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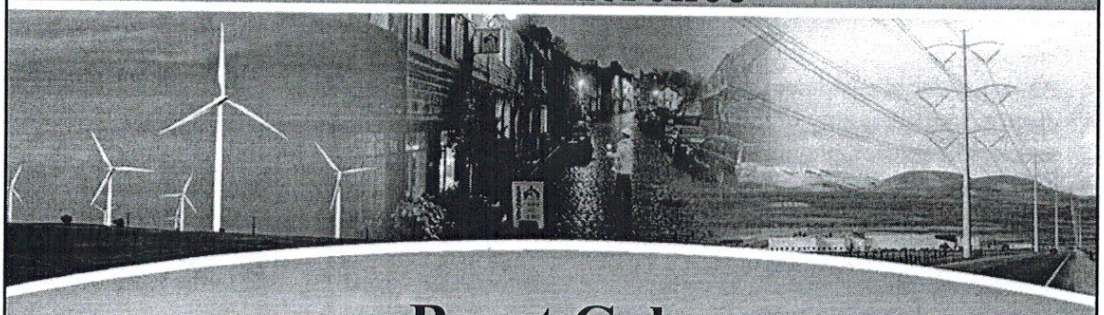
2014 Conference



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Managing Declining Retail Electric Sales

- Regulated utilities have previously managed reductions in the rate of retail electric *consumption* caused by increased appliance efficiency, energy efficiency programs, economic downturn, and voluntary conservation.

- Absent material customer movement completely off the grid (e.g., cost-effective residential electric storage; ability of industrials to lock in long-term natural gas at very low & predictable prices), previously utilized regulatory mechanisms will probably be adequate to continue to manage future electric *consumption* reductions caused by increased appliance efficiency, energy efficiency programs, economic conditions, and voluntary conservation. These mechanisms include:
  - Decreasing the amount of distribution & customer service fixed costs in the variable component of rates & instead including those costs in the customer charge component;
  - Use of forecast sales in setting rates;
  - Attrition adjustments;
  - Risk adjustments to allowed ROE;
  - Decoupling for the unbundled distribution function.

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Managing Declining Retail Electric Sales (continued)

- However, two different and increasing developments are reducing retail electric *sales* but not necessarily electric consumption.

- First, industrial customers are reducing electric purchases from the utility (but not necessarily reducing total electric consumption) by taking advantage of natural gas prices to generate their own electricity. This development can probably be adequately addressed by ensuring that:
  - Partial requirements/standby tariffs reflect the full costs of that service;
  - Regulatory policies regarding partial requirements customers returning to full requirements service recognize the cost of maintaining reserves that other customers and the utility should not bear.

- Second, customers currently served under standard residential and small commercial electric rates are reducing electric *purchases* from the utility by use of distributed generation (DG) and reducing the utility's *billed retail sales* through net metering (NEM), but not necessarily reducing total electric consumption.

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Managing Declining Retail Electric Sales (continued)

- Rates for residential and small commercial customers have been developed for the average customer with an average load factor (frequency and stability of usage), an average load curve (usage pattern), and average billing determinants. The rates were developed for a customer that receives his/her full requirements for energy from the grid and delivers no energy back to the grid (referred to as full-requirements service).
- DG customers use the same generation, transmission, distribution and customer services as other customers, and also use services unique to their needs such as administration & operation of DG & NEM tariffs.
- But, once a residential customer installs a generator to serve all or a portion of his/her electric usage, the customer, by his/her own choice, is no longer a full requirements customer for whom the two-component, residential and small commercial rates were designed; they are a partial requirements customer.
- DG customers, as partial requirements customers, have different load curves, different load factors, different billing determinants and a different cost of service than the average full requirements residential and small commercial electric customers for whom the current two-component rates (i.e., customer charge and energy charge) were designed.

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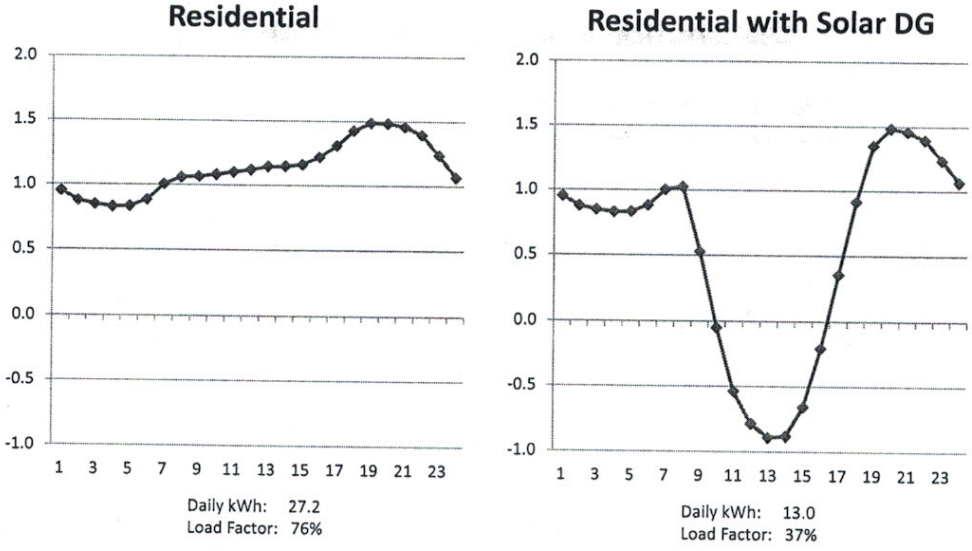
Typical Residential Loads Average Day - Iowa



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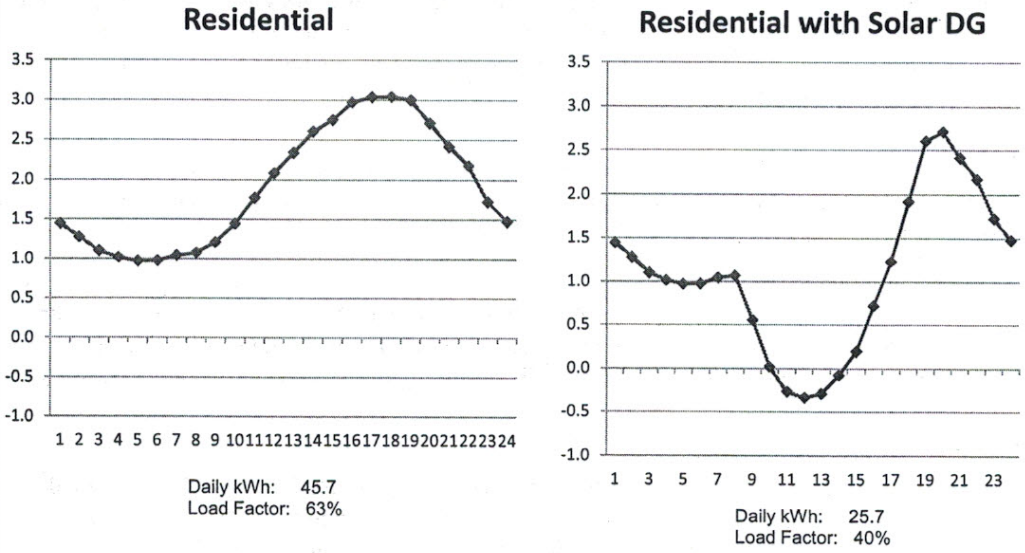
Typical Residential Loads
Summer Peak Day - Iowa



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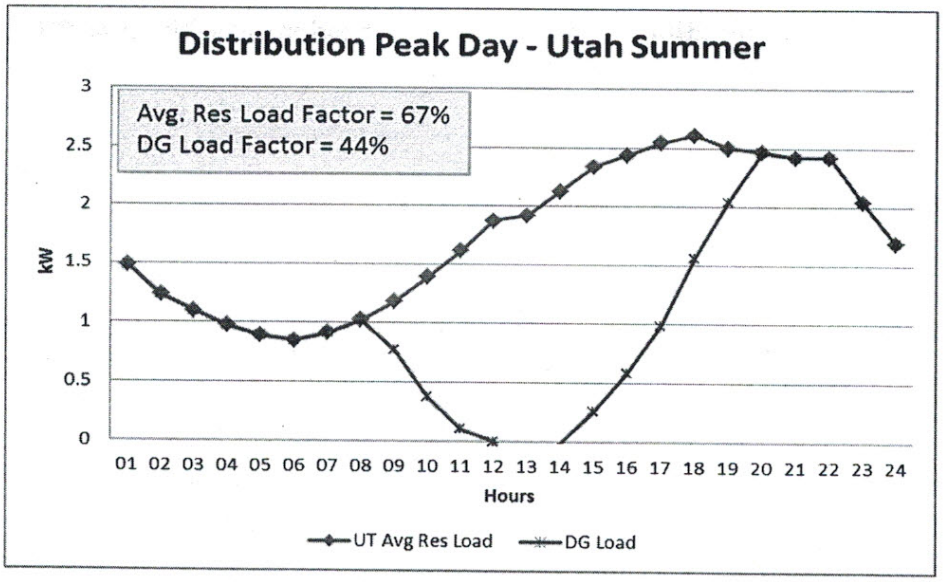
Typical Residential Loads
Summer Peak Day - Utah



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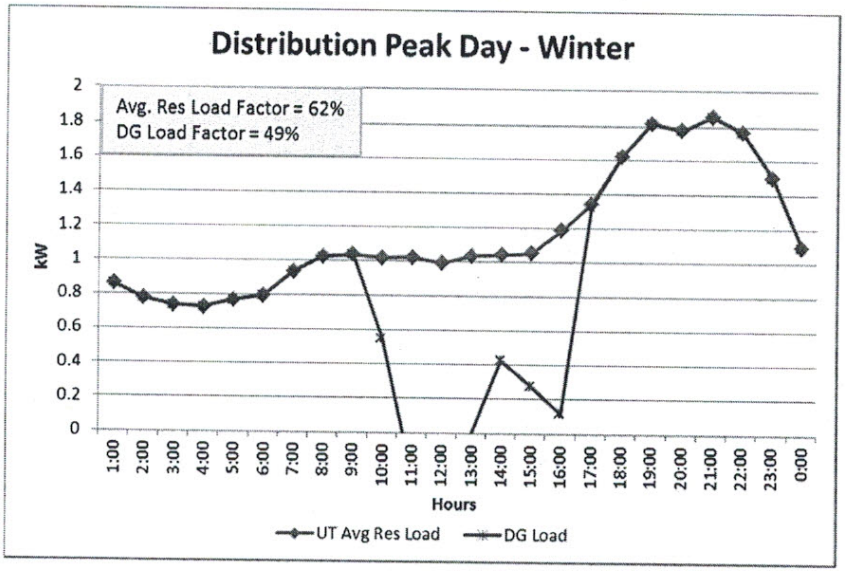
Typical Residential Loads Winter Peak Day - Utah



9

Managing Declining Retail Electric Sales (continued)

- Regulation has historically not permitted large commercial and industrial partial requirements customers to be served by full requirements rates due to concerns that full requirements rates do not reflect the costs of serving partial requirements customers and create the potential for shifting costs that should be paid by partial requirements customers. Those same concerns exist for residential and small commercial DG customers.

- Simply applying existing partial requirements tariffs to DG customers is not a solution since those tariffs are for large customers with dispatchable generation and do not typically apply to customer sales of energy to the utility.

- Allowing DG customers to continue to be served on standard two-component, full-requirements residential rates – rates that do not correctly assign costs to rate components and that were not designed for DG customers' usage characteristics – is not sustainable since it will continue to result in costs being improperly shifted to other residential customers, including low-income and fixed-income customers, and will provide the DG customers with no incentive to maximize the potential of DG to benefit the grid.

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Managing Declining Retail Electric Sales (continued)

- When electric service is provided to a customer through a rate that does not correctly assign costs to rate components and that was not designed for the customer's usage characteristics, then uneconomic or otherwise ill-advised decisions are likely to be made – not just by the customer but also by the utility and regulators.
- If a regulatory and societal objective is to integrate DG into the grid in a manner that provides maximum value and minimum harm to the grid and the customers it serves, then consumers and participants must be provided the tools and prices designed to achieve that objective.
- New regulatory policies and new rate designs are critical. Merely tweaking traditional rate design and regulation will not be sufficient.
- When designing rates for sales to DG customers, it is paramount to recognize that DG has the potential to benefit the grid and the customers it serves, but only if DG is properly integrated into the grid with rates that (a) do not result in shifting costs to other non-DG customers; (b) do provide the DG customer with an incentive to reduce purchases from the grid at the time of the grid peak demand; and (c) do provide the DG customer with an incentive to avoid sharply ramping up purchases from the grid as DG production wanes.

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Managing Declining Retail Electric Sales (continued)

- A properly designed DG rate will:
  - Encourage DG installations where it benefits the DG customer and doesn't harm other customers;
  - Encourage DG customers to install and operate the DG facilities in a manner that benefits the grid and the customers that rely upon that grid;
  - Discourage uneconomic DG installations that require subsidization by other customers;
  - Avoid shifting costs to other customers (including low-income and fixed-income customers) who may not have the means to install DG or who cannot install DG or who choose not to install DG;
  - Incentivize DG customers to avoid sharply ramping up purchases from the grid as DG production wanes and incentivize DG customers to reduce purchases from the grid at the time of the grid peak demand; moreover, when coupled with time-differentiated prices for DG deliveries into the grid, incentives can also be provided to maximize DG deliveries into the grid at the time of greatest benefit to the grid and the customers it serves;
  - Enable regulators to positively address DG issues without impacting the standard residential rate that serves millions of customers; and
  - Overall, promote the public interest by avoiding both uneconomical outcomes and unfair redistribution of dollars that can raise rates to most utility customers without compensatory benefits.

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Getting The Rates Right – Part 1
Developing An Appropriate Rate For Retail Sales To DG

Recommendation: Design three-component rates for sales to DG customers consistent with the cost of serving these partial requirements customers. The three components are a customer ($/monthly bill) charge, a demand (kW) charge, and an energy (kWh) charge. The three-component rate design has been used for decades to serve commercial and industrial customers and is familiar to regulators. Costs should be assigned among the components as nearly as practicable to reflect cost causation.

- All costs considered customer-related should be included in the customer charge component and not in the energy charge component. It may be necessary for the utilities to address the needs of low income customers through assistance programs or other mechanisms, but the number of low-income DG customers is likely limited.
- All costs considered demand-related (typically, demand-related and facilities-related costs of distribution and transmission and the capacity costs of generation) should be included in the demand component of rates. The demand charges should be designed (to the extent possible within the constraints of data, billing capabilities and state restrictions) to incentivize actions by the DG customer that are beneficial to the grid: (1) avoid rapid ramping up of purchases from the grid as DG production wanes; (2) reduce personal usage (including electric purchases from the grid) at the time of highest grid prices (e.g., peak periods); and (3) maximize DG production at the time that it has the highest value to the grid.
- Only costs normally considered to be energy-related should be included in the energy component. Where feasible, the energy component should reflect the costs at the time of use.

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Developing An Appropriate Rate For Retail Sales To DG (continued)

- By implementing a new rate for serving DG customers from the grid using the three-component rate design, DG customers will be provided incentives (a) to reduce purchases of energy from the grid at times of peak demand on the grid and (b) to avoid rapid ramping up of the DG customer's usage of the grid. [See also, "Teaching the Duck to Fly", Jim Lazar, Webinar January 2014, www.raponline.org.]

- At the same time, by assigning fixed costs to the correct rate components and designing the demand component to reflect the DG customer's unique usage and billing determinants, the three-component rate design will better ensure that DG customers more fully pay the fixed costs of serving them, with fewer (or none) of those fixed costs being shifted to other customers, including low-income and fixed-income customers.

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Developing An Appropriate Rate For Retail Sales To DG (continued)

- Both the demand-related charges and the energy component of the three-component rate should be time-differentiated where appropriate. Similarly, if the price paid to the DG customer for DG production in excess of the DG customer's personal usage is also structured to be based on the costs the grid avoids at the time DG production is delivered to the grid (discussed later in these slides), the DG customer will have an added incentive to maximize the amount of DG production offered to the grid at the time of highest grid costs and highest grid benefit.
- The three-component DG rate completes the connection between cost of service and rate design, and fully reflects cost of service principles down to the individual customer level.
- This is exactly the result that rate policy should be seeking; it is fully consistent with the objectives of demand response; and the result cannot be achieved by merely tweaking the standard two-component residential rate.

15

An Appropriate Rate For Sales To DG Is Not Unreasonably Discriminatory

- Some DG proponents contend that it would be discriminatory to require that DG customers be served under a different rate than the full requirements residential rate. Having a separate rate for DG customers is not unreasonably discriminatory and simply recognizes DG customers use the grid differently and have different load factors and billing determinants than the average full-requirements residential customer for whom the standard residential rate was designed.
- Indeed, maintaining the status quo and allowing DG customers to continue to be served by residential rates that do not reflect the cost of serving DG customers and which shift costs to other customers is arguably the situation that would be deemed unreasonably discriminatory.

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An Appropriate Rate For Sales To DG Is Not Unreasonably Discriminatory (continued)

- With respect to the load factor and load curve characteristics (i.e., the "duck" curve) that distinguish DG customers from the average full requirements residential customer, some parties contend that DG customers have the ability to modify both their purchases from the grid and deliveries to the grid to produce load factors and load curves more like the average residential customer.
- In support, many parties reference "Teaching the Duck to Fly", Jim Lazar, Webinar 2014, www.raponline.org. Adding a demand component to rates, incentivizing DG customers to reduce demand/purchases from the grid at the time of grid peak loads, and incentivizing DG customers to increase DG production at the time of the grid peak by, among other actions, orienting PV panels, are precisely ways in which to incentivize those modifications.
- These parties can't have it both ways and cry "fowl" about being placed on an appropriate rate. It is not possible to teach the duck to fly if it refuses to leave the nest of the residential full requirements rate.

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An Appropriate Rate For Sales To DG Is Not Unreasonably Discriminatory (continued)

- Nor are DG and NEM customers similarly situated to full requirements customers who reduce purchases from the grid *and total energy consumption* through energy efficiency and demand response programs. Reductions in electric purchases by DG customers will not necessarily reduce the total electric *consumption* of the DG household nor are DG reductions in electric purchases permanent and predictable.
  - When a residential customer adopts energy efficient appliances and behaviors, both energy consumption and energy purchases from the grid are reduced. They also reduce energy consumption at the time of the system peak, improving load shape and load factor and, ultimately, the class and system load factor.
  - In contrast, when a customer adds DG, energy purchases by the customer from the grid are reduced but that customer's total energy consumption may remain unchanged.
  - Similarly, most residential demand-side measures result in the customer reducing energy consumption at the time of the system peak, improving load shape and load factor and, ultimately, the class and system load factor.
  - In contrast, when a customer adds DG, the customer's purchases from the grid at the time of the grid peak may not be reduced to the extent DG production is not coincident with the grid peak.

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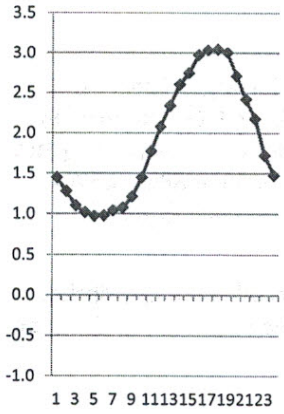
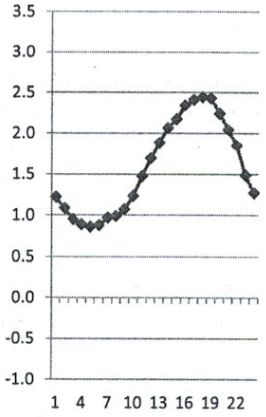
Typical Residential Loads
Summer Peak Day - Iowa

Residential



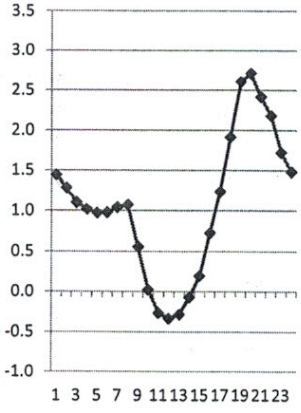
Daily kWh: 45.7
Load Factor: 63%

Residential – High Efficiency Air Conditioner E.E. Program



Daily kWh: 37.8
Load Factor: 65%

Residential with Solar DG



Daily kWh: 25.7
Load Factor: 40%

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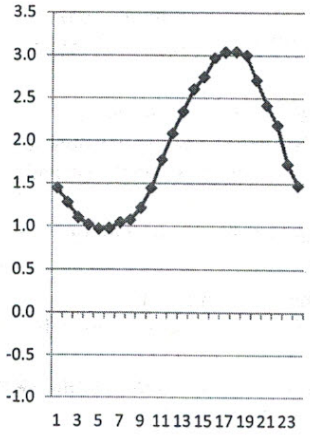
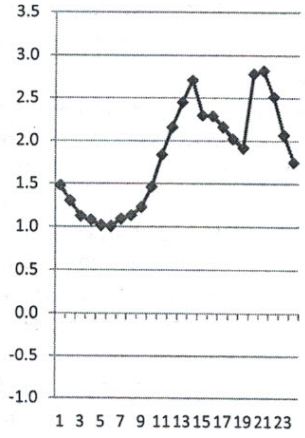
Typical Residential Loads
Summer Peak Day - Iowa

Residential



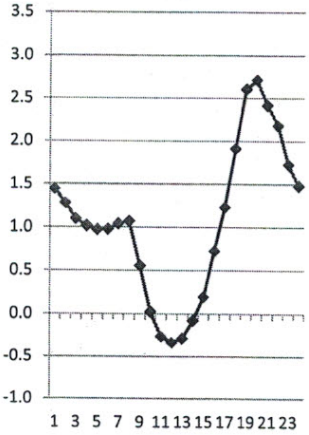
Daily kWh: 45.7
Load Factor: 63%

Residential - Air Conditioner DLC



Daily kWh: 43.7
Load Factor: 65%

Residential with Solar DG



Daily kWh: 25.7
Load Factor: 40%

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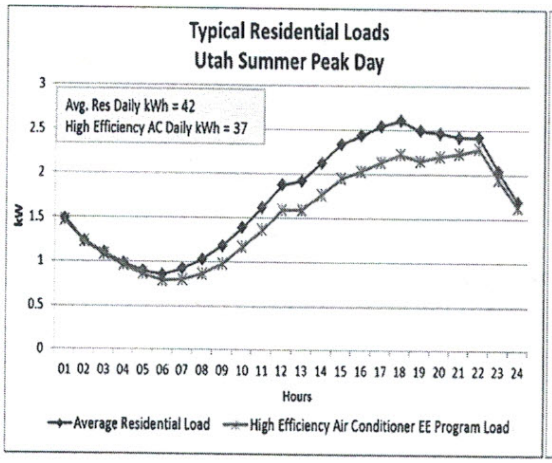
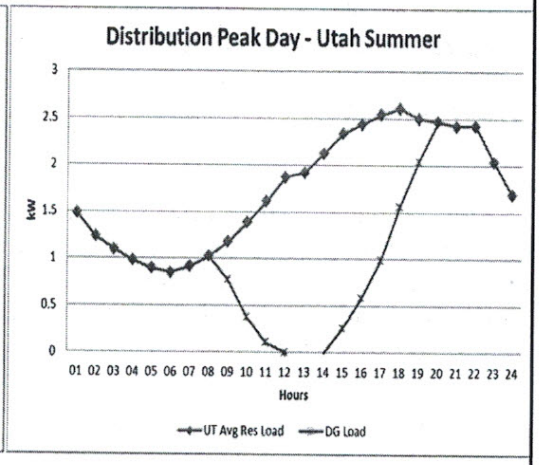
Typical Residential Loads
Summer Peak Day - Utah





21

Getting The Rates Right – Part 2
Net Metering

Recommendation: When a state requires a regulated utility to allow a DG customer to use NEM, the state bypasses the RFP process and effectively assumes the value of the DG production is always equal the utility rate block that the DG customer is able to avoid paying by either generating at the time of use or by offsetting that use by applying previous or future DG generation that net metering requires the utility to bank for the DG customer without payment for the service. NEM based on standard residential rates should be prospectively eliminated. In lieu of NEM, all DG production in excess of the DG customer's personal use should be valued by regulators separately from the determination of a utility's bundled rate for generation, transmission and distribution services.

- DG is a supply option; NEM is a rate scheme. The issues between the two differ.
- The value of DG deliveries to the grid is not a function of the utility's bundled rate for generation, transmission and distribution services, which is the presumption inherent in NEM.

22

Net Metering (continued)

- Contrary to the representations of some proponents, NEM is not a means for DG customers to sell excess DG output to the grid. Indeed, in the seminal NEM case at FERC [*MidAmerican Energy Company*, FERC Docket No. EL99-3-000 (FERC 2001)], FERC specifically rejected the position that NEM involved a sale by the customer. Instead, FERC held that the NEM customer does not sell DG production to the utility during a billing cycle.
- Also see, *Sun Edison, LLC,* Order EL09-31-000, 129 FERC ¶ 61,146 (FERC 2009) where FERC attempts to reconcile its holding in the *MidAmerican* case with its subsequent definition of net metering in *Standardization of Generator Interconnection Agreements and Procedures,* Order No. 2003-A at ¶ 744, FERC Stats. & Regs. ¶ 31,160, (FERC 2004) , ["Net metering allows a retail electric customer to produce and sell power onto the Transmission System without being subject to the Commission's jurisdiction." (emphasis supplied)].
- And NEM rules in most states do not permit sales of excess DG production to the grid (i.e., cash out).
- If a DG customer wants to sell excess DG production to the grid, the customer may do so via the state-approved qualifying facility rate under PURPA or other state program such as a feed-in tariff.

23

Net Metering (continued)

- Similarly, NEM is not a means for DG customers to reduce either consumption of energy or usage of the grid. Total energy consumption (i.e., personal use of DG production plus electric purchases from the grid) may be totally unchanged by the addition of DG. And the NEM customer continues to rely on the grid nearly every hour of the day and night, not only for purchases of energy from the grid but for banking of DG generation in excess of personal use and for energy services to start compressor motors on air conditioners and refrigerators.
- The real benefits to the DG customer from NEM are that (1) the NEM customer is permitted to "bank" DG production in excess of immediate personal use for "withdrawal" at a later time, thereby avoiding paying for an actual purchase from the grid; (2) the NEM customer is not charged for the administrative costs of banking; (3) the NEM customer avoids any difference between the value of the banked DG kWh and the withdrawn DG kWh because NEM incorrectly presumes each to be equal to the utility rate block the NEM customer avoids paying; and (4) to the extent that the utility rate block that the NEM customer avoids paying includes any fixed costs, the NEM customer avoids paying those also.

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Net Metering (continued)

- To the extent the two-part residential rate design is inverted with multiple blocks, DG alone may be sufficient to enable the DG customer to avoid the tail block of the retail electric rate (i.e., the highest priced rate block and the one with the greatest proportion of fixed and demand related costs inappropriately included in the rate block).
- NEM should be prospectively eliminated and replaced by separately determining the value of the DG production delivered to the grid. That determination should be made by regulators based upon testimony and reliable evidence, while keeping in mind that it is retail electric customers and not the utility that ultimately pays the value determined.
- To the extent a DG customer wishes to purchase DG banking services, the utility should have the option to offer such service but the costs of that service should not be shifted to other customers as they currently are with NEM.

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Getting The Rates Right – Part 3
Valuing DG Deliveries To The Grid

Recommendation: The price paid to a DG customer for energy delivered into the grid should be determined separately from the utility's rates for retail sales. The vertically-integrated utility's bundled retail electric rate and the distribution utility's unbundled delivery rates have no relationship to the benefits to/costs avoided by the grid as a result of a unit of DG production used by the DG customer or delivered to the grid. The price paid for energy delivered into the grid by the DG customer should be based on the actual costs that other customers and the grid avoid at the time of and as a result of the DG production. Keep in mind that it is customers, not the utility, that pay for DG production delivered into the grid.

- DG production is just another form of third-party supply that is delivered into the grid. DG production that the DG customer does not use and wishes to sell to the grid rather than bank should be priced based on the actual costs that other customers and the grid avoid at the time of and as a result of the DG production, consistent with other forms of third-party supply not subject to RFPs (e.g., QFs).

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Valuing DG Deliveries To The Grid (continued)

- The price paid for DG deliveries to the grid should be capped based on the market price for comparable energy (e.g., solar or wind bids in RFPs), wherever possible, since that price reflects the alternative or avoided costs for the grid and its customers.
- Valuation based on market prices may be adjusted for actual short-term avoided costs of distribution (e.g., losses) to the extent it is proven those costs are avoided by virtue of the DG energy delivered to the grid.
- Keep in mind that it is customers, not the utility, that pay for DG production delivered into the grid.

27

Getting the Rates Right – Part 4 Incentivizing Maximum DG Production Coincident With Grid Peak

Recommendation: Where feasible, compensation for DG production in excess of the DG customer's personal usage should be time-differentiated and based on the costs the grid avoids at the time DG production is delivered to the grid.

- The DG customer's peak energy production is unlikely to be coincident with the utility's system peak, in part because the current non-time-differentiated, two-component rate design used for NEM fails to provide any incentive to the DG customer to maximize production coincident with the utility system and circuit peaks.

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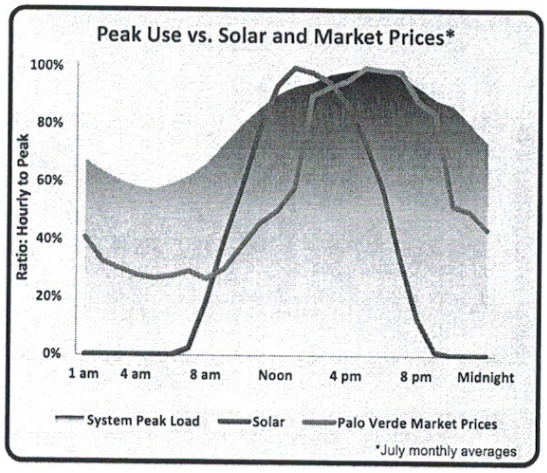
Non-coincidence of Western peak load, prices and wind & solar production

- System peak loads in the West occur after 6:00 p.m. (blue)
- Market prices are highest during system peak (green)
- Solar and wind peak production is not coincident with either peak load or peak prices (red)



The graph depicts the timing of the maximum of the curves, not the absolute amounts

29

Incentivizing Maximum DG Production Coincident With Grid Peak (continued)

- A three-component rate for utility sales to DG customers provides desirable incentives for DG customers to (1) avoid rapid ramping up of purchases from the grid as DG production wanes; (2) reduce personal usage (purchases) from the grid at the time of highest grid prices (i.e., peak periods); and (3) maximize DG production at the time that it has the highest value to the grid.

- Since the value of DG deliveries to the grid varies with time and grid conditions, further incentive to maximize the amount of DG production offered to the grid at the time of highest grid costs and highest grid benefit can be provided if compensation for DG production in excess of the DG customer's personal usage is also based on the costs the grid avoids at the time DG production is delivered to the grid.

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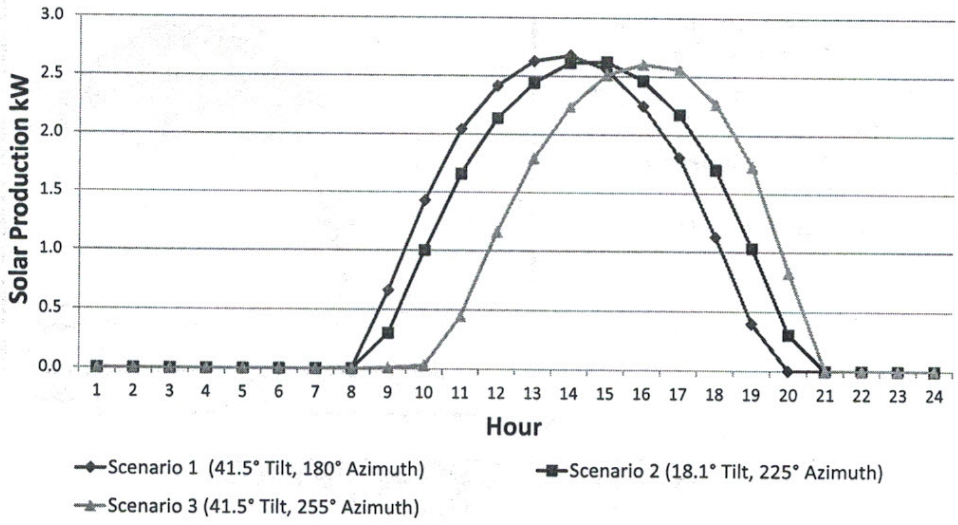
Solar Production on Simulated System Peak Day



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