Massachusetts Institute of Technology
“Demand Response”
November 4, 2011
Afternoon Session
Market Maturity for Demand-Side Assets to Participate

- Technology Required
- Speed of Response

- HV Transmission Relief
- Local Voltage/ VAR Control
- Grid Balance
- Emrg. Load Response
- Operating Reserve
- Distribution Relief
- Ramp (Wind Firming, Solar Firming)
- Curtailment
Years After Purchase

Cumulative Cost

LI-ION BATTERIES

Regulation Services and the Cashback Car

Payment to owners of cashback vehicles average $2,400 annually

$4.00/gal.

$0.09¢/kWh (2009 avg)

Maintenance costs and rebate not applied

Prius

Gasoline Auto

Volt

Leaf
Transactive Load

ETS Heat

Ice-based AC

EV’s

Source: VCharge Transactive Energy Management
SmartBricks™ Value Drivers

Provide Regulation to grid operator

Source: VCharge Transactive Energy Management
Grid Benefits of Demand Response

- PJM Study: a 3% reduction in demand of Top 20 5hr blocks in 5 Mid-Atlantic States could save $280 million annually.

- Brattle Group: a 5% reduction in grid peak load (757 GW) can result in $3 billion savings annually, for PV over 20 yrs of $31 billion.
The Hunt for Transmission and Distribution Losses

2010 Electric System Loss $\sim 10.3\%$ includes Transmission, Distribution and “Behind the Meter”

- Transmission Loss $\sim 1.5\%$
- Transmission to Distribution Loss $\sim 0.9\%$
- High & Low Voltage Distribution Loss $\sim 0.5\%$
- Distribution to Secondary Loss $\sim 0.8\%$
- Secondary Loss $\sim 1.6\%$
- Behind the Meter $\sim 5\%$

Source: Dominion
Precision Power: How it Works

Source: Dominion
When there's a huge solar energy spill, it's called a "nice day."

Pass the NY Solar Jobs Act
Thank you!