



Oracle Energy and Water  
Customer Edge  
Conference

# Complex Billing Concepts

*Oracle's commitment to modern utilities' AML related billing needs*

---

## **Name**

Ha Bui

Solution Consultant

Oracle Energy & Water

March 13, 2023 1PM



# San Diego Trivia!

What is the name of the local professional baseball team?



It was the Franciscan Friars -- Father Junípero Serra and Don Caspar de Portolá -- who founded the first Spanish colony in southern California. "Padre," of course, is Spanish for "Father" or "Friar" and **the name stems directly from the priests who established the first Spanish Missions in California in 1769.**

# Our Mission

*To provide the best meter solutions to address the world's energy and water challenges.*



## Accurate Billing and Settlement per market rules

- Market Trends
- Best Utility Practice
- A solution that will grow and evolve with industry trends

Ha Bui  
Solution Consultant  
Oracle Energy & Water  
March 13, 2023



# The Agenda

**1.** **Complex Billing**  
→ What does it mean?

**2.** **Oracle's E&W commitment to addressing evolution of billing**

**3.** **Key use cases introduced with AMI and leveraging product features and concepts**

# What is Complex Billing?

- **Meter and Management of Meter Data is complex**
  - Typically, multi-accounts, multi-premise, multi-meter/multi-channels per meter, bi-directional metering, etc. with complex relationships
  - Totalization, Aggregation, Balancing, Imbalance, Netting,
- **Charge calculation is complex**
  - Multi-Layers of Service Agreements may exist.
  - Contract Options, renewals, cancellations

- **Invoice presentation is complex**
  - Multi-page invoice and/or statement
  - Almost always requires ALL interval data to be sent to customer.
  - Some requires a specific MS-Excel spreadsheet to be submitted as invoice
- **Billing process is complex**
  - Accrual
  - True-up / Re-statement
  - Prior-period adjustments
  - Adjustments to Adjustments



# Quick question...

---

## *OPEN YOUR ORACLE EVENTS APP*

- *Navigate to our session*
- *Click on polls*
- *Select poll to vote*



**OPEN & SHARE RESULTS >> [HERE](#)**

**When rolling out a new rate tariff/ program, what is your biggest hurdle in supporting new customer rate initiatives today?**

- A. Ensuring ability of metering solution to provide bill determinants to CIS
- B. Ensuring CIS and Rating engine has capability to support new tariff calculations
- C. Presentation of Customer Invoice
- D. Customer Engagement/ Rate Adoption



# Oracle's E&W commitment to addressing evolution of billing

---





# Oracle E&W Products with Complex Billing Capabilities

## On-Premise

### CC&B

#### Customer Care & Billing

- The Rating Side of Complex Billing
- Requires an MDM
- Requires pre-calculated “complex” Billing Determinants

### MDM/AMS

#### Meter Data Management/Advanced Metering System

- AMS is same as MDM but adds ability to manage interval measurement
- Allows complex interval billing determinant calculations
- Requires integration to a Rating system, i.e., CC&B

### C2M +AMS

#### Customer to Meter

- MDM & CC&B in a single instance
- All capabilities of CC&B and MDM
- Includes the following capabilities:
  - Customer Operations
  - Service Orders
  - Revenue Management
  - Device Management
  - Meter Data Management
  - Head-End Integration (note: specific AMI Vendor adapters are extra cost)

## SaaS

### CCS + AMS

#### Customer Cloud Service

- Cloud version of C2M
- Includes the following:
  - BI Publisher for invoicing
  - Includes all currently supported AMI Vendor adapters
  - OUAV – Oracle Utilities Analytics Visualization

### MSCS

#### Meter Solution Cloud Service

- Exact capabilities of MDM+AMS
- Includes the following:
  - Includes all currently supported AMI Vendor adapters
  - OUAV – Oracle Utilities Analytics Visualization

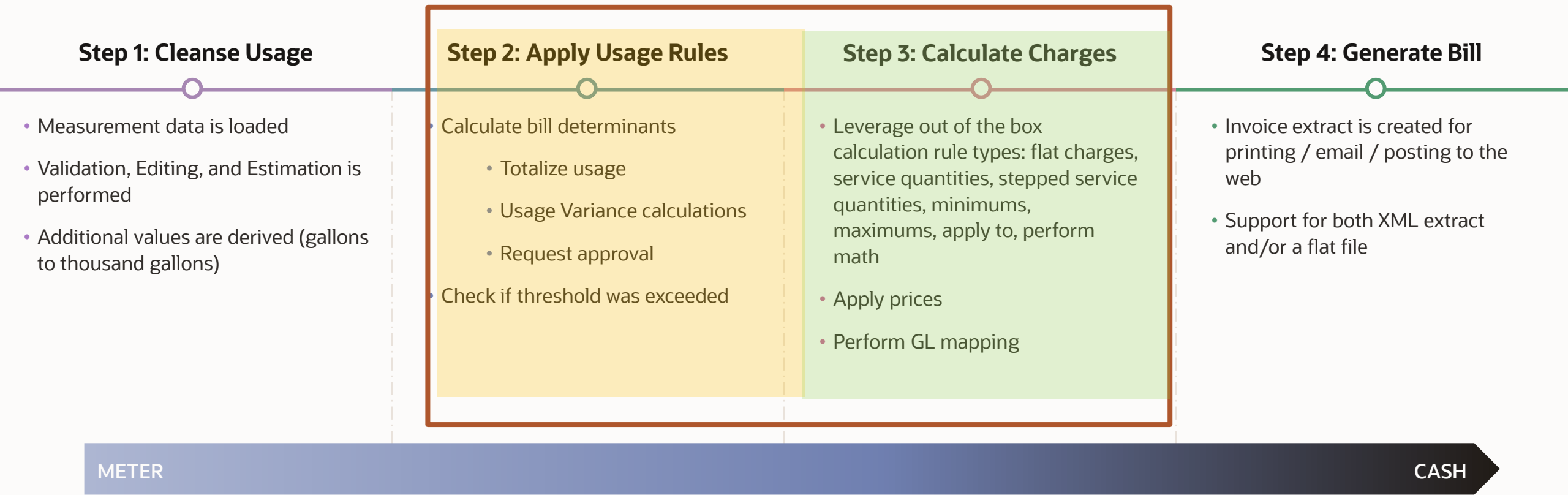
### BCS

#### Billing Cloud Service

- Standalone Complex Billing Solution
- All Features of CCS minus:
  - Credit & Collections
  - Service Orders
  - Device Management



# End to end usage to invoice process

Business users can design, build, and maintain without coding



# Standard Configuration

Advanced pre-built bill determinants and rating calculations

STANDARD PRECONFIGURED RULES		
Usage Rules 	Vector and Service Quantity Math	Rating Rules 
<ul style="list-style-type: none"><li>▪ Defines the calculation of Billing Determinants for use by the Rating<ul style="list-style-type: none"><li>▪ Residential, commercial, and industrial billing support</li><li>▪ Simple Scalar/Register Reads</li><li>▪ Simple Interval Totalization</li><li>▪ Interval Time-of-Use</li><li>▪ Support for unmetered items</li><li>▪ Curtailments</li><li>▪ Demand Response<ul style="list-style-type: none"><li>▪ Critical Peak Periods (CPP)</li><li>▪ Peak Time Rebate (PTR)</li></ul></li><li>▪ Peak Values (Coincident / Non-Coincident)</li><li>▪ Interval Curves (Real or Derived)</li><li>▪ Validation against a Tolerance</li><li>▪ Rule to call other Usage Groups</li><li>▪ Eligibility Criteria</li></ul></li></ul>	<ul style="list-style-type: none"><li>▪ Library of functions: Math, Trigonometric, etc.</li><li>▪ Math Expressions (<math>\text{SQRT}(X^2 + Y^2)</math>)</li><li>▪ Conditional Expressions (IF <math>X &gt; Y</math> THEN <math>X+Y</math> ELSE <math>X*Y</math>)</li><li>▪ Combination of above</li><li>▪ Powerful user-interface allows customers to write complex formulas</li></ul>	<ul style="list-style-type: none"><li>▪ Defines the pricing for products offered to the market.<ul style="list-style-type: none"><li>▪ Tariff / Contract Billing</li><li>▪ Unlimited number of charge lines</li><li>▪ Proration is handled automatically</li><li>▪ Consumption values may be further manipulated, if needed.</li><li>▪ Testing and checking rates:<ul style="list-style-type: none"><li>▪ What-if Analysis</li><li>▪ Validating Billing Queries from customers</li><li>▪ Calculating quotes for sales</li></ul></li><li>▪ Summary Billing for many services</li><li>▪ Cancel/Rebill</li><li>▪ Billable charges for 3<sup>rd</sup> party calculations</li></ul></li></ul>

# Key use cases introduced with AMI and leveraging product features and concepts

---

# Charlie is responsible for rates



**Charlie**  
“Billing and Rating Analyst”

1. Transition from Register to Interval or TOU based billing



3. Net Energy Metering and Community Solar Programs



2. Demand Response/  
Event base pricing e.g. Peak  
Time Rebate



4. Complex Pricing and  
Contracts





1. Transition from Register to Interval based billing

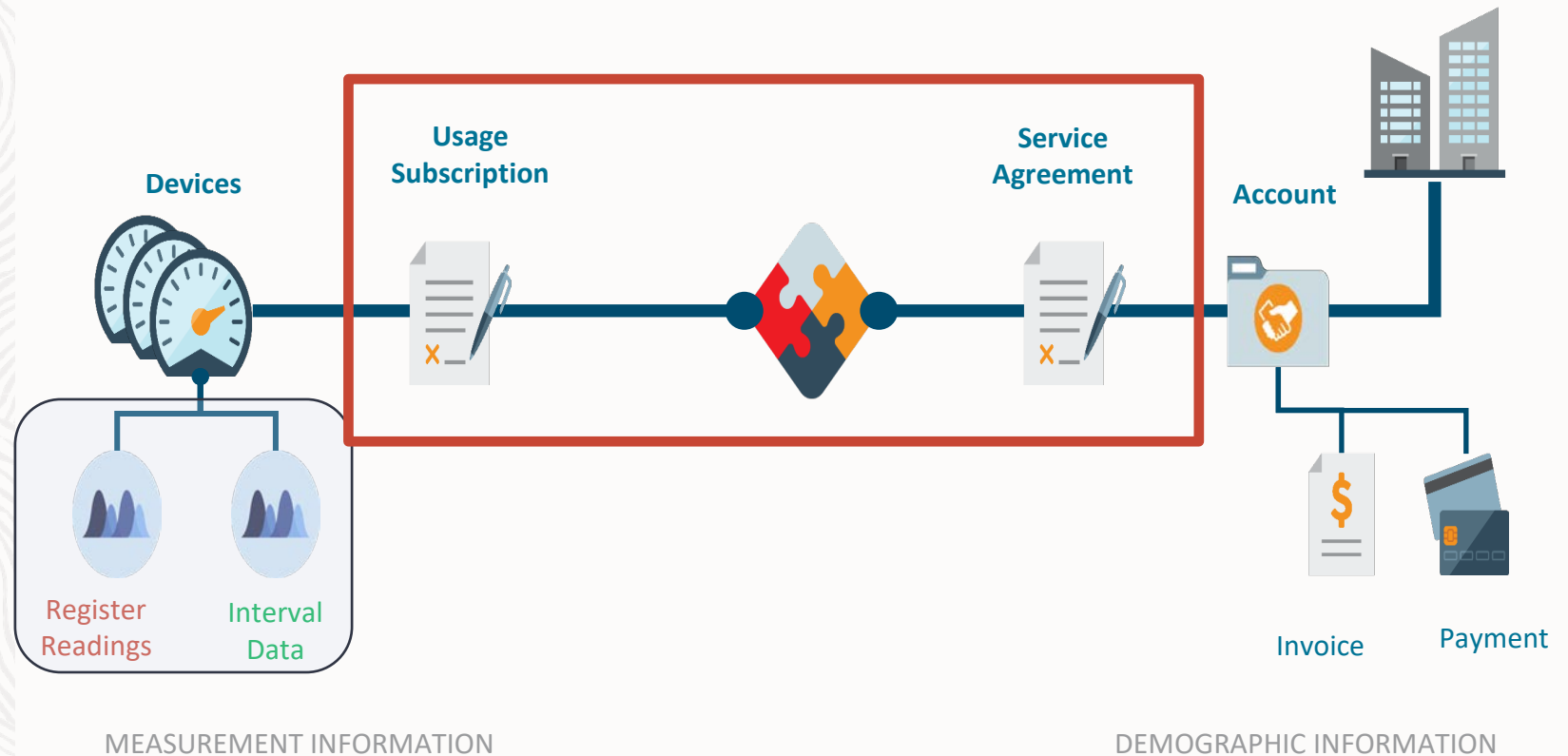
2. Demand Response/ Event base pricing e.g. Peak Time Rebate

3. Net Energy Metering and Community Solar Programs

4. Complex Pricing and Contracts

## Standard Data Model

Standard data model allows for register and interval data billing



1. Transition from Register to Interval based billing

2. Demand Response/ Event base pricing e.g. Peak Time Rebate

3. Net Energy Metering and Community Solar Programs

4. Complex Pricing and Contracts

## Service Agreement- Rate Schedule

Rate Schedule defines rules required for billing calculations...

The screenshot displays the 'Service Agreement' interface, specifically the 'Rate Info' tab. The top navigation bar includes links for 'Main', 'Rate Info' (active), 'SA/SP', 'Chars, Qty & Rec. Charges', 'Misc', 'Contract Options', 'Billing Scenario', and 'SA Portal'. The 'SA Info' section shows the agreement details: 'Oracle / Electric Residential, E-TOU, Active, 01-01-2017, Residential time of use, 4214916267'. The 'Rate' section shows a table with columns for 'Effective Date' and 'Rate Schedule'. The table contains one row with '01-01-2017' and 'E-TOU'. The 'Rate Schedule Tree' section is expanded, showing a hierarchical list of calculation groups and items. The tree includes: 'Electric time of use', 'Pre-Processing : Sum kWh', 'Sum kWh on, off and shoulder [Calculate Service Quantity]', 'Rate Version : Electric time of use 01-01-2001', 'Service charge [Flat Charge]', 'TOU consumption charges [Execute Calculation Group]', 'On peak - kWh [Service Quantity]', 'Off peak - kWh [Service Quantity]', 'Shoulder peak - kWh [Service Quantity]', 'Power cost adjustment, taxes and totals [Execute Calculation Group]', 'Power cost adjustment [Service Quantity]', 'Total energy charge [Summary]', 'Total taxable amount [Summary]', 'Calculate taxes [Execute Calculation Group]', 'City tax [Apply To]', 'State tax [Apply To]', 'County tax [Apply To]', 'Total taxes [Summary]', and 'Total charges [Summary]'. The 'Rate Schedule Tree' section is highlighted with a blue rounded rectangle.

Service Agreement

SA Info Oracle / Electric Residential, E-TOU, Active, 01-01-2017, Residential time of use, 4214916267 SA ID 4214916267

Rate

	Effective Date	Rate Schedule
+	01-01-2017	E-TOU Electric time of use

Rate Schedule Tree

- Electric time of use
  - Pre-Processing : Sum kWh
    - Sum kWh on, off and shoulder [Calculate Service Quantity]
  - Rate Version : Electric time of use 01-01-2001
    - Service charge [Flat Charge]
  - TOU consumption charges [Execute Calculation Group]
    - On peak - kWh [Service Quantity]
    - Off peak - kWh [Service Quantity]
    - Shoulder peak - kWh [Service Quantity]
  - Power cost adjustment, taxes and totals [Execute Calculation Group]
    - Power cost adjustment [Service Quantity]
    - Total energy charge [Summary]
    - Total taxable amount [Summary]
  - Calculate taxes [Execute Calculation Group]
    - City tax [Apply To]
    - State tax [Apply To]
    - County tax [Apply To]
    - Total taxes [Summary]
    - Total charges [Summary]

## 1. Transition from Register to Interval based billing

## 2. Demand Response/ Event base pricing e.g. Peak Time Rebate

## 3. Net Energy Metering and Community Solar Programs

## 4. Complex Pricing and Contracts

# Rate Schedule

....but also validates appropriate device configuration

Rate Schedule: Electric time of use

AddSearchBookmarkRefresh

Main

Rate Schedule

Main ⓘ

Rate ScheduleE-TOU ☑

DescriptionElectric time of use

Service TypeElectric

FrequencyMonthly

Currency CodeUnited States Dollars

Allow EstimatesYes

Allow RV ProrationYes

RV Selection Date

Pre-Processing Calculation Groups ⓘ

Add Calculation Group ^

Sequence	Description	Calculation Group	Rule Cross Reference
10	Sum kWh on, off and shoulder	Sum kWh	Add/Remove Links

Rate Version Calculation Groups ⓘ

Add Calculation Group ^

Effective Date	Description On Bill	Calculation Group	Rule Cross Reference
01-01-2000	Electric time of use %D	Electric time of use	Add/Remove Links

Post-Processing Calculation Groups ⓘ

Add Calculation Group ^

Sequence	Description	Calculation Group	Rule Cross Reference
----------	-------------	-------------------	----------------------

Record Actions ⓘ

EditDeleteDuplicate

Record Information

Valid Device Configuration Types ⓘ

Go to CCB Rate Schedule Extendable Lookup ^

Device Configuration Type

Electric Manual Read - kWh TOU - Scalar

Electric Auto Read - kWh - 60 min intervals

Bill Messages ⓘ

Bill Message	Start Date	End Date
Earth Day	03-12-2017	04-12-2017



1. Transition from Register to Interval based billing

2. Demand Response/ Event base pricing e.g. Peak Time Rebate

3. Net Energy Metering and Community Solar Programs

4. Complex Pricing and Contracts

## Rate Schedule – Usage Subscription

Provide a relationship link to how the usage should be calculated in supporting the Rate Schedule

Usage Subscription: Keller,James / Electric - Residential / 01-01-2017 0:00:00 PST / Active

Add Search Bookmark Refresh

Main Log

### Usage Subscription

Main ⓘ

Information Keller,James / Electric - Residential / 01-01-2017 0:00:00 PST / Active ✓

Usage Subscription Type Electric - Residential

Division California

Access Group

Status Active

Start Date/Time 01-01-2017 0:00:00 PST

End Date/Time

Usage Recipient Customer to Meter

Usage Approval Not Required

External ID 4214916267

Main Contact Keller,James ✓

Time Zone US Pacific Time

### Processing Information ⓘ

Most Recent Usage Transaction Date/Time 03-01-2017 0:00:00 PST

### Record Actions ⓘ

Edit Delete Deactivate

### Record Information

### Factor Overrides ⓘ

Factor	Start Date/Time	End Date/Time	Value
--------	-----------------	---------------	-------

### Usage Calculation Groups ⓘ

Effective Date/Time	Expiration Date/Time	Calculation Group
---------------------	----------------------	-------------------

### Fallback Usage Calculation Groups ⓘ

Effective Date	Calculation Group
----------------	-------------------

### Rate History ⓘ

Effective Date	Rate
01-01-2017	E-TOU

### Measuring Components ⓘ

Relationship Type	Measuring Component
-------------------	---------------------

### Service Points ⓘ

Service Point	Start Date/Time	Override Start Date/Time	Stop Date/Time	Override Stop Date/Time	Usage	Use Percent
375 Harrison St. #101, San Francisco, CA, 94107 / Electric Residential / Electric / ER-SM-902 / Active ✓	01-01-2017 0:00:00 PST				Add	100

1. Transition from Register to Interval based billing

2. Demand Response/ Event base pricing e.g. Peak Time Rebate

3. Net Energy Metering and Community Solar Programs

4. Complex Pricing and Contracts

## Rate Schedule – Extendable Look-up Configuration

Provide a relationship link to how the usage should be calculated in supporting the Rate Schedule

Extendable Lookup Value

**Main**

Rate	E-TOU
Description	Electric time of use
Override Description	
Detailed Description	

**Default Usage Calculation Group**

Calculation Group	Electric - Time of Use
-------------------	------------------------

**Record Actions**

Edit Delete Duplicate

**Record Information**

**Override**

Device Configuration Type	Calculation Group
Electric Auto Read - kWh - 60 min intervals	Electric - TOU (on/off/sh) & Demand with register reads

Established default usage calculation e.g. requires standard scalar/ register reads to support billing

Applies override usage calculation based on change or type of device configuration



1. Transition from Register to Interval based billing

2. Demand Response/ Event base pricing e.g. Peak Time Rebate

3. Net Energy Metering and Community Solar Programs

4. Complex Pricing and Contracts

## Usage Calculation Group- Rules

Provide list of usage calculation rule(s) that will output the desired results for billing

Usage Calculation Group: Electric - TOU (on/off/sh) & Demand with register reads

Add Search Bookmark Refresh

Main

Usage Calculation Group

Main

Calculation Group E-TOUMAP-DERIVEKWREADS

Description Electric - TOU (on/off/sh) & Demand with register reads

Detailed Description Produces TOU mapped kWh (on/off/sh), Total kWh and maximum demand (kW).

Division

Calculation Group Class Usage

Record Actions

Edit Duplicate Delete

Record Information

Device Configuration Types

Device Configuration Type

Electric Auto Read - kWh - 15 min intervals

Electric Auto Read - kWh - 30 min intervals

Electric Auto Read - kWh - 60 min intervals

Usage Calculation Rules List

Add Rule Resequence Rules

	Calculation Rule/Eligibility Criteria	Category	Referred Calculation Group
1	TOU Map kWh (on/off/sh)	Usage Calculation	
2	Derive kW	Usage Calculation	
3	Total KWH from Daily Scalar Readings	Usage Calculation	

Established default usage calculation e.g. requires standard scalar/ register reads to support billing

1. Transition from Register to Interval based billing

2. Demand Response/ Event base pricing e.g. Peak Time Rebate

3. Net Energy Metering and Community Solar Programs

4. Complex Pricing and Contracts

## Rate Schedule – Extendable Look-up Configuration

Provide a relationship link to how the usage should be calculated in supporting the Rate Schedule

Extendable Lookup Value

Main	
Rate	E-TOU
Description	Electric time of use
Override Description	
Detailed Description	
Default Usage Calculation Group	
Calculation Group	Electric - Time of Use

Record Actions ⓘ

Edit Delete Duplicate

Record Information ⓘ

Override

Device Configuration Type	Calculation Group
Electric Auto Read - kWh - 60 min intervals	Electric - TOU (on/off/sh) & Demand with register reads

Established default usage calculation e.g. requires standard scalar/ register reads to support billing

Applies override usage calculation based on change or type of device configuration

## 1. Transition from Register to Interval based billing

## 2. Demand Response/ Event base pricing e.g. Peak Time Rebate

## 3. Net Energy Metering and Community Solar Programs

## 4. Complex Pricing and Contracts

# Usage Calculation Results

Usage Calculation Rules Service Quantity (SQ) results can be used for more than just billing and rating. SQs are also used for interim calculation and informational purposes

Usage Request: Oracle / Electric Residential, Bill Determinants Processed, 02-01-2017 - 03-01-2017

Search Bookmark Refresh

Main Log

Service Point Usage Periods ⓘ

Period 02-01-2017 0:00:00 - 03-01-2017 0:00:00

Service Point 375 Harrison St. #101, San Francisco, CA, 94107 / Electric Residential / Electric / ER-SM-902 / Active ⓘ

Sequence	UOM	TOU	SQI	Quantity	Estimation	SQ Highlight
1	Kilowatt-Hours	Shoulder Peak		81.632162	Not Estimated	
2	Kilowatt-Hours	On-Peak		141.113896	Not Estimated	
3	Kilowatt-Hours			520.700000		
4	Kilowatt-Hours	Off-Peak		297.927327	Not Estimated	

Service Quantity Results for future rate and customer awareness

Usage Read Details ⓘ

Final UOM	Final TOU	Final SQI	Quantity	Service Point	Seq	UOM	TOU	SQI	Start Reading	End Reading	Measured Quantity	Constant	How To Use	How To Use (SP)	Use Percent	Measures Peak Qty	Start Read Date/
Kilowatt-Hours			520.700000	2846798342	1	Kilowatt-Hours			549.990000	1,070.690000	520.700000	1.000000	Additive	Add	100	<input type="checkbox"/>	02-01-2017 0:00:

Service Point ⓘ

Service Point 375 Harrison St. #101, San Francisco, CA, 94107 / Electric Residential / Electric / ER-SM-902 / Active ⓘ

Premise 375 Harrison St. #101, San Francisco, CA, 94107 ⓘ

Market

Sequence	Badge Number	Serial Number	From Date/Time	To Date/Time
1	ER-SM-902	ER-SM-902	02-01-2017 0:00:00	03-01-2017 0:00:00

Meter Reading Details



## 1. Transition from Register to Interval based billing

## 2. Demand Response/ Event base pricing e.g. Peak Time Rebate

## 3. Net Energy Metering and Community Solar Programs

## 4. Complex Pricing and Contracts

# Rate Schedule Execution- Bill Calculation Results

Service Quantity (SQ) are summarized scalar results values so rating isn't impacted with usage calculation determining how to summarize the information

Calculation Lines ①				
Description on Bill	Calc Amount	RC Seq / Calc Rule	Print	In Summary
Header 1, 02-01-2017 to 02-28-2017 , Electric time of use ( 01-01-2000 )	\$57.81			
Service charge	\$15.00	Service charge		Y
141.11 kWh at \$0.134 per kWh peak usage	\$18.91	On peak - kWh		Y
297.93 kWh at \$0.03029 per kWh off peak usage	\$9.02	Off peak - kWh		Y
81.63 kWh at \$0.06783 per kWh shoulder peak usage	\$5.54	Shoulder peak - kWh		Y
PCA 520.67 kWh at \$0.00547 per kWh	\$2.85	Power cost adjustment	Y	Y
Energy total	\$36.32	Total energy charge	Y	Y
Total taxable amount	\$51.32	Total taxable amount	N	Y
City sales tax 11.5%	\$0.00	City tax	N	Y
State sales tax 7.5%	\$6.36	State tax	Y	Y
County sales tax 0.25%	\$0.13	County tax	Y	Y
Tax total	\$6.49	Total taxes	N	Y
Total charges	\$57.81	Total charges	Y	N

Application of Rate  
Calculation against Usage  
related Service Quantity

1. Transition from Register to Interval or TOU based billing

2. Demand Response/ Event base pricing e.g. Peak Time Rebate

3. Net Energy Metering and Community Solar Programs

4. Complex Pricing and Contracts

## Dynamic Event Option

Dynamic options specify and override on how usage is normally calculated such as a Critical Peak or Curtailment period

Dynamic Option Type

AddBookmarkRefresh

Main

Dynamic Option Type List

No Filters Defined

	Dynamic Option Type	Description	Class	Edit	Duplicate	Delete
1	CPP	Critical Peak Period	Usage Event			
2	FIXED	Interruption: Fixed	Usage Event			
3	INTERRUPT	Standard Interruption	Usage Event			
4	NDP	Natural Disaster Period	Usage Event			
5	SMARTDAY	Smart Day Events	Usage Event			
6	VARIABLE	Interruption: Variable	Usage Event			

Dynamic Option Type

Main

Dynamic Option TypeCPPDescriptionCritical Peak PeriodDynamic OptionDynamic OptionBusiness ObjectTime ZoneUS Pacific TimeDynamic Option ClassUsage Event

Record Actions

EditDeleteDuplicate

Record Information



1. Transition from Register to Interval or TOU based billing

2. Demand Response/ Event base pricing e.g. Peak Time Rebate

3. Net Energy Metering and Community Solar Programs

4. Complex Pricing and Contracts

## Dynamic Option Time of Use (TOU) Map

Dynamic options reference a Dynamic TOU Map that allows for identification of dynamic option down to required interval resolution

TOU Map: Critical Peak Period - 15 min (TOU Override Use Only)

Main Log

TOU Map

Main ⓘ

Information Critical Peak Period - 15 min (TOU Override Use Only)  
TOU Map Data exists for period 01-01-2019 0:15:00 PST to 01-01-2025 0:00:00 PST









TOU Map Type Critical Peak Period - 15 min

Status Active

Override TOU Map Template

TOU Map Data List ⓘ

Filters: TOU Map 227148861272

	Date/Time	TOU	Edit
1	01-01-2025 0:00:00 PST	Critical Peak	
2	12-31-2024 23:45:00 PST	Critical Peak	
3	12-31-2024 23:30:00 PST	Critical Peak	
4	12-31-2024 23:15:00 PST	Critical Peak	
5	12-31-2024 23:00:00 PST	Critical Peak	
6	12-31-2024 22:45:00 PST	Critical Peak	
7	12-31-2024 22:30:00 PST	Critical Peak	
8	12-31-2024 22:15:00 PST	Critical Peak	

TOU identifier assigned to Dynamic Option period

Navigation icons: back, home, forward, and a red button with a white circle.

1. Transition from Register to Interval or TOU based billing

2. Demand Response/ Event base pricing e.g. Peak Time Rebate

3. Net Energy Metering and Community Solar Programs

4. Complex Pricing and Contracts

## Usage Calculation Group- Rules

Provide list of usage calculation rule(s) that will output the desired results for billing based on required Dynamic Event Option

Usage Calculation Group: Electric - Residential Peak-Time Rebate

**Main**

Usage Calculation Group

**Main**

Calculation Group: E-RES-PTR  
Description: Electric - Residential Peak-Time Rebate  
Detailed Description:  
Division:  
Calculation Group Class: Usage

Device Configuration Types ⓘ

Device Configuration Type

Electric Auto Read - kWh - 60 min intervals

Usage Calculation Rules List ⓘ

	Calculation Rule/Eligibility Criteria	Category	Referred Calculation Group
1	Get kWh Consumption	Usage Calculation	
2	Peak-Time Rebate Quantity Calculation	Usage Calculation	

Usage Rule to incorporate Dynamic Event Option

1. Transition from Register to Interval or TOU based billing

2. Demand Response/ Event base pricing e.g. Peak Time Rebate

3. Net Energy Metering and Community Solar Programs

4. Complex Pricing and Contracts

## Usage Rule reference to Dynamic Option Event

Usage rule are allowed to reference Dynamic Option Event to apply appropriate Service Quantity Identifier for Billing

Usage Calculation Rule

AddSearchBookmarkRefresh

Main

Calculation GroupElectric - Residential Peak-Time Rebate

Calculation RulePTR-QTY-CALC

Sequence20

DescriptionPeak-Time Rebate Quantity Calculation

Detailed Description

Calculation Rule CategoryUsage Calculation

Input Values

Dynamic Option IDCritical Peak Period / Active

TOU MapYear-Round 2-Bucket with Critical Peak - 00 min

UOMKilowatt-Hours

SQINet Conserved

Time Of Use Calculate FunctionSum

TOU Code for PeakOn-Peak

TOU Code for Critical PeakCritical Peak

Qualifying Days10

Peak Days5

Include WeekendNo

Include HolidaysNo

Include Critical Peak DaysNo

SQI Code for kWh ConservedConserved

EditDuplicateDelete

Record Information

Resulting Service Quantity

UOMKilowatt-Hours

TOU

SQINet Conserved



1. Transition from Register to Interval or TOU based billing

2. Demand Response/ Event base pricing e.g. Peak Time Rebate

3. Net Energy Metering and Community Solar Programs

4. Complex Pricing and Contracts

## Usage Calculation Results

*Provide list of usage calculation rule(s) that will output the desired results for billing*

Usage Transaction: Sent / 01-01-2019 2:00:00 PST - 02-03-2019 2:00:00 PST / Electric - Residential Peak-Time Rebate

Add Search Bookmark Refresh

Main Log

Usage Period ⓘ

Period: 01-01-2019 2:00:00 PST-02-03-2019 2:00:00 PST  
Usage Type: Frequently Read  
Service Quantities

UOM	TOU	SQL	Quantity	Data Quality Assessment	SQL Type	Service Point	Measuring Component	TOU Map	Factor	Characteristic Type	Characteristic Value	Calculation Group	Calculation Rule	Source Measurement Quality List	SQL Highlight Date/Time
Kilowatt-Hours			1,334.309614		Other							Electric - Residential Peak-Time Rebate	GET-KWH-CONS	Source Measurement Quality	SQL Highlight Date/Time
Kilowatt-Hours		Conserved	4.810000		Measuring Component	775 Howard St, San Francisco, CA, 94103 / Electric Residential / ER-PTR-01 / Active	ER-PTR-01 / 1 / Electric Interval kWh - 60 min					Electric - Residential Peak-Time Rebate	PTR-QTY-CALC	Source Measurement Quality	SQL Highlight Date/Time
Kilowatt-Hours		Net Conserved	4.810000		Measuring Component	775 Howard St, San Francisco, CA, 94103 / Electric Residential / ER-PTR-01 / Active	ER-PTR-01 / 1 / Electric Interval kWh - 60 min					Electric - Residential Peak-Time Rebate	PTR-QTY-CALC	Source Measurement Quality	SQL Highlight Date/Time

Usage Rule SQL results as Dynamic Event Option period is identified

1. Transition from Register to Interval or TOU based billing

2. Demand Response/ Event base pricing e.g. Peak Time Rebate

3. Net Energy Metering and Community Solar Programs

4. Complex Pricing and Contracts

## Rate Schedule Execution- Bill Calculation Results

Usage Calculation Rules Service Quantity (SQ) results are then passed to rating calculations (SQ rule- Quantity times Bill Factor)

Bill Seg Info

Oracle / Electric Residential, Frozen, Period: 01-01-2019 - 02-02-2019, \$66.80, 2004487423

Bill Segment ID 200878337099

Bill Seg Hdr

1 of 1

Sequence1

Start Date01-01-2019

End Date02-02-2019

Amount\$66.80

Desc on Bill

Electric residential rate

Rate Version

Electric - Residential Peak Time Rebate 01-01-2019

Sequence	Description on Bill	Calculated Amount	Print	Appears in Summary	Unit of Measure	Time of Use	SQI
1	Service and Facility Charge	\$6.75	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
2	Non-Summer Energy Charge: 1,334.31 kWh at \$0.04604 per kWh	\$61.43	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Kilowatt-Hours		
3	Peak Time Rebate: 4.81 kWh at \$-0.28776 per kWh	\$-1.38	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Kilowatt-Hours		Net Conserved



1. Transition from Register to Interval or TOU based billing

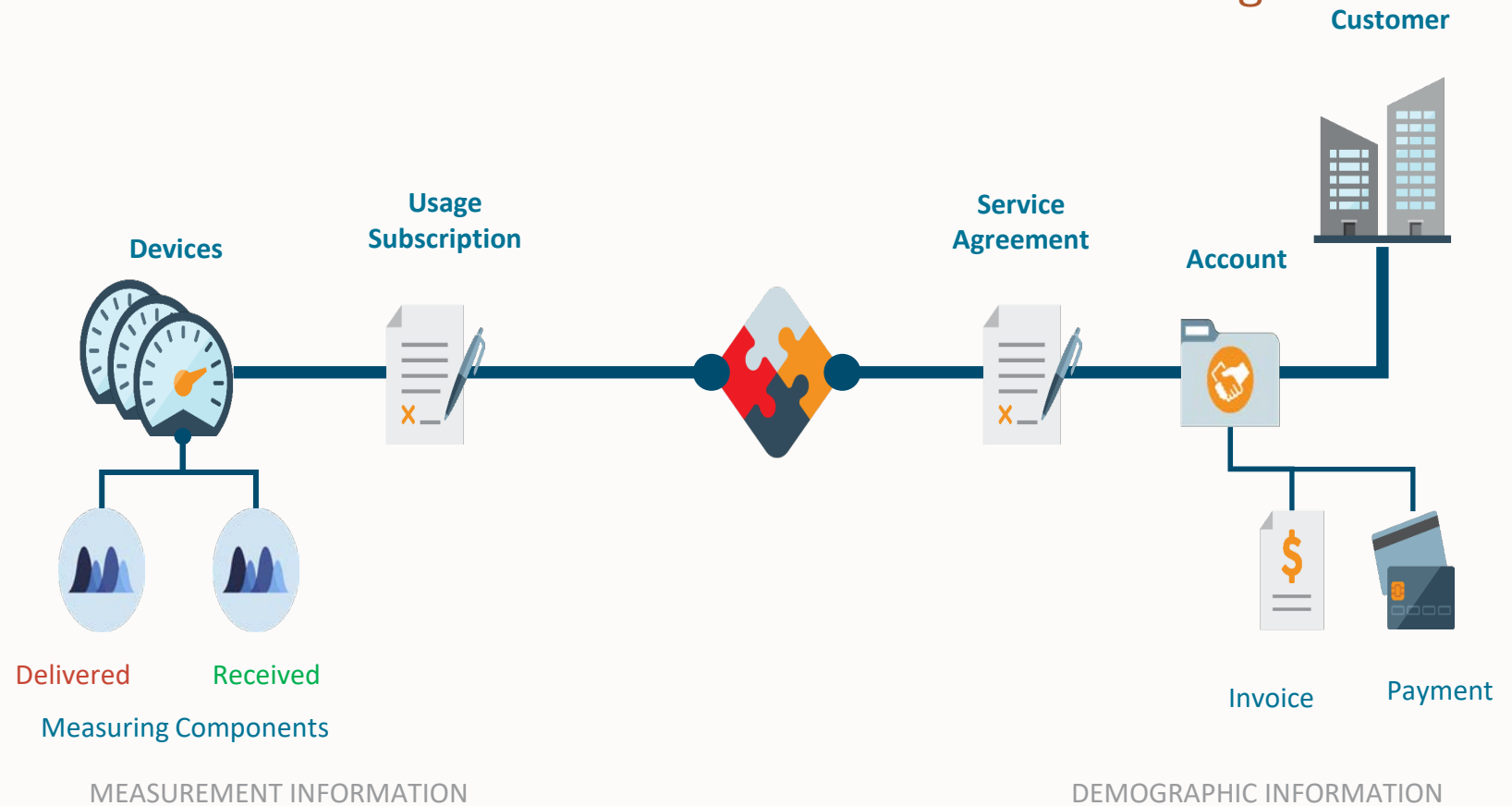
2. Demand Response/ Event base pricing e.g. Peak Time Rebate

3. Net Energy Metering and Community Solar Programs

4. Complex Pricing and Contracts

## Standard Data Model

Standard data model allows for individual Net Metering



1. Transition from Register to Interval or TOU based billing

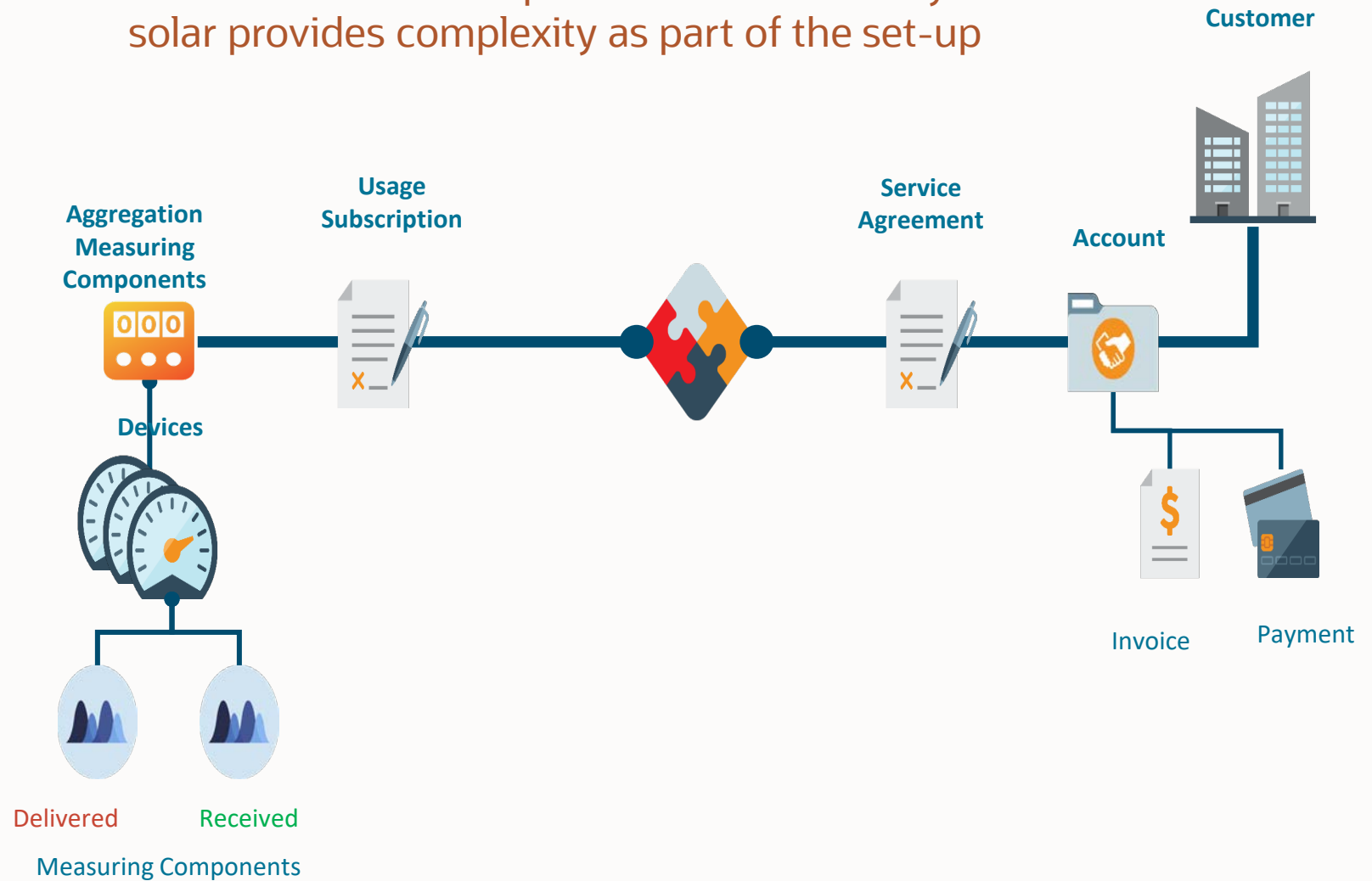
2. Demand Response/ Event base pricing e.g. Peak Time Rebate

3. Net Energy Metering and Community Solar Programs

4. Complex Pricing and Contracts

## Standard Data Model

Introduction of concepts such as community and shared solar provides complexity as part of the set-up



1. Transition from Register to Interval or TOU based billing

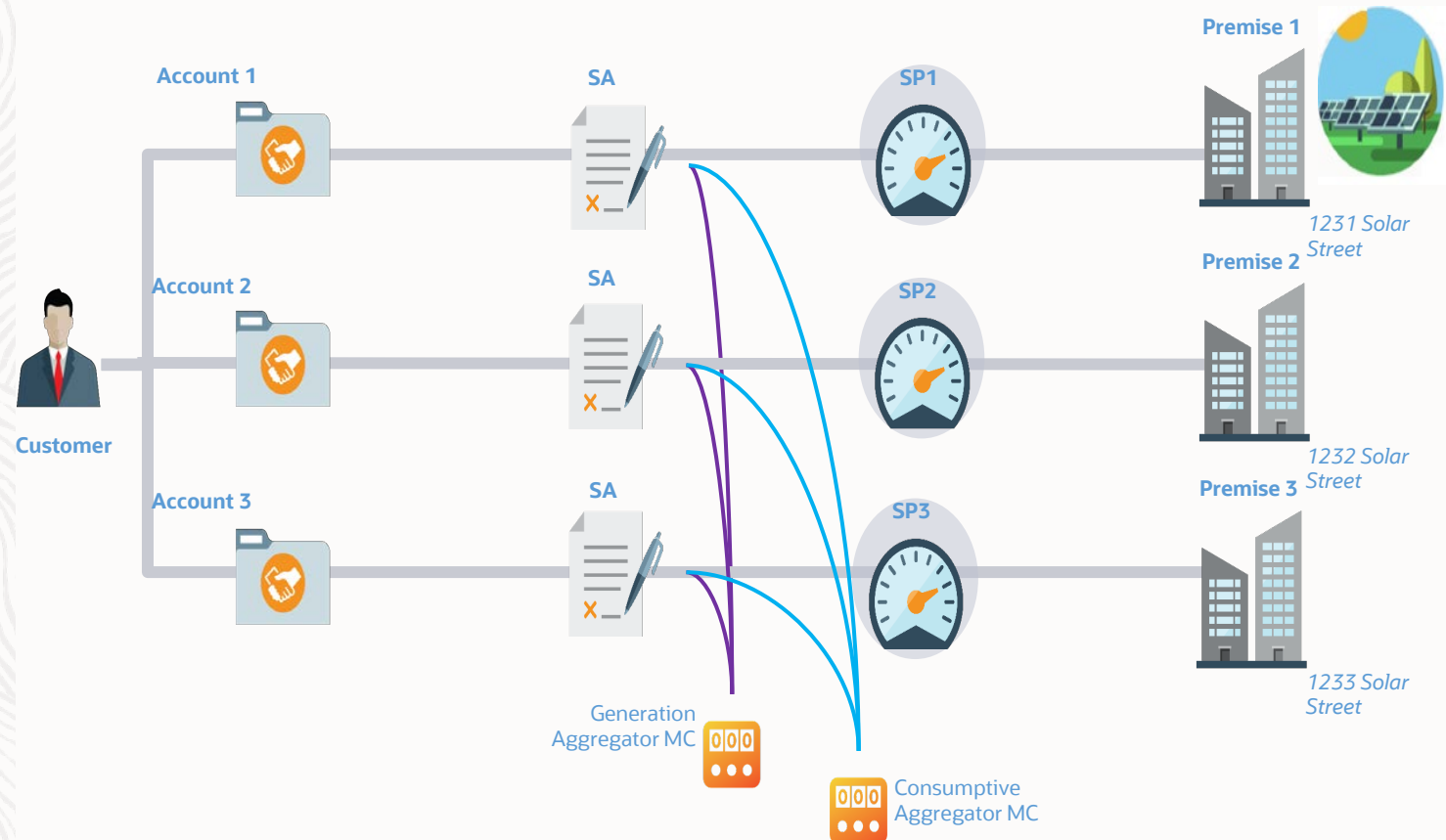
2. Demand Response/ Event base pricing e.g. Peak Time Rebate

3. Net Energy Metering and Community Solar Programs

4. Complex Pricing and Contracts

## Complex Solar Arrangement and Set-up

Introduction of concepts such as community and shared solar provides complexity as part of the set-up





1. Transition from Register to Interval or TOU based billing

2. Demand Response/ Event base pricing e.g. Peak Time Rebate

### 3. Net Energy Metering and Community Solar Programs

4. Complex Pricing and Contracts

## Dynamic Aggregation

Use of dynamic aggregation will allow to such as community and shared solar provides complexity as part of the set-up

Total and Trends View Add Search Bookmark Refresh

Main

Measuring Component

Main

Information

Aggregate by Solar Generation Source SP Id 352482330205

Measuring Component Type

Solar NEM Generator Aggregator

Status

Active

Solar Generation Source

1 NEM Street, San Francisco, CA, 94111 / Electric Residential / Active

Consumption Aggregated Through Date/Time

04-01-2020 12:00AM

Record Actions

Edit Delete Aggregate Deactivate

Record Information

Next Aggregation Horizon

1. Transition from Register to Interval or TOU based billing

2. Demand Response/ Event base pricing e.g. Peak Time Rebate

3. Net Energy Metering and Community Solar Programs

4. Complex Pricing and Contracts

## Dynamic Aggregation

Use of dynamic aggregation will allow to monitor periodic load of community and shared generation and load as required

Total and Trends View

Add Search Bookmark Refresh

Main

Measuring Component

Main

Information Aggregate by Solar Generation Source SP Id 352482330205

Measuring Component Type Solar NEM Generator Aggregator

Status Active

Solar Generation Source 1 NEM Street, San Francisco, CA, 94111 / Electric Residential / Active

Consumption Aggregated Through Date/Time 04-01-2020 12:00AM

Record Actions

Edit Delete Aggregate Deactivate

Record Information

Next Aggregation Horizon

Solar Aggregation Overview

	Type	Information	Calculation Group	
1	Solar Generation Source	Aggregate by Solar Generation Source SP Id 352482330205		Reload
2	Service Point - MDM	6 NEM Street, San Francisco, CA, 94111 / Electric Residential / Active	Shared Generation Usage Calc Group	360
3	Service Point - MDM	5 NEM Street, San Francisco, CA, 94111 / Electric Residential / Active	Shared Generation Usage Calc Group	360
4	Service Point - MDM	1 NEM Street, San Francisco, CA, 94111 / Electric Residential / Active	Shared Generating Usage Calc Group	360
5	Service Point - MDM	4 NEM Street, San Francisco, CA, 94111 / Electric Residential / Active	Shared Generation Usage Calc Group	360
6	Service Point - MDM	3 NEM Street, San Francisco, CA, 94111 / Electric Residential / Active	Shared Generation Usage Calc Group	360
7	Service Point - MDM	2 NEM Street, San Francisco, CA, 94111 / Electric Residential / Active	Shared Generation Usage Calc Group	360



1. Transition from Register to Interval or TOU based billing

2. Demand Response/ Event base pricing e.g. Peak Time Rebate

3. Net Energy Metering and Community Solar Programs

4. Complex Pricing and Contracts

## Usage Subscription – Aggregation MCs

Provide a relationship link to aggregation MCs to be used as part of usage calculation process

Usage Subscription: SOLAR,COMMUNITY / Home Phone (415) 010-1010 / Electric - Residential / 06-28-2019 12:00AM PDT / Active

Add Search Bookmark Refresh

Main Log

### Usage Subscription

Main

Information: SOLAR,COMMUNITY / Home Phone (415) 010-1010 / Electric - Residential / 06-28-2019 12:00AM PDT / Active

Usage Subscription Type: Electric - Residential

Division:

Access Group:

Status: Active

Start Date/Time: 06-28-2019 12:00AM PDT

End Date/Time:

Usage Recipient: Customer to Meter

Usage Approval: Not Required

External ID: 6876159346

Main Contact: SOLAR,COMMUNITY / Home Phone (415) 010-1010

Time Zone: US Pacific Time

Record Actions: Edit Delete Deactivate

Record Information

Factor Overrides

Factor	Start Date/Time	End Date/Time	Value
--------	-----------------	---------------	-------

Usage Calculation Groups

Effective Date/Time	Expiration Date/Time	Calculation Group
---------------------	----------------------	-------------------

Fallback Usage Calculation Groups

Effective Date	Calculation Group
----------------	-------------------

Rate History

Effective Date	Rate
06-28-2019	ERESNEMA

Measuring Components

Relationship Type	Measuring Component
Generation Aggregator	Aggregate by Solar Generation Source SP Id 352482330205
Consumption Aggregator	Aggregate by Solar Generation Source SP Id 352482330205

Processing Information

Most Recent Usage Transaction Date/Time: 02-28-2020 12:00AM PST

Service Points

1. Transition from Register to Interval or TOU based billing

2. Demand Response/ Event base pricing e.g. Peak Time Rebate

**3. Net Energy Metering and Community Solar Programs**

4. Complex Pricing and Contracts

## Usage Rule

Standard Vector and Interval Calculation rules will allow for reference to established Aggregation MC associated with the Usage Subscription

Usage Calculation Rule - Math Maintenance

**Main**

Calculation Group: Shared Generation Usage Calc Group

Calculation Rule: DETTOUALLOC

Sequence: 30

Description: Determine Total and Framed (TOU) Current period Allocati

Detailed Description:

Calculation Rule Category: Usage Calculation

**Interval Vector 1**

Type: Direct Channel on Subscription

Direct Channel Relationship Type: Generation Aggregator

Use Primary Measurement: Yes

**Interval Vector 2**

**Interval Vector 3**

**Interval Vector 4**

**Interval Vector 5**

1. Transition from Register to Interval or TOU based billing

2. Demand Response/ Event base pricing e.g. Peak Time Rebate

3. Net Energy Metering and Community Solar Programs

4. Complex Pricing and Contracts

## Usage Calculation Results

Provide list of usage calculation rule(s) that will output the desired results for billing

Usage Transaction: Sent / 01-29-2020 12:00AM PST - 02-28-2020 12:00AM PST / Shared Generation Usage Ca...

Add

Search

Bookmark

Refresh

Main

Log

Kilowatt-Hours	Aggregated Cumulative Usage	131,779.796280		Other								NEM Cumulative Generation/Usage for Benefitting Account Calc Group	GETCMLOAD
Kilowatt-Hours	Cumulative Generation	44,745.892040		Other								NEM Cumulative Generation/Usage for Benefitting Account Calc Group	GETCMGEN
Kilowatt-Hours	Previous Bill Periods' Allocations	0.000000		Other								NEM Cumulative Generation/Usage for Benefitting Account Calc Group	GETPREVALLC
Kilowatt-Hours	Relative Proportion of Load Percentage	0.060824		Other								Shared Generation Usage Calc Group	GET_CPERALL
Kilowatt-Hours	Bill Period Allocation - Scalar	2,721.638287		Other								Shared Generation Usage Calc Group	CALCCURPER



1. Transition from Register to Interval or TOU based billing

2. Demand Response/ Event base pricing e.g. Peak Time Rebate

3. Net Energy Metering and Community Solar Programs

4. Complex Pricing and Contracts

## Rate Schedule Execution- Bill Calculation Results

Usage Calculation Rules Service Quantity (SQ) results are then passed to rating calculations (SQ rule- Quantity times Bill Factor).

Bill Seg Info

Oracle / E-Residential NEM-A Sub SA, Freezable, Period: 01-28-2020 - 02-27-2020, \$1,399.56, 1992166716

Bill Segment ID199295298325

Bill Seg Hdr

1 of 2

Sequence1

Start Date01-29-2020

End Date02-27-2020

Amount\$1,399.56

Desc on Bill

Energy Charges

Rate Version

Electric NEM Energy Charges (Benefitting) 01-01-2010

Sequence	Description on Bill	Calculated Amount	Print	Appears in Summary	Unit of Measure	Time of Use
1	300.00 kWh at \$0.282 per kWh	\$84.60	<div></div>	<div></div>	Kilowatt-Hours	
2	4,412.61 kWh at \$0.298 per kWh	\$1,314.96	<div></div>	<div></div>	Kilowatt-Hours	
3	0.00 kWh at \$-0.282 per kWh	\$0.00	<div></div>	<div></div>	Kilowatt-Hours	



1. Transition from Register to Interval or TOU based billing

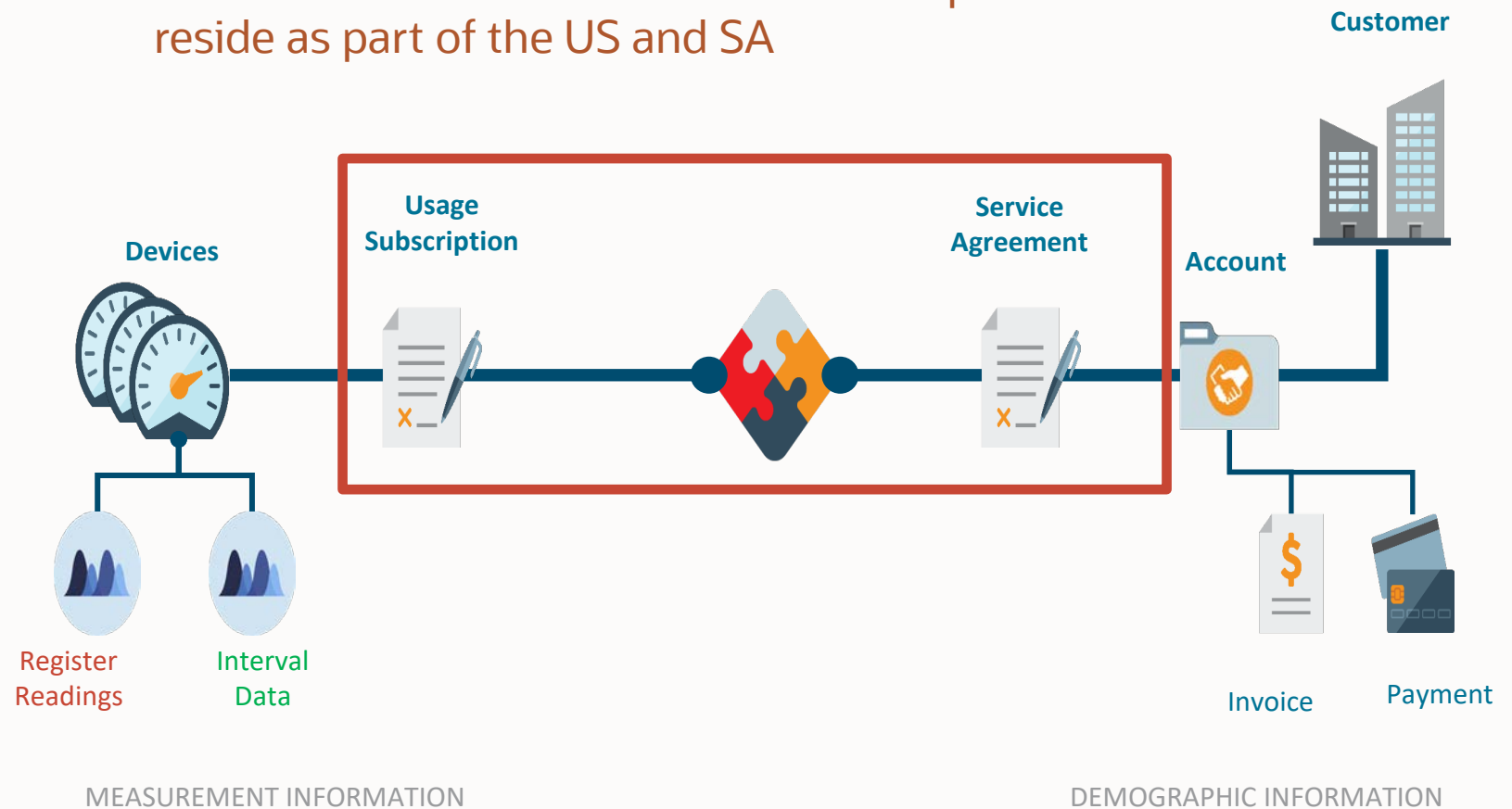
2. Demand Response/ Event base pricing e.g. Peak Time Rebate

3. Net Energy Metering and Community Solar Programs

4. Complex Pricing and Contracts

## Standard Data Model

Standard data model allows for various parameters that reside as part of the US and SA



1. Transition from Register to Interval or TOU based billing

2. Demand Response/ Event base pricing e.g. Peak Time Rebate

3. Net Energy Metering and Community Solar Programs

4. Complex Pricing and Contracts

## Factors

Factors can be used to reference billing factors (flat, rate charges), but they can also be used for baseline comparisons, interval data adjustments and pricing adjustments when referencing a profile

Factor

Main

FactorPROF-OVRERLAY  
DescriptionProfile - Overlay  
Factor ClassProfile  
Characteristic Source Factor Characteristic Source Service Point  
Algorithm  
Factor Characteristic TypeService Point Type for VEE Groups and Profile

Record Actions

EditDeleteDuplicate

Record Information

Factor Char Value and Factor Value List

	Factor Char Value/Factor Value Details	Add	Edit	Delete
1	Electric Residential	+		
2	01-01-2010 0:00:00, AVG-RES-KWH-60 / Standalone for kWh 60min			
3	Water Residential	+		
4	01-01-2010 0:00:00, W-RES-SFH / Standalone for CCF (Water) 60min			

Description

1. Transition from Register to Interval or TOU based billing

2. Demand Response/ Event base pricing e.g. Peak Time Rebate

3. Net Energy Metering and Community Solar Programs

4. Complex Pricing and Contracts

## Profile Factor- Standalone Measuring Component

Profile Factors can be linked to a Standalone Measuring Component to include any type of time series data that is required as part of interval data required calculations.

Factor Value

Bookmark

Refresh

Main

Factor Value

Main

Factor

Profile - Overlay

Factor Characteristic Type

Service Point Type for VEE Groups and Profile

Factor Characteristic Value

E-RES

Effective Date/Time

01-01-2010 0:00:00

Profile

AVG-RES-KWH-60 / Standalone for kWh 60min

Profile Identifier Type

Profile Identifier Value

Record Actions

Edit

Delete

Record Information

Measurements - Interval

Measurement Date/Time

Measurement

Additional Details

Value 1

Value 2

Value 3

Value 4

Value 5

Value 6

Value 7

Value 8

Value 9

Value 10

kWh

06-01-2022 0:00:00 PDT

2.454400

Condition: Regular , Combined Multiplier: 0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

05-31-2022 23:00:00 PDT

2.714400

Condition: Regular , Combined Multiplier: 0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

05-31-2022 22:00:00 PDT

2.724800

Condition: Regular , Combined Multiplier: 0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

05-31-2022 21:00:00 PDT

2.839200

Condition: Regular , Combined Multiplier: 0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

05-31-2022 20:00:00 PDT

2.880800

Condition: Regular , Combined Multiplier: 0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

05-31-2022 19:00:00 PDT

2.808000

Condition: Regular , Combined Multiplier: 0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

05-31-2022 18:00:00 PDT

2.745600

Condition: Regular , Combined Multiplier: 0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

05-31-2022 17:00:00 PDT

2.558400

Condition: Regular , Combined Multiplier: 0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

05-31-2022 16:00:00 PDT

2.371200

Condition: Regular , Combined Multiplier: 0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

05-31-2022 15:00:00 PDT

2.184000

Condition: Regular , Combined Multiplier: 0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

05-31-2022 14:00:00 PDT

2.017600

Condition: Regular , Combined Multiplier: 0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000

0.000000



1. Transition from Register to Interval or TOU based billing

2. Demand Response/ Event base pricing e.g. Peak Time Rebate

3. Net Energy Metering and Community Solar Programs

4. Complex Pricing and Contracts

## Usage Rule reference and use of Profile Factors\*

Factors can be used for interval pricing and used as part of usage and billing processing

**Main**

Calculation Group: Firm Gas Transportation Cash-out with Contract End-User Billing Rate Usage Calc Group

Calculation Rule:

Sequence:

Description:

Detailed Description:

Calculation Rule Category:

Interval Vector 1

Type:

Interval Vector 2

Interval Vector 3

Interval Vector 4

Interval Vector 5

Scalar Variables

	Type	Set Function	Interval Set	Reference Interval Set
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

**Vector Processing**

Common Interval Size:

Vector Formula Source:

**Result**

Unit of Measure:

Time of Use:

Service Quantity Identifier:

✓

- Direct Channel on Subscription
- Specific Measuring Component
- Specific Measuring Component by Identifier
- Totalized Measuring Component Set
- Profile Factor
- Physical Channels Linked To Usage Subscription
- Quantities Stored on Transaction



1. Transition from Register to Interval or TOU based billing

2. Demand Response/ Event base pricing e.g. Peak Time Rebate

3. Net Energy Metering and Community Solar Programs

4. Complex Pricing and Contracts

## Contract Quantities

Contract Quantities are available to be configured for customer specific parameters

Service Agreement

Bookmark Clear Save Refresh

Main Rate Info SA/SP Chars, Qty & Rec. Charges Misc Contract Options Billing Scenario SA Portal

SA Info Oracle / Electric Commercial, TOUDMD, Active, 01-01-2021, 0208230596 SA ID 0208230596

Characteristics

		Effective Date	Characteristic Type	Characteristic Value
+		01-01-2021		

Contract Quantity

		Effective Date	Contract Quantity Type	Contract Quantity
+		01-01-2021	Maximum Demand	1000.000000

Budget Amount

		Effective Date	Recurring Charge Amount
+		01-01-2021	

1. Transition from Register to Interval or TOU based billing

2. Demand Response/ Event base pricing e.g. Peak Time Rebate

3. Net Energy Metering and Community Solar Programs

4. Complex Pricing and Contracts

## Usage Calculation results

Sometimes usage calculation rules service quantity (SQ) results are not enough and more steps for pre-billing are necessary...

Usage Request: Oracle / Electric Commercial, Bill Determinants Processed, 02-01-2021 - 03-01-2021

Search Bookmark Refresh

Main Log

Usage Response Details

Usage Start Date/Time: 02-01-2021 12:00AM  
Usage End Date/Time: 03-01-2021 12:00AM  
Estimated: ☐  
SA Skipped: ☐

Exception Details

Messages

Usage Periods

Period: 02-01-2021 12:00AM - 03-01-2021 12:00AM (Interval)  
Standard Period: 02-01-2021 12:00AM - 03-01-2021 12:00AM

Sequence	UOM	TOU	SQ	Quantity	Seconds Per Interval	SQ Highlight
1	Kilowatt-Hours			31,212.625100		
2	Kilowatt-Hours	Off Peak		26,268.758900		
3	Kilowatt-Hours	On Peak		4,943.866200		
4	Kilowatt			70.319600		
5	Kilowatt	Off Peak		70.319600		
6	Kilowatt	On Peak		58.288400		
7	Kilovolt-Ampere Reactive			23.908800		
8	Kilovolt-Ampere Hours			5.977200		
9	Power Factor			1.000000		

Item Information

Sequence	Item Type	Item Count	Start Date/Time	End Date/Time	Daily Service Quantity	UOM
----------	-----------	------------	-----------------	---------------	------------------------	-----

Service Print | Usage Periods

1. Transition from Register to Interval or TOU based billing

2. Demand Response/ Event base pricing e.g. Peak Time Rebate

3. Net Energy Metering and Community Solar Programs

4. Complex Pricing and Contracts

## Rate Schedule- Pre-Processing Calculation

Additional pre-billing steps are required in addition to usage bill determinant processing is required

Rate Schedule: Electric TOU General Service with Demand

Add Search Bookmark Refresh

**Main**

**Main**

Rate Schedule: TOUJMD

Description: Electric TOU General Service with Demand

Service Type: Electric

Frequency: Monthly

Currency Code: United States Dollars

Allow Estimates: Yes

Allow RV Proration: Yes

RV Selection Date:

**Record Actions**

Edit Delete Duplicate

**Record Information**

**Valid Device Configuration Types** [Go to CCB Rate Schedule Extendable Lookup](#)

Device Configuration Type

Electric Auto Read - kWh, kVARh - 15 min intervals

Electric Auto Read - kWh, kVARh - 30 min intervals

**Pre-Processing Calculation Groups** [Add Calculation Group](#)

Sequence	Description	Calculation Group	Rule Cross Reference
10	Get Number of Delivery Points	<a href="#">Get Number of Delivery Points on Service</a>	<a href="#">Add/Remove Links</a>
20	Derive Current and annual Seasonal TOU Demand	<a href="#">Determine TOU Billable Demand</a>	<a href="#">Add/Remove Links</a>
30	Sum and Derive Current TOU Energy Consumption	<a href="#">Determine TOU Billable Energy</a>	<a href="#">Add/Remove Links</a>

**Rate Version Calculation Groups** [Add Calculation Group](#)

Effective Date	Description On Bill	Calculation Group	Rule Cross Reference
01-01-2000	Electric time of use %D	<a href="#">Electric Time of Use General Service</a>	<a href="#">Add/Remove Links</a>

**Post-Processing Calculation Groups** [Add Calculation Group](#)

**Bill Messages**

Bill Message	Start Date	End Date
<a href="#">Earth Day</a>	03-12-2017	04-12-2017



1. Transition from Register to Interval or TOU based billing

2. Demand Response/ Event base pricing e.g. Peak Time Rebate

3. Net Energy Metering and Community Solar Programs

4. Complex Pricing and Contracts

## Rate Schedule- Pre-Processing Calculation

Service Quantities evaluation based on contract quantities and established factor values or historical service quantities

Calculation Rule: Calculate Excess Demand

Add Search Bookmark Refresh

**Main**

Calculation Group: Determine TOU Billable Demand  
Calculation Rule: GETEXCESSDEMANDSUM  
Sequence: 60  
Business Object: Calculate Service Quantity  
Description: Calculate Excess Demand  
Detailed Description:  
Execution Option: Always

Scalar Variable 1

Type: Contract Quantity  
Missing Value Action: Error  
Contract Quantity Type: Maximum Demand  
Prorate Method: Maximum

Scalar Variable 2

Type: Service Quantity  
Missing Value Action: Error  
Unit of Measure: Kilowatt  
Time of Use: On Peak  
Service Quantity Identifier: Billable  
SQ to Use: Billable

Scalar Variable 3

Type: Service Quantity  
Missing Value Action: Error  
Unit of Measure: Kilowatt  
Time of Use: On Peak

Record Information

Result

Unit of Measure: Kilowatt  
Time of Use:  
Service Quantity Identifier: Excess

**Calculation Details**

Calculation Rule Processing: Always  
Fail Action: Error  
Calculation Rule Output: Service Quantity  
Retain SQ: Yes  
Round Service Quantity: No

Formula Source: Conditional Formula

Sequence	Operand 1	Operator	Operand 2	True Action	True Formula	False Action	False Formula
1	MAX(V2,V3)	<=	V1	Apply True Formula	0*MAX(V2,V3)	Apply False Formula	abs(V1-MAX(V2,V3))



1. Transition from Register to Interval or TOU based billing

2. Demand Response/ Event base pricing e.g. Peak Time Rebate

3. Net Energy Metering and Community Solar Programs

4. Complex Pricing and Contracts

## Rate Schedule Execution- Bill Calculation Results

Usage Calculation Rules Service Quantity (SQ) results are then passed to rating calculations (SQ rule- Quantity times Bill Factor)

Bill Seg Info

Oracle / Electric Commercial, Freezable, Period: 02-01-2021 - 03-01-2021, \$8,360.55, 0208230596

Bill Segment ID 020305114590

Bill Seg Hdr

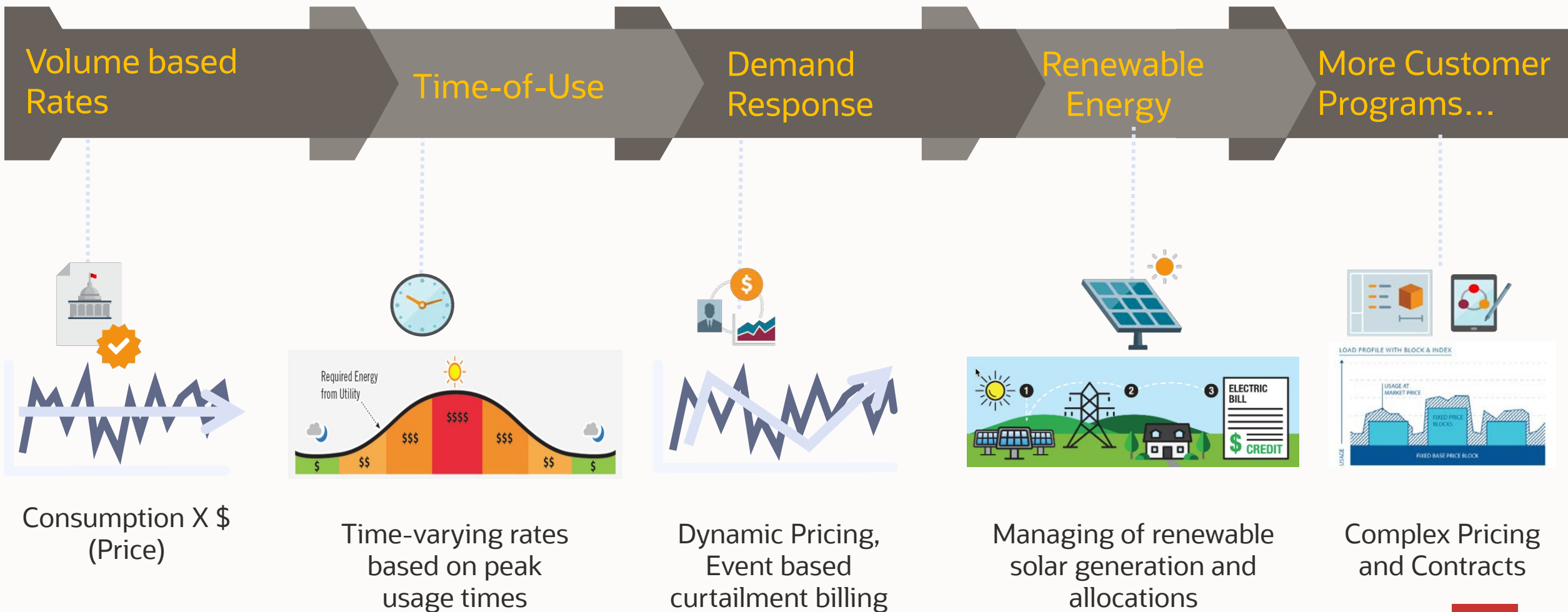
1 of 1

Sequence 1 Start Date 02-02-2021 End Date 03-01-2021 Amount \$8,360.55

Desc on Bill Electric time of use Rate Version Electric TOU General Service with Demand 01-01-2000

Sequence	Description on Bill	Calculated Amount	Print	Appears in Summary	Unit of Measure	Time of Use
1	Service Charge: 1.00 delivery points @ \$1,500.00	\$1,500.00	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
2	Admin Charge: 1.00 delivery points @ \$350.00	\$350.00	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
3	On Peak Demand Charge: 300.00 On Peak kW @ \$10.69	\$3,207.00	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Kilowatt	On Peak
4	Maximum Demand Charge: 300.000 Maximum kW @ \$6.18	\$1,854.00	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Kilowatt	
5	Excess Demand Charge: 0.00 Excess kW @ \$10.69	\$0.00	<input type="checkbox"/>	<input type="checkbox"/>	Kilowatt	
6	On peak Energy Charge: 4,943.87 On Peak kWh @ \$0.06103	\$301.72	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Kilowatt-Hours	On Peak
7	Off peak 200 HUD: 11,836.29 kWh at \$0.04879 per kWh (0 - 11,836.29 kwh)	\$577.49	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Kilowatt-Hours	Off Peak
8	Off peak 200 HUD: 11,836.30 kWh at \$0.00871 per kWh (11,836.29 - 23,672.59 kwh)	\$103.09	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Kilowatt-Hours	Off Peak
9	Off peak 200 HUD: 2,596.17 kWh at \$0.00502 per kWh (23,672.59 - 26,268.76 kwh)	\$13.03	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Kilowatt-Hours	Off Peak
10	City sales tax 11.5%	\$0.00	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
11	State sales tax 7.5%	\$454.22	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
12	Tax total	\$454.22	<input type="checkbox"/>	<input type="checkbox"/>		

# Ready with your AMI Billing Journey TODAY and Beyond!!!!





# Conclusion

Our 3 Key Takeaways:

- Oracle Energy & Water has several products that use to support through AMI billing evolution.
- Complex Billing concepts are not new they are being normalized with AMI.
- Oracle continues its investments in standardizing these complex billing concepts to allow utilities to quickly implement.
- Please contact us for more information.





# Complex Billing Concepts

*Oracle's commitment to modern utilities' AMI related billing needs*

**Ha Bui**



Principal Solution Consultant  
Oracle Energy & Water





# Thank you

---



ORACLE

# Questions?

[Ha.bui@oracle.com](mailto:Ha.bui@oracle.com)  
713-591-5343



ORACLE