Massachusetts Electric Utility Stranded Costs

Don't Give Away the Store Without Checking Out the Merchandise

November 4, 1997

Prepared for
MASSPIRG
Union of Concerned Scientists
Clean Water Action
Massachusetts Citizens for Safe Energy
Public Citizen

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Executive Summary

With the introduction of retail competition in the electricity industry in Massachusetts, electric companies will not be able to recover their past investments in power plants and contracts through market prices of electricity. Current legislative proposals under consideration would require that consumers pay 100% of these costs including an expected return on uneconomic investment. This outcome would impose an unacceptable price on consumers. At an absolute minimum, the legislature should: (1) prohibit utilities from receiving a return on their generation investments, (2) require full divestiture, and (3) impose tough requirements to minimize the recovery of above-market power purchase contract costs. The savings from these measures should lead to at least an additional $1 billion in consumer savings.

This report examines the nature and magnitude of projected stranded costs, arguments made in favor of requiring consumers to bear the entire financial burden, options for sharing costs, and the consequences of failing to allocate any responsibility to utilities and their investors.

This study finds, in short, that a decision to allow Massachusetts utilities to recover the full amount of stranded costs deprives consumers of the near-term benefits of competition, does not represent an appropriate balance of the interests of ratepayers and utility investors, is unfair to utilities that made wiser choices, disadvantages new competitors in the electricity market, and will have a negative impact upon the state's economy.

Summary of Specific Findings

Estimated Stranded Costs

- Massachusetts consumers are paying among the highest electricity prices in the country with residential prices which are 34% above the national average.
- Estimates of utility stranded costs run as high as $12 to $16 billion (or $6 to $8 billion in present value*) and comprise as much as 38 percent of current prices.
- Full recovery of stranded costs will amount to as much as $3,000 per residential customer (or about $1500 in present value*).
- Granting full recovery of stranded costs constitutes a transfer of income from consumers to utilities and out-of-state investors, leading to the sacrifice of 25,000 jobs per year, in the near-term.

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* Representing figures in present value means that they are adjusted to account for the changing worth of a dollar over time. In this case, given the time period, the shape of the cost stream, and the assumed discount rate, the difference between the total cost in nominal dollars and in present value dollars works out to roughly 2 to 1.

- The largest portion of stranded costs (53% or $4.1 billion in present value*) is caused by power purchase contracts. The majority of these contract costs are not the result of obligations mandated by federal law (i.e. PURPA).
- The second largest portion of stranded costs (17% or $1.4 billion in present value*) is the capital investment in generating plants that utilities predict will be unrecoverable in a competitive market.
- The third largest portion of stranded costs (13% or $1.0 billion in present value*) consists of "return on generation assets." This category includes the expected profits from investments in uneconomical power plants. The beneficiaries would be the utilities and their shareholders.
- Other stranded cost categories are regulatory assets (6% or $483 million in present value*), nuclear decommissioning (6% or $450 million in present value*), and "other" (5% or $378 million in present value*).
- Nuclear power obligations account for roughly $1.6 billion (present value*) in stranded costs. Including unfunded decommissioning liabilities brings the nuclear total to over $2 billion (present value*).
- Sharing stranded costs equally between consumers and utilities would provide as much as $3.9 billion (present value*) in additional rate relief.
- Providing power plant operating subsidies and compensating utilities for any losses suffered on the standard offer could increase total stranded costs.
- Divestiture of generation is essential to accurate valuations of stranded cost. Failing to require divestiture will likely increase the amount of recovery by utilities.
- Securitization of stranded costs increases risks for consumers in the event that market conditions change.

Utility Arguments For Full Recovery of Stranded Costs

- There is no legal entitlement in either state or federal law which guarantees the full recovery of stranded costs. Utility arguments for full recovery as a matter of law have been consistently rejected by the Massachusetts DPU, the Massachusetts Supreme Judicial Court and the United States Supreme Court.
- In Massachusetts, there is a long history of holding utilities responsible for a share of the costs resulting from uneconomic investments. Under the current system, there is no guarantee that utilities would be able to fully recover their existing investments.

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- The recent Supreme Judicial Court decision in Massachusetts Institute Of Technology v. DPU, 425 Mass. 856 (1997) held that some utility assets currently in service may not be prudent. Assets are therefore not prima facie prudent simply because they were originally allowed into service by the DPU.

Summary of Recommendations

- Regulators and legislators should seek opportunities to share stranded costs between utility stockholders and customers with the ultimate goal of achieving as close as possible to an even 50/50 sharing.

- Consistent with past DPU precedent for canceled or retired power plants, no return on stranded generation investments should be permitted. Allowing utilities and their investors to receive expected returns on uneconomic plants rewards unwise decisions, penalizes consumers and reduces the savings from competition. The legality of denying the recovery of expected profits has been upheld by the Massachusetts Supreme Judicial Court and the US Supreme Court.

- Recovery of costs associated with power purchase agreements should be disallowed if utilities fail to affirmatively prove their ongoing prudence. Standards for evaluating prudence should not be limited to the initial decision to enter into the agreement but must include assessing the management of the contract over time, missed opportunities to renegotiate, buyout, buydown, resell, or terminate the contract at any point during its existence. The DPU should assume the mitigation of contract costs based on these factors and the experiences of other regional utilities. Contract costs which exceed the level allowable under the prudence and mitigation standards should not be recoverable in rates.

- Utilities should be required to divest their generation assets and power purchase agreements. Only through divestiture will the true market value of these investments be ascertained. The recent sale of generation assets and power purchase contracts by the New England Electric System caused estimates of their stranded costs to drop by over 50 percent. Allowing other utilities to avoid divestiture will likely result in an overestimation of stranded costs.

- No new costs incurred after August 1995 should be recoverable as stranded costs, including capital additions, operation and maintenance, incremental nuclear decommissioning, and on-site nuclear waste storage.

- Securitization, if used at all for stranded costs, should be accompanied by strong provisions requiring utility investors to bear a share of the burden. Also, any securitization plan should be limited to a small fraction of estimated stranded costs in order to minimize the probability of over-collection.

Table of Contents

List of Tables

List of Figures

Acknowledgements

The authors are grateful to all of the individuals who contributed in various ways to this effort, most notably Matt Freedman of Public Citizen, Alan Nogee of the Union of Concerned Scientists, Rob Sargent of MASSPIRG, and Jerrold Oppenheim of the National Consumer Law Center.

The views expressed in this report are those of the authors and do not necessarily reflect those of sponsoring organizations or the individuals acknowledged above.

1. Introduction

The most contentious issue in the electricity industry today is whether to bailout utilities for uneconomic investments made in the past. Many utilities built power plants, or signed contracts for power, that were much more expensive than electricity available in the market today.

Until now, regulators have generally allowed utilities to pass on most of the costs of these uneconomic plants -- including a profit on their bad investments -- to the captive electricity customers. In a deregulated industry, however, customers would no longer be captive to their local utilities. Each consumer would be able to choose her own electricity supplier. (Though the transmission and distribution wires would still be owned by a regulated monopoly, to avoid duplicating these expensive facilities.)

If utilities are forced to compete for customers, they may not be able to recover all of their uneconomic costs. Like other competitive businesses, utilities would only be able to charge market prices for their power. Costs for expensive power plants and contracts that could not be recovered in the market are sometimes referred to as "stranded costs."

Stranded costs are, in large part, the result of technological and economic forces. New, efficient generating plants are becoming available at lower costs and in smaller sizes. At the same time, fossil fuel prices (current and forecast) have been dropping. Natural gas in particular is currently available at low cost, and can be burned in small-scale, highly efficient combined-cycle power plants. The combined effect of these technological and economic developments is that consumers paying high electricity prices have economically attractive electricity alternatives, and utilities are stuck with high-cost, obsolete electricity generation resources.

Policy changes in the electric utility industry have also played a role in creating new generation alternatives. The key changes began with the Public Utility Regulatory Policies Act (PURPA) in 1978 and have continued with the Energy Policy Act of 1992, several orders of the Federal Energy Regulatory Commission, and recent activities by many state utility commissions and legislatures. These policy changes have promoted increased competition in electricity generation at the wholesale level, requiring utilities to buy power from non-utility power plants.

In the early 1990s, large industrial customers in Massachusetts began pushing to lower their electricity costs, arguing that they could generate cheaper electricity on their own, by choosing a new electricity supplier, or by moving to a region with lower electricity prices. A debate then began about whether to allow retail competition in generation – providing all customers an opportunity to choose their electricity supplier.[1]

The electric utilities in Massachusetts have requested that they be allowed to recover all of their stranded costs as a precondition for introducing retail competition into the state.

[1] Between 1990 and 1995 average electricity prices for ***industrial*** electricity consumers in Massachusetts increased by 7 percent while the average prices for ***residential*** consumers in the State increased by 17 percent (based on data from Edison Electric Institute's *Statistical Yearbooks*).

The Massachusetts Department of Public Utilities has proposed that utilities be given a reasonable opportunity to recover all stranded costs that cannot be mitigated. Three of Massachusetts' investor-owned utilities have entered into settlement agreements with the Office of Attorney General, the Division of Energy Resources, and others, whereby the utilities are allowed full recover of their stranded costs.

The implications of allowing full recovery of stranded costs are enormous. Estimates of stranded costs for some companies run as high as 38 percent of their current rates. Allowing full recovery of stranded costs could pose the following problems:

- The full benefits to electric customers of competition would be delayed for ten or more years.
- The interests of utility stockholders and customers would not be balanced, as customers bear the full brunt of stranded costs while stockholders lose nothing.
- Opportunities for economic development and job creation from lower electricity prices would be lost.
- New generation companies seeking to compete in the Massachusetts electricity industry would be put at a disadvantage by having to pass through access charges to pay off the stranded costs of the utilities.
- Utilities that have managed their generation resources more effectively in the past, including those that have cancelled uneconomic plant, would not be treated fairly.
- Full recovery of stranded costs would be inconsistent with how other industries -- gas, telephone, airlines and trucking -- were treated when they were deregulated.
- The objective of narrowing the electricity price gap between Massachusetts and other regions would not be achieved for many years.

Massachusetts' electricity customers are already paying some of the highest electricity prices in the country. Table 1 presents a summary of average residential electricity prices in Massachusetts in 1996. Commonwealth Electric has the highest average residential price at 13.7 cents/kWh, while Mass Electric Company has the lowest average residential price at 10.4 cents/kWh.

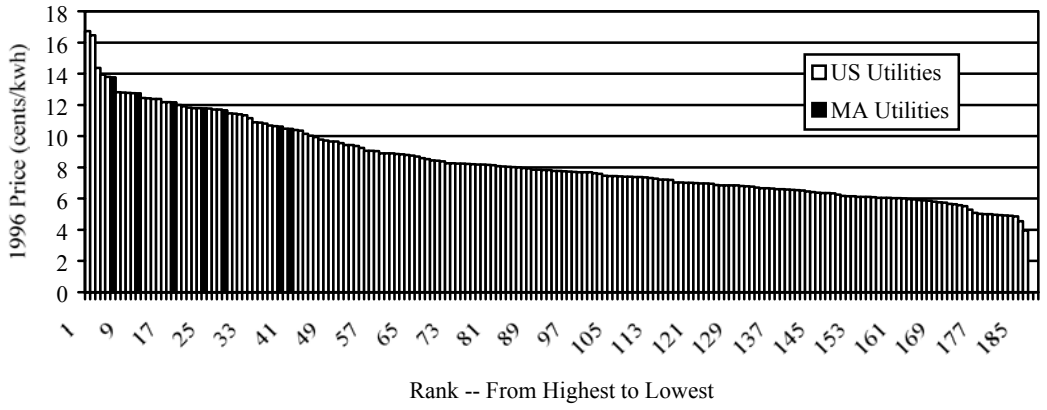
Table 1. Average 1996 Residential Electricity Prices in Massachusetts and the US (cents/kWh)

	Price
Boston Edison	12.73
Cambridge Electric	12.16
Commonwealth Electric	13.76
Eastern Edison	10.60
Fitchburg G&E	11.77
Mass Electric	10.45
Western Mass Electric	11.62
Massachusetts Residential Average	11.25
US Residential Average	8.40

Source: EEI 1997a and 1997b.

As indicated in Table 1, residential customers in Massachusetts are paying electricity prices that are 34 percent higher than the U.S. average. Figure 1 presents a graph of the average residential prices of 186 electric utilities in the US in 1996. Massachusetts' investor-owned utilities are all among the top 41 most expensive utilities in the country, as indicated in Figure 1.[2]

Figure 1. Average Residential Electricity Prices for 186 US Electric Utilities



The purpose of this report is to provide an overview of the many complex stranded cost issues facing Massachusetts' legislators, regulators, utilities, and ratepayers. We hope to shed light on the implications to ratepayers and to the Massachusetts economy as a whole of allowing the utilities to recover all stranded costs. We encourage legislators and

[2] Based upon data from Edison Electric Institute (1997). Excludes Alaska and Hawaii.

regulators to investigate utility stranded cost claims in detail and to consider alternative cost recovery policies that strike a fair balance between utility investors and ratepayers.

We begin by describing the current utility estimates of stranded costs in Massachusetts. We also describe how Massachusetts Electric Company's estimates have been affected by the sale of New England Electric Systems' generation assets to the US Gen Company. In Section 3 we describe various policy options for recovering stranded costs, including a discussion of why Massachusetts regulatory precedent dictates that stranded costs should be shared between ratepayers and stockholders. In Section 4 we identify the total amount of stranded costs that may be collected from ratepayers under different recovery policies, and estimate the impact that different stranded cost recovery policies may have on employment in Massachusetts. Finally, in Section 5 we provide some recommendations for how legislators and regulators can share stranded cost burdens equitably between utility investors and ratepayers.

2. Current Estimates of Potentially Stranded Costs in Massachusetts

2.1 Overview of Industry Estimates of Stranded Costs

Estimating stranded costs is a complex task, requiring a number of projections about cost and market conditions well into the future.[3] The only aspect of today's stranded cost estimates that we can be certain of, is that they will be wrong. Nevertheless, it is important to make estimates using the best information available, in order to analyze their potential impact, and to develop public policies to help mitigate such impacts.

The magnitude of stranded costs may be estimated by an administrative procedure or determined by a market test. With an administrative procedure, the costs of utility assets are compared to projected market prices. Complex models of the power system are used to simulate the operation of generating facilities in future years and to forecast market prices. Administrative estimation of stranded costs is daunting, since future inputs such as fuel prices are unknown and many important details of the market structure are yet to be determined.

With a market test, the generation assets are offered for sale. The potential buyers will then decide how much to bid for the resources, based on their perception of the market value. The potential buyers will presumably develop their own projections of market prices for electricity and asses their own exposure to market risks.

Not all generating assets are uneconomic and not all utilities have stranded costs. Older fossil-fuel and hydroelectric generators tend to be very valuable. Their capital costs have been paid off and their operating costs are low. In estimating stranded costs for a particular utility it is important to subtract the value of ***economical*** resources from stranded costs associated with the ***uneconomical*** resources. In other words, stranded cost estimates should be made on a net, system-wide basis. Moreover, for some utilities with attractive resource portfolios, the net stranded cost may even be negative. That is, the company's assets, on a net basis, could have a market value that is higher than the book value.

Two nation-wide studies have recently prepared estimates of the stranded costs of all the major investor-owned electric utilities in the US (Moody's 1996; RDI 1997). In addition, most utilities in Massachusetts have prepared estimates of their stranded costs, as a part of the Department's on-going investigation of electricity industry restructuring (Docket No. DPU 96-100). The results of these various estimates of potentially stranded costs in Massachusetts are presented in Table 2. The results are also presented graphically in Figure 2.

[3] The two largest uncertainties in estimating above-market costs are (a) future market prices, and (b) how much electric companies may be able to reduce costs and improve performance of existing plants.

Table 2. Potential Stranded Costs In Massachusetts:
Summary of Various Industry Estimates (Millions of Present Value Dollars)

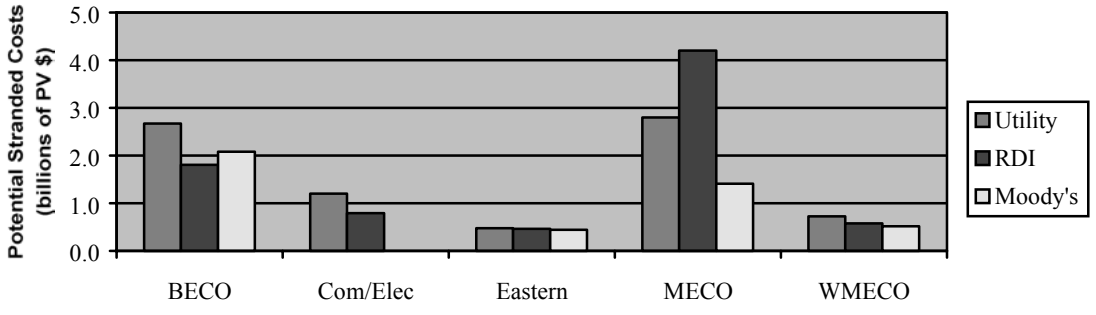
	Boston Edison	Com/ Electric	Eastern Edison	Mass Electric	Western Mass	Total of Utilities Listed
Utility Estimates	2,673	1,201	474	2,798	727	7,872
Resource Data Int.	1,808	795	462	4,198	575	7,838
Moody's	2,083	na	444	1,412	517	4,536

Sources: BECO 1997, Com/Electric 1996, Eastern 1997, NEES 1996, WMECO 1996, RDI 1997, Moody's 1996.

It is difficult, and potentially misleading, to compare stranded cost estimates that have been prepared by different analysts. Estimates of stranded cost can vary widely depending upon various assumptions and methodologies employed.[4] Table 2 and Figure 2 are provided here simply to illustrate the rough order of magnitude of potential stranded costs in Massachusetts and to illustrate the wide range of estimates that can be produced by different assumptions and methods.

The estimates presented in Table 2 indicate that stranded costs of the large investor-owned utilities in Massachusetts could be as high as $4.5 to $7.8 billion. In general, the Boston Edison Company (BECO) and the Massachusetts Electric Company (MECO) are expected to have the highest stranded costs, in part because they are the two largest utilities in the state.

Figure 2. Potential Stranded Costs in Massachusetts
Summary of Various Industry Estimates



It is important to note that one of the most difficult aspects of stranded costs to estimate is the potential value of stranded generating assets in the deregulated electricity market of the future. While the owners of stranded generation assets may not be able to charge a generation price high enough to cover their fixed sunk costs, they will be able to charge a market price for their generation. One recent study found that the market value of electricity from generation assets in Massachusetts is likely to completely offset the

[4] While we have not reviewed in detail the assumptions and methodologies used in each study, the estimates prepared by utilities have been more specifically tailored to their unique circumstances and thus are likely to be more accurate. We turn to these estimates in more detail in Section 2.2.

stranded costs associated with those generation assets (Resource Insight 1996).[5] The implication of this is that stranded costs could turn out to be significantly lower than those presented in Table 2 and Figure 2, depending upon the market value of the utilities' assets.

2.2 Massachusetts Utility Estimates of Stranded Costs

Table 3 presents more detail on the estimates of stranded costs prepared by Massachusetts' largest investor-owned utilities. Stranded costs are broken down by six main categories of costs:

- Utility owned generation assets. When a utility's generating plant costs are in excess of the market value of that plant, the uneconomic portion of the plant can become stranded.
- Return on generation assets. When a utility's generating plant costs are in excess of the market value of that plant, the future profits and interest payments related to the generation plant investment can also become stranded.
- Regulatory assets. Regulatory assets are sometimes created when a utility defers recovery of items such as tax payments, unamortized loss on reacquired debt, pensions and other post-employee benefits and early retirements. These obligations generally have no market value, and hence may become fully stranded.
- Purchased power agreements. Long-term contracts for purchased power or for fuel supply can also exceed market prices, and hence become all or partially stranded.
- Nuclear decommissioning. Nuclear decommissioning costs are obligations with no market value, and hence may become fully stranded.
- Other. In the table below the other category includes fixed transmission and nuclear costs, as well as variable sales and transportation costs.

Table 3 also presents the estimated amount of stranded costs per residential customer for each utility. Presenting stranded costs this way helps to provide some perspective on how big the stranded costs are relative to the size of the utility, and accounting for the usage per customer. Western Mass Electric and Com/Elec have, at $1,500 (present value), the greatest amount of stranded costs per residential customer.

[5] This conclusion was recently confirmed by the sale of New England Electric System's generation assets to US Gen, at least with respect to the fossil and hydro units (see Section 2.3).

Table 3. Utility Estimates of Potential Stranded Costs in Massachusetts: Breakdown of Stranded Costs by Type (Millions of Present Value Dollars)

	Boston Edison	Com/ Electric	Eastern Edison	Mass Electric	Western Mass	Total of Utilities Listed	Percent of Total
Generation Assets	603	-8	113	580	75	1,364	17%
Return on Gen. Assets	319	1	72	464	193	1049	13%
Regulatory Assets	39	32	7	111	294	483	6%
Purchased Power	1,514	1,139	262	1,139	95	4,148	53%
Nuclear Decommissioning	168	37	23	152	70	450	6%
Other	30	0	-4	352	0	378	5%
Total	2,673	1,200	474	2,798	727	7,872	100%
Stranded Cost in Dollars Per Residential Customer (present value)	1,300	1,500	1,300	1,200	1,500	1,300	Na

Sources: BECO 1997, Com/Electric 1996, Eastern 1997, NEES 1996, WMECO 1996.

Note: The costs per residential customer listed here are derived by spreading the total stranded costs over sales to all customer classes, and then dividing the residential portion by the number of residential customers. Consumers would pay additional amounts indirectly, to the extent that commercial and industrial customers pass on their increased cost of electricity through higher prices for goods and services.

Figure 3 graphically presents the breakdown of estimated potentially stranded costs by utility. For most utilities, the costs associated with above-market PPAs represent the largest share of potentially stranded costs. For the state as a whole, PPAs represent roughly 53 percent of all the estimated potentially stranded costs. Generating assets and the return on investment in those assets tend to represent the next largest share of potentially stranded costs – roughly 30 percent.

Figure 3. Utility Estimates of Potential Stranded Costs in Massachusetts

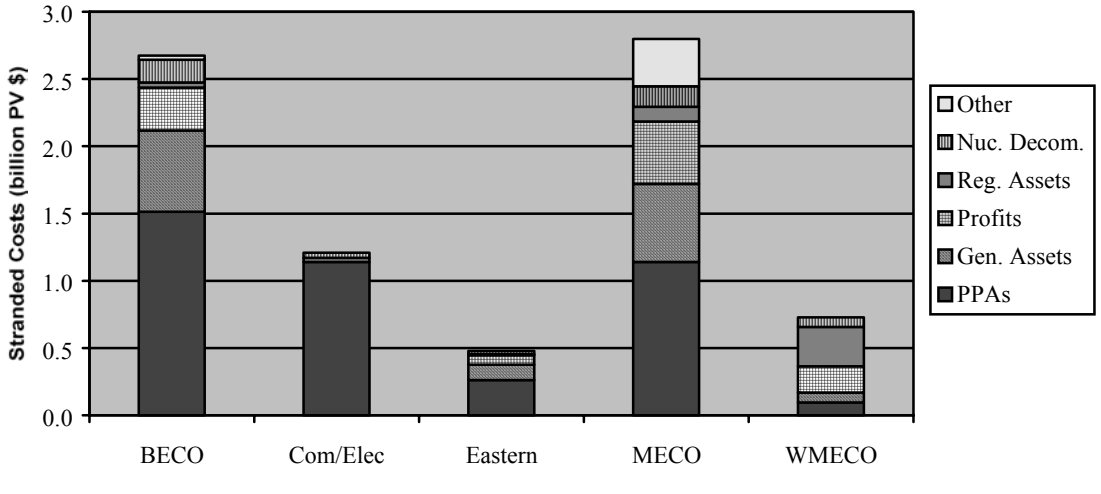


Table 4 and Figure 4 present the annual charges – in cents/kWh -- that utilities have proposed to recover their stranded costs from customers. These stranded cost recovery charges would be applied to all electricity customers within the utilities' current service territories, regardless of where the customers choose to purchase generation services. The utilities have proposed amortizing the stranded costs associated with generation assets over ten years, while the stranded costs associated with PPAs would be recovered over the lives of the PPA contracts. Appendix A presents details on the annual stranded costs recovered over time for each utility.

Table 4 and Figure 4 indicate that Commonwealth Electric is likely to have the largest stranded cost recovery charge of all Massachusetts utilities – starting out at roughly 5.2 cents/kWh in 1998. While Commonwealth Electric's total stranded costs are not as high as those of other utilities, it has fewer electricity sales over which to recover them, resulting in higher charges per customer. Cambridge Electric is expected to have the lowest stranded cost recovery charge – starting at roughly 2.2 cents/kWh in 1998.

Table 4. Utility Estimates of Potential Stranded Costs in Massachusetts: Estimated Stranded Cost Recovery Charges (cents/kWh)

Year	Boston Edison	Cambridge Electric	Common wealth	Eastern Edison	Mass Electric	Western Mass
1998	3.51	2.19	5.17	3.04	2.80	4.21
1999	3.35	2.24	5.17	3.04	2.80	4.13
2000	3.35	2.17	4.83	3.04	2.80	3.74
2001	2.68	1.90	5.03	2.85	2.53	*
2002	2.54	2.17	4.86	2.54	2.36	*
2003	2.53	1.69	4.81	2.31	2.23	*
2004	2.49	2.02	4.52	2.10	2.13	*
2005	2.49	1.82	4.16	2.06	2.06	*
2006	2.44	1.58	3.80	1.88	1.97	*
2007	2.32	1.45	3.59	1.86	1.86	*
2008	2.21	1.29	3.20	1.68	1.76	*
2009	2.18	1.23	3.14	1.69	1.51	*
2010	1.62	1.18	2.91	0.85	0.71	*

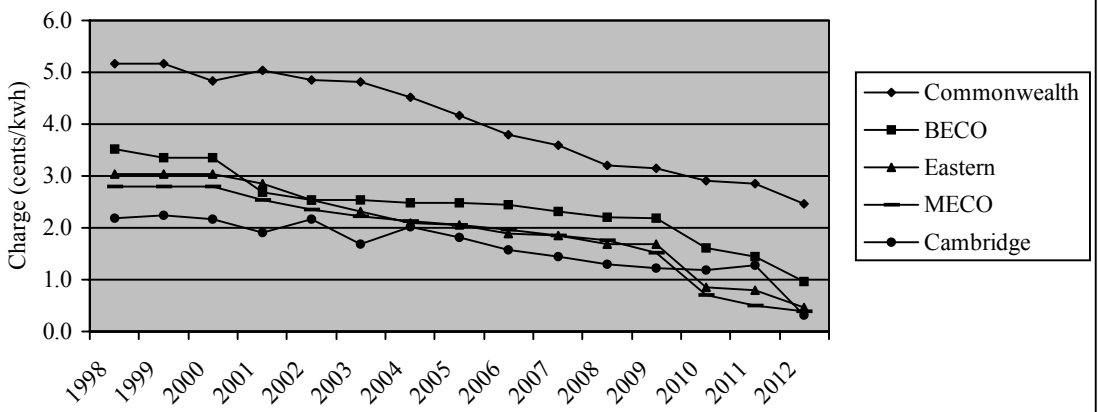
Sources: BECO 1997, Com/Electric 1996, Eastern 1997, NEES 1996, WMECO 1996.
**WMECO calculated its stranded cost recovery charges on the assumption that all stranded costs would be recovered from 1996 through 2000. Thus WMECO charges are not directly comparable to the others.*

Nuclear power plants represent an important portion of the stranded costs in Massachusetts. While there is only one operating nuclear facility (the Pilgrim plant) located in the state, most Massachusetts utilities have ownership shares in nuclear facilities located in other New England states (Seabrook, Millstone, Maine Yankee, Vermont Yankee). Estimating the stranded cost associated with nuclear facilities is difficult because of their special risks and uncertainty about how those risks will be handled.[6] Because the operating costs (fuel, O&M, and capital additions) of nuclear

[6] For example, accident liability, spent fuel storage and disposal, and decommissioning requirements raise concerns that are unique to nuclear plants. How these nuclear risks and obligations are treated as a matter of government policy influences the attractiveness of the plants to investors.

plants are in many cases similar to the market price for electricity, the nuclear plants' net book value (i.e., the uncollected embedded costs) can provide a rough indication of their potential stranded costs.[7] The net book value of the nuclear power entitlements in Massachusetts is roughly $1.6 billion.

Figure 4. Estimated Stranded Cost Recovery Charges



It is important to note that for three of the Massachusetts utilities – BECO, MECO and Eastern – the stranded cost estimates and charges presented in Tables 3 and 4 are likely to represent the maximum amount of costs that will actually become stranded over time, at least through 2004. These companies prepared their stranded cost estimates in conjunction with their restructuring settlement agreements. The settlements include a number of provisions for adjusting the stranded costs over time as conditions change and new data become available. The settlements include six components that may cause the actual stranded costs incurred in the future to deviate significantly from the estimates presented in Table 3, including:

1. **Market value.** Each settlement utility has agreed to divest their generation assets in order to determine the market value of these plants. The proceeds from the divestiture of generation assets would be used to reduce the stranded cost charge through a "residual value credit."

2. **Reconciliation adjustment.** For some costs, a reconciliation adjustment will correct for any differences between costs estimated and costs actually incurred. The reconciliation adjustment will cover: nuclear decommissioning, above-market PPA costs, payments made to buyout uneconomic PPAs, credits for utility sales

[7] If a nuclear unit can be operated at costs that are less than the market value of generation, then its stranded costs will be lower than its net book value. If a nuclear unit operates at costs that are higher than the market value of generation, then the unit should be retired. Therefore, a nuclear unit's net book value should, in theory, represent the maximum amount of stranded costs that could be created by it. A recent study indicates that some nuclear units in New England should be able to operate at costs below the market value of generation, while others might not (Resource Insight 1996).

contracts, above-market fuel transport costs, nuclear operating costs (see below), employee severance and retraining costs, and more.[8]

3. **Nuclear operating costs.** If utilities are not able to divest their nuclear units, they will be able to collect a certain percentage of the difference between the going-forward costs and the going-forward revenues of the nuclear units in their stranded cost charge.[9] If a utility's nuclear units operate economically, its stranded costs will be reduced by the percentage of savings that are included in the reconciliation adjustment. Conversely, in those years when a utility's nuclear units operate uneconomically, its stranded costs will be increased. [10]

4. **Mitigation efforts.** The reconciliation adjustment includes an incentive to encourage the utility to mitigate stranded costs wherever possible. Utilities will be allowed to keep a share of savings from any PPA contracts which they can renegotiate, through a small increase in the stranded cost charge.

5. **Standard Offer shortfall.** The settlement utilities are required to provide Standard Offer rates to those customers who do not choose alternative sources of generation services. These rates start at 2.8 cents/kWh in 1998 and increase to 5.1 cents/kWh by 2004. If a utility loses money at these prices, it is allowed to make up for this shortfall by applying a surcharge to Standard Offer rates through 2004, and to the stranded cost charge after 2004.

6. **Ten percent rate reduction shortfall.** The settlement utilities are also required to reduce their total electricity rates by ten percent upon the introduction of retail competition. If a utility experiences a shortfall of revenues as a result of this cap, the settlements allow the utility to make up for this shortfall in the same manner as the Standard Offer shortfall provision described above. These surcharges can only be applied to the extent that the actual stranded cost recovery charges fall below those determined in the settlements.

Therefore, the estimates presented in Tables 3 and 4 should not be seen as fixed values that are to be used to recover stranded costs over many years, but instead as first-cut estimates that will change over time as conditions change and new data become available. The residual value credits are likely to significantly reduce the stranded costs associated with non-nuclear generation assets. The residual value credits arising from NEES's sale of its non-nuclear generation assets reduced the MECO stranded cost estimates by 50 percent, as described in Section 2.3 below. On the other hand, the reconciliation

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[8] The settlements contain a provision whereby the reconciliation adjustment will not be allowed to increase stranded cost recovery charges above those originally estimated in the settlements. However, any shortfall of recovery as a result of this provision can be recovered in future years, with compensation for carrying charges.

[9] MECO and Eastern are allowed to collect 80 percent of costs and revenues associated with their nuclear purchases, while BECO is allowed to collect 25 percent of the costs and revenues associated with its Pilgrim nuclear plant.

[10] If a nuclear unit continues to operate uneconomically, with long-run costs exceeding long-run revenues, then it should be retired.

adjustment (including the nuclear PBR) could cause the stranded costs to either increase or decrease.

For the years through 2004 the estimates of stranded costs and recovery charges presented in Tables 3 and 4 for these utilities are likely to be "caps" -- i.e., as the maximum potential costs allowed to be recovered. The stranded costs are likely to be reduced as a result of residual value credits, but they could also be increased -- up to the cap – as a result of shortfalls from the Standard Offer or the ten percent rate reduction. For the years after 2004 the stranded costs recovered could exceed those presented in Tables 3 and 4, because any remaining shortfalls from the Standard Offer or the ten percent rate reduction can be recovered from all retail customers.[11]

The estimates presented in Tables 3 and 4 for WMECO and Com/Electric were not prepared as part of settlement agreements. These should be considered preliminary estimates that may be updated by the utilities over time. Many of the points made directly above may not apply to these two utilities because the estimates are not a part of settlement agreements. In particular, both of these utilities included an estimate of the market value of their stranded generation assets, instead of the after-the-fact residual value credit approach used by the settlement utilities. Consequently, the WMECO and Com/Electric estimates should be seen as best current estimates of stranded costs, as opposed to stranded cost caps.

2.3 Impacts of Divesting Generation Assets

In August, 1997 the New England Electric System (NEES) reached an agreement to sell its non-nuclear generation business to US Generating Company (US Gen), an affiliate of PG&E Corporation, a California utility. The principle terms of the sale are the following: (NEES 1997b; US Gen 1997)

- US Gen will receive roughly 4,000 MW of generation plant, as well as 23 purchase power agreements totaling 1,100 MW.
- US Gen will pay NEES a purchase price of $1.59 billion. US Gen will also reimburse NEES for $85 million of costs associated with early retirement and severance programs for employees affected by industry restructuring.
- NEES will compensate US Gen for the above-market costs of the PPA contracts. NEES will make payments of approximately $170 million per year for five years and $150 million for another five years, with a total cumulative present value of roughly $1.1 billion. These payments are fixed and will not be reconciled for changing conditions in the future.
- US Gen has agreed to provide NEES with electricity for its Standard Offer service, starting at a price of 3.2 cents/kWh in 1998 and rising thereafter. NEES plans to go out to bid for less expensive providers of Standard Offer services.

[11] A recent analysis of the BECO Settlement concludes that the short-term ten percent rate discount is "illusory" and may actually turn out to be a rate increase (NCLC 1997).

The NEES sale is among the first of its kind in the country, and provides important information regarding the company's stranded cost estimates. It provides an actual "market test" for the value of the non-nuclear generation assets, as well as the value of the PPA contracts.

Table 5 presents a summary of the MECO stranded cost estimates before and after the sale, in cumulative present value terms (NEES 1997a). Table 6 presents the impact of the sale on MECO's annual stranded cost recovery charge.

Table 5. Massachusetts Electric Company Estimates of Stranded Costs: Impact of the Sale of Generation Assets and PPAs (Millions of Present Value Dollars)

	Stranded Costs Before the Sale	Stranded Costs After the Sale	Difference in Stranded Costs	New Total of Utilities in Table 3	Percent of Total
Generation Assets	580	-40	-620	744	12%
Return on Gen. Assets	464	15	-449	600	10%
Regulatory Assets	111	135	24	507	8%
Purchased Power	1,139	640	-499	3,649	59%
Nuclear Decommissioning	152	282	130	580	9%
Other	352	118	-234	143	2%
Total	2,798	1,149	-1,649	6,223	100%

Sources: NEES 1997a, NEES 1997b, PG&E 1997, NEES 1996.

As indicated in Tables 5 and 6, the sale of generation assets significantly reduced MECO's estimates of stranded costs. The cumulative present value of stranded costs was reduced from $2.8 billion to $1.1 billion. Roughly $0.5 billion of the reduction is due to the above-market PPA update, roughly $1.1 billion of the reduction is due to the residual value of the non-nuclear generation assets, and rest of the reduction was due to miscellaneous adjustments made to the stranded cost estimates.[12] MECO's first year stranded cost recovery charge was reduced from 2.8 to 1.5 cents/kWh.

[12] The estimate of stranded nuclear decommissioning costs was increased due to the costs associated with the shutdown of Maine Yankee.

Table 6. Massachusetts Electric Company Estimates of Stranded Cost Recovery Charges: Impact of the Sale of Generation Assets and PPAs (cents/kWh)

Year	Recovery Charge Before the Sale	Recovery Charge After the Sale	Percent Reduction
1998	2.80	1.50	46%
1999	2.80	1.41	50%
2000	2.80	1.39	50%
2001	2.53	1.11	56%
2002	2.36	1.08	54%
2003	2.23	1.00	55%
2004	2.13	0.95	55%
2005	2.06	0.93	55%
2006	1.97	0.90	54%
2007	1.86	0.86	53%
2008	1.76	0.29	84%
2009	1.51	0.20	87%
2010	0.71	0.16	78%

Sources: NEES 1997a, NEES 1997b, PG&E 1997, NEES 1996.

However, the stranded costs presented in Table 5 and 6 are not the end of the story. As described above, MECO's settlement allows it to apply a Standard Offer surcharge to offset any shortfalls that may result from its purchase of Standard Offer services or from its ten-percent discount to customers. Given that NEES has agreed to pay US Gen 3.2 cents/kWh for Standard Offer services in the early years, and that MECO is only allowed to charge customers 2.8 cents/kWh for Standard Offer services, MECO may have a Standard Offer shortfall – at least in the first few years after 1997. If such a shortfall occurs, MECO can increase its total surcharges to customers above the revised stranded cost recovery charges presented in Table 6.

In sum, the stranded cost estimates presented in Tables 5 and 6 for before and after the US Gen sale can be seen as the two ends of a range of likely stranded cost outcomes for MECO. If MECO can find low-cost Standard Offer services, then its stranded costs might be closer to the lower estimate. If not, then they will be closer to the higher estimate.

Table 5 indicates the extent to which the NEES sale has reduced the estimates of potential stranded costs in Massachusetts. Total potential stranded costs have been reduced from $7,872 to $6,223 million. Potential stranded costs due to generation assets, and the return earned on them, now represent only seventeen percent of total potential stranded costs, while PPAs represent nearly 60 percent.

Other utilities, (especially the other settlement utilities) may have similar outcomes from selling their generation assets, although it is possible that the fossil fuel plants of other utilities will not have the value of the NEES fossil and hydro plants. Also, the higher proportion of nuclear assets with other utilities is likely to result in lower residual value credits for other companies. However, it is difficult to generalize about the market value of the generation portfolios held by different utilities.

3. Policies Regarding the Recovery of Stranded Costs in Massachusetts

3.1 Sharing Stranded Costs is Fair and Efficient

In deregulation of electric generation, it is important to bear in mind the appropriate role of regulation. Electric utility investors typically receive a return on their investment considerably above the return on low-risk investments such as treasury bills. The "risk premium" compensates investors for occasional circumstances in which investments fail economically. It is not the role of utility regulators to shield utilities from market risks. According to Bonbright (1961):

> Regulation, it is said, is a substitute for competition. Hence, its objective should be to compel a regulated enterprise, despite its possession of partial or complete monopoly, to charge rates approximating those which it would charge if free from regulation but subject to competition. In short, regulation should not only be a substitute for competition, but a closely imitative substitute. (page 93)

Customers, by and large, did not make the decisions to commit to the resource portfolios of the State's electric utilities. Nor are customers responsible for developments in electric generating technologies and fossil fuel markets that have rendered the resource portfolios uneconomic. Under the circumstances, a sharing of the excess costs would be fair and appropriate.

Louis Kaplow (1986) examined transitions from an economic efficiency perspective, and concluded that transitional relief (such as stranded cost recovery) "usually is inefficient" (page 119). He notes that "Changes in government policy often impose gains and losses on those who made investments prior to reform" (page 118) and analyzes the incentives to market participants in an uncertain environment. Comparing types of risks, Kaplow finds that "government-created risk – the root of the transition problem – is little different from market-created risk, when viewed from an economic perspective" (page 14). He goes on to conclude that "The belief that market solutions to problems of risk and incentives are generally more efficient than government remedies implies that the market response to legal transitions is similarly more efficient than government transitional relief" (page 14).

That is, the same faith in markets to deliver efficient outcomes that underlies the move to restructure the electric industry would call for a policy of no stranded cost recovery. To provide stranded cost relief would distort the market, encourage inefficient behavior, and undermine the ability of the market to make efficient appropriate risk management decisions.

3.2 Utilities Do Not Have a Legal Right to Recover All Stranded Costs

During the course of recent restructuring investigations, the Department has addressed various stranded cost recovery options in great detail. Some utilities argued that they

have a legal right to recover stranded costs, based on a historical "regulatory compact" with the Department. They argue that not allowing full recovery of stranded costs would violate the federal Constitution as a taking of private property without just compensation.

The utilities' attempt to call upon a "regulatory compact" requiring recovery of 100 percent of stranded costs is unconvincing. There never was such a regulatory compact, and utility shareholders have long been aware of financial risk and have been compensated for that risk (see Biewald, Chernick, Wallach, and Bradford 1996).[13] In Massachusetts in particular there is a long history of holding utilities responsible for a share of the costs resulting from uneconomic investments (see Section 3.2, below).

The utilities' "takings" claims have historically been unsuccessful in state regulatory proceedings and before both state and federal courts. Utility regulators in New Hampshire, Vermont, Massachusetts, Maine and New York have concluded that utilities have no statutory or constitutional guarantees to full recovery of their past investments. (MDPU 1996; MEPUC 1996; NHPUC 1997; NYPSC 1996; VTPSB 1996) The US Supreme Court, in a series of cases, ruled that state utility commissions and legislatures have broad flexibility in their approach to determining rates even if the result is to disallow recovery of prudently incurred costs.[14]

In Duquesne Light Co. v. Barasch, the U.S. Supreme Court made it clear that states could apply an economic approach to valuation, and specifically noted the move toward competition in the electric industry:

> [R]igid requirement of the prudent investment rule would foreclose …a return to some form of the fair value rule just as its practical problems may be diminishing. The emergent market for wholesale electric energy could provide a readily available objective basis for determining the value of utility assets. (at 316)

Massachusetts utilities have asserted that the US Supreme Court ruling in Loreto v. Teleprompter Manhattan CATV Corp,458 U.S. 419 (1982) represents proof that denial of stranded cost recovery amounts to a uncompensated, state-ordered physical occupation of their property and is therefore compensable under the takings clause of the US Constitution. In the first test of this argument, a New York court found that it had no merit.[15]

Based on its own recent review of numerous "taking" cases, including review of many Supreme Court decisions, the Department has also found that utilities do not have a legal right to recover all costs that become uneconomic as a consequence of retail competition.

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[13] Hartman and Tabors (1996) scrutinize utility appeals to the "regulatory contract" in terms of expectations and fairness, and then go on to argue that allowing utilities to recover all stranded costs would distort incentives to utilities, and hence be "inefficient."

[14] See Duquesne Light Co. v. Barasch, 488 U.S. 299 (1989), Federal Power Commission v. Hope Natural Gas Co, 320 U.S. 591 (1944), Permian Basin Area Rate Cases, 390 U.S. 747 (1968).

[15] See Energy Association Of New York State v. Public Service Commission Of The State Of New York, 169 Misc. 2d 924, 935 (1996).

The Department found that a disallowance would not represent a "physical taking" or a "regulatory taking," and that it would not be considered confiscatory ratesetting. The Department concluded its legal analysis by finding that it is:

> not required to ensure that electric companies continue to receive from ratepayers the same level of recovery of investments and return on those investments that they received as regulated monopolies, or to ensure the companies against possible losses in a competitive market. Rather the Department's duty under this line of takings cases is to balance the interests of ratepayers and shareholders in the new circumstances of a restructured electricity industry, in order to achieve a fair result and set just and reasonable rates. (MDPU 1996, page 259)

The Vermont Department of Public Service has made a similar finding, and has also gone a little further to remind us precisely what ratepayers are entitled to.

> Ratepayers are entitled to reasonable rates. The historic goal of regulation has been to serve as a proxy for a competitive market, so that customers would pay close-to-market rates rather than the monopolistic rents that would have been obtained in the absence of regulation. It would be unreasonable, and inconsistent with the long history of utility regulation, to require customers to pay rates that are now commercially unsustainable. (VTPSB 1996a, page 55.)

3.3 Massachusetts Regulatory Precedent Dictates That Uneconomic Costs Be Shared Between Stockholders and Ratepayers

The Massachusetts Department of Public Utilities has a long history of regulatory precedent regarding the recovery of utility costs that are not economic. In order to determine the proper allocation of risks and rewards between electric companies and ratepayers, the Department has applied a "prudent/used and useful" standard. The first level of consideration is whether a utility's decision to undertake an investment was prudent. The Department is only obliged to provide utilities with a reasonable opportunity to recover and earn a return on those investments that are prudently incurred in the process of serving electricity customers. (MDPU 1996, page 260)

For investments that are considered prudent, the Department then undertakes a used and useful analysis to determine the extent to which it provides economic benefits to ratepayers. If the Department determines that the investment is not economic, then it can share the uneconomic costs between the ratepayers and the company stockholders. This sharing is typically achieved by allowing the utility to recover the costs associated with the uneconomic investment, but not allowing it to earn any return on that investment. [16]

Over the past two decades, the Department has reviewed a number of cases to determine whether plant that has previously been included in rate base continues to be used and

[16] Vermont also has an explicit policy of sharing uneconomic investments 50/50 between utility customers and stockholders. (VTPSB 1996b, page 34)

useful. In those cases where plant has been found to be not used and useful, the Department has consistently removed the uneconomic investments from rate base, thereby sharing the costs between ratepayers and shareholders. (MDPU 1996, page 261) The Massachusetts Supreme Judicial Court has consistently upheld the Department's used and useful policy, and has held that it will defer to the Department's decisions regarding the recovery of uneconomic investments. (MDPU 1996, page 263)

The regulatory precedent regarding utility recovery of uneconomic costs is unequivocal. Under the prudent/used and useful standard the Department has the discretion to share uneconomic costs between electric companies and their stockholders.[17]

3.4 Principles for Recovering PPA Stranded Costs

Stranded costs caused by uneconomic purchased power agreements represent a significant majority of the stranded costs in Massachusetts. As indicated in Tables 3 and 5, they represent more than half of the total according to current industry estimates. They are likely to represent an even larger share once the residual values of all utilities' generation assets are accounted for.

Stranded costs caused by uneconomic PPAs involve somewhat different considerations than those caused by uneconomic investments in utility generation plants. PPAs are typically not included in a utility's rate base hence they do not contribute directly to a utility's rate of return. In addition, PPAs represent wholesale transactions, and as such their rates are generally regulated by Federal Energy Regulatory Commission (FERC).

The regulatory treatment of stranded costs arising from PPAs may depend upon the specific context of each PPA. PPAs can be characterized as one of two types: (a) wholesale agreements between electric companies and qualifying facilities (QFs), and (b) wholesale agreements between electric companies and other electric companies or non-utility generators (NUGs). For most Massachusetts utilities, QF purchases represent the minority of PPA costs.[18]

With regard to the first type, electric companies are required to purchase electricity from QFs under the federal Public Utilities Regulatory Policy Act (PURPA). In Massachusetts the Department implemented regulations under PURPA that required a competitive bidding process to encourage utilities to purchase those QFs that offered the greatest benefits. Consequently, the Department would be unlikely to find that the initial decisions to purchase power from QFs were imprudent. The Department has recently noted that QF purchases have essentially already been reviewed and approved by the

[17] Furthermore, the adoption of a non-bypassable stranded cost recovery charge to collect uneconomic costs from ratepayers will reduce, and potentially eliminate, the risk to utilities of recovering these costs. With little or no risk attached to the recovery of these costs, the return associated with those costs should be reduced commensurately.

[18] The QF portions of total annual PPA costs in 1998 for each utility are approximately the following: BECO zero percent, Cambridge Electric zero percent, Commonwealth 17 percent, Eastern less than one percent, MECO 37 percent, and WMECO 14 percent. (BECO 1997, Com/Electric 1997, Eastern 1997, NEES 1996)

Department, and that "electric companies should have a reasonable opportunity to recover net, non-mitigable stranded costs associated with PPAs entered into with QFs." (MDPU 1996, page 280)

With regard to the second type of PPAs, the prices for wholesale purchases by electric companies from other electric companies or NUGs are regulated by FERC. Under the Federal Power Act, states cannot preempt wholesale rates set by FERC. In other words, states must include in retail rates all of the costs included in wholesale rates approved by FERC. However, states can consider whether an electric company was prudent in agreeing to a particular purchased power contract under FERC-approved rates. This means that the Department can prohibit an electric company from recovering from retail customers' FERC-approved wholesale rates from a PPA if it determines that the PPA does not represent a prudent decision. (MDPU 1996, page 278)

It is important to note that the prudency standard for PPA contracts includes the prudence with which electric companies have managed their PPAs over time. Utilities may have had opportunities to reduce the costs associated with PPAs through renegotiating the terms of contracts, negotiating contract buydowns, or negotiating contract buyouts. In its Order No. 888, FERC emphasized that utilities should only be able to recover stranded costs that were prudently incurred, and that prudence pertains to decisions and opportunities for buyouts and buydowns, as well as the prudence of the initial decision to enter into the contract. (See Section 3.5.) This prudence standard for the management of PPAs over time applies to all types of PPAs, including those associated with QFs.

The Department has an obligation to review every PPA contract for prudence. If the PPA is to purchase electricity from a QF under PURPA, then the Department's review is limited to the prudence of managing these costs over time. If the PPA is to purchase electricity from another electric company or a NUG, then the Department should consider both the initial decision to enter into the PPA and the management of the PPA over time. In both cases, any costs that are found to be imprudent must be disallowed. Finally, for those costs that are found to be prudently incurred the Department can encourage that they be mitigated to the greatest extent possible.

3.5 Mitigation of Stranded Costs

The Department has placed much emphasis on encouraging utilities to mitigate their stranded costs. Encouraging the mitigation of stranded costs is obviously an appropriate policy, with potential benefits for both utilities and their ratepayers.[19] The Department has been clear that utilities should only be allowed to recover those stranded costs that cannot be mitigated. (MDPU 1996, page 268)

In its recent restructuring order, the Department considered a number of incentive mechanisms to encourage utilities and others to mitigate stranded costs, particularly those resulting from PPAs. However, the Department did not adopt any mitigation incentive mechanism, because it concluded that none of the policies were reasonably practical,

[19] For a good discussion of the role of mitigation in reducing stranded costs, see VPSB 1996 pages 54-60.

sufficiently supported or adequately developed. Nonetheless, the Department did "strongly urge renegotiation and favor codification of legislative intent to encourage parties to renegotiate above-market PPAs." (MDPU 1996, page 283) Furthermore, the Department notes that interested parties are welcome to recommend more detailed and practical mitigation incentive mechanisms in the context of company-specific restructuring cases.

As described in Section 2.2 above, the settlement utilities have proposed a stranded cost mitigation incentive mechanism as a part of their stranded cost recovery charge calculation. A well-designed mitigation incentive mechanism can provide benefits to both the electric utility and its customers. However, the mitigation incentive mechanism proposed in the restructuring settlements may not be sufficient to significantly reduce stranded costs. The settlement incentive mechanism allows each utility to increase the stranded cost recovery charge slightly, if the utility is successful in reducing stranded costs below the original estimates. For example, if MECO is successful in lowering its stranded costs charge below those presented in Table 4, then it will be allowed to increase the lower stranded cost charge by a small amount (about four percent of the amount mitigated).

Our main concern with the mitigation incentive mechanisms in the restructuring settlements is that they only include positive rewards for mitigating stranded costs; there are no penalties involved for not mitigating costs. Given the importance of mitigation in shielding customers from stranded costs, and that utilities have an important obligation to mitigate those costs, we believe it may be appropriate to implement penalties for utilities that do not mitigate stranded costs down to acceptable levels. [20] Mitigation penalties of significant size can have two effects -- each of which will result in customer benefits. Either they will encourage the utility to mitigate stranded costs, of they will shield ratepayers from a certain portion of those stranded costs.

In addition, it is important to identify what types of measures qualify as stranded cost mitigation. For example, MECO has already demonstrated that it can significantly reduce its estimates of potentially stranded costs by selling off its generation assets and PPAs. According to the settlement agreements, MECO is entitled to a mitigation incentive simply by reducing its estimate of stranded cost through the sale to US Gen. However, the NEES sale to US Gen does not represent an actual mitigation of stranded costs; it was merely a means of developing a more accurate estimate of stranded costs. Utilities should not be provided with financial incentives for simply improving estimates of stranded costs.

Furthermore, it is up to the Department to establish clear standards for what represents acceptable levels of mitigation efforts by the utilities. Utilities have had an obligation to

[20] Furthermore, MECO has already demonstrated that it can significantly reduce its estimates of potentially stranded costs by selling off its generation assets and PPAs, thereby earning a mitigation incentive. We do not see the MECO sale as an example of mitigation of stranded costs. Instead, it was simply a means of developing a more appropriate estimate of stranded costs, and much of the savings depicted on Tables 5 and 6 are due to the way that the stranded cost were defined in the original settlement estimates.

begin mitigating their stranded costs since as early as August 1995, when the Department issued its first order on introducing competition into the electric utility industry. (MDPU 1995) Therefore, the Department review of utilities' mitigation efforts should include efforts undertaken since then. The Department's review should also consider at least the following questions:

- When did the utility begin seeking to renegotiate PPA contracts?
- Did the utility approach the PPA seller with more favorable terms and conditions, short of an actual buydown or buyout?
- Did the utility approach the PPA seller with a buydown proposal? What were the terms of the proposal, and how were they negotiated with the seller?
- Did the utility approach the PPA seller with a buyout proposal? What were the terms of the proposal, and how were they negotiated with the seller?
- Has the utility taken any efforts to resell any PPA contract purchases that are at risk of becoming stranded? Who has the utility approached and what terms and conditions has it offered.
- How do the utility's efforts, including answers to the questions above, compare with efforts undertaken by similar utilities in New England?

3.6 Recent Opinion on Stranded Costs From The Massachusetts Supreme Judicial Court

In the first test case of stranded cost recovery in Massachusetts, the Cambridge Electric Light Company (Cambridge Electric) has sought to impose a customer transition charge (i.e., exit fee) upon the Massachusetts Institute of Technology (MIT) for the electricity sales lost due to MIT's construction of its own cogeneration facility and departure as a full-service customer. The Department allowed Cambridge Electric to include 75 percent of its estimated stranded costs in the proposed transition charge, and MIT subsequently appealed the decision to the Massachusetts Supreme Judicial Court (SJC).

The SJC recently declined to affirm the Department's decision, and remanded the case back to the Department for further consideration. This SJC decision provides an important indication of how the SJC believes stranded costs should be treated by the Department, and how it may treat any future Department decisions on stranded that are appealed.

While the SJC noted that recovery of prudent and verifiable stranded costs is consistent with sound public policy, it rejected the Department's decision to allow the MIT exit fee for three reasons. First, the SJC found that the Department did not sufficiently verify the calculations used to estimate Cambridge Electric's stranded costs. MIT has challenged a number of aspects of Cambridge Electric's estimates, but the Department's order did not explain why these challenges were rejected. (SJC 1997, pages 19-22.)

Second, the SJC found that the Department's decision to allow 75 percent of the estimated stranded costs in the exit fee was arbitrary and not sufficiently justified.[21] In addition, the SJC expressed concern that the Department's decision was ambiguous a to whether the remaining 25 percent of the stranded costs were to be allocated to the company's other ratepayers or borne by the company's stockholders. The SJC emphasized its position that stranded costs must be recovered by the parties to whom they are attributable, and not to the company's remaining customers. (SJC 1997, pages 22-25.)

Third, the SJC found that there was not sufficient explanation in the Department's decision to determine whether the stranded costs had been prudently incurred. The SJC refers to FERC's policy for the recovery of stranded costs, and cites FERC Order No. 888:

> Prudence of costs, depending upon the facts in a specific case, may include different things: e.g., prudence in operation and maintenance of a plant; prudence in continuing to own a plant when cheaper alternatives become available; prudence in entering into purchased power contracts, or continuing such contracts when buyouts or buydowns for the contracts would result in savings. The Commission therefore cannot make a blanket assumption that all claimed stranded costs will have been prudently incurred. (FERC 1996)

The SJC stated that it, too, prefers not to make any "blanket assumption" that the company's stranded costs were prudently incurred. Instead, it remanded this issue back to the Department for further analysis. (SJC 1997, pages 25-28.)

3.7 Striking the Appropriate Balance Between Ratepayers and Stockholders.

A Standard of Review for Assessing Stranded Cost Claims

It is important to establish a standard for reviewing utilities' requests for stranded cost recovery, in order to clarify the burden of proof that utilities bear in seeking recovery, as well as to indicate how various types of stranded costs may be recovered from ratepayers. In its recent restructuring order, the Department outlined a broad standard of review that included, among other things, requirements that utilities demonstrate (a) that stranded costs exist, (b) that utilities have taken all reasonable means to mitigate stranded costs, and (c) that PPA contracts are prudent.

The recent SJC decision regarding Cambridge Electric's proposed exit fee for MIT complements this standard of review in three ways:

1. All requests for stranded cost recovery must be supported with detailed documentation and justification for how the stranded costs were estimated.

[21] The SJC noted that one Commissioner, in a concurring opinion, suggested that a 60 percent allocation would be more reasonable, but that no findings were provided for this suggestion.

2. Any explicit allocation of stranded costs between customers and other entities must be documented and justified.

3. All stranded costs should be reviewed for prudency, including the prudency with which the costs were managed over time.

We recommend adding two important elements to the standard of review implied by the Department and the SJC. First, regulators and legislators should seek opportunities to share stranded costs between utility stockholders and customers, with the ultimate goal of an even 50/50 sharing. Such a sharing would be consistent with the Department's long-standing and well-supported prudent/used and useful standard, which requires that all uneconomic costs be shared between utility stockholders and customers – even if the costs were prudently incurred.[22] Any deviation from a 50/50 sharing must be justified with a detailed analysis of the rate and financial implications of various stranded cost recovery scenarios.

Consequently, the second element we would add to the standard of review is that any request for stranded cost recovery should be accompanied by a detailed assessment of rate impacts on electricity customers, as well as the financial impacts on the electric company.[23] Rate and financial impacts should be evaluated for a number of different stranded cost sharing options, so that the Department can consider the sensitivity of these impacts to different sharing options. Without assessing rate impacts and financial impacts, the Department will not be able to identify how electric companies and their customers will be affected by various stranded cost recovery proposals, making it impossible to determine whether an appropriate balance of the two parties' interests has been found.

The Restructuring Settlements Do Not Meet a Reasonable Standard of Review

The stranded cost estimates proposed in the restructuring settlements have not been subject to the Department's standard of review, or the standard of review implied by the recent SJC order. Furthermore the settlements do not include an analyses of the rate impacts on customers and the financial impacts on the utilities. Hence, it is not possible to determine whether they strike an appropriate balance between utilities and customers. Given that they essentially allow the utilities to recover all stranded costs, it appears as if they are heavily weighted in favor of utilities.

The Full Recovery of Stranded Costs Is Not an Appropriate Balance of Interests

Although the Department found that utilities do not have a clear legal entitlement to recover their stranded costs, it has proposed to allow essentially full recovery of those costs. The Department's primary justification for allowing full recovery of non-mitigable

[22] The Vermont restructuring bill, which passed in the Senate in April, 1997 (S.56) stated that "net, prudently incurred discretionary above-market costs should be shared evenly between utilities and customers." (Section 8006 (a) (3)).

[23] The Vermont Public Service Board requires such assessments in its standard of review of electric company stranded cost requests (VTPSB 1996a, page 60).

costs is that drawn-out litigation over legal challenges to a denial of stranded costs would significantly delay the benefits of competition for consumers. (MDPU 1996, page 222) However, it is important to recognize that if customers are required to pay full stranded costs, then they may be denied the primary benefit of retail competition: the reduction of prices down to market-based prices. As indicated in Figures 4 and 5, full recovery of stranded costs could prevent customers from seeing market-based prices until many years into the future. Hence, allowing full recovery of stranded costs could defeat the Department's own objective.

Another concern often raised about not allowing recovery of stranded costs is the financial implications: a utility may not be able to raise capital in financial market, or may even be forced into bankruptcy. However, this sort of argument has been raised in the past with regard to the Department's prudent/used and useful standard, and yet time has shown that utilities have not suffered dire financial consequences from this standard.[24] While the financial impacts of disallowing a portion of stranded costs may be significant, and should be considered, the mere possibility of negative financial impacts should not be used as a threat to justify full recovery of stranded costs. Instead, each utility should make a demonstration of the financial impacts of various stranded cost recovery options, so that the Department can make an informed decision regarding the utility's financial well-being.

3.8 Securitization of Stranded Cost Recovery

A number of states, including Massachsuetts, have considered "securitizing" stranded cost as a means of reducing the burden on electricity consumers. With securitization, which requires legislative approval, bonds are sold to investors to cover some or all stranded costs. Utilities get the proceeds of the bond sales, and the bond principal and interest charges are guaranteed by ratepayer funds.

Because the bonds, with their legislated payback guarantees, carry lower interest rates than the rates of return utilities would charge, securitization is sometimes said to reduce stranded cost payments by ratepayers. But securitization does not provide a free lunch. The reduction in cost is accompanied by higher risks to customers, since they must pay back the bonds under any conditions. These risks are especially high for captive residential customers.

Consider a scenario in which stranded costs are misestimated. This could happen, for example, if market prices turn out to be higher than currently forecast. In this case, reconciliation of stranded cost recovery based upon the actual market prices could be impossible, and customers would end up paying for more than 100% of stranded costs. History provides many examples of decisions that limit flexibility turning out badly. Two examples that are relevant to electricity include the long-term rate deals that were made for Public Service of New Hampshire and Long Island Lighting Company, with

[24] In 1985 Boston Edison's president, Stephen Sweeney, responded to the prudent/used and useful standard by saying, "Under these rules, investors would have no incentive to invest and utilities would lose control of their ability to obtain the funds necessary to meet their public service obligation." (MDPU 1986, page 8)

regard to their financial troubles from overextended investments in nuclear construction projects.[25] In both cases, agreements locked in rate increases based in part upon expectations of where electricity prices in the region were headed. As it turned out these two companies now have the highest electricity prices in the US, outside of New York City and Hawaii (based upon data from EEI, 1997).

We recommend against securitization in order to avoid over-recovery of stranded costs. To the extent that any securitization is used for stranded cost recovery, it should be accompanied by much stronger provisions requiring utility investors to bear a share of the burden. Also, any securitization plan should be limited to a small fraction of estimated stranded costs in order to minimize the probability of over-collection.

[25] The nuclear units for PSNH and LILCO were Seabrook and Shoreham, respectively.

4. Estimated Economic Impacts of Stranded Cost Recovery Options

4.1 Electricity Cost Implications of Stranded Cost Recovery

Stranded cost recovery policy has important implications for electricity prices in Massachusetts over the next two decades. The electricity price impacts, in turn, will influence the performance of the state's economy. In this section, we present several stranded cost recovery scenarios in terms of their cost to consumers. We then proceed to estimate the impacts of stranded cost recovery upon employment in Massachusetts.

The utilities' estimates of stranded costs are presented in Table 7, showing the annual costs through the year 2020. The first column presents the annual costs recovered from customers if all estimated stranded costs are recovered. The time pattern has a gradual decline from roughly $1.4 billion per year for 1998, to roughly $800 million in 2009, and less than $100 million per year after 2016. This time pattern is to some extent an artifact of the structure of the utilities' calculations (e.g., Western Mass Electric has stranded costs being recovered over the five year period from 1996 through 2000). It also reflects the specifics of the obligations underlying the stranded costs (e.g., nuclear plant license periods and purchase power contract duration).

Table 7. Annual Stranded Costs Imposed Upon All Massachusetts Ratepayers: Three Scenarios

Year	Full Recovery of Stranded Costs	No Return On Generation Assets	Even 50/50 Sharing of Stranded Costs
1998	1,364	1,105	682
1999	1,361	1,127	680
2000	1,352	1,145	676
2001	1,083	932	541
2002	1,034	901	517
2003	1,008	891	504
2004	986	887	493
2005	967	885	484
2006	932	865	466
2007	894	845	447
2008	845	812	422
2009	798	781	399
2010	534	534	267
2011	469	469	235
2012	344	344	172
2013	284	284	142
2014	233	233	117
2015	239	239	119
2016	198	198	99
2017	90	90	45
2018	60	60	30
2019	64	64	32
2020	41	41	21
Cumulative Present Value	7,872	6,823	3,936

Sources: BECO 1997, Com/Electric 1996, Eastern 1997, NEES 1996, WMECO 1996. Cumulative present values are in 1997 discounted dollars, for the entire recovery period from 1998 through 2026..

In the two right-hand columns in Table 7 we present two scenarios for sharing stranded costs between stockholders and customers. First, there is a sharing case where the utilities are not allowed to recover any stranded costs associated with the return on the generation assets. In other words, utilities would not be allowed to recover the roughly $1.0 billion in profits and interest payments (in cumulative present value dollars) listed in Table 3 above. This scenario represents how stranded costs would be shared if the Department's prudent/used and useful principle were to be applied to utility generation assets only. Based upon the utilities' estimates, this would result in recovery of $6.8 billion of stranded costs (in cumulative 1997 present value dollars), or 87 percent of the total.

Second, Table 7 presents a scenario where the stranded costs are shared evenly between the utility and its customers. In this case, the stranded costs to be recovered follow a similar pattern as in the full recovery case, but at one-half the magnitude. This scenario represents how stranded costs would be shared if the Department's prudent/used and useful principle were to be applied to all stranded costs. In this scenario, the consumers bear $3.9 billion of stranded costs (in cumulative 1997 present value dollars).

Actually, the name "50/50 Sharing" is inaccurate, since the utility shareholders will benefit from a substantial tax break as a result of the rate treatment. A recent report on stranded costs by Oak Ridge National Laboratory states that

> [A]ny losses experienced by a private firm are offset in part by reduced federal and state income-tax payments. For example, if a utility's combined federal-state income tax rate is 36%, its shareholders will face only 64% of any losses associated with retail wheeling. Taxpayers will bear the remainder through lower tax receipts. (Hirst et. al. 1996, page 10)

Massachusetts utilities currently face a combined state and federal income tax rate of slightly less than 40 percent. Thus, for every $100 million of stranded costs that is "shared 50/50" in Masachusetts consumers bear $50 million, utilities shareholders bear roughly $30 million, and taxpayers bear roughly $20 million through lower tax receipts.

4.2 Employment Implications of Stranded Cost Recovery

To the degree that stranded costs are awarded entirely to the electric utilities, this constitutes a transfer of income from all electricity consumers in Massachusetts to the utilities (or, alternatively, a failure to provide consumers with the benefits of deregulation). Thus, all commercial and industrial businesses will have higher electricity bills than they would have had were the utilities denied recovery of stranded costs. As a result, businesses will have less money remaining to spend on other costs, such as payroll. The inevitable result is that their employment levels will fall.

Similarly, residential electricity consumers will have less money remaining after paying their electric bills. As a result, they will spend less on all their other consumption items, such as food, clothing, transportation, entertainment, medical care, and housing. All these industries will then have lower sales, reducing their employment. These direct effects on spending by the industrial, commercial, and residential sectors will be enlarged through

"indirect" effects that result from re-spending, as businesses reduce their purchases of inputs from other companies. For example, if the demand for meals at restaurants falls, their purchases of food, supplies, and business services will all drop; and their laid-off employees will also reduce their spending.

We have estimated both the direct and indirect job impacts of stranded cost recovery, by the use of standard statistical techniques. The results are presented in Table 8. Our job impact results are based on estimates of the amount of stranded costs recovered in each year in Massachusetts from all ratepayers, as presented in Table 7. In the scenario where all stranded costs are recovered from customers, the job losses in Massachusetts each year begin with a loss of roughly 25,000 jobs in 1998, falling to a job loss of roughly 17,000 by the 10th year. In the other two scenarios, the job losses are directly proportional to the amount of stranded costs recovered in each year. For example, the losses in the 50/50 sharing scenario job losses are one-half of those in the full return scenario.

Table 8: Total Jobs Sacrificed Each Year Under Different Stranded Cost Recovery Scenarios

Year	Full Recovery of Stranded Costs	No Return On Generation Assets	Even 50/50 Sharing of Stranded Costs
1	25,479	20,638	12,740
5	19,315	16,823	9,658
10	16,700	15,782	8,350
15	6,426	6,426	3,213
20	1,681	1,681	840

Source: See Appendix A.

Job losses can also be estimated by industry and by county, although with less precision. The greatest losses would take place in the industries that presently have the highest employment levels in Massachusetts: about 6,400 in retail and wholesale trade, 5,300 in "miscellaneous services," and 3,960 in health services. (See Table A-2 in Appendix A.)

Losses by county depend both on population and employment levels in the county, and would be largest in Middlesex (6,900), followed by Worcester (3,300), Essex (3,200), and Suffolk (3,000). (See Table A-3, in Appendix A.) Further explanation of the methodology used to compute these results is contained in Appendix A.

In March, 1997 NEPLAN's Economic and Load Forecasting Staff published a document titled "Long-Term Economic Impacts of a Restructured New England Electric Utility Industry." NEPLAN forecasted that if restructuring causes electricity rates to fall by 40% in New England, while those for the United States as a whole fall by 20% on average, the eventual result (20 years from now) will be a gain of approximately 100,000 jobs in New England.

Without conducting a detailed examination of NEPLAN's methodology, their results appear to be consistent with our finding – that reducing electricity prices significantly in the near term by removing some the uneconomic portion of electricity supply costs, employment in the State will be improved by more than 20,000 jobs per year.

5. Recommendations

Our primary recommendation is that the recovery and allocation of stranded costs in Massachusetts should receive much greater attention from regulators and legislators, on a case-by-case basis. Each utility's stranded cost recovery proposal should be reviewed in depth by the Department and be supported by detailed analyses of the rate impacts borne by customers and the financial impacts imposed on the utility.

Second, the principle underlying the Department's prudent/ used and useful policy should be applied to all stranded costs. In particular, regulators and legislators should seek all opportunities to share total stranded costs between the two groups, with the ultimate goal of an even 50/50 sharing. A 50/50 sharing of stranded cost should be seen as the best way to balance the interests of both utilities and their customers. Deviations from a 50/50 sharing should be justified only on the basis of the expected rate and financial impacts. For example, recovery of more stranded costs from customers may be allowed if a 50/50 sharing resulted in unduly burdensome financial constraints on the utility (i.e., potential bankruptcy).

Third, the utilities should be encouraged to divest their generation assets to the greatest extent possible -- including selling off PPA contracts. Stranded cost requests that are based simply on administrative estimates should be subject to a much higher standard of review. Utilities should not be allowed to earn a return on stranded costs associated with any generation assets that have been divested.

Fourth, estimates of stranded costs associated with generation assets should account for the residual value of those assets, and any negative stranded costs that result should be netted against other stranded costs. If there are any positive stranded costs associated with generation assets, then the Department's prudent/used and useful standard should be applied to achieve a sharing of those costs.

Fifth, each utility should demonstrate which of its PPA contracts have previously been approved by the Department. For those that have been approved, the utility should demonstrate that it has prudently managed those contracts over time, including the consideration of contract renegotiation, contract buydowns, and contract buyouts. Utilities should not be allowed to recover stranded costs associated with PPA contracts that have not been prudently managed.

Sixth, for those PPA contracts that have not been previously approved by the Department, the utility should demonstrate (a) that the initial decision to enter into the contract was prudent, and (b) that it has prudently managed those contracts over time, including the consideration of contract renegotiation, contract buydowns, and contract buyouts. Utilities should not be allowed to recover stranded costs associated with PPA contracts that have not been prudently established or managed. Given that QF purchases represent only a small portion of most utilities' PPA contracts, we expect that most PPA contracts have not been previously approved by the Department.

Seventh, utilities should mitigate all types of stranded costs to the greatest extent possible. The Department should establish meaningful penalties for utilities that do not

adequately mitigate stranded costs. The Department should establish clear standards for what represents appropriate mitigation efforts by utilities -- based on the standards proposed in Section 3.4. Utilities should be responsible for all opportunities to mitigate stranded costs as of August 1995, when the Department first put utilities on notice that competition would be introduced into the electric utility industry in Massachusetts. Any benchmark estimate of stranded costs used to measure mitigation efforts should account for the residual value of generation assets.

Eighth, utilities should not be allowed to recover any incremental fixed costs incurred after August 1995, including capital additions, incremental nuclear decommissioning costs, and incremental costs of on-site storage of nuclear fuel. In order to recover any incremental fixed costs incurred after August 1995 as stranded costs, the utility should be required to demonstrate that the cost was incurred for measures that successfully reduced net stranded costs.

Ninth, stranded costs should exclude operating costs of non-divested generation, such as fuel and operations and maintenance expenses.

Tenth, utilities should not be allowed to earn a profit on any stranded costs that are recovered through a stranded cost recovery charge. A stranded cost recovery charge provides for a guaranteed recovery of those costs, and therefore includes no risks for which investors need to be compensated.

Finally, utilities' stranded cost recovery charges should include reconciliation mechanisms to adjust for any deviations over time between estimated stranded costs and actual stranded costs.

References

American Council for an Energy-Efficient Economy (ACEEE) 1992. *Energy Efficiency and Job Creation: The Employment and Income Benefits from Investing in Energy Conserving Technologies*.

Biewald, Bruce, Paul Chernick, Jon Wallach, and Peter Bradford 1996. *Restructuring New Hampshire's Electric Utility Industry: Stranded Costs and Market Power*, a report for the New Hampshire Office of Consumer Advocate, November 6.

Bonbright, James C. 1961. *Principles of Public Utility Rates*, Columbia University Press.

Boston Edison Company (BECO) 1997. *Restructuring Settlement Agreement*, DPU Docket Nos. 96-100 and 96-23, Attachment 3, July.

Bradford, Peter 1996. *Til Death Do Us Part or the Emperor's New Suit: Does a Regulatory Compact Compel Strandable Investment Recovery?*, PUR Quarterly, July 16.

Commonwealth Electric Company (Com/Electric) 1996. *Presentation of Stranded Cost Estimates*, Explanatory Statement, Overheads and Workpapers, DPU Docket No. 96-100, June 19.

Eastern Utilities (Eastern) 1997. *Electric Utility Industry Restructuring Offer of Settlement*, DPU Docket Nos. 96-100 and 96-24, Volume 2, Attachment 1, Amendment to Service Agreement, May.

Edison Electric Institute (EEI) 1991. *Statistical Yearbook of the Electric Utility Industry 1990.*

Edison Electric Institute (EEI) 1996. *Statistical Yearbook of the Electric Utility Industry 1995*.

Edison Electric Institute (EEI) 1997. "Typical Bills" data, January 1.

Federal Energy Regulatory Commission (FERC) 1996. *Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Services by Public Utilities; Recovery of Stranded Costs by Public Utilities and Transmitting Utilities*, FERC Order 888, Docket Nos. RM95-8-000 and RM94-7-001, Washington DC, April.

Hartman, Raymond and Richard Tabors 1996. The Regulatory Contract and Its Relevance to Stranded Assets Under Restructuring: A Modest Proposal, Massachusetts Institute of Technology, School of Engineering, Laboratory for Electromagnetic and Electronic Systems, LEES Working Paper WP-96-003, February.

Hirst, Eric, Stan Hadley and Lester Baxter 1996. *Methods to Estimate Stranded Commitments for a Restructuring U.S. Electricity Industry*, Oak Ridge National Laboratory, sponsored by Competitive Resource Strategies Program, Office of Energy Efficiency and Renewable Energy, U.S. Department of Energy, ORNL/CON-424, January.

Kalt, Lee and Leonard 1987. *Re-Establishing the Regulatory Bargain In the Electric Utility Industry*, March.

Kaplow, Louis 1986. "An Economic Analysis of Legal Transitions," *Harvard Law Review*, January.

Maine Public Utilities Commission (MEPUC) 1996. *Electric Utility Industry Restructuring: Report And Recommended Plan*, Docket No. 95-462, December 31.

Massachusetts Department of Public Utilities (MDPU) 1996. *Electric Industry Restructuring Plan: Model Rules and Legislative Proposal*, DPU Docket No. 96-100, December.

Massachusetts Department of Public Utilities 1995. *Electric Industry Restructuring*, DPU Docket No. 95-30, August.

Massachusetts Department of Public Utilities 1986. Order 86-266-A/85-271-A.

Massachusetts Supreme Judicial Court (SJC) 1997. Massachusetts Institute of Technology vs. Department of Public Utilities, Suffolk County, SJC-07277, September 18.

Moody's Investors Service (Moody's) 1996. *Moody's Calculates Little Change in Potential Stranded Investments*, New York, December.

Moody's Investors Service 1995. *Stranded Costs Will Threaten Credit Quality of US Electrics*, New York, August.

National Consumer Law Center 1997. *Initial Brief of Low-Income Intervenors* in D.P.U. 96-23.

New England Electric System (NEES) 1997a. *Direct Testimony of Jennifer L Kenney*, New England Power Company Sale of Generation Assets to USGen New England, Inc., submitted to the Massachusetts Department of Public Utilities, October 1.

New England Electric System 1997b. *Current Report to the Securities and Exchange Commission, Form 8-K,* August 6.

New England Electric System 1996. *Electric Utility Industry Restructuring Offer of Settlement*, DPU Docket Nos. 96-100 and 96-25, Book 2 of 5, Attachment 1, Amendment to Service Agreement, October.

New England Power Planning 1997. *Long-Term Economic Impacts of a Restructured New England Electric Utility Industry*, NEPLAN Economic & Load Forecasting Staff, March.

New Hampshire Public Utilities Commission (NHPUC) 1997. *Final Plan*, Docket 96-150, February 28.

New York Public Service Commission (NYPSC) 1996. *Opinion And Order Regarding Competitive Opportunities For Electric Service*, Order 96-12, May 20.

O'Connor, John and Edward Kelly 1997. *Stranded Costs, Stranded Opportunities*.

PG&E Corporation 1997. *Current Report to the Securities and Exchange Commission, Form 8-K,* August 6.

Resource Data International (RDI) 1997. *Power Markets in the US*, as cited in Public Utilities Fortnightly, May 1.

Resource Insight 1996. *Estimation of Market Value, Stranded Investment, and Restructuring Gains for Major Massachusetts Utilities*, prepared for the Massachusetts Attorney General, April.

Resource Data International (RDI) 1995, *The Mega-NOPR: Implications of Stranded Investment Recovery*, presented to National Association of Regulatory Commissioners, Summer Meeting, San Francisco, July 25.

Vermont Public Service Board (VTPSB) 1996a. *The Power To Choose: A Plan To Provide Customer Choice Of Electricity Suppliers*, Docket No. 5854, December 31.

Vermont Public Service Board 1996b. Order in Dockets 5810, 5811, and 5812, February 8.

Western Massachusetts Electric Company (WMECO) 1996. Testimony of Richard Soderman, DPU Docket No.96-26, Exhibit RAS-2(V), February 16.

Appendix A:
Methodology for Estimating Employment Impacts

In recent decades, numerous analyses have shown that reducing energy consumption, and therefore funds going to electric and gas utilities, and to gasoline and fuel oil consumption, will have strong positive effects on employment. (See, for example, ACEEE 1992.) This result occurs because utilities and other energy-related activities yield far fewer jobs per dollar of spending than virtually all other industries, due both to their capital-intensity and to the large fraction of spending which goes to imports of fuel.

In the particular case of stranded costs, employment from providing funds to the utilities will be even smaller.

Other analyses, such as that by Geller, have looked at provision of electricity through building additional power plants versus using electricity more efficiently -- with either alternative requiring new economic activity. But whether or not stranded costs are provided to the utilities, they will continue to operate the transmission, distribution, metering and billing systems, while they or their competitors will continue to generate electricity.

It is likely, therefore, that there will be only small employment losses within the electric utility industry. Less stranded cost recovery does mean lower incomes for utility stockholders. But such funds are used primarily for investment purposes, not for consumption, and may be spent anywhere in the world. The effects on employment levels within Massachusetts businesses are therefore small.

Employment impacts have been estimated by the use of a methodology known as "input-output analysis," which examines the number of jobs yielded per dollar of spending by each industry in a regional economy. For this study we have utilized data for Massachusetts derived from the RIMS (Regional Input-Output Multiplier System) of the U.S. Department of Commerce, and have adjusted the data for the portion of spending which goes to businesses out of the state.

For this study it has not been feasible to conduct a detailed analysis of the relative intensity of electricity use by each industry in Massachusetts. Rather, we have used employment levels as a proxy for electricity consumption, utilizing data from the U.S. Department of Commerce's publication County Business Patterns. To estimate consumer spending patterns we have relied on data from the Bureau of Labor Statistics in the U.S. Department of Labor.

In order to divide up the employment impacts by county we have assumed that residential consumption of electricity is proportional to population, while commercial and industrial consumption is a function of employment in the county.

Some say that businesses move from one state to another based in part on their costs of obtaining electricity. The degree to which this takes place is a complex function of many factors, utility costs being only one, and we have not attempted to provide a forecast of such relocation decisions in this study. To the extent that business would tend to locate

or expand (or decide to stay) in Massachusetts as a result of the lower electricity rates, our employment estimates are understated.

Finally, there are limitations to input-output analysis as a forecasting tool. The technique looks at industry differentials from a "demand-side" perspective, essentially assuming that workers are available to fill whatever job slots are created by industry (the "supply side"). This assumption is valid at times of economic slack, when there is substantial unemployment in the geographic region under consideration. It is less true the closer to full employment is the regional economy.

Table A-1. Total Job Gains Sacrificed Each Year If All Stranded Costs Are Awarded to Utilities

Year	Total Jobs Sacrificed
1	25,479
2	25,423
3	25,255
4	20,230
5	19,315
6	18,829
7	18,418
8	18,063
9	17,409
10	16,700
11	15,784
12	14,906
13	9,975
14	8,761
15	6,426
16	5,305
17	4,352
18	4,464
19	3,699
20	1,681

Table A-2. Job Gains Sacrificed By Industry If All Stranded Costs Awarded to Utilities (year 1)

Industry	Jobs Lost
Agricultural Products/Services	10
Forestry/Fishery	0
Coal Mining	0
Crude Petroleum/Natural Gas	0
Miscellaneous Mining	0
Construction	650
Food and kindred products	30
Textile mill products	40
Apparel	80
Paper/Allied products	40
Printing/publishing	200
Chemical and petroleum refining	30
Rubber/ Leather products	80
Lumber/wood prod. & furnish.	40
Stone/clay/glass	20
Primary metal	30
Fabricated metal	40
Machinery, except electrical	90
Electrical equipment	170
Motor vehicles and equipment	0
Transport equip. ex. motor veh.	20
Instruments and related products	130
Misc. Manufacturing	40
Transportation	670
Communication	210
Electric/Gas/Water/Sanitary Serv.	50
Wholesale Trade	1,240
Retail trade	5,120
Finance	880
Insurance	1,080
Real Estate	60
Hotels/Amusements	740
Personal Services	520
Business Services	1,800
Eating/drinking places	2,100
Health Services	3,960
Miscellaneous Services	5,320
Total	25,490

Table A-3. Job Gains Sacrificed By County If All Stranded Costs Awarded to Utilities (year 1)

County	Total Job Loss
Barnstable	910
Plymouth	2,100
Dukes	70
Worcester	3,330
Essex	3,170
Bristol	2,360
Middlesex	6,860
Suffolk	3,010
Franklin	330
Hampshire	700
Hampden	2,000
Berkshire	610
Nantucket	40
Total	25,480