TODAY’S AGENDA

- INTRODUCTION
- SURVEY RESULTS
- NEXT STEPS
- IRP RESOURCES
- 2018 INTEGRATED RESOURCE PLAN
- 2018 ELECTRIC COST OF SERVICE STUDY
- QUESTIONS/DISCUSSION

May 2, 2018
IRP TEAM

VERNON PUBLIC UTILITIES
- Overall IRP Responsibility
- Management of Consultants

ABB
- Prime IRP Consultant
- IRP Development and Analysis

JOULE MEGAMORPHOSIS
- IRP Support Sub-Contractor
- IRP Public Process
From which perspective(s) did you respond to this survey?

- Residential customer: 0.00%
- Commercial customer: 29.17%
- Industrial customer: 72.92%
- Business owner: 27.08%
- City employee: 2.08%
- Elected official: 0.00%
- Interest group: 0.00%
- Other (please specify): 0.00%

83 RESPONSES

May 2, 2018
Please check any of the following statements that apply:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>None of the above.</td>
<td>17.46%</td>
</tr>
<tr>
<td>My business would like to get more information about and/or participate in a City of Vernon green power rate program, where a customer can specify up to 100% of its energy usage to be supplied by renewable energy. Note: higher rates may apply for higher power use.</td>
<td>31.75%</td>
</tr>
<tr>
<td>I would like to get more information about the City of Vernon’s energy or gas efficiency incentive programs.</td>
<td>63.49%</td>
</tr>
<tr>
<td>My business has participated in the City of Vernon’s energy or gas efficiency incentive programs.</td>
<td>28.57%</td>
</tr>
<tr>
<td>My business in the City of Vernon hosts a form of distributed electrical generation other than solar.</td>
<td>1.59%</td>
</tr>
<tr>
<td>A solar PV generating system is installed at my business in the City of Vernon.</td>
<td>3.17%</td>
</tr>
<tr>
<td>Someone in my household or business entity owns or leases an electric vehicle that could utilize charging infrastructure in the City of Vernon.</td>
<td>41.27%</td>
</tr>
</tbody>
</table>
CUSTOMER PLANS
Is your facility planning to alter its electrical usage in the future?

- **Yes**: 60%
- **No**: 40%
Would you be interested in participating in demand response programs where your on-site generation, energy storage, or load is paid to respond to instructions to provide power or reduce load?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>35.09%</td>
<td>64.91%</td>
</tr>
</tbody>
</table>
Does your company have any plans to install electric vehicle charging stations?

- **71.67%** Yes
- **28.33%** No

ELECTRIC VEHICLE CHARGING
Would you like the City of Vernon to install fee-based public EV charging stations for electric vehicles on your property?

Yes: 31.25%
No: 68.75%

ELECTRIC VEHICLE CHARGING

May 2, 2018
Would you prefer that VPU install and maintain your EV charging stations?

- Yes: 43.75%
- No: 56.25%

ELECTRIC VEHICLE CHARGING
Has your company installed or is it planning to install a solar photovoltaic system?

- **Yes**: 18.97%
- **No**: 81.03%
Will your solar photovoltaic system be owned by your company or leased?

- **Owned**: 71.43%
- **Leased**: 28.57%
Would you be interested in the City of Vernon providing solar installation services?

71.43% Yes
28.57% No
Would you be interested in partnering with the City of Vernon or with other businesses in the City to install one or more solar photovoltaic systems?
Does your facility plan to install other forms of on-site power generation, such as combined heat and power or other systems? 

- Yes: 15.38%
- No: 84.62%

May 2, 2018
Has your facility installed, or is it planning to install, an energy storage system such as batteries or compressed air systems to back up and/or shape your electricity usage, or to manage your peak electricity consumption?
Would you be interested in partnering with the City of Vernon or with other businesses in the City to install one or more energy storage systems?
Does your facility plan to implement new energy efficiency measures such as lighting retrofit, building insulation, motor upgrade, or process improvement?

Yes: 78.95%
No: 21.05%

May 2, 2018
Are you familiar with VPU's energy efficiency programs?

- Yes: 32.65%
- No: 30.61%
- Not sure: 36.73%
Would you like to be added to VPU's stakeholder list for additional information about the 2018 Integrated Resource Plan?

65.91% Yes

34.09% No

INTEREST IN IRP
ENERGY MIX

VPU Energy Resources 2017

- Natural Gas 59%
- Renewable Energy 29%
- Nuclear (Palo Verde) 9%
- Solar 12%
- Large Hydroelectric (Hoover) 2%
- Biomethane & Landfill Gas 9%
- Generic (Unspecified) Short-Term Purchases 1%
- Other 8%
A renewable portfolio standard (RPS) is a regulation that requires the increased production of energy from renewable sources, such as wind, solar, geothermal, and biomethane. The current California RPS is at least 33 percent by the end of 2020, and at least 50 percent by the end of 2030. VPU’s power supply includes a significant amount of renewable energy. VPU is meeting or exceeding the current state RPS requirement. In 2017, approximately 29% of VPU’s energy load was served by eligible utility scale renewable resources. That percentage is on track to meet or exceed 50% by 2030. There is pending legislation (CA Senate Bill 100) that would increase California’s renewable energy target to 60% by 2030, and to 100% “clean energy” by 2045. Clean energy means electrical generating resources with low or no greenhouse gas emissions, such as renewables, large hydro and nuclear.

Should the City of Vernon attempt to accelerate its procurement of renewables and other clean energy to exceed state mandates?

- Yes: 39.22%
- No: 27.45%
- Don’t Know: 33.33%

May 2, 2018
According to NASA, a greenhouse gas (GHG) is any gaseous compound in the atmosphere that is capable of absorbing infrared radiation, thereby trapping and holding heat in the atmosphere. Gases such as water vapor, methane, carbon dioxide, ozone, nitrous oxide, and fluorine-containing compounds are called “greenhouse” gases because they trap heat and warm the planet’s surface. Some of these gases are generated naturally, and some through human activities. Policies and regulations that call for reducing GHG emissions are most commonly targeting carbon dioxide (CO2).

Is your company interested in more information about reducing greenhouse gas emissions associated with electric energy production?

- Yes: 56.86%
- No: 43.14%

GREENHOUSE GAS (GHG) EMISSIONS
CALIFORNIA GHG EMISSIONS

2015 Total CA Emissions: 440.4 MMTCO2e
Some of the most popular and lowest cost renewable resources such as solar and wind only produce energy intermittently, i.e., when the sun is shining and not obscured by clouds, or when the wind flow is within a certain range. Other resources, such as natural-gas fired generation or various forms of energy storage, may be required to serve customer load when energy from these renewable resources is reduced or not available. Energy storage costs are decreasing, but are generally not yet cost-effective. Proposed California legislation (Senate Bill 100) may limit or eliminate the ability to use fossil-fueled resources such as natural gas-fired generation in the future (by 2045) as part of the effort to reach green-house gas emission reduction targets.
Renewable resources can be either large, centralized facilities located remotely, or smaller facilities typically located on customer properties. The term "local renewable resources" generally refers to rooftop or parking lot solar photo-voltaic installations within a utility's service territory. These local resources are typically much (generally about 3x) more expensive than large, 20+ MW utility scale installations that can track the sun. Note: MW stands for megawatt, or one million watts (one thousand kilowatts). A MW is a measure of power or capacity (the potential to do work).

LOCAL RENEWABLE ENERGY
Fundamentally, the production of electricity must match in time and quantity the consumption (load) on the electrical grid. Energy production from intermittent resources generally cannot be controlled (dispatched) to precisely match consumption patterns. An energy storage system is a commercially available technology that is capable of absorbing energy, storing it for a period of time, and thereafter dispatching the energy. An energy storage system may be centralized or distributed. Some of the most common examples of energy storage include: various forms of batteries, pumped hydroelectricity, compressed air energy storage, and thermal energy storage. California Assembly Bill (AB) 2514 (Skinner, Chapter 469, Statutes of 2010), amended by Assembly Bill 2227 (Bradford, Chapter 606, Statutes of 2012), encourages California to incorporate energy storage into the electricity grid. Energy storage can provide many benefits to California, including supporting the integration of greater amounts of renewable energy into the electric grid and reducing dependence on fossil fuel generation (such as coal and natural gas) to meet peak loads. While its costs are declining rapidly, viable energy storage today is typically not considered cost-effective for utilities such as VPU.

ENERGY STORAGE

How aggressively should the City of Vernon pursue energy storage resources?

- Pursue it vigorously to encourage the development of the energy storage industry: 16%
- Wait to pursue it until it is proven viable and cost effective for the City of Vernon: 36%
- Pursue it if it is useful to support the bulk electric grid, but only if the benefits to the City of Vernon are proportionate to the costs it incurs: 26%
- Let the larger utilities worry about pursuing energy storage: 6%
- Don't know/not enough information: 16%
The transportation sector produces approximately 40% of California’s greenhouse gas emissions while emissions from the electric generation sector are roughly half as much. However, to date, the electric sector of the economy has provided the majority of emission reductions in California. One way California is endeavoring to reduce greenhouse gases from transportation and more effectively utilize renewable energy is by encouraging the increased use of electric vehicles.

How interested is your entity in electric vehicles and the associated charging infrastructure?

- Not interested: 22%
- Would like more education and assistance with the purchasing, ownership, operation and maintenance of electric vehicles: 22%
- Would like to see more vehicle charging infrastructure in the City of Vernon: 28%
- Would like to provide more vehicle charging ports for our employees and customers: 14%
- Would like to see more commercial applications of transportation electrification (e.g., semi-tractors, mass transit, heavy equipment): 22%
- Interested only if and when it is cost effective: 30%
- Extremely interested in all forms of electric vehicles and charging infrastructure: 12%
- Comments: 8%
As illustrated above, VPU's energy portfolio includes a significant amount of renewable resources (29% in 2017). Some customers are interested in the benefits of on-site solar energy systems, but are unable to install them at their location for a variety of reasons, such as the age, structure or angle of their roof, shading, fire codes/potential to obstruct fire-fighting, or because they do not own the property. “Community Shared Solar” projects or “Solar Gardens” offer an alternative for these customers. A shared solar program typically involves a single, larger solar energy system designed to benefit multiple electric consumers by allowing them to choose to invest in (or “subscribe” to) the program and receive a portion of the electricity generated by the system with typically lower initial investment costs, economies of scale, and the ability to transfer if they relocate within the host utility's service territory. The output of the customer's participation in these projects can offset a portion or most of their regular power bill.
VPU utilizes a number of methods to communicate with its customers and the public. Please check the VPU methods of communication you are aware of.
Please check the following VPU communication methods that you think are beneficial.
Which VPU communications methods do you prefer?

- City Council Meetings: 20%
- Social Media (Facebook...): 6%
- Vernon Notification System: 29%
- Bill Inserts: 27%
- Community Outreach Events: 12%
- Phone/Email: 65%
- Customer Counter: 4%
- Website: 16%
- Other (please specify): 12%
Which of VPU's communication methods would you like to see more of, or see improvement in?
Please rate VPU in terms of the following, where 1 means "excellent" and 5 means "poor":

<table>
<thead>
<tr>
<th>Aspect</th>
<th>1 - Excellent</th>
<th>2 - Very Good</th>
<th>3 - Average</th>
<th>4 - Below Average</th>
<th>5 - Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliability of service</td>
<td>47%</td>
<td>27%</td>
<td>22%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Cost of service/value</td>
<td>23%</td>
<td>27%</td>
<td>27%</td>
<td>19%</td>
<td>4%</td>
</tr>
<tr>
<td>Choice of utility products and services</td>
<td>24%</td>
<td>35%</td>
<td>39%</td>
<td>2%</td>
<td>0%</td>
</tr>
<tr>
<td>Concern for the environment</td>
<td>25%</td>
<td>33%</td>
<td>38%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Customer service/responsiveness</td>
<td>47%</td>
<td>35%</td>
<td>18%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Involvement in local community</td>
<td>26%</td>
<td>34%</td>
<td>36%</td>
<td>4%</td>
<td>2%</td>
</tr>
<tr>
<td>Saving customers money with energy saving tips and services</td>
<td>25%</td>
<td>19%</td>
<td>50%</td>
<td>4%</td>
<td>2%</td>
</tr>
</tbody>
</table>

May 2, 2018
Please rate VPU overall:

- 5 - Excellent: 35%
- 4 - Very Good: 33%
- 3 - Average: 31%
- 2 - Below Average: 2%
- 1 - Poor: 0%

CUSTOMER SATISFACTION

May 2, 2018
With respect to your electrical service from the City of Vernon, please rank each of the following from 1 (most important) to 5 (least important).

- Electric rates/bills that are as low as possible
- Adequate power supply reliably available when and where needed
- Minimizing adverse environmental impacts
- Quality of customer service
- Customer-owned (distributed) generation on-site at my facility, including battery storage, solar, and other forms.

May 2, 2018
CUSTOMER PRIORITIES

<table>
<thead>
<tr>
<th>Priority</th>
<th>1 - Extremely Important</th>
<th>2 - Somewhat Important</th>
<th>3 - Neither Important nor Unimportant</th>
<th>4 - Somewhat Unimportant</th>
<th>5 - Completely Unimportant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Having a local public utility that responds to customer input</td>
<td>71%</td>
<td>19%</td>
<td>6%</td>
<td>4%</td>
<td>0%</td>
</tr>
<tr>
<td>Ability to choose a 100% renewable energy supply</td>
<td>25%</td>
<td>33%</td>
<td>25%</td>
<td>10%</td>
<td>6%</td>
</tr>
<tr>
<td>Locally-produced solar power</td>
<td>17%</td>
<td>36%</td>
<td>32%</td>
<td>9%</td>
<td>6%</td>
</tr>
<tr>
<td>Lowest possible electric bills</td>
<td>91%</td>
<td>6%</td>
<td>2%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Information on electric usage and ways to save money on electric bills</td>
<td>57%</td>
<td>37%</td>
<td>6%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Rebates/incentives for installing energy-saving equipment and upgrades</td>
<td>69%</td>
<td>29%</td>
<td>2%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Access to information about City of Vernon initiatives, projects and services in print and on the internet</td>
<td>43%</td>
<td>45%</td>
<td>10%</td>
<td>0%</td>
<td>2%</td>
</tr>
<tr>
<td>Reducing the environmental impact caused by use of electricity</td>
<td>37%</td>
<td>47%</td>
<td>6%</td>
<td>6%</td>
<td>4%</td>
</tr>
<tr>
<td>Additional service from VPU, such as on-site solar panel installation, on-site energy storage (e.g., batteries), EV charging, etc.</td>
<td>17%</td>
<td>52%</td>
<td>21%</td>
<td>8%</td>
<td>2%</td>
</tr>
</tbody>
</table>

May 2, 2018
During the past year, how often did you contact the VPU office in regards to your electric service?

- Never: 14%
- Once: 22%
- 2 - 5 times: 39%
- 6 or more times: 24%
What was the reason or reasons you contacted the VPU office during the past year?

- **Bill payment**: 12%
- **Bill query**: 24%
- **Outage**: 24%
- **No reason or contact**: 10%
- **Other (please specify)**: 29%

May 2, 2018
Are the VPU office and field personnel courteous and helpful?

- Always: 79%
- Almost always: 21%
- Sometimes: 0%
- Never: 0%

May 2, 2018
SCHEDULE: NEXT STEPS

- PUBLIC MEETING 1:
  February 14, 2018
  INTRODUCTION/ SURVEY

- PUBLIC MEETING 2:
  March 29, 2018
  PRESENT PRELIMINARY ANALYSIS

- SURVEY: EXTENDED - CLOSED APRIL 8, 2018

- PUBLIC MEETING 3:
  May 2, 2018
  PRESENT DRAFT ANALYSIS

- PUBLIC MEETING 4:
  TBD
  PRESENT FINAL IRP
RESO URC ES FOR STA KEHO LDERS

- VPU IRP Webpage: www.cityofvernon.org/irp
- VPU IRP Questions/Comments? Email: IRP@ci.vemon.ca.us
QUESTIONS OR COMMENTS?

THANK YOU FOR YOUR PARTICIPATION AND SUPPORT!

May 2, 2018
MAY 2, 2018

2018 Integrated Resource Plan Update

Vernon Public Utilities

Benson Joe (ABB)
Leesa Nayudu (Joule Megamorphosis)
Resource Planning Objectives

Core Principles

- Reliability/Security
  - Higher renewable energy levels require more flexible resources (natural gas or energy storage)

- Low Rates
  - Procure resources that help maintain low rates

- Sustainability
  - Renewable Portfolio Standards 50% by 2030
  - GHG Emission Reduction 40% reduction from 1990 levels by 2030
  - Possible 100% RPS by 2045 per Senate Bill 100 (if passed)
Customer Survey Summary

Survey Results

Energy Efficiency

- VPU will be investigating rebates and other incentive programs to encourage large amounts of cost competitive energy efficiency
  - LED lighting retrofit
  - Refrigeration
  - Evaporator Cooler

Distributed Solar

- Up to 7% of peak load per upcoming tariff
- 15 MW max
- Investigate community solar options
- Interest in solar maintenance services

Demand Response

- Interest in interruptible rates
- Interest in Time of Use (TOU) pricing

Energy Storage and EV Infrastructure

- Some interest by customers, but concerns about cost competitive of energy storage
- Limited market for EV (1-3 MW max)
- No overwhelming customer response for massive EV charging infrastructure
- EV chargers on a customer by customer basis
### Key Resource Planning Decisions

<table>
<thead>
<tr>
<th>Reliability/ Security</th>
<th>Renewable Portfolio Standard</th>
<th>Malburg Generating Station</th>
<th>GHG Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Ensure adequate amount of power supply</td>
<td>- Less than 1% remaining of short term procurement to meet 2020 RPS compliance period</td>
<td>- Malburg Generating Station is under contract till middle 2028</td>
<td>- Procure renewable energy above and beyond the 50% RPS requirement</td>
</tr>
<tr>
<td>- VPU will be at 24% reserve margin in 2018</td>
<td>- Continue long term resource procurement to meet RPS after 2021</td>
<td>- VPU will need to decide to re-contract, re-configure, or retire the plant/contract by 2028</td>
<td>- Procure energy storage resources</td>
</tr>
<tr>
<td>- 15% reserve margin is the minimum requirement</td>
<td></td>
<td>- Energy storage may be a viable replacement option</td>
<td>- Introduce a solar distributed generation tariff</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Invest in additional energy efficiency program incentives</td>
</tr>
</tbody>
</table>

This IRP cycle will not require any firm near term resource commitments due to VPU’s current long supply position.
**GHG Reduction Goals**

GHG Targets are still preliminary and may change over time

VPU will likely need to reduce GHG emissions by 41% between now and 2030

Source: California Air Resources Board
Battery technology costs are coming down and may be competitive with natural gas peaking technology in the future.
Renewable Energy

Where does it come from?

– VPU is a member of the Southern California Public Power Agency (SCPPA) which provides joint power procurement assistance with other members

– SCPPA routinely evaluates Request for Power bid from third parties

– Most bids will come from in-state resources, but bids from out-of-state resources are also evaluated
  • Deliverability
  • Energy and/or Capacity
  • Environmental Attributes
  • Pricing and PPA Duration

Source: CPUC IRP - RESOLVE
Renewable Energy Costs

Levelized Cost = Total life span costs are equally allocated over each year

Price of renewable energy will vary based upon location, resource quality, deliverability status and contract terms

Note: Costs do not include tax credits
Comparing Apples with Oranges
How are resources with different profiles compared?

**Solar**
- **PRO:** Cheap and plentiful during middle of the day
- **CON:** Not available during the super peak

**Wind**
- **PRO:** Daily profile matches better with system load profile
- **CON:** More expensive than solar and may require additional transmission

**Geothermal**
- **PRO:** Reduces flexible capacity requirements
- **CON:** Expensive and less future need for baseload generation

**Battery Storage**
- **PRO:** Flexibility and helps to integrate renewable energy. Costs are declining
- **CON:** Expensive today and uncertain lifecycle costs

Lowest cost to the entire system is used to value renewable energy instead of lowest cost resource
Solar Resource Plan

Solar and energy storage focused

2018-2020
- Less than 1% remaining of short term procurement to meet 2020 RPS compliance period
- Existing supply contract enough to meet reliability requirements

2021-2028

2029-2030

2031 and beyond

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Wind Resource Plan
Wind and energy storage focused

2018-2020
- Less than 1% remaining of short term procurement to meet 2020 RPS compliance period
- Existing supply contract enough to meet reliability requirements

2021 - 2028

2029 - 2030

2031 and beyond
Diverse Resource Plan
Solar, wind, energy storage, geothermal, energy efficiency

<table>
<thead>
<tr>
<th>2018-2020</th>
<th>2021 - 2028</th>
<th>2029 - 2030</th>
<th>2031 and beyond</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Less than 1% remaining of short term procurement to meet 2020 RPS compliance period</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Existing supply contract enough to meet reliability requirements</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geothermal</td>
<td>Solar, wind</td>
<td>Energy storage</td>
<td>Wind, solar, energy storage</td>
</tr>
<tr>
<td></td>
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Preferred Resource Plan

Determine optimal mix of resource in the Preferred Plan

- The 30% solar investment tax credit ramps down to 10% by 2022 and beyond
  - Energy storage is also eligible for the ITC if it is charged using solar
- Pending expiration of the wind PTC ($23/ MWh) makes wind less favorable to solar
- Geothermal is a clean base load resource, but the cost of geothermal (~$90/ MWh) and reduced need for baseload generation make it less attractive
- 3:1 ratio of solar vs energy storage is a “rule of thumb” for sizing of solar + storage systems, but additional analysis is required to determine optimal timing and sizing

Preliminary results indicate Solar + Storage focused long term resource plan appears to the lowest cost plan if battery cost continue to decline
The pairing of storage with solar helps to reduce solar curtailment which is estimated to be ~3% with 100 MW of storage on the system.
Next Steps

**Action Plan**

- Incorporate customer and stakeholder feedback into the resource plan evaluation
- Complete resource plan evaluation to determine optimal or lowest cost resource plan
- VPU to provide more information on distributed solar tariff program
- Research incentives and time of use programs for implementing higher levels of energy efficiency and demand response
- Review RFP offers from renewable developers to get price discovery of actual market PPA pricing for renewables
- Work with owner of Malburg plant to evaluate re-configuration or refurbishment options upon expiry of PPA in 2028
- Lay the foundation for continuous update of IRP using latest info on regulatory requirements, load forecast and technology costs
Cost of Service and Rate Design Study – Initial Results
Agenda

• Introduction
• Review COS Process, Forecast, and Revenue Requirement Development
• Test Year Revenue Requirement Results
• COS Results
• Next Steps
Introduction
What is a Cost of Service and Rate Study?

- Industry process that determines the costs incurred by a utility to provide service to customers
- Calculates the costs related to each customer class (e.g., residential, commercial), that must be recovered through rates
Why Now?

Why are we doing a Cost of Service and Rate Study?

• Best practice to complete a COS study every 3 to 5 years

• Typically, **updates needed when:**
  - Current revenues don’t adequately recover costs
  - Significant change in expected expenses (e.g., new debt issued, increased regulatory costs, or capital needs)
  - Change in system loads or energy sales (e.g., new customer class)
  - Potential changes to power generation costs or plans (e.g., VPU’s IRP)
  - Application of new technologies (e.g., AMI or EVs)
  - Other significant market changes or drivers
VPU COS and Rate Study Process

- **Financial Forecast (5-yrs)**
  - Forecast financial performance and needs for VPU over a five-year period

- **Revenue Requirement**
  - Total costs of providing utility services to customers in various rate classes to be recovered through rate revenue

- **Cost of Service**
  - Allocates the revenue requirement to each customer class (e.g., the costs from each customer class to be recovered in rates)

- **Rate Design and Recommendations**
  - Develop charges and pricing signals that convey the COS to customers and fully recover costs.
Vernon Rate Design Strategy and Philosophy

Rate Strategy:

Combines VPU’s financial objectives and rate design philosophy while guiding long-term cost of service and rate making decisions.
Vernon Rate Strategy – Key Elements

• **Ensure financial stability and integrity**
  – Ensure stable performance, strong bond ratings

• **Fairness and equity in rates**
  – Align rates with COS results, eliminate subsidization where possible

• **Renewables and Conservation**
  – Compliance; support where directed and properly recover fixed and variable costs

• **Maintain competitiveness and valuable services**

• **Engage stakeholders in process**
Review COS Process, Forecast, and Revenue Requirement Development
Cost of Service and Rate Design Implementation Process

**Step 1**
Determine the revenue requirement of the utility

**Step 2**
Functionalize costs and services (production, transmission, distribution, etc.)

**Step 3**
Classify costs (demand, energy, customer costs, etc.)

**Step 4**
Allocate costs among customer classes

**Step 5**
Design rates

REVENUE REQUIREMENT DETERMINATION

COST ALLOCATION

RATE DESIGN
Revenue Requirement

Definition:

*Total costs of providing utility services to customers in various rate classes to be recovered through rate revenue*

- Calculates the costs the customer classes impose on the system
- For each customer class, rates should generate revenues equaling the class revenue requirement less any use of reserves and/or debt for the test year
- Develop Test Year by applying “Known and Measurable” adjustments (e.g., any expected material expense / customer changes)
- Foundation of a COS study
Revenue Requirement Development
Process / Forecast

- Test Year was developed from the average of 5-year budgeted costs by account
- Accounts were organized by Division and grouped into functions
- Using a 5-year forecast supports stable rates over the 5-year period
# 5-Year Budgeted Costs Converted to Test Year Revenue Requirement

<table>
<thead>
<tr>
<th>Functional Category</th>
<th>5-YR TY Avg.</th>
<th>FY19</th>
<th>FY20</th>
<th>FY21</th>
<th>FY22</th>
<th>FY23</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production</td>
<td>$130,340</td>
<td>$120,884</td>
<td>$126,707</td>
<td>$129,528</td>
<td>$136,583</td>
<td>$138,001</td>
</tr>
<tr>
<td>Transmission/Distribution</td>
<td>$11,698</td>
<td>$10,729</td>
<td>$11,199</td>
<td>$11,611</td>
<td>$12,056</td>
<td>$12,897</td>
</tr>
<tr>
<td>Customer</td>
<td>$9,381</td>
<td>$9,056</td>
<td>$9,267</td>
<td>$9,168</td>
<td>$9,524</td>
<td>$9,891</td>
</tr>
<tr>
<td>Administrative &amp; General</td>
<td>$14,226</td>
<td>$11,683</td>
<td>$13,646</td>
<td>$15,066</td>
<td>$15,098</td>
<td>$15,639</td>
</tr>
<tr>
<td>Capital Improvement Plan</td>
<td>$12,084</td>
<td>$11,735</td>
<td>$17,651</td>
<td>$12,547</td>
<td>$9,579</td>
<td>$8,907</td>
</tr>
<tr>
<td>Debt Service</td>
<td>$43,811</td>
<td>$46,379</td>
<td>$46,071</td>
<td>$45,841</td>
<td>$40,182</td>
<td>$40,583</td>
</tr>
<tr>
<td>Misc. Revenues</td>
<td>-$34,091</td>
<td>-$37,711</td>
<td>-$38,177</td>
<td>-$38,056</td>
<td>-$28,721</td>
<td>-$27,793</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$187,450</strong></td>
<td><strong>$172,755</strong></td>
<td><strong>$186,363</strong></td>
<td><strong>$185,705</strong></td>
<td><strong>$194,300</strong></td>
<td><strong>$198,125</strong></td>
</tr>
</tbody>
</table>
## Test Year Revenue Requirement Detail

<table>
<thead>
<tr>
<th>Function</th>
<th>Total ($000s)</th>
<th>Percentage of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operations &amp; Maintenance Expenses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Production</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Energy</td>
<td>$25,228</td>
<td>13.5%</td>
</tr>
<tr>
<td>Natural Gas Expense</td>
<td>$18,386</td>
<td>9.8%</td>
</tr>
<tr>
<td>Capacity</td>
<td>$48,037</td>
<td>25.6%</td>
</tr>
<tr>
<td>Transmission - Firm</td>
<td>$16,525</td>
<td>8.8%</td>
</tr>
<tr>
<td>Salaries/Benefits/Retirement</td>
<td>$1,538</td>
<td>0.8%</td>
</tr>
<tr>
<td>Other</td>
<td>$20,625</td>
<td>11.0%</td>
</tr>
<tr>
<td><strong>Transmission and Distribution</strong></td>
<td></td>
<td>0.0%</td>
</tr>
<tr>
<td>Repair &amp; Maintenance</td>
<td>$7,140</td>
<td>3.8%</td>
</tr>
<tr>
<td>Salaries/Benefits/Retirement</td>
<td>$3,673</td>
<td>2.0%</td>
</tr>
<tr>
<td>Other</td>
<td>$886</td>
<td>0.5%</td>
</tr>
<tr>
<td><strong>Customer</strong></td>
<td></td>
<td>0.0%</td>
</tr>
<tr>
<td>Salaries/Benefits/Retirement</td>
<td>$457</td>
<td>0.2%</td>
</tr>
<tr>
<td>Other Income</td>
<td>-$226</td>
<td>-0.1%</td>
</tr>
<tr>
<td>Other</td>
<td>$9,150</td>
<td>4.9%</td>
</tr>
<tr>
<td><strong>Administrative &amp; General</strong></td>
<td></td>
<td>0.0%</td>
</tr>
<tr>
<td>ILOT, Gen. City Administrative Service Exp</td>
<td>$8,673</td>
<td>4.6%</td>
</tr>
<tr>
<td>Salaries/Benefits/Retirement</td>
<td>$4,046</td>
<td>2.2%</td>
</tr>
<tr>
<td>Other</td>
<td>$1,507</td>
<td>0.8%</td>
</tr>
<tr>
<td><strong>Subtotal Operations &amp; Maintenance Expense</strong></td>
<td>$165,646</td>
<td>88.4%</td>
</tr>
<tr>
<td><strong>Debt Service</strong></td>
<td>$43,811</td>
<td>23.4%</td>
</tr>
<tr>
<td><strong>Capital Improvement Plan</strong></td>
<td>$12,084</td>
<td>6.4%</td>
</tr>
<tr>
<td><strong>Misc. Revenues</strong></td>
<td>-$34,091</td>
<td>-18.2%</td>
</tr>
<tr>
<td><strong>Total Revenue Requirement</strong></td>
<td>$187,450</td>
<td>100.0%</td>
</tr>
</tbody>
</table>
Cost of Service Results
# COS Functionalization, Classification and Allocations to Customer Classes

<table>
<thead>
<tr>
<th>STEP 1 - Develop Revenue Requirement</th>
<th>STEP 2 - Functionalize Costs</th>
<th>STEP 3 - Classify Costs</th>
<th>STEP 4 - Allocate Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production</td>
<td>Demand (CP)</td>
<td>Demand (CP)</td>
<td>Residential</td>
</tr>
<tr>
<td>Transmission</td>
<td></td>
<td>Demand (NCP)</td>
<td>Small Commercial</td>
</tr>
<tr>
<td>Distribution</td>
<td></td>
<td>Customer</td>
<td>Medium Commercial</td>
</tr>
<tr>
<td>Customer</td>
<td></td>
<td>Customer Service</td>
<td>Large Commercial</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Meter Reading</td>
<td>Lighting</td>
</tr>
<tr>
<td>O&amp;M</td>
<td></td>
<td>Customer Accounting</td>
<td></td>
</tr>
<tr>
<td>Debt Service</td>
<td></td>
<td>(# of customers)</td>
<td></td>
</tr>
<tr>
<td>Transfers / Taxes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expenditures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reserves</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Revenue Requirement</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Functionalization of Revenue Requirement

<table>
<thead>
<tr>
<th>Function</th>
<th>Revenue Requirement</th>
<th>Percentage of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Supply</td>
<td>$135,939,698</td>
<td>72.5%</td>
</tr>
<tr>
<td>Transmission</td>
<td>$16,348,864</td>
<td>8.7%</td>
</tr>
<tr>
<td>Distribution</td>
<td>$20,969,348</td>
<td>11.2%</td>
</tr>
<tr>
<td>Customer</td>
<td>$14,191,867</td>
<td>7.6%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$187,449,778</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

Please note throughout the presentation, the totals may not sum properly due to rounding within the numbers within the table.

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Majority of Vernon’s Costs are related to power supply.
<table>
<thead>
<tr>
<th>Classification</th>
<th>Revenue Requirement</th>
<th>Percentage of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer</td>
<td>$17,567,275</td>
<td>9.4%</td>
</tr>
<tr>
<td>Energy</td>
<td>$33,410,559</td>
<td>17.8%</td>
</tr>
<tr>
<td>Demand</td>
<td>$136,447,647</td>
<td>72.8%</td>
</tr>
<tr>
<td>Direct Assignment</td>
<td>$24,296</td>
<td>0.01%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$187,449,778</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

82% of Vernon’s costs are fixed costs (Customer and Demand) and do not vary with the amount of energy consumed by customers.
Fixed Cost Recovery

• Vernon’s revenue collections are misaligned with the costs incurred.
  • 82% of the costs are fixed
  • 30% of the revenues come from fixed charges (i.e., demand and customer charges)

• VPU will continue to improve the alignment of cost and revenue
Key Takeaways
Key Takeaways

• The timing of a rate increase impacts the magnitude necessary to recover costs
  – There will be no rate increase for the upcoming fiscal year as studies will not be completed in time by budget approval
  – City will use reserves to meet any shortfall.
  – If implemented in July 2019 (FY20), an estimated 2% - 3% increase in system average rates is necessary
    • Subject to load forecast and cost update based on IRP Study

• Drivers of upward pressure on rates include:
  – Need for system upgrades and capital investment for system reliability
  – Power supply and capacity costs

• VPU will continue to better align fixed and variable revenue and costs
CONTACT INFORMATION

Kelly Nguyen
General Manager of Public Utilities
knguyen@ci.Vernon.ca.us
Office: (323) 583-881, Ext. 834

Abraham Alemu
Integrated Resources Manager
aalemu@ci.vernon.ca.us
Office: (323) 583-8811, Ext. 250