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February 5, 2019

## **MEMORANDUM**

**TO: Council Members**

**FROM: Mike Starrett**

**SUBJECT: Proposed Discount Rate for the 2021 Power Plan**

### **BACKGROUND:**

Presenter: Mike Starrett

Summary: The discount rate is an important early input needed for the development of the 2021 Power Plan. It is used in determining the levelized cost of energy efficiency measures and it is also used in the Council's modeling tools to compare candidate resource strategies on a present value basis.

This presentation will review how the discount rate is used in present value calculations, how individual utilities typically choose their discount rate, and how that methodology is expanded when taking a regional view of planning. The presentation concludes with a staff recommended discount rate for use in the Plan.

Workplan: Prepare for 2021 Power Plan

# Proposed Discount Rate for the 2021 Power Plan

Mike Starrett  
February 12, 2019

## Definition

- ***Four explanations for Discount Rate:***
  1. Describes the time preference for money
  2. Used to calculate the value today of all future costs and benefits
  3. Reflect that benefits in the future can be whittled down by inflation, risk, and today's lost opportunity
  4. *"A bird in the hand is worth two in the bush"*

## Present Value of Future Costs & Benefits

- What is **present value (PV)** of having to pay a \$100 cost some number of years in the future?
- The answer depends on how much you discount the future based on risk, lost opportunity, etc.
  - Discounting future costs or benefits to a present value is a decision making tool only – you still owe the \$100 when the future year arrives!*



### Impact of discount rate on PV

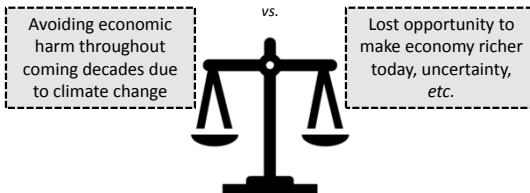
- $\frac{100\%}{(1+0.025)^5} = 88\%$
- $\frac{100\%}{(1+0.05)^5} = 78\%$

### Impact of time on PV

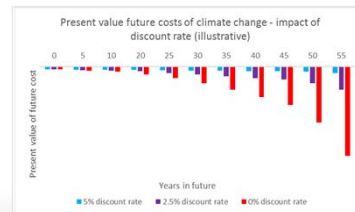
- $\frac{100\%}{(1+0.05)^5} = 78\%$
- $\frac{100\%}{(1+0.05)^50} = 8.7\%$

## Present Value of Future Costs & Benefits

- The Social Cost of Carbon (\$/ton of carbon) is the **present value** of costs occurring throughout the next several decades (or longer) caused by the harm of each additional ton of carbon
- A higher discount rate gives a lower emphasis to the future
  - 5% discount rate: \$12/ton of carbon**
  - 2.5% discount rate: \$62/ton of carbon**



**Future costs & benefits don't actually change!**  
 Discounting is just a decision making tool



## What we can say about discounting in decision making

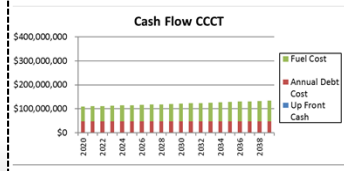
- When planning with a **higher discount rate, near-term costs matter a lot**, and long-term costs and benefits are less emphasized
- Remember, though, discounting future costs or benefits doesn't actually make them smaller when the day arrives!

## Impact of Discount Rate in Power Planning

- Capital structure and lifetime cashflows can vary by entity and resource type
- The discount rate can be used to calculate the present value of all future costs for a single resource or for a candidate portfolio of resources

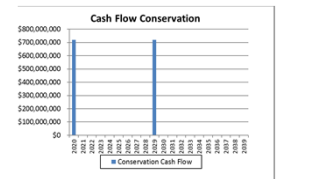
### Combined Cycle Gas

- Usually financed with a mix of debt and equity, both of which are paid back over time
- Lifetime fuel costs are often biggest driver of levelized cost



### Conservation

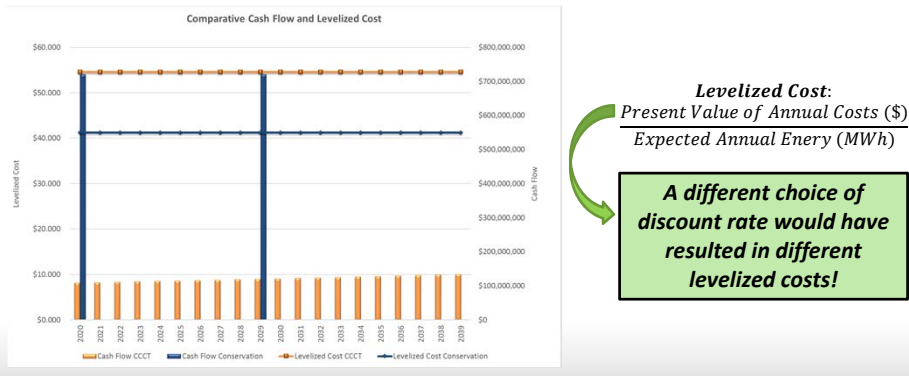
- Usually expensed in single year
- End-of-life re-purchase shown below but responsible party could switch from utility to consumer



*Important note! All numbers here and elsewhere in the presentation are meant to be illustrative and do not reflect the 7<sup>th</sup> Plan, 7<sup>th</sup> Plan Mid-Term, 2021 Plan, or etc.*

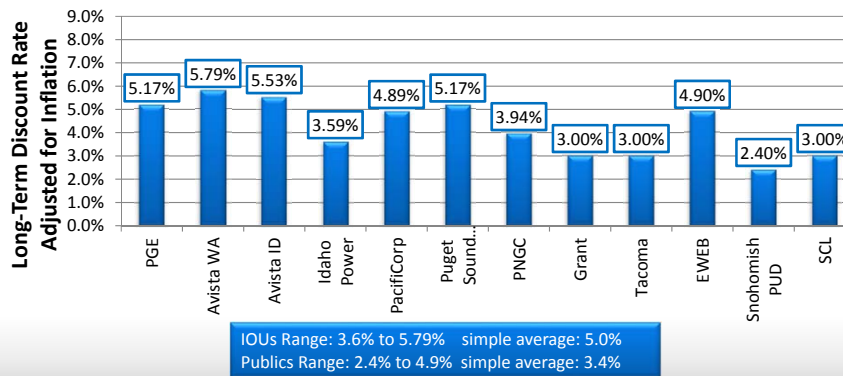
# Impact of Discount Rate on Levelized Cost

- Levelized costs (\$/MWh) are calculated using the present value of future costs (which the discount rate is embedded in)



# Choosing a Discount Rate

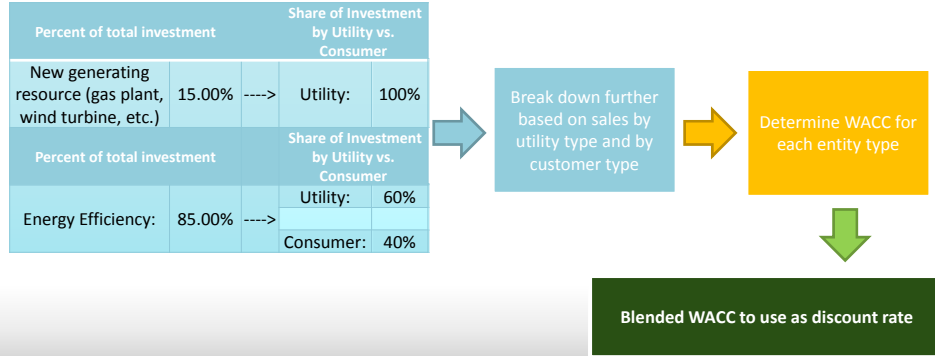
- A single utility will often choose their cost of capital (WACC) as their discount rate
- This is typical for corporate decision makers who expect the present value of costs to exceed the present value of benefits



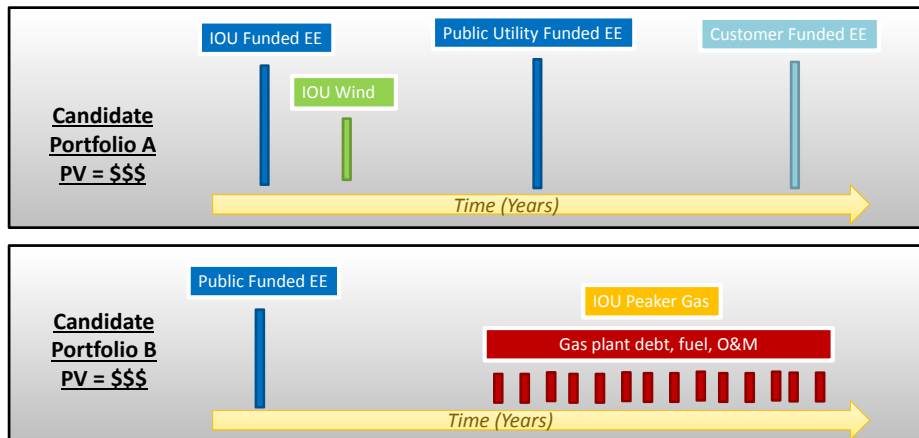
Source: Survey of Demand Forecast Advisory Committee Members- Feb 2013

# Council Investment Assumptions for Blended WACC

Accounting for investments across region with different decision making entities requires some *a priori* assumptions about what is being bought & by whom



# Comparing Portfolio Options based on Present Value



Labels of "IOU Funded" and etc. as used above would not actually be known to model. The blended WACC approach reflects that a regional plan does not specify procurements for specific entities or entity types.

## Summary & Recommendation for 2021 Plan

- **Using a discount rate equal to the WACC of the entity making an investment decision is consistent with corporate norms and regional utility regulation**
- **Using data as recent as Q3 2018, the regional blended WACC would be 3.76%**
- **Staff recommends using a discount rate of 3.75%**