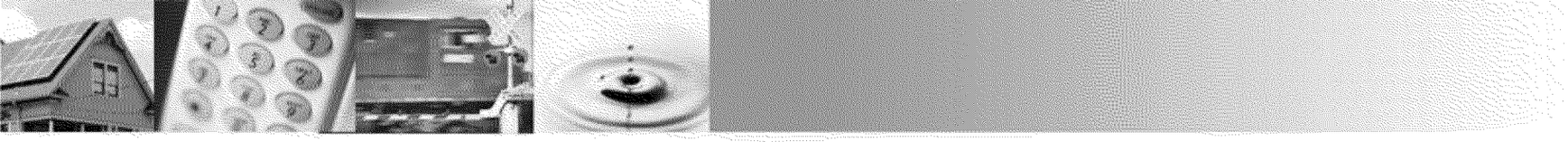


California Public Utilities Commission

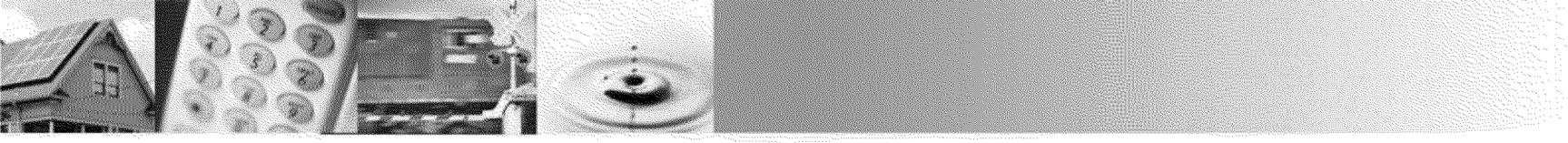
Residential Rate Structure OIR

R.12-06-013

Workshop Presentation

Rate Design Elements, Concepts and Definitions

December 5, 2012

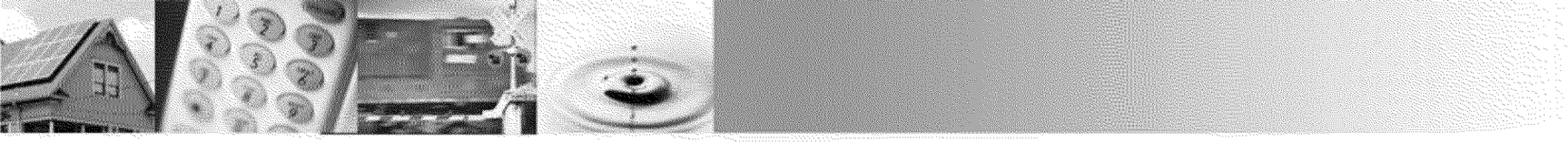


Workshop Objectives

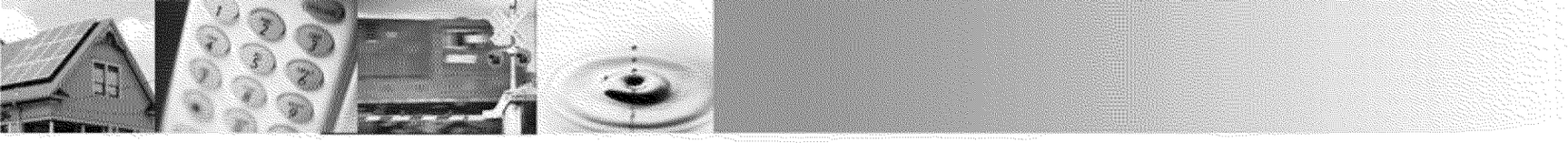
1) Identify the terms that should be defined and possible definitions.

2) Consider the pros and cons of specific rate design elements and concepts.

We will not attempt to reach consensus on each proposed rate design element, concept and term, but rather have a discussion on the elements and terms with the aim of understanding and identifying the elements and terms that would need to be defined through the subsequent ALJ ruling.



Rate Design Terms and Definitions



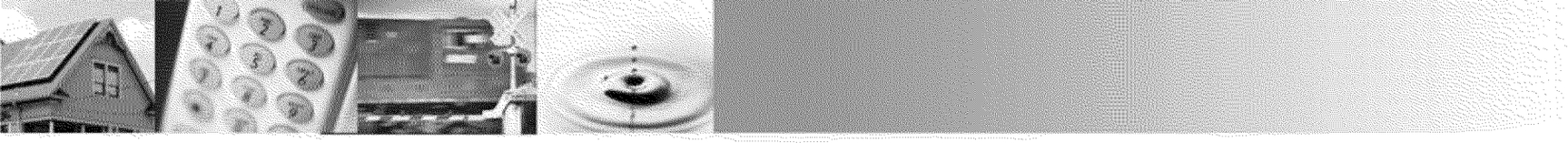
Rate Design Definitions

1) ***Revenue Neutrality***: *A regulatory requirement that any alternative rate design must recover the same total revenue requirement as the default rate design, assuming that customers make no change in their usage patterns.*

2) ***Fixed Costs***: *Costs that do not vary with usage. For example, this might include some types of distribution costs, customer service, meters, etc.*

3) ***Cost-Causation***: *Method of allocating costs (e.g., generation, transmission, distribution) and designing rates based on the drivers of the cost categories in an attempt to assign those costs to the customers who caused the costs to be incurred.*

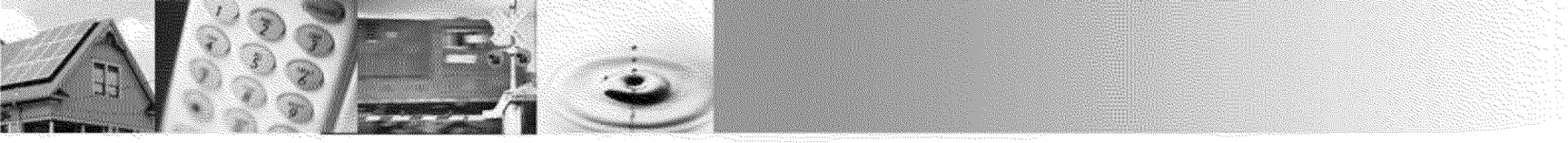
4) ***Cross-Subsidy***: *Recovering costs incurred by one group of customers from another group of customers. For example, California has an explicit policy to shift the cost of the CARE program discounts to all non-CARE customers.*



Rate Design Definitions

5) ***Economic Efficiency***: *Obtaining maximum consumer satisfaction from available resources. In the rate design context, economic efficiency is achieved when pricing reflects the marginal cost of generating and delivering electricity, including externalities.*

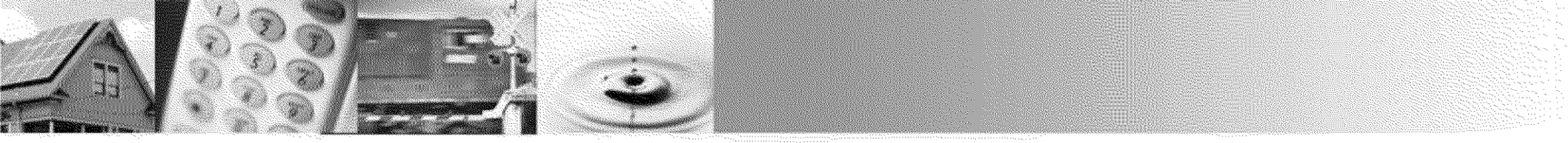
6) ***Externality***: *A cost or benefit that is not included in the market price of a good because it's not included in the supply price or the demand price. Pollution is an example of an externality cost if producers aren't the ones who suffer from pollution damages. Externality is one type of market failure that causes inefficiency.*



Rate Design Definitions

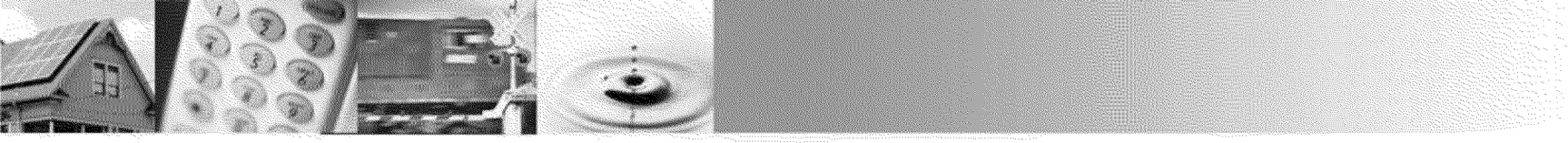
7) ***Marginal Cost***: *The cost of providing one additional unit of a good or service. In the electric utility context there are several types of marginal costs – energy, generation capacity, transmission capacity, and distribution capacity. The change in utility costs resulting from an additional customer or additional use of energy or capacity, or the change in costs related to a change in output. The CPUC uses marginal costs in allocating the utility's revenue requirement to customer classes, and as reference points in rate design. In the California ratemaking context, short-run marginal costs would reflect current market conditions (e.g., over- or under- capacity situations), while long-run marginal costs would include the entire cost of new facilities.*

8) ***Embedded Cost***: *Method of allocating costs starting with the utility revenue requirement and assigning these costs based on cost-causation principles (e.g., meter costs for residential class assigned to residential class)*



Rate Design Definitions

9) ***Rate Cost Components**: In California, rates are unbundled into generation, distribution, and transmission components based on key cost-drivers for each component.*
   - e) ***Generation Costs**: Costs related to generating power to produce electricity. Typically defined in terms of capacity costs (e.g., $100/kW) and energy costs ($0.08/kWh).*
   - f) ***Transmission Costs**: Costs associated with the transmission system for moving power long-distances or at high voltage, regulated primarily by FERC.*
   - g) ***Distribution Costs**: Costs associated with distributing power to customers (e.g., poles and wires, meters). Typically defined in terms of capacity costs ($/kW) and customer costs ($ per customer)*
   - h) ***Public Purpose Charges**: Costs associated with a variety of programs, including energy efficiency, demand response, solar and distributed generation, low-income and medical needs*



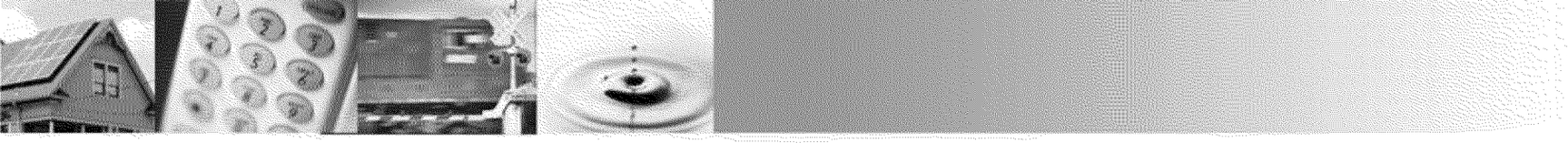
Rate Design Definitions

10. ***Peak Demand**: The maximum amount of energy carried by the utility system during a specific time period (e.g., a year, season, month, or day), also referred to as peak load. Peak demand determines the required system capacity.*

11. ***Off-Peak**: Time period when the electric system does not usually face high demand (peak).*

12. ***Coincident Peak Demand**: The level of demand of a customer or customer class at the time of system peak demand.*

13. ***Non-Coincident Peak Demand**: The maximum demand of a customer or customer class during a billing period, regardless of when the system peak occurs.*

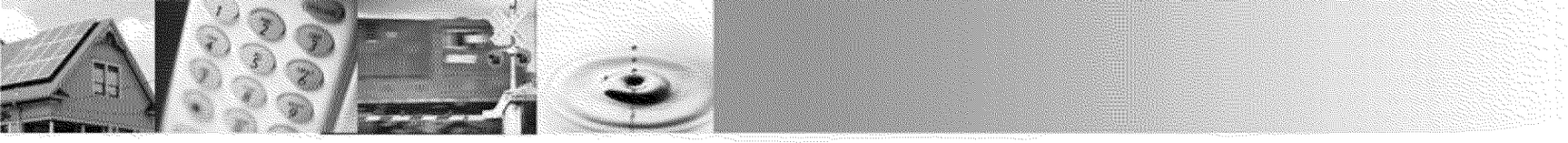


Rate Design Definitions

14) ***Demand Response***: *The ability of an individual electric customer to reduce or shift usage or demand in response to a financial incentive or reliability need.*

15) ***Energy Efficiency***: *Using less energy to perform the same function at a comparable level of service through the installation of equipment or adoption of a practice.*

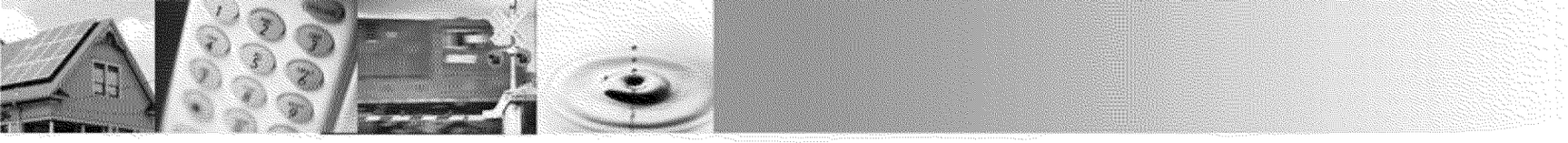
16) ***Energy Conservation***: *Total reduction in energy use, including using less energy to perform a function or reducing the level of service for a function.*



Rate Design Definitions

17) ***Price Elasticity of Demand***: *The relative response of a change in quantity demanded to a relative change in price. More specifically the price elasticity of demand can be defined as the percentage change in quantity demanded due to a percentage change in demand price.*

18) ***Income Elasticity of Demand***: *The relative response of a change in demand to a relative change in income. More specifically the income elasticity of demand can be defined as the percentage change in demand due to a percentage change in buyers' income. The income elasticity of demand quantitatively identifies the theoretical relationship between income and demand.*



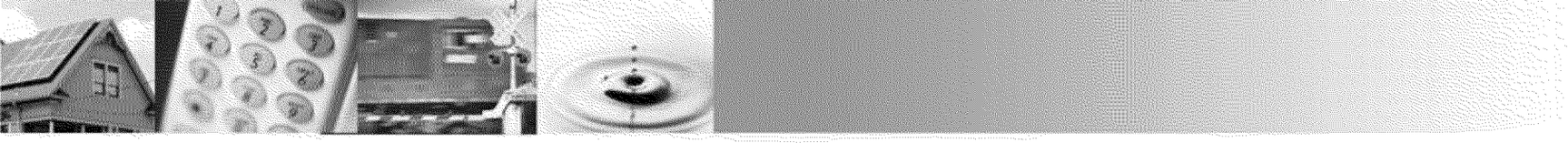
Rate Design Definitions

19) ***System Conditions***: *Any or all of the following: wholesale electricity costs, reliability conditions, short-term environmental impacts, the relationship between supply and demand.*

20) ***Dispatch***: *A broadcast signaling the initiation of a control strategy or price adjustment.*

21) ***Automatic Control Technology***: *Any technology that allows the customer or their agent (e.g., an electric service provider or a demand response provider) to pre-program a control strategy - for an individual electric load, group of electric loads, or an entire facility - to be automatically activated in response to a dispatch.*

22) ***Notification***: *Information provided to customers regarding price adjustments or system conditions. 'Day-ahead' notification provides at least 24 hours advance notice. 'Hour-ahead' notification provides at least one hour advance notice.*

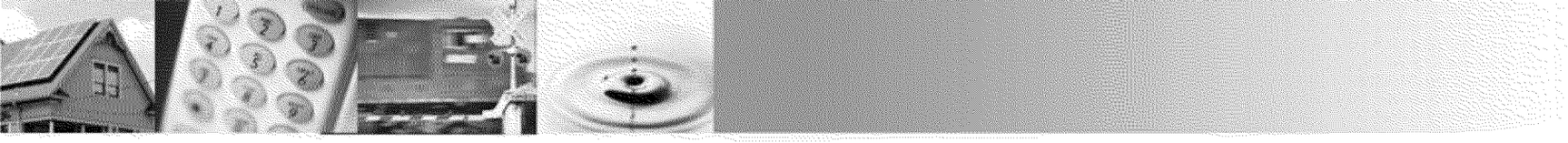


Rate Design Definitions

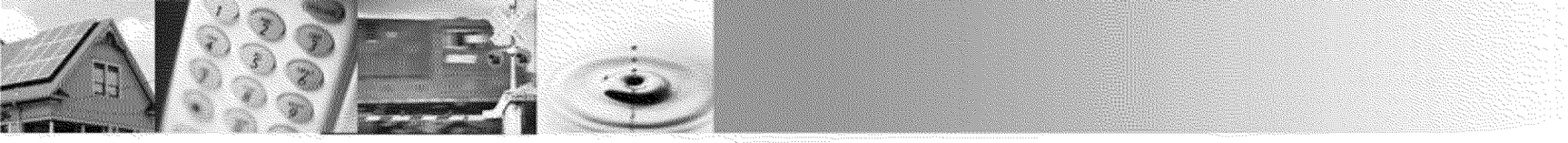
***23) Seasonal Rate**: A rate in which the price of electricity changes by season.*

***24) Public Goods Charge (PGC):** A non-bypassable surcharge imposed on all retail sales to fund public goods research, development and demonstration, energy efficiency activities, and low income assistance programs.*

***25) Medical Baseline**: Customers who rely on life support equipment or those who have life threatening illnesses or compromised immune systems are given a higher baseline quantity to ensure their medical needs for electricity are met at affordable prices.*



Rate Design Elements and Concepts

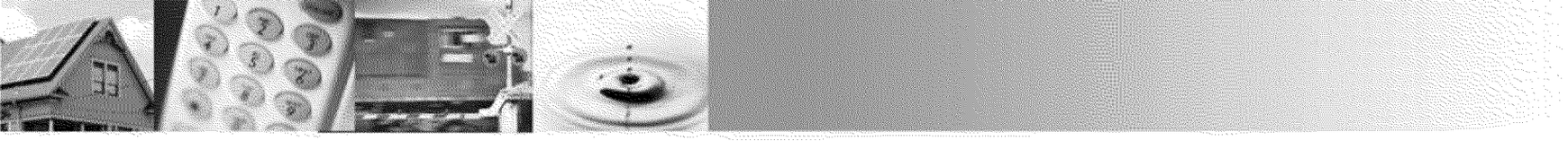


Flat Rates

- Flat rates – an average rate charged volumetrically in cents per kWh, that would be applicable for all usage in all climate zones (e.g., 18 cents per kWh)

- Advantages
  - Would be simple and understandable

- Disadvantages
  - Not likely to fully reflect cost-causation
  - Would not encourage changes in energy usage (e.g., on-peak to off-peak usage, etc.)

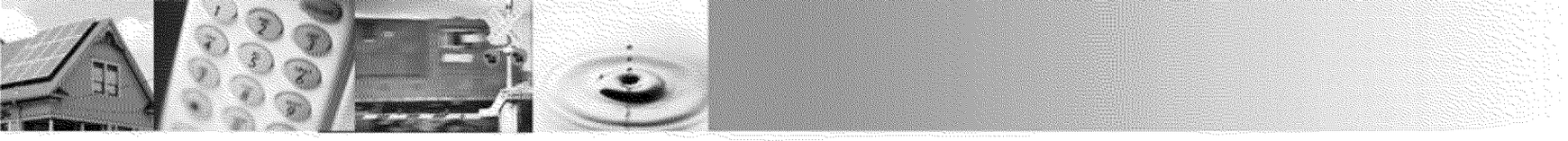


Fixed Charges and Volumetric Charges

- **Fixed charges** – monthly charge (e.g., $5/month) applicable to all customers regardless of usage intended to reflect costs that do not change with usage and are necessary to ensure constant availability of service.
- **Volumetric charges** – per kWh charges based on electricity usage during the billing cycle (e.g., $0.15/kWh) intended to reflect costs that change with usage (e.g., variable generation charges), but typically includes generation, distribution, transmission, and public purpose program costs.

- Advantages of Recovering Some Cost via Fixed Charges
  - Would be simple and understandable
  - May better reflect cost-causation
  - Fixed monthly charge reflects non-volumetric costs
  - Fixed costs are necessary to serve all customers permonth for each customer

- Disadvantages
  - Likely to increase bills for low-use customers compared to the current tiered system
  - Fixed charges may not fully reflect cost-causation for classes of customers (e.g., multi-family vs. single-family residences), but FCs could be differentiated by SFR vs. MFR
  - May decrease incentives to conserve.

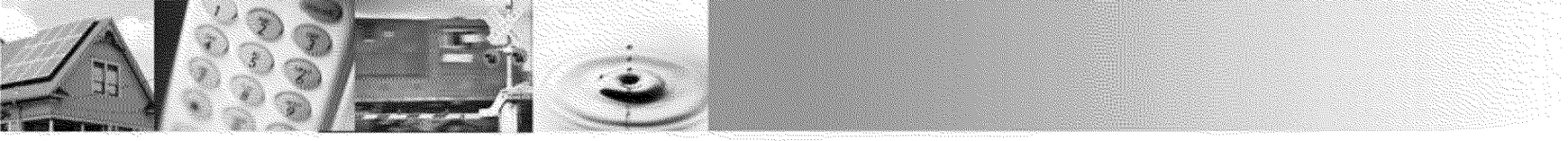


Baseline Quantity & Tiered Rates

Baseline Quantity: A quantity of electricity allocated for residential customers based on 50-60 percent of average residential consumption (60-70 percent for all-electric during winter season). The Commission is required by statute to designate a baseline quantity of electricity which is necessary to supply a significant portion of the reasonable energy needs of average residential customers at affordable prices. In setting those quantities, the Commission was directed to take into account the difference in energy needs between all-electric residences and those with both gas and electric service and to take into account differences in energy use by climatic zone and season. (Paraphrased from Sec. 739 of the PU Code)

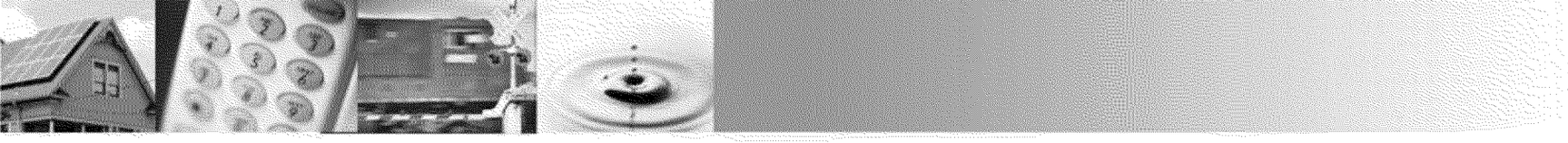
Tiered Rates: A rate which changes as a function of cumulative customer electricity usage within a monthly bill cycle. Prices in an 'inverted tier' or 'inclining block' rate increase as cumulative electricity usage increases. California IOUs currently have inclining tiered rates as follows:

Tier 1 Electricity usage up to the Baseline amount
Tier 2 Electricity usage from 101% to 130% of Baseline
Tier 3 Electricity usage from 131% to 200% of Baseline
Tier 4 Electricity usage from 200% to 300% of Baseline
Tier 5 Electricity usage over 300% of Baseline (SCE only)



Baseline Quant. & Tiered Rates (cont.)

- **Advantages**
  1) Baseline promotes affordability for basic needs
  2) Higher tier rates are perceived to encourage conservation
  3) Two tiers relatively simple to understand
- **Disadvantages**
  1) Does not reflect different consumption needs of single vs. multi-family
  2) 4-5 tiers not simple for customers to understand
  3) Increased monthly usage doesn't raise utility's cost per kWh
  4) Marginal cost of production and delivery does vary with the time of consumption, thus tiered rates do not send an accurate price signal re: the cost of delivering electricity on and off-peak.
  5) Legislative restrictions on Tier 1 and 2 rates have led to large disparities between the tiers resulting in significant cross-subsidy from upper tier users to lower tier users and increases in bill volatility
  6) Price signals are only apparent after bill is received.
  7) Many upper-income low-usage HHs pay below-cost bills and vice versa.
  8) Perception that coastal customers are subsidizing inland customers due to higher baseline quantities for inland customers.
  9) Perception that inland customers are subsidizing coastal customers due to inland customers higher demand.



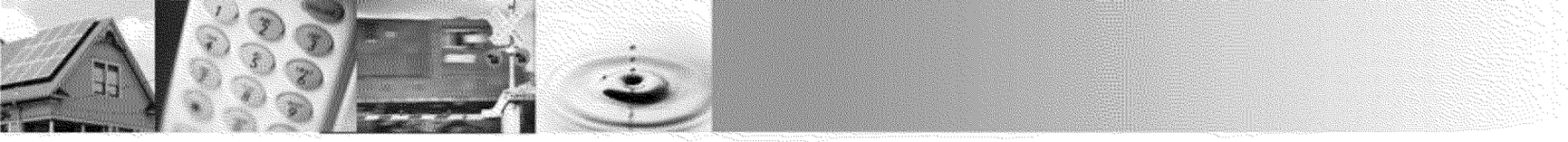
Low-Income and Medical Assistance Programs

California Alternative Rates for Electricity (CARE): Customers with household incomes up to 200% of the federal poverty level qualify for the CARE rate discount program

Family Electric Rate Assistance (FERA): The FERA program provides electricity at the tier 2 rate for consumption up to 200% of Baseline (i.e. for tier 3 usage). The program is available to families of three or more with annual incomes up to 250% of the federal poverty level

Medical Baseline: Customers who rely on life support equipment or those who have life threatening illnesses or compromised immune systems are given a higher baseline quantity to ensure their medical needs for electricity are met at affordable prices.

- Advantages
  - Promotes affordability through means-tested programs
  - Relatively simple and understandable
  - Relatively simple and easy to administer
- Disadvantages
  - Due to other legislative restrictions, the cost of CARE is disproportionately borne by upper tier non-CARE customers as opposed to all non-CARE customers.
  - Providing a volumetric discount encourages increased consumption.



Alternative Low-Income and Medical Assistance Mechanisms

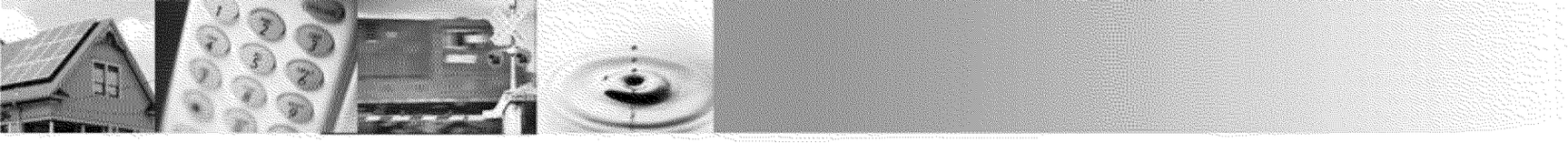
Fixed Credits: In lieu of rate discounts, the eligible customer would receive a fixed payment or fixed credit on their bill to represent the level of rate subsidy they qualify for

Staggered Discounts: Discounts for low-income customers that are staggered based on differing levels of income.

- Advantages of Fixed Credits and Staggered Discounts
  - Rates can be set closer to true cost, encouraging more efficient levels of consumption
  - Maintains the visibility of any price signal in rates, e.g. TOU
  - Achieves same or intended level of subsidy and support
  - Makes subsidy more transparent and simpler to understand
  - Reduces risk of unintended consequences and distortions
- Disadvantages
  - Could increase bills for low-income customers if the CARE subsidy is re-aligned to reflect a 20% discount off of standard rates.

Baseline Credit: Instead of baseline quantities and below-cost rates, intended beneficiaries receive the equivalent support via line-item credit(s).

Discount off of Standard Rates for CARE Customers: Originally CARE was designed as a 20% discount off of standard rates. Due to legislative requirements CARE rates are effectively discounted more than 20%. This approach would restore CARE to its intended level of discount.

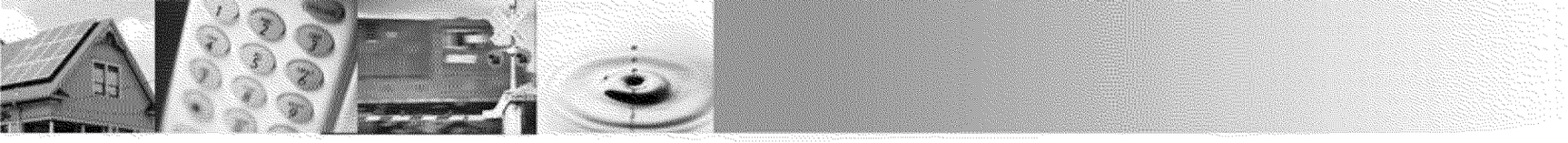


Demand Charges

Demand charge: Calculated on a per-kilowatt (kW) basis for a customer's monthly maximum usage (e.g., $5/kW). Demand charges reflect the cost of transmission and distribution facilities built to meet customers' maximum power demands. Demand charges are in addition to volumetric energy charges (per kWh), but the volumetric energy charges are lower than those on rate schedules without demand charges.

- Advantages
  - May better reflect cost-causation

- Disadvantages
  - May not be simple and understandable for residential customers (typically used for larger, more sophisticated customers)
  - Likely to increase bills for low-use customers compared to the current tiered system
  - May discourage energy efficiency, conservation; customer-generation, uncertain effect on demand response if poorly implemented



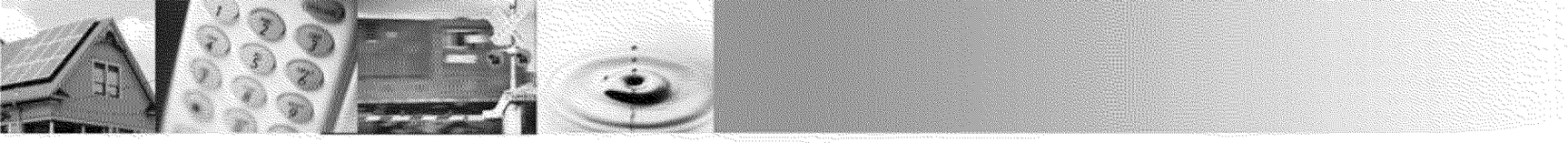
Time Variant Pricing

Time-Of-Use Rate: A rate that prices electricity according to the season or time of day that it is used. A time-of-use (TOU) rate design more closely reflects the actual cost of providing electricity:

- Lower rates during a utility's off-peak and partial-peak demand periods
- Higher rates during seasonal and daily peak demand periods
- By charging more during the peak period, when incremental costs are highest, TOU rates send more accurate marginal-cost price signals to customers.

- Advantages
  - Accomplishes several goals: marginal cost pricing, cost causation, encouraging conservation and peak reduction, economically efficient decision making.
  - Many customers could see reduced bills.
  - Encourages solar PV and off-peak charging of electric vehicles

- Disadvantages
  - Could cause some customers' bills to increase, especially those with above-average peak-period usage.

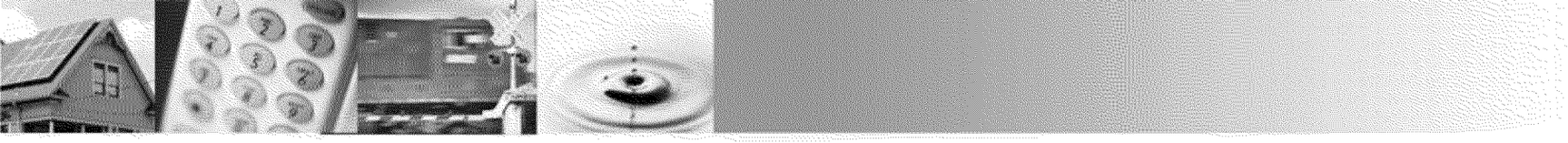


Tiered Time-of-Use Rates

Time-Of-Use Rates Can Also be Tiered:
An un-tiered 2-season, 2-3 part TOU rate would have peak, semi-peak, and off-peak rates in the summer and peak and off-peak rates in the winter for a total of 5 different rates.
In comparison, a 4-tiered TOU rate would have 20 rates. (5 rate periods x 4 tiers)

- Advantages
  - There are no inherent advantages other then the theoretical ability to accomplish two rate design goals: keeping Tiers 1 and 2 compliant with statutory limits while implementing TOU pricing.

- Disadvantages
  - Tiered TOU rates make it more complex for the customer to understand the price signal since prices change according to the time of day and increase as consumption progresses through the billing cycle.

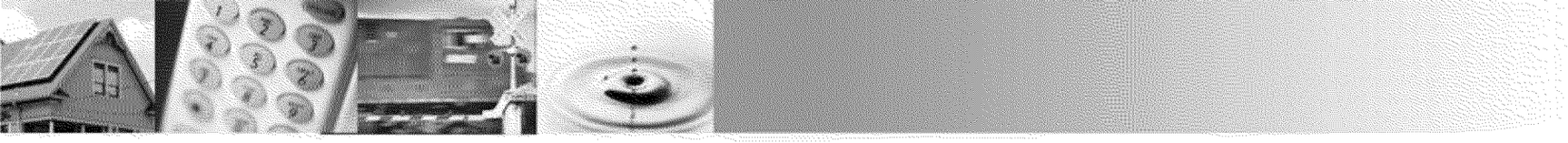


Critical Peak Pricing

A dynamic rate that allows a short-term price increase to a predetermined level (or levels) to reflect real-time system conditions. In a fixed-period CPP, the time and duration of the price increase are predetermined, but the days are not predetermined. The CA IOU CPP programs provide participating customers an incentive to shift usage to non-peak hours, and charge higher rates during peak hours on a CPP event day. CPP event days are called 24 hours in advance, with customer notification provided through several communication channels.

- Advantages
  - Enrolled customers that respond to event notifications will see bill reductions.
  - For residential customers CPP may be most appropriate as a purely opt-in program or a default with the ability to opt out to TOU rates.

- Disadvantages
  - Enrolled customers that don't respond to event notifications may see bill increases.
  - Some view CPP as a punitive "gotcha" program, but this argument falls away when the customer chooses to opt-in or declines to opt-out of CPP.



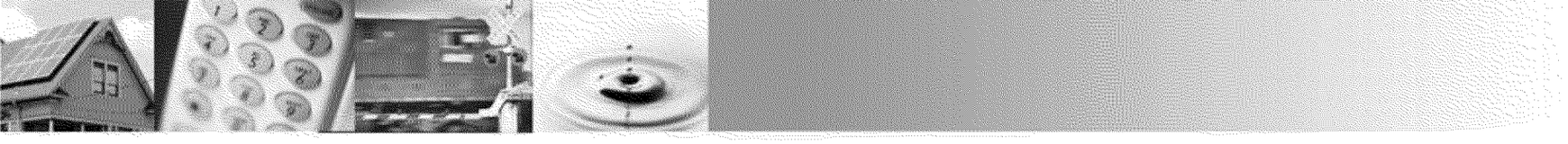
Dynamic Pricing

Dynamic Rate: A rate in which prices can be adjusted on short notice (typically an hour or day ahead) as a function of system conditions. A dynamic rate cannot be fully predetermined at the time the tariff goes into effect; either the price or the timing is unknown until real-time system conditions warrant a price adjustment. Examples include: real-time pricing (RTP), critical peak pricing (CPP)

Real-Time Pricing Rate: A dynamic rate that allows prices to be adjusted frequently, typically on an hourly basis, to reflect real-time system conditions.

- Advantages
  - Accomplishes several goals: marginal cost pricing, cost causation, encouraging conservation and peak reduction, economically efficient decision making.

- Disadvantages
  - Other then voluntary CPP programs, dynamic pricing is not widespread in residential rates.
  - Without the aid of technology controls, most residential customers lack the ability to monitor and respond to real-time pricing.

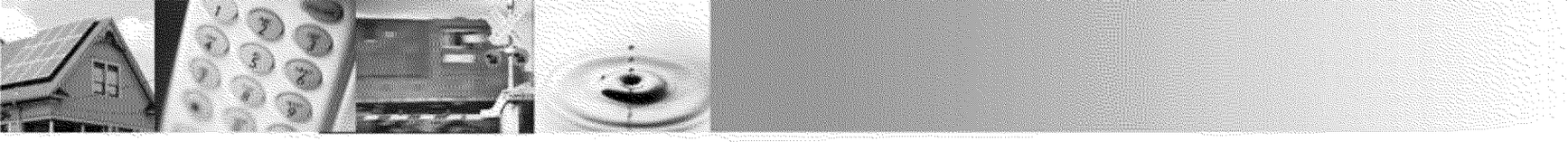


Peak-Time Rebate

Peak-Time Rebate: A program that offers a bill credit for customers who reduce their energy use when requested by the utility during a specific time. Typically event hours are during peak demand periods and events are called with day-ahead notice in response to system conditions. PTR offers a payment per kWh reduced during event periods, but does not assess any penalties for households that do not achieve reduction of electricity usage. To encourage customers to embrace automated enabling demand response technologies, PTR often pays a premium incentive per kWh reduced for customers enrolled in an automatic enabling technology program. Bill credits for each unit of electricity reduced are calculated based on event day reduction in electric usage below an established customer-specific reference level (CRL) for that day.

- Advantages
  - A "no risk" proposition for customers who can only win by reducing load during event hours.
  - More customer-friendly as a mandatory program due to lack of penalties.
  - A possible stepping stone to default time-variant pricing such as TOU.

- Disadvantages
  - Initially low awareness among customers means business as usual for most.
  - Some potential for 'structural winners,' i.e. those that receive a bill credit without making any intentional behavior change.



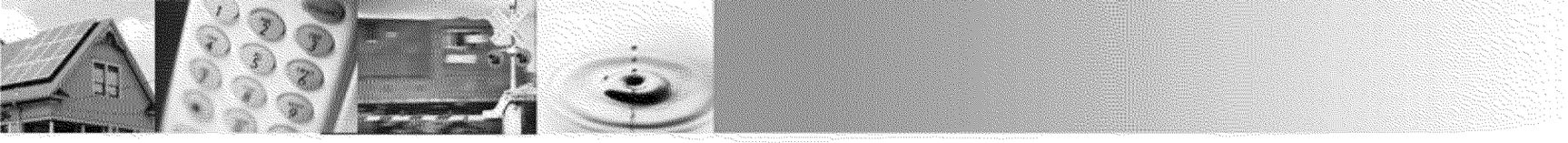
Shadow Billing and Bill Protection

Shadow Billing: When transitioning to a new time-variant rate customers see a shadow bill either monthly or annually of what their bill would have been had they remained on the non-time-variant rate. This enables them to determine if the new TVP rate is to their advantage, whether they want to remain on it, and how they could adjust their consumption to better perform on the TVP rate.

Bill Protection: Bill protection guarantees that the customer pays no more on the new pricing plan then what they would have paid on the old pricing plan.

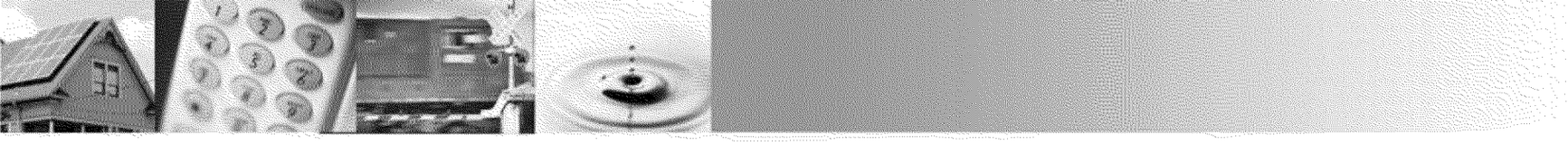
- Advantages
  - Designed to lower consumer anxiety about being on a new TVP rate.
  - Acts as training wheels for a 1st time TVP customer.

- Disadvantages
  - Could cause the customer to disregard the new TVP rate until the bill protection period expires and the “training wheels” come off.



Transition to New Rate Structures

- In some instances, rate design changes are mitigated or phased in over time to promote customer acceptance and to ensure that customers do not experience excessive bill impacts
    - Example: Customer and Demand Charges phased by incremental increases until the full charge is in effect.
- Advantages
    - May promote better acceptance
    - May avoid excessive bill impacts
- Disadvantages
    - Could delay implementation of rates that better reflect cost causation and Commission policy goals



Rate Structure Transitions (continued):

Default Rate: The rate that all customers pay unless they have the option and choose to opt for another rate.

Optional Rate: A rate that customers can voluntarily choose to be on

- Pro: Customers appreciate having choices
- Con: Adoption rates are historically very low

Mandatory Default Rate: When customers are transitioned to a new rate without the option to opt out to another rate.

- Pro: Best for achieving maximum participation and goals of new rate design, especially if a universal transition is necessary to avoid "self-selection bias"
- Con: Some customers resent not having a choice

Default Opt Out: When customers are transitioned to a new rate, but have the option to opt out to another rate. Can be used when transitioning to more then one rate. Example, a transition to default TOU and CPP rates where TOU is mandatory, flat rates are no longer available, but customers may choose to opt out of CPP and have just TOU as their new default rate.

- Pro: Maximizes participation while still maintaining some choice.
- Con: Despite the freedom to opt out some do not realize this option is available, or still resent the effort required to return to original rate.