

# Conservation Potential Assessment Methodology

September 15, 2017



# Agenda

Topic	Time
Introductions	9:00-9:10
Project Scope and Changes	9:10-9:30
Methodology	9:30-11:15
Next Steps	11:15-11:30

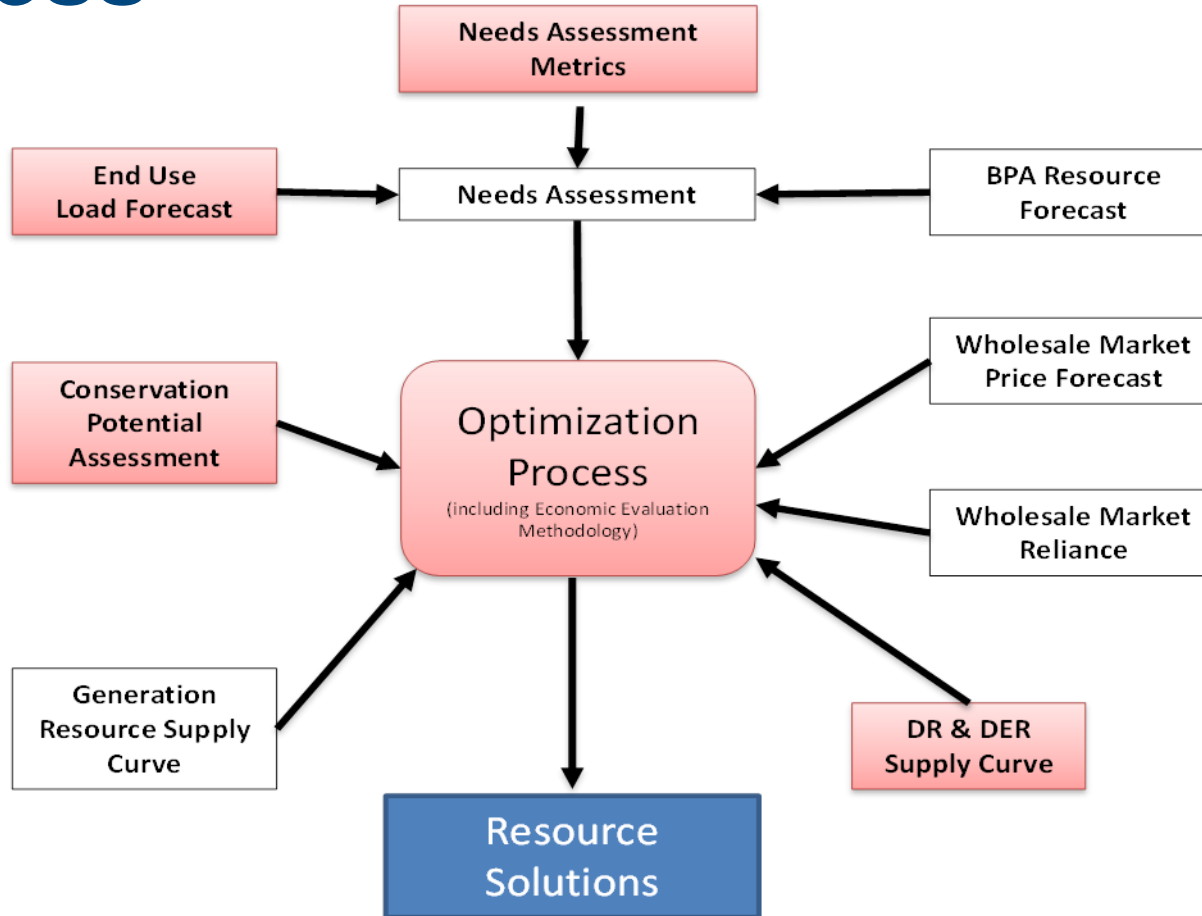
# Today's Objectives

- Understand project scope and changes
- Receive feedback on proposed methodology
- Discuss next steps and further engagement

# Background

- BPA has historically assumed 42% of Council goal as potential within BPA service territory
- Becoming increasingly important in understanding EE potential specific to BPA
  - Non wires, Integrated Planning, IDSM
- Administrator's Focus 2028 EE Closeout letter
- Lead us to the Resource Program
  - Compare supply and demand side resources to meet BPA's power needs
  - CPA is one component of the Resource Program Enhancement

# Resource Program Planning Process

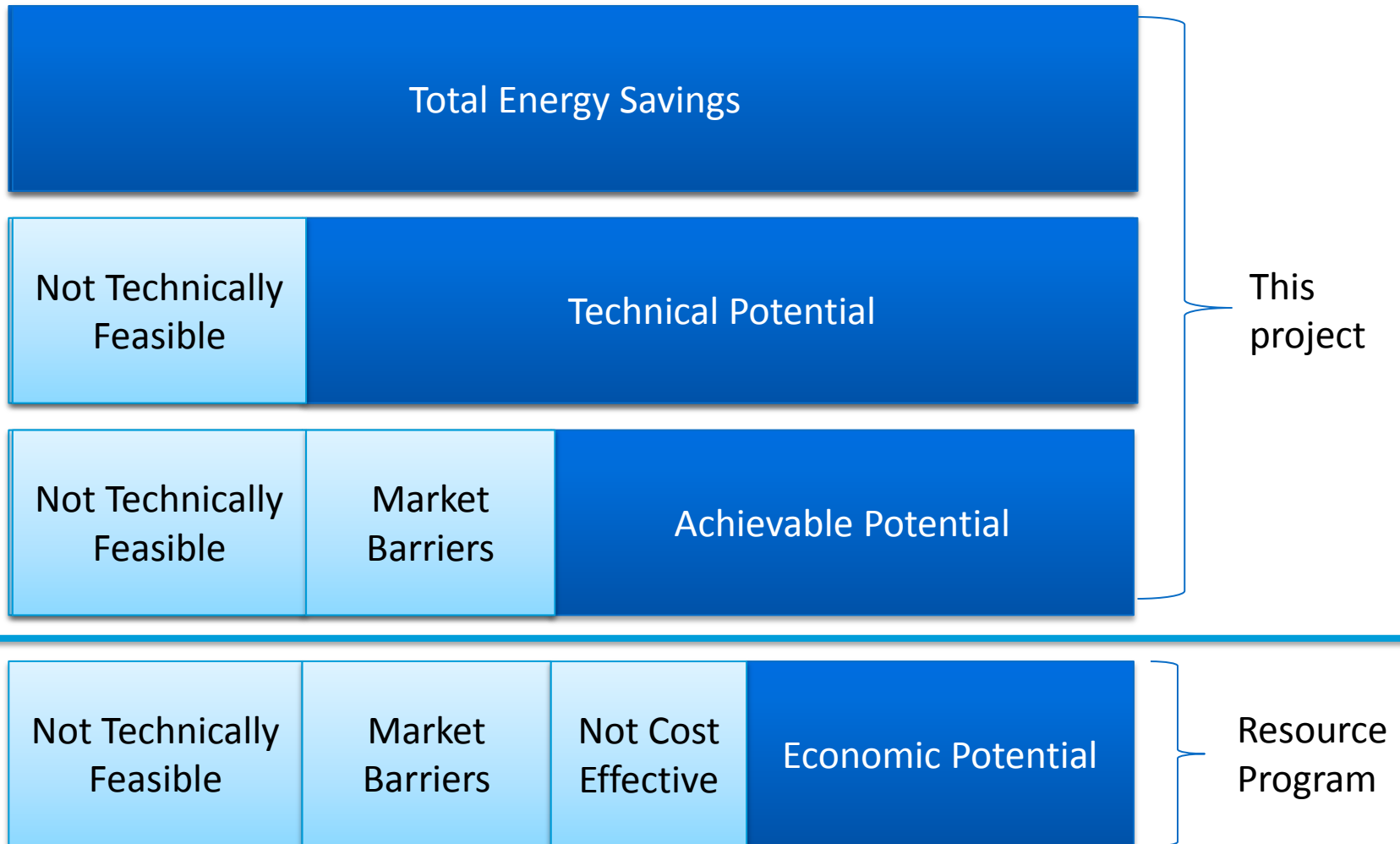


# CPA Project Timeline

Implementation Plan	2017					2018		
<span style="color: red;">◆</span> <i>Milestone</i> <span style="background-color: #ADD8E6; border: 1px solid black; display: inline-block; width: 15px; height: 10px; vertical-align: middle;"></span> <i>Development</i> <span style="background-color: #0056B3; border: 1px solid black; display: inline-block; width: 15px; height: 10px; vertical-align: middle;"></span> <i>Delivery</i>	Q3		Q4			Q1		
	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
<b>Task Order 001</b>								
Kick off meeting and work plan								
Outline methodology for determining total EE savings in BPA service territory		W						
Develop energy efficiency technical potential supply curves specific to BPA								
Calculate the achievable savings potential for the BPA service territory								
Develop draft workbook, report and presentation								
Develop final workbook, report and presentation								
Presentation of Results								

W - Methodology workshop: September 15th

# What is a CPA?



# Project Objectives

- Estimate 20-year technical and achievable technical potential in BPA's service territory
- Produce conservation supply curves for use in BPA's resource program modeling
- Produce BPA-specific analysis consistent with the Council's methodology



# The Original\* Question

How much of the Council's Seventh Plan goals reside in the BPA service territory?

- To answer that question, need consistency with:
  - Timeline (2016-2035)
  - Baselines
  - Available measures

\*as discussed at the first CPA workshop on May 18th

# The BPA Resource Program

How can BPA best meet its resource needs beginning in the next rate period?

- To answer this question:
  - Align all inputs to begin in 2020
  - Use most accurate and up to date information available
    - Load forecast
    - Needs assessment
    - Market prices
    - Generation Resources
    - Demand Response

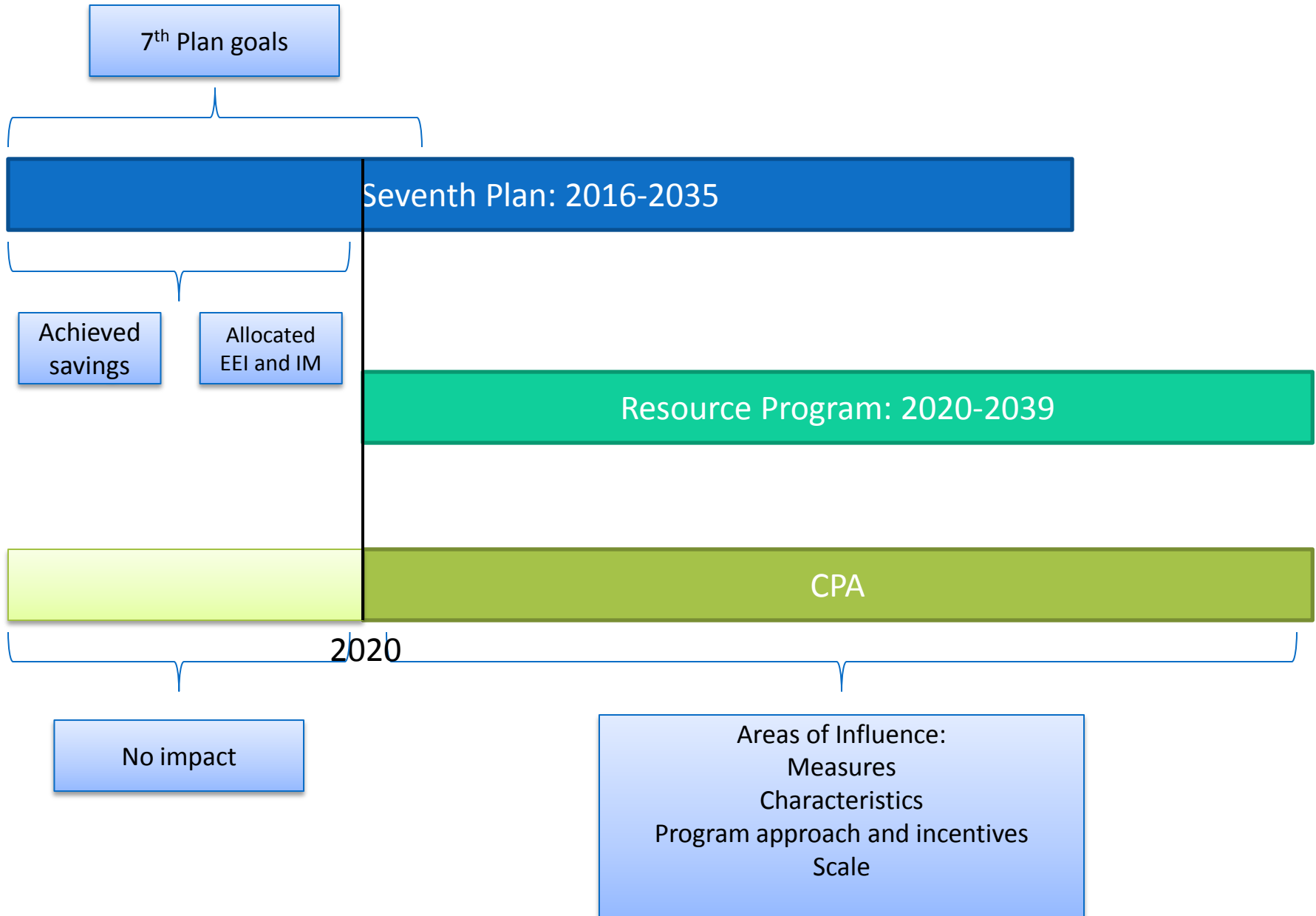
# When we brought the two together...

- We discovered we were trying to solve two different questions with the same CPA project

How does BPA's potential compare to the 7<sup>th</sup> Plan?

What EE is available to meet BPA's needs?

- Given the differences in timing, baselines and measure saving estimates, it's not feasible to answer both within the same contract



# Our Proposed Path Forward

Develop a CPA based on the Seventh Plan methodology but updated for baselines, characteristics and available measures  
Beginning in 2020

- While the comparison to the Seventh Plan potential is interesting, it does not provide value to the decisions needed in the Resource Program
- Would not be able to directly compare the economic potential for 2020 and 2021 to the 7<sup>th</sup> Plan
  - Updates to saturations, baselines and measures

# Project Adjustments

	Original	Modified	Fully Updated
Methods	X		
Measure Set		X	
New RTF-Approved Measures			X
Measure Savings		X	
Codes & Standards		X	
Load Forecast			X
Market Data (RBSA)			X
Economic/Financial Data		X	

# Methodology

1. Segmentation
2. Compile Measure Data
3. Develop Unit Forecasts
4. Calculate Levelized Costs
5. Forecast Technical Potential
6. Forecast Achievable Potential
7. Develop supply curves for resource program modeling

# 1. Segmentation

- Region
  - Urban and rural: Based on USDA Rural-Urban Continuum Codes; Consistent with CBSA rural-urban definitions
  - Climate zone: Three heating zone and three cooling zones
- Sectors
  - Residential, Commercial, Industrial, Agricultural, Street Lighting, and Utility (for distribution efficiency)
- Building types and industries
  - Same as 7<sup>th</sup> Power Plan (see next slide)



# Sectors and Segments

Market Sector	Building Characteristics	
Residential	Single-Family Multifamily High Rise	Multifamily Low Rise Manufactured
Commercial (Gross Floor Area, if Applicable)	Large office (>50,000) Medium office (5,000 to 50,000) Small office (<5,000) Extra large retail (>100,000) Large retail (50,000 to 100,000) Medium retail (5,000 to 50,000) Small retail (<5,000) School K-12 University	Warehouse Supermarket (>5,000) Minimart (<5,000) Restaurant Lodging Hospital Residential care Assembly Other
Industrial	Mechanical pulp Kraft pulp Paper Foundries Frozen food Other food Wood – lumber Wood – panel Wood – other Sugar	Hi tech - chip fab Hi tech – silicon Metal fab Transportation, equip Refinery Cold storage Fruit Storage Chemical Misc. manufacturing
Agricultural	Irrigation Area Lights Dairy	
Utility	Distribution efficiency	

## 2. Compile Measure Data

1. Determine measure set: Include all measures from the 7<sup>th</sup> Power Plan and active RTF measures
2. Compile measure data and determine BPA-specific inputs:
  - Costs
  - Applicability
  - Unit energy savings
  - Saturations; Number of Units
  - Effective useful lives
  - Non-energy impacts
  - Load Shape
3. Map to BPA's technology/area/practice

# Key Inputs and Data Sources

Component	Sources
Unit Energy Savings	Seventh Power Plan and RTF, adjusted with BPA-specific primary data
Costs and non-energy impacts	Seventh Power Plan and RTF
Effective useful lives	Seventh Power Plan and RTF
Applicability factors	2012 and 2017 RBSA; 2014 CBSA; BPA and utility program data (where available)
End use savings percent (industrial sector)	Seventh Power Plan
Load shapes	Seventh Power Plan
Technology/Area/Practice Category	Cadmus mapping using BPA UES Data Set Version 6.0

# 3. Develop Unit Forecasts



- Estimate all available measures in BPA service territory
- Using:
  - BPA's load forecast and utility data
  - Regional stock assessment data (CBSA and RBSA)
  - U.S. Census Bureau American Community Survey

# Three Types of Units Forecasts

- Natural replacement:
  - Unit can be installed when the unit it replaces reaches the end of its effective useful life
- New Construction:
  - Unit installed when new home or building is constructed
- Retrofit:
  - No technical constraint on when the unit can be installed. Does not depend on turnover.

# Unit Forecast Components

Component	Data Source	Specific to BPA's Service Territory?
Sector Units	BPA load forecasts; regional stock assessments; BPA utility customer data (when available)	Yes
Saturation	BPA load forecasts; regional stock assessments; BPA utility customer data (when available)	Yes
Applicability Factor	Regional stock assessments; BPA utility customer data (when available)	Yes
Turnover Rate	Seventh Power Plan supply curve workbooks	No; turnover rates are a function of measure lives, which will be the same as those used in the Seventh Power Plan

# Unit Forecast Approach - Residential

- **First year (2016):** Calculate number of **households** from U.S. Census Bureau American Community Survey
  - Performed for each zip code within BPA's service territory, then aggregated to urban/rural segments in each state
- **Forecast (2017-2039):** Apply 7<sup>th</sup> Plan state-level household growth rates

# Unit Forecast Approach - Commercial

- First Year (2016)
  - Determine the commercial sector's proportion of total usage using utility and EIA 861 data in each state
  - Disaggregate state-level 7<sup>th</sup> Plan floor space forecasts using commercial proportion of sales (assumes sales are a proxy for floor space)
- Forecast (2017-2039)
  - Apply floor space growth rates from the 7<sup>th</sup> Plan



# Unit Forecast – Industrial

- Industrial modeling uses energy (MWh) forecasts
- First year (2016)
  - Determine the industrial sector's proportion of total usage using utility and EIA 861 data in each state
  - Disaggregate state-level 7<sup>th</sup> Plan energy using industrial proportion of sales
- Forecast (2017-2039)
  - Apply industrial growth rates from the 7<sup>th</sup> Plan

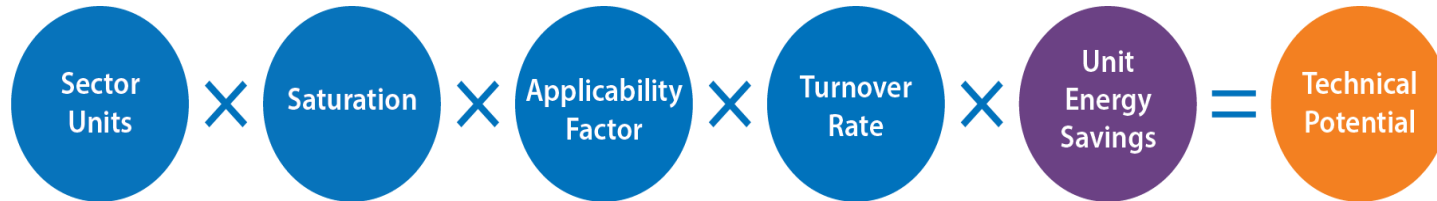
## 4. Calculate levelized costs

- Calculate total resource and utility levelized cost of measures to compare with supply side resources
- Compile BPA financial assumptions (discount rates, line losses, etc.)
- Populate/run ProCost (v3.0.33) with BPA assumptions

# Costs and Benefits

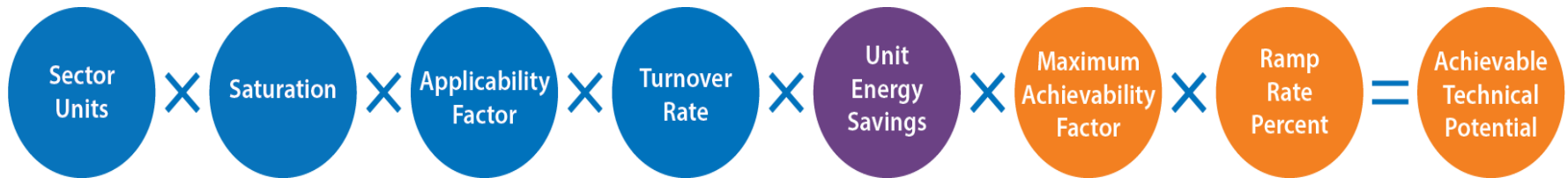
Cost or Benefit	Component	Source/Value	Incorporated in CPA analysis or portfolio model?	TRC	UCT
<b>Cost</b>	Capital and Labor	Varies by measure; 7th Plan values	CPA	yes	yes-only portion covered by the utility and/or BPA in an incentive
	Annual O&M	Varies by measure; 7th Plan values	CPA	Yes	yes-only portion covered by the utility and/or BPA in an incentive
	Program Administration	20% of incremental measure costs	CPA	yes	yes
	Periodic Replacement	Varies by measure; 7th Plan values	CPA	yes	yes-only portion covered by the utility and/or BPA in an incentive
	Other Fuel Costs	Varies by measure; 7th Plan values	CPA	Yes	no, unless the utility is multi-fuel
	Non-Energy Impacts	Varies by measure; 7th Plan values	CPA	Yes	no
<b>Benefit</b>	Avoided energy costs	BPA resource program modeling	Portfolio modeling	Yes	yes
	Avoided carbon costs	BPA resource program modeling	Portfolio modeling	Yes	Include carbon prices; Exclude social cost of carbon
	Deferred T&D Expansion	BPA to provide	CPA	Yes	yes
	Regional Act Credit	10%	Portfolio modeling	Yes	yes
	Deferred Generation Capacity Investment	BPA resource program modeling	Portfolio modeling	Yes	yes
	Avoided Periodic Replacement	Varies by measure; 7th Plan values	CPA	Yes	no
	Other Fuel Benefits	Varies by measure; 7th Plan values	CPA	Yes	no
	Non-Energy Impacts	Varies by measure; 7th Plan values	CPA	Yes	no
	Risk mitigation credit	BPA resource program modeling	Portfolio modeling	Yes	yes

## 5. Forecast technical potential



- All measures available, regardless of cost or market acceptance
- Unit energy savings derived from 7<sup>th</sup> Plan or RTF UES values
  - May change UES values if algorithms embed inputs that can be changed to BPA-specific values

## 6. Forecast achievable technical potential



- Based off technical potential, accounts for barriers and ramp rates
- Ramp rates: Start with 7<sup>th</sup> Plan ramp rates and adjust for realized and planned program savings
- Maximum achievable factor: 85%

## 7. Develop Resource Program Inputs

- Provide shaped and hourly savings over 20-year (2020-2039) period
- Measures bundled by groups of levelized cost
- Resource program modeling will select the cost-effective level of conservation (achievable economic potential)

# Next Steps

- Finalize methodology
- Develop and review draft supply curves
- Public review expected in December/January

# Questions?

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