

**Electric Utility Decoupling in North Carolina: Removing  
Disincentives for Energy Efficiency**

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December 10, 2010

Masters project submitted in partial fulfillment of the requirements for the Master  
of Environmental Management degree in the Nicholas School of the Environment of  
Duke University

2010

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**ABSTRACT**

North Carolina's demand for electricity will grow at approximately 1.1% annually through 2035. That could mean an additional yearly demand of 39 million megawatt hours (MWh) by 2035, enough to power 2.9 million North Carolina households. If residents paid the current rate for that additional electricity, it would increase yearly electric utility bills by \$3.9 billion. This cost will almost certainly increase due to the need to build new generation plants in order to meet increased demand. However, North Carolina has the potential to meet or exceed its future increase in demand through energy efficiency. Moreover, energy efficiency is less expensive per kilowatt-hour (kWh) than any other form of new generation.

However, current regulation of electric utilities in the state makes it unlikely that any utility would choose to implement energy efficiency over increased generation. Under traditional regulation, electric utilities earn revenue based on the amount of electricity they sell, in kWh. Increased sales lead to more profits and decreased sales lead to reduced profits and more risk for the utility. Since energy efficiency would decrease the amount of electricity sold, compared to projections, it financially penalizes the utility by damaging its core business- selling electricity. Traditional regulation creates a link between sales volume and revenue, which creates the throughput incentive. The throughput incentive has two parts: 1) an incentive for the utility to increase sales and, 2) a disincentive for the utility to decrease sales (or implement energy efficiency which would decrease sales). Full

decoupling breaks the link between sales volume and revenue and completely removes the throughput incentive.

This Master's Project examines the current regulation of electric utilities in North Carolina and the implications of that regulation for energy efficiency. It then examines current knowledge of full decoupling and details options for implementation. Next, it examines the positions of some North Carolina stakeholders around full decoupling. Finally, the report offers suggestions for further study that should be done in the state before full decoupling is put into practice.

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**EXECUTIVE SUMMARY**

North Carolina's demand for electricity will continue to increase in the coming decades. The state has the potential to meet all of its increase in demand through energy efficiency. While the state's investor-owned electric utilities alone cannot achieve all of the potential for energy efficiency, they are well poised to help their customers achieve significant gains in energy efficiency. However, under the current regulatory structure, these utilities collect revenue based on the amount of electricity sold. This gives them an incentive to increase the amount of electricity sold and a disincentive to promote any activity that would decrease the amount of electricity sold, including energy efficiency. Full decoupling is the term used to describe any policy or regulation that completely breaks this link between sales volume and revenue. Full decoupling allows an electric utility to collect its allowed revenue, no more and no less, regardless of the amount of electricity it sells. However, many stakeholders have expressed concern over some possible effects of the implementation of full decoupling. These concerns should be considered when designing a full decoupling program or policy and many can be addressed with appropriate implementation.

The purpose of this report is to provide a resource for discussion of breaking the link between sales volume and revenue for investor-owned electric utilities in North Carolina. The report provides a summary of the current knowledge on policy and regulation that fully breaks this link as well as an overview of current electric policy and regulation in North Carolina as it pertains to energy efficiency. While the

report also introduces methods that partially break the link between sales volume and revenue, further examination of those methods is beyond its scope. Finally, the report offers recommendations for further analysis of the possible effects of full decoupling in the state.

The Energy Information Administration predicts that the demand for electricity in North Carolina will grow 1.1% annually from 2009 to 2035. In 2035, that could mean an additional yearly demand of 38 million megawatt hours, or enough to power an additional 2.9 million North Carolina households. At current rates, that would cost residents an additional \$3.9 billion in electricity bills. This does not account for the fact that the construction of new generation facilities to meet this increased demand will increase rates.

North Carolina has the potential to meet all of its increased demand through energy efficiency. A meta-analysis shows that North Carolina can achieve yearly energy savings of 1.4-2% annually, more than offsetting the estimated annual growth in demand. Energy efficiency is also the least expensive way for the state to meet its future electricity needs. In fact, energy efficiency measures cost less than any other form of new generation- conventional or renewable.

Investor-owned utilities should participate in the promotion of energy efficiency in the state. They possess information about the way electricity is used in the state and have established relationships with customers. However, current regulation allows these utilities to earn revenue based on the amount of electricity sold. This means that increased sales lead to higher profits for the utility and lower

sales lead to decreased profits. Because of this, utilities have an incentive to promote increased use of electricity and a disincentive to promote any activity that would decrease the use of electricity, including energy efficiency measures. This phenomenon is known as the throughput incentive.

Decoupling refers to the decoupling of sales volume and revenue, or breaking the link between them. Full decoupling breaks this link completely. Partial and limited decoupling also work to break this link, but do not break it completely and leave some part of the throughput incentive intact. Because full decoupling is the only type of decoupling that completely breaks the link between sales volume and revenue, it is the only type of decoupling examined by this paper. Four main methods achieve full decoupling:

- Revenue-cap decoupling is the simplest form of full decoupling. With revenue-cap decoupling, a utility's allowed revenue is set by the Public Utilities Commission and over or under collections are refunded or recovered through rate adjustments.
- Revenue-per-customer decoupling allows a fixed level of revenue to be collected for each customer. The total revenue allowed is based on the number of customers served by a utility during a period.
- Fixed cost adjustment functions similarly to revenue-cap decoupling, but the rate adjustment is made to the portion of the rates determined to represent a utility's fixed costs.

- Flat distribution divides a utility's fixed costs evenly among customers through a fixed cost charge in every billing cycle. Only variable costs are charged to customers based on the amount of electricity used. This method is rarely used because it burdens those customers who use the least electricity.

With the exception of flat distribution, full decoupling methods can be used along with traditional billing and rate structures. Full decoupling can be instituted by a Public Utilities Commission with the proper directives or required statutorily.

Stakeholder concerns about the implementation of full decoupling can typically be captured in four major groups: effect on rates (rate variability or general increasing trend); the shifting of risk from utilities to ratepayers; the amount of regulatory oversight required; retention of desired incentives (e.g. the incentive to provide customer service or repair outages). These concerns have been expressed both in North Carolina and other states that have implemented full decoupling or have considered implementing full decoupling.

In order to further inform the discussion on full decoupling in North Carolina, further study is required. Quantitative analyses should be conducted to examine the effects of full decoupling on rate variability compared with the effect of current riders and rate trends, effect of a rate cap, and appropriate rate of return for each utility with and without full decoupling in place. This will provide stakeholders with additional information to determine whether full decoupling is the appropriate tool to help achieve North Carolina's goals for energy efficiency.

In conclusion, North Carolina faces a growing demand for electricity. The state has the potential to meet this demand through energy efficiency, which is also its least-cost option. However, investor owned utilities currently face a disincentive to promote energy efficiency. In order to align utility incentives with the State's plans for energy efficiency, the link between sales volume and revenue must be broken. Full decoupling breaks the link completely and can be designed to benefit the State and address the concerns of major stakeholders. However, further quantitative analysis should be conducted to determine the effect on the ratepayers.

**SECTION 1: INTRODUCTION**

The Energy Information Administration (EIA) has projected that the demand for electricity in the United States will grow 30% by 2035 from 2008 levels, increasing by about 1% each year (EIA, 2010, p65). However, the South is the fastest-growing region in the United States and its demand for electricity grows more quickly with increases in population due to significant heating and cooling loads and historically low electricity rates (Brown, et al., 2010).

North Carolina's demand for electricity is expected to increase more rapidly than the national average, at 1.1 % annually (Kydes, 2010). For North Carolina, whose electricity consumption is already among the highest in the nation in absolute terms (EIA, 2008) that could mean an additional yearly demand of 39 million megawatt hours (MWh) by 2035, enough to power 2.9 million North Carolina households. If residents paid the current rate for that additional electricity, it would increase yearly electric utility bills by \$3.9 billion.<sup>1</sup>

The EIA also projects that average electricity rates will continue to rise due to increasing fuel prices and the need for new power plants (EIA, 2010, p66). To meet this new demand through additional electric generation would require massive investment by the state's main electric utilities, Duke Energy and Progress Energy. Moreover, electric utilities will be faced with escalating construction costs, increased uncertainty surrounding cost-recovery for new generation plants, and

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<sup>1</sup> Calculated using data from the EIA websites.

public opposition to the siting of new generation and transmission facilities, increasing costs dramatically (Kushler, York, & White, 2006, p1). These costs would be passed on to North Carolina ratepayers.

Energy efficiency is the least expensive way for the state and its utilities to begin to meet future electricity needs (ACEEE, 2010, p2). The costs of either government policies or utility programs to achieve energy efficiency are lower than any other form of additional generation. Furthermore, many cost-effective methods of promoting energy efficiency are available to the state, meaning they have a positive net present value. According to the American Council for and Energy Efficiency Economy (ACEEE), “energy efficiency investments for electricity usage will cost consumers and businesses at least half of the cost of conventional electricity generation supplies” (ACEEE, 2010, pvi).

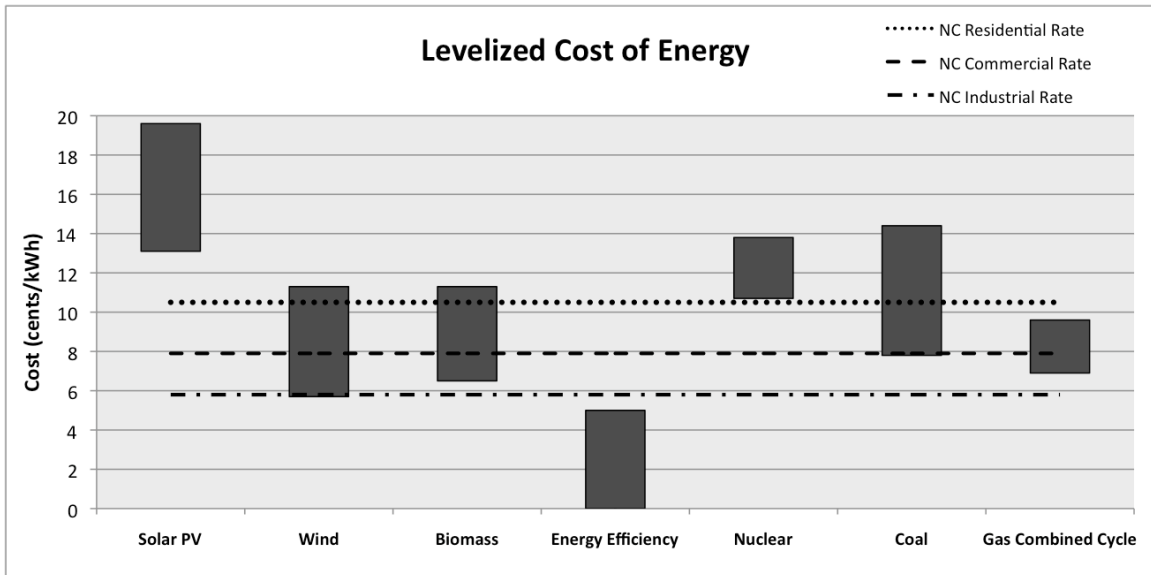


Figure 1.1. Levelized cost of new generation from renewable and traditional energy sources (Lazard, 2009; EIA, 2010b).

According to the meta-analysis conducted by ACEEE, North Carolina has the potential to generate electricity savings of 1.5-2% of demand per year. This means that the state could reduce its demand for electricity in 2025 by 22-32%, enough to keep the usage of electricity at or below 2008 levels (ACEEE, 2010, p12). According to one study, a yearly savings of 1.4% would cost \$0.05 per kilowatt-hour (kWh) or less (La Capra Associates, 2006, p47; ACEEE, 2010, p93). That is approximately half the cost of a kWh to retail consumers today.

Energy efficiency lowers costs to consumers of electricity in two ways. Customers who make energy efficiency investments or participate in programs for energy efficiency will save immediately as their energy bills are lowered due to their reduced consumption. All consumers benefit as well, since a reduction in overall energy consumption causes the costs of electricity to rise more slowly than it otherwise would (Brown, et al., 2010). This means that energy efficiency can help the state to minimize increases in the cost of electricity in the future.

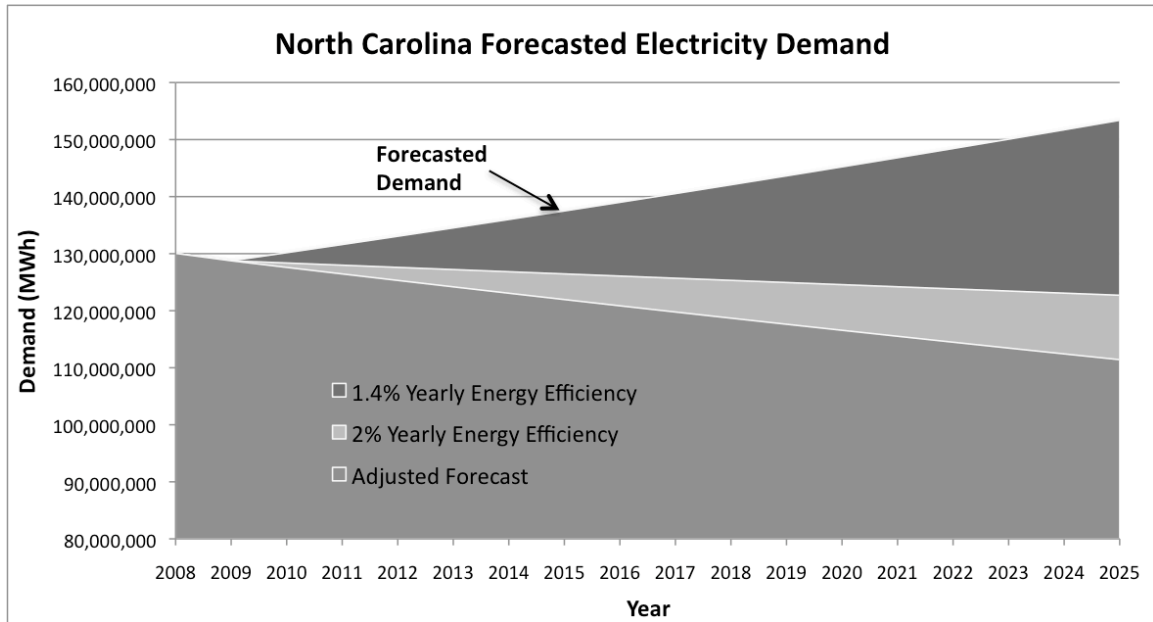


Figure 1.2 Forecasted demand and energy efficiency potentials for North Carolina. Data from EIA and ACEEE.

By reducing the amount of electricity demanded, energy efficiency also provides the state with environmental benefits. First, energy efficiency allows the state to reduce its carbon emissions from the generation of electricity, compared with future projections. Second, energy efficiency allows the state to reduce its consumption of fresh water for the generation of electricity. In 2005, North Carolina drew over 8 billion gallons of fresh water daily for thermoelectric generation. This means that 74% of the fresh water drawn by the state was used in the generation of electricity (U.S. Geological Survey, 2009, p7). Additional power plants, built to meet increased demand, would increase the strain on North Carolina's water supply.

Energy efficiency can also help the state achieve economic growth and independence. In 2008 alone, North Carolina imported 16 million MWh of electricity (EIA, 2010). Reducing the demand for electricity would help the state to provide a

larger share of electricity from local sources and reduce its dependence on outside supplies. Increasing efficiency also promotes jobs in sectors like construction and manufacturing, which generate 16.5 jobs for every \$1 million spent. In addition to job creation, savings on utility bills will foster long-term growth in other sectors of the economy. It has also been shown that aggressive energy efficiency can have an overall positive impact on a region's level of economic activity, or gross regional product (Brown, et al., 2010). According to The Regulatory Assistance Project (RAP), "reducing the energy intensity of an economy (Btu input per unit of GDP output) improves its efficiency and competitiveness, and makes it more resistant to the cataclysmic impacts of energy supply constraints" (RAP, 2008, p35).

### **1.1: The Utility's Role in energy efficiency**

As North Carolina seeks to realize its potential for energy efficiency, the state's regulated electric utilities will be greatly affected. Energy efficiency will cause a reduction in the amount of electricity sold compared to projected sales. Since, under the current rate structure utilities are paid for every unit of electricity- a kilowatt-hour (kWh)- they sell, this will lead to a decrease in the utility's revenue and profit. A significant reduction in the amount of electricity sold could even threaten the ability of the utility to recover its costs. While energy efficiency can adversely affect utilities, their participation in the implementation of energy efficiency is likely to help the state achieve greater success in reaching its goals. However, as long as the utility has the incentive to sell more units of electricity, it may engage in load-building efforts, contrary to the message of any energy

efficiency program (U.S DOE, 2006, p2-7). Furthermore, utility participation in the promotion of energy efficiency offers advantages including a relationship with customers, long-term resource planning, and infrastructure (RAP, 2003, pp16-17).

First, the state's electric utilities have a relationship with the customer and are knowledgeable about the customers' individual energy use. Therefore, they will be much better able to identify and achieve the state's lowest cost and most effective opportunities for energy efficiency. The utilities have also established a rapport with their customers and have experience communicating to them important information about electricity and ongoing programs. Moreover, customers may be accustomed to trusting the utility with all of their electricity needs, including efficiency (RAP, 2003, p16).

Second, utility promotion of energy efficiency is compatible with integrated long-run resource acquisition (RAP, 2003, p17). North Carolina's electric utilities are vertically integrated, meaning they have control over most of the generation, transmission, and distribution assets in the state and can make efficiency improvements in these areas. The utilities also participate in planning the construction of new generation and transmission. A utility that participates in the state's goals for energy efficiency will be better informed about and have a better ability to balance future demand and capacity. This could mean the ability to avoid the construction of unnecessary power plants or transmission lines. A utility that does not participate in the planning of energy efficiency in the state may not be able to factor decreased demand from energy efficiency into its future plans due to lack of

knowledge or control over the energy efficiency achieved. Finally, utility administration of energy efficiency programs takes advantage of existing infrastructure, knowledgeable staff, relationships within the energy services professional community, and relationships with distributors already established by the utility (RAP, 2003, p17).

While it is advantageous for the state to engage its electric utilities in promoting energy efficiency, the state must take further actions since utility programs cannot realize all of the energy efficiency potential in NC. For example, the utility cannot achieve the savings that would be realized through improved building energy codes. The Electric Power Research Institute, funded by its member utilities, has stated that its own estimates of achievable energy efficiency are considerably smaller than estimates of several other studies because they only take into account the reduction in electricity consumption that could occur as the result of programs run by electric utilities (Brown, et al., 2010, p64). This means that the state must take action outside its utilities' programs if it is to achieve its maximum energy efficiency potential.

With the current regulatory structure and incentive programs for energy efficiency, an electric utility may be penalized for reductions in sales due to energy efficiency measures that are not a direct result of the utility's program. Since the utilities are still paid for every kWh sold and reimbursed only for lost sales for which they are directly responsible, energy efficiency implemented by any other party can result in lost revenues for the utility. This means that energy efficiency

achieved as a result of improved building codes, another state program, or customers acting on their own may cause the utility to suffer reduced revenue and the risk of not recovering its capital costs. This also means that the utilities retain the incentive to increase the amount of energy sold. For this reason, the utility's incentives are still not aligned with goals for achieving energy efficiency.

Although its utilities alone cannot achieve all of the energy efficiency potential in North Carolina, aligning utility goals with state goals will allow North Carolina to choose the most effective strategy for implementing high levels of energy efficiency. The utility can offer expertise, a relationship with customers, and control over the planning of future generation. In order to align utility goals for energy efficiency, the current regulatory system must be altered.

### **1.2: Decoupling and Aligning Utility and State Interests for Energy Efficiency**

Any policy to promote energy efficiency should help to align the incentives inherent in the rate structure with the state's energy goals (Center for Energy, Economic & Environmental Policy, 2005, p2). Aligning the utility's energy efficiency goals with the states' offers several advantages. First, aligning utility and state goals helps to align the political positions of both. If energy efficiency continues to pose a threat to the utility revenues, it is possible that the utility would oppose further legislation that promotes energy efficiency. Second, if external energy efficiency measures continue to threaten the utility's revenues, the utility may become a riskier investment and could require a rate increase as its investors begin to demand a higher rate of return. For a utility to focus on the promotion of energy

efficiency over expanding generation, it requires three things (United States Environmental Protection Agency, 2006, p1):

1. The decoupling of revenue from sales volume.
2. Program cost recovery.
3. Performance incentives.

Full decoupling achieves the first of these requirements. Program cost recovery and performance incentives must be addressed with an energy efficiency program aggressive enough to achieve the state's energy efficiency goals.

The term "decoupling" refers to breaking of the link between sales volume and revenue. For an electric utility, this means breaking the link between the amount of electricity in kWh a utility sells and the amount of revenue in dollars that it earns. However, "decoupling" is often used to describe a variety of policies and regulations that work in some way to remove the disincentive for utilities to promote energy efficiency. In order to provide clarity in this discussion, this report will utilize the following terms:

1. Full decoupling refers to any policy or regulation that completely breaks the link between sales volume and revenue. Full decoupling removes both a utility's incentive to increase the amount of energy sold and the disincentive to promote measures that would reduce the amount of energy sold. California currently utilizes full decoupling.

2. Partial decoupling refers to a policy or regulation that partially breaks the link between sales volume and revenue.
3. Limited decoupling refers to a policy or regulation that breaks the link between sales volume and revenue for only specified drivers of sales variations. For example, Lost Revenue Adjustment Mechanism, used in North Carolina, allows a utility to collect revenue for lost sales due to its energy efficiency programs. This removes the disincentive for a utility to implement approved energy efficiency programs.

### **1.3: Project Overview**

The purpose of this report is to provide North Carolina stakeholders with a starting point for the discussion on breaking the link between sales volume and revenue for investor-owned utilities in the state. Because full decoupling policy and regulation breaks this link completely, the report focuses on methods of full decoupling instead of methods that break only a portion of this link. The report provides a summary of current knowledge on policies and regulations that fully break the link between sales volume and revenue. The report also discusses possible effects of full decoupling and highlights common concerns expressed by North Carolina stakeholders on this issue and recommendations for further analysis. The remainder of the report is organized into the following sections.

*Section 2: Electric Utility Regulation*

This section introduces the concepts of electric utilities as monopolies and rate-of-return regulation.

### *Section 3: Current Ratemaking in North Carolina*

This section describes current ratemaking practices and regulations in the state including general rate cases and rider hearings. The section also describes the inherent incentives created by this ratemaking and the implications for the implementation of energy efficiency.

### *Section 4: Current Energy Efficiency Policy and Regulation*

This section describes the energy efficiency incentive programs that have been approved for Duke Energy and Progress Energy. Also described in this section are the implications of these programs and the effects of the programs on the throughput incentive.

### *Section 5: Decoupling*

Definitions and concepts are introduced for full, partial, and limited decoupling.

### *Section 6: Methods for Full Decoupling*

This section discusses the four main methods for fully breaking the link between sales volume and revenue: revenue-cap decoupling, revenue-per-customer decoupling, fixed cost adjustment, and flat distribution.

### *Section 7: Considerations for the Implementation of Full Decoupling*

This section lists several options for how a full decoupling method can be implemented and how these options can address the concerns of stakeholders.

#### *Section 8: Possible Effects of Full Decoupling*

This section discusses some of the possible effects of full decoupling including effect on rates and the costs of full decoupling.

#### *Section 9: Stakeholder Concerns*

Here, the common concerns of the state's major stakeholders are introduced. These concerns are largely taken from filed comments of Duke Energy, Progress Energy, NC Public Staff, Carolina Utility Customers Association, The Carolina Industrial Groups for Fair Utility Rates, NC Electric Membership Corporations, and ElectriCities.

#### *Section 10: Conclusion*

The report concludes by offering some recommendations for analysis of full decoupling in North Carolina.

## **SECTION 2: ELECTRIC UTILITY REGULATION**

Electricity displays certain characteristics that make it different from most other industries and limit the possibilities for markets. First, high-voltage transmission and low-voltage distribution are most economically performed by a single line or network of lines. Because use of a single line or network minimizes

both capital costs and losses to electrical resistance per unit of power carried, the transmission and distribution of electricity are natural monopolies. Second, electricity cannot be stored cheaply, so must be produced instantaneously on demand. This requires operating generators to be constantly backed up by “spinning reserve” units that can begin producing electricity instantaneously. Given these characteristics, a typical electricity supplier is vertically integrated, meaning it is a large integrated owner of generation, transmission and distribution. These suppliers hold a monopoly granted by the government in return for the legal obligation as a public utility to serve all customers in an area (Michaels, 1993).

In states with traditionally regulated electricity markets, investor-owned electric utilities are allowed monopolistic control over electric power distribution within the areas they serve. Municipal, state, and federal administrative agencies substitute for the economic controls of free competition on the distribution of profits and services. These agencies are responsible for establishing uniform accounting systems, standards of service, rates to be charged for services rendered, and to regulate every other phase of a public utility’s operation (Heberton, 1961).

In 1898, the Supreme Court case *Smyth v. Ames* established that a public service company is entitled to a fair return on the value of that property which it employs for the public convenience. It has since been established that utility property be valued and considered as the rate base. The rate base represents the dollar value of the utility’s assets on which the utility may earn a return. This typically records property at original cost, less the accumulated depreciation, plus

and allowance for working capital. However, the regulating body has discretion as to how to value a utility's assets and what capital may be included in the rate base (Heberton, 1961).

Once a rate base has been established, the regulatory body will determine the rate of return (ROR) to be allowed. This type of regulation is referred to as rate-of-return regulation since the regulatory body controls the ROR a utility may earn. One main consideration in determining the allowed ROR is the utility's cost of capital. A utility's cost of capital is the expense required to raise capital, including debt and equity (Heberton, 1961).

One effect of this type of regulation is the Averch-Johnson (A-J) Effect: that a firm has an incentive to acquire additional capital if the allowable ROR exceeds the cost of capital. This means that a utility will profit from acquiring capital as long as the return it earns on the capital is higher than the expense required to raise the capital (Kihm, 2009). This is particularly noteworthy in the case of electric utilities that may seek to increase amount of electricity demanded by customers in order to justify the acquisition of new generation assets. Another effect is that the utility may also have an incentive to seek the most capital-intensive plant design options even if more efficient options exist. This behavior is often referred to as gold-plating (Kellow, 1996, p22).

### **SECTION 3: CURRENT RATEMAKING IN NORTH CAROLINA**

"All regulation is, in one way or another, incentive regulation" (RAP, 2008, p5). Primarily, the way in which regulated electric utilities earn revenue creates a

powerful incentive. Therefore, before discussing how regulation can be changed to align utility incentives with state goals for energy efficiency, it is first necessary to establish how utilities profit under the current regulatory structure.

Current regulation determines a price for electricity and therefore the revenues collected vary with fluctuations in sales. Electric rates can only be changed through a general rate case or through a hearing to adjust rate riders. A rider is an additional charge per kWh that allows the utility to recover costs for a specified program including fuel charges, renewable energy projects, and other approved programs.

### **3.1: General Rate Cases**

Presently, North Carolina uses the cost-of-service method to establish electricity rates (NARUC, 2008, p1). This method is a type of rate-of-return regulation, traditionally used to set prices for regulated monopolies (Braeutigam, 1993). This means that the utility is allowed to collect from ratepayers the amount of money it costs to provide service to those ratepayers plus a return on that investment. The North Carolina Utilities Commission (NCUC) will determine the utility's rate base- the amount of money on which it is allowed to earn a return. In order for an investment to be included in the rate base, it must be deemed to be "used and useful" to the ratepayers. The Commission will also determine an appropriate ROR for the utility to earn on its rate base. Once the amount of money to be collected from ratepayers, the revenue requirement, is determined, it is spread

out across the amount of electricity that is projected to be sold, establishing a rate per unit of electricity sold in kilowatt-hours (kWh).

$$\text{Price (\$/kWh)} = \text{Revenue Requirement (\$)} \div \text{Projected Units of Consumption (kWh)}$$

Once a rate is established, utilities earn revenue based on the amount of electricity sold; sales above the projected level result in increased earnings and reduced sales result in a loss of revenue.

$$\text{Revenue Collected (\$)} = \text{Price (\$/kWh)} * \text{Actual Units of Consumption (kWh)}$$

General rate cases do not occur on a regular basis. They occur only when a utility or another party requests one and NCUC approves this request. For Duke Energy, the most recent rate case was decided in December of 2009; the general rate case before that occurred in 1991. For Progress Energy, the most recent case occurred in the 1980's.

### **3.2: Rider Hearings**

One way that the total rate charged to customers can be adjusted outside of a general rate case is through a rider hearing. This is because riders are set to recover the costs to a utility of a specific item or program, requiring the Commission to examine a much smaller set of data than in a general rate case. Riders are adjusted much more frequently than base rates and some riders are required to be adjusted yearly.

Riders can consist of two parts: the rider adjustment and a true-up mechanism.

1. A rider adjustment is the amount per kWh that will be charged based on the expected costs of the program during the upcoming period.
2. The true-up mechanism, sometimes called an Experience Modification Factor (EMF), recovers or refunds the difference between actual program costs and the revenue collected. The true-up mechanism ensures that the utility will not collect an amount over or under the amount allowed for any program.

North Carolina allows its electric utilities to pass on the cost of fuel to its ratepayers through a Fuel Cost Adjustment (FCA) Rider. In a yearly rider hearing, the cost of fuel is determined and the rider is increased or decreased so that the utility receives revenue appropriate to recover the estimated cost of fuel. The rider also contains an EMF to true-up over- or under-collections from the previous period.

### **3.3: Effects of the Ratemaking Process**

Current regulation is designed so that the utility will recover its approved costs and an appropriate ROR based on the sale of a projected amount of electricity. After prices are set, a utility's profitability depends on two things: its ability to manage costs and its levels of sales (RAP, 2008, p5). If the utility can lower its costs in between rate cases, it can increase the profit it earns from its allowed revenue. If a utility does not lower its costs, it will only improve its profit through increased sales. This creates a strong incentive for the utility to increase its overall sales and a strong disincentive to reduce sales (e.g. implement energy efficiency). This phenomenon is known as the throughput incentive. The throughput incentive can

be thought of as a two-sided coin- with the incentive to increase sales on one side and the disincentive to reduce sales on the other.

When actual sales are greater than the projected amount, the utility collects revenue greater than needed to recover its costs and its allowed return. For instance, if the state experiences unusually hot or cold weather, and consumers use their air conditioners or heaters more than usual, they will use more kWh than projected and the utility will collect excess profits. A utility may also implement load-building programs in between rate cases. Successful load building programs will increase the number of customers that a utility serves, therefore increasing the volume of electricity it sells. As long as the marginal cost to produce electricity is lower than the marginal price, the utility will collect more revenue than required to meet the increased demand. This also means that consumers will have paid more money than necessary on utility bills; because of the increase in sales, the utility could have recovered its revenue requirement through lower rates. The excess profit generated from increased revenue is kept by the utility, which provides an inherent incentive for the utility to sell electricity above its projected sales, the first side of the throughput incentive.

If on the other hand, if consumers use less energy than projected, due to increased energy efficiency, a depressed economy, or mild weather, sales may fall below projected levels. This will cause the utility to earn less revenue than required to recover its costs and the appropriate return. If sales fall far enough or are reduced over a long period of time, the utility may not earn enough revenue to

recover its fixed costs, the largest portion of a utility's costs. In this case, the utility would not be able to provide a return for its investors and may be considered a riskier investment. As a result, investors will require a higher return and the utility may have to request a general rate case in order to obtain a higher allowable ROR as well as increased rates in order to recover costs at the lower sales level. A utility that promotes energy efficiency will experience reduced revenue, possibly threatening the financial stability of the company. This creates the inherent disincentive for a utility to promote energy efficiency, the second side of the throughput incentive.

The FCA rider shields the utility from any long-term changes in the cost of fuel. Since the rider is adjusted annually, it will be very difficult for the utility to lower its fuel costs in the short-term and extract extra profit from this charge. The utility is also shielded from the earnings erosion that would have occurred if the utility had to pay higher fuel prices but did not collect extra revenue from its customers.

Because of the high fixed costs of electric generation, transmission, and distribution, electric utilities often have a low profit compared with revenue. This relationship between a utility's revenues and profits, added to the fact that a utility's costs do not vary significantly with sales in the short run, means that a change in revenue will lead to a disproportionate change in profits for a utility. The impact on earnings, caused by sales above or below the projected level, will be disproportionately greater than the actual change in sales. For example, a 1%

increase in sales could cause a 10% increase in the utility's profits. For the same utility, a 1% decrease in sales would mean a 10% decrease in profits (RAP, 2008, p36).

In order for a utility to truly promote energy efficiency, it must be regulated in a way that eliminates both parts of the throughput incentive- the incentive to increase sales of electricity and the disincentive to promote energy efficiency.

#### **SECTION 4: CURRENT ENERGY EFFICIENCY POLICY AND REGULATION**

In 2007, the North Carolina General Assembly passed Senate Bill 3 (SB 3), which includes a Renewable Energy and Energy Efficiency Portfolio Standard (REPS). While SB 3 does not compel the state's electric utilities to implement any amount of energy efficiency, it does specify that energy efficiency measures may be used to achieve a portion (up to 25% through 2020 and up to 40% thereafter) of their renewable energy requirements. Finally, SB 3 empowered NCUC to approve cost-recovery and incentive mechanisms for energy efficiency measures implemented by a utility (Senate Bill 3, 2007).

##### **4.1: Duke Energy- "Save a Watt"**

At the end of 2009, NCUC approved Duke's proposed regulatory approach to utility-administered energy efficiency programs. This approach, called "Save a Watt" allows the utility to profit from energy efficiency by allowing it to charge customers for each kWh saved by one of its programs. The amount of money Duke

Energy may charge its customers for each kWh saved is equal to 50% of what it would have cost the utility to provide a kWh through the construction of a new power plant, the avoided cost. Under traditional regulation, the utility would be allowed to recover the capital, depreciation, and operating costs for a new plant as well as earn a return on the un-depreciated plant. Under Save a Watt, for each kWh saved, the utility can:

- Recover the amortization of and return on 50% of the NPV of avoided capacity and energy costs for energy efficiency measures and 75% of the avoided capacity costs for DSM measures. The avoided costs would include the depreciation and operating costs avoided by not building the new plant, plus the amortized return the utility would have earned on that investment. The actual avoided cost is determined for the life of the program. This revenue is limited by an earnings cap to the amount necessary to produce an after-tax return on program costs between 5% and 15%, depending on the target level of energy efficiency reached.

Performance Targets where 100% Achievement equals \$754 million in nominal avoided costs over 4 years.	
% of Target Achievement	Earnings Cap
≥90%	15%
80% to 89%	12%
60% to 79%	9%

<60%	5%
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- Recover net lost revenues for energy efficiency measures only. Net lost revenues may be recovered for a period of 36 months for each vintage year. A vintage year is the 12-month period in which a specific demand-side management or energy efficiency measure is installed for an individual participant or a group of participants. Net lost revenues are defined as the revenue losses, due to lost sales of electricity from energy efficiency, net of marginal costs avoided. Net lost revenues are trued-up to reflect actual, not projected savings, after the EM&V process.
- Use a rider on electricity rates to recover these costs from consumers. The rider consists of two components- Projected Avoided Costs and a Balance Adjustment to true-up the rider based on actual results (Docket E-7, Sub 831).

#### **4.2: Progress Energy's Energy Efficiency Incentive Program**

In 2008, Progress Energy proposed its own program of energy efficiency incentives. With the exception of Low-Income programs, all programs submitted to NCUC for approval should pass two cost-effectiveness tests: the Total Resource Cost test and the Utility Cost Test. The Total Resource Cost (TRC) test measures the net costs of a demand-side management or energy efficiency measure or program based on the costs incurred by both the utility and program participants (excluding incentives paid by the utility to the participants). The benefits include avoided

supply costs (i.e., reduction in transmission, distribution, generation, and capacity costs) calculated using net program energy savings. The Utility Cost (UTC) test measures the net costs of a DSM or energy efficiency program based only on the costs incurred by the utility. The benefits are calculated in the same manner as for the Total Resource Cost test. In order to qualify for approval by the Commission any measure must have TRC test result of 1.0 or greater and any program (a suite of measures) must have TRC and UTC test results of 1.05 or greater. Under its program, Progress may:

- Recover all reasonable and prudent costs to implement approved energy efficiency programs. These costs include capital costs, depreciation, administrative costs, implementation costs, incentive payments to participants, and operating costs. Except for administrative and general expenses, Progress may also earn a return on these costs equal to its allowed ROR.
- Receive a Program Performance Incentive (PPI), which is a payment for adopting and implementing new energy efficiency measures based on the sharing of savings achieved by the energy efficiency measures. The PPI is equal to 13% of the estimated net savings provided by the measure. The net savings are calculated as the total avoided costs of the kWh and kW saved over the measure's life, less the estimated cost to the utility of the measure during its lifetime, and discounted to the net present value. The PPI is trued-up when evaluation, measurement, and verification (EM&V) is performed to

determine the actual savings of the program. The avoided cost to be used is established at the cost recovery proceeding and shall not be updated outside of that proceeding.

- Recover net lost revenues in the same way as Duke Energy.
- Recover costs reasonably and appropriately estimated to be incurred during the current rate period through a DSM/energy efficiency rider. The rider will also allow the utility to recover its net lost revenues. The EMF rider reflects the difference between projected and actual costs and revenues during the previous period (Docket E-2, Sub 931).

#### **4.3: Effect on Energy Efficiency**

The energy efficiency programs of both Duke Energy and Progress Energy address the disincentive for the utility to promote energy efficiency and create incentives for energy efficiency implemented or achieved. To address the disincentive, both programs use a form of the Lost Revenue Adjustment Mechanism (LRAM), in order to ensure that utility-implemented energy efficiency does not cause lost sales to affect the utility financially. LRAM determines the number of kWh saved by a utility's energy efficiency programs and provides a payment to the utility amounting to the total value of the lost sales net the marginal avoided cost of each kWh saved. Essentially for each kWh saved, the utility is paid the profit it would have made by selling that kWh. LRAM can effectively remove the disincentive to promote utility energy efficiency programs by ensuring that lost sales due to energy efficiency do not punish the utility financially.

However, LRAM does not remove the disincentive to the utility to promote external energy efficiency measures. While LRAM removes the disincentive for utilities to implement their own energy efficiency programs, it does not remove the negative financial impact that any energy efficiency implemented outside of utility programs has on the utility. If the state, a third-party businesses, or consumers implement energy efficiency measures outside of the utility programs (e.g. improved building codes), the utility will not receive lost revenues for the associated reduction in sales.

Difficulty may also exist in separating kWh saved as a direct result of a utility program and savings from free riders. Free riders are those who participate in a utility program, but would have implemented the same energy efficiency measure if the program did not exist. Free ridership can be a major issue for the utility since the utility must pay for implementation of the energy efficiency measure, but does not receive credit for the kWh saved when the LRAM and incentive mechanisms are applied. LRAM may also be an expensive way to achieve energy efficiency since customers would pay the utility a charge for both the energy efficiency program to save kWh and the lost sale of that kWh.

The LRAM method can be difficult to use because it may be very difficult to determine the number of kWh for which a utility should be reimbursed (RAP, 2008, p21). It may be complicated to establish actual savings achieved by each program compared with projected or theoretical savings. However, North Carolina's

programs that include LRAM are relatively new and this has not yet become a problem in the view of stakeholders.

LRAM does not completely remove the throughput incentive for utilities. Because the utility still has the incentive to increase the sale of electricity and has a disincentive to support energy efficiency measures that it will not be reimbursed for, utility incentives and state energy efficiency goals are not aligned.

## **SECTION 5: DECOUPLING**

Decoupling refers to the decoupling of revenue from sales volume. For electric rates, this means the decoupling of an electric utility's revenue from the amount of electricity it sells.

In order to achieve this, a policy must remove the throughput incentive. The throughput incentive creates two effects for a utility: a disincentive to reduce sales volume (or promote energy efficiency), which reduces revenue, and an incentive to sell more electricity in order to increase revenue. Full decoupling removes the both parts of the throughput incentive:

1. Full decoupling removes the incentive to increase sales. Under the current rate structure, higher than expected sales volumes allow electric utilities to collect and keep more revenue than is required to recover costs and provide an appropriate return to investors. This provides an incentive to the utility

- to sell more electricity than projected. Decoupling requires that revenues in excess of the allowable revenue requirement be returned to the ratepayers.
2. Full decoupling removes a utility's disincentive to promote energy efficiency. Under the current rate structure, utilities earn revenue based on the amount of electricity sold. When less electricity is sold, due to external energy efficiency measures or any other factor, utilities earn less revenue, which reduces their profits and return to investors and puts them at risk of not recovering fixed costs. Decoupling removes the disincentive to promote energy efficiency by ensuring the electric utility that it will receive revenue sufficient to recover its costs and provide an appropriate return for investors, regardless of sales volume.

As a policy, decoupling simply requires that the Public Utilities Commission (PUC) ensure that errors in sales estimates used to establish rates not result in over or under collections by electric utilities (Office of Legislative Research, Connecticut, 2009). This ensures that electric utilities receive cost recovery for authorized revenue requirements, but also requires that any over collections be returned to the ratepayers.

While current regulation sets the price for electricity and allows the revenues collected to vary with fluctuations in sales, decoupling sets the allowed revenue and allows prices to vary with fluctuations in sales. Decoupling works by ensuring that the actual revenue collected in a period is equal to the allowed revenue and that any over or under collections are refunded to or recovered from the ratepayers in a

subsequent period. In this case, over-collections are returned to ratepayers through a decrease in rates while under-collections are recovered from the ratepayers by a rate increase. Decoupling is an important policy in promoting large-scale energy efficiency because it provides utilities with a consistent framework for providing reliable, economic electricity without a penalty for lower sales volume (EPA, 2006, p3).

Frequently, “decoupling” is a term used to describe a variety of policies that work in some way to remove the disincentive for utilities to promote energy efficiency. In order to clarify the definition of “decoupling,” this report will use and further define some terminology laid out by the Regulatory Assistance Project (RAP), a non-profit dedicated to providing policy and technical assistance to regulators and other government officials. Mechanisms that are not considered full decoupling will be considered alternative policies to decoupling and addressed in the appropriate section of this paper.

### **5.1: Limited Decoupling**

Limited decoupling insulates a utility’s revenue only from specified causes of variations in sales. For example, a utility could be permitted to true-up variations in collected revenue due to the successful implementation of energy efficiency. However, the utility’s revenue would still be affected by other impacts on sales, such as weather. Limited decoupling can insulate a utility’s revenues from variations caused by any combination of factors including energy efficiency, weather, and economic conditions (RAP, 2008, p7). With limited decoupling, over-collections

may or may not be returned to the ratepayers depending on the factors included in the decoupling mechanism. For example, if revenues are decoupled from variations in sales due to weather, it is possible to calculate the under-collections caused by mild weather and the over-collections caused by extreme weather. The utility would then recover or refund the difference in the following period. However, in the case of energy efficiency, only under-collections due to energy efficiency can be calculated and over-collections will not be refunded to the ratepayers. The Lost Revenue Adjustment Mechanism employed by North Carolina is a form of limited decoupling that shields utilities from decreased sales driven only by a utility's own energy efficiency programs.

*Example Formula for Lost Revenue Adjustment Mechanism*

$$\text{Revenue Collected (\$)} = \text{Price (\$/kWh)} * \text{Actual Units of Consumption (kWh)} + \text{Units of Energy Conserved (kWh)} * \text{Net Lost Revenue per kWh (\$/kWh)}$$

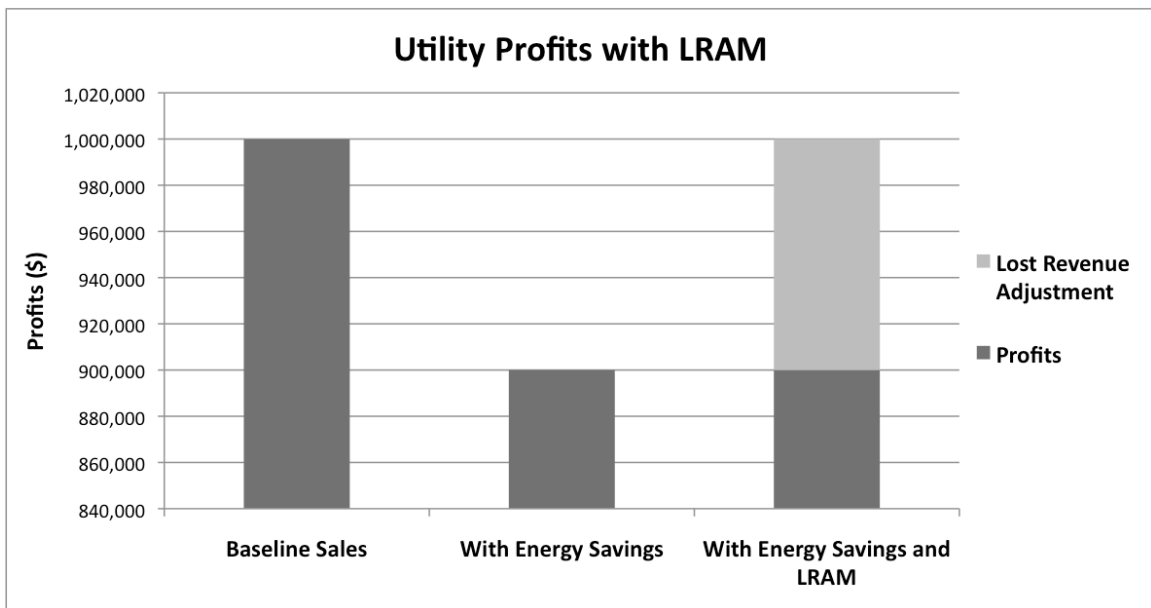
One disadvantage of limited decoupling is that complex calculations must be employed to quantify the variation in sales caused by individual factors.

Furthermore, these calculations must rely on data that one or more parties may contest. Using the example of energy efficiency, the calculation of sales variations due to energy efficiency may be calculated based on the projected savings of energy efficiency measures that have been implemented. Dozens of methods exist for creating these projections and each may yield different results. Furthermore, the actual performance of energy efficiency measures may differ greatly from

projections. Because different parties (e.g. the State and the utility) may use different methods to determine the projected and actual electricity savings of specific energy efficiency measures, it may be difficult to determine the actual amount of under-collection caused by energy efficiency (RAP, 2008, p7).

**5.1.1: Lost Revenue Adjustment Mechanism**

Lost revenue adjustment mechanism (LRAM) is a form of limited decoupling that eliminates the disincentive for utilities to encourage energy efficiency by reimbursing the utility for profit lost due to reduced sales volume from energy efficiency achieved by the utility’s energy efficiency program. Typically with LRAM, the utility is reimbursed for the marginal revenue, net the marginal cost avoided for each kWh saved (United States Environmental Protection Agency, 2006, pp 6-26).



*Figure 3. Utility Profits with LRAM. This figure assumes baseline sales of 100,000,000 kWh at a price of \$0.10/kWh with a 10% profit margin. The energy savings equal 10,000,000 kWh with marginal net revenue equal to \$0.01/kWh.*

LRAM is considered a limited decoupling policy because it shields the utility only from an isolated driver of sales variations, in this case, from decreased sales directly attributable to one of the utility's approved energy efficiency programs. LRAM is not considered a full decoupling policy because it fails to completely remove the throughput incentive. First, the utility is still rewarded for increased sales volume, so the incentive to increase sales remains. In turn, the utility's long-term plans are more likely to include increased generation capacity. This represents a misalignment with long-term energy efficiency goals, particularly when a state has vertically integrated utilities that control the development of new capacity.

Second, the utility is reimbursed only for loss of sales volume directly attributable to its own energy efficiency programs. This means that LRAM does not shield the utility from decreases in sales relating to energy efficiency implemented outside of the utility's program or any other driver of decreased sales. However, since the utility is only compensated for revenues lost as a direct result of its programs, it may still have a powerful incentive to discourage energy efficiency that occurs outside of its programs (RAP, 2008, p20). LRAM will not change the utility's lack of support for other energy efficiency measures such as improved energy efficiency codes for new or existing buildings (Kushler, York, & White, 2006, p5).

An advantage of this method is that stakeholders may prefer to compensate the utility only for those revenues lost as a result of its energy efficiency programs

(RAP, 2008, p20). Stakeholders and consumer advocates often favor LRAM as a more equitable alternative to full decoupling since the utility retains the risk of lost revenue caused by variations in the weather or a depressed economy.

This mechanism, however, has several problems associated with it. First, it is possible that a utility could be reimbursed for an amount larger than actual lost revenues. Since the amount paid to a utility is based on estimates, unforeseen technical or behavioral differences could cause estimates of kWh saved to be significantly higher than those actually achieved (United States Environmental Protection Agency, 2006, pp 6-26). Effectively, LRAM incentivizes programs with the highest estimated savings and the least amount of actual kWh saved. Also, since the current period's savings will be added to the savings of previous periods, lost revenue will escalate over time. In some cases, this has had politically unsupportable rate impacts (Kushler, York, & White, 2006, p5).

Finally, LRAM is very tedious because it requires the estimation of the energy savings from a utility's energy efficiency program and a separate calculation of free ridership- the number of customers who would have utilized similar conservation measures in the absence of the utility's program (RAP, 2008, p21). Reconciliation hearings have also become very contentious in states that have implemented LRAM as parties argue over the measurement of those savings (Kushler, York, & White, 2006, p8).

## **5.2: Partial Decoupling**

Partial decoupling differs from full decoupling in that only a portion of over- or under-collections will be trued-up in the subsequent period. For example, if a utility collects less than its allowed revenue in one period, only a percentage of the difference between its actual and allowable revenue (e.g., 90% of the difference) will be collected in the following period (RAP, 2008, p7).

$$\text{Revenue Collected (\$)} = \text{Price (\$/kWh)} * \text{Actual Units of Consumption (kWh)} - \\ \text{Percentage of Overcollections (\$)}$$

or

$$\text{Revenue Collected (\$)} = \text{Price (\$/kWh)} * \text{Actual Units of Consumption (kWh)} + \\ \text{Percentage of Undercollections (\$)}$$

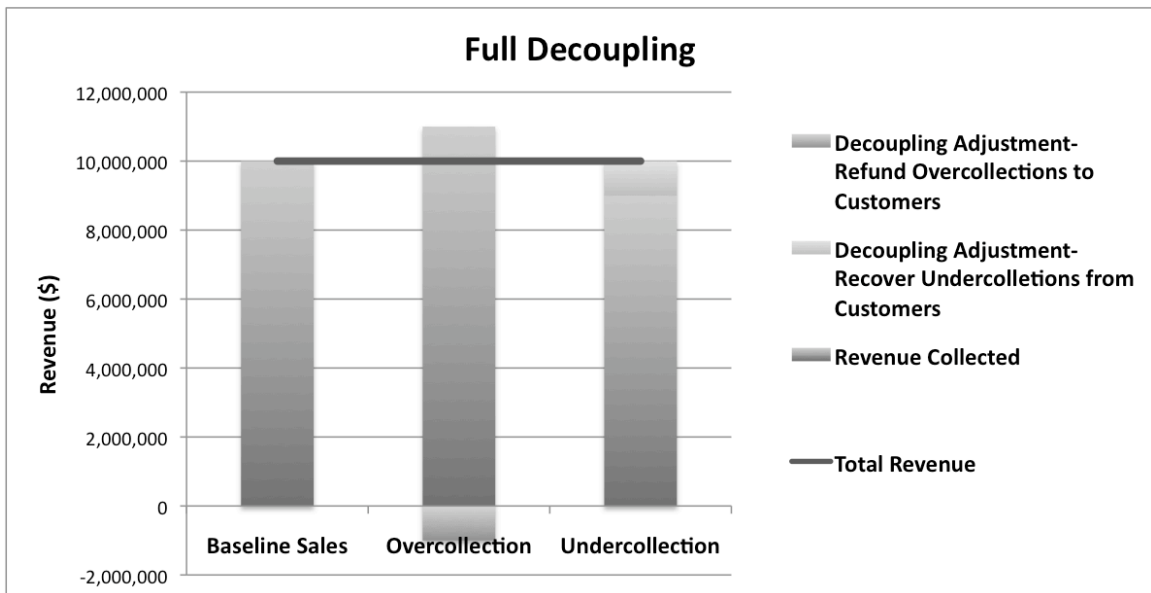
### **5.2.1: Earning Sharing Adjustment Mechanism**

Earning sharing adjustment mechanism (ESAM), also known as profit sharing, is similar to full decoupling in that if sales are lower than forecasted, rates may be adjusted up to ensure that a utility can cover its costs and provide an acceptable ROR. However, if sales exceed the forecast, then the excess profits are shared between the utility and the ratepayers.

ESAM is considered a variation of a partial decoupling policy because the utility would profit from increased sales, even though at a reduced rate. This allows the throughput incentive for utilities remains (United States Environmental Protection Agency, 2006, pp 6-26).

**5.3: Full Decoupling**

Full decoupling completely removes a utility’s throughput incentive by insulating “a utility’s revenue collections from any deviation of actual sales from expected sales.” By insulating the utility’s revenue from deviations in sales, full decoupling removes both a utility’s incentive to increase the sale of electricity and its disincentive to promote measures, such as energy efficiency or distributed generation, that would decrease sales. Any deviations in collected revenue- over or under the allowed revenue- would be trued-up in the subsequent period. With full decoupling, the utility knows exactly how much money it will be allowed to collect and can improve its profitability only by improving how well it operates within that given budget (RAP, 2008, p6).



*Figure 4. Full Decoupling. Over and undercollections of revenue are corrected by decoupling adjustments to keep total revenue stable.*

**SECTION 6: METHODS FOR FULL DECOUPLING****6.1: Revenue-Cap Decoupling**

Revenue-cap decoupling is the simplest form of full decoupling. Using this method, the utility is allowed to collect the exact revenue requirement, in dollars, determined in its last rate case- no more and no less. The revenue requirement is held constant between rate cases and a general rate case must be initiated to change the revenue requirement. Adjusted prices for each period are calculated by dividing the revenue requirement by the actual units of consumption (RAP, 2008, p38).

$$\text{Allowed Revenue (\$)} = \text{Rate Base (\$)} + \text{Rate Base (\$)} * \text{Rate of Return (\%)}$$

California uses revenue-cap decoupling. The revenue requirement is not adjusted for inflation, customer, growth or other factors. However, a future test period is used in the determination of the revenue requirement. Also, an “attrition” case between rate cases adjusts the allowed revenue for inflation, productivity, and growth. A utility’s return on equity is also adjusted annually (RAP, 2008, p44).

**6.2: Revenue-per-Customer Decoupling**

Revenue-per-customer (RPC) decoupling adjusts the utility’s allowed revenue for the number of customers the utility serves during a period. This accounts for changes in the utility’s costs that are related the number of customers it serves, including metering, billing, and some distribution system expansions. RPC decoupling begins by setting prices using the traditional technique. Then, data from the rate case is used to determine the average revenue per customer for each rate

class. For any period, the allowed revenue is calculated by multiplying the number of customers by the allowed RPC. Prices are then determined as they are in revenue-cap decoupling, using the adjusted allowed revenue (RAP, 2008, p40).

$$\text{Allowed Revenue (\$)} = \text{Allowed Revenue per Customer (\$)} * \text{Number of Customers}$$

While RPC decoupling takes into account a utility's marginal cost per customer, it may not automatically account for changes in those marginal costs over time. For example, if new customers use less electricity on average than existing customers, a cross subsidy will occur with existing customers subsidising new customers. In this case, a lower RPC should be calculated and used for customers who join the utility after a certain date (RAP, 2008, p42).

One form of RPC decoupling is called Bill Stabilization Adjustment (BSA). BSA compares the approved revenue per customer for each rate class to actual revenue on a monthly basis and adjusts rates accordingly. This method has been reported to smooth out customer bills during extreme weather since rates decrease as usage increases (EPA, 2006, pp 6-25).

### **6.2.1: Natural Gas Decoupling in North Carolina**

North Carolina's natural gas local distribution companies can help to provide an example of how full decoupling can work in the state. In 2005, the North Carolina Utilities Commission approved full decoupling mechanisms for both Piedmont Natural Gas and Public Service Company of North Carolina (PSCNC). Both

natural gas utilities currently utilize revenue-per-customer decoupling with semiannual rate adjustments (RAP, 2008, p46).

Originally Piedmont Natural Gas employed a mechanism called the customer utilization tracker (CUT). Each month the utility calculated the “margin” that it should have recovered and compared it to the actual margin collected. The difference, positive or negative, was placed in the Customer Utilization Deferred account. Twice a year, the utility filed for adjustments to its rates to maintain the deferred account within a reasonable level. The customer utilization adjustment was the increment or decrement applied to rates at that time in order to refund or recover the balance in the Deferred account. Interest was applied to that account at the company’s authorized overall rate of return. Finally, Piedmont was required to contribute funds towards conservation programs as long as the CUT mechanism was utilized (Order Granting Partial Rate Increase, 2005).

In 2008, Piedmont’s mechanism was changed to a margin decoupling tracker (MDT). MDT functions in exactly the same way as CUT. Rates are adjusted twice a year (in April and November) to refund or recover the balance in the Margin Decoupling Deferred account (Order Approving Partial Rate Increase, 2008).

For both utilities, the weather normalization adjustment (WNA) previously in place was removed with the implementation of the decoupling mechanism (Order Granting Partial Rate Increase, 2005). The WNA had essentially decoupled the utilities’ revenue from variations in sales due to weather. If weather was colder

than expected and customers used more gas, bills were credited. If weather was warmer than expected and customers used less gas, a surcharge was added to bills.

### **6.3: Fixed Cost Adjustment**

Fixed Cost Adjustment (FCA) focuses on the fixed cost portion of rates charged by electric utilities. The mechanism establishes a fixed cost portion of the rates for separate customer classes. The remaining portion of the rate covers variable costs. The fixed cost portion of the rates is then adjusted up or down depending on the sales volume.

### **6.4: Flat Distribution**

With flat distribution, a utility's fixed costs are divided evenly over its customers, with the possibility of variation between customer classes (United States Environmental Protection Agency, 2006, pp 6-26). Since presumably, the only portion of revenue tied to the number of kWh sold would cover the variable cost of providing that kWh, increased or decreased sales would not lead to increased or decreased profits. This mechanism has the added advantage of encouraging a utility to lower its variable costs between rate cases in order to extract a profit from the variable cost portion of the rate as well.

$$\text{Charge to Customer (\$)} = \text{Marginal Variable Cost (\$/kWh)} * \text{Units of Energy Consumed (kWh)} + \text{Marginal Fixed Cost per Customer (\$/customer)}$$

Flat distribution, however, is typically considered politically unattractive because it shifts the financial burden within customer classes from customers who

use the most electricity to customer who use the least. Furthermore, since a much smaller portion of the customer's bill would be tied to kWh consumed, flat distribution could discourage customer side energy efficiency measures (United States Environmental Protection Agency, 2006, pp 6-26). Flat distribution functions in the same way as a straight-fixed variable rate design.

## **SECTION 7: CONSIDERATIONS FOR THE IMPLEMENTATION OF FULL DECOUPLING**

In order for a decoupling policy to function as desired, several aspects must be tailored on a state or utility basis. The implementation of a full decoupling mechanism must be adjusted based on a state's market structure, economy, current and future electricity needs, current and predicted electricity prices, weather, political climate, and stakeholder needs.

### **7.1: Classes to be Included**

A decoupling mechanism can be applied across all customer classes or it can be applied more selectively. Excluding any one class from the mechanism can shift costs to the classes that are included in the mechanism.

### **7.2: Current versus Accrual Method**

In the current method for decoupling, rate adjustment periods would coincide with billing cycles. At the end of the period, the allowed revenue would be divided by actual sales to determine a price for electricity. This price would be

applied immediately to consumer bills. With this method, there will be no error in collection and reconciliation will be necessary (RAP, 2008, p41).

Under the accrual method, prices are calculated for an upcoming period based on projected sales. If actual sales deviate from projected sales, revenue collected will differ from the allowed revenue. In this case, the collections must be periodically reconciled- trueed up. This is similar to the EMF portion of a rider. If collections fall below the allowed amount, accrued charges are tracked in a deferral account and a surcharge added to rates in the subsequent period to recover these funds. If collections exceed the allowed revenue, accrued credits are tracked in the same account and rates will be reduced by an amount appropriate to refund ratepayers (RAP, 2008, pp 40-41).

If the accrual method will be used, the lag between payment and true-up must be considered. When a lag exists between adjustments, it can shift the revenue responsibility between customers and years. For example, if a mild winter causes the utility to under-collect, a rate increase in the following year could exacerbate bill volatility in a colder than average winter (RAP, 2008, p41). If however, true-ups occurred monthly, customers would better retain responsibility for rate adjustments and customer bills would remain less volatile.

### ***7.2.1: Electric Rate Adjustment Mechanism***

Electric rate adjustment mechanism (ERAM) is one application of the accrual method. With this mechanism, rates are set based on the allowed revenue and projected sales. Excess revenue is returned through subsequent rate decreases and

shortfalls are recovered through rate increases. In order to track revenue, some utilities use a “balancing account.” This account is the same as a deferral account and tracks the difference between actual and forecasted revenues (Office of Legislative Research, Connecticut, 2009). Variations of this mechanism include Periodic Rate Adjustment Mechanism (PRAM) and Monthly Revenue Adjustment (MRA). These mechanisms are extremely similar to ERAM, only altering the length of the period between rate adjustments.

### **7.3: Rate of Return**

Full decoupling significantly reduces the earnings volatility for the utility, therefore lowering its financial risk. By making it a less risky investment, full decoupling can lower a utility’s cost of debt and equity. One way to reflect this risk reduction is through reducing a utility’s allowed ROR. This has been done in many jurisdictions, but may be less appealing to the utility (RAP, 2008, pp 13-15).

#### ***7.3.1: Averch-Johnson Effect***

On the other hand, an inappropriately high rate of return (ROR) allowed to the utility can result in an ineffective decoupling policy. This occurs because of the Averch-Johnson (A-J) Effect. According to the A-J Effect, when profits are regulated to a certain percentage based on capital, than an incentive exists to over-invest in capital in order to increase overall profits. When the A-J Effect exists, decoupling revenue from sales volume will not remove the incentive for a utility to increase its generation capacity. The stockholder value and profits of a utility in this situation will be increased by increased investment in capital.

The A-J Effect can be avoided by setting a utility's ROR close to its cost of capital. If the ROR is set higher than the cost of capital, then the incentive will still exist to increase investment in capital. If the ROR is set at or close to the utility's cost of capital then new large capital investments will cost the utility as much as the investment increases revenue. Since further capital investment will not result in increased profits, the utility will not have any incentive to invest in capital beyond what is necessary to provide service to its rate base (Kihm, 2009).

#### **7.4: Rate Structure**

While decoupling breaks the link between revenue and sales volume for a utility, the policy, aside from flat distribution, may be applied in a way that does not affect the rate structure (the way that customers are charged for electricity). Revenue-cap and RPC decoupling are applied to the volumetric prices of each rate class (RAP, 2008, p40), meaning customers are still charged based on the amount of kWh and kW used. This means that any existing or desired rate structure can be applied along with a decoupling policy.

### **SECTION 8: POSSIBLE EFFECTS OF FULL DECOUPLING**

Little data exists regarding the effects of implementing full decoupling in a state. This lack of data stems from the fact that no state except California has implemented full decoupling for more than a few years and the effects of decoupling in California cannot be separated from the effects of deregulating the state's electric

industry and other factors. For this and other reasons, arguments for and against the implementation of full decoupling can still be made.

### **8.1: Rate Variability**

One argument against full decoupling is that the true-up process, which adjusts rates up or down, could cause rates to vary greatly from period to period. Changes in rates would particularly impact low-income customers, who are least able to respond to changes in bills (NARUC, 2007).

A 2009 study of the decoupling mechanisms of 28 natural gas and 17 electric utilities found that decoupling adjustments provided both refunds and surcharges to customers, with no pattern of rate increases or decreases emerging. The study also found that decoupling adjustments have been very small, most often under 2%, with the majority under 1%. Using 2007 rates, this translates to less than \$2.00 per month in higher or lower charges for residential electric customers (Lesh, 2009, pp 66-67). Customers may already see significantly greater rate variability through surcharges for fuel and purchased power (NARUC, 2007).

Increasing the frequency with which rates are brought into alignment with the approved revenue requirement should result in smaller changes from period to period and decrease the likelihood of a sharp hike or decline in rates, which is common in traditional rate cases (NARUC, 2007). One way to eliminate the possibility of large variations in rates is to set a cap on the allowable percentage change in rates from period to period. If the adjustment required exceeds the cap, it could be rolled over into subsequent periods.

**8.2: Shifting of Risk from Utility to Customers**

If a full decoupling mechanism is implemented for a utility, risk is shifted from the utility's shareholders to its ratepayers. The utility no longer faces the risk of sales variability due to weather, a recessed economy, or any other factor; however, the ratepayers face the risk of rate variability due to the same factors. Since decoupling significantly reduces the earnings volatility for the utility, it lowers its financial risk. By making it a less risky investment, full decoupling lowers the utility's cost of capital. This could lower the utility's costs of debt and equity or alternatively allow the utility to lower its equity capitalization ratio (RAP, 2008, p13).

Bond rating agencies now recognize that mechanisms including decoupling, weather adjustments, fuel and purchased gas adjustments, and others reduce net earnings volatility and risk. The implementation of a decoupling mechanism may improve a utility's bond rating. This allows the utility to obtain debt and equity at reduced costs. This effect however, can take years to materialize, delaying the benefit to customers. Reducing a utility's allowed return on equity is another way to reflect this risk reduction. This has been done in many jurisdictions, but may be less appealing to the utility (RAP, 2008, pp 13-15).

Decoupling might instead allow a utility to maintain its bond rating while reducing its equity capitalization ratio, or how much equity the company is using to finance its operations compared to debt and equity. The utility can reduce the amount of equity because it no longer runs the risk not recovering costs from

ratepayers. Since equity is generally more costly than debt, a reduction in the equity capitalization ratio reduces the overall ROR required by a utility. For a \$1 billion rate base, a 3% reduction in the equity capitalization rate could result in a 1% decrease in the total cost of service to consumers. These savings can be captured by consumers in the first few years the mechanism is in place, in the form of reduced rates or could be used to fund energy efficiency programs (RAP, 2008, pp 14-15).

### **8.3: Costs of Decoupling**

A concern shared by many stakeholders is that decoupling could increase the rates paid by consumers. The effects of a decoupling policy could impact customers in several ways that should be examined. These impacts include the costs and benefits to ratepayers across time, the impact on total electric bills versus electric rates, and risk and its effect on a utility's cost of capital. According to RAP, the benefits and costs of decoupling can be placed in one of three categories: costs associated with regulation and administration; costs associated with short-term impacts on the revenue requirement; and long-term costs of meeting the demand for electricity (RAP, 2008, pp 8,10).

#### ***8.3.1: Administrative Costs***

Currently, the general rate case comprises the "overwhelming cost in ratemaking." Decoupling would not affect the cost of these rates cases. If an increase in the frequency of general rate cases was deemed necessary, then the overall cost of regulation could increase. However, a decoupling mechanism designed to adjust for changes in short-term drivers such as number of customers,

inflation, and productivity could reduce the frequency of general rate cases.

Generally, the administrative costs of a decoupling mechanism should be similar to the costs of other periodic rate adjustments (RAP, 2008, p9), like rider hearings.

### **8.3.2: Regulatory Lag**

Regulatory lag- the amount of time that passes between rate cases- may drive decoupling's effect on short-term rates. Under traditional regulation, if a utility's earnings are satisfactory, it will not seek an increase in rates. If the utility's earning exceeds its allowed returns and no stakeholder initiates a rate case to reduce rates, the utility's shareholders benefit. In this case, regulatory lag allows the utility to continue to collect more revenue than required (RAP, 2008, p9). Under decoupling, rates would be adjusted down and any over-collection would be refunded to the ratepayers. This suggests that a decoupling mechanism would provide a rate reduction compared to traditional regulation in this instance.

However, if earnings begin to decline, the utility will likely seek a rate increase. If regulatory lag exists, then the utility's shareholders will be harmed until rates are increased, allowing the utility to recover its full revenue requirement. This can be viewed as a benefit to ratepayers who would pay increased rates in the absence of any regulatory lag (RAP, 2008, p9). With decoupling, rates would be adjusted up and any under-collection would be recovered from ratepayers. In this instance, a decoupling mechanism would increase rates compared to traditional regulation (RAP, 2008, p9).

Therefore, the amount of regulatory lag experienced under traditional ratemaking will influence how decoupling affects rates in the short term. In general, utilities with increasing sales per customer, like a typical electric utility, will tend to see higher profits with longer regulatory lag (RAP, 2008, p9).

### ***8.3.3: Long-Term Effects***

The final category, according to RAP, is the effects of decoupling on the long-term costs of meeting demand. While these effects have not been quantified, one benefit of decoupling is the focus on operational efficiency, or cost reduction, that decoupling encourages. Another benefit that could create overall savings for consumers is the increased emphasis on long-term, least-cost strategies for meeting demand (RAP, 2008, p10)

### **8.4: Maintaining Lowest Cost Service**

Another concern regarding the implementation of a decoupling policy is that the utility would no longer have an incentive to lower its costs between rate cases. Under current regulation, a utility has a great incentive to lower its costs after a rate case- since the price is set, if a utility can lower its costs per kWh, it can increase its profit per kWh. This increased profit can be realized until rates are reset at the next rate case.

Full decoupling also provides the utility with a strong incentive to reduce its costs between rate cases. In fact, under full decoupling, this is the only way that a utility can increase its profits (RAP, 2008, p8). If the utility can decrease its costs between rate cases, it can increase the amount profit it earns from the allowed

revenue stream. With decoupling, excess revenues are returned to ratepayer, not excess profits.

Again, if rate cases occur more frequently than in the past, then the utility may have less time to realize profits from lowered costs. In order to ensure that a utility selects the lowest cost options, it is also possible, when determining the amount of cost recovery required by the utility, to use wage rates and material costs based on price indexes to create external pressure or competition on the utility's actual costs (Center for Energy, Economic & Environmental Policy, 2005, p3).

With respect to fuel costs, however, North Carolina utilities are already permitted to pass the cost of fuel directly to the customer through a rate rider. If this rider were replaced by decoupling, the incentive to seek out lower fuel prices would be increased. The rider has already essentially "decoupled" the utility with regards to the cost of fuel. Since the utility is already guaranteed to recover its fuel costs, the incentive to seek out the lowest cost fuel sources would change very little under decoupling. If the rider remained intact, the incentive would be unchanged. Only a difference in the timing of hearings or rate cases would change this incentive- if rate cases under decoupling were held more than one year apart, the regulatory lag would be greater, increasing the incentive to reduce costs, and increase profits, between rate cases. It is unlikely that a rate case would be held more frequently.

### **8.5: Maintaining Reliable Service**

Some concern exists that the implementation of a decoupling policy would cause a utility to lower its customer service standards and maintain only the

minimum level of service required of it by law. Since the utility would no longer be penalized for lost sales, it would have no incentive to react quickly to power outages or other issues in order to maintain customer satisfaction.

This concern may differ from state to state. It is unlikely that customer service in any regulated state would be affected by the implementation of a decoupling policy. Since customers cannot currently choose another electricity provider under the regulated structure, the incentive for regulated utilities to provide customer service would remain unchanged. In a regulated state, utilities do have the incentive to react quickly to outages that could cause lost sales. To address this and other quality of service issues, performance standards, incentives, and penalties could be used.

In deregulated or restructured states however, some electric utilities must provide excellent customer service as a means of keeping customers from choosing a different provider since losing these customers would result in lost profits. To deal with this situation, some states have included customer service performance incentives or penalties in the requirements for their utilities.

## **SECTION 9: STAKEHOLDER CONCERNS**

Senate Bill 3 required NCUC to prepare “an analysis of whether rate structures, policies, and measures, including decoupling, in place in other states and countries that promote a mix of generation involving renewable energy sources and

demand reduction should be implemented” in North Carolina. The Commission solicited comments from stakeholders on the matter and also asked if decoupling would cause utilities to “more aggressively pursue conservation and energy efficiency.” Dozens of stakeholders submitted their comments in this docket, including several organizations in support of a full decoupling mechanism. However, only the concerns of major stakeholders will be reviewed in this paper.

Throughout the comments of these stakeholders, several concerns associated with decoupling were repeated. These concerns fall into four main categories:

- Effect on rates. Stakeholders expressed concerns about the possibility of rate variability or a general trend of increased rates.
- Risk. Decoupling may shift the risk of sales variations from the utility to its customers. Because of this, the utility’s allowed ROR should be reduced to reflect the lower risk.
- Regulatory oversight. Some stakeholders expressed conflicting concerns over the amount of regulatory oversight required by the implementation of decoupling including the need for and frequency of general rate cases and the amount of administrative work required once decoupling is implemented.
- Retention of desired incentives. Concerns exist that some of the incentives existing in the current regulatory structure would be eliminated by a decoupling mechanism. These incentives include the incentive for

customers to conserve electricity, the incentive for utilities to operate in a least cost manner, and the incentive for utilities to participate in business recruitment and retention.

### **9.1: Duke Energy Comments**

In its comments, Duke Energy states that declining sales attributable to activities related to energy efficiency are of particular concern to the utility. “Because of the link between profits and sales, a 1% increase in sales might lead to a 5% increase in profits (with corresponding decreases in profits when efficiency reduces sales).” Duke also states that an extensive list of pros and cons could be made for various decoupling methods, including full decoupling and LRAM, and that “several can be used with a variety of modifications that can be fair and reasonable to all parties” (Duke’s Response, 2008, pp 1-2,7). It points out that although decoupling does “remove a significant disincentive to promote energy efficiency and removes the incentive to promote sales...it does not provide an explicit financial incentive to promote energy efficiency.” Finally, Duke states that “the lack of a level playing field between demand-side and supply-side investments remains a substantial obstacle to utility implementation of energy efficiency programs.” To make energy efficiency investments profitable compared with other investments, they should earn an equivalent return. Duke states that its Save a Watt method has the potential to drive significant energy efficiency investment with or without decoupling (Duke’s Initial Comments, 2008, pp5-6).

### **9.2: Progress Energy Comments**

Progress Energy reiterates that a decoupling mechanism alone does not encourage energy efficiency, but also states that “a properly designed decoupling methodology may be productive.” It “would allow a utility to adjust its rates annually without a rate case to ensure the utility is allowed to earn its authorized return on rate base.” Progress also asserts that utilities should be given sufficient mechanisms to recover costs, including lost revenues, and incentives to encourage them to aggressively promote conservation and energy efficiency (Progress Comments, 2008b, pp 2-3)

Progress Energy also brings up several concerns about the implementation of a full decoupling policy (Progress Comments, 2008, pp 2-3):

- That risk would be transferred from the utility to the customer. Progress cites the state of Maine’s experience with decoupling “when customer usage dropped in response to an economic recession... decoupling adjustments kicked in to reflect pre-recession target revenues, causing rates to go up when customers were least prepared to pay them. Maine discontinued the program in 1993 after deferrals accumulated by the adjustment mechanism had reached \$52 million.”
- Decoupling could have negative impacts on rate stability.

### **9.3: Public Staff Comments**

The Public Staff opens its comments by observing that “demand for electricity continues to increase. In August 2007, both Duke Energy and Progress

Energy Carolinas reported record energy usage.” “Fuel prices, including prices for natural gas, coal, and oil are at or near record highs, and these prices are likely to remain above historic averages for the foreseeable future.” It also affirms that while demand for power continues to increase, a great deal of controversy surrounds efforts to construct new generation sources, whether they are coal, nuclear, hydroelectric, or wind projects.”

The Public Staff affirms that “utilities should be active participants in conservation and load reduction efforts... however, utilities may be penalized at the bottom line for reductions in customer usage and have a strong incentive to promote sales between rate cases.” However, the Staff expressed the following concerns over a full decoupling mechanism (Public Staff’s Comments, 2008, pp 1-2, 8-12):

- Full decoupling would shield the utility from the risk of sales variation, regardless of the driver. If decoupling does shift these risks to the ratepayers, the utility should be allowed a reduced ROR.
- “Decoupling would eliminate the necessity to have general rate cases when all aspects of a utility’s costs could be examined.”
- “If all revenues were decoupled, there would not be a strong incentive for the utility to do everything it could to deliver electric utility service in a least cost manner.”

- “Decoupling could also reduce a utility’s incentive to assist the state in business recruitment and retention.”
- Decoupling could cause significant rate increases.
- Decoupling could require “additional regulatory oversight during the implementation period as well as ongoing oversight of complex filings and requests.”
- “Decoupling may result in a redistribution of revenue responsibility among customers.”
- Decoupling can change customers’ incentives to invest in energy efficiency, since any voluntary reduction in usage on their part will be partially offset by an increase in rates.

#### **9.4: Carolina Utility Customers Association**

The Carolina Utility Customers Association (CUCA) made the following comments on decoupling (Comments of CUCA, 2008, p4):

- “Since such a measure as decoupling clearly reduces the risk profile of participating utilities, the allowed rate of return earned by these utilities should likewise be reduced.”
- “The only means for realigning the lower risk of the utility with the higher earned return is through a rate case proceeding. Before any decoupling

measure is implemented, a rate case proceeding should be conducted so as to establish the proper cost structure of the utility.”

- “After the initial rate case, a mandatory rate review of each regulated utility’s rates should be conducted at a minimum of every four years.”

#### **9.5: The Carolina Industrial Groups for Fair Utility Rates**

The Carolina Industrial Groups for Fair Utility Rates (CIGFUR) “urges the Commission and the General Assembly to reject revenue decoupling for electric utilities in North Carolina.” In support of this statement, CIGFUR offered the following:

- “Such a step should be accompanied by a downward adjustment to the allowed rates of return for electric utilities to reflect the reduced business risk...”
- “Decoupling mechanisms should be rejected because they would: frustrate the voluntary efforts of customers to reduce energy consumption; transfer traditional utility business risks to customers; reduce a utility’s motivation to be responsive to the needs of its customers; and create unnecessary rate volatility and uncertainty.”
- “Decoupling mechanisms are not needed to ensure that customers engage in energy efficiency efforts...customers will rationally respond to price signals in the electricity markets by undertaking independent efforts to reduce their energy consumption.”

- “The rate volatility associated with revenue decoupling produced disastrous consequences for the decoupling programs implemented in Maine and Washington” (CIGFUR’s Comments, 2008, pp 1-9).

#### **9.6: Electric Corporations and Municipal Electric Providers**

North Carolina Electric Membership Corporations (NCEMC), which represents a majority of the state’s electric membership corporations, filed its comments jointly with ElectriCities, which represents the state’s municipal electric providers. These comments refer to full decoupling as a simplistic approach that ignores the fact that sales of electricity can be reduced by factors other than energy efficiency, concluding that decoupling is not a proper means for overcoming the inherent conflict between energy efficiency and the revenue of the electric utility and promote energy efficiency programs (Initial Joint Comments of NCEMC and ElectriCities, 2008).

#### **SECTION 10: CONCLUSION**

The state of North Carolina will face a growing increase in demand for electricity in the coming decades. The State must create a long-term plan for meeting this need that serves the best interest of its residents, electric consumers, businesses, and regulated electric utilities. Energy efficiency is the lowest-cost form of meeting increased demand and offers the State other benefits over increased electric generation including improved air quality, reduced fresh water usage, and reduced carbon emissions. The State’s regulated electric utilities can offer expertise

and a relationship with electric customers if included in the State's effort to achieve its energy efficiency goals. However, these utilities currently face a financial incentive to continue to build load, which works against energy efficiency goals, and a disincentive to support energy efficiency measures for which they will not be reimbursed. Moreover, without the current limited decoupling policy in place, these utilities would face a financial disincentive for the implementation of any energy efficiency measures. Full decoupling could serve North Carolina as a part of a comprehensive plan for achieving its energy efficiency goals.

However, the potential impacts of full decoupling in the state have not yet been quantified. In order to determine whether the implementation of full decoupling would be advantageous for the state's ratepayers and electric utilities, further quantitative analysis should be performed.

1. **Rate Variability.** An analysis of the variation in electric rates caused by full decoupling should be completed. This analysis could use historical data a utility's rate base, allowed rate of return, actual and projected sales, and rates (including all applicable riders) to simulate the effect on rates if a full decoupling mechanism had been in place. This analysis should test rate variation using both the current and accrual methods for decoupling. Furthermore, an analysis of the variation in rates caused by existing riders should also be conducted using historical data to determine the percentage change in rates caused by fluctuations in riders. These analyses should be

compared to determine the effect full decoupling would have on rates compared to existing fluctuations.

2. **Rate Cap.** An analysis should be conducted to determine the level at which a rate cap would minimize rate variability as well as the time required to refund or recover any deferred balance. Further analysis should test the effect on ratepayers, particularly low-income ratepayers, of a rate cap at that level as well as higher and lower values.
3. **Rate Trends.** An analysis should also be conducted, using the same historical data, to determine if, over time, the utility would have earned more or less revenue if a full decoupling mechanism had been in place compared with actual historical revenue collected.
4. **Rate of Return.** First, study should be conducted to determine the appropriate ROR that should be allowed for each utility that provides a reasonable return and does not encourage load-building. Another analysis could use historical rate base and revenue data to determine the actual ROR earned by a utility for each year and the average ROR earned over time. This data could be compared with the allowed ROR for those years and the appropriate ROR determined by the first ROR analysis.

This quantitative data would provide more information about the effects of full decoupling and the best methods for its implementation. This would allow North Carolina stakeholders to determine if full decoupling is an appropriate option for the promotion of energy efficiency in the state.



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**APPENDIX A: STATE ELECTRIC EFFICENCY FRAMEWORKS**

State	Type of Decoupling (Year Approved)	Energy Efficiency Incentive Program	Notes
Alabama			
Alaska			
Arizona		Net Benefits: 10% of DSM net benefits and capped at 10% of total DSM expenditures	In 2008, the Arizona Corporation Commission opened an investigatory docket to explore whether regulatory incentives should be changed to align utility financial incentives with energy efficiency investment.
Arkansas			
California	Full- Revenue Cap (1982-1996, 2001)	Risk Reward Incentive Mechanism: minimum performance standard under which incentive is earned only if program achieves 85% of goals. 9% of net benefits are earned if utility achieves 85-99% goals; 12% of net benefits earned if utility if meets or exceeds goals up to earnings cap	California briefly suspended decoupling in order to deregulate its electricity industry, but reinstated full decoupling after restructuring. Revenue requirements are adjusted for customer growth, productivity, weather, and inflation on an annual basis with rate cases every three to four years.
Colorado		Utility may earn profit on DSM expenditures as long as it achieves 80% of its goal; incentive is tied to net benefits and energy saving and is capped at 20% of DSM expenditure	

State	Type of Decoupling (Year Approved)	Energy Efficiency Incentive Program	Notes
Connecticut	Full (2007)	Yes	As of 2007, all electric and gas utilities must include a decoupling proposal as a part of their individual rate cases. United Illuminating is using a full decoupling mechanism, adjusted annually as a pilot. Connecticut Light & Power was denied a full decoupling mechanism in its last rate case and will continue decoupling through rate design.
DC	Full- RPC (2009)	Authorized	PEPCO uses Bill Stabilization Adjustment, which is and RPC mechanism adjusted quarterly
Delaware	Full (2009)		Full decoupling has been authorized for utilities but not yet implemented.
Florida		Authorized	
Georgia	Limited- LRAM	15% of NPV of net benefits from approved program if utility achieves at least 50% of projected participation levels	
Hawaii	Full (2010)	Net Benefits: If all goals are met, utility may earn 1% of net system benefits; incentive increases to maximum of 5% if the utility exceeds goals by 10% or more; capped at \$4million BT	Hawaii approved full decoupling in 2010. The utilities have submitted proposed mechanism which allows for rate base adjustments for O&M costs and planned capital additions, and a mechanism for sharing earnings with rate payers if the utility exceeds allowed ROE. True-ups occur annually.
Idaho	Full- RPC (2007)	Discontinued in 2009. Net Benefits: 10% of program net benefits tied to market share % achieved	Three-year pilot is currently employed by Idaho Power Company. Sales are adjusted for weather and rate increases are capped at 3% over the previous year. Mechanism is only applied to residential and small general service customers.

<b>State</b>	<b>Type of Decoupling (Year Approved)</b>	<b>Energy Efficiency Incentive Program</b>	<b>Notes</b>
Illinois			
Indiana	Limited- LRAM requested by Commission	Authorized	LRAM has been requested by utilities and Commission approval is pending.
Iowa			
Kansas		Authorized- Increased ROE on EE	
Kentucky	Limited- LRAM	Cost Recovery, Shared Savings: up to 10% of program costs for achieving goals	
Louisiana			
Maine	Authorized	Authorized	
Maryland	Full- RPC (2007)		RPC decoupling with quarterly adjustments.
Massachusetts	Authorized (2008)	Shareholder incentive for 5% of program costs	Gas and electric utilities must include a decoupling proposal in their next rate case. Revenues can be adjusted for inflation or capital spending if necessary. MA DPU expects that all utilities will have fully operational decoupling plans by 2012.
Michigan	Full (2009)	Authorized	Act 295 mandates that the Commission consider decoupling mechanisms proposed by state's electric utilities. Detroit Edison's decoupling mechanism was approved in January 2010 and normalizes for weather and has separate adjustments for each customer class.
Minnesota	Full (2008)	Net Benefits: % of net benefits increases as achievement increases; at 150% of goal, utility would receive 30% of expenditure	A statute was passed in 2007 that allows electric and gas utilities to implement decoupling pilot of no more than three years.
Mississippi			
Missouri		Authorized	

<b>State</b>	<b>Type of Decoupling (Year Approved)</b>	<b>Energy Efficiency Incentive Program</b>	<b>Notes</b>
Montana	Limited- LRAM	Authorized	For Northwestern Energy, lost revenues due to DSM acquisition efforts are factored into rates monthly and lost T&D is true-up annually.
Nebraska			
Nevada	Limited- LRAM	Utility may earn extra 5% ROE for approved DSM costs	
New Hampshire	Recommended (2009)	8-12% of program budget; tied to meeting goals	NH PUC concluded in 2009 that existing rate mechanisms are a barrier to energy efficiency. It ordered that future rate mechanisms be normalized for changes in weather.
New Jersey	Proposed Full- RPC		Atlantic City Electric has proposed Bill Stabilization Adjustment, which is RPC decoupling with monthly true-ups with changes capped at 10% of previous fixed revenue amounts
New Mexico	Proposed Full	Authorized	PNM proposed a decoupling mechanism in June 2010, which is pending approval.
New York	Full (2007)	% of program costs based on achievement of target	Electric and gas utilities must file proposals for true-up based decoupling mechanisms in ongoing and new rate cases. Proposals have been approved for Consolidated Edison and Orange & Rockland. Both are RPC mechanisms with annual true-ups.
North Carolina	Limited- LRAM	Save a Watt for Duke Energy; Cost Recovery and PPI for Progress	
North Dakota			
Ohio	Limited- LRAM	Shared Savings with maximum 10% shareholder incentive if at least 65% of targeted savings are achieved; Save a Watt for Duke Energy	

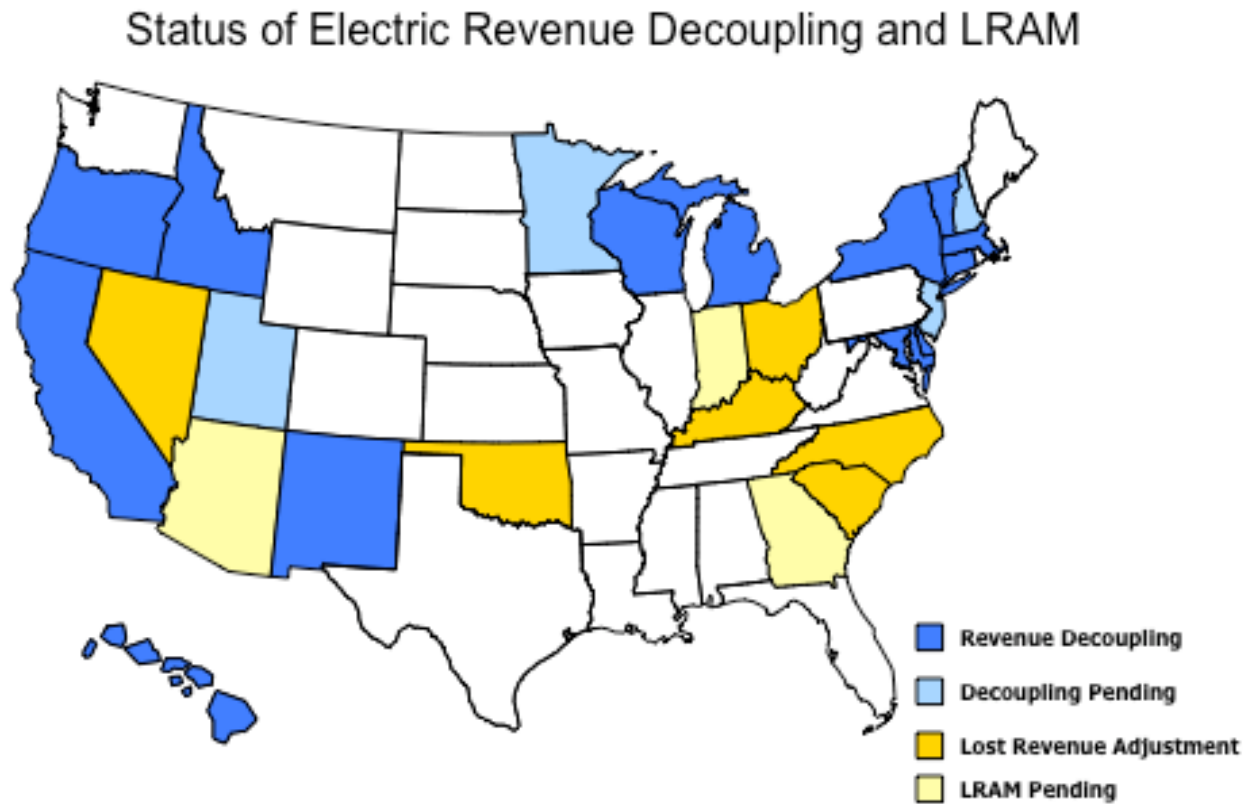
State	Type of Decoupling (Year Approved)	Energy Efficiency Incentive Program	Notes
Oklahoma	Limited- LRAM	Shared Savings allowing 25% of net savings; 15% costs for education and marketing	
Oregon	Full- RPC (2009)		Portland General Electric was approved for a two year pilot with true-ups occurring annually.
Pennsylvania			
Rhode Island		Shareholder Incentive	
South Carolina	Limited- LRAM	Save a Watt for Duke	
South Dakota		Yes	
Tennessee			
Texas		Performance bonus based on net benefits; max bonus is 20% of program costs	
Utah	Authorized	Authorized	HJR 9 passed in 2009 and included language supporting decoupling. However, Rocky Mountain Power's proposal was rejected in 2010.
Vermont	Full- RPC (2007)	Yes-Efficiency Vermont can earn up to 2% of overall budget for exceeding goals	Approved for Green Mountain Power. Rates can be adjusted up to four times per year with annual reconciliation. Change in base rates cannot exceed 2% per year. CVPS was also approved for decoupling.
Virginia		Authorized	
Washington			
West Virginia			
Wisconsin	Full (2008)	ROR- earn same ROR on EE as capital investments	WPSC allowed to implement Revenue Stabilization Mechanism during four-year pilot. True-ups occur annually and over or under collection is capped at ~\$14million.

<b>State</b>	<b>Type of Decoupling (Year Approved)</b>	<b>Energy Efficiency Incentive Program</b>	<b>Notes</b>
Wyoming	Limited- LRAM		Recover costs and lost revenues for load management programs only.

Sources: ACEEE (2009); The Edison Foundation (2009)

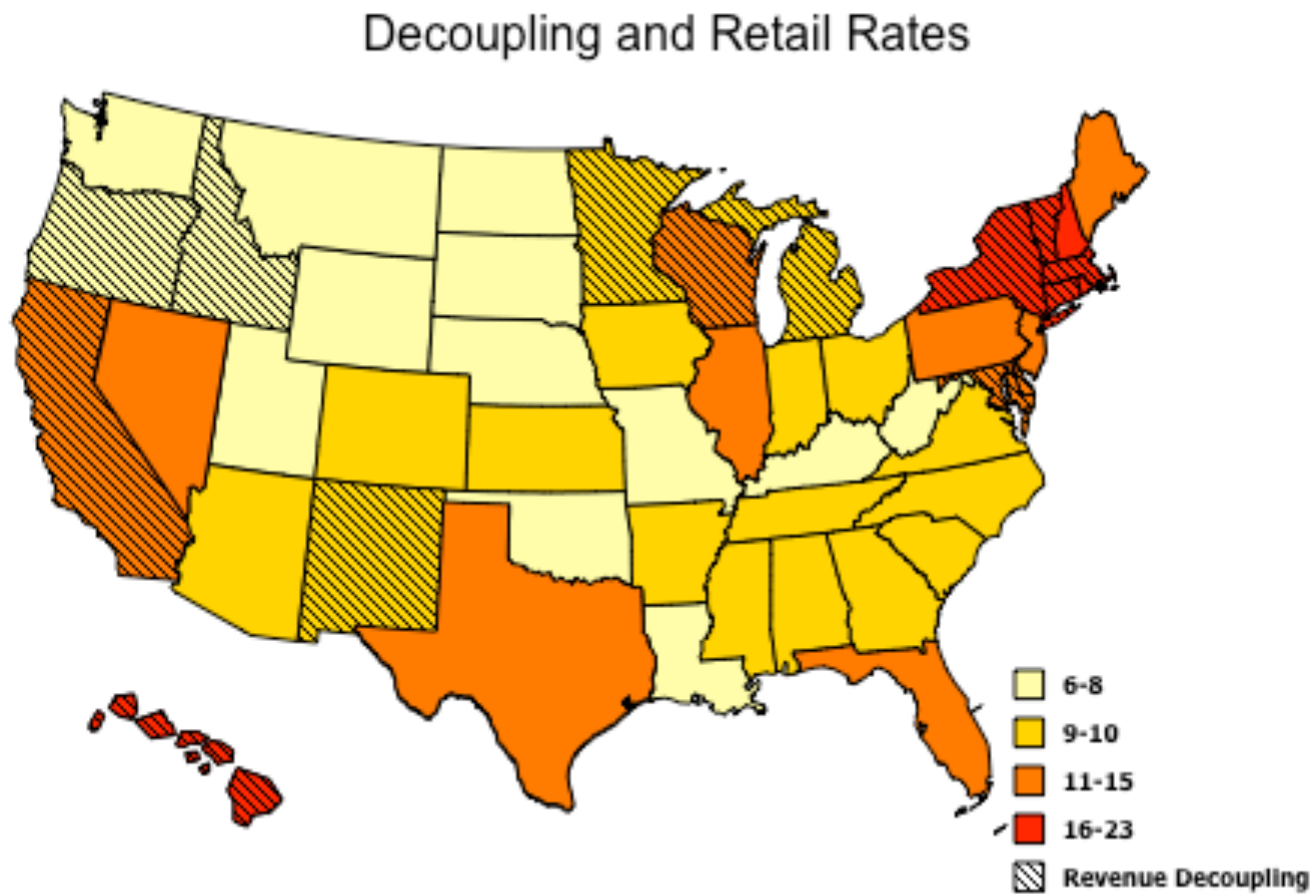
**APPENDIX B: DECOUPLING MAPS**

B.1: U.S. map of full decoupling and LRAM mechanisms.

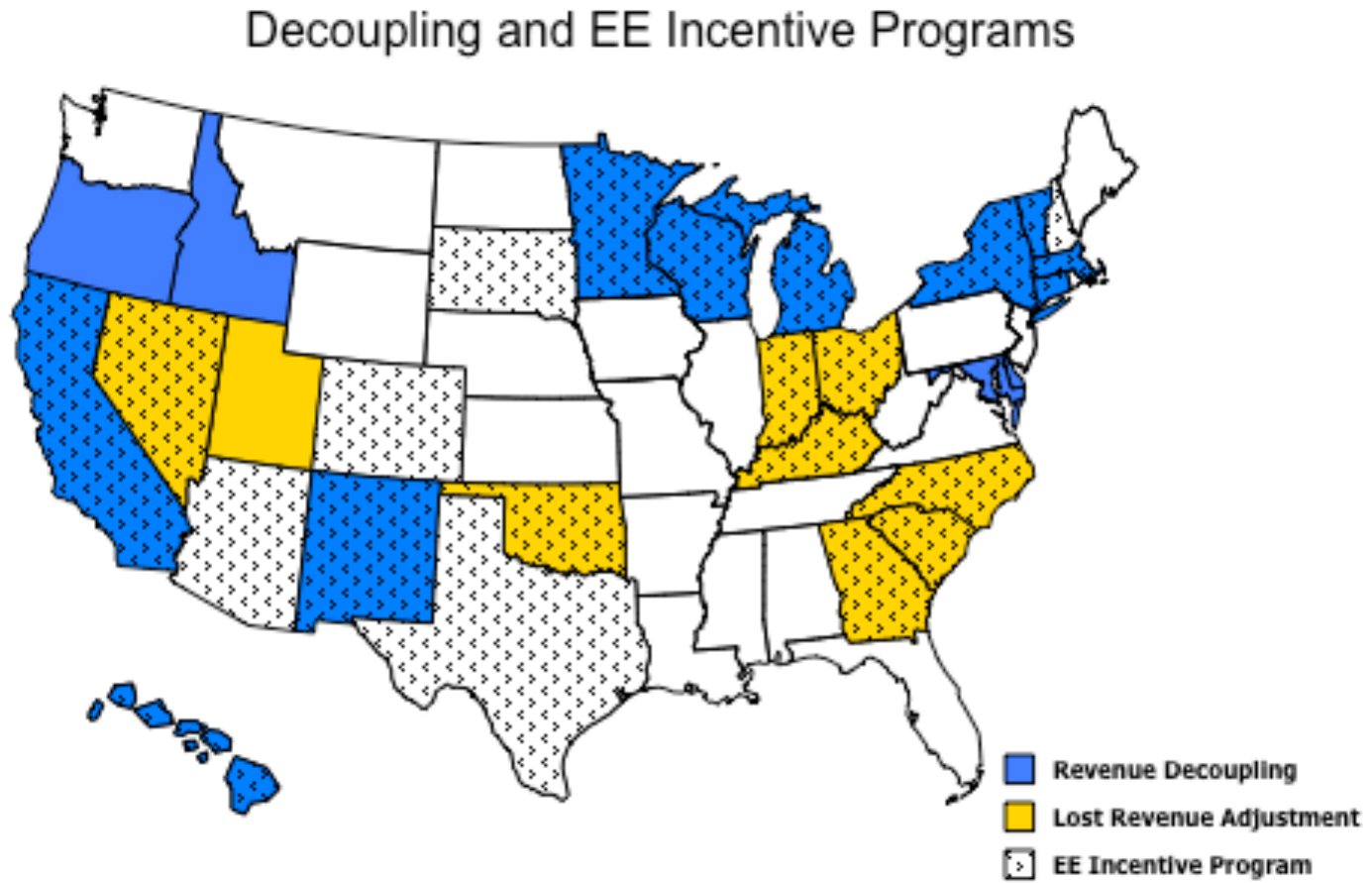


Sources: ACEEE (2009); The Edison Foundation (2010)

B.2: U.S. map of decoupling and electric retail rates.



B.3: U.S. map of decoupling and energy efficiency incentive programs.



Sources: ACEEE (2009); The Edison Foundation (2010)