DISTRIBUTED SOLAR GENERATION: VALUE AND PRICING

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Anaheim, CA

September 17, 2018

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PART 1

PRICING ISSUES:
PROS AND CONS OF NET METERING

Historic Basis for Pricing Generation

A. Costs

B. Market

Net Metering is Neither

Benefits of Net Metering

A. Strong Incentive for Increasing Market Penetration

B. No Emissions in Energy Production

C. Complements Reservoirs
(Important Where Hydro Predominates)

D. Profitability for Solar Commercial Interests

Cons of Net Metering

A. Cross Subsidies

A. Paying Retail, Delivered Price for Wholesale Energy

B. Solar Hosts Do Not Pay Their Share of Demand, Transmission and Distribution Costs

C. Social Regressive Impact

D. Disincentive for Productivity and Efficiency (e.g. Batteries, Direction Shifting Panels, Smart Inverters and System Support Services)

(continued...)

Cons of Net Metering

A. Cross Subsidies (continued)

E. Discourages Technical Innovation

F. Maintains Prices Elevated Over Underlying Costs

G. Puts More Efficient Wind and Large Scale Solar at Competitive Disadvantage

H. Encourages Off Peak Production (Negative Prices in Some Cases—California Duck Curve)

New Trends for Pricing Distributed Solar

A. Three Part Tariffs (Kansas)

B. Energy Only Net Metering (Texas)

C. Reconfiguring Distribution Systems to Resemble High Voltage Systems (New York and California)

D. Dynamic Pricing

E. California's Solar Mandate

Impact of Price Distortions

- On Energy Efficiency
- On Solar Host Behavior on Peak
- On RPS where Least Efficient Resource is Paid the Highest
- Unjustifiable Reallocation of Fixed & Demand Costs

PART 2

VALUE ISSUES

Benefits Claimed by Advocates of Value of Solar Approach

A. Avoided Energy Costs

B. Avoided Capacity Costs (Generation and Transmission)

C. Environmental Externalities

D. Jobs and Economic Development

E. Hedging Fuel and Energy Costs and Price Volatility

F. Distribution System Benefits

Purpose of Value of Solar Studies

- Set Actual Price for Solar DG; or
  - Justify Paying High Price (e.g. Net Metering)
    - Deviation from Historic Norms:
      - Cost of Service (except regarding cost of capital)
        - Market Based
        - Avoided Cost

Methodology

- No Commonly Accepted Methodology
- Wide Variance in Conclusions

Narrow Focus of Value of Solar Studies

- Technology Specific
  - No Comparison with Alternatives for Attaining Value
  - No Assessment of Risks of Technology Specific Focus
  - Impacts of SIP's

Value

- Economic
  - Energy Value Depends on Time of Production
    - Mostly Off Peak
  - Capacity Value Depends on Availability
    - Consequences of Non-Availability
  - Hedge Value Depends on Cost and Callability
    - High Price Could Exceed the Risk to be Hedged
    - Is it Really Callable?

(continued…)

Value

- Economic (continued)
  - Transmission Effects
  - Distribution Effects
  - Transaction Costs

Externalities in a Limited and Selective Way

- Avoided Costs in a Generally Limited and Selective Way
  - Energy
  - Fuel
  - Transmission, Distribution, and Generation Capacity
  - Jobs/Economic Development
  - Transmission and Distribution Losses

Externalities

- Primary Justification for High Price
  - Rarely Weighs DG Against Alternatives for Reducing Carbon
  - Subjective Choice of Externalities
  - Questionable Valuations of Carbon Prices and REC's
  - Overlooks Effects of Intermittency
  - Fails to Track Impact on Dispatch and Displacement (i.e. Real Time)
    - Ignores Social Impact (e.g. Regressive Nature of Net Metering)
    - Distorts Carbon Prices

Jobs and Economic Development

- Highly Myopic View
  - No Consideration of
    - Job Impact of Choosing High Cost Technology
    - Job Impact of High Priced Electricity
    - Fact that Most Solar Manufacturing is Abroad
    - Loss of Mining Jobs

Fuel and Energy Price Consideration

- Long Term Price Forecasts: Notoriously Unreliable (MN vs ME: re annual adjustments)

Generation Capacity Considerations

- Fails to Fully Reflect Intermittency
- Fails to Fully Reflect Solar DG's Non-Coincidence with Peak Demand
- Fails to Recognize Non-Callable Nature of Solar DG

Transmission Capacity Considerations

- Ignores Lumpiness of New Transmission
- Ignores Scarcity of Right of Way

Distribution Issues

- Often Ignores Bi-Directional Flow Issues
- Often Ignores Transaction Costs
- Ignores Revenue Attrition Issues with Net-Metering
- Ignores Planning Issues

Conclusions

A. Preferential Pricing for Distributed Solar

   A. Distorts Market Prices

   B. Fails to Pass on to Consumers the Full Declining Costs of Solar Panels

   C. Highest Cost, Least Effective Means of Reducing Carbon Emissions

   D. Dilutes Energy Efficiencey Price Signals

   E. Transfers Wealth from Less Affluent to More Affluent Customers

   F. Discourages Technological Productiviity and Gains in Solar Energy

      i. MIT Study—Harms Solar Energy in Long Run

Value of Solar Theories

A. Highly Subjective

B. No Generally Acceptable Methodology for Valuation

C. Lack Foundation in Historic Energy Pricing (Costs or Market)

D. Never Technology Neutral

E. Lacks Granularity Required to be Accurate