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Getting the Full Value Stream from GIWH

ACEEE Hot Water Forum Portland, Oregon

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Recognizing the Full Value of Energy Efficiency

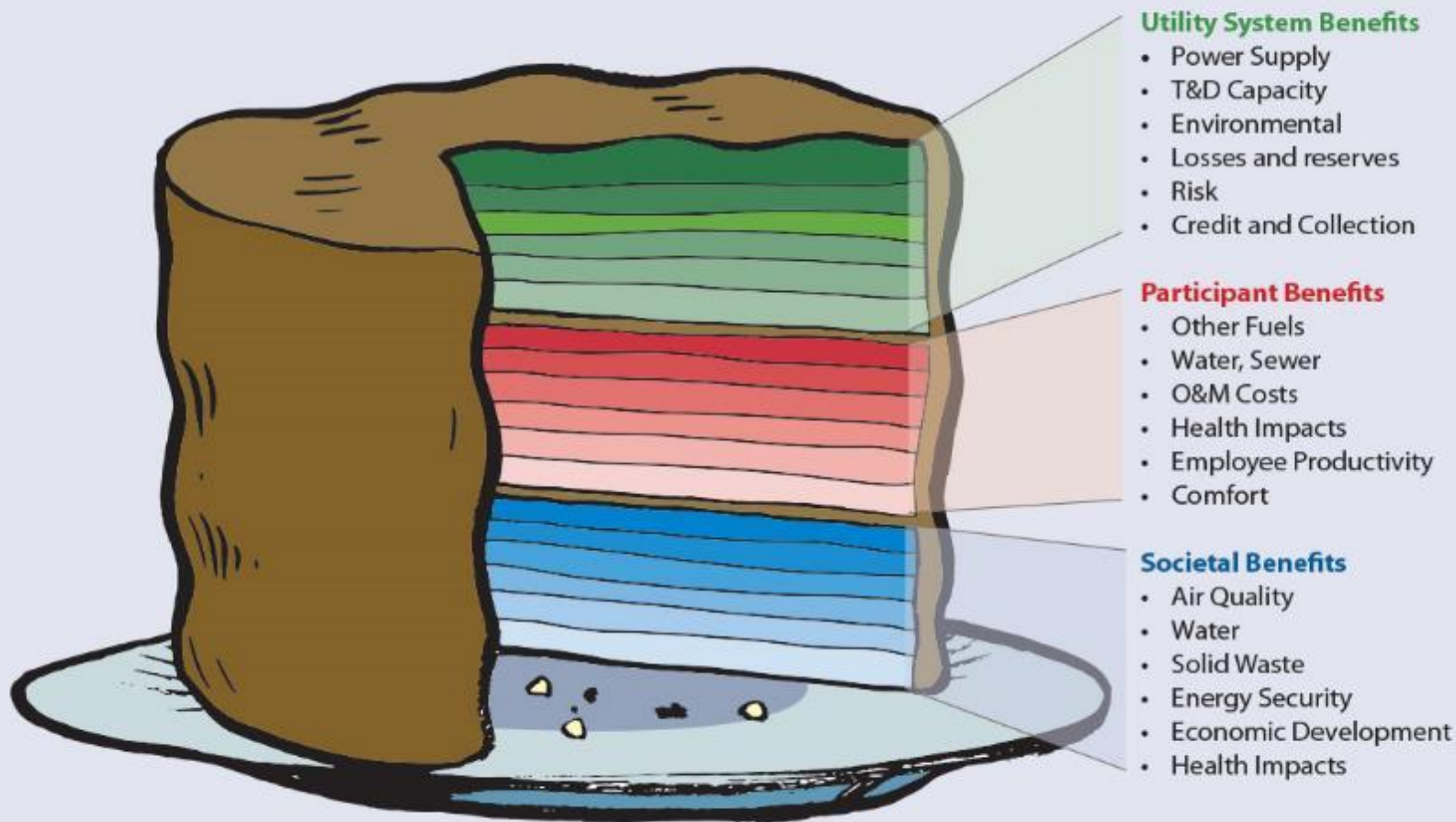
(What's Under the Feel-Good Frosting of the
World's Most Valuable Layer Cake of Benefits)

Lead Authors

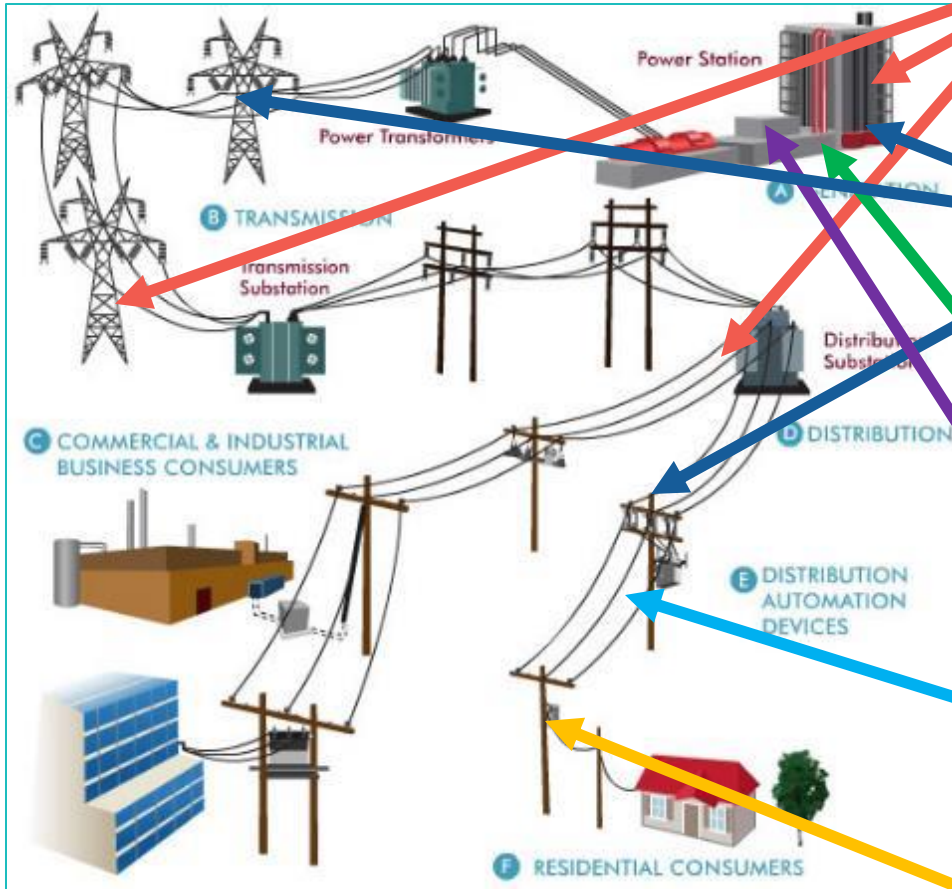
Jim Lazar and Ken Colburn

The Layer Cake of Benefits

A "Layer Cake" of Benefits from Electric Energy Efficiency



The Hot Water Control Value Stream



Peak Load Reduction

**Ancillary Services
Frequency Regulation
Voltage Support**

Renewable Integration

Diurnal Storage

Distribution Line Losses

**Distribution
Transformers**

The Layer Cake Beneficiaries

- Vertically-Integrated Utilities
- Competitive Generators
- RTOs and ISOs
- Distribution Utilities
- Electricity Retailers



Portland General Electric



The Layer Cake Beneficiaries



Generation Level Benefits

Peak Load Reduction

Renewable Integration

Frequency Regulation

Spinning and Operating Reserves

Diurnal Storage

Transmission Level Benefits

Peak Load Reduction

Frequency Regulation

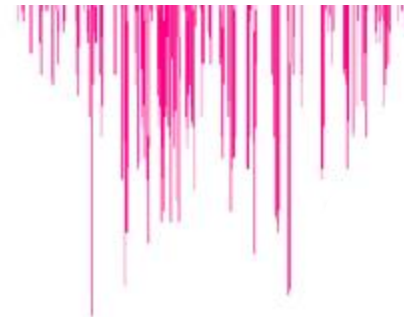
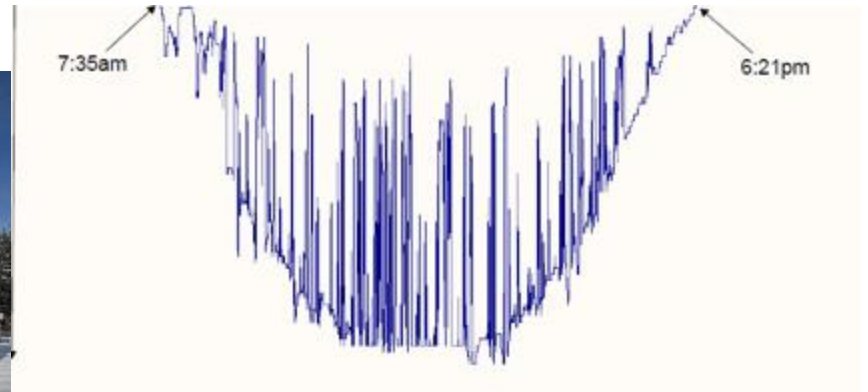
Distribution Level Benefits

Peak Load Reduction

Voltage Support

Distribution transformer management

Renewable Integration Benefits



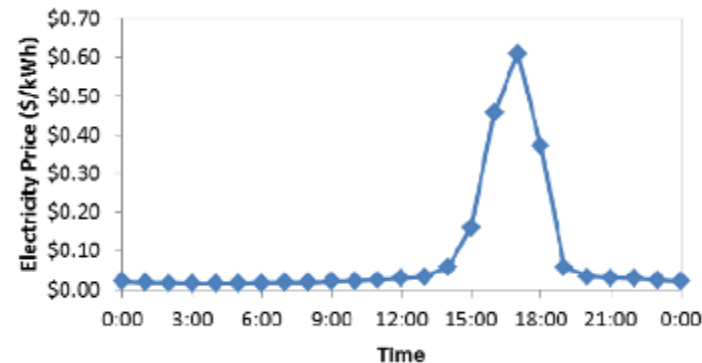
Retailer Benefit

AMBIT ENERGY

Retailer offers fixed price to consumers

\$0.10/kWh

Retailer experiences market prices



Controllable loads are a hedge



Who does what?

Roles Vary by Region and by Type of Utility Service

- Vertically-integrated utility
- ISO or RTO
- Power Marketers
- Distribution Utility
- Retailer
- Regulator
 - Federal
 - State

Vertically-Integrated Utility No TOU Rates

- Attract the load
- Compensate the consumer for benefits for:
 - Generation
 - Transmission
 - Distribution
- \$150 “sign up bonus”
- \$15/month bill credit



Portland General Electric

Vertically-Integrated Utility With TOU Rates



- \$150 “sign up bonus”
- \$5/month bill credit for ancillary services and capacity management
- Additional Savings in TOU Rate

Independent System Operator or Regional Transmission Operator

- Establish standardized load control, ancillary services and storage products that water heater aggregators can bid into
- Require transmission owners to participate
- Set compensatory prices
- Provide a central clearinghouse for compensation processing
- \$/kW



California ISO

Power Marketers and Competitive Generators

- May want to buy spinning reserves or other services
- May want to buy storage to sell output at higher value hours
- \$/mwh



Distribution Utility



- Distribution capacity
- Voltage Support
- Line Losses
- Distribution transformer life

- \$/month discount from fixed charge

Competitive Electricity Retailers and Default Service Suppliers

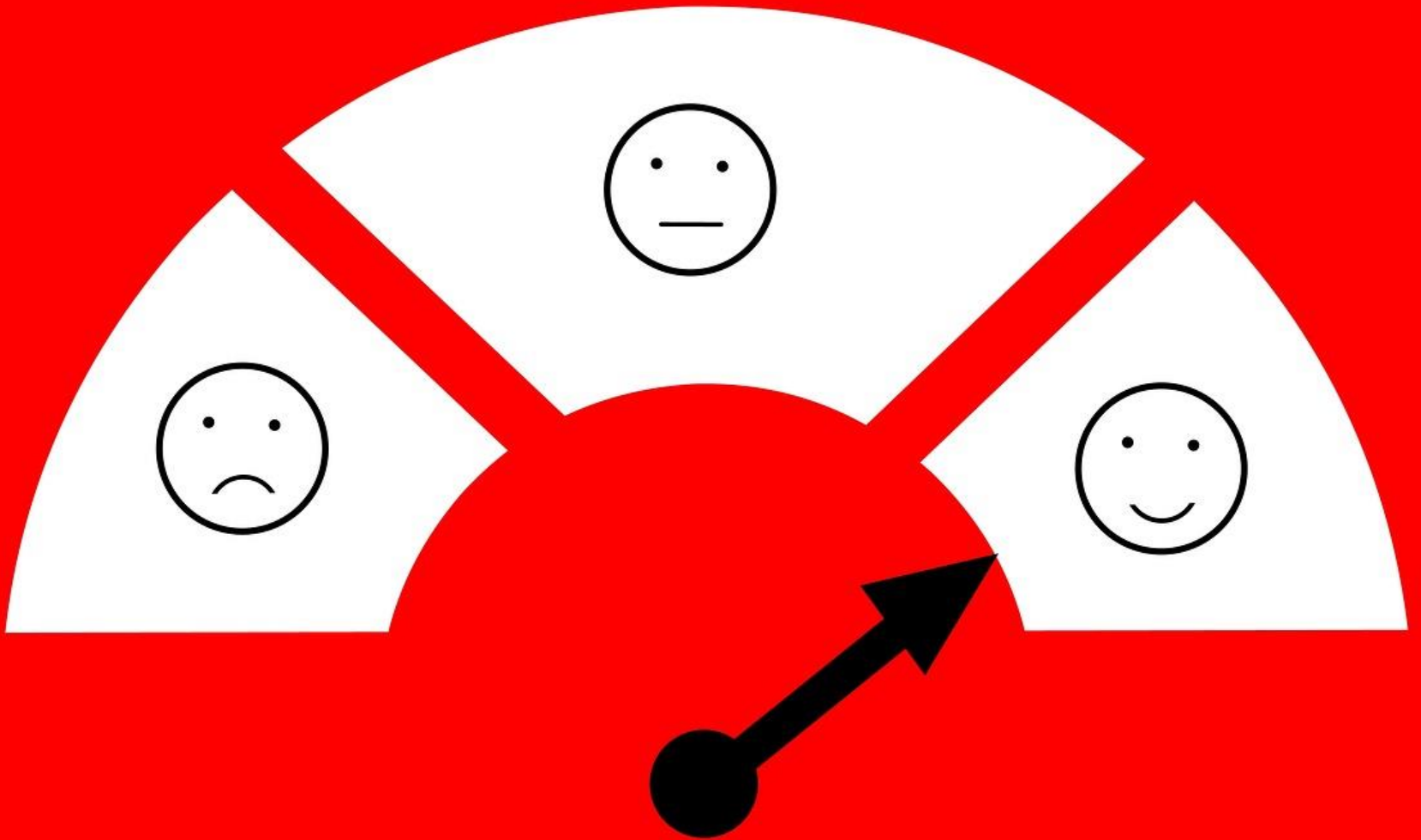
- Energy arbitrage:
 - Most customers choose a flat rate
 - Retailer experiences ERCOT (or other) real-time prices
 - \$/MWh

AMBIT ENERGY™

The Consumer Value Package

- Sign-up bonus must exceed the incremental cost.
- Monthly credit must be significant
- “Override” capability is desirable.





About RAP

The Regulatory Assistance Project (RAP)[®] is an independent, non-partisan, non-governmental organization dedicated to accelerating the transition to a clean, reliable, and efficient energy future.

Learn more about our work at raponline.org



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