Why Not Build the Best Power System? – Problems with Ratebase-Indexe
Compensation

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Challenges in Planning a High-Renewable Power System

- Wind and solar power vary with the weather
- Planners must choose a least-cost combination of wind, solar, storage and conventional power plants to meet the load each day
- Must solve for many years simultaneously (evolution of power system)
slow renewable adoption; adds HECO-owned CC plant

more renewables; adds/retains HECO-owned thermal plants

HECO plants (gray) phase out; AES continues; more wind+solar
Utility-Owned Generation in the Plans

Installed capacity (MW)

PSIP Apr 2016

PSIP Dec 2016

SWITCH

- Combined Cycle
- IC Projects
- Kahe/Waiau/CIP
Production and Cost Comparison

7% offshore wind

25% biofuel

10% biofuel

Electricity Cost, Excluding T&D

PSIP Dec 2016

SWITCH
• Why would HEI prefer to keep running their thermal plants instead of switching to cheaper renewables?

• Because that’s what we pay them to do!
Summary

• HEI’s profits are pegged to the size of the ratebase (their assets used to serve customers)
• We don’t allow HEI to build new ratebased generators
• If HEI adopts the cheaper generation plan, they must retire existing generators, shrinking ratebase and profit
• HEI’s profits are maximized by sticking with the status quo
• Solution: peg utility profits to something else
Utility Rates of Return

• Utility dividends: around 4% of share price
  – This is what the market is willing to accept for investments in utilities

• Allowed rates of return on equity invested in ratebase: around 10%
Averch-Johnson Effect (1962)

If a regulated company is given a rate of return on equity that is above the market rate, they have an incentive to build too many assets or “gold plate” their assets.

Suppose a utility issues $100 million in common stock and invests the proceeds in ratebased assets:

- dividend yield will stay constant if they pay another $4M/year in dividends (4% of new stock value)
- income will rise by $10M/year (10% allowed return)
- company has $6M extra to enrich dividends; eventually stock price rises
“Competitive bidding, unless the Commission finds it to be unsuitable, is established as the required mechanism for acquiring a future generation resource or a block of generation resources.”

“Competitive bidding shall enable the comparison of a wide range of supply-side options, including PPAs, utility self-build options, turnkey arrangements (i.e., build and transfer options), and tolling arrangements where practical.”

– Hawaii Public Utilities Commission, 2006
Averch-Johnson Corollary

Current situation:
- HEI owns some generation assets which are receiving above-market return on equity
- New generation assets will mostly not receive above-market return
- Adding new generation assets will lead to retirement of old assets

Consequences:
- Any new generation will undermine HEI share price
  - IPP/DG: $100M of rate base is retired and proceeds are used to buy back stock; company can now pay out $4M less per year and maintain same 4% dividend yield; but income drops by $10M, so dividend yield must fall
  - Competitive utility-owned: $100M of existing assets at 10% are replaced by $100M of new assets at 4%; profits fall by $6M/year; dividend per share falls
- The utility’s best option is to preserve the status quo or seek waivers for new utility-owned generators
What’s Good for HEI May Not be Good for Customers

With above-market rates of return on equity, there is a conflict between the utility’s role as asset owner and planner

- Without competitive bidding rules:
  HEI does best by overinvesting in generation assets

- With competitive bidding rules:
  HEI does best by protecting legacy assets

- Neither of these are best for customers

We are paying HEI to preserve or expand the ratebase, not to do what’s best for customers
“It is difficult to get a man to understand something, when his salary depends upon his not understanding it!”

– Upton Sinclair, 1935

• HEI has come remarkably far, given that moving toward a better generation portfolio will reduce their earnings per share

• There is no reason they should be enthusiastic about going further
What to Do?

**Problem:** We pay HEI entirely based on the size of their ratebase, but we want them to be indifferent about the size of the ratebase (happy to shrink ratebase and use 3rd-party renewables and DG instead)

**Solution:** Pay them for something that is neutral or positive for ratepayers instead
A Better Way to Pay?

Reduce allowed return on equity from 10% to 4%

- Then changing the ratebase will not affect HEI’s dividend yield
  - $100M of rate base is retired and proceeds are used to buy back stock; earnings drop by $4M/year and earnings requirement drops by $4M/year; earnings per share are unchanged
- HEI will be indifferent between owning its own generation or buying power from IPPs or customers

Accumulate rest of profit in neutral or pro-customer ways

- **neutral**: give HEI 0.7¢ per kWh of power delivered (or avoided via DG or efficiency)
  - HEI maximizes sales (and profits) by choosing a least-cost plan
- **pro-renewable**: give HEI 3.5¢ per kWh of renewable power consumed in 2018, tapering down to 0.7¢ by 2045
- **other metrics and baselines**: reliability, carbon-intensity, average power price, stable power price…

HEI makes the same profit as before, but now it wants the same things as ratepayers (or at least regulators!)
Suppose Hawaii adopts a carbon tax…

- **Ratebase-based profit:** HEI’s most profitable option is to keep oil plants running and pass the tax through to ratepayers

- **Sales-based profit:** HEI can boost sales and profits by offering lower-cost renewable power
  - customer interests feedback to HEI’s interest
  - market-oriented incentives have the expected effect
Soundest way to calculate market-based return on equity is to look at what the market is paying for the returns they are getting (discounted cash flow model):

market rate of return = market dividend yield + expected dividend growth rate

- Dividend yield for utility stocks is about 4%
  - market buys shares, boosting stock price, until dividend yield reaches this level
- In utility rate of return studies, expected dividend growth rate is based on analyst estimates of 5–6%/year long-term dividend growth
  - implication is that investors buy utility stocks because they get 4% now and expect dividends per share to grow by 5–6% per year; so HEI must pay 9–10% to attract capital
  - utility dividends per share do not actually grow; analyst growth estimates evaporate as long-term becomes short-term
    - the market bids up HEI shares until the yield is 3.75%, even though they don’t expect dividends per share to grow; HEI dividend per share has been $0.31 for 74 quarters in a row
- Using an above-market rate blocks progress toward a cheaper, cleaner power system