Cascadia Independent Review Study

Joint Transportation Committee

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the science of insight

December 15, 2022

Project Context and History

- Ultra-High-Speed Ground Transportation (UHSGT) concept first discussed as part of the 2016 *Emerging Cascadia Innovation Corridor Conference*
- System originally envisioned as providing one hour travel time between major city segments (Portland to Seattle and Seattle to Vancouver, BC)
- Several feasibility studies have been completed to date, using funding approved by Washington, Oregon, British Columbia, and Microsoft
  - *Initial Feasibility & Economic Impact Study* (2017-2018)
  - *Business Case Analysis* (2019)
  - *Framework for the Future Report* (2020)
- **Our charge**: to to conduct an independent, unbiased review of these previous studies to inform any future funding and project development activities

Cascadia Innovation Corridor

Project Status

- Original focus was on (ultra-high) speed, mode agnostic
- Assessing trade offs between many variables: speed, reliability, cost, feasibility, inclusiveness/equity impacts
- HSR technology most viable in the short/medium term
  - *Could be very fast HSR (as in Japan, Europe)*
  - *Could be reasonably fast (e.g., DC to Boston train—Acela—at speeds up to 150 mph)*
  - *Most understood by FRA for funding*
- It's still early in the overall process. These major infrastructure projects can take decades

Our Study's Approach

- **Due Diligence Analysis**
  - *Was the previous work done properly/reasonably?*
- **Trade Off Analysis**
  - *How do different investment decisions relate to each other, and vice versa?*
- **Implementation/Operational Pitfalls**
  - *How to avoid repeating mistakes made by others?*

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Due Diligence Analysis

Key Question: Was Core Work Done Properly & Reasonably?

Focus Areas

- Ridership
  - Residential and population growth assumptions
  - Level-of-service assumptions for all modes (times, costs, fares, congestion)
  - Induced demand assumptions
  - Model parameter assumptions, survey, model estimation/application methods
  - Mode share results vs. other real and proposed HSR systems
- Costs
  - Capital costs
  - Operations and maintenance (O&M) costs
- Economic Benefits
  - Tools, assumptions, multipliers

Trade Off Analysis

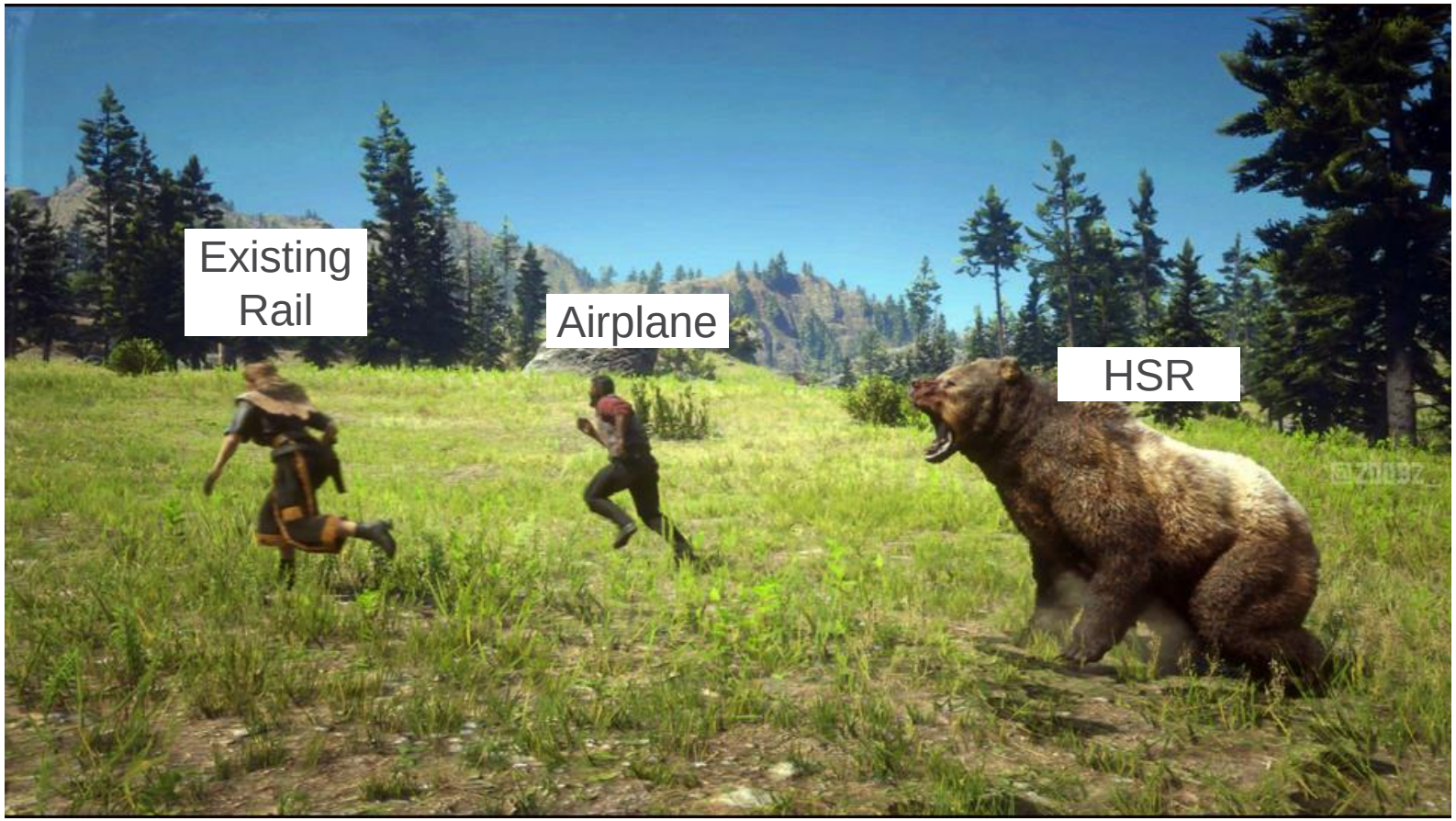
Key Question: What Other Factors need to be Evaluated when Considering Next Steps?

Focus Areas

- Trade-offs between technology and feasibility
  - Alignment vs. land availability, new vs. proven technology, speed vs. cost
  - Mode share results vs. other real and proposed HSR systems
- Cutting to the chase
  - Assessing competitiveness of HSR project vs. existing modes
  - Speed is good, but it's not everything
- Being clear on modeling limitations
  - Econometric models are based on "rational" utility maximization, but humans are not rational
  - Will the HSR service capture the imagination of the public or not?
- Understanding who benefits
  - Fewer stations, high fares means many potential constituencies do not receive direct benefits

Speed: You don’t have to as fast as an ultra-high-speed bear. But you must be competitive against existing transportation modes

The key to a viable project is not technology but competitiveness—the train must be as good or better an overall value than competing modes



Implementation & Operational Pitfalls

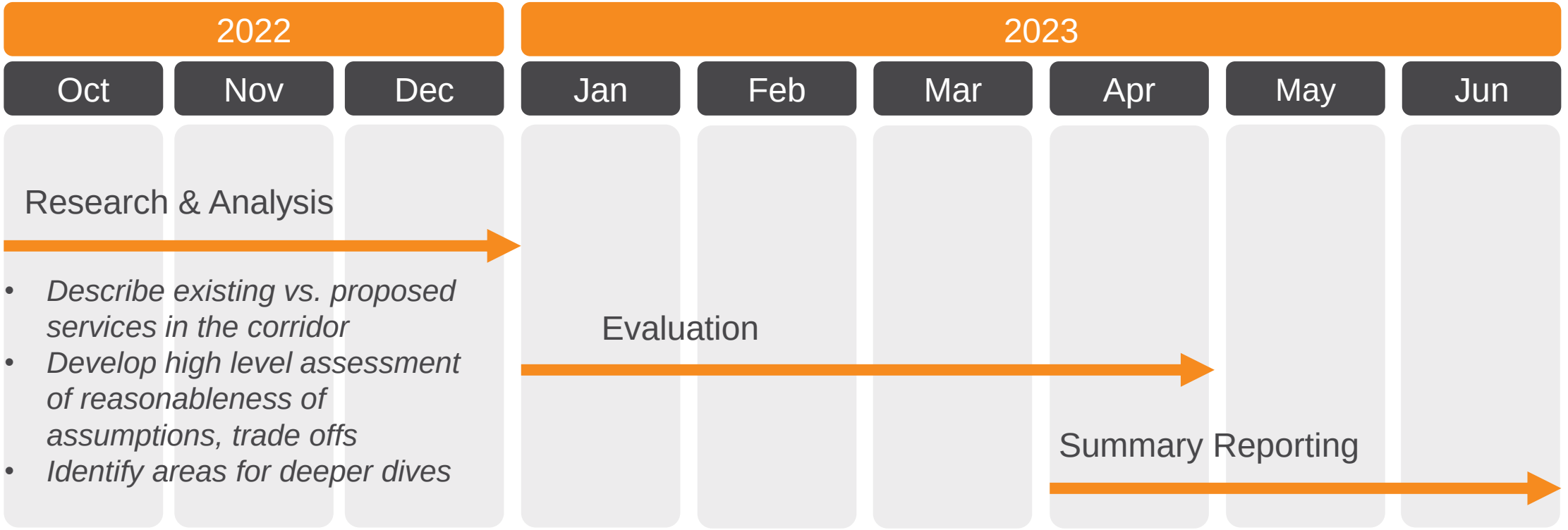
Key Question: How to avoid issues encountered by others?

California HSR is the most important system to review closely (geographical and political relevance), but other systems may provide useful lessons

Focus Areas

- Importance of third-party agreements
- Accounting for full cost of right-of-way
- Building staff competencies and capacity
- Challenges of unrealistic schedule

Current & Future Study Efforts



Initial Analysis Summary

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Current State of the Corridor

Rail/Bus Service

Amtrak Cascades (current rail service) travel time is as long as bus service. The primary city pair, Seattle to Portland, has 3 trips (in each direction) per day but is hoping to increase to 6. Meanwhile, buses are at least double the frequency of current rail between city pairs.

Air Service

Air service in the corridor is relatively robust, taking about 55 minutes to fly from Seattle to Portland (SEA to PDX) and about an hour from Seattle to Vancouver, BC (SEA to YYR) with about 10 flights (in each direction) each day between each city pair.

Roadway Travel

Meanwhile, driving takes 2:55 between Seattle and Portland and 2:30 between Seattle and Vancouver (free flow, no customs) gets the highest share—show share chart?

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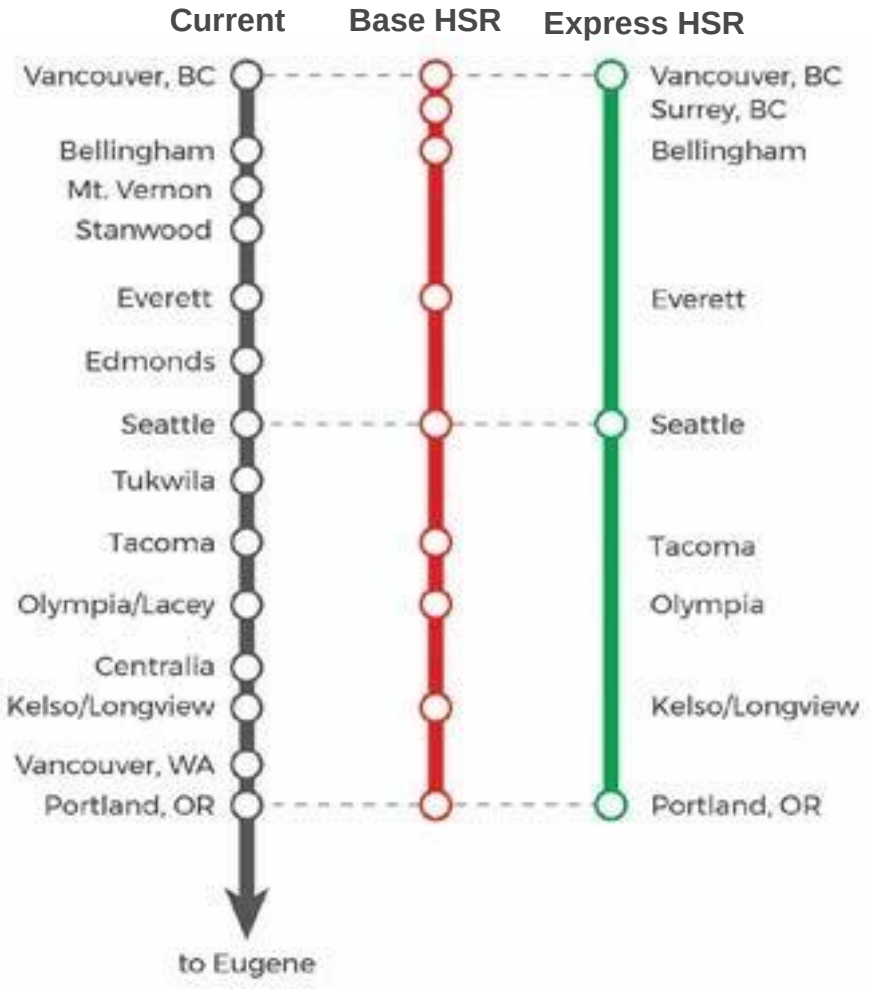
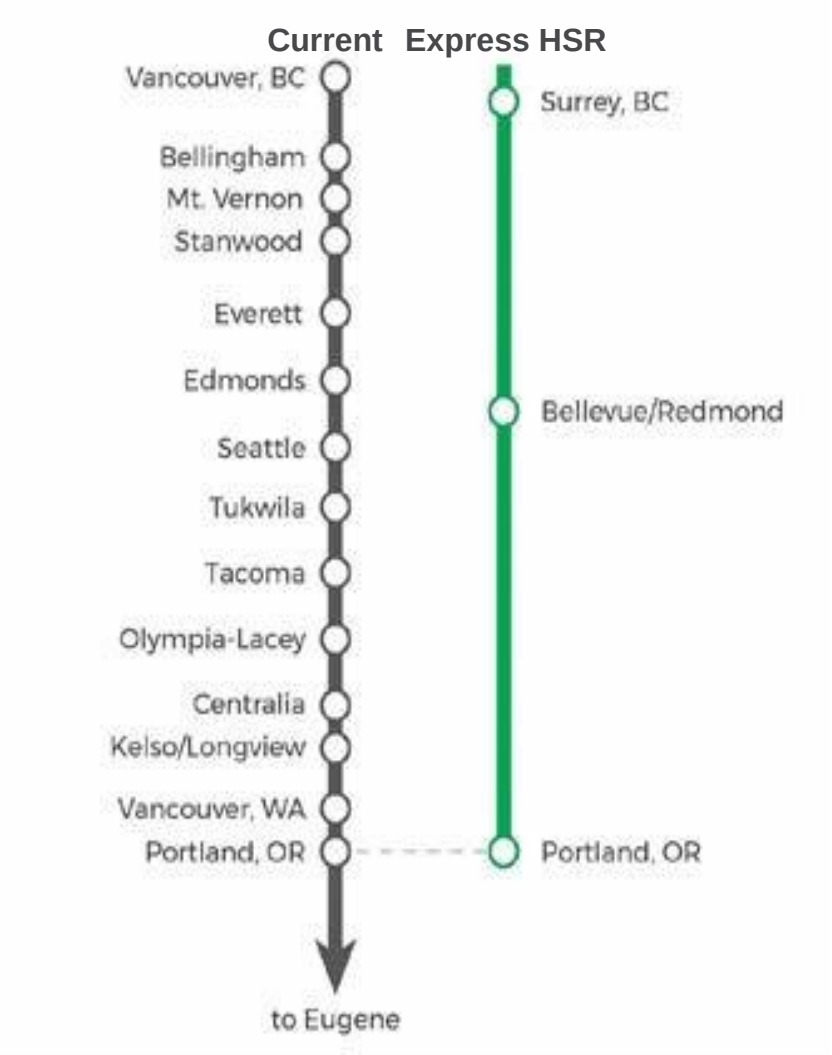
Future Corridor Scenario—Service Detail High Ridership

Station	Express Service		Base Service	
	Stop Served	Travel Time (min)	Stop Served	Travel Time (min)
Vancouver, BC	X	47	X	8
Surrey, BC			X	16
Bellingham			X	24
Everett			X	12
Seattle	X	58	X	15
Tacoma			X	10
Olympia			X	24
Kelso/Longview			X	24
Portland	X		X	
Hours of operation	*6:00 am – 8:00 pm*		*5:00 am – 11:00 pm*	
Frequency (each direction, per day)	*9*		*12*	

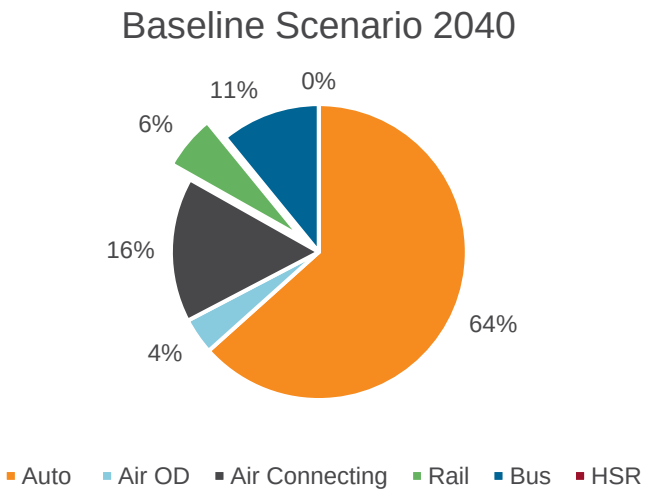


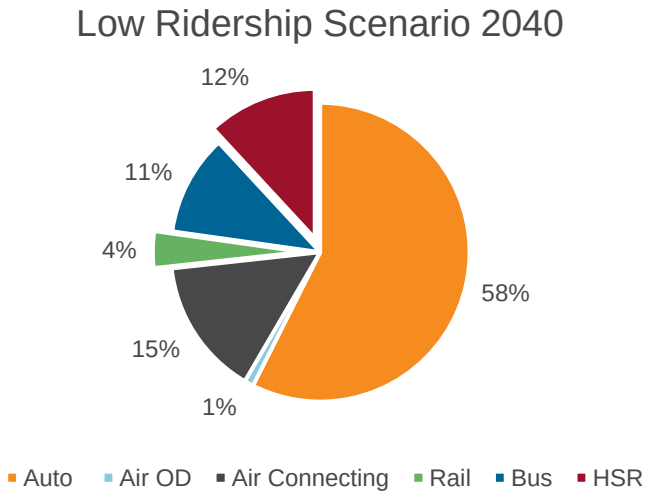
Future Corridor Scenario—Service Detail Low Ridership

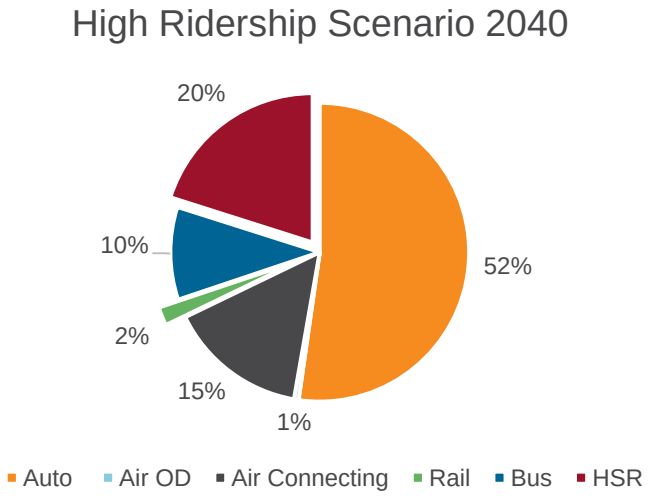
	Express Service	
Station	**Stop Served**	**Travel Time (min)**
Surrey, BC	X	46
Bellevue/Redmond	X	58
Portland	X	
Hours of operation	5:00 am – 10:00 pm	
Frequency (in each direction, per day)	21	



Ridership as share of the 2040 market for baseline, low, and high scenarios







Capital Costs and assumptions—very generalized at this stage

- The capital cost estimated from the 2017-2018 Feasibility Study ranged from $24 billion to $42 billion (2017)
- UHSGT was stated to be a better value infrastructure investment than possible alternative projects
- Cascadia megaregion future growth stated to be at risk without substantial increase in infrastructure investment
- UHSGT could mitigate the need for some future infrastructure projects such as further major expansions of US I-5, estimated to possibly exceed $108 billion or building an additional runway, which could exceed $10 billion (not to mention a new airport!).
- By providing a range of services (not just HSR, but commuter rail, freight, etc.), this spine can significantly increase capacity in the US I-5/ Canada Highway 99 highway corridor.

What have we learned so far?

- Ridership modeling appears to have been done reasonably, but some aspects of the work point to aggressive assumptions
  - *Survey sample skewed to respondents with higher value of time, indicating higher income levels and more propensity to choose HSR*
  - *"Penalties" to HSR are favorable to HSR, tending to over-estimate ridership*
  - *Induced demand due to the HSR project seems relatively high*
- Alternatively, some conservative assumptions were also noted
  - *Performance of competing modes held steady, tending to underestimate HSR ridership*
- O&M / Capital costs very generalized, warrant a more detailed investigation

Moving forward

Next steps on the study

Our Next Steps

Due Diligence

- Deep dive on ridership & economic analysis assumptions
- Better understanding of economic impacts/benefits & scale

Trade Offs

- Define the most important trade-offs to consider when evaluating investment options

Implementation Pitfalls

- Lessons learned & case studies from other systems, both domestic & international
- Potential implementation & operational arrangements

Questions

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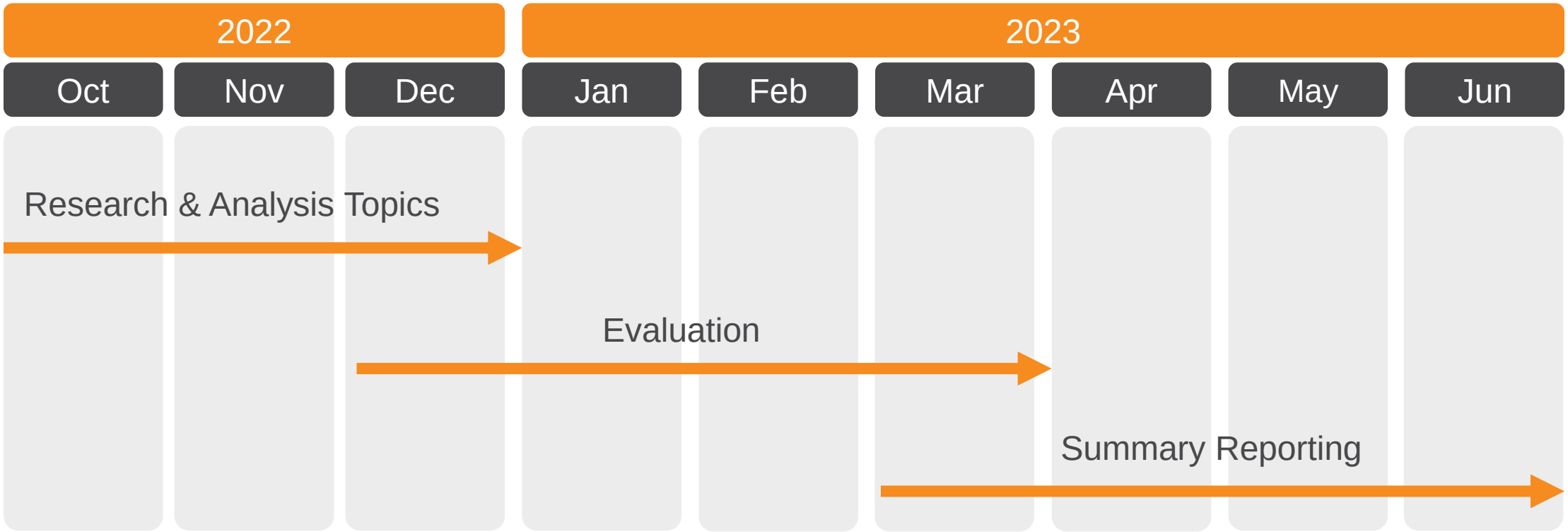
Project Schedule Overview

What's next

Continue due diligence

Focus on presenting more information on tradeoffs, based on feedback from this meeting



Contacts

JIM BROGAN
VICE PRESIDENT
jim.brogan@rsginc.com

GREG SPITZ
SENIOR DIRECTOR
greg.spitz@rsginc.com

www.rsginc.com