

Solar Incentives: Be Careful What You Wish For

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Premise

- Solar can contribute to the grid with more than just energy.
- Incentives should be tailored to *all* these benefits



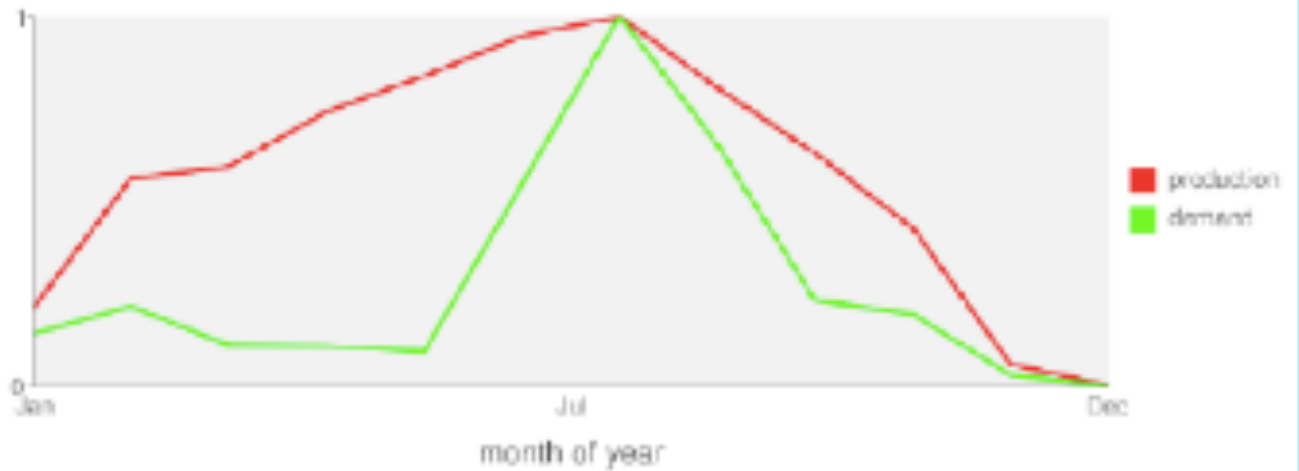
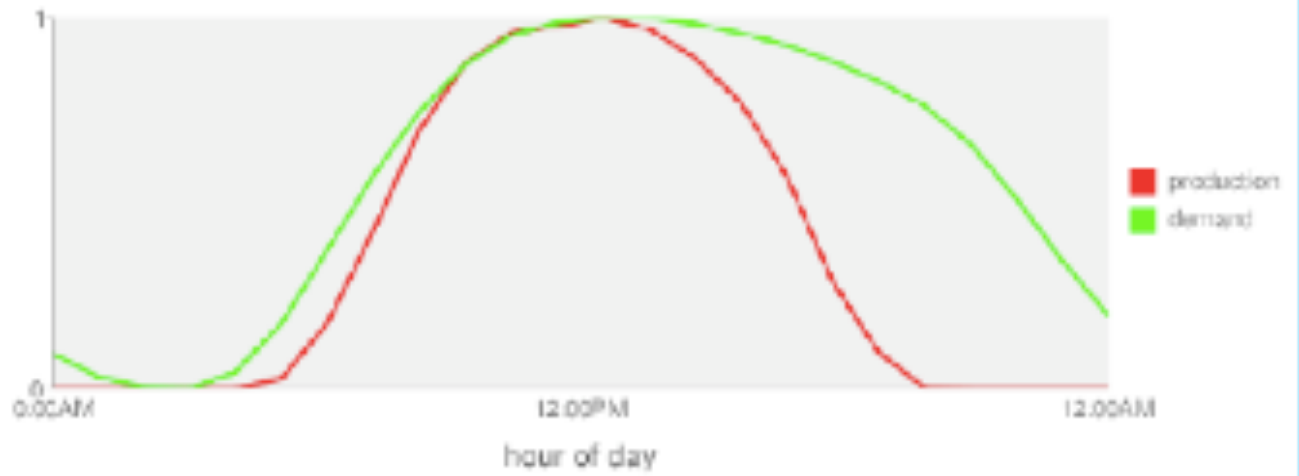
Advantages of Solar of Grid

- Timing
 - Correlated with demand
 - Deferral of peak capacity upgrades
 - Complements variability of wind
- Distributed
 - Transmission and Distribution (T&D) upgrade deferral
 - Can make use of low-value surfaces (roofs, etc.)
- Fuel
 - Carbon-Free
 - Fuel Price Stability

Disadvantages of Solar for Grid

- Timing
 - Cloud Transients
 - Not dispatchable
- Distributed
 - Potential stranded T&D investments
- Fuel
 - Diffuse, often less than local power demands

Time...



Energy Timing

...and Place

Input Parameters

Renewable Energy Supply Site:

Alamosa, CO (solar)

Demand NERC regions:

WECC MRO SPP TRE NPCC RFC SERC
FRCC

List of Optimal Demand Sites

Site Name	Corre
1) Cambridge Electric Light Company	0.429
2) Boston Edison Company (NSTAR)	0.411
3) Progress Energy (Florida Power Corp.)	0.381
4) Northeast Utilities Service Company	
5) Green Mountain Power Corporation	



= optimal demand site(s)



= wind supply site



= solar supply site

[click on marker to see information on site]



Energy Timing

Types of Incentives

- Incentives for energy production
 - Renewable Electricity Standards (RES)
 - Renewable Electricity Credits (RECs)
 - Feed-in Tariffs (FIT)
- Payments for investment
 - Investment Tax Credit (ITC)
 - Accelerated depreciation
- Other
 - Net Metering
 - Carbon Pricing (Tax or Cap'n Trade.)

Incentives for Energy Production: RES, RECs, FIT

- Advantages
 - Price Stability
- Neutral
 - Carbon
- Disadvantages
 - Timing
 - Distributed

Net Metering

- Advantages
 - Cloud Transients
 - Encourages use of already-built-up areas/ roofs
 - Price Stability
 - T&D
- Neutral
 - Peak (depends on rate)
 - Carbon
- Disadvantages
 - Arbitrary limit on system size
 - T&D
 - Very low payments on most commercial rates (demand charges)

Incentives for Investment (ITC, Acc. Depreciation.)

- Advantages
 - Price Stability
- Neutral
 - Timing
 - Location
 - Carbon
- Disadvantages
 - May lead to complicated ownership structures.

Carbon Pricing (Tax or Trade)

- Advantages
 - Carbon
- Neutral
 - Timing
 - Distributed
 - Price Stability

In a Perfect World

- Combination of
 - Investment (not production) incentives (ITC, etc.)
 - Time-of-use pricing (not flat or demand-charge based) (Peak)
 - Incentives for Distributed installation based on existing T&D infrastructure
 - Carbon Pricing

Thank You



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