VT Rail - Corridor ID

Ridership Modeling and Potential

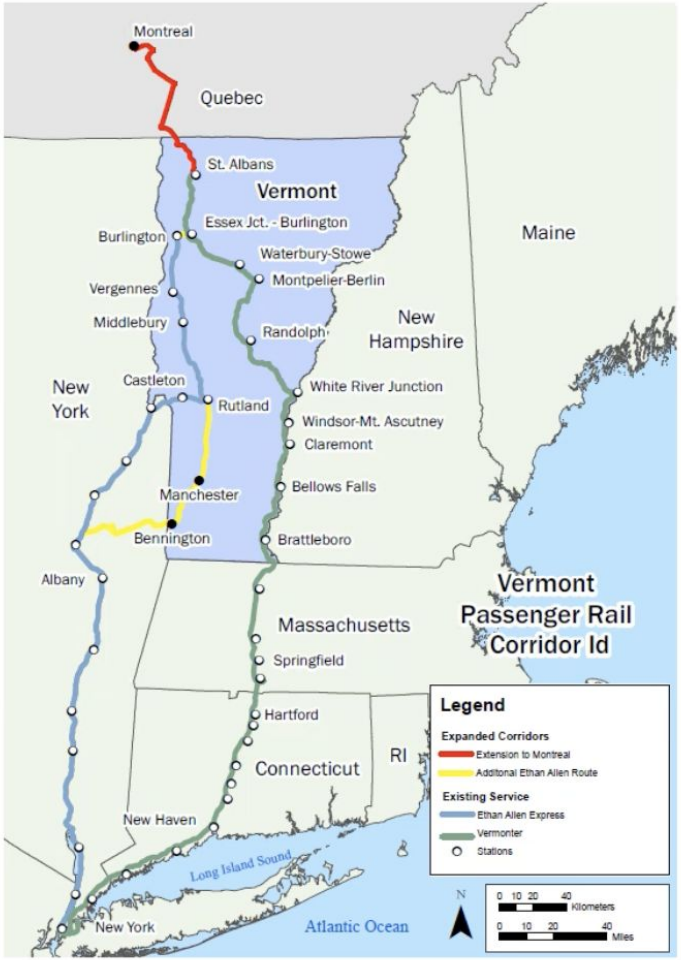
Vermonters for People-Oriented Places (VPOP) — February 29, 2024

Overview

- Proposed Montreal-New York City Service via Burlington and Rutland
- Summary of Comparable Rail Corridors
- Ridership Models of Montreal-New York Connection
- Survey Results - Interest in Rail

Vision

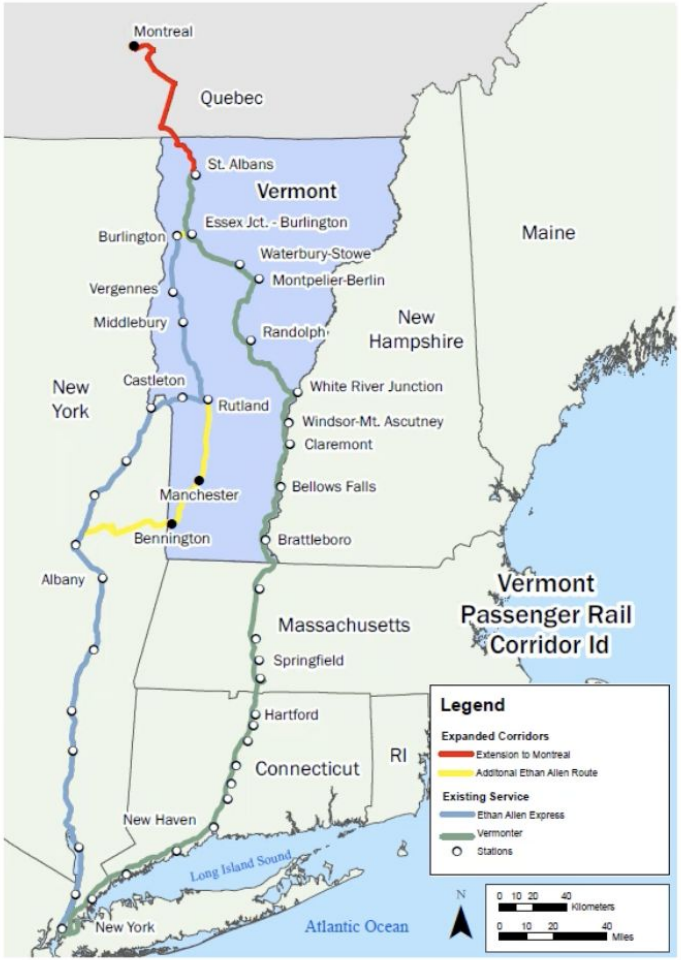
- Corridor ID is a good opportunity, need to be ready to take initiative at state level first
- Instead of looking at our two Corridor ID routes as isolated projects, the network must be considered
- Intercity route between Montreal and NYC via Burlington/Rutland **outperforms** some projects funded in US/Canada, complements Vermonter route



Source: VTrans Rail Council Meeting, February 6, 2024

Vision (continued)

- By completing smaller projects at the state level e.g. Winooski Branch rehab, we demonstrate our commitment to rail to Quebec/neighboring states
- Corridor ID studies should also include **cost/benefit analysis of higher investment scenarios**, which have higher ridership/revenue and lower labor costs per rider



Source: VTrans Rail Council Meeting, February 6, 2024

Montreal-NYC Service via Burlington and Rutland

Service Route

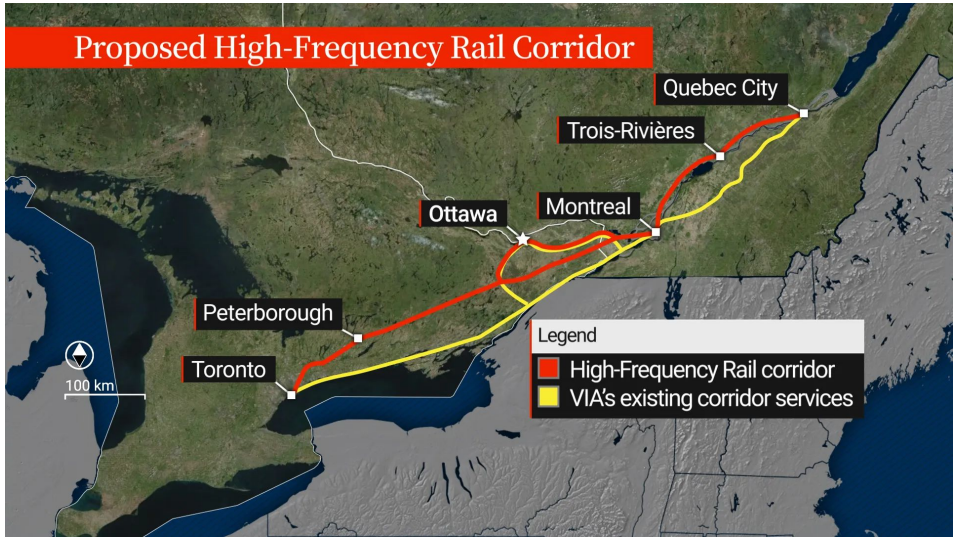
- Follows northbound Ethan Allen route to Burlington, continues east on the NECR Winooski Branch to Essex Junction, then north via St. Albans to Montreal
- Connects two of Vermont's largest population centers to Montreal
- Justifies greater frequencies and speed along the existing Ethan Allen Express line, supporting **5-9 round trips/day** depending upon speed
- Contains elements from both Vermont Corridor ID grants

Comparable Rail Corridors

Canada - High Frequency Rail

Characteristics:

- Minimum design speed of 125 mph
- Approximately **hourly** service to start
- Projected ridership of 17 million per year by 2059
- Request for Proposal issued 2023

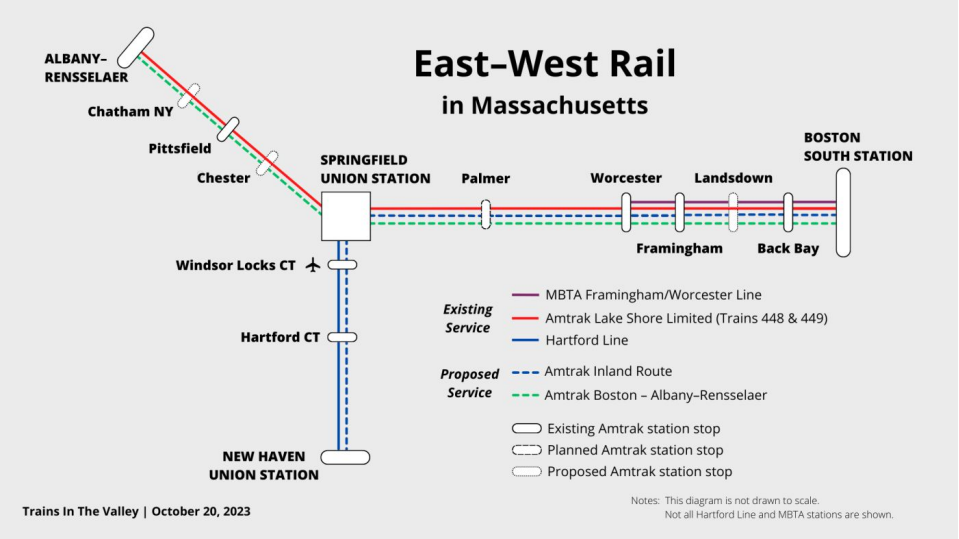


Source: https://hfr-tgf.ca/faq/

MA - East / West Rail

Characteristics:

- Two hour travel time between Springfield and Boston South Station (~41 mph avg.)
- Up to **eight** trains per day, per direction Springfield-Boston when complete
- Adds Vermonter connection to Boston

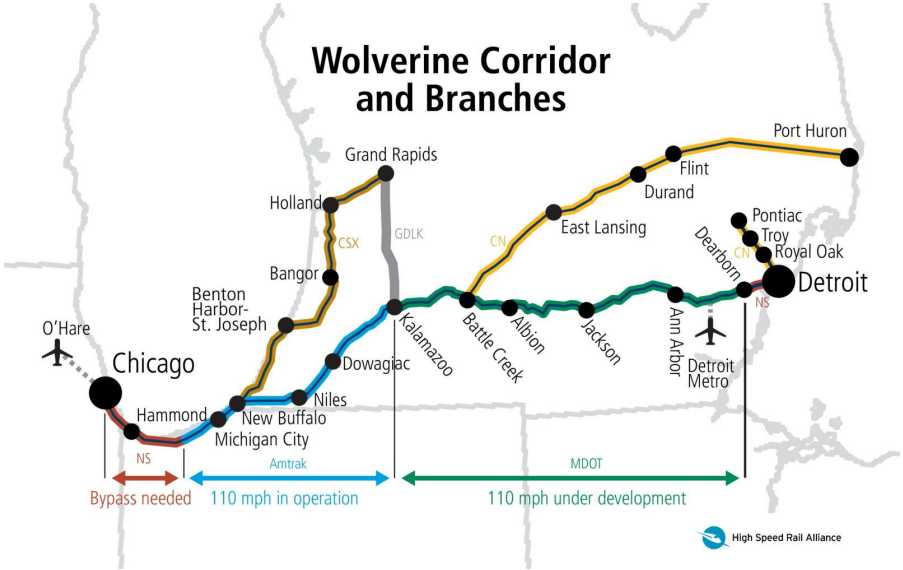


Source:

Michigan - Chicago to Detroit Wolverine

Characteristics:

- State-owned passenger corridor
- Funded to allow 110 mph top speeds by adding signaling and straighten curves
- Long term plan: **Hourly service** with 4.5 hour travel times between Chicago and Detroit



Source: https://www.hsrail.org/wolverine-corridor/

Florida - Miami to Orlando

Characteristics:

- 3.5 hour travel time between Miami and Orlando (~70 mph avg.)
- Currently up to **sixteen** trains per day, per direction Orlando-Miami

Source: https://miamicentral.com/

Ridership Model

Ridership Model - Conceptual

- How do planners approximate travel demand?
- Gravity models consider about two variables:
  - Population
  - Travel Time
- Larger city pairs will have more ridership
- Ridership decreases with distance

$$\mathrm{Pop}_A \cdot \mathrm{Pop}_B / d^2$$

Source: https://pedestrianobservations.com/2020/02/13/metcalfes-law-for-high-speed-rail/

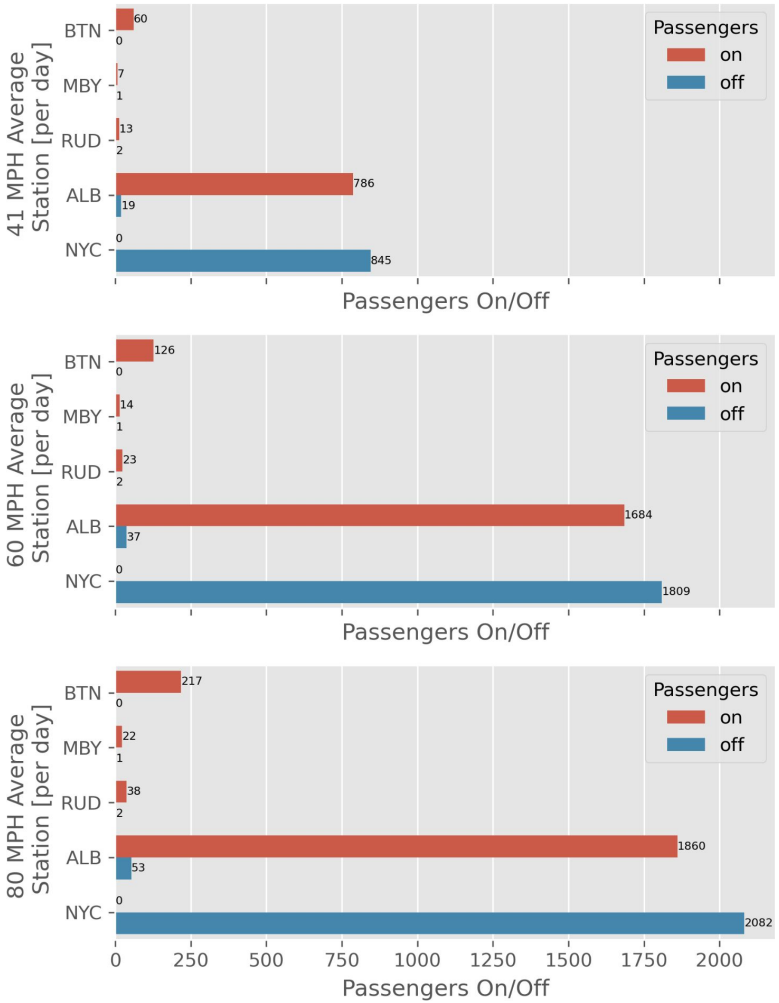
Ridership Model - Full Model

- Prefactor to match pre-pandemic ridership on NY's Empire Service.
- Populations raised to a power <1 to penalize station access time in cities
- Minimum time penalty, which models a preference to drive short distances.

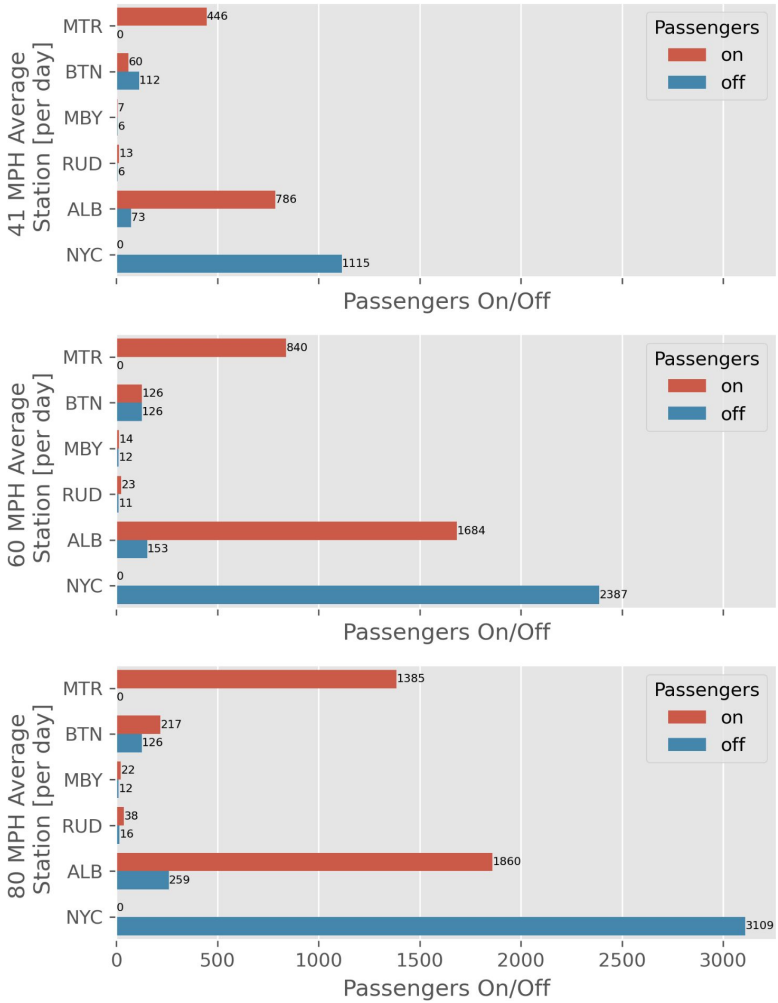
$$1.8 \cdot \mathrm{Pop}_A^{0.8} \cdot \mathrm{Pop}_B^{0.8} / \max\{2.5, \mathrm{time}\}^2$$

Source: https://pedestrianobservations.com/2020/02/13/metcalfes-law-for-high-speed-rail/

Ethan Allen (Current Route)



Ethan Allen (Montreal Extention)



Analysis

Adding Montreal increases seat occupancy by 5x inside Vermont:

- Need to plan for increased capacity

With a Montreal extension speed matters:

- **2x** ridership increase for reaching 60 mph
- **3x** increase for 80 mph

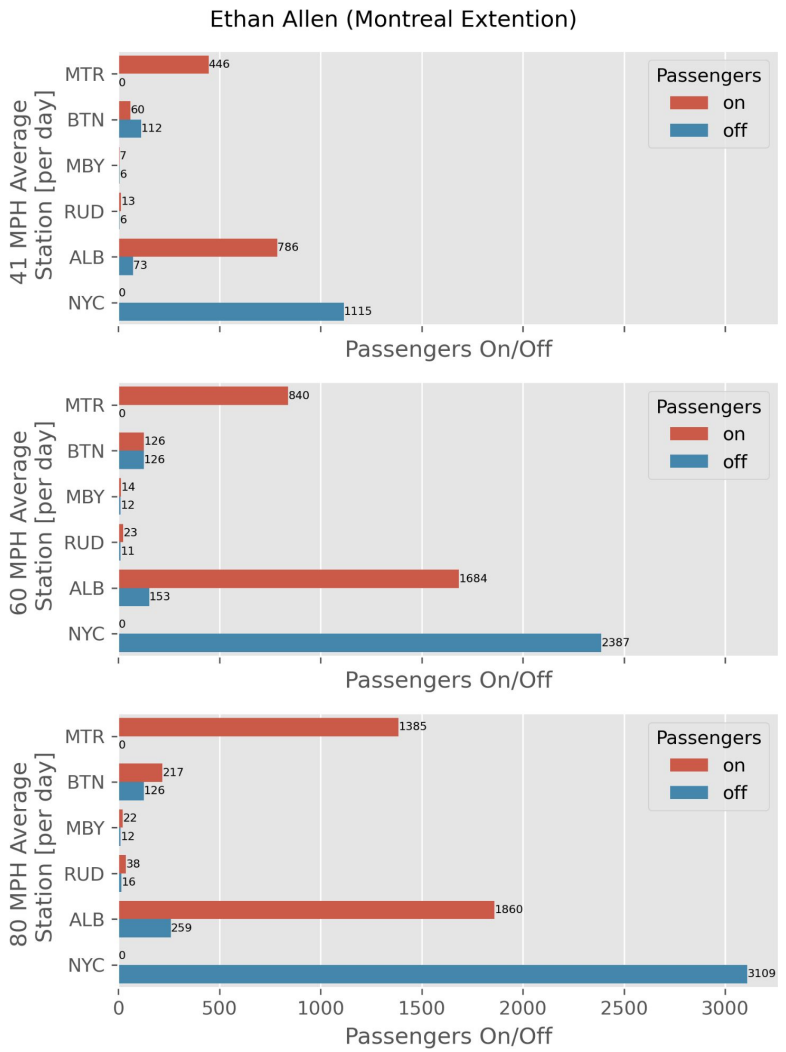
Most ticket revenue comes from MTR to NYC

Demand is large enough for:

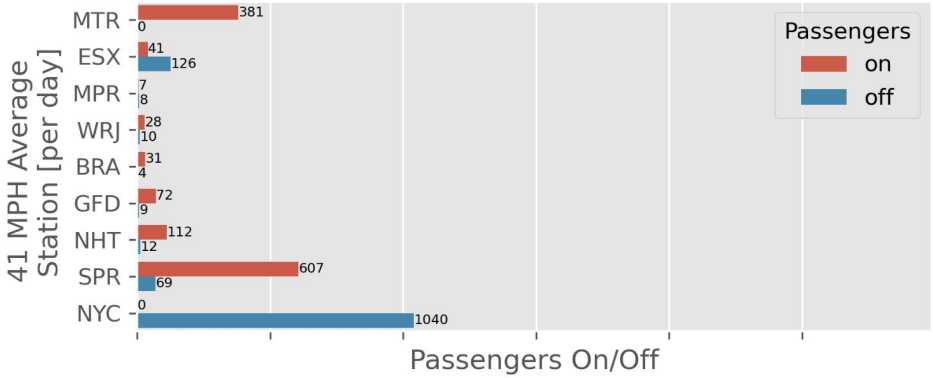
- 5 RT trains per day at 60 mph
- 9 RT trains per day at 80 mph

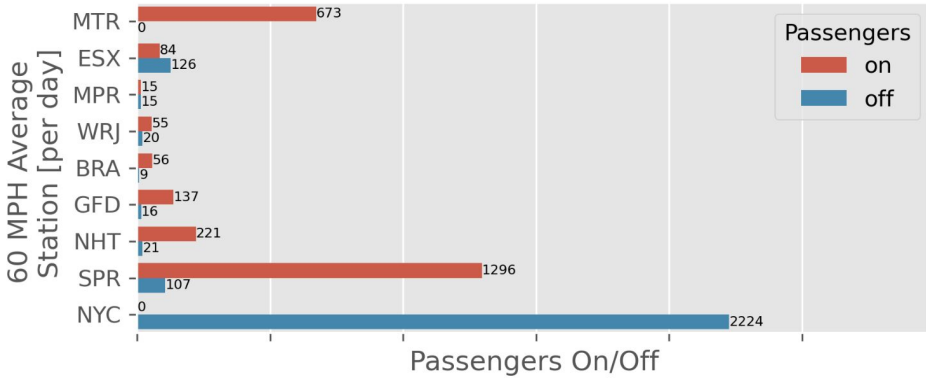
Need capital investments to achieve speed

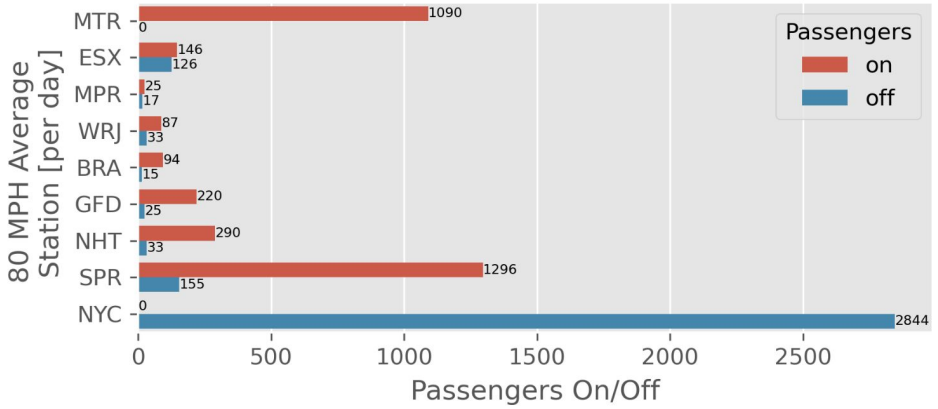
Need consultants to study the most cost-effective ways to target investments.

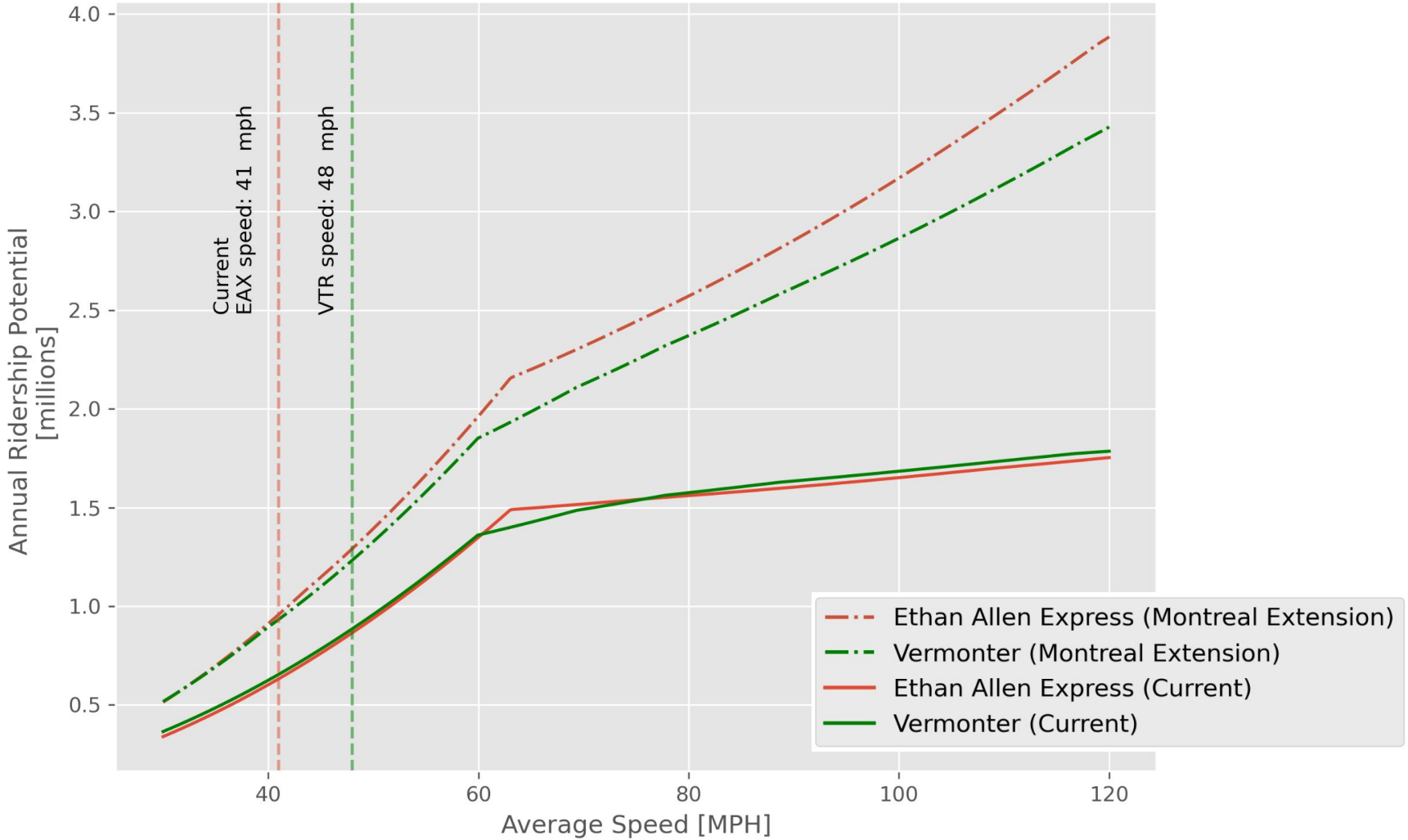


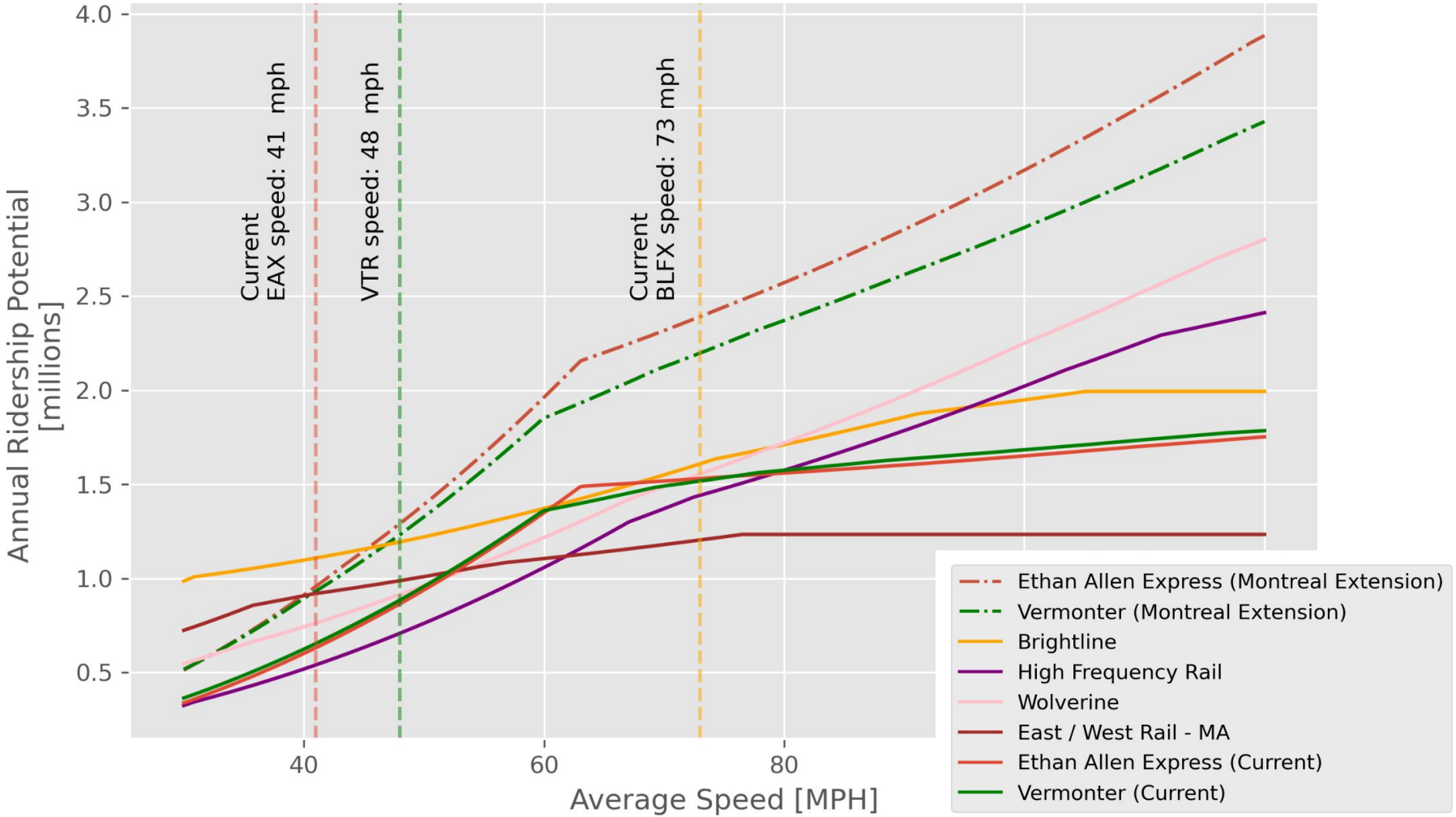
Vermonter to Montreal








Annual Ridership Potential
[millions]
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
Current
EAX speed: 41 mph
VTR speed: 48 mph
40
60
80
100
120
Average Speed [MPH]
Ethan Allen Express (Montreal Extension)
Vermonter (Montreal Extension)
Ethan Allen Express (Current)
Vermonter (Current)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40
60
80
Average Speed [MPH]
Current
EAX speed: 41 mph
VTR speed: 48 mph
Current
BLFX speed: 73 mph
Ethan Allen Express (Montreal Extension)
Vermonter (Montreal Extension)
Brightline
High Frequency Rail
Wolverine
East / West Rail - MA
Ethan Allen Express (Current)
Vermonter (Current)

Speed Improvements

- Speed improvements = more ridership

Possible action items:

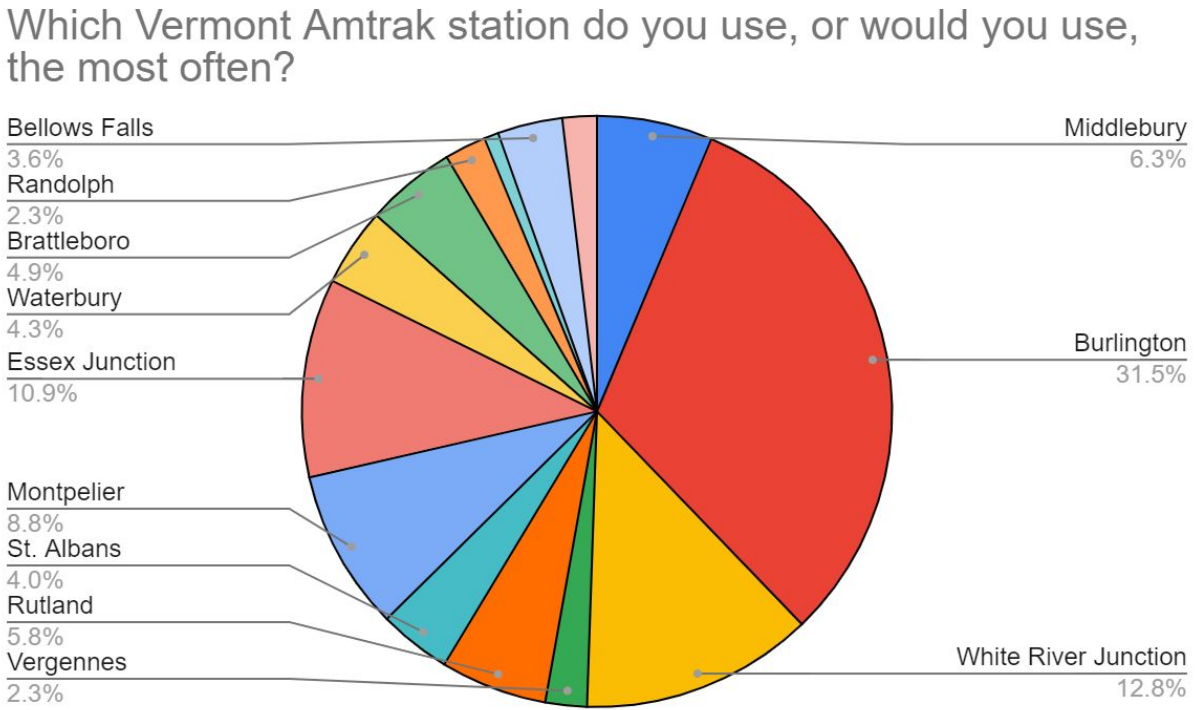
- Reduction of schedule padding at intermediate stations, e.g. Rutland
- Raised platforms at high-traffic stations like Burlington
- Favorable curve radii Burlington-Rutland makes 80-110 MPH top speeds feasible with improved signals, grade crossings
- With high speeds, 1 trainset can complete 2 runs/day instead of just 1/day, increasing frequencies

Source: https://trainsinthevalley.org/tag/brattleboro-station/

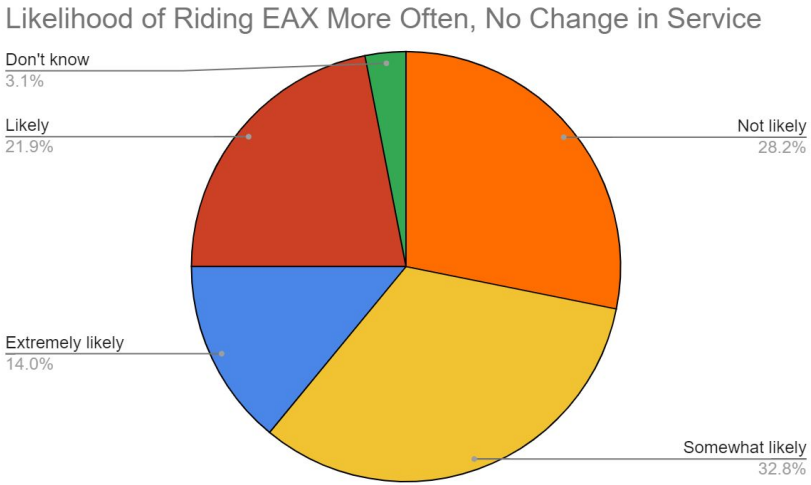
Survey of Public Interest

Demand Survey

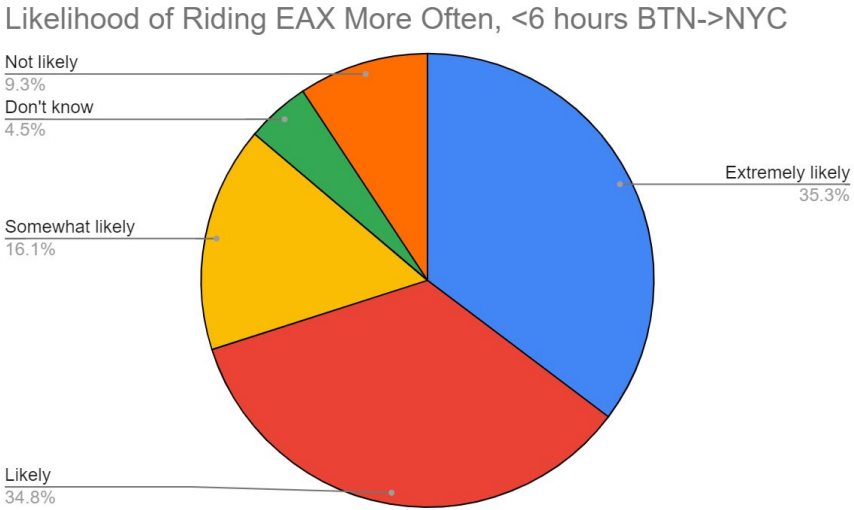
- 1012 respondents from across Vermont
- Respondents gathered primarily virtually
- 40% currently ride once a year or less
- 22.7% have never ridden



Comparison of Interest by Train Speed

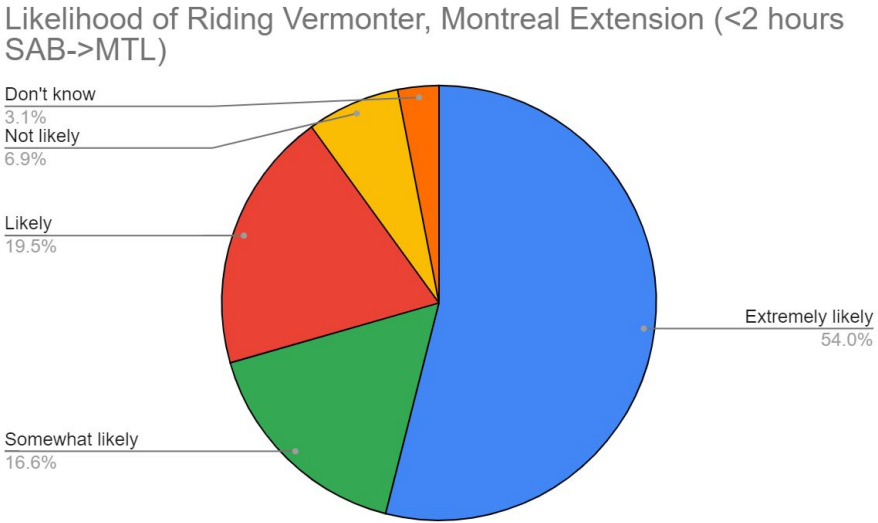


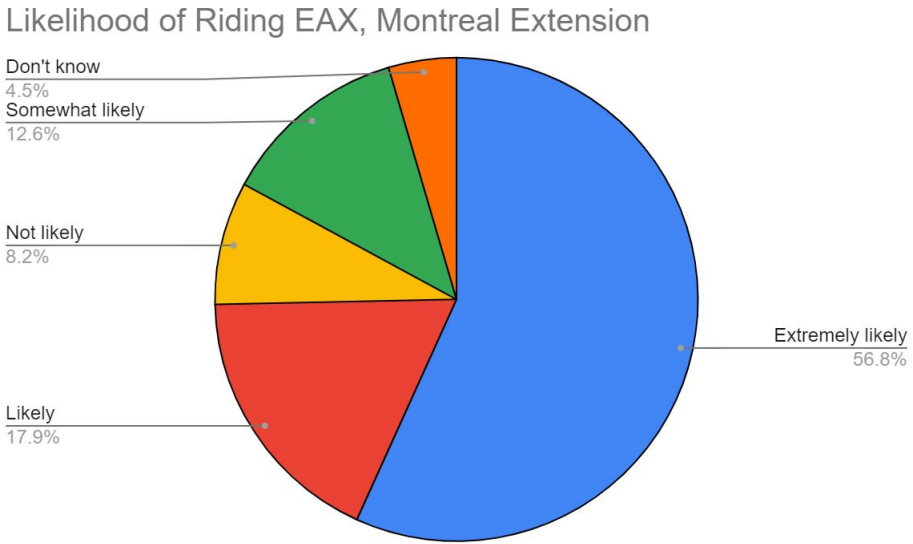
35% Extremely Likely or Likely



70% Extremely Likely or Likely

Montreal Interest





Survey Conclusions

- Speed improvements will pay dividends on ridership
- Demand is there for additional trains
- Montreal has significant interest, but other city pairs are equally valuable

Recommendations

- Study infrastructure needed to improve speeds (110 or 125 MPH top speeds)
- Clamor about a higher speed and frequency vision to entice Quebecois (and NY/MA/CT) to invest as well
- Work on speeding up the current route to boost ridership and lower operating costs per rider
- Invest in rehabilitating the Winooski Branch for passenger rail as soon as possible