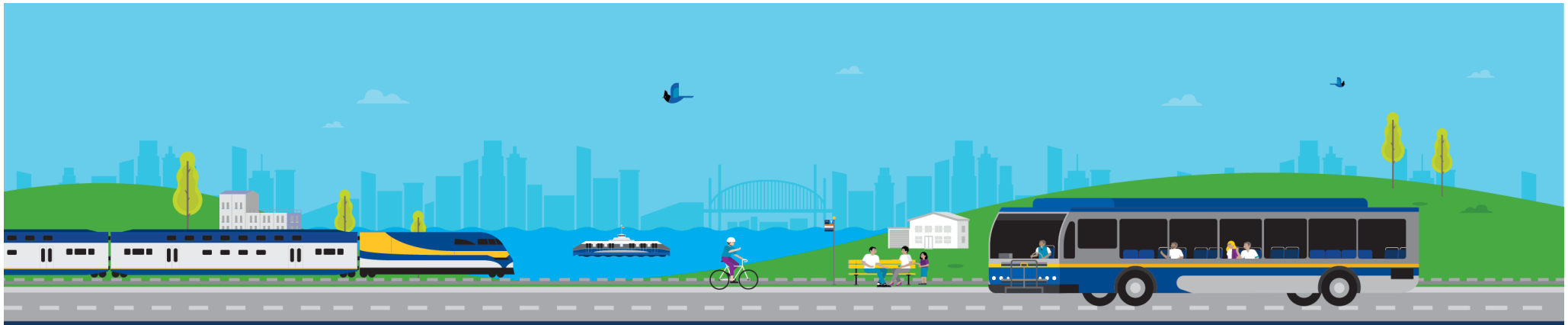


TransLink's ActivitySim Experience

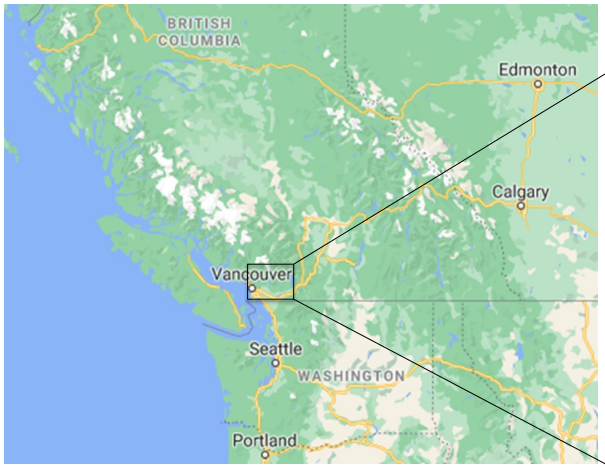
Ilan Elgar, Director, Research & Analytics

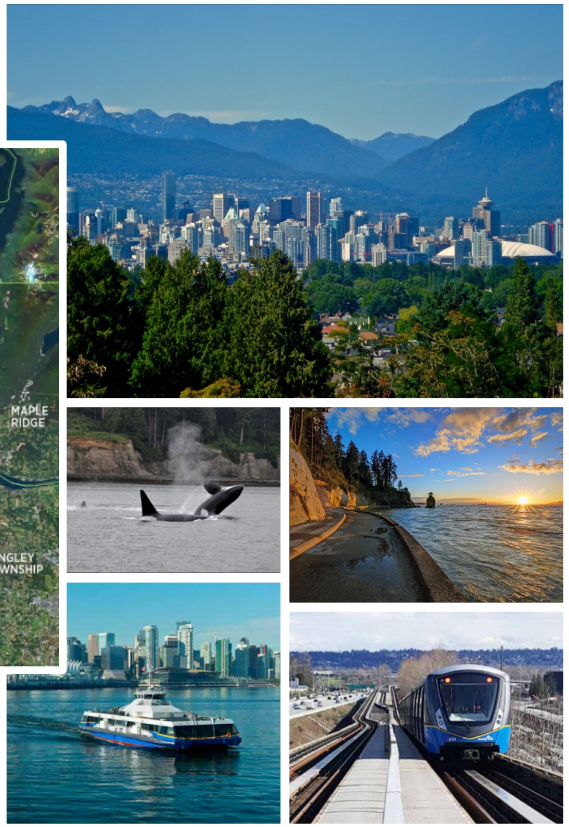
MoMo 2025

Together all the way

TRANSLINK

Metro Vancouver





Population – 2.99m (2023)

Jobs – 1.54m (2023)

TransLink

Coast Mountain Bus Company
220+ bus routes with a fleet of 1,500 vehicles

SeaBus
3 passenger-only ferries linking Downtown Vancouver & North Vancouver

Cycling
1,000 km of regional bike paths, locker facilities

HandyDART
Custom transit service for people with disabilities (310 fleet vehicles)

SkyTrain
Expo, Millennium & Canada Lines (68 km)

West Coast Express
5 daily trains running from Mission to Vancouver & back (67 km)

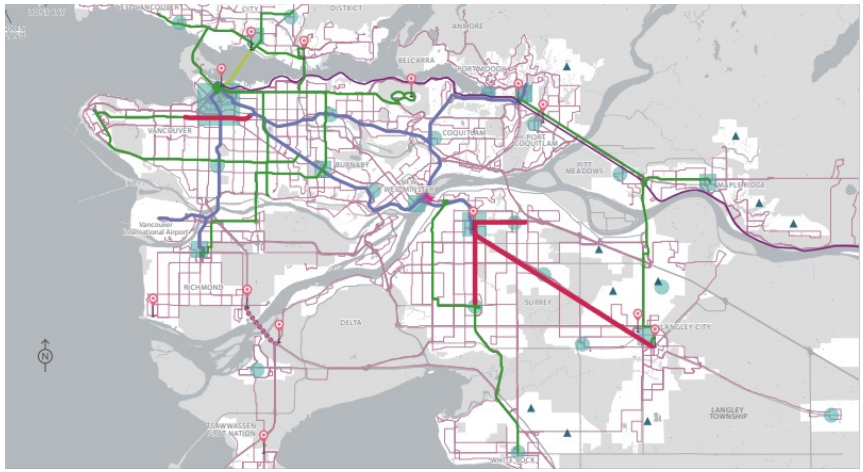
Major Road Network
Operation & maintenance of 2,300 lane kms of major roads

Bridges
Pattullo, Knight Street, Golden Ears & Westham Island Bridges

Transit Police
Dedicated transit police service (160+ sworn uniformed officers)

TransLink: Roles and Responsibilities

- Plans, funds and delivers the public transit system for Metro Vancouver
- Provides cost-sharing funding to municipalities for the Major Road Network
- Provides cost-sharing funding to municipalities for regional cycling and pedestrian infrastructure and programs
- Provides coordination role for regional transportation planning



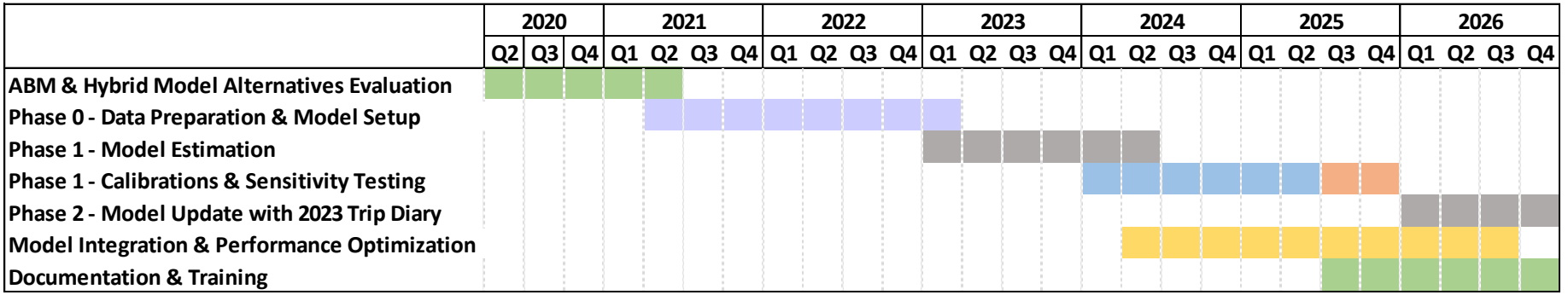
Why ABM?

- New conditions/behaviors
  - Increased work from home
  - Increased schedule flexibility
- New questions we could not answer with our trip-based model
  - Which groups gain the most from a new investment, service, or policy (DEI)
  - Distribution of costs of different pricing schemes (road user charging)
  - Forecasting peak-spreading and off-peak travel behavior
  - Policies that relate to fuel types and energy, e.g., promoting hybrid and electric vehicles

Why ActivitySim

- Open Source
- Python based
- Robust - Have been implemented, bench of consultants
- Flexible/customizable – could use different modules, assignment software agnostic
- Continuous improvements
- Ability to impact direction of platform development

Model Development Timelines



Work over the last year

- Assignment integrations with multiple iterations with assignment software (EMME)
- Complete estimation of trip mode choice
- ActivitySim model calibration to match the weighted household survey for the following models:
  - Workplace and school location
  - Work from home
  - Auto ownership
  - Transit pass ownership
  - Coordinated daily activity pattern
  - Tour frequency
  - Tour destination
  - Tour scheduling
  - Tour mode choice
  - Trip mode choice

Recent performance optimizations

ActivitySim (1-cycle), 100% Sample, run times (minutes)

Solution	Before Chunking Optimization, no sharrow	RSG Chunking Optimized with sharrow	TL Chunking Optimized with sharrow
Az-Batch-Linux	55.7	41.7	36.6
Az-VM-Windows	122.5	65.9	52.2
On-Prem-Server	145.2	72.9	53.6

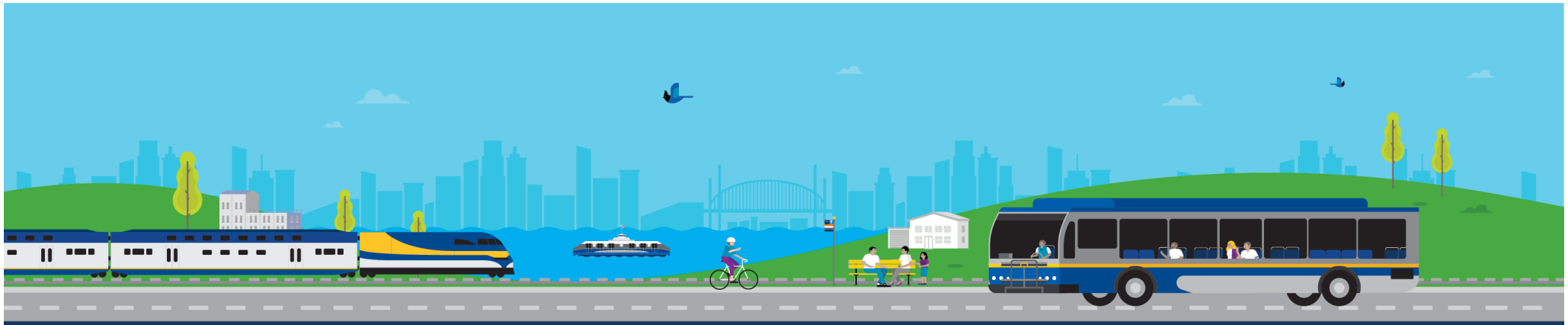
Estimated 4-cycle full model run times (hours)

Solution	Before Optimization, no sharrow	RSG Optimized with sharrow	TL Optimized with sharrow
Az-Batch-Linux	6.4	5.5	5.1
Az-VM-Windows	10.9	7.1	6.2
On-Prem-Server	12.4	7.6	6.3

What is left to make it operational

- Validate travel behavior patterns
- Ensure reasonable responsiveness/sensitivity
- Further optimize performance to reduce run times and memory requirements
- Achieve scalable cloud computing
- Re-estimate modules based on post-COVID household travel survey
- Generate synthetic populations for future years
- Develop documentation and examples for modelers and users
- Provide modeling as a service cloud computing solution for stakeholders

In the meantime, deploy the ActivitySim model in parallel to the production trip-based model to gain experience and confidence



Thank You!

Together all the way

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