



# Forecasting the Impact of New Mobility in the Context of Long-Range Transportation Plans

## Metro Vancouver Case Study

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# Project Team

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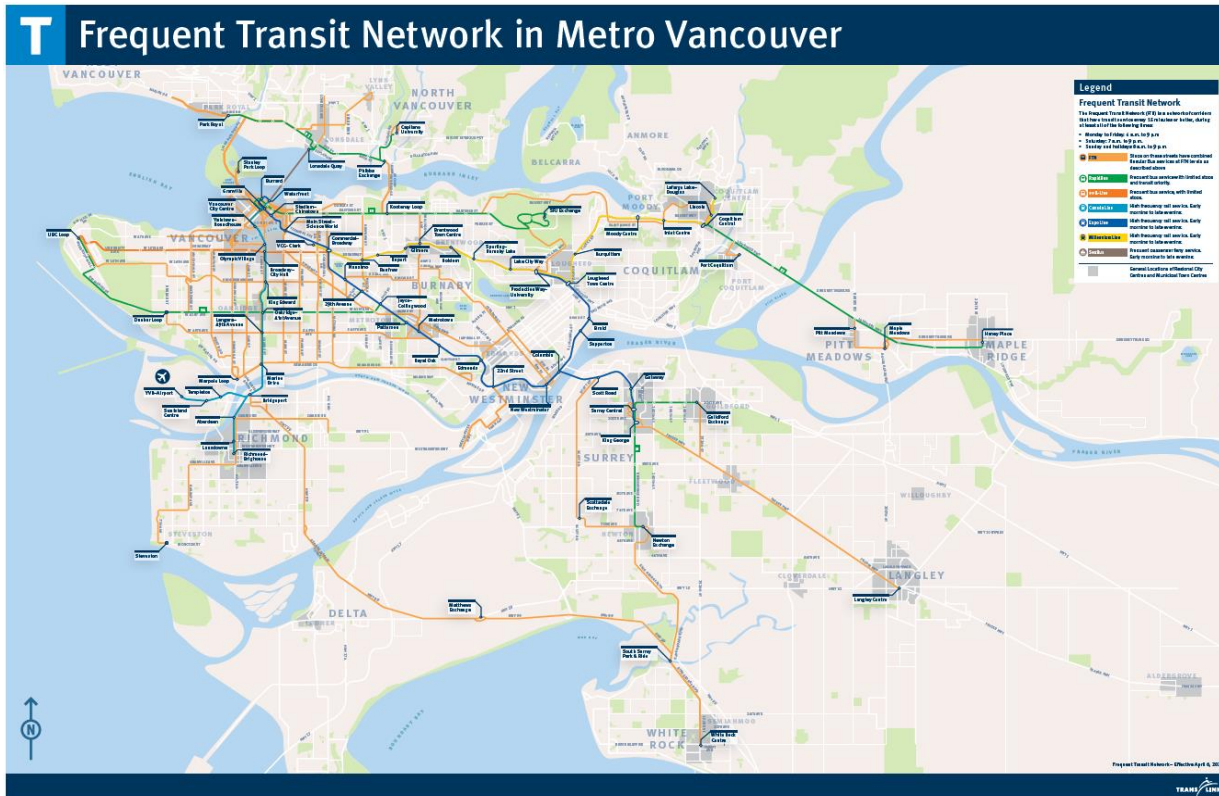
- **Uber**

- Mohamed Mahmoud

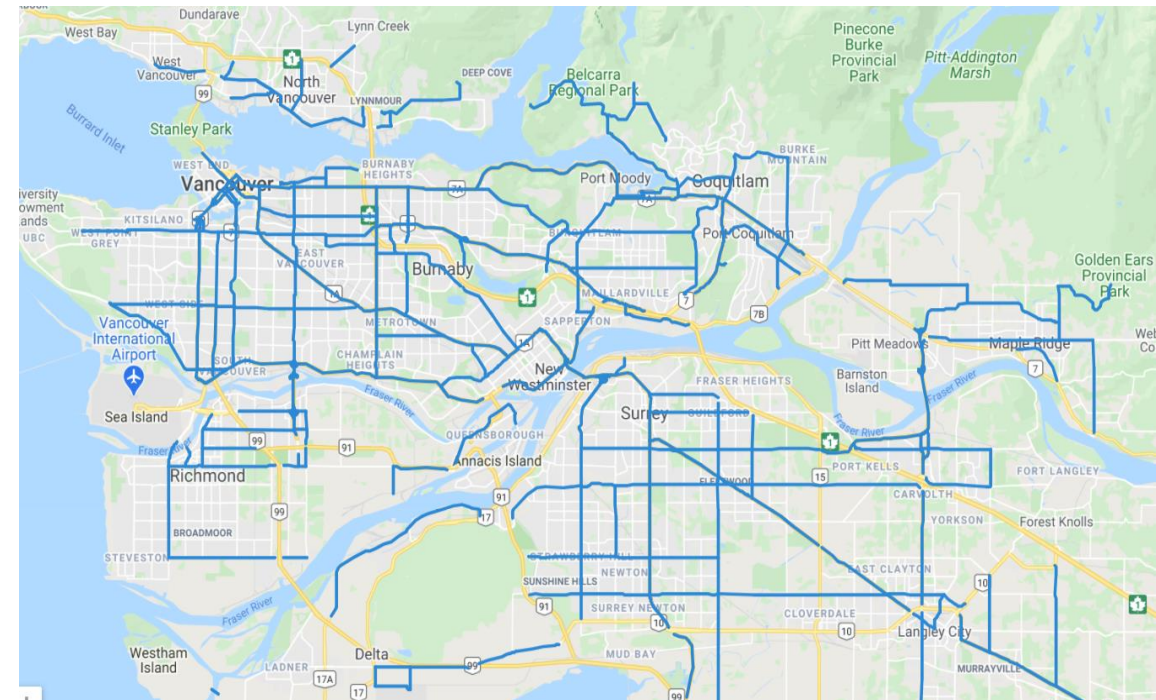


# TransLink 101

## FREQUENT TRANSIT NETWORK

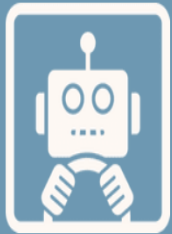


## MAJOR ROAD NETWORK



Source: <https://www.translink.ca/plans-and-projects/projects/major-road-network>

# TRANSPORT 2050



## Automated

Advances in computing and sensors could put robots in the driver's seat.



## Connected

Vehicles of all types will soon be able to communicate with each other.



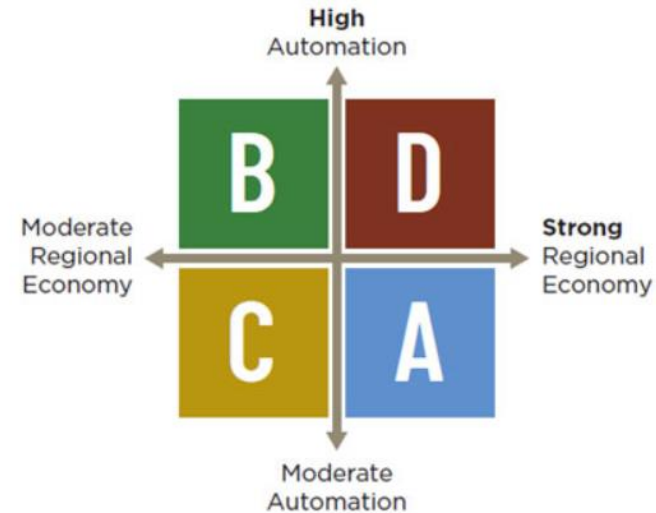
## Electrified

Powered by renewable energy, electric vehicles are taking off.



## Shared

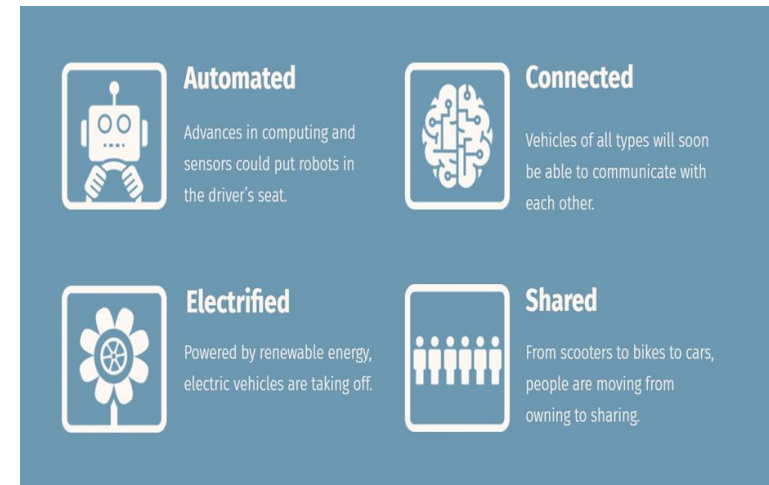
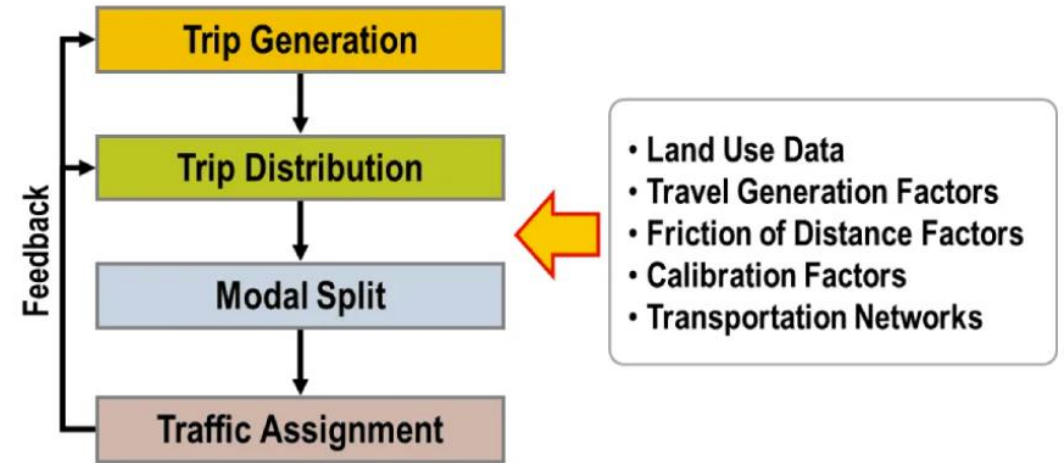
From scooters to bikes to cars, people are moving from owning to sharing.



- A Trend Forward**  
Current economic, growth and development trends continue
- B Automation-Driven Decline**  
Automation-driven job losses and outmigration result in a regional economy in decline
- C Self-Sufficiency**  
Barriers to global trade spur a more self-sufficient regional economy
- D Automation-Driven Boom**  
Automation drives a new economic boom led by new creative and knowledge sectors

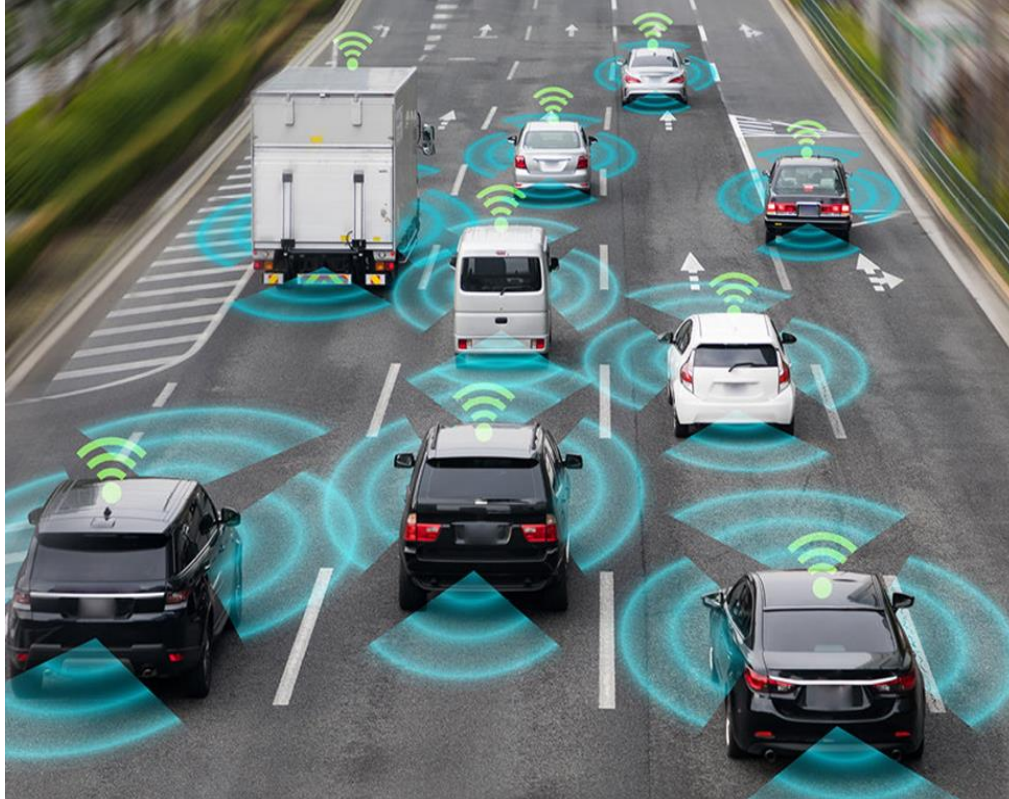
# The Regional Transportation Model (RTM)

- Travel Demand Model
- Used to Evaluate Scenarios
  - Land Use
  - Infrastructure
  - Demand Management
- Upgraded to Incorporate New Mobility





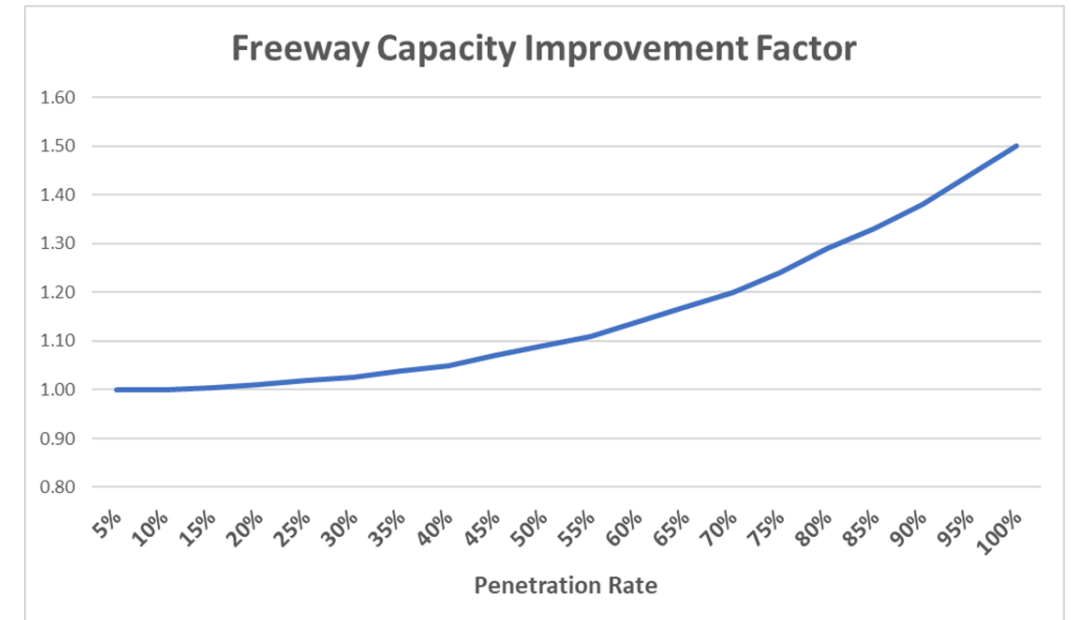


# New Mobility



# New Mobility – Behavioral Upgrades

- Connected-Autonomous Vehicle (CAV) owners can send vehicle back home to avoid parking
- CAV travel less sensitive to travel time
- TNC availability correlated with density
- CAV % 
  - Speed and Capacity 
- Modeller controls ‘knobs’
  - CAV Penetration
  - Speed/Capacity improvement factors
  - Travel time sensitivity



# Summary of Upgrades

Connected and  
Autonomous Vehicles  
(CAV) ownership ✓

Accessibility-sensitive  
trip generation ✓

Transportation Network  
Company (TNC) modes ✓

Network speed/capacity  
adjustments ✓

Intra-household travel ✗

TNC dispatch model ✗

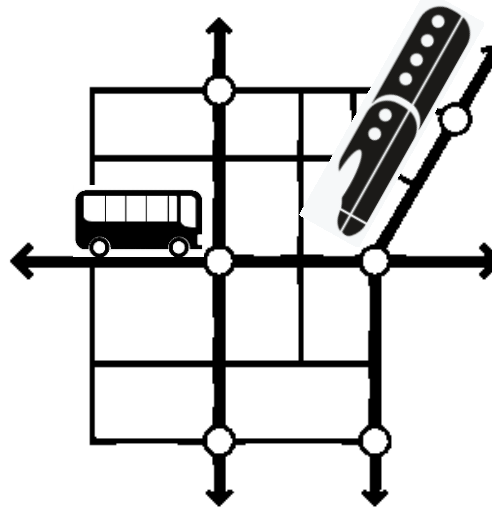
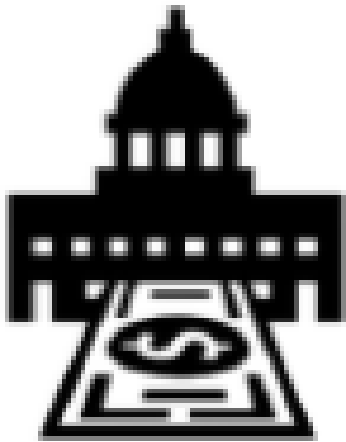
TNC ridesharing ✗

Parking demand model ✗



# Transport 2050 modelling

- Used the RTM to model the proposed:
  - Policy levers (Road User Charging(RUC) etc.)
  - New mobilities (TNC etc.)
  - Transit services (Higher-order transit etc.)
  - New Infrastructures (Bus Lane etc.)



# BAU Assumptions

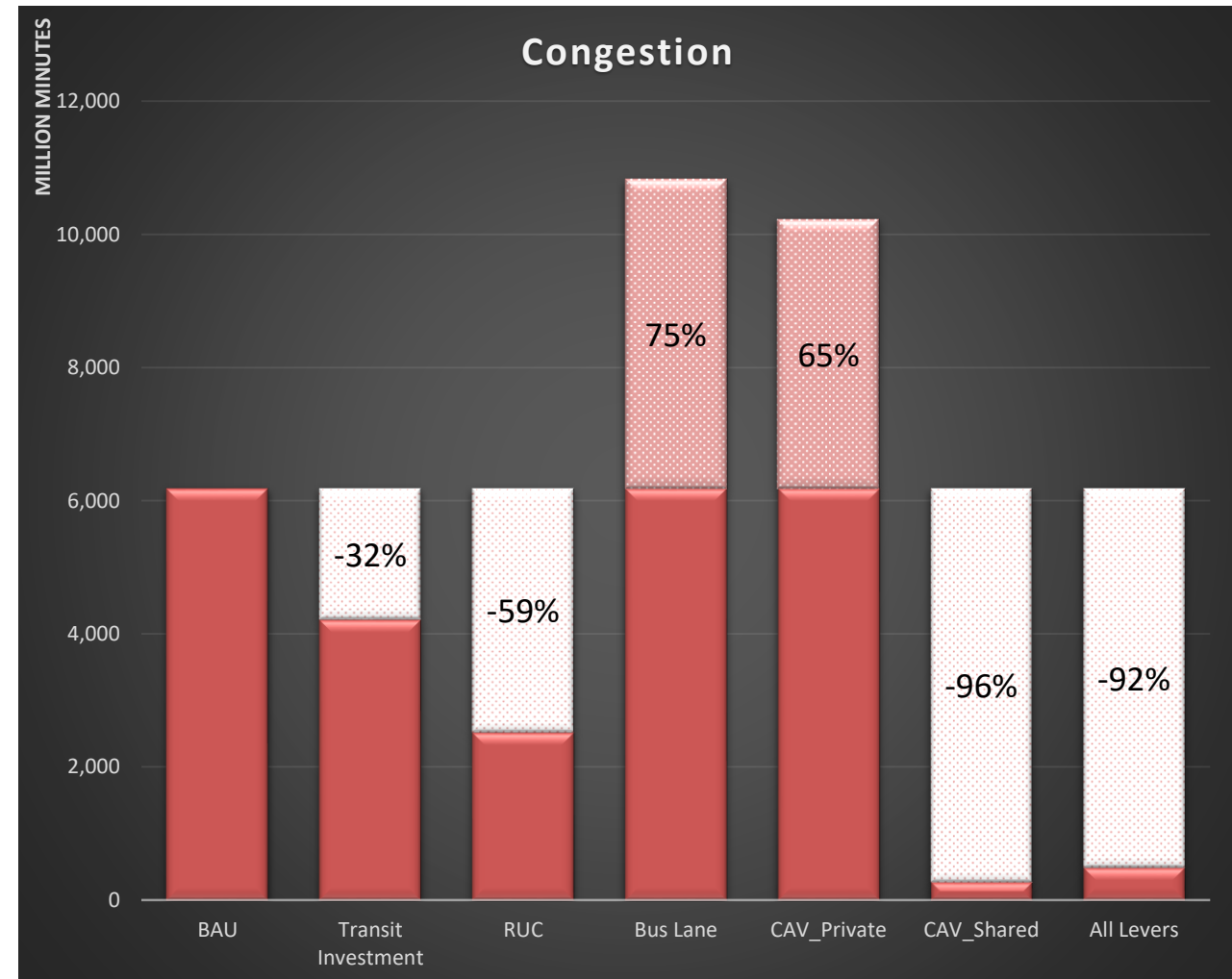
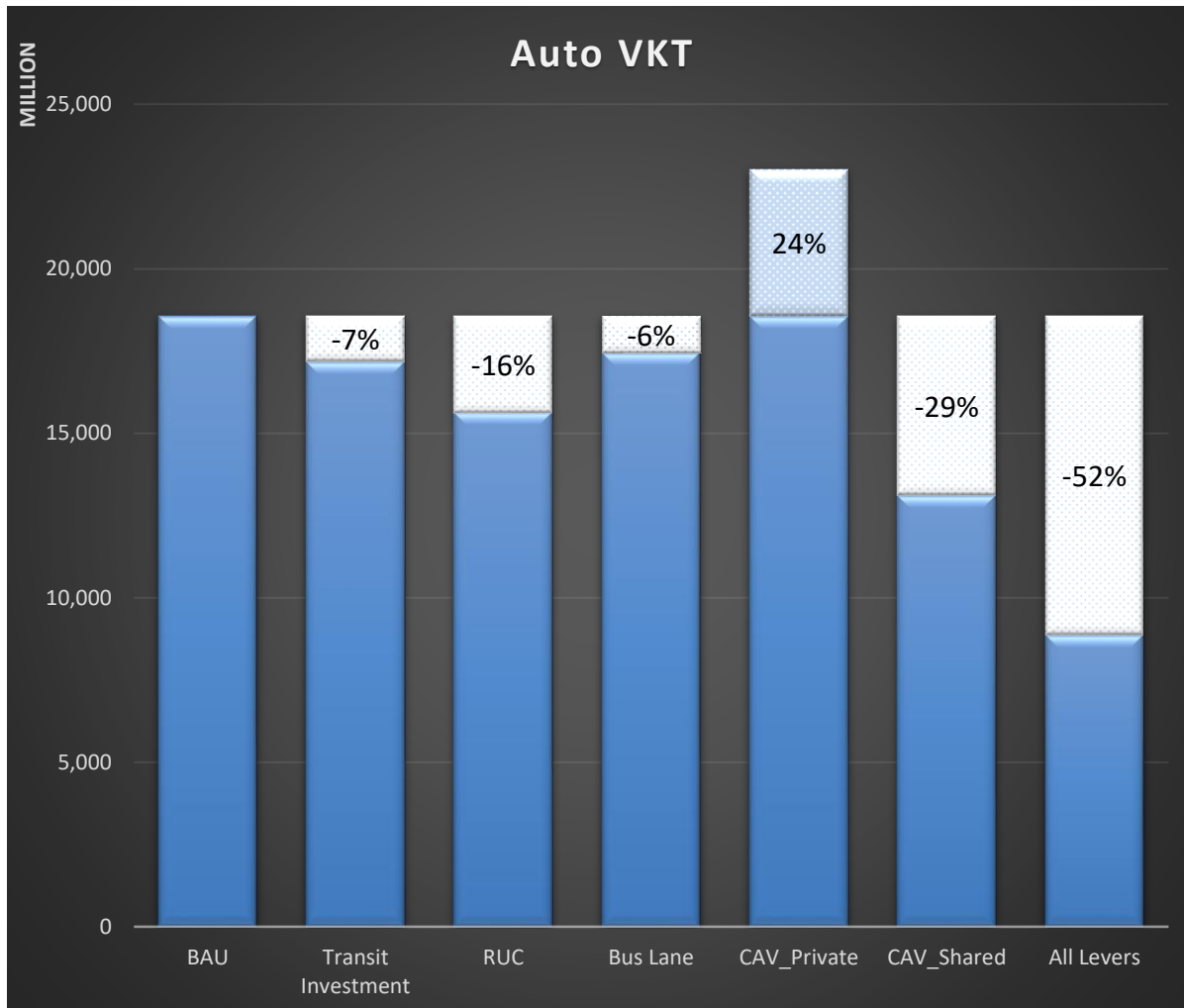
- Horizon year 2050
- 100% Electric Vehicle penetration (non-truck)
- Landuse aligns with MetroVan Regional Growth Strategy Plan
- No CAVs
- No Road User Charging (RUC)
- Transit Network Companies (TNCs)
- New SkyTrain Extensions
  - Surrey Langley SkyTrain
  - Broadway Subway
- etc...



# Scenarios

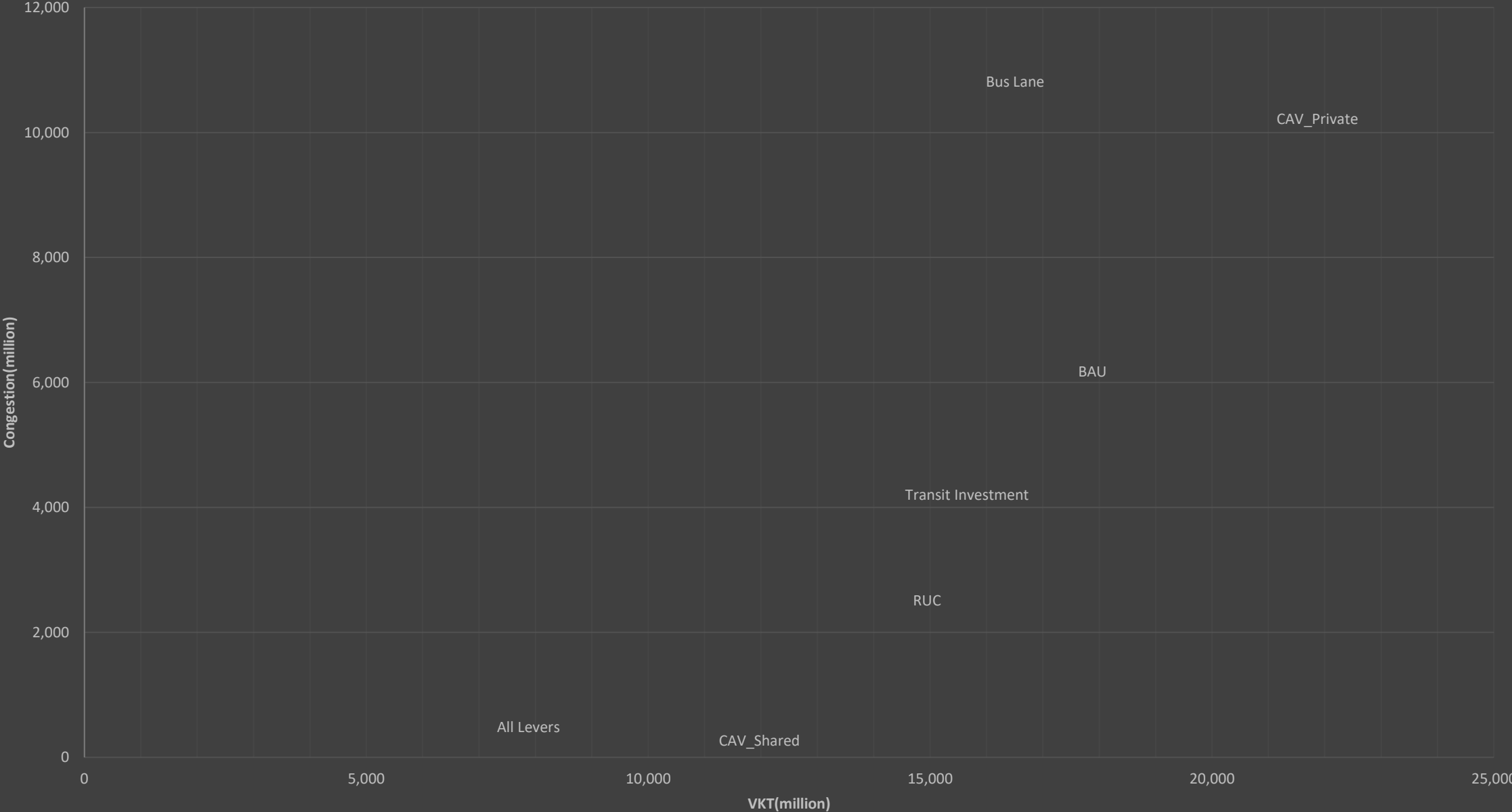
Scenario	Policy Lever	New Mobility	Transit Service	New Infrastructure
<b>Transit Investment</b>			<ul style="list-style-type: none"> <li>- 36 new rapid transit services, increase rapid service by approx 450%.</li> <li>- Increase regular bus service by approx 300%</li> </ul>	
<b>Road User Charging (RUC)</b>	<ul style="list-style-type: none"> <li>- Apply additional price by trip distance.</li> <li>-The range is 0.2-0.8 \$/km in peak hour, depending on the region.</li> </ul>			
<b>Bus Lane</b>				<ul style="list-style-type: none"> <li>- Convert general traffic lane to bus-only lane under a certain criterion</li> </ul>
<b>CAV private</b>		<ul style="list-style-type: none"> <li>- All private owned vehicles are CAVs</li> </ul>		
<b>CAV shared</b>		<ul style="list-style-type: none"> <li>- No private vehicles, and all shared vehicles are CAVs</li> </ul>		
<b>All levers</b>	√	CAV shared	√	√

# VKT and Congestion

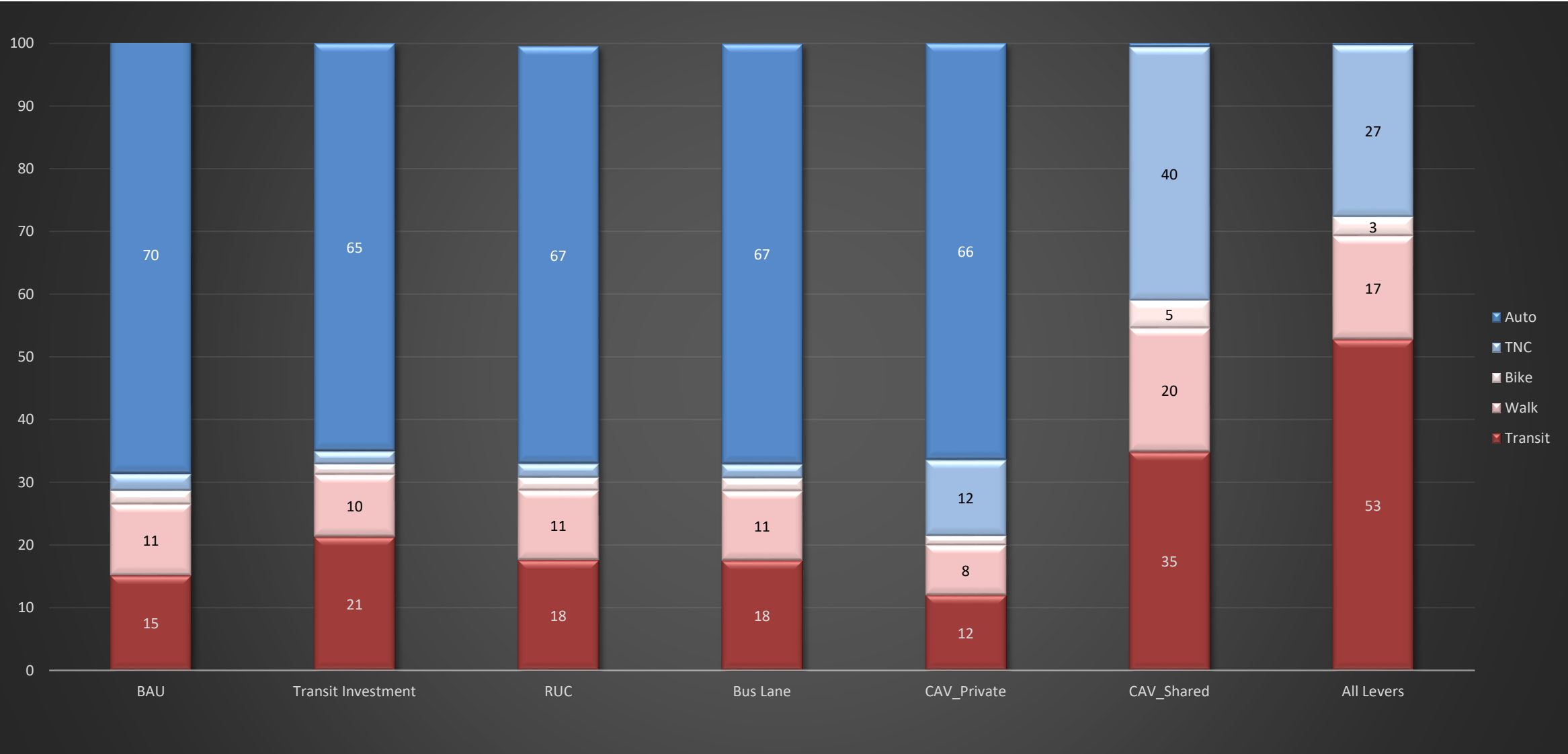




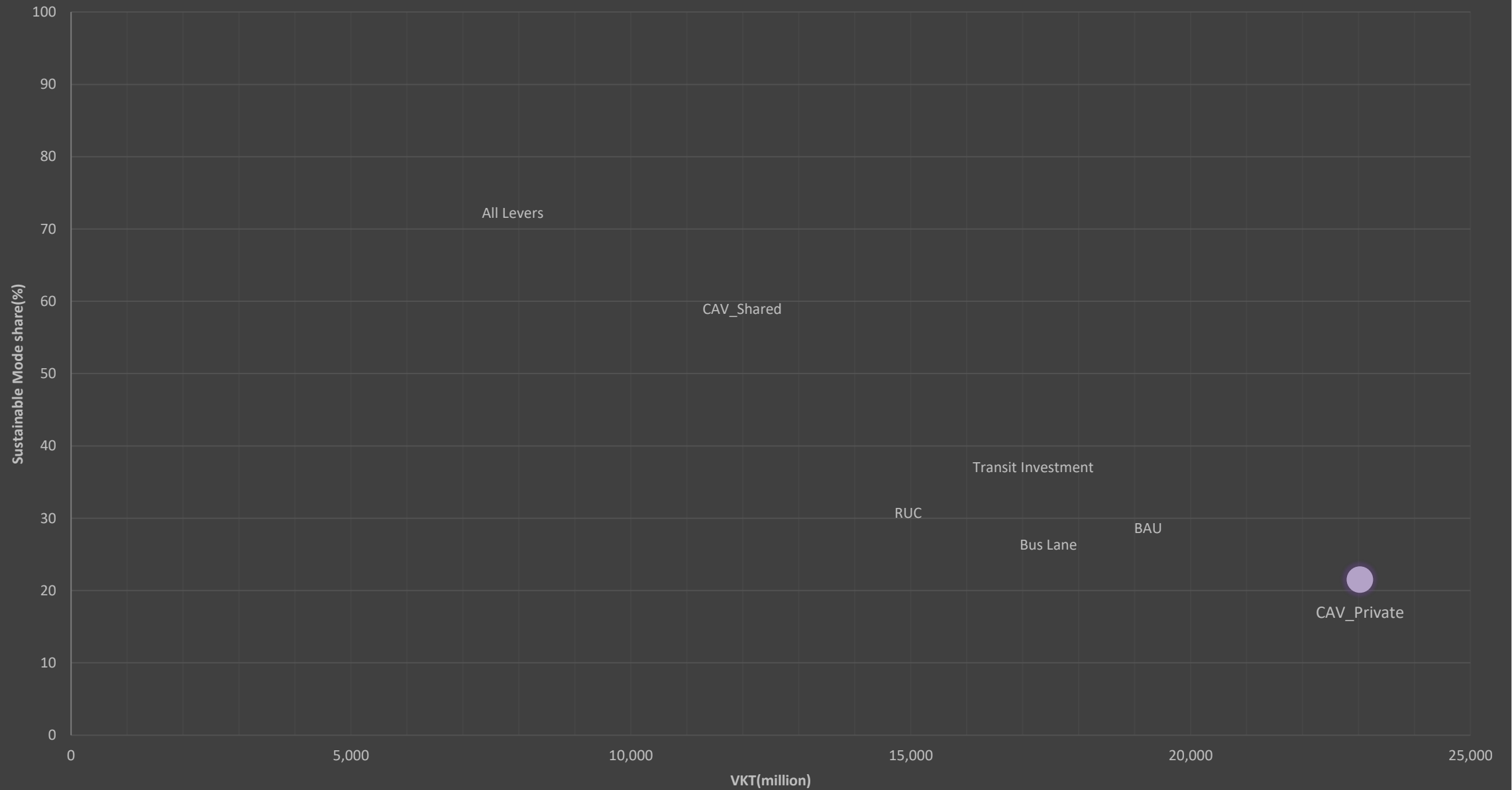
VKT vs Congestion



# Mode Share



## VKT vs Mode Share



# Findings

- Private-owned CAVs contribute to higher congestion and VKT
  - Lower travel time sensitivity
  - Sending car back home to avoid parking
- Road User Charging reduces auto usage and road congestion efficiently
  - Fewer long trips
  - Shift to other modes
- Significant investment in transit required to reduce congestion
  - Very expensive
- Shared CAVs is a hypothetical scenario however
  - Almost eliminates congestion
- CAVs could be a game changer in transportation system



# Concluding Remarks

- The future is uncertain
  - Models are ‘best guesses’ based on:
    - What we know today
    - What we think is the impact of what has not been observed yet
- Long term plans need to be ‘nimble’
  - As more information becomes available, planners can readily decide to refine some plans and discard others
- One type of policy is not enough



