CASCADE NATURAL GAS CORPORATION®

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In the Community to Serve®

Integrated Resource Plan (WA) Technical Advisory Group Meeting #4

AUGUST 10, 2022

MICROSOFT TEAMS/TELECONFERENCE

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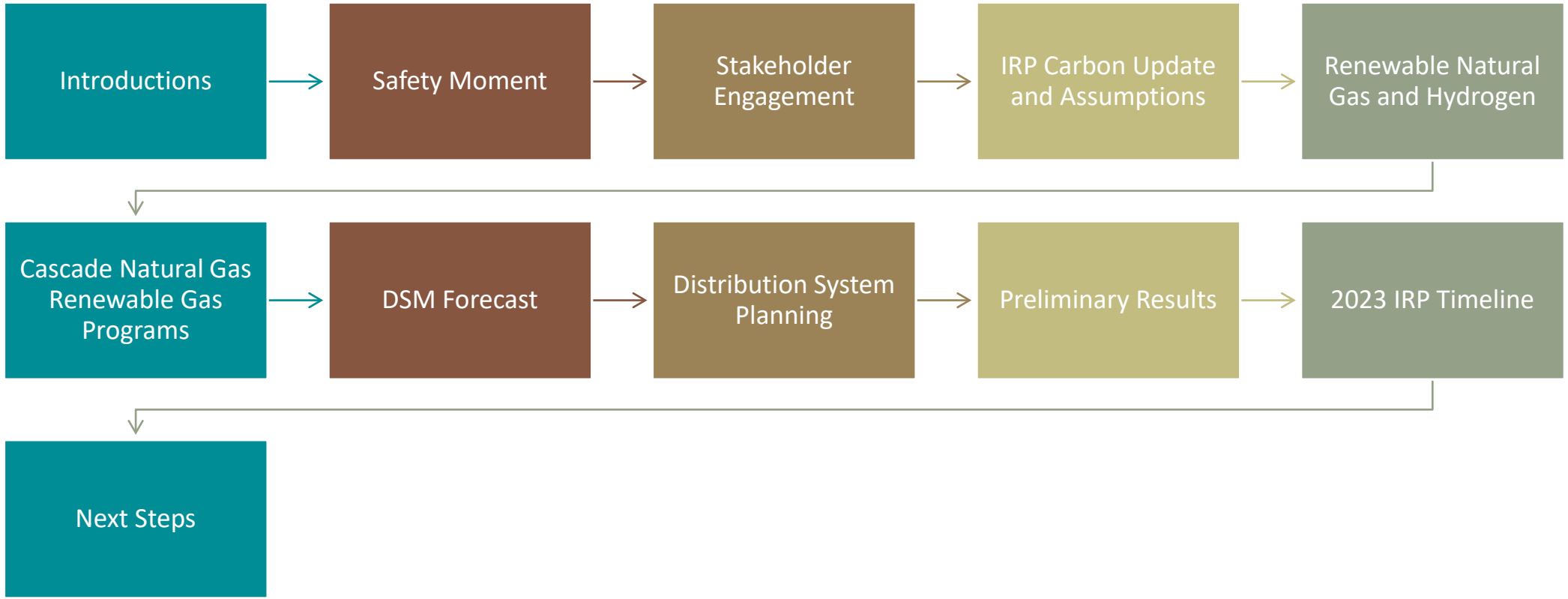
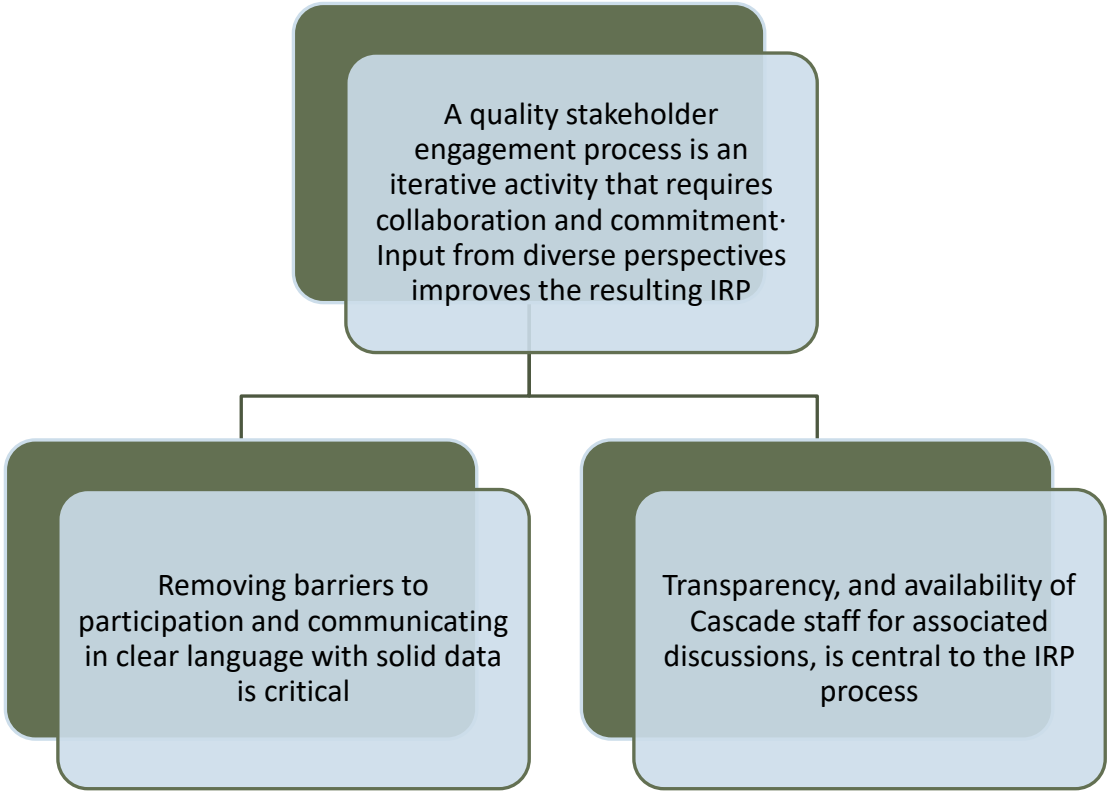
Agenda


Introductions
Safety Moment
Stakeholder Engagement
IRP Carbon Update and Assumptions
Renewable Natural Gas and Hydrogen
Cascade Natural Gas Renewable Gas Programs
DSM Forecast
Distribution System Planning
Preliminary Results
2023 IRP Timeline
Next Steps

Safety Moment

Stakeholder Engagement[1]



What is a Stakeholder?

Customers and the general public participating in the IRP process are called Stakeholders. Stakeholders also include the professional analytical staffs of the state utility commissions and groups representing residential and industrial customers. Further, community-based organizations and independent experts attending the series of meetings.

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1: SEE STAKEHOLDER ENGAGEMENT DESIGN DOCUMENT AT WASHINGTON INTEGRATED RESOURCE PLAN - CASCADE NATURAL GAS CORPORATION (CNGC.COM)

IRP Carbon Update and Assumptions

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Topics to Cover

Cascade's commitment to reducing emissions
- Current Baseline Customer Emissions
- Emissions Reductions

GHG Policy
- Climate Commitment Act
  - Ways to offset emissions
- The local focus
  - Bellingham
  - Whatcom County
  - Bend
- National focus

Different policies between WA and OR

Cascade's Washington Compliance Plan

Upstream Methane Emissions Factor

Next Steps and Conclusion

Cascade's commitment to reducing emissions

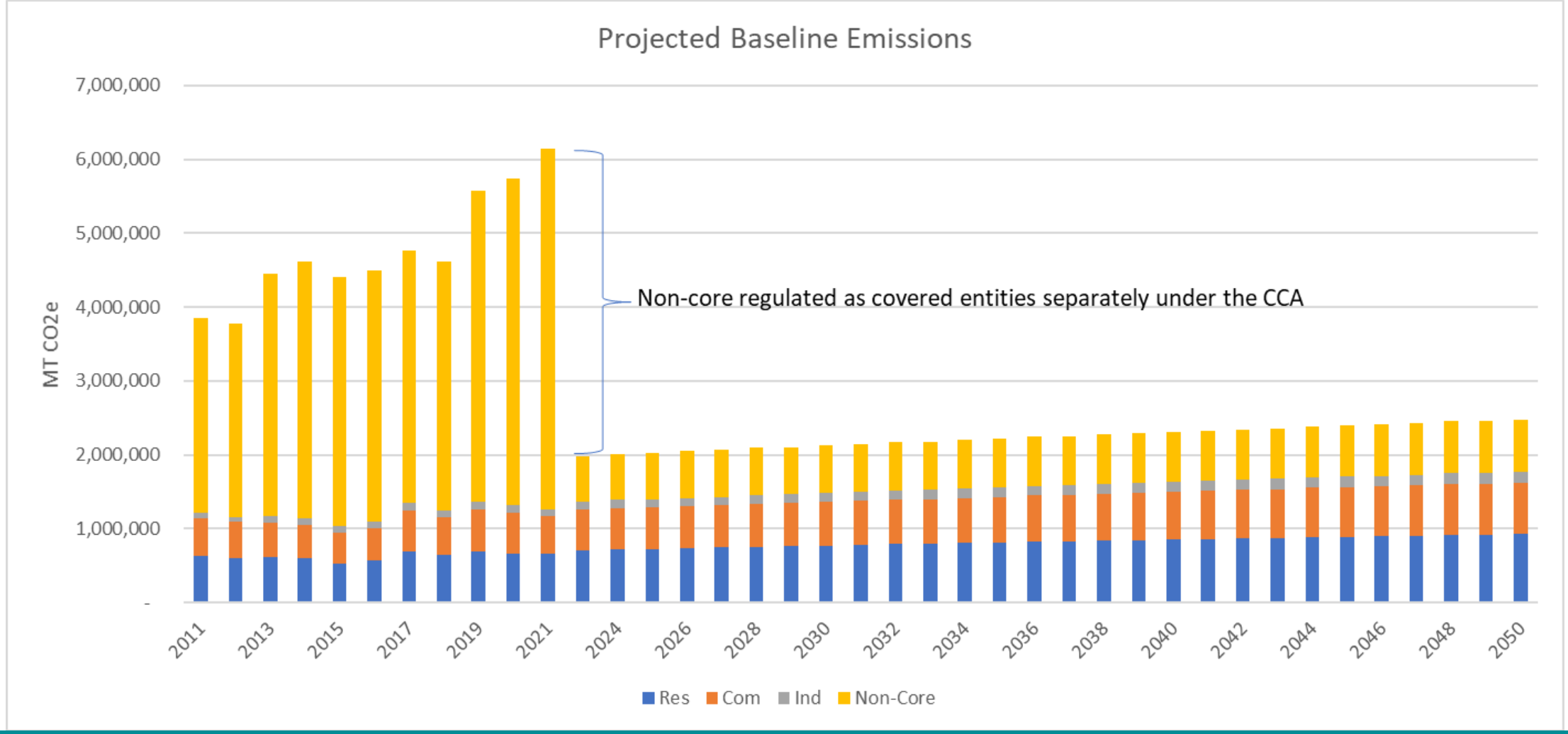
As an energy provider proudly serving Washington and Oregon, Cascade Natural Gas has an important role to play in securing a lower carbon future for the Pacific Northwest. Natural gas remains the cleanest option to meeting the region's peak energy demand. This means keeping Cascade's system reliable and affordable for customers while helping communities meet their GHG emission reduction targets.

Communities and agency programs focused on emissions reductions for Cascade include: Bellingham, Bend, Whatcom County, Washington Climate Commitment Act and Oregon Climate Protection Program

Environmental Policy:

The Company will operate efficiently to meet the needs of the present without compromising the ability of future generations to meet their own needs. Our environmental goals are:

- *To minimize waste and maximize resources;*
- *To be a good steward of the environment while providing high quality and reasonably priced products and services; and*
- *To comply with or surpass all applicable environmental laws, regulations and permit requirements*



Projected Emissions for CCA Compliance for Cascade's IRP Baseline

Reducing Customer Emissions

Energy Efficiency and Conservation/DSM

- Increasing focus on energy efficiency and benchmarking (HB-1257)
- Commercial program adaptation to meet increased goals

Renewable Natural Gas

- Cascade is engaged in discussions with developers on several projects.
- RNG deliveries could start by mid to late 2024.

Annual EE and Conservation/ DSM Savings	WA		OR	
	therms	MT CO2e	therms	MT CO2e
2019	760,956	4,038	499,135	2,648
2020	659,176	3,498	427,060	2,266
2021	1,243,223	6,597	525,372	2,788

Emissions from Natural Gas Distribution Operations

Cascade's methane emissions from pipeline infrastructure and GHG emissions from combustion equipment

- Distribution system methane emissions and compressor station emissions reported to the Dept of Ecology equals about 24,000 to 25,000 metric tons of CO_2e.
- EPA recently announced amendments to Subpart W reporting, proposing emission factor updates and reporting of "other large release events" starting in reporting year 2023. EPA defines the release events as releases of ≥250 MT CO2e (~500,000 scf of pipeline quality natural gas).
- With other operational emissions added to our inventory, we expect total annual emissions between 35,000 to 48,000 metric tons of CO2e.
- Cascade's methane emissions rate is in the range of 0.06% and 0.10% (% of volume of methane emitted per total methane throughput volume).

Reducing Operations Emissions

Cascade is committed to methane emissions reductions

- Cascade became a founding member of EPA's Natural Gas Star Methane Challenge Program in March 2016 participating in Excavation Damages Prevention category
  - Created Public Awareness Coordinator position and implemented a Damage Prevention Program
  - Actively participating in 811, Common Ground Alliance, local underground utility coordinating councils, and damage complaint programs in Washington and Oregon.
  - Analyze excavation damages and report data to EPA
- Created a more robust inventory of GHG emissions in all operational areas for 2022 and ongoing
  - Example is expansion of internal reporting of gas losses to include much smaller non-hazardous releases
- Cascade mitigates methane leaks, and has adopted a program to quickly address even small leaks that are not considered a public safety concern
- Exploring more ways to reduce emissions in normal operations, including the use of methane capture technology for pipeline blowdowns

Reducing Operations Emissions

System Integrity Projects

- Since 2012, Cascade has replaced over 98 miles of early vintage steel pipe with new steel or polyethylene pipe in Washington and over 45 miles in Oregon.
- Cascade is better positioned than most US utilities as it has no unprotected steel pipeline and no cast iron pipe

Climate Commitment Act

Program establishing a declining cap on GHG emissions from covered entities consistent with the limits established in RCW 70A.45.020, and a program to track, verify, and enforce compliance with the cap through the use of compliance instruments.

Anthropogenic GHG Emissions Reductions:

- Achieve 1990 levels (90.5 million metric tons) by 2020
- 45% below 1990 levels (50 million MT) by 2030
- 70% below 1990 levels (27 million metric tons) by 2040
- 95% below 1990 levels (5 million metric tons) by 2050

Covered Entities:

- Fuel suppliers, natural gas distribution, electric utilities, and large facilities.
- Landfills and certain emissions intensive and trade exposed (EITE) entities are added in during 2nd and 3rd compliance periods.

Climate Commitment Act

Cascade's regulated emissions:

- Customer Emissions – about 2,000,000 metric tons CO2e in 2023
  - All core customers
  - Non-core customers that are not covered entities under the CCA (=/>25,000), and excludes customers that may "opt-in" to program individually or that may petition to be emissions-intensive and trade exposed (EITE).
- Operations Emissions – about 24,000 to 25,000 metric tons CO2e
  - Methane leakage
  - Fuel combustion from >5 mmbtu sources (e.g. compressor stations)

Climate Commitment Act

Baseline

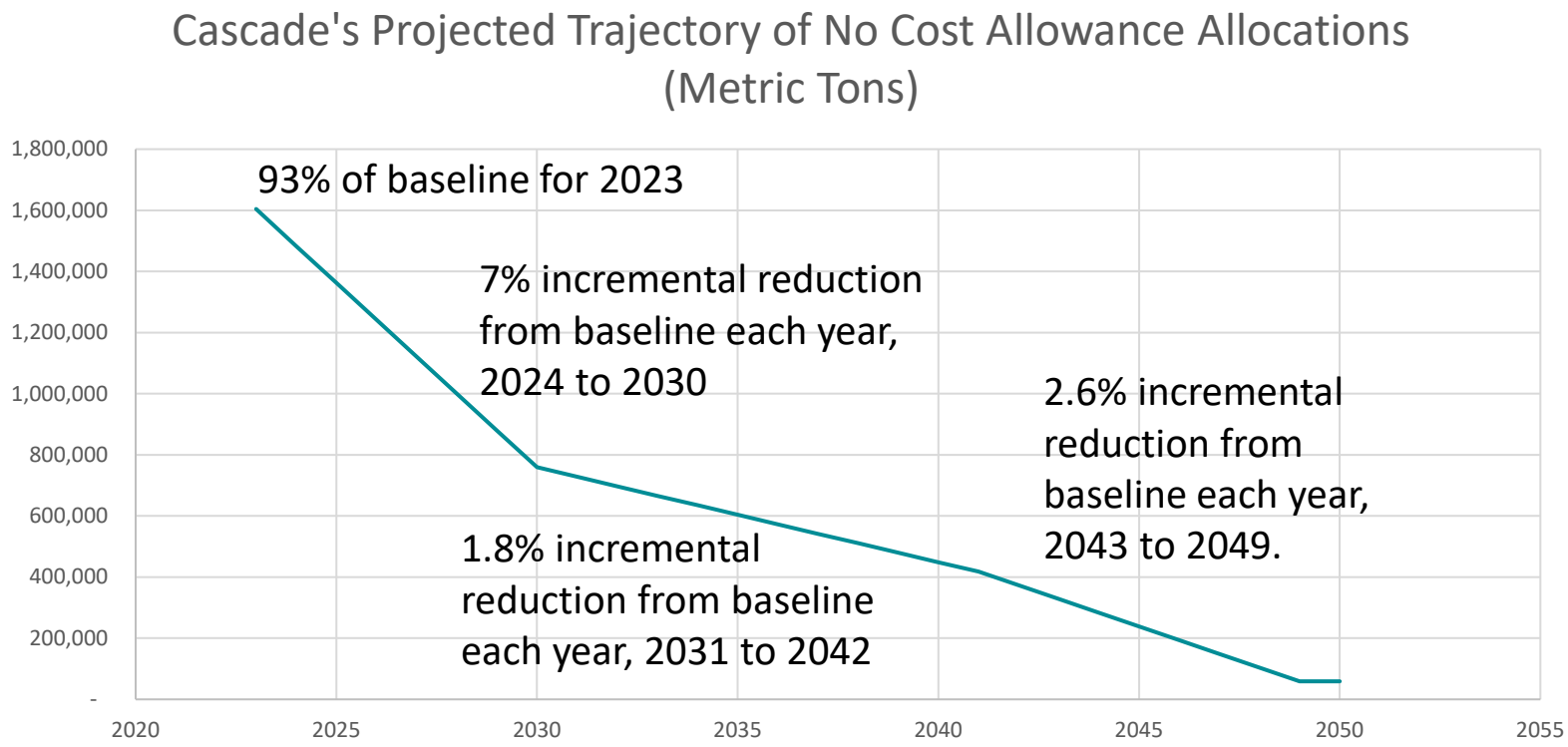
- 2015-2019 average

No Cost Allowances for Natural Gas Suppliers

- See chart

Allocation of No Cost Allowances

- 2023 – proposed allocation by September 1, 2023
- 2024 and thereafter, allocations made in October of prior year



Climate Commitment Act

Rule Requirements Commence on January 1, 2023

4 Year Compliance Periods

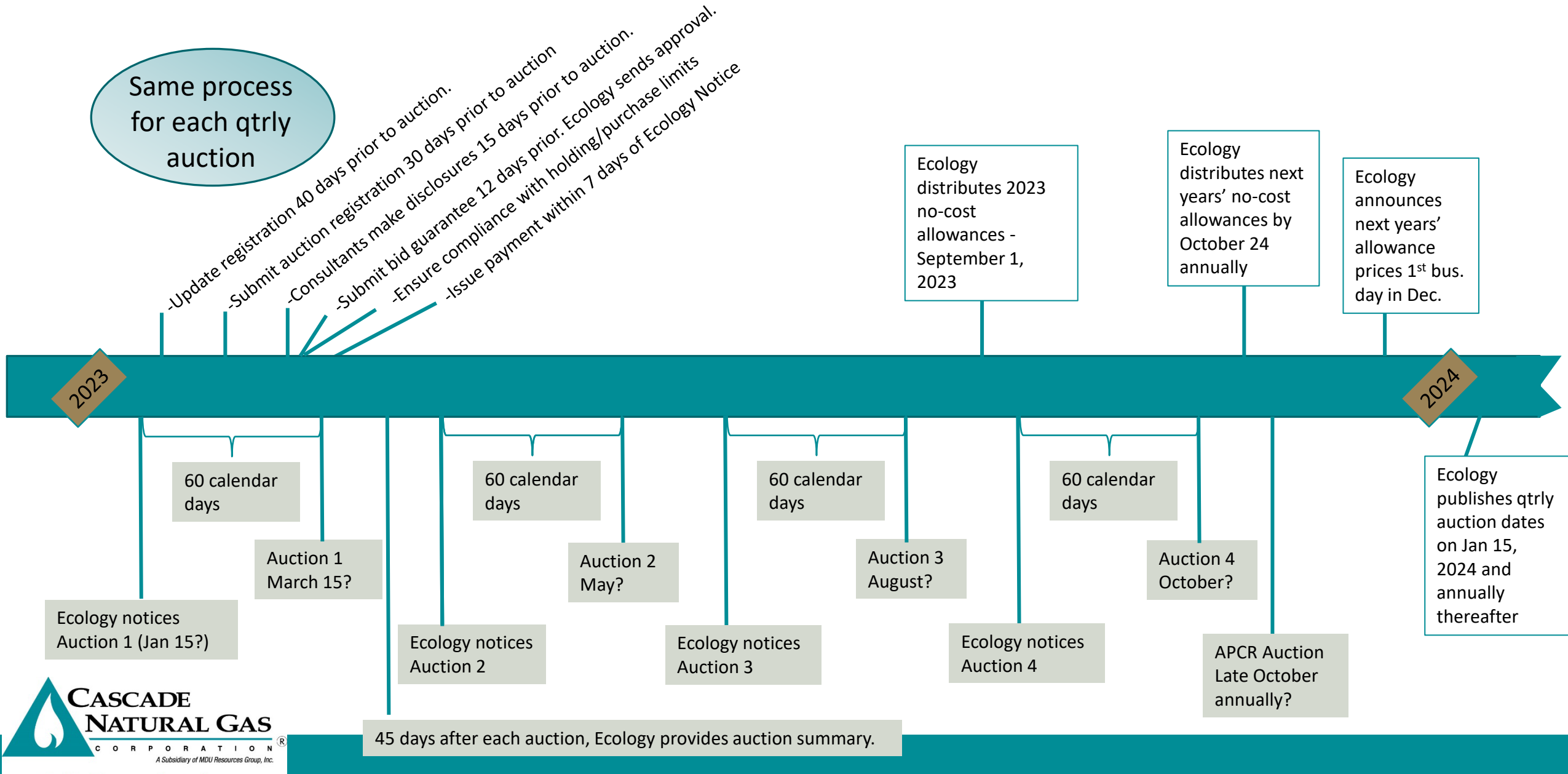
- 2023-2026, 2027-2030, 2031-2034, …

Compliance Demonstrations

- Full compliance demonstrations required by Nov 1 of the year following the end of a 4-year compliance period
- Interim compliance period demonstrations by Nov 1 annually of 30% of prior year's emissions.

Quarterly Auctions Commence 2023

Climate Commitment Act - 2023 Example Auction Schedule



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CCA Compliance Options

Renewable Natural Gas

- One for one replacement of fossil gas.

Allowances

- Bid for allowances in quarterly auction

Offsets

- Limit use to 8% of compliance obligation in first compliance period, 6% thereafter.

Energy Efficiency and Conservation/Demand-side Management

Hydrogen

- Future option

CCA Compliance Options

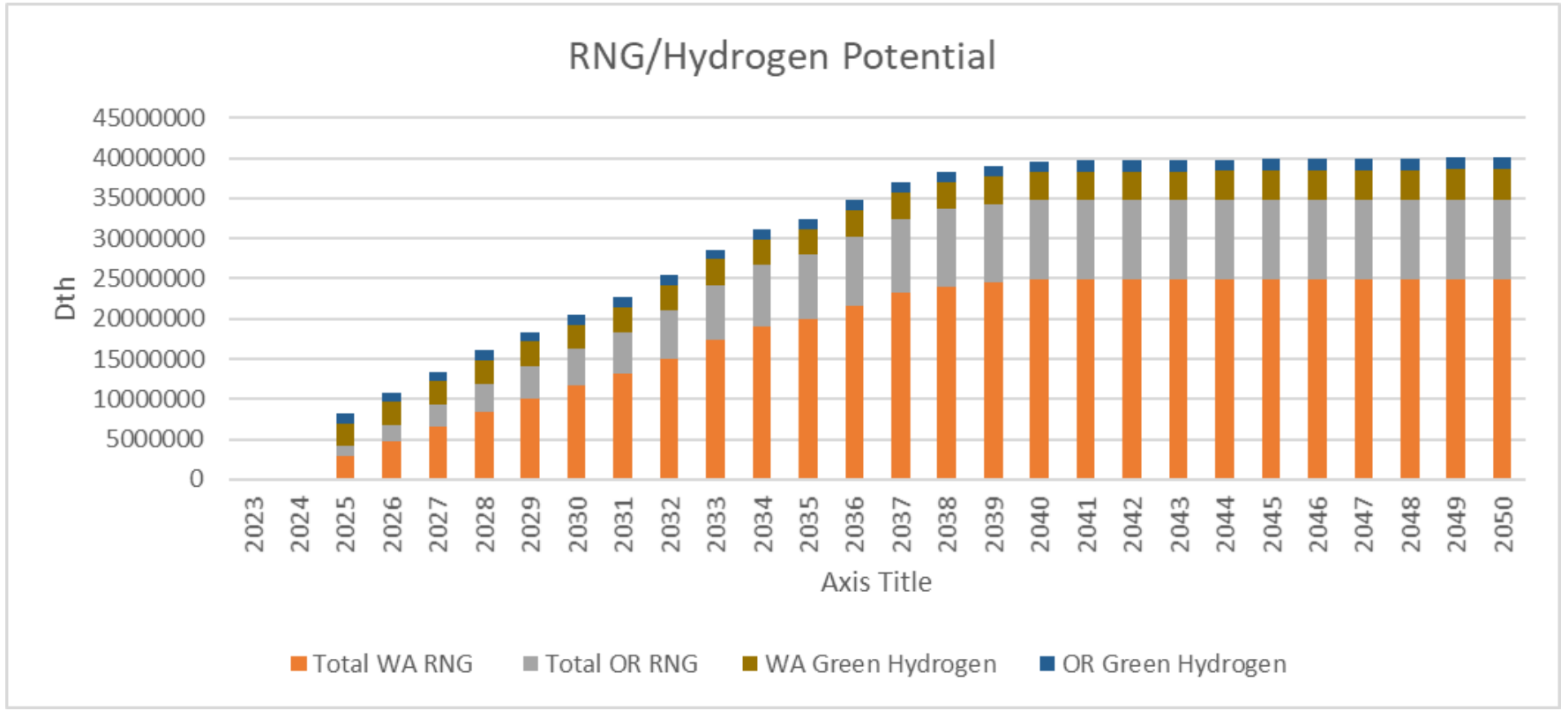
RNG limits in Cascade's modeling are based on the Company's potential share of RNG projected values in 2019 AGF/ICF Study.

- The 2019 AGF study provides RNG potential by 2040 by RNG type, and adoption curves for the various types of RNG are then used to generate acquisition curves for each resource

Cascade's position is that the constraining factor for maximum hydrogen acquisition will be the amount that can be safely blended with geologic gas

- According to a technical report by the Gas Technology Institute, "If less than 20% hydrogen is introduced into distribution system the overall risk is not significant for both distribution mains and service lines." Also, the National Renewable Energy Laboratory's research findings indicate adding hydrogen blends at 20% or less to existing natural gas pipeline systems would result in only minor increases in safety risk
- This is a volumetric quantity. Hydrogen burns at a lower heating volume, and all modeling is done in therms (energy) vs. volume. The adjusted safe blending quantity of hydrogen energy is approximately 7.4%

CCA Resource Projections



City of Bellingham

Bellingham City Council passed an ordinance on Feb 7, 2022, which requires electric space and water heating equipment for new commercial and large (4+ story multifamily buildings) buildings. It also requires incremental improvements in EE (building envelope, lighting, insulation) and solar installation or readiness in new buildings.

The electric-only mandate for space and water heating does not apply to single family construction, detached houses, duplexes, townhomes or row houses.

The ordinance takes effect August 7, 2022.

Cascade is running sensitivity analyses based on the new limitations to the use of natural gas in new buildings. Cascade pulled historical data from the 2017-2021 to see which customers would have been affected if this ban took place earlier. The result was approximately 50 customers per year. Cascade decremented customer counts by 50, cumulatively, each year for the forecast.

City of Bellingham

The City of Bellingham continues to work on the design of a Climate Action Fund. Preliminary drafts indicate that this would be treated as a property tax and would direct funds towards electrification, among other efforts. Following the City Council and Mayor expressing reservations about the design and timing of the plan it was announced they will delay putting the measure on the November ballot.

Whatcom County

On July 27th, 2021, Whatcom County voted to ban the construction of new refineries, coal-fired power plants and other fossil fuel-related infrastructure

This does not constitute a gas ban but may have impacts on distribution system enhance projects if needed in Whatcom County.

City of Bend

Aspirational goal to reduce GHG by 40% by 2030 based on 4 areas of focus:

- Energy Supply
- Transportation
- Energy in Buildings
- Waste and Materials

There isn't a specific carve-out for what Cascade is required to do for this action plan. However, Cascade's representative on the original Climate Action Steering Committee (CASC) helped identify pathways for gas to support the City goals through development of an offset program and a biodigester plant. Regulatory is working on offset programs and Cascade was awarded Bend landfill RFP.

The City's current Environment and Climate Committee is having preliminary discussions about the role of gaseous fuels as part of a decarbonized future. Cascade intends to share information on its emerging RNG efforts and overall renewable gas potential as appropriate.

National Focus

US Dept of Energy is in process of holding a proposed rulemaking for energy conservation standards for commercial water heating equipment. This rulemaking may result in impacts to baseline equipment used to determine the Company's Energy Efficiency portfolio.

The US Dept of Energy has also launched a notice of intent for funding opportunities for Clean Hydrogen Programs associated with the Bipartisan Infrastructure Law. Cascade is monitoring opportunities for partnerships in this sector across the states we serve.

EPA recently announced amendments to Subpart W (O&G segment) operational GHG emissions reporting, proposing emission factor updates and additional reporting of "other large release events". These changes are proposed to be effective starting in reporting year 2023. Comments are due this fall with final rule by end of year.

US Supreme Court issued its decision July 1st on West Virginia v. the EPA, ruling on the extent of EPA's ability to regulate carbon emissions from power plants. EPA is expected to propose new GHG regulation on existing electric generating units in 2023 considering the court's decision. Future rulemaking could result in additional low carbon fuel requirements for new and existing electric generation.

US Senate Bill - Inflation Reduction Act of 2022 was released in late July, which includes climate change investments to promote decarbonizing the economy. A Methane Emissions Reduction Program is included in the bill and would require fees or investments in reducing methane leaks from production and distribution of natural gas.

Differing Policy Between WA and OR

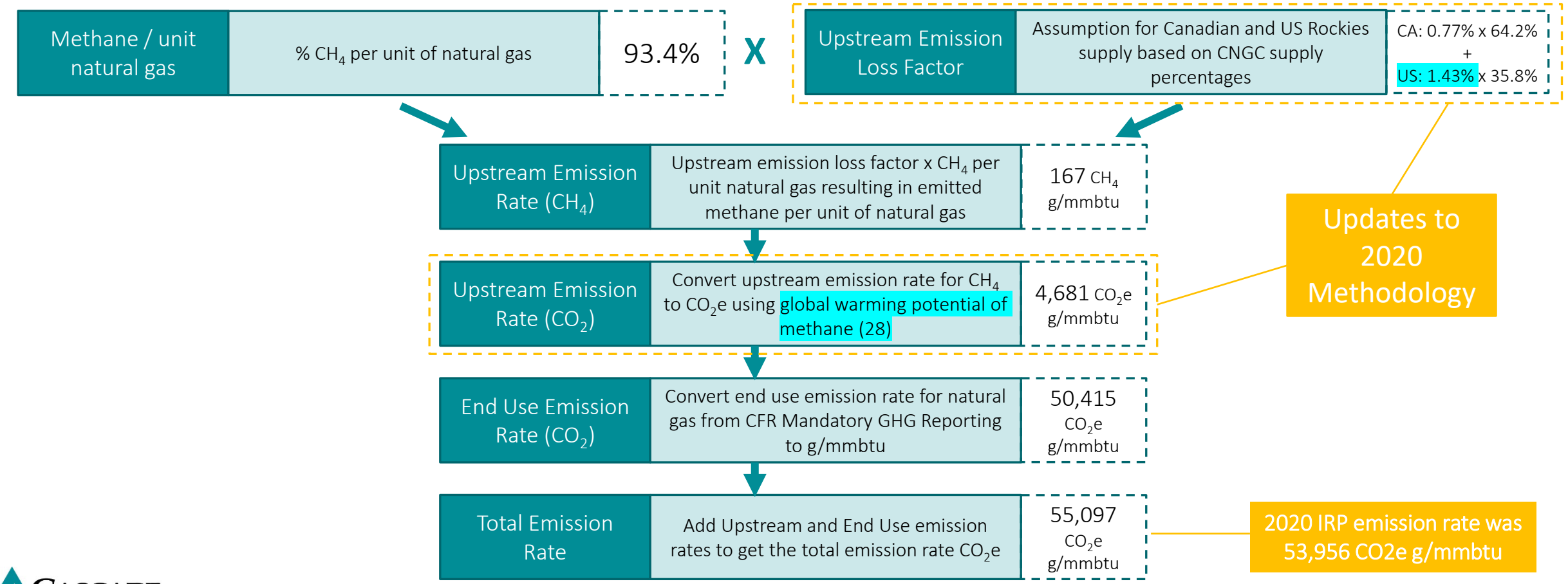
Emissions Compliance Option Differences	WA CCA	OR CPP
RNG - Environmental Attributes	?	X
RNG – Biogas with Associated Environmental Attributes	X	X
No Cost Allowance Allocations	X	X
Auctions for Additional Allowance Purchases	X	
Allowance trades between covered entities		?
Environmental Offsets	X	
Community Climate Investment Credits (CCI Credits)		X
Energy Efficiency and Conservation	X	X
Hydrogen	X	X

Differences with compliance options across the states we serve are anticipated to create some challenges with compliance planning.

Limiting RNG to demonstrating contractual delivery is misaligned with other states' determinations and overlooks recognition of how electric RECs are considered and other state agency recognition of RNG compliance use.

New Cascade Calculation Methodology - 2023 IRP

Equation: $Emission\ Rate_{Total} = \mathbf{Upstream\ Emission\ Rate_{CO_2e}} + Customer\ Emission\ Rate_{CO_2e}$



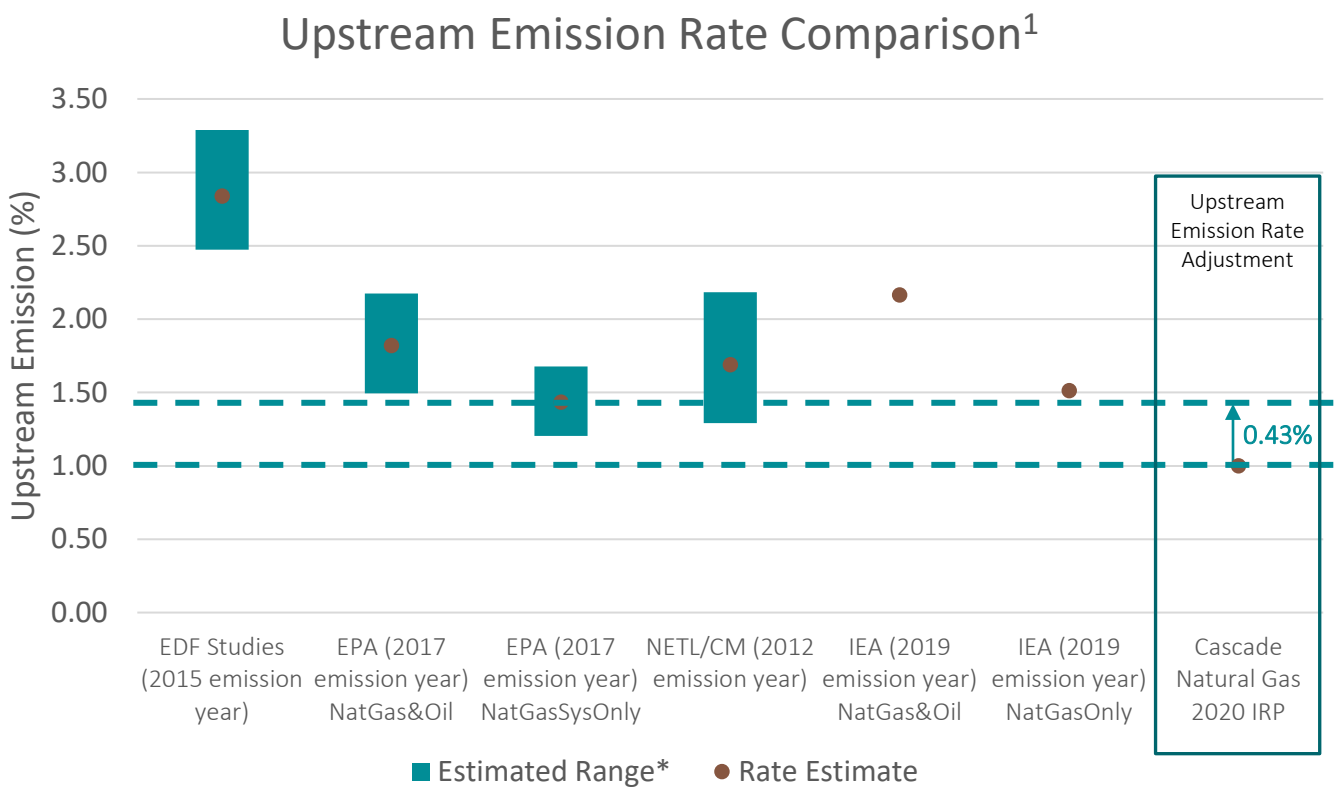
Calculation Updates

1. Update Upstream Emissions Rate to 1.43% based on EPA 2017 Emission Year (gas system only)
   - Our current 1.00% upstream emission rate has remained the lowest reported in studies (EDF, IEA, NETL, and EPA GHG Inventory 2017 Emission Year) according to methodology applied by the NW Power & Conservation Council. **Re-evaluation of the studies appears to support a recommended increase in the upstream emissions rate to at least the 2017 EPA GHG Inventory Estimate of 1.43%.** This is within the range of the NETL Life Cycle Model Study and 0.08% below the IEA 2019 rate estimate.
   - A highlight of these studies was identifying the challenge of tracking methane emissions in the gas supply chain. **One potential option for Cascade to account for difficulties in emissions tracking through all of the studies is to integrate a *scenario modeling* approach, which could include the 2.47% rate as a *high emissions* scenario.**
2. Update the GWP of Methane to 28
   - While international reporting standard under the United Nations Framework Convention on Climate Change currently requires the use of the GWP values from IPCC's AR4 (25), **the GWP estimates presented by the most recent IPCC scientific assessment reflect the current state of science**. In the IPCC AR5 Synthesis Report, this value is 28.
3. Maintain value for % Methane in Natural Gas
   - The 93.4% methane in natural gas is in line with EPA estimates of 95-98% and therefore, can be maintained. We will periodically review and update this if our sourced natural gas would indicate differently.

Reasoning Behind Calculation Updates

While Cascade recognizes upward pressure on upstream emission rates as new evaluation methods arise, we do not believe it is appropriate to move forward with the results of a single study when several other recent studies from reputable sources have not corroborated that result.

- EDF Methodology
  - **Claim**: Current inventory methods miss emissions that occur during abnormal operating conditions, and improvement of these methods could improve and verify international inventories
  - **Response:** Accurately measuring methane remains challenging and requires more frequent, regular sampling, and potentially more satellite-based methane tracking. Cascade will continue to track new methane monitoring approaches and monitoring standards as they are developed but will currently defer to a stronger consensus of upstream emissions documentation using multiple reputable sources.



Note: The estimated range is calculated by dividing the low and high upstream emission rate by historical natural gas deliveries (EIA) for the corresponding year.
Source: 1. NW Council Upstream Methane Emission Workbook

Next Steps

Compliance planning and demonstrations for the WA CCA

- Working UTC and other LDCs on auction revenue distributions for compliance

Cascade continues to pay close attention to National, Regional, and Local policies related to Carbon

Will provide a brief update of the modeling impacts at TAG 5

Renewable Natural Gas

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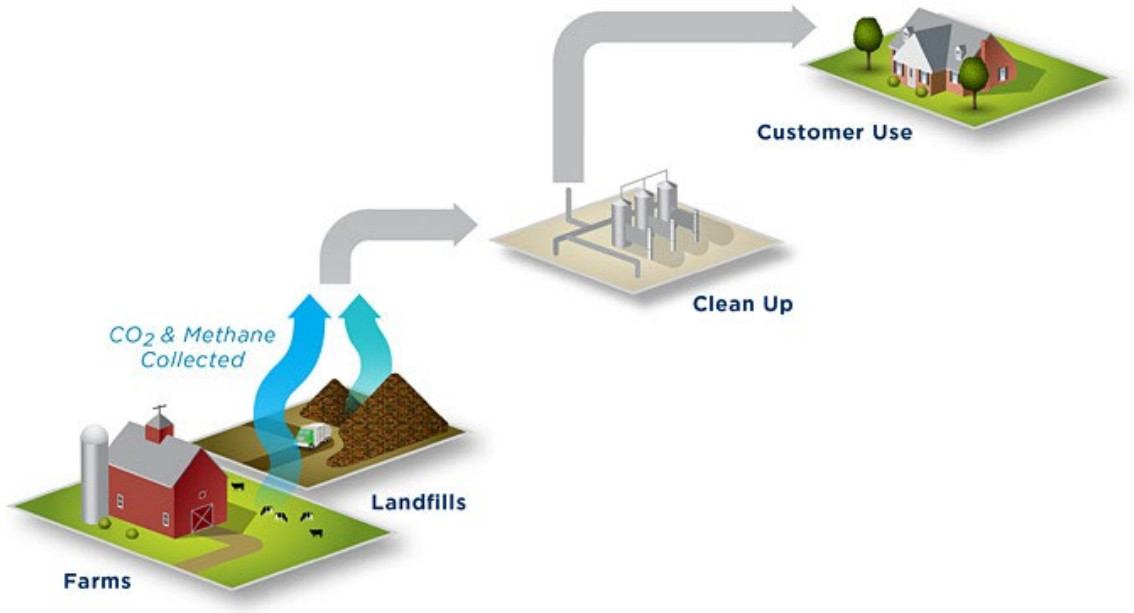


What is Renewable Natural Gas (RNG)?

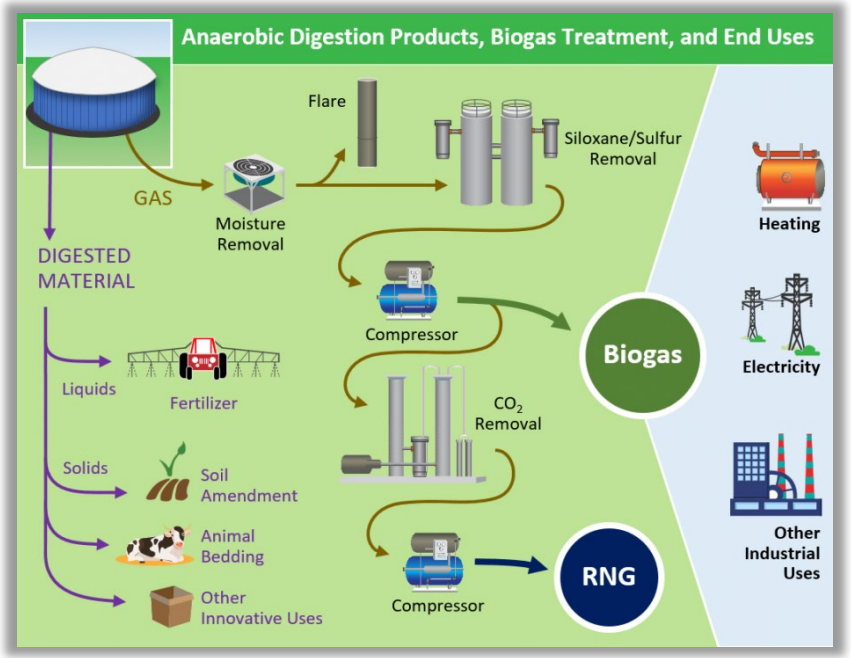
RNG is pipeline quality natural gas produced from various biomass sources through biochemical processes such as anaerobic digestion or gasification.[1]

[1] U.S. Department of Energy, Alternative Fuels Data Center, Renewable Natural Gas

Renewable Natural Gas

Examples:

- Biogas from Landfills
  - Collect waste from residential, industrial, and commercial entities.
  - Digestion process takes place in the ground, rather than in a digester.
- Biogas from Livestock Operations
  - Collects animal manure and delivers to anaerobic digester.
- Biogas from Wastewater Treatment
  - Produced during digestion of solids that are removed during the wastewater treatment process.
- Other sources include organic waste from food manufacturers and wholesalers, supermarkets, restaurants, hospitals, and more.[1]



[1] U.S. Department of Energy, Alternative Fuels Data Center, Renewable Natural Gas

Benefits

Fuel diversity benefits – Use of RNG increases and diversifies domestic energy production. RNG can be used as a baseload fuel source with high availability rates. It leverages existing infrastructure such as pipelines and heavy-duty vehicles. Biogas feedstocks for RNG are generated continuously from a variety of sources.

Economic benefits – The development of RNG projects can benefit the local economy through the construction of RNG processing and fueling station infrastructure and sale of natural gas-powered vehicles. National, state and local incentives may be available depending on the end use, such as credits for production of RNG used for vehicle fuel. These financial incentives can provide additional economic drivers for project development.

Benefits

Local air quality benefits – Replacing traditional diesel or gasoline with RNG can significantly reduce emissions of nitrogen oxides and particulate matter, resulting in local air quality benefits. RNG is comprised primarily of methane; compared to fossil natural gas, RNG contains zero to very low levels of constituents, such as ethane, propane, butane, pentane or other trace hydrocarbons.

Greenhouse gas emission reductions – RNG projects capture and recover methane produced at a landfill or anaerobic digestion (AD) facility. Methane has a global warming potential more than 25 times greater than CO2 and a relatively short (12-year) atmospheric life, so reducing these emissions can achieve near-term beneficial impacts in mitigating global climate change. For facilities that are not already required to mitigate such emissions, an RNG project can reduce methane emissions significantly.

Renewable Natural Gas

Principles of RNG Cost-Effectiveness Evaluation

On the surface, RNG appears to not be cost effective when compared to traditional natural gas, but a number of factors can level the playing field

- Potential hedge value of RNG
- Value of environmental attributes
- Cost savings related to building vs. buying

RNG is a critical resource in Cascade's projected compliance resource stack related to the CPP and CCA, but must be acquired prudently

When not deemed cost effective, RNG acquisition may still be desired under certain regulatory exceptions (Oregon SB 98)

Cascade's Cost Effectiveness Formula

$$C_{RNG} = I_{RNG} - AC_U - AC_D + \sum_{T=1}^{365} (P_{RNG} + VC - CIF) * Q$$

$$C_{Conventional} = \sum_{T=1}^{365} (P_{Conventional} + VC) * Q$$

Where

C_{RNG} = The all-inclusive annual cost of a proposed RNG project
I_{RNG} = The annual required investment to procure a proposed RNG resource. If Cascade is simply buying the gas and/or environmental attributes, this value is zero.
AC_U = Avoided upstream costs
AC_D = Avoided distribution system costs
P = Daily price of gas being evaluated
Q = Daily quantity of gas being evaluated
VC = Variable cost to move one dekatherm of gas to Cascade's distribution system. This value can be zero if a project connects directly to the Company's system.
CIF = Carbon Intensity Factor. This is calculated by multiplying the Company's expected carbon compliance cost by 1 minus the ratio of a proposed projects carbon intensity to conventional gas' carbon intensity.
$C_{Conventional}$ = The all-inclusive annual cost of conventional natural gas.

If $C_{Conventional} \geq C_{RNG}$, a project can be considered cost effective, and should be acquired. If not, the project may still be considered under the regulatory exceptions

Key Inputs

Case/RIN Selector	D5
State Jurisdiction	WA
Project Terms (yrs)	15
Project Output Volumes (dth)	200,000
Project Output Percentage (Obliged)	100.0%
Supply Price (annualized)	$1.45
Project Investment Percentage	100.0%
Project Investment	$3,000,000
Carbon Treatment	Landfill CNG
RINs Risk Rating	Avg
Inflation Escalator?	CPI
RNG Revenue Increase / (Decrease)	$1,471,938
RNG Percentage Change	0.51%
Voluntary RNG Price Adder ($/therm)	$0.91107
Potential Market Value (Enterprise Value)	-$21,432,726

Purchase Vs. Build?

Cascade utilizes different models based on whether the Company is evaluating the purchase of RNG or the building and ownership of an RNG generating facility

While philosophically the same, build model provides a more detailed breakdown of items related to ownership

Purchase model considers revenue that the Company would earn from transportation agreements of volumes of RNG that Cascade would not own

Future Considerations

Include Risk Reduction value from avoided cost as RNG benefit?

Stochastic analysis of key inputs

Modification of CIF factor to use IRP marginal carbon compliance cost?

Voluntary RNG/Offset Program

Internal re-organization planning to staff the program

Work in process to secure RNG resources and/or attributes

Next steps:

- IT systems/ billing systems in place
- Stakeholder meetings
- Program/tariff filing

The State of Hydrogen

RNG and Hydrogen will be critical in meeting the dual goals of decarbonizing energy pipelines while maintaining the benefits of reliability and resiliency provided by our distribution system

Hydrogen Shot [Hydrogen Shot | Department of Energy]

- 111 Goal: reduce the cost of clean hydrogen by 80% to $1 per 1 Kg in 1 decade

H2Hubs

- Release of NOI to fund Bipartisan Infrastructure Law's $8 billion program
- Develop regional hubs across the country
- Hubs will include production, processing, delivery, storage, and end-use of hydrogen
- FOA in Sept/Oct 2022

Hydrogen Research

Sister company investment in GTI and LCRI

LCRI [Low-Carbon Resources Initiative (epri.com)]

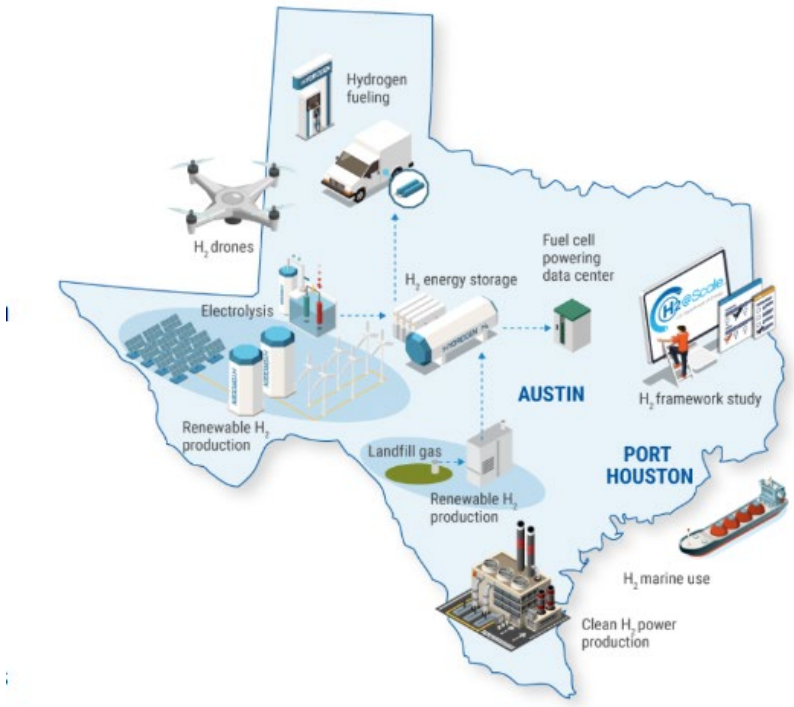
- 5-year collaborative supported by electric and gas utilities
- Advance the technologies needed for deep decarbonization within the next decade so they can be deployed in the 2030 to 2050 timeframe

GTI Hydrogen Technology Center[Hydrogen Technology Center • GTI Energy]

- Cross-cutting research, product development, and demonstration projects, focused on clean hydrogen production, storage, delivery, and use

Hydrogen Research – examples

H2@SCALE IN TEXAS AND BEYOND



ASSESSING H2 COMPATIBILITY IN NATURAL GAS INFRASTRUCTURE

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Cascade Natural Gas Renewable Gas Programs

RNG DEVELOPMENT STATUS

KENT CROUSE – INDUSTRIAL SERVICES MGR. – RENEWABLE NATURAL GAS & H_2

WUTC TAG4 – 8/10/22

Overview

Priority 1 – On System RNG Development with Attribute Purchase

- 4 projects in active contract negotiations
- 1 project in early development

Priority 2 – On System RNG Development, Transportation Only

- Where Environmental Attributes cannot be purchased, these projects displace geological gas on Cascade's system
- 1 project under contract
- 1 project in active contract negotiation
- 5 projects in early development

Deschutes County Landfill, Bend OR

- Cascade/Jacobs Engineering Team was successful candidate chosen through RFP process to own and operate processing facilities to convert landfill gas to RNG.
- RNG to be injected into local distribution system.
- Currently working through landfill operation & contractual details with Deschutes County
- Volumes/Term - 2,500,000 therm/yr, 20 Years - TBD

Combined Landfill/Food Waste Project– Benton, County

- 3rd part developer has rights to raw biogas from two sources in close proximity to each other - a Landfill and a Food Processing Plant.
- Currently in contract negotiations with developer to purchase RNG from both locations.
- RNG to be injected into local distribution system.
- Volumes/Term - 1,250,000 therm/yr, 15 years

Municipal Industrial Food Wastewater Project– Franklin, County

- Wastewater from 6 food producers/manufacturers aggregated in municipal processing facility
- Purchase and Interconnect contract negotiations in progress
- RNG to be injected into local distribution system.
- Volume/Terms - 3,400,000 therm/yr, 15-20 years

Industrial Food Waste Project– Yakima, County

- Food Waste from Industrial Food Processor
- Purchase and Interconnect contract negotiations in progress
- RNG to be injected into local distribution system.
- Volume/Terms - 715,000 therm/yr, 10 years

National Food Waste Aggregator – Cowlitz, County

- Food Waste aggregated from ~100 grocery stores in Washington & Oregon
- Interconnect Agreement executed for RNG transportation service
- RNG to be injected into local distribution system.
- Volumes - 1,800,000 therm/yr, operation start planned Q4/23

Dairy RNG Project– Snohomish, County

- 3,500 Head Dairy Operation
- Interconnect Agreement in negotiation for RNG transportation service
- RNG to be injected into local distribution system.
- Volumes - 815,000 therm/yr, operational start late Q4/23

Single RNG Projects can provide significant local impacts

Projects listed for Franklin County, Yakima County, Snohomish County, and Deschutes County, OR are sufficiently significant to offset near 100% of geological gas during times of lowest system demand

DSM Forecast, 2023 IRP

Monica Cowlishaw & Caleb Reimer

August 10th, 2022

DSM Topics

Overview
- Program Performance
- LoadMAP Modeling Tool

LoadMAP Scenarios – Changes in Avoided Costs
- Original 2021 CPA
- Updated Reference Case Avoided Costs
- RNG Future
- RNG Future + Municipal Gas Bans

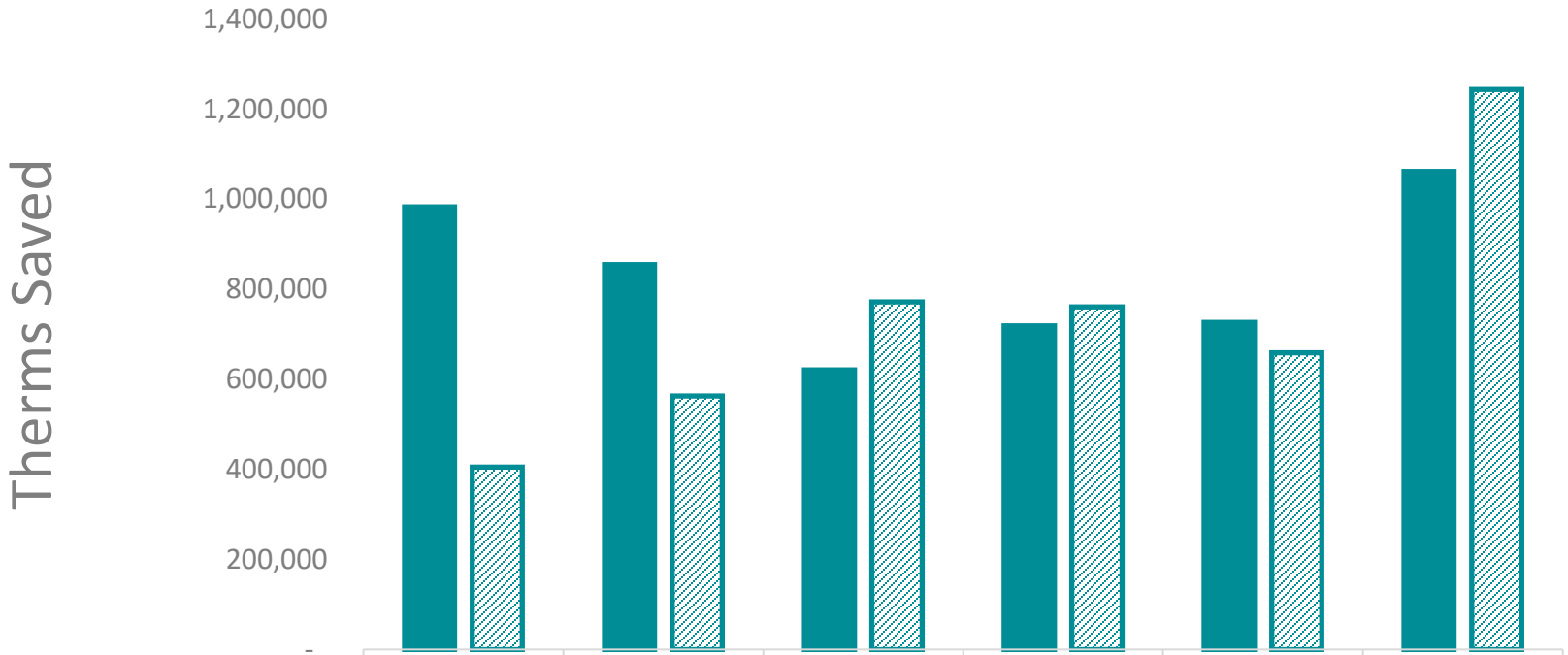
Energy Efficiency Forecast

Energy Efficiency Programs
- Commercial and Industrial
- Residential
- Portfolio

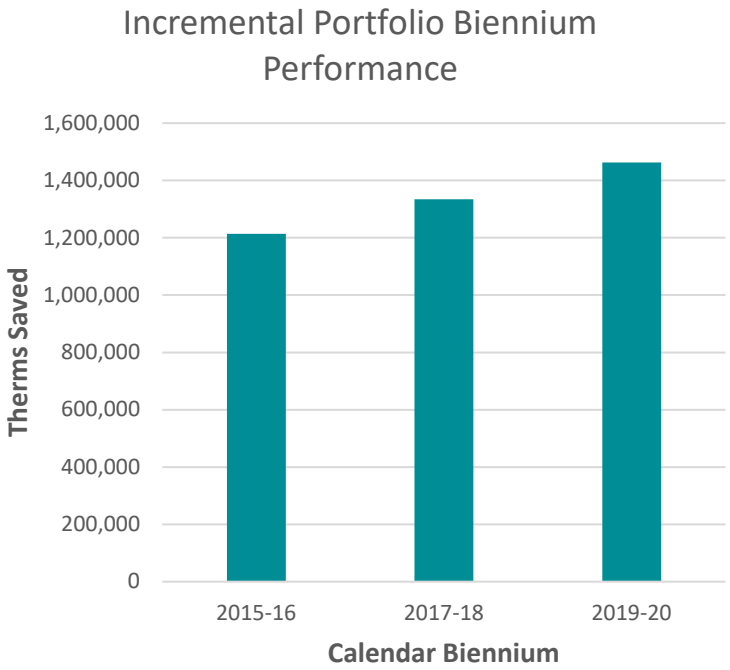
DSM Action Items / Next Steps

Overview

Incremental Portfolio Annual Accomplishments



Calendar Year	2016	2017	2018	2019	2020	2021
Targeted Therm Savings	982,915	854,876	621,267	719,011	726,625	1,061,827
Actual Therm Savings	405,557	562,956	771,819	760,956	659,176	1,243,223



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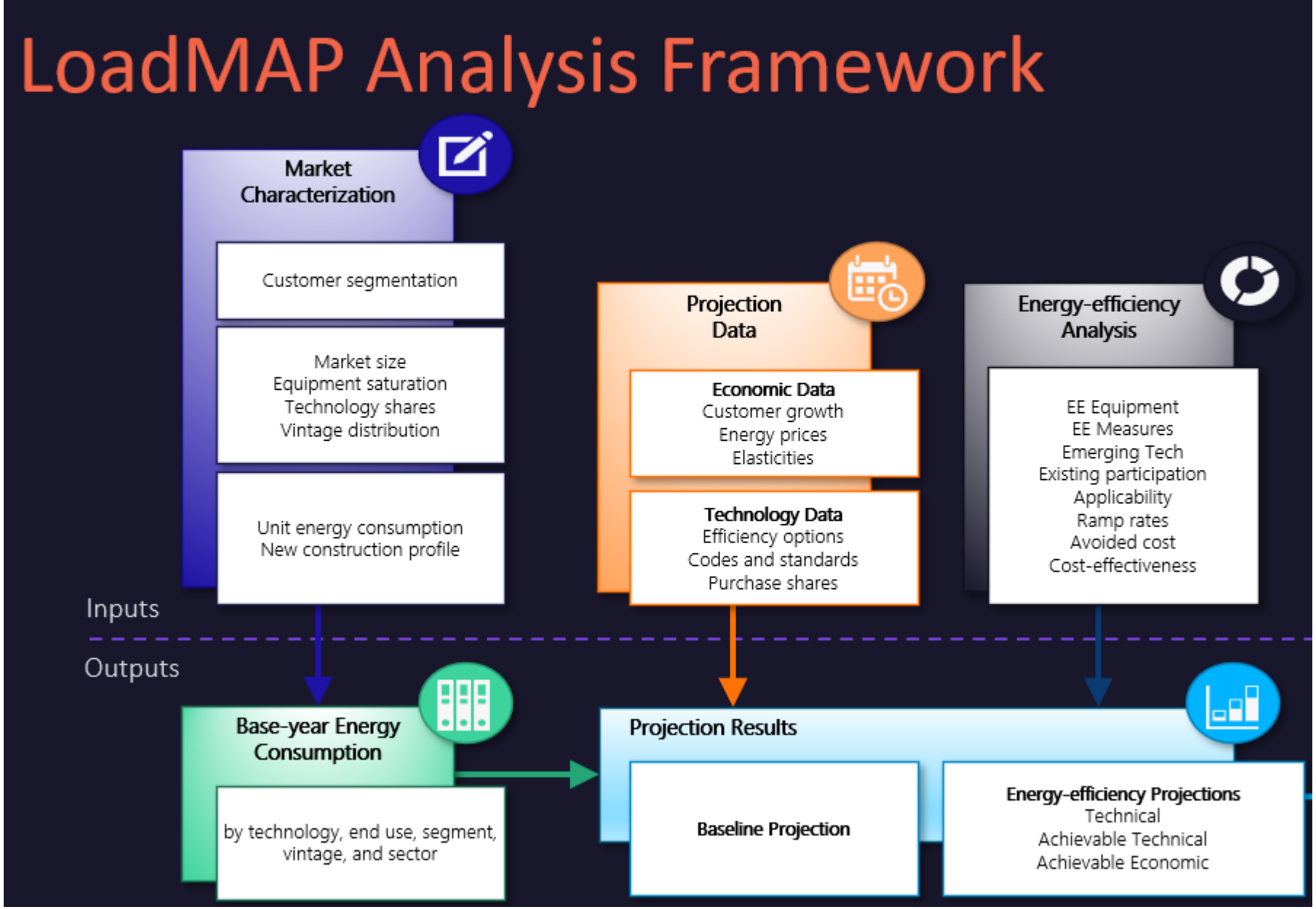
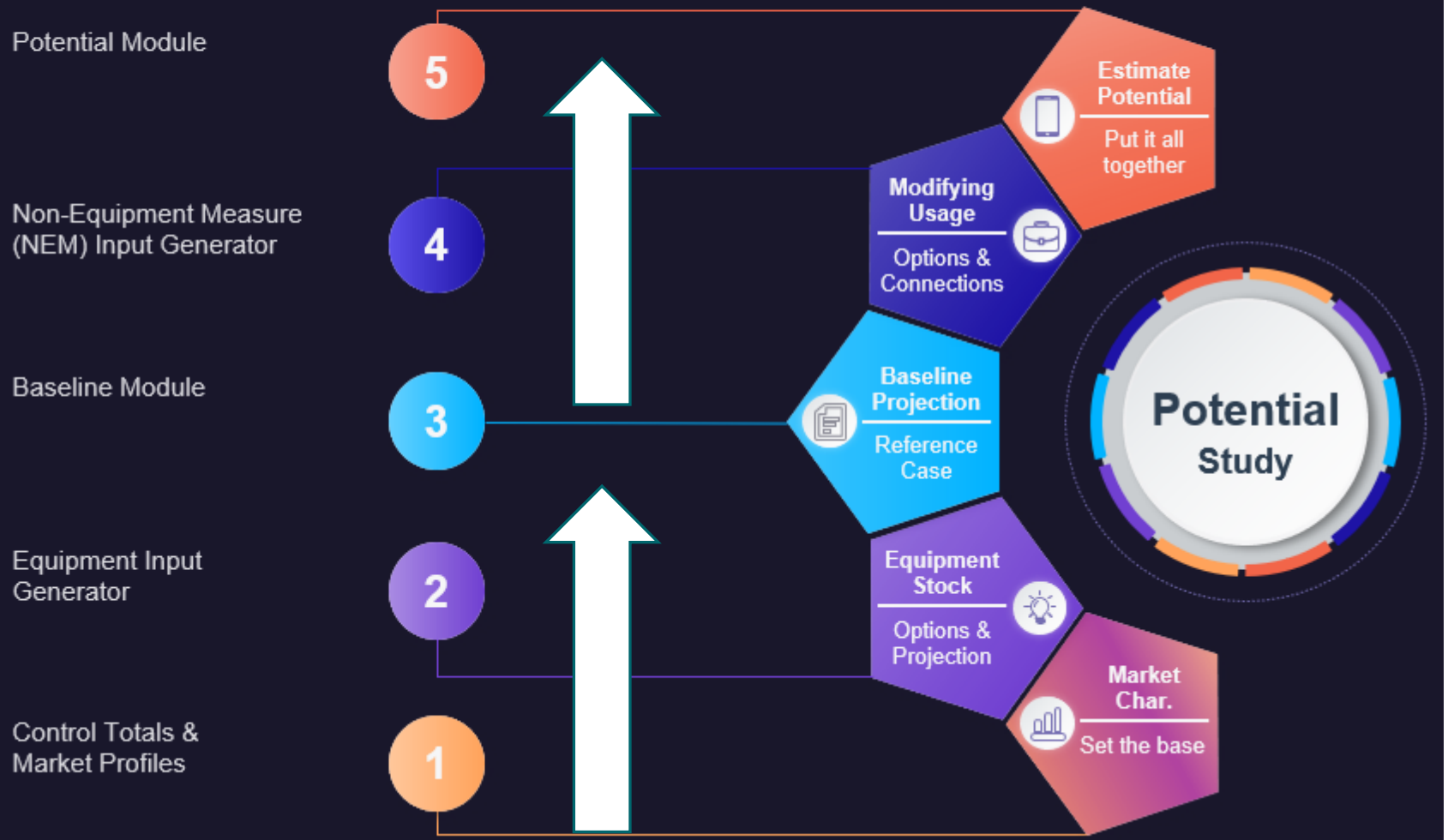
LoadMAP Analysis Framework

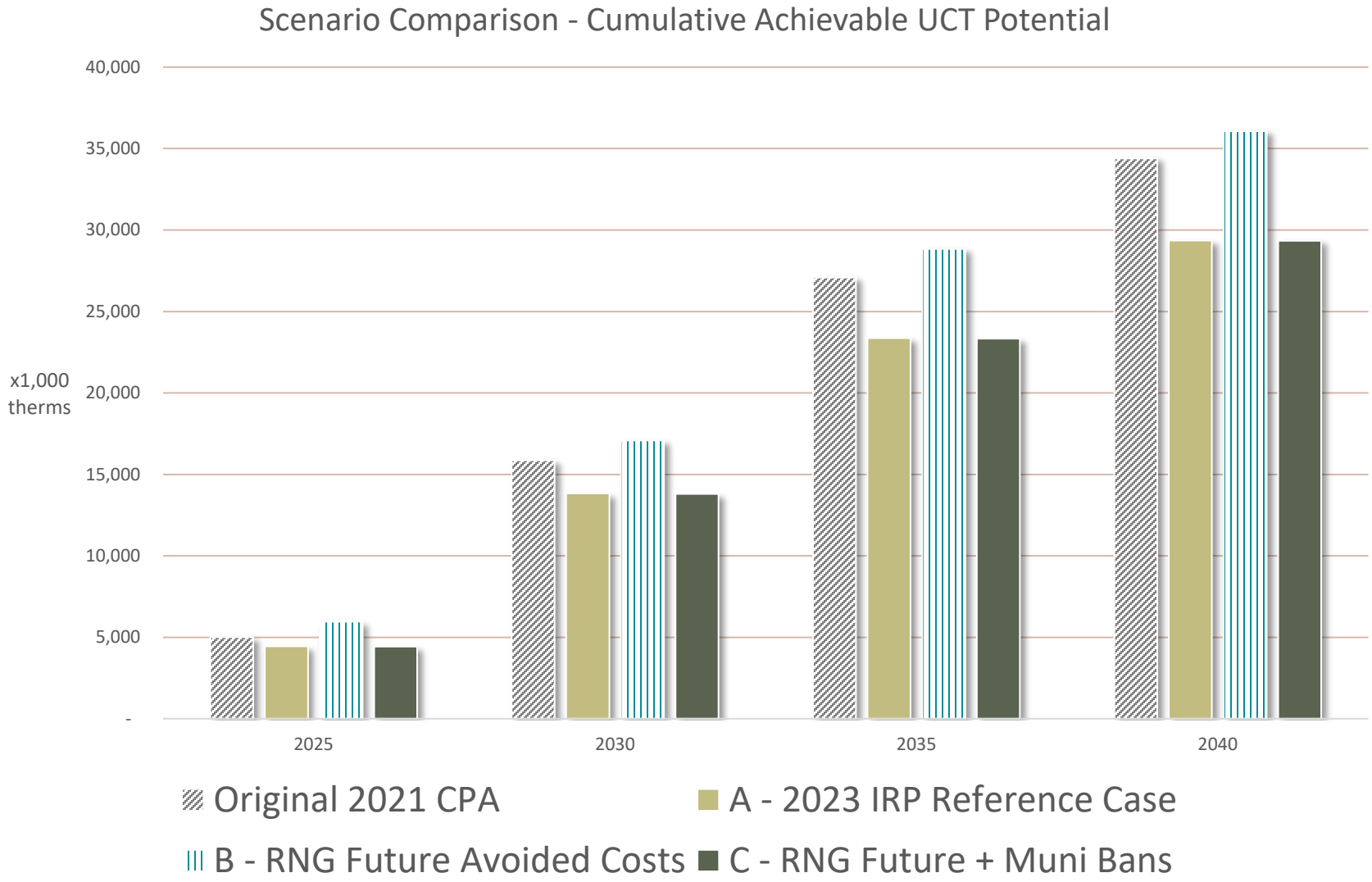


LoadMAP Analysis Framework



3 New LoadMAP Scenarios

- Original 2021 Discount Rate = 3.40%
- Updated Discount Rate = 5.06%
- Time Horizon of 2050
- Declining HDD



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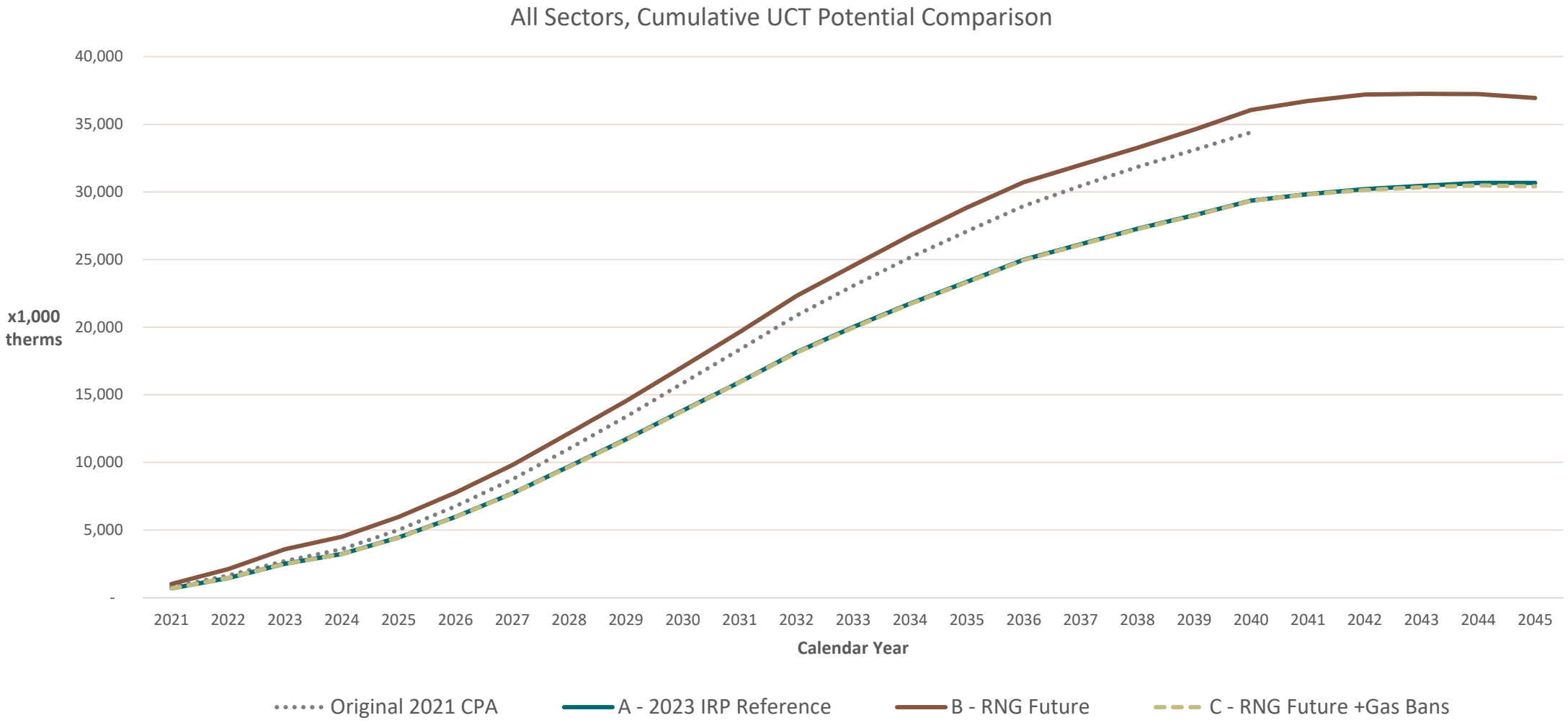
Scenario Comparison



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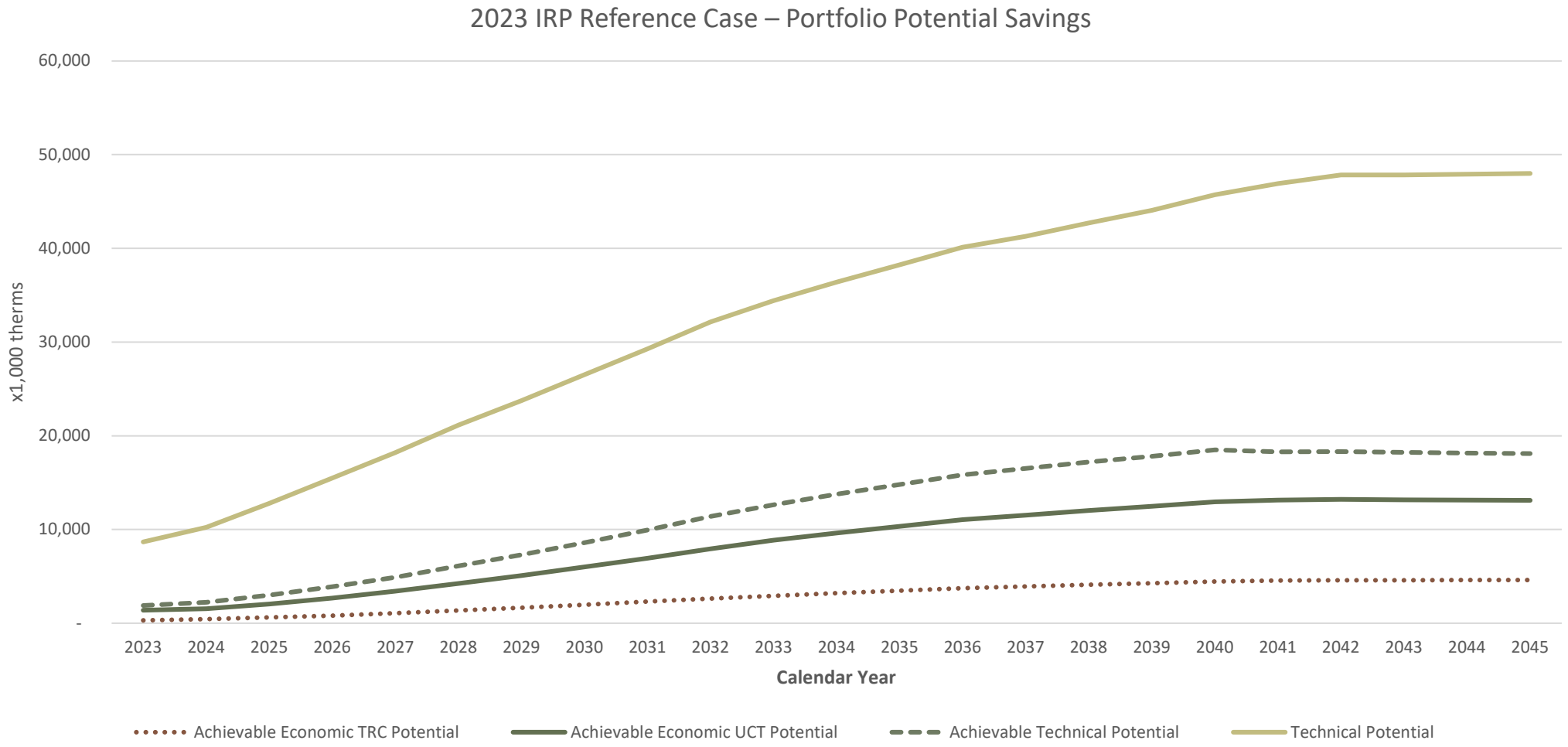
Energy Efficiency Present - 2045 Cumulative Potential Forecast



COMMERCIAL & INDUSTRIAL

COMMERCIAL FORECAST SUMMARY

Summary of Energy Savings (thousand therms), Selected Years	2023	2024	2025	2030	2035	2040	2045
Reference Baseline	243,965	247,595	247,199	253,812	259,582	266,336	272,292
Cumulative Savings (thousand therms)							
Achievable Economic TRC Potential	363	836	1,441	6,453	11,253	14,155	15,144
Achievable Economic UCT Potential	378	873	1,492	6,497	11,294	14,426	15,585
Achievable Technical Potential	1,157	2,475	3,874	11,760	17,586	20,586	21,070
Technical Potential	2,338	4,661	6,943	18,372	25,225	28,582	29,740
Energy Savings (% of Baseline)							
Achievable Economic TRC Potential	0.1%	0.3%	0.6%	2.5%	4.3%	5.3%	5.6%
Achievable Economic UCT Potential	0.2%	0.4%	0.6%	2.6%	4.4%	5.4%	5.7%
Achievable Technical Potential	0.5%	1.0%	1.6%	4.6%	6.8%	7.7%	7.7%
Technical Potential	1.0%	1.9%	2.8%	7.2%	9.7%	10.7%	10.9%
Incremental Savings (thousand therms)							
Achievable Economic TRC Potential	361	466	624	1,264	1,142	1,040	1,295
Achievable Economic UCT Potential	377	485	638	1,241	1,153	1,068	1,204
Achievable Technical Potential	1,386	1,493	1,667	1,966	1,599	1,401	1,765
Technical Potential	2,332	2,280	2,425	2,550	2,011	1,777	2,384

Commercial Top Ten Measures

Rank	Measure / Technology (Ranked by 1st year potential)	Achievable Economic UCT Potential (therms) Incremental (Annual) Potential					% of 2045 Total
		2023	2024	2025	2035	2045	
1	Commercial - Insulation - Roof/Ceiling	53,388	92,767	139,502	99,986	17,548	1%
2	Commercial - Water Heater	32,064	34,862	42,111	208,234	202,618	16.8%
3	Commercial - Gas Boiler - Insulate Hot Water Lines	26,824	48,090	72,526	61,649	1,592	0.1%
4	Commercial - Insulation - Wall Cavity	25,027	29,326	46,540	175,988	367,074	30.5%
5	Commercial - Fryer	20,018	28,260	38,956	73,257	85,244	7.1%
6	Commercial - Boiler	19,899	19,746	19,100	14,450	0	0.0%
7	Commercial - Hydronic Heating Radiator Replacement	19,784	22,456	27,855	39,368	48,567	4.0%
8	Commercial - Water Heater - Ozone Laundry	18,807	22,322	25,359	1,647	0	0.0%
9	Commercial - Furnace	16,887	20,497	29,491	200,564	207,175	17.2%
10	Commercial - Gas Boiler - Hot Water Reset	15,082	17,364	19,149	925	0	0.0%

INDUSTRIAL FORECAST SUMMARY

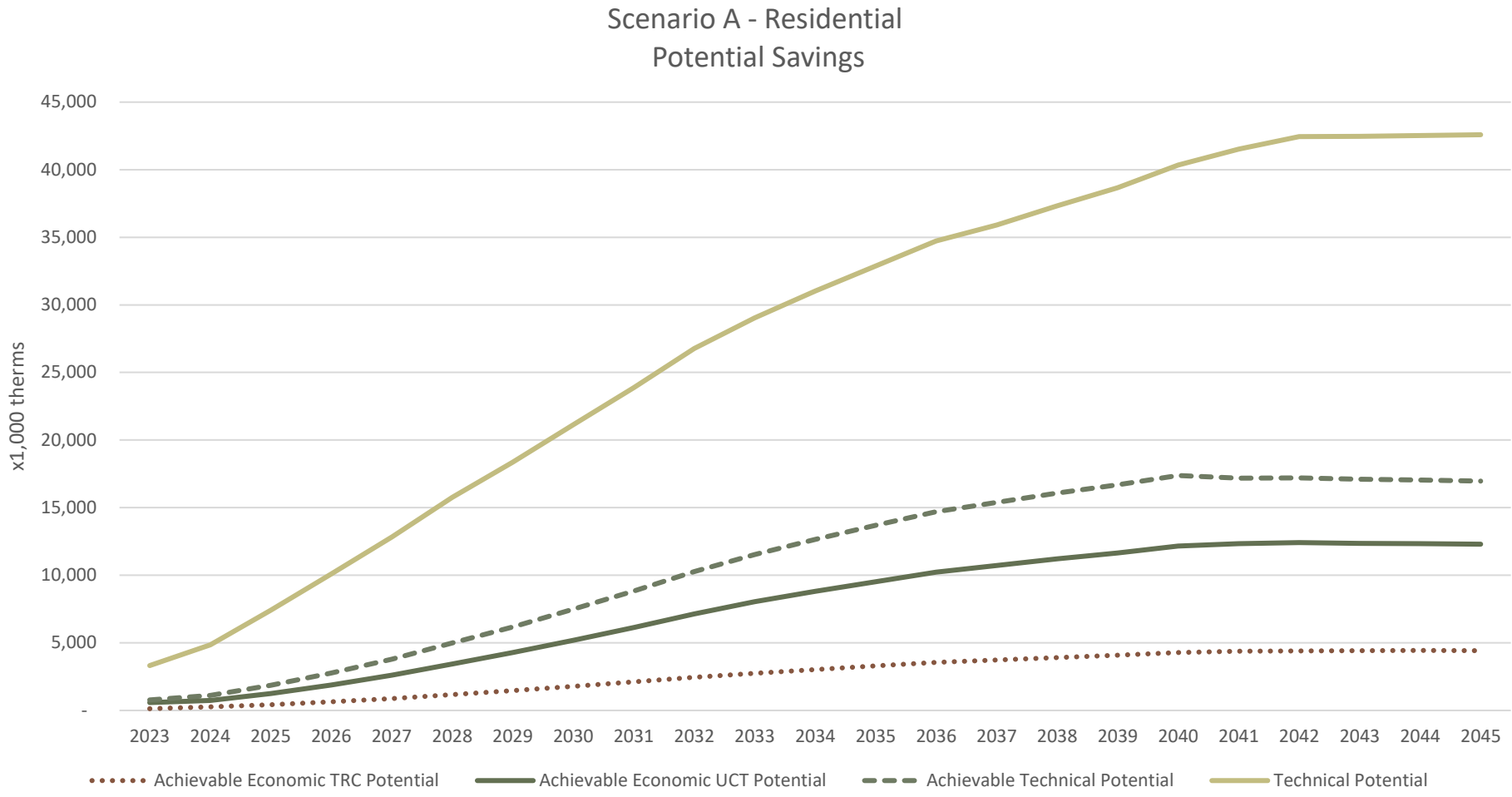
Summary of Energy Savings (thousand therms), Selected Years	2023	2024	2025	2030	2035	2040	2045
Reference Baseline	243,965	247,595	247,199	253,812	259,582	266,336	272,292
Cumulative Savings (thousand therms)							
Achievable Economic TRC Potential	94	204	321	927	1,326	1,534	1,518
Achievable Economic UCT Potential	81	168	256	697	1,082	1,322	1,333
Achievable Technical Potential	121	258	405	1,130	1,595	1,818	1,792
Technical Potential	158	334	515	1,391	1,927	2,172	2,155
Energy Savings (% of Baseline)							
Achievable Economic TRC Potential	0.0%	0.1%	0.1%	0.4%	0.5%	0.6%	0.6%
Achievable Economic UCT Potential	0.0%	0.1%	0.1%	0.3%	0.4%	0.5%	0.5%
Achievable Technical Potential	0.0%	0.1%	0.2%	0.4%	0.6%	0.7%	0.7%
Technical Potential	0.1%	0.1%	0.2%	0.5%	0.7%	0.8%	0.8%
Incremental Savings (thousand therms)							
Achievable Economic TRC Potential	95	110	121	123	86	68	60
Achievable Economic UCT Potential	81	87	89	93	83	71	63
Achievable Technical Potential	125	143	154	149	102	82	72
Technical Potential	160	179	187	176	119	97	86

Industrial Top Ten Measures

Rank	Measure / Technology (Ranked by 1st year potential)	Achievable Economic UCT Potential (therms) Incremental (Annual) Potential					% of 2045 Total
		2023	2024	2025	2035	2045	
1	Industrial - Strategic Energy Management	20,542	21,046	21,191	23,494	23,502	37%
2	Industrial - Process - Insulate Heated Process Fluids	10,778	11,058	11,161	1,523	2,064	3.3%
3	Industrial - Gas Boiler - Insulate Hot Water Lines	9,703	9,750	9,711	9,614	982	1.6%
4	Industrial - Gas Boiler - Stack Economizer	9,556	9,785	9,854	1,323	1,165	1.9%
5	Industrial - Process Heat Recovery	5,148	6,128	7,047	508	2,535	4.0%
6	Industrial - Gas Boiler - Insulate Steam Lines/Condensate Tank	4,744	4,656	4,570	460	0	0.0%
7	Industrial - Gas Boiler - Hot Water Reset	4,563	4,674	4,709	5,243	865	1.4%
8	Industrial - Gas Boiler - High Turndown	3,759	3,847	3,872	518	457	0.7%
9	Industrial - Gas Boiler - Maintenance	3,091	4,801	4,388	17,794	17,508	27.8%
10	Industrial - Unit Heater	2,431	2,872	2,282	2,125	744	1.2%

RESIDENTIAL

Energy Efficiency 2045
Cumulative Potential Forecast: Residential (RES)



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RESIDENTIAL FORECAST SUMMARY

Summary of Energy Savings (thousand therms), Selected Years	2023	2024	2025	2030	2035	2040	2045
Reference Baseline	243,965	247,595	247,199	253,812	259,582	266,336	272,292
Cumulative Savings (thousand therms)							
Achievable Economic TRC Potential	125	255	424	1,784	3,285	4,270	4,416
Achievable Economic UCT Potential	584	723	1,246	5,183	9,526	12,153	12,290
Achievable Technical Potential	767	1,115	1,865	7,480	13,687	17,372	16,968
Technical Potential	3,303	4,846	7,404	21,146	32,873	40,339	42,598
Energy Savings (% of Baseline)							
Achievable Economic TRC Potential	0.1%	0.1%	0.2%	0.7%	1.3%	1.6%	1.6%
Achievable Economic UCT Potential	0.2%	0.3%	0.5%	2.0%	3.7%	4.6%	4.5%
Achievable Technical Potential	0.3%	0.5%	0.8%	2.9%	5.3%	6.5%	6.2%
Technical Potential	1.4%	2.0%	3.0%	8.3%	12.7%	15.1%	15.6%
Incremental Savings (thousand therms)							
Achievable Economic TRC Potential	128	144	176	339	285	194	6
Achievable Economic UCT Potential	596	466	548	970	889	667	103
Achievable Technical Potential	786	680	795	1,411	1,291	903	105
Technical Potential	3,383	2,654	2,722	3,061	2,161	1,862	373

Residential Top Ten Measures

Rank	Measure / Technology (Ranked by 1st year potential)	Achievable Economic UCT Potential (therms) Incremental (Annual) Potential					% of 2045 Total
		2023	2024	2025	2035	2045	
1	Residential - Furnace - Direct Fuel	224,866	46,915	51,094	78,871	17,013	16%
2	Residential - Water Heater <= 55 gal.	95,501	95,478	102,000	129,025	56,865	55.1%
3	Residential - ENERGY STAR™ Connected Thermostat	79,577	88,382	96,342	171,431	0	0.0%
4	Residential - Insulation - Ceiling, Installation	43,181	45,054	46,154	57,517	0	0.0%
5	Residential - ENERGY STAR Clothes Washers	26,259	23,351	29,544	72,556	25,005	24.2%
6	Residential - Fireplace	26,073	26,046	25,884	24,706	0	0.0%
7	Residential - Insulation - Basement Sidewall	13,741	22,273	33,146	106,689	0	0.0%
8	Residential - Ducting - Repair and Sealing	13,311	23,226	35,459	27,481	0	0.0%
9	Residential - Gas Boiler - Pipe Insulation	8,093	4,387	5,339	8,416	0	0.0%
10	Residential - Thermostat - Programmable	7,909	13,837	21,415	17,955	0	0.0%

Top Measures - Alternate Scenarios

B - RNG Future

Rank	Measure / Technology (Ranked by 1st year potential)	Achievable Economic UCT Potential (therms) Incremental (Annual) Potential					% of 2045 Total
		2023	2024	2025	2035	2045	
1	Residential - Furnace - Direct Fuel	497,823	48,474	52,809	81,232	9,913	6.4%
2	Residential - Water Heater <= 55 gal.	157,310	168,259	194,025	333,759	112,159	72.2%
3	Residential - Insulation - Wall Cavity, Installation	80,537	90,234	98,374	174,805	0	0.0%
4	Residential - ENERGY STAR Connected Thermostat	76,250	79,488	81,342	99,135	0	0.0%
5	Residential - Insulation - Ceiling, Installation	45,271	47,226	48,373	60,020	0	0.0%
6	Residential - ENERGY STAR Clothes Washers	27,177	24,182	30,603	75,153	26,528	17.1%

C -RNG Future + Gas Bans

Rank	Measure / Technology (Ranked by 1st year potential)	Achievable Economic UCT Potential (therms) Incremental (Annual) Potential					% of 2045 Total
		2023	2024	2025	2035	2045	
1	Residential - Furnace - Direct Fuel	231,677	48,474	52,809	81,232	17,013	16.8%
2	Residential - ENERGY STAR Connected Thermostat	87,597	90,494	100,657	136,991	55,018	54.3%
3	Residential - Water Heater <= 55 gal.	80,424	90,106	98,231	174,657	0	0.0%
4	Residential - Insulation - Ceiling, Installation	43,479	45,364	46,472	57,916	0	0.0%
5	Residential - ENERGY STAR Clothes Washers	26,573	26,548	26,385	25,188	0	0.0%
6	Residential - Fireplace	26,290	23,326	29,521	72,544	25,005	24.7%

Portfolio

Portfolio Top Twenty Measures

Rank	Measure / Technology (Ranked by 1st year potential)	Achievable Economic UCT Potential (therms) 2023	2024	2025	2035	2045	% of 2045 Total
1	Residential - Furnace - Direct Fuel	224,866	46,915	51,094	78,871	17,013	1%
2	Residential - Water Heater <= 55 gal.	95,501	95,478	102,000	129,025	56865	4.2%
3	Residential - ENERGY STAR Connected Thermostat	79,577	88,382	96,342	171,431	0	0.0%
4	Residential - Insulation - Ceiling, Installation	53,388	92,767	139,502	99,986	17548	1.3%
5	Commercial - Insulation - Roof/Ceiling	43,181	45,054	46,154	57,517	0	0.0%
6	Residential - ENERGY STAR Clothes Washers	32,064	34,862	42,111	208,234	202618	14.8%
7	Commercial - Water Heater	26,824	48,090	72,526	61,649	1592	0.1%
8	Commercial - Gas Boiler - Insulate Hot Water Lines	26,259	23,351	29,544	72,556	25005	1.8%
9	Industrial - Strategic Energy Management	26,073	26,046	25,884	24,706	0	0.0%
10	Commercial - Insulation - Wall Cavity	25,027	29,326	46,540	175,988	367074	26.8%
11	Commercial - Fryer	20,542	21,046	21,191	23,494	23502	1.7%
12	Commercial - Boiler	20,018	28,260	38,956	73,257	85244	6.2%
13	Commercial - Hydronic Heating Radiator Replacement	19,899	19,746	19,100	14,450	0	0.0%
14	Residential - Fireplace	19,784	22,456	27,855	39,368	48567	3.5%
15	Commercial - Water Heater - Ozone Laundry	18,807	22,322	25,359	1,647	0	0.0%
16	Commercial - Furnace	16,887	20,497	29,491	200,564	207175	15.1%
17	Commercial - Gas Boiler - Hot Water Reset	15,082	17,364	19,149	925	0	0.0%
18	Industrial - Process - Insulate Heated Process Fluids	13,827	14,170	14,218	4,348	3190	0.2%
19	Commercial - Kitchen Hood - DCV/MUA	13,741	22,273	33,146	106,689	0	0.0%
20	Commercial - Unit Heater	13,311	23,226	35,459	27,481	0	0.0%

DSM Action Items /Next Steps

- EM&V: Operating under Biennial Conservation Plan
- New CPA: Completing in 2023
- Municipal Gas Bans: Impact on future assumption i.e., scenario B & C
- Code changes
- Low income
- Adaptive management
- IRP DSM Chapter: September 2022

Questions?

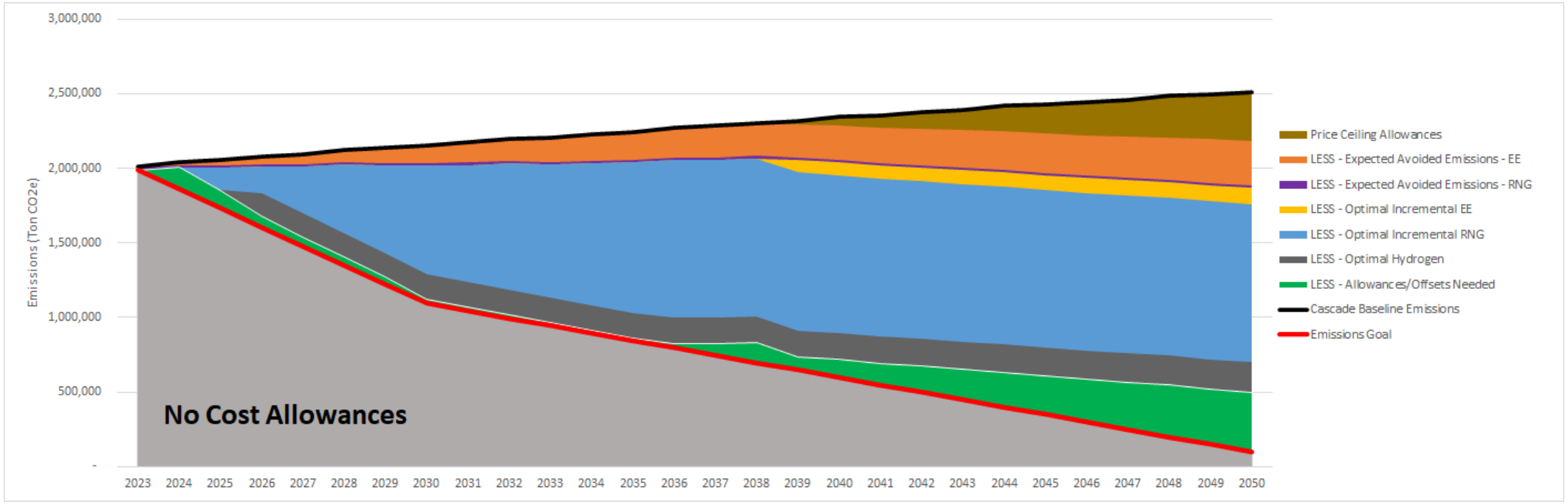
Preliminary Results

Preliminary upstream pipeline transportation results

	First year shortfall w/o DSM	Max Shortfall	First year shortfall w/ DSM	Max Shortfall
Zone 11	2034	7,570	2046	1,430
Zone ME-WA and GTN	2038	20,390	2049	3,600

- Preliminary results show shortfalls on transportation side.
- DSM delays about 11-12 years.
- Remaining shortfall could be solved by targeted DSM, pipeline expansion, on-system RNG/Hydrogen if deemed peak day reliable, etc.

Base Case Modeling for Climate Commitment Act



Distribution System Planning

KATHLEEN CAMPBELL, PE – SENIOR ENGINEER

WASHINGTON

AUGUST 10TH, 2022

Presentation will cover:

1. Distribution system modeling process
2. Identification of system deficits/constraints
3. Distribution enhancements/reinforcements options to address deficits
4. Enhancement review and selection process to capital budget
5. Enhancement/reinforcements identified in 2023-2027 capital budget
6. Iterative process of IRP

Distribution System Modeling

System Dynamics:

Piping:

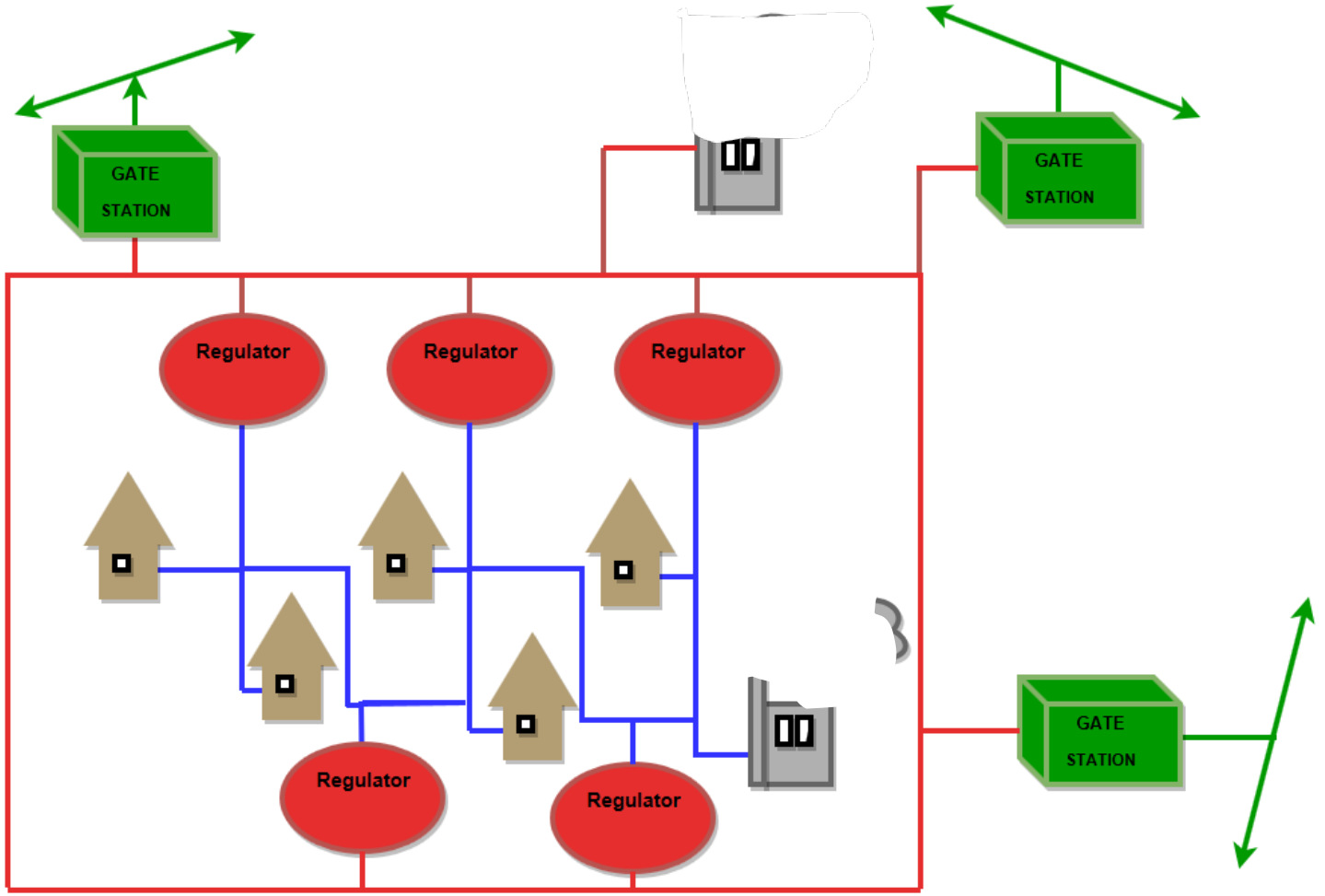
- Diameter – ½” to 20”
- Material – Polyethylene and Steel
- Operating Pressure – 20 psi to 900 psi
- Washington – approx. 4,893 miles of distribution & 170 miles of transmission
- Oregon – approx. 1,710 miles of distribution & 107 miles of transmission

System Dynamic's Cont.

Facilities:

- Regulator stations – Over 700
- Valves – Over 1,600
- Other equipment such as heaters, odorizer and compressors

System Design



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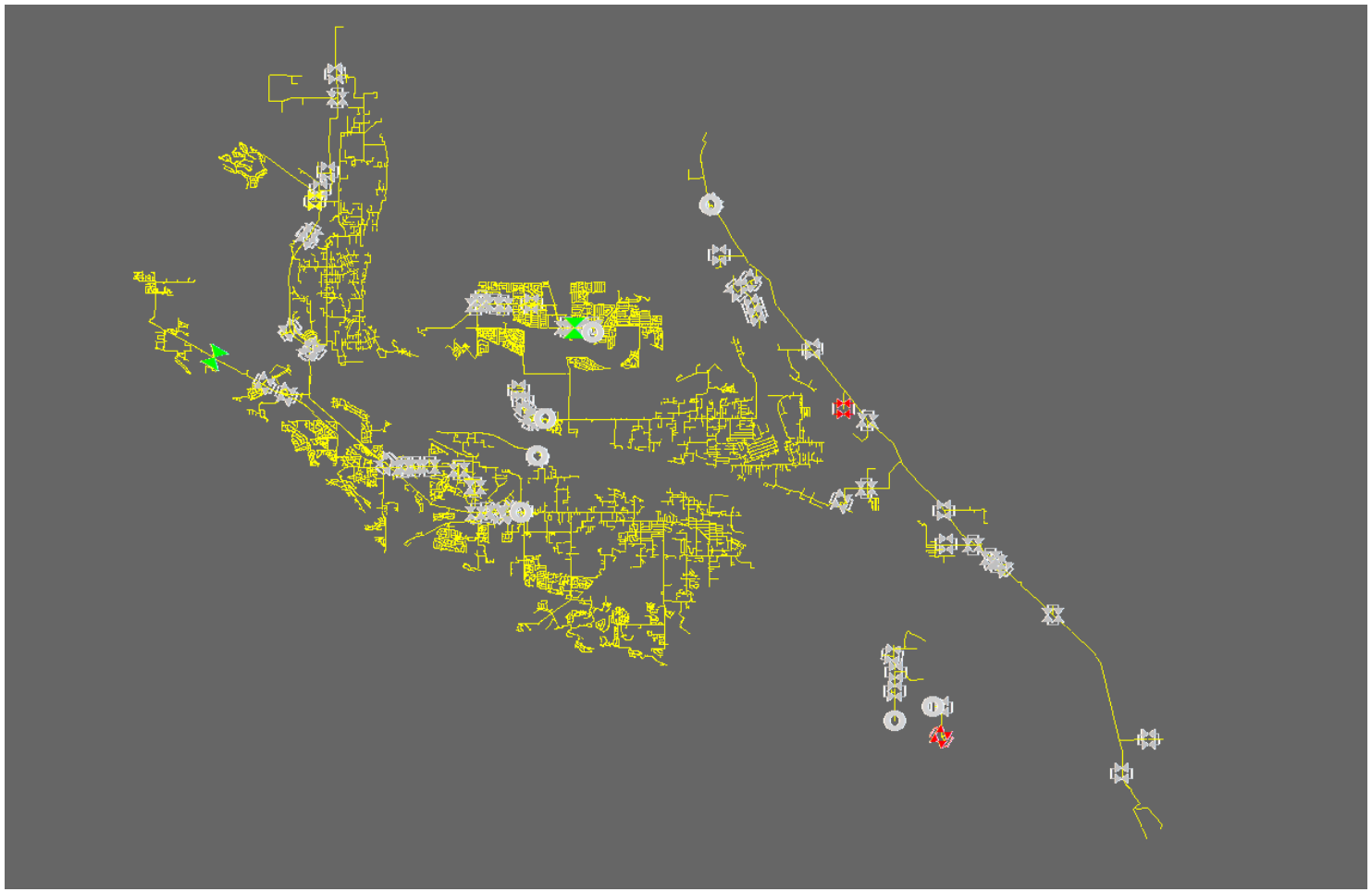
Synergi Gas Modeling

- To evaluate our systems for growth and potential future deficits we use our gas modeling software, Synergi Gas
- Synergi gas is distributed and supported by DNV GL
- Synergi Gas models incorporates:
  - Total customer loads
  - Existing pipe and system configurations
- Synergi gas is a hydraulic modeling software that allows us to predict flows and pressures on our system based on gas demands predicted during a peak weather event.
- Synergi models are updated every three years and maintained between rebuilds

Synergi Model Example



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Model Building Process

Synergi models are completely rebuilt every three years and maintained/updated between rebuilds

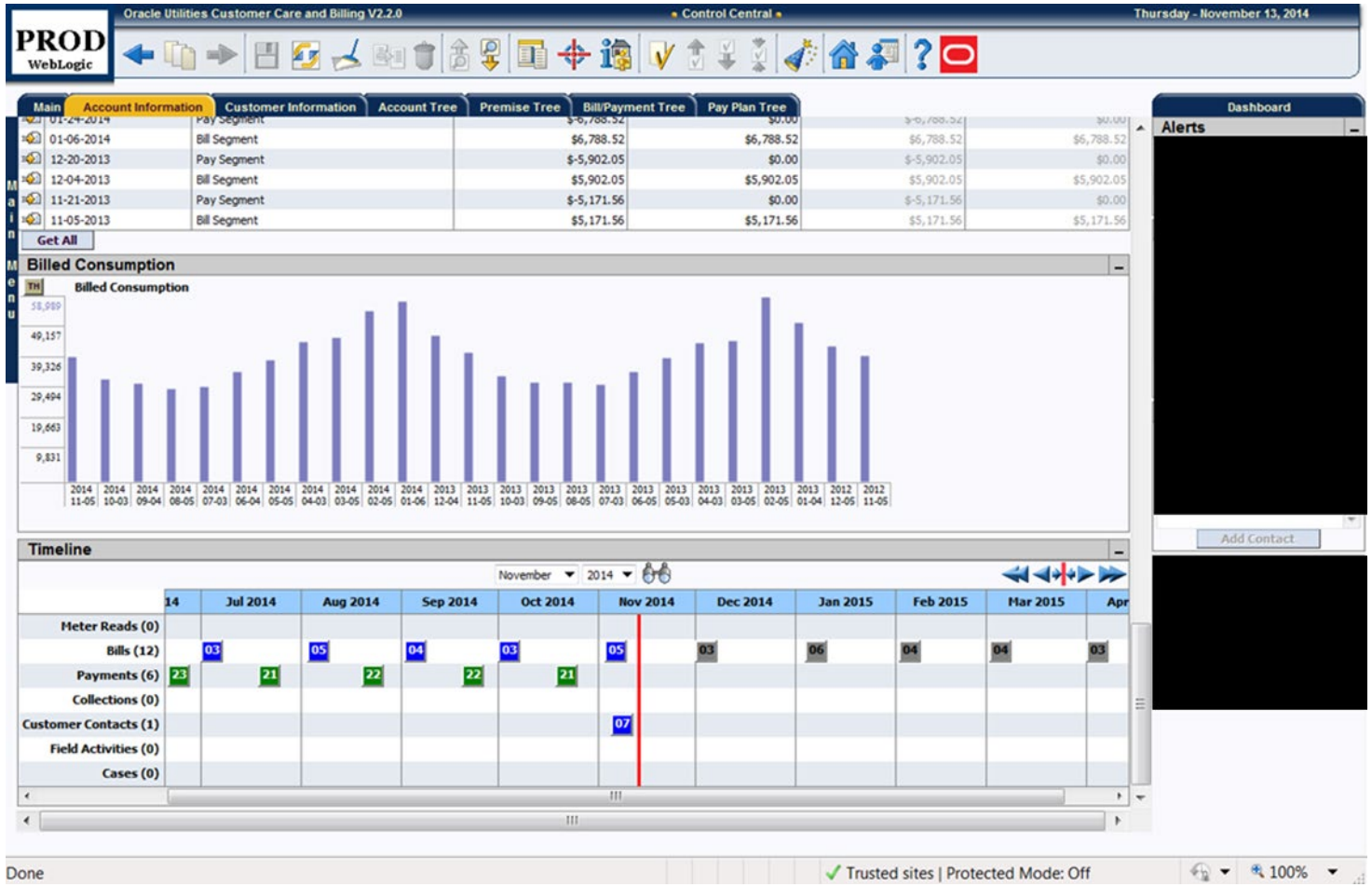
When models are rebuilt

- We export current GIS data to build spatial model
- We export current CC&B billing data to CMM to create an updated demands file
- We validation and calibrate each district model to a recent low-pressure event using existing data (ERXs/pressure charts/SCADA/metertek/LV usage)
- We create a design day model based on the updated heating degree day determined by gas supply (determined by trending historical weather events)

CNG models were rebuilt in 2021

Data Gathering

CC&B (Customer Billing Data)



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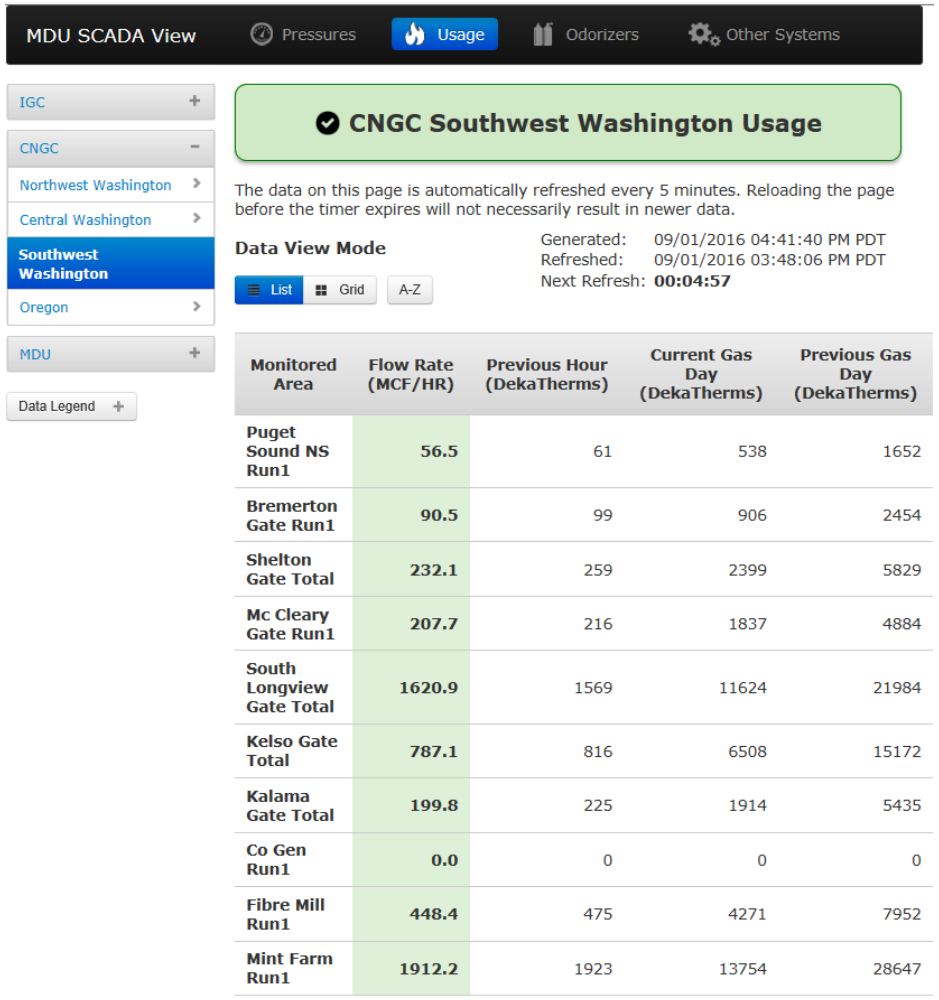
Data Gathering



Monitored Area	Flow Rate (MCF/HR)	Previous Hour (DekaTherms)	Current Gas Day (DekaTherms)	Previous Gas Day (DekaTherms)
Puget Sound NS Run1	56.5	61	538	1652
Bremerton Gate Run1	90.5	99	906	2454
Shelton Gate Total	232.1	259	2399	5829
Mc Cleary Gate Run1	207.7	216	1837	4884
South Longview Gate Total	1620.9	1569	11624	21984
Kelso Gate Total	787.1	816	6508	15172
Kalama Gate Total	199.8	225	1914	5435
Co Gen Run1	0.0	0	0	0
Fibre Mill Run1	448.4	475	4271	7952
Mint Farm Run1	1912.2	1923	13754	28647

SCADA Data

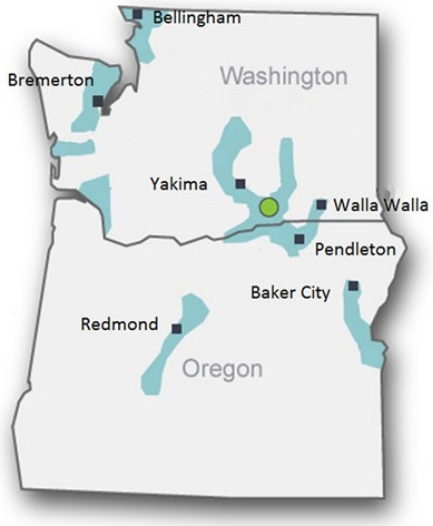
Real time and historical flow characteristics at specific locations in the system

Data Gathering

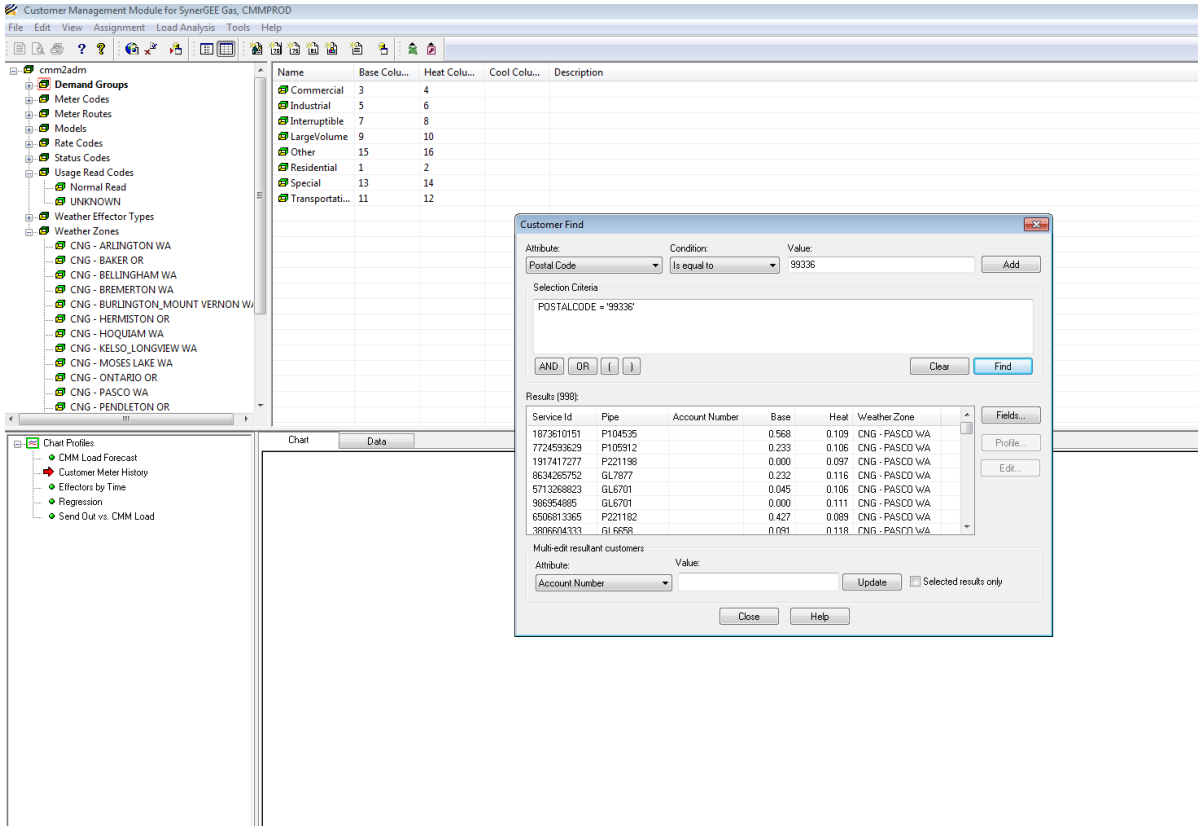
District	HDD	Avg Daily Temperature (°F)
Aberdeen	46	14
Bellingham	47	13
Bend	71	-11
Bremerton	46	14
Eastern Oregon	73	-13
Kennewick	65	-5
Longview	46	14
Mt Vernon	47	13
Pendleton	67	-7
Walla Walla	66	-6
Wenatchee	65	-5
Yakima	65	-5

Peak Heating Degree Day (HDD) modeled by CNG based on historical weather data

Peak HDD = 60 – Average Daily Temp



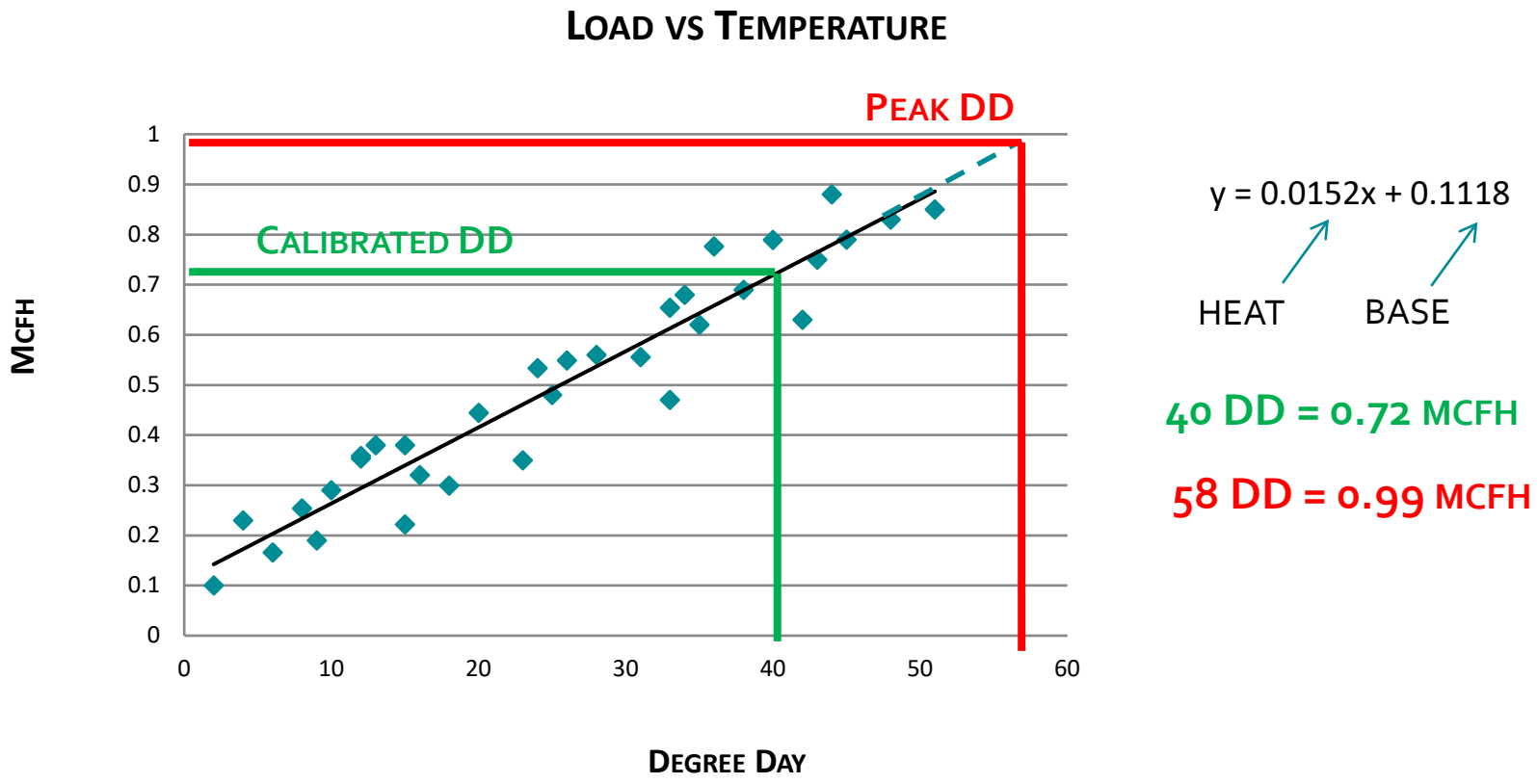
Customer Management Module (CMM)



Brings CC&B customer data into Synergi as demands file

Demand file applies load spatially in the model.

Calibrated vs Peak Degree Day



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Identification of system deficits/constraints

Synergi Modeling Capabilities:

- Review Large Volume Customer requests
- Model RNG
- Supports design/sizing of pipe and pipeline components (regulator stations, compressors)
- Future planning
- Model IRP predicted growth
- Identify deficiencies
- Determine system reliability
- Optimize distribution enhancement options

What is a capacity deficit?

A deficit is defined as a critical system that is at or limiting capacity.

Critical system examples include:

- Pipeline bottlenecks
- Minimum inlet pressure to a regulator station or HP system
- Not meeting a required customer delivery pressure
- Component limiting capacity

Distribution System Modeling Process to ensure we can meet IRP growth predictions

As part of the IRP process, we complete a comprehensive review of all of our distribution system models every two years to ensure that we can maintain reliable service to our customers during peak low temperature events.

With our capital budget cycle, we also complete system reviews on an annual basis.

If a deficit is predicted the system is evaluated and a reinforcement/enhancement is proposed and selected based on alternative analysis considerations and placed into the capital budget based on timing needs of the predicted deficit.

Distribution Enhancement/Reinforcement Options to address deficits

Enhancement Options

Pipeline:

- Replacements
- Reinforcements
- Loops & Back feeds
- Pressure Increases
- Uprates

Facility Upgrades

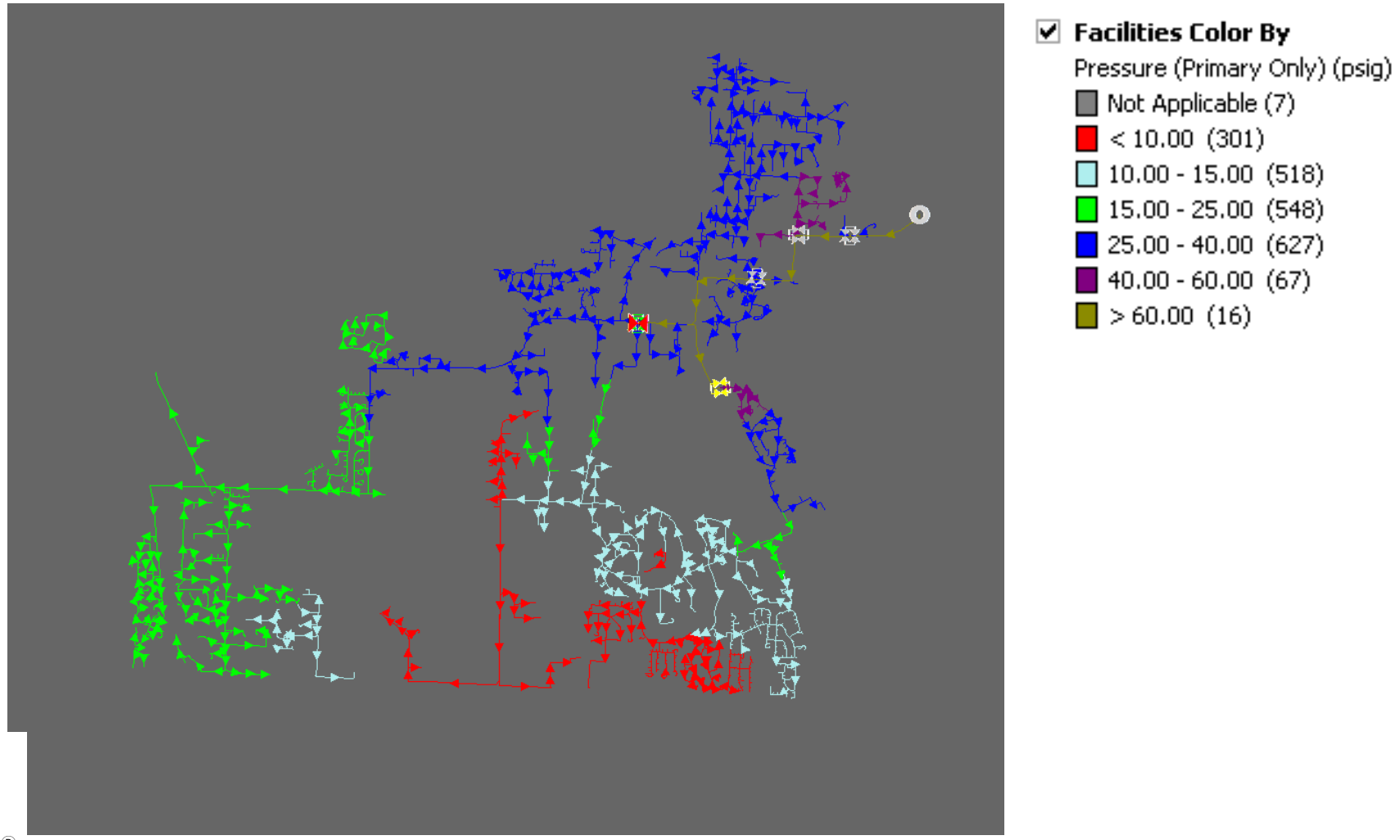
Additional Regulator Stations feeding the distribution system

New Strategically placed Gate Stations

Compressor Stations

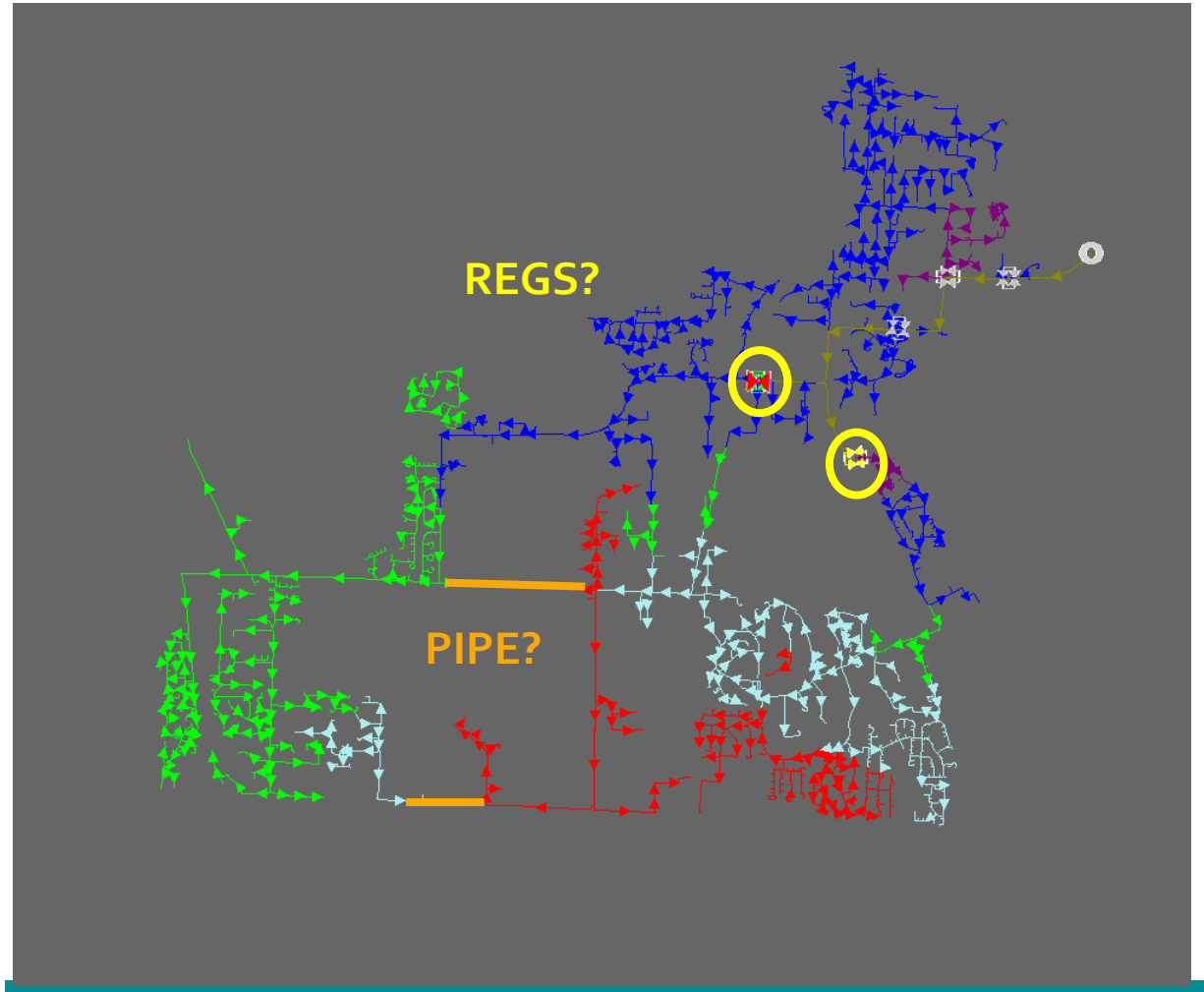
Distribution Enhancement Example

Theoretical low-pressure scenario



Distribution Enhancement Options

Low pressure scenario

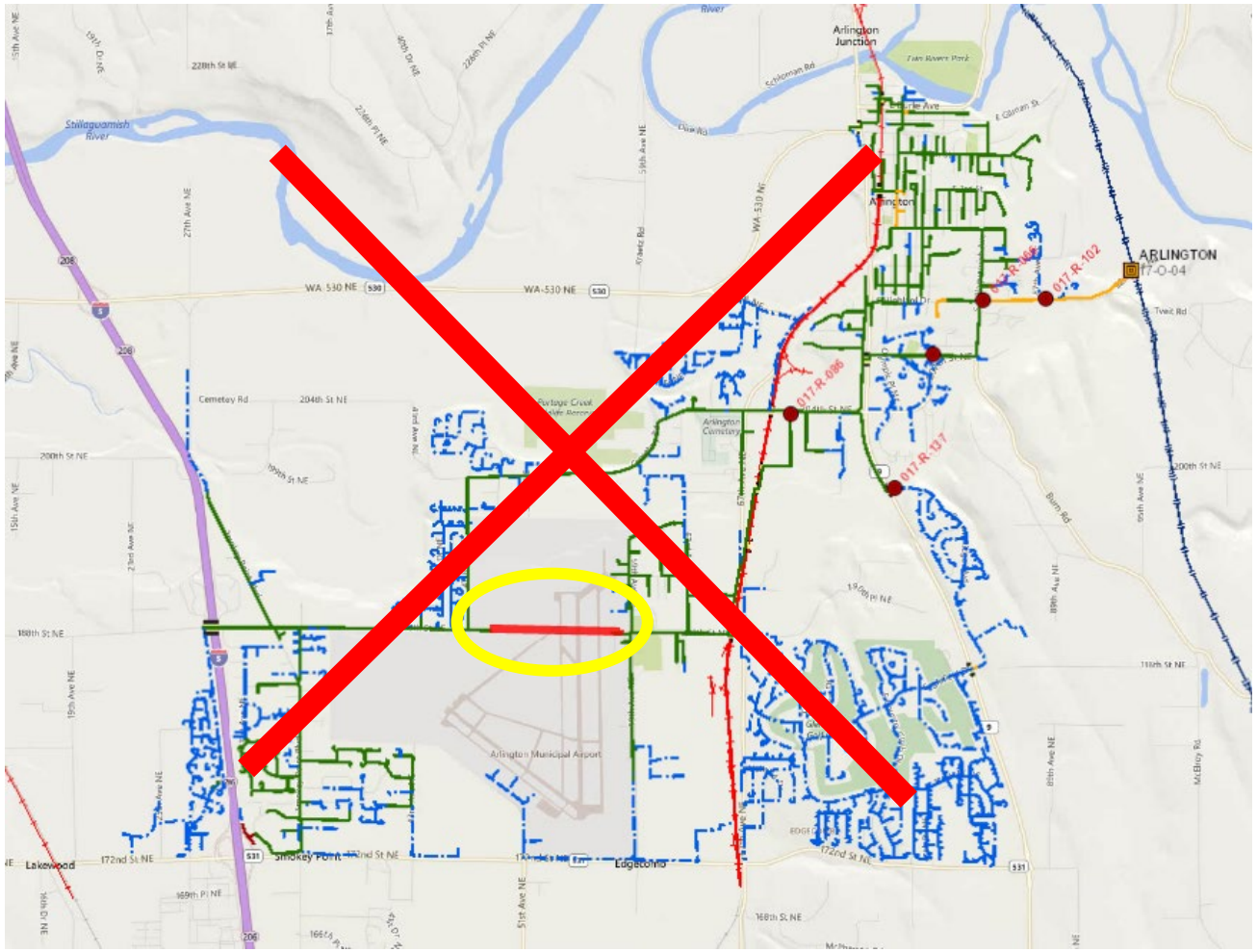


Facilities Color By
Pressure (Primary Only) (psig)
- Not Applicable (7)
- < 10.00 (301)
- 10.00 - 15.00 (518)
- 15.00 - 25.00 (548)
- 25.00 - 40.00 (627)
- 40.00 - 60.00 (67)
- > 60.00 (16)

- Compressor station infeasible
- Other Solutions?

Distribution Enhancement Options

Reinforcement option #1



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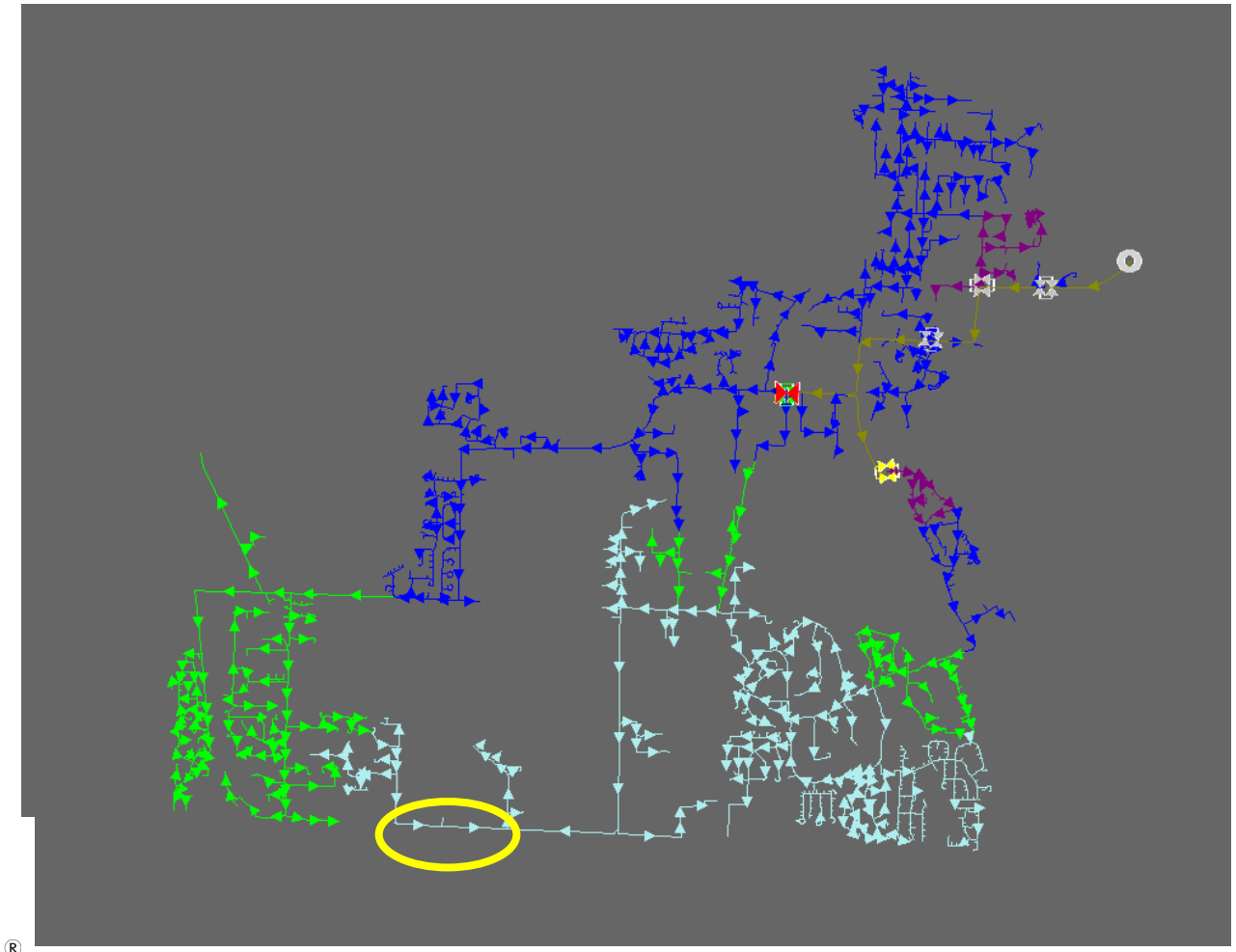
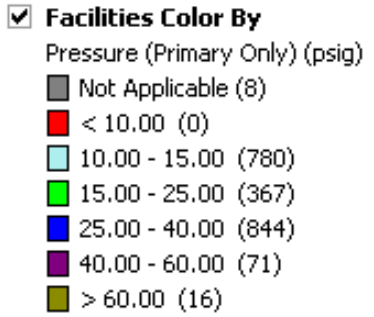
Distribution Enhancement Options

Reinforcement option #2





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Enhancements Considerations

Scope

Cost

Capacity Increase

Timing

System Benefits

Alternative Analysis

Enhancement Review and Selection Process to Capital Budget

Enhancement Selection Guidelines:

Shortest segment of pipe that addresses deficiency

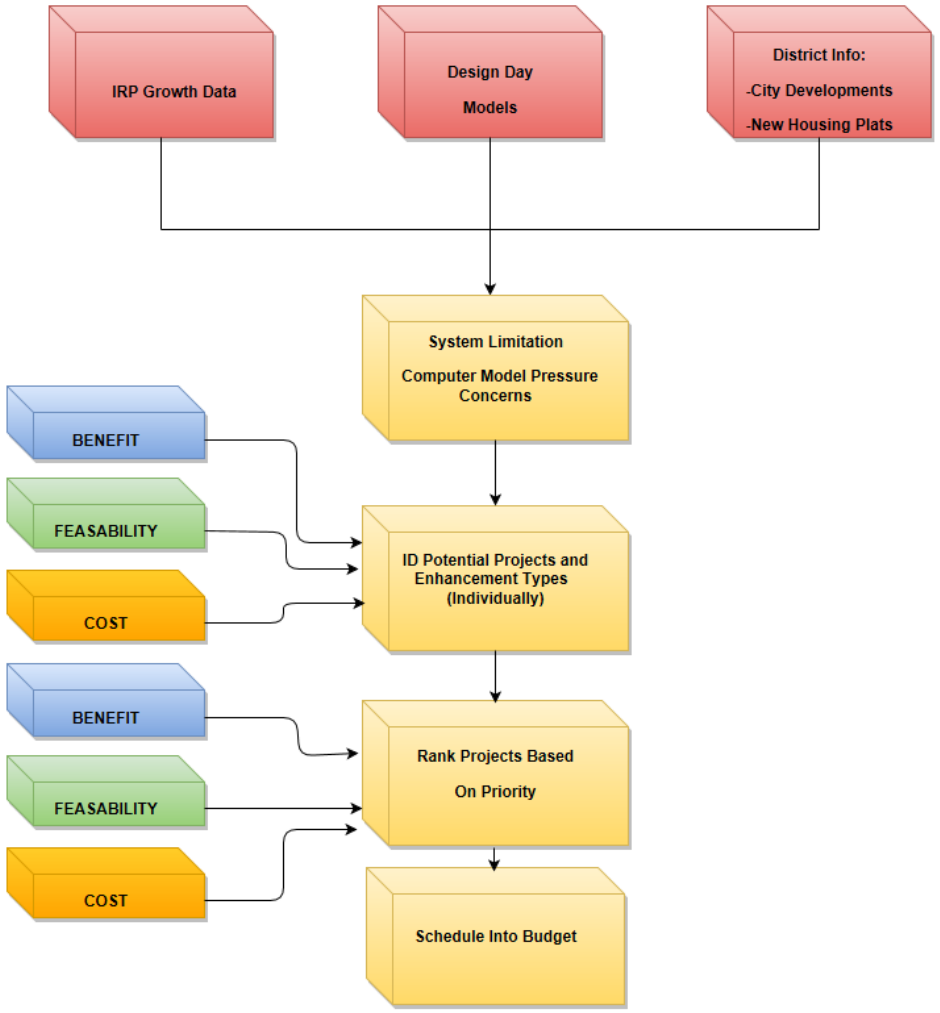
Segment of pipe with the most favorable construction conditions

Segment of pipe that minimizes environmental concerns and impacts to the community

Segment of pipe that provides opportunity to add additional customers

Total construction cost including restoration

Enhancement Selection Process:



Info & Data

Project & Schedules

Enhancements/Reinforcements Identified in 2023-2027 Capital Budget

2023-2027 WA Distribution Enhancements:

- Kitsap Phase V Pipeline Reinforcement
- Aberdeen HP Reinforcements
- Bellingham 6-inch HP Reinforcement – Meador Ave
- Richland HP Reinforcements
- South Kennewick Reinforcements
- Pasco 6-inch HP Reinforcement
- Burlington South Feed Reinforcement
- Wapato 4-inch HP Replacement

Kitsap Phase V Pipeline Reinforcement

Scope: 4 miles of 12-inch HP

Cost: $530k in 2023 and $4.5M in 2024

Timing:

- 2023 Design and Permitting
- 2024 Construction

Benefits: Completes 12-inch Loop from Shelton to Bremerton on 8-inch Kitsap Transmission Line (installed in 1963)

Alternative Considered: Supports long term system planning, ties into Phase IV and Phase III

8-inch HP reinforcement on Basich Blvd

Scope: 12,500 ft of 8-inch HP and regulator station

Cost: $950k in 2022 & $3.233M in 2023

Timing: 2022 Design/Permitting & 2023 Construction

Benefits: Provides redundant feed into Aberdeen DP

Alternatives Considered: Would need to complete significant DP system reinforcements as an alternative

Elma/Satsop Gate Station

Scope: Second supply source to the Greys Harbor Lateral

Cost:

- CNG
  - $129k in 2024 & $1.57M in 2025
- NWP
  - $514k in 2024 & $2.6M in 2025

Timing: 2024 Design/Permitting & 2025 Construction

Benefits: Addresses high pressure issues in Aberdeen and provides redundancy to McCleary Gate

Alternatives Considered: Reinforce and or replace Greys Harbor Lateral

Bellingham 6-inch HP Reinforcement – Meador Ave

Scope: 2500 ft of 6-inch HP

Cost: $262k in 2022 and $964k in 2023

Timing:

- 2022 Design and Permitting
- 2023 Construction

Benefits: Eliminates pipe hanging on above ground bridge crossing

Alternatives Considered: None, no alternative route with comparable cost

Richland HP Reinforcements

RICHLAND 12-INCH HP PHASE 2

Scope: 3.75 miles of 12-inch HP

Cost: $5.79M in 2023

Timing: 2023 Construction

RICHLAND Y GATE UPGRADE

Scope: Gate Upgrade

Cost:

- CNG
  - $11.5k in 2022 & $1.79M in 2023
- NWP
  - $503k in 2022 & $4.53M in 2023

Timing: 2022 Design/Permitting & 2023 Construction

Benefits: Solves capacity deficit in Richland and provides a back feed to Richland HP

Alternatives Considered: Upgrading the Kennewick gate and replacing the 6-inch Richland HP lateral on Clearwater and Columbia Center

South Kennewick Reinforcements

SOUTH KENNEWICK GATE

Scope: New Gate Station

Cost:
- CNG
  - $302k in 2023 & $1.125M in 2024
- NWP
  - $503k in 2022 & $2.52M in 2024

Timing:
- 2023 Design and Permitting
- 2024 Construction

KENNEWICK 8-INCH PE REINFORCEMENT

Scope: 2500 ft of 8-inch PE

Cost: $557k in 2024

Timing: 2024 Construction

Benefits: Solves low pressure issue in Kennewick and supports growth
Alternatives Considered: Alternative reinforcements and loops to distribution system

Pasco 6-inch HP Reinforcement

Scope: 5 miles of 6-inch HP

Cost: $203k in 2024 & $4.9M in 2025

Timing:

- 2024 Design and Permitting
- 2025 Construction

Benefits: Addresses high pressure capacity deficit in Pasco

Alternatives Considered: Upgrade North Pasco gate and reinforce HP out of gate

Burlington South Feed Reinforcement

Scope: 15,000 ft of 6-inch PE and Reg Station

Cost: $40k in 2022 & $1.69M in 2023

Timing:

- 2022 Design and Permitting
- 2023 Construction

Benefits: Addresses low pressure issues in Burlington, loops system

Alternatives Considered: HP extension with a new reg station, no equivalent DP loops

Wapato 4-inch HP Replacement/Reinforcement

Scope: Replace 31,000 ft of 4-inch HP with 6-inch HP

Cost: $400k in 2022 & $6M in 2023

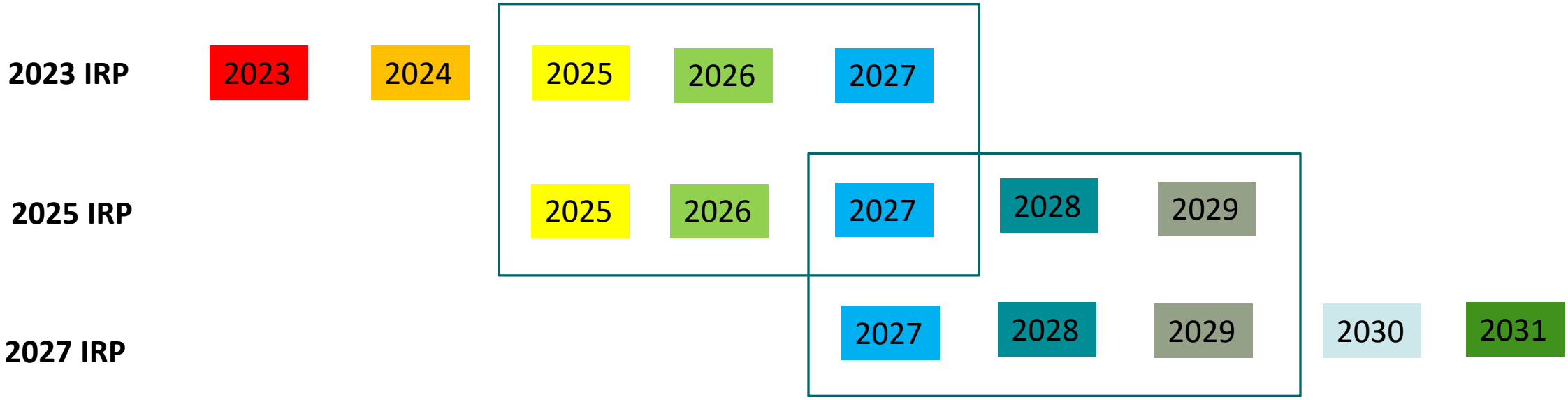
Timing:

- 2022 Design and Permitting
- 2023 Construction

Benefits: Addresses MAOP concerns on 4-inch HP, provides additional capacity to Wapato

Alternatives Considered: New gate near Donald with HP back feed to Wapato, challenging route with significantly higher costs

Iterative Process of IRP



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Questions?

2023 IRP Remaining Schedule

Process Items	Process Elements	Date
TAG 4 (OR)	Carbon Impacts, Energy Efficiency (ETO), Bio-Natural Gas, Preliminary Resource Integration Results.	9/20/2022
TAG 5 (WA)	Final Integration Results, finalization of plan components, Proposed new 2- to 4-year Action Plan.	9/28/2022
TAG 5 (OR)	Final Integration Results, finalization of plan components, Proposed new 4-year Action Plan.	11/9/2022
Draft of 2022 IRP distributed (WA)	Filing of Draft IRP	11/24/2022
Draft of 2022 IRP distributed (OR)	Filing of Draft IRP	1/5/2023
Comments due on draft from all stakeholders (WA)	Comments due from Stakeholders	1/13/2023
Comments due on draft from all stakeholders (OR)	Comments due from Stakeholders	2/24/2023
TAG 6, if needed (WA)	An additional TAG if needed based on comments from Stakholders	2/1/2023
TAG 6, if needed (OR)	An additional TAG if needed based on comments from Stakholders	3/15/2023
IRP filing (WA)	IRP Final Filing	2/24/2023
IRP filing (OR)	IRP Final Filing	4/14/2023

Questions/Next Steps

Review Plans for TAG 5 Discussion

- Final Integration Results
- Finalization of Plan components
- Proposed new Action Plan
- Next WA TAG is Thursday, September 28
- Next OR TAG (TAG 4) is Tuesday, September 20

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Integrated Resource Plan (WA) Technical Advisory Group Meeting #4

AUGUST 10, 2022

MICROSOFT TEAMS/TELECONFERENCE

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