Stranded Assets and the Transition to Competition

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In a competitive market, price is set not by average cost but by the equilibrium in the market. The difference between the competitive market value and the regulated book value is the value of the potential stranded asset. For many companies, the value of the total potential stranded assets is larger than the book equity of the firm.

- **Power Plants.** In the competitive world, the price of the power from expensive power plants is determined in the wholesale market for the commodity energy output. In a market like that of many regions of the U.S., where there is excess capacity and many available sources of power supply, the market price may be relatively low, too low to support the historical capital costs of the existing power plants.

- **NUG Contracts.** Nationwide, non-utility generators (NUGs) have responded vigorously to the PURPA legislation of 1978 and to subsequent state legislative and regulatory initiatives. The majority of new generation built in recent years or currently planned new capacity is from NUGs. Many of these contracts include prices that are well above the marginal cost of energy in the current market.

- **Other Regulatory Assets.** Regulatory assets are accounting concepts; their value rests on the strength of a state regulatory decision to allow future recovery of certain costs from ratepayers. The assets are on the books, but require regulation to retain their value. Examples include capitalized demand-side management expenditures, deferred taxes and capitalization of retirement obligations.
One basis for a normative theory of compensation after legal transition emphasizes the incentive effects on investment. Should investors be compensated for the effects of the transition, or should they bear the risk of gains and losses?

- Under the assumptions of a beneficial change in government policy and no independent cost to the credibility of government, the general case suggests that compensation would create inefficient incentives and should not be provided as a matter of policy.

- The risks should be matched with the rewards. If investors are not taxed for gains, but are compensated for losses, the imbalance of incentives would lead to overinvestment.

- The basic analysis and argument is similar to the case of moral hazard and insurance. Should the government provide free or subsidized flood insurance for people who choose to live in flood plains?

- Exceptions may be made in transitions to restrain government behavior or preserve government credibility. This leads to the common practice of "grandfathering" many new tax provisions or other regulatory requirements.

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REGULATORY TRANSITION

Compensation

The regulatory transition in the electric utility industry differs from the general case in a number of important conditions. Different facts can produce a different answer.

- **Symmetry.** For many of the assets at risk, there is an inherent lack of the symmetry assumed in the general case. Under regulation, customers receive the benefits of low cost assets. Should customers be able to elect to avoid the high cost assets? In the presence of asymmetric cost disallowances, the cost of capital theory is inconsistent with cost of service regulation.

- **Choice.** The general case assumes that investors have discretion regarding investment commitments. But with the obligation to serve, managers of regulated companies may not have discretion, and only incremental investors have the choice to invest new funds.

- **Contracts.** Implicit and explicit promises have been made by regulators to accept customer responsibility but defer recovery of certain costs. These regulatory assets can be recovered only through monopoly activities under regulatory control and approval.

- **Ownership.** Under regulation, legal ownership may differ from the ownership of the beneficial interest in the assets. Customers, or regulators acting on their behalf, may be seen as the "owners" consistent with the theory of legal transition and compensation.
The allocation of sunk costs has important equity effects—cutting up the pie—but the allocation can induce economic responses that have costs in that they actually change the size of the pie. Everyone shares an interest in expanding the size of the pie. Examples of real costs from the allocation of sunk costs include:

- **Transition Overhead Costs.** The costs of this meeting and the many others underway.

- **Price Distortions.** With excess capacity and sunk costs allocated to customer energy prices, average costs will be higher than marginal costs. With prices too high, there is too little consumption of electricity.

- **Bankruptcy and Financial Health.** Managers faced with the potential bankruptcy will go to great lengths to avoid the final step, often at the expense of efficiency and quality of service. Some argue that the after effects of bankruptcy will leave financially weaker companies who cannot provide efficient electricity services.

- **Credibility of Government.** Providing stable rules for the market is an important responsibility of government. A pattern of random or capricious change undermines credibility for all markets, including the electricity industry.

- **Transition Cooperation.** Creating an efficient, open access market that allows for increased competition in electricity is not easy and will require the cooperation of regulators, customers, new entrants and existing utilities. If the allocation of sunk costs is not settled, strategic behavior will both the transition process and destination.
REGULATORY TRANSITION

In part, the public policy motivation for developing a transition strategy depends on the potential magnitude of these costs of allocating sunk costs. Preliminary review suggests the priorities:

- **Transition Overhead Costs.** Meetings and other overheads are comparatively cheap.

- **Price Distortions.** With relatively low elasticities of demand given the existing stock of electricity-using equipment, the short-term price distortions are small. This is a frequent result in economic analyses of the "deadweight" loss of short-term mispricing.

- **Bankruptcy and Financial Health.** Pre-bankruptcy costs could be large, but post-bankruptcy costs tend to be small or non-existent. This is a common argument for quick reorganization of troubled companies.

- **Credibility of Government.** The potential impact is large, but there is a familiar public goods problem: the independent effect on electricity is likely to be difficult to estimate.

- **Transition Cooperation.** The experience in railroads and other industries suggest that this cost could be very large. Managers at many companies are "mesmerized" by the stranded asset problem. Reallocation of the pie may be far more important to each individual interest group, even though collectively the disputes will delay and constrain the benefits of a more efficient electricity market.
The recovery of sunk investments that are stranded assets is a key issue in the transition to a competitive generation market.

- If stranded asset costs are large and recovery is not envisioned, any smooth transition to a deregulated generation market would be thwarted and costs increased.

- The transition to a competitive generation market is not a zero sum game. The greater the costs savings that accompany the transition to competition, the easier the transition to a competitive market will be for customers, regulators, and utilities. If operating costs fall, rates can be lower than under current regulatory projections.

- Recovery of sunk costs need not forestall a transition to a more competitive market. The goal here is to design recovery mechanisms that are compatible with competition.

- If stranded costs are to be recovered in a more competitive market, the costs must be collected through a monopoly segment. The most direct mechanism is through access fees for connection to the wires, or a functional equivalent.
Decisions on the allocation of sunk costs will be affected in part by perceptions of equity based on past commitments. The choice of strategy will depend on this history.

- **Explicit Agreements.** Settlements in past cases deciding on the allocation of disputed costs. Should these agreements be reopened? Or would equity principles dictate that the allocation has been accepted?

- **Mandated Programs.** For investments required by law or regulatory directive, the decision makers are not the shareholders.

- **Implicit Agreements.** Under the obligation to serve and the "regulatory bargain," prudent investment costs should be allowed in regulated rates. There will be problems of "characterization: Did the regulator make me do it? Or did I make the regulator make me do it?"

- **Nuclear Industry.** The special problems of the nuclear industry, with high and uncertain long-term costs, may call for separate treatment. Separate treatment of the nuclear industry has precedent in the case of the U.K.

- **Discretionary Investments.** Unregulated investments made "at risk" will be at risk.
RECOVERY OF SUNK INVESTMENTS

There is a large range of possible strategies. In general, practical approaches will be hybrids that include many components.

- **Cold Turkey.** If government could act unilaterally and there were no costs of shifting costs, a quick transition would be possible, with no consideration for the allocation of sunk costs. There would be large regulatory and financial writedowns.

- **Delay.** If competitive pressures can be contained, delay of implementation of a more efficient, open access electricity market would allow gradual working off of excess costs and excess capacity. This may require a long wait before competition is allowed.

- **Surcharges.** The residual monopolies of the "wires" businesses will continue to be regulated. Ultimately these monopoly segments are the only place to collect surcharges that allow for full open access competition for wholesale commodity electricity and simultaneous recovery of sunk costs that are above market. There are two broad approaches to identifying and implementing surcharges.

  **Bottom Up.** Following the accounting conventions of traditional cost-of-service regulation, adjust depreciation rates, revalue assets, reassign costs, etc.

  **Top Down.** Start with the acceptable final rate to customers and then separate the cost of commodity energy from all other costs for the final "pipe." Apply some combination of price cap and cost of service over the transition.
Although the precise structure of a future deregulated generation market is uncertain, we expect that its structure will include many unregulated generators, a regulated grid company and pool company, and regulated distribution or line companies. Utility power sales to at least some of the retail customers will be at risk in such a market.
ELECTRICITY MARKET

The degree of unbundling and competition, whether wholesale or retail, is a policy choice. In designing a competitive market, the focus should be on providing nondiscriminatory, equal access to the essential facilities.

Fully Unbundled Competitive Electricity Market

Fully Unbundled

Fuelco Fuelco Fuelco Fuelco
Plantco Plantco Plantco Plantco
Selco Selco Selco Selco

Fully Unbundled

Fuelco Fuelco Fuelco Fuelco
Plantco Plantco Plantco Plantco
Selco Selco Selco Selco

Poolco

Gridco

Gridco

Poolco

Fully Unbundled

Brokeco Brokeco Brokeco Brokeco
Buyco Buyco Buyco Buyco

Fully Unbundled

Brokeco Brokeco Brokeco Brokeco
Buyco Buyco Buyco Buyco

Fully Unbundled

Lineco Lineco Lineco Lineco

Fully Unbundled

Lineco Lineco Lineco Lineco

Fully Unbundled

Retailco Retailco Retailco Retailco

Fully Unbundled

Retailco Retailco Retailco Retailco

Fully Unbundled

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Fully Unbundled

Retailco Retailco Retailco Retailco

Regulated

Regulated

Regulated

Regulated

Providing a wide range of educational opportunities for students to pursue excellence and develop
A fully unbundled competitive market would allow entry into virtually every competitive segment of the industry. Only the Pool and the Wires would remain as regulated businesses.

<table>
<thead>
<tr>
<th>Segment</th>
<th>Function</th>
<th>Structure</th>
<th>Regulation</th>
<th>Jurisdiction</th>
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<tbody>
<tr>
<td>Fuelco</td>
<td>Purchases fuels for generating plants</td>
<td>Many sellers and many buyers in regional and national markets</td>
<td>Competitive market</td>
<td>Unregulated</td>
</tr>
<tr>
<td>Plantco</td>
<td>Operates and maintains generating plants</td>
<td>Many participants with existing plants and no barriers to entry</td>
<td>Competitive market</td>
<td>Unregulated</td>
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<tr>
<td>Sellco</td>
<td>Markets long-term power supply compensation contracts</td>
<td>Many participants and no barriers to entry</td>
<td>Competitive market</td>
<td>Unregulated</td>
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<td>Poolco</td>
<td>Dispatches generating plants and operates a short-term market with long-term transmission compensation contracts</td>
<td>System control interactions require monopoly operation or close coordination</td>
<td>Regulated to provide open access, comparable service, and cost recovery</td>
<td>Regional or national</td>
</tr>
<tr>
<td>Gridco</td>
<td>Constructs and maintains transmission wires</td>
<td>Network interaction and scale economies call for monopoly provision and entry barriers</td>
<td>Regulated to provide non-discriminatory connections, comparable service, and cost recovery</td>
<td>Regional or state</td>
</tr>
<tr>
<td>Brokeco</td>
<td>Matches buyers and sellers as brokers of long-term power supply and transmission compensation contracts</td>
<td>Many potential participants and no barriers to entry</td>
<td>Competitive market</td>
<td>Unregulated</td>
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<tr>
<td>Buyco</td>
<td>Purchases long-term power supply and transmission compensation contracts for final customers</td>
<td>Many potential participants and no barriers to entry</td>
<td>Competitive market</td>
<td>Unregulated</td>
</tr>
<tr>
<td>Lineco</td>
<td>Constructs and maintains distribution wires</td>
<td>Network interactions and scale economies call for monopoly provision and entry barriers</td>
<td>Regulated to provide non-discriminatory connections, comparable service, and cost recovery</td>
<td>State</td>
</tr>
<tr>
<td>Retailco</td>
<td>Provides services to final customers, including connection and billing</td>
<td>Many potential entrants and no barriers to entry</td>
<td>Competitive market</td>
<td>Unregulated</td>
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RECOVERY OF SUNK INVESTMENTS

The magnitude of the stranded asset problem depends on the market mechanisms adopted or retained in the transition to a competitive market. Of particular importance are:

- **Reserve requirements** -- Excess reserve margins keep inefficient capacity in operation and depress energy prices below the competitive level. The present system of reserve requirements exacerbates the problem of recovering fixed costs in a competitive market. This problem will not be solved by demand growth.

- **Transmission pricing** -- Non-market-based pricing of constrained transmission interfaces will ensure that utility generators bear the costs of the out-of-merit generation required to meet demand.

- **Mandated purchases** -- Mandates for the regulated utility to purchase power above the market price creates additional stranded asset costs.

- **Environmental policies** -- If environmental goals are met through requirements imposed on utilities rather than through charges on all generators that flow through into spot prices, then utility costs will rise but market prices will not.

- **Obligation to serve** -- If utilities are required to serve at-risk customers at other than market prices, future stranded assets will be created.

- **Social programs** -- These costs will not be recoverable if they are imposed on the utility generator rather than included in the wires charge.
RECOVERY OF SUNK INVESTMENTS

Approaches to measuring stranded asset costs may be characterized along three broad dimensions:

- **Bottom-Up or Top-Down Approach**
  
  **Bottom-Up:** Calculates the amount of each investment that would be stranded.
  
  **Top-Down:** Calculates the aggregate difference between the regulated rate and the market rate for a utility or group of utilities.

- **Ex Ante or Ex Post Approach**
  
  **Ex Ante:** Determines the magnitude of the stranded assets before the transition to competition.
  
  **Ex Post:** Determines which assets turn out to be stranded once competition is present.

- **Administrative or Market Approach**
  
  **Administrative:** Bases the determination of asset values on administrative estimates.
  
  **Market:** Bases the determination of asset values on market valuations.
RECOVERY OF SUNK INVESTMENTS

These broad approaches can be arranged in various combinations to yield alternative approaches to measuring stranded asset costs.

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<th>Administrative Valuation</th>
<th>Market Valuation</th>
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<td>Ex Ante</td>
<td>Ex Post</td>
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<tr>
<td>BOTTOM-UP</td>
<td>Asset-by-asset value projections</td>
<td>Assets valued after the transition</td>
</tr>
<tr>
<td>TOP-DOWN</td>
<td>Projection of regulated rate by customer class</td>
<td>After-the-fact adjustments of regulated prices</td>
</tr>
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The alternative approaches differ in:

- Analytical requirements for forecasting and estimation.
- Risk allocation of market uncertainties.
- Restructuring requirements.
- Regulatory exposure.
RECOVERY OF SUNK INVESTMENTS

BOTTOM-UP

The Bottom-Up approach attempts to estimate the portion of the rate base valuation of each asset that will not be recovered in a competitive market.

While this is a direct approach to the problem, it would require a major effort to implement. It would require:

- Forecasting loads and fuel costs for many years.
- Estimating the market price of power (for each hour in each year).
- Estimating how often each generating unit would run each year.
- Estimating when contract power would be supplied.
- Estimating the value of assets that are worth more, as well as less than their rate base valuation.

Furthermore, the fundamental approach of identifying specific assets that might be stranded may increase the chance that they will be stranded.
RECOVERY OF SUNK INVESTMENTS

TOP-DOWN

The essence of the Top-Down or "Moskovitz" approach is that stranded asset costs can be measured by developing ex ante estimates of the following factors:

Sales volume * (current regulated rates - market price of energy - cost-based T&D charges)

The "current regulated rates" are the rates that would be paid absent any change in regulation.

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Top-Down Approach Values Stranded Assets
As Difference Between Market And Regulated Rate

![Graph showing the relationship between stranded asset value, regulated rate, market price, and T&D charge over time.](image)
RECOVERY OF SUNK INVESTMENTS

TOP-DOWN

The premise for this approach is that within a competitive market a utility will be able to recover the market price of energy plus cost-based T&D charges from all customers; thus, it is the excess of current embedded costs over this competitive price that measures the stranded asset costs. While the Moskovitz approach has considerable appeal, every element of the formula raises conceptual and practical problems that would need to be carefully addressed. For example:

- The present value of the stranded assets may differ from that indicated by an extrapolation of current market conditions.
- The "option" value of the assets is not accounted for in the standard revenue requirement calculation for the assets.
- The ex ante estimates by rate class depend on the projections for the many uncertainties or assumptions about market structure.
RECOVERY OF SUNK INVESTMENTS

EX POST METHODS

The ex post measurement methods apply either the Top-Down or Bottom-Up approach after the fact rather than ex ante. Instead of trying to predict sales volume and the market price of energy ex ante, the ex post approaches would measure stranded asset costs based on actual sales volume and market prices following the transition to competition:

- Either the Top-Down or Bottom-Up approach could be applied ex post, for example, through a formula that adjusts the wires charge to reflect differences between the actual and forecast market price of power.

- These approaches could also be applied ex post by calculating the wires charge for each year based on prior year market prices and sales.

These approaches, therefore, avoid the very difficult forecasting problems for sales volume and energy prices associated either with the Top-Down or Bottom-Up ex ante approaches. Ex post adjustments also serve to reallocate risk.
RECOVERY OF SUNK INVESTMENTS

EX POST METHODS

Nevertheless, these approaches also have significant limitations.

- It is still necessary to estimate avoidable operating costs ex ante or the utility generator would have little incentive to reduce avoidable costs.

- Much of the apparatus of regulation for the existing assets would be required, achieving little in regulatory process improvements.

- If utility generation is sold or divested, providing compensation to the utility based on unanticipated events that change the value of the sold or divested generation assets may not be allowed.

- Ad hoc ex post adjustments may simply create windfall profits or losses and complex systems risk recreating the existing regulatory system.

- Leaving the measurement and collection of stranded asset costs for determination after the transition to competition raises the risk that no such costs would be recovered.
RECOVERY OF SUNK INVESTMENTS

MARKET VALUATION APPROACH

The market value approach is based on the observation that stranded assets are basically assets whose rate base value exceeds their market value. Rather than regulators or utilities trying to value the individual assets through administrative methods, deregulated assets can be valued by markets. Thus:

Current rate base - market value of deregulated assets = T&D assets + stranded assets

The market value of the deregulated assets can be established in a market either through individual asset sales or through stock market valuation of spun-off generating companies.

By relying on market forces to provide aggregate valuations, this approach avoids most of the complex forecasting problems inherent in the Bottom-Up and Top-Down approaches based on administrative valuation. Furthermore, market forces not only take account of the value of the assets in the more likely scenarios but take account of the possible option value of some types of assets.
RECOVERY OF SUNK INVESTMENTS

MARKET VALUATION APPROACH

A principal drawback of the market valuation approach would be the substantial restructuring required of the vertically integrated utilities if there is no other reason to separate the major assets.

However, the market value approach may be compatible with both regulatory and business strategies. Utilities may choose to separate generation into an unregulated company. Or the requirements of comparable open access may lead to a regulatory separation that would make sale or spin off a small further step. In these cases, the process of transfer of ownership and market valuation provides an opportunity for measurement of the market view of the magnitude of stranded assets.

The market value approach could be applied ex ante by deducting the market value of the divested assets at the time of divestiture from the regulated rate base. The remaining rate base would be recovered in wires charges.

The market value approach could be applied ex post by deferring valuation of spun-off assets until after the transition to competition or including contingent payments based on market price levels.
Once quantified, there are many related approaches to collecting stranded asset costs in wires charges by the "Disco" or the "Lineco." These approaches include:

- **Sunk Charges Based on Historic Use.** This is the pure "lump sum" transfer that has assigns the sunk cost responsibility to customers for an immediate payment. Attractive in its economic properties, implementation will be a problem.

- **Fixed Access Fees.** A close approximation of the sunk cost charge would convert the stranded asset recovery into a fixed charge over time for access to the wires. Except for those who would disconnect, perhaps to leave the service territory, this recovery method provides the right economic incentives.

- **Volumetric Surcharge.** For customers with either minimal options on the customer side of the meter, or options selected for further incentives (e.g., DSM), volumetric surcharges may provide a workable means of collection rather than a fixed charge.

- **Exit Fees.** A variant of the sunk charge, but exit fees would apply selectively to those who wish to take advantage of customer choice; presumably with a different form of charge for customers who remain as franchise customers. This approach will face challenges of discrimination.

- **Back Up Rates.** An alternative similar to the fixed access charge but designed developed in connection with the backup service. This approach could be equivalent to the access charge, but is vulnerable to charges being set at the incremental cost of backup, which may have no connection to the requirements for sunk cost recovery.
RECOVERY OF SUNK INVESTMENTS

The many approaches for cost recovery could be made compatible with a competitive market and the associated business strategies. For example, one combination might include:

- **Spinoff Existing Generation.** Take the difference between the sales price or market value of the assets and the book value and assign this as the "stranded asset" cost that remains with the wires company and is collected as a fixed access charge over a transition period.

- **Keep Other Regulatory Assets with the Wires Company.** For "assets" that have no market value, other than through regulation, keep the assets on the books of the wires company and include the costs in constructing a combination of a fixed charge for connection to the wires and a volumetric charge for use of the wires.

- **Collect Social Costs as Fees on Wires.** For all programs designed to support social goals not met by the market--low income subsidies, environmental subsidies for renewables, DSM programs--collect the costs through surcharges on the wires that apply to all users of the system.

- **Apply a Cost Sharing Program for Economic Development.** Discounts for access fees could be permitted, when necessary to retain or acquire new customers in a territory, with a sharing of the sunk cost revenue recovery.

- **Open Access.** Provide open access for customers to obtain power in the market, arranging their own bilateral long-term transactions with generators or aggregators. The wire charges are independent of the source of the commodity energy.