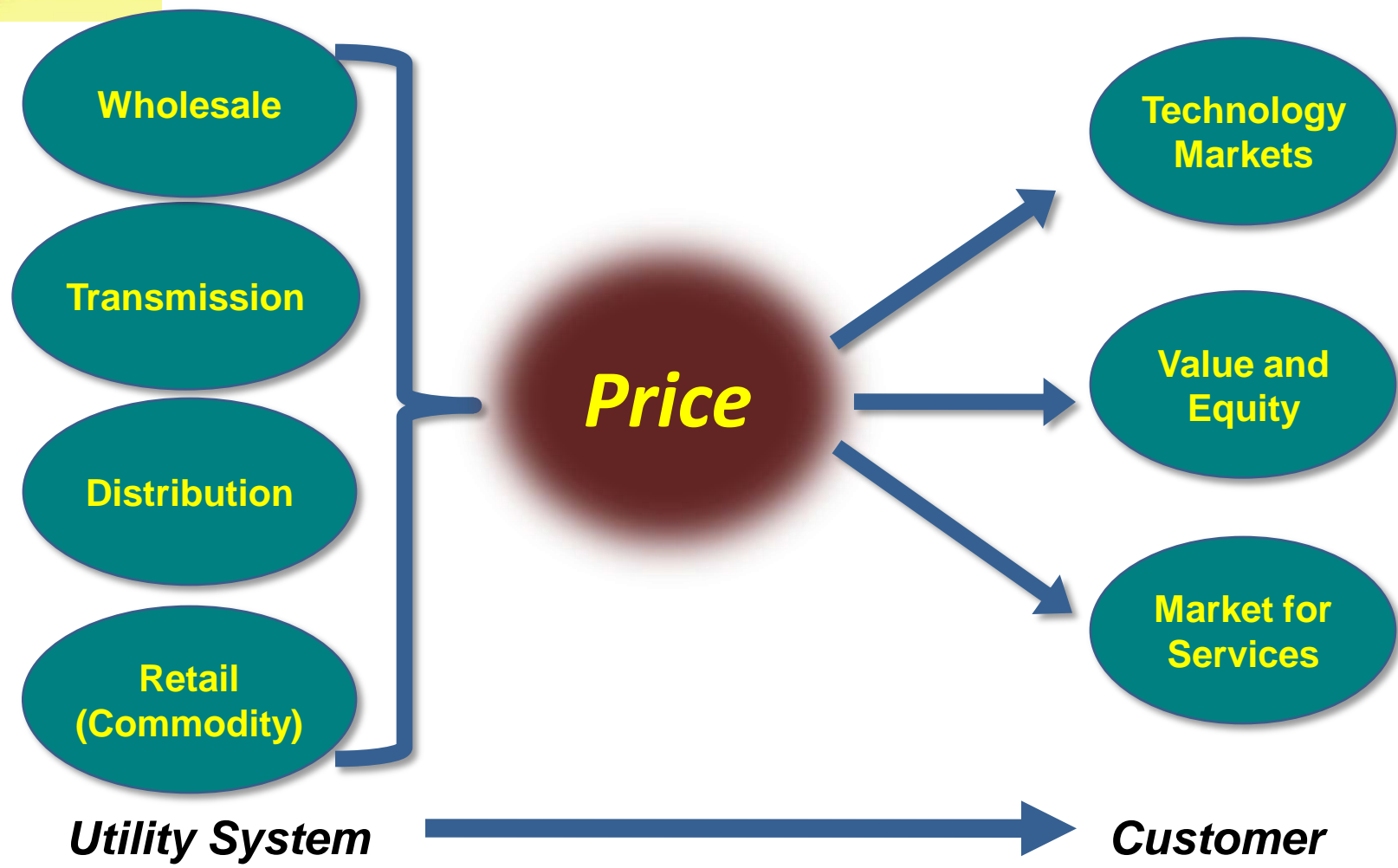


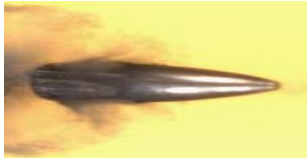
Price Responsive Demand

Is Pricing the
Silver Bullet ?





Issues and Risks



DR Complexity

- How much, what type
- Wholesale – Retail competition
- Renewable energy mandates
- Efficiency goals
- Building and appliance standards
- FERC mandates
- Carbon initiative
- PHEV's
- Incentives and tariffs

Increased Cost

Reduced Usage

Changing Load Shape

Dynamically Changing Demand Response

Customers

- Customer Choice
- Customer - is not a load
- Multiple, transparent participation options

Rate Design

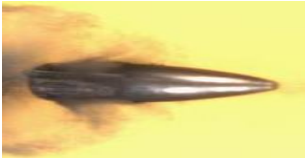
- Wholesale – retail integration
- Complexity
- Digital and actionable

Billing

- If you can't bill for it, you can't offer it.



Lessons Learned



Automation

- **Reliable, Consistent, Predictable**
- **Flexible and Adaptable**
- **Dispatchable**
- **Speed**

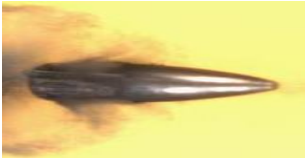
Open Data Model

- **Adaptable**
- **Wholesale – Retail Interoperability**
- **Low Cost**

Customer Choice

- **Adaptable**
- **Acceptance and Retention**
- **Performance**





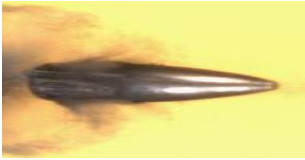
Low Cost



OpenADR Automation Results Average One-Time Cost / kW Peak Reduction

Seattle City Light Sites	Controls Vendor	Controls Cost (\$/kW)	Commissioning DR Strategies (\$/kW)	Total (\$/kW)
Office Building #1 (hardware client)	ATS	180	51	\$231
High Rise Office Tower	Siemens	8	2	\$10
Retail Stores (2)	ALC	33	0	\$33
University Office Tower	ESC	23	9	\$32
Average costs		61	21	\$76





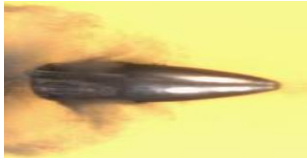
Adaptable, Flexible, Performance



OpenADR Results CAISO Participating Load Pilot

Forecasted vs Actual Ramp Time (MW/ min)	Forecasted vs. Actual Average Hourly Shed (kW)			
	HE 15:00	HE 16:00	HE 17:00	HE 18:00
0.002 / 0.006	20/72	80/86	40/51	30/49
Percent Performance	360%	108%	128%	163%





“....we argue that dynamic pricing that reflects varying system conditions over locations as well as time is the path to realizing the full benefits of active participation of final demand in the wholesale market”.

Market Surveillance Committee of the California ISO, F.Wolak, J.Bushnell, B.Hobbs, June 24, 2009.

Is Pricing the Silver Bullet ?





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