Northwest **Power** and **Conservation** Council

February 6, 2018

MEMORANDUM

TO: **Power Committee**

FROM: **Jennifer Light, Tina Jayaweera, Charlie Grist**

SUBJECT: **Introduction to Cost-Effectiveness Calculations for Energy Efficiency**

BACKGROUND:

Presenter: Jennifer Light

Summary: Staff will provide Council members an overview on how we conduct cost-effectiveness calculations for energy-efficiency measures. The Council uses a total resource cost (TRC) benefit-to-cost analysis for measures, and staff will describe what the TRC entails and what parameters go into the benefits and costs. Staff will present a few examples to illustrate the approach.

Relevance: The Power Plan provides a target for the region's acquisition of cost-effective energy efficiency and an approach to determine whether a measure qualifies as cost-effective. This methodology is adopted by the Regional Technical Forum as well as utilities around the region for use in their measure analysis.

Workplan: C.1. Conservation Resources – Prepare for 8th Plan.

More Info: Appendix G of the Seventh Power Plan provides the overall approach to cost-effectiveness.

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Approach to Determining Cost-Effectiveness for Energy Efficiency Measures

Jennifer Light

February 13, 2018

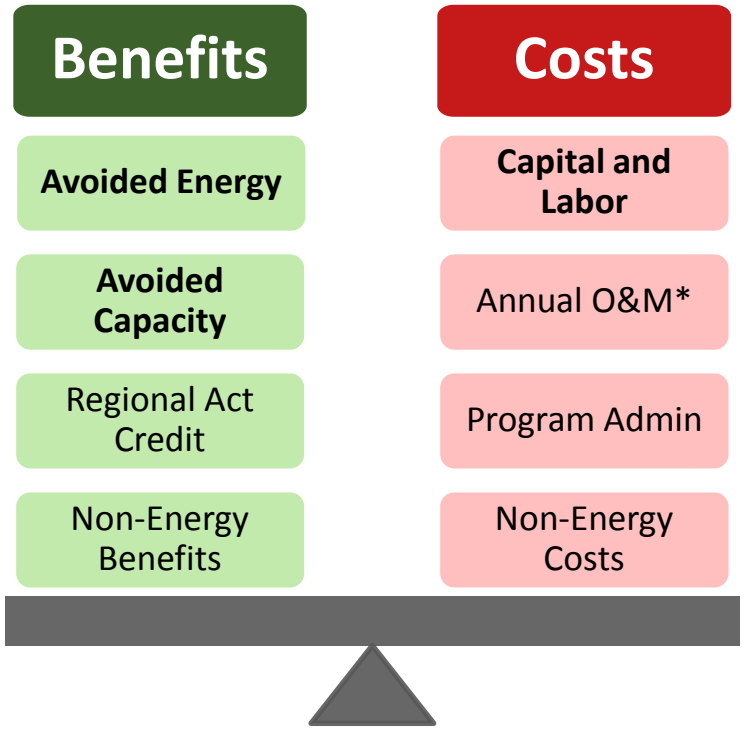
Council Uses Total Resource Cost and Benefits Perspective for Planning

- Best meets the requirements of the Regional Act
- Considers all quantifiable costs & benefits regardless of who accrues them
- Aims for symmetry in treatment of conservation and generating resources to allow fair comparison of resources considered for development
- Ensures that conservation expenditures are good for the power system, the customer, and society
- Was *strongly* recommended by utilities to first Council after regional debate in 1981

Approach

- Quantify the incremental benefits and costs for a given measure

Additional benefits may include: Other fuel benefits, avoided periodic replacement, risk mitigation



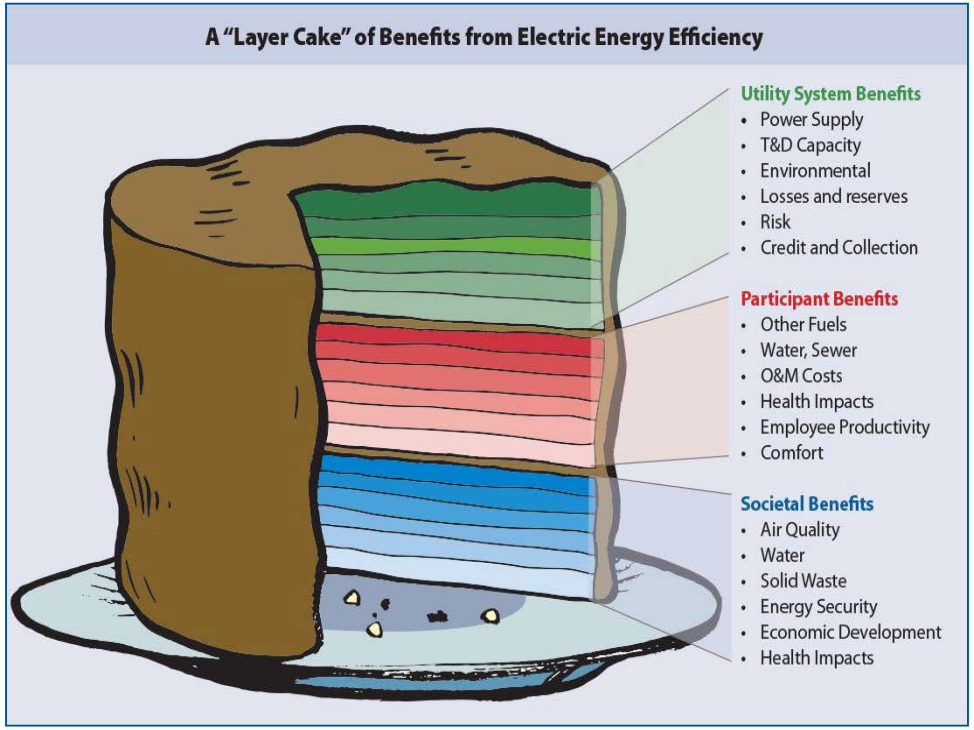
Additional costs may include: Other fuel costs, periodic replacement

If benefits > costs, measure is cost effective and thus region should pursue acquisition

- But, quantifying cost and (especially) benefits can sometimes be challenging…

Council Methodology for Determining Environmental Impacts (Costs and Benefits)

- Provides a framework for including quantifiable environmental impacts that are *directly attributable* to a resource
- Emphasizes importance of treating measures symmetrically
  - Avoids piece-meal quantification
  - Avoids skewing cost-effectiveness comparison of resources
- Examples of non-energy impacts included to date:
  - Avoided carbon emissions
  - Use of consumables (water, sewer)



Layer Cake of Benefits from Jim Lazar & Ken Colburn of RAP

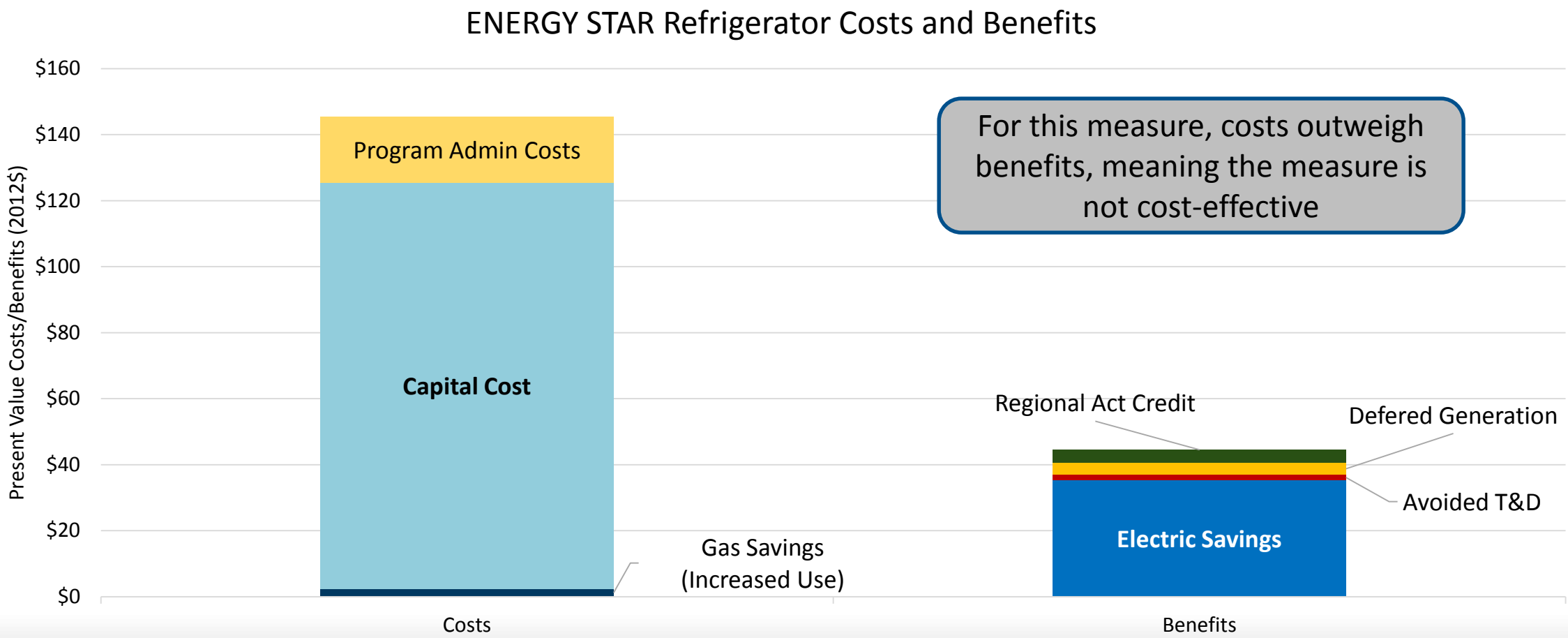
Council's Environmental Methodology is available in Chapter 19 of the Seventh Plan

An Example: ENERGY STAR Refrigerator

An ENERGY STAR refrigerator uses less energy and is more expensive than standard refrigerators, and it puts less heat into the surrounding space

- Incremental Costs:
  - Capital cost
  - Program administration
  - Additional space heating
- Incremental Benefits:
  - Energy savings
  - Capacity savings
  - Reduced space cooling

An Example: ENERGY STAR Refrigerator

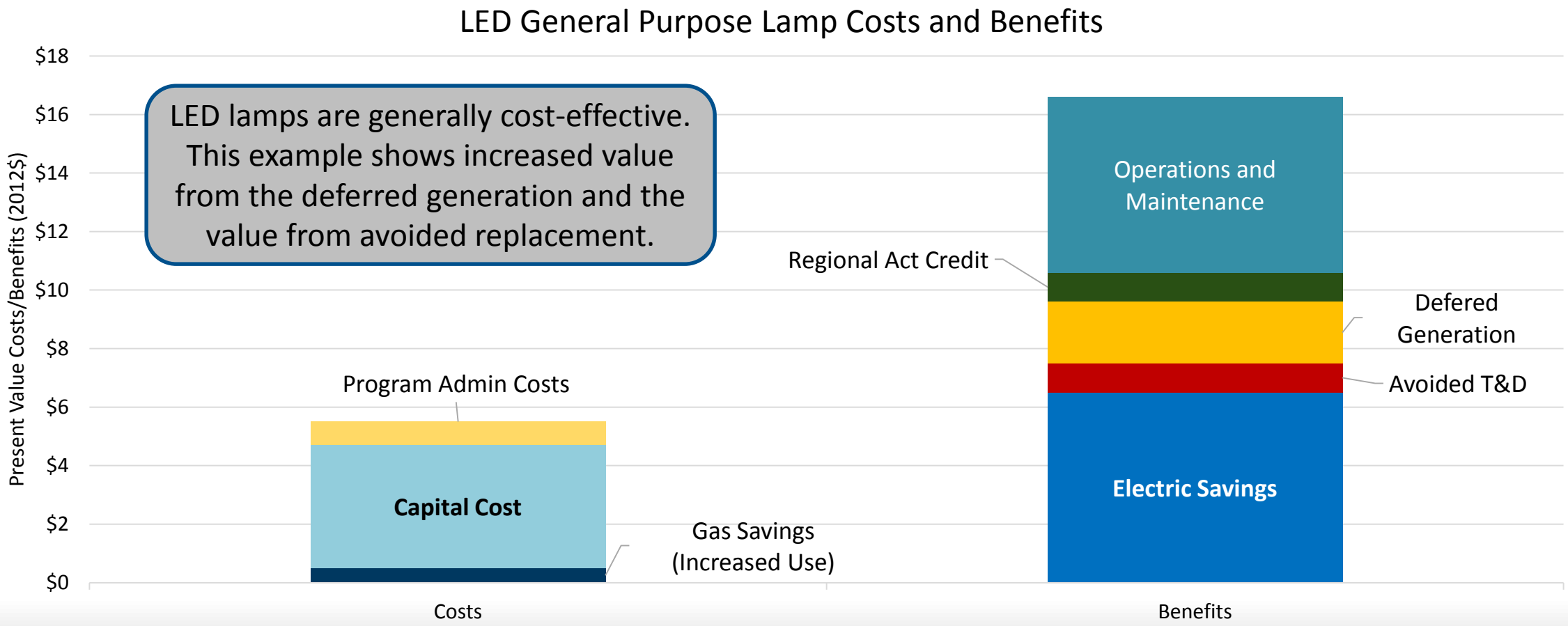


An Example: LED Light Bulb

LED light bulbs use less energy, las longer, put off less heat to the surrounding space, and are more expensive relative to other lamps

- Incremental Costs:
  - Capital cost
  - Program administration
  - Additional space heating
- Incremental Benefits:
  - Energy savings
  - Capacity savings
  - Avoided replacement (due to longer life)
  - Reduced space cooling

An Example: LED Light Bulb

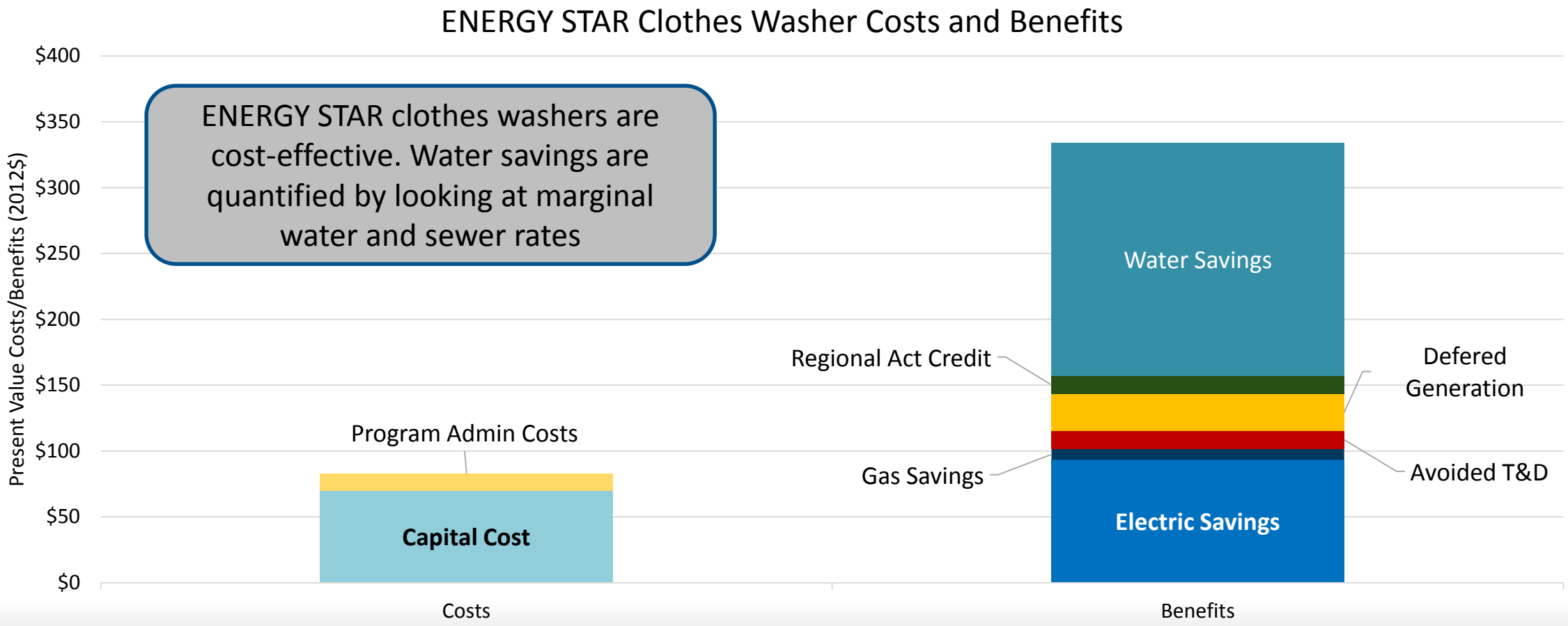


An Example: ENERGY STAR Clothes Washer

ENERGY STAR clothes washers use less energy and less water, extract more water from clothes during spin cycle, and are (usually) more expensive than traditional clothes washers

- Incremental Costs:
  - Capital cost
  - Program administration
- Incremental Benefits:
  - Energy savings
  - Capacity savings
  - Reduced water usage
  - Reduced sewage usage
  - Reduced dryer time

An Example: ENERGY STAR Clothes Washer



Looking Ahead

- Next Month
  - Exploring quantification of potential benefits from reduced water use of irrigation measures
- Eighth Plan Development and Ongoing RTF Measure Assessment
  - Continuing to quantify costs and benefits attributable to conservation measures (and other resources)
  - Seeking symmetry in the application of costs and benefits across resources