



Seattle City Light

# 2018 INTEGRATED RESOURCE PLAN

Stakeholder meeting

Seattle City Light | June 7, 2017

# SAFETY MOMENT: CAR TRAVEL SAFETY TIPS

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Requires planning:

- forecasting
- equipment/provisions
- contingency plans
- tactics

<http://www.redcross.org/get-help/prepare-for-emergencies/types-of-emergencies/highway-safety>



## MEETING PURPOSE

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- Review the IRP process and 2016 IRP conclusions to set the stage for conducting the 2018 IRP
- Present and discuss the preliminary 2017 conservation potential assessment (CPA) for the 2018 IRP

# AGENDA

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- Introductions
- Integrated resource planning (IRP) overview
- 2016 IRP review
- 2017 draft conservation potential results
- Next steps
- IRP website and contact information
- Adjourn

## EXTERNAL IRP STAKEHOLDERS

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- Steve Gelb, Emerald Cities Collaborative
- Mike Ruby, Envirometrics, Inc.
- Cameron Cossette, Nucor
- Henry Louie, Seattle University
- Wes Lauer, Seattle University
- Rebecca Wolfe, Sierra Club
- Jeremy Park, University of Washington
- Paul Munz, Bonneville Power Administration (BPA)
- Charlie Grist, Northwest Power & Conservation Council (NWPCC)
- Massoud Jourabchi, Northwest Power & Conservation Council (NWPCC)
- Elizabeth Osborne, Washington State Energy Office
- \* New participant

## CITY LIGHT IRP PARTICIPATING GROUPS

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- Resource Planning, Forecasting and Analysis (IRP leads)
- Customer Energy Solutions (CPA leads)
- Environmental Affairs
- Power Supply & Strategic Planning
- System Planning
- Financial Planning
- Generation Engineering and Power Production
- Asset Management
- Emerging Technology Innovation
- Race & Social Justice Initiative Program
- Communications



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# IRP PROCESS

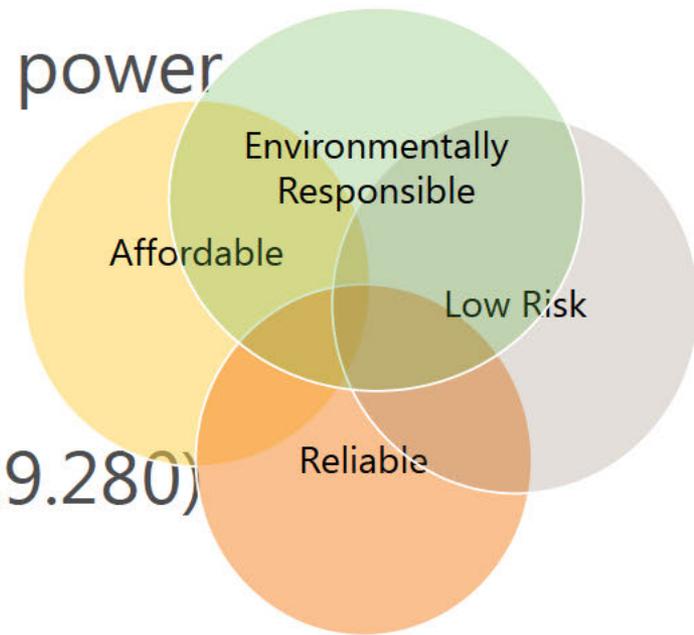
Overview



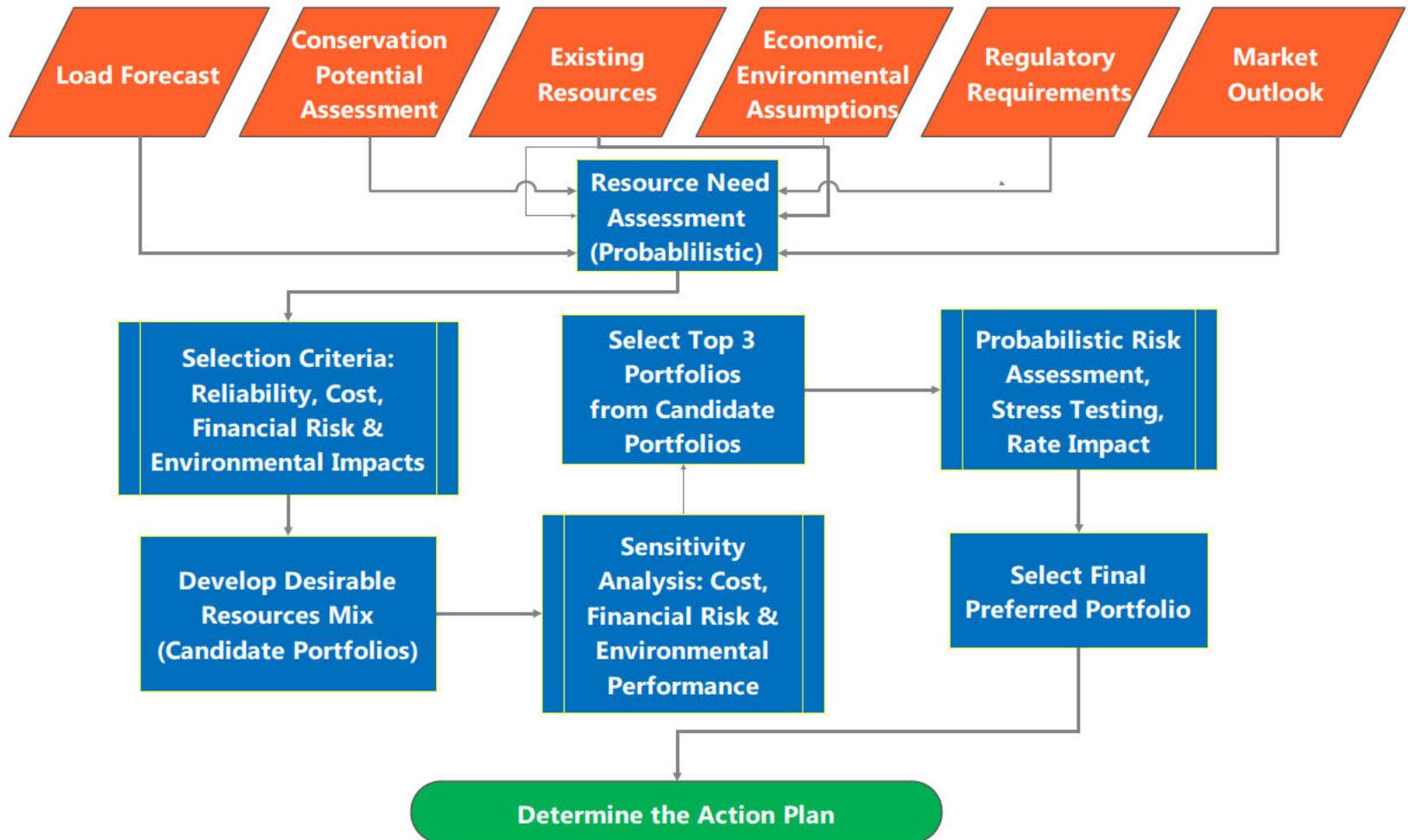
# INTEGRATED RESOURCE PLAN OVERVIEW

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- An Integrated Resource Plan:
  - Identifies how much, when, and what kind of energy resources are needed
  - Treats conservation as equal to power generation
  - Includes public involvement
  - Is updated often (biennially)
  - Is required by state law (RCW 19.280)



# INTEGRATED RESOURCE PLANNING PROCESS



# 2018 IRP CONSIDERATIONS

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- No identified need for resource additions for more than 5 years
- Last IRP was a full IRP update
- City Light has surplus resources
- No/minimal changes to City Light's resource outlook
- Load forecast declining or virtually unchanged



- Substantial changes to City Light's resource outlook
- Near term major economic / policy / technology changes or disruptions impacting City Light resources
- Major change in load forecast
- Last IRP was a progress report
- Identified need for resource additions within 5 years

## 2018 IRP MAJOR TASKS

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- Review 2016 IRP action plan
- Review and update core assumptions from the 2016 IRP
- Test robustness of 2016 IRP strategy with new information
- Plan for the 2020 IRP



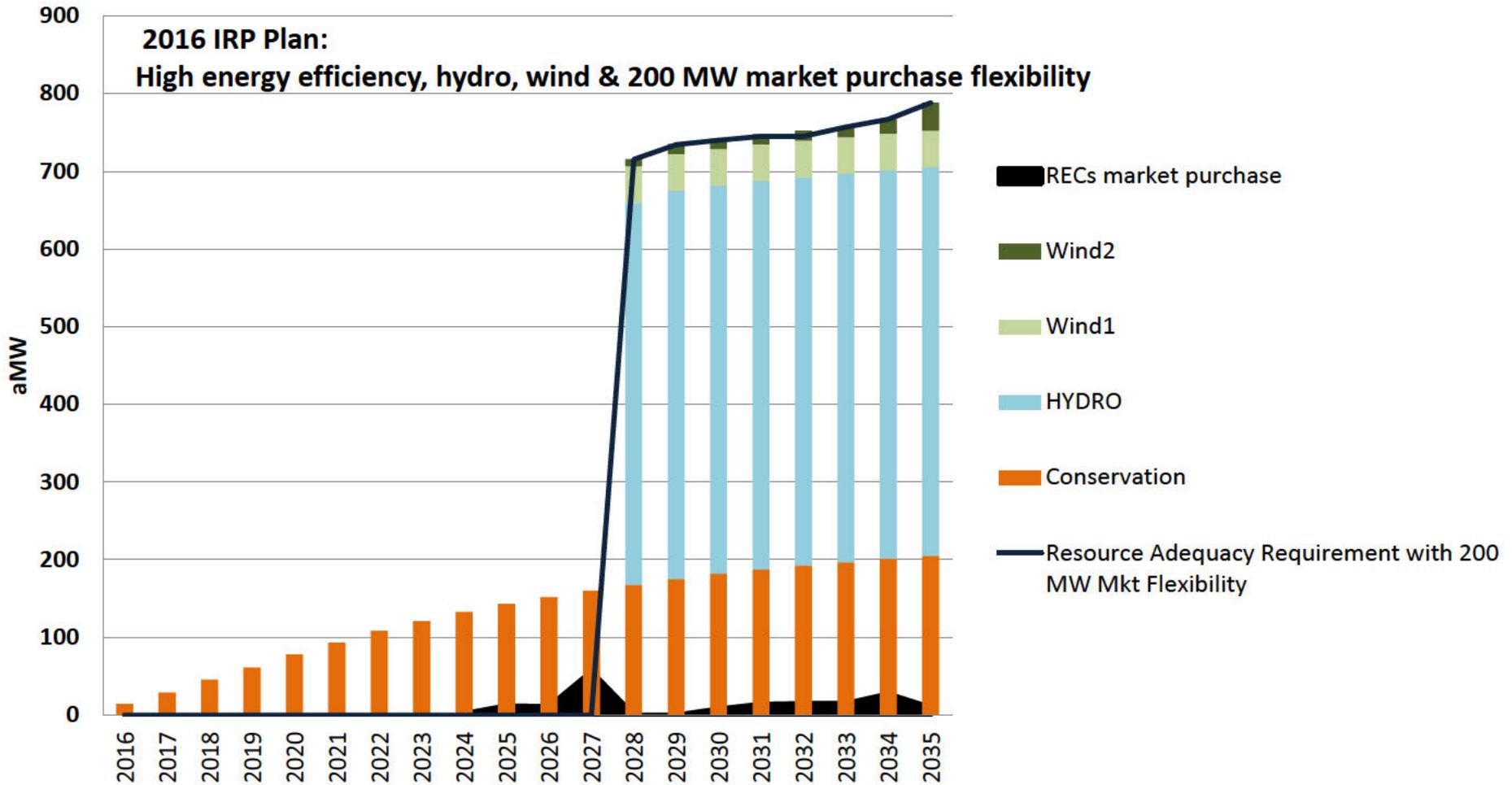
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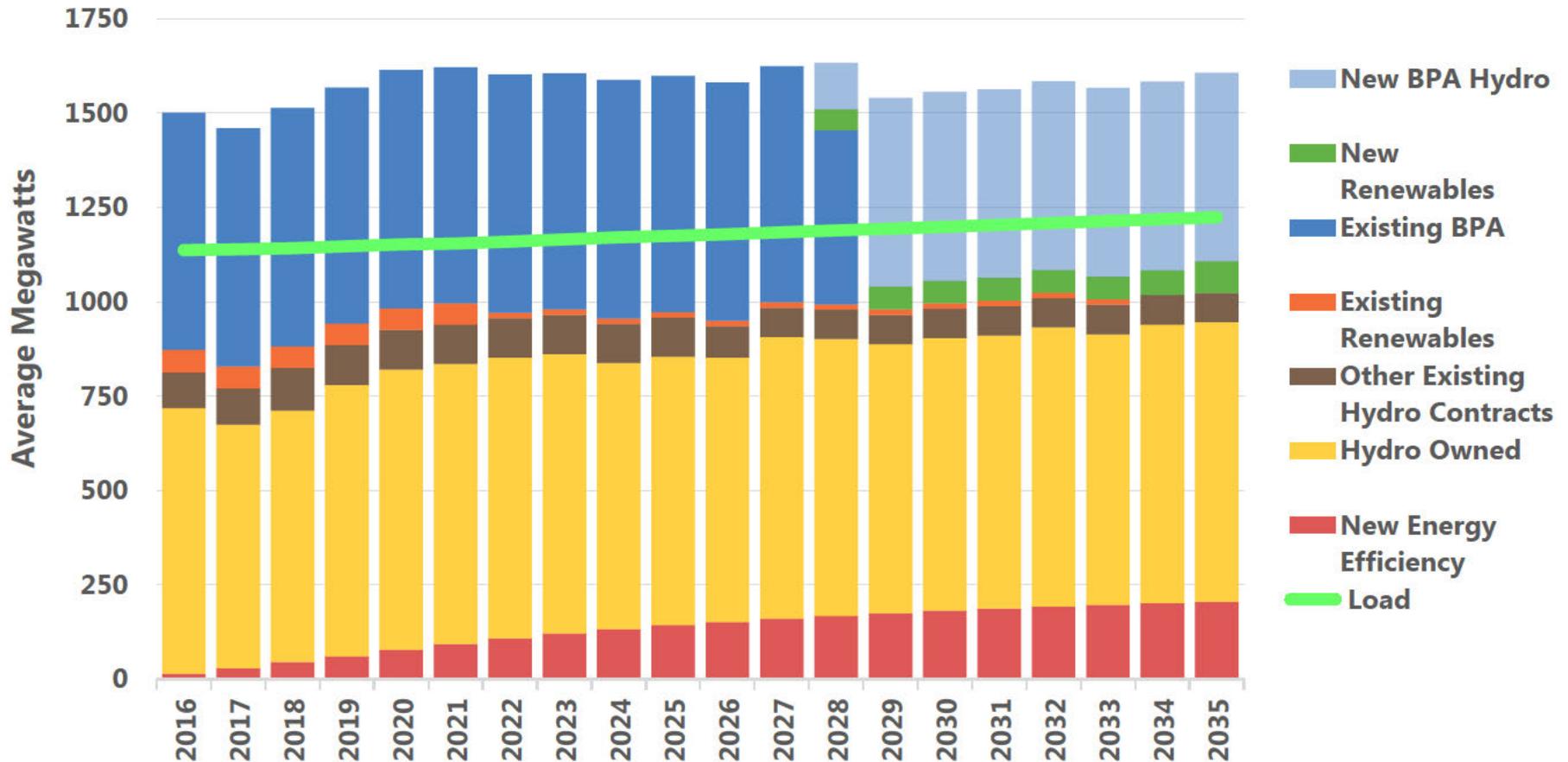
# 2016 IRP REVIEW



# 2016 IRP PREFERRED PORTFOLIO



# EXISTING RESOURCES AND 2016 IRP PREFERRED RESOURCE ADDITIONS



## 2016 IRP CONCLUSIONS

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- City Light is well positioned to meet its power supply and renewable resource needs for many years
- Energy efficiency is the resource of choice and its forecast to outpace load growth
- The BPA contract is an important resource for meeting reliability, environmental, risk and cost objectives

## 2016 IRP ACTION PLAN HIGHLIGHTS

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- Continue high achievement of cost-effective energy efficiency
- Evaluate factors that impact hydro generation, electricity demand, and fish populations as new information is available
- Pursue market opportunities to optimize hydro generation portfolio
- Assess and update IRP inputs, assumptions, and methodologies as needed



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# CONSERVATION POTENTIAL ASSESSMENT

Draft results for 2017



# CONSERVATION CONTEXT

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- First choice resource
  - Low cost, risk, and environmental impact
- Running programs since 1977
- >160 aMW of conservation in place
  - >15% of City Light's retail load
- Set and exceeded aggressive goals
  - Strategic plan goal of 14 aMW/year

## I-937

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- Requires utilities to...
  - Undertake all cost-effective energy conservation
  - Set and meet conservation targets on two year cycles using a CPA
  - Follow NWPCC methodology
- 5<sup>th</sup> CPA under I-937

# STUDY OBJECTIVES - CPA

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**Estimate 20-year technical, economic, and achievable potential**



**Satisfy requirements of WAC 194-37**



**Develop conservation input for the IRP**



**Provide reports and presentations that thoroughly document methodology, data sources, and results**

# DEFINITIONS

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EPA- National Action Plan for Energy Efficiency

# DEFINITIONS

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## ***Technical potential***

Includes all technically feasible energy-efficiency measures, regardless of costs or market barriers. Technical potential divides into two classes: discretionary (retrofit) and lost-opportunity (new construction and replacement of equipment on burnout).



## ***Economic Potential***

Includes all technically feasible and cost-effective energy efficiency measures, regardless of market barriers.

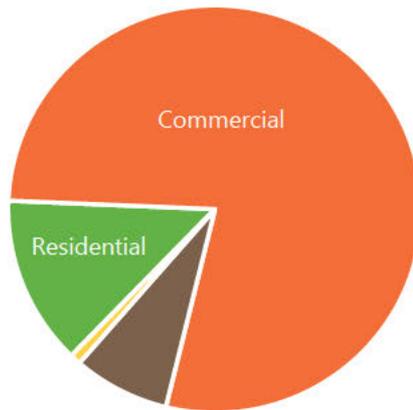


## ***Achievable technical potential***

Represents the portion of technical potential that might reasonably be achievable in the course of the 20-year planning period, given the possibility that market barriers could impede customer adoption.

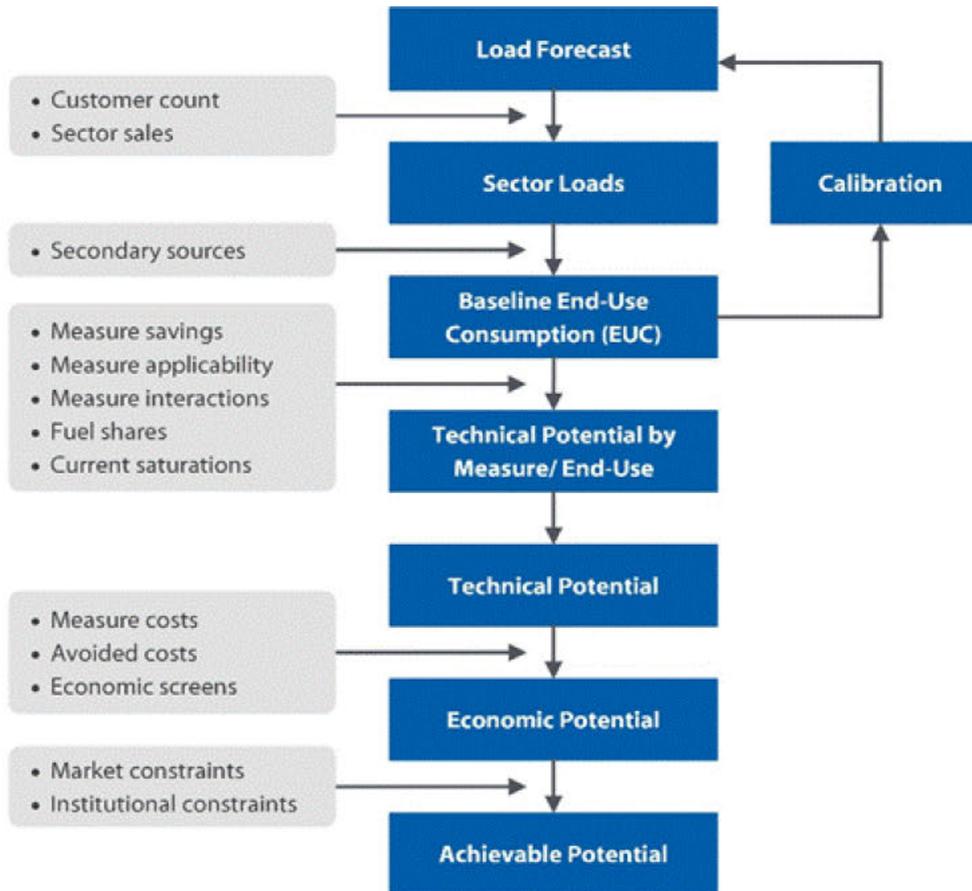
# SUMMARY

Sector	Achievable Economic Potential – aMW			20% of Ten-Year Potential
	2 Year	10 Year	20 Year	
2016 CPA	26	128	205	26
2018 CPA	25	90	119	18



Residential, commercial, and industrial sectors account for 14%, 78%, and 7% of 20-year achievable potential

# OVERVIEW OF METHODOLOGY



## WHAT'S NEW FOR THE 2018 CPA?

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- Commercial and industrial program accomplishments
- 2016 RBSA Data
- Updated non-residential database
- New load forecasts
- Updated baseline end use forecasts
- 7<sup>th</sup> Power Plan measures
- Updates to RTF measures
- Federal standards and energy codes
- Conservation avoided cost forecasts

# WHAT HAS CHANGED FROM THE 2016 CPA?

Update	Description	Impact on Potential	
		Technical Potential	Economic Potential
<b>Updated Saturations and Conservation Achievements</b>	<ul style="list-style-type: none"> <li>• 2016 Residential Building Stock Assessment</li> <li>• Program accomplishments</li> </ul>	Decrease	Decrease
<b>New load forecasts</b>	<ul style="list-style-type: none"> <li>• Forecasted residential baseline sales are 9% lower</li> <li>• Forecasted commercial baseline sales are 5% lower</li> <li>• Forecasted industrial baseline sales 3% higher</li> </ul>	Mostly decrease	Mostly decrease
<b>Measure list based on recent RTF workbooks and the Council's 7th Power Plan</b>	<ul style="list-style-type: none"> <li>• Uses final version of 7<sup>th</sup> Power Plan workbooks</li> <li>• Incorporates new federal standards and baselines derived from stock assessment data</li> </ul>	Mostly decrease	Mostly decrease

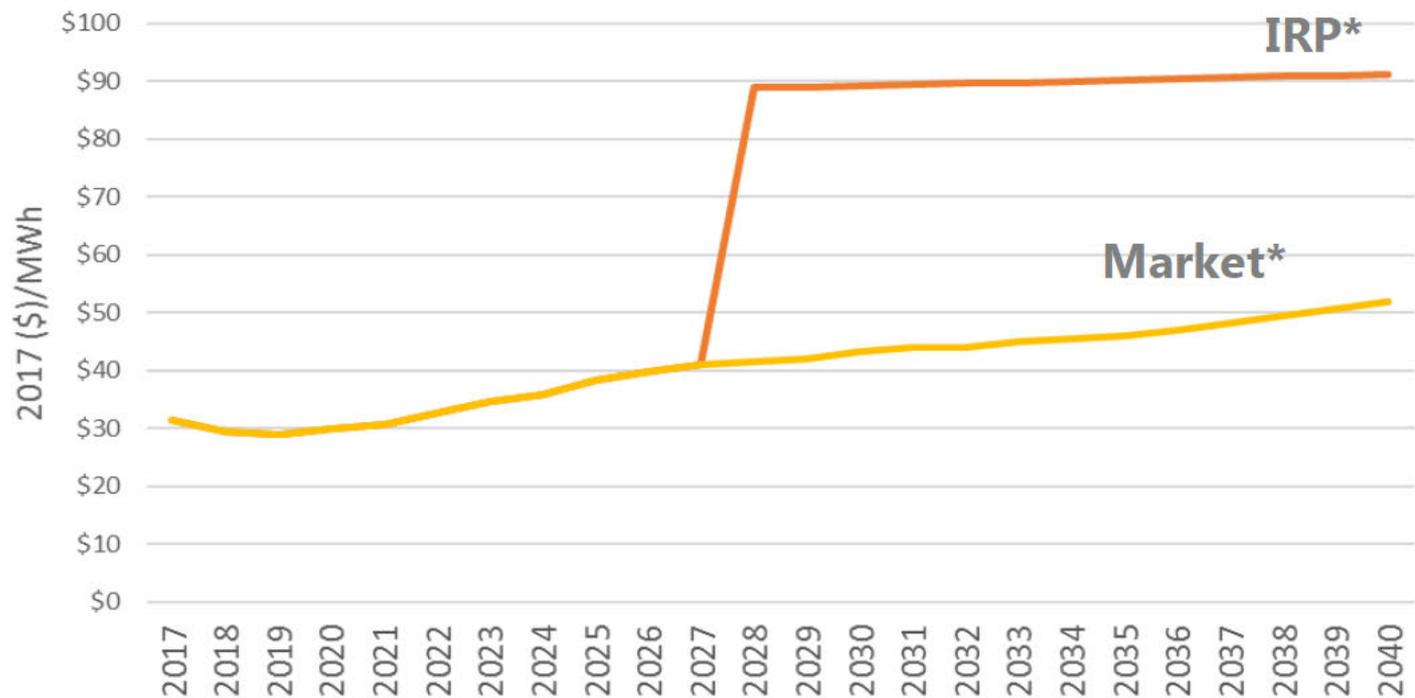
# SUMMARY OF POTENTIAL

Sector	Baseline Sales	Technical Potential		Economic Potential - IRP		Achievable Potential	
		MWh	Percent of Baseline	MWh	Percent of Baseline	MWh	Percent of Baseline
Residential	336	85	25%	21	6%	16	5%
Commercial	697	148	21%	115	16%	93	13%
Industrial	150	13	9%	10	7%	9	6%
Street Lighting	10	1	12%	1	12%	1	12%
<b>Total</b>	<b>1,193</b>	<b>247</b>	<b>21%</b>	<b>147</b>	<b>12%</b>	<b>119</b>	<b>10%</b>

## Key points

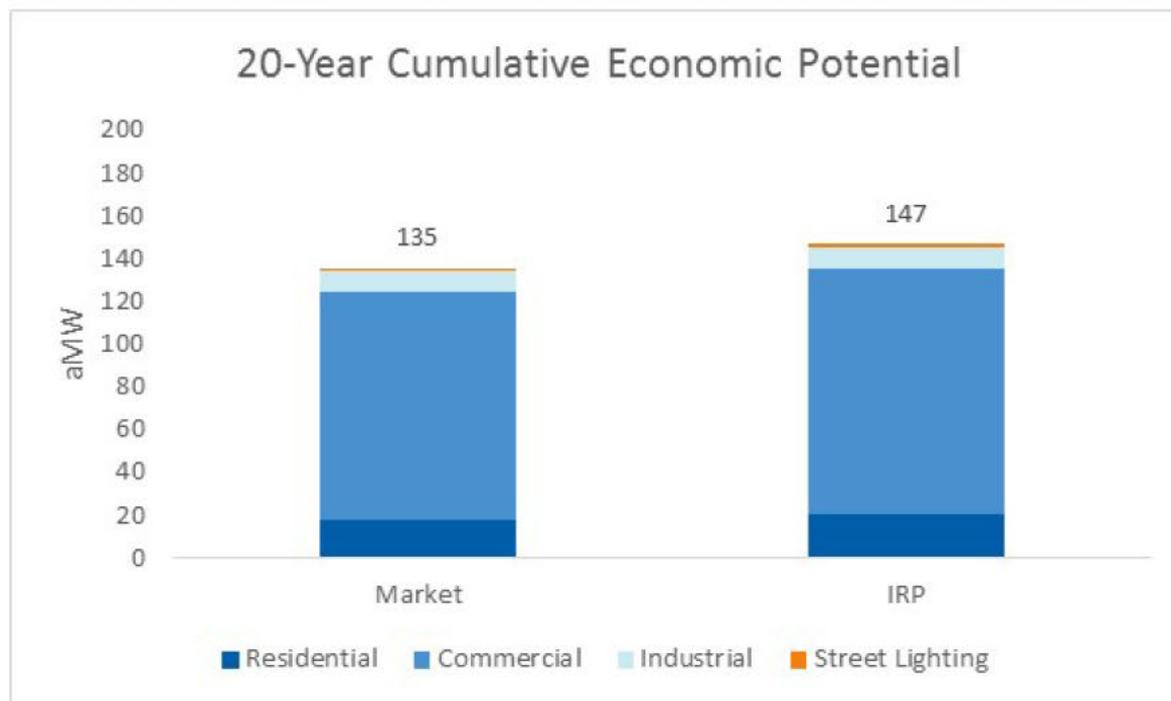
- Residential, commercial, and industrial sectors account for 14%, 78%, and 7% of 20-year achievable potential. Street lighting accounts for less than 1%
- Economic potential as a portion of technical potential is 25%, 77%, and 77% in the residential, commercial, and industrial sectors, respectively. Overall, economic potential represents 59% of technical potential

# CONSERVATION AVOIDED COST SCENARIOS



\* Includes avoided social cost of carbon, renewable energy credit costs, transmission and distribution costs, and Northwest Power Act adjustments

# CONSERVATION AVOIDED COST SCENARIOS



## Key Points

- Changes in the avoided cost have little impact in the industrial sector
- Commercial and residential economic potential is 10% higher in the IRP scenario, compared to the market price scenario

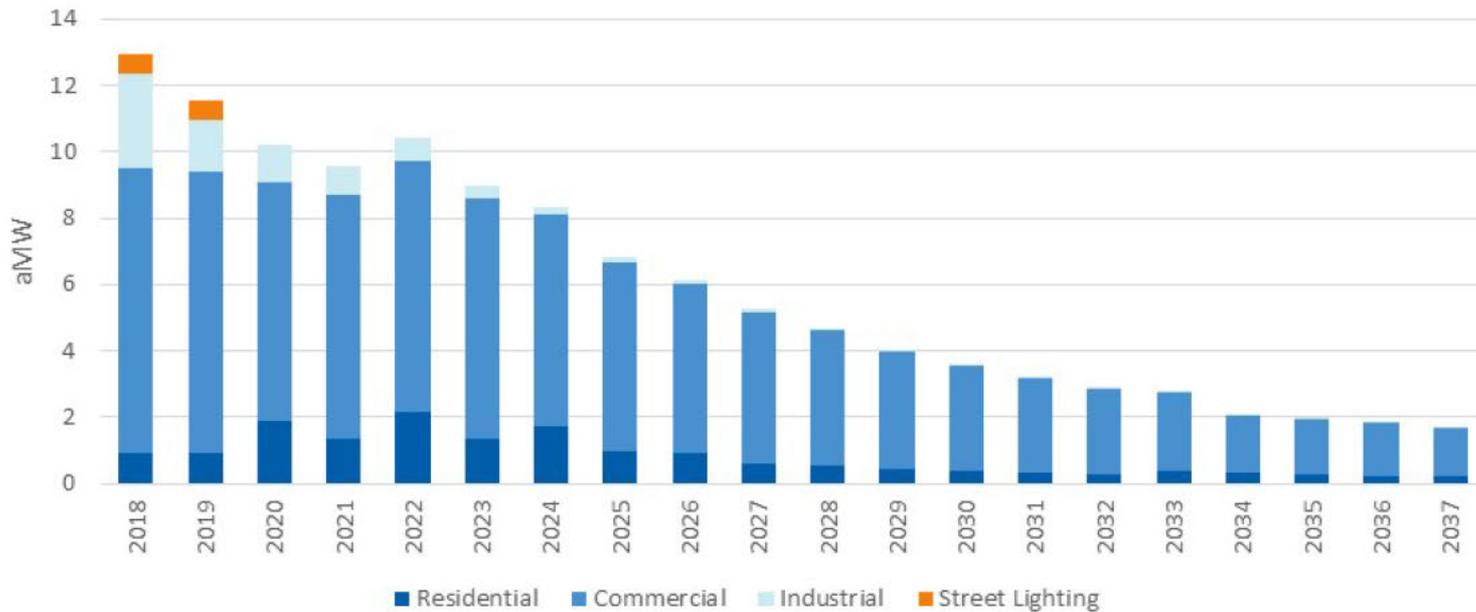
# ACHIEVABLE POTENTIAL

Sector	Achievable Economic Potential - aMW			
	Two Year (2018-2019)	Ten Year (2018-2027)	20 Year (2018-2037)	20% of Ten-Year Potential
Residential	1.9	12.9	16.3	2.6
Commercial	17.0	68.0	93.0	13.6
Industrial	4.4	8.2	8.5	1.6
Street Lighting	1.2	1.2	1.2	0.2
<b>Total</b>	<b>24.5</b>	<b>90.3</b>	<b>119.0</b>	<b>18.1</b>

## Key Points

- Two year achievable potential (24.5 aMW) is higher than the pro rata share of ten year potential (18.1 aMW) due to ramping of some measure in the first five years (e.g. enterprise data centers, CoGen, and street lighting)
- Pro rata achievable potential (18.1 aMW) is lower than City Light's conservation target from the 2016-2017 biennium (25.6 aMW)

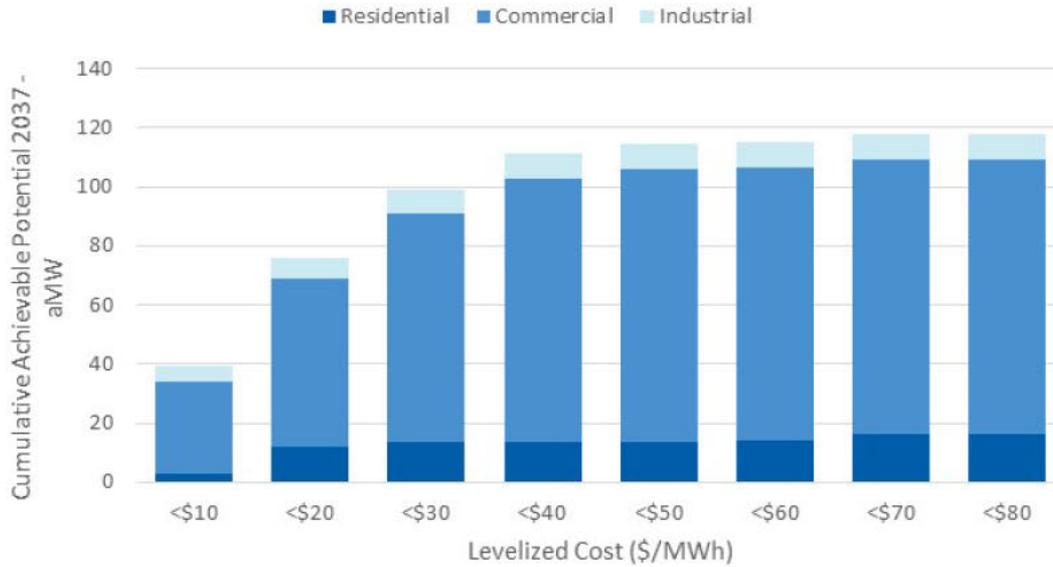
# INCREMENTAL ACHIEVABLE POTENTIAL



## Key Points

- Approximately 76% of 20-year potential is achieved within the first ten years
- Timing of savings driven by natural turnover of equipment and ramp rates. High savings for measures ramped over five to twelve years
- Spikes in residential savings in 2020 and 2022 is driven by the interaction of quick turnover of incandescent and halogen screw base lighting and ramp rates
- Incremental commercial and industrial savings are higher in 2018 and 2019 than 2020 due to the inclusion of enterprise data center savings in commercial and cogeneration in industrial

# SUPPLY CURVE – ACHIEVABLE ECONOMIC POTENTIAL



## Key Points

- Approximately 33% of achievable potential costs less than \$10/MWh. Very cheap potential comes from measures with low incremental costs and potentially high lifetime O&M savings.
- Approximately 94% of achievable potential costs less than \$40/MWh.

# ACHIEVABLE POTENTIAL COMPARISON

## 2018 CPA

Sector	Achievable Economic Potential - MWh			
	Two Year (2018-2019)	Ten Year (2018-2027)	20 Year (2018-2037)	20% of Ten-Year Potential
Residential	1.9	12.9	16.3	2.6
Commercial	17.0	68.0	93.0	13.6
Industrial	4.4	8.2	8.5	1.6
Street Lighting	1.2	1.2	1.2	0.2
<b>Total</b>	<b>24.5</b>	<b>90.3</b>	<b>119.0</b>	<b>18.1</b>

- Lower achievable Potential Driven by:
  - New baselines in residential sector and commercial lighting
  - Lower load forecasts
  - Lower avoided cost forecasts
- In the 2018 CPA, a larger proportion of savings are acquired within the first few years

## 2016 CPA

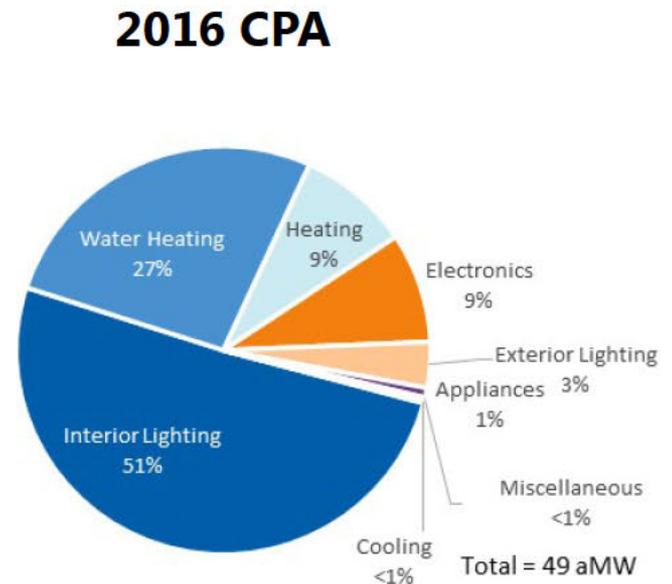
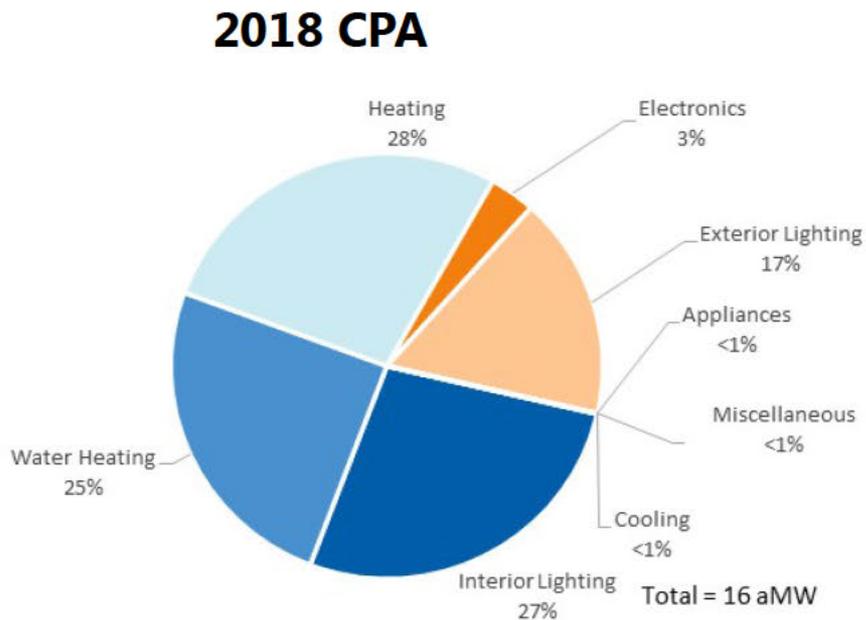
Sector	Achievable Economic Potential - MWh			
	Two Year (2016-2017)	Ten Year (2016-2025)	20 Year (2016-2035)	20% of Ten-Year Potential
Residential	5.9	36.5	48.6	7.3
Commercial	10.3	82.2	145.9	16.4
Industrial	1.7	7.1	8.8	1.4
Street Lighting	2.2	2.2	2.2	0.4
<b>Total</b>	<b>20.1</b>	<b>128.1</b>	<b>205.4</b>	<b>25.6</b>

# COMPARISON TO THE 2016 CPA

Sector	Technical Potential		Economic Potential			Achievable Potential	
	2018 CPA	2016 CPA	2018 CPA - IRP	2018 CPA - Market	2016 CPA	2018 CPA	2016 CPA
Residential	25%	33%	6%	5%	11%	5%	13%
Commercial	21%	31%	16%	15%	24%	13%	20%
Industrial	9%	6%	7%	7%	4%	6%	4%
Street Lighting	12%	22%	12%	12%	22%	12%	22%
<b>Total</b>	<b>21%</b>	<b>27%</b>	<b>12%</b>	<b>11%</b>	<b>17%</b>	<b>10%</b>	<b>15%</b>

- Decreases in residential technical and economic potential drives the decrease in overall potential. Residential potential is lower largely due to lower potential for efficient appliances, lighting, and electronics.
- Commercial potential drives lower technical, economic, and achievable potential. The decrease is almost entirely in lighting where updates to baselines reduced potential for LED lighting in linear fluorescent, screw base, and high bay applications.

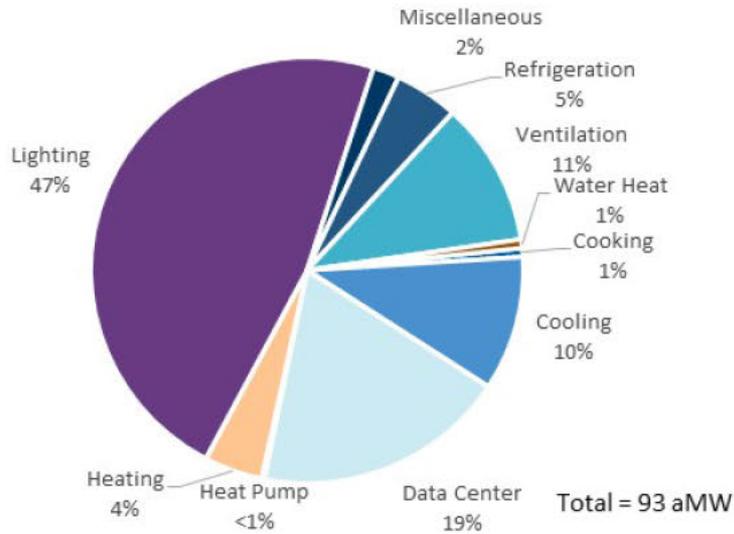
# RESIDENTIAL 20-YEAR ACHIEVABLE POTENTIAL COMPARISON – BY END USE



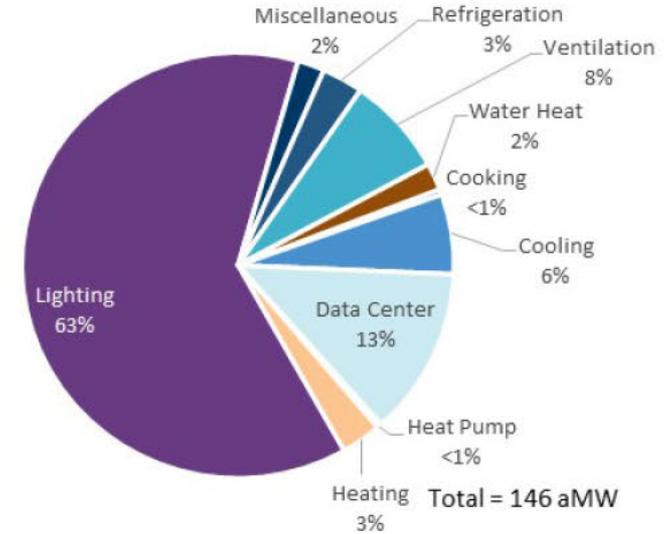
- Lower potential in interior lighting, electronics, and appliances due to lower end use saturations (fewer units per home), and more efficient baselines
- Absolute water heater savings decreased because tier 1 heat pump water heaters are not cost-effective in the 2018 CPA
- Absolute exterior lighting savings increased due to a higher number of fixtures and bulbs in the 2018 CPA

# COMMERCIAL 20-YEAR ACHIEVABLE POTENTIAL COMPARISON – BY END USE

## 2018 CPA

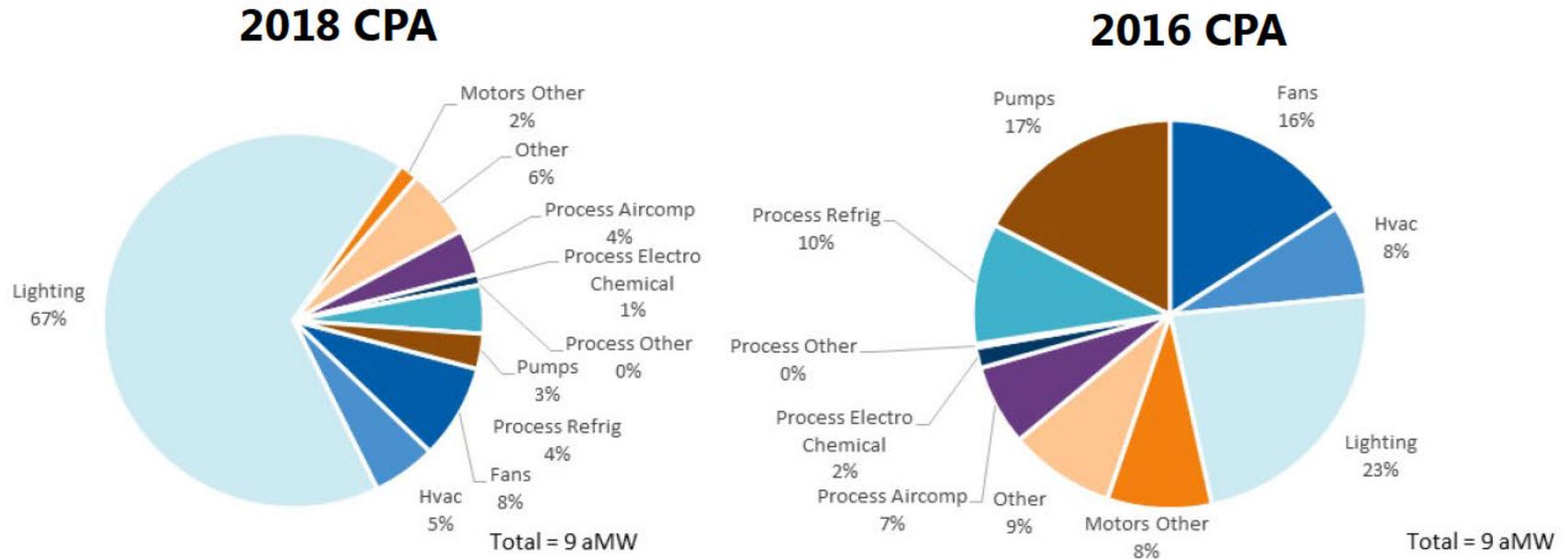


## 2016 CPA



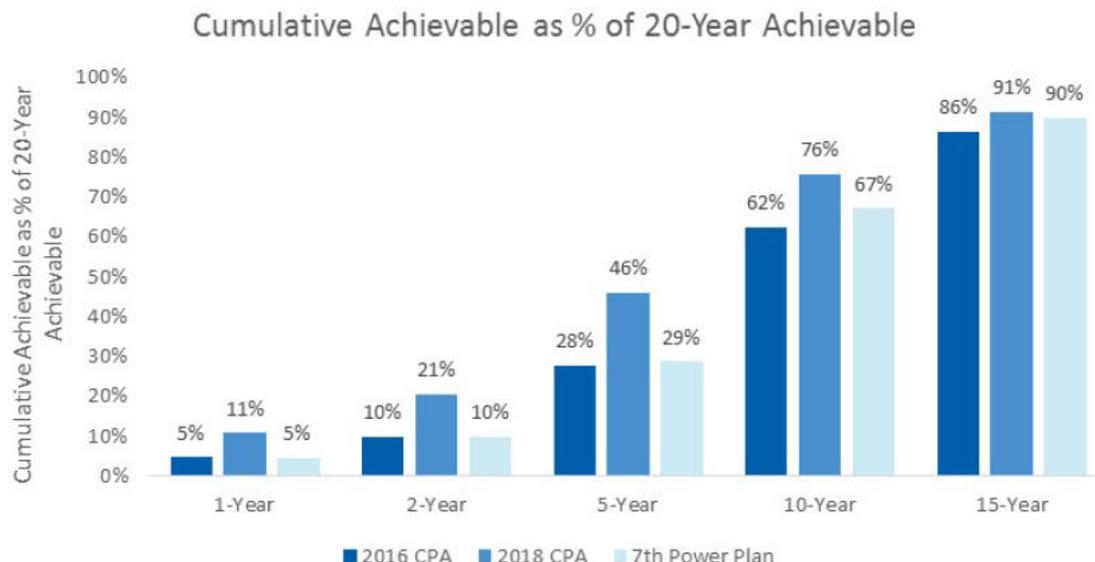
- Lower commercial potential driven almost entirely by the lighting end use. Due to:
  - More efficient baselines
  - Updated treatment of standards
- Absolute potential for non-lighting end uses only slightly lower than the 2016 CPA

# INDUSTRIAL 20-YEAR ACHIEVABLE POTENTIAL COMPARISON – BY END USE



- New industrial segmentation. More baseline sales identified in industries with higher lighting consumption
- Include LED lighting for fluorescent and HID fixtures in the 2018 CPA

# ACHIEVABLE ACQUISITION RATE



- The 2018 CPA assumes a quicker acquisition rate, compared to the 2016 CPA. Approximately 76% of the 20-year potential is achieved by the tenth year, compared to 62% in the 2016 CPA
- Acquisition rate is driven by acceleration of ramp rates. Ten-year potential accounts for approximately 67% of 20-year potential in the 7<sup>th</sup> Power Plan. The accelerated adoption in the 2018 CPA is faster than the acquisition in the 7<sup>th</sup> Power Plan



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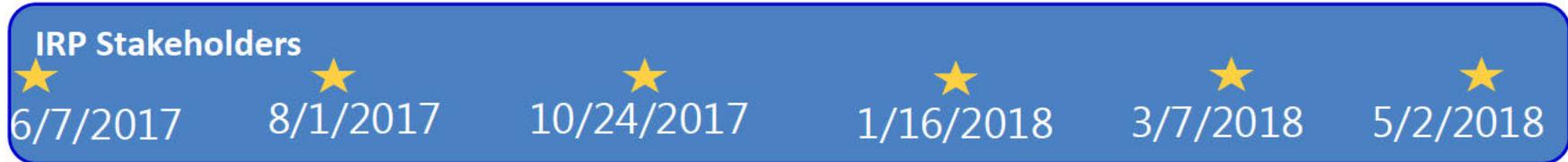


# NEXT STEPS

2018 IRP



# IRP PUBLIC INPUT PROCESS (PROPOSED DATES)



★ Meeting date

Public Outreach & Information Sessions (TBD)

Mayor and City Council Energy Committee (TBD)

## IDENTIFIED 2018 IRP UPDATES

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- California and Oregon renewable portfolio standard changes
- City Light BPA product conversion to all block product from slice/block
- Federal Clean Power Plan is on hold

# POTENTIAL 2018 IRP DISCUSSION TOPICS & PLANNING FOR 2020

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- Western Energy Imbalance Market participation
- Environmental policy changes (federal vs state)
- BPA Focus 2028
- Recent climate change studies
- Demand response and battery storage resource options
- Load forecast and distribution planning processes
- Solar microgrid for resilience pilot
- RSJI efforts at City Light and IRP
- City of Seattle's carbon neutral by 2050 (Office of Sustainability and Environment)

## IRP WEBSITE AND CONTACT INFORMATION

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Please visit:

[www.seattle.gov/light/irp](http://www.seattle.gov/light/irp)

City Light IRP contact:

Aliza Seelig, Resource Planning, Forecasting, & Analysis  
Manager

(206) 684-8458, [aliza.seelig@seattle.gov](mailto:aliza.seelig@seattle.gov)

# CITY LIGHT

## OUR MISSION

Seattle City Light is dedicated to delivering customers affordable, reliable and environmentally responsible electricity services.

## OUR VISION

We resolve to provide a positive, fulfilling and engaging experience for our employees. We will expect and reinforce leadership behaviors that contribute to that culture. Our workforce is the foundation upon which we achieve our public service goals and will reflect the diversity of the community we serve.

We strive to improve quality of life by understanding and answering the needs of our customers. We aim to provide more opportunities to those with fewer resources and will protect the well-being and safety of the public.

We aspire to be the nation's greenest utility by fulfilling our mission in an environmentally and socially responsible manner.

## OUR VALUES

Safety, Environmental Stewardship, Innovation, Excellence, Customer Care

