MEMORANDUM

June 16, 2017

TO: Board of Directors

FROM: Foster Hildreth, General Manager

RE: Work Session Materials

Please see attached for the materials presented to the Board at the June 16th work session on rates – budgetary review. This memo outlines the discussion and outcomes of the first of two schedule work sessions on rates.

The Board requested that staff compile information on budgeted expenses in all categories of Co-op operations and demonstrate how those expenses relate to OPALCO's mission, particularly those required to maintain safety and service levels.

The June work session on rates was designed as a diligent budgetary review to ensure prudent use of member resources. The session was a deep exploration to discover any savings or opportunities for adjustment on expense and/or revenue that could benefit member rates. This work session was the first of two open sessions planned in 2017, leading up to the 2018 budget planning process in October and informing the 2018 Cost of Service Analysis that will examine rate structure and member billing.

To start this session off, each Board member answered the question: "What would you like to learn today to inform the rates/budget process?" Here are the questions raised by each Board member:

- Vince: What concrete data exists to indicate our current rates/bills create hardships?
- Randy: Why am I paying triple for the over 3,000 kWh block [residential tariff]?
- Mark: Budget fraction with level of capital credits payouts long term.
- Brian: What investment can we make (action can we take) that will actually reduce rates/member bills?
- Winnie: How can we find more revenue to help keep rates low?
- Jim: How can we effect the growth of the members' bills?
- Jerry: What is left to be able to reduce cost and what are the trade-offs relative to the mission statement?

After much discussion and review of actual budgets, service levels, capital projects and reliability standards, the major take-away was that there aren't many discretionary

expenses that can be cut without risking service levels and safety. The Board directed staff to continue to fine tune the budget, reduce any discretionary expense and "make sure every penny benefits the membership."

The Board agreed that the current fuel switching initiative is a good way to increase revenues by helping members reduce their TOTAL energy cost by transitioning from fossil fuels to more efficient and cost-effective electricity, especially for transportation and heating. Discussion ensured on how to encourage members to switch from gas cars to electric vehicles and from propane or wood heating sources to ductless heat pumps.

The member billing experience was discussed and how OPALCO could help members save money with information on how and when to use energy most efficiently. Options discussed included billing factors such as demand, time of use and specific EV charging rates. Other factors such as metering options, building codes, County Comprehensive Planning, retail operations and grid interoperability were discussed.

The next Board work session on rates is scheduled for Friday, September 22nd at the Eastsound OPALCO Headquarters (183 Mt. Baker Road) beginning at 10:00 am. Members are invited to attend.

Board Rate Review Work Session - June 2017

Today's Goal

Vince Dauciunas

- "We want to leave the work session saying 'Yeah, this is the right set of stuff we are doing. Now, how do we generate that revenue with the right rate structures."
 - May 2017 board meeting, after reviewing and analyzing the 2017 budget







Since 2014, OPALCO has engaged in a comprehensive review and reduction of all expenses that don't impact our mission and strategic directives - providing safe, reliable, cost effective and environmentally sensitive utility services.

On the revenue side, there is tremendous potential to help the county transition from fossil fuels, through the electrification of transportation and heating.

This helps members save money while reducing their carbon footprint.

OPALCO service quality and rates will be at their best by providing smart valuable helpful energy services that improve co-op member quality of life.

Overview

OPALCO runs a very lean yet effective operation.







- Timeline
- Current Strategic Directives
- Industry Comparables
- Quick review of 2017 Budget
- One Question exercise
- Board Q/A and Discussion
- Appendix
 - Expense Analysis
 - Revenue Analysis The key to keeping rates low

Agenda





Rate Process Timeline



2013 2014 2015



GM: Foster Hildreth



Mission Statement

Orcas Power & Light Cooperative (OPALCO) serves our members with safe, reliable, cost effective and environmentally sensitive utility services.





Strategic Directives

Board Strategic Directives provide guidance in achieving the goals and objectives of OPALCO and serve as the basis for the General Manager's performance appraisal.

1. Safety

Safety is job #1. Safety programs will be implemented to promote OPALCO's high standards for safety to achieve the goal of no accidents.

2. Sustainable Power Supply Strategy

Maintain a long-term strategy to provide safe, adequate, reliable, advantageously priced power, including consideration of source risk and economic, climate and energy policy uncertainty:

- Maintain BPA as our primary long-term power supplier. •
- Investigate possible relationships with alternate suppliers of power.
- Implement energy efficiency and conservation programs as a cost effective power resource. These include member projects, BPA programs, and OPALCO infrastructure improvements.
- Encourage local generation installations consistent with our OPALCO grid operations.

3. Cash and Asset Availability

Ensure revenue and financial stability and have cash and assets available to provide for foreseeable demands and to mitigate the impacts of potential significant damaging events including storm damage, loss of electric supply, equipment or cable failure.

4. Access to Debit Funding

Maintain Time Interest Earned Ratio (TIER) and other relevant parameters at a level that facilitates debt structuring and satisfies major lending agencies.

5. Equity as a Percent of Capitalization

Maintain a prudent equity-to-capital ratio which shall not fall below 40% on an annualized basis without the Board's approval.

6. Reliability of Electric Service

Maintain reliability of electric service.

7. Member Satisfaction

Demonstrate greater than 80% member satisfaction.

8. Communications with Members

Have member communication programs to inform members of relevant issues. Information of interest to members might include financial conditions, policies, programs, operational achievements and member benefits.

9. Fiber Optic and Wireless Backbone for Grid Control (Operational Use)

Accelerate completion of the planned fiber optic and wireless communications grid control backbone. (Per Board motion of November 2013).

10. Internet and Data Services to the Premises (NewCo)

Organize, manage, and control a wholly-owned subsidiary to provide access to the Internet, phone and data services to the premises, and ancillary data and communications to emergency responders. (Per Board Motion of October 2014).

11. Personnel Transition Plan – Apprentice and Training Programs for Key Positions

Maintain and implement succession planning for all staff positions.





Comparables

- - Inflation
 - Global
 - National

 - KRTA
 - Form 7 Peers

Rates, Costs, Wages, Performance

Competitive Fuels









Comparables: Inflation





U.S. Annual Inflation Rate



Source: Bureau of Labor Statistics



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Cost Index of U.S. Consumer Items: Not Inflation Adjusted



Source: Bureau of Labor Statistics

<u>Notes</u>

- Prices indexed to 1 in 1980
- Electricity has increased the least
- Wages have not kept up with most household expenses
- Food prices are volatile, often moving in concert with the price of oil and natural gas



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History of 1,000 kWh Monthly Bill U.S., inflation adjusted



Source: BLS

Notes

- 1992 through 2017, Residential
- Historically, average OPALCO member usage has been 1,000 kWh/month
- Monthly bill includes all Facility, Usage Charges for US and OPALCO
- **OPALCO** Rate increases postponed during 2008 - 2011 recession and after effects, to ease economic impact on county.







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History of 1,000 kWh Monthly Bill OPALCO, inflation adjusted



Source: OPALCO

Notes

- OPALCO 2017 average bills are about the same as they were 25 years ago
- 1992 through 2017, Residential
- Historically, average OPALCO member usage has been 1,000 kWh/month
- Monthly bill includes all Facility, Usage Charges
- **OPALCO** Rate increases postponed during 2008 - 2011 recession and after effects, to ease economic impact on county.









Comparables: RUS O&M





Smart Expense Results: 100% Score from RUS Form 300

In 2000, 28 of 47 performance measures needed improvement, 5 received the lowest rating. Now <u>all</u> 47 receive RUS's highest rating.



O&M

Engineering

Total









Comparables: Global





Retail Electric Rates: Global View

40 Cost includes Usage & Facility Charge (Total Revenue / Total kWh) Germany High 36 Retail Electricity Cost (¢/kWh) 32 Denmark Uruguay 28 0 24 2000 20 ost 16 California 12 Low 8 **OPALCO** 4 \bigcirc 2 6 8 \bigcirc 4 Pollution Cleaner

Carbon Emissions (metric T CO₂eq/person/year)



Notes

- OPALCO cost of energy is ulletsimilar to global average
- And much less expensive and ulletcleaner than renewable energy early adopters



Source: EIA, BPA, IEA - 2015 data









Comparables: National





Retail Electric Rates: National View



Notes

Though OPALCO's 20 island service area has one of the most complex and expensive infrastructures in the nation, we deliver some of the lowest cost, cleanest energy.

- Hydro: low cost, very clean \bullet
- BPA fuel mix is predominately ullethydro, with some wind, biomass and coal. Coal will be phased out over the next decade.









Comparables: Form 7 Peers







Со-Ор	State	Meters	Gross Plant	Revenu
Harney Electric Co-op	OR	2,413	40,784,551	11,360,64
Okanogan	WA	3,517	11,356,250	4,878,68
Columbia Basin Electric Co-op	OR	3,860	32,179,650	7,687,78
West Oregon Electric Co-op	OR	4,273	38,181,664	8,971,52
Tanner	WA	4,558	36,288,323	9,275,33
Wasco Electric Co-op	OR	4,633	32,306,084	9,977,25
Columbia	WA	4,942	81,436,054	20,991,25
Blachy-Lane Electric Cooperative	OR	5,000	24,139,628	11,517,86
Big Bend	WA	8,694	70,102,236	27,526,57
Lakeview	WA	9,848	27,264,950	20,716,49
Douglas Electric Co-op	OR	10,000	56,989,726	13,651,72
Lane Electric Cooperative	OR	12,878	66,755,182	21,514,33
Elmhurst	WA	13,935	34,226,787	14,558,91
Umatilla Electric Co-op	OR	14,497	131,101,784	54,662,14
OPALCO	WA	14,738	83,593,001	20,987,01
Benton	WA	16,041	109,158,098	37,875,72
Coos-Curry Electric Co-op	OR	17,452	116,955,019	30,974,26
Midstate Electric Co-op	OR	18,578	96,194,065	27,083,14
Salem Electric	OR	18,759	56,493,242	24,654,24
Consumers Power, Inc.	OR	22,014	136,937,382	32,926,51
Oregon Trail Electric Consumers Co-op	OR	30,309	146,627,833	46,589,60
Peninsula Light Co	WA	30,921	149,236,086	49,139,00
Central Electric Co-op	OR	31,733	206,192,112	49,355,30
Inland Power and Light Co	WA	38,951	199,954,999	60,654,56

Notes

Source: 2012 IRS Form 990 tax filings Area: Square miles of land







Regional Co-Op Comparison: Meters & Gross Plant





Notes

Serving 20 Islands with multi-island substations and distributed aerial, buried and submarine infrastructure is much more expensive than mainland counterparts

Yet, OPALCO plant expense is inulletline with mainland counterpart







Distribution: Overhead versus Underground Cable



Notes

Serving 20 Islands with stormhardened infrastructure requires very expensive buried distribution cable for comparable reliability

- "Rural 1" service area 200 times larger than OPALCO
- "Seasonal" territory size similar to ightarrow**OPALCO**, with concentrated neighborhoods rather than our scattered rural population





















KRTA Comparables: Reliable (KRTA #145)



Source: KRTA



- OPALCO kept the power on 99.92% of the time in the last 5 years
- 2015 outage work on underground circuits requires a planned outage – cannot work while "hot"
- Source notes: US median, WA median, Size median (similar to OPALCO total members)

OPALCO \bullet \bullet US • State Peer **O**









Disasters had to fulfill at least one of the following criteria:

10 or more people reported killed.

- 100 people reported affected.
- Declaration of a state of emergency
- 4. Call for international assistance.

Increasing Extreme Weather Events will Impact O&M Cost

1 000%		
1,000/0	extreme rain events have increa	as
900%		
800%		
	Percentage increase in total daily rainfall levels in London:	
/00%	1961 to 2005 average,	
600%	compared to 1900 - 1960 average	
500%		
400%		
300%		
200%		
20070		
100%		
0%		
	>25mm >30mm >35mm >	4(

Source: Lloyd's emerging risks team, Center on the Epidemiology of Disasters

sed over 900%



UW Climate Impacts Group







Comparables: Reliability - SAIDI (KRTA #140)



Source: KRTA

Notes

- National average co-op SAIDI = 119.1
- Industry average SAIDI = 66
- **DOE Interruption Cost Estimator** calculates that outages cost homes and businesses an estimated \$2.88 million annually.

National average co-op SAIDI

digital tracking starts July 2016

KRTA Comparables: Member kWh Usage Lower (KRTA #61)

ERAGE RESIDENTIAL USAGE KWH PER MONTH (KWh) AV

Source: KRTA

- Enhanced by milder climate, OPALCO leads the way in helping members use less energy through investments in energy efficiency, rebates and education. With higher grid and fixed costs, 35% seasonal membership, and low kWh sales, this requires more facility cost be recovered compared to our mainland counterparts.
- Source notes: US median, WA median, Size median (similar to OPALCO total members)

•	OPALCO
- •	US
•	State
•	Peer
	Non-Seasonal
015	

KRTA Comparables: Power Cost % Much Lower (KRTA #88)

Source: KRTA

<u>Notes</u>

- While OPALCO facility costs from our more expensive island grid are much larger than our mainland counterparts, our power costs are much lower.
- Source notes: US median, WA median, Size median (similar to OPALCO total members)

OPALCO \mathbf{O} \bullet US • State Peer **O**

KRTA Comparables: Total Utility Plant Investment Per Mile Higher (KRTA #124)

Source: KRTA

<u>Notes</u>

- Due to our County's geography, OPALCO invests more to build & maintain the grid than our US, state & size peers
- Source notes: US median, WA median, Size median (similar to OPALCO total members)

- OPALCO \bullet US
- State
- Peer **O**

2015

KRTA Comparables: Total Cost of Electric Service Per Member (KRTA #107)

Source: KRTA

- Inline with our mission, we keep the cost of service as low as possible for our members - about 25% less than our mainland counterparts.
- Source notes: US median, WA median, Size median (similar to OPALCO total members)
- Example: SCL City of Seattle 2017 5.9% rate increase

OPALCO \bullet US • State Peer **O**

KRTA Comparables: Longterm Debt Per Member (KRTA #21)

3,000

Source: KRTA

- Thanks to strong leadership over the years, we've managed a healthy level of debt and kept our debt per member below or comparable to our mainland counterparts.
- Debt cycles back down in 2018 as submarine cable replacement project completes. See 2017 Budget Capital Projects slide below.
- Source notes: US median, WA median, Size median (similar to OPALCO total members)
- OPALCO \bullet
- \bullet US
- State
- Peer **O**

Comparables: Blended Interest Rate Improved (KRTA #23)

Source: KRTA

Notes

- Thanks to active efforts to leverage recession-driven unprecedented low interest rates, the interest rate we pay on our debt is now lower than our mainland counterparts. We used these low rates to solve the internet crisis in the county and finance the submarine cable replacement project and distribution under-grounding project
- Source notes: US median, WA median, Size median (similar to OPALCO total members)
- OPALCO US \mathbf{O} • State
- Peer **O**

Comparables: Overtime Hours Lower (KRTA #111)

Source: KRTA

<u>Notes</u>

- Our crews have the tools & training to work efficiently, keeping overtime low.
- Source notes: US median, WA median, Size median (similar to OPALCO total members)

Peer **O**

KRTA Comparables: General Plant Higher (KRTA #130)



Source: KRTA

Notes

- **OPALCO** Facility Plant cost has long been more expensive than our mainland counterparts. Driven largely by recent investments in grid modernization, undergrounding and fiber projects.
- Source notes: US median, WA median, Size median (similar to OPALCO total members)

- OPALCO \mathbf{O} \bullet US • State
- Peer **O**







KRTA Comparables: G&A (KRTA #85)



Source: KRTA

Notes

- Includes general management, accounting, member services, energy savings, communications, legal, IT, board, audits, consultants, fees, general plant maint.
- Dedicated to running a lean operation, each year our general and administrative costs per member are among the lowest in the state, but higher than national and peer utilities.
- Source notes: US median, WA median, Size median (similar to OPALCO total members)











KRTA Comparables: HQ Costs Lower (KRTA #133)



Source: KRTA

<u>Notes</u>

- We keep the cost of our HQ facilities low
- Source notes: US median, WA median, Size median (similar to OPALCO total members)

- OPALCO \mathbf{O} • US
- State
- Peer **O**

2015







2017 Budget





2017 Budget: Mission

Mission:

OPALCO serves our members with safe, reliable, cost effective and environmentally sensitive utility services. Our mission drives our budget in the following ways:

Safety - In 2017, we will complete the build out of our fiber communications backbone, improving the reach and ease of communication and resilience of our grid. This translates to a greater safety net for our crews in the field who are now connected to our system and each other with personal devices. With more devices deployed on our grid, the system not only reroutes power quickly to our members. It puts data in the hands of crew members in the field to rapidly locate and resolve outages. This safety net extends to our members who rely on power, communications, and data to serve the needs of their families and businesses, and to reach emergency first responders when needed.

Reliability - As budgeted, we will replace 10% of the unjacketed underground cable (referred to as URD) system wide. This trend will continue with prioritization of replacement targeted at the areas with higher failure rates. With each URD project, where needed, we include fiber and increase the reach of our fiber network and therefore the reach of our monitoring and control system. We have major tie-line strengthening projects scheduled on San Juan Island to shift load from one substation to another, allowing us to more dynamically manage high load periods and outages. Working with BPA, we'll add a second pathway to reroute interisland power to Orcas in case of major outages.

Cost Effective - As our grid is enhanced with fiber and devices in the field, we contain costs by putting control of the system in the hands of crew members wherever they are. The days of sending linemen out in a storm, in a boat, on a dark night, are going away. With a matching grant from the WA DOC, we'll install a battery storage bank at the Decatur substation that will create cost savings through load shifting and peak shaving, as well as prepare us for our Community Solar project. With equipment replacements scheduled for 2017, greater efficiency and cost savings will contribute to our sustainability as a co-op. The higher cost of managing a remote, rural utility in our island environment is tempered through prudent use of technology best practices.

Environmentally Sensitive - OPALCO has significant infrastructure installed throughout our beautiful and sometimes fragile island environs. In 2017, we will remove an old submarine cable and install a new one. We will plan and begin to market our first large community solar project to give all co-op members access to renewable generation. Doing the right thing comes at a cost that is reflected in our cost of service and OPALCO is committed to good stewardship, working within the County's Critical Areas Ordinance, complying with all permitting requirements and keeping as low a profile as possible to maintain island character.





Revenue Allocation











2017 Budget: Capital Projects



Headline

- Transmission: peak is Lopez San Juan submarine cable
- **Distribution:** Normal under-grounding to improve reliability, Decatur substation upgrade, community solar project
- Grid Control Backbone: Expansion to improve
 - reliability
 - field communications
 - preparing for intermittent local renewable energy resources









Rule of Thumb

each \$1 million of capital project cut = \$180,000 increased expense (due to labor, Depr.&Int. offsets) = \$1.00 increase in avg member monthly bill

Cuts in capital projects increase O&M expenses and rates





2016 Actual and Forecast: Financial Metrics







2016 Budget: Debt Analysis









Submarine Cable Replacements: Managing Equity Level

Note: Schematic to illustrate equity planning process



Level

Equity



each 1 million kWh sold = \$130,000 in revenue

each 1% rate increase = \$250,000 in revenue

Rules of Thumb

= \$1.30 increase in avg member monthly bill





One Question Exercise

What one question would you like to have answered at the end of the day? e.g. "What investment can we make (action we take) that will actually reduce rates/member bill?"







Q/A and Discussion







Appendix











Expense Analysis



Expense Category





Expense Analysis: Power



sidential exchange credit disappears in 2018	
PA inflation, net metering, PNGC dues	
nergy efficiency, warm winters, heavier gauge distribution cable, grid storage DRUs	
Trending at 5.5%, possible acceleration as local net metering increases	
2016 B-2017 B-2018 B-2019	B-2020

Expense Category





Expense Analysis: BPA Power Cost







Expense Analysis: BPA Power Cost per kWh Sold







Expense Analysis: Fixed (Depr, Int., Taxes)

Notes	larg
Increasers	Ca
Decreasers	
Management Guidelines	An



ge increase in 2018 due to capitalizing submarine cable			
apEx drives depreciation and interest			
refinancing at lower rates			
nticipate leveling after 2019 as CapEx returns to norm			
2016 B-2017 B-2018 B-2019	B-2020		
aint./Ops General & Admin	ES	Island Network	Other

Expense Category





Expense Analysis: Current Capital Projects (depreciation + interest)







Expense Analysis: Distribution + Transmission









Expense Analysis: Taxes







Expense Analysis: Margin (Future capital project + Capital credit planning + Other)







Expense Analysis: Labor Costs

Notes	
Increasers	unic
Decreasers	a
Management Guidelines	rarely



Expense Category



Other



Labor: Employees by Year, Budget v. Actual

Actual employee count usually runs below budget







Workforce Challenges of Electric Power Employers in the Pacific Northwest

- The U.S. recession reduced the demand for electricity nationally.
- Employers implemented cost-cutting measures that limited new hiring, especially at the entry level.
- The uncertain economy caused many experienced employees to delay their retirements.
- Employers anticipate losing 1,522 craft and professional employees to retirements during the next five years, which represents nearly 17 percent of their current workforces across nine occupations.
- The largest number of projected retirements is for line workers (386), electricians (251), and power engineers (177).

Source: Workforce Challenges of Electric Power Employers in the Pacific Northwest, Alan Hardcastle, Ph.D

Survey of 16 electric utilities in Pacific Northwest



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Workforce Challenges of Electric Power Employers in the Pacific Northwest Survey of 16 electric utilities in Pacific Northwest

- There is a shortage of qualified applicants, making it a seller's market.
- Skilled candidates are increasingly attracting top salary, benefits packages.
- Employers need to cast a wider net, and often poach from other utilities, with attractive signing bonuses and other incentives.
- Working conditions and lifestyles matter
- Recruiting family from out of state can be challenging, due to limited job opportunities for spouse.

Source: Workforce Challenges of Electric Power Employers in the Pacific Northwest, Alan Hardcastle, Ph.D







Expense Analysis: Maintenance and Operations

			Notes	equal po contra counterp
			Increasers	extre
			Decreasers	replacem
			Management Guidelines	
	\$10			
lions)	\$8			2015
ollars (in Mil	\$5			
	\$3 \$0			
		Power F (Depr, l	ixed Labor Cos nt., Taxes)	sts M

ortions of ROW maintenance, materials and excavation actors, OPALCO is a cost bellwether for our mainland parts as they tackle emerging environmental standards









Expense Analysis: G&A (no labor or Energy Savings)

 ware licensing, payment processing and chant fees, legal fees, communications, anting services, audits, board, advertising ervices, GM/Board industry group, training/ravel, consultants, member meetings proactive steady strategic direction fat trimmed, trending with inflation 2016 B-2017 B-2018 B-2019 B
ervices, GM/Board industry group, training/ cavel, consultants, member meetings proactive steady strategic direction fat trimmed, trending with inflation
proactive steady strategic direction fat trimmed, trending with inflation 2016 B-2017 B-2018 B-2019
fat trimmed, trending with inflation 2016 B-2017 B-2018 B-2019 B
2016 B-2017 B-2018 B-2019 B
ZUTO D-ZUT/ D-ZUTO D-ZUTY D





Expense Analysis: Member Services (includes labor)





5.80% 5.75%

2021 Forecast





Expense Analysis: Energy Savings Department



BPA EE initiatives, fuel switching initiatives, well offset by power cost savings	
self funding, fuel switching, EV and heat pump rebates	
RESP program	
trending with inflation, strong ROI	
2016 B-2017 B-2018 B-2019	B-2020





Expense Analysis: Energy Savings Rebate Program



Expense Analysis: Energy Savings



6.19% 4.34%

2021 Forecast





Expense Analysis: Other

				No	tes		C	outr	ead	ch,	you ⁻ pa	th rti
				Increa	asers				nc)n-e	esse	n
				Decre	easers	6						
				Manag Guide	jemer elines	nt			fa	it tri	imm	e
Dollars (in Millions)	\$10 \$8 \$5 \$3 \$0							3	201	4	2015	
	ψυ	Pow	er		Fixe	d		Lab	or C	osts		M

Fixed (Depr, Int., Taxes)

rally, community solar marketing, board icipation in industry meetings

tial but important G&A like activities

purposeful reductions

d in 2014/15, trending with inflation

2016	B-2017	B-2018	B-2019	B-2020		



Expense Category




Expense Analysis

Notes	residential exchange credit disappears in 2018	large increase in 2018 due to capitalizing submarine cable	new union contract effective 2019	equal portions of ROW maintenance, materials and excavation contractors	software licensing, payment processing and merchant fees, legal fees, communications, board, advertising	BPA EE initiatives, fuel switching initiatives, well offset by power cost savings	now Rock Island subsidiary	outreach, youth ra community solar mark board participation in ir meetings
Increasers	BPA inflation net metering PNGC dues	CapEx drives depreciation and interest	union contract COLA keeping competitive with industry rates	extreme weather, substation failures, outages, inflation	legal services, training/ travel, consultants, member meetings	self funding		non-essential t important G&A activities
Decreasers	energy efficiency warm winters	refinancing at lower rates	less than full staffing	replacement of aging infrastructure expansion of ROW program	proactive steady strategic direction	RESP program		purposeful reduct
Management Guidelines	trending at 5.5% possible acceleration as local net metering increases	anticipate leveling after 2019 as CapEx returns to norm	rarely are we fully staffed, so actuals are often less than budget	fat trimmed, trending with inflation	fat trimmed, trending with inflation	trending with inflation, strong ROI		fat trimmed in 201 trending with infla



Expense Category







Revenue







Rates = Revenue - Expenses





Rate Equation Low Strong Smart Rates = Revenue - Expenses





Strong Smart

Rate Equation Rates = Revenue - Expenses

Large market potential in fuel switching, energy services, resilience services, grid battery services, communication services

Leverage technology to continually improve efficiency, not much fat, little opportunity, risk of degrading service levels





OPALCO IRP Fuel Switching Strategy Initiated in 2015

Dan Kammen Director of the Renewable and Appropriate Energy Laboratory

"Electricity is cleaner than liquid fuels in essentially every case. So we need to shift from liquid and fossil fuels toward electricity. The mantra is "Electrify everything."





OPALCO IRP Fuel Switching Strategy Initiated in 2015

We are just getting started...





2017 Fuel Switching Rebate Status

Rebate

EV Chargers

Ductless Heat Pump



7/6/2017





Growth Transformation: A Shift from Quantity to Quality

Last Century

Population Growth Driving kWh Growth

New service additions peaked in the 1990s, during the real estate boom.



This Century Electrification of Heating and Transportation Driving kWh Growth Transitioning to heat pumps and EVs





U.S. Incremental kWh Growth Due to Electrification of Transportation and Heating



Source: NREL 2016, The Brattle Group, OPALCO Analysis





Rule of Thumb

fuel switching to electric saves members money

each \$25 increase in member kWh sales from fuel switching to EV and ductless heat pump saves members about \$100 in gasoline and propane cost







OPALCO IRP Fuel Switching Strategy Initiated in 2015

"Fuel switching drives healthy revenues, which helps keep rates low, and funds the expensive capital costs of a transition to local energy resilience, ...

which reduces co-op member <u>total</u> energy bill and carbon emissions."





"We endeavor to design <u>affordable</u> <u>competitive</u> rates to increase the use of OPALCO energy, by accelerating the transition from fossil fuels to electricity."





Comparing Monthly Heating Costs: Propane, Electric Baseboard, Electric Ductless Heat Pump



Notes

- Typical winter month cost (Dec, Jan, Feb)
- 40 million BTU annual heat load home
- Propane heater is typical furnace or stove -80% efficient. Cost could be higher due to lower efficiency.
- Baseboard is 100% efficient
- Ductless heat pump is about three to four times more efficient than baseboard and propane heaters
- Propane is a fossil fuel with much higher carbon footprint than OPALCO electricity











San Juan County Heating Fuels Market Share 2016

Heating

18% other

Fossil Fuels

electric 66% (up from 53%) in 2013)

OPALCO

13% propane

2% fuel oil

source: OPALCO

Water Heaters

electric 88% (up from 81%) in 2013)

OPALCO

Fossil **Fuels**







- Help members save money and reduce carbon pollution by fuel switching
 - reduce their winter heating bills by \$1,000+ using ductless heat pumps
 - reduce their annual driving cost too, with EVs
 - EV group buy programs
- Reduce barriers to entry and demand charges \bullet
 - on-bill low interest financing for heat pumps and water heaters (RESP program)
 - rent heat pumps and electric water heaters with built-in demand response unit (DRU)
- Microgrid community solar + battery services for critical community systems \bullet
 - help hospitals, first responders, grocery stores, town centers, during extended outages
- Help members optimize rooftop solar \bullet
 - Vehicle-to-Grid EV battery charging and storage from rooftop solar, with DRU
 - residential customers for just \$15 per month, with built-in DRU dispatchable power
 - Use grid battery as lower cost, cleaner, more comfortable option to going off-grid

Large market potential in fuel switching, energy services, resilience services, grid battery services, communication services...

Tesla and Vermont utility Green Mountain Power have partnered to offer backup battery power to







