

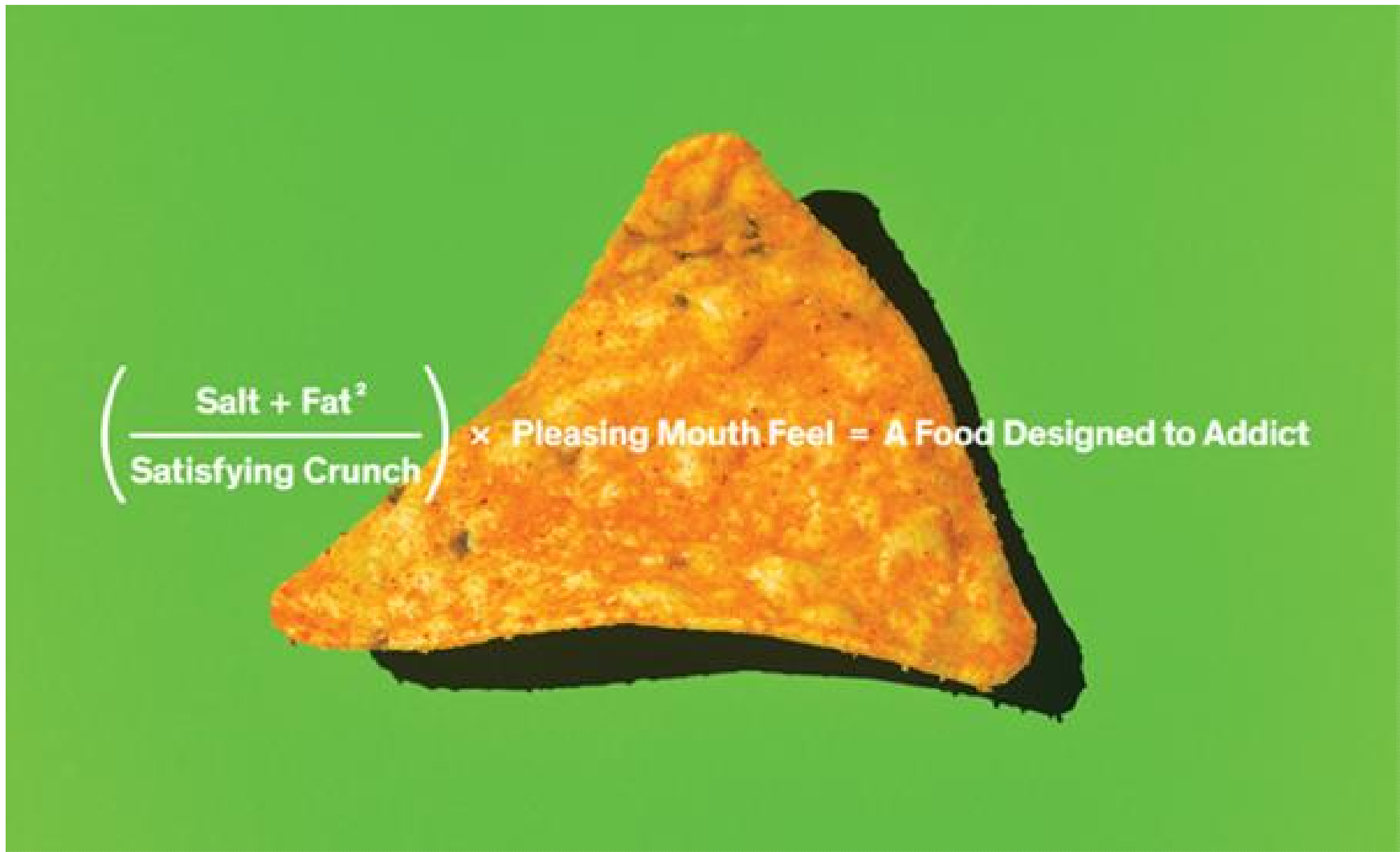
# **Characterizing Customer Preferences:**

## **How the Doritos® Nachos Method Works for Electricity Service Plans**

**Ellen Petrill, Bernie Neenan, Jen  
Robinson, Ellen Donnelly**  
EPRI

**Behavior, Energy and Climate  
Conference**  
Wednesday, October 21, 2015

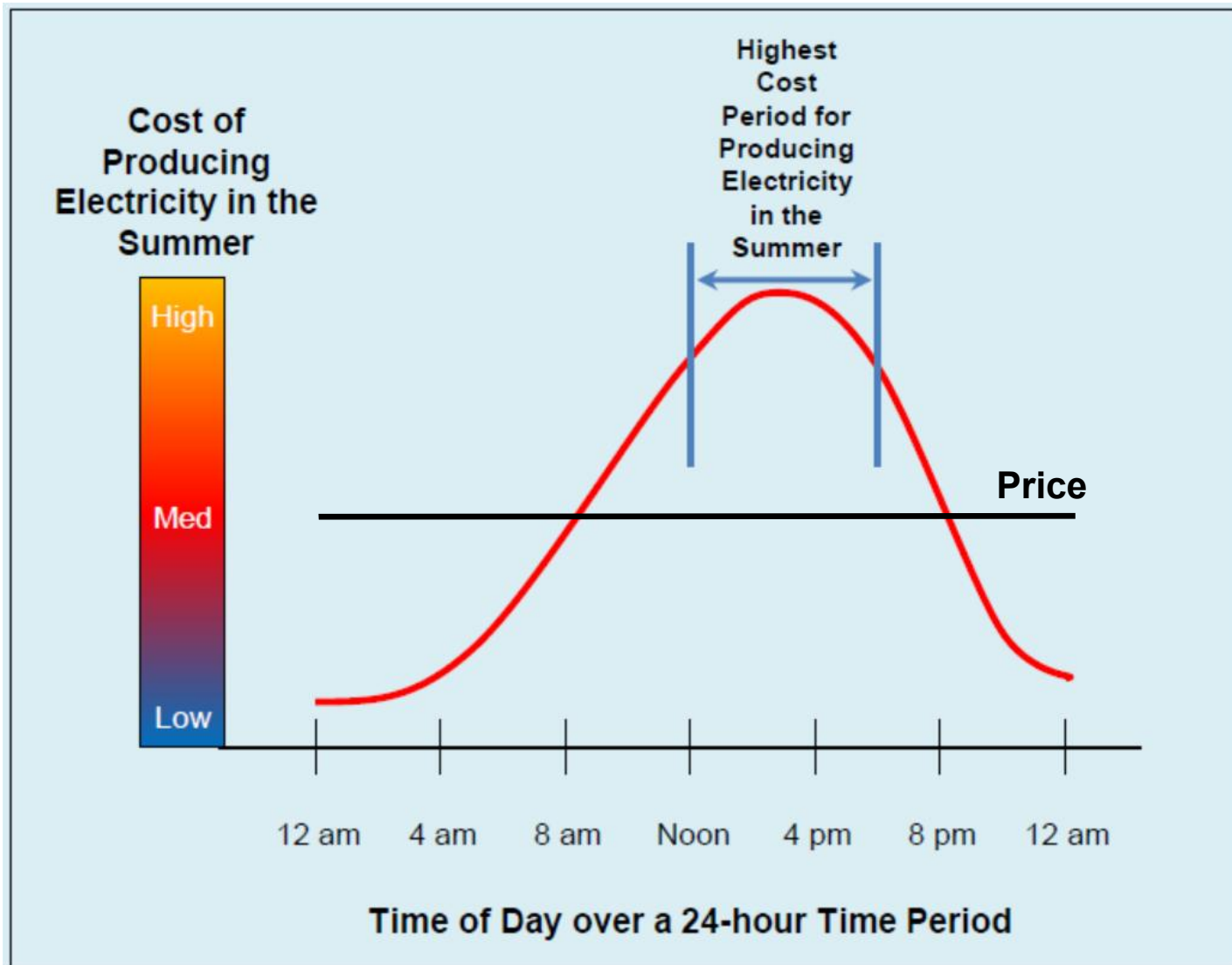




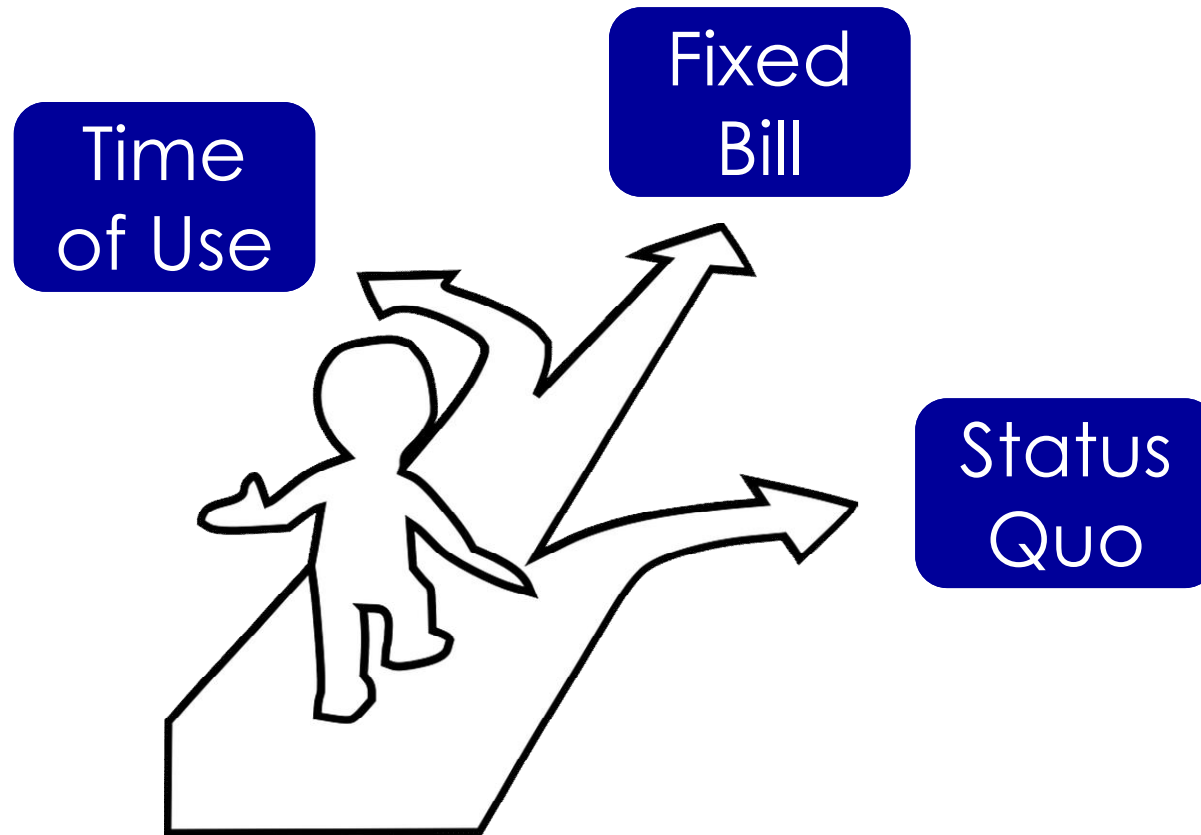
## Discrete Choice Experimentation

Source: "The Extraordinary Science of Addictive Junk Food," *The New York Times Magazine*, February 20, 2013.

# Consumers Typically Don't Pay the Real-Time Cost of Producing Electricity



# The Challenge



# Complex! Made Simple in Survey

Experiment	Attributes	Levels
Flat Rate	Price	\$0.10
Time-of-Use	Off-peak price	\$0.03, \$0.06, \$0.09
	Peak price	\$0.12, \$0.25, \$0.35, \$0.45
	Peak duration and times	2 hours 5 p.m. to 7 p.m.
		3 hours 2 p.m. to 5 p.m.
		3 p.m. to 6 p.m.
		4 p.m. to 7 p.m.
		4 hours 2 p.m. to 6 p.m.
		6 hours 2 p.m. to 8 p.m.
	Season	Summer, summer and winter
Fixed Bill	Premium	2%, 5%, 15%
	Contract length	1, 2, or 3 years

# Survey Worked: Easy to Understand

## Electricity Service Plans 2014 Survey



### PART I

#### Instructions

This questionnaire is about your electricity service plan preferences. It takes only a few minutes of your time and all answers are completely confidential.

There are no right or wrong answers to these questions. We are interested in your preferences and opinions.

Please turn to the next page to begin. ➞

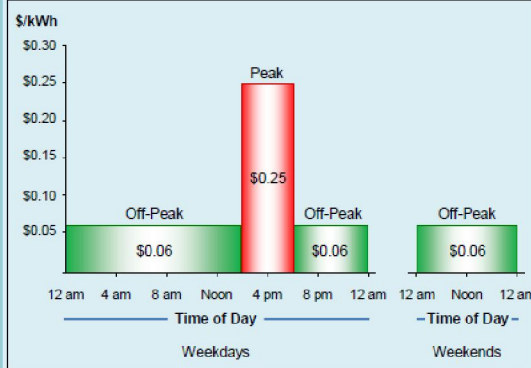
## Information Leaflet

### Time-of-Use (TOU) Plan

Time-of-Use Plans offer lower prices during off-peak hours and higher prices during peak hours. Figure 3 provides an overview of a two-period, Time-of-Use Plan.

- The price per unit of electricity (kWh) is higher during "peak" periods in the summer when costs of producing it are higher.
- Peaks are typically in the afternoon and early evenings during the week.
- Prices per kWh are lower when people use less electricity, typically in the early mornings, nights, and weekends.
- Lowering use during summer peak periods saves more than lowering use during off-peak periods.

Figure 3: Overview of Time-of-Use Plan



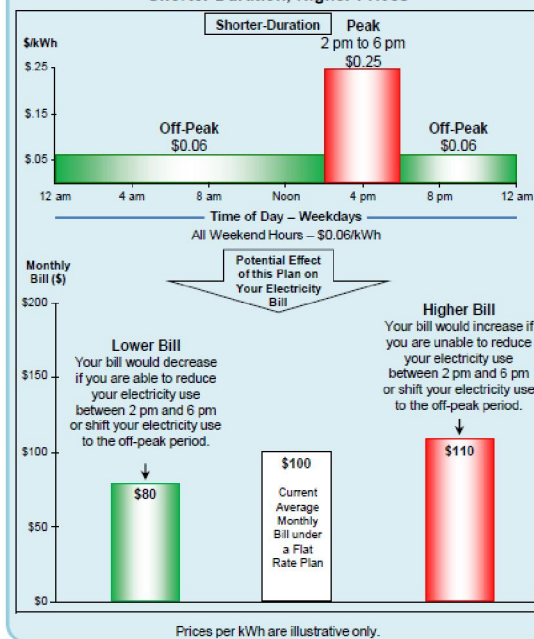
Prices per kWh are illustrative only.

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### Different Types of Time-of-Use Plans

Figures 4 and 5 show the effect that different Time-of-Use plans can have on your bill. Figure 4 shows a Time-of-Use plan that has a shorter duration (2 pm to 6 pm) and a higher peak and off-peak price than the plan in Figure 5.

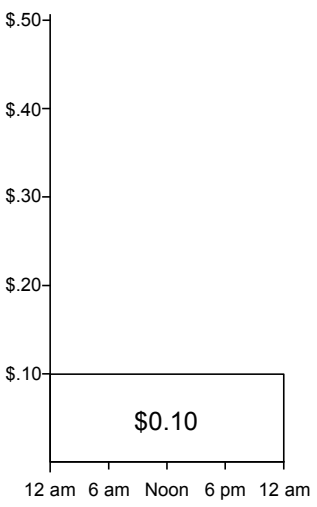
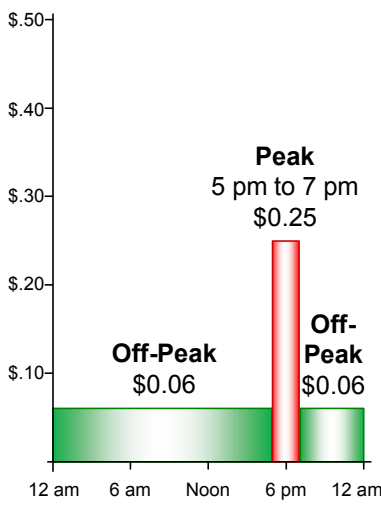
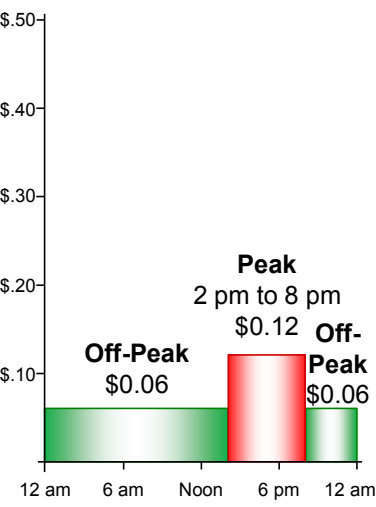
Figure 4: Types of Time-of-Use Plans  
Shorter Duration, Higher Prices



Prices per kWh are illustrative only.

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# Choice Questions Were Understandable

Attributes	Current Rate	Option A	Option B
Pricing Blocks	<p><b>\$/kWh</b></p>  <p>Time of Day All Hours</p>	<p><b>\$/kWh</b></p>  <p>Time of Day Weekdays</p> <p>All Weekend Hours \$0.06/kWh</p>	<p><b>\$/kWh</b></p>  <p>Time of Day Weekdays</p> <p>All Weekend Hours \$0.06/kWh</p>
Season When This Rate Would Apply	Year-Round	Summer	Summer
Which option would you choose?	<input type="checkbox"/> I would choose this option.	<input type="checkbox"/> I would choose this option.	<input type="checkbox"/> I would choose this option.

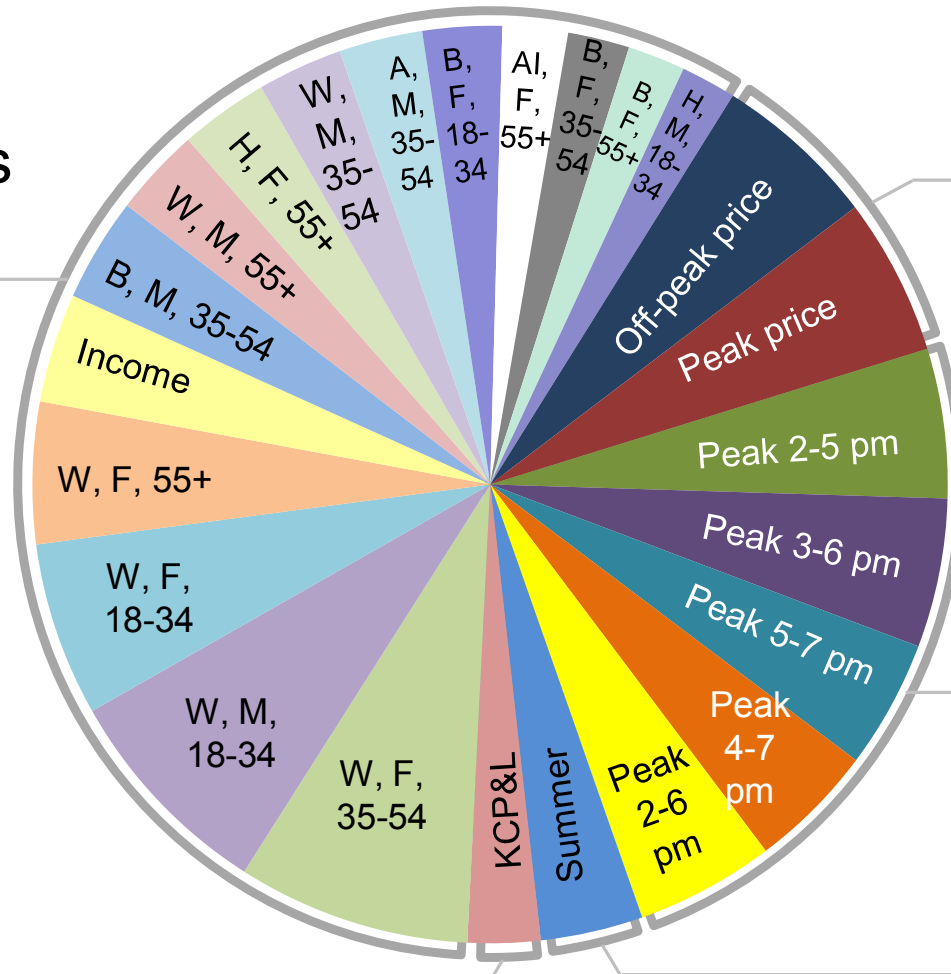
# Choice Model Results – Time of Use (TOU)

Demographics  
58%

**Legend**

W: White  
B: Black  
H: Hispanic  
A: Asian  
AI: American Indian  
M: Male  
F: Female

Service Territory  
3%



Prices  
11%

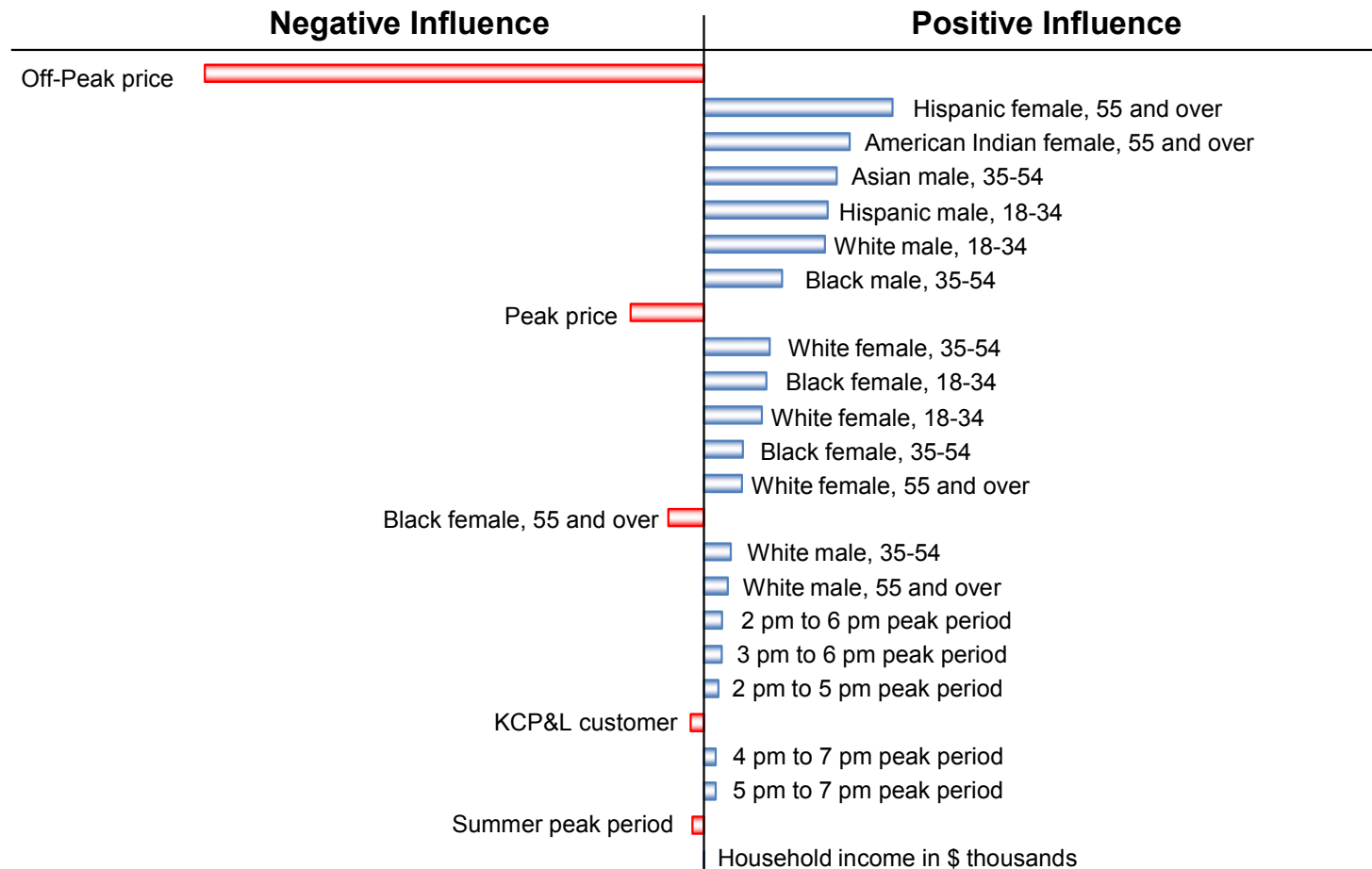
Peak periods  
24%

Peak seasons  
4%



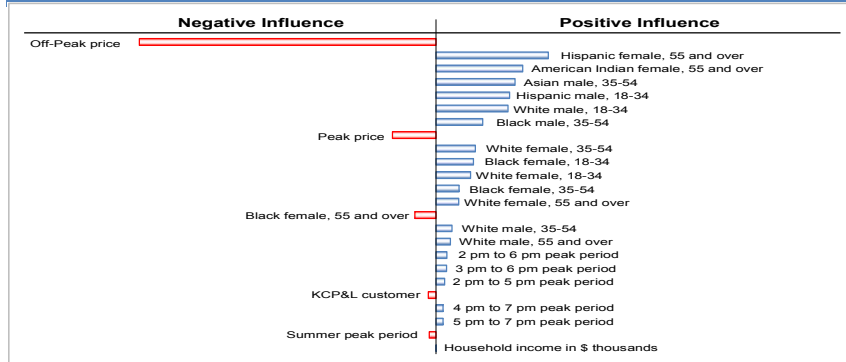
# Influence of Factors on TOU Preferences

The factors that influence whether consumers are likely to choose an individual Electricity Service Plan (ESP) are comprised of numerous variables. These variables either negatively or positively affect ESP likelihood at different levels.

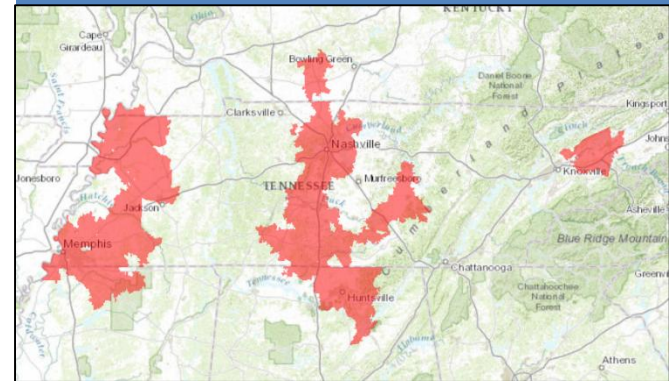


## Using Choice Model Results to Develop Predictions of Potential Market Size

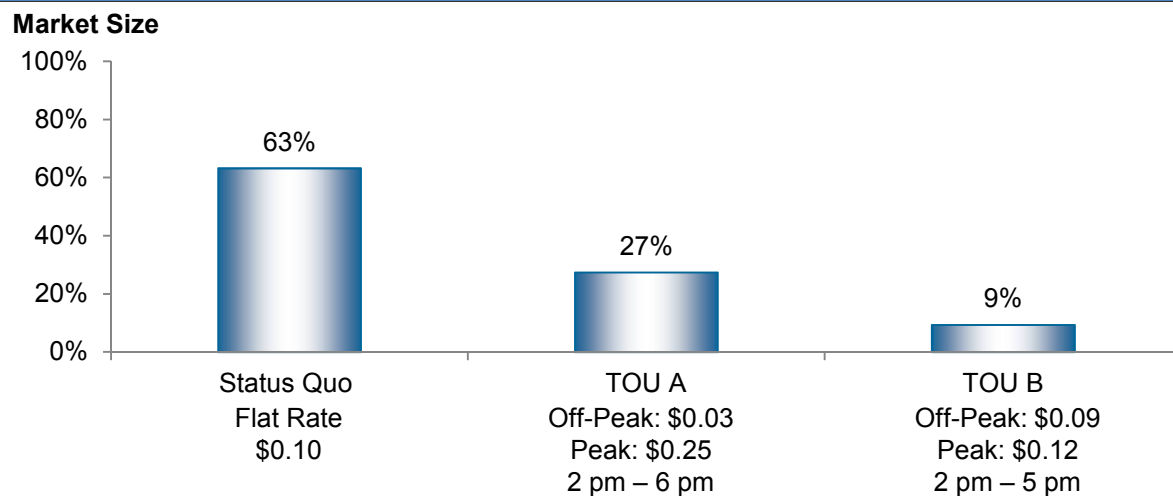
## Statistical Model of Characteristics that Relate to ESP Selection Purchase Likelihood



## Demographic Data on the Sampled Utilities

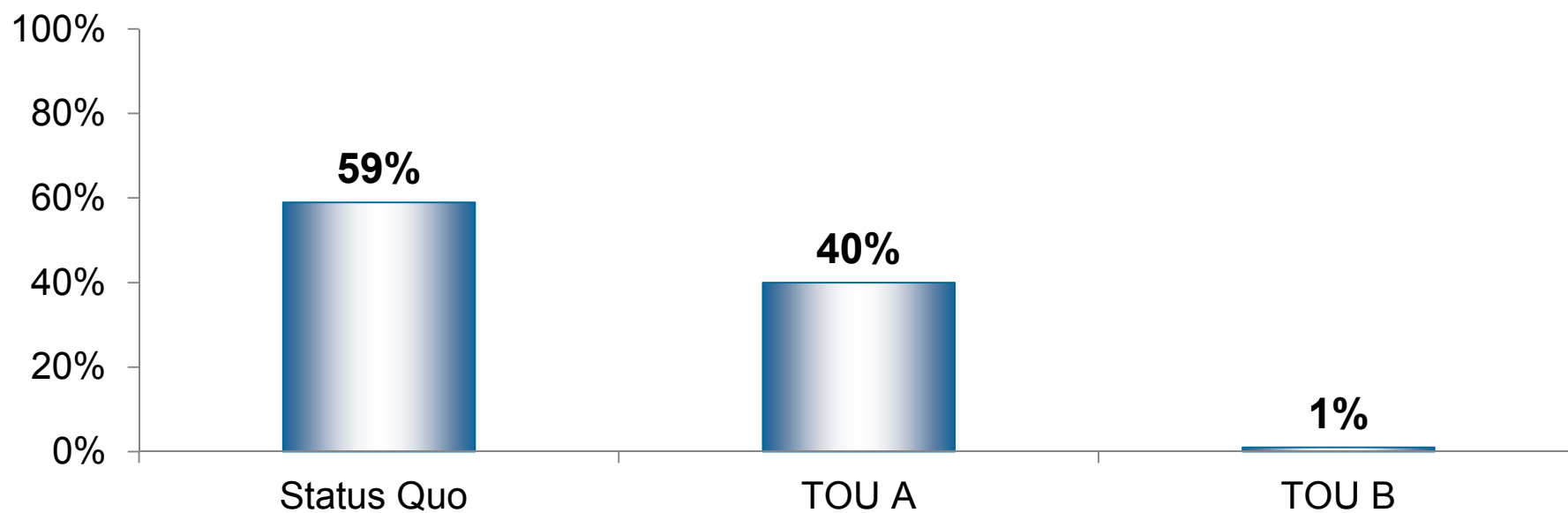


## Predictions of ESP Potential Market Size for Sampled Utilities



# A Tool To Predict Market Size

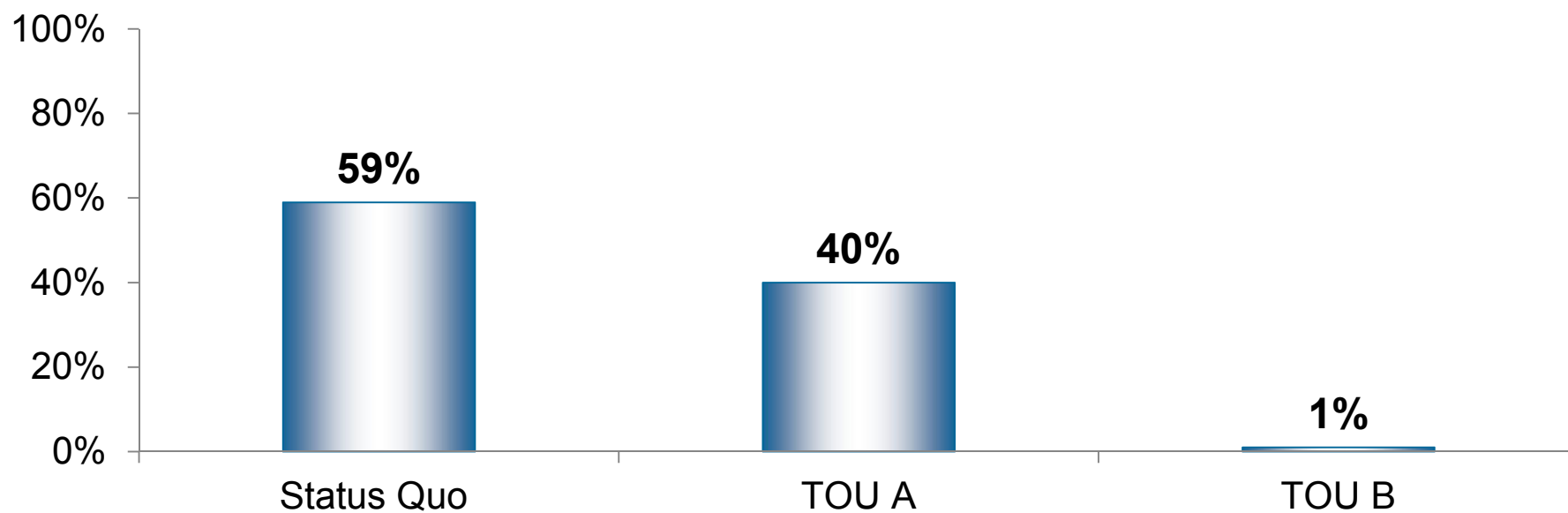
## Market Size



Flat Rate: \$0.10	Off-Peak \$0.03	Off-Peak \$0.09
	Peak: \$0.12	Peak: \$0.45
	Peak Timing: 2 pm – 5 pm	Peak Timing: 2 pm – 6 pm

# A Tool To Predict Market Size: TOU Peak Price

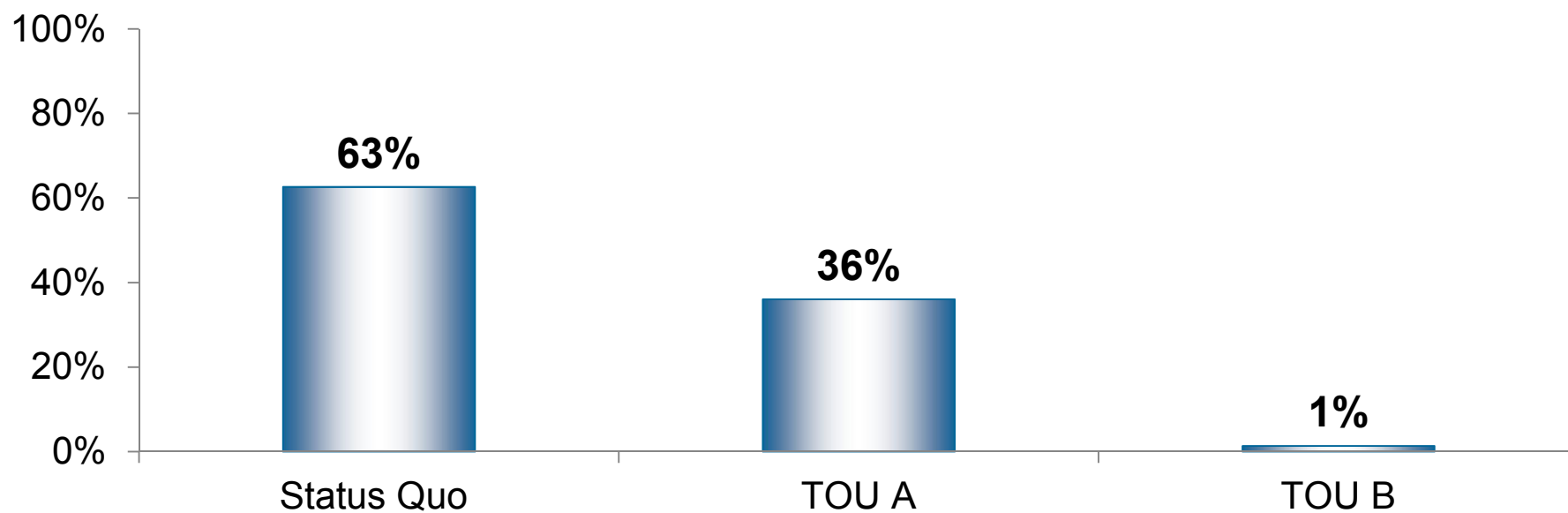
## Market Size



Flat Rate: \$0.10	Off-Peak \$0.03	Off-Peak \$0.09
	Peak: \$0.12	Peak: \$0.45
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# A Tool To Predict Market Size: TOU Peak Price

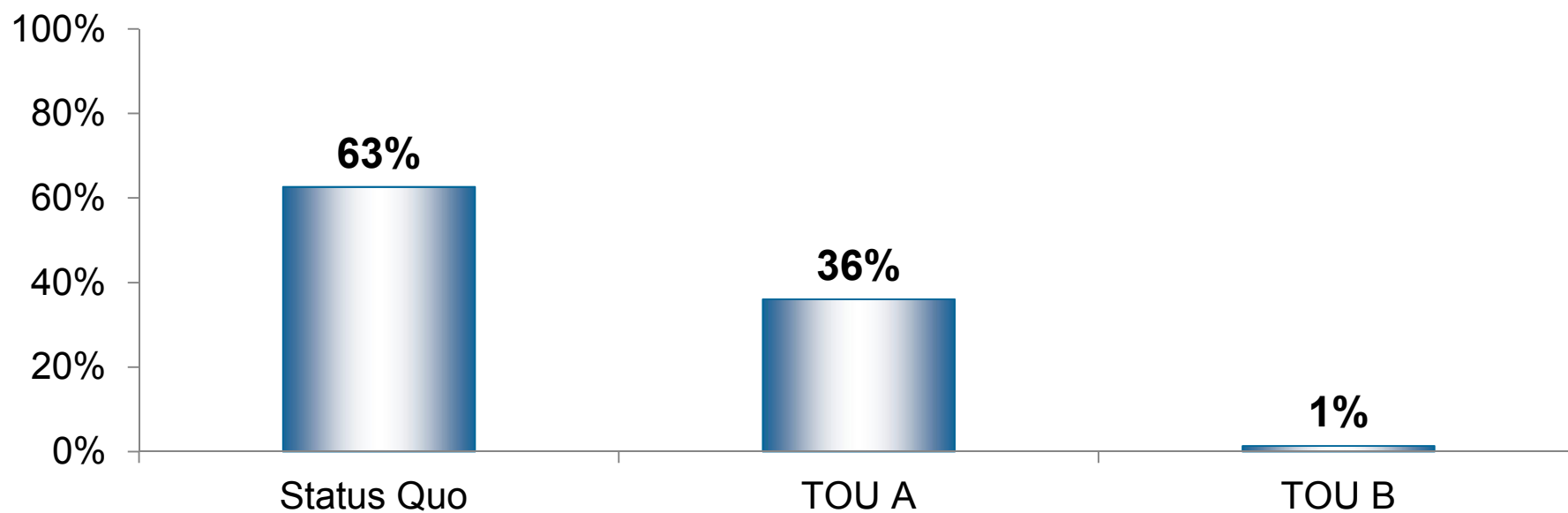
## Market Size



Flat Rate: \$0.10	Off-Peak \$0.03	Off-Peak \$0.09
	Peak: \$0.25	Peak: \$0.45
	Peak Timing: 2 pm – 5 pm	Peak Timing: 2 pm – 6 pm

# A Tool To Predict Market Size: TOU Peak Period

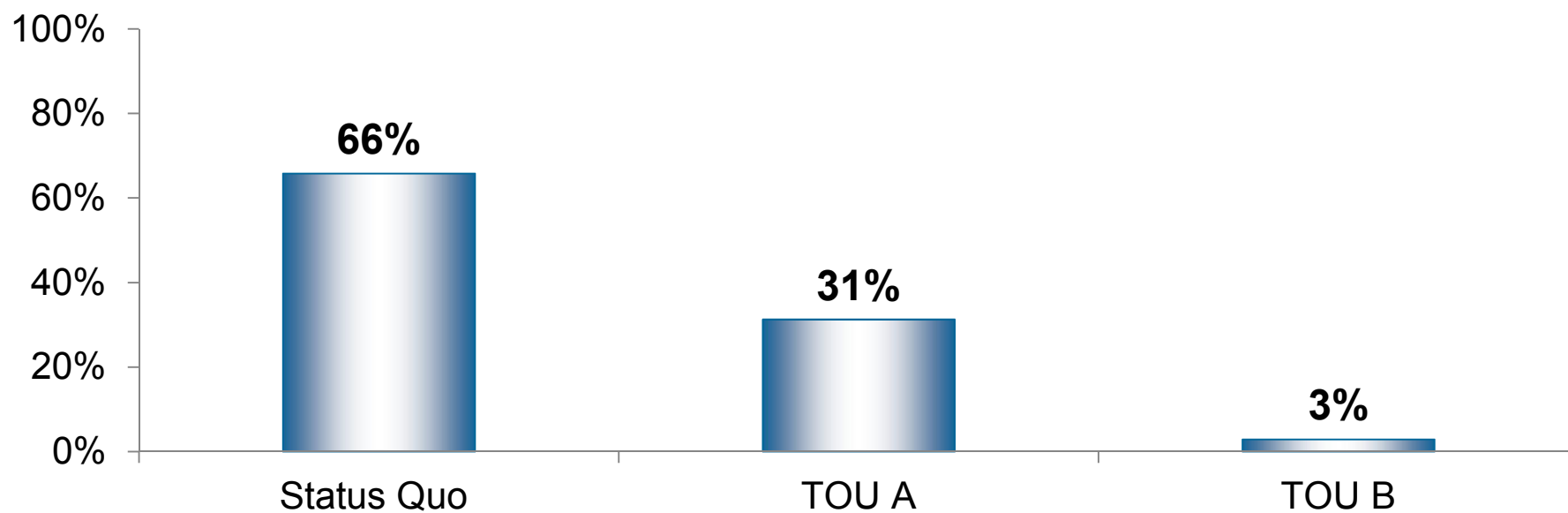
## Market Size



Flat Rate: \$0.10	Off-Peak \$0.03	Off-Peak \$0.09
	Peak: \$0.25	Peak: \$0.45
	Peak Timing: 2 pm – 5 pm	Peak Timing: 2 pm – 6 pm

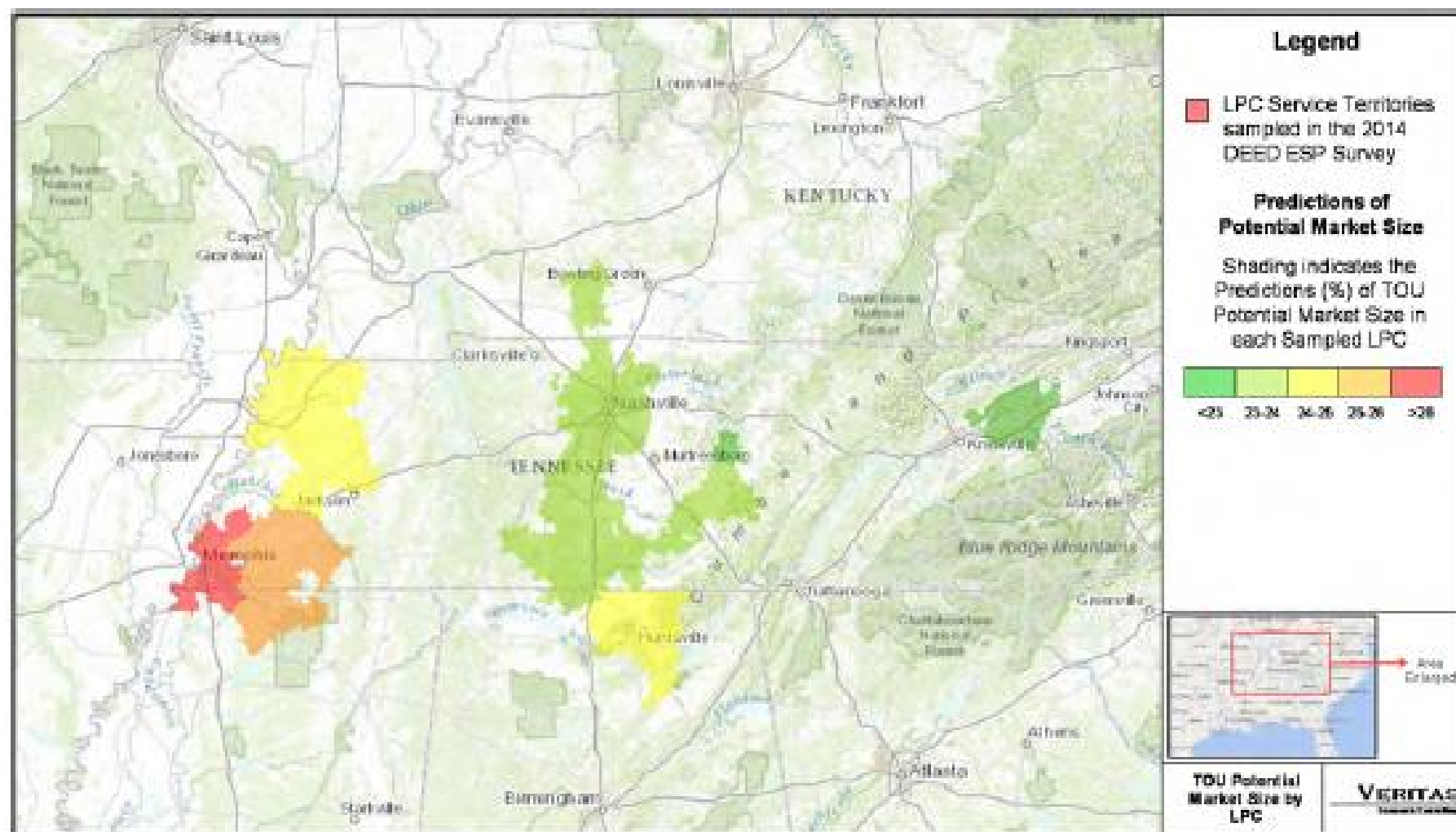
# A Tool To Predict Market Size: TOU Peak Period

## Market Size



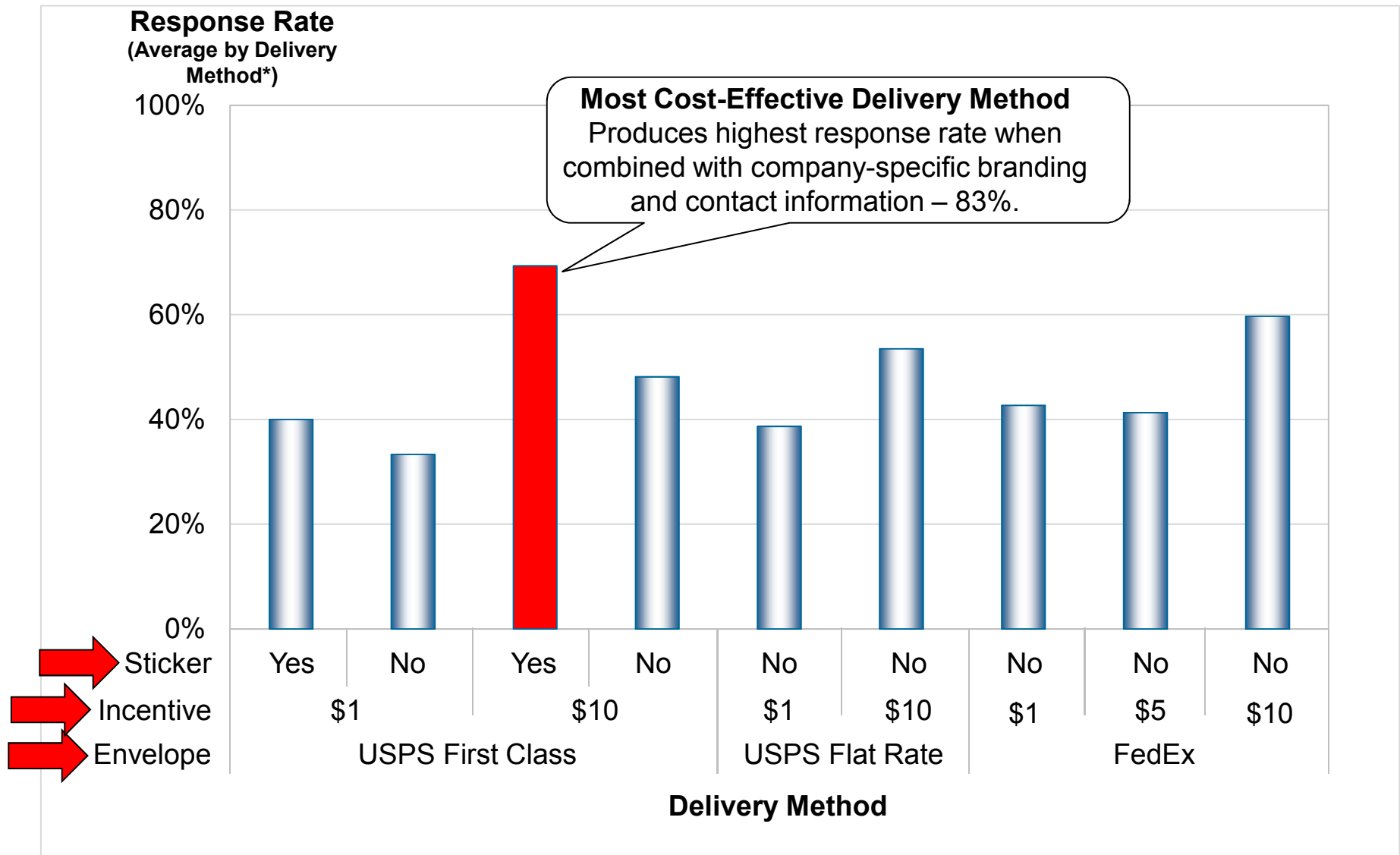
Flat Rate: \$0.10	Off-Peak \$0.03	Off-Peak \$0.09
	Peak: \$0.25	Peak: \$0.45
	Peak Timing: 2 pm – 8 pm	Peak Timing: 2 pm – 6 pm

# Results Help Understand How Market Potential Varies Across A Market





# Excellent Response Rates Achieved



\*Of surveys sent to local power companies in the Tennessee Valley

# Today Rates; Tomorrow Customer Technologies

- More is on the way...
  - Other utility offerings
  - Solar photovoltaics
  - Plug-in electric vehicles
  - Energy efficiency measures
  - Electricity storage



*Measuring Customer Preferences for Alternative Electricity Service Plans: An Application of a Discrete Choice Experiment*, EPRI, Palo Alto, CA: 2015. [3002005757](#).

# Resources

## Team

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# Together...Shaping the Future of Electricity