0000172218

ORIGINAL

Memorandum

From the office of
Commissioner Andy Tobin
Arizona Corporation Commission
1200 W. WASHINGTON
PHOENIX, ARIZONA
(602) 542-3625

TO: Docket Control

DATE: August 4th, 2016

FROM: Commissioner Andy Tobin's Office

SUBJECT: Docket No. # E-00000J-16-0257

Attached please find Sean Gallagher presentation entitled "Rate Design & Reducing System Peak Demand" for the Reducing System Peak Demand Costs Workshop on August 4, 2016.

.

Arizona Corporation Commission
DOCKETED
AUG 03 2016
DOCKETED BY

RECEIVED
AZ CORP COMMISSION
DOCKET CONTROL
2016 AUG -3 A 10: 54

CERTIFICATION OF SERVICE

On this 4th day of August, 2016, the foregoing document was filed with Docket Control as a correspondence from Commissioner Andy Tobin, and copies of the foregoing were mailed on behalf of Commissioner Andy Tobin to the following who have not consented to email service. On this date or as soon as possible thereafter, the Commission's eDocket program will automatically email a link to the foregoing to the following who have consented to email service.

Diane E. Brown
Arizona PIRG Education Fund
130 N. Central, STE. 202
Phoenix Arizona 85004

Janice Alward
1200 W. Washington
Phoenix Arizona 85007

Thomas Broderick
1200 W. Washington St.
Phoenix Arizona 85007

Dwight Nodes
1200 W. Washington
Phoenix Arizona 85007-2927

By: _____
Jennifer Bontrager
Assistant to Andy Tobin

RATE DESIGN & REDUCING SYSTEM PEAK DEMAND

Sean Gallagher
Vice-President, State Policy
Solar Energy Industries Association

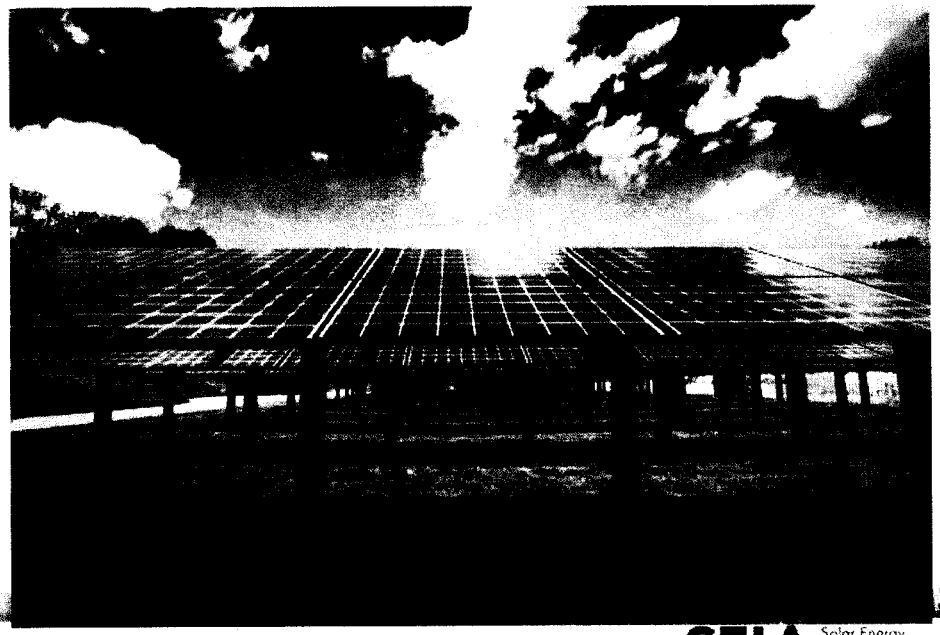
Special Open Meeting of the Arizona Corporation Commission
Legislative Workshop: Reducing System Peak Demand Costs

August 4, 2016

© 2016 Solar Energy Industries Association®

About SEIA

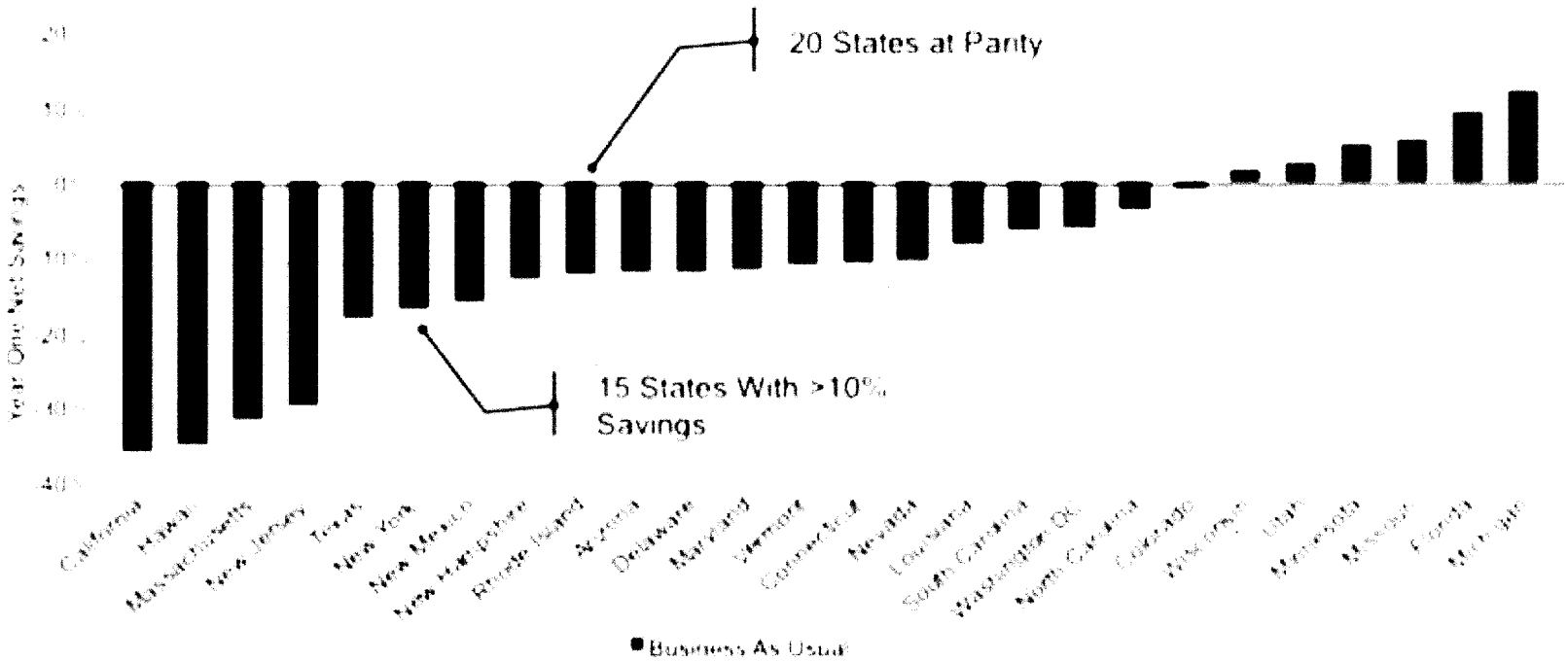
- U.S. National Trade Association for Solar Energy
  - Founded in 1974
  - 1,000 member companies from all 50 states
- Our Mission: Build a strong solar industry to power America
- Our Goal: 100 gigawatts of solar capacity by 2020
- SEIA has litigated demand charge issues in rate cases in California, Texas, Colorado, Massachusetts, and Arizona



© 2016 Solar Energy Industries Association®

Net Metering & Rate Design (1)

- **Under current rate design, distributed generation solar at grid parity in 20 states**

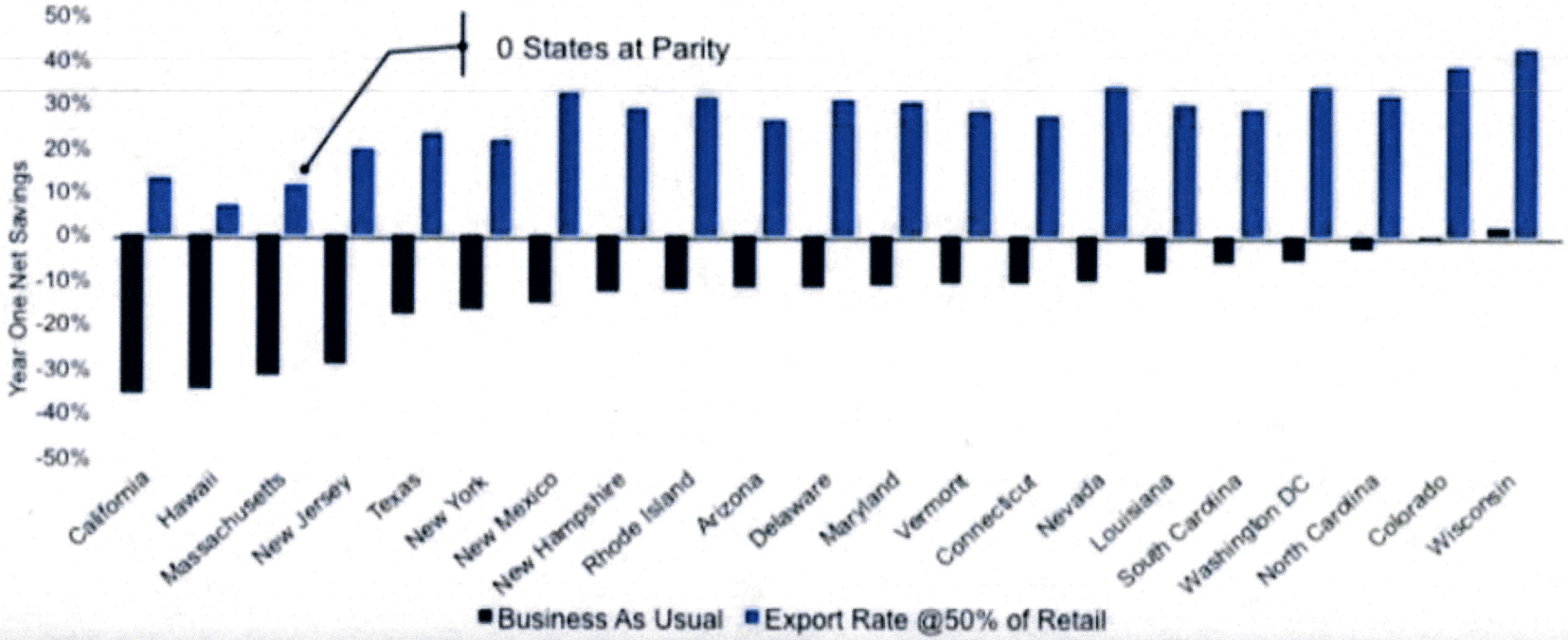


Source: Shayle Kann, GTM Research
U.S. Solar Market Insight Conference
Keynote: *The Future of Solar*

© 2016 Solar Energy Industries Association®

Net Metering & Rate Design (2)

- **If export rate is cut in half, 0 states at grid parity**



Source: Shayle Kann, GTM Research *U.S. Solar Market Insight* Conference Keynote: *The Future of Solar, Nov 2015*

© 2016 Solar Energy Industries Association®

SEIA Solar Energy Industries Association®

Cost shifts, or "cross-subsidies," are inherent in utility rate design

Examples include:

- **Multi-family** subsidizes **Single-family**; an apartment building is served by a single transformer bank, and the utility never sees the individual demand of individual units – only the consolidated demands of the group. But a large apartment building, under high fixed charge rate design, will pay much more than an otherwise identical-to-serve load (kw, kWh, hourly usage) at a hotel or office building served through a single meter.
- Customers served with (cheaper) **overhead** service subsidize customers served with (more expensive) **underground** service who actually receive more reliable service (storm outages)
- **Urban** customers subsidize **suburban and rural** customers; there are typically 500 customers per circuit-mile urban, 100 suburban, 10 rural
- Customers with sporadic and generally **off-peak** demand usage who are served on demand charge rates (high-school stadium, large churches) subsidize customers with predominantly **on-peak** usage (office buildings) served on the same tariff.

Utilities and regulators that are truly concerned about such preferences should address all of these, rather than singling out solar customers.

© 2016 Solar Energy Industries Association®

Benefits of Distributed Solar Typically Equal or Exceed Costs

- Solar industry agrees that **all customers should pay a fair share of grid costs**.
- Rooftop **solar provides a wide range of benefits**, including avoided generation, transmission and distribution capacity, lower wholesale market prices, reduced volatility, and avoided pollution
- A determination of net costs or benefits to nonparticipating ratepayers, requires a **comprehensive study of costs and benefits**.
- Recent studies, collected on the SEIA website, show that **in most cases, the benefits of rooftop solar exceed the costs to non-participating ratepayers**.
- Environment America found that **eight analyses out of 11 concluded that the value of solar energy was worth more than the average residential retail electricity rate** in the area at the time the analysis was conducted. The three analyses that found different results were all commissioned by utilities.
- An analysis by the **non-partisan Brookings Institution** of all of the major cost-effectiveness studies to date found that net metering provides a net benefit to ratepayers. The paper **finds that: "In short . . . net metering is more often than not a net benefit to the grid and all ratepayers**."
- A full accounting of the costs and benefits of net metering across all customer classes should be undertaken for any particular state or region before a determination is made that changes are warranted to rectify unfair cost-shifting between customers within a class of ratepayers.

http://www.seia.org/news/tech-solar-organizations-release-paper-rate-design-distributed-grid

© 2016 Solar Energy Industries Association®

Impacts of Distributed Generation on rates is *de minimis* until significant penetration is reached

Summary of base case results

BERKELEY LAB

	ROE Impacts (Avg. 10-yr)		Earnings Impacts (NPV 20-yr)		Average Retail Rate Impacts (Avg 20-yr)	
PV Penetration	*2.5%*	*10.0%*	*2.5%*	*10.0%*	*2.5%*	*10.0%*
Southwest Utility	-0.3%	-2.9%	-3.9%	-8.1%	0.0%	2.5%
Northeast Utility	-4.7%	-18.1%	-4.5%	-15.4%	0.2%	2.7%

Under base-case utility characterizations:

- PV reduces utility revenues, collected largely based on customer sales and demand, by a *greater* amount than it reduces utility costs
- Utility shareholders experience revenue erosion and lost earnings opportunities, leading to reduced ROE and achieved earnings
- Ratepayers experience increase in average retail rates, though those effects are generally less pronounced than shareholder impacts

© 2013 Solar Energy Industries Association®

SEIA Solar Energy Industries Association®

"Rate Design for a Distributed Grid"

- By reducing peak demand, Solar reduces energy and capacity needs.

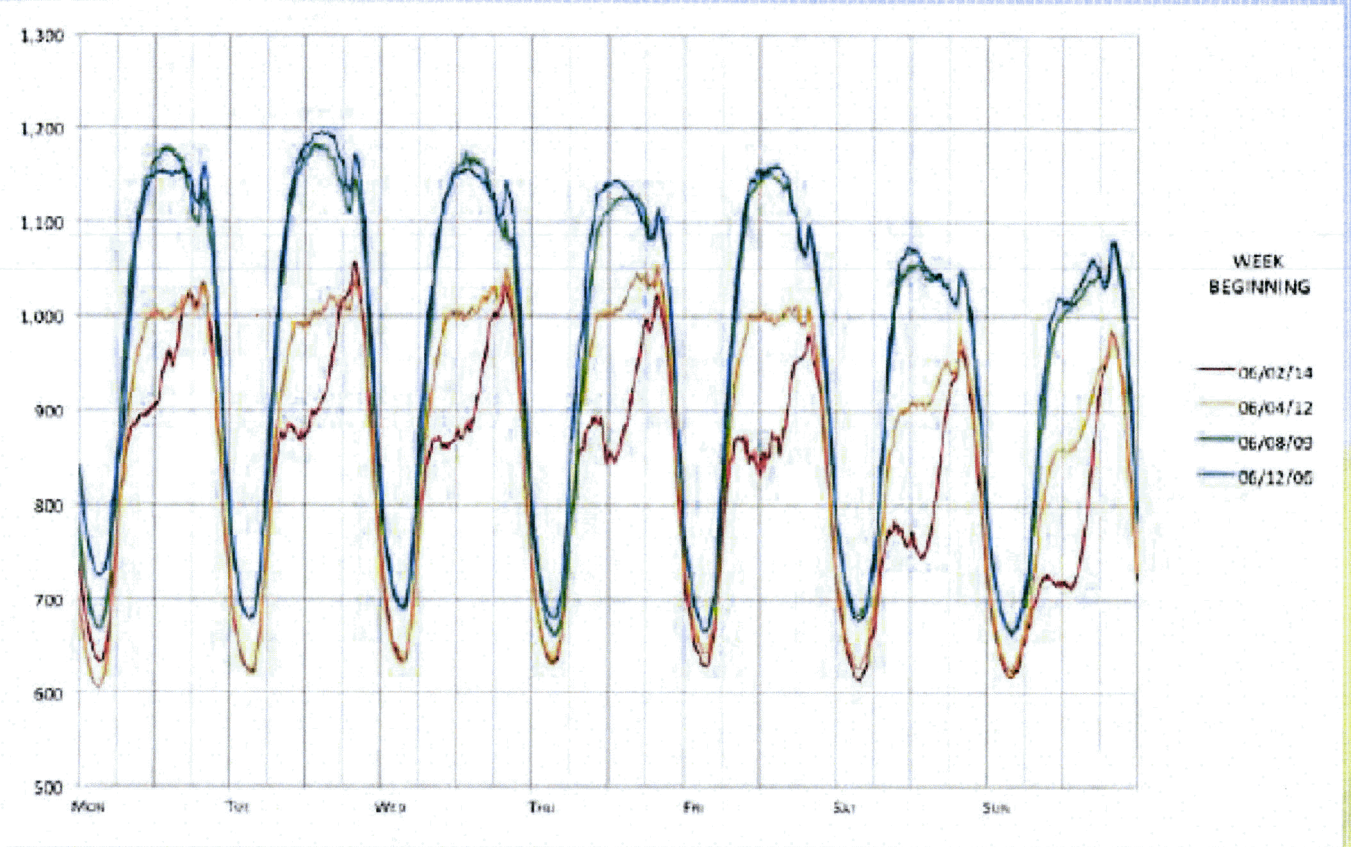


Figure 1-7. O'ahu System Load Profiles, 2006–2014

Source: http://www.seia.org/news/tech-solar-organizations-release-paper-rate-design-distributed-grid

© 2015 Solar Energy Industries Association®

SEIA Solar Energy Industries Association®

"Rate Design for a Distributed Grid"

We conclude this paper by offering the following recommendations:

- **Study the impact** of distributed resources by conducting a rigorous analysis of the costs and benefits
- **Design electricity rates that empower customers** to control energy costs and adopt new technologies that provide system benefits
- **Implement technology standards** to gradually increase the functionality and benefits of distributed resources
- **Incorporate distributed resources into utility planning** in order to defer or replace traditional infrastructure
- **Update utility business models** so that utilities have greater financial incentive to rely upon customer-sited distributed resources to meet infrastructure needs
- **Implement rate changes gradually** and incrementally, with grandfathering for customers who made long-term capital investments on the basis of previously existing rates

Source: http://www.seia.org/news/tech-solar-organizations-release-paper-rate-design-distributed-grid

© 2016 Solar Energy Industries Association®

Significant Downsides to Demand Charges for Residential and Solar Customers

- Demand charges are **an historical artifact of past meter limitations**. We can do better.
- Demand charges are **not cost-based for solar customers**, whose loads may peak on cloudy or cool days.
- Demand charges are **not cost-based for residential customers** where there is significant diversity of loads and individual loads are too small to have an appreciable impact on local capacity. They are more appropriate for larger C&I customers.
- Demand charge-based rates **are complex to understand and to analyze**. E.g. customers may not know when their refrigerator, water heater, etc. are running.

© 2016 Solar Energy Industries Association®

Significant Downsides to Demand Charges for Residential and Solar Customers

- Demand charges have **limited appeal for residential customers**. Customers understand and prefer TOU rates.
- Demand charges have **regressive bill impacts similar to fixed charges**. The biggest impacts are on **lower-income customers who have low load factors** and whose electricity demand is dominated by essential air conditioning use.
- Demand charges for residential solar customers have recently have been **rejected in both California and Nevada**, though these state commissions have dramatically different attitudes toward the merits of customer-owned rooftop solar.
- Residential **TOU/CPP pilots have shown that such rates work to reduce peak demand** and produce customer savings.

© 2016 Solar Energy Industries Association®

NARUC Staff Subcommittee on Rate Design (1)

- **Demand charges have long been used in commercial and industrial customer class rates**, but have not historically been applied to other customer classes.
- **Parties advocating for the use of demand charges** on a more widespread basis **state that the short-run costs of the distribution system are all fixed** in nature and should be proportioned among customers in the same rate class based on their maximum demand regardless if it contributes to a system peak.
- Advocates argue that **demand charges can ensure greater revenue certainty and cost recovery for the utility** – and costs are better covered by the cost causers (unlike NEM, or other rates which offset distribution costs). Since the costs are recovered based on individual peaks rather than overall volume of usage, which can vary greatly from year to year, there is also more certainty that the utility will be able to fully recover its authorized return. In this way **it reduces risk for the utility**.
- However, as opponents argue, **there are many unknowns and uncertainty surrounding the use of demand charges on classes other than C&I** – mainly regarding customer impacts. Empirical data on the impacts and customer acceptance and responses to residential and small commercial demand charges are insufficient.
- While **demand charge structures** may encourage reduction in peak (depending on how peak is defined), it **may not send an adequate conservation signal to reduce usage**, if implemented with an associated reduction in kwh/volumetric costs, and subsequently the costs of generation (as compared to volume-based rates).

© 2016 Solar Energy Industries Association®

NARUC Staff Subcommittee on Rate Design (2)

- Additionally, **demand charges do not assist in customer understanding of the rate design** as there is a small margin for customer error; higher bills can be earned through a shorter timeframe of a lapse of attention (*i.e.*, too many appliances on at once) and can result in the possibility of higher bill volatility from month to month.
- **Lower income customers (or those with low load factors) are especially hard hit** as they can have less control over peak demand usage. Lastly, demand charges, if a large portion of a customer's distribution bill, would over collect customer costs as demand costs.
- Using a **coincident peak method better aligns the demand charge with economic principles** (to align costs to cost causers, among others), **however, coincident peak demand charges can be harder to understand and can lead to reduced rate stability on the part of the customer**. Notably, customers and the utility may not know when the system peak occurred until the end of the month.
- Use of **the non-coincidental peak method in determining an individual customer's appropriate share of demand charges is functionally problematic**. Non-coincidental peak usage does not correlate with how the system is designed, and costs are incurred, as the system needs to be designed for peak usage. In other words, if a customer's peak demand occurs in non-peak hours, there is likely plenty of available capacity, which has little economic impact on the utility's costs to serve that demand.

* DRAFT NARUC MANUAL ON DISTRIBUTED ENERGY RESOURCES COMPENSATION, http://pubs.naruc.org/pub/88954963-0F01-F4D9-FBA3-AC9346B18FB2

© 2016 Solar Energy Industries Association®

"Charge Without a Cause?"

The goal of this document is to unpack the key elements of demand charges and explore their effect on fairness, efficiency, customer acceptability and the certainty of utility cost recovery. As will be evident, **most applications of demand charges for small customers perform poorly** in all categories. Following are **five key takeaways**:

- Residents and small businesses are very diverse in their use of electricity across the day, month and year — **most small consumers' individual peak usage does not actually occur during peak system usage overall**. This means that traditional demand charges tend to overcharge the individual small consumer.
- **Apartment residents are particularly disadvantaged by demand charges** because a particular apartment resident's peak usage isn't actually served by the utility. Utilities only serve the combined diverse demand of multiple apartments in a building or complex rather than the individual apartment unit.
- **Demand charges are** complex, **difficult for small consumers to understand**, and not likely to be widely accepted by the small customer groups.
- **Very little of utility capacity costs are associated with the demands of individual small consumers**. Nearly all capacity is sized to the combined and diverse demand of the entire system, the costs of which are not captured by traditional demand charges. **If consumers actually were able to respond to a demand charge by levelizing their electricity usage across broader peak periods, then utilities would incur revenue shortages without any corresponding reduction in system costs**.
- **Demand charges do not offer actionable price signals to small consumers** without investment in demand control technologies or very challenging household routine changes. This results in effectively adding another mandatory fixed fee to residential and small consumer electric bills.

Paul Chernick, John T. Colgan, Rick Gilliam, Douglas Jester, Mark LeBel, "Charge Without a Cause: Assessing Electric Utility Demand Charges on Small Consumers, July 18, 2016. Available at http://www.seia.org/research-resources/demand-charges

© 2016 Solar Energy Industries Association®

Arizona Demand Charge Case Study

- **APS' optional demand charge residential rate currently has about 10% enrollment**. The customers who self-select onto this rate design tend to be those whose usage patterns benefit from this rate option.
- Residential customers that have self-selected onto the demand rate reveals that they have an average monthly consumption nearly three times the average monthly consumption of customers on the default rate.
- We understand that **the Company markets the demand rate only to large-use customers who they think will benefit**. It is a self-selected subclass of customers with above-average usage, and above-average diversity.
- The fact that APS has marketed its optional demand charge rates for upwards of three decades with only 10% current enrollment suggests that 90% of APS's **customers have either not gained an understanding of how the demand charge rate would impact them, or they have decided that the demand charge rate is not the best option for them**.
- In a recent rate proceeding, APS revealed that **as many as 40% of its customers that recently switched to the optional demand charge rate actually increased their maximum on-peak demand**. This means that even among the customers that self-selected onto the demand charge rate, 40% did not respond to the demand charge price signal in their optional tariff.

Meghan Grabel, APS, *Residential Demand Rates: APS Case Study* 3 (June 25, 2015), *available at* http://www.ksg.harvard.edu/hepg/Papers/2015/June%202015/Grabel%20Panel%201.pdf.

Paul Chernick, John T. Colgan, Rick Gilliam, Douglas Jester, Mark LeBel, "Charge Without a Cause: Assessing Electric Utility Demand Charges on Small Consumers, July 18, 2016. Available at http://www.seia.org/research-resources/demand-charges

© 2016 Solar Energy Industries Association®

APS Customers have Chosen TOU Rates over Demand Charges

Distribution of APS Total & Solar Residential Customers by Rate Schedule – 2014 Data

APS Rate Schedule	Rate Elements	2014 Total Residential Customers			2014 Solar Customers	
		Annual kWh	Share (%)	Average kWh/month	Annual kWh	Share (%)
E-12 (standard tiered)	Tiered Rates	473,326	46%	634	9,269	37%
ET-1 (time advantage 9am-9pm)	Frozen Pre-2010 TOU Rate	152,478	15%	1,290	4,794	19%
ET-2 (time advantage noon-7pm)	TOU Rate	288,631	28%	1,182	9,879	40%
ET-SP (time advantage super peak)	TOU Rate with Super Peak	1,143	0.1%	1,180	0	0%
ECT-2 (combined advantage noon-7pm)	TOU with Demand Charge	89,125	8%	1,898	342	1%
ECT-1R (combined advantage 9am-9pm)	TOU with Demand Charge	29,024	3%	2,102	664	3%

Source: APS workpapers for its cost-of-service study submitted in Docket No. E-00000J-14-0023.

© 2016 Solar Energy Industries Association®

SEIA Solar Energy Industries Association®

National Grid Pilot TOU/CPP Results

Figure E-1. Key Findings from Interim Evaluation of Smart Energy Solutions

Energy and Demand Savings for Active Customers	• Load reductions ranged from 10% to 31% (0.12 to 0.56 kW) during Conservation Day Peak Events depending on the combination of rates and technology • Nearly 5% (approximately 30 kWh per month) energy savings from January - September 2015 for most customers on CPP
Enabling Technologies Increase Demand Savings for Active Customers	• Customers with programmable communicating thermostats have the highest load reductions (29%-31% on CPP and 22% on PTR) • Customers with in-home displays are next (17% on CPP and 9% on PTR), followed by customers with Web Portal access only (12% on CPP and 10% on PTR)
Bill Savings	• Average per customer bill savings of $109 from Janaury - September 2015 for customers on CPP • Average total rebates of $20 for summer 2015 Conservation Day Peak Events for customers on PTR
High Retention Rate	• 98% of customers remained in the Pilot as of November 9, 2015 after rates went live on January 1, 2015.
High Customer Satisfaction	• 72% of customers are "very satisfied" or "somewhat satisfied" with Smart Energy Solutions

Source: Navigant analysis

© 2016 Solar Energy Industries Association®

Faruqui's 2012 Multi-National TOU Survey

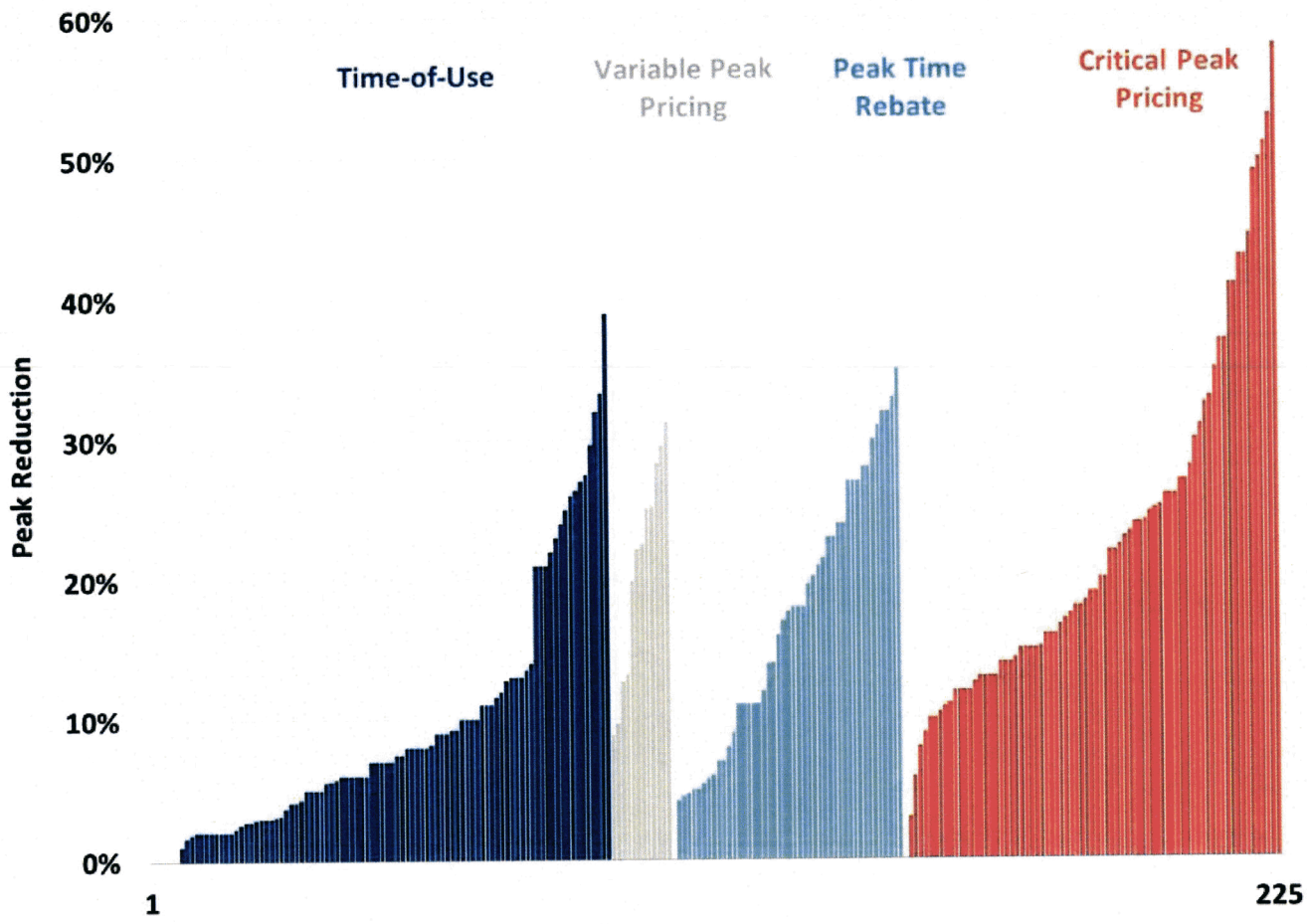
- **Among the *potential* benefits are**:
  - avoided or deferred resource costs (including generation capacity and, to a lesser extent, transmission and distribution capacity),
  - reduced wholesale market prices,
  - **improved fairness in retail pricing** (i.e., providing a better match between the costs that customers impose on the system and the amount they are billed),
  - customer bill reductions,
  - facilitating the deployment of both distributed resources (such as solar electric systems) and end-use technologies (such as plug-in electric vehicles),
  - and environmental benefits (through possible emissions reductions).
- **We have learned a lot about time-varying rates through recent pilots**. Load shifting increases as the strength of the price signal increases, but at a decreasing rate. Low-income customers have been found to be price responsive, although not always as responsive as the average residential customer.
- **Survey** included 24 recent residential pricing pilots that were conducted by utilities in North America, Europe, and Australia between 1997 and 2011 **demonstrated that time-varying rates induce peak load reductions**:
  - CPP programs supported with enabling technologies that automate the customers' response result in the largest reductions in load.
  - CPP programs alone (without an enabling technology) also achieve significant reductions in load.
  - TOU programs without enabling technologies do reduce load somewhat;
  - Larger average load reduction in TOU programs with enabling technologies

Source: Faruqui, *Time-Varying and Dynamic Pricing*, RAP, 2012

© 2016 Solar Energy Industries Association®

SEIA

Well-Designed TOU Rates Can Reduce Peak Loads Substantially



CAMPUT Energy Regulation Course

9 | brattle.com

Faruqui, A Global perspective on time-varying rates, CAMPUT Energy Regulation Course, June 2016

© 2016 Solar Energy Industries Association®

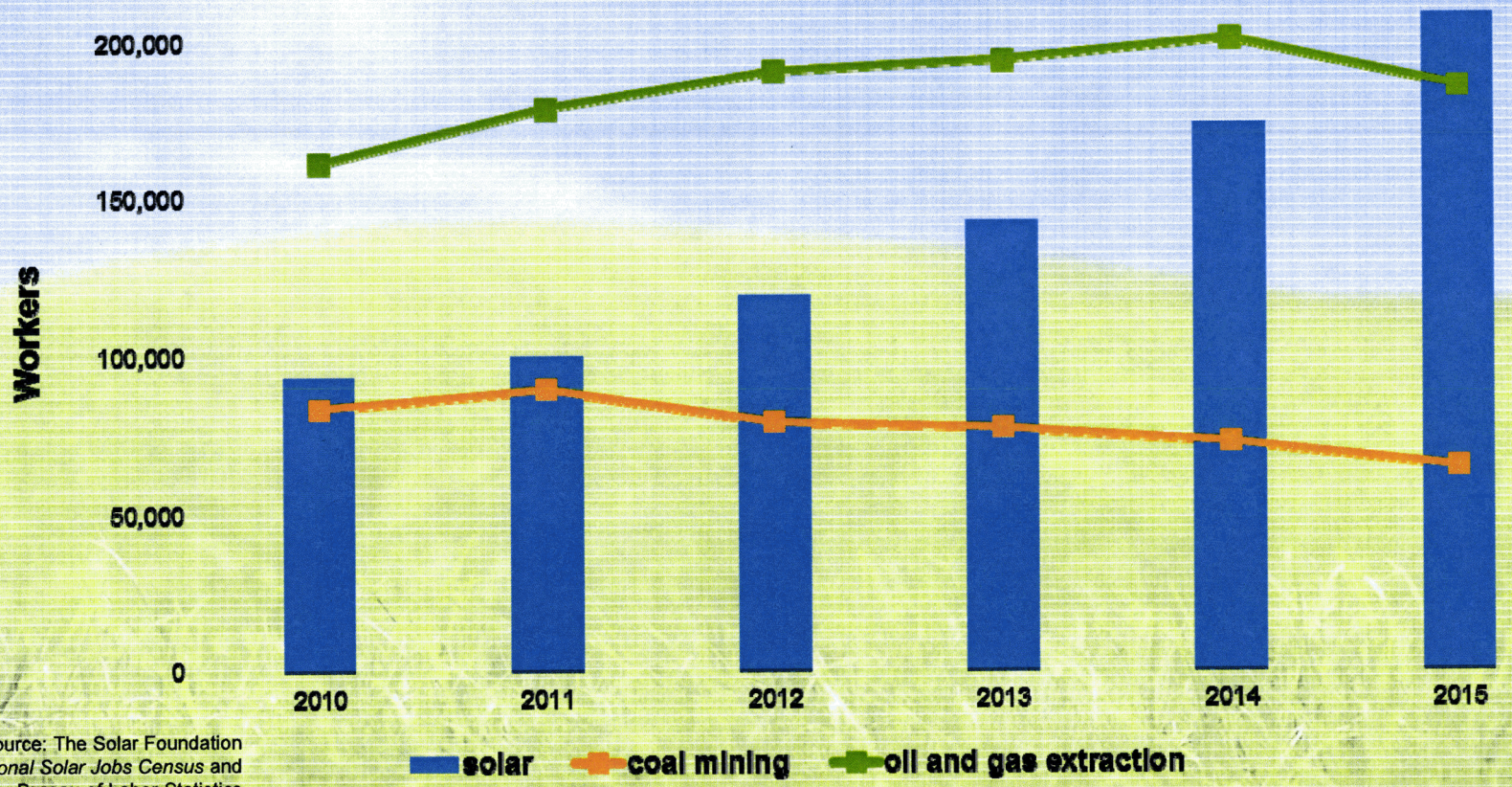
SEIA Solar Energy Industries Association®

APPENDIX

© 2016 Solar Energy Industries Association®

Solar as an Economic Engine

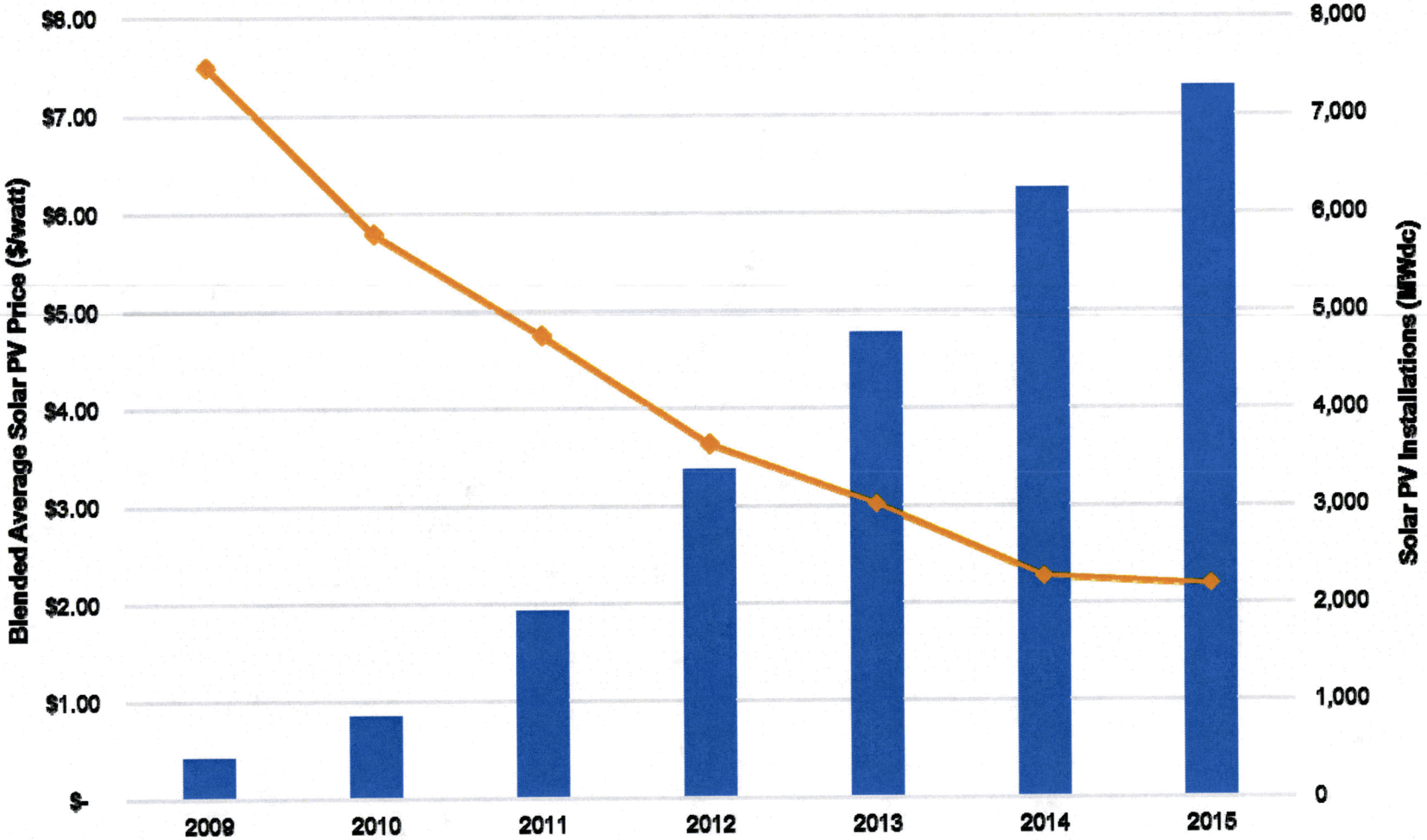
- Nearly 209,000 American workers in solar – more than double the number in 2010 – at more than 8,000 companies



Source: The Solar Foundation *National Solar Jobs Census* and Bureau of Labor Statistics

© 2015 Solar Energy Industries Association®

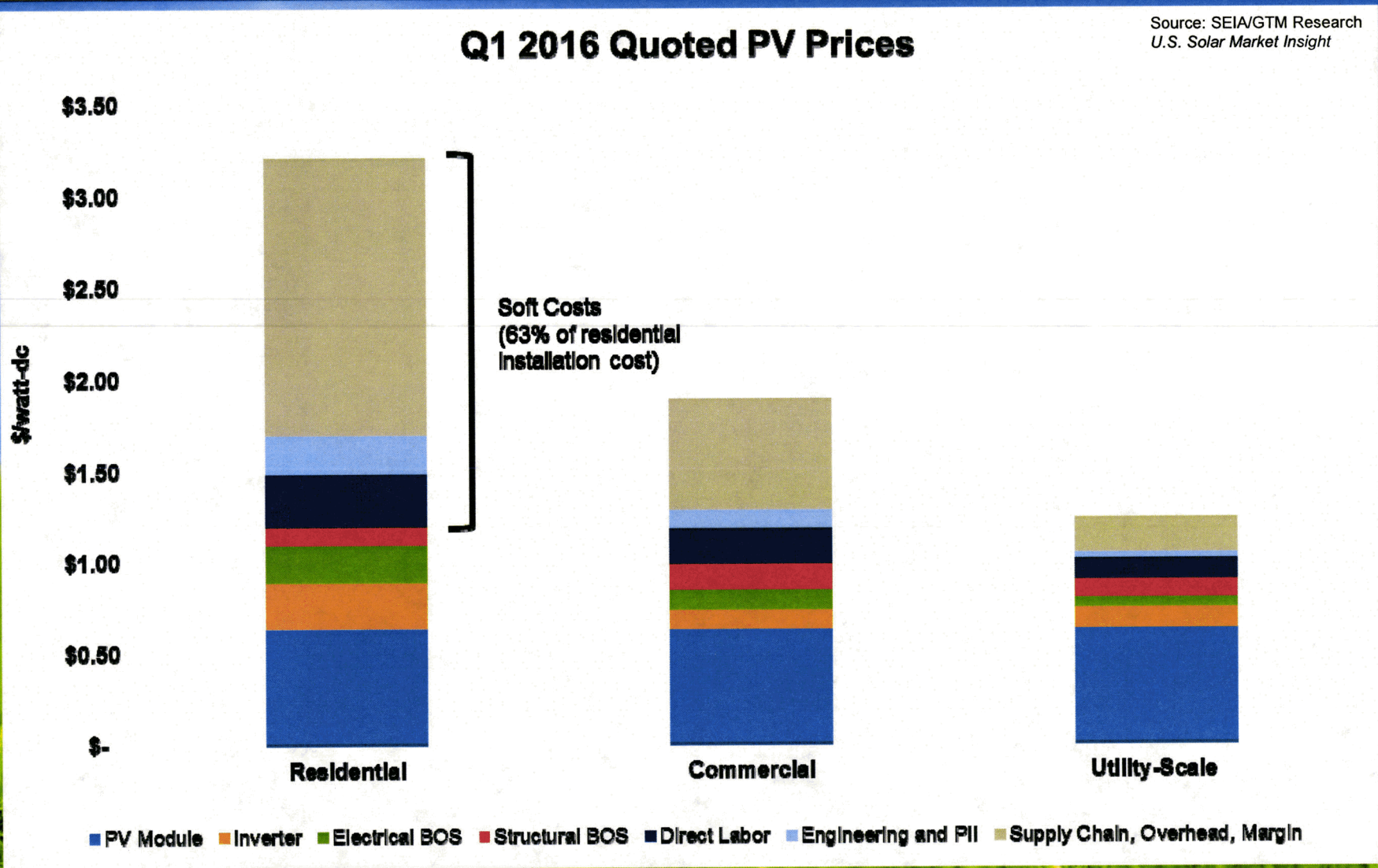
Growth in Solar led by Falling Prices



Source: SEIA/GTM Research *U.S. Solar Market Insight Q4 2015*
greentechmedia.com/research/ussmi
Lawrence Berkeley National Laboratory, *Tracking the Sun*

© 2016 Solar Energy Industries Association®

Solar PV Price Breakdown



© 2016 Solar Energy Industries Association®

Demand charges are not cost based for residential customers

- The diversity of small customer loads means that the individual peak demand of a small customer does not necessarily indicate the customer's impact on peak demand on the local distribution circuit.
- For example, a residential customer could hit its highest demand for the month on a busy morning getting ready for work and school at a time when demand is low on the local distribution system.
- More generally, the peak load of a single residential customer is too small to have an appreciable impact on local capacity. There is a level of diversity on residential circuits with many small customers such that the utility does not have to plan to size residential circuits to serve the sum of the non-coincident maximum demands of all residential customers on the circuit.
- Such diversity does not exist to the same extent on circuits serving larger customers, and thus non-coincident demand charges are more reasonably a part of commercial and industrial ("C&I") distribution rates.
- In contrast, for residential and small commercial customers it is more reasonable to collect transmission and distribution ("T&D") costs based on those customers' average demand over a summer on-peak TOU period that covers the hours when the circuit is most likely to peak.
- This can be accomplished through a volumetric TOU charge to recover T&D costs during these peak hours. A customer's kWh usage over the peak period measures the customer's contribution to the average demand during those hours and would be a reasonable, cost-based charge.

© 2016 Solar Energy Industries Association®

Demand charges are not cost-based for solar customers

- **Demand charges are typically based on a customer's maximum 15- or 60-minute usage** during the billing period, either whenever that maximum demand occurs (non-coincident) or during a defined on-peak period (coincident).
- However, **a customer's individual maximum demand is not what drives the utility to incur costs** on much of its system, particularly on the upstream portions of the system (e.g. the transmission system and distribution substations) **where there is significant load diversity**.
- Where there is significant diversity, the utility serves the aggregate, diversified demand during peak periods. In designing rates to cover the costs of this portion of the electric system, there is no need, and indeed **it can be unfair and inefficient, to base a customer's rate on its individual maximum demand**.
- Instead, a customer's average demand (i.e. its volumetric usage) during a peak TOU period is a far better measure of a customer's impact on these costs than the customer's maximum 15-minute demand, which may not even occur in that peak period.
- This is **particularly true for solar DG customers**, whose individual demand is likely to peak at times of lower demand, either in the evening or on cooler, cloudy days. For this reason, based on a number of cost studies of solar customers, the California PUC has adopted rates for **commercial customers who install solar that feature reduced demand charges and higher TOU** energy charges than the comparable commercial rates for non-solar customers

© 2016 Solar Energy Industries Association®

Demand charges are an historical artifact of past meter limitations

- The 15- or 60-minute maximum demand charge is simply a traditional way that utilities have charged large customers for certain costs given the past limitations on metering equipment.
- Demand charges date from the infancy of the electric industry, when meters could only record maximum usage, with no means to record the time when that maximum usage occurred.
- As a result, utilities charged for what they could measure, and developed rate designs based on the limited capabilities of the meters of the day.
- However, demand charges are increasingly obsolete because, with new metering technology, focused time varying rates (such as Critical Peak Pricing rates) will be much more accurate than traditional 15- or 60-minute maximum demand charges.
- There is no doubt that it more accurately reflects cost causation to bill a customer a high rate during the peak hours on a peak or near-peak day, than to charge a maximum demand charge based on usage that may not occur when the system is stressed

© 2016 Solar Energy Industries Association®

Demand charge-based rates are complex to understand and to analyze

- Demand charges substantially complicate customers' and vendors' ability to analyze and project the bill savings from demand-side programs, including energy efficiency, demand response, and DG.
- For example, demand data for typical home energy uses and appliances is not readily available (the federally-mandated yellow tag on a new appliance reports annual kWh usage, not 15-minute demand).
- Understanding and accepting demand charges will require customers to have access to and become familiar with data on their 60- or 15-minute demands and to be aware not just when they are using electricity, but also how much they are using in every short interval of time.
- Although smart meters are widespread in Arizona, in-home displays of current power demand are not.

© 2016 Solar Energy Industries Association®

Demand charges have limited appeal for residential customers

- Despite APS's broad success at achieving an impressive penetration of residential TOU rates, APS's residential customers have chosen the energy-only TOU rates by a 4-to-1 margin over rates with demand charges.
- Similarly, in in 2015, SDG&E conducted a survey of customer preferences for a new NEM 2.0 tariff in California. This survey only looked at possible new structures for the NEM 2.0 tariff, and did not test continuing the existing NEM 1.0 tariff based on a retail rate credit.
- The survey concluded that, for customers, the key drawbacks of the demand charge are that it is "confusing," "unpredictable (may pay more)," and "can be difficult to change behavior" to reduce your maximum 60- or 15-minute demand

© 2016 Solar Energy Industries Association®

Demand charges have regressive bill impacts similar to fixed charges

- Because demand charges are difficult for small customers to understand and to avoid, they have bill impacts similar to fixed charges.
- This includes having the greatest adverse impact on smaller customers, who tend to be lower-income customers who have low load factors and whose electricity demand is dominated by essential air conditioning use.
- A demand charge structure tends to reward large, high-income residential customers who have higher load factors.
- This is shown by the fact that APS's existing residential TOU rates with demand charges tend to attract exactly such larger, higher load factor residential customers

© 2016 Solar Energy Industries Association®

Demand charges for residential solar customers have recently have been rejected in both California and Nevada

- Both commissions expressed concern about customer acceptance, even though these state commissions have dramatically different attitudes toward the merits of customer-owned rooftop solar.
- Further, California has elected not to include residential demand charges in its new rate design for all residential customers.
- Instead, the new residential rate design will focus on energy-only TOU rates. California has also adopted CPP rates as the default rate design for all C&I customer classes.

© 2016 Solar Energy Industries Association®

Residential TOU/CPP pilots have shown that such rates work

- National Grid, a large distribution utility in New England, recently reported positive results for its *Smart Energy Solutions Pilot*, which featured TOU rates with an overlay of CPP rates during high-demand summer periods.
- The pilot achieved load reductions of 10% to 31% among active program participants during critical peak periods, as well as almost 5% overall energy use reductions, with a high degree of customer satisfaction.
- TOU and CPP rates represent a far more accurate, targeted, and cost-based means to charge customers than the traditional 15- or 60-minute maximum demand charge
- *See* National Grid Smart Energy Solutions Pilot: Interim Evaluation Report, D.P.U 10-82 (Feb. 24, 2016), http://web1.env.state.ma.us/DPU/FileRoomAPI/api/Attachments/Get/?path=10-82%2fNGrid_Smart_Energy_Solutions_R.pdf, at p. 5 and Figure E-1.

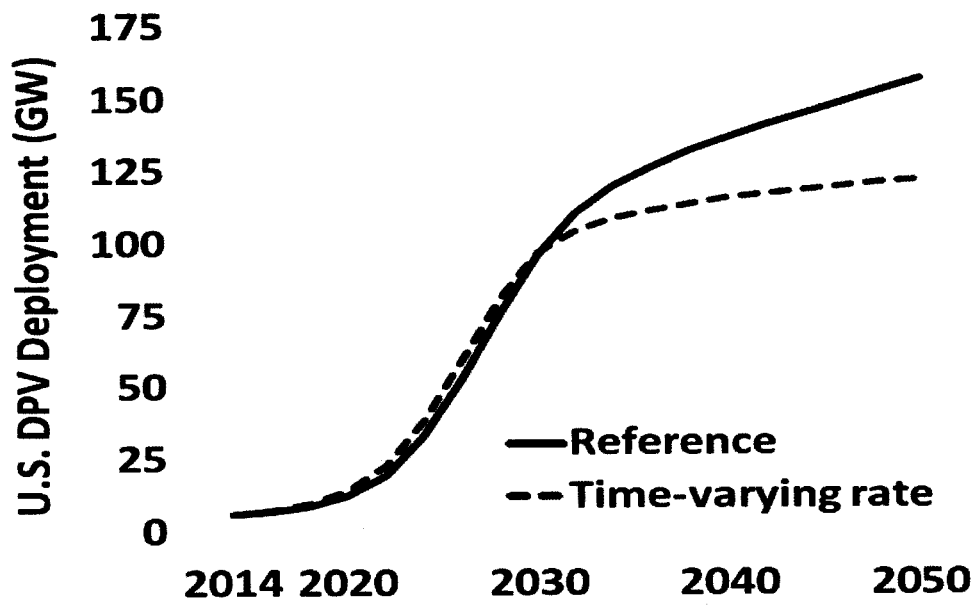
© 2016 Solar Energy Industries Association®

Rate Design Impacts Solar Deployment Rates

PV Deployment Is Highly Sensitive to Rate Designs and PV Compensation Mechanisms

Converting all customers to time-varying retail rates results in varying deployment results over time

Results in increased PV deployment in the near term, but decreased deployment in the longer term



SunShot
U.S. Department of Energy

14

© 2016 Solar Energy Industries Association®

SEIA Solar Energy Industries Association®

SEIA's Net Energy Metering Guiding Principles

1. Right to self-generate, connect to the grid, and reduce grid electricity use.
2. Properly valuing solar electricity, and adequately compensating solar customers.
3. Non-discriminatory practices within cost of service recovery.
4. No net energy metering caps.
5. Statewide application.
6. Transparency, access to data.
7. Implementation best practices.

SEIA Solar Energy Industries Association®

SEIA Rate Design Principles

1. Rates should be based on marginal costs which emphasize a long-run perspective.
2. Rates should encourage conservation and integration of renewables.
3. Rates should reduce peak demand.
4. Rates should include the development of time-of-use (TOU) tariffs.
5. Rates should be based on cost-causation principles.
6. Any rate design should not be discriminatory toward renewables.
7. Rates should have transparency, with enough availability of data so that the customer has predictability into what their rate should be.
8. Any rate redesign should minimize any impact to existing customers, such as grandfathering in existing customers (no retroactivity), with the option to opt into a new rate.
9. There should be a smooth transition to a new rate structure.
10. Customer charges should be avoided.
11. Rates should encourage economically efficient decision-making.

SEIA Solar Energy Industries Association®

AGENDA: VARYING APPROACHES TO REDUCING SYSTEM PEAK DEMAND

Rate Design

- **Lon Huber**, *Director*, Strategen Consulting, LLC
- **Dan Cross-Call**, *Manager*, Rocky Mountain Institute
- **Sean Gallagher**, *VP of State Affairs*, Solar Energy Industries Association

- What residential rate design tools are available to target system peak reduction?
  - What is a residential Time of Use (TOU) rate?
  - Can residential TOU rates reduce system peak?
  - What are the different design elements of residential TOU rates?
  - How do residential TOU rates and their various design elements impact different types of residential customers (low usage, high usage, limited-income, solar etc.)
  - How does technology interact with the implementation of residential TOU rates?
  - What is the history of residential TOU rates in Arizona? Nationally?
- What is a residential Demand Charge?
  - Can residential demand charges reduce system peak?
  - What are the different design elements of residential demand charges?
  - How do residential demand charges and their various design elements impact different types of residential customers (low usage, high usage, limited-income, solar etc.)
  - How does technology interact with the implementation of residential demand charges?
  - What is the history of residential demand charges in Arizona? Nationally?
- What studies and research examine how customers on residential TOU and residential demand rates respond to these pricing mechanisms?
  - How are Arizona's utilities leveraging this research to improve marketing, education, outreach, tools, and programs currently available to customers?
  - Examples of customers that are currently enrolled in Demand Charge program with and without demand management technology (such as NEST)
  - What roles do seasonality and geography play in rate design?

© 2016 Solar Energy Industries Association®