Advanced Rate Designs

The Eight FAQs

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THE Brattle GROUP

Digital technologies are changing the way customers interact with electric utilities

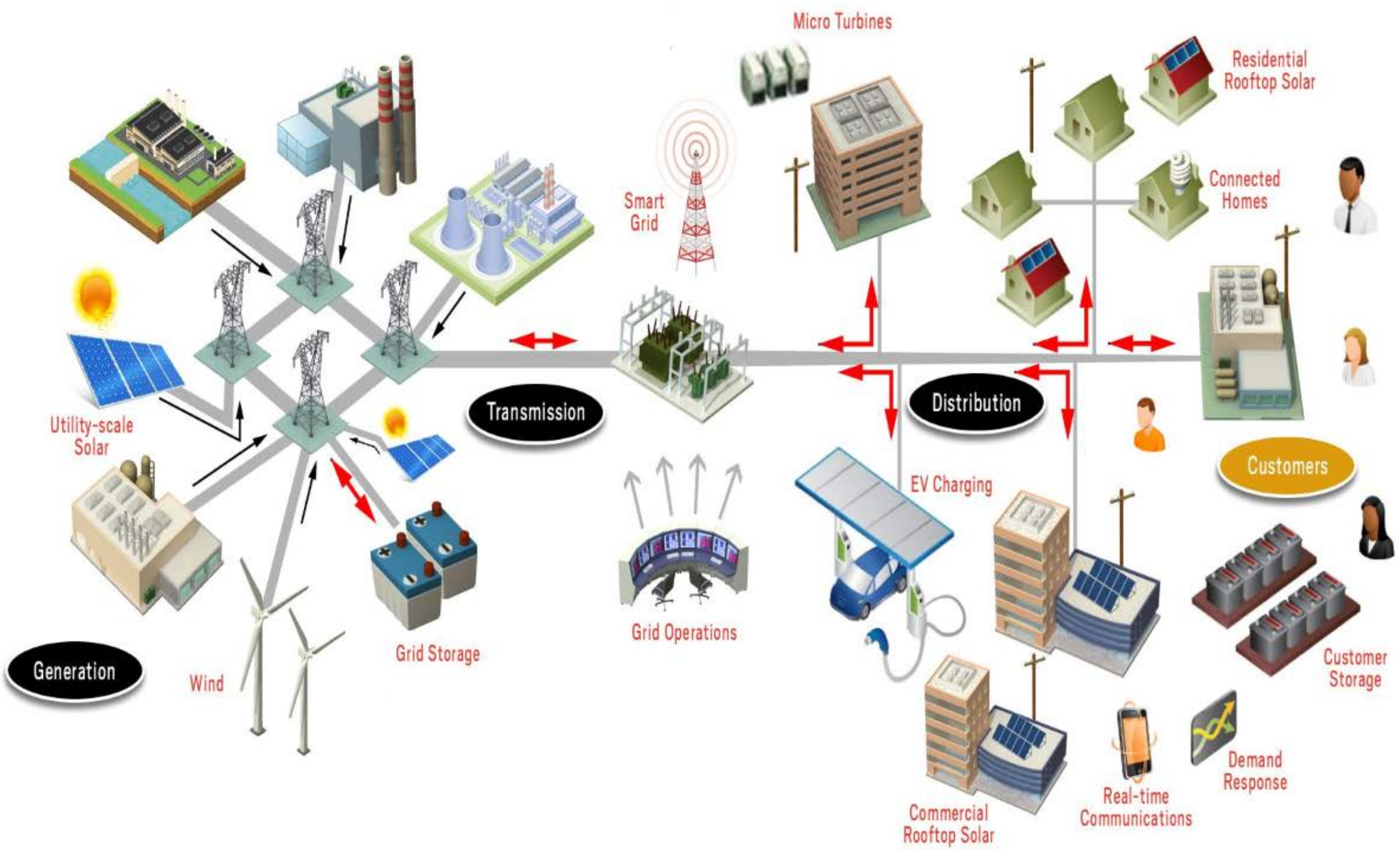
Smart homes: Smart appliances, smart thermostats, and smart phones are becoming ubiquitous

Electric vehicles: Some car manufacturers have said they will stop making gasoline-powered cars in the next decade

Distributed generation: Customers are increasingly turning into prosumers, by installing rooftop solar panels, battery storage, and fuel cells; this requires the grid to be modified to accommodate two-way energy flows

Smart metering: Advanced metering infrastructure (AMI) now covers half of the United States

To deal with these challenges, the integrated grid is beginning to take shape



Source: EPRI

Today's rate designs hearken back to an era when the Treaty of Versailles was signed

They consist of a tiny fixed charge and a flat energy charge

In 1938, rate design was called "an unfailing annoyance"

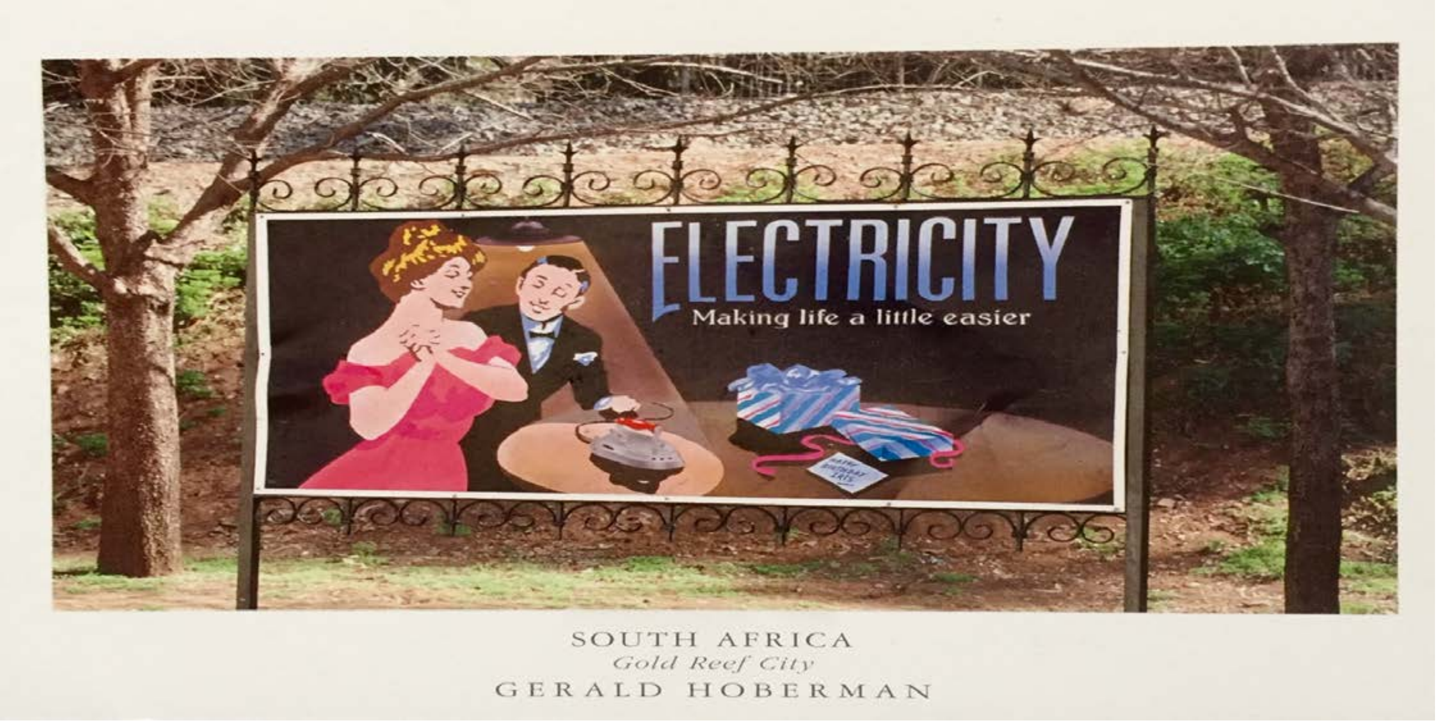
"There has never been any lack of interest in the subject of electricity tariffs. Like all charges upon the consumer, they are an unfailing source of annoyance to those who pay, and of argument in those who levy them. There is general agreement that appropriate tariffs are essential to any rapid development of electricity supply, and there is complete disagreement as to what constitutes an appropriate tariff."

-D.J. Bolton, Costs and Tariffs in Electricity Supply, London, 1938

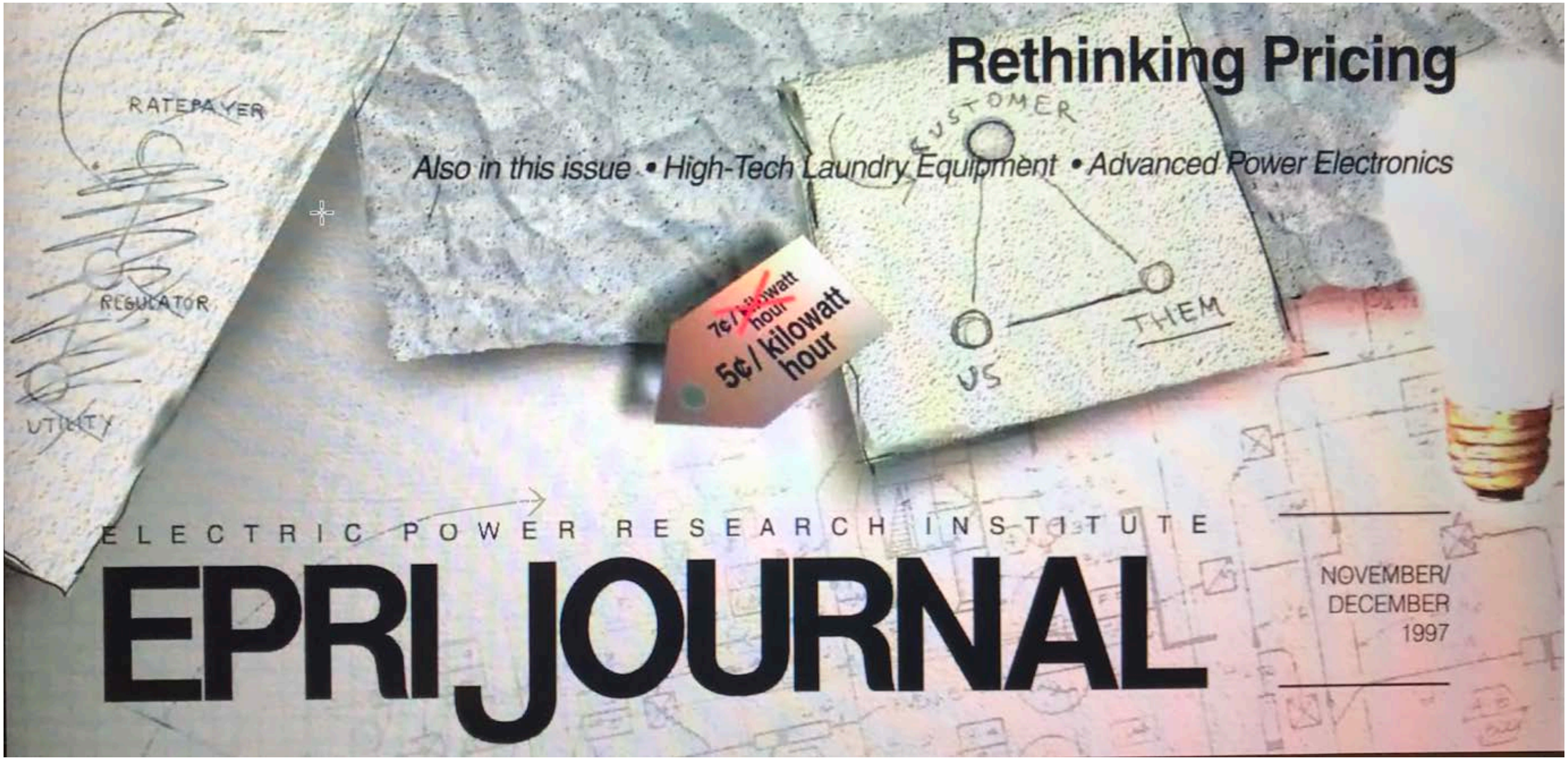
In 1951, originality in rate design was questioned

“The vast literature on electricity tariffs shows so many different views that it would be difficult to be original in proposing tariff changes.”

-Hendrik Houthakker, 1951

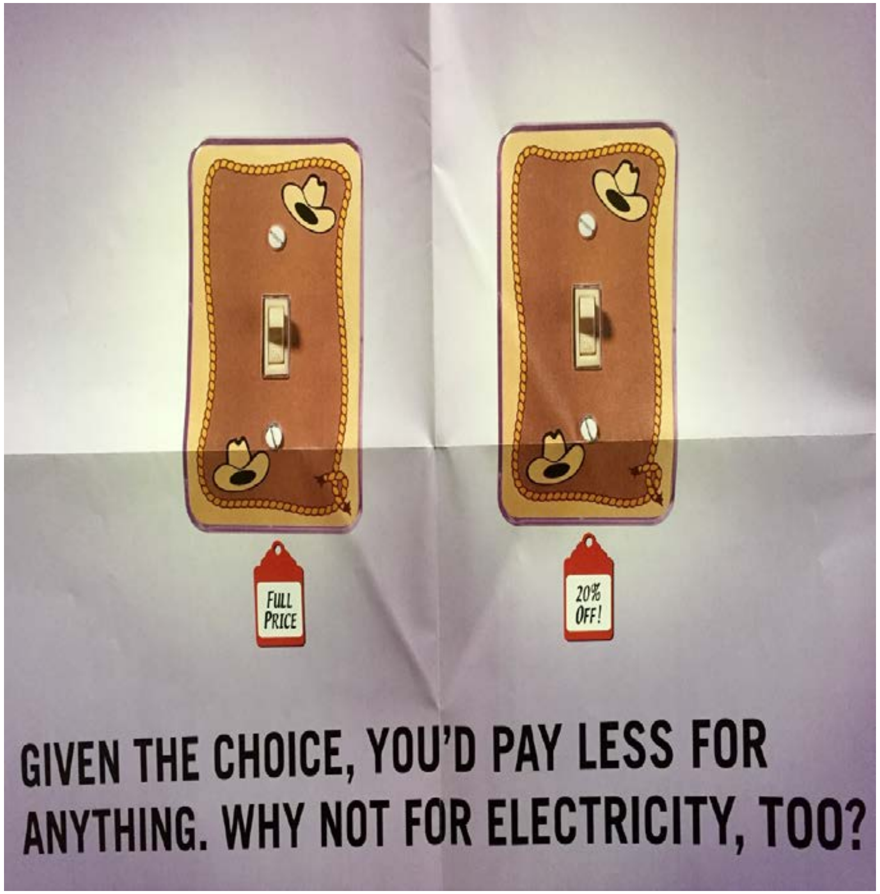


In 1997, EPRI published an essay on the need to modernize rate design

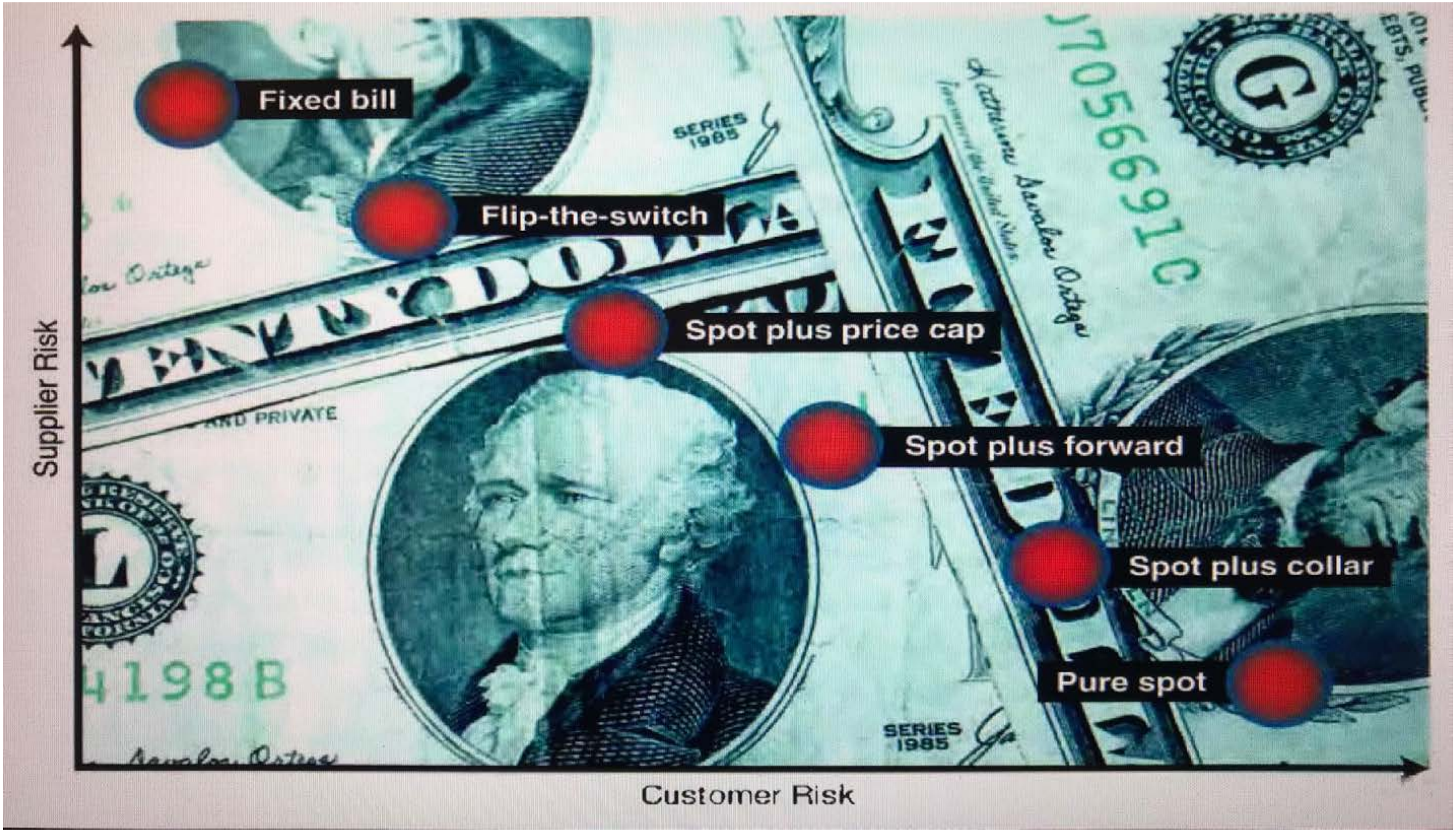


In the late 1990s, inspired by UK's Professor Littlechild, deregulation arrived on the shores of the US

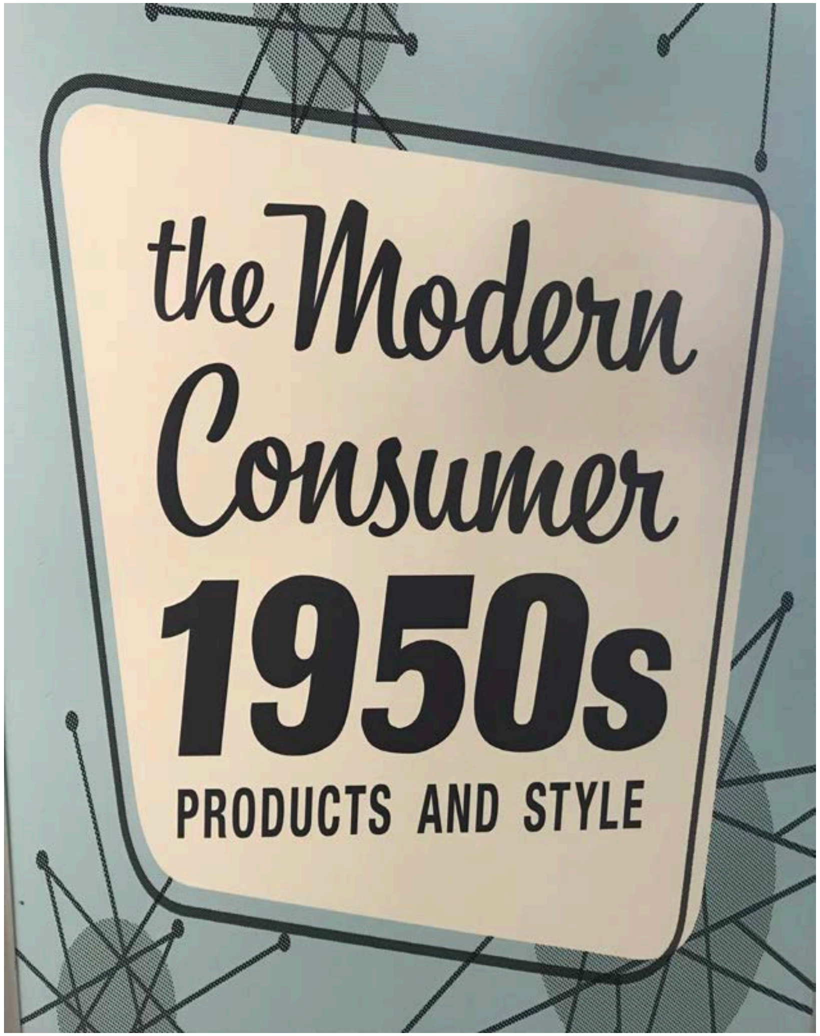
It was going to be the proverbial "Brave New World" where utilities would face competition like never before



The choices would trade-off supplier risk against consumer risk



In 2019, what was modern in 1950 is no longer modern



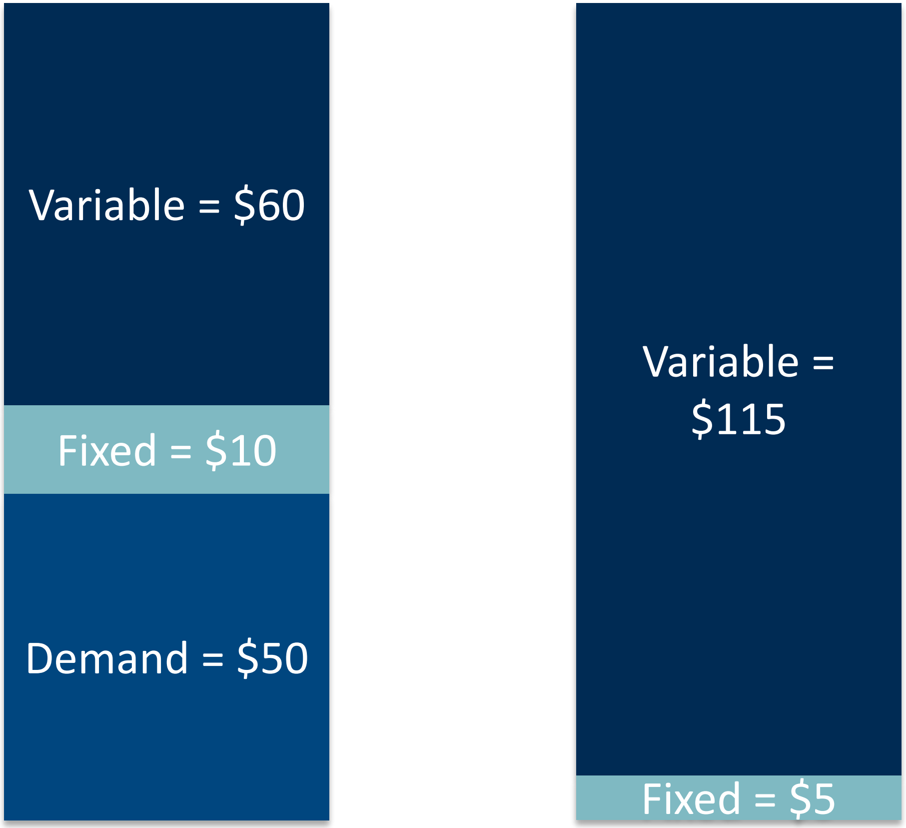
Current rate designs do not mirror the cost structure of generating and delivering electricity

Cost Categories	Utility's Costs	Customer's Bill

Variable ($/kWh)
- Fuel/gas supply
- Operations & maintenance

Fixed ($/customer)
- Metering & billing
- Overhead

Size-related (demand) ($/kW)
- Transmission capacity
- Distribution capacity
- Generation capacity



Note: Illustrative example for an electric utility.

FAQ 1. What do advanced rate designs look like?

They reflect the cost structure of electricity and thereby promote economic efficiency and equity

They allow customers to control their electricity use and bill

They incentivize energy efficiency and demand response and facilitate the development of clean energy resources

Advanced rate design provide choices to customers

FAQ 2. What are the trade-offs in rate design?

The Bonbright Principles are predicated on **cost-causation,** and allow the following objectives to be achieved

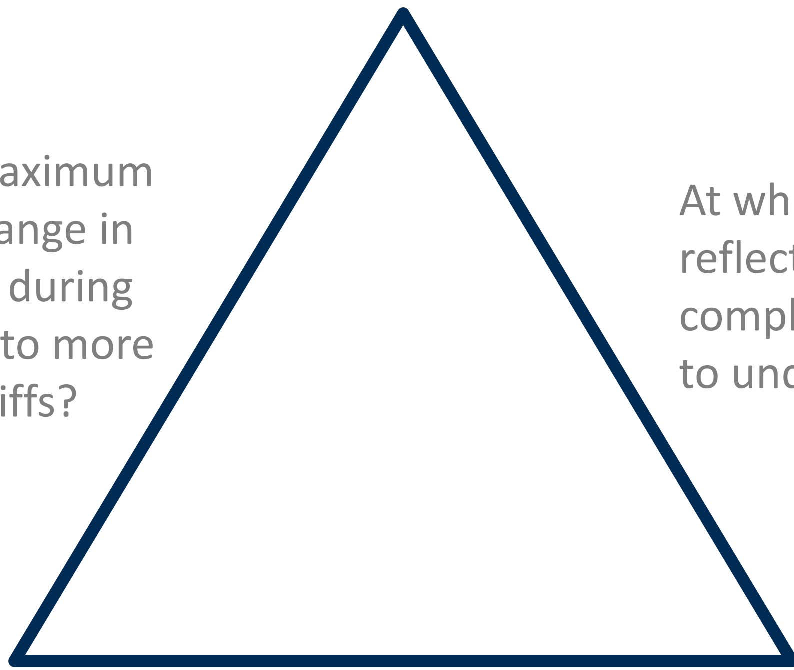
- Equity/minimization of cross-subsidies
- Reduced long-run costs due to more efficient use of the network
- Efficient siting of distributed energy resources (DERs)

Customer considerations will require that strictly cost-reflective tariff designs be modified

- Simplicity / understandability
- Customer acceptance / appeal / perceived fairness
- Mitigating large bill changes / volatility
- Protecting vulnerable customer segments

Thus, rate design involves making trade-offs against three competing goals

Cost Reflective



What is the maximum acceptable change in customer bills during the transition to more cost based tariffs?

At what point is a cost reflective tariff too complex for customers to understand?

Bill Impact

Do simple tariffs lead to significant over/under-payment by certain customer segments?

Simplicity/ Acceptability

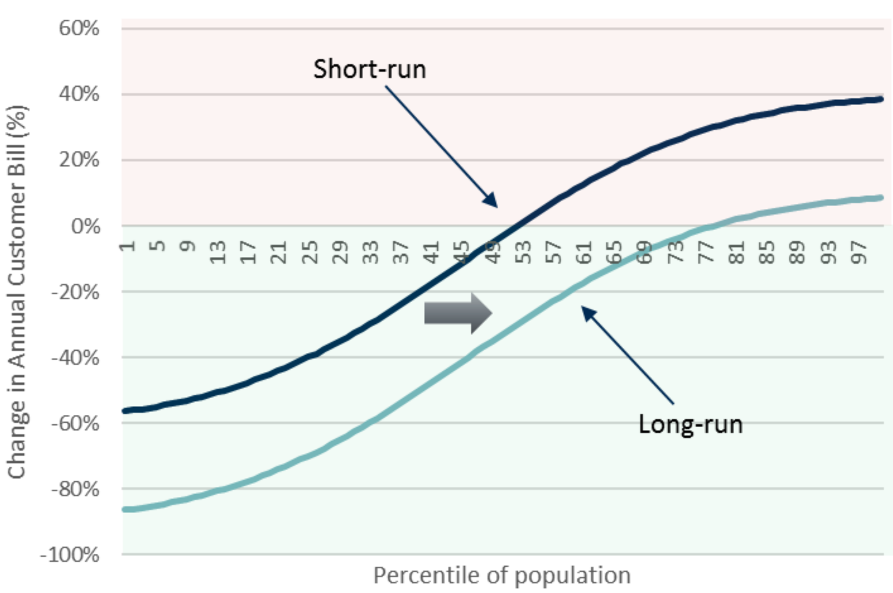
Rate design reform requires buy-in from stakeholders and, most importantly, from customers

Some of the benefits of the tariff transition, such as network cost reductions, will occur in the long-run, while impacts will be felt by customers immediately

Commonly cited stakeholder concerns about tariff changes

- Higher bills for (some) customers
- Changes to status quo are perceived to be "unfair"
- Bills for some vulnerable customers may increase, or they may be unable to respond to new price signals

Illustration of Bill Impacts due to Tariff Transition



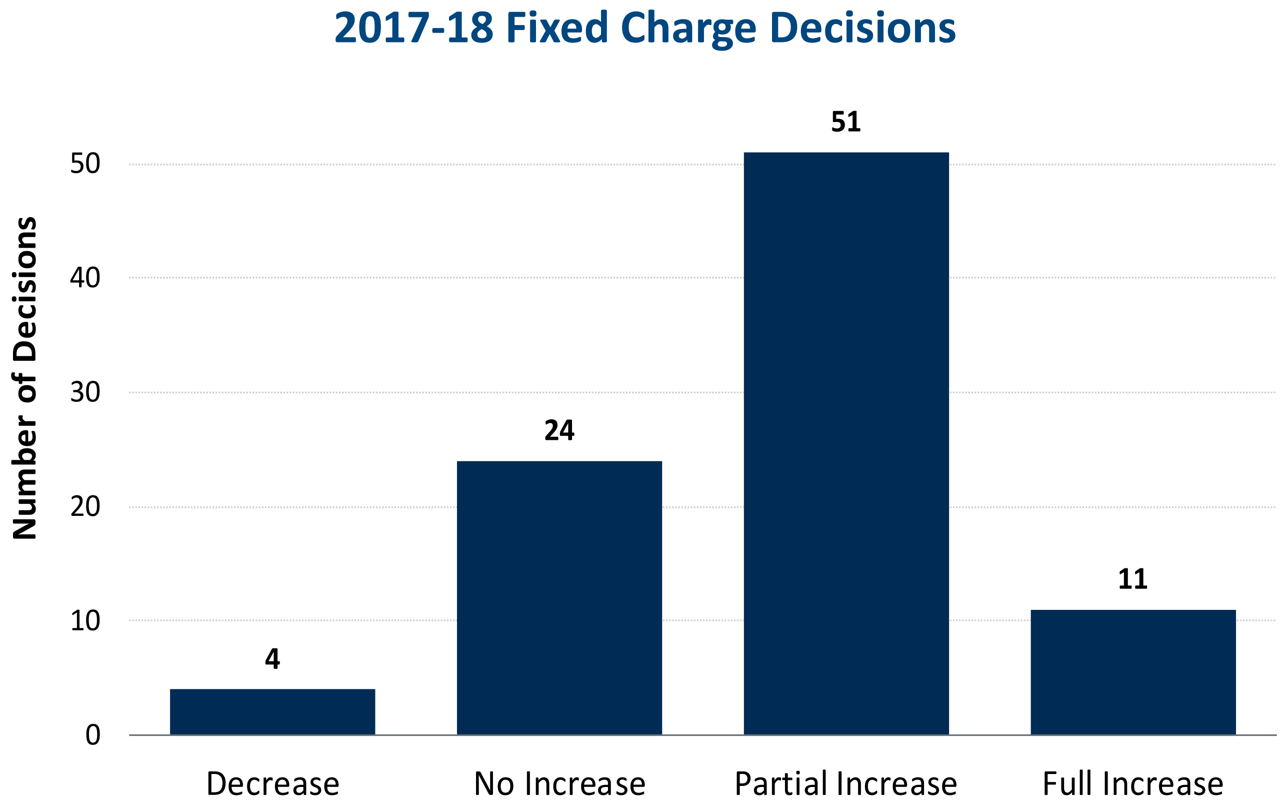
It is important to ensure that customers understand why the transition is occurring and are aware of any opportunities to save on their bill

FAQ 3. What are some examples of advanced rate design?

Rate Design	Definition
Fixed bill	Customers pay a fixed monthly bill accompanied with tools for lowering the bill (such as incentives for lowering peak usage)
Seasonal Rates	The year is divided into different seasons, commonly winter and summer, each of which have distinct rates. Prices are higher in peak seasons to reflect seasonal variation in the cost of supplying energy.
Demand Charges	Customers are charged based on peak electricity consumption, typically over a span of 15, 30, or 60 minutes.
Time-of-Use (TOU)	The day is divided into peak and off-peak time periods. Prices are higher during the peak period hours to reflect the higher cost of supplying energy during that period.
Critical Peak Pricing (CPP)	Customers pay higher prices during critical events when system costs are highest or when the power grid is severely stressed.
Peak Time Rebates (PTR)	Customers are paid for load reductions on critical days, estimated relative to a forecast of what the customer would have otherwise consumed (their "baseline")
Variable Peak Pricing (VPP)	During alternative peak days, customers pay a rate that varies by day to reflect dynamic variations in the cost of electricity.
Demand Subscription Service (DSS)	Customers subscribe to a kW demand level based on the size of their connected load. If they exceed their subscribed level, they must reduce their demand to restore electrical service.
Transactive Energy (TE)	Customers subscribe to a "baseline" load shape based on their typical usage patterns, and then buy or sell deviations from their baseline.
Real-Time Pricing (RTP)	Customers pay prices that vary by the hour to reflect the actual cost of electricity

In the industry, utilities are seeking to move fixed charges closer to fixed costs

Many utilities have proposed to increase the fixed charge, with varying degrees of success



Source: NC Clean Energy, “The 50 States of Solar,” 2017 and 2018 Year in Reviews. Average partial increase was 26% of utility’s request in 2017, and 40% in 2018.

There is also a trend toward residential demand charges

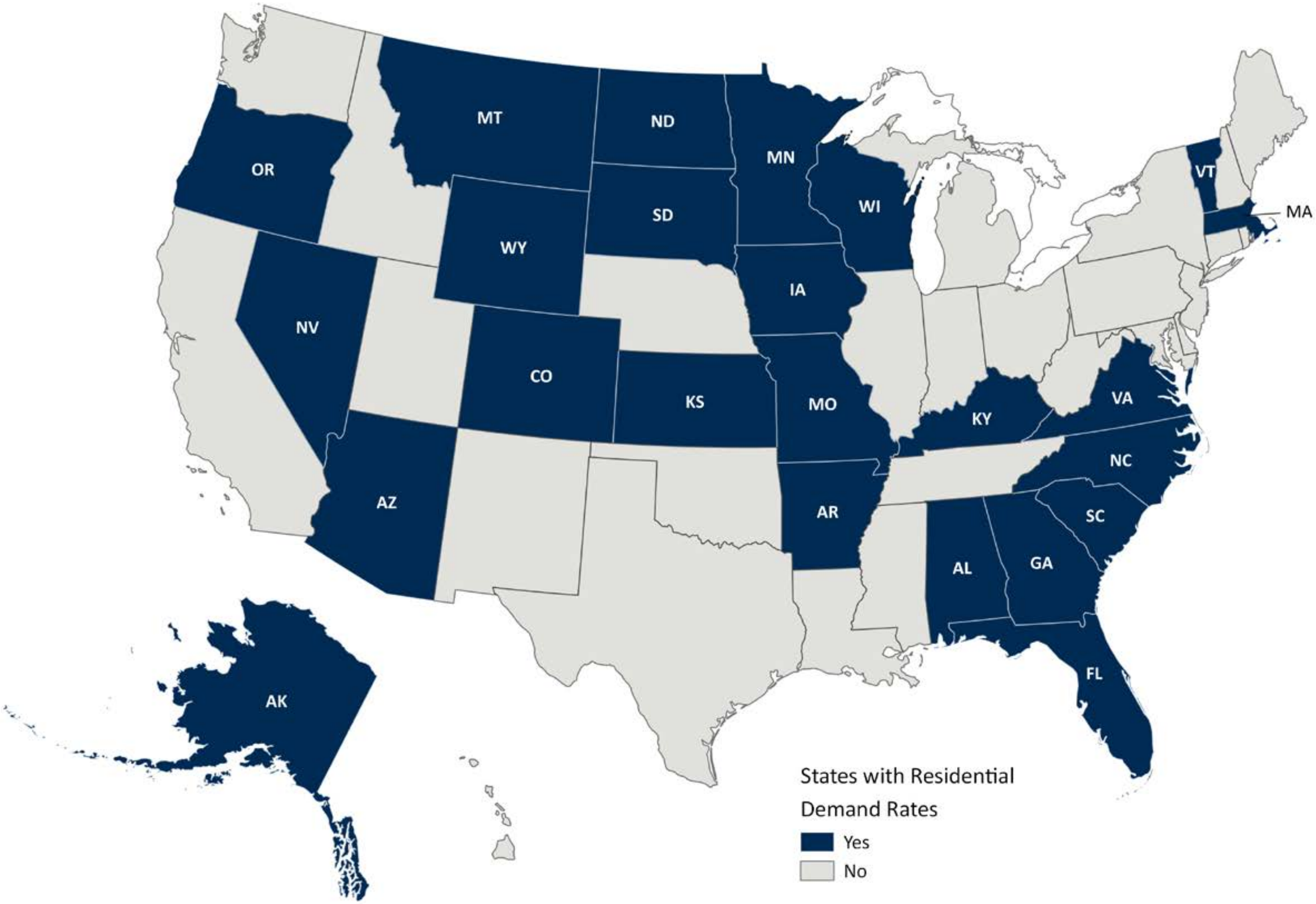
Capacity charges based on the size of the connection are mandatory for residential customers in France, Italy, and Spain

Demand charges are being offered by more than 50 utilities across 24 states in the United States

Utilities such as Arizona Public Service, NV Energy, and Westar Energy have filed applications to make them a mandatory tariff for customers with PVs on their roof

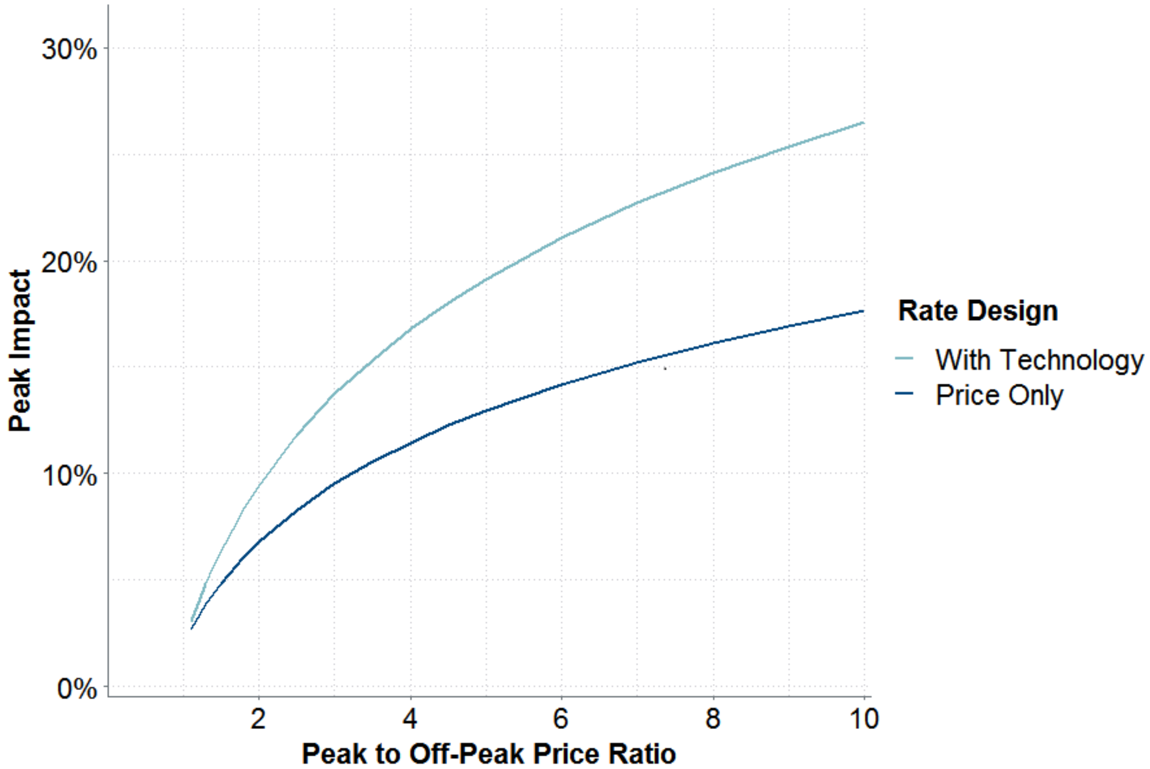
- Salt River Project in Arizona, a municipally owned system, has instituted such a tariff for DG customers
- The Kansas Corporation Commission has ordered that DG customers be considered a separate class and be offered three-part rates, among other options

More than 60 demand charges are deployed today to residential customers



FAQ 4. Do time-varying rate designs significantly change customer load shapes?

A meta-analysis of 349 deployments worldwide shows that when customers face a strong price signal (a higher on-peak price), they reduce peak electricity usage. And if the price signal is accompanied by enabling technology, they reduce their peak electricity usage even more.



Source: Arcturus Data Base, The Brattle Group.

FAQ 5. Where are advanced rate designs being offered?

	Mandatory	Opt-in	Opt-out
Flat bill		Georgia Power, Oklahoma Gas & Electric	
Peak-time rebates			Maryland, California, Illinois
Demand charges		Arizona Public Service, Black Hills, Salt River Project,	
Time-of-use (TOU) volumetric rates	Fort Collins (Colorado)	Texas	SMUD (California)
Dynamic volumetric rates (CPP, PTR, and RTP)		Oklahoma, Illinois	California

FAQ 6. Have customers accepted advanced rate designs?

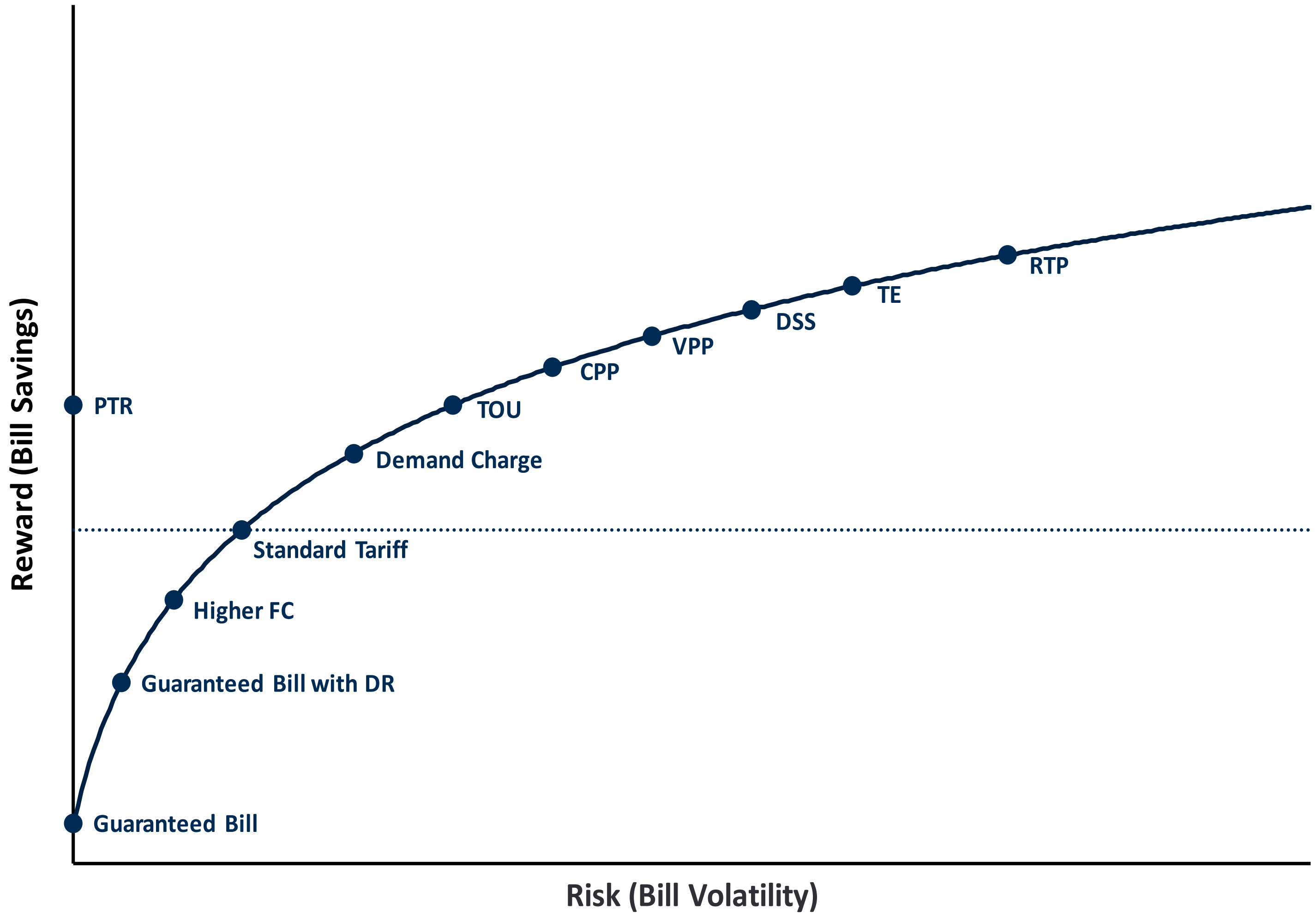
Utility or Location	Type of Rate	Applicability	Participating Customers
Oklahoma Gas & Electric	Variable Peak Pricing (VPP)	Opt-in	20% (130,000)
Maryland (BGE, Pepco, Delmarva)	Dynamic Peak Time Rebate (PTR)	Default	80%
Ontario, Canada	Time-of-Use (TOU)	Default	90% (3.6 million)
Great Britain	Time-of-Use (TOU)	Opt-in	13% (3.5 million)
Hong Kong (CLP Power Limited)	Dynamic Peak Time Rebate (PTR)	Opt-in	27,000
Arizona (APS, SRP)	Time-of-Use (TOU)	Opt-in	57% of APS' residential customers (20% of which are also on a demand charge), 36% of SRP's
California (PG&E, SCE, SDG&E)	Time-of-Use (TOU)	Default (2019)	TBD – 75-90%*
California (SMUD)	Time-of-Use (TOU)	Default	75-90%*
Colorado (Fort Collins)	Time-of-Use (TOU)	Mandatory (for residential)	100%
Illinois (ComEd, Ameren Illinois)	Real Time Pricing (RTP)	Opt-in	50,000
France	Time-of-Use (TOU)	Opt-in	50%
Spain	Real Time Pricing (RTP)	Default	50%
Italy	Time-of-Use (TOU)	Default	75-90%*

*Estimated participation based on historical trends

FAQ 7. What advanced rate design choices are being offered by utilities?

A	Guaranteed bill (GB)
B	GB with discounts for demand response (DR)
C	Increased fixed charge (FC)
D	Standard tariff
E	Demand charge
F	Time-of-Use (TOU)
G	Critical peak pricing (CPP)
H	Peak time rebates (PTR)
I	Variable peak pricing (VPP)
J	Demand subscription service (DSS)
K	Transactive energy (TE)
L	Real-time pricing (RTP)

Customers can pick their landing point along the “efficient pricing frontier”



Example 1: Rate design choices being offered today by Arizona Public Service

Residential Plan Comparison*

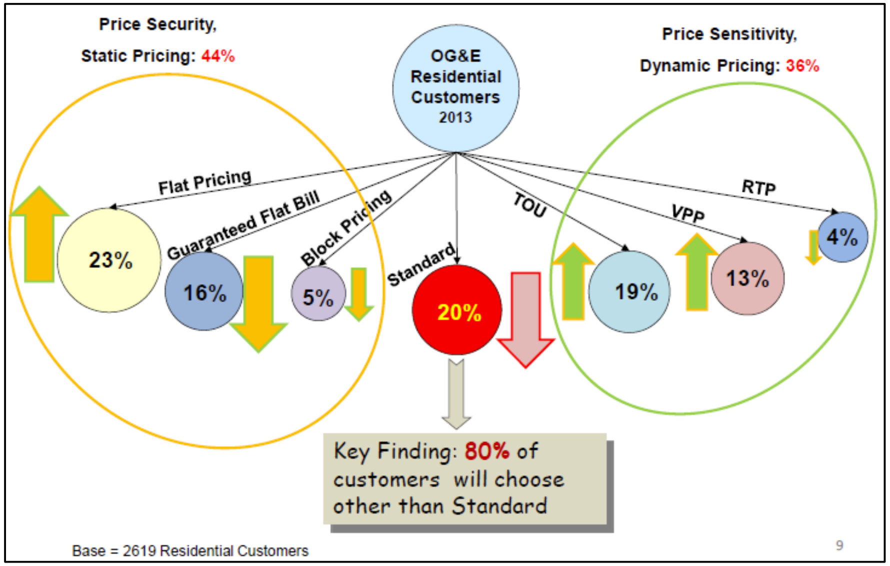
PLANS	BASIC SERVICE CHARGE (PER DAY)	ENERGY CHARGE (PER kWh)	OFF-PEAK PRICING	SUPER OFF-PEAK WINTER PRICING	ON-PEAK SUMMER PRICING	ON-PEAK WINTER PRICING	ON-PEAK SUMMER PEAK USAGE (DEMAND) CHARGE PER kW	ON-PEAK WINTER PEAK USAGE (DEMAND) CHARGE PER kW	OFF-PEAK HOURS	SUPER OFF-PEAK WINTER HOURS	ON-PEAK HOURS	ENERGY USE RESTRICTIONS (12-MONTH AVERAGE)	RENEWABLE ENERGY COMPATIBLE
Saver Choice	42.7¢	-	10.873¢	3.200¢	24.314¢	23.068¢	-	-	8 p.m.-3 p.m. weekdays, all weekend +10 holidays	10 a.m.-3 p.m. weekdays	3 p.m.-8 p.m. weekdays	-	Yes (with grid access charge)
Saver Choice Plus	42.7¢	-	7.798¢	-	13.160¢	11.017¢	$8.40	$8.40	8 p.m.-3 p.m. weekdays, all weekend +10 holidays	-	3 p.m.-8 p.m. weekdays	-	Yes
Saver Choice Max	42.7¢	-	5.230¢	-	8.683¢	6.376¢	$17.44	$12.24	8 p.m.-3 p.m. weekdays, all weekend +10 holidays	-	3 p.m.-8 p.m. weekdays	-	Yes
Lite Choice	32.9¢	11.672¢	-	-	-	-	-	-	-	-	-	Under 600 kWh per month	No
THE FOLLOWING PLAN IS AVAILABLE TO ELIGIBLE CUSTOMERS AFTER A TRIAL OF 90 DAYS ON ONE OF THE SAVER CHOICE PLANS.													
Premier Choice	49.3¢	12.393¢	-	-	-	-	-	-	-	-	-	601-999 kWh per month	No

Source: Arizona Public Service, Residential Plan Comparison, https://www.aps.com/library/rates/PlanComparison.pdf, accessed March 2019.

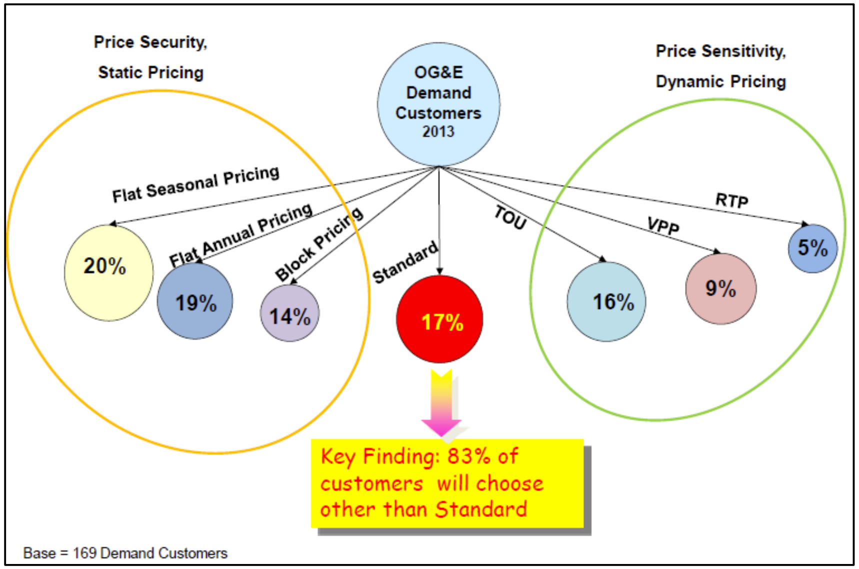
Example 2: OG&E picked its rate design choices through "design thinking"

Customer Choices Among Pricing Plans (2013)

Residential Customers



Demand Customers



Source: Direct Testimony of Bryan J. Scott on behalf of Oklahoma Gas and Electric Company, Before the Arkansas Public Service Commission, Docket No. 16-052-U, August 26, 2016. Survey responses include both Oklahoma and Arkansas customers. Arrows next to the residential customer results represent changes from an earlier survey conducted in 2010.

FAQ 8. What are the different ways for transitioning to advanced rate designs?

Roll out the rate designs on a gradual basis

Pilot the new rate designs

Offer the advanced rate designs on an opt-in basis, with the clear understanding that one of them will eventually become the default rate design

Make one of them the default rate design with bill protection that’s gradually phased out

Supplement the rate designs with enabling technologies

Structure the rate design around a reference load shape (a good example is Georgia Power’s rea time pricing rate tariff)

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Appendix A
Residential Demand Charges

Listing of demand charges being offered today in the US

#	Utility	Utility Ownership	State	Residential Customers Served	Fixed charge ($/month)	Demand Charge ($/kW-month)		Timing of demand measurement	Demand interval	Combined with Energy TOU?	Applicable Residential Customer Segment	Mandatory or Voluntary
						Summer	Winter					
[1]	Alabama Power	Investor Owned	AL	1,268,271	14.50	1.50	1.50	Any time	15 min	Yes	All	Voluntary
[2]	Alaska Electric Light and Power	Investor Owned	AK	14,579	11.13	6.51	10.76	Any time	Unknown	No	All	Voluntary
[3]	Albemarle Electric Membership Corp	Cooperative	NC	11,679	27.00	13.50	13.50	Peak Coincident	15 min	Yes	All	Voluntary
[4]	Alliant Energy (IPL)	Investor Owned	IA	403,160	11.50	17.40	11.62	Peak Coincident	60 min	Yes	All	Voluntary
[5]	Alliant Energy (WPL)	Investor Owned	WI	410,620	15.04	3.00	3.00	Peak Coincident	60 min	Yes	All	Voluntary
[6]	Arizona Public Service	Investor Owned	AZ	1,080,665	13.02	8.40	8.40	Peak Coincident	60 min	Yes	All	Voluntary
[7]	Arizona Public Service	Investor Owned	AZ	1,080,665	13.02	17.44	12.24	Peak Coincident	60 min	Yes	All	Voluntary
[8]	Black Hills Power	Investor Owned	SD	56,430	13.00	8.10	8.10	Any time	15 min	No	All	Voluntary
[9]	Black Hills Power	Investor Owned	WY	2,031	15.50	8.25	8.25	Any time	15 min	No	All	Voluntary
[10]	Butler Rural Electric Cooperative	Cooperative	KS	6,662	31.00	5.10	5.10	Peak Coincident	60 min	No	All	Mandatory
[11]	Butte Electric Cooperative	Cooperative	SD	5,082	45.00	9.50	9.50	Unknown	Unknown	No	All	Voluntary
[12]	Carteret-Craven Electric Cooperative	Cooperative	NC	36,124	30.00	11.95	9.95	Peak Coincident	15 min	No	All	Voluntary
[13]	Central Electric Membership Corp	Cooperative	NC	20,299	34.00	8.55	7.50	Peak Coincident	15 min	Yes	All	Voluntary
[14]	City of Fort Collins Utilities	Municipal	CO	63,760	6.16	2.60	2.60	Any time	Unknown	No	All	Voluntary
[15]	City of Glasgow	Municipal	KY	5,522	24.16	11.86	10.87	Peak Coincident	30 min	Yes	All	Voluntary
[16]	City of Kinston	Municipal	NC	9,694	14.95	9.35	9.35	Peak Coincident	15 min	No	All	Voluntary
[17]	City of Longmont	Municipal	CO	36,392	16.60	5.75	5.75	Any time	15 min	No	All	Voluntary
[18]	City of Templeton	Municipal	MA	0	3.00	8.00	8.00	Any time	15 min	No	All*	Mandatory
[19]	Cobb Electric Membership Corporation	Cooperative	GA	184,095	28.00	5.55	5.55	Peak Coincident	60 min	No	All	Voluntary
[20]	Dakota Electric Association	Cooperative	MN	98,048	12.00	14.70	11.10	Any time	15 min	No	All	Voluntary
[21]	Dominion Energy	Investor Owned	NC	102,429	16.39	9.76	5.66	Peak Coincident	30 min	Yes	All	Voluntary
[22]	Dominion Energy	Investor Owned	VA	2,196,466	11.53	5.46	3.79	Peak Coincident	30 min	Yes	All	Voluntary
[23]	Duke Energy Carolinas, LLC	Investor Owned	NC	1,693,953	14.00	7.83	3.92	Peak Coincident	30 min	Yes	All	Voluntary
[24]	Duke Energy Carolinas, LLC	Investor Owned	SC	487,693	9.93	8.15	4.00	Peak Coincident	30 min	Yes	All	Voluntary
[25]	Edgecombe-Martin County EMC	Cooperative	NC	10,199	31.00	8.75	8.00	Peak Coincident	Unknown	No	All	Voluntary
[26]	Flathead Electric Cooperative	Cooperative	MT	54,511	23.71	0.26	0.26	Peak Coincident	60 min	No	All	Mandatory
[27]	Fort Morgan	Municipal	CO	4,988	8.17	10.22	10.22	Unknown	Unknown	No	All	Voluntary
[28]	Georgia Power	Investor Owned	GA	2,173,557	10.00	6.64	6.64	Any time	30 min	Yes	All	Voluntary
[29]	Kentucky Utilities Company	Investor Owned	KY	429,407	12.25	7.87	7.87	Peak Coincident	15 min	No	All	Voluntary
[30]	Lakeland Electric	Municipal	FL	107,703	9.50	5.60	5.60	Peak Coincident	30 min	No	All	Voluntary
[31]	Lincoln Electric Cooperative	Cooperative	MT	5,133	39.39	0.75	0.75	Any time	15 min	No	All	Voluntary

Sources: Utility tariffs as of September 2018, and EIA Form 861 from 2017 (for Utility ownership and Residential Customers Served columns).

Listing of demand charges (concluded)

#	Utility	Utility Ownership	State	Residential Customers Served	Fixed charge ($/month)	Demand Charge ($/kW-month)		Timing of demand measurement	Demand interval	Combined with Energy TOU?	Applicable Residential Customer Segment	Mandatory or Voluntary
						Summer	Winter					
[32]	Louisville Gas and Electric	Investor Owned	KY	359,658	12.25	7.68	7.68	Peak Coincident	15 min	No	All	Voluntary
[33]	Loveland Electric	Municipal	CO	31,915	23.50	9.80	7.35	Any time	15 min	No	All	Voluntary
[34]	Mid-Carolina Electric Cooperative	Cooperative	SC	50,451	24.00	12.00	12.00	Peak Coincident	60 min	No	All	Mandatory
[35]	Midwest Energy Inc	Cooperative	KS	29,738	22.00	6.40	6.40	Any time	15 min	No	All	Voluntary
[36]	NV Energy (SPP)	Investor Owned	NV	294,966	10.25	0.35 (daily)	0.35 (daily)	Peak Coincident	15 min	No	All	Voluntary
[37]	NV Energy (SPP)	Investor Owned	NV	294,966	15.25	0.26 (daily)	0.93 (daily)	Peak Coincident	15 min	Yes	All	Voluntary
[38]	Oklahoma Gas and Electric Company	Investor Owned	AR	55,622	9.75	1.00	1.00	Any time	15 min	No	All	Voluntary
[39]	Otter Tail Power Company	Investor Owned	MN	48,477	11.00	8.00	8.00	Any time	60 min	No	All	Voluntary
[40]	Otter Tail Power Company	Investor Owned	ND	45,688	18.38	6.52	2.63	Any time	60 min	No	All	Voluntary
[41]	Otter Tail Power Company	Investor Owned	SD	8,736	13.00	7.05	5.93	Any time	60 min	No	All	Voluntary
[42]	PacifiCorp	Investor Owned	OR	503,632	13.30	2.20	2.20	Unknown	Unknown	No	All	Voluntary
[43]	Pee Dee Electric Membership Cooperative	Cooperative	SC	28,735	34.40	8.50	7.00	Peak Coincident	Unknown	Yes	All	Voluntary
[44]	Platte-Clay Electric Cooperative	Cooperative	MO	21,336	25.38	2.50	2.50	Peak Coincident	60 min	No	All	Mandatory
[45]	Progress Energy Carolinas	Investor Owned	NC	1,183,832	16.85	4.88	3.90	Peak Coincident	15 min	Yes	All	Voluntary
[46]	Progress Energy Carolinas	Investor Owned	SC	136,342	11.91	5.38	4.14	Peak Coincident	15 min	Yes	All	Voluntary
[47]	Salt River Project	Political Subdivision	AZ	942,690	32.44	11.13	4.54	Peak Coincident	30 min	Yes	NEM Only	Voluntary
[48]	Salt River Project	Political Subdivision	AZ	942,690	32.44	21.94	8.13	Peak Coincident	30 min*	Yes	NEM Only	Voluntary
[49]	Santee Cooper Electric Cooperative	Cooperative	SC	33,105	50.00	6.00	6.00	Peak Coincident	30 min	Yes	NEM only	Mandatory
[50]	Smithfield	Municipal	NC	3,390	17.00	5.93	5.93	Peak Coincident	15 min	Yes	All	Voluntary
[51]	South Carolina Electric & Gas Company	Investor Owned	SC	615,096	14.00	12.04	8.60	Peak Coincident	15 min	Yes	All	Voluntary
[52]	Sun River Electric Cooperative	Cooperative	MT	4,473	32.00	4.00	4.00	Unknown	Unknown	No	All	Mandatory
[53]	Swanton Village Electric Department	Municipal	VT	3,263	11.33	9.17	9.17	Any time	15 min	No	All*	Mandatory
[54]	Tideland Electric Member Corp	Cooperative	NC	20,153	31.00	10.35	9.40	Peak Coincident	15 min	No	All	Voluntary
[55]	Tri-County Electric Cooperative	Cooperative	FL	16,391	23.00	7.00	7.00	Any time	15 min	No	All	Voluntary
[56]	Traverse Electric Cooperative, Inc.	Cooperative	MN	1,873	76.00	18.65	18.65	Peak Coincident	Unknown	No	All	Voluntary
[57]	Tucson Electric Power	Investor Owned	AZ	381,556	10.00	8.85	8.85	Peak Coincident	60 min	Yes	All	Voluntary
[58]	Tucson Electric Power	Investor Owned	AZ	381,556	10.00	8.85	8.85	Peak Coincident	60 min	No	All	Voluntary
[59]	Vigilante Electric Cooperative	Cooperative	MT	8,406	26.00	0.50 per KVA	0.50 per KVA	Any time	Unknown	No	All*	Mandatory
[60]	Westar Energy	Investor Owned	KS	329,457	16.50	6.91	2.13	Any time	30 min	No	All	Voluntary
[61]	Xcel Energy (PSCo)	Investor Owned	CO	1,244,432	19.31	10.08	7.76	Any time	15 min	No	All	Voluntary
[62]	Xcel Energy (PSCo)	Investor Owned	CO	1,244,432	6.54	13.38	10.46	Peak Coincident	60 min	No	All	Voluntary

Sources: Utility tariffs as of September 2018, and EIA Form 861 from 2017 (for Utility ownership and Residential Customers Served columns).

Appendix B

A Pocket History of Rate Design

A pocket history of rate design

Year	Author	Contribution
1882	Thomas Edison	• Electric light was priced to match the competitive price from gas light and not based on the cost of generating electricity
1892	John Hopkinson	• Suggested a two–part tariff with the first part based on usage and the second part based on connected kW demand
1894	Arthur Wright	• Modified Hopkinson's proposal so that the second part would be based on actual maximum demand
1897	Williams S. Barstow	• Proposed time-of-day pricing at the 1898 meeting of the AEIC, where his ideas were rejected in favor of the Wright system
1946	Ronald Coase	• Proposed a two-part tariff, where the first part was designed to recover fixed costs and the second part was designed to recover fuel and other costs that vary with the amount of kWh sold
1951	Hendrik S. Houthakker	• Argued that implementing a two-period TOU rate is better than a maximum demand tariff because the latter ignores the demand that is coincident with system peak
1961	James C. Bonbright	• Published "Principles of Public Utility Rates" which would become a canon in the decades to come

A pocket history of rate design (concluded)

Year	Author	Contribution
1971	William Vickrey	• Proffered the concept of real-time-pricing (RTP) in *Responsive Pricing of Public Utility Services*
1976	California Legislature	• Added a baseline law to the Public Utilities Code in the *Warren-Miller Energy Lifeline Act*, creating a two-tiered inclining rate
1978	U.S. Congress	• Passed the *Public Utility Regulatory Act (PURPA),* which called on all states to assess the cost-effectiveness of TOU rates
1981	Fred Schweppe	• Described a technology-enabled RTP future in *Homeostatic Control*
2001	California Legislature	• Introduced *AB 1X,* which created the five-tier inclining block rate where the heights of the tiers bore no relationship to costs. By freezing the first two tiers, it ensured that the upper tiers would spiral out of control
2001	California PUC	• Began rapid deployment of California Alternative Rates for Energy (CARE) to assist low-income customers during the energy crisis
2005	U.S. Congress	• Passed the *Energy Policy Act of 2005*, which requires all electric utilities to offer net metering upon request

Presenter Information

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Ahmad Faruqui is an internationally recognized authority on the design, evaluation and benchmarking of tariffs. He has analyzed the efficacy of tariffs featuring fixed charges, demand charges, time-varying rates, inclining block structures, and guaranteed bills. He has also designed experiments to model the impact of these tariffs and organized focus groups to study customer acceptance. Besides tariffs, his areas of expertise include demand response, energy efficiency, distributed energy resources, advanced metering infrastructure, plug-in electric vehicles, energy storage, inter-fuel substitution, combined heat and power, microgrids, and demand forecasting. He has worked for nearly 150 clients on 5 continents, including electric and gas utilities, state and federal commissions, governments, independent system operators, trade associations, research institutes, and manufacturers.

Ahmad has testified or appeared before commissions in Alberta (Canada), Arizona, Arkansas, California, Colorado, Connecticut, Delaware, the District of Columbia, FERC, Illinois, Indiana, Kansas, Maryland, Minnesota, Nevada, Ohio, Oklahoma, Ontario (Canada), Pennsylvania, Saudi Arabia, and Texas. He has presented to governments in Australia, Egypt, Ireland, the Philippines, Thailand, New Zealand and the United Kingdom and given seminars on all 6 continents. He has also given lectures at Carnegie Mellon University, Harvard, Northwestern, Stanford, University of California at Berkeley, and University of California at Davis and taught economics at San Jose State, the University of California at Davis, and the University of Karachi.

His research been cited in Business Week, The Economist, Forbes, National Geographic, The New York Times, San Francisco Chronicle, San Jose Mercury News, Wall Street Journal and USA Today. He has appeared on Fox Business News, National Public Radio and Voice of America. He is the author, co-author or editor of 4 books and more than 150 articles, papers and reports on energy matters. He has published in peer-reviewed journals such as Energy Economics, Energy Journal, Energy Efficiency, Energy Policy, Journal of Regulatory Economics and Utilities Policy and trade journals such as The Electricity Journal and the Public Utilities Fortnightly. He is a member of the editorial board of The Electricity Journal. He holds BA and MA degrees from the University of Karachi, both with the highest honors, and an MA in agricultural economics and a PhD in economics from The University of California at Davis, where he was a research fellow.