CASCADE NATURAL GAS CORPORATION®

A Subsidiary of MDU Resources Group, Inc.

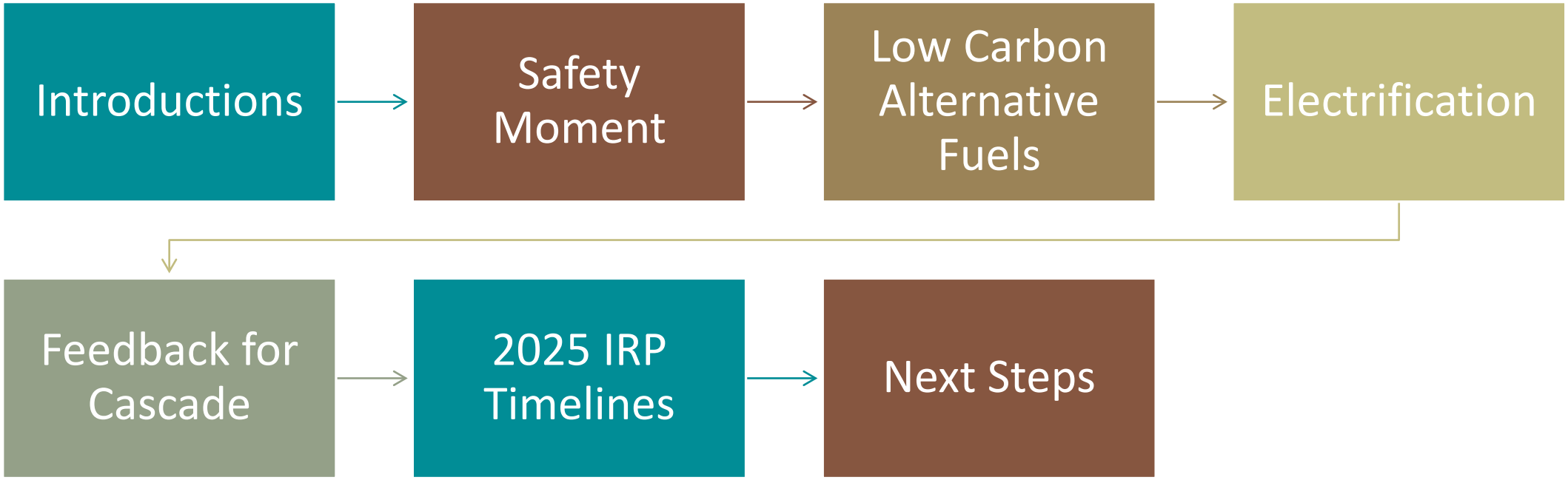
In the Community to Serve®

Integrated Resource Plan Technical Advisory Group Meeting #3

JANUARY 8, 2025

MICROSOFT TEAMS/TELECONFERENCE

Agenda


Introductions
Safety Moment
Low Carbon Alternative Fuels
Electrification
Feedback for Cascade
2025 IRP Timelines
Next Steps

Safety Moment

Low Carbon Alternative Fuels

Alternative Fuel Price Inputs

MODEL RESTRICTION

- Cascade does not anticipate doing carbon capture in the near future
- Cascade is considering removing low carbon alternative fuels from the model that are lower than current market prices

CAPITAL COSTS

- Equipment
- Pipeline Costs
- Installation and Owners Costs

O&M – FIXED AND VARIABLE

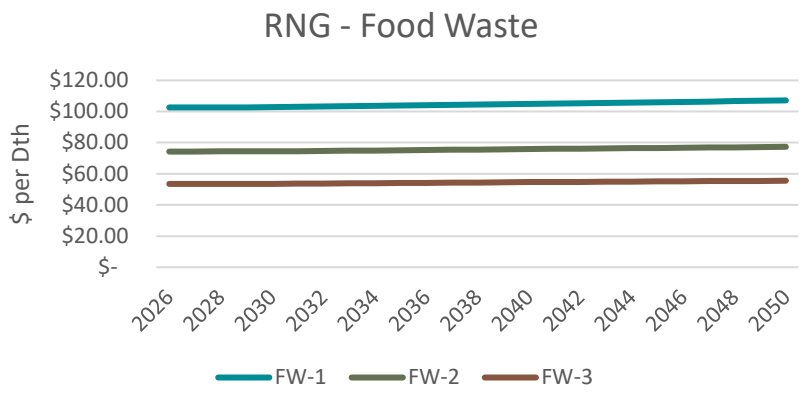
- Electricity Rates
- Gas Rates

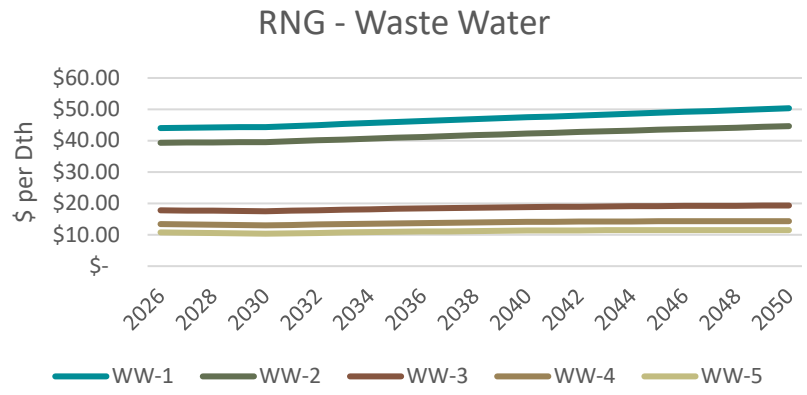
Prices

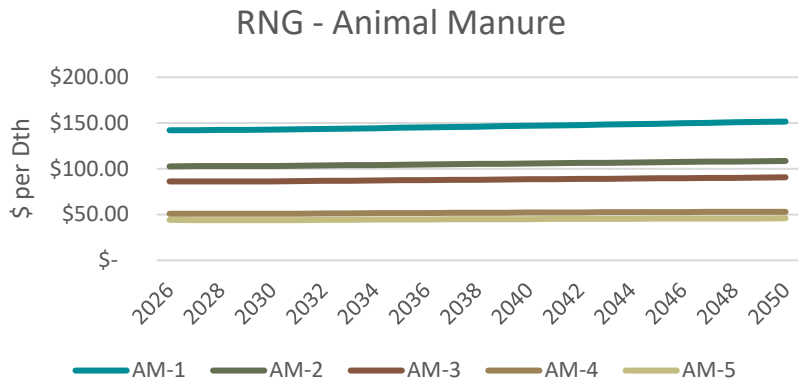
- Expected prices are broken down between Northwest and National technical potential (ICF)
  - Prices are averaged between Northwest and National to reduce model inputs
  - Prices consider Inflation Reduction Act (IRA) incentives where applicable
  - All low carbon alternative fuels except Carbon Capture will be evaluated as off-system

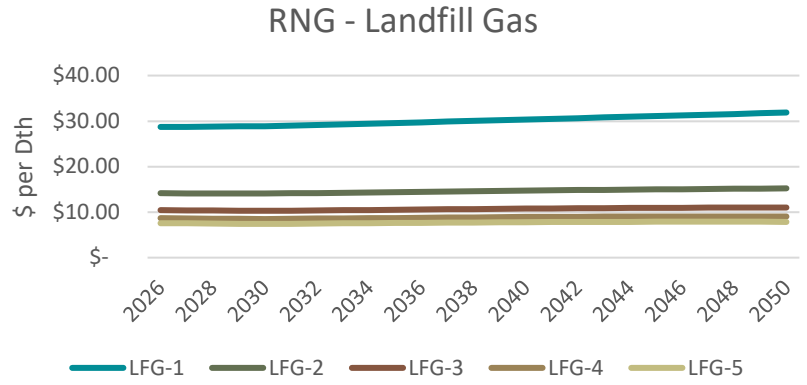
Renewable Natural Gas Prices

- Green attribute RNG cost
- Categorized by RNG source
- Provided by facility size. Smaller numbers indicate smaller facilities.
- Landfill and Waste Water currently most feasible



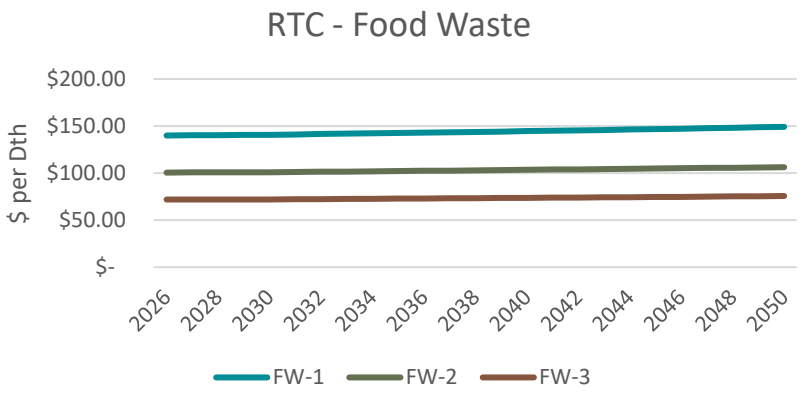


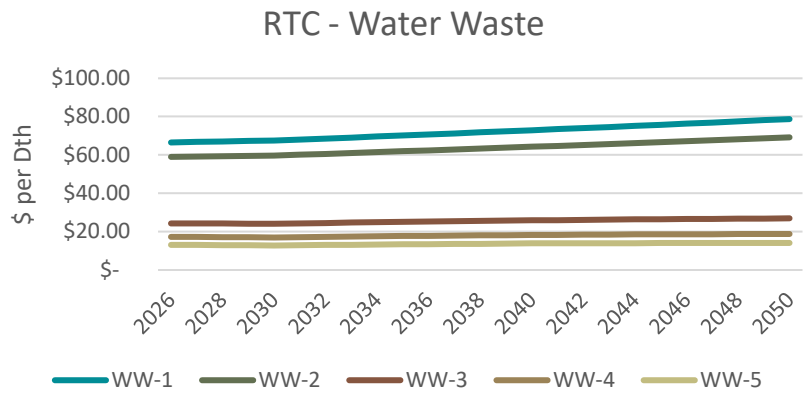


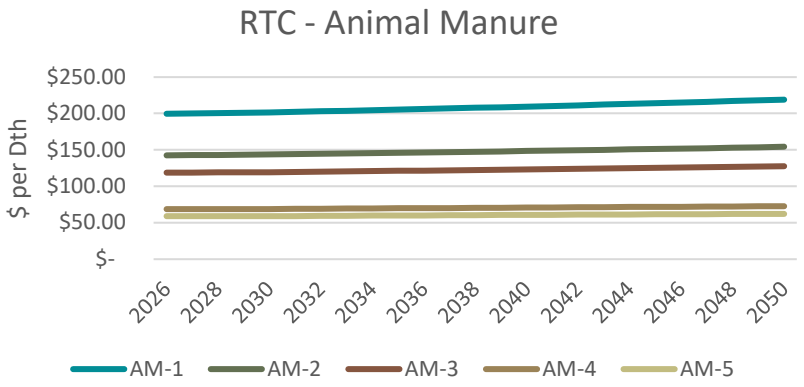


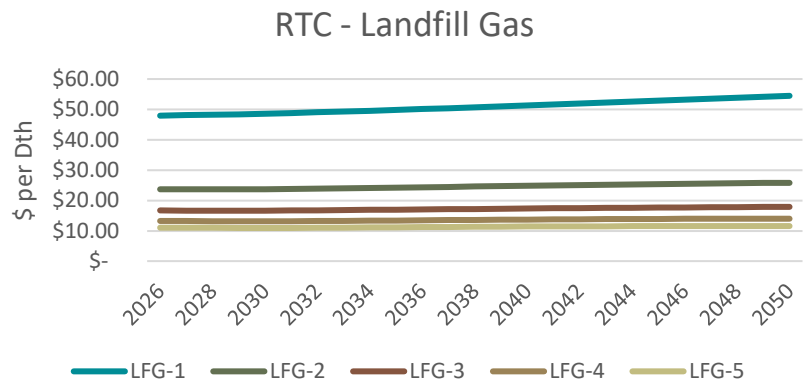
Renewable Thermal Credit Prices

- Green attribute cost
- Categorized by RTC source
- Provided by facility size. Smaller numbers indicate smaller facilities.
- Landfill and Waste Water currently most feasible









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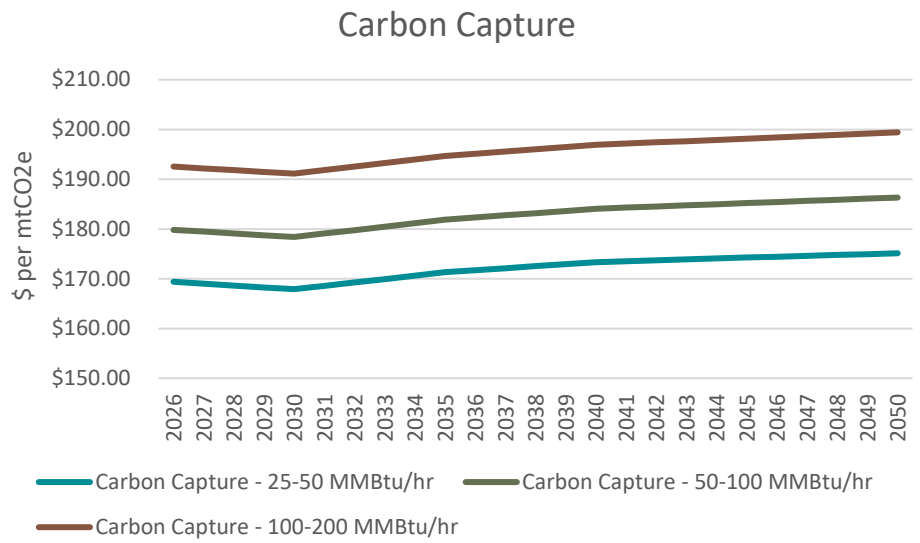
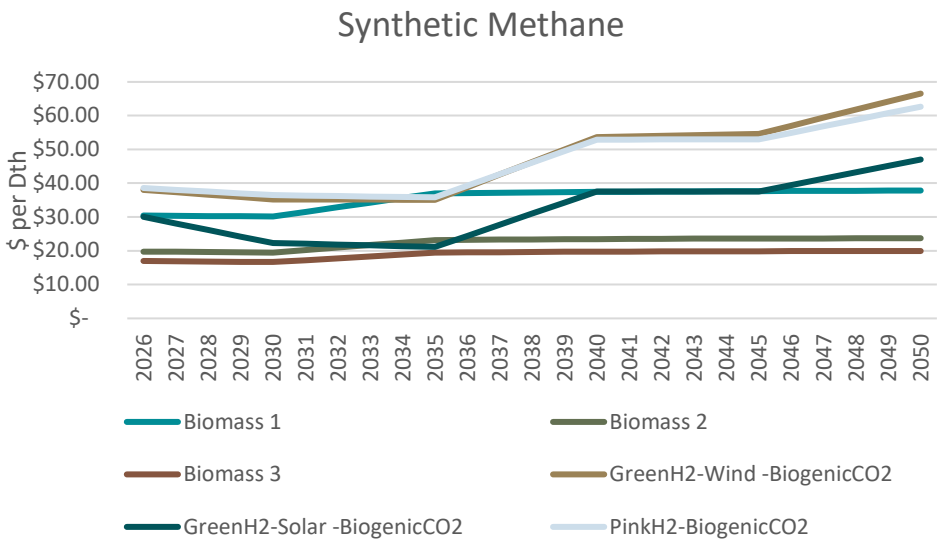
Carbon Capture and Synthetic Methane Prices





- Provided by facility size.
- Not in consideration by Cascade prior to 2030

- Provided by Synthetic Methane source
- Large Biomass facility and Solar most feasible

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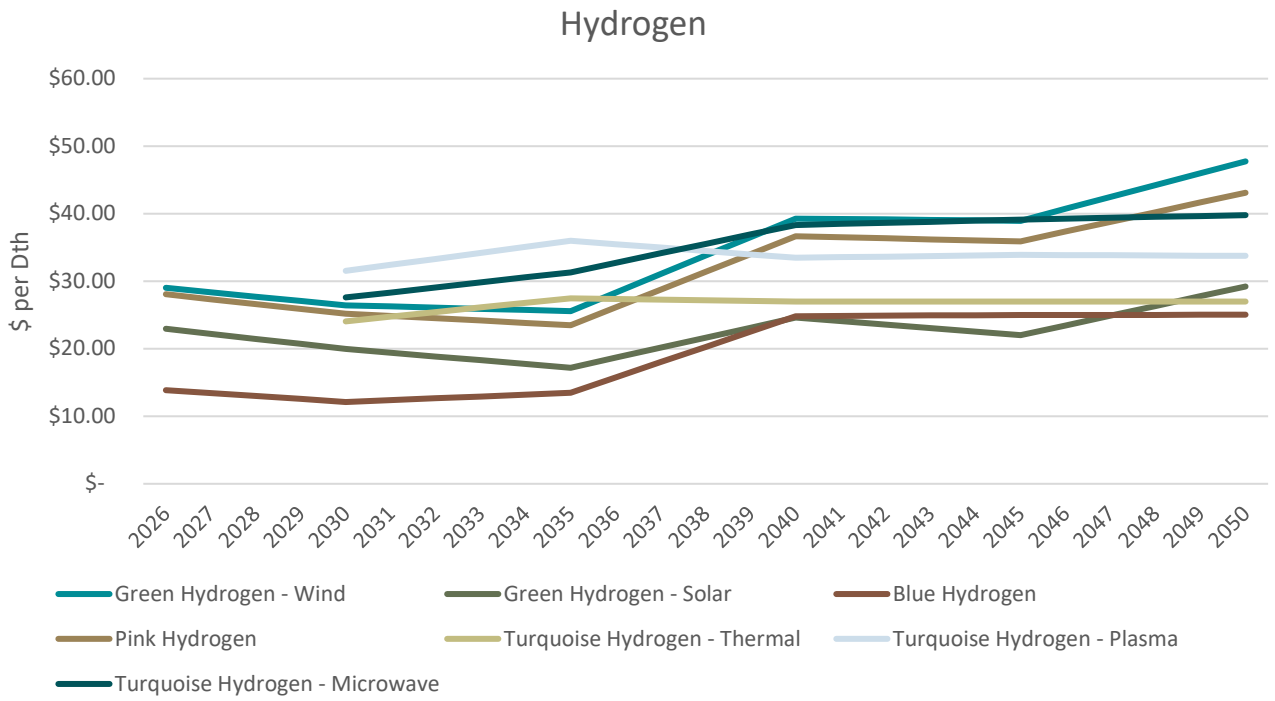
Hydrogen Prices

- Provided by hydrogen source
- Blue Hydrogen and Solar Green Hydrogen currently most feasible

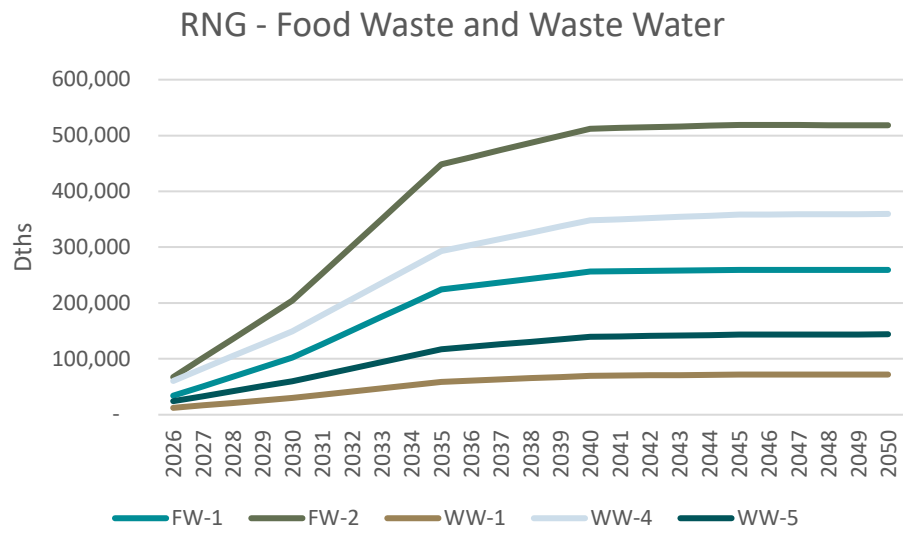


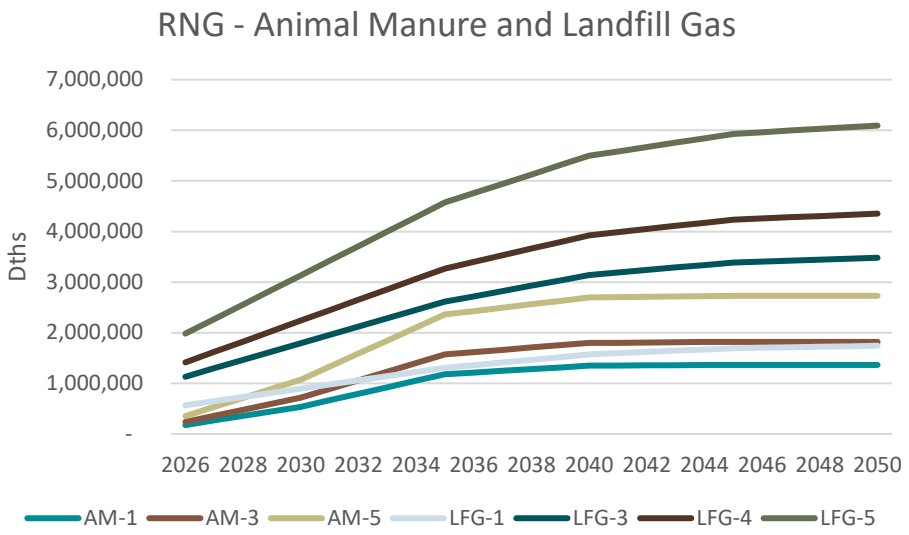
Volumes

- Expected technical potential volumes are broken down between northwest and national
  - These are weighted by US population for states where some form of climate policy is in place or expected
  - Cascade had a weighted share of 13% of the Northwest
    - The allocation was based on the number of LDC meters in Washington and Oregon in 2023

Company	Sum of Meters	Percent Share
AVA	379,223	15.83%
CNGC	316,929	13.23%
NWN	799,250	33.37%
PSE	900,000	37.57%
NW Total	2,395,402	100.00%

Renewable Natural Gas Volumes

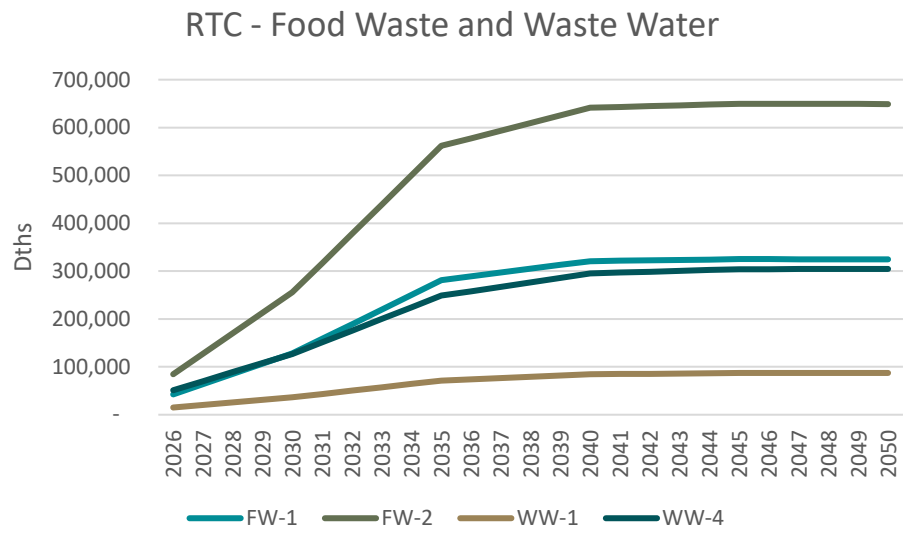


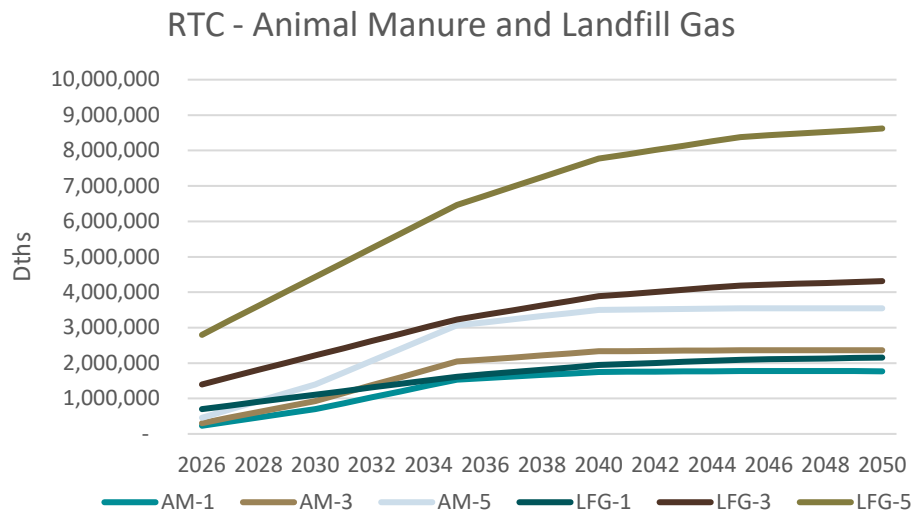


- Categorized by RNG source
- Provided by facility size. Smaller numbers indicate smaller facilities.

- Largest volumes available in Landfill gas

Renewable Thermal Credit Volumes

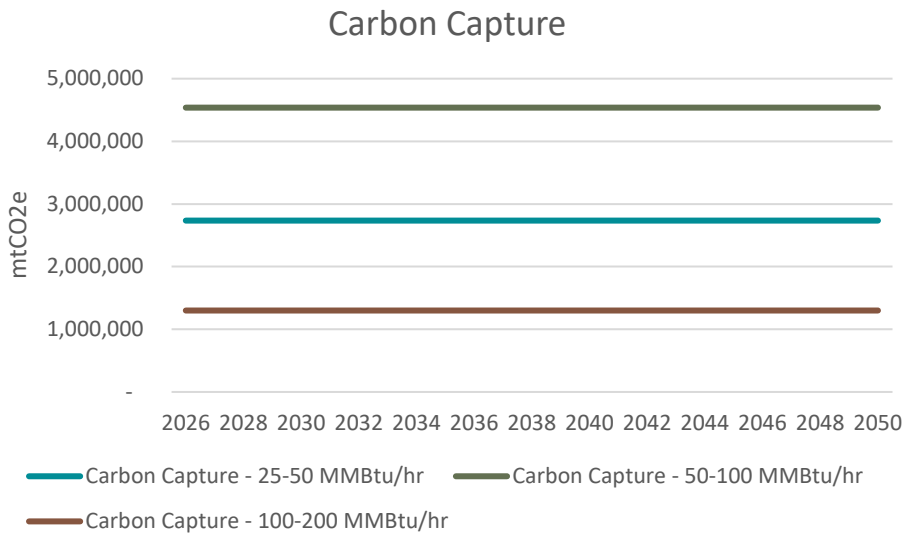


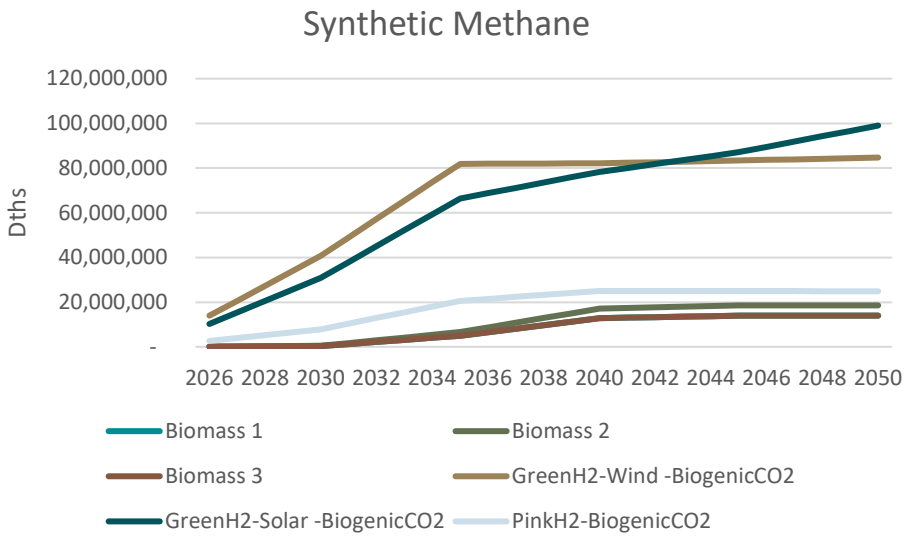


- Categorized by RTC source
- Provided by facility size. Smaller numbers indicate smaller facilities.

- Largest volumes available in Landfill gas and Animal Manure

Carbon Capture and Synthetic Methane Volumes



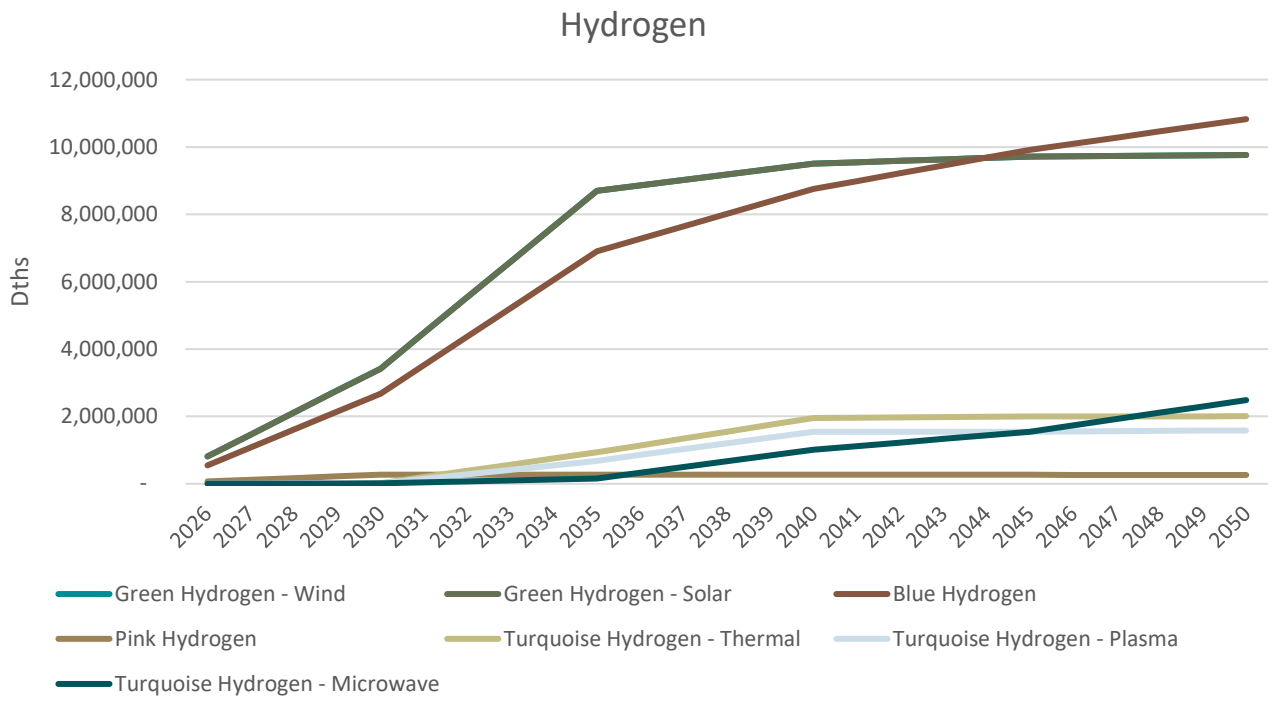


- Provided by facility size
- Not in consideration by Cascade prior to 2030

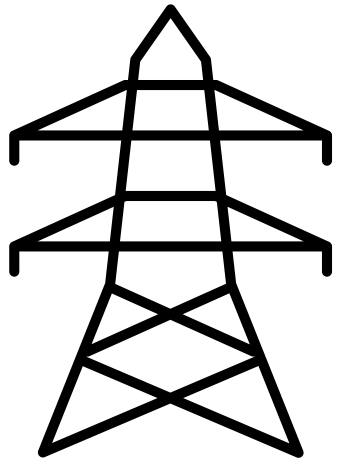
- Provided by Synthetic Methane source
- Largest volumes available in Solar and Wind Green Hydrogen

Hydrogen Volumes

- Provided by hydrogen source
- Largest volumes available in Blue Hydrogen and Solar Green Hydrogen



Electrification



Key Inputs

- Heat Pump Performance Specs at varying temperatures.
- Size and Efficiency of Home
- Climate Zone
- Natural Gas Equipment Efficiency
- Gas and Electric Rates
- Install Costs with IRA Rebates and Incentives

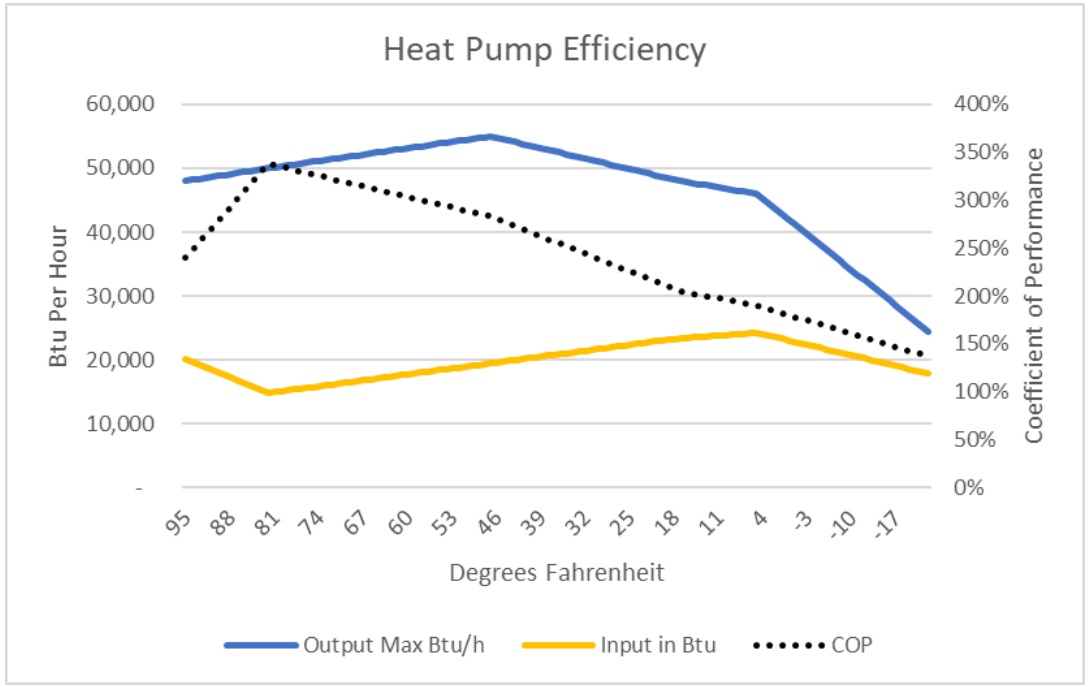
Heat Pump

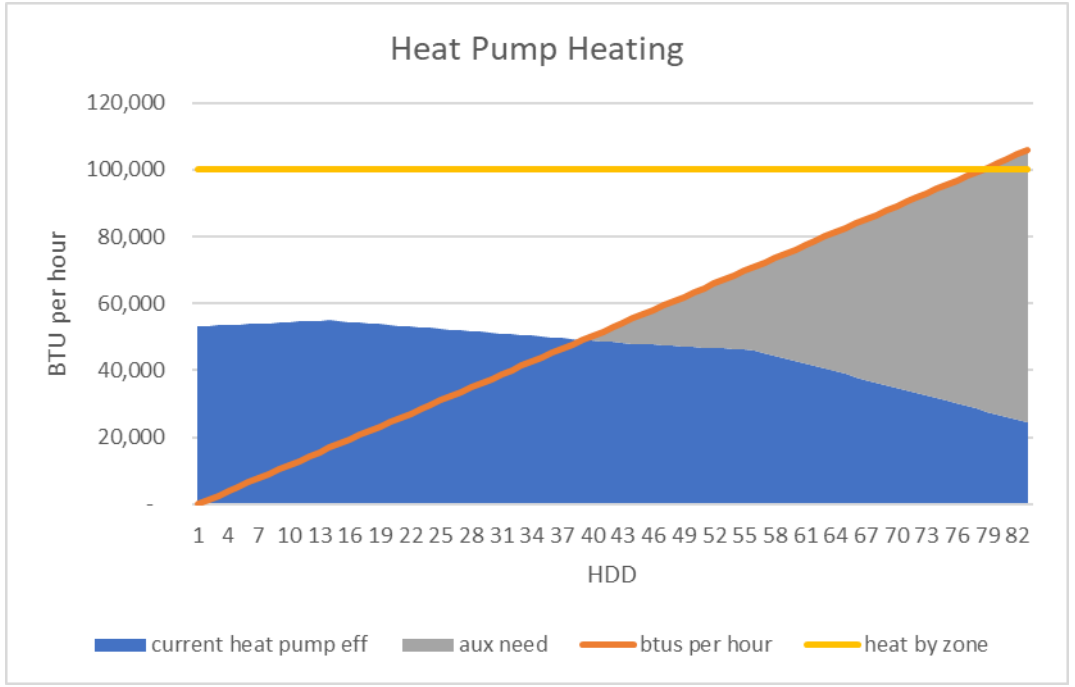
- There are several hundred air-source heat pump models. Cascade must reduce this for modeling purposes.

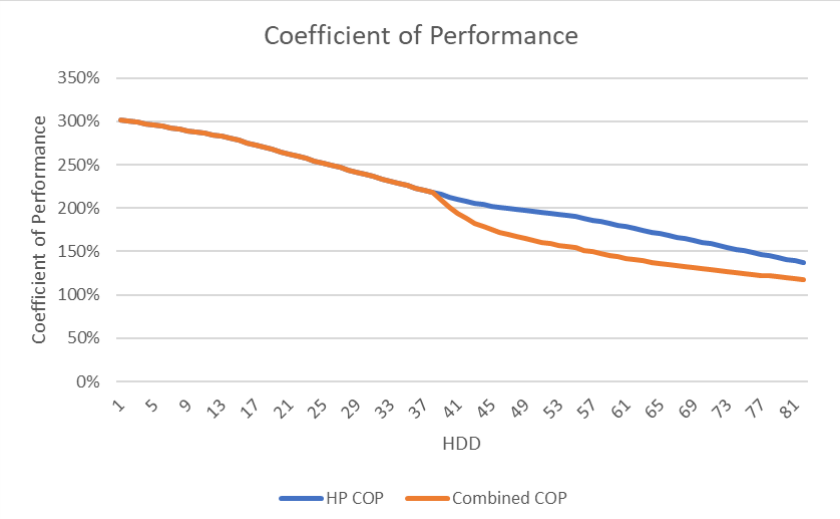
	Output Max Btu/h	COP	Input kW
@95 deg F	48,000	240%	5.87
@82 deg F	50,000	338%	4.34
@47 deg F	55,000	283%	5.7
@17 deg F	48,000	205%	6.86
@5 deg F	46,000	190%	7.1
@-22 deg F	24,500	137%	5.24

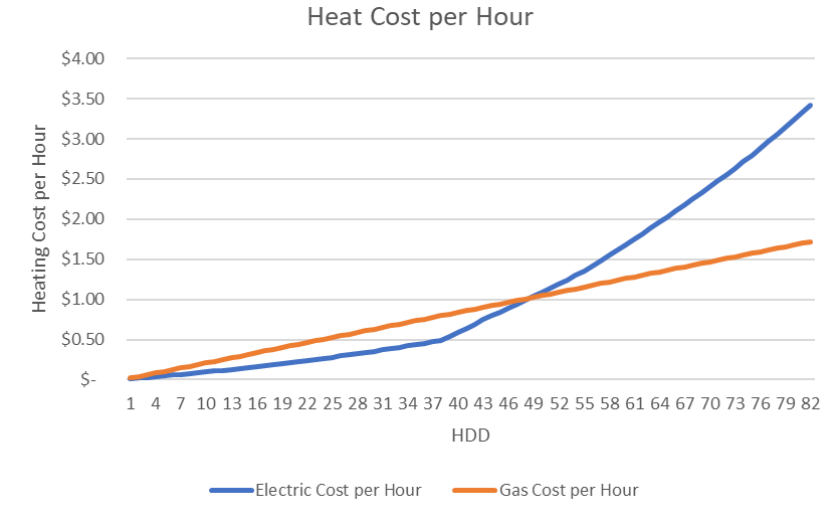
Coefficient of Performance

- Heat Pump Efficiency measures the amount of output produced given the amount of input received at different temperatures.
- Heat Pump Heating measures the amount of heat produced vs the amount of heat needed by zone, showing when auxiliary heat is needed.







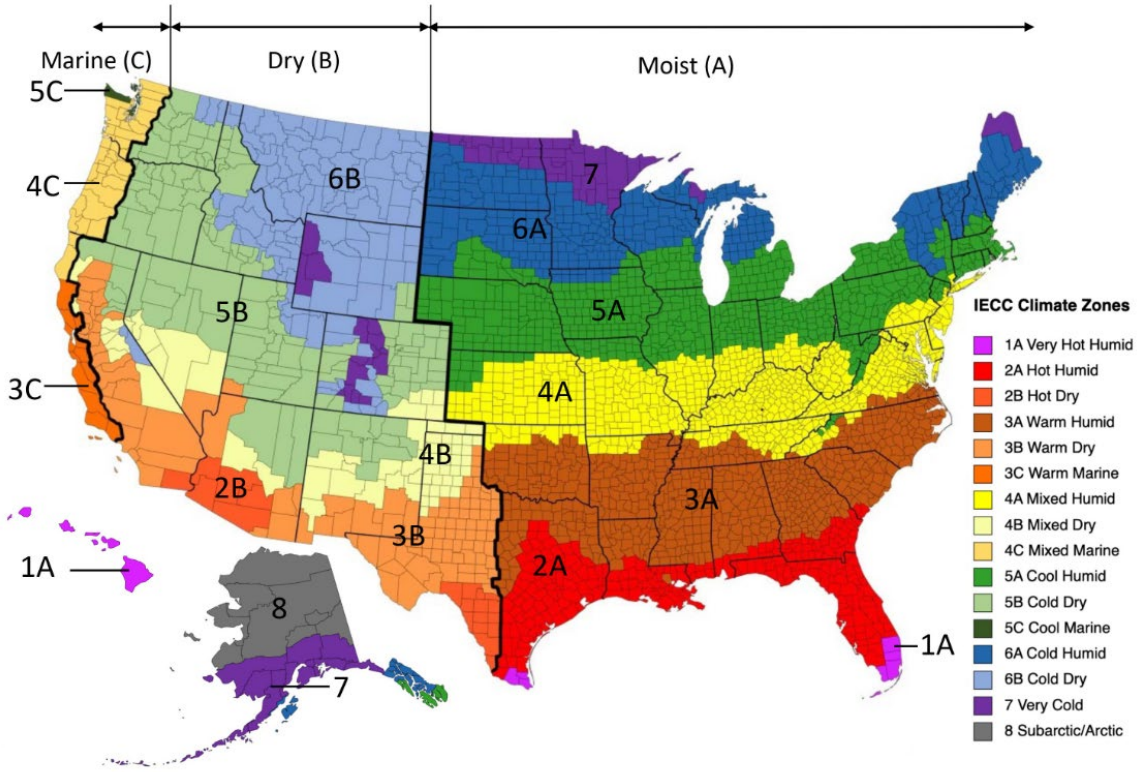


Coefficient of Performance and Cost

- Coefficient of Performance (COP) measures the ratio of useful heating or cooling provided to the energy required to produce heating or cooling, broken out by heat pump only COP and heat pump and auxiliary heat combined COP.
- Heating Cost per Hour measures the cost to operate the heating system for electric vs gas at varying HDD levels.

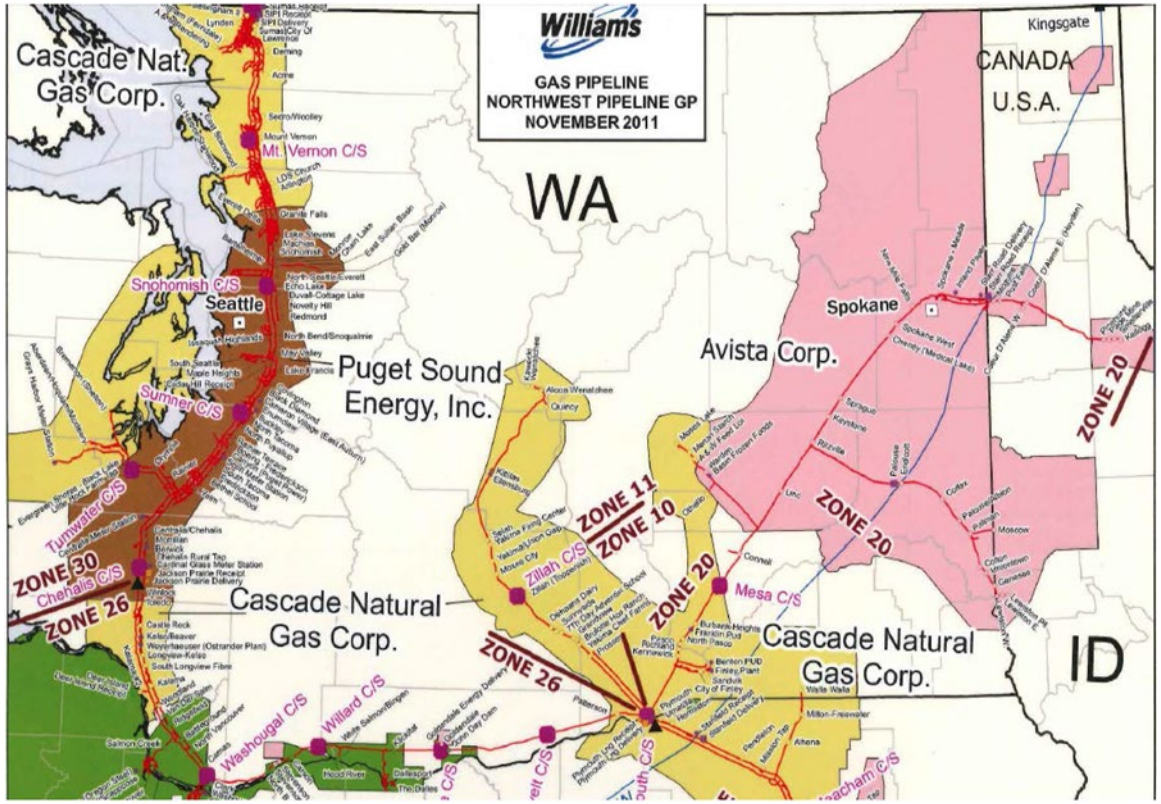
Calculation of BTUs needed

- Total Square Footage multiplied by climate zone BTU per sq ft value[1]



[1] CLIMATE ZONE MAP FROM IECC 2021 | BUILDING AMERICA SOLUTION CENTER

Cascade WA Service Territory



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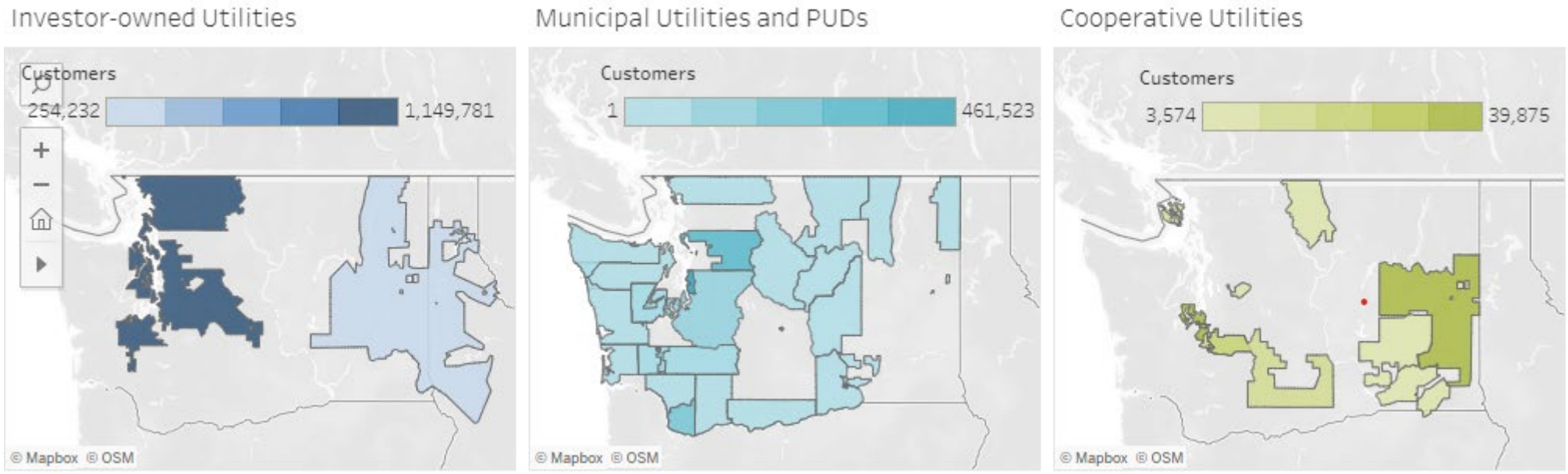
Electric Service Territory

- Between WA and OR, Cascade shares service territories with twenty-five IOU's, Municipalities and PUDs, and Cooperative Utilities.[1]
- Cascade pulled current residential and commercial rates for each and weighted them by customer counts for each pipeline zone.



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[1] HTTPS://WWW.NWCEATLAS.ORG/VISUALIZATION/WASHINGTON-ELECTRIC-UTILITIES-OVERVIEW

Install Costs with IRA Rebates and Incentives

- Install Costs gathered from American Council for an Energy-Efficient Economy report.[1]
- Modeled in three separate income groups; 1. Below 80% median household income, 2. Between 80% and 150% median household income, 3. Above 150% median household income.
- Assuming a lognormal distribution with a standard deviation of 1, 41.3%, 24.6%, and 34% of people would fall under the first, second, and third threshold from the above bullet, respectively.
- Washington State has or will receive a total of just over $165 million from the Inflation Reduction Act for its Home Energy Rebate programs.[2]
- Install Costs are broken out by Space Heat, Water Heat, and Other. Install Costs also have a payback period assuming a loan.

[1] HTTPS://WWW.ACEEE.ORG/PRESS-RELEASE/2024/05/REPORT-ELECTRIFYING-US-HOMES-CAN-SAVE-96-BILLION-ENERGY-COSTS-IF-DONE

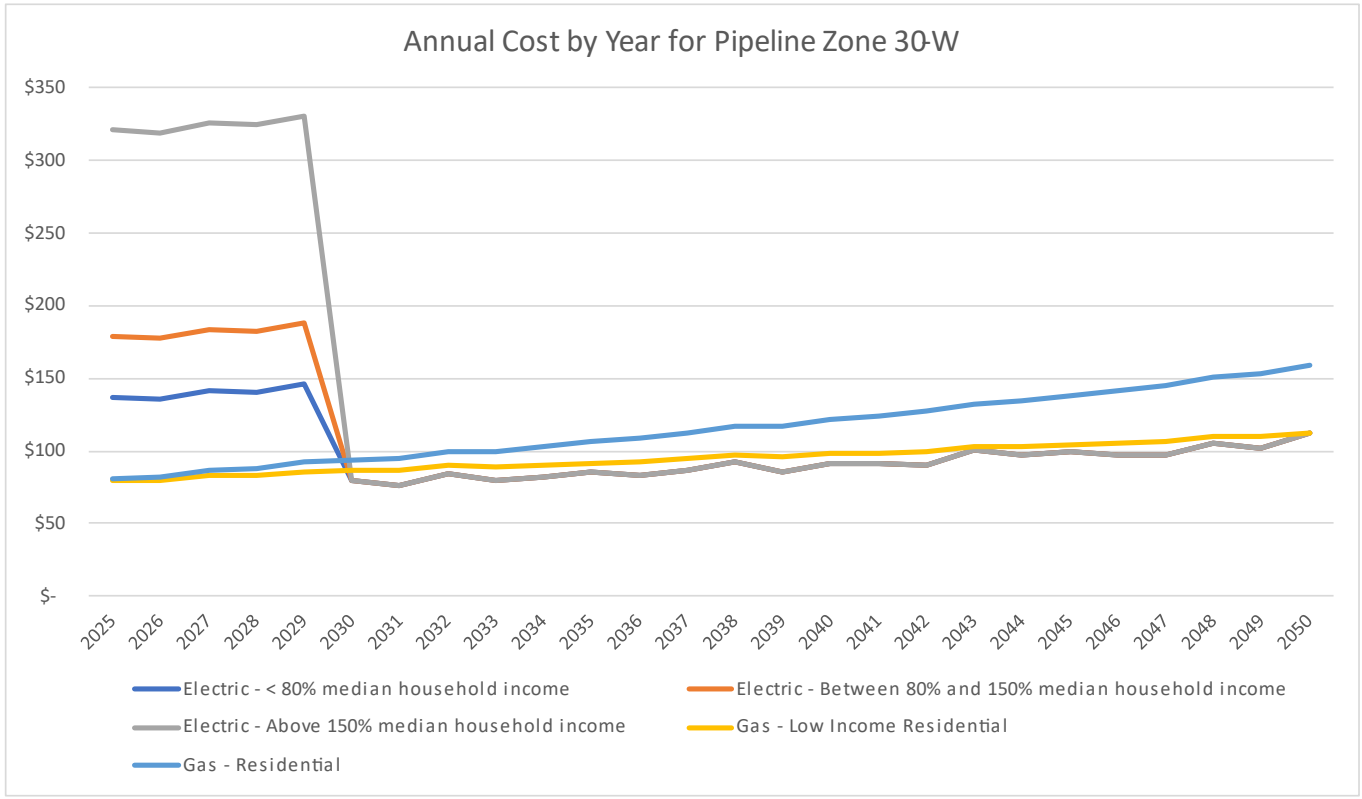
[2] DOE CONFIRMS WA REQUEST FOR HIGHER IRA HOME REBATES – WASHINGTON STATE DEPARTMENT OF COMMERCE

IRA Rules

Program	Eligibility	Rebate/Tax Credit Amount	Details
HEEHRA - Electrification Rebates	Low- and moderate-income households	Up to $14,000	Covers high-efficiency electric equipment and appliances. Low-income households can receive up to 100% of project costs; moderate-income households up to 50%.[1]
HEEHRA - Efficiency Rebates (HOMES)	Low- and moderate-income households	Varies by energy savings	Provides rebates for whole-house energy-saving retrofits. Amount depends on the percentage of energy savings achieved.[1]
IRA Tax Incentives - Energy Efficiency Improvements	All households and businesses	Up to 30% of project costs	Tax credits for energy-efficient improvements like heat pumps, solar panels, and insulation. Average tax credit ranges from $2,000 to $5,000.[1]
IRA Tax Incentives - Renewable Energy	All households and businesses	Up to 30% of project costs	Tax credits for renewable energy installations, such as solar panels and wind turbines.[1]

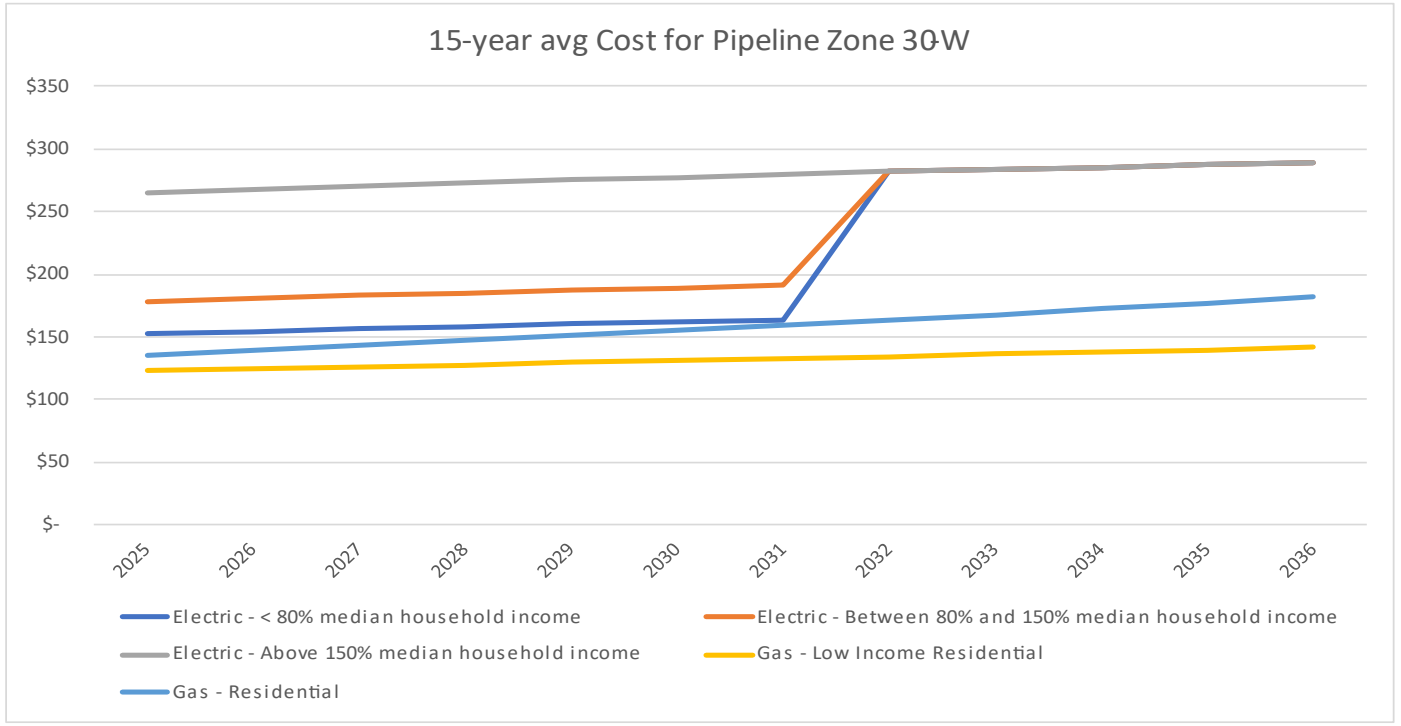
[1] HTTPS://WWW.COMMERCE.WA.GOV/ENERGY-INCENTIVES/IRA-HOME-ENERGY-REBATES/

Annual Cost Preliminary Results (Whole Home)



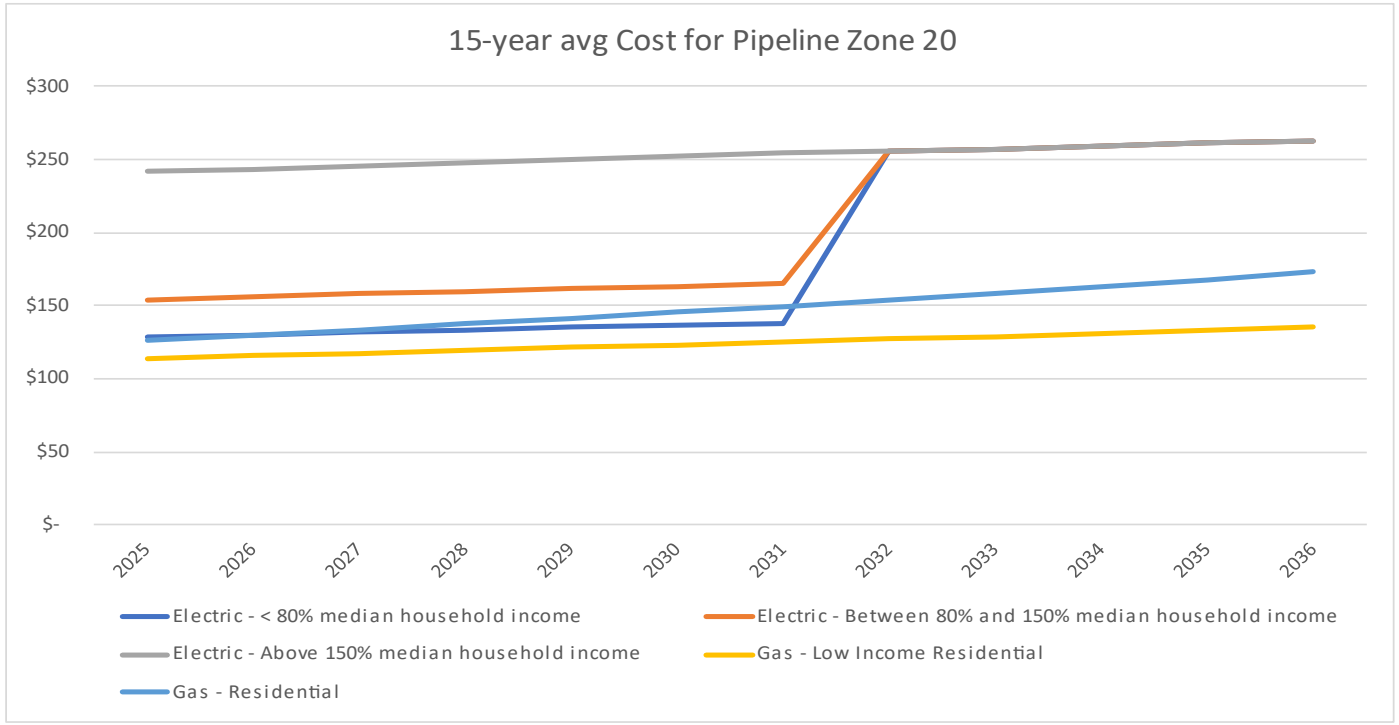
- Annual Costs, including installation cost and cost of service.
- Includes different install costs based on IRA incentive.
- Includes costs to electrify vs remaining as a gas customer.

Levelized Cost Preliminary Results (Whole Home)



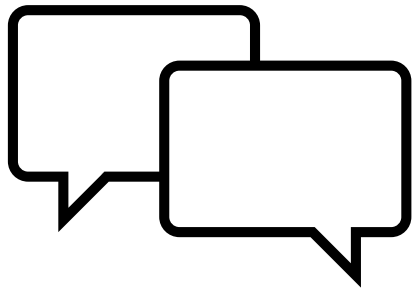
- Levelized costs over 15 years, including installation cost and cost of service.
- Includes different install costs based on IRA incentive.
- Includes costs to electrify vs remaining as a gas customer.
- Projects done after 2031 do not include IRA incentives.

Levelized Cost Preliminary Results (Whole Home)



- Levelized costs over 15 years, including installation cost and cost of service.
- Includes different install costs based on IRA incentive.
- Includes costs to electrify vs remaining as a gas customer.
- Projects done after 2031 do not include IRA incentives.
- Cascade will produce results for all ten pipeline zones.

Feedback for Cascade



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Questions/Next Steps

Review Plans for TAG 3 Discussion

- Respond to TAG 3 Feedback
- Distribution System Planning
- Final Integration Results
- Finalization of Planned Components
- Proposed new 2- to 4-year action plan
- TAG 4 is Wednesday, February 5

2025 WA IRP Schedule

Process Item	Date	Process Element
Comments Due	Friday, January 10, 2025	
TAG 4	Wednesday, February 5, 2025	Respond to TAG 3 feedback, Distribution System Planning, Final Integration Results, finalization of plan components, Proposed new 2- to 4-year Action Plan
Final Draft	Tuesday, March 4, 2025	
Comments Due	Tuesday, April 15, 2025	
TAG 5 (if needed)	Thursday, May 1, 2025	
Final Complete By	Friday, May 16, 2025	
File	Friday, May 23, 2025	

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JANUARY 8, 2025

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