Electric Utility Stranded Costs: Valuation and Disclosure Issues

Julia D'Souza* and John Jacob†

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ABSTRACT

We analyze the stock market’s valuation of electric utility “stranded costs” (i.e., costs that might become unrecoverable under deregulation), and investigate whether stranded costs that have arisen as a result of voluntary firm business decisions are valued differently from those that are more directly linked to regulatory mandates. Further, we study whether investor valuations differ across jurisdictions. Finally, we examine the relation between investor valuation of stranded costs and the decision by utilities to make stranded cost-related disclosures in their financial statements voluntarily.

We find that investors anticipate that, on average, approximately 10% of total stranded costs will be borne by utility shareholders. Stranded costs arising from voluntary operating or investing decisions made by utilities are valued more negatively than those associated with mandatory power purchase contracts, consistent with investors assigning a higher recovery probability to the latter. Investor valuations of stranded costs associated with utility generating investments do not differ systematically across jurisdictions. We find that stranded costs are valued less negatively for voluntary disclosers not just in the year of disclosure but also in the preceding two years, implying that it is not disclosure per se that favorably influences valuation. Voluntary disclosers operate in jurisdictions that have more clearly established stranded cost recovery mechanisms, suggesting that both stranded cost disclosure and valuation are prompted by reduction in uncertainty about recoverability.

*Cornell’s Johnson School of Management; †University of Colorado at Boulder. We are grateful to Arthur Andersen & Co., Duff & Phelps, Goldman, Sachs & Co., Merrill Lynch, Moody’s Investor Services, Regulatory Research Associates, and Resource Data International for sharing with us their industry expertise. We thank Kunal Madhukar for expert research assistance. We benefited from helpful suggestions from Tom Dyckman, Woody Eckard, John Elliott,
1. Introduction

We investigate the stock market’s valuation of electric utility “stranded costs” (i.e., past expenses planned to be recovered in future rates, high-cost capital investments, and uneconomical contractual commitments that might be unrecoverable under deregulation). Estimates of electric utility stranded costs range from $150 to $300 billion, and exceed 50% of equity for many of the large investor-owned electric utilities (see Moody’s [1995]). Recently, there has been vigorous debate in the financial press about whether electric utilities should be permitted to recoup these costs. Proponents of stranded cost recoveries argue that there was an implicit guarantee of recovery associated with the investments undertaken by electric utilities. Opponents (e.g., low-cost electricity producers) argue that stranded cost recoveries “would subsidize certain high-cost generators to the detriment of competition” (IPALCO Annual Report, 1996, p. 40).

We first determine whether stranded cost estimates are reflected in electric utility stock prices, and investigate whether stranded costs that can be more directly linked to regulatory mandates are valued differently from those that have arisen as a result of voluntary firm business decisions. Next, we investigate whether stranded cost valuation differs systematically across utilities, based on two factors: regulatory climate (i.e., the relative leniency or stringency exhibited by the utility’s regulators in past decisions) and the pace of deregulation (i.e., the relative speed at which the utility’s jurisdiction is moving towards deregulation). Finally, we examine the association between investor valuation of stranded costs and the decision by utilities to make stranded cost-related disclosures in their financial statements.

We find a significant negative association between electric utility stock prices and our estimates of utility-specific stranded costs, suggesting that investors anticipate that a non-trivial portion of stranded costs will be borne by utility shareholders. We find also that stranded costs arising from uneconomical contractual commitments are valued less negatively than those stemming from other operating or investment decisions made by utilities. This is consistent with investors assigning a higher probability of recovery to stranded costs due to contractual commitments, possibly because these can be traced in large measure to mandatory power purchases from non-utility generators after the passage of the Public Utilities Regulatory Policies Act.

Bob Magee, K. Ramesh, Steve Ryan, Naomi Soderstrom, and accounting workshop participants at NYU, SUNY–Buffalo, and Syracuse University. We are also grateful for helpful comments received at the International Conference on Contemporary Accounting Issues (Taiwan, July 1998), and the American Accounting Association Annual Meetings (New Orleans, August 1998). Finally, we thank two anonymous referees, Richard Leftwich and Katherine Schipper for suggestions that have improved the paper.

1 Stranded cost estimates from Moody’s Investors Service [1995] and Resource Data International [1995] are around $150 billion. Fernando et al. [1995] estimate a stranded cost range of $200 to $300 billion.

of 1978 (PURPA). Our results suggest that neither regulatory climate nor deregulation pace affects the valuation of stranded costs arising from generating investments. Investors do not appear to believe that there will be significant differences in the proportion of generating stranded costs borne by utility shareholders based on these two factors.

Only 18 electric utilities (less than 20% of our sample) make quantitative disclosures about potential stranded costs in their 1996 Annual Reports or Forms 10-K, and more than 45% make no stranded cost disclosures at all. Consistent with past findings on incentives to disclose bad news voluntarily (e.g., Skinner [1994]), we find that stranded cost estimates are significantly higher for the 18 disclosers in our sample as compared to non-disclosures. We also find a less negative association between stock prices and potential stranded cost estimates for the 18 disclosers in our sample in the year of disclosure. However, stranded costs are also valued less negatively for these 18 firms in the two years preceding disclosure, suggesting that the less negative valuation is not driven by reduction in uncertainty arising from stranded cost disclosures in financial statements. The decision to disclose stranded cost estimates is positively correlated with deregulation pace and the establishment of explicit stranded cost recovery mechanisms. It appears that both disclosure and valuation of stranded costs are driven by reduction in uncertainty about recoverability.

2. Institutional Background

2.1 THE BEGINNINGS OF COMPETITION

The electric utility industry faced increased competitive pressures after the passage of PURPA, which encouraged the growth of non-utility power production by guaranteeing a market for any excess power produced by non-utility generators. More recently, the Energy Policy Act of 1992 significantly increased competition in the most profitable sector of the industry: generation. The Act increased competition by giving the Federal Energy Regulatory Commission (FERC) the authority to order a utility to transport and deliver (“wheel”) energy for another supplier in wholesale power transactions. Following the 1992 Energy Policy Act, many state legislatures began to consider “retail wheeling” (the use of one utility’s transmission system to transmit power for another utility’s retail sales). Analysts generally agree that competition will spread to commercial and residential sectors in the near future.

2.2 STRANDED COSTS

Rate regulation can be thought of as an implicit contract between the regulator and the regulated firm. Sidak and Spulber [1997] note that this contract has three features: utility service obligations, entry controls, and rate regulation. The regulated firm undertakes to meet the service requirements of all consumers at all times and makes necessary investments towards
this end. In return, the regulator controls entry into regulated markets. Rates are set such that the regulated firm can both recover its operating costs (including depreciation of fixed assets) and earn a “fair” return on investments deemed “used and useful.”

In the absence of regulated returns, many utilities will not be able to recover the cost of their investments (i.e., some of their costs will be “stranded”). Factors giving rise to stranded costs include capital investments made in anticipation of rapid demand growth that fails to materialize or investments in technologies (e.g., nuclear) whose promise falls short of expectations (see Fernando et al. [1995]). Total stranded costs for each utility consists of three components: generating assets whose book value exceeds their fair market value, regulatory assets, and the uneconomic portion of long-term power purchase contracts.

The book value of utilities’ plant assets represents investments that currently form part of the ratebase and are used to compute permitted revenues incremental to operating expense recoveries. We measure stranded generating assets as the extent to which the book value of a plant exceeds its market value (i.e., its intrinsic value or the net present value of its expected future cash flows under competitive conditions).

Regulatory assets are a subset of deferred charges typically used to book costs whose recoveries in current rates would lead to unacceptable rate shocks. During the last decade, regulatory assets have become a growing component of many electric utilities’ balance sheets. Regulatory assets have no intrinsic value apart from the implicit regulatory guarantee of future recoverability. Consequently, these assets might well become stranded under deregulation.

Long-term contracts for power purchases and sales represent the third category of stranded costs. The bulk of these contracts relate to wholesale power purchases from non-utility generators, mandated under PURPA. In anticipation of regulated rates, many such contracts have been set for over 10 years at prices well above probable competitive market prices. The portion above market prices for power purchase contracts (i.e., the uneconomic portion of the contract) could represent an unrecoverable cost to the utility in a more competitive environment.

2.3 STRANDED COSTS ESTIMATES

We obtain data on regulatory assets (REGASS) from utility filings on FERC Form-1, for each year from 1994 through 1996. Data on regulatory assets provided on FERC Form-1 include unrecovered costs due to phase-in plans, deferred losses from disposal of property, and other deferred operating costs that are classified as regulatory assets. Because these data are uniformly defined, disclosed and presented in Form-1 filings, they are more easily comparable across firms than information on regulatory assets presented in annual reports.
stranded costs related to generating assets and contractual commitments from Resource Data International (RDI), a strategic information firm specializing in energy information systems, geographic information systems, industry studies and consulting services. To obtain generating stranded cost estimates, RDI first forecasts future revenues and costs for each generating unit, and computes the unit’s market value as the present value of its projected future net cash flows. The difference between the book value and the estimated market value of the asset captures the stranded cost component of the asset (GENSC). RDI computes estimates of stranded costs from contractual commitments (CONSC) by multiplying the actual amount of energy to be purchased under each contract by the difference between the forecast price of electricity for each year and the corresponding contractual rate for the year. The Appendix contains a more detailed explanation of the methodology used by RDI to compute stranded cost estimates.

2.4 STRANDED COST RECOVERY MECHANISMS

The issue of who should bear stranded costs (ratepayers or electric utility shareholders) is contentious. Utilities with high stranded costs prefer full recovery of stranded costs while those with low stranded costs want to maintain their competitive advantage over other utilities and argue against stranded cost recovery.5

The California Public Utilities Commission (CPUC) led the way in industry restructuring, establishing competition transition charges for departing customers. Several other regulatory commissions have followed the CPUC’s lead. As of December 1999, the timing and framework of transition to retail competition had been established in over fifteen states.

3. Empirical Tests

3.1 ARE STRANDED COST ESTIMATES RELATED TO EQUITY VALUATION?

We test our first research question by adding our variable of interest to the generic equation linking market value of equity to book value of equity and net income.

\[
MVE_t = \alpha_0 + \alpha_1 BVE_t + \alpha_2 NI_t + \alpha_3 TOTALSC_t + \epsilon_t
\]  

5 For instance, in a letter to The Wall Street Journal on December 26, 1997, Niagara Mohawk argues: “These are the costs that have already been approved for recovery, and in some cases are costs that utilities were ordered to incur by the government. The government’s reneging on recovery of these costs would not be a policy vagary, it would be a scandal, not to mention a sizable subsidy for new market entrants.” On the other hand, IPALCO, a low-cost producer, asserts in its 1996 Annual Report, “There is no reasonable explanation for the fact that the very companies that are charging their captive customers two or three times the real commodity value of electricity are ... crying for stranded cost recovery, while engaged in a worldwide acquisition binge.”
where:

\[ MVE_t = \text{market value of equity at the end of fiscal year } t; \]
\[ BVE_t = \text{book value of equity at the end of fiscal year } t; \]
\[ NI_t = \text{net income for fiscal year } t; \]
\[ TOTALSC_t = \text{estimate of total stranded costs at the end of fiscal year } t. \]

We obtain data on fiscal year-end market and book values and net income for the year from the Compustat annual tapes for 1994, 1995 and 1996. We compute TOTALSC, as the sum of three components: regulatory assets (REGASS), stranded costs associated with generating assets (GENSC), and stranded costs associated with contractual commitments (CONSC). We obtain data on regulatory assets at the end of each fiscal year from information provided by utilities on FERC Form-1 for 1994, 1995 and 1996. We use RDI estimates (computed at end 1995) to measure GENSC and CONSC.7

Our sample consists of all electric utilities for which data are available. We start with the 124 electric utilities (SIC codes 4911 or 4931) listed on Compustat. We eliminate 11 firms incorporated outside the US; 16 firms with missing Compustat data (eight of these firms are subsidiaries of holding companies already in the sample and have missing price data); and two firms with missing data for stranded cost estimates. The final sample consists of 95 firms.

As indicated in table 1, regulatory assets comprise, on average, 33.9% of equity book value at the end of 1995 for the 95 electric utilities in our sample. Table 1 also shows that as of the end of 1995, estimates of stranded costs related to generating assets and contractual commitments represent, on average, 19.0% and 23.3%, respectively, of the book value of equity for the firms in our sample. Generating stranded cost estimates are negative for some utilities, suggesting that current customers of these utilities may pay higher rates in a fully competitive market.8 Median values of stranded cost components are generally substantially below the corresponding mean value, indicating a skewed distribution. Total stranded cost estimates (TOTALSC) constitute, on average, 76.2% of the book value of equity for the utilities we analyze.

RDI computes GENSC and CONSC using publicly available information, so it is possible that these estimates (or correlated variables) are already reflected in prices before 1995. However, the computation of these estimates

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6 For most firms, the fiscal year-end coincides with the calendar year-end. One firm has a fiscal year-end that ends in August.
7 GENSC and CONSC estimates are not available for 1994 and 1996.
8 Negative GENSC values indicate that the book value of plant assets is lower than the net present value of the cash flows they are expected to generate under competitive markets. This in turn suggests that under regulation these utilities are forced to charge lower rates than they could obtain in open markets, since it is book value that determines permitted return on investment.
TABLE 1

Our Sample Consists of 95 Electric Utilities. We First Identify All Firms Listed on Compustat Under SIC Code 4911 or 4931 (124 Firms). We Are Left with a Sample of 95 Firms After Eliminating Utilities Incorporated Outside the U.S. (11) and Those with Missing Data (18).

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MVE</td>
<td>2718.6</td>
<td>1479.7</td>
<td>2964.3</td>
</tr>
<tr>
<td>BVE</td>
<td>2018.3</td>
<td>1187.6</td>
<td>2188.4</td>
</tr>
<tr>
<td>ASSET</td>
<td>6064.9</td>
<td>3448.0</td>
<td>6547.3</td>
</tr>
<tr>
<td>REGASS</td>
<td>574.7</td>
<td>201.2</td>
<td>932.4</td>
</tr>
<tr>
<td>REGASS as % of BE</td>
<td>33.9%</td>
<td>17.7%</td>
<td></td>
</tr>
<tr>
<td>GENSC</td>
<td>280.4</td>
<td>15.9</td>
<td>1453.4</td>
</tr>
<tr>
<td>GENSC as % of BE</td>
<td>19.0%</td>
<td>2.7%</td>
<td></td>
</tr>
<tr>
<td>CONSC</td>
<td>556.8</td>
<td>19.8</td>
<td>1566.0</td>
</tr>
<tr>
<td>CONSC as % of BE</td>
<td>23.3%</td>
<td>3.1%</td>
<td></td>
</tr>
<tr>
<td>TOTALSC</td>
<td>1411.9</td>
<td>288.6</td>
<td>2619.1</td>
</tr>
<tr>
<td>TOTALSC as % of BVE</td>
<td>76.2%</td>
<td>40.2%</td>
<td></td>
</tr>
</tbody>
</table>

MVE = market value of common equity at the end of fiscal 1995; BVE = book value of common equity at the end of fiscal 1995; ASSET = book value of total assets at the end of fiscal 1995; REGASS = regulatory assets at the end of 1995; GENSC = book value less estimates of market value of electric utility generating plant assets at the end of 1995; CONSC = estimates of present value of net future costs arising from long-term power purchase contracts measured at the end of 1995; TOTALSC = REGASS + GENSC + CONSC.

We obtain data on MVE, BVE and ASSET from the 1995 Compustat annual tape, and data on REGASS from utility FERC Form-1 filings at the end of fiscal 1995. Resource Data International provided us with GENSC and CONSC estimates.

involves relatively sophisticated projections of future market prices, so it is also possible that they might get reflected in prices only after the estimates are publicly released.9

Barth and Kallapur [1996] note two potential econometric problems associated with levels-based research designs using accounting data: heteroskedastic regression errors and biases in coefficient estimates because cross-sectional scale differences result in spurious correlations between dependent and independent variables (i.e., large (small) values of the dependent variable are generally associated with large (small) values of the independent variables). Much of past accounting research of this genre has attempted to mitigate these potential econometric problems by using a scale proxy as a deflator: The number of common shares outstanding is a frequently used deflator (e.g., Barth and McNichols [1994], Barth and Clinch [1998]). Easton [1998] points out that scale differences may persist even on a per share basis and suggests that book value of equity is a better proxy for scale.

We estimate equation (1) using book value and the number of common shares outstanding as alternative deflators. Our results are similar for both

9Since information about net income for a fiscal year and fiscal-year end book values might not be publicly known at year-end, we also repeat all estimations using as dependent variable the market value of equity at the end of the first quarter of the following fiscal year. Results are unaltered.
specifications. We report results using the number of shares outstanding as the deflator because having book value of equity as a separate independent variable facilitates the interpretation of the coefficients on our variables of interest.10

We expect that the coefficient on TOTALSC will lie between 0 and −1. Assuming accurate stranded cost estimates and efficient markets, a coefficient of −1 would suggest that investors expect the full stranded cost burden to be borne by utility shareholders. A coefficient of zero, on the other hand, would suggest that future rates are expected to reflect recovery of these costs. When equation (1) is estimated, results (not reported) indicate that the coefficient on TOTALSC is significantly negative for each year (mean coefficient = −0.097; mean t-statistic = −4.41), suggesting that, on average, investors expect that around 10% of total utility stranded costs will be borne by utility shareholders. The coefficient on TOTALSC is significantly greater than −1 for all years (mean t-statistic = 45.9).11

Skinner [1996] notes that correlated omitted variable biases may limit inferences that can be drawn from coefficient estimates derived from models such as equation (1). In particular, he points to the fact that equation (1) can be viewed as a variant of the Feltham-Ohlson valuation model, where current earnings proxy for expected future abnormal earnings. To the extent that the variables of interest (stranded cost estimates, in this instance) are correlated with the firm’s future growth prospects, omitting the latter from the specification is likely to introduce bias and obscure inferences that can be drawn from the model. Skinner suggests estimating the model in differences rather than levels, and testing the robustness of results to alternative specifications as a means of alleviating concerns about correlated omitted variable biases. We do not have GENSC or CONSC estimates for 1994 or 1996, so we cannot estimate equation (1) in differences.12

Even if the coefficient of TOTALSC is driven by correlated omitted variable biases, we do not expect the coefficients on its components to be consistently negatively associated with equity value, unless these components are similarly correlated with the variables possibly omitted from the estimation.

10 After the deflation, the White [1980] test does not reject the null hypothesis of homoskedasticity at conventional levels. Inferences are similar using White or OLS standard errors.

11 Outlier analyses indicate that the results are not driven by outlier firms. Also, condition indices are small (less than five), so the diagnostic procedures of Belsley et al. [1980] suggest that multicollinearity is not likely to be a significant problem affecting coefficient estimates.

12 RDI produced an earlier set of stranded cost estimates in 1993. These estimates were produced using different methodologies and assumptions and are not directly comparable to the 1995 estimates. Nonetheless, as a robustness check, we re-estimated equation (1) with each variable capturing the difference between 1995 and 1993 values. Results are slightly weaker, but essentially comparable.
TABLE 2
Estimates of the Regression of the Market Value of Common Equity on the Book Value of Equity, Net Income and Stranded Cost Estimates, Broken Down by Components, for a Sample of 95 Electric Utilities over the Period 1994–96. We First Identify All Firms Listed on Compustat Under SIC Code 4911 or 4931 (124 Firms). We Are Left with a Sample of 95 Firms After Eliminating Utilities Incorporated Outside the US (11) and Those with Missing Data (18).

\[ MVE_t = \alpha_0 + \alpha_1 BVE_t + \alpha_2 NI_t + \alpha_3 \text{REGASS}_t + \alpha_4 \text{GENSC}_t + \alpha_5 \text{CONSC}_t + \epsilon_t \]

All Variables Are Deflated by the Number of Common Shares Outstanding at the End of Fiscal Year t (Data Obtained from Compustat Annual Tapes) to Reduce Heteroskedasticity

<table>
<thead>
<tr>
<th></th>
<th>1994 Coefficient Estimate (t-statistic)</th>
<th>1995 Coefficient Estimate (t-statistic)</th>
<th>1996 Coefficient Estimate (t-statistic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \alpha_0 )</td>
<td>6.270 (4.68)</td>
<td>6.578 (3.46)</td>
<td>3.474 (1.52)</td>
</tr>
<tr>
<td>BVE</td>
<td>0.557 (5.72)</td>
<td>0.938 (8.83)</td>
<td>0.910 (8.46)</td>
</tr>
<tr>
<td>NI</td>
<td>3.457 (4.71)</td>
<td>1.651 (2.45)</td>
<td>2.546 (3.58)</td>
</tr>
<tr>
<td>REGASS</td>
<td>-0.245 (-4.79)</td>
<td>-0.229 (-3.05)</td>
<td>-0.232 (-2.72)</td>
</tr>
<tr>
<td>GENSC</td>
<td>-0.106 (-2.81)</td>
<td>-0.195 (-4.01)</td>
<td>-0.240 (-4.71)</td>
</tr>
<tr>
<td>CONSC</td>
<td>-0.024 (-1.32)</td>
<td>-0.039 (-1.52)</td>
<td>-0.063 (-2.19)</td>
</tr>
<tr>
<td>( R^2 )</td>
<td>0.75</td>
<td>0.68</td>
<td>0.60</td>
</tr>
</tbody>
</table>

\( MVE_t \) = market value of common equity at the end of fiscal year t; \( BVE_t \) = book value of common equity at the end of fiscal year t; \( NI_t \) = net income for fiscal year t; \( \text{REGASS}_t \) = regulatory assets at the end fiscal year t; \( \text{GENSC}_t \) = book value less estimates of market value of electric utility generating plant assets at the end of 1995; \( \text{CONSC}_t \) = estimates of present value of net future costs arising from long-term power purchase contracts measured at the end of 1995.

We obtain data on \( MVE, BVE \) and \( NI \) from the 1994, 1995 and 1996 Compustat annual tapes, and data on \( \text{REGASS} \) from utility FERC Form-1 filings at the end of fiscal 1994, 1995 and 1996. Resource Data International provided us with \( \text{GENSC} \) and \( \text{CONSC} \) estimates.

We estimate equation (2) where TOTALSC is replaced by its individual components.

\[ MVE_t = \alpha_0 + \alpha_1 BVE_t + \alpha_2 NI_t + \alpha_3 \text{REGASS}_t + \alpha_4 \text{GENSC}_t + \alpha_5 \text{CONSC}_t + \epsilon_t \]

(2)

Table 2 indicates that the coefficients of \( \text{REGASS} \) and \( \text{GENSC} \) are significantly negative in all years. The coefficient on \( \text{CONSC} \) is only statistically less than zero at the 5% level or better in 1996. The negative coefficients on \( \text{REGASS} \) and \( \text{GENSC} \) capture the extent to which, on average, investors discount the excess of book over market value of these assets. Since \( \text{REGASS} \) is directly included in utility assets, the negative coefficient on \( \text{REGASS} \) can be interpreted also as the extent to which investors discount regulatory assets more heavily than they do other assets. The heavier discounting of regulatory assets is consistent with results documented in Loudder et al. [1996] and Blacconiere et al. [1999].
Table 3
Our Sample Consists of 95 Electric Utilities. We First Identify All Firms Listed on Compustat Under SIC Code 4911 or 4931 (124 Firms). We Are Left with a Sample of 95 Firms After Eliminating Utilities Incorporated Outside the U.S. (11) and Those with Missing Data (18).

<table>
<thead>
<tr>
<th></th>
<th>BE</th>
<th>NI</th>
<th>REGASS</th>
<th>GENSC</th>
<th>CONSC</th>
<th>TOTALSC</th>
</tr>
</thead>
<tbody>
<tr>
<td>MVE</td>
<td>0.71</td>
<td>0.59</td>
<td>−0.22</td>
<td>−0.22</td>
<td>0.10</td>
<td>−0.08</td>
</tr>
<tr>
<td></td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.03)</td>
<td>(0.03)</td>
<td>(0.34)</td>
<td>(0.44)</td>
</tr>
<tr>
<td>BVE</td>
<td>0.57</td>
<td>0.11</td>
<td>0.13</td>
<td>0.24</td>
<td>0.28</td>
<td></td>
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<td></td>
<td>(0.00)</td>
<td>(0.30)</td>
<td>(0.19)</td>
<td>(0.02)</td>
<td>(0.01)</td>
<td></td>
</tr>
<tr>
<td>NI</td>
<td>−0.14</td>
<td>−0.04</td>
<td>0.18</td>
<td>0.09</td>
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<tr>
<td></td>
<td>(0.16)</td>
<td>(0.74)</td>
<td>(0.08)</td>
<td>(0.38)</td>
<td></td>
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</tr>
<tr>
<td>REGASS</td>
<td>0.28</td>
<td>0.05</td>
<td>0.45</td>
<td></td>
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<tr>
<td></td>
<td>(0.01)</td>
<td>(0.66)</td>
<td>(0.00)</td>
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<tr>
<td>GENSC</td>
<td>−0.03</td>
<td>0.50</td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td>(0.80)</td>
<td>(0.00)</td>
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<tr>
<td>CONSC</td>
<td>0.81</td>
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<td></td>
<td>(0.00)</td>
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</table>

MVE = market value of common equity at the end of fiscal 1995; BVE = book value of common equity at the end of fiscal 1995; NI = net income for fiscal year 1995; REGASS = regulatory assets at the end of 1995; GENSC = book value less estimates of market value of electric utility generating plant assets at the end of 1995; CONSC = estimates of present value of net future costs arising from long-term power purchase contracts measured at the end of 1995; TOTALSC = REGASS + GENSC + CONSC.

We obtain data on MVE, BVE and ASSET from the 1995 Compustat annual tape, and data on REGASS from utility FERC Form-1 filings at the end of fiscal 1995. Resource Data International provided us with GENSC and CONSC estimates.

The coefficients of REGASS and GENSC are comparable in magnitude, but the coefficient of CONSC is considerably smaller in absolute terms. This may indicate that investors expect that there is a higher probability that stranded costs associated with contractual commitments will be recoverable. Since a major portion of these uneconomical contractual commitments can be traced to mandatory power purchases from non-utility generators after the passage of PURPA, utilities may have a stronger case for the recovery of these costs.13

Table 3 indicates that REGASS and GENSC are both negatively correlated with the market value of firm equity, but CONSC is not. Moreover, while there is a significantly positive correlation between REGASS and GENSC (i.e., those firms with greater stranded costs associated with generating assets also tend to have more regulatory assets), CONSC is not correlated with either REGASS or GENSC. It therefore does not seem likely that CONSC,

13 For instance Allegheny Power states: “Stranded costs should be divided into two categories: costs which were incurred because of legislative or regulatory mandates and costs which resulted from business decisions made by utilities. Costs which resulted from decisions to build high capital-cost generating facilities fall into the second category and should be held to a strict standard, with intensive mitigation efforts required as a condition of recovery.” (1996 Annual Report, p. 11)
GENSC and REGASS will all be influenced in a similar manner by variables possibly omitted from the estimated model.

3.2 POTENTIAL FACTORS AFFECTING MARKET VALUATION OF STRANDED COST ESTIMATES

Our analysis so far assumes that investor valuation of potential stranded costs is identical across utilities. It is, however, likely that investors have different expectations about how these costs will be shared between ratepayers and utility shareholders based on the characteristics of the jurisdiction in which each utility functions. Regulatory actions often differ significantly across states. If investors expect that the factors that gave rise to regulatory differences in the past will also affect regulatory decisions on the stranded cost issue, stranded cost valuations will differ systematically based on jurisdictional characteristics.

3.2.1. Regulatory Climate. Regulators can have a significant impact on how much of the costs associated with the transition to deregulation are borne by electric utility shareholders. As discussed earlier, state public utility commissions are generally perceived to differ widely in how “favorable” they are to the utilities in their jurisdiction.

More than 20 Wall Street investment and research firms produce periodic ratings of the regulatory environment associated with different commissions, assigning the highest ratings to those most favorable to utilities. We operationalize regulatory climate using regulatory quality ratings produced by Merrill Lynch, Duff & Phelps, and Goldman, Sachs & Co. for 1993. All ratings are on a scale of 1 to 5. Merrill Lynch uses 5 to denote the highest quality rating, while Duff & Phelps and Goldman Sachs use 1 for the highest rating. For consistency, we recode the ratings of Duff & Phelps and Goldman Sachs, so that 5 (1) denotes the highest (lowest) ratings for all analysts, and then average ratings across analysts.\(^{14}\)

3.2.2. Regional Restructuring Activity. The transition to deregulation has been proceeding at varying speeds in different states, though the pressure to restructure has been mounting. The impact of deregulation pace on stranded cost recoveries is an empirical question. On the one hand, industry analysts conjecture that electric utility shareholder interests are likely to be better protected in instances where deregulation is accomplished through well-deliberated measures at the local level rather than by default. This suggests that investor assessment of potential shareholder losses will be moderated by the pace at which states are formulating

\(^{14}\) We code \(+(-)\) qualifiers by adding (subtracting) 0.25 from the numerical rating, in order to differentiate between consecutive ratings associated with opposite qualifiers (i.e., a 1\(^+\) and a 2\(^-\) both lie between 1 and 2). For utilities operating in more than one jurisdiction, we compute the regulatory climate variable as the revenue-weighted jurisdictional average.
restructuring plans to assist the transition to deregulation. Conversely, utilities might be in a better position to recover more of their regulatory assets and stranded generating costs (through depreciation expenses recovered in rates) in jurisdictions that are delaying the move toward deregulation.

We capture restructuring activity through a variable that ranges from 1 to 5 based on the relative speed at which the jurisdiction(s) in which each utility operates is taking action to restructure the industry (1 = fastest; 5 = slowest).\textsuperscript{15} We rely on data provided by Regulatory Research Associates ("Electric Industry Restructuring," Special Report, April 29, 1996) to measure this variable.

3.2.3. The Influence of Regulatory Climate and Restructuring Pace on Stranded Cost Valuation. We measure the influence of regulatory climate and restructuring pace on stranded cost valuation by estimating the following equation:

\[
MVE_t = \alpha_0 + \alpha_1 BVE_t + \alpha_2 NI_t + \alpha_3 TOTALSC_t + \alpha_4 TOTALSC_t \times REG + \alpha_5 TOTALSC_t \times PACE + \varepsilon_t \tag{3}
\]

where REG (PACE) is a dichotomous variable that takes on the value 1 if the utility’s regulatory climate (restructuring pace) falls in the upper half of its distribution. We set REG and PACE equal to 1 for utilities operating under more favorable regulators, and for jurisdictions that are managing the deregulation process more actively. All other variables are as defined in equation (1). Results from the estimation of equation (3) (not reported) show that both regulatory climate and restructuring pace favorably influence investor assessment of total stranded cost recoveries. These results are consistent for 1994, 1995, and 1996.\textsuperscript{16}

Next, we investigate whether REG and PACE influence each of the three components of TOTALSC: regulatory assets, stranded costs associated with generating assets, and stranded costs arising from uneconomical contractual commitments. We re-estimate equation (3), replacing TOTALSC by REGASS, GENSC and CONSC. Results are reported in table 4.

The coefficient of REGASS is significantly less than zero at the 0.05 level or better in 1994 and 1995. Regulatory climate emerges as a significant factor influencing the valuation of REGASS. Investors value regulatory assets

\textsuperscript{15} For utilities that operate in more than one jurisdiction, we compute restructuring pace as computed as the revenue-weighted average of the restructuring speed in the various jurisdictions in which they operate.

\textsuperscript{16} Market valuation of stranded costs could depend on the interaction between PACE and REG, i.e., more active restructuring management may have a more positive impact on equity valuation if it occurs in jurisdictions where regulators have traditionally been more favorable to utilities. To test this, we add to equation (3) the interactive term TOTALSC \times REG \times PACE. The coefficient on this additional explanatory variable is not statistically different from zero.
The Impact of Regulatory Climate and Deregulation Pace on the Valuation of Stranded Cost Components. Our Sample Consists of 95 Electric Utilities over the Period 1994–96. We First Identify All Firms Listed on Compustat Under SIC Code 4911 or 4931 (124 Firms). We Are Left with a Sample of 95 Firms After Eliminating Utilities Incorporated Outside the U.S. (11) and Those with Missing Data (18).

\[
MVE_t = \alpha_0 + \alpha_1 \text{BVE}_t + \alpha_2 \text{NI}_t + \alpha_3 \text{REGASS}_t + \alpha_4 \text{REGASS}_t \times \text{REG}
\]

\[
+ \alpha_5 \text{REGASS}_t \times \text{PACE} + \alpha_6 \text{GENSC}_t + \alpha_7 \text{GENSC}_t \times \text{REG} + \alpha_8 \text{GENSC}_t \times \text{PACE}
\]

\[
+ \alpha_9 \text{CONSC}_t + \alpha_{10} \text{CONSC}_t \times \text{REG} + \alpha_{11} \text{CONSC}_t \times \text{PACE} + \epsilon_t
\]

All Variables Are Deflated by the Number of Common Shares Outstanding at the End of Fiscal Year \(t\) (Data Obtained from Compustat Annual Tapes) to Reduce Heteroskedasticity

<table>
<thead>
<tr>
<th>Year</th>
<th>Coefficient (t-statistic)</th>
<th>Coefficient (t-statistic)</th>
<th>Coefficient (t-statistic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>5.753 (4.20)</td>
<td>4.548 (2.43)</td>
<td>3.926 (1.65)</td>
</tr>
<tr>
<td>1995</td>
<td>0.610 (5.70)</td>
<td>1.056 (9.58)</td>
<td>0.912 (7.99)</td>
</tr>
<tr>
<td>1996</td>
<td>3.240 (4.22)</td>
<td>1.409 (2.11)</td>
<td>2.223 (3.04)</td>
</tr>
<tr>
<td></td>
<td>-0.442 (-3.46)</td>
<td>-0.350 (-2.03)</td>
<td>-0.132 (-0.68)</td>
</tr>
<tr>
<td></td>
<td>0.315 (2.31)</td>
<td>0.467 (2.52)</td>
<td>0.193 (0.87)</td>
</tr>
<tr>
<td></td>
<td>0.161 (1.23)</td>
<td>-0.012 (-0.07)</td>
<td>-0.157 (-0.78)</td>
</tr>
<tr>
<td></td>
<td>-0.119 (-1.74)</td>
<td>-0.257 (-2.81)</td>
<td>-0.283 (-2.80)</td>
</tr>
<tr>
<td></td>
<td>0.033 (0.44)</td>
<td>0.015 (0.15)</td>
<td>0.027 (0.24)</td>
</tr>
<tr>
<td></td>
<td>-0.045 (-0.54)</td>
<td>0.086 (0.76)</td>
<td>0.037 (0.30)</td>
</tr>
<tr>
<td></td>
<td>-0.062 (-0.77)</td>
<td>-0.305 (-2.89)</td>
<td>-0.267 (-2.18)</td>
</tr>
<tr>
<td></td>
<td>0.038 (1.09)</td>
<td>0.057 (1.22)</td>
<td>0.090 (1.44)</td>
</tr>
<tr>
<td></td>
<td>0.012 (0.16)</td>
<td>0.243 (2.46)</td>
<td>0.151 (1.31)</td>
</tr>
<tr>
<td></td>
<td>(R^2 = 0.78)</td>
<td>(R^2 = 0.74)</td>
<td>(R^2 = 0.64)</td>
</tr>
</tbody>
</table>

\(MVE\) = market value of common equity at the end of fiscal year \(t\); \(BVE\) = book value of common equity at the end of fiscal year \(t\); \(NI\) = net income for fiscal year \(t\); \(REGASS\) = regulatory assets at the end of fiscal year \(t\); \(GENSC\) = book value less estimates of market value of electric utility generating plant assets at the end of 1995; \(CONSC\) = estimates of present value of net future costs arising from long-term power purchase contracts measured at the end of 1995; \(REG\) is a dichotomous variable that takes on the value of 1 for utilities operating in jurisdictions whose regulators’ favorable predispositions to utilities are rated as being above the median value and 0 for utilities in less favorable jurisdictions; \(PACE\) is a dichotomous variable that takes on the value of 1 for utilities in jurisdictions that have taken significant steps toward industry deregulation and 0 for other utilities.

We obtain data on MVE, BVE and NI from the 1994, 1995 and 1996 Compustat annual tapes, and data on REGASS from utility FERC Form-1 filings at the end of fiscal 1994, 1995, and 1996. Resource Data International provided us with GENSC and CONSC estimates. We use data provided by Merrill Lynch, Duff & Phelps, and Goldman Sachs & Co. to compute REG, and data provided by Regulatory Research Associated to measure PACE.

less negatively for utilities operating in jurisdictions characterized by more favorable regulators. However, the influence of PACE on REGASS is not significantly different from zero. After controlling for regulatory climate, the progress toward deregulation made by the utility’s jurisdiction does not appear to affect investor assessments of the recoverability of regulatory assets in future rates.\(^{17}\)

The coefficient of GENSC is significantly less than zero at the 0.05 level or better in all estimations. Neither REG nor PACE influences the valuation of

\(^{17}\) However, our focus on individual jurisdictions is a potential limitation of our analysis. Stranded cost valuation may well be affected by restructuring activities in surrounding states.
GENSC. Investors appear to believe that utility shareholders will, under all circumstances, bear some of the costs associated with uneconomical business decisions to build high-cost generating facilities.

The coefficient of CONSC is significantly less than zero at the 0.05 level or better in 1995 and 1996. The influence of REG and PACE on CONSC is generally significantly different from zero only at the 0.10 level at best in most yearly regressions.

3.3 THE ASSOCIATION BETWEEN STRANDED COST VALUATION AND UTILITY DISCLOSURES

We examined the 1996 financial statements of all 95 investor-owned electric utilities in our sample for disclosures on potential stranded costs or related write-offs in compliance with SFAS 121. Only five utilities wrote-off assets in compliance with the Statement of Financial Accounting Standards No. 121 (SFAS 121), “Accounting for the Impairment of Long-lived Assets and Long-lived Assets to be Disposed of” (Financial Accounting Standards Board [1995]). The magnitudes of the write-offs were generally insignificant in comparison to our stranded cost estimates. It is likely that utilities are reluctant to write off assets because the write-off may reduce the probability of recovery.

The uncertainties surrounding recoveries of stranded costs in rates would appear to require that utilities disclose these potentially large future costs in their financial statements in line with Statement of Position No. 94–6, “Disclosure of Certain Significant Risks and Uncertainties” (American Institute of Certified Public Accountants [1994]). However, we find that only 18 utilities (less than 20% of our sample) make quantitative disclosures about potential stranded costs in their 1996 Annual Reports or Forms 10-K, and more than 45% do not even discuss the possibility of asset value loss in the future.

Table 5 shows that the 18 utilities that disclose quantitative estimates have significantly higher stranded costs than the non-disclosers in the sample. It is possible that these firms make more extensive disclosures because they run a high risk of non-recovery of stranded costs. Conversely, disclosing firms may be more optimistic about their recovery prospects. We investigate the relation between stranded cost valuation and the decision to make quantitative stranded cost disclosures in financial statements by estimating the following model:

\[ MVE_t = \alpha_0 + \alpha_1 BVE_t + \alpha_2 NI_t + \alpha_3 \text{TOTALSC}_t + \alpha_4 \text{TOTALSC}_t \times \text{DISCL} \]  

(4)

Estimation results, presented in table 6, indicate that \( \alpha_3 \) is significantly negative, but \( \alpha_4 \) is significantly positive at the end of fiscal 1996. This implies that stranded costs are less negatively valued for disclosers. However, we also find a similar result at the end of 1994 and 1995, the two years preceding disclosure, suggesting that it is not the disclosure of stranded
**Table 5**


<table>
<thead>
<tr>
<th></th>
<th>Mean for disclosers (n = 18)</th>
<th>Mean for non-disclosers (n = 77)</th>
<th>Wilcoxon Test for mean equality. The test statistic Z is drawn from a standard normal distribution. Two-tailed p-values reported</th>
<th>Kruskal-Wallis Test for mean equality. The test statistic is drawn from a chi-square distribution with one degree of freedom</th>
</tr>
</thead>
<tbody>
<tr>
<td>BVE</td>
<td>2431.1</td>
<td>2057.8</td>
<td>( Z = 0.44 )  ( p = 0.66 ) ( \chi^2 = 0.20 ) ( p = 0.66 )</td>
<td></td>
</tr>
<tr>
<td>REGASS</td>
<td>779.0</td>
<td>526.9</td>
<td>( Z = 1.67 )  ( p = 0.09 ) ( \chi^2 = 2.79 ) ( p = 0.09 )</td>
<td></td>
</tr>
<tr>
<td>GENSC</td>
<td>558.4</td>
<td>215.4</td>
<td>( Z = 0.97 )  ( p = 0.33 ) ( \chi^2 = 0.96 ) ( p = 0.33 )</td>
<td></td>
</tr>
<tr>
<td>CONSC</td>
<td>1516.5</td>
<td>332.5</td>
<td>( Z = 1.14 )  ( p = 0.25 ) ( \chi^2 = 1.32 ) ( p = 0.25 )</td>
<td></td>
</tr>
<tr>
<td>TOTALSC</td>
<td>2854.0</td>
<td>1074.8</td>
<td>( Z = 2.78 )  ( p = 0.01 ) ( \chi^2 = 7.74 ) ( p = 0.01 )</td>
<td></td>
</tr>
</tbody>
</table>

BVE = book value of common equity at the end of fiscal 1995; REGASS = regulatory assets at the end of 1995; GENSC = book value less estimates of market value of electric utility generating plant assets at the end of 1995; CONSC = estimates of present value of net future costs arising from long-term power purchase contracts measured at the end of 1995; TOTALSC = REGASS + GENSC + CONSC.

We obtain data on BVE from the 1995 Compustat annual tape, and data on REGASS from utility FERC Form-1 filings at the end of fiscal 1995. Resource Data International provided us with GENSC and CONSC estimates.

Costs in financial statements per se that impacts positively on investor valuation.

DISCL may proxy for other firm characteristics that have a favorable influence on investor assessment of stranded cost recoverability. We focus on two factors that we have argued are likely to influence investor valuation of potential utility stranded costs: REG and PACE. When we investigate the correlation between DISCL, REG, and PACE, results (not reported) indicate that DISCL, while uncorrelated with REG, is significantly correlated with PACE. Disclosers operate in jurisdictions that are moving faster toward deregulation.18 Perhaps firms disclose stranded cost estimates because better information about these potential future costs is available in these jurisdictions. However, stranded cost estimates are derived from publicly available information, and industry analysts (such as RDI and Moody’s) had utility-specific estimates of potential stranded costs computed as early as end-1993. Our results suggest that firms’ decisions not to disclose stranded cost estimates are associated with uncertainty about recoverability rather than uncertainty about measurement.

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18 We re-estimate equation (4), adding the interaction of TOTALSC with REG and with PACE as incremental explanatory variables. \( \alpha_4 \) continues to be significantly positive at the 0.05 level.
Association Between Disclosure Choice and the Valuation of Stranded Costs. Our Sample Consists of 95 Electric Utilities over the Period 1994–96. We First Identify All Firms Listed on Compustat Under SIC Code 4911 or 4931 (124 Firms). We Are Left with a Sample of 95 Firms After Eliminating Utilities Incorporated Outside the U.S. (11) and Those with Missing Data (18).

\[ MVE_t = \alpha_0 + \alpha_1 BVE_t + \alpha_2 NI_t + \alpha_3 TOTALSC_t + \alpha_4 TOTALSC \ast DISC_t + \epsilon_t \]

All Variables Are Deflated by the Number of Common Shares Outstanding at the End of Fiscal Year \( t \) (Data Obtained from Compustat Annual Tapes) to Reduce Heteroskedasticity

<table>
<thead>
<tr>
<th>Year</th>
<th>1994</th>
<th>1995</th>
<th>1996</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coefficient Estimate (t-statistic)</td>
<td>Coefficient Estimate (t-statistic)</td>
<td>Coefficient Estimate (t-statistic)</td>
<td></td>
</tr>
<tr>
<td>( \alpha_0 )</td>
<td>5.038 (3.67)</td>
<td>4.795 (2.52)</td>
<td>4.579 (1.98)</td>
</tr>
<tr>
<td>BVE</td>
<td>0.472 (4.92)</td>
<td>0.920 (8.62)</td>
<td>0.883 (8.22)</td>
</tr>
<tr>
<td>NI</td>
<td>4.546 (6.34)</td>
<td>2.508 (3.78)</td>
<td>2.321 (3.19)</td>
</tr>
<tr>
<td>TOTALSC</td>
<td>-0.115 (-5.67)</td>
<td>-0.158 (-5.64)</td>
<td>-0.197 (-5.93)</td>
</tr>
<tr>
<td>TOTALSC \ast DISC</td>
<td>0.103 (3.77)</td>
<td>0.128 (3.39)</td>
<td>0.130 (3.13)</td>
</tr>
<tr>
<td>( R^2 )</td>
<td>0.74</td>
<td>0.67</td>
<td>0.59</td>
</tr>
</tbody>
</table>

\( MVE_t \) = market value of common equity at the end of fiscal year \( t \); \( BVE_t \) = book value of common equity at the end of fiscal year \( t \); \( NI_t \) = net income for fiscal year \( t \); \( TOTALSC_t \) = REGASS + GENSC + CONSC; \( REGASS_t \) = regulatory assets at the end of fiscal year \( t \); \( GENSC_t \) = book value less estimates of market value of electric utility generating plant assets at the end of 1995; \( CONSC_t \) = estimates of present value of net future costs arising from long-term power purchase contracts measured at the end of 1995; \( DISC \) is a dichotomous variable that takes on the value of 1 for utilities that have disclosed quantitative estimates of potential stranded costs in their 1996 financial statements; and 0 for other utilities.


4. Conclusion

The electric utility industry is in the process of deregulation, with most states moving toward fully competitive markets within the next five years. Many fixed investments and contractual commitments made by electric utilities under an implicit regulatory guarantee of recovery may be unrecoverable in deregulated markets. Whether these stranded costs (estimated to be between $150 to $300 billion) will be borne by electric utility shareholders or passed on to ratepayers is an unresolved issue.

We find a negative association between firm value and our estimates of utility-specific stranded costs, suggesting that investors expect at least a portion of these costs to be borne by utility shareholders. However, our results indicate that investors assign a higher probability of recovery to stranded costs that arose as a result of regulatory mandate than to those stemming from voluntary utility business decisions. Jurisdictional characteristics such as regulatory climate or deregulation initiatives do not influence the valuation of stranded costs associated with utility generating investments.
Our results indicate that there is a less negative association between stranded cost estimates and firm values for the sub-sample of utilities that choose to make more extensive stranded cost disclosures. This relation is also in evidence, however, for the two years preceding the disclosure year, suggesting that the more favorable market valuation is not prompted by stranded cost disclosure per se. We find that voluntary disclosers operate in jurisdictions that are moving faster toward deregulation and have more clearly established stranded cost recovery mechanisms. It appears that both stranded cost valuation and the decision to disclose these costs in financial statements are prompted by reduction in uncertainty about stranded cost recoverability.

APPENDIX

This Appendix describes the methodology used by Resource Data International (RDI) to compute estimates of stranded cost associated with utilities’ generating assets and contractual commitments.

RDI uses an analytical model called Inter-Regional Electric Market Model (IREMM) to develop energy price forecasts for more than 200 different market areas. Using forecasts of energy price, capacity price, capacity factor and availability, RDI computes the stream of revenues associated with each generating unit belonging to each utility. If a utility reports in FORM EIA-411 that a unit will be retired within the next ten years, RDI uses this retirement date to determine the duration of projected revenues. For nuclear units, RDI assumes that the retirement date will coincide with the expiration date of its operating license. RDI assumes that all other units will continue to operate through 2035, unless they are unable to recover operating costs through revenues.

Next, RDI forecasts the expected costs of each generating asset. Cost forecasts include operation and maintenance expenses (variable as well as fixed) and ownership costs such as income and property taxes. RDI computes annual net cash flows for each generating unit as the difference between forecasted revenues and costs, and estimates the market value of each generating plant as the present value of these projected future net cash flows, using a discount rate of 12%. This discount rate is based on an assumed capital structure comprising 40% debt and 60% equity, with the cost of debt assumed to be 8% and that of equity 15%. The difference between the book value and the estimated market value of each generating unit captures the stranded cost component associated with that asset. RDI then aggregates these generating stranded cost estimates to the company level.

For power purchase contracts, RDI computes stranded costs by multiplying the actual amount of energy to be purchased under the contract by the difference between the forecast price of electricity each year and the corresponding contractual rate for the year. RDI uses actual contract expiration dates where available, and assumes an expiration date of 2005 in other instances. It uses a discount rate of 12% to arrive at present value estimates.
RDI analyzes data on a contract-by-contract basis and then aggregates data to the company level.

REFERENCES


FINANCIAL ACCOUNTING STANDARDS BOARD. *FASB Statement No. 121: Accounting for the Impairment of Long-lived Assets and for Long-lived Assets to be Disposed of.* Norwalk, Conn.: FASB, 1995.


