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Out With The Old and In With the New:

Rate Design As Though Efficiency Matters

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Electricity Pricing Structures for the 21st Century

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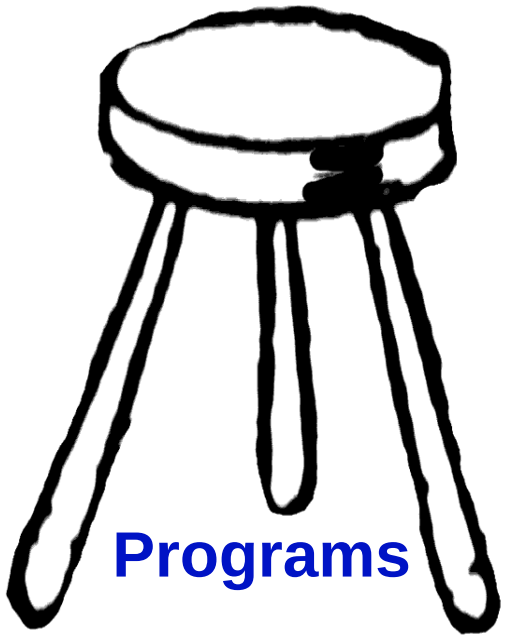
Achieving Clean Energy Goals

- We must achieve an 80% reduction in greenhouse gas emissions by 2050.

- Getting there requires dramatic changes in the production and utilization of electricity.
  - Renewable Resources
  - Energy Efficiency
  - Smart Technologies
  - Coal retirement

- Three principal tools
  - **Policies:** IRP, RPS, EEPS
  - **Programs:** EE Funding, Smart Grid
  - **Pricing:** Today's topic



Goals of Utility Pricing

- Recover costs equitably
- Encourage efficient use (and discourage inefficient use) of energy
- Simple enough to understand
- Align the customer's interest with the public interest
- Help achieve an economy-wide 80% reduction in CO_2 by 2050
- Provide for utility financial stability

Matrix of Rate Design Options By Customer Class

	Typical Current Rate Design	Inverted Rate	TOU Rate (Fixed time periods)	TOU plus Critical Peak Pricing	Baseline-Referenced RTP	Market Indexed RTP
Residential	Flat Energy Charge	Default (if kwh-only metering in place)	Default (if TOU meters in place)	*Optional*	*Not Available*	*Not Available*
Small Commercial 0 - 20 kw demand	Flat Energy Charge	*Not Available*	Default (if TOU meters in place)	*Optional*	*Not Available*	*Not Available*
Medium General Service 20 - 250 kw	Demand Charge --- Flat Energy Charge	*Not Available*	Default (until interval metering installed)	Default (after interval metering installed)	*Not Available*	*Not Available*
Large General Service 250 - 2,000 kw	Demand Charge --- Flat Energy Charge	*Not Available*	*Not Available*	Default	*Optional*	*Optional*
Extra Large General Service >2000 kw	Demand Charge --- Flat Energy Charge	*Not Available*	*Not Available*	*Not Available*	Customer Must Choose Between These Two Options	

Pricing: Don't Expect Too Much

- Economic theory holds that efficiency results from competition ONLY if the preconditions are met.

All goods are perfect substitutes	**No buyer or seller has market power**
Capital is fungible	**All buyers and sellers have perfect information**
No price discrimination	**Complete market transparency**
No barriers to entry or exit	**Markets at equilibrium: SRMC = LRIC = Price**

- Pricing affects both short-run behavior (consumption), and long-run behavior (investment) . **The latter is far more important, because it lasts decades.**

Pricing Do's and Don'ts

- Published in April, 2011
- Following up early next year with *Global Power Best Practices: Retail Pricing*
- Other publications on Decoupling, Smart Grid, and Energy Efficiency available at www.raponline.org

Pricing Do's: Residential

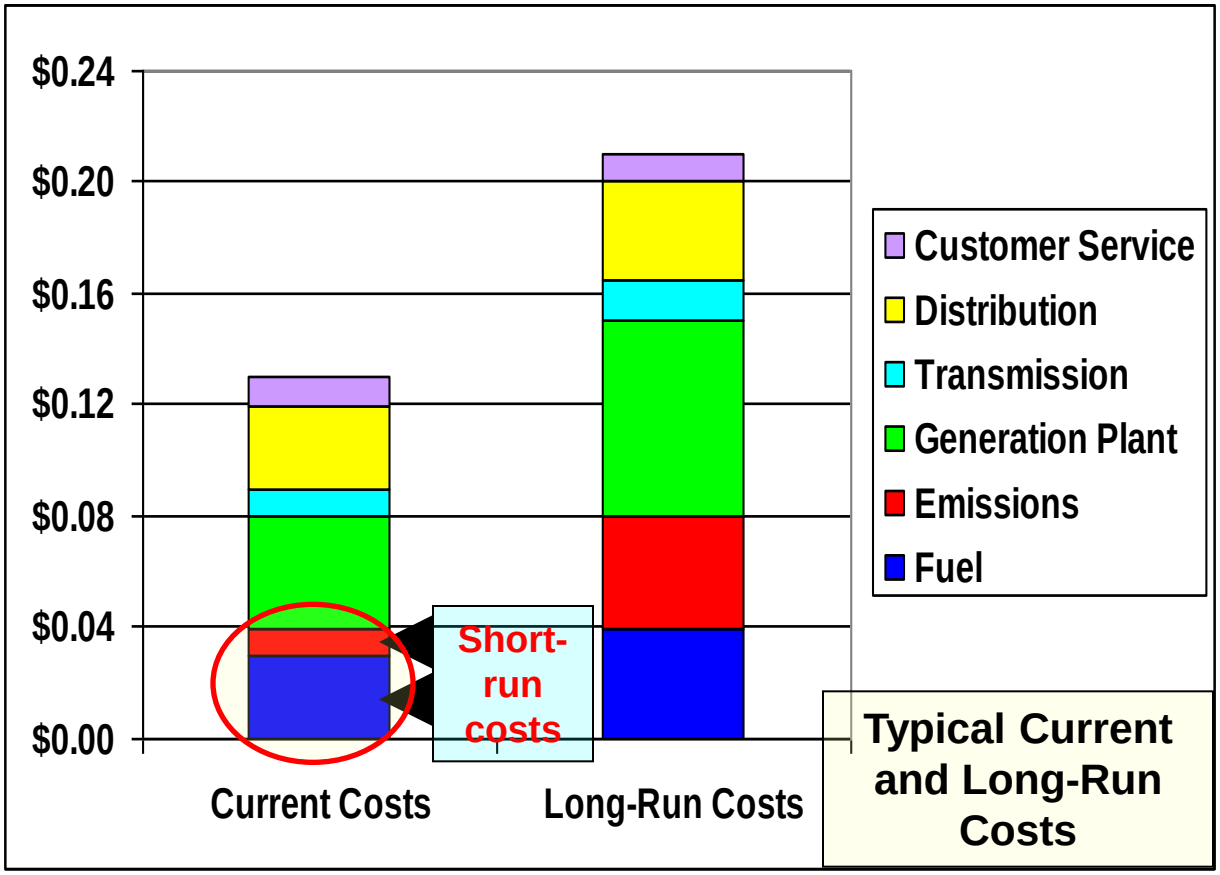
- **Do** focus on total system long-run marginal costs – including environmental costs.
- **Do** pursue inclining block residential rates (perhaps combined with TOU/CPP)
- **Do** let customers **choose** a more complex rate -- but make it EASY for them to respond
- **Do** print the rate (with all adders) on the bill so people know the total cost/kWh
- **Do** complement with efficiency programs
- **Do** consider revenue decoupling

Pricing Don'ts: Residential

- **Don't** raise the fixed charge to address earnings stability.
- **Don't** use declining blocks.
- **Don't** force consumers onto complex rates they cannot understand or respond to.
- **Don't** shift risks without addressing this in the cost of capital calculation.
- **Beware:** of the possible environmental impacts of load-shifting to off-peak

DO: Stay Focused On Long-Run Incremental Costs

- New power resources cost more than embedded resources.
- Customers make long-run decisions based on utility rates.
- Businesses make locational and investment decisions based on utility rates.



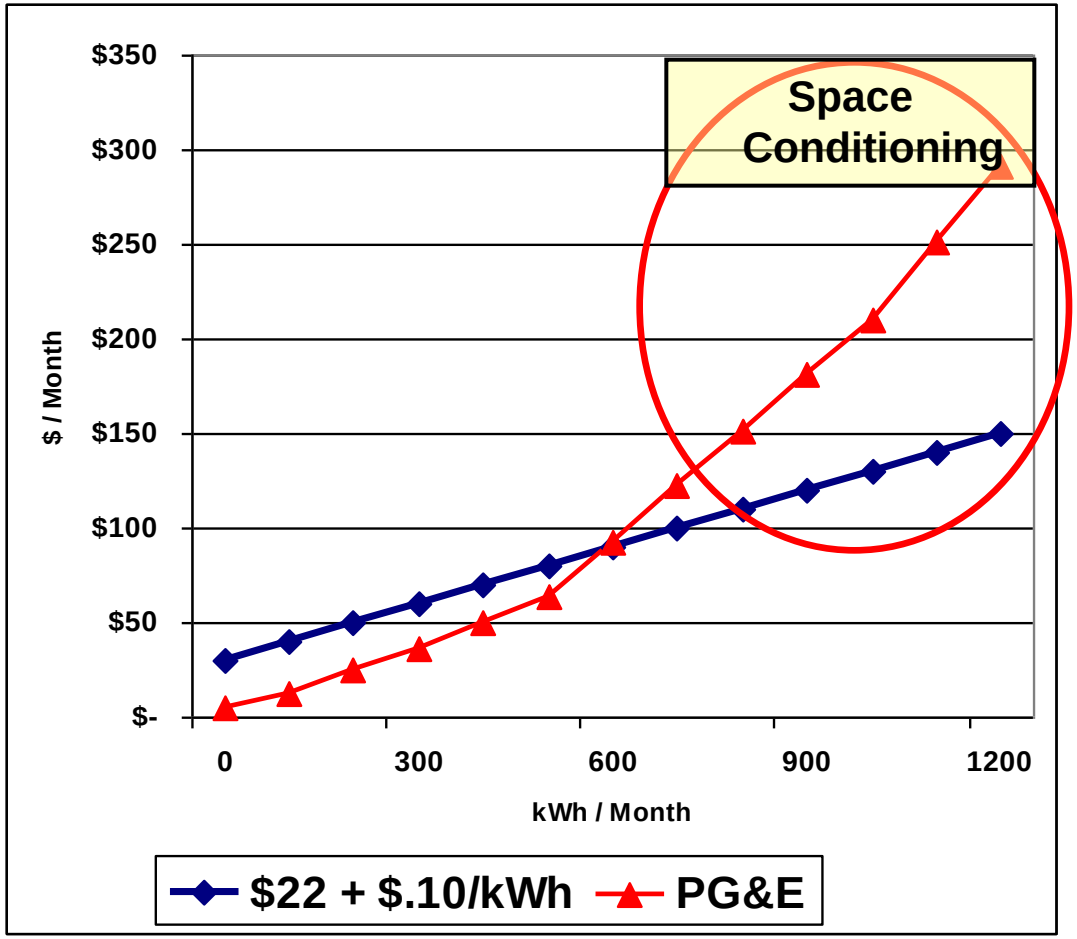
Inverted Rates Are Cost-Based

- **Resource Method**
  - Existing and older resources are lower-cost
  - New and additional resources are higher-cost
- **Load Factor Method**
  - Lights and Appliances (1st 500 kWh): High LF
  - Space Conditioning (over 1,000 kWh): Low LF

  - If residential consumers faced demand/energy rates, the cost of space conditioning would be much higher than typical flat residential rates.

DON'T: Raise Fixed Charges

- High fixed charges distort usage rates away from LRIC
- Discourage investment in efficiency
- In competitive markets there are typically no fixed charges.



Revenue Stabilization Is Essential

- Forward-looking, cost-based rates create a risk of revenue under-recovery if EE is effective or weather is mild.
  - Decoupling mechanisms resolve this with little customer impact.
    - Revenue per customer approaches (Maryland)
    - Attrition approaches (California)
    - Current vs. Accrual methods
- New RAP publication on Decoupling, July 2011, at **http://www.raponline.org/docs/RAP_RevenueRegulationandDecoupling_2011_04.pdf**

Both Of These Rates Generate The Same Average Revenue / kWh

High Fixed Charge			
Customer Charge		Per Month	$ 30.00
Energy Charge		All kWh	$ 0.100

Marginal Cost Based Endblock			
Customer Charge		Per Month	$ 5.00
Energy Charge		First 500 kWh	$ 0.100
		Next 500 kWh	$ 0.150
		Over 1,000 kWh	$ 0.180

Which rate makes it more likely a customer will invest in an Energy Star A/C Unit?

A Conceptual Utility Rate For The 21st Century

- Feed-In Tariffs and Net Metering are good tools for an infant industry, but are not cost-based for the long run.
- Once utilities have 5% - 50% of their power coming from customer-site distributed resources, a new approach is needed.
- Idea: **bi-directional distribution rate**

Note: this is a discussion idea, not a "RAP Proposal"

Bi-directional Distribution Rate

- Customer-specific costs are recovered from the customers causing them.
- **Customers pay for shared distribution facilities through a rate that applies in either direction.**
- Power supply rates are uniform TOU rates for power sold, or power purchased.
- A revenue stabilization mechanism is needed to assure utility financial strength.

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Example Bi-directional Rate

Rate Element	What it Covers	Example Rate
Customer Charge	Bimonthly metering and billing	$5.00
Facilities Charge	Customer-specific distribution facilities	$1/kw/month
Shared Distribution Facilities & Service	All other distribution costs	$.03/kWh coming or going
Power Supply (Competitive in Some States)	Generation / Transmission	$.08 off-peak; $.12 mid-peak; $.20 on-peak, $.50 Critical coming or going
Decoupling Adjustment	Revenue Stabilization	+ / - ~ $.003 / kWh

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Benefits of Bi-directional Distribution Rate

- Treats generating and non-generating customers equally
  - All users pay for all usage of the distribution network – down or up.
  - Distribution level generators are compensated for avoided transmission system costs
- TOU rate design is attractive to solar PV and Electric Vehicle owners
- Critical Period Pricing Option provides demand response capability and opportunity for EVs
- Decoupling assures financial stability for utility

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About RAP

The Regulatory Assistance Project (RAP) is a global non-profit team of experts that focuses on the long-term economic and environmental sustainability of the power and natural gas sectors. RAP has deep expertise in regulatory and market policies that:

- Promote economic efficiency
- Protect the environment
- Ensure system reliability
- Allocate system costs and benefits fairly among all users

Learn more about RAP at www.raponline.org

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