

# Time of Use Tariffs

Examples from the United States of America

**ERRA Tarff/Pricing Committee**

**Abu Dhabi, U.A.E.**

**6-7 February 2013**

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# Optional versus Mandatory

- Nearly all Time of Use programs in the USA are optional, not mandatory
- Some mandatory time of use programs are starting to emerge

# Why most customers do not choose time of use rates

## Portland General Electric

Monthly kWh  kWh/month used by average customer; or enter the kWh from your [bill](#).

Type of customer

Change in Use	Kilowatt-hours			Estimated energy cost*	
	On-peak	Mid-peak	Off-peak	Standard rate	Time of Use
No change; you continue using electricity as usual	206	408	386	\$67.78	\$67.77
You shift 10 percent of your on-peak electricity use to off-peak hours	185	408	406	\$67.78	\$65.95
You shift 25 percent of your on-peak electricity use to off-peak hours	154	408	437	\$67.78	\$63.22
You shift 35 percent of your on-peak electricity use to off-peak hours	134	408	458	\$67.78	\$61.40

# Why most customers do not choose time of use rates

## Portland General Electric (Residential)

	Prices Per kWh	Summer (May – October)	Winter (November – April)
<b>On Peak</b>	\$0.13266	Monday – Friday 1500 - 2000	Monday – Friday 0600 – 1000 1700 - 2000
<b>Mid Peak</b>	\$0.07500	Monday – Friday 0600 – 1500 2000 – 2200 Saturday 0600 - 2200	Monday – Friday 1000 - 1700 2000 - 2200 Saturday 0600 – 2200
<b>Off Peak</b>	\$0.04422	Every Day 2200 – 0600 Sunday and Holidays 0600 - 2200	Every Day 2200 – 0600 Sunday and Holidays 0600 - 2200

# Why most customers do not choose time of use rates

## Portland General Electric

Monthly kWh  kWh/month used by average customer; or enter the kWh from your [bill](#).

Type of customer

Calculate

Change in Use	Kilowatt-hours			Estimated energy cost*	
	On-peak	Mid-peak	Off-peak	Standard rate	Time of Use
No change; you continue using electricity as usual	1018	2284	1699	\$317.80	\$317.73
You shift 10 percent of your on-peak electricity use to off-peak hours	916	2284	1800	\$317.80	\$310.35
You shift 25 percent of your on-peak electricity use to off-peak hours	764	2284	1953	\$317.80	\$299.26
You shift 35 percent of your on-peak electricity use to off-peak hours	662	2284	2055	\$317.80	\$291.88

# Salt River Project

## Optional Time of Use Plan (Residential)

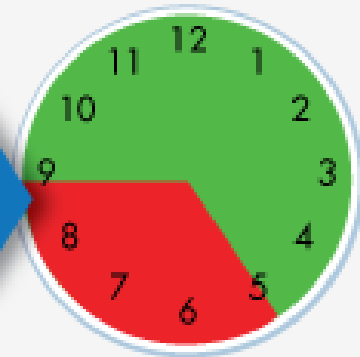
Higher-cost, on-peak hours  
Monday - Friday

MAY-OCTOBER



NOVEMBER-APRIL

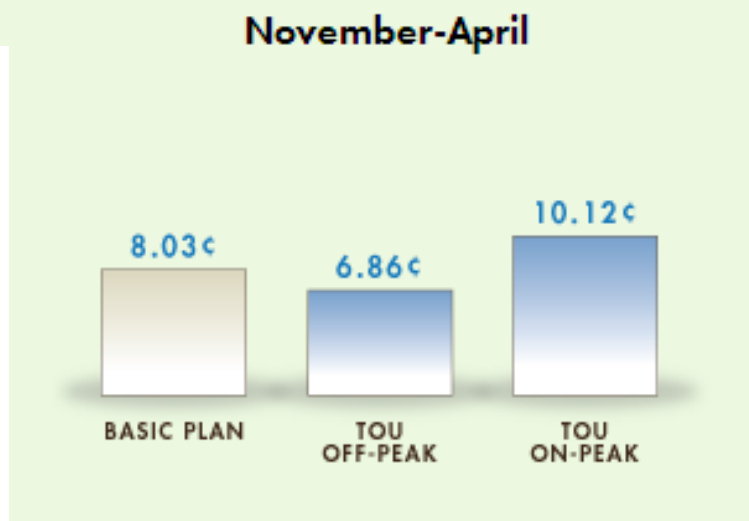
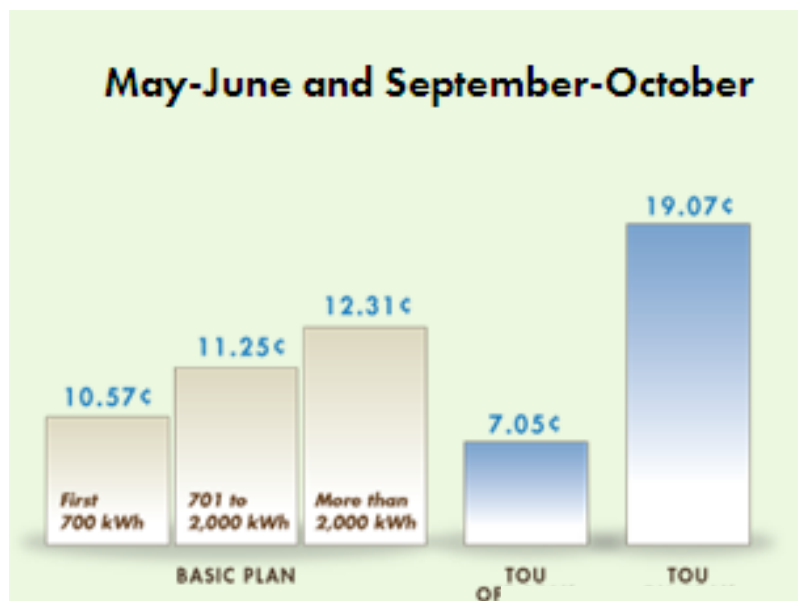
5-9 A.M.  
5-9 P.M.  
HIGHER-COST  
HOURS



**About 22% of Salt River Project's Residential Customers are on this Traditional Time of Use Rate (one of largest TOU programs in USA, started in 1980s)**

# Salt River Project

## Optional Time of Use versus Basic Plan (Residential)



# Salt River Project

## Optional Time of Use (Residential)

- Average time of use residential customer uses about 25% of energy on peak
- Average of about 7.5% savings
- Website information helps customers figure out which rate plan is best for customers
  - August bill is \$125 or more
  - Have a larger home or several people in the household
  - Have a pool
  - Can be flexible when using major appliance



# Salt River Project Optional Residential EZ-3 Plan

Customers select one of 3  
on-peak periods

2-5 p.m. (1400-1700)

4-7 p.m. (1600 to 1900)

are pilot plans

and are limited to

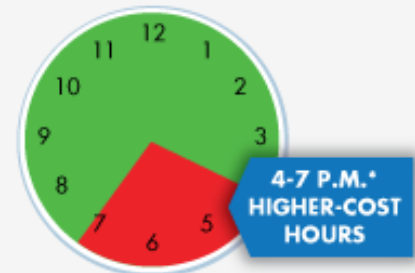
10,000 participants each

(Company serves about 950,000  
customers in total)

**Approximately 6% of Salt River Project's  
Residential Customers selected one of  
the EZ-3 Plans**

From Salt River Project Website at  
<http://www.srpnet.com/prices/home/tod.aspx>

On-peak and off-peak hours  
Monday - Friday  
YEAR-ROUND

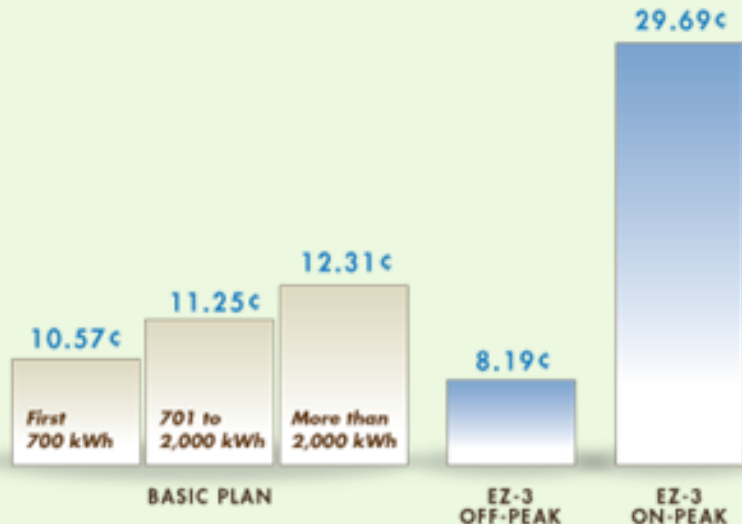


*\* 2-5 p.m. and 4-7 p.m. time periods are pilot price plans  
and limited to 10,000 participants each.*

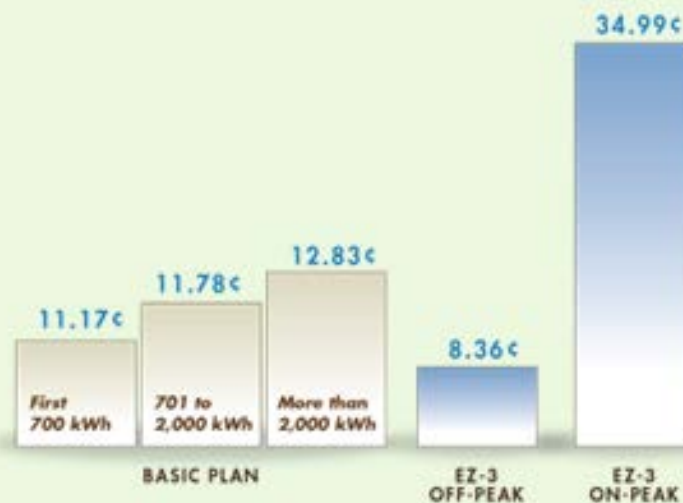
# Salt River Project

## Optional EZ-3 Plan versus Basic Plan (Residential)

May-June and September-October



July-August



November-April



# Salt River Project

## Optional EZ-3 (Residential)

- Average EZ-3 residential customer uses about 10% on-peak energy
- Average of about 6% savings
- Website information helps customers figure out which rate plan is best for customers
  - August bill is \$125 or more
  - Have a larger home
  - Use major appliances daily
  - Can limit or shift energy use for just three hours

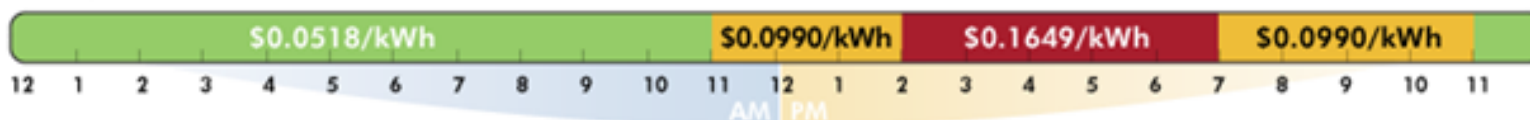
# Salt River Project

## Standard Optional Commercial Time of Use

### SUMMER

Monday–Friday

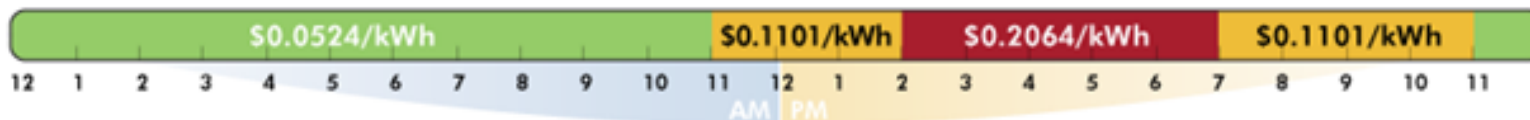
May, June, September, October



### SUMMER PEAK

Monday–Friday

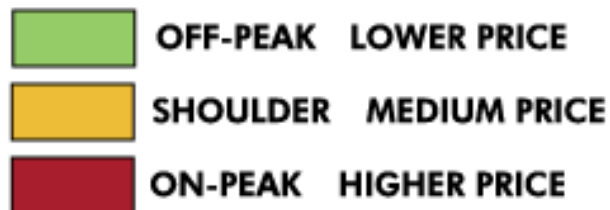
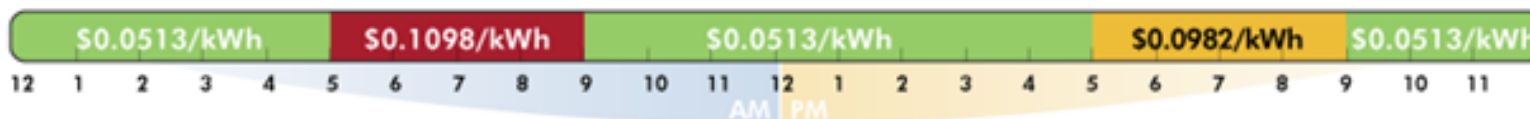
July, August



### WINTER

Monday–Friday

November through April



# Mandatory for Some – Connecticut Law

- Not later than October 1, 2005, each electric distribution company shall submit an application *to implement time of use rates for customers that have a maximum demand of not less than 350 KW* to take effect on or before January 1, 2007.
  - From March to December 2006, each company shall issue comparative analysis to customers with maximum demand of  $\geq 350$  KW showing the effects of the forthcoming time of use rates
- Not later than November 1, 2005, each company shall submit an application to *implement mandatory seasonal rates for all customers* beginning April 1, 2007
  - From April 2006 to March 2007, each company shall issue comparative analysis to customers that show the effects of the forthcoming seasonal rates

# Mandatory for Some – Connecticut Law

- No application for time of use rates shall be approved unless
  - The rates reasonably reflect the cost of service during their respective time use periods
  - The costs of implementation, impact on customers, and benefits to the utility system justify such rates
  - Such rates alter patterns of customer consumption without undue adverse effect on the customer.

# Mandatory for Some – Connecticut Law

- On or before July 1, 2007, each electric distribution company shall submit a plan to deploy an **advanced metering system**... Such metering systems shall support net metering and be **capable of tracking hourly consumption** to support proactive customer pricing signals through innovative rate design, such as time of day or real time pricing of electric service for all customer classes.
- On or before July 1, 2007, each electric distribution company shall submit a proposal to ***implement voluntary critical peak pricing or real-time pricing tariffs for all customer classes***. The department shall approve a voluntary critical peak pricing or real time pricing tariff for each customer class to become effective on or before January 1, 2008.

# Mandatory for Some / Optional for Others

## Connecticut Time of Use Rates

- Phase-in of Mandatory Time of Use Rates
  - Optional not working
    - Connecticut Light & Power serves > 1,100,000 residential customers
    - <200 residential time of use customers
  - Mandatory use designed to reduce growing peak
    - Financial Incentive to reduce usage during peak times
- Peak Periods – Residential
  - Initially, 0700 to 2300 hours on weekdays
    - Provided little opportunity to shift usage
  - Now, 1200 to 2000 hours on weekdays



# Mandatory for Some

## Connecticut Time of Use Rates

- United Illuminating Phase-in Schedule
  - Residential (average customer uses about 700 kWh/month)
    - 2008: Customers with  $> 4,000$  kWh in a billing period in 2007
    - 2009: Customers with  $> 3,000$  kWh in a billing period in 2008
    - 2010: Customers with  $> 2,000$  kWh in a billing period in 2009
    - 2011 and later: To be determined if should apply to others
      - In September 2011, decision made not to mandate for additional residential customers – instead will expand the Variable Peak Pricing rate option
  - Small Commercial and Industrial
    - June 2008: Customers with demands of  $\geq 300$  kW
    - June 2009: Customers with demands of  $\geq 200$  kW
    - June 2010: Customers with demands of  $\geq 100$  kW

# Mandatory for Some

## Connecticut Time of Use Rates

- Connecticut Light & Power Phase-in Schedule
  - Residential
    - Mandatory Time of Use was to begin in 2009, but was put on hold until a determination on the meters to be used and who will pay for the meters (should cost be socialized) is resolved
      - Continue to offer voluntary Time of Use rates
      - Establish an optional real time rate
      - Conduct a 10,000 meter and time-based rate study
        - » Determine customer response to advanced Time of Use rate designs
        - » Study different rate designs based on different time based costs
  - Small Commercial and Industrial
    - 2008: Begin educating customers regarding mandatory Time of Use
    - 2009: Customers with demands of  $\geq 300$  kW
    - 2010: Customers with demands of  $\geq 200$  kW
    - 2011: Customers with demands of  $\geq 100$  kW

# Alternative Time of Use Rates

## Connecticut Light & Power – Variable Peak Pricing

- On-peak consumption rate (initially approved in 2008)
  - Based on the average of the Day Ahead market price of energy for each hour of the on-peak period plus an adjustment factor to calculate an equivalent full requirements price
    - Day ahead price does not reflect the full requirements price
    - Adjust to reflect the cost of capacity and ancillary services
  - Post the on-peak price for the next day around 4 p.m.
- Implemented July 2008
  - After 2 years, only 17 customers taking (all residential)
  - Rate is a calculated proxy
    - Actual result shows lower peak rates compared to time of use rate
    - Actual result shows higher non-peak rate compared to time of use rate
    - Rate is subsidized by other customers because of the true-up mechanism for supply that is paid by all customers
      - No separate supply purchase or generation source for these customers

# Alternative Time of Use Rates

## Connecticut Light & Power – Variable Peak Pricing

- Changed the on-peak and off-peak rates method in September 2011
  - Adjusted the computation of the generation true-up mechanism – try to eliminate subsidies from other classes
  - Improved relationship in the relative peak / off-peak prices

### Example of Difference in Computed Prices (kWh)

Date	VPP Peak	VPP Off-Peak	TOU Peak	TOU Off Peak
1 January 2010	\$0.13345	\$0.11113	\$0.13619	\$0.10119
1 April 2010	\$0.10889	\$0.09645	\$0.13619	\$0.10119
1 July 2010	\$0.12907	\$0.10439	\$0.13619	\$0.10119
1 October 2010	\$0.12276	\$0.98230	\$0.13619	\$0.10119

# Alternative Time of Use Rates

## Connecticut Light & Power – Seasonal Rates

- Winter Months
  - Highest supply procurement costs occur in January and February – support establishing winter rates
  - But, would create a hardship for most customers (especially those with electric heating) so not develop
- Summer
  - June, July, August, September
  - Initial difference of \$0.02/kWh from the rate in other months

# Time of Use Rates are Not New

**Mandatory time-of-use tariffs were authorized in the January 5, 1978 interim order for the general primary, general secondary, and 500 largest residential customers.**

Order dated July 20, 1978  
Wisconsin Electric Power Company Rate Case  
Wisconsin Public Service Commission

# Time of Use Rates are Not New

There is no disagreement among economists or rate engineers that the cost of providing electricity may vary from minute to minute, from hour to hour, day to day, and by seasons of the year depending on the extent to which the utility's facilities are being utilized. Because the demand for electricity varies widely from one part of the day to another and from season to season, much of the generation and transmission capacity lies idle for substantial periods of time. In addition, utility fuel costs per unit of production vary with the level of demands; as demand increases, the production cost of additional generating capacity increases because the utility dispatches the generating units in the order of increasing unit production costs.

Time-of-use rates give price signals to the customer as to the cost of producing units of electricity according the time it is used...

Order dated January 5, 1978  
Wisconsin Electric Power Company Rate Case  
Wisconsin Public Service Commission