

Will the Potential for a Death Spiral in Electricity Rates Hinder Transformation of the Electric Power System?

In One Word: No

In Two Words: Should Not

In More Words:
Rest of Presentation

“l'existence précède l'essence”

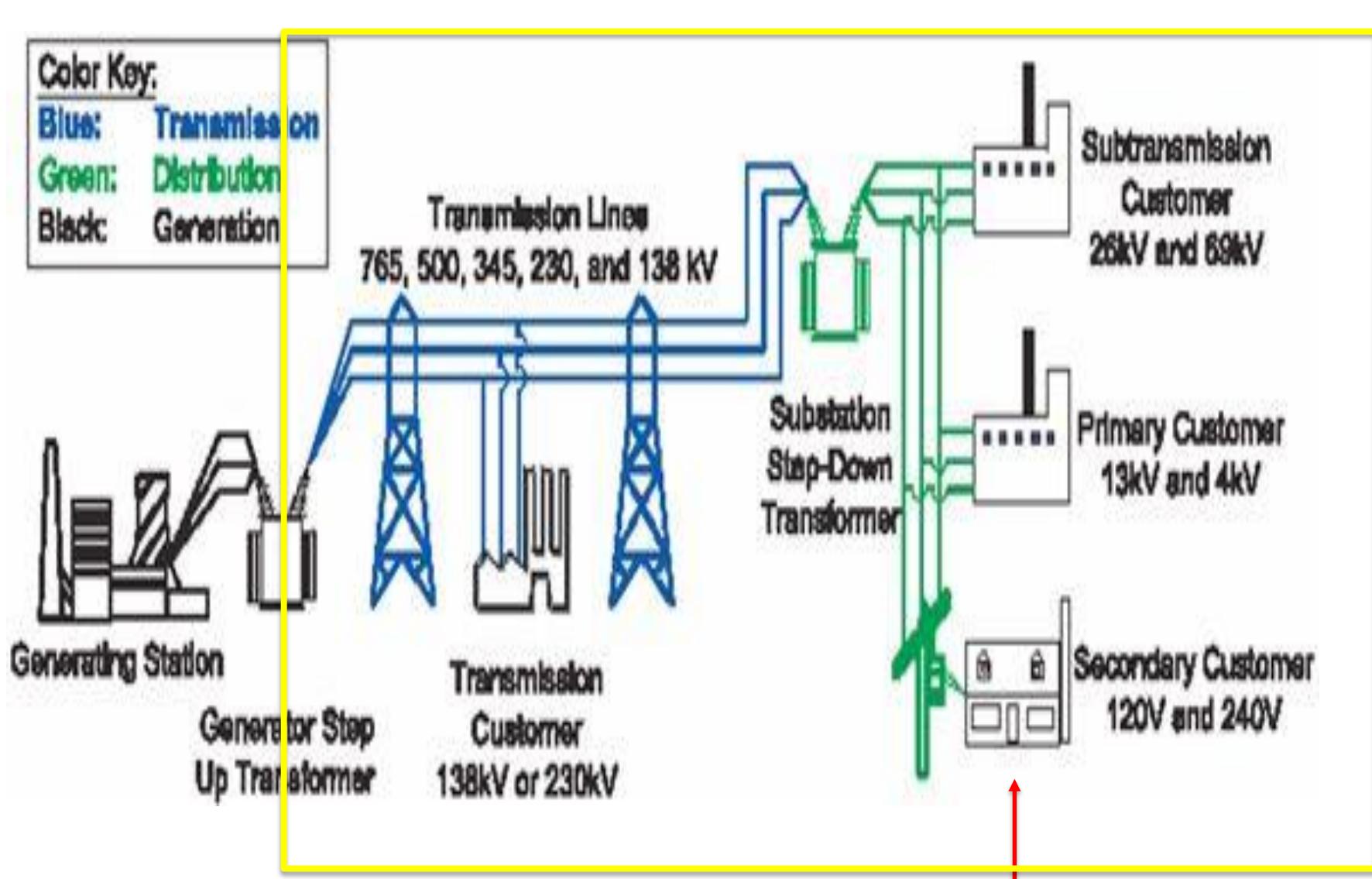
- The electric utility industry's essence, not existence, is in question
 - Purpose
 - Technological strategy
 - Industry Structure



Jean Paul Sartre

Color Key:

Blue: Transmission
Green: Distribution
Black: Generation



The Grid

Behind the meter generation

The transmission and distribution systems are extremely capital intensive:

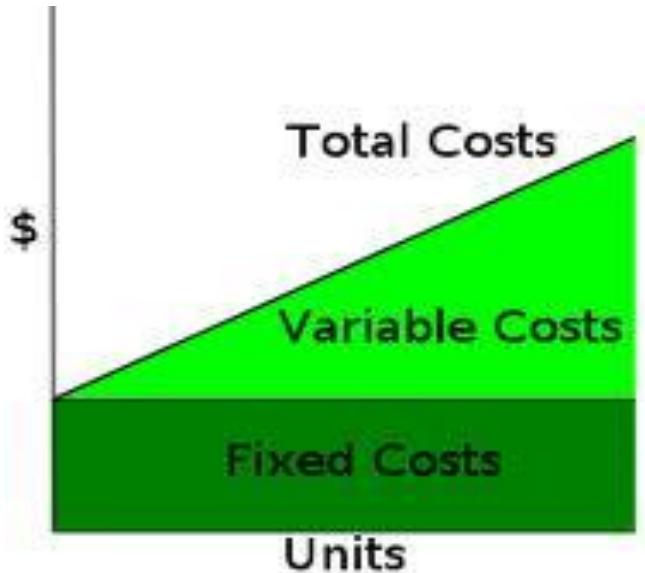
High Fixed Costs

Economies of Scale

Sunk Costs

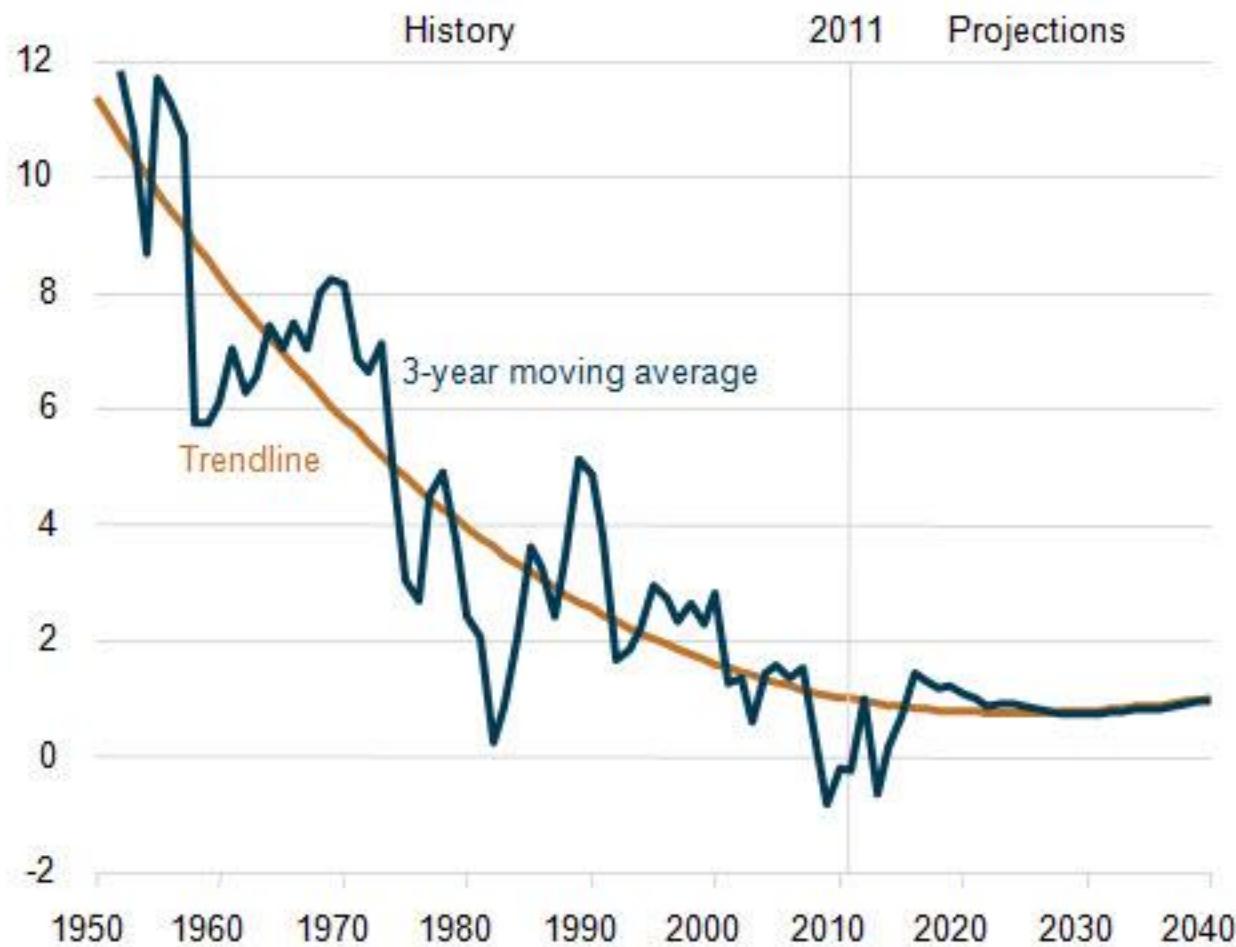
Fixed costs are recovered in a volumetric charge

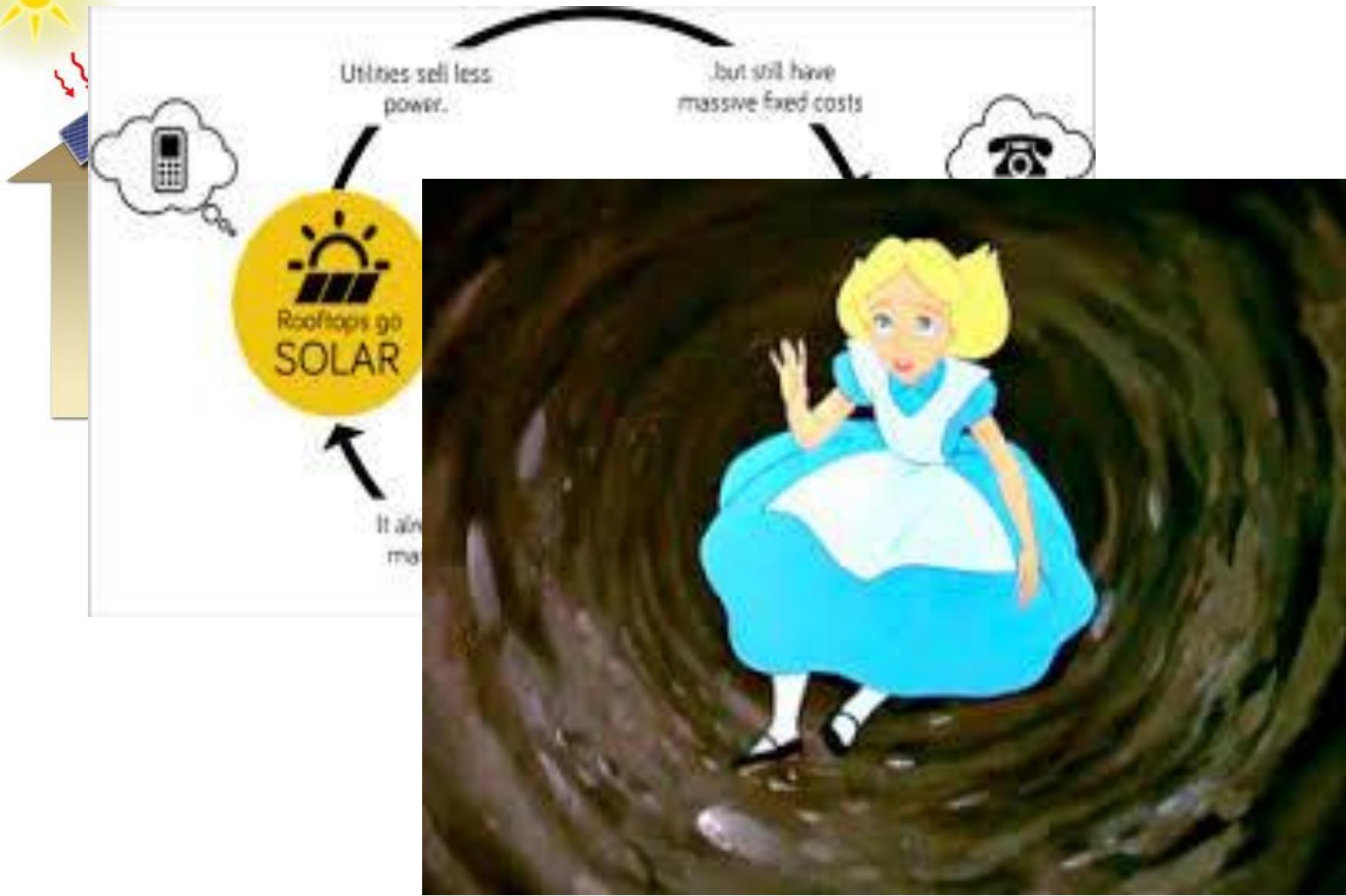
In many states, there are strong incentives for behind-the-meter generation that work by avoiding payment of per unit charges (e.g., net metering & standby charges)



$$\begin{aligned}\text{Rate} &= (\text{Total Cost})/\text{Quantity} \\ &= \text{Average Cost}\end{aligned}$$

Figure 75. U.S. electricity demand growth, 1950-2040
(percent, 3-year moving average)





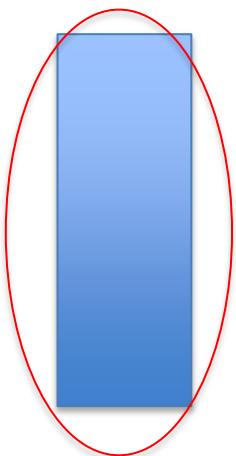
Some Asides:

1. “Death Spiral” is a little over the top; “Solar Vortex” is a little silly
2. There are other potential new sources of utility revenues such as smart grid and electric vehicles





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How to allocated
Fixed T&D costs?

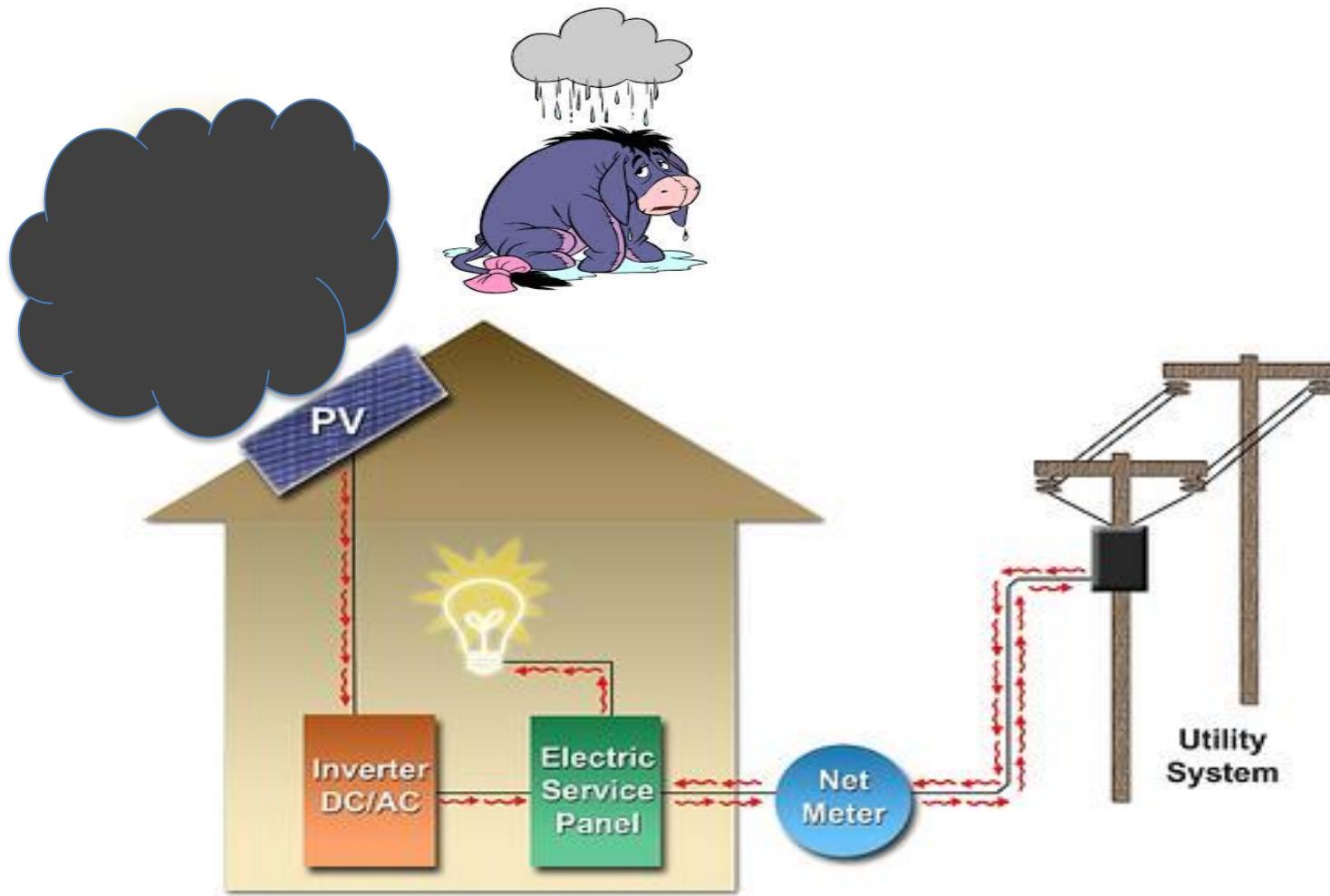
Total Bill:
20 Cents/kWh

Generation:
10 Cents/kWh

T&D:
8 Cents/kWh

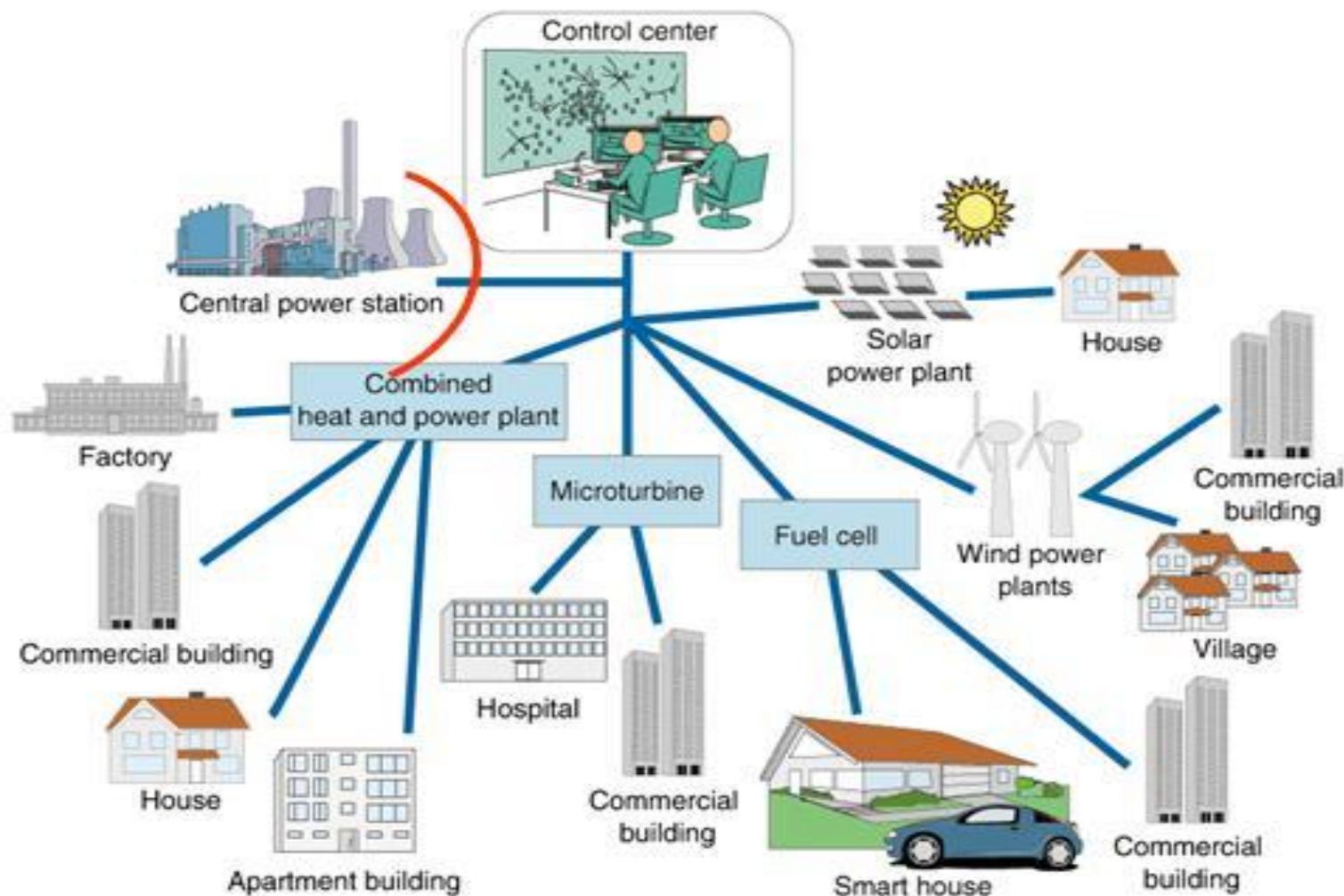
Tax/SBC:
2 Cents/kWh

1. Unless customers with behind the meter generation disconnect from the grid, the grid (perhaps in a much different form) is still needed by them and other (perhaps with some capital savings)
2. If these customers avoid paying fixed costs due to existing rate design then someone else will have to pay or the grid will deteriorate



The grid's value is not just delivering kWh's

Distributed utility of tomorrow

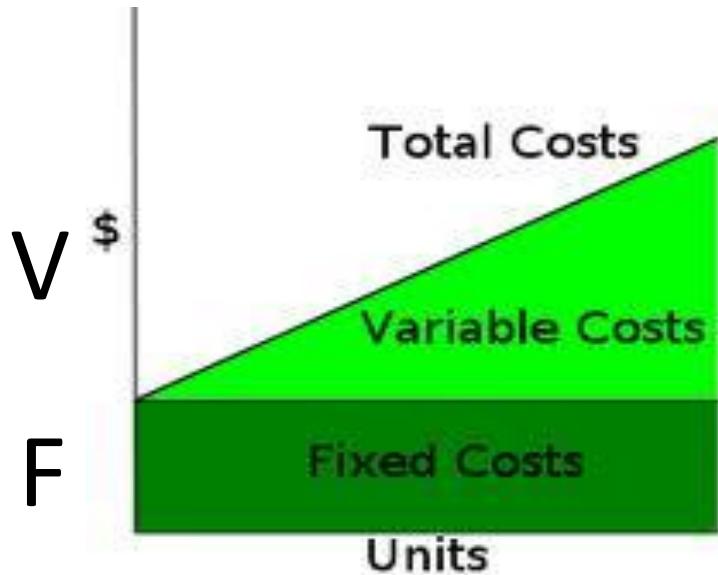


No Exit?

Change the Rate Design By Recovering Fixed Costs In a Fixed Charge

New Utility Bill:

10 Cents * kWh +
fixed monthly fee
based upon customer
Class and peak load



$$\text{Bill} = F + V \cdot q$$

Several Challenges

1. Equity

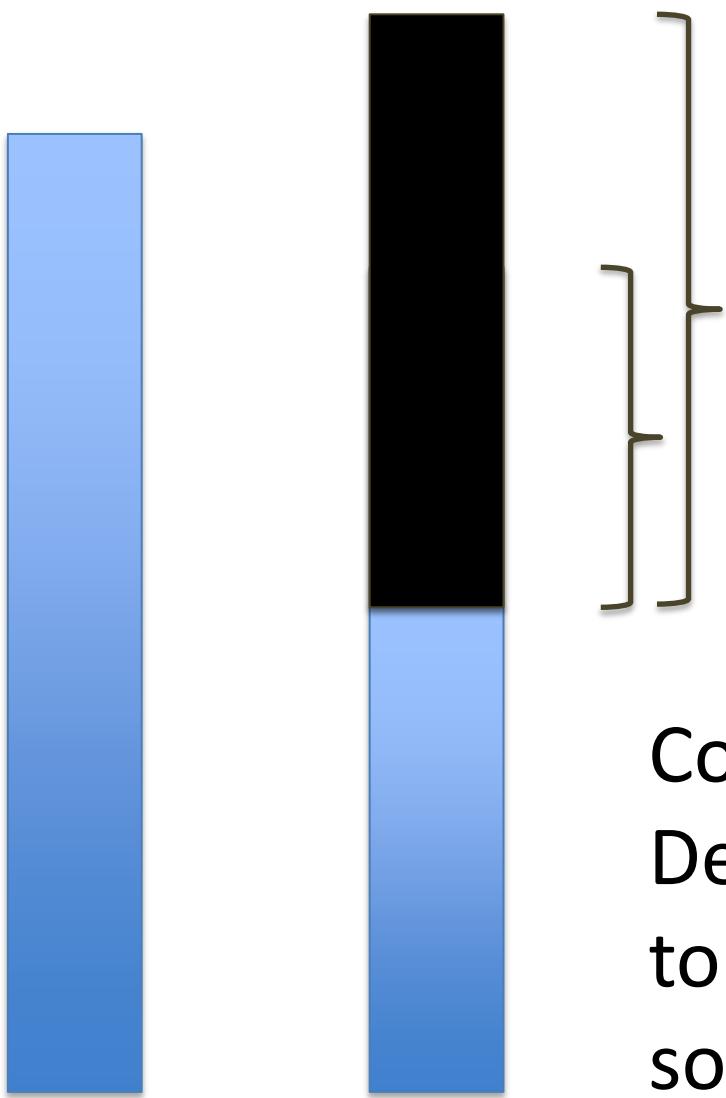
=> Within a given rate class, above average users pay less switching to the new rate design and below average users pay more

Several Challenges

2. Externalities

=> Fixed plus variable rate design lowers the cost on the margin of consuming the next kWh

=> If the total societal cost of consuming electricity was internalized in the variable portion, then this would not be a problem



Consumers marginal cost
Decreases from 20 cents/kWh
to 10 cents/kWh but the
societal cost is much higher

Two wrongs may make a right!

Several Challenges

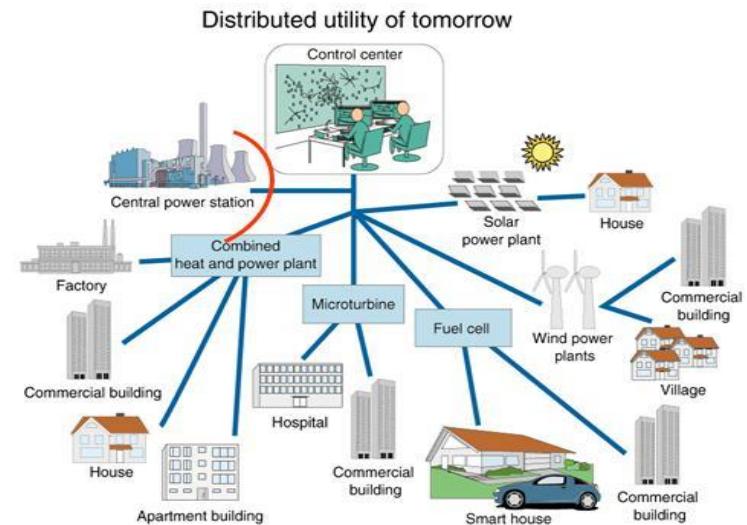
3. Regulatory Fog

The stakes are high and the issues are complex and intertwined, which results in a lot of unintentional misunderstanding and intentional strategic behavior



Final Thoughts

1. If the grid continues to provide value to many customers, then its fixed costs will be recovered and changing rate design can do this in an equitable and environmentally sound manner



Final Thoughts (con't)

2. If it turns out the grid is not the most cost effective way to meet our societal objectives, then we want the grid to fade away

“We don’t call them utility companies for nothing.”



More Final Thoughts

3. Stranded costs – let's start thinking about how to minimize this potential problem
4. Competitive entry with micro grids, distributed generation, etc. may be sufficient in the future to deregulated T&D

Final, Final Thoughts

5. Focus on the Prize: Setting the policy to achieve socially optimal outcomes:

Price = Social Marginal Cost Subject to Fixed Cost Recovery

6. How do we move forward in the “World of the Second Best?”