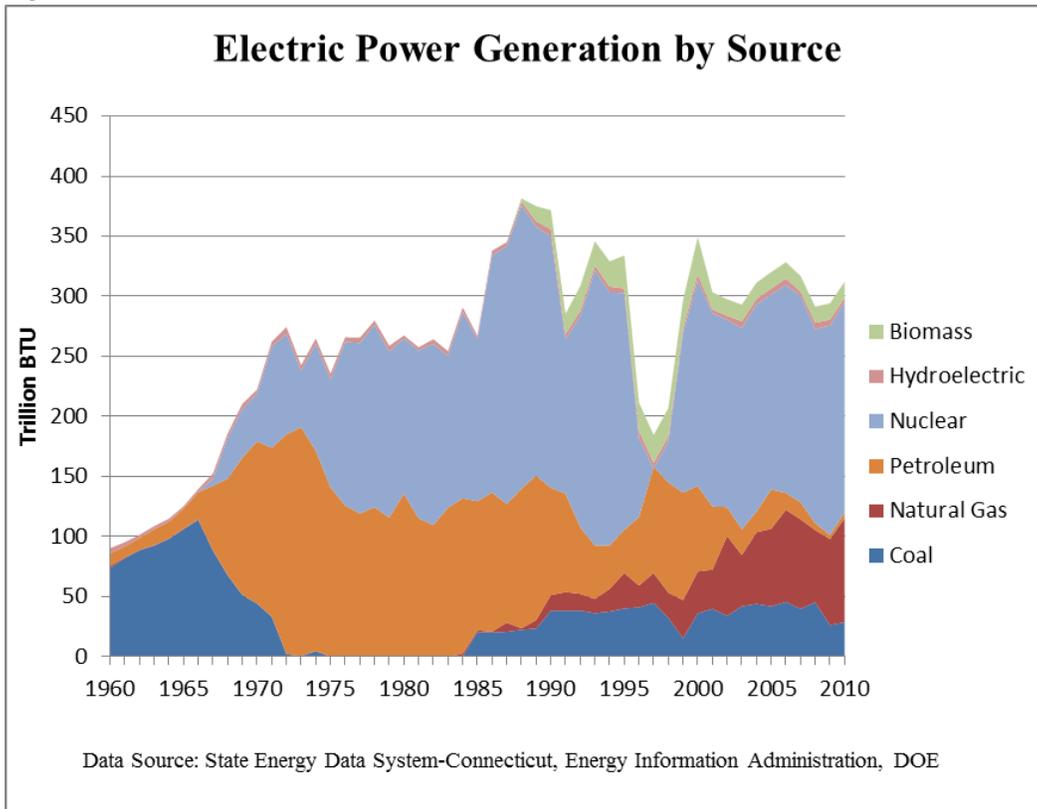
⁵⁰ *Id.* (Major non-nuclear plants: Lake Road Generating Plant, Middletown, Kleen Energy Systems Project, New Haven Harbor, and Towantic Energy LLC)

⁵¹ See Figure 2.

⁵² Millstone Power Station Unit 1 closed in 1998.

Petroleum provides 1.5% of total generation, and its use in electricity generation has declined significantly over time.⁵³ Much of petroleum’s use in electricity has been supplanted by the use of natural gas fired generation.⁵⁴ In the late 1990s, Millstone Unit One closed, and Millstone Units Two and Three closed due to regulatory compliance issues, which accounts for the absence of nuclear power in electricity generation illustrated by Figure 3.

Figure 3



⁵³ See Figure2; Figure 3.

⁵⁴ See Figure 3.

C. Natural Gas

Connecticut produces no natural gas in the State. All natural gas used in Connecticut is imported. Three major pipelines service the state: Algonquin; Iroquois; and Tennessee.

Algonquin originates in New Jersey where it connects to Texas Eastern and runs from Danbury northeasterly to Thompson, with major spurs to North Haven and New London.⁵⁵

Iroquois starts at the Canadian border, enters Connecticut at Sherman and runs southeast through Milford, then offshore to Long Island.⁵⁶

Tennessee starts in the Gulf, enters Connecticut in Greenwich, runs northeasterly leaving Connecticut in Suffield, with a spur from Massachusetts to Torrington.⁵⁷

There are approximately 590 miles of transmission pipeline in Connecticut, including 16 miles in Long Island Sound.⁵⁸ Connecticut has no natural gas storage sites and must rely on Appalachian Basin storage capacity to supply peak demand in winter.⁵⁹

In Connecticut, 29% of households used natural gas for home heating in 2000.⁶⁰ The total consumption of natural gas in Connecticut was 199 billion cubic feet or 203.8 trillion BTU in 2010.^{61,62}

⁵⁵ Public Utility Regulatory Authority, *What Transmission Pipelines Serve Connecticut?*, <http://www.ct.gov/pura/cwp/view.asp?a=3363&q=414234> (last updated May 2012).

⁵⁶ *Id.*

⁵⁷ *Id.*

⁵⁸ *Id.*

⁵⁹ Energy Information Administration, *Connecticut Energy Profile-Analysis*, <http://www.eia.gov/state/state-energy-profiles.cfm?sid=CT> (last updated July 2012).

⁶⁰ Energy Information Administration, *Connecticut Energy Profile-Consumption*, <http://www.eia.gov/state/state-energy-profiles.cfm?sid=CT> (last updated July 2012).

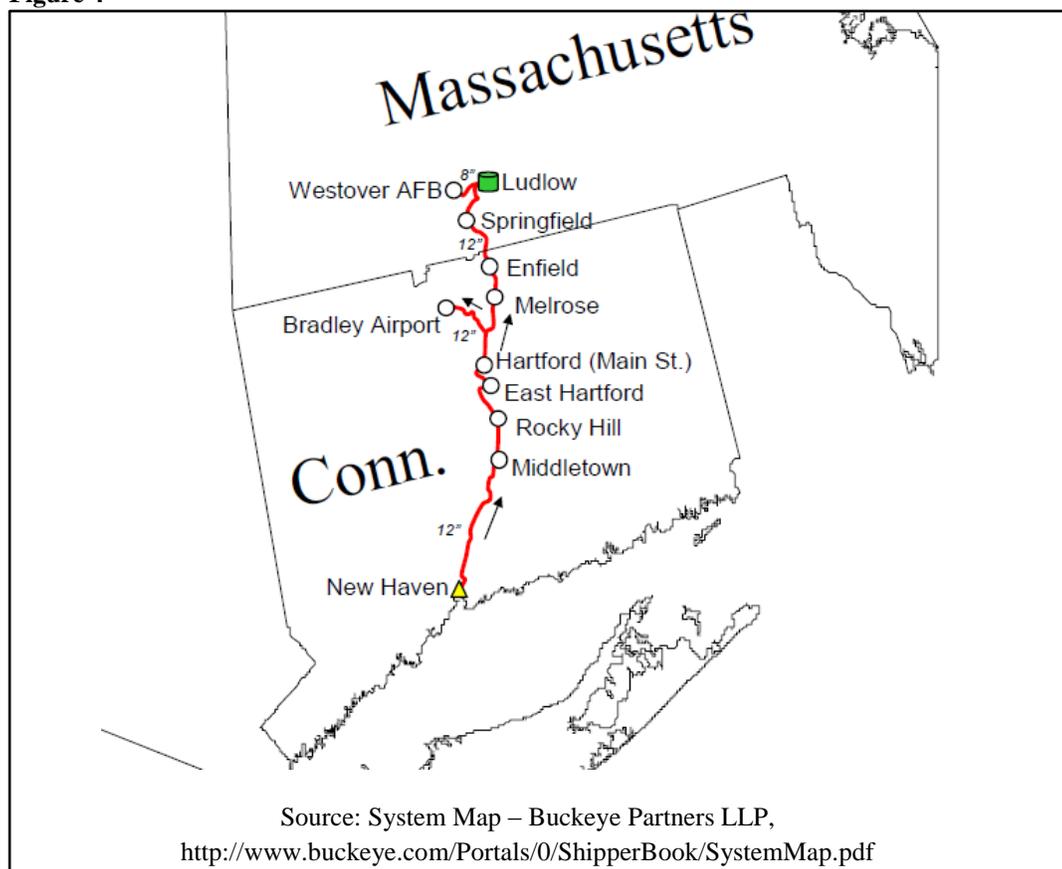
⁶¹ *Id.*

⁶² Energy Information Administration, *Primary Energy Consumption Estimates, Selected Years, 1960-2010, Connecticut*, http://www.eia.gov/state/seds/hf.jsp?incfile=sep_use/total/use_tot_CTcb.html&mstate=Connecticut (last updated June 29, 2012).

D. Petroleum

Connecticut has no fossil fuel reserves. As a result, much of the State's petroleum products are imported through the New Haven Terminal Wharf. From there, petroleum products are transported by truck, ship/barge, or through the Buckeye pipeline, which supplies Hartford and Bradley Airport, among other locations before terminating in central Massachusetts north of Springfield.

Figure 4



In 2010, Connecticut consumed a total of 63.8 million barrels of petroleum.⁶³ 52% of households used fuel oil for home heating in 2000; 2% of households used LPG in the same period.⁶⁴

One of the two Northeast Home Heating Oil Reserve sites is located in Groton, Connecticut. The Groton site has an inventory of 500 thousand barrels of ultra-low sulfur distillate.⁶⁵

⁶³ *Id.* (Motor Gasoline—35.9 million barrels; Distillate Fuel—21.6 million barrels; Liquefied Petroleum Gases—3.1 million barrels; and Jet Fuel—1.5 million barrels)

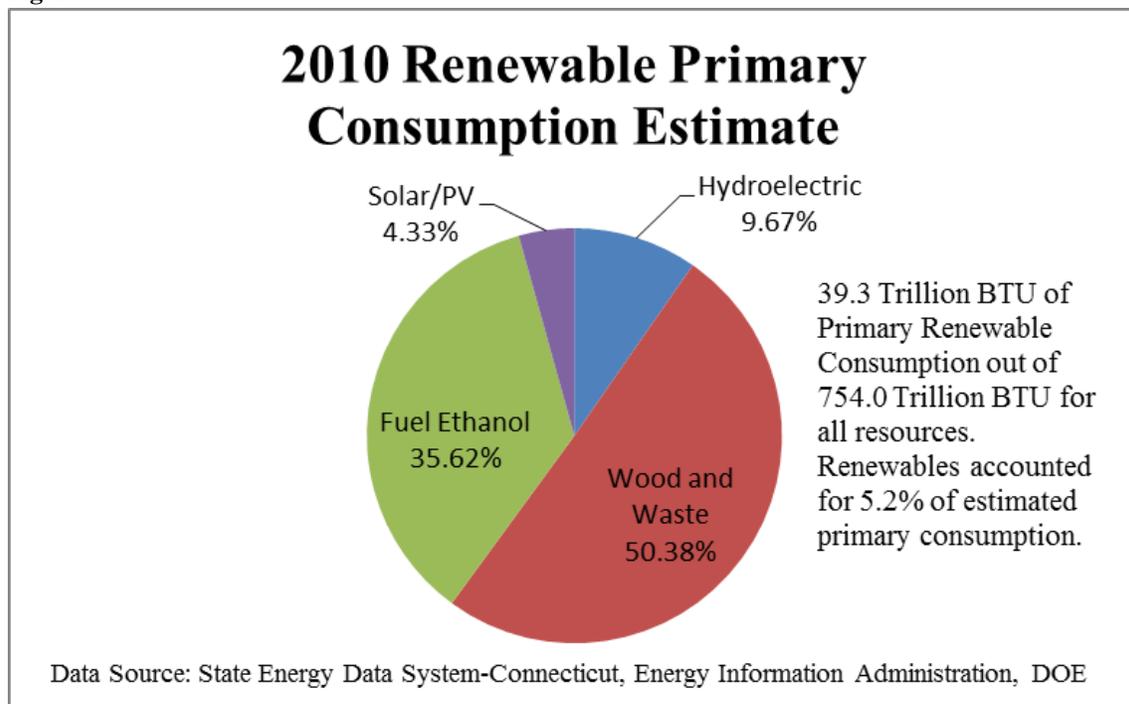
⁶⁴ *Id.* (EIA used 2000 U.S. Census data)

⁶⁵ U.S. Department of Energy, *Northeast Home Heating Oil Reserve – Profile*, <http://www.fossil.energy.gov/programs/reserves/heatingoil/index.html> (last updated April 11, 2012).

E. Renewables

Connecticut is currently positioning itself to take advantage of emerging renewable energy technologies with its ambitious Renewable Portfolio Standard (RPS) goals—20% Class 1 renewable energy sources by 2020. Approximately 5% of Connecticut’s primary energy consumption came from in-state renewable sources in 2010.⁶⁶ Currently, BETP administered a procurement for 10 MW of Class 1 Renewable Generation Program to encourage EDCs and owners or developers of generation projects to build, own, or operate more generation facilities using Class 1 renewable energy sources.⁶⁷ Under the same statutory provision, the Electric Distribution Companies are authorized to develop up to 20 MW – 10 MW for each EDC – That process is currently underway. Also, Project 150 is an initiative aimed to increase the State’s renewable energy supply by 150 MW of installed capacity. Wood and waste together with fuel ethanol make up an overwhelming majority of the primary consumption of the State’s renewable energy sources.

Figure 5



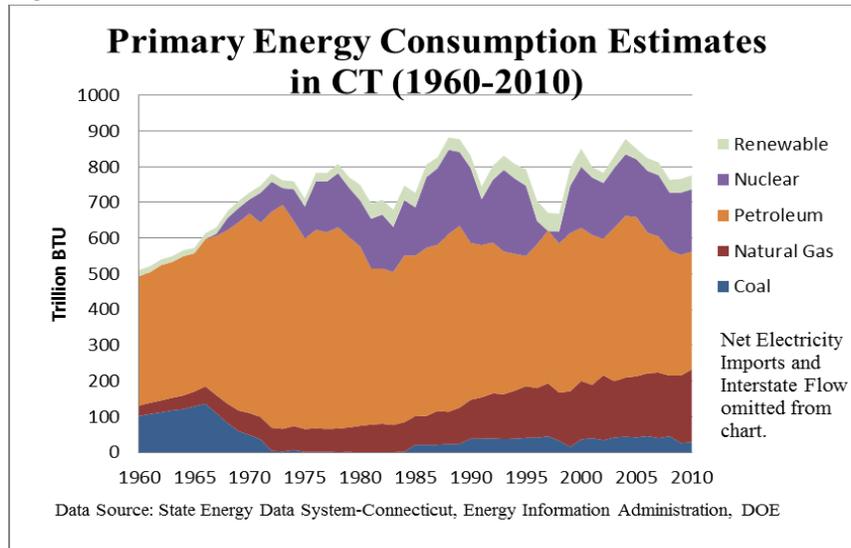
⁶⁶ Energy Information Administration. *State Energy Data System-Connecticut*, http://204.14.135.140/state/seds/seds-states.cfm?q_state_a=CT&q_state=Connecticut (last updated June 29, 2012).

⁶⁷ C.G.S. § 16-244(v), *Renewable energy sources generation. Proposals to build, own or operate facilities.*

F. Energy Use and Expenditures

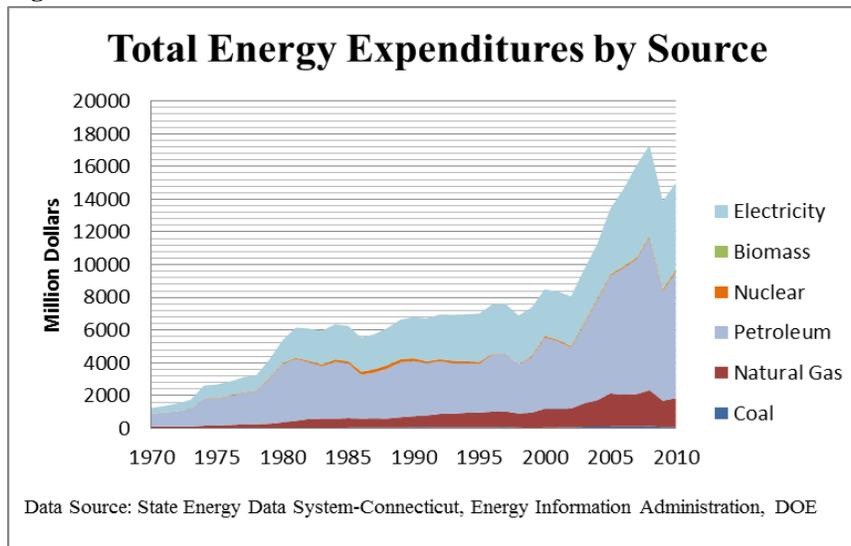
In 1960, petroleum and coal accounted for an overwhelming majority of Connecticut’s energy use.⁶⁸ Over time, coal usage has been supplanted by natural gas and nuclear power, while petroleum’s percentage usage has diminished with increases in natural gas and nuclear usage.⁶⁹

Figure 6



Connecticut’s energy expenditures have increased greatly since 1970, most notably between the years 2001 and 2008.⁷⁰ The State’s energy consumption has not increased linearly with expenditures – in particular, spending on petroleum has multiplied several times while its consumption level has not.⁷¹

Figure 7



⁶⁸ See Figure 6.

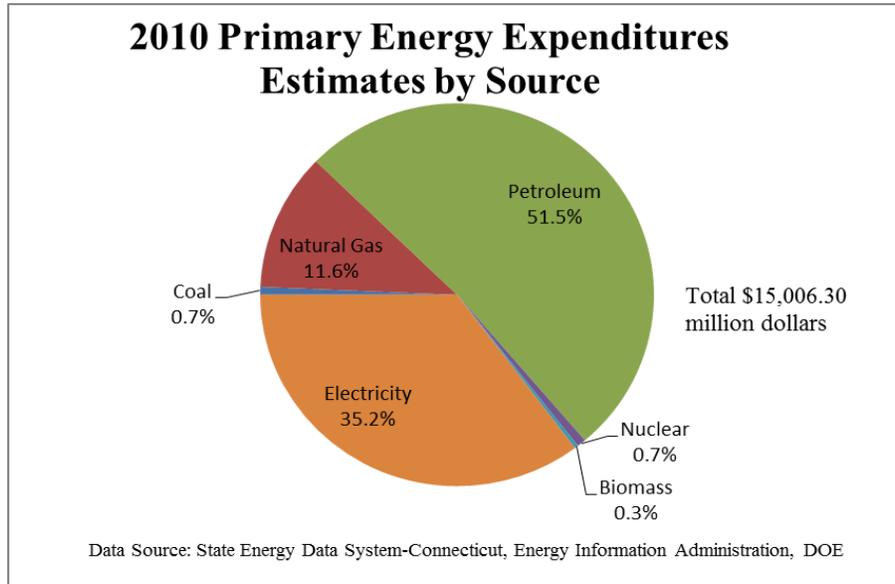
⁶⁹ *Id.*

⁷⁰ See Figure 7.

⁷¹ See Figure 6; Figure 7.

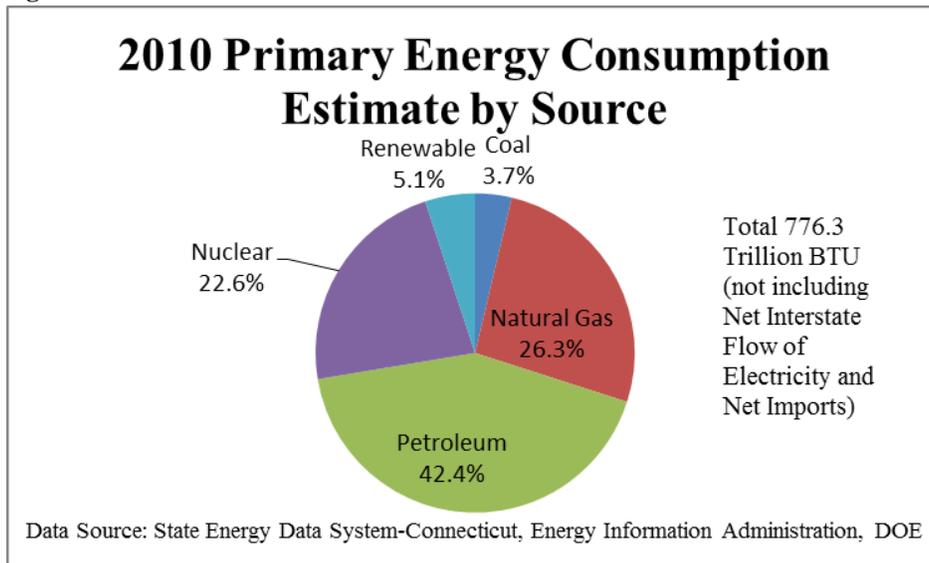
In 2010, petroleum accounted for the majority of energy expenditures (51.5%), electricity accounted for over a third of energy expenditures (35.2%), and natural gas (not used for electric generation) accounted for slightly more than one tenth of energy expenditures.⁷²

Figure 8



Connecticut’s energy supply is somewhat diversified with petroleum products (42.4%), natural gas (26.3%), and nuclear power (22.6%) all contributing significantly to the State’s energy consumption needs. Renewables (5.1%), mostly biomass, and coal (3.7%) contribute small shares to the total energy supply as well.⁷³

Figure 9

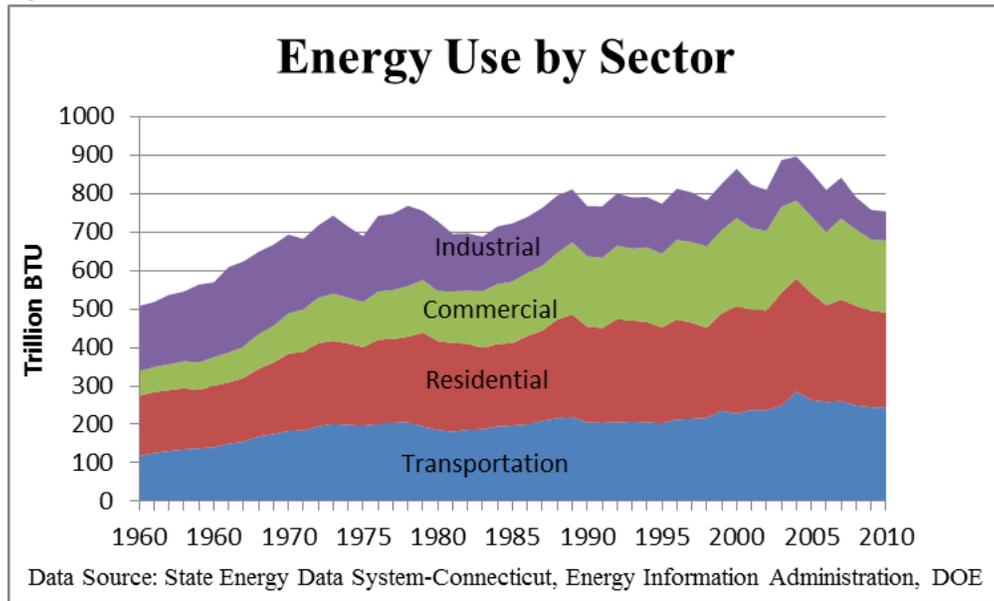


⁷² See Figure 8.

⁷³ See Figure 9.

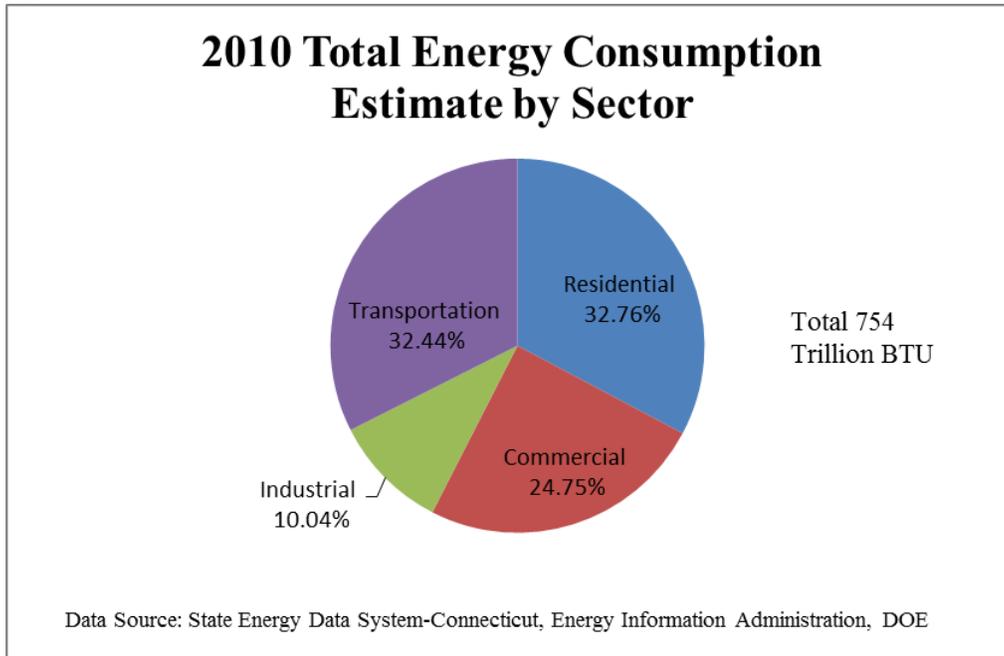
Energy use has grown across all sectors except the industrial sector since 1960.⁷⁴

Figure 10



In 2010, the transportation and residential sectors each accounted for nearly one third, the commercial sector accounted for about one fourth, and the industrial sector accounted for about one tenth of energy use.⁷⁵

Figure 11



⁷⁴ See Figure 10.

⁷⁵ See Figure 11.

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IV. ENHANCING RELIABILITY THROUGH CRITICAL INFRASTRUCTURE PROTECTION, SUPPLY EFFORTS, AND DEMAND MANAGEMENT

Implementing policies, practices, and programs to prevent energy supply disruptions is the best way to avoid the economic and social costs of an energy emergency. Protecting critical energy infrastructure is arguably the most important aspect of energy assurance because infrastructure hardening and optimizing reliability is the first step to mitigating the damage caused by an energy supply disruption. However, no energy system is 100% damage proof; so, steps must be taken to enhance system resiliency, which is the ability to quickly recover from damage.

In addition to critical infrastructure protection, this section addresses initiatives, activities, and efforts ongoing within the State to enhance reliability by ensuring an adequate energy supply and a reducing in demand. Ensuring adequate supply means making certain that Connecticut will have enough energy from both traditional and emerging sources available for use, but also that critical supply infrastructure will continue to function at peak demand. Further, reductions in demand through demand-side management programs decrease stress on critical infrastructure, so efforts to manage demand add to reliability. Also, alternative supply sources and reduced demand lead to a faster recovery from damage, or in other words, enhanced resiliency.⁷⁶

This chapter discusses: critical infrastructure protection; supply and demand for electricity, natural gas, and petroleum; and the role of emerging technologies with respect to enhancing reliability. Most, if not all, of what is discussed in this chapter may be described as preparedness activities. Reliability measures that take place during the preparedness phase of emergency management can help mitigate a supply disruption by preventing one from even occurring.

A. Critical Infrastructure Protection (“CIP”)

Critical infrastructure protection efforts come in a variety of forms. The CIP efforts first begin in the planning stages of energy infrastructure projects and should not cease until the infrastructure is no longer used. Given the scope, cost, and interdependencies of most energy infrastructure projects, protection efforts are critical to maintaining a reliable and functional energy supply system as a whole. One poorly planned or inadequately protected transmission line could cause a relatively large energy supply disruption. CIP efforts range from extremely costly (e.g., undergrounding miles of power lines) to relatively inexpensive (e.g., vegetation management near power lines — compared to undergrounding for the same distance).

⁷⁶ For example, if 33% of homes have backup systems powered by renewables and the entire grid fails, responders need to restore only the 67% without backup power to return to “normal”. Likewise, if home heating oil supply is completely disrupted, but all homes have reduced their consumption by 50%, the volume of oil needed is half of what it would have been, and recovery time is reduced significantly.

1. Compliance with Connecticut Siting Council (“CSC”) Energy Proceedings⁷⁷

The first opportunity to protect critical infrastructure arises during the planning process, which the CSC regulates. The CSC reviews the location, design, construction, and operation of public utility facilities. With respect to electricity, CSC has jurisdiction over certain transmission and generation infrastructure.⁷⁸ Ensuring compliance with CSC regulations is important to keep critical energy infrastructure operating safely and efficiently and to guarantee the welfare and protection of the citizens of Connecticut.

CSC requires utilities to submit detailed development and management plans that are professionally engineered documents comprising designs, site plans, construction schedules, and site inspection reports.⁷⁹ Often required filings include proprietary information concerning Critical Energy Infrastructure Information (“CEII”), which may be filed under a protective order and reviewed in camera by CSC to determine if it qualifies for protected treatment.^{80,81,82}

CEII filed with CSC by the utilities covers all aspects of energy assurance. CEII incorporates information into four categories: planning; preparedness; response; and recovery. Planning includes identifying physical vulnerabilities most likely to pose a threat, any ways in which the facility’s setting affects security concerns, security challenges due to interdependencies, and methods for security officials to maintain situational awareness of the facility. Preparedness includes examining site security and support infrastructure, reviewing any simulated exercises with the appropriate response personnel, and examining whether liaisons and mutual aid agreements are in place. Response includes examining notification procedures to public officials to ensure access to information and examining mitigation measures such as backup generation. Recovery includes identifying recovery measures that will be taken and determining whether reporting procedures are established to evaluate and improve the effectiveness of response, mitigation, and restoration efforts.

CSC reviews development and management plans and conducts field investigations to ensure compliance with its certificates and orders. The CT Attorney General ensures Enforcement of Council orders.

⁷⁷ See Appendix A for Connecticut Siting Council, *White Paper on the Security of Siting Energy Facilities*.

⁷⁸ Connecticut Siting Council, *About Us*, <http://www.ct.gov/csc/cwp/view.asp?a=895&q=248310> (last updated December 28, 2011). (C.G.S. 16-50i grants CSC has jurisdiction over: “1) Electric transmission lines 69-kV or above; 2) Fuel transmission lines of 200 PSIG or above; 3) Electric generating or storage facilities excluding emergency generating devices, cogeneration facilities of 25 MW or less, and facilities fueled by renewable energy sources of 1 MW or less; and 4) Electric substation or switchyards of 69-kV or above.”)

⁷⁹ See Connecticut Siting Council, *Procedures for Filing Proprietary Information Under Protective Order*, <http://www.ct.gov/csc/cwp/view.asp?a=945&q=438698&cscNavPage=%7C> (last updated April 20, 2009).

⁸⁰ *Id.* (“Proprietary Information is defined as any information that may be exempt from public disclosure under the Freedom of Information Act (FOIA) C.G.S. sec. 1-210(b)”)

⁸¹ *Id.* (“CEII is defined as specific engineering, vulnerability, or detailed design information about proposed or existing critical infrastructure that: 1) relates to details about the production, generation, transportation, transmission or distribution of energy; 2) could be useful to a person in planning an attack on critical infrastructure; 3) is exempt from mandatory disclosure under FOIA, C.G.S. §1-210(b)(19); and 4) does not simply give the general location of critical infrastructure.”)

⁸² See Connecticut Siting Council, *White Paper on the Security of Siting Energy Facilities* (October 8, 2009). (Providing guidelines for analysis of CIP and risks/vulnerabilities required by Siting Council from the applicant)

2. Docket No. 11-12-13: PURA Review of Electric Companies' and Electric Distribution Companies' Plans for Maintenance of Transmission and Distribution Overhead and Underground Lines

Pursuant to CGS § 16-32g, EDCs are required to submit their plans for maintenance of transmission and distribution lines to PURA annually. Plans must include the necessary staffing levels for adequate vegetation management. PURA reviews each plan and may require EDCs to revise and submit an updated plan. The purpose of PURA's review is to ensure critical transmission and distribution infrastructure protection measures are continually updated and sufficient to minimize the potential of an energy supply disruption caused by damage to the lines.

Connecticut Light & Power and United Illuminating Plans^{83,84}

Both CL&P and UI submitted maintenance plans for review by PURA within the last year. The plans can be accessed on PURA's Web Filing System in Docket No. 11-12-13. CL&P's plan is titled "Electric Utility Line Maintenance Plan." UI's plan is titled "Maintenance Plan for Transmission and Distribution Overhead and Underground Lines."

Both plans are substantially similar and essentially address the same topics. First, they provide system descriptions that include information on customer classes and system infrastructure. Next, CL&P's plan discusses tree trimming and UI's plan has a similar section on line clearance/vegetation management. Finally, both plans cover each companies' maintenance practices in depth and are organized by type of infrastructure (e.g., substations or underground transmission lines).

3. Docket No. 12-01-10: PURA Investigation into the Tree Trimming Practices of Connecticut Utility Companies

Pursuant to CGS § 16-11, PURA established Docket No. 12-01-10 to investigate the tree trimming and vegetation management practices of Connecticut's utility companies to increase system reliability and decrease storm-caused damage to utility infrastructure. OCC has been designated as a Participant to this proceeding.

The two major storms of 2011 resulted in significant damage to distribution lines and widespread electricity outages caused by falling trees and branches. The goal of the investigation is to determine the most cost-effective level of tree trimming and vegetation management to ensure system reliability.

PURA requires comment from the public utilities on all issues included in its Notice of Request for Written Comments in Docket No. 12-01-10. The investigation requires reports from the utility companies on their plans to expand tree trimming plans, recommendations for

⁸³ See Appendix B for Connecticut Light & Power, *Electric Utility Line Maintenance Plan*.

⁸⁴ See Appendix C for United Illuminating, *Maintenance Plan for Transmission and Distribution Overhead and Underground Lines*

improvements to vegetation management practices, suggestions on the role of local governments with respect to vegetation management, and rights-of-way issues, among other topics. In addition, PURA allows other interested persons to submit written comments on any or all issues in the proceeding.

4. New England East-West Solution (“NEEWS”)

Northeast Utilities (“NU”), ISO New England (“ISO-NE”), and National Grid formed a working group of planners to resolve the five problems ISO-NE identified in its regional planning process.⁸⁵ NEEWS comprises four related transmissions projects: Greater Springfield Reliability Project; Interstate Reliability Project; Rhode Island Reliability Project; and Central Connecticut Reliability Project. All four projects are similar in that they involve adding at least one new 345-kV transmission line in each area. The goals of NEEWS is to build new electricity transmission infrastructure to strengthen the bulk electricity delivery systems between Connecticut, Massachusetts and Rhode Island and increase power transfer capability across southern New England.

ISO New England supports the proposed Interstate Reliability Project.⁸⁶ ISO-NE states that the Interstate Reliability Project will eliminate the thermal and voltage criteria violations and improve transfer capabilities, which would address the reliability issues ISO-NE has recognized.⁸⁷ The transmission upgrades will also serve to ensure that the transmission system complies with the North American Electric Reliability Corporation, the Northeast Power Coordinating Council, and the Independent System Operator reliability standards and criteria.⁸⁸

CL&P estimates the NEEWS projects will increase Connecticut’s import capability to approximately 3,600 MW from 2,500 MW (about 45% of CT’s peak load).^{89,90} According to CL&P, the projects will: strengthen system reliability by broadening the base of power supply; mitigate rising electricity costs by reducing the number of reliability agreements and congestion charges; and provide access to remote renewable and lower emission generation.⁹¹ The goal is to transmit more dependable power to Connecticut’s citizens and increase the ability to move power between east and west in New England.⁹²

⁸⁵ See Northeast Utilities, *New England East-West Solution (NEEWS) Webpage*, <http://www.transmission-nu.com/residential/projects/neews/default.asp> (accessed August 8, 2012). (“Limitations to east-west movement of electricity on the New England power grid; weaknesses in transmission around Springfield, MA, a major interstate transmission hub; limitations to moving electricity across CT, MA, and RI; RI’s dependence on single transmission lines or autotransformers for reliability; and limitation to the power than can flow from east to west within CT”)

⁸⁶ See ISO New England, *Connecticut Siting Council Hearing on Interstate Reliability Project- Docket No. 424*, Prefiled Testimony, http://www.ct.gov/csc/lib/csc/pendingproceeds/docket_424/pre_filed_submissions/iso/424-20120717-exh2_isoprefiled.pdf (July 17, 2012).

⁸⁷ *Id.* at 15.

⁸⁸ *Id.* at 15.

⁸⁹ See Connecticut Light and Power, *2012 Forecast of Loads and Resources*, at 29. (Estimated import capability-new)

⁹⁰ See *id.* at 2 (Estimated import capability-current)

⁹¹ See *id.* at 30.

⁹² See Northeast Utilities, *New England East-West Solution (NEEWS) Webpage*, <http://www.transmission-nu.com/residential/projects/neews/default.asp> (accessed August 8, 2012).

5. DESPP/DEMHS-Critical Infrastructure Protection Unit

The Critical Infrastructure Protection Unit (“CIPU”) catalogs Critical Infrastructure and Key Resource (“CI/KR”) Sites within the state and conducts physical security/vulnerability assessments at such sites. CIPU utilizes the Constellation/Automated Critical Asset Management System (“C/ACAMS”) to organize vulnerability information. C/ACAMS provides tools and resources to collect and use CI/KR asset data; assess CI/KR asset vulnerabilities; develop all-hazards incident response and recovery plans; and build public-private partnerships.

CIPU has participated in a number of operations with federal, state, and local agencies. According to DESPP/DEMHS’s CIPU webpage, these operations include: Buffer Zone Protection Program (with DHS); Strategic National Stockpile Program (with DPH); Long Island Sound Security Initiative; Visible Intermodal Prevention and Response Teams (with TSA); Rentschler Field Operations Security; and Secure the Cities.

CIPU’s efforts are vital to emergency preparedness. Knowing its risks and vulnerabilities, the State can plan effectively and pinpoint reliability issues that can be improved upon.

6. Call Before You Dig (“CBYD”)

Call Before You Dig, Inc. is a non-profit organization that administers Connecticut’s CBYD program. The program provides a free service to homeowners and professional excavators to ensure public utility companies are aware of any planned excavations that may affect their underground facilities. The purpose of the program is to prevent damage to underground utility lines. Anyone planning *any* outdoor project *must* notify CBYD prior to the start of their project if they are digging with power equipment.⁹³ Anyone digging with hand tools is encouraged to notify CBYD; however, it is not required. After calling, the affected utilities will mark the location of their underground facilities so one can dig safely. The CBYD program helps prevent electricity and natural gas supply disruptions. For more information, visit CBYD.com.

7. PURA Gas Pipeline Safety Unit (“GPSU”) Inspection Program⁹⁴

GPSU’s regulation of natural gas pipelines is an ongoing preparedness activity that enhances reliability of natural gas infrastructure. GPSU conducts over 300 field inspections of facilities per year and reviews company plans, procedures, and records to ensure compliance with applicable safety requirements.⁹⁵ GPSU regulates intrastate gas company facilities and interstate pipeline operators.⁹⁶ GPSU coordinates with PHMSA regarding the interstate operations.

GPSU inspects both new construction and operation/maintenance activities for compliance with safety standards. Gas companies must participate in pipe replacement, damage prevention, and

⁹³ Pursuant to C.G.S. § 16-349

⁹⁴ See Appendix D for Public Utility Regulatory Authority, *What is the Gas Pipeline Safety Unit?*

⁹⁵ Public Utility Regulatory Authority, *What is the Gas Pipeline Safety Unit Inspection Program?*, <http://www.ct.gov/pura/cwp/view.asp?a=3363&q=414220> (last updated May 2012).

⁹⁶ *Id.* Liquefied Natural Gas plants are subject to annual inspection by GPSU.

integrity management programs. *What is the Gas Pipeline Safety Unit?*, located in the appendix, describes the programs in more detail.

B. Electricity Supply & Demand

First, this section addresses the ongoing initiatives, activities, and efforts in place to ensure the continued adequacy of electricity supply within the State. Then, this section addresses the ongoing initiatives, activities, and efforts in place to reduce electricity demand within the State starting at number six. As energy demand is reduced within the state, fewer energy resources are required to ensure adequate supply (i.e., the easier it is to ensure energy demand will be met). Further, as our energy consumption levels decrease, the amount of renewable generation required to meet RPS goals decreases.

1. 2012 Integrated Resource Plan for Connecticut⁹⁷

The 2012 IRP is a comprehensive plan for the procurement of electric resources, which entails ensuring adequate electricity supply and improving Connecticut's electric energy future. The 2012 IRP is Connecticut's fourth such plan, but it is the first developed primarily by DEEP in conjunction with CEAB and EDCs, pursuant to CGS § 16a-3a. The 2012 IRP's effective date is June 14, 2012—DEEP must reassess its integrated resources plan and report to the energy-related and environment-related joint standing committees of the General Assembly biennially.

Pursuant to CGS § 16a-3a, DEEP must assess and consider, among other things, the electricity and capacity requirements of customers for the next three, five, and ten years; how best to reduce overall demand and peak demand; energy security and economic risks; environmental impact; reliability; optimization of potential energy resources; and the effects of policies on customer costs.⁹⁸ The General Assembly emphasizes the use of all cost-effective energy efficiency and demand reduction resources as the first priority in integrated resource planning.⁹⁹

The 2012 IRP can be broken down into three fundamental parts: 1) the forecast for future electricity supply and demand; 2) the plan for achieving Connecticut's electric energy policy goals (cheaper, cleaner, more reliable energy sources); and 3) the appendices — they detail the building blocks of the 2012 IRP (i.e., data tables, resource adequacy, energy efficiency, renewables, environmental regulations, natural gas, transmission planning, emerging technologies, macroeconomic analysis, and public comments). The appendices that are particularly relevant to energy assurance — renewables, transmission planning, and emerging technologies — are addressed later in this section.

⁹⁷ See Appendix E for Department of Energy & Environmental Protection, *2012 Integrated Resource Plan for Connecticut*.

⁹⁸ See C.G.S. § 16a-3a *Integrated resources plan for energy resources*. (Providing full list of mandated assessments and considerations for preparation of the integrated resource plan.)

⁹⁹ See C.G.S. § 16a-3a

Forecast for Future Electricity Supply and Demand

There are several important takeaways in the 2012 IRP regarding future electricity supply and demand:¹⁰⁰

- DEEP’s ten-year forecast predicts the state will likely have adequate generating resources to meet demand reliably through 2022 without the need to add new generation.
- The region’s dependency on natural gas-fired generation requires monitoring to assure the reliability of electric supply.
- Generation Service Charges have recently lowered due to expanding shale gas supplies, but are expected to rise through the year 2022 because of predicted natural gas price increases and higher Renewable Energy Certificate (“REC”) prices due to anticipated scarcity.
- Demand for renewable generation is expected to exceed supply by 2018; regional development of renewable resources and enabling transmission must increase or customers might face Alternative Compliance Payments (“ACP”) of more than \$250 million annually.

Plan for Achieving Cheaper, Cleaner, More Reliable Energy Sources

The 2012 IRP recommends a number of resource strategies that will enable the State to meet its electric energy objectives and ensure adequate energy supply. Those strategies include:

- Pursuing expanded energy efficiency to achieve all cost-effective energy savings by increasing CLM programs’ budgets;
- Developing a longer term renewable energy policy that addresses RPS issues — that is, consider how to meet Class I, II, and III goals in a cost-effective manner;
- Working with other New England states to maximize cost-effective renewables and improve transmission infrastructure to increase access to renewables to reach RPS goals and avoid ACP;
- Continuing to assess the adequacy of energy resources to provide reliable generation service during peak demand periods;
- Working with ISO-NE to maintain reliability during cold snaps (when natural gas resources are used for heating); and
- Establishing a pilot program for distributed generation and Microgrids in addition to implementing smart grid technology to enhance storm disaster preparedness, response, and recovery.

Renewables

The 2012 IRP’s Appendix D: Renewable Energy provides analysis of three future resource scenarios — “Base Case,” “Full Renewables,” and “Low Renewables” — and evaluates the effects of each scenario on the State’s energy and environmental goals. The appendix does not

¹⁰⁰ See Department of Energy & Environmental Protection, *2012 Integrated Resource Plan*, at i.

provide a policy conclusion; it merely aids policymakers in their decisionmaking by providing extensive data on the renewable energy market in both Connecticut and New England. Such analysis is integral to the energy planning process and necessary for Connecticut to make well-informed decisions about its energy future. The 2012 IRP concludes that action is necessary to meet RPS goals because the potential for in-state renewable generation is low. See the appendix for the complete renewables analysis.

Transmission Planning

The 2012 IRP's Appendix G: Transmission Planning addresses transmission reliability needs and ongoing studies in Connecticut, non-transmission alternatives, and emerging issues affecting transmission planning. First, the appendix discusses two transmission reliability studies — Southwest Connecticut Solution Study and Greater Hartford/Central Connecticut Needs Assessment. Both studies are still currently underway. Then, the appendix discusses non-transmission alternatives within three categories — new substations, infrastructure upgrades, and new transmission lines — as a substitute for backstop transmission reliability solutions. Last of all, the appendix identifies three issues affecting transmission — FERC Order 1000 on Transmission Planning and Cost Allocation, Minimum Offer Price Rule Relationship to NTAs, and Eastern Interconnection Planning Collaborative — which allows DEEP to better plan ahead for infrastructure issues. See the appendix for an in-depth review of transmission planning.

Emerging Technologies

The 2012 IRP's Appendix H: Emerging Technologies addresses how technological advances will play an increasing role in Connecticut's resource planning. Three technologies—Advance Metering Infrastructure (“AMI”), Plug-in Electric Vehicles (“PEVs”), and Energy Storage—are identified as most likely to play increasingly important roles in future resource planning. These three technologies are addressed with regard to: current state of the technology; current and future deployment in both the U.S. and Connecticut; barriers to adoption; and state-level activities to overcome the barriers. Geothermal energy and advanced waste-to-energy (“AWE”) are addressed as well because of interest among state policy-makers, but to a lesser extent due to lower impact potential or higher uncertainty.

Optimization of new technologies will improve the State's energy future. The fact that Connecticut is analyzing the potential incorporation of such technology is very promising. Further, the State is not merely recognizing the technologies exist. It is developing policies to overcome barriers to the adoption of these emerging technologies. If we fully take advantage of these opportunities, the State will be much closer to assuring adequate energy supply systems in the future. See the appendix for the complete analysis of emerging technologies.

2. Comprehensive Energy Strategy¹⁰¹

The Comprehensive Energy Strategy is a guide to Connecticut policymaking toward the Governor's vision of a cheaper, cleaner, and more reliable energy future. The CES incorporates all fuels and all sectors in its planning out to the year 2050. It is organized into five major sections: Electricity; Buildings; Industry; Transportation; and Natural Gas.

The CES incorporates a number of principles to reach its goal of cheaper, cleaner, and more reliable energy. The principles aim to facilitate a flexible approach to clean energy, spur innovation, promote all cost-effective and deep energy efficiency, and finance--as opposed to subsidize--new investments.

The CES is currently under development; the final version will address energy supply and demand management in depth.

3. ISO Market Study¹⁰²

DEEP submitted a draft for public comment of its ISO Market Study titled "Study of the Impact of the Regional Independent System Operator on Connecticut Ratepayers and the New England and State Wholesale Electric Power Markets" on BETP's Energy Filings website on May 25, 2012 pursuant to Section 35 of Public Act 11-80.

The study's purpose is to assure that Connecticut and DEEP have a strong role in policy matters affecting the best interests of Connecticut's citizens and ratepayers whether the state participates in ISO New England, another Regional Transmission Operator ("RTO"), or operates outside the RTO system.

The ISO Market Study delineates options for Connecticut to take better control over its electricity supply market. The study discusses: Area for Further Engagement between ISO-NE and the states; ISO-NE Governance; Forward Capacity Market; Strategic Planning; Non-Transmission Alternatives Studies; Coordinated Renewable Procurement; and FERC Order 1000.

The Department, with the active involvement of the Commissioner, is engaged in discussions at the Forward Capacity Market ("FCM") Working Group with the goal of providing technical expertise and leadership to parties throughout the region. The Department is attempting to work with all parties, including ISO-NE, to develop an efficient and well-functioning market to provide reliability to customers at just and reasonable rates.

The existence of the study shows Connecticut is taking a proactive approach to gaining control over its energy supply and ensuring an adequate electricity supply. The initial study

¹⁰¹ See Appendix F for Department of Energy & Environmental Protection, *Comprehensive Energy Strategy*

¹⁰² See Appendix G for Department of Energy & Environmental Protection, *Study of the Impact of the Regional Independent System Operator on Connecticut Ratepayers and the New England and State Wholesale Electric Power Markets*

recommendations are designed to ensure Connecticut proactively seizes opportunities to improve its electricity supply and addresses issues before they arise.

4. Forecast of Loads and Resources (“FLR”)

Section 97 of Public Act 11-80 (“PA-11-80”) requires every person engaged in electric transmission services with a capacity greater than one megawatt to file a report with both DEEP and CSC on a forecast of loads and resources, which may consist of an update of the previous year's report that covers a ten year forecast period beginning with the year of the report.

Pursuant to § 97 of PA 11-80, the report must include:

- A tabulation of estimated peak loads, resources and margins for each year;
- Data on energy use and peak loads for the five preceding calendar years;
- A list of existing generating facilities in service;
- A list of scheduled generating facilities for which property has been acquired, for which certificates have been issued and for which certificate applications have been filed;
- A list of planned generating units at plant locations for which property has been acquired, or at plant locations not yet acquired, that will be needed to provide estimated additional electrical requirements, and the location of such facilities;
- A list of planned transmission lines on which proposed route reviews are being undertaken or for which certificate applications have already been filed;
- A description of the steps taken to upgrade existing facilities and to eliminate overhead transmission and distribution lines in accordance with the regulations and standards described in section 16-50t; and
- For each private power producer having a facility generating more than one megawatt and from whom the person furnishing the report has purchased electricity during the preceding calendar year, a statement including the name, location, size, and type of generating facility, the fuel consumed by the facility and the by-product of the consumption.

Pursuant to § 98 of PA 11-80, the DEEP Commissioner may issue a request for proposals to seek alternative solutions to any reliability or load and resource issues including, but not limited to, energy efficiency measures or generation.

The requirement for EDCs to submit an FLR annually ensures DEEP and the private companies will be conscious of any potential long-term supply, demand, or reliability issues. The State uses the submission of FLRs as just one element of its proactive approach to planning its energy future.

Connecticut Light & Power¹⁰³

CL&P's FLR highlights its continual efforts to maintain a reliable transmission system. The report discusses: electric energy and peak demand forecasts; existing and planned generation supply; integrated resource planning; conservation and load management; and transmission planning and system needs.

CL&P's chapter on transmission planning is important in the context of energy assurance. According to CL&P, only 30 percent of the State's peak load could be served by transmission imports — the transmission system infrastructure is the limiting component.¹⁰⁴ Therefore, Connecticut's in-state generation infrastructure is critical to responding to electricity demand.¹⁰⁵ Improvements could be made to transmission infrastructure to allow for more flexibility to use out-of-state generation if necessary. The New England East – West Solution ("NEEWS") is one project currently underway to solve the State's limited transmission infrastructure problem that CL&P discusses in its FLR — the EAP addresses NEEWS in-depth later in this chapter.

CL&P's FLR also considers NTAs, incorporation of renewables through transmission, and underground transmission in its transmission planning process. In addition, CL&P suggests that Connecticut's potential to develop large quantities of in-state renewable resources is low, so the State should plan for importation of wind and hydroelectric power from Northern New England and Canada.¹⁰⁶

United Illuminating¹⁰⁷

UI's FLR report discusses: UI's load forecast update; distributed generation; conservation and load management; transmission planning and issues, and system reliability.

The section on transmission planning discusses UI projects that fulfill the company's obligation to provide reliable service and meet reliability standards. For example, UI identifies reliability concerns in the Shelton area, which would be addressed by its planned Shelton Substation Project.¹⁰⁸ UI also identifies issues in several areas of its service area (greater New Haven, greater Bridgeport, and Naugatuck Valley). UI also recognizes the importance of ISO-NE's Strategic Planning Process and FERC Order 1000 on "Transmission Planning and Cost Allocation."

¹⁰³ See Appendix H for Connecticut Light & Power, *2012 Forecast of Loads and Resources*.

¹⁰⁴ Connecticut Light & Power, *2012 Forecast of Loads and Resources*, March 1, 2012 at 2.

¹⁰⁵ *Id.* at 2. ("Consequently, at least 70% of the electric power needed to serve customer peak demand must be generated in Connecticut.")

¹⁰⁶ See *id.* at 2.

¹⁰⁷ See Appendix I for United Illuminating, *Report to the Connecticut Siting Council on Loads and Transmission Resources*

¹⁰⁸ See United Illuminating, *Report to the Connecticut Siting Council on Loads and Transmission Resources*, March 1, 2012 at 20.

5. Distributed Generation (“DG”) and Combined Heat and Power (“CHP”) Systems

Replacement Heating System and CHP Programs

Pursuant to § 116 of PA 11-80, DEEP is establishing a plan to implement replacement heating systems and CHP programs. The purpose of the programs is to stimulate construction of CHP generating capacity to help reduce customers’ energy usage and energy bills by increasing efficiency.

Through the program, CEFIA offers financial incentives to industrial and commercial customers. The incentives assist with customer-owned CHP system installation costs. The program includes: capital grants up to \$200/KW; low interest loans; discounts for the cost of natural gas; an exemption from certain electric costs for backup service; and Renewable Energy Certificates.¹⁰⁹

DEEP must report the results of the program to the Energy and Technology Committee by October 1, 2014.

CHP and Anaerobic Digester Program

Pursuant to § 103 of PA 11-80, CEFIA is required to establish a three-year pilot program to provide financial incentives for installing CHP systems with a generating capacity of less than 2 MW. The CHP program may not exceed 50 MW and funding is capped at \$350 per kW.

In addition, CEFIA must establish a pilot program to provide financial assistance to Connecticut’s farms for using organic waste with on-site anaerobic digestion facilities to generate electricity and heat. CEFIA may approve five projects or fewer with a maximum size of 3 MW each and a maximum cost of \$450 per kW.

CEFIA must allocate \$2 million for each program annually. CEFIA must report on the programs and whether or not the programs should continue to the Energy and Technology Committee by January 1, 2016.

6. 2012 Conservation and Load Management (“C&LM”) Plan¹¹⁰

The 2012 C&LM Plan’s purpose is to advance the State towards a more secure energy future by providing a coordinated effort between the EDCs, LDCs, and the State in the implementation of all cost-effective energy efficiency programs. In accordance with CGS § 16-245m and § 16-32f, the C&LM Plan was created by CL&P, UI, YGS, CNG, and SCG with the advisement and assistance of ECMB. Each year, the EDCs and LDCs (with advisement and assistance from ECMB) must submit a C&LM Plan to be approved by DEEP/PURA. The latest C&LM Plan is available to the public on DEEP-BETP’s Energy Filings website.

¹⁰⁹ Department of Energy and Environmental Protection Bureau of Energy and Technology Policy, *Customer-side Distributed Generation Incentives*, accessible at <http://www.dpuc.state.ct.us/DEEP/Energy.nsf/c6c6d525f7cdd1168525797d0047c5bf/1dbbc28dccb75ea88525799d006d13cc?OpenDocument>.

¹¹⁰ See Appendix J for Electric and Natural Gas Utility Companies, *2012 Electric and Natural Gas Conservation and Load Management Plan*.

The C&LM Plan covers residential programs; commercial and industrial programs; education and outreach; financing, load management, and research, development and demonstration; benefit cost analysis; IT initiatives; and an increased savings scenario or expanded plan. The C&LM Plan is important as a guide to reducing energy consumption; the programs that relate most closely to energy assurance goals are discussed below.

Before discussing the energy efficiency programs, it is important to note that all programs in the C&LM Plan must be cost-effective.¹¹¹ That is, the cost of energy-saving measures must be less than the actual savings produced by the measure.¹¹² See chapter 6 of the C&LM Plan, “Benefit Cost Analysis,” for more information.

Residential Programs

Residential Retail Products (Electric)

Objective

- Increase awareness and acceptance of ENERGY STAR® products among consumers, such as lighting, appliances, and electronics.

Target Market

- Residential customers purchasing new lighting, appliances, and electronics.

Program Description

- Continued offering of discounted lighting products in retail outlets; education about benefits of energy efficient products; and periodic promotions for energy-efficient appliances and electronics.

Residential New Construction (Electric and Natural Gas)

Objective

- Reduce energy use and peak demand in new housing; increase awareness of energy-efficient business practices among builders and consumers.

Target Market

- Any residentially metered single or multifamily unit (three stories or fewer) being built in Connecticut with a focus on four main areas—Building Code, Energy Star® Qualified Homes, Low Load Homes, and Outreach and Education.

Program Description

- Four energy efficiency tracks will be offered to program participants—ENERGY STAR® Certification Incentive, Home Energy Rating System Incentive, Residential New Construction Prescriptive Incentive, and Low Load Homes Incentive.

¹¹¹ C.G.S. § 16-245m(c)(3)

¹¹² C.G.S. § 16a-37x(a)(2) (“Cost effective” means the savings resulting from an energy-savings measure outweigh the costs of such measure, including, but not limited to, any financing costs, provided the payback period for any financing provided pursuant to this section is less than the functional life of the proposed energy-savings measure and the payback period does not exceed fifteen years.)

Home Energy Solutions (“HES”) (Electric and Natural Gas)

Objective

- Reduce total residential energy use through residential retrofitting of all existing residential structures; weatherize 80 percent of existing homes by 2030.

Target Market

- All residential customers with an emphasis on high-use customers to maximize cost-effective savings.

Program Description

- HES comprises Core Services, Add-On Measures, HVAC, Multi-Family Initiative, Consumer Financing, and Home Performance with ENERGY STAR®.
- *Core Services* include blower door guided air sealing, duct sealing, installation of CFL bulbs, domestic hot water measures, pipe insulation, and provision of education information.
- *Add-On Measures* include creation of a Home Energy Yardstick tool that provides payback and investment information to customers to assist with decision making regarding additional energy efficiency and conservation measures outside the scope of core services and low-interest financing for recommended energy efficient improvements.
- *The HVAC component* includes incentives to increase heating and air conditioning equipment efficiency and to improve system installation quality through HES’s Quality Installation Verification, Geothermal Verification of Installed Performance, and Ductless Heat Pump initiative.
- *The Multi-Family Initiative* captures measures and savings that are provided under various C&LM offerings but not clearly identified as Multi-Family projects.
- *Consumer Financing* provides attractive third-party consumer financing for energy improvement projects recommended and/or offered through HES.
- *Home Performance with ENERGY STAR®* encourages and enables customers to complete comprehensive and individualized energy efficient projects by analyzing and optimizing the cost and energy savings for each custom project.

Residential Water Heating Program (Electric and Natural Gas)

Objective

- Encourage customers to purchase and install high-efficiency natural gas water heaters or high-efficiency electric heat pump water heaters.

Target Market

- All residential customers.

Program Description

- \$100 rebate for installing a natural gas ENERGY STAR-qualified water heater or \$400 rebate for installing an ENERGY STAR-qualified electric heat pump water heater (subject to an inspection).

Commercial and Industrial Programs

Energy Conscious Blueprint (Electric and Natural Gas)

Objective

- Maximize electric and natural gas energy savings for “lost opportunity” projects when the opportunity arises (time of initial construction/major renovation, or when equipment needs to be replaced or added) by introducing energy efficiency concepts to all parties involved, demonstrating the benefits of energy efficient design, and working with the design community to prove more benefits are achievable by a holistic approach to energy efficient design.

Target Market

- Commercial and Industrial customers (including municipalities) of all sizes that are planning projects involving new construction/major renovation or replacement/addition of new equipment.¹¹³

Program Description

- Offers variety of services and incentives based on the proposed project’s complexity, energy savings potential, scope of work, and owner/design team’s desire to participate
- Services and incentives include technical and financial assistance from design through construction.

Energy Opportunities (Electric and Natural Gas)

Objective

- Encourage customers and contractors to save energy in existing commercial, industrial, and municipal facilities by offering incentives, financing and other resources to replace existing, inefficient equipment with energy-saving options.

Target Market

- Commercial, industrial, state, municipal, and institutional customers whose annual peak demand is 200 kW or greater and can benefit from retrofit projects.

Program Description

- Assists customers with measure identification, basic rebate programs for more common measures, complete incentive and financing solutions for comprehensive projects, Quality Assurance of energy savings calculations and analysis, and verification of installed equipment efficiency.

¹¹³ Owners/managers of multi-family residential buildings may participate in the program.

Small Business Energy Advantage (Electric)Objective

- Provide cost-effective, turnkey C&LM services for small business customers.

Target Market

- All commercial and industrial customers that meet eligibility criteria—electric customers must have a 12-month peak demand average of 200 kW or less and natural gas customers must be firm gas customers.

Program Description

- Provides direct or turnkey services including energy assessments and installation of measures, which usually entail no up-front customer costs to incentivize participation.

Business and Energy Sustainability ProgramObjective

- Help customers improve electrical and thermal efficiency of their building's infrastructure through operational improvements and adjustment of building controls; and provide customers with the knowledge and means to maintain equipment and system performance on an ongoing basis.

Target Market

- All commercial and industrial customers.

Program Description

- The program comprises five components—Retro-Commissioning; Process Re-engineering for Increased Manufacturing Efficiency (“PRIME”); Business Sustainability Challenge; Operations & Maintenance Services; and Training and Outreach.
- *Retro-Commissioning* finds low-cost/no cost, non-capital, energy-efficient measures that quickly and effectively result in energy savings.
- *PRIME* is addressed as its own program below.
- *The Business Sustainability Challenge* is a training and educational initiative that integrates sustainability into a customer's business practices and manages energy, carbon, waste, and water as valuable resources by helping customers create and implement a sustainability plan.
- *Operations and Management Services* offers incentives and analytical services for customers to improve operation and maintenance of their facilities to make them more energy efficient.
- *Training and Outreach* includes focused training to help customers improve their building energy management, operations, and maintenance and sustainability activities.

Process Re-engineering for Increased Manufacturing Efficiency (“PRIME”) (Electric)Objective

- Teach manufacturers how to implement “Lean Manufacturing” techniques to eliminate non-value-added activities and waste, reduce energy consumption per product and align production to meet actual demand.

Target Market

- Industrial customers that use traditional manufacturing techniques and are interested in fostering a “Lean” culture—best suited for customers with 500,000 kWh/year of electric usage or greater.

Program Description

- Offers eligible customers the opportunity to participate in up to four separate three-and-a-half day, team-based Kaizen events at their facility which teach fundamentals of lean manufacturing and facilitates implementation of changes to a process in order to eliminate waste and improve efficiency.^{114,115}

Education and Outreach**Clean Energy Communities Program (Electric)**Objective

- Utilize locally organized efforts to help advance the energy efficiency message and to raise awareness of and promote Energy Efficiency Fund programs.

Target Market

- Residential, business, and municipal energy consumers.

Program Description

- Organized grassroots effort to spread awareness of and interest in energy efficiency programs.

SmartLiving Center & Museum Partnerships (Electric)Objective

- Educate CT residents about the importance of energy efficiency through an educational center, exhibits and partnerships with museums.

Target Market

- CT residents, specifically architects, builders, designers, homeowners, homebuyers, educators, students, residential and business customers, trade allies, and not-for-profit organizations.

Program Description

- The EEF and EDCs have developed and will support partnership exhibits at museums and centers throughout the state. For details, refer to the C&LM Plan in the appendices.

eesmarts (Electric)

¹¹⁴ Kaizen means continuous improvement.

¹¹⁵ First two events are at no cost to customer, second two events require the customer to contribute 50% of cost

Objective

- Educate schoolchildren about energy efficiency and encourage them to incorporate energy-efficient practices into their daily lives.

Target Market

- K-12 Connecticut educators and schoolchildren.

Program Description

- Energy-efficiency and clean-learning initiative, including professional development workshops for educators; teachers guides and lesson materials; and outreach and partnerships.

C&LM Financing Programs

A number of financing programs are available to customers for costs not covered by the Energy Efficiency Fund's incentives. Loans are available for commercial/industrial customers and residential customers. For more information, see chapter five of the C&LM Plan.

IT Initiative

PURA directed CL&P to develop a comprehensive presentation of tracking data for all programs as part of its annual filings. Thus, each C&LM program's data is tracked through the C&LM IT Tracking and Reporting system. Chapter six of the C&LM Plan details all of the recent and planned changes to the tracking system.

Expanded Plan—Increased Savings Scenario

The State must take advantage of all cost-effective energy efficiency opportunities. Chapter eight of the C&LM Plan details how to achieve deeper and broader savings as compared to the base plan—including extensive budget tables, financial data, and projections. The C&LM Plan proposes that by ramping up existing budgets from \$105 million to \$201 million, the State can more than double its energy savings with respect to both electricity and natural gas. DEEP reviewed the C&LM Plan's proposed expanded budget. DEEP's determination process is described in the following section.

7. C&LM Expanded Budget Determination¹¹⁶

DEEP initiated an uncontested proceeding and invited public comments to review the base and expanded budgets. In February 2012, DEEP approved the C&LM Plan's base budget of \$105.6 million while reserving judgment on the expanded budget. In June 2012, DEEP filed its draft Proposed Determination to Approve 2012 C&LM Plan Expanded Budget on the BETP's Energy Filings website for public comment. DEEP issued its final determination on July 17, 2012.

DEEP's proposed determination for the expanded budget provides a total of \$158.4 million in funding, which includes the base budget of \$105.6 million. In drafting its determination, DEEP considers the following: how expanding the C&LM budget promotes the State's energy goals;

¹¹⁶ See Appendix K for Department of Energy & Environmental Protection, *Final Determination to Approve 2012 Conservation and Load Management Expanded Plan and Budget*.

cost-effectiveness; feasibility of ramp up; residential programs; commercial and industrial programs; revenue recovery mechanisms; customer equity; and cost allocation to customer classes.

DEEP's reasoning for expanding the C&LM Plan's budget is well-documented in its determination. The C&LM expanded plan is necessary to reach DEEP's goals articulated in the 2012 IRP. Greater conservation efforts will ensure the 2012 IRP's conclusions remain accurate — that is, energy prices will decrease as the use of high cost resources is diminished from reduced demand and new generation capacity will not be necessary for the next 10+ years as long as demand is managed. Also, maximizing energy efficiency programs will help the State reach its Lead by Example goals of reducing energy consumption in state owned or leased buildings 10 percent by January 1, 2013 and another 10 percent by January 1, 2018. In addition, the Expanded Budget is needed to achieve the State's goal to weatherize 80 percent of residential buildings by 2030.

The Expanded Budget Determination not only reviews C&LM programs, but recommends modifications of the programs to be implemented by the program administrators. DEEP also recommends three funding mechanisms to recover revenues necessary to support the Expanded Plan—subject to review by PURA. The recommendations are: a direct increase in the current \$0.003/kWh assessment; an authorization to allow EDCs to include energy efficiency in their rate base; and the implementation of a Conservation Adjustment Mechanism (“CAM”).

DEEP also uses the Expanded Budget Determination as an opportunity to shape the 2013 C&LM Plan. The 2013 Plan should address the following issues: Self-Directed Energy Efficiency Pilot; C & I Incentive Caps; Non-Distribution Alternatives; and Long-Term Goals.

8. Docket No. 12-02-01: PURA Review of the Connecticut Energy Efficiency Fund's Electric Conservation and Load Management Plan for 2012

PURA initiated a docket to review the 2012 C&LM Plan. The information filed in the docket includes: briefs/reply briefs; compliance filings; correspondence between parties; interrogatories; motions; notices; and decisions. The purpose of the docket is to allow all interested parties to submit and view related material organized in a central location.

9. ISO New England Demand Response Programs

Demand Response Programs are an effective tool for preventing a supply disruption during periods of high electricity demand, most often during the summer months, by helping to curtail demand and ensure a reliable electricity supply.

ISO-NE has established five Demand Response Programs available for implementation during periods of high demand for electricity when prices are highest. The five programs are: Real-Time 30-minute Demand Response; Real-Time Price Response; Day-Ahead Demand Response;

Real-Time 2-hour Demand Response; and Real-Time Profiled Response.¹¹⁷ These programs are administered by power marketers, competitive energy suppliers, utilities, and other wholesale market participants.

The Demand Response Programs offer incentives for commercial and industrial consumers to reduce electricity consumption during periods of high demand and to stimulate conservation. The purpose of the programs is to increase system reliability by reducing peak demand/consumption. Reducing demand alleviates strain on the electricity system, which reduces the risk of a supply shortage or congestion resulting in local delivery issues.

10. PURA Annual Report on Electric Distribution Company System Reliability¹¹⁸

Pursuant to C.G.S. § 16-245y(a), each EDC must report reliability data to PURA. Then, PURA must report the data for each electric and electric distribution company and for the State as a whole to the General Assembly. PURA initiated Docket No. 12-04-10: PURA 2012 Annual Report to the General Assembly on Electric Distribution Company System Reliability to facilitate composition of its report.

First, PURA's report discusses the implementation of C.G.S. § 16-255y(a) and provides a brief description of CL&P and UI. Next, the report provides reliability statistics for each utility — including System Average Interruption Duration Index, System Average Interruption Frequency Index, and Outage Causes.¹¹⁹ These statistics also include the storms that met PURA's major storm definition criteria over the past year and customer-hours or meter hours were interrupted. Additionally, the report provides statewide reliability indices.

PURA's reliability report contributes to the State's energy assurance efforts because it allows energy stakeholders to track whether reliability within the electric system is increasing, decreasing, or stagnant from year to year.

¹¹⁷ For more information on the specifics of these programs, visit ISO-NE's website: http://www.iso-ne.com/genrntion_resrcs/dr/index.html

¹¹⁸ See Appendix L for Public Utility Regulatory Authority, *2012 Annual Report to the General Assembly on Electric Distribution Company System Reliability*

¹¹⁹ Reliability statistics are presented both with and without the major storms incorporated.

C. Natural Gas Supply & Demand

Connecticut has no natural gas reserves, so the State's supply efforts are centered on keeping interstate and intrastate pipelines functioning properly. PURA requires LDCs to submit forecasts of demand and supply so the State can recognize supply issues in advance. The CES will provide an extensive overview of natural gas in Connecticut, but it is still under development.

The C&LM Plan addresses natural gas demand, which is discussed in the electricity supply and demand section of this chapter. Many programs apply to both resources (i.e., electricity and natural gas).

1. Docket No. 10-10-09: DPUC Review of the Connecticut Gas Utilities Forecasts of Demand and Supply 2011-2015

The State's gas utilities, YGS, CNG and SCG, each must submit a five-year demand and supply forecast report by October 1st of every even-numbered year pursuant to CGS § 16-32f. The gas utilities last submitted reports in 2010 to DPUC (now PURA) for the period 2011-15, and they are required to submit new reports by October 1st, 2012 for the period 2013-17. The reports are submitted to the designated docket in PURA's Web Filing System. The docket contains the reports, interrogatories with answers, motions, notice, and other correspondence. Further, the docket is accessible by the public, and PURA holds public hearings on the reports if requested by any person. In addition, PURA may request an updated report from the gas utilities by August 1st of the odd-numbered year.

In accordance with CGS § 16-32f, "[t]he report shall include: (1) A tabulation of estimated peak loads and resources for each year; (2) data on gas use and peak loads for the five preceding calendar years; (3) a list of present and projected gas supply sources; (4) specific measures to control load growth and promote conservation; and (5) such other information as the department may require by regulation."

PURA's (and formerly DPUC's) biennial review of the gas utilities' forecasts of demand and supply is one of the State's tools in ensuring adequate natural gas supply. Forecasting five years into the future should prevent an unexpected supply shortage or disruption — or allow the state to help mitigate an expected supply shortage. In addition, the filing requirement makes certain gas utilities are planning ahead and that the public can access the information if they desire.

2. Comprehensive Energy Strategy

The CES includes extensive measures regarding natural gas supply. The final version has not yet been released. Once finalized, more information will be available.

D. Petroleum Supply & Demand

The State relies on market forces to ensure petroleum supply remains adequate. There are not any supply-side measures currently underway within the State with respect to petroleum. In fact, any supply-side measures are focused on ensuring adequate supply of electricity, natural gas, and renewables because those resources fit in with the State's push towards cheaper, cleaner, and more reliable energy.

One traditional petroleum demand management measure in effect in the State is the 80% weatherization goal by 2030, which stretches across all resources. In addition, recent legislation will expand the reach of efficiency programs by removing a funding cap to ensure home heating oil customers, who represent nearly half the homes in the State, can participate.¹²⁰ There are other initiatives in currently under development to curb petroleum demand such as, plug-in electric vehicles, natural gas expansion, and geothermal technology.

¹²⁰ Office of the Governor, Press Release, *GOV. MALLOY: CONNECTICUT CAN LEAD THE NATION IN ENERGY EFFICIENCY*, June 14, 2012.

E. Role of Emerging Technologies in Enhancing Reliability

1. Renewables

Connecticut is very engaged in procuring new renewable energy resources. PA 11-80 has helped to facilitate a push towards a more robust selection of renewable energy sources. Increasing the presence of renewable sources will provide enhanced reliability in a couple of ways. First, decentralized electricity generation will decrease the likelihood of a wide-scale power outage because the current grid is heavily centralized, so one disturbance can affect many people. Second, most renewable generation sources depend on naturally occurring mechanisms, such as sunlight, wind, or waves, unlike traditional energy sources that depend on access to coal, natural gas, or petroleum products. Below are some of the policies in place to promote renewable generation in Connecticut. For a more in-depth analysis of the State's renewable energy capabilities, see the 2012 IRP Appendix D: Renewable Energy, which is attached in the appendix to the EAP.

Renewable Portfolio Standards (“RPS”) Goals. Connecticut has established high RPS goals for the year 2020. By 2020, electricity providers must obtain at least 20 percent of their retail load from Class I renewable energy sources. Class I renewable energy sources are derived from solar power, wind power, a fuel cell, methane gas from landfills, ocean thermal power, wave or tidal power, low emission advanced renewable energy conversion technologies, a run-of-the-river hydropower facility meeting certain requirements, or a sustainable biomass facility meeting certain requirements.¹²¹

Project 150. Project 150 is an initiative aimed to increase the State's renewable energy supply by 150 MW of installed capacity. PURA approved 14 projects totaling 159.89 MW, but only 4 projects totaling about 47 MW are financed and moving forward.¹²² Any contracts for Project 150 not effectuated by the approved date may be rescinded.¹²³

Clean Energy Finance and Investment Authority. CEFIA was created by PA 11-80 to promote investment in clean energy sources; to foster the growth, development, and commercialization of clean energy sources; and to stimulate demand for clean energy sources.

Residential Solar Program. The program is required by § 106 of PA 11-80. CEFIA was charged with developing a solar incentive program to support at least 30 MW of new residential solar capacity by December 31, 2022.

“ZREC” Program. The utilities are required by § 107 of PA 11-80 to enter into 15-year contracts for Renewable Energy Certificates from “zero-emission” Class I renewable energy sources.

¹²¹ C.G.S. § 16-1(a)(26)

¹²² Department of Energy & Environmental Protection, 2012 *Integrated Resource Plan*, at D-3.

¹²³ Conn. Public Act No. 11-80 § 91(j)(2) (2011) (“The Public Utilities Regulatory Authority shall not issue any order that results in the extension of any in-service date or contractual arrangement made as a part of Project 100 or Project 150 beyond the termination date previously approved by the authority established by the contract, provided any party to such contract may provide a notice of termination in accordance with the terms of, and to the extent permitted under, its contract.”)

“LREC” Program. The utilities are required by § 110 of PA 11-80 to enter into 15-year contracts for Renewable Energy Certificates from “low-emission” Class I renewable energy sources.

30 MW Class I Renewable Program. § 127 of PA 11-80 solicits developers and utilities to submit proposals for up to an aggregate of 30 MW of new Class I renewable energy sources. Two 5 MW solar energy projects have already been selected for long-term purchase power agreements.

Commercial Property Assessed Clean Energy Program (“C-PACE”). CEFIA will administer the program, which allows commercial and industrial property owners to pay for energy-related improvements to their properties using a special finance program. Building owners repay the cost of their upgrades through an assessment on property taxes. The repayment obligation transfer automatically to the next owner if the property is sold. C-PACE will drive investment in clean energy technologies by lowering the cost of capital for such projects.

Docket No. 11-09-03: Annual Review of Connecticut Electric Suppliers’ and Electric Distribution Companies’ Compliance with Connecticut’s Renewable Energy Portfolio Standards in the Year 2010. PURA reviews the RPS compliance of electricity providers annually. All motions, compliance filings, and correspondence are accessible by the public in PURA’s Web Filing System. Each RPS Compliance report contains data on: retail load for each quarter; Class I & II RECs; Class I & II fuel sources, and Alternative Compliance Payments.

2. Energy Efficiency

Decreasing the State’s energy consumption is one very effective way to enhance reliability. The less stress energy users put on the supply system, the lower the risk of damage from operating at peak capacity. Also, when less energy is consumed, electricity providers can use more reliable generation first and avoid calling upon less reliable energy sources. Further, traditional energy sources are finite resources, so conservation is the only way to ensure we can rely on such resources until renewable technology can meet demand.

Many of the programs aimed at achieving all cost-effective energy efficiency are covered by the C&LM Plan, so, they are not repeated here. One important effort DEEP implemented to enhance energy efficiency among state agencies is Lead By Example. In addition, the deployment of smart systems and advance metering infrastructure will allow electric customers to maximize efficiencies at home and in their businesses.

Lead By Example (“LBE”).¹²⁴ DEEP developed its LBE program to reduce energy use in Connecticut’s State and local government buildings and operations. The goal is to reduce energy use in State buildings by 10 percent by 2013 and an additional 10 percent by 2018. LBE is just one part of the Governor’s goal of making Connecticut the most energy efficient state in the nation. The LBE team meets regularly to review all applications for funding and to approve the best projects. Twenty four energy efficiency projects have been approved as of Spring 2012.

¹²⁴ See Appendix M for Department of Energy & Environmental Protection and Department of Administrative Services, *Lead By Example Legislative Report July 2012*.

One major effort tied to the LBE program is the new energy monitoring system that will allow facilities managers at up to 100 state buildings to identify and address inefficiencies in energy use associated with buildings operations, such as lights left on overnight or inefficient temperature settings.¹²⁵ Better information will help manage the State's energy resources more efficiently.

Smart Systems & Advance Metering Infrastructure (“AMI”). UI has implemented the use of smart systems and AMI to better manage their electricity distribution system. AMI also provides customers with detailed information on electricity usage.

UI can use its advanced data to better manage loads and resources to meet demand throughout the day. The AMI technology allows UI to prevent an energy supply disruption by diverting electricity when a system component is at or near peak operating capacity. Also, the extensive consumption data can help power generators plan for peak usage times.

UI's customers can easily access their energy consumption data via UI's website. Customers can discover what days or even times of day they use the most energy and change their behavior accordingly. Certain eligible UI customers have already switched over to time-of-day rates to encourage usage during off-peak hours. The access to such detailed information will allow consumers to alter their behavior so they use less power during peak hours. Reducing peak demand will allow generators to avoid using less reliable sources. In addition, UI is currently engaged in a pilot program where even more usage data can be collected by installing advanced outlets that allow the monitoring of individual appliances to pinpoint inefficiencies.

C&LP is currently engaged in refining its AMI implementation strategy. DEEP is currently developing recommendations on AMI deployment as part of the CES.

3. Distributed Generation & Microgrids

Distributed generation and microgrids will help enhance the reliability of the electricity system by increasing decentralization of the grid. Distributed generation may be powered by renewable sources, but it will likely be powered by natural gas because renewables cannot yet be depended on to supply power continuously. Electricity reliability will increase because the electricity will be generated for use on-site — eliminating the risk inherent in overhead transmission and distribution lines. Natural gas pipelines will deliver gas to each distributed generation facility, which will then generate electricity.

Instead of a handful of power plants supplying electricity to the entire region, many sites throughout the State could generate their own electricity. In fact, distributed generation systems would potentially increase supply by selling power back to the grid. Further, new distributed generation facilities could help facilitate the transition to microgrids. Microgrids can significantly increase the reliability of their coverage areas by islanding the generation and loads of each respective microgrid for continued operation during a power outage. DEEP is currently developing a Microgrid programs and expects to initiate a stakeholder process in September of 2012.

¹²⁵ Department of Energy and Environmental Protection, *Energy Monitoring System to Reduce Energy Use at State Buildings*, <http://www.ct.gov/deep/cwp/view.asp?Q=502116&A=4174> (April 5, 2012).

V. ENHANCING ENERGY EMERGENCY PREPAREDNESS AND RESPONSE

In addition to the State's commitment to improving the reliability of its energy supply system, discussed in the preceding chapter, Connecticut is dedicated to continually improving its energy emergency management capabilities in the event an energy supply disruption cannot be prevented. *Public Act No. 12-148 An Act Enhancing Emergency Preparedness and Response* ("PA 12-148") is one of the driving forces behind the State's push to improve resiliency of the energy supply system by focusing on increasing the speed of restoration and mitigating the negative effects of a supply disruption. There are also several recent investigations, studies, and efforts aimed at refining the State's emergency preparedness and response. PA 12-148 and other activities the State has engaged in since the Two Storms of 2011 and the start of Connecticut's Emergency Planning and Preparedness Initiative ("EPPI") are addressed below, followed by a review of the State's cyber security efforts.

A. Public Act 12-148, *An Act Enhancing Emergency Preparedness and Response*¹²⁶

PA 12-148 is the main legislative action borne out of the EPPI. The relevant sections of PA 12-148 are summarized below. Some sections modified existing statutes pertaining to emergency preparedness and response; other sections created new statutes. The last bullet point for each section of the act explains why that particular section is important to energy assurance.

Section 1—Inclusion of Public Service Companies in Civil Preparedness

- Modifies subsection (b) of C.G.S. § 28-5.¹²⁷
- All public service companies are now included with all state and local government agencies and all civil preparedness forces with respect to carrying out the duties and functions assigned by the state's plan and program for civil preparedness.¹²⁸
- This change will improve emergency planning because it mandates the participation of all public services companies in the civil preparedness plan/program — coordination between government agencies and public service companies is critical for an effective and holistic response.

¹²⁶ See Appendix N for Public Act No. 12-148, *An Act Enhancing Emergency Preparedness and Response*.

¹²⁷ Titled "Preparation for civil preparedness. Subpoenas. Comprehensive plan and program for civil preparedness. Training programs. Cooperation by other state agencies. Orders and regulations"

¹²⁸ As defined in C.G.S. § 16-1 (a) (4) "Public service company" includes electric, electric distribution, gas, telephone, telegraph, pipeline, sewage, water and community antenna television companies and holders of a certificate of cable franchise authority, owning, leasing, maintaining, operating, managing or controlling plants or parts of plants or equipment, and all express companies having special privileges on railroads within this state, but shall not include telegraph company functions concerning intrastate money order service, towns, cities, boroughs, any municipal corporation or department thereof, whether separately incorporated or not, a private power producer, as defined in section 16-243b, or an exempt wholesale generator, as defined in 15 USC 79z-5a

Section 2—Participation in Planning, Training, and Exercises

- Modifies subsection (e) of C.G.S. § 28-5.
- Specifies several activities—that is, planning, training, and exercises—that heads of departments, offices and agencies of the state must participate in as directed by the commissioner of DESPP.
- Participation in planning, training, and exercises is absolutely necessary to continually improve emergency preparedness.

Section 3—Restoration Performance Standards

- Requires PURA to initiate a docket “to establish industry-specific standards for acceptable performance by each utility in an emergency to protect public health and safety, to ensure the reliability of such utility's services to prevent and minimize the number of service outages or disruptions and to reduce the duration of such outages and disruptions, to facilitate restoration of such services after such outages or disruptions, and to identify the most cost-effective level of tree trimming and system hardening, including undergrounding, necessary to achieve the maximum reliability of the system and to minimize service outages.”¹²⁹
- PURA shall review:
 - Each utility’s current service restoration practices after an emergency;
 - Adequacy of each utility’s infrastructure, facilities and equipment;
 - Coordination efforts between each EDC and any telecommunications company including emergency planning;
 - Tree trimming/vegetation management policies and data of each EDC; and
 - Any other policy, practice or information that PURA determines is relevant to system reliability and emergency management.
- PURA shall establish emergency¹³⁰ performance standards for utility companies including, but not limited to:
 - Minimum staffing and equipment levels;
 - Targets for recovery and restoration of service for service outages affecting more than 10, 30, 50, and 70 percent of a utility’s customers;
 - Communication plan between each utility and its customers including communication outside of normal business hours;
 - Safety standards for utility employees, mutual aid crews and private contractors;
 - Filing mutual aid agreements by utilities and assessing their ability to rely on mutual storm restoration assistance from other regional utilities;
 - Communication and coordination protocols defining interactions between each utility and the appropriate EOC official;

¹²⁹ Conn. Public Act 12-148 § 3(b) (2012).

¹³⁰ Conn. Public Act 12-148 § 3(d) (2012). (Performance standards apply in an emergency in which more than 10 percent of any utility’s customers are without service for more than 48 consecutive hours.)

- Tree management by each EDC to reduce services outages caused by trees and limbs;
 - Communication and coordination between each utility and the public including notification of service restoration estimates and any dangerous conditions using the emergency notification system and in consultation with DESPP;
 - Timely notification by each utility to any relevant state or municipal agency /official regarding any emergency; and standards for such communication;
 - Communication and coordination between any appropriate electric, gas, and telecom companies;
 - Operation of the call center of each utility; and
 - Any other performance standards that are intended to ensure the reliability of a utility's services in any emergency, to prevent and minimize any extended service outages or disruptions, and to facilitate restoration of services after outages or disruptions.
- As a result, PURA initiated Docket No. 12-06-09: PURA Establishment of Industry Performance Standards for Electric and Gas Companies and Docket No. 12-06-11: PURA Review of Connecticut Public Service Company Plans for Restoration of Service that is Interrupted as a Result of an Emergency.
 - Annually, each utility shall provide PURA with an emergency response report regarding each utility's ability to meet the performance standards established by PURA; PURA may require a supplemental emergency response report after any storm, emergency or event causing significant service outages.
 - Emergency management needs to be a unified effort with clear standards and all stakeholders working towards one goal.

Section 4—Restoration Performance Review

- Requires PURA to review the performance of each EDC and LDC after an emergency that results in 10 percent or more of a utility's customers to be without service for more than 48 hours or at PURA's discretion.
- If a utility failed to comply with performance standards, PURA may make orders to enforce such standards and may levy civil penalties up to 2.5 percent of the company's annual distribution revenue.
- Public utilities should be held accountable by the State on behalf of Connecticut consumers to ensure the emergency preparedness and response of the utilities is acceptable.

Section 5—Telecommunication Company Restoration Standards

- Requires PURA to initiate a docket to establish standards for restoration of intrastate telecommunications service by any telecommunications company after any emergency that affects more than 10 percent of a company's, provider's or holder's access lines for more than 48 hours.
- As a result, PURA initiated Docket No. 12-06-10: PURA Establishment of Industry Performance Standards for Telecommunications Companies.
- Communications are a critical aspect of emergency management; without a resilient communication system, energy emergency response will be hindered.

Section 6—Telecommunication Company Restoration Plan Requirements

- Modifies CGS § 16-32e "Emergency plans to be filed by public service companies, telecommunications companies and municipal utilities. Hearings. Revisions."
- Adds voice over Internet protocol (VoIP) service providers to list of companies affected by the statute.
- Elaborates on what is to be included in each companies plan for restoring service that is interrupted as a result of an emergency, specifically, measures for (1) communication and coordination with parties involved in emergency management; (2) participation in training exercises; and (3) response for service outages affecting more than 10, 30, 50, and 70 percent of customers.
- Requires telecom companies with more than 25k subscribers to provide a representative at an EOC at the discretion of the DESPP Commissioner.
- Telecommunication companies, as well as all public service companies, are essential to emergency management and must be included in emergency planning.

Section 7—Microgrid Pilot Program

- Requires DEEP to establish a microgrid grant and loan pilot program to support local distributed energy generation for critical facilities and develop and issue a request for proposals from any entities seeking to develop microgrid DG or repurpose existing DG for use with microgrids.
- The program funding limit is \$15 million.
- Recipients must submit report every year for 5 years to PURA, DEEP, OCC, and related joint standing committees of the General Assembly.
- DEEP must file a report to identify other funding sources necessary to expand the microgrid program.
- Requires DEEP and CASE to study methods of providing reliable electric service to critical facilities including microgrids, undergrounding, and portable turbine generation.
- Microgrids will ensure affected areas are not completely without critical facilities and electricity.

Section 8—Feasibility of Backup Power for Telecommunication Towers and Antennae

- Requires each provider of mobile radio service to submit report to CSC and DESPP regarding its ability to provide backup power during electric service outage for any telecom tower or antenna owned/leased/operated by such provider and plans concerning such backup power.
- CSC, DEEP, DESPP, PURA shall study the feasibility of requiring backup power.
- Communication is absolutely essential to emergency management—backup power to telecom towers and antennae will ensure communication channels remain operational.

Section 9—Office of Consumer Counsel’s Role Clarification

- Modifies subsection (a) of CGS § 16-2a “Office of Consumer Counsel.”
- Elaborates on what matters that affect Connecticut consumers’ interests OCC must advocate for with respect to public service companies, which include, but are not limited to:
 - Rates and related issues;
 - Ratepayer-funded programs; and
 - Matters concerning the reliability, maintenance, operations, infrastructure and quality of service of such companies.
- Clearly defined roles are important to effective emergency management, and reliability issues are critical to emergency preparedness.

Section 10—Opportunities for Undergrounding

- Requires DOT to notify PURA of any pending project involving any state or other public highway that is greater than five miles long or located in a commercial area. If PURA determines such project may provide an opportunity for any public service company to install/replace/upgrade/bury any lines/wires/cables, PURA will notify the company of the project.
- Infrastructure improvements might mitigate the effects of an energy emergency and are an important part of emergency preparedness; cost-effective opportunities must be taken advantage of.

Section 11—Road-Clearing Plan

- Requires DEEP, public service companies, DOT, DESPP and an association of municipalities to develop procedures to expedite process of road-clearing for public safety personnel after an emergency.
- Effective emergency response depends on the ability of responders to reach affected areas, as such, the state must prepare a plan to ensure emergency responders have access to necessary areas during an emergency.

B. Connecticut's Emergency Planning and Preparedness Initiative

After the October Nor'easter of 2011, the State retained Witt Associates to assess the preparedness, response, and restoration efforts for the October snowstorm, and the Two Storm Panel was created to review the preparedness, response, and recovery efforts for both storms. In addition, the State Emergency Management Director from DESPP/DEMHS released the Proposed Process for Enhancement of State Preparedness Planning ("Action Plan").¹³¹ Following the release of the Witt Associates report, the Two Storm Panel report and the Action Plan, the Governor announced the EPPI that includes both legislative proposals and changes to administrative procedures.¹³² The Action Plan identifies three goals for the EPPI:

- 1) To enhance the existing State Response Framework and local plans to create more comprehensive planning to identify in detail multi-agency, multi-jurisdictional response and coordination actions, roles and responsibilities;
- 2) To increase the quality of communications between local and state governments and utilities during emergencies; and
- 3) To increase utilities' interface with Connecticut emergency management systems.

To achieve these goals, the EPPI is concentrated on improving operation with respect to performance; management and communication; preparedness and training; and infrastructure strengthening. The activities that have been completed and those that are still ongoing are highlighted below.

*Connecticut October 2011 Snowstorm Power Restoration Report by Witt Associates*¹³³

Purpose

- Discover what aspects of emergency management and power restoration may be improved upon.

Description

- Assessed emergency management efforts of both CL&P and UI with focus on CL&P service territory.¹³⁴
- The report presents key findings and recommendations for improving electricity outage restoration response.

Result

- The key findings show that CL&P has many opportunities to improve their emergency management—mainly through enhanced preparedness and communication.
- The report includes 27 recommendations pertaining to planning for large-scale events, information management, and coordinating with state and local governments.

¹³¹ See Appendix O for Division of Emergency Management & Homeland Security, *Proposed Process for Enhancement of State Preparedness Planning*.

¹³² See Appendix P for Governor Malloy Press Release, *Gov. Malloy Announces Storm Disaster Preparedness & Recovery Initiatives*.

¹³³ See Appendix Q for Witt Associates, *Connecticut October 2011 Snowstorm Power Restoration Report*.

¹³⁴ UI restored all customers within 5 days and CL&P restored all customers within 11 days, but it is important to note UI serves fewer customers and a smaller proportion of customers were without power after the storm. Nevertheless, the report focuses on CL&P.

Docket No. 11-09-09: PURA Investigation of Public Service Companies' Response to 2011 Storms ("Storm Docket")¹³⁵

Purpose

- PURA initiated the Storm Docket to investigate the preparedness, response, and communications of CL&P and UI after Tropical Storm Irene and the October Nor'easter.¹³⁶

Description

- Filings include briefs, reply briefs, compliance filings, correspondence (incl. customer comments), interim and draft decisions, interrogatories, late file exhibits, motions, notices, and prefiled testimony.

Result

- The Storm Docket helped shape the EPPI's package of initiatives and legislation.
- PURA produced a decision regarding the Storm Docket that will affect all public service companies' future storm response and the EDCs' ability to recover 2011 storm-related costs in their next rate request.

Two Storm Panel Report¹³⁷

Purpose

- The Two Storm Panel was formed to evaluate emergency management within the state in both preparation and recovery from the Two Storms, identify areas for improvement, and make future emergency management recommendations.¹³⁸

Description

- The report addresses: state response to the two storms; impact of climate change; utility issues; communications and information sharing; municipal issues; geographical information systems; health care and community provider issues; and general state issues.

Result

- The recommendations have a few common themes—the quality of communications between all involved in emergency management must increase, performance standards and accountability of the utilities is needed, infrastructure must be better protected, and DESPP/DEMHS has opportunities for improvement.
- Many of the recommendations from the report have materialized in the form of legislation (specifically, PA 12-148, among others), administrative changes, and other efforts.

¹³⁵ See Appendix R for Public Utility Regulatory Authority, *Investigation of Public Service Companies' Response to 2011 Storms Decision*.

¹³⁶ Initially, the docket was created to investigate emergency management related to Tropical Storm Irene, but it was revised to include the October Nor'easter.

¹³⁷ See Appendix S for Two Storm Panel, *Report of Two Storm Panel*.

¹³⁸ Originally named S.T.O.R.M. to investigate Tropical Storm Irene, but renamed Two Storm Panel after the October Nor'easter

DESPP/DEMHS Action PlanPurpose

- DESPP/DEMHS created the Action Plan to enhance state emergency preparedness and planning at the Governor’s direction, which was captured by the DESPP/DEMHS State Emergency Management Director’s memo, “Proposed Process for Enhancement of State Preparedness Planning.”

Description

- Analyzed the aspects of emergency preparedness and planning that presented opportunities for improvement.

Result

- Created the Energy and Utilities Work Group to create the State Emergency Support Function 12 as an annex to the SRF to address emergency management roles and responsibilities during widespread utility outages, and an ESF 12 template for Local Emergency Operations Plans.¹³⁹
- Created the Technology Work Group to improve the Web EOC, use of GIS in emergency management, and the state Emergency Notification System.

CT Geospatial Information Systems Council-Storm Response and Recovery Assessment Group (“Assessment Group”) Report¹⁴⁰Purpose

- Identify what GIS strategies were used or not used during the Two Storm response efforts, barriers encountered, best practices, and recommendations.

Description

- Assessment Group reviewed how GIS was used for pre-storm, storm, and post-storm response and recovery efforts at the local, regional, utility, state, and federal levels.
- Organized report into three main sections—Findings, Recommendations, and Best Practices.
- Assessment Group made twenty recommendations to consider in the short-, mid-, and long-term.

Result

- Key takeaway is that improving GIS requires broad support from the GIS community and information sharing is essential to the success of the technology.
- GIS is important to emergency management because of its usefulness with respect to monitoring and disseminating information during an emergency.

¹³⁹ Many work groups were created, but the EAP discusses only two

¹⁴⁰ See Appendix T for Connecticut Geospatial Information Systems Council, *Storm Response and Recovery Assessment Group Findings Report*.

Statewide Emergency Preparedness Exercise (“Exercise”)Purpose

- Improve communications for road clearing and utility restoration; activating local emergency operations centers; and establishing coordinated emergency shelters.

Description

- Four-day statewide emergency and preparedness drill designed to simulate a Category 3 hurricane.
- Segmented into two, two-day drills to allow for maximum participation from municipalities.¹⁴¹

Result

- Tested new preparedness structures, policies, and protocols among the over 165 participating municipalities.
- Drilled five multi-jurisdictional shelters for the first time and activated local EOCs and Unified Commands.

Interstate Exercise—Amber BorealisPurpose

- Provide participants with an opportunity to discuss energy emergency response and assess features of the existing energy emergency response framework, plans, and policies in the State.

Description

- Simulated three scenarios--a hurricane, a solar storm, and a truckers’ strike—to test multi-state energy emergency response.

Result

- Motivated creation of the SESF-12 and identified potential enhancements for the State’s energy emergency response, such as clarifying the roles and responsibilities of state agencies and involving the energy industry in State energy plans.

¹⁴¹ One drill occurred over the weekend to allow for municipalities with volunteer emergency responders to participate, and the other occurred during the week for municipalities with paid emergency responders to participate.

C. Cyber Security

The complexity of the energy supply system requires sophisticated cyber infrastructure to operate reliably and efficiently. The use of emerging technologies is expanding, which enhances our energy supply system in many ways, but also increases the magnitude of a cyber disruption's effects resulting from both unintentional technology failures and intentional attacks on energy infrastructure. Also, the ever-increasing use of complex technology creates more vulnerabilities and threats to protect against.

Much of the focus of cyber security is on the electricity system. On the federal level, NERC, the electric reliability organization certified by FERC, has created standards and guidelines concerning to cyber infrastructure that the EDCs must comply with. On the regional level, NPCC develops regional reliability standards, including cyber security standards, and provides compliance assessment and enforcement of both NERC and regional reliability standards.

NERC has strict standards regarding cyber security:

NERC Standards CIP-002-3 through CIP-009-3 provide a cyber security framework for the identification and protection of Critical Cyber Assets to support reliable operation of the Bulk Electric System.

These standards recognize the differing roles of each entity in the operation of the Bulk Electric System, the criticality and vulnerability of the assets needed to manage Bulk Electric System reliability, and the risks to which they are exposed.

Business and operational demands for managing and maintaining a reliable Bulk Electric System increasingly rely on Cyber Assets supporting critical reliability functions and processes to communicate with each other, across functions and organizations, for services and data. This results in increased risks to these Cyber Assets.¹⁴²

With respect to natural gas, trade organizations offer guidance regarding cyber security to LDCs. For example, the AGA produced its Report No. 12 "Cryptographic Protection of SCADA Communications" to aid natural gas companies in protecting against cyber threats.

In addition to industry-specific cyber security measures, several groups help to enhance cyber security generally. The Information Systems Security Association, a global not-for-profit organization of IT security professionals, and InfraGard, an information sharing and analysis effort between the FBI and private sector, both have chapters in Connecticut to help protect our cyber systems and infrastructure.

Although much of the cyber infrastructure protection is left to the owners and operators of such infrastructure, Connecticut must continue to participate in the cyber security effort. The State is taking measures both to prevent a cyber attack and to respond effectively should an attack occur.

¹⁴² NERC, *Standards: Reliability Standards*, <http://www.nerc.com/page.php?cid=2|20> (December 16, 2009)

For example, DESPP/DEMHS is in the process of refining its cyber disruption response team. Further, PURA has examined the cyber security policies of the public service companies serving Connecticut, which are discussed below.

1. Docket No. 10-11-08: DPUC Determination of a Public Service Company-Specific Cyber Security Policy

In 2010, PURA initiated a docket regarding the cyber security policies of public service companies. The cyber security docket on PURA's Web Filing System is one of the State's latest efforts to ensure the protection of cyber assets. The purpose of the docket is to query public services companies' cyber security policies to see what enhancements can be made and how PURA and the State can contribute to more robust cyber security.

The cyber security docket comprises compliance filings, correspondences, motions, notices, and interrogatories. The interrogatories are the primary method used by PURA to discover opportunities for enhancing cyber security, with 65 total queries directed at the public service companies. The interrogatories evoke a broad range of responses regarding all aspects of cyber security, such as, a company's cyber security practices, system vulnerabilities, the role of "smart meters," and how the state can assist in augmenting cyber security. The responses to a number of the interrogatories are accessible through PURA's Web Filing System; however, due to the sensitive nature of cyber security policy, many of the responses to the interrogatories are either protected filings or not filed, but only available to PURA during an on-site visit.

The EDCs and LDCs appear confident that between the efforts of various organizations involved in cyber security and their own internal cyber security efforts, they are adequately prepared with respect to cyber security.^{143,144,145,146} In responses to interrogatories, CL&P/YGS had no recommendations regarding how PURA could assist them with cyber security, nor did they see a benefit in PURA organizing a cyber utility working group. With respect to the same issues, UI/SCG/CNG only suggested that PURA facilitate a semi-annual meeting between PURA staff, other utilities, and themselves to discuss best practices and longer term evolving threats/concerns.

Overall, PURA is carefully examining the cyber security needs of the State's energy industry to determine the best approach to energy assurance with respect to critical cyber systems. It will be important for the State to monitor the outcome of this process and identify necessary next steps

¹⁴³ CL&P and YGS submitted joint filings for the cyber security docket.

¹⁴⁴ UI, SCG, and CNG submitted joint filings for the cyber security docket.

¹⁴⁵ See generally CL&P/YGS and UI/SCG/CNG Responses to Interrogatories accessible in Docket No. 10-11-08 of PURA's Web Filing System

[http://www.dpuc.state.ct.us/DOCKCURR.NSF/\\$FormDocketGasView?OpenForm&Start=1&Count=1000&Expand=3.1.1&Seq=47&scrollTop=0](http://www.dpuc.state.ct.us/DOCKCURR.NSF/$FormDocketGasView?OpenForm&Start=1&Count=1000&Expand=3.1.1&Seq=47&scrollTop=0)

¹⁴⁶ Various organizations referenced in the interrogatories include: Edison Electric Institute, Utilities Telecom Council, Electric Power Research Institute, Electricity Sector-Information Sharing and Analysis Center, among those previously mentioned (ISSA, US-CERT, InfraGard, NERC, NPCC, and AGA).

D. Role of Emerging Technologies in Enhancing Resiliency

1. Renewables

Although renewable energy technology has great potential to mitigate the effects of an energy supply disruption, the use of renewables has yet to make a significant impact on improving emergency response. While small-scale solar installations in residential and commercial settings certainly help people deal with a power outage, they have yet to be deployed on-demand as a response measure. Likewise, wind power is not easily mobilized for use in an emergency setting. Therefore, renewable technology is not yet ready to be used as a full-fledged response mechanism. With respect to energy assurance, renewables best help prevent an energy supply disruption by allowing the State to decentralize its generation resources.

However, there are some opportunities for renewable technology to enhance resiliency. For example, solar-powered devices, like flashlights, can provide emergency responders with the tools they need to respond effectively when they have no access to the electric grid.

2. Smart Systems & Advance Metering Infrastructure

Smart Systems and AMI can be very useful with respect to their restoration efforts. Currently, only UI has implemented its AMI. CL&P is refining its plan for implementation of AMI, and DEEP is developing policy recommendations as part of the CES.

UI has the ability to collect very detailed data about the electricity consumption of their customers. With this data, UI can respond to areas with highest priority during an outage. Further, UI can ‘ping’ individual customers to see if they are without power. As a result, UI can conduct its restoration efforts with maximum information and optimal planning. Restoration crews will be able to respond to power outages in the most efficient way possible, allowing for a faster return to normal conditions.

3. Distributed Generation & Microgrids

Connecticut’s Microgrid initiative will enhance emergency response if implemented successfully. During an energy supply disruption, microgrids can separate its generation and loads from the main distribution system, which is known as islanding. In effect, the microgrid can act as its own subsystem because it will have its own distributed generation. Thus, the microgrid provides a much higher level of reliability.

Microgrids will be designed to include critical facilities and infrastructure. The State’s goal is to eventually build microgrids in many town centers in the State.¹⁴⁷ Ensuring the State’s residents access to food, electricity, and fuel through the use of microgrids will allow emergency responders to focus their efforts elsewhere. If the basic needs of people are met (e.g., food, water, heat, and electricity to charge devices), the community might be more patient and cooperative in an energy emergency.

¹⁴⁷ See Conn. Public Act No. 12-148 § 7 (2012).

Not only will microgrids help the average person deal with a power outage, they will contribute greatly to the speed with which emergency personnel can respond. Microgrids will ensure local EOCs will be functional. Also, emergency responders will be able to charge their own electronic devices used in their response efforts and access gasoline that would otherwise be unavailable with no electricity to power the pumps. The development of microgrids – through DEEP’s pilot program -- will enhance the resiliency of our energy system.

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VI. MONITORING DATA AND ANALYSIS

Monitoring data and the corresponding analysis are essential to emergency preparedness activities. Various government agencies and private sector companies are responsible for monitoring and analyzing vast amounts of data related to the energy industry on a day-to-day basis. There is not one centralized location for data monitoring because various organizations and industries monitor data in various ways. The chapter on Responding to Energy Supply Disruptions addresses how the relevant data is centralized within the EOC and WebEOC once a potential or actual energy supply disruption is recognized. This chapter identifies what information is important to detecting a potential or actual energy supply disruption and who is monitoring/analyzing it.

A. Electricity

EIA, EDCs, ISO-NE, and PURA conduct much of the electricity-related monitoring.

Price. ISO-NE “monitors the wholesale electricity markets, identifies ineffective market rules and tariff provisions, identifies potential anticompetitive behavior by market participants, and provides comprehensive market analysis critical for informed policy decision-making.”¹⁴⁸

Supply. EIA monitors the levels of fuel inventories available for generation. ISO-NE monitors power system conditions and power capacity information continuously to ensure there is an ample supply of electricity to meet expected demand.

Demand. EIA, ISO-NE, and the EDCs all monitor electricity demand to ensure supply will be adequate or if demand response programs should be implemented.

Infrastructure. ISO-NE and the EDCs are responsible for monitoring vulnerabilities that could impact system adequacy or reliability of electricity infrastructure.

Weather. Weather monitoring and analysis is conducted by the National Weather Service and National Oceanic and Atmospheric Administration. This includes cooling and heating degree day data. The data may be used to describe extreme weather conditions that create peak loads on the electrical generation system.

Other. EIA monitors extensive amounts of data on electricity. For example, monthly sales of electricity are published by state, month, and sector in the *Electric Power Monthly*. EIA also monitors electricity production by fuel source—the quantity of fuel used; kilowatt-hour produced; and fuel costs by state.

¹⁴⁸ ISO New England, *Market Monitoring & Mitigation*, <http://www.iso-ne.com/markets/mktmonmit/> (accessed August 8, 2012).

B. Natural Gas

EIA, LDCs, pipeline operators and PURA conducts much of natural gas-related monitoring.

Price. DEEP monitors and reports natural gas prices on a weekly basis. EIA monitors spot and contract prices of natural gas.

Supply. EIA monitors interstate natural gas deliveries by sector that show the amount of natural gas delivered into the state for sale and state natural gas inventories.

Demand. LDCs monitor projected system send-outs. Interstate natural gas pipeline operators provide notices of curtailment to FERC.

Infrastructure. The interstate pipeline operators, the LDCs, and PURA GPSU are responsible for monitoring natural gas infrastructure.

Weather. Weather monitoring and analysis is conducted by the National Weather Service and National Oceanic and Atmospheric Administration. This includes heating degree day data. The data may be used to indicate periods of extreme cold weather that bring on increases in demand for natural gas for space heating.

C. Petroleum

Marketers and commercial buyers conduct much of the petroleum market monitoring. EIA and the American Petroleum Institute monitor petroleum as well. There is no single information source given the decentralized petroleum network. Also, the State often plays a larger role in developing data regarding supply availability and price due to anti-trust laws.

Price. EIA monitors wholesale and retail prices of petroleum products. The Bureau conducts weekly surveys of petroleum distributors and retailers weekly. Department of Consumer Protection monitors for petroleum price gouging.

Supply. EIA monitors inventory (petroleum stocks) and production data—API does the same. EIA monitors the source and volumes of crude oil supply used by regional refineries.

Demand. US DOT monitors motor gasoline consumption. EIA monitors petroleum product demand; volume of product supplied each month; and projected deliveries for the upcoming month.

Infrastructure. Marine and pipeline terminals, locations of terminals, terminal capacity, and terminal product transfer capability are all pieces of information that can provide valuable insight. EIA monitors relevant infrastructure information.

Weather. Weather monitoring and analysis is conducted by the National Weather Service and National Oceanic and Atmospheric Administration. This includes heating degree day data. The data may be used to indicate periods of extreme cold weather that bring on increases in demand for heating fuels for space heating.

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VII. ENERGY SUPPLY DISRUPTION EVENTS

Connecticut's energy system is highly interdependent across sectors and resources, as such, the State is susceptible to a wide range of events, both natural and manmade, that can cause an energy supply disruption. This chapter discusses some historic events that have caused energy supply disruptions, future issues that should be planned for, and interdependencies that might complicate an energy supply disruption event.

A. Historic Events

The historic events described below are all highlighted in the Northeast States Emergency Consortium's historical timeline presentation from its website.¹⁴⁹ The Northeast is vulnerable to many types of hazards, such as hurricanes, winter storms, floods, earthquakes, tornadoes, and terrorism. Recognizing the impact and magnitude of past events can help emergency planners in their preparedness activities. Two such events referenced earlier in the EAP have already inspired a renewed energy emergency planning effort, Tropical Storm Irene and the October Nor'easter of 2011.

- *Cape Ann Earthquake of 1755*
 - Magnitude 6.
 - From Nova Scotia to Chesapeake Bay to New York.
 - Estimated that a similar earthquake would cause \$42 billion in damage today.

- *Great Blizzard of 1888*
 - Maryland to Maine.
 - Wind gusts up to 75 mph.
 - Disabled telegraph wires.

- *Newfoundland Tsunami of 1929*
 - Caused by magnitude 7.2 earthquake.

- *Hurricane of 1938*
 - Category 3.
 - 5th deadliest storm in U.S.
 - Estimated \$92.6 billion in damage if it occurred today.

- *Hurricane Carol of 1950*
 - Category 3.
 - Very similar to Hurricane of 1938.

¹⁴⁹ Northeast States Emergency Consortium, *About NESEC*, <http://www.nesec.org/about.cfm> (accessed August 8, 2012).

- *Worcester Tornado of 1953*
 - Category F4.
 - Last 84 minutes and traveled 64 miles.
- *Hurricane Donna of 1960*
 - Affected entire east coast—Florida to Maine.
- *Great Blackout of 1965*
 - 25 million people lost electricity for up to 12 hours.
- *The Blizzard of 1978*
 - Heavy snowfall for 36 hours.
 - 67 mph winds.
 - Left many people without heat, water, food, and electricity for over a week.
- *Hurricane Gloria of 1985*
 - Caused evacuation of over 380,000 people along the east coast from North Carolina to Connecticut.
- *Ice Storm of 1998*
 - Resulted in 4 inches of ice over Canada, New York, and Maine.
 - Millions lost power as a result of downed power lines and trees.
- *World Trade Center Terrorist Attack of 2001*
 - Over 2,900 deaths and \$40 billion in damage.
- *Northeast Blackout of 2003*
 - Largest blackout ever in North America.
 - 40 million people affected in eight states.
 - \$6 billion in financial losses.
- *Spring Nor'easter of 2007*
 - Resulted in Presidential Disaster Declarations in all eight NESEC states for the first time in history.

B. Electricity

Electricity supply disruptions are classified by the percent of customers without power. The levels are 10, 30, 50, and 70 percent.¹⁵⁰ EDC restoration plans must cover each of the four levels of disruption. The level of disruption will guide emergency response. In addition, PURA must review the performance of EDCs if 10 percent of their customers are without service for over 48 hours.¹⁵¹

There are a number of issues that can interrupt the supply of electricity. The issues fall under the following categories: supply; demand; weather; infrastructure; price; and other.

Supply. The loss of a large generating station or major transmission line can cause a disruption. Also, the loss of natural gas, coal, or petroleum supplies can lead to inadequate generation. Further, safety issues may result in the shutdown of a nuclear power plant. As the State experienced in 2011, extensive damage to the distribution system can cause a significant disruption.

Demand. Extreme temperatures might cause a spike in demand, resulting in blackouts.

Weather. Extreme weather—whether it be temperature, wind, or precipitation—might cause a disruption. Natural disasters, such as hurricanes and tornadoes, can also cause a disruption. Both heating degree days and cooling degree days may lead to a demand-related disruption.

Infrastructure. The loss of major equipment in the generation, transmission, or distribution systems can cause a disruption due to the current centralized state of the electricity grid.

Price. A labor strike involving a generation plant might cause a disruption.

Other. Terrorist attacks, both cyber and physical, can cause a disruption. Geological events, such as earthquakes and tsunamis, can cause a disruption. Also, solar flares and electromagnetic pulses (including coronal mass ejections) can cause disruptions.

¹⁵⁰ See Conn. Public Act 12-148 (2012).

¹⁵¹ See *id.*

C. Natural Gas

Natural gas supply disruptions are classified by the percent of customers without service. The levels are 10, 30, 50, and 70 percent.¹⁵² LDC restoration plans must cover each of the four levels of disruption. The level of disruption will guide emergency response. In addition, PURA must review the performance of LDCs if 10 percent of their customers are without service for over 48 hours.¹⁵³

There are a number of issues that can interrupt the supply of natural gas. The issues fall under the following categories: supply; demand; weather; infrastructure; price; and other.

Supply. A shortage of gasoline or diesel fuel for tankers and trucks, or even a shortage of tankers, can cause a disruption for liquefied natural gas and compressed natural gas users.

Demand. Curtailment of fuel oil supplies might increase demand for natural gas and cause a disruption.

Weather. Several heating degree days can cause a disruption because of increased use of natural gas for heating. Natural disasters near the Gulf of Mexico and the Marcellus Shale can cause a disruption.

Infrastructure. The loss of electric power needed to operate compressors and controls for natural gas transmission and distribution pipelines can cause a disruption. Also, equipment or pipeline failures can lead to a disruption.

Price. Labor strikes in the natural gas industry might cause a disruption. Also, market pricing diverting supply from the US is a potential risk.

Other. Terrorist attacks, both cyber and physical, pose a risk to the natural gas supply system. Geological events, such as earthquakes and tsunamis, can cause a disruption.

¹⁵² *See id.*

¹⁵³ *See id.*

D. Petroleum

Petroleum shortages at the state level are difficult to quantify. Calculating an accurate percentage of shortfalls is challenging. The severity of the shortage can be estimated using various indicators, but it is still only an estimate. Thus, a petroleum shortage response plan should not necessarily be tied to specific percentage shortage levels. However, there are certain guidelines for releasing the stock of the Strategic Petroleum Reserve and Northeast Home Heating Oil Reserve that can provide insight into what constitutes a petroleum shortage.¹⁵⁴

There are a number of issues that can interrupt the supply of petroleum. The issues fall under the following categories: supply; demand; weather; infrastructure; price; and other.

Supply. A shortage of tankers and trucks can cause a disruption. Also, the silting of harbors and rivers can cause ships and barges to be partially loaded and cause a disruption.

Demand. Curtailment of natural gas supplies might increase demand for petroleum products and cause a disruption.

Weather. Several heating degree days can cause a disruption because of increased use of petroleum products for heating. Extreme weather can interfere with trucking and shipping schedules. Natural disasters near refineries along Gulf Coast can cause a disruption.

Infrastructure. The loss of electric power needed to operate pumps and controls for the petroleum distribution system can cause a disruption. Also, equipment or pipeline failures can lead to a disruption. Inadequately dredged harbors and rivers can cause an interruption in the delivery of petroleum via ships and barges.

Price. Labor strikes in the petroleum industry might cause a disruption. Also, market pricing diverting supply from the US is a potential risk. International embargoes might also pose a risk to the petroleum supply.

Other. Terrorist attacks, both cyber and physical, pose a risk to the petroleum supply system. Geological events, such as earthquakes and tsunamis, can cause a disruption.

¹⁵⁴ See U.S. Department of Energy, *Northeast Home Heating Oil Reserve - Guidelines for Release, 2011-12*, http://www.fossil.energy.gov/programs/reserves/heatingoil/Sales_Basis_1112.html (last updated March 21, 2012). (Detailing information on the price differential required for release of NHHOR.); U.S. Department of Energy, *The Energy Policy and Conservation Act's Statutory Authority for an SPR Drawdown*, <http://www.fossil.energy.gov/programs/reserves/spr/spr-epca.html> (last updated May 21, 2010).

E. Interdependencies

The energy supply system is susceptible to disruptions through a number of ways. Interdependencies across resources and sectors can aggravate a disruption. For example, about 30 percent of Connecticut's electricity is generated from natural gas. Therefore, a natural gas disruption would affect not only home heating users, but electricity users as well. Further, as power plants are taken offline, the load is shifted to other plants that must then operate closer to max capacity, which poses a risk per se. Petroleum poses a lesser risk to electricity because only about 1.5 percent of electricity generation is powered by petroleum products. Alternatively, a power outage might limit access to petroleum products, such as motor gasoline, or natural gas if there is no backup electricity to power the pumps or to control the pipelines.

Recently, power plants serving Connecticut have been reducing their dual fuel and fuel switching capabilities to reduce costs. Reducing the redundancy in our electricity generators decreases our resiliency. However, if the cost savings are used to enhance our system in other ways — for example, spending more on renewable generation — then it might be worth the risk.

One resource that is important to all types of energy production is water. Water is used for cooling power plants, extracting natural gas, and producing oil. An extreme drought could affect all energy resources and sectors in addition to the agriculture industry and the public water supply. In fact, drought increases energy consumption in the agriculture industry due to increased power used to operate irrigation systems.

The transportation sector's almost exclusive dependence on petroleum (95% of transportation sector energy consumption) has the potential for wide-ranging effects. If a natural gas or electricity disruption occurred concurrently with a petroleum shortage many response efforts would be affected. Many people use gas-fired backup generators, including emergency responders. Also, emergency personnel require fuel to transport themselves throughout the State as they are needed.

VIII. RESPONDING TO ENERGY SUPPLY DISRUPTION EVENTS

As mentioned in the introduction, Connecticut has refocused its efforts to ensure the preparedness and effectiveness of energy emergency responders both in the public and private sectors. Public Act 12-148, *An Act Enhancing Emergency Preparedness and Response*, passed earlier in 2012, focuses on PURA's role in regulating and overseeing the emergency preparedness and response plans of utility companies.¹⁵⁵ As a result, energy emergency management, specifically response planning, has improved greatly since the two storms of 2011. The response measures for an energy emergency are addressed in this chapter. The topics covered are monitoring and analysis, proclamation of an energy emergency, response organization, management and communication, and sector-specific response.

A. Monitoring and Analysis

Most monitoring and data analysis activities take place in the State Emergency Operations Center ("SEOC") during an energy emergency. It is important to have a centralized emergency management headquarters to respond efficiently and effectively. A centralized operations center allows for better coordination and communication between all personnel with an emergency response role. In addition, most information pertinent to the emergency response effort is also available on the State's WebEOC System.

1. State Emergency Operations Center

The SEOC is located at the State Armory in Hartford, CT. Only the Governor, the Commissioner of DESPP/DEMHS, or one of their designees may activate the SEOC. The SEOC operates under the National Incident Management System.

DESPP/DEMHS has published a list of many functions performed at the SEOC. They are:

- Receiving and disseminating warnings;
- Developing policies;
- Collecting intelligence and disseminating information to various SEOC representatives and, as appropriate, to municipal, military, and federal agencies;
- Preparing intelligence/information summaries, situation reports, operation reports, and other reports as required;
- Maintaining general and specific maps, information display boards, and other data pertaining to emergency operations;
- Continuing analysis and evaluation of all data pertaining to emergency operations;

¹⁵⁵ PA 12-148 requires PURA to initiate proceedings to: (1) review electric and gas company emergency preparation and service restoration practices, infrastructure adequacy, and coordination efforts; (2) establish electric and gas company emergency performance standards for the companies; and (3) identify the most cost-effective levels of electric company tree trimming and system hardening needed to achieve maximum system reliability and minimize outages. In addition, the act requires PURA to review companies' performance after an emergency and issue orders to enforce the standards. The act also allows PURA to issue civil penalties for violations.

- Controlling and coordinating, within established policy, the operations and logistical support of the fire service resources committed to emergency operations;
- Maintaining contact with support EOC's -- regional, local, other jurisdictions, and levels of government; and
- Providing emergency information and instructions to the media and the scheduling of press conferences as necessary in coordination with the Governor's Press Desk.

2. WebEOC

WebEOC is a web-based emergency management communications system. It creates a real-time common operating picture for all users in Connecticut, which are DESPP/DEMHS, emergency managers from all levels of government and the private sector (i.e., utilities), police, fire, medical, FEMA Region 1, and others. WebEOC can be viewed from any device with an internet connection including BlackBerrys and iPhones. WebEOC is a very useful and powerful tool in emergency response. It allows for users to ensure information is flowing to all of the appropriate emergency response personnel. Further, it makes certain data is shared effectively, so there are fewer duplicative efforts and resources can be allocated accordingly.

B. Proclamation of an Energy Emergency¹⁵⁶

In this section, topics discussed are proclaiming an energy emergency that is, and is not, covered by the state energy emergency plan, including the authority to proclaim, how to proclaim, review and disapproval, duration and termination of the proclamation. Exemptions and violations are also discussed.

Covered by State Plan

Proclamation. The Governor, pursuant to CGS 16a-11(a), may proclaim that an energy emergency exists and designate by order all or any part of the emergency plan that the Governor intends to implement and the effective date thereof.¹⁵⁷ Any such order by the Governor shall become effective upon filing said proclamation and designation in the office of the Secretary of State.¹⁵⁸

Review. Any proclamation may be disapproved, pursuant to CGS 16a-11(b), by the joint legislative committee (i.e., the Energy and Technology Committee) having cognizance of matters relating to energy at a meeting which shall be held within seventy-two [72] hours after the filing of such proclamation in the office of the Secretary of the State. Such disapproval shall be by a majority vote, provided at least one [1] of the minority leaders shall vote for such disapproval. The joint legislative committee shall meet to review the proclamation of an energy emergency every sixty [60] days until such emergency ends and may disapprove such proclamation by a simple majority vote.

Duration. Notwithstanding disapproval by the joint legislative committee [the Energy and Technology Committee] having cognizance of matters relating to energy, pursuant to CGS 16a-11(b), such proclamation and any order pursuant to this section shall be valid and effective from the time the Governor files such proclamation until such time as said committee files its disapproval in the office of the Secretary of the State. Any proclamation not disapproved shall remain in effect until the Governor proclaims the end of the energy emergency or until three hundred [300] days after the date of the proclamation of the energy emergency.

Termination. Any order or designation shall remain in effect until termination by further order by the Governor, pursuant to CGS § 16a-11(b), which termination shall become effective upon filing such order in the office of the Secretary of the State. Such order shall be published in full at least once in a newspaper having general circulation in each county, provided failure to publish shall not impair the validity of such order.

¹⁵⁶ Worth noting is the fact that the original energy emergency plan and respective statutes were created in response to the oil crisis of the 1970s.

¹⁵⁷ C.G.S. § 16a-9. (An energy emergency is an actual or impending acute shortage in usable energy resources that threatens the health, safety, or welfare of the citizens of the state.)

¹⁵⁸ C.G.S. § 16a-11(a). (Such proclamation and any such designation shall be published in full at least once in a newspaper having general circulation in each county; failure to publish shall not impair the validity of such proclamation or designation.)

Not Covered by State Plan

Proclamation. Prior to the issuance of an order proclaiming that an energy emergency exists, the Governor shall make written findings, pursuant to CGS § 16a-12(a), that there is an energy emergency and that the order is necessary to assure the health, safety and welfare of the people of the state. Any such orders by the Governor shall be promulgated in the same manner as provided for an energy emergency covered by the state energy emergency plan [see above *Proclamation*]. The Governor may issue orders such as are permitted pursuant to chapter 517.¹⁵⁹

Review. Any proclamation or order issued may be disapproved, pursuant to CGS § 16a-12(a), by the joint legislative committee established under section 16a-10 within seventy-two [72] hours of the filing of such proclamation or order in the office of the Secretary of the State. Such disapproval shall be by a majority vote, provided at least one of the minority leaders shall vote for such disapproval. The joint legislative committee shall meet to review the proclamation of an energy emergency every sixty days until such emergency ends and may disapprove such proclamation by a simple majority vote.

Duration. Notwithstanding such disapproval, such proclamation or any order shall be valid and effective from the time the Governor files such proclamation or order until such time as said committee files its disapproval in the office of the Secretary of the State. Any proclamation not disapproved shall remain in effect until the Governor proclaims the end of the energy emergency or until three hundred days after the date of the proclamation of the energy emergency.

Termination. Such order shall remain in effect until termination by further order by the Governor, pursuant to CGS § 16-12(b), which termination shall become effective upon filing such order in the office of the Secretary of the State. Such order shall be published in full at least once in a newspaper having general circulation in each county, provided failure to publish shall not impair the validity of such order.

Exemptions. Any person aggrieved by any order issued under CGS section § 16a-11 or § 16a-12 may file a petition with the commissioner requesting an exemption.¹⁶⁰ The commissioner may grant an exemption to any person who due to certain circumstances is unable to comply with such order without suffering inordinate hardship beyond that hardship suffered by persons generally.¹⁶¹ The commissioner may also grant an exemption to any person who performs an

¹⁵⁹ C.G.S. § 16a-12. (Such orders may include (1) establishment of programs, controls, standards, priorities and quotas for the allocation, rationing, conservation, distribution and consumption of available energy resources, (2) suspension and modification of existing statutes, standards and requirements affecting or affected by the use of energy resources, (3) adoption of measures affecting the type and composition and production and distribution of energy resources, (4) imposition of price restrictions on energy resources, (5) adoption of measures affecting the hours and days on which public buildings and commercial and industrial establishments may be or are required to remain open or closed and (6) establishment and implementation of regional programs and agreements for the purpose of coordinating energy resource programs and actions of the state with those of the federal government and of other states and localities.)

¹⁶⁰ “Commissioner” is the Commissioner of DEEP.

¹⁶¹ C.G.S. § 16a-13. (Including, but not limited to, circumstances where in the absence of such exemption the petitioner would: (A) Be prevented from performing activities essential to the pursuit of his regular occupation or profession, (B) suffer adverse medical effects or be unable to obtain necessary medical treatment, or (C) incur permanent and substantial injury to person or property.)

essential public service and who would be prevented from performing such service or would be impaired in his performance in the absence of such exemption. The commissioner has the ultimate discretion in granting or denying exemptions.¹⁶²

Violations. Any person who during the course of an energy emergency proclaimed under this chapter violates any provision of the energy emergency plan which has been implemented pursuant to § 16a-11 or any order adopted pursuant to § 16a-12, or who obtains an exemption pursuant to § 16a-13 by misrepresentation or false pretenses, or who impedes, interferes with or obstructs any lawful energy emergency activities pursuant to this chapter, or who violates any provision of this chapter, shall be fined not more than one thousand dollars or imprisoned not more than one year, or both, for each offense. Each violation and each day on which the violation occurs or continues shall be a separate offense.¹⁶³

¹⁶² See C.G.S. § 16a-13.

¹⁶³ C.G.S. § 16a-13c.

C. Response Organization, Management, and Communication

Organization, management, and response are vital to the success of any energy emergency response. Knowing and practicing the proper procedures for emergency management is critical to the effectiveness of the response effort. As mentioned earlier in the EAP, Connecticut has undergone processes to enhance emergency preparedness and response, which are central to this section. DESPP/DEMHS has created the State's ESF 12, made improvements to WebEOC, and conducted an intrastate emergency exercise all within the last year. This section describes the SRF, EOC and WebEOC, and ESF 12 because they guide the State's response organization, management, and communication with respect to an energy emergency.

1. State Response Framework ("SRF")¹⁶⁴

Connecticut has adopted the National Incident Management System ("NIMS") for its SRF, which is administered by DESPP/DEMHS. NIMS is a flexible framework for guiding emergency management actions, not an operational incident management plan.¹⁶⁵ Likewise, the SRF describes how the State and its partners, under the direction of DESPP/DEMHS, will work together in responding to disasters and emergencies as opposed to detailing emergency operations. Much like how this EAP is a guide to the plans, policies, and practices that are ongoing within the state to promote Energy Assurance, the SRF is a guide to the State's plans, policies, and practices regarding emergency management. As such, the SRF provides general emergency operations concepts and the roles and responsibilities of state agencies and how local, regional and federal partners, NGOs, and the private sector fit into the State's emergency management organization.

Connecticut State Plans, Resources, and Initiatives. Appendix A of the SRF contains a list of plans, resources, and initiatives available in Connecticut for emergency response. This appendix serves as a menu for a variety of response options: Support Plans; Incident Plans; Historic Event-Specific Plans; Partnerships – Memoranda of Agreement/Understanding; Local and National Plans; Emergency Response Support Resources/Civil Preparedness Forces; and Current Key Framework Initiatives.¹⁶⁶ It is important to have a catalog of all available plans, resources, and initiatives in one place in the event of an emergency.

Pre-Activation Framework. Appendix B of the SRF details Pre-Activation Framework, which consists of the actions being taken in response to a potential or developing incident prior to the activation of the state Emergency Operations Center. Pre-activation actions include monitoring, providing situational awareness, and pre-incident preparations and coordination by various agencies. DESPP/DEMHS tracks the development of potential incidents and coordinates with other state agencies and partners (federal, regional, local, and private sector) as appropriate under

¹⁶⁴ See Appendix U for Division of Emergency Management & Homeland Security, *State Response Framework Version 2.0*.

¹⁶⁵ There are three components to NIMS: 1) Incident Command System; 2) Multi-Agency Coordination Systems; and 3) Public Information.

¹⁶⁶ Several types of support plans are worth mentioning in this EAP —procurement of supplies, communications (alert and notification), and public information plans. These plans are important in all emergencies, but especially in energy emergencies because power outages often affect communications and public information systems or the availability of certain resources.

the SRF's Multi-Agency Coordination ("MAC") system. Organization and communication are critical aspects of the pre-activation framework because they set the stage for enhanced coordination throughout the emergency response effort.

State EOC ("SEOC") Standard Operating Procedures ("SOP"). Appendix C of the SRF provides great detail regarding the SEOC SOP. The SEOC monitors disaster response activities statewide and coordinates the allocation of assistance to state and local authorities. Further, the SEOC operates, supports, and oversees the MAC system.¹⁶⁷ The SOP outlines the interaction of state agencies with other state agencies, private response agencies, and the federal government. The success of the SEOC is unquestionably critical to an effective emergency response because it is the center for all emergency response communication and coordination.

Emergency Support Function #12.^{168,169} ESF 12s exist at the federal, state, and local levels. All three ESF 12s provide a concept of operations and the roles and responsibilities of primary and support agencies. The SESF 12 is the most detailed—it describes the role of private sector partners and the communications flow more in-depth than the national and local annexes.

The federal ESF 12 – Energy Annex served as a model for the creation of the SESF 12. The federal ESF 12 serves as part of the National Response Framework. It focuses on the functions of federal agencies and is intended to facilitate the restoration of damaged energy systems and components when a coordinated federal response is required. The lead agency is US DOE.

The SESF 12 is the All Hazards Energy and Utilities Annex to the SRF. It describes the MAC specific to utility-related aspects of disasters and emergencies to be used to restore or maintain critical public services, including, but not limited to energy, utility, electric and gas. While primarily concerned with restoring and maintaining energy supply systems, the SESF 12 also emphasizes the importance and interrelationship between SESF 12 and SESF 2 (Communications) because power outages often affect communications systems and infrastructure, and communication is essential to power restoration efforts.

As part of the Governor's EPPI, DESPP/DEMHS created a Local ESF 12 ("LESF 12") template to aid municipalities in creation of their own LESF 12s. The purpose of the LESF 12 is to ensure municipalities have a coordinated response framework in place they can use to deal with energy emergencies. LESF 12s will help local emergency management officials to maintain adequate communication with their respective public service companies to put forth a coordinated response effort.

¹⁶⁷ Division of Emergency Management and Homeland Security, *State Response Framework Appendix C: SSEOC-SOP*, August 2011 at 1. (MAC system is a "combination of facilities, equipment, personnel, procedures and communications integrated into a common system with responsibility for coordinating and supporting incident management activities.")

¹⁶⁸ See Appendix V for Division of Emergency Management & Homeland Security, *Connecticut Emergency Support Function #12Draft*.

¹⁶⁹ See Appendix W for Division of Emergency Management & Homeland Security, *Local Emergency Support Function #12Template*.

D. State Response Measures¹⁷⁰

Much of the State's critical energy infrastructure is owned and operated by private companies. Therefore, the bulk of energy supply disruptions are handled by the private companies that are directly affected. That is not to say that the State lacks control over private response efforts. In fact, the State has recently exerted more authority over the private sector emergency management process. As discussed earlier in the EAP, PURA requires all public service companies to submit restoration plans for review. Further, PURA now has the authority to enforce performance standards regarding a company's response to a disruption.

That being said, the State still has a significant role to play when an energy supply disruption rises to the level of an energy emergency. The State has a relatively old energy emergency plan in place that was last updated in 1994. Much of the 1994 plan focuses on public information. For example, one of the main response strategies is to promote demand reductions and voluntary conservation. It is important to note that the 1994 plan was designed with a petroleum shortage in mind. The 1994 Plan is provide in the appendix.

Although it has not been updated recently, there are response measures that are still effective in the plan, such as the Petroleum Fuels Set-Aside Program. The current administration has been working hard to prepare Connecticut for the next emergency. Much of what the original energy emergency plan was intended to address has been covered by other initiatives and plans. For example, the State Response Framework now has a state-level ESF-12 that can be used in an energy emergency. Also, PURA has much more oversight regarding the emergency management of public service companies. One of the more recent state response measures, the Fuel Task Force, is highlighted below.

Fuel Task Force ("FTF").¹⁷¹ The FTF comprises DMV, DESPP/DEMHS, DOT, DAS, CTNG, DCP and other non-governmental fuel partners, for example, Independent Connecticut Petroleum Association. DMV is the lead agency for the FTF. The purpose of the FTF is to restore and provide emergency fuel and generators for the power needs of the State's emergency response effort. The FTF is described in detail in Section 6 of the state's Commodities Distribution Standard Operating Procedure titled, "Fuel Task Force Standard Operating Procedure."

Sulfur Content Requirements of Home Heating Oil and Off-Road Diesel Fuel. The Commissioner of DEEP may suspend the sulfur content requirements of number two home heating oil and off-road diesel fuel if the commissioner finds that the physical availability of fuel that satisfies such requirements is inadequate to meet the needs of residential, commercial, or industrial users within the State and that such inadequate availability constitutes an emergency.¹⁷²

¹⁷⁰ See Appendix X for State of Connecticut, *1994 Energy Emergency Plan*.

¹⁷¹ See Appendix Y for Division of Emergency Management & Homeland Security, *Commodities Distribution SOP*.

¹⁷² See C.G.S. § 16a-21a(f).

Petroleum Product Price Monitoring. If, during an “abnormal market disruption,” the DEEP Commissioner determines that the wholesale price of motor gasoline or gasohol has increased by 15 percent or more over a certain period, the Attorney General or Commissioner of Consumer Protection may take any actions authorized by statute.^{173,174} Ensuring fair access to fuel and preventing price gouging should help maintain an orderly emergency response. When an abnormal market disruption is detected, the following agencies are contacted: the Attorney General’s Office and the Department of Consumer Protection.

With respect to home heating oil, the DEEP Commissioner collects, or causes to be collected, information on the wholesale and retail prices of home heating oil.¹⁷⁵ The pricing information collected is monitored and analyzed for “evidence of market activities that impair the free and fair operation of the home heating oil market.”¹⁷⁶ The DEEP Commissioner will provide such evidence to such agencies that the Commissioner determines may have jurisdiction, among other actions required or permitted by statute.¹⁷⁷

¹⁷³ See Conn. Public Act No. 12-4 § 3 (2012).

¹⁷⁴ “‘Abnormal market disruption’ refers to any stress to an energy resource market resulting from weather conditions, acts of nature, failure or shortage of a source of energy, strike, civil disorder, war, national or local emergency, oil spill or other extraordinary adverse circumstance.” Conn. Public Act No. 12-4 § 3(a)(3) (2012).

¹⁷⁵ C.G.S. § 16a-23t(d).

¹⁷⁶ C.G.S. § 16a-23t(e)(1).

¹⁷⁷ See C.G.S. § 16a-23t(e) (Summoning/examining witnesses; directing the production or examination of written documents; notifying the joint standing committee of the General Assembly having cognizance of matters relating to energy; recommending actions to address such conditions; and convening the Home Heating Oil Planning Council).

E. Sector-Specific Response Measures

Pursuant to Connecticut General Statutes § 16-32e, public service companies, telecommunications companies, and municipal utilities must periodically file updated emergency plans with PURA, DESPP, and each municipality they service.¹⁷⁸ PURA may revise the emergency plans as necessary.¹⁷⁹ The petroleum sector response is less regulated and much different from that of the electricity and natural gas sectors because petroleum disruptions might occur as a result of supply shortages whereas electricity and natural gas would be caused by damage to critical infrastructure. Thus, the electricity and natural gas response plans are focused on restoration of service efforts while the petroleum response plans are geared towards maintaining an adequate supply of petroleum products.¹⁸⁰

1. Electricity

There are three components of the electricity system that can be damaged that might result in a potential or actual energy supply disruption: generation, transmission, and distribution. ISO New England is responsible for responding to generation and transmission issues throughout Connecticut. The public utility companies, Connecticut Light & Power and United Illuminating, as well as the municipal utility companies are responsible for responding to distribution issues within their respective operating areas.

Independent System Operator

ISO New England. ISO-NE plays the primary role in preventing and responding to potential and actual disruptions of generation and transmission services. ISO-NE oversees administration of the region's wholesale electric power markets, including the real time spot markets. On its website, ISO-NE publishes its rules and procedures governing operations of the real time markets.¹⁸¹ Numerous documents detail ISO-NE's plans for various situations, such as implementation of "Energy Emergency Actions," "Disturbance Remedial Action," and even "Solar Magnetic Disturbance Remedial Action." NERC develops and enforces reliability standards with respect to ISO-NE to ensure they will be prepared to respond effectively to an emergency or disruption.

One of ISO New England's important response procedures is *ISO New England Operating Procedure No. 4 – Action During A Capacity Deficiency* ("OP-4"). OP-4 may be implemented any time one or more of a number of events occur or are expected to occur that pose a serious threat to the integrity of the bulk power system and ISO-NE determines OP-4 will mitigate the

¹⁷⁸ Recently, the Connecticut Legislature amended § 16-32e (by P.A. 12-148) to require public service companies to file an updated plan every two years (previously every five years).

¹⁷⁹ C.G.S. § 16-32e. ("[T]he Public Utilities Regulatory Authority may conduct public hearings on such plans and, in consultation with the Department of Emergency Services and Public Protection, the Department of Public Health and the joint standing committee of the General Assembly having cognizance of matters relating to public utilities, revise such plans to the extent necessary to provide properly for the public convenience, necessity and welfare.")

¹⁸⁰ Supply issues are addressed within the electricity and natural gas plans as well.

¹⁸¹ ISO-NE rules and procedures are accessible at http://www.iso-ne.com/rules_proceeds/operating/sysop/rt_mkts/

impact.¹⁸² OP-4 establishes eleven actions during capacity deficiencies that may be implemented by ISO-NE and the Local Control Centers – for example, ISO-NE may “dispatch Real Time Demand Resources in the amount and location required” (Action 2).¹⁸³

Electric Distribution Companies

Connecticut Light & Power.¹⁸⁴ CL&P’s Emergency Preparedness and Response Plan (“EPRP”) addresses responses for electricity outages affecting 10, 30, 50, and 70 percent of its customers. The EPRP provides an overview of how CL&P addresses situations that might adversely affect its customers’ electric service. The EPRP outlines a systematic approach to prepare for and respond to emergency events causing disruptions of CL&P’s distribution system. The EPRP details CL&P’s Incident Command System (ICS), preparedness activities, response measures, and recovery procedures.^{185,186,187,188}

United Illuminating.¹⁸⁹ UI’s Emergency Preparedness Plan (“EPP”) is designed to provide a systematic approach with respect to all phases of emergency management to mitigate the effects of a disruption to UI’s distribution system. The EPP is separated into three key sections: Organization and Functions, Operating Guidelines, and Appendices.^{190,191,192} The EPP deals with five levels of disruption events based on incident severity among other factors.

Municipal Utilities.¹⁹³ There are six electric municipal utilities in the state: the city of Groton, the borough of Jewett City, the second and third taxing districts of Norwalk (South Norwalk and East Norwalk, respectively), the city of Norwich, and the town of Wallingford. Together, the six municipal utilities compose the Connecticut Municipal Electrical Energy Cooperative (“CMEEC”). All six have filed emergency plans in PURA (formerly DPUC) Docket No. 11-05-22: DPUC Review of Updated Emergency Plans. The plans are attached in Appendix [x].

2. Natural Gas

Connecticut has limited control over its natural gas supply because there are no natural gas reserves within the state. Therefore, any response efforts in Connecticut pertain to transmission or distribution of natural gas. PURA’s Gas Pipeline Safety Unit reviews gas company plans and

¹⁸² See ISO New England, *ISO New England Operating Procedure No. 4 – Action During A Capacity Deficiency*, http://www.iso-ne.com/rules_proceeds/operating/isone/op4/op4_rto_final.pdf (last updated December 9, 2011) at 3. (Listing seven events – non-exclusive -- that may allow for implementation of OP-4).

¹⁸³ See *id.* at 4.

¹⁸⁴ See Appendix Z for Connecticut Light & Power, *Emergency Preparedness and Response Plan*.

¹⁸⁵ ICS is a standardized, on-scene, all-hazards incident management approach that provides an organizational structure for incident management and guides the process for planning, building, and adapting that structure.

¹⁸⁶ For example, the Preparedness chapter discusses, among other things, training exercises and activation of the CL&P’s Emergency Operations Center .

¹⁸⁷ The Response chapter addresses restoration strategies, operations, planning, logistics, and public information processes.

¹⁸⁸ The Recovery chapter addressed demobilization and post event reporting and analysis.

¹⁸⁹ See Appendix AA for United Illuminating, *Emergency Preparedness Plan*.

¹⁹⁰ The Organization and Functions section includes an overview of the company organization, provides a description of key functions, and describes restoration organization.

¹⁹¹ The Operation Guidelines section comprises pre-event preparations, plan activation and event level classification.

¹⁹² The Appendices section comprises specific position guides, procedures and checklists related to event and post event activities.

¹⁹³ See Appendices AB through AG for Municipal Utility Response Plans.

procedures, including emergency response plans, to ensure compliance with applicable State and federal safety requirements. PURA's efforts focus more on the intrastate distribution pipelines of local distribution companies ("LDCs"), while US DOT's Pipeline & Hazardous Materials Safety Administration ("PHSMA") oversees interstate natural gas transmission pipelines.¹⁹⁴

Natural Gas LDCs are required to submit updated emergency response plans to PURA for review pursuant to CGS § 16-32e. The LDCs serving Connecticut are Yankee Gas Services ("YGS"), Southern Connecticut Gas ("SCG"), and Connecticut Natural Gas ("CNG"). Norwich Public Utilities also submitted its gas emergency response plan to PURA.¹⁹⁵

Local Distribution Companies

Yankee Gas Services.¹⁹⁶ YGS submitted its Emergency Preparedness and Response Plan to PURA for review in Docket No. 12-06-11. The plan describes the YGS Incident Command System, the planning process for an Incident Action Plan, the ICS activation process, ICS communications policy, and the After Action Review of the ICS. The plan also discusses the YGS EOC, emergency resource needs, and training, exercises and drills. The incorporation of an ICS is consistent with the state's adoption of NIMS.

Southern Connecticut Gas & Connecticut Natural Gas.¹⁹⁷ SCG and CNG share a common emergency plan. The plan was submitted to PURA in Docket No. 12-06-11 on a confidential basis. Therefore, discussion of the plan in this EAP would be improper. PURA will ensure the plan meets all standards with respect to its newly established standards and PA 12-148.

3. Petroleum

The petroleum industry is largely unregulated and decentralized, so the state depends on market forces to effectively keep petroleum supply at a level sufficient to meet demand. As a result, government intervention occurs only when necessary to protect the health, safety, and welfare of the public.

Federal Government Response

Strategic Petroleum Reserve ("SPR").¹⁹⁸ The SPR is a government-owned stockpile of crude oil. The US DOE is charged with acquiring additional oil for the stockpile. US DOE administers the reserve, but only the President can direct the release of the oil when a disruption of commercial oil supplies threatens the U.S. economy. The capacity of the SPR is 727 million barrels and consists of mostly sweet crude. The Reserve consists of 62 underground salt caverns along the Gulf Coast in which the oil is stored. No refineries are located within Connecticut, so

¹⁹⁴ PURA's GPSU has concurrent jurisdiction over interstate pipelines along with PHSMA.

¹⁹⁵ See Appendix AJ for Norwich Public Utilities, *Emergency Plan-Gas*.

¹⁹⁶ See Appendix AH for Yankee Gas Services, *Emergency Preparedness and Response Plan*.

¹⁹⁷ See Appendix AI for Connecticut Natural Gas and Southern Connecticut Gas, *Emergency Preparedness Plan*.

¹⁹⁸ U.S. Department of Energy, *Strategic Petroleum Reserve – Profile*,

<http://www.fossil.energy.gov/programs/reserves/spr/index.html> (last updated February 22, 2012).

the state has no direct involvement with the SPR because the crude oil must be refined before it enters the state.

Northeast Home Heating Oil Reserve (“NHHOR”).¹⁹⁹ Established in 2000, the NHHOR was originally intended to be a two million barrel supply of emergency fuel oil for homes and business in the northeast. Now, the NHHOR, controlled by US DOE, contains one million barrels total of ultra low sulfur distillate in its reserves in Groton, CT and Revere, MA.²⁰⁰

The President may direct the emergency release of the Reserve at his discretion. In the event of a “severe energy supply interruption,” the President may find “there is a dislocation in the heating oil market or a circumstance exists (other than the defined dislocation) that is a regional supply shortage of significant scope and duration and the Reserve’s release would significantly reduce its adverse impact.”²⁰¹

4. Cyber Threats

PURA requires public utilities to submit filings in its docket pertaining to cyber security, Docket No. 10-11-08: DPUC Determination of a Public Service Company-Specific Cyber Security Policy. The specifics of the cyber response plans are sensitive information. In addition, DESPP/DEMHS is currently refining its Cyber Disruption Response Team in the event of a cyber attack. The details of the Cyber Disruption Team are not available at this time.

The private sector bears a great amount of responsibility when responding to cyber threats. The State is relatively uninvolved in private sector cyber events. But, as mentioned before, PURA requires public service companies to develop and maintain cyber security policies, which are subject to PURA’s review.

One federal organization that is active in cyber security is DHS’s United States Computer Emergency Readiness Team (“US-CERT”). US-CERT partners with cyber security stakeholders to improve the nation’s cyber security across all sectors.²⁰² US-CERT provides extensive assistance to organizations in need of cyber security guidance.²⁰³

¹⁹⁹U.S. Department of Energy, *Northeast Home Heating Oil Reserve – Profile*,

<http://www.fossil.energy.gov/programs/reserves/heatingoil/index.html> (last updated April 11, 2012).

²⁰⁰ In 2011, DOE converted the reserve from #2 high sulfur heating oil to cleaner burning ultra low sulfur distillate.

²⁰¹ U.S. Department of Energy, *Northeast Home Heating Oil Reserve - Guidelines for Release, 2011-12*,

http://www.fossil.energy.gov/programs/reserves/heatingoil/Sales_Basis_1112.html (last updated March 21, 2012). (This site contains information on the price differential required for release.)

²⁰² United States Computer Emergency Readiness Team, *About Us*, <http://www.us-cert.gov/about-us/> (accessed August 8, 2012). (“US-CERT partners with private sector critical infrastructure owners and operators, academia, federal agencies, Information Sharing and Analysis Centers (ISACs), state and local partners, and domestic and international organizations to enhance the Nation’s cybersecurity posture.”)

²⁰³ *Id.* (“Through its 24x7 operations center, US-CERT accepts, triages, and collaboratively responds to incidents; provides technical assistance to information system operators; and disseminates timely notifications regarding current and potential security threats and vulnerabilities.”)

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IX. RECOVERY

Connecticut prepares itself for a disaster by encouraging residents to participate in energy efficiency programs, while expanding the use of renewable energy sources.²⁰⁴ To persuade residents to participate, the State offers financial incentives such as low-interest loans, tax breaks, grants, and rebates.²⁰⁵ The State's policies and regulations require government buildings to be energy efficient and utilities to purchase electricity from renewable sources. Hence, the State conserves energy and is better prepared for a disaster, or energy loss.

A. Recovery Characteristics

Disaster Recovery. Disaster recovery focuses on restoring essential services to residents. The National Disaster Recovery Framework (“NDRF”), the nation's guide for managing disasters, makes a distinction between short and long term disaster recovery. Short term recovery efforts focus on reestablishing a community's health, safety, and critical infrastructure. In the long term, the focus is on rebuilding the community's social, economic, and physical environment as it moves towards self-sufficiency.

The NDRF defines short-term recovery activities as those directed towards reestablishing safety by providing medical care, shelter, food, and restoring transportation and energy systems. Long-term recovery activities focus on rebuilding the community.

Energy Recovery. Energy recovery focuses on activities that occur after the immediate needs of an energy supply disruption event are addressed. Recovery activities include repairing damaged infrastructure and rebuilding destroyed property with an effort to build back better to reduce energy supply risks and vulnerabilities.

Pre-Disaster Energy Recovery Planning. Pre-disaster recovery planning is essential to reestablishing a State's energy supply. An energy recovery plan is a policy that informs decisionmaking at the individual, community, state, and Federal level. A recovery plan recognizes recovery priorities, incorporates mitigation tactics, and increases a community's resiliency. A community with a comprehensive plan will be less effected by a power loss and recover more quickly.

Connecticut's disaster and energy recovery plans are communicated in the State's Response Framework. The SRF describes the emergency concepts, responsibilities, and resources available to the State. The SRF is used in conjunction with other state emergency management and response plans such as the Connecticut Natural Disaster Plan.

²⁰⁴ Renewable energy includes photovoltaic energy, solar thermal, geothermal, wind, ocean thermal, tidal, fuel cell, hydropower that meets the low-impact standard, low emission advanced biomass conversion technologies, alternative fuels derived from agricultural produce, usable electricity from combined heat/power systems and technologies that have potential for commercialization and do not involve the combustion of coal, or petroleum products.

²⁰⁵ Energy efficiency and renewable energy programs are funded by legislative resources, state bonds, private capital, surcharges on electric bills, and Federal grants.

Energy Recovery Phase. Connecticut’s energy recovery phase is an opportunity for residents to integrate renewable energy resources and technologies as the State rebuilds.²⁰⁶ The State has a strong commitment to rebuilding structures and energy producing systems that incorporate renewables that maximize energy conservation, efficiency, and reliability. Thus, the State’s recovery phase aims at generating energy that is cheaper, cleaner, and more environmentally friendly. Subsequently, residents rely less on traditional energy sources and recover more quickly from a disaster.

Taking Advantage of Connecticut’s Existing Incentive Programs. Connecticut’s energy recovery phase can use and build on, accelerate, and expand existing energy conservation incentives, policies, and programs already in place.²⁰⁷ Following is a brief description of these incentives, policies, and programs:

²⁰⁶ The “recovery” phase begins after the “response” phase. In reality, however, preparedness, response, and recovery often occur concurrently. Thus, the phases operate on a continuum where decisions made in the “preparedness” or “response” phase influence “energy recovery.”

²⁰⁷ Some of the State’s clean energy incentives, policies, and programs are being phased out and replaced with new ones. Programs require applicants to satisfy eligibility requirements.

B. Financial Incentives

1. Local Rebate Programs

Litchfield Hills Region. Litchfield Hills Region provides rebates/incentives to regional businesses that participate in energy efficiency or renewable energy improvements.

2. PACE Financing

Local Option-Sustainable Energy Program. The Commercial Sustainable Energy Program provides loans to property owners for large-scale commercial and industrial efficiency improvements. Property owners can pay off the loan by a “benefit assessment,” which is added to their property tax bill with the bank’s consent. The Clean Energy Finance Authority is developing the statewide program.

3. Performance-Based Incentives

Connecticut Light & Power and United Illuminating- ZREC and LREC 15-Year Contracts. LREC/ZREC program provides Class I Renewable Energy Certificates to electricity customers who install renewable energy technologies such as wind, rooftop solar panels, and fuel cells that achieve low emission (LREC) or zero emissions (ZREC).²⁰⁸ A renewable generator measures the electricity produced. A customer receives 1 REC for each 1000 kilowatt hours produced. Renewable Energy Certificates represent the environmental attributes and are sold separately from the physical electricity produced.

4. Property Tax Incentive

Property Tax Exemptions for Renewable Energy Systems. Residents that install Class I renewable energy systems and hydropower facilities that generate electricity to farms, and single and multi- family homes are exempt from paying property taxes on the system. This includes active solar and water, or space heating systems or geothermal energy resource.²⁰⁹

5. Sales Tax Incentives

Exemption for Electric Generation Tax. In Connecticut, renewable energy facilities and customer-sited facilities do not pay tax on the electricity generated.

Sale and Use Tax Exemption for Energy Efficient Products. Residents and contractors are exempt from paying sales tax on weatherization products for private homes.²¹⁰

Sale and Use Tax Exemption for Solar and Geothermal Systems. Consumers are exempt from sales or use tax of solar energy equipment and geothermal resources systems. The exemption applies to equipment and labor required to install technology.²¹¹

²⁰⁸“Class I” power is generated from solar, wind, fuel cells, anaerobic digestion, ocean thermal power, tidal power, low-emission renewable energy conversion technologies, and hydropower.

²⁰⁹ C.G.S. § 12-81

²¹⁰ C.G.S. § 12-41k

²¹¹ C.G.S. § 12-412

Sales and Use Taxes for Items. Connecticut provides a sales and use tax exemption for equipment, machinery, and fuels used to manufacture solar thermal, solar electric, wind-power electric, or geothermal resource systems, including equipment related to such systems.²¹²

6. State Grant Programs

Combined Heat and Power Pilot Grant Program. The Clean Energy Financial Investment Authority is administering a 3-year, \$6 million Combined Heat and Power pilot program. CEFIA will provide financial assistance for new renewable energy generation equipment projects in the developmental phase at commercial, institutional facilities in Connecticut. The amount awarded depends on the technology, efficiency, and economics of the installation.

Commercial Solar Thermal Incentive Program. The Clean Energy Financing Authority provides financial assistance to non-residential entities who wish to install solar hot water technologies. Applicants must be CL&P or UI customers.

Community Innovations Grant Program. The Clean Energy Financing Authority provides grants to Connecticut cities and towns to start local projects that support clean energy awareness and education. The town must have a local energy task force, council, or commission. Applicants must meet other criteria as well.

On-Site Renewable DG Program. In the past, the Clean Energy Financing Authority provided grants to owners of commercial, industrial, and institutional buildings who wanted to use solar photo-voltaic, wind, fuel cells, landfill gas, low-emission advanced biomass-conversion technologies, run-of-the-river hydropower, wave or tidal power, or ocean-thermal power to generate electricity. The program budget is \$12 million.

7. State Loan Programs

Energy Conservation Loan. The Connecticut Housing Investment Fund offers low or no interest loans to owners of residential single and multi-family homes who wish to invest in energy efficient technologies. The loans can be used to purchase ENERGY STAR water heaters, furnaces, boilers, heat pumps, windows, insulation, roofs, wood stoves and passive solar space heat, photo-voltaic, wind, biomass and geothermal heat pumps. Generally, loans range from \$400-\$60,000.

Energy Efficiency Fund (Electric and Gas) – Residential. Connecticut homeowners and customers of Connecticut Light and Power Company, and United Illuminating may apply for up to 100% financing for eligible energy efficiency upgrades through the Home Energy Solutions Program. Eligible homes include single and two-family homes and condos as well as second homes.

²¹² C.G.S. § 12-412

Low-Interest Loans: Customer-Side Distributed Resources. Long-term financing is available to retail end-use customers for the installation of customer-side distributed resources.²¹³ The maximum amount of financing for projects is \$150 million.

Operational Demonstration Program (Op Demo). Entrepreneurs and developers of clean energy technologies can apply for unsecured loans for demonstration projects that have a strong possibility of maturing into commercial products within 3-5 years. The maximum loan amount is \$500,000.

8. State Rebate Programs

Residential Solar Investment Program. The Clean Energy Financing Authority offers rebates and performance based incentives to CL&P and UI customer who purchase or lease a solar photo-voltaic system. Customers can lease systems with no initial cost. The program is limited to owner-occupied homes. Thus far, \$10 million has been allocated to the program.

Solar Thermal Incentive Program. The Clean Energy Financing Authority offers residential rebates to home-owners who have approved solar hot water equipment installations. The rebate goes to the contractor who then compensates the customer.

9. Utility Loan Programs

Energy Efficiency Fund-Small Business Energy Advantage Program. CL&P and UI offer rebates and efficiency loans to small business and industrial, municipal, and government customers. Customers can receive rebates and pay for the remaining project cost with a zero interest loan. The maximum award is \$100,000 per project.

Norwich Public Utilities-Zero Percent Financing. Norwich Public Utilities in collaboration with local banks offers commercial and industrial customers loans for energy efficiency improvements. A technical evaluation of customer's facility must demonstrate a positive cost-benefit and project payback period of less than five year.

10. Utility Rebate Program

Energy Efficiency Fund/Residential New Construction-Electric & Gas. The Residential New Construction Program provides rebates to CL&P and UI customers who incorporate energy efficiency measures into new home construction.

Energy Efficiency Fund/Groton and Norwich Public Utilities-Residential. Connecticut electric and gas companies offer rebates to residential customers who include energy efficiency design in new home construction, weatherization, and some ENERGY STAR central air-conditioning or heat pumps.

Energy Efficiency Fund/Groton and Norwich Public Utilities-Commercial and Industrial. Connecticut electric and gas companies offer rebates to commercial customers who include

²¹³ C.G.S. § 16-1

energy efficiency design in new construction, replace outdated inefficient equipment, install high efficiency air conditioning, heat pumps, lighting, electric ovens, and participate in technical support and training.

11. Building Permit Fee Waiver

Building Permit Waiver. Connecticut municipalities can pass local ordinances that exempt applicants from paying building permit fees for Class I renewable projects.

C. Rules, Regulations, and Policies

1. Building Code

Building Energy Code. Recently, Connecticut revised its building code so that buildings are more energy efficient and newly constructed buildings must comply with green building guidelines.

2. Solar/Wind Contractor Licensing

Contractor Licensing. The Department of Consumer Protection grants licenses to contractors who perform “solar thermal/electrical work.”²¹⁴

3. Green Power Purchasing

CT Clean Energy Communities. More than 100 Connecticut municipalities have agreed to purchase 30% of electricity from renewable energy sources by 2015. Municipalities must agree to the Clean Energy Communities requirements.

Green Power Purchasing. Connecticut law requires state agencies to purchase electricity produced by renewable sources. Currently, agencies are required to purchase 20% of its electricity from Class I sources. The State’s goal is to purchase 100% of its electricity from Class I sources by 2050.²¹⁵ The Environmental Protection Agency’s National Top 50 Green Power Partnership list includes Connecticut.

4. Energy Efficiency Resource Standards

Renewable Portfolio Standards - Energy Efficiency Standards. Connecticut’s RPS requires electric suppliers and distributors to acquire at least 23% of its retail load from renewable energy sources by January 2020. Currently, electric suppliers and distributors’ retail load must include 7% of Class I, Class II and Class III renewables.^{216,217} Companies can satisfy RPS by purchasing renewable energy certificates. Electric companies must satisfy other requirements as well.

5. Energy Standards for Public Buildings

Energy Efficiency Requirements for State Government. State agencies and Universities are required to:

- 1) purchase equipment that meets the federal Energy Policy and Conservation Act’s Energy Star standards;
- 2) reduce energy consumption in state owned or leased buildings by 10% no later than January 2013;²¹⁸ and

²¹⁴ C.G.S §20-230

²¹⁵ Executive Order 32, April 22, 2004

²¹⁶ Class II power is generated from trash to energy facilities, certain biomass not included in Class I, and older hydropower facilities

²¹⁷ Class III power is generated from combined heat and power systems that are at least 50% efficient.

²¹⁸ This energy efficiency requirement was the impetus for Connecticut’s Lead by Example initiative, which focuses on energy conservation.

- 3) reduce energy consumption in state owned or leased buildings by 20% no later than 2018.

State funded building projects of at least \$2 million are required to:

- 1) comply with the U.S. Green Building Council's LEED silver rating for new construction or renovation projects;²¹⁹
- 2) exceed Connecticut building code or ASHRAE energy standards by 21%; and
- 3) implement 26 of 60 efficiency strategies outlined in building regulations.

6. Net Metering

Net Metering. CL&P and UI are required to provide net metering to customers who generate electricity from Class I renewable energy sources.²²⁰ Customers carry over their “net excess generation” (“NEG”) monthly.²²¹ Annually, the utility pays the customer retail value for the NEG or Kilowatt hours.²²²

Virtual Metering. Municipal customers can participate in virtual net metering and generate electricity from Class I renewables for the municipal host and additional “beneficial accounts.”

7. New Technologies

Microgrids. Connecticut municipalities have considered developing a “neighbor to neighbor” energy producing microgrid.²²³ Microgrids reduce energy demand on the utility company grid while increasing reliability. If the main grid lost power, residents would still be able to generate electricity. Thus, recovery time would be lessened. The goal is to mitigate energy loss by shortening the transmission distance. That is, by placing the power generation systems near the end-user.

²¹⁹ C.G.S. §16a-37k

²²⁰ Net metering measures a customer's contribution to the electrical grid.

²²¹ The amount of electricity generated that the customer does not consume.

²²² C.G.S. § 16-243h

²²³ There are technological and legal constraints that need to be addressed before microgrids can be distributed for statewide use.

D. Funding

1. The Clean Energy Finance and Investment Authority

Public Act 11-80 created the nation's first "green bank" in the Clean Energy Finance and Investment Authority. CEFIA's role is to manage and develop programs to finance the renewable energy goals of the state. In doing so, CEFIA offers incentives that encourage municipalities, businesses, and individuals to pursue clean energy technology and projects.

2. Public Benefits' Fund

Connecticut Clean Energy Fund. Utility companies charge ratepayers a fee, which is allocated to the Connecticut Clean Energy Fund ("CCEF"). The CCEF's purpose is to finance renewable energy projects such as solar-electric energy, wind energy, wave energy, fuel cells and geothermal, which have the potential for commercialization. Usually, \$20 million is allocated to the fund annually. CEFIA manages the CCEF.

The Energy Efficiency Fund. Utility companies charge ratepayers a fee, which is allocated to the Energy Efficiency Fund. The fund is used to promote energy efficiency, pollution reduction, and energy security. In addition to ratepayers' fees, the Regional Greenhouse Gas Initiative, the Forward Capacity Market, and American Recovery Act Funds have been allocated to the fund.

Connecticut law also requires municipal electric utility companies to charge ratepayers a fee, which is used to establish town energy efficiency and conservation and load management programs.²²⁴

²²⁴ C.G.S. § 7-233y

E. Conclusion

Connecticut has created many financial and other incentives making it easier for governments, businesses, and residents to develop and use energy efficiency technologies. Thus, residents can prepare for future energy losses by including renewable energy sources in their storm mitigation plans.

If the necessary planning and procedures are in place, the energy recovery phase can use and expand upon existing programs by making certain energy efficiency standards mandatory, instead of discretionary. In addition, the State could make existing incentives stronger, so that most businesses and individuals will take advantage of them. This combined approach of stronger replacement standards and enhanced incentives can turn an energy disaster into a recovery that simply does not establish the status quo, but rather creates a more resilient and sustainable and more efficient system.

X. APPENDICES

- Appendix A: Connecticut Siting Council, *White Paper on the Security of Siting Energy Facilities*
- Appendix B: Connecticut Light & Power, *Electric Utility Line Maintenance Plan*
- Appendix C: United Illuminating, *Maintenance Plan for Transmission and Distribution Overhead and Underground Lines*
- Appendix D: Public Utility Regulatory Authority, *What is the Gas Pipeline Safety Unit?*
- Appendix E: Department of Energy & Environmental Protection, *2012 Integrated Resource Plan for Connecticut*
- Appendix F: Department of Energy & Environmental Protection, *Comprehensive Energy Strategy*
- Appendix G: Department of Energy & Environmental Protection, *Study of the Impact of the Regional Independent System Operator on Connecticut Ratepayers and the New England and State Wholesale Electric Power Markets*
- Appendix H: Connecticut Light & Power, *2012 Forecast of Loads and Resources*
- Appendix I: United Illuminating, *Report to the Connecticut Siting Council on Loads and Transmission Resources*
- Appendix J: Electric and Natural Gas Utility Companies, *2012 Electric and Natural Gas Conservation and Load Management Plan*
- Appendix K: Department of Energy & Environmental Protection, *Final Determination to Approve 2012 Conservation and Load Management Expanded Plan and Budget*
- Appendix L: Public Utility Regulatory Authority, *2012 Annual Report to the General Assembly on Electric Distribution Company System Reliability*
- Appendix M: Department of Energy & Environmental Protection and Department of Administrative Services, *Lead By Example Legislative Report July 2012*
- Appendix N: Public Act No. 12-148, *An Act Enhancing Emergency Preparedness and Response*
- Appendix O: Division of Emergency Management & Homeland Security, *Proposed Process for Enhancement of State Preparedness Planning*
- Appendix P: Governor Malloy Press Release, *Gov. Malloy Announces Storm Disaster Preparedness & Recovery Initiatives*

- Appendix Q: Witt Associates, *Connecticut October 2011 Snowstorm Power Restoration Report*
- Appendix R: Public Utility Regulatory Authority, *Investigation of Public Service Companies' Response to 2011 Storms Decision*
- Appendix S: Two Storm Panel, *Report of Two Storm Panel*
- Appendix T: Connecticut Geospatial Information Systems Council, *Storm Response and Recovery Assessment Group Findings Report*
- Appendix U: Division of Emergency Management & Homeland Security, *State Response Framework Version 2.0*
- Appendix V: Division of Emergency Management & Homeland Security, *Connecticut Emergency Support Function #12Draft*
- Appendix W: Division of Emergency Management & Homeland Security, *Local Emergency Support Function #12Template*
- Appendix X: State of Connecticut, *1994 Energy Emergency Plan*
- Appendix Y: Division of Emergency Management & Homeland Security, *Commodities Distribution Standard Operating Procedure*
- Appendix Z: Connecticut Light & Power, *Emergency Preparedness and Response Plan*
- Appendix AA: United Illuminating, *Emergency Preparedness Plan*
- Appendix AB: Groton Utilities, *Emergency Preparedness Plan*
- Appendix AC: Jewett City Department of Public Utilities, *Emergency Plan*
- Appendix AD: South Norwalk Electric and Water, *Municipal Electric Utility Emergency Plan*
- Appendix AE: Norwalk Third Taxing District Electric Department, *Emergency Plan*
- Appendix AF: Norwich Public Utilities, *Emergency Operations Plan-Electric Emergencies*
- Appendix AG: Wallingford Department of Public Utilities Electric Division, *Emergency Response Plan*
- Appendix AH: Yankee Gas Services, *Emergency Preparedness and Response Plan*
- Appendix AI: Connecticut Natural Gas and Southern Connecticut Gas, *Emergency Preparedness Plan*
- Appendix AJ: Norwich Public Utilities, *Emergency Plan-Gas*

Appendix AK: List of Public Utility Regulatory Authority Dockets Relevant to Energy Assurance

Appendix AL: List of Bureau of Energy & Technology Policy Filings Relevant to Energy Assurance