



Energy+Environmental Economics

Design and Implementation of  
+ Real Time Pricing and Other  
Advanced Dynamic Rates

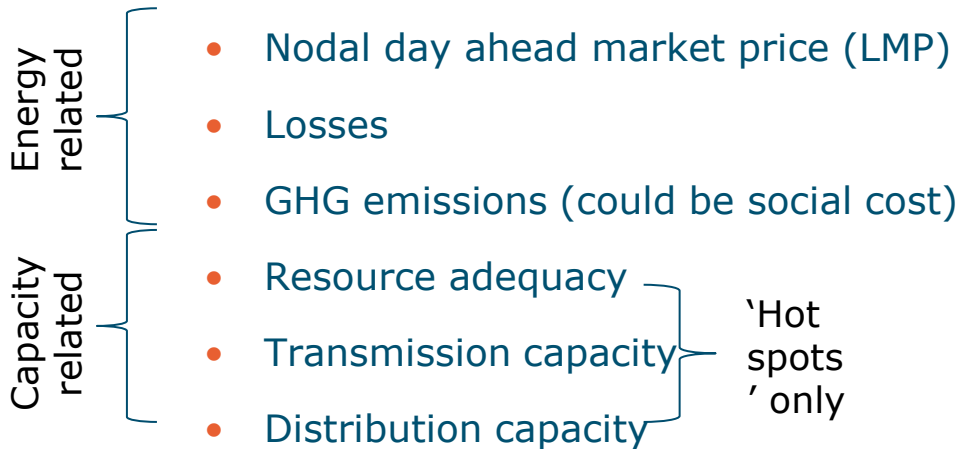
CPUC Advanced Rate Design  
Workshop

December 12, 2017  
San Francisco, CA



# New York Full Value Tariff Concept

- + 3 part rate: Customer charge + network charge + dynamic price
- + Dynamic price components a mix of actual and 'virtual' markets
- + Components of dynamic price



Market-based prices pass through to customers. Day-ahead is practical, but real time possible.

Social GHG price would shift more revenue to \$/kWh, reduce network charges

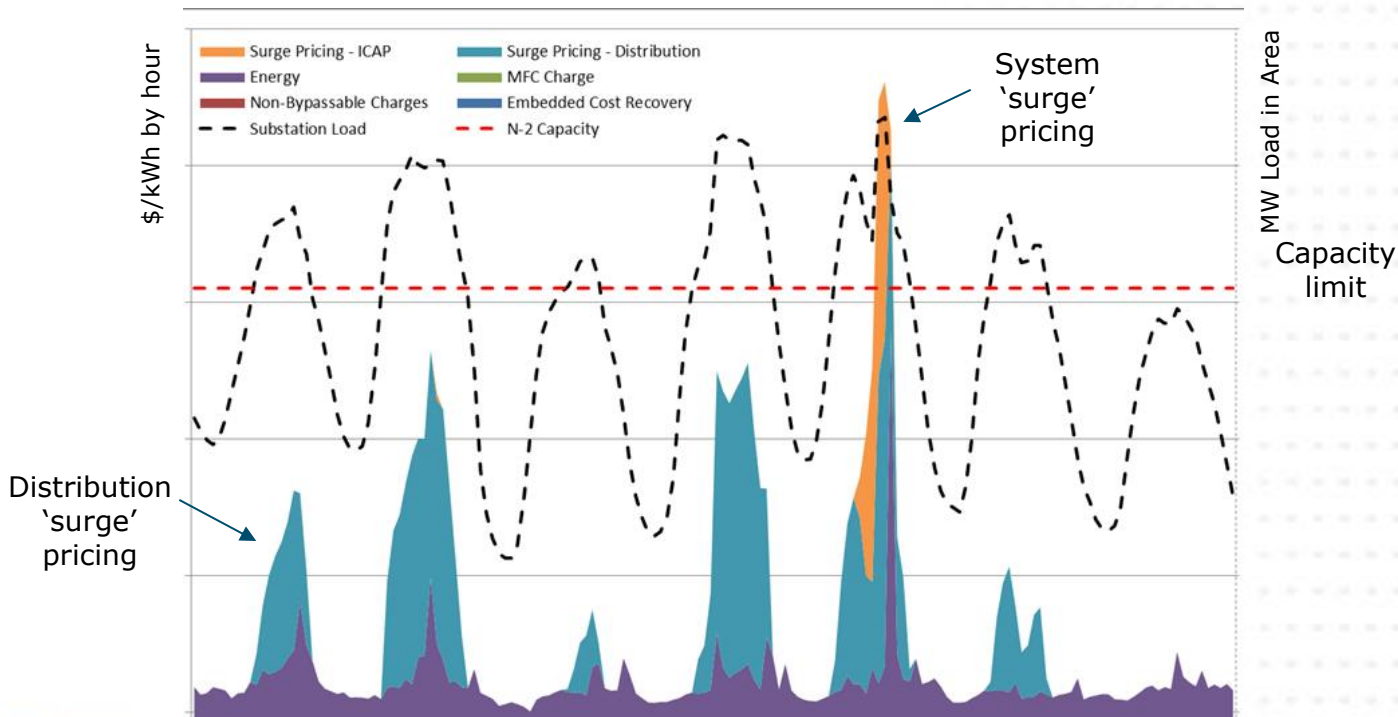
'Virtual' utility-run market prices linked to cost of utility T&D capacity, and allocated to high load hours of concern (eg. 'surge pricing')

- Customers in 'hot spot' areas receive credit on network subscription charge such that they are revenue neutral based on class loads.



# Example of “full value” pricing in a distribution constrained area

## Hourly prices by component, sub-station capacity limit and loads





# Consolidated Edison Smart Home Rate Demonstration – Draft Rates

+ **Caveat: Easy to critique, hard to create!**

+ **Critiques**

- Rate A disadvantages electrification with a daily demand charge
- Rate B dampens price signal since it only applies to 'overage'
- Other options could be used to collect embedded costs

Rate components	Rate components ( <i>billing determinants in italics</i> )			
	Rate A		Rate B	
Supply Charge	Hourly NYISO LMP prices, Zone H , I, J ( <i>kWh consumed each hour</i> )			
Embedded Delivery Charge	\$1.096 / max daily kW	<i>Daily charge based on interval with highest demand between 12 pm and 8 pm</i>	\$33.999 per kW subscribed	<i>Monthly charge based on subscribed kW preselected by customer (default level to cover 85% of eligible hours)</i>
Coincident Generation Event	\$11.344 / max event kW	<i>Incremental to daily demand charge. Event charge based on interval with highest demand during event hours. 24 hour advance notice provided for events, hours may vary by event and by event type.</i>	\$3.638 / kW (moderate days) \$7.051 / kW (extreme days)	<i>Event charge based on interval with highest demand during event hours. 24 hour advance notice provided for events, hours may vary by event.</i>
Coincident Transmission Delivery Event	\$1.145 / max event kW		\$1.748 / kW over (moderate days) \$3.029 / kW over (extreme days)	<i>Incremental to subscription. Overage based on interval with highest demand during event hours. Overage penalty only charged on demand above subscribed kW. 24 hour advance notice provided for events, hours may vary by event and by event type.</i>
Coincident Distribution Delivery Event	\$4.608 / max event kW		\$7.010 / kW over (moderate days) \$12.216 / kW over (extreme days)	
Fixed Monthly Customer Charge	\$15.76 per month			
Adjustments and Surcharges	\$0.XX ( <i>kWh consumed</i> ); varies, includes System Benefit Charges, MAC, RDM, etc.			

Note: Rates are designed to be revenue neutral



# Residential Customer's Bill Savings on NY Full-Value Tariff Compared to Existing

## E3's Smart Home Model

E3's Smart Home model simulates the customer and utility system benefits of controllable flexible loads under any user defined retail rate price scheme like the FVT including TOU, tiers, subscription charges, and real-time pricing

A 2,500 square foot, 3-bedroom New York specific home is modeled with a generic home energy control device that:

- Sends and receives data signals to/from the electricity grid
- Learns customer preferences and behavior
- Controls electricity use and generation of home appliances



Bill savings (high local T&D value) \$/year

Bill savings (zero local T&D value) \$/year

	Rate Option	Solar Roof (75% Usage Offset)	A/C EE 25% Savings	Price Induced Load Shifting	Smart HVAC	Battery Storage	Smart Electric Vehicle
ConEd	Existing Rates	\$1,253 / \$1,253	\$112 / \$112	No Savings	No Savings	No Savings	No Savings
	Full Value/Smart Rate	\$1,179 / \$742	\$146 / \$93	\$274 / \$(74)*	\$236 / \$151	\$430 / \$305	\$141 / \$133
	Full Value/Smart Rate + Societal Signal	\$1,300 / \$863	\$142 / \$89	\$260 / \$(74)*	\$229 / \$144	\$404 / \$280	\$123 / \$122

Solar value reduced from NEM, but not much in high value locations

- Efficiency savings, particularly peak-coincident end uses
- Increased use in low-cost periods

- Load shifting provides significant value
- Battery storage investment not cost-effective yet





Energy+Environmental Economics

# Thank You!

Energy and Environmental Economics, Inc. (E3)

101 Montgomery Street, Suite 1600

San Francisco, CA 94104

Tel 415-391-5100

Web <http://www.ethree.com>

Snuller Price, Senior Partner [snuller@ethree.com](mailto:snuller@ethree.com)