Rhode Island EERMC Member Handbook

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STATE OF RHODE ISLAND
ENERGY EFFICIENCY &
RESOURCE MANAGEMENT COUNCIL

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SECTION 1: WHAT IS ENERGY?

1.1) What is Energy?

Fundamentally, energy is the ability to do work. Our modern society is dependent on energy for many daily operations, such as lighting, heating, cooling, manufacturing, and transportation. Most of the energy used in the United States comes from non-renewable sources, which cannot easily be replenished. Renewable sources of energy, those that can be replenished, are less prolific but have growing markets (Table 1.1) (EIA, 2018).

Table 1.1: Energy Sources Used in the United States

Non-Renewable Sources	Renewable Sources
• Coal • Hydrocarbon gas liquids • Natural gas • Nuclear energy • Petroleum products	• Biomass (energy from plants) • Geothermal energy (heat inside the Earth) • Hydropower (flowing water) • Solar energy • Wind energy

1.2) How is Energy Measured?

All forms of energy can be measured. Common types of energy and their units of measure include:

- Electricity: kilowatt hours (kWh), megawatt hours (MWh)
- Natural gas: 100 cubic feet (Ccf), therms, decatherms
- Liquid petroleum or biofuels: barrels (bbl) or gallons (one barrel = 42 gallons)
- Coal: tons, metric tons

In order to compare different types of energy, their measurements must be converted to the same units. Typically, that will be the British thermal unit (Btu), a measure of heat energy. Some examples of Btu conversions include:

- 1 gallon of gasoline = 120,476 Btu
- 1 cubic foot of natural gas = 1,037 Btu
- 1 gallon of propane = 91,333 Btu
- 1 kilowatt hour of electricity = 3,412 Btu

(EIA, 2018)

1.3) How is Energy Produced?

Since energy can neither be created nor destroyed, all human engineered energy has been converted from one form to another. Energy is transformed differently depending on the energy source and the technology being used. For example, natural gas, oil and coal can be burned to produce heat directly or to spin turbines with magnets that generate electricity. Wind turbines and solar photovoltaics (PV) harness energy from the wind and sun to produce electricity. Heat from solar thermal technology can be used directly to heat water or ventilation air.

More information: https://www.energy.gov/science-innovation/energy-sources

1.4) How Is Energy Delivered?

1.4.1) Electricity Transmission and Distribution

In the United States, electricity is primarily generated from fossil fuel power plants and transmitted across a vast grid of substations, transformers, and power lines. *Transmission* lines carry high-voltage electricity long distances to the area where it will be used. Once it reaches a local substation, a transformer lowers the voltage, so it is safer for use in homes and businesses, and sends it through *distribution* lines to the end-user (Figure 1.1). Transmission systems are managed by Regional Transmission Organizations (RTOs), which also have the responsibility of working with power generators to ensure that enough electricity is available to meet demand at all times (EIA, 2018). Distribution systems are managed more locally by electric distribution companies, also known as utility companies.

New England's power grid is managed by ISO New England. Within Rhode Island, the majority if the electric distribution system is managed by National Grid, the state's primary utility company (RI OER, 2019).

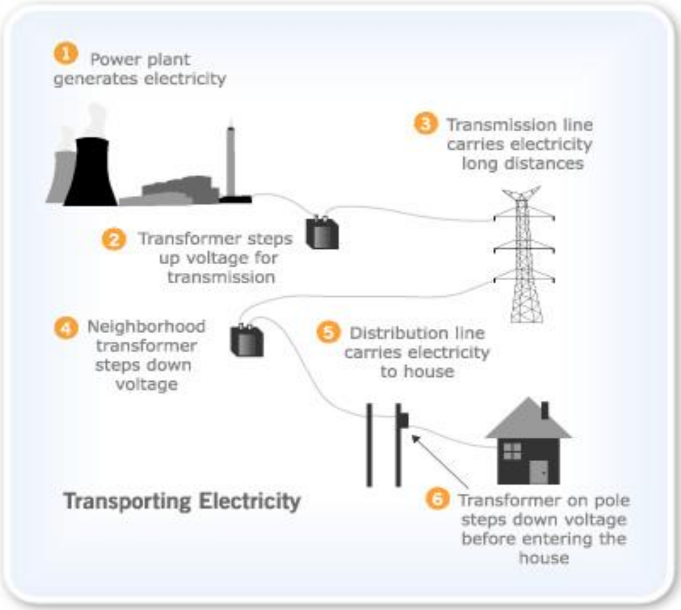

Figure 1.1. Transporting Electric Energy
Source: www.solarschools.net

More information:

- ISO/RTO Council (https://isorto.org/)
- ISO New England (https://www.iso-ne.com/)
- RI Office of Energy Resources (http://www.energy.ri.gov/electric-gas/electricity/learn-about-electricity.php)

1.4.2) Natural Gas and Delivered Fuels

After natural gas is extracted and processed, it must be transported to end users like power plants for electric generation or homes and businesses for heating. Like the delivery of electricity, the delivery of natural gas involves first piping the fuel through wide-diameter *transmission* pipelines across long distances. When the natural gas arrives in the area where it will be used, it is received by smaller diameter *distribution* pipes, also known as mains and service lines, that connect directly to the end-use facility (EIA, 2019). Because natural gas is not native to New England, it is piped in from production areas in the Appalachian region, the Gulf Coast, and Canada. National Grid, Rhode Island's only natural gas distribution company, manages the retail delivery of gas to end users in the state (OER, 2019).

Petroleum-based fuels have a similar story. After the crude oil has been collected from wells in a production field, pipelines, barges, trains, or trucks transport it to refineries or ports for shipment on oil tankers to other countries (EIA, 2018). Almost all of the transportation and heating fuel consumed in Rhode Island, eastern Connecticut, and parts of Massachusetts are supplied via marine shipments through the Port of Providence and other marine import terminals in East Providence and Tiverton (EIA, 2018). Most of the product arriving at the terminals is subsequently trucked to end users. Because Rhode Island does not regulate retail sales of heating oil and propane, sales are managed primarily by local delivered fuel dealers. (OER, 2019).

1.6) Forms of Energy in Rhode Island

1.6.1) Electricity

Electricity used in Rhode Island is an integrated mix from a variety of power plants and distributed renewable energy sources located throughout the region (Figure 1.2) (National Grid, 2018).

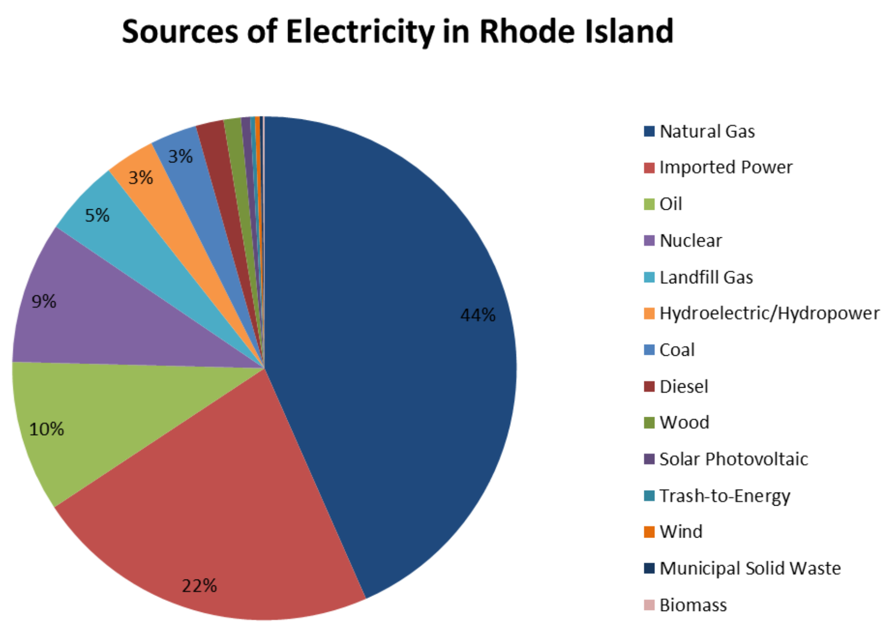

Figure 1.2. Sources of Electricity in Rhode Island
Source: www.nationalgridus.com

There are six power plants located in Rhode Island, which have a collective generating capacity of 2 gigawatts (GW). Almost all of these plants use natural gas as the primary fuel (EIA, 2018). As of December 2016, Rhode Island also had approximately 2,150 distributed renewable energy systems representing approximately 100 MW of wind, solar, and hydropower capacity (OER, 2019). All of this in-state generation gets fed into the regional electric grid and combined with many other generation sources.

1.6.2) Heating

In addition to being used for electricity, natural gas is also used directly as a source of heat for roughly half of Rhode Island's households. Another third of Rhode Islanders use fuel oil as the primary energy source for heating their homes (EIA, 2018). In recent years, heat pumps have started becoming more widely used in Rhode Island. Air source heat pump technology transfers heat in and out of a building to provide efficient space heating as well as cooling (OER, 2019).

1.6.3) Transportation

Much of the transportation sector in Rhode Island is fueled by petroleum products such as motor gasoline, which is required to be mixed with ethanol to limit ozone formation (EIA, 2018). As alternative fuel vehicles (AFVs) gain traction, supporting infrastructure like electric charging stations and biodiesel fueling stations are available throughout the state (DOE, 2018). Overall, Rhode Island hosts 318 motor gas fueling stations, 7 liquefied petroleum gas stations, 80 electric charging stations, and 4 compressed natural gas/alternative fuel stations (EIA, 2018).

1.7) How Do Rhode Islanders Use Energy?

Rhode Island relies on energy for three major purposes: end use electric consumption, thermal energy demand, and transportation applications (Figure 1.3). The state's energy consumption is split fairly evenly among the three main areas of energy use; however, different sources supply demand in each sector. The electric sector is highly dependent on natural gas, whereas the transportation sector is virtually entirely dependent on petroleum fuels such as gasoline and distillate fuel (diesel). Both natural gas and petroleum fuels supply thermal energy needs (OER, 2015).

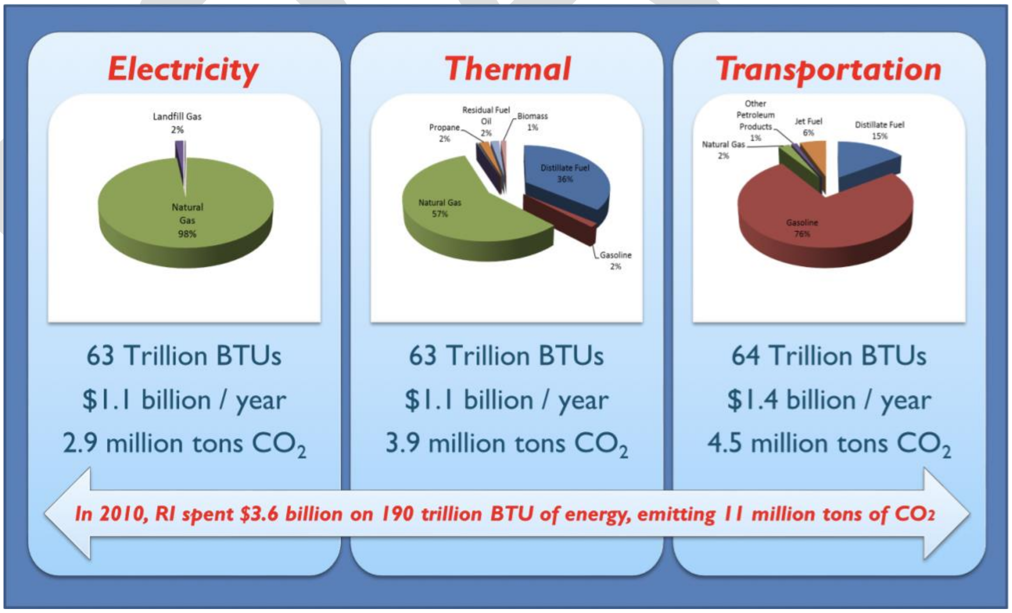

Figure 1.3. Rhode Island's Total Energy Profile 2010
Source: Energy 2035: Rhode Island State Energy Plan

Rhode Island has among the lowest energy consumption per capita in the country, in part because there is not much manufacturing and industry. The residential and transportation sectors are the largest consumers, with the commercial sector following close behind (EIA, 2016).

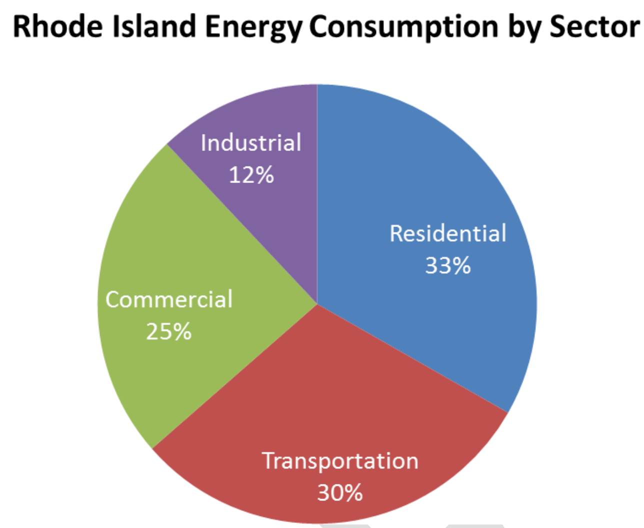

Figure 1.3. Rhode Island Energy Consumption by Sector in 2016
Source: www.eia.gov

1.8) Energy Efficiency and Conservation

Energy efficiency and energy conservation are strategies to reduce the demand of energy. Both strategies reduce demand which reduces costs for utility ratepayers.

- **Energy conservation** occurs when less energy is used as a result of a *behavior*, such as turning off the lights or setting back your thermostat.
- **Energy efficiency** is when *technology* is employed that uses less energy to produce the same result. For example, an LED light bulb can produce the same amount of light as an incandescent bulb, but it is significantly more efficient because it requires less energy (EIA, 2019).

Maximum energy savings can be achieved when both energy efficiency and energy conservation provide are used together. There countless examples of efficiency and conservation measures. Some of the most impactful, and therefore common, measures for the residential and commercial sectors are: lighting, insulation, air sealing, heating and cooling systems, thermostats, appliances, water heating, windows, electronics, and transportation (DOE, 2014). Energy efficiency programs can help ratepayers identify and implement efficiency and conservation measures to lower their energy bills. Section 7 covers Rhode Island's energy efficiency programs in more detail.

1.9) Additional Resources

- https://www.eia.gov/energyexplained/index.php?page=about_home
- https://www.energy.gov/science-innovation/energy-sources
- https://www.eia.gov/energyexplained/index.php?page=electricity_delivery

- https://www.eia.gov/state/analysis.php?sid=RI#26
- https://www.nationalgridus.com/media/pdfs/billing-payments/bill-inserts/ri/cm4391_ri-edisclosure.pdf
- https://afdc.energy.gov/states/ri

SECTION 2: HISTORY OF ENERGY EFFICIENCY IN THE UNITED STATES

2.1) Energy Efficiency as a Resource

In general, two options exist to meet the energy needs of consumers, businesses, and institutions:

1. Using sources of energy supply (from natural gas, petroleum, renewable energy, etc.), or
2. Reducing energy demand (from energy conservation or investments in energy efficiency) (OER, 2015).

In other words, energy efficiency is capable of displacing energy supply. Because efficiency programs are generally significantly cheaper to implement than acquiring conventional supply (e.g. buying electricity), efficiency is now widely considered not only a resource, but often the "first fuel" of choice. Efficiency programs can also defer expensive upgrades to utility infrastructure, improve system reliability, reduce peak demand, and increase energy security (Yang, 2015).

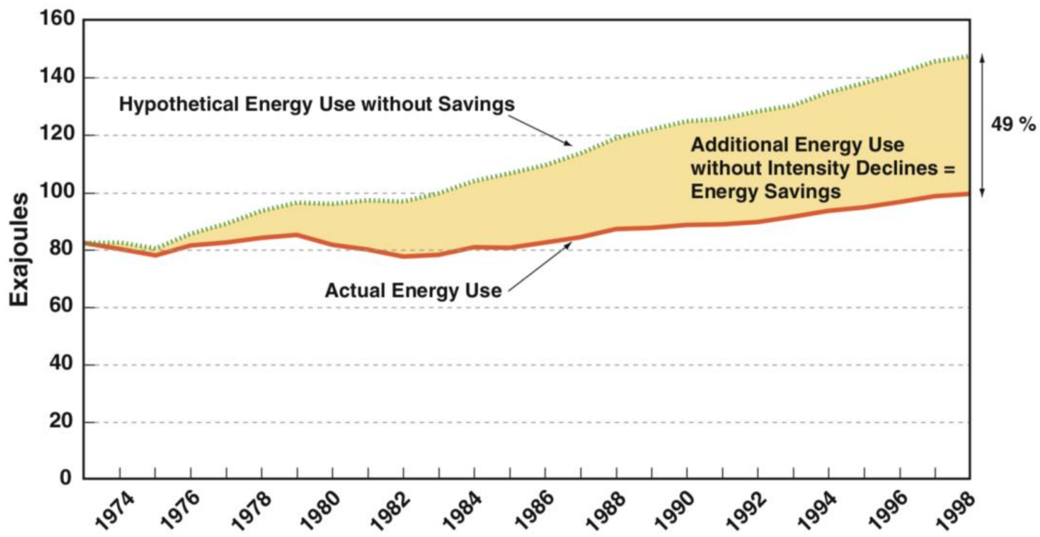

Figure 2.1. Impact of energy efficiency on total energy use in IEA countries
Source: Yang, 2015

2.2) Energy Efficiency as a Strategy for Demand Side Management

On a fundamental level, a utility company is concerned with two main aspects of energy:

1. The supply side – the procurement of energy resources, and
2. The demand side – the use of energy resources.

Managing the demand side means encouraging ratepayers to modify their energy use by either using less energy overall or by moving the time of energy use to off-peak times (when energy consumption is lowest) such as nighttime and weekends. The main goal of Demand Side Management (DSM) is to mitigate the need for costly investments in utility infrastructure that might be needed to accommodate rising peak demand.

Energy efficiency programs (including energy conservation) represent one type of DSM, as they offer consumers financial and behavioral incentives to implement energy saving measures in their homes, businesses, and facilities. The result is avoided infrastructure investments, which keeps costs low while still ensuring a steady supply of energy (EIA, 2002).

2.3) Where Demand Side Management Began

In the 1970's, growing concerns over the United States' reliance on foreign oil and the environmental impacts of electric generation led to the development of Demand Side Management (DSM). During the 1980's, public utilities commissions began using least-cost planning principles and offered utilities incentives to establish DSM programs, resulting in rapid growth into the early 1990's (Eto, 1996).

Focus on electric industry restructuring (see Section 4.1.1) in the mid 1990's caused a decline in DSM investments. Growth resumed in the late 1990's as states began creating DSM funding mechanisms, like "public benefits" funds (DOE, 2009). Since then, investments in demand-side resources have steadily increased. In 2016, spending on electric energy efficiency programs (both utility and nonutility programs) totaled $6.8 billion compared to $1.6 billion in 2006 (CEE, 2017).

2.5) Additional Resources

- Energy Efficiency as a Resource: https://www.springer.com/cda/content/document/cda_downloaddocument/9781447166658-c2.pdf?SGWID=0-0-45-1494788-p177249982
- History of Demand Side Management: https://www.energy.gov/sites/prod/files/oeprod/DocumentsandMedia/adequacy_report_01-09-09.pdf
- Recent Demand Side Management Trends: https://library.cee1.org/system/files/library/13561/CEE_2017_AnnualIndustryReport.pdf

SECTION 3: UTILITIES REGULATION

3.1) History of Utility Regulation and Energy Efficiency

Utilities historically had two main functions: power generation and power distribution. While power generation can be a competitive, non-monopoly industry (detailed further below), power distribution is a natural monopoly. The monopoly arises because the costs of creating multiple, competing power distribution grids in the same region would be too great compared to possible gains or cost reductions from competition. Public Utilities Commissions, or equivalent bodies, regulate monopolies like utilities to prevent the abuse of monopoly power.

3.1.1) Utility Restructuring and Deregulation

Traditionally, utilities offered both power generation and distribution services, and the costs of power generation and distribution were both included in calculations for cost-based regulation. However, in the 1990s, due to rising costs and the subsequent increasing regulatory burden, some states began a process of restructuring the utility business model by separating the functions of power generation from distribution. Utilities were required to sell off their power generation assets but continued to be responsible for delivering energy to consumers and maintaining the distribution infrastructure (e.g. poles, wires, transformers, substations, etc.)

Relatedly, many states also deregulated the power supply market, allowing for independent, non-utility power producers to sell their power directly to the end-use customer at unregulated rates in an open marketplace. In deregulated states, like Rhode Island, utilities no longer generate power and focus solely on maintaining the power delivery system.

3.1.2) Rate of Return Regulation

Rate of Return (RoR) regulation is a method of compensating private companies, often called legal monopolies, who supply a marketplace with a natural monopoly structure, such as electricity distribution. Because the market is best suited to having a single distribution utility in a given region, it is important for regulators to ensure that consumers are treated fairly while still allowing a reasonable rate of return on investment for the utility.

3.1.3) Cost Based Regulation

A common regulatory model is cost-based regulation, in which a regulator determines how much money a utility must make to recover its costs (plus earn a reasonable return on infrastructure investments) and allows the utility to base its rates on that.[1] On its own, cost-based regulation can incentivize utilities to sell more power because the more energy they sell, the more money they earn. Any amount earned over the set rate of return can be kept as profit. Additionally, they earn more if they invest

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[1] In cost-based regulation, regulators identify the costs needed to provide adequate, reliable power on well-maintained infrastructure, allow a return on utility infrastructure investments, and divide the sum of the costs, allowed return, and a depreciation allowance by the projected total sale of energy units. For utilities that provide both power generation and distribution, the calculated costs include power generation costs. Regulators determine a set amount for utilities to recover annually on their capital investments (typically 9-10%). This is lower than the average return on equity across all industry, in part because utility investments are seen as less risky than the industry average.

more in capital upgrades, as the returns are calculated as a percent of capital investments. This provides a strong disincentive for the utility to provide efficiency programs.

3.1.4) Revenue Decoupling

Revenue decoupling is an increasingly common way to regulate how a utility gets paid. It breaks the link between the utility's revenue and the amount of energy it sells, removing the disincentive for the utility to be a full partner in energy efficiency and clean resource investments. Decoupling changes only the way the utility is compensated for its distribution costs. Under decoupling, delivery charges are not based on sales, but rather on how much it costs to run the system and maintain the grid.

Some states, like Rhode Island, have policies which decouple the amount of power sold from the amount of revenue earned by the utility. For example, National Grid undergoes an annual review to "true up" the profits earned from selling power and match them to the allowed rate of return. If National Grid sells less power than expected, they are allowed to collect additional funds in the future to match the revenue requirement. If they sell more power than expected (as has been the case in recent years), they return money to the ratepayers.

3.1.5) Utility Business Model and Energy Efficiency

A traditional utility business model, when subjected to rate of return (RoR) regulation, incentivizes investment in physical infrastructure and energy sales, because these investments yield increased income (since income = investment * RoR). As a result, utilities have historically felt tension between the goals of energy efficiency policies and their fiduciary duty to shareholders. Fortunately, policy solutions to these poorly aligned incentives have proven effective. For example, in Rhode Island, utility companies receive financial incentives for achieving energy efficiency savings targets. This model has largely been able to overcome the tension between rate of return regulation and energy efficiency, in part because the state's efficiency programs are well-run and utility regulators set and enforce appropriate incentives.

3.1.6) Performance Based Regulation

Performance-based regulation (PBR) is an alternative to cost-based regulation. While there are different types, typically PBR attaches utility earnings to the achievement of specific goals or metrics. Rather than utility profit increasing as utility investment increases, utility profit increases as performance improves. For example, a utility is allowed to earn a higher return if it achieves certain performance goals (also known as Performance Incentive Mechanisms or PIMS) like energy efficiency, peak reductions, Distributed Energy Resources integration, or data sharing.

3.2) Utility Structures

Utility companies can have a range of structures, and it is important to understand what the key differences among these are. This section will define and highlight key distinctions among three of the most common structures, Investor-Owned Utilities (IOUs), Publicly Owned Utilities (POUs), and Cooperative Utilities (Coops).

- **Investor-Owned Utility** – Privately owned companies, these utilities are typically subject to state regulation, often have portfolios that span multiple fuels (most commonly electricity and natural gas) and are financed through a combination of shareholder investments and debt. *A key feature of IOUs is their fiduciary duty to shareholders.*

- **Publicly-Owned Utility** – These utilities, sometimes referred to as municipal utilities, are owned by a governmental or municipal entity. As a result of this, in contrast to with IOUs, there is a presumption that these utilities are managed with the customers' interests in mind, because they are part of the public sector and thus vested with the public interest rather than shareholder interests. *A key feature is that these utilities are sometimes exempt from state regulations due to this presumption.*

- **Cooperative Utilities** – Cooperative utilities are owned by their customers. As with other customer-owned businesses, they are typically governed by a board of directors, while day-to-day management falls to employees. Coops are common in rural areas, and *due to their customer-owned structure, the board of directors often provides primary regulatory oversight.*

Rhode Island's primary utility company, National Grid, is a private investor-owned distribution utility company. Pascoag Utility District and Block Island Power Company are both publicly-owned by their respective municipalities.

3.7) Additional Resources

- Utility Regulation and Policy:
https://aceee.org/topics/utility-regulation-and-policy
- Utility Structures:
https://marketrealist.com/2014/09/must-know-structure-electric-utility-industry
- Rate of Return Regulation / Utility Business Model and Energy Efficiency:
https://www.investopedia.com/terms/r/rate-of-return-regulation.asp
- Strategic Energy Management:
https://aceee.org/files/proceedings/2014/data/papers/4-1119.pdf
https://www.energy.gov/eere/slsc/data-driven-strategic-energy-management

SECTION 4: ENERGY EFFICIENCY IN RHODE ISLAND

Rhode Island is widely recognized as a leader in the nation for energy efficiency policy, programs, and outcomes. While many factors, including dedicated staff at all levels of energy efficiency policy, programs, and implementation, the regulatory structure in Rhode Island is a key enabler of the state's consistent performance. This section describes the landmark legislation that propelled Rhode Island to the top, provides an overview of the key groups that contribute to energy efficiency efforts, and highlights Rhode Island's recent energy efficiency accomplishments and opportunities for improvement.

4.1) Landmark Legislation

Rhode Island is a deregulated, decoupled state that uses performance-based utility regulation (see Section 3). The utility's profit does not change based on how much energy it delivers to homes and businesses. In fact, if the utility sells more energy than expected, ratepayers receive a credit on their bills at the end of the year. If it sells less, ratepayers receive a surcharge.

Not only does the utility *not* have an incentive to sell more energy, its investment in energy efficiency is actually cheaper than buying energy. Selling less energy also reduces strain on infrastructure, lowers greenhouse gas emissions and air pollution, and fosters economic growth and job creation.

Rhode Island has nearly two decades of concerted energy efficiency efforts under its belt. The following subsections describe the landmark legislation that removed barriers and enabled Rhode Island to effectively invest in energy efficiency.

4.1.1) Rhode Island Utility Restructuring Act (1996)

Prior to 1996, Rhode Island utilities owned both power generation facilities and all the transmission and distribution infrastructure (poles and wires) to get that power to your home or business. When consumers wanted more electricity, the utility profited from both supplying that power *and* delivering it. This business model did not allow for a competitive energy supply market and prevented ratepayers from choosing lower-cost supply alternatives.

In 1996, Rhode Island joined four other New England states in restructuring the utility by effectively unbundling the energy supply and distribution functions of the utility. The utility was required to sell off its power generation assets (e.g. all power plants it had previously owned) but maintain nondiscriminatory access to distribution infrastructure for all retail customers and nonregulated power producers.

Importantly, this legislation also deregulated the power supply market, allowing for power plants to sell their power competitively in an open marketplace. Ratepayers can now choose to purchase power from any of these "third party suppliers". For customers who prefer a default supply of power, the utility purchases power from a mix of suppliers and passes that supply cost directly through to ratepayers. If the cost of default supply (also called "Standard Offer Service") increases, then the cost on the ratepayer's bill will increase, but the utility does not profit from it.

The other key aspect of the Utility Restructuring Act was the creation of the nation's first public benefits fund, known as the Systems for demand-side management and renewable energy resources, which funded utility investment in energy efficiency (i.e. programs that incentivize energy-saving measures like insulation, air sealing, and higher-efficiency lighting, HVAC systems, and appliances).

More information:

- Utility Restructuring Act: http://www.energy.ri.gov/policies-programs/ri-energy-laws/rhode-island-utility-restructuring-act-1996.php
- Third Party Suppliers: http://www.ripuc.org/utilityinfo/electric/compfaq.html

4.1.2) Least Cost Procurement (2006)

This groundbreaking statute established a new economic model for efficiency investment in Rhode Island. Officially called the "Comprehensive Energy Conservation, Efficiency and Affordability Act", it requires electric and natural gas distribution companies to procure energy supply (including energy efficiency) that is the least costly. When considering which supply to purchase, utilities must invest in *all cost-effective efficiency* that is *less than the cost of supply* as well as prudent and reliable.[2] In this way, Rhode Island treats energy efficiency as equivalent to a power generation resource and its first fuel of choice.

Benefits of Least Cost Procurement:

- avoided costs of energy supply
- avoided costs of energy capacity
- avoided transmission & distribution costs
- wholesale market price (electricity rates) suppression
- avoided cost of environmental compliance
- utility non-energy benefits
- participant non-energy benefits
- environmental benefits
- macro-economic benefits

Costs of Least Cost Procurement:

- costs of running the energy efficiency program
- cost of any financial incentives paid to program participants
- costs the participants pay out-of-pocket

The sum of all benefits must be larger than the sum of all costs for energy efficiency to be considered cost-effective. Not only does the energy efficiency have to be cost-effective, it must also cost less than it would to buy the equivalent amount of actual energy from traditional sources.[3] The statute also required the utility to begin submitting Annual and Three-Year Energy Efficiency Procurement Plans and established the Energy Efficiency and Resource Management Council to oversee the efficiency programs. As a result of Least Cost Procurement, Rhode Island now leads the country in efficiency investments per capita and realizes hundreds of millions of dollars in benefits to ratepayers every year.

More information:

- Comprehensive Energy Conservation, Efficiency and Affordability Act of 2006 (R.I.G.L. § 39-1-27.7.1): http://webserver.rilin.state.ri.us/Statutes/title39/39-1/39-1-27.7.HTM

[2] Cost-effective means that the benefits of energy efficiency are greater than the costs of energy efficiency. All benefits and costs are specified in the Rhode Island Test (formerly the Total Resource Cost Test). The cost of power supply is typically around 10 cents per kilowatt-hour (kWh) for homeowners. The cost of energy efficiency is typically around 4 cents per kWh saved. In other words, the cost of saving energy is generally cheaper than the cost to supply that energy. Equivalently, the ratio of benefits to costs (a.k.a. the benefit-cost ratio) must be greater than 1.000.

[3] On the electric side, for example, the cost of kWh saved over the lifetime of the investment is averaged across the entire efficiency program portfolio. The cost of supply used for this critical comparison is the price-per-kWh of electricity charged to residential consumers who choose the default Standard Offer Service supply of electricity.

- Least Cost Procurement:
  http://www.energy.ri.gov/policies-programs/ri-energy-laws/least-cost-procurement-2006.php
  https://aceee.org/files/proceedings/2012/data/papers/0193-000255.pdf
- Least Cost Procurement Standards:
  https://rieermc.ri.gov/least-cost-procurement-standards-2017/

4.1.3) Revenue Decoupling (2010)

After the Utility Restructuring Act and Least Cost Procurement removed critical barriers for utility investment in energy efficiency, the Revenue Decoupling Act of 2010 (R.I.G.L. § 39-1-27.7.1) severed the final link between utility profits and sales volume. Before 2010, the utility profited on how much power it delivered to homes and businesses. Delivering more power meant higher profits, even though the utility did not profit on supplying that power (since Restructuring in 1996).

Least Cost Procurement mandated that utilities invest in energy efficiency, which inherently decreased sales volume and, therefore, profits. Decoupling resolved this tension by tying the size of the distribution charge to the actual costs of maintaining the distribution system (the utility's revenue requirement), rather than the amount of energy sold.[4]

Furthermore, the utility has an opportunity to earn a performance-based incentive based on meeting energy savings targets each year (see Section 3.2.3 *Performance Based Regulation)*. The result is that Rhode Island utilities have no disincentive to invest in energy efficiency and do have an incentive to meet energy savings targets.[5]

More information:

- Revenue Decoupling Law (R.I.G.L. § 39-1-27.7.1):
  http://webserver.rilin.state.ri.us/Statutes/TITLE39/39-1/39-1-27.7.1.HTM
- Rhode Island's Performance Based Incentive:

6.9) Utility Performance Incentive Structure

National Grid is given the opportunity to earn 5% of the total energy efficiency spending budget for achieving 100% of the energy savings goals approved by the Public Utilities Commission. It is worth noting that Rhode Island offers one of the lowest performance incentives for energy efficiency in the country, while achieving highest-in-the-nation energy savings goals. The median award among states with similarly-designed performance incentives is 8%, with a low of 4.2% and a high of 15% (ACEEE, 2015). The performance incentive signals that utility executives must take energy efficiency seriously in Rhode Island and devote the necessary resources to achieving the energy savings goals set by the Public Utilities

[4] Utilities must justify these costs in a rate proceeding before the Rhode Island Public Utilities Commission. If the utility over-collects, customers receive a credit on their bills; if the utility under-collects, customers pay a surcharge.

[5] This legislation can affect energy distribution rates and ratepayer bills by either affecting the amount of energy sold or the revenue requirement (how much the utility is allowed to make each year). Rates are determined by dividing the revenue requirement by the forecasted sale of energy. If ratepayers reduce energy use, then the amount of energy sales will decrease and lead to an increase in rates. Even though there is upward pressure on rates, ratepayer bills will decrease because they use less energy. If energy efficiency investments are sufficient to reduce strain on the energy system or defer/prevent the need for additional energy infrastructure, costs to build and maintain the energy system will decrease. Since the approved revenue requirement is directly linked to costs of maintaining the distribution system, the revenue requirement would decrease, causing rates to decrease.

Commission. The benefits to Rhode Island consumers far outweigh the cost of both the energy efficiency investment and the performance incentive reward (EERMC, 2015).

Rhode Island has had a shareholder incentive for electric and gas since 2005 and 2007, respectively. The Narragansett Electric Company, d/b/a National Grid (NG), can earn incentives for both electric (kWh) and gas (MMBtu) savings. There is a target base incentive rate of 5% for both electric and gas in 2010 applied to the eligible spending budget for 2010. The threshold performance level for energy savings by sector is set at 75% of the annual energy and demand savings goal for the sector (Docket 4366). Further, in 2015, the Commission approved 30% of the target electric program incentive to be based on demand savings, while the remaining 70% will be based on energy savings (Docket 4527). https://database.aceee.org/state/rhode-island

4.2) The Role of the System Benefits Charge

The 2006 Comprehensive Energy Conservation, Efficiency, and Reliability Act established Rhode Island's System Benefits Charge (SBC), which is a small fee assessed on electricity and gas customers' bills. Across all ratepayers in the state, this small charge per kilowatt-hour or per therm accumulates to a significant amount and is the primary source of funding for the state's energy efficiency programs like free home energy audits and incentives for energy-saving measures. Funding for energy efficiency programs also comes from the Forward Capacity Market (see Section 4.3 *The Role of the Forward Capacity Market*).

Funding from the SBC is carefully spent and evaluated to ensure the funds support only cost-effective energy efficiency that is less than the cost of supply, as required by the Least Cost Procurement law.

Diverting SBC funds to fill gaps in the state budget or imposing an artificial cap on the charge will always be detrimental to Rhode Island's efficiency programs. National Grid would be forced to scale back programs and funds would be exhausted, so many Rhode Island homes, businesses, and institutions would not be able to participate in programs that lower their energy bills. Additionally, the state would not receive the full benefits like reduced spending on electricity generation, transmission, and distribution capacity; reduced spending on emissions controls; avoided carbon emissions; and economic development resulting from local spending on energy resources.

Why is it called the *System Benefits Charge*?

Energy efficiency reduces the amount of energy that the utility has to distribute. Less distribution decreases strain on the energy infrastructure system. This reduction in strain is considered a benefit to the system. The charge for energy efficiency investment, therefore, is simultaneously a charge to fund system benefits.

More Information:
http://rieermc.ri.gov/wp-content/uploads/2017/09/eermc-faq-final-6-22-15.pdf

4.3) The Role of the Forward Capacity Market

The Forward Capacity Market (FCM) ensures that the New England power system will have sufficient resources to meet the future demand for electricity. Forward Capacity Auctions (FCAs) are held annually, three years in advance of when the power will be needed. Resources (mostly power plants) compete in the auctions to supply capacity in exchange for a market-priced capacity payment. Energy efficiency is one such resource for which the utility can receive payment.[6] When National Grid receives a payment, it re-invests those funds in more energy efficiency (and therefore in future FCM revenues).

More information: https://www.iso-ne.com/markets-operations/markets/forward-capacity-market

4.4) Key Groups

Several entities are instrumental in ensuring that Rhode Island's energy efficiency programs perform at their best and adhere to the law of Least Cost Procurement.

4.4.1) Utilities

National Grid is the primary utility in Rhode Island, as it serves 99% of electric and gas customers. National Grid also operates in Massachusetts and New York. The Pascoag Utility District serves a portion of Burrillville and Block Island Power Company serves New Shoreham. Because National Grid is the primary utility in the state, it is often referred to as "the utility" or "the Company". National Grid is also the primary energy efficiency program administrator in Rhode Island, maintaining a wide portfolio of successful programs.

4.4.2) Energy Efficiency and Resource Management Council (EERMC)

The Energy Efficiency and Resource Management Council (EERMC or Council) provides oversight of Rhode Island's rate-payer funded energy efficiency programs and structured stakeholder participation. The Council includes fifteen members that represent small and large business, non-profit organizations, market rate and low-income home-owners and renters, municipalities, governments and environmental science and policy. The Council's goal is to ensure Rhode Islanders are getting the least expensive and most environmentally healthy energy supply through energy efficiency, conservation, and resource management.

More information: See Section 5 and http://www.rieermc.ri.gov/

4.4.3) Public Utilities Commission (PUC)

The Rhode Island Public Utilities Commission (PUC) is a quasi-judicial body that regulates Rhode Island utilities. In addition to regulating electric distribution and pipeline public utilities, the PUC also has jurisdiction over gas, water, railroad, ferry boats, telephone, and telegraph. The PUC has three Commissioners appointed by the Governor to six-year terms with the advice and consent of the Senate. The Commissioners hold public hearings on rates, tariffs, and charges by the utility, among other items. Its role in energy efficiency involves approving utilities' Annual Energy Efficiency (EE) and System Reliability Procurement (SRP) Plans (including the System Benefits Charge), Three-Year Energy Savings Targets, and Least Cost Procurement Standards.

More information: http://www.ripuc.org/generalinfo/commission.html

4.4.4) Division of Public Utilities & Carriers (DPUC)

[6] Because the FCM is subject to market forces its revenues vary from year to year depending on demand for increased capacity.

The Division of Public Utilities and Carriers (DPUC or "Division") is the regulatory arm that represents the ratepayer in rate cases and filings with the Public Utilities Commission. The Division is a settling party to EE and SRP Plans and participates in the Energy Efficiency Technical Working Group.

More information: http://www.ripuc.org/generalinfo/division.html

4.4.5) Office of Energy Resources (OER)

The Office of Energy Resources (OER) is Rhode Island's lead state agency on energy policy and programs. OER works closely with private and public stakeholders to increase the reliability and security of the state's energy supply, reduce energy costs and mitigate price volatility, and improve environmental quality. OER operates at the nexus of the many ongoing efforts to transform the Ocean State energy system. Its role in energy efficiency includes working closely with the Council and its consultant team to review EE and SRP Plans.

More information: http://www.energy.ri.gov

4.4.6) Energy Efficiency Technical Working Group (Collaborative)

National Grid's Rhode Island Energy Efficiency Technical Working Group (formerly known as the Demand Collaborative) is a group of energy efficiency stakeholders that meets monthly to inform the development, implementation, and evaluation of National Grid's EE and SRP Plans. National Grid has facilitated the Collaborative since 1991 as a means to create transparency around the development of annual EE and SRP Plans and to work towards building consensus with organizations before the plans are filed with the PUC each year.

More information: https://rieermc.ri.gov/thecollaborative/

4.5) Accomplishments

Rhode Island remains a nationally recognized leader in implementing high-quality energy efficiency programs. In the *2018 State Energy Efficiency Scorecard*, published by the American Council for an Energy Efficient Economy (ACEEE), Rhode Island received the #1 ranking in the category of "utility-sector energy efficiency programs and policies" after once again being the only state to earn a perfect score in that category. Rhode Island also ranked #3 overall for the second year in a row by achieving some of the highest energy savings in the country and pushing the envelope in several other categories. Since 2009, Rhode Island has consistently been in the top 10 states (ACEEE, 2018).

Energy efficiency has made a significant contribution to Rhode Island's overall energy supply portfolio. As of 2018, 10 years of demand reduction investments made through the ratepayer-funded electric efficiency program supply approximately 17 percent of the state's electric needs (Figure 4.1)(OER, 2015).

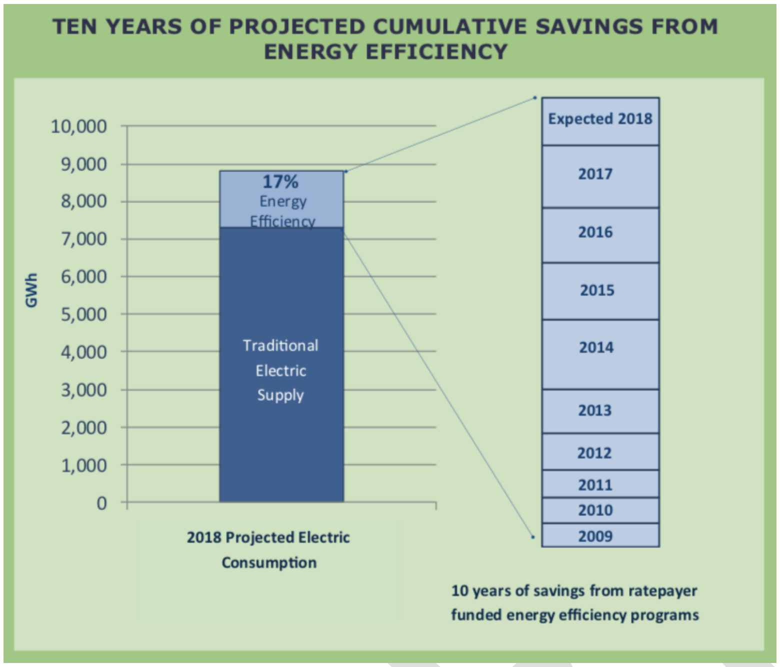


Figure 4.1. The role of energy efficiency since 2009, and its cumulative effects on energy use in Rhode Island. Source: EERMC 2018 Annual Report

In addition to enabling nation-leading levels of energy savings, Rhode Island's investments in cost-effective, low cost energy efficiency are creating jobs and boosting economic activity. Energy efficiency reduces the cost of doing business in Rhode Island and lowers residents' energy bills, leaving them with more disposable income to spend on other goods and services. These two effects lead to job creation and economic growth. Every $1 million invested in energy efficiency leads to the creation of 45 job-years of employment, and every $1 invested boosts Gross State Product by $4.20 (National Grid, 2014).

More information:

- Full Report: http://aceee.org/sites/default/files/publications/researchreports/u1710.pdf
- RI Summary: http://aceee.org/sites/default/files/pdf/state-sheet/2017/rhode-island.pdf
- RI Full Details: http://database.aceee.org/state/rhode-island

SECTION 5: RHODE ISLAND ENERGY EFFICIENCY AND RESOURCE MANAGEMENT COUNCIL

5.1) What is the EERMC?

The Energy Efficiency and Resource Management Council (EERMC) was established in 2006 under amendments to the Rhode Island Energy Resources Act (R.I.G.L. § 42-140.1) to provide structured stakeholder participation and oversight of energy efficiency procurement. The Council includes members that represent small and large business, non-profit organizations, market rate and low-income home-owners and renters, municipalities, governments and environmental science and policy. The EERMC is responsible for ensuring maximum benefits to all Rhode Island ratepayers through energy efficiency.

Rhode Island is among the leading energy efficiency jurisdictions in North America. The presence of a council consisting of stakeholders focused on energy efficiency policy planning is a key driver of Rhode Island's success. The strength of the Council comes from the fact that diverse, key stakeholders representing all types of Rhode Island interests work together to make decisions from a common set of facts to implement the legislative mandate to acquire all cost-effective efficiency resources.

5.2) Purposes

Per its enabling legislation, the Council has four main purposes:

- "Evaluate and make recommendations, including, but not limited to, plans and programs, with regard to the optimization of energy efficiency, energy conservation, energy resource development; and the development of a plan for least-cost procurement for Rhode Island;
- Provide consistent, comprehensive, informed and publicly accountable stake-holder involvement in energy efficiency, energy conservation, and energy resource management;
- Monitor and evaluate the effectiveness of programs to achieve energy efficiency, energy conservation, and diversification of energy resources; and
- Promote public understanding of energy issues and of ways in which energy efficiency, energy conservation, and energy resource diversification and management can be effectuated."

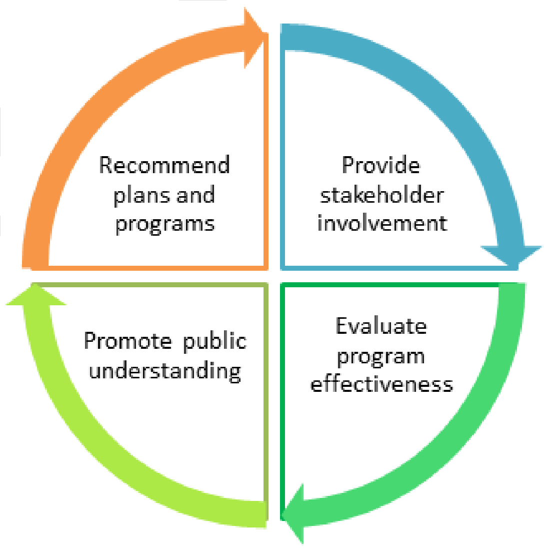


Figure 5.1: Purposes of the RI EERMC

5.3) Key Stakeholders

To fulfill its mandates, the EERMC maintains important working relationships with key entities, including National Grid, the Office of Energy Resources, the Division of Public Utilities and Carriers, and the Public Utilities Commission. Council meetings also serve as a forum for public and private stakeholders, such as non-profit organizations, industrial users, institutions, businesses, and municipalities, to engage in the energy efficiency process by sharing their unique perspectives, challenges, and suggestions. A diverse array of voices at the table ensures that energy efficiency policy and programs continue to serve all Rhode Islanders and address evolving needs. Stakeholders are encouraged to attend meetings and/or submit public comment to the Council at https://rieermc.ri.gov/submit-public-comment/.

5.4) Meetings

As a quasi-governmental entity, the EERMC must adhere to the stipulations of the Rhode Island Open Meetings Act and the Access to Public Records Act. The Council must provide written notice of regularly scheduled meetings at the beginning of each calendar year. In addition, the date, time, location, and agenda for each Council meetings must be posted to the Rhode Island Secretary of State website at least 48 hours prior to each meeting. Written meeting minutes must be maintained and made public at the next regularly scheduled meeting or within 35 days. These procedures ensure that decision-making is transparent and that all stakeholders have the opportunity to participate in their government.

More Information:
http://www.riag.ri.gov/documents/opengov/guidetoopengovernmentbookletfullpagetext.pdf

5.5) EERMC Membership

5.4.1) Membership Appointment

New members of the EERMC are nominated by the Governor, with the Senate's advice and consent. Each member represents the perspectives and interests of their sector, functioning as a liaison between stakeholders and the efficiency policy and planning process (R.I.G.L. § 42-140.1-4).

- Energy regulation and law
- Large commercial/industrial
- Small commercial/industrial
- Residential
- Low-income
- Environmental issues pertaining to energy
- Energy design and codes
- Energy efficiency education and employment tracking
- Municipal
- Large nonprofit institutional
- Small nonprofit

These 11 seats make up the voting members. The remaining 4 seats are ex-officio, non-voting members, including:

- A representative from an electric distribution entity
- A representative from a gas distribution entity
- A representative from a fuel oil or heating fuel industry
- The commissioner of the Rhode Island Office of Energy Resources

Once a new member has been selected by the Governor and approved by the Senate, they are officially appointed to the EERMC by the General Assembly.

Figure 5.2. Member photograph taken May 17, 2018 (several members not pictured)

5.4.2) Member Responsibilities

Once appointed, an EERMC member commits to:

- Serve a 5-year term
- Attend at least 8 out of the 12 meetings each year
- Actively participate in meetings
- Relay the work of the Council to their constituents

5.4.3) Current Members

Information about the current EERMC members, including their biographies and the sectors they represent, can be found at https://rieermc.ri.gov/about/.

5.5) Officers

5.5.1) Chairperson

The Chairperson of the EERMC, which must be a voting member, is appointed by the Governor and presides at all meetings when they are present. In addition to reporting on what was discussed at Executive Committee meetings, the Chairperson leads discussion, calls for votes, and ensures that the agenda is followed. When needed, the Chairperson can create ad-hoc sub-committees and appoint EERMC members to them.

5.5.2) Vice-Chairperson

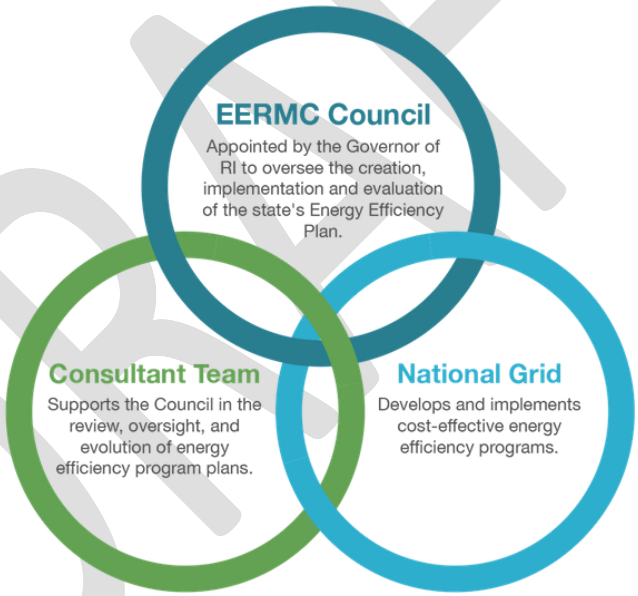
Also appointed by the Governor, the Vice-Chairperson of the EERMC performs the Chairperson's duties whenever they are not present and can also be given additional duties and powers from the Chairperson when necessary.

5.5.3) Executive Director

The Commissioner of the Rhode Island Office of Energy Resources serves as the Executive Director of the EERMC. The Executive Director and his/her staff keep the EERMC up to date on local and national energy-related information and fields, including energy efficiency and renewable energy. The Executive Director and staff are also responsible for EERMC administrative duties such as ensuring meetings meet open meeting regulations, maintaining official meeting minutes, drafting annual reports, and making all public EERMC documents available online.

5.6) Consultant Team

As part of the Legislation, the EERMC enlists the help of technical consultants to assist with its responsibilities. The Consultant Team serves the EERMC as a project manager -- ensuring that the Council meets its objectives and required duties each year and providing technical support wherever issues may arise. A Consultant Team work-plan is completed and submitted to the Council for review and approval on an annual basis. Consultant Team members include expertise with energy efficiency policy, data and analysis, project management, residential and commercial sector program development, regulation, financing, and evaluation, measurement, & verification. The Consultant Team's contract is rebid on a triennial basis.



5.7) Legal Counsel

As directed by the enabling legislation, the EERMC retains legal counsel, which:

- Advises the EERMC on all legal matters;
- Provides legal interpretations of legislative mandates pertaining to the EERMC; and
- Represents the EERMC at regulatory proceedings conducted by the Public Utilities Commission.

5.8) EERMC Committees

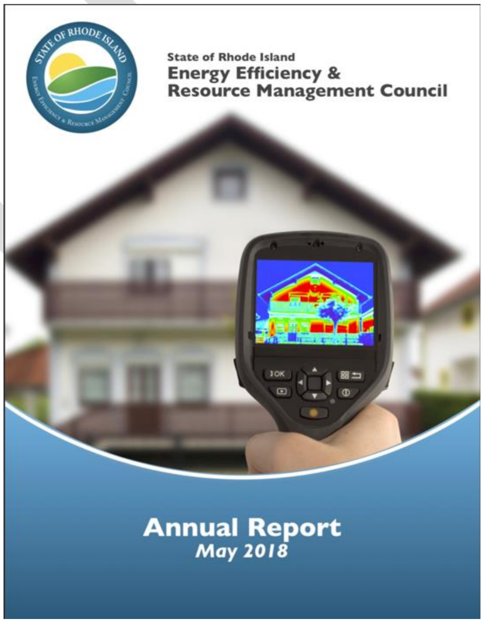
By vote of the Council, the EERMC may create sub-committees to address specific issues or tasks within the Council's powers and duties. Like EERMC meetings, these sub-committee meetings must be open to the public, and the majority of the sub-committee membership constitutes a quorum.

5.8.1) Executive Committee

The EERMC Executive Committee (also casually referred as: “Ex-Com”) meets monthly and consists of the Chairperson, Vice-Chairperson, Executive Director, and any other members designated by the Council. While non-EERMC members may attend these open meetings, only voting EERMC members are permitted to vote in Executive Committee decisions. The Executive Committee's general duties include:

- Reviewing the performance of EERMC members;
- Identifying educational opportunities for new and current EERMC members;
- New member recruitment; and
- Developing EERMC meeting agendas and budget recommendations.

5.9) Annual Report to the General Assembly



Each spring, the EERMC is required to submit an Annual Report to the Rhode Island General Assembly “regarding the activities of the council, its assessment of energy issues, the status of system reliability, energy efficiency and conservation procurement, and its recommendations regarding any improvements which might be necessary or desirable” (R.I.G.L. § 42-140.1-5). The report also serves as a showcase of the previous year's energy efficiency program achievements including case studies of successful initiatives.

More information: https://rieermc.ri.gov/plans-reports/

5.10) By-Laws

While the creation of the EERMC is defined in the legislation, the specific rules that the Council must adhere to are outlined in the by-laws. The by-laws, originally adopted in February of 2015, explain the council’s purposes, powers, and duties, its membership composition, the roles of officers and committees, and meeting procedures.

More information:
http://rieermc.ri.gov/wp-content/uploads/2017/11/eermc-by-laws-final-10-19-17.pdf

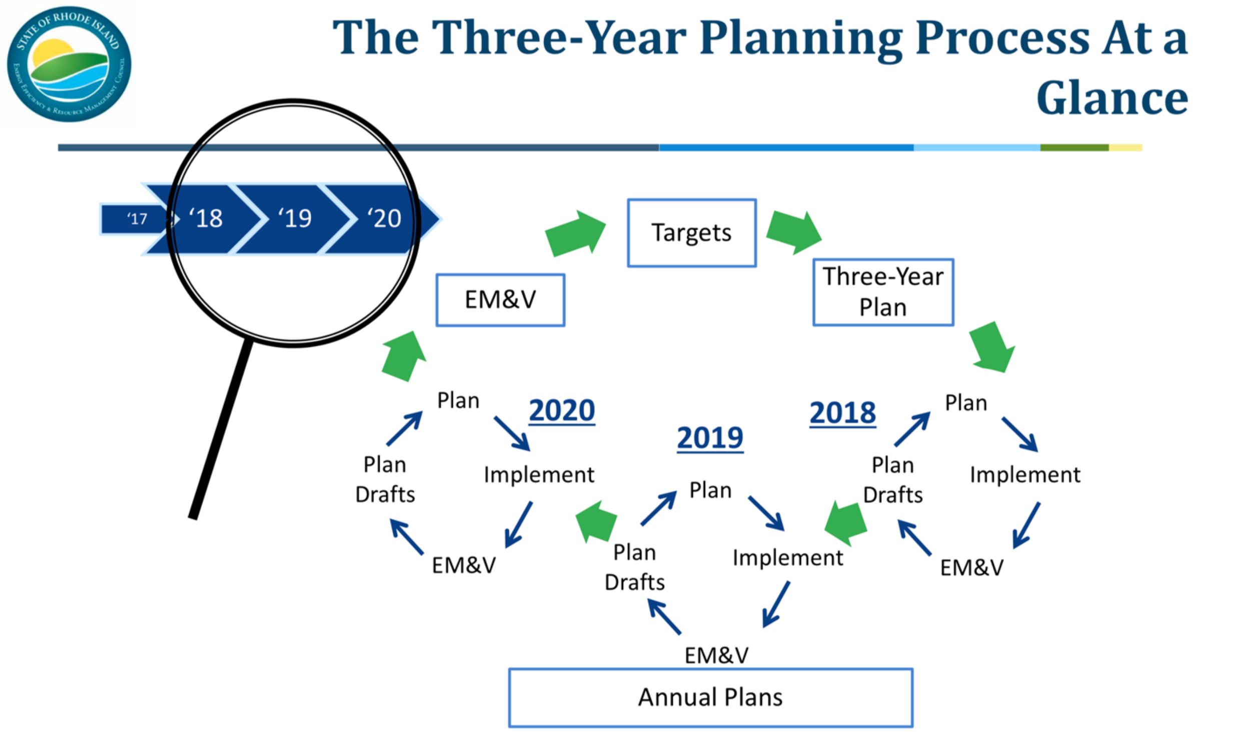
5.11) Additional Resources

- EERMC Website:
  https://rieermc.ri.gov/
- EERMC Enabling Legislation:
  http://webserver.rilin.state.ri.us/Statutes/TITLE42/42-140.1/INDEX.HTM

- The Attorney General's Guide to Open Government in Rhode Island http://www.riag.ri.gov/documents/opengov/guidetoopengovernmentbookletfullpagetext.pdf

SECTION 6: ENERGY EFFICIENCY PLANNING

Rhode Island's energy efficiency activities work in three-year cycles that include setting energy savings targets; developing three-year plans; developing, implementing, and evaluating annual plans for three years; evaluating again; and then using the evaluation results to inform the next cycle (Figure 6.1).



6.1) Least Cost Procurement Standards

The foundation of the energy efficiency planning process is the Least Cost Procurement Standards, which lay out a clear structure and process for achieving the goals of least cost procurement and define the roles and responsibilities for the different program administration and oversight entities. The Standards:

- Set deadlines for annual and triennial efficiency plans
- Require that the plans include certain components, including strategies for procuring all cost-effective efficiency and providing the utility with the opportunity to earn a performance incentive
- Require that the plans include information on program costs and benefits, energy savings goals, funding sources, and monitoring and evaluation plans
- Define an active role for the EERMC in providing assistance to develop the energy efficiency plans and ensure that the state's ratepayers "get excellent value from the EE Procurement Plan being implemented on their behalf

More information:
http://rieermc.ri.gov/wp-content/uploads/2018/05/4684-lcp-standards_7-27-17.pdf

6.2) Total Resource Cost Test

An important component of the Standards is cost-effectiveness testing. Because Least Cost Procurement requires the benefits of all utility investments in energy efficiency to be greater than the costs to implement them, a benefit-cost analysis is required. In the past, Rhode Island used the Total Resource Cost Test. In 2017, the state developed own state-specific test that provides a more holistic view of energy efficiency by accounting for additional benefits and costs. Rhode Island's test accounts for avoided costs of compliance with emissions regulations, participant health benefits and environmental benefits from reduced emissions. It also accounts for non-energy costs and benefits associated with economic well-being, comfort, health and safety, other fuels, water savings, the social cost of carbon not embedded in energy market prices, economic development, and energy security from reduced use of fuel oil (ACEEE, 2019).

More information: http://www.ripuc.org/eventsactions/docket/4684-NGrid-RITest-Tech%20Session(9-13-17).pdf

6.3) Energy Efficiency Savings Targets

Every three years, the EERMC is required to develop targets for annual electric and natural gas reductions as a result of energy efficiency programs administered by National Grid. The targets support the development of National Grid's triennial and annual energy efficiency program plans by to give the utility guidance on potentially available cost-effective efficiency resources in the state. The EERMC and its consultant team conduct in-depth analysis, research, and stakeholder engagement to establish achievable, cost-effective levels of energy efficiency to inform proposed energy savings targets. Then the targets are submitted to the PUC for final approval. the targets developed by the EERMC under R.I.G.L § 39-1-27.7.1(e)(4) and (f) are not subject to the cost-effectiveness standard, because as high-level estimates, the purpose of the targets is simply to guide the development of those plans.

More information: http://rieermc.wpengine.com/wp-content/uploads/2017/08/4684-eermc-targetsstandards_12-22-16.pdf

6.4) Triennial and Annual Plans for Energy Efficiency and System Reliability Procurement

The Standards require National Grid to develop triennial and annual program plans that offer program details as well as spending and savings goals for energy efficiency and system reliability procurement. The EERMC's role is to verify that the programs are cost-effective and will deliver the expected energy and economic savings. This model is proving successful because all of the customer sectors paying for the energy efficiency investments have a role in oversight, planning, and evaluation. This level of stakeholder participation results in high quality programs that are responsive to customers' needs and broad support for energy efficiency.

6.4.1) Three-Year Plans

The Three-Year Plan illustrates how lifetime and annual energy savings set out in the Targets will be achieved through energy efficiency program delivery. It also describes economic and environmental benefits including the development and maintenance of jobs. Sections of the Three-Year Plan include:

- Strategies and Approaches to Planning
- Cost-Effectiveness
- Prudence and Reliability

- Funding Plan and Savings Targets
- Performance Incentive Plan

The Three-Year Plan is subsequently filed with the PUC on September 1st, though the PUC does not have to rule on it.

6.4.2) Annual Plans

The Annual Plans are settlements among the parties in the Technical Working Group (Collaborative) and must be approved by both the EERMC and the PUC. The Commission is to consider the EERMC's evaluation and approval of the distribution utility's plan in issuing its order of approval of the Plan. Primary sections of the Annual Plan include:

- Final Funding Plan and Budget Amounts, Cost-Effectiveness, and Goals
- Program Descriptions
- Monitoring and Evaluation Plan
- Reporting Requirements
- Performance Incentive Plan

Key factors that inform the Annual Plan include:

- Energy Savings Targets
- Rhode Island Benefit Cost Test
- Program evaluations and pilots
- Evolving markets
- New and/or improved technologies
- State policy objectives

Portfolios are *required* to be cost-effective and programs *should* be cost-effective. Annual Plans are due each year on October 15th (or November 1st if a Three-Year Plan is also being submitted) and PUC hearings to review them are held once a year.

6.4.3) System Reliability Plans

National Grid is also responsible for drafting and filing System Reliability Procurement (SRP) Plans annually and triennially along with Energy Efficiency Plans. National Grid works closely with the EERMC, the consultant team, OER, and the Technical Working Group to develop robust SRP Plans. Guidelines for SRP Plans are described in Chapter 2 of the Least-Cost Procurement Standards. The SRP Standards set forth guidelines for the incorporation of energy efficiency, distributed generation, demand response, and other energy technologies (collectively referred to as "non-wires alternatives" or NWA) into utility planning.

6.5) Program Implementation

Program implementation runs on a calendar year, January through December. Throughout the year, National Grid, the EERMC's consultant team, and the Office of Energy Resources meet monthly to review program progress, identify any program issues, assure programs are moving along in a timely fashion, and discuss strategies to continually improve programs.

6.6) Program Reporting

Per the Least Cost Procurement Standards, National Grid, in consultation with the EERMC, is required to report quarterly and annually on the benefits of the energy efficiency efforts implemented, with particular focus on energy cost savings and program participation levels across all sectors.

6.11) Additional Resources

- http://rieermc.ri.gov/wp-content/uploads/2018/05/4684-lcp-standards_7-27-17.pdf
- http://www.ripuc.org/eventsactions/docket/4684-NGrid-RITest-Tech%20Session(9-13-17).pdf
- http://rieermc.wpengine.com/wp-content/uploads/2017/08/4684-eermc-targetsstandards_12-22-16.pdf
- http://www.ripuc.org/eventsactions/docket/4684-NGrid-3YP-2018-2020-Presentation(10-25-17).pdf

GLOSSARY OF COMMON ENERGY EFFICIENCY ACRONYMS

AB – Advanced Buildings
ACEEE – American Council for an Energy-Efficient Economy
ADMS – Advanced Distribution Management System
AE – Account Executive
AESC – Avoided-Energy Supply Costs
AFR – Automated Feeder Reconfiguration
AFUE – Annual Fuel Utilization Efficiency
AGA – American Gas Association
AIA – American Institute of Architect
AMI – Advanced Metering Infrastructure
AMF – Advanced Metering Functionality
AMR – Advanced Meter Reading
AMSC – American Superconductor Corporation
AO – Application Owners
ARRA – American Recovery and Reinvestment Act
BBRS – Board of Building Regulations and Standards
B/C or BCR – Benefit to Cost Ratio
BCA – Benefit Cost Analysis
BES – Bulk Electric System
BIA – Business Impact Analysis
BPI – Building Performance Institute
BTU – British Thermal Unit (a measure of energy)
BWR – Boiling water reactor
C&F – Chain & Franchise
C&I – Commercial and Industrial
C&IMC – Commercial and Industrial Management Committee
CAIDI – Customer Average Interruption Duration Index
CAP – Community Action Program
CDA – Comprehensive Design Approach
CEC – California Energy Commission
CECP – Clean Energy and Climate Plan
CEP – Customer Engagement Platform
CFL– Compact Fluorescent Lightbulb
CFR – Code of Federal Regulations
CHP – Combined Heat & Power
CIP – Critical Infrastructure Protection
CIS – Customer Information System
CISO – Chief Information Security Officer
CLF – Conservation Law Foundation
CMI – Customer Minutes Interrupted (can also mean Community Mobilization Initiatives)
CMS – Customer Minutes Saved
CO_2 – Carbon Dioxide
COH – Customer Outage Hours
CPP – Critical Peak Pricing
CSF – Cybersecurity Framework
CSR – Customer Service Representative

CVR – Conservation Voltage Reduction
CWIP – Construction Work In Progress
DA – Distribution Automation
DC – Direct Current
DCF – Discounted Cash Flow
DER – Distributed Energy Resources (can also mean Deep Energy Retrofit)
DERM – Distributed Energy Resource Management
DG – Distributed Generation
DMS – Distribution Management System
DOE – Department of Energy
DOER – Department of Energy Resources
DOT – U.S. Department of Transportation
DR – Demand response
DRIPE – Demand Reduction Induced Price Effects
DSCADA – Distribution Feeder Supervisory Control and Data Acquisition
DSM – Demand side management
EA – Environmental assessment
ECM – Electronically Commutated Motor
ECS – Energy Control System
EDC – Energy Distribution Company
EDR – Economic demand response
EE – Energy Efficiency
EEAC – Energy Efficiency Advisory Council
EEPCA – Energy Efficiency Program Cost Adjustment
EERF – Energy Efficiency Reconciliation Factor
EES – Energy Efficiency Surcharge
EIA – Energy Information Administration
EIS – Environmental impact statement
EISA – Energy Independence and Security Act
EM&C – Energy Measurement & Control
EMC – Evaluation Management Committee
EMS – Energy Management System
EM&V – Evaluation, measurement and verification
EPA – U.S. Environmental Protection Agency
EPRI – Electric Power Research Institute
ERP – Emergency Response Plan
ES-C2M2 – Electricity Subsector Cybersecurity Capability Maturity Model
ES-ISAC – Electricity Subsector Information Sharing and Analysis Center
ETR – Estimated Time to Restore
EV – Electric Vehicle
FAN – Field Area Network
FCM – Forward Capacity Market
FLISR – Fault Location, Isolation, and Service Restoration
FR – Free Rider (or Free Ridership)
FRERP – Federal Radiological Emergency Response Plan
FTE – Full Time Equivalent
FTR – Financial transmission rights
GHG – Greenhouse Gas

GE-VBWR – General Electric – Vallicetos Boiling Water Reactor
GIS – Geographic Information System
GMP – Grid Modernization Plan
GPO – Government Printing Office
GRI – Gas Research Institute (now the Gas Technology Institute)
GSEAF – Gas System Enhancement Adjustment Factor
GSEP – Gas System Enhancement Plan
GTI – Gas Technology Institute
GWP – Global Warming Potential
GWSA – Global Warming Solutions Act
HEHE – High Efficiency Heating and Water Heating
HERS – Home Energy Rating System
HES – Home Energy Services
HLW – High level radioactive waste
HPCs – Home Performance Contractors
HVAC – Heating, Ventilation, and Air Conditioning
ICAP – Installed Capacity
ICRP – International Commission on Radiation Protection
ICS-CERT – Industrial Control Systems Cyber Emergency Response Team
IECC – International Energy Conservation Code
IEEE – Institute for Electrical and Electronics Engineers
IIC – Independent Installation Contractors
IOUs – Investor-owned utilities
IPS – Intruder Prevention System
ISFSI – independent spent-fuel storage installation
ISO – Independent System Operators
ISO-NE – ISO New England
IVR – Interactive Voice Response
JMC – Joint Management Committee
kW – Kilowatt
kWh – Kilowatt-hour
LAUF – Lost and Unaccounted for Gas
LBR – Lost Base Revenue
LCIEC – Large Commercial & Industrial Evaluation Contractor
LDAC – Local Distribution Adjustment Clause
LDAF – Local Distribution Adjustment Factor
LDC – Local Distribution Company
LED – Light Emitting Diode
LLW – Low-level radioactive waste
LMP – Locational Marginal Price
LNG – Liquefied Natural Gas
LP – Liquefied Propane
LSE – Load-serving entities
LTC – Load Tap changer
M&R – Metering and Regulation
Mbps – Megabits per second
Mcf – Thousand cubic feet
MDM – Meter Data Management

MFNC – Multi-Family New Construction
MMcf – Million cubic feet
MMI – Multi-Family Market Integrator
MOU – Memorandum of Understanding
MPLS – Multiprotocol label switching
MT – Metric ton
MTAC – Technical Assessment CommitteeMVA – Mega Volt Amps
MW – Megawatts
NARUC – National Association of Regulatory Utility Commissioners
NBI – New Building Institute
NCP – Negotiated Cooperative Promotions
NCRP – National Council on Radiation Protection and Measurements
NECEC – New England Clean Energy Council
NEED – National Energy Education Development
NEI – Non-energy impact
NISTIR – National Institute of Standards and Technology Interagency Report
NMR – Network Meter Reading
NPDES – National Pollutant Discharge Elimination System
NPS – Non-Participant Spillover
NPV – Net Present Value
NRC – U.S. Nuclear Regulatory Commission
NREL – National Renewable Energy Laboratory
NTG – Net-to-Gross
NTGR – Net-to-Gross Ratio
NWA – Non-Wires Alternative
ODCM – Offsite Dose Calculation Manual
O&M – Operations and Management
OMS – Outage Management System
ONG-C2M2 – Oil and Natural Gas Subsector Cybersecurity Capability Maturity Model
OT – Operation Technology
PA – Program Administrator
PAF – Pension Adjustment Factor
PBOP – Post-Retirement Benefits Other than Pensions
PCI – Payment Card Industry
PEx – Program Expediter
PHMSA – Pipeline and Hazardous Materials Safety Administration
PI – Performance Incentive
PIA – Privacy Impact Analysis
PII – Personally Identifiable Information
PLC – Power Line Carrier
PP&A – Program Planning and Administration
PPA – Power purchase agreement
PP&A – Program Planning & Administration
PRV – Pressure Relief Valve
PSDAR – Post-Shutdown Decommissioning Activities Report
PSIG – Pounds per square inch gage
PTR – Peak-Time Rebate
PV – Photovoltaic

PWR – Pressurized water reactor
QA/QC – Quality Assurance/Quality Control
RCNLD – Reproduction Cost New Less Depreciation
RCS – Residential Conservation Service
RD&D – Research, development & deployment
REG – Resilient Electric Grid
RFCI – Remote Faulted Circuit Indication
RFP – Request for Proposal
RGGI – Regional Greenhouse Gas Initiative
RMC – Residential Management Committee
RNC – Residential New Construction
RPS – Renewable Portfolio Standard
RTO – Regional transmission organization
RTU – Remote Terminal Unit
SBC – System Benefit Charge
SAIDI – System Average Interruption Duration Index
SAIFI – System Average Interruption Frequency Index
SCADA – Supervisory Control and Data Acquisition
SCF – Standard cubic feet
SFP – Spent fuel pool
SIT – State inventory tool
SO – Participant Spillover
SPN – Strategic Partner Network
SREC Solar Renewable Energy Credit
SRP – Storm Resiliency Program
STAT – Sales, Technical Assistance & Training
STIC – Short Term Investment Clause
STIAF – Short Term Investment Adjustment Factor
STIF – Short Term Investment Factors
STIP – Short term Investment Plan
STIRF – Short Term Investment Reconciliation Factor
T&D – Transmission & Distribution
TIRF – Targeted infrastructure recovery factor
TMS – Translation Management System
TOU – Time-of-use
TSRG – Technical Standards Review Group
TRC – Total resource cost
TRL – Technical Resource Library
TRM – Technical Review Manual
TVR – Time Varying Rates
UDC – Utility Distribution Company
VAR – Volt-ampere reactive
VBA – Visual Basic for Applications
VVO – Volt/VAR Optimization
WACC – Weighted Average Cost of Capital
WAN – Wide Area Network
WAP – Weatherization Assistance Program
WISP – Written Information Security Plan

REFERENCES

Section 1

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