Energy Cost Adjustment Mechanisms (ECAM)

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Rules and Goals for this Workshop

- "ECAM" used today generically. Any mechanism that adjusts the energy costs a utility may recover from customers between rate cases.
- Focus is on ECAM as used by a vertically integrated utility.
- Not an assessment of ECAM proposed by Rocky Mountain Power to the PSC.
- Opinions are those of presenter and not NRRI. (My "bias" is public interest cost-effectiveness)

ECAMs Pros and Cons

- Pros: Allows utility to recover the costs associated with volatile fuel prices
  - Costs (prices) difficult to forecast
  - Prices largely out of utility's control
  - Fuel costs a major expense and changes have large effect on earnings
  - Improves credit worthiness and decreases cost of capital
- Cons: Alignment of private interests with public interest
  - May not be needed
  - Utility no longer financially responsible for energy costs, except via prudence review
  - Price signals can be misaligned when ECAM allocated across the board
- Depends on conditions and design
  - One size does not fit all
  - Details

Regulatory Concepts

- Sliding scale of rates
  - Rates adjust through a surcharge between rate cases based upon changes from base assumptions to actual costs incurred.
  - Rates may move either up or down (symmetric)
- ECAMs not “commission made rates”
  - Require reconciliation to ensure dollar for dollar recovery of allowed change
  - Opportunity for prudence reviews after cost incurred
- Does ECAM align private interest of utility and customers with the public interest?
- Does ECAM achieve desired balance between price stability, accurate price signals and least costs?

The Classic Formula

- ECAM = ((actual costs for the period-base costs for the period) + (over or under collections from previous periods))/sales for the period to which the surcharge is applied

or

- $ECAM_1 = ((A_0 - B_0) + (E_{-1}))/S_1$
- Lots of periods and lags
- May need to be grossed up for revenue taxes
- Productivity adjustments may be added

ECAM - Example

- See Handout 1
- Note difference between generation and sales. Line loses.
- First calculated base rate (used shorthand $/mWh for fuel price rather than heat rate and cents/mmBtu).
- Period 1 charges $4.84/mWh. Prices, coal output and sales are all up.
- Under collection of $36.48 applied to Period 2 over 100 mWh.
- Period 2, actual sales less than forecasted (under collections not fully recovered). Prices still higher than forecasted. Total under recovery now $58.02. Surcharge based on 105 mWh sales forecast is $0.5526.

Need for ECAM

- Widely used by utilities in unrestructured states
- Can energy costs be reasonably forecasted and recovered through base rates?
  - Price volatility
  - Fuel mix
  - Demand volatility
- What is effect on utility financial situation (materiality)?
- Benefits to consumers

Major Issues

- What is included?
- What is adjusted?
- How are prices measured?
- How are costs allocated?
- How frequently are rates adjusted?
- How is the surcharge posted on customers' bills?
- How does the Commission monitor the ECAM?

What is Included?

- Cost of fuel – always included (subject to productivity or prudence adjustments)
- Purchased power
  - Energy versus capacity
  - Net sales
  - Economic power versus long-term purchased power
  - Renewable energy
- Cost of hedges
- The kitchen sink

Cost of Fuel

- Cost has two components. Price x Quantity.
- Fuel or energy clauses initially implemented to recover change in fuel (oil) prices.
- Current concerns about price of cleaner coal
- Full pass-through design also recovers changes in quantity (e.g., changes in availability, heat rate, load)

Purchased Power – In or Out

- "Energy" clauses versus "fuel" clauses
- Fuel clauses once dominated
- Oil-based utilities saw cost of purchased power costs (economic dispatch, shared-savings transactions) increasing between rate cases
- Moved to energy clauses when concerned about cost of energy purchases increasing between rate cases.
- Short-term purchases typically in (e.g., economic dispatch or peak capacity)
- Long-term purchases (base load) sometimes (typically) in ECAM
  - Purchased power in ECAM provides more earnings stability to utility and increses misalignment between productivity and profits
  - Purchased power in ECAM provides customers with margins associated with wholesale sales from plants for which they have paid
  - Inverse is true

Purchased Power – the Components

- Energy: always included if resource included
- Capacity: not an “energy” cost, so sometimes excluded
- Renewable energy: Long and short-term purchases often recovered. Looked at as separate mandate and costs should be funded.
- Profits from sales: Issue of what happens to sales over base rates. Short-term revenues usually included. Long-term sometimes treated through base rates.
- Economic power versus long-term purchased power: Short-term typically included. Long-term purchases or sales still unresolved. (See recent article).

Long-Term Purchases and Sales

- Should purchase be a straight pass-though or recovered through base rates?
  - Contract terms
  - Profit potential
  - Predictability – need for surcharge adjustments
- Who gets net revenues from long-term sales
  - Utility – make the best deal
  - Customers – paid for plant
- Recent NRRI paper on topic by presenter
  - Aligning a Utility's Interests with the Public Interest in Cost Effective Purchased Power Transactions, April 6, 2009
  - http://www.nrri.org/pubs/electricity/NRRI_purchased_power_alignment_tools_apr09-05.pdf

Hedging Premiums

- Hedges are insurance and charge a premium
- Purpose of hedging (financial or physical) is cost stability or acceptibility ans not cost minimization
- Has regulator weighed-in on trade-off?
- Often implicitly included through physical hedges – e.g., long-term coal or nuclear fuel or purchased power contract
  - Hedge not isolated as with financial instruments
  - Implicit hedges exist when utility builds a power plant or purchases long-term power

The Kitchen Sink

- "Energy" clause often a sliding scale of rates with line item on bill
- Utilities or regulators may want to have only one adjustment clause appearing on bill.
- ECAM could be largest component. Tack on surcharges for:
  - Conservation funds
  - Environmental compliance investments
  - Emergency funding (e.g., storm damage)
  - Cost of fuel inventories
  - Infrastructure improvements
  - Decoupling adjustments
  - Taxes

What is adjusted

- Changes in price of included components
  - Core adjustment
  - Greatly outside utility's control (e.g., imported oil and fuel quality)
- Changes in energy mix
  - Driven by demand (may or may not be utility's control)
  - Changes in availability factor and heat rates (within utility's control)
  - Changes in purchased power delivery (contract issues that may be within utility's control)

Productivity Incentives

- Utility obligation to provide service at lowest reasonable cost
- Align utility's interest with public interest
  - Good regulation reduces police work but may increase work on standard setting
- What is in the utility's control?
- Safety – particular nuclear
- Sample of Designs
  - Price only
  - Heat rate targets
  - Base load availability factors
  - Dead bands and sharing
- Allocation of responsibility and cost between utility and ratepayers. How are shares defined (all, shares, steps, null zones)
- Some incentive mechanisms require production cost modeling or other analytical tools.

Productivity Example – Heat Rate Assumptions

- Utility and customers share difference from target heat rate for coal generation 50/50.
- Target heat rate of 9,000 Btu/kWh.

Productivity Example – Heat Rate Results

- See Handout #2.
- Utility and customers share in changes associated with coal plant heat rates.
  - Heat rate goes down (improves), surcharge decreases and opportunity for utility to profit increases.
  - Heat rate increases (worsens), surcharge increases and opportunity for utility to profit decreases.
- Utility buys better coal and gains. Not intent, as higher price is a pass through.
- How frequently is the target updated?

Productivity Example – Price Only Assumptions

- Surcharge only changes when price changes.
- Generation shares modified in same proportion as sales.
- All benefits and risks with utility on productivity.
- Requires production cost modeling to set.

Productivity Example – Price Only Results

- Utility responsible for changes in heat rate, availability and demand response.
- Surcharge higher in Period 1 than in Handout 1 because productivity gains in Handout 1 are retained by utility.
- Surcharge is lower in Period 2 than in Handout 1 because productivity losses are responsibility of utility.
- How frequently are the targets updated?

Limerick and Merchant Plants

- PECO Energy (now Exelon) was building Limerick Nuclear Station in 1980s.
- Unit's potential capacity factor major concern as to station's cost-effectiveness.
- PAPUC (post-TMI) established a productivity target
- Utility shared in benefits for all electricity produced over established range (also potential downward adjustment).
- Capacity factor increased from historical nuclear plant output in the 60-70% range to high 90s. Became most productive nuclear plant in the world.
- Similar gains achieved by utility subsidiaries when generation spun off (merchant plants).

How are prices measured?

- Actual prices
  - Inventory practices
    - LIFO uses most recent fuel purchases as price basis. Better price signals.
    - FIFO uses oldest sources of inventory first. Avoids outdated fuel supplies in rate based inventory.
    - Average price of inventory. Least volatile.
  - Without Inventories
    - Actual current (actually lagged) volatile
    - Rolling averages dampen volatility
    - Projected needs to be adjusted Projected prices for upcoming period
- Pure projection (may require outside experts)
  - Historical average (more mechanical)
    - May be updated frequently as rolling average
  - Actual with lag
    - A “one-month” average
    - May be volatile
- Best fit depends on frequency of surcharge and base adjustment

Allocation (1)

- Across the board
- Time of day
  - Requires data tracking. Put costs into on and off peak buckets.
  - Also requires TOD metering.
  - Can also be accomplished with base rate TOD differential.
- Seasonal
  - No extra metering required
  - Superior price signal to across the board
  - Can also be accomplished with base rate seasonal differential.

Allocation (2)

- Voltage level adjustments
  - Applicable to any allocation approach. Adjusts by class for transmission and distribution losses
  - Fair and accurate
- Real-time pricing
  - Requires matching of costs and usage hourly
  - Better price signal than across the board but not necessarily more effective than TOD and seasonal rates
- Special rates
  - Some special or non-cost based rates cannot be easily adjusted via such a surcharge
  - Should check to see if rate collects at least the utility's variable costs.

Frequency of Adjustment

- Typically, monthly or annually
- Monthly adjustment to surcharge
  - Frequent filings and rate changes
  - Lag between costs incurred and charged through ECAM about two months
  - If surcharge driven by seasonal changes in price, load or availability, lag may not produce a timely price signal.
  - If surcharge driven by long-term changes in fuel prices, surcharge provides “timely” update
- Annual adjustment to surcharge
  - Annual review of projected energy costs and set costs for year
  - Creates “mini” annual rate case
  - Filings should be at least quarterly for monitoring
  - Only trigger mechanism (actual significantly different from projected) can send price signal caused by changed conditions
  - Customers can budget and are not annoyed by frequent changes in rates

Billing

- ECAM often posted as separate line item on customer bill.
  - Creates transparency
  - May be required by statute or regulation
  - Commission may have discretion on how much to include in the base and how much to include in the surcharge (roll-in vs. roll-out)
  - Large surcharge creates customer service challenges

Monitoring

- Fuel purchase procedures
  - Pass through eliminates utility profit motive to "optimize" fuel or energy procurement process. Creates a policing responsibility for commission
  - Mix of contracts and hedges
  - Bid process
  - Affiliated interest purchases
- Tracking forecast versus actual
  - Utility should provide monthly or quarterly data even if surcharges change less frequently
  - Triggers

Auditing & Reconciliation

- "Two-finger" audits
- Alignment audits – commission policing
  - Fuel and energy procurement
  - Power plant efficiency
  - Demand management
- Reconciliation
  - Period
    - Ongoing
    - Annual
  - Interest rate

The Process

- Set the Base Rate
  - Commission may set base rates in rate case.
    - Then wait until next base rate case to readjust base.
    - May cause large surcharge.
  - Commission may be allowed to change base as part of periodic (e.g., annual) review. Work load on commission and others.
  - How frequently are base and targets adjusted?
- Track and update surcharge
- Audits
- Reconciliation

How Do ECAMs Interact with Energy Efficiency and Demand Response?

- Energy usage reductions at the peak or at other times typically offset the most expensive energy source needed at that time.
- When energy costs are fully recovered through an ECAM and the utility's sales and profits have been decoupled, the utility is financially insulated from cost-effective demand response and energy efficiency improvements.
- When energy costs are fully recovered through base rates and the utility's sales and profits have been decoupled, the utility can profit from cost-effective demand response and energy efficiency improvements.

Sales Change Example - Assumptions

- Case compares effect on utility of sales change with and without a full pass-through ECAM.

Sales Reduction Example - Results

- See Handout 4.
- Utility insulated from sales changes regarding energy costs with ECAM.
- Utility bottom-line increases when sales decrease and average energy costs decrease.
- Utility bottom-line decreases when sales increase and average energy costs decrease.

No Single Right Answer

- Whether to have an ECAM and how to design it depends on many factors
  - Fuel price volatility
  - Public policy on rate stability vs. rate minimization
  - Public policy on price signals
  - Metering technology and information systems
  - Energy mix (IRP)
  - Market structure
  - Utility financial condition and needs (credit worthiness)
  - Other rules and regualtions
  - Regulator's resources
- ECAM does not exist in a vacuum

Boonin's Absolute Don'ts

- Don't create a paradigm that misaligns the private interest from the public interest.
- Don't adjust through a surcharge what you can reasonably set in base rates.
- Don't penalize utilities for costs that are outside of their control.
- Don't muddle price signals to customers.
- Don't create a regulatory tool that creates regulatory needs outside of the regulator's capabilities.

Q&A