

Leaving Level of Service Behind


The Implications of the Switch to VMT Impact Metrics in Land Use Planning

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**National Center
for Sustainable
Transportation**

- 
1. Urban Metabolism & Land Use?
 2. Policy Landscape
 3. LOS & VMT
 4. Implications of a Switch: Nishi Gateway

Urban Metabolism

“Big picture” quantification of inputs, outputs and storage of energy, water, nutrients, materials and waste from an urban region.

Kennedy et al. 2010

Urban Metabolism

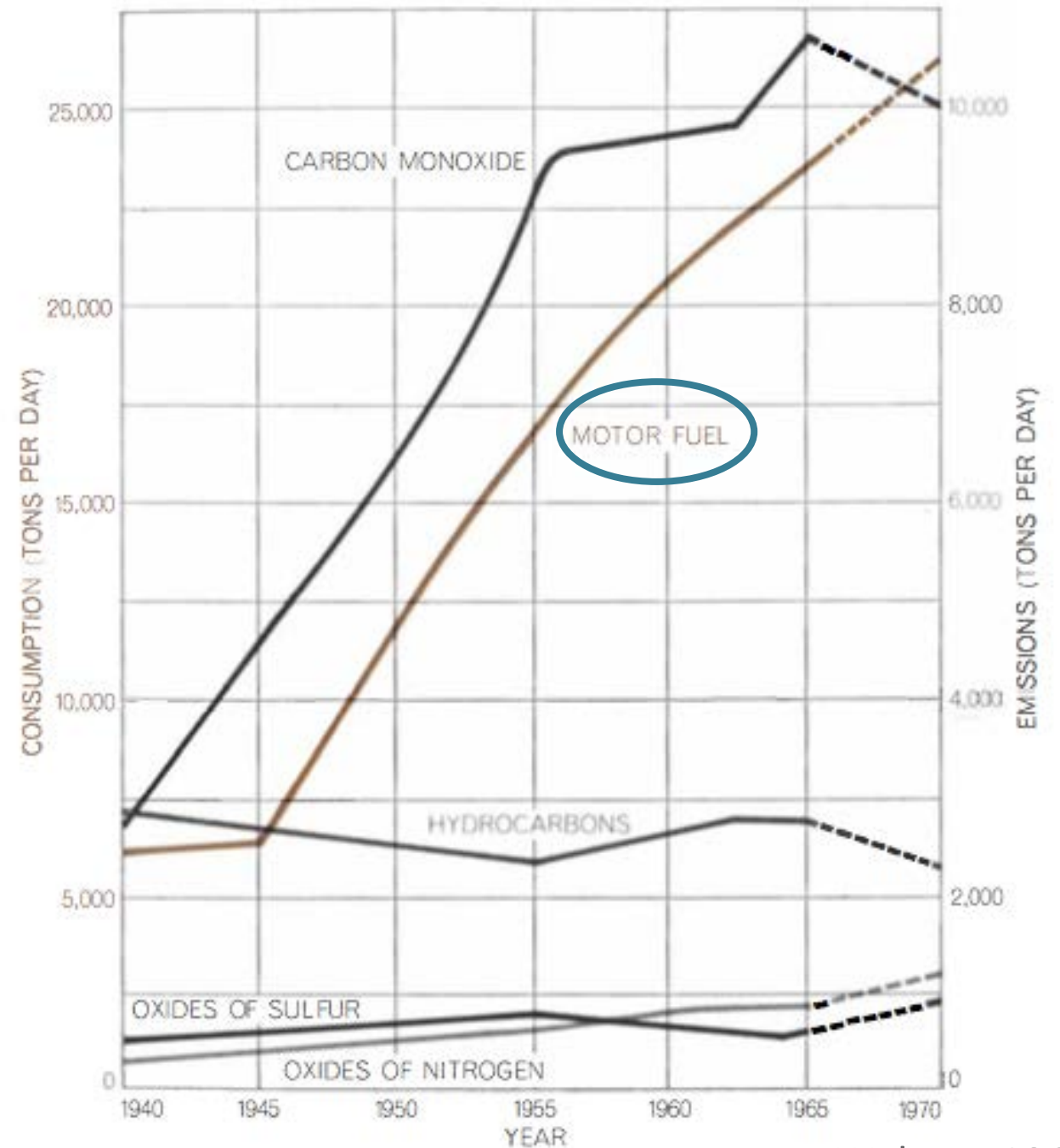
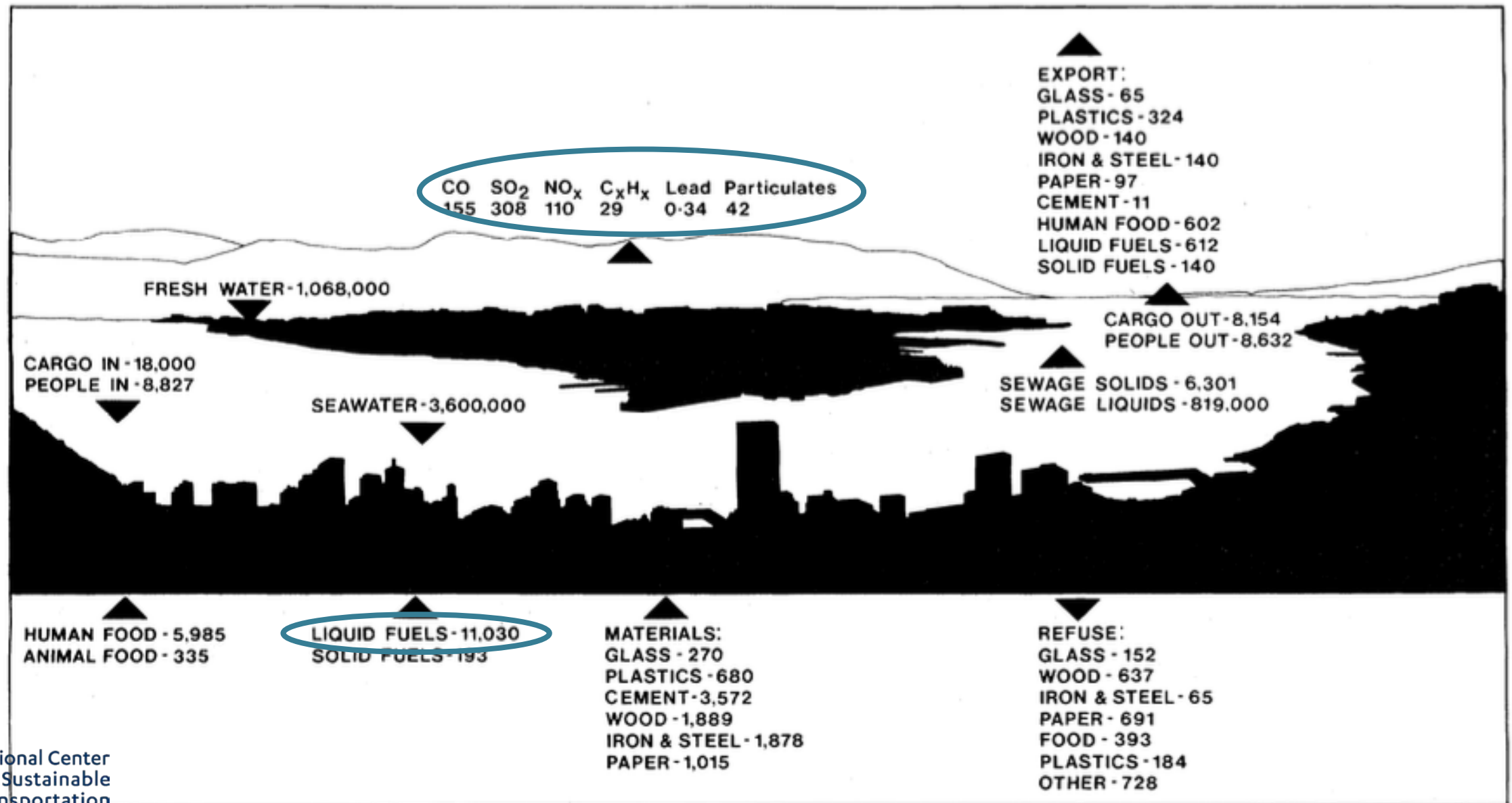


Figure 2. Diagrammatic representation of the flow of important materials into and through the settlement of Hong Kong. All units are in metric tonnes per day. Arrows are intended to give some indication of the direction of flow of materials.



≡

			Transportation	Energy	Air Pollutants	GHGs	
	Hypothetical	1965	*	*	*		Wolman
	Miami	1975		*	*		Zuccheto
	Tokyo	1976	*		*	*	Hanya & Ambe
	Hong Kong	1978	*	*	*		Newcombe et al.
	32 Cities	1991	*	*			Newman & Kenworthy
	Gävle, SE	1995					Nilson
	Swiss Lowlands	1997	*	*	*		Baccini
	Brisbane	1999					Stimson
	Vienna	2000					Hendriks et al.
	Hong Kong	2001	*	*	*	*	Warren-Rhodes & Koenig
	Phoenix	2001					Baker et al.
	Stockholm	2001					Sviden & Jonsson
	Stockholm	2001					Sörme
	Vienna	2001					Obernosterer et al.
	Bangkok	2001					Faerge
	York	2002	*	*		*	Barrett et al.
	Toronto	2003	*	*	*	*	Sahely et al.
	Stockholm	2003					Burström
	Singapore	2003		*			Shulz et al.
	Shenzhen, CN	2007					Zhang & Yang
	Los Angeles	2008	*	*	*	*	Ngo & Pataki
	Cape Town	2008	*	*	*	*	Crane et al.
	Toronto	2008	*	*			Codoban & Kennedy
	10 Cities	2009	*			*	Kennedy et al.
	Lisbon	2009	*		*		Niza et al.
	Paris	2009	*	*	*		Barles
	Singapore	2009		*		*	Schulz
	Vancouver	2011	*	*	*	*	Moore et al.
	Los Angeles	2014				*	Pincetl et al.
	Birmingham	2015	*	*	*	*	Lee et al.

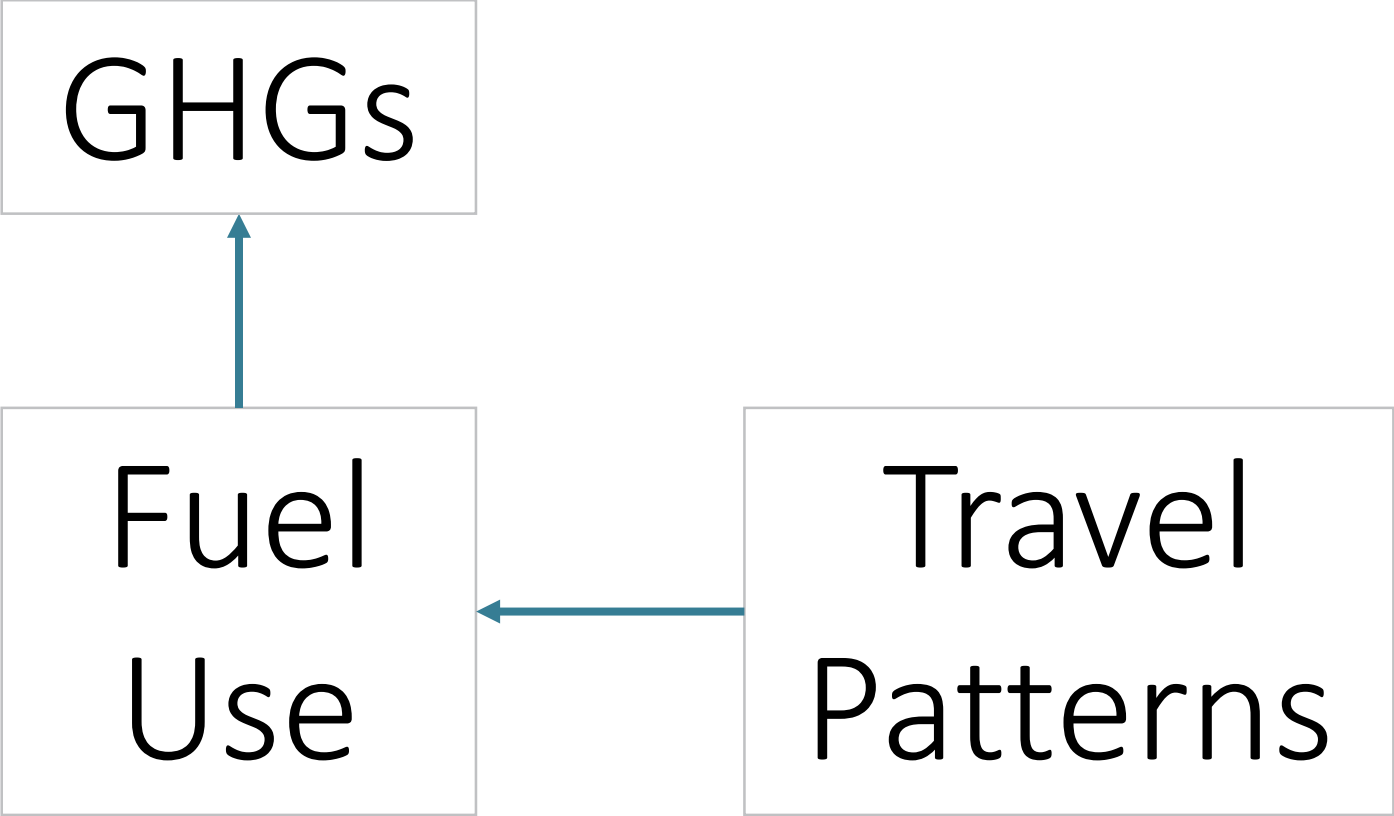
What does this have to do with
land use planning?

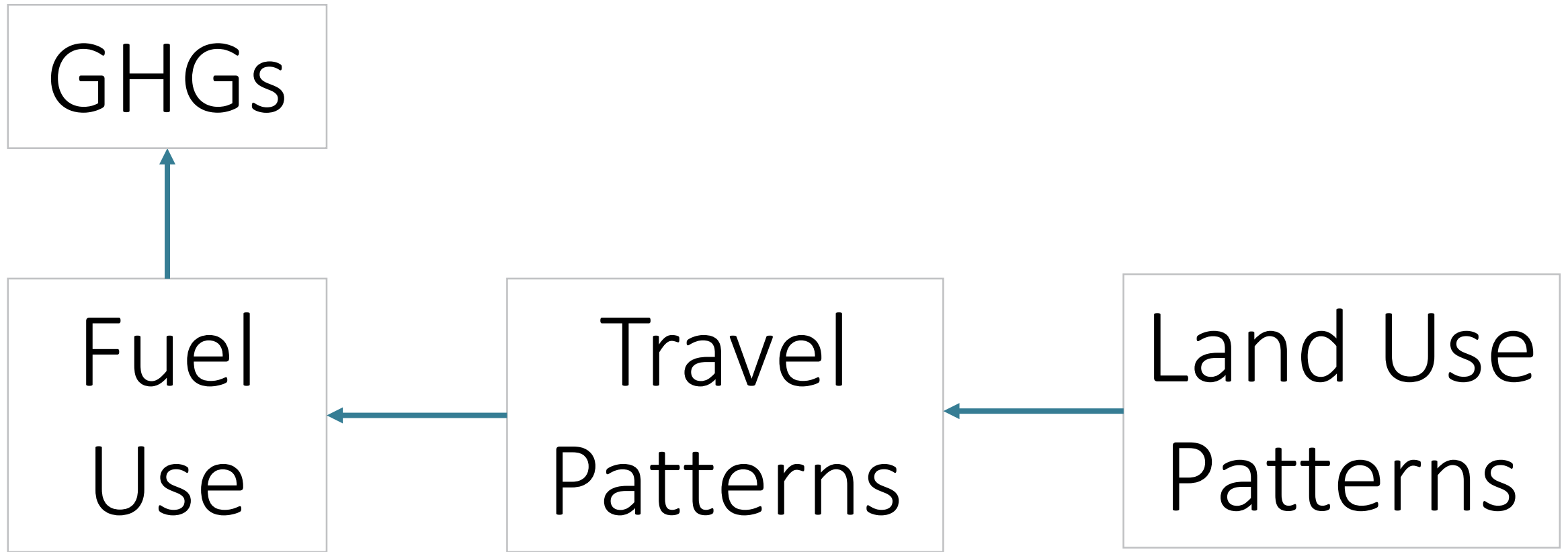
Fuel
Use

GHGs

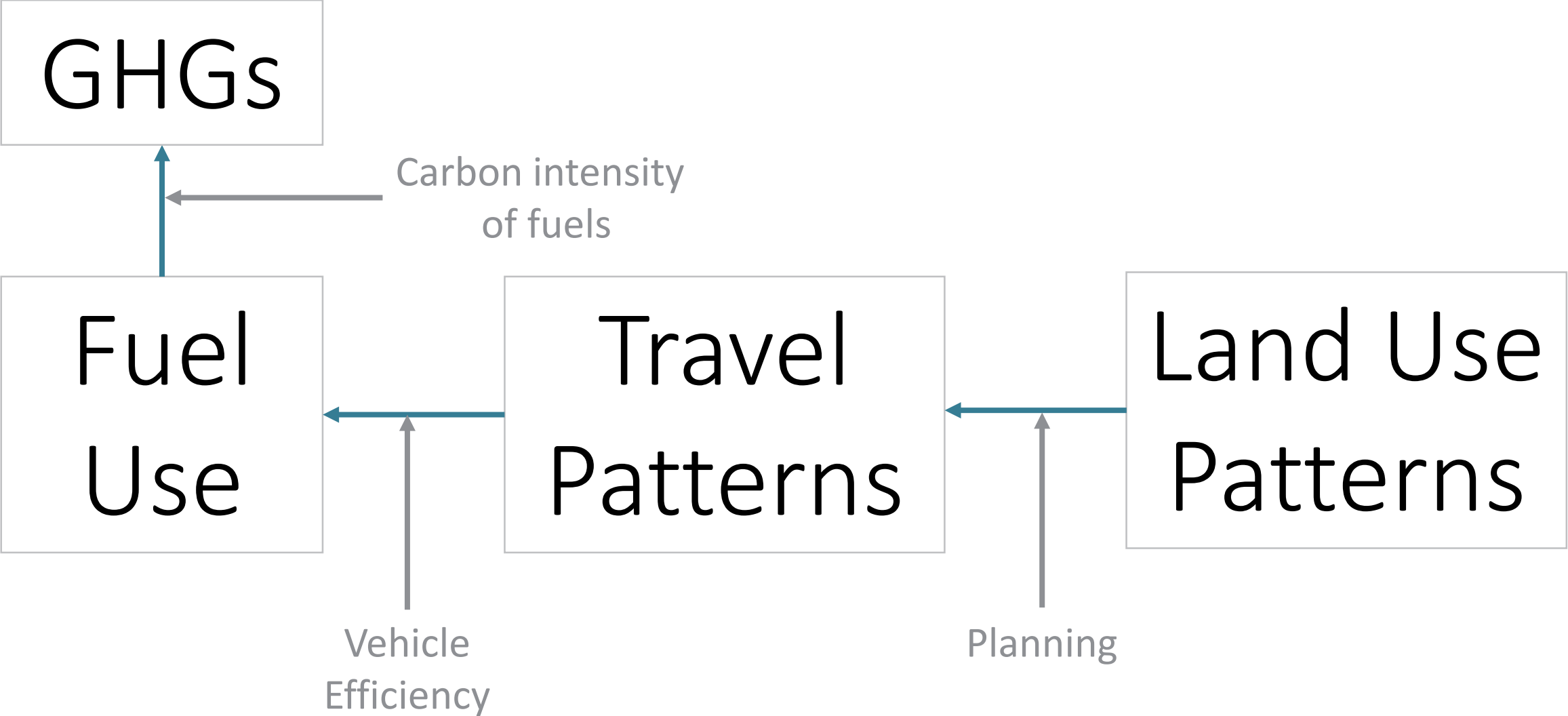


Fuel
Use





		Fuel Use	VMT/VKT	
Hypothetical	1965	*		Wolman
Miami	1975			Zuccheto
Tokyo	1976	*		Hanya & Ambe
Hong Kong	1978	*	*	Newcombe et al.
32 Cities	1991	*		Newman & Kenworthy
Gävle, SE	1995			Nilson
Swiss Lowlands	1997	*		Baccini
Brisbane	1999			Stimson
Vienna	2000			Hendriks et al.
Hong Kong	2001	*		Warren-Rhodes & Koenig
Phoenix	2001			Baker et al.
Stockholm	2000			Sviden & Jonsson
Stockholm	2001			Sörme
Vienna	2001			Obernosterer et al.
Bangkok	2001			Faerge
York	2002	*		Barrett et al.
Toronto	2003	*		Sahely et al.
Stockholm	2003			Burstrom
Singapore	2003			Shulz et al.
Shenzhen, CN	2007			Zhang & Yang
Los Angeles	2008	*	*	Ngo & Pataki
Cape Town	2008	*		Crane et al.
Toronto	2008	*	*	Codoban & Kennedy
10 Cities	2009	*	*	Kennedy et al.
Lisbon	2009			Niza et al.
Paris	2009	*		Barles
Singapore	2009			Schulz
Vancouver	2011	*	*	Moore et al.
Los Angeles	2014			Pincetl et al.
Birmingham	2015	*	*	Lee et al.



$$GHGs = \frac{gCO_2e}{MJ} \times \frac{MJ}{mile} \times miles$$

↑
Carbon Intensity
of Fuels

↑
Vehicle
Efficiency

↑
Land Use &
Transportation
Planning

$$\begin{aligned} &GHGs \\ &= \frac{gCO_2e}{MJ} \times \frac{MJ}{mile} \times miles \end{aligned}$$

↑
AB 32 & SB 32

↑
Low Carbon
Fuel Standard

↑
CAFÉ
Standards

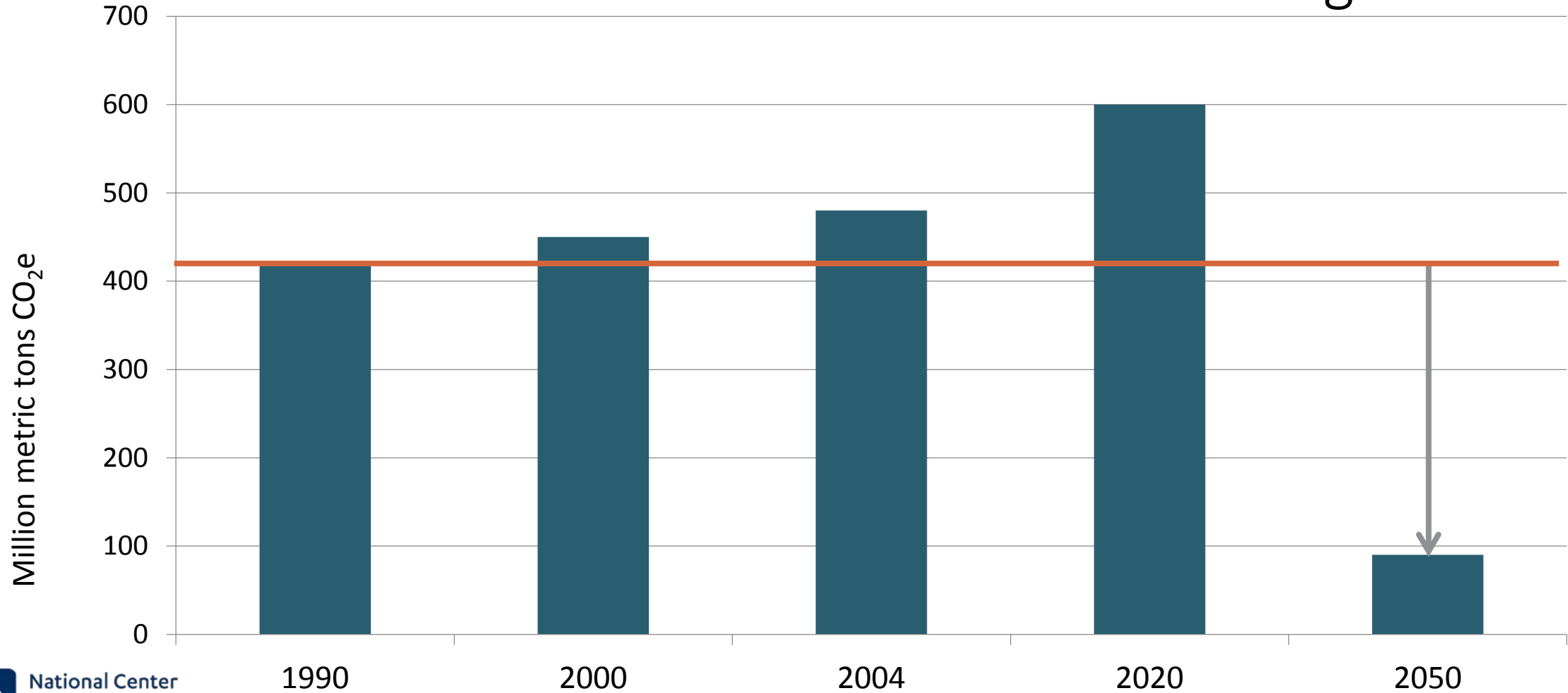
↑
SB 375
SB 743

Climate Policy

The Case of California

AB 32 – Global Warming Solutions Act of 2006

Statewide GHG Emissions & Reduction Targets



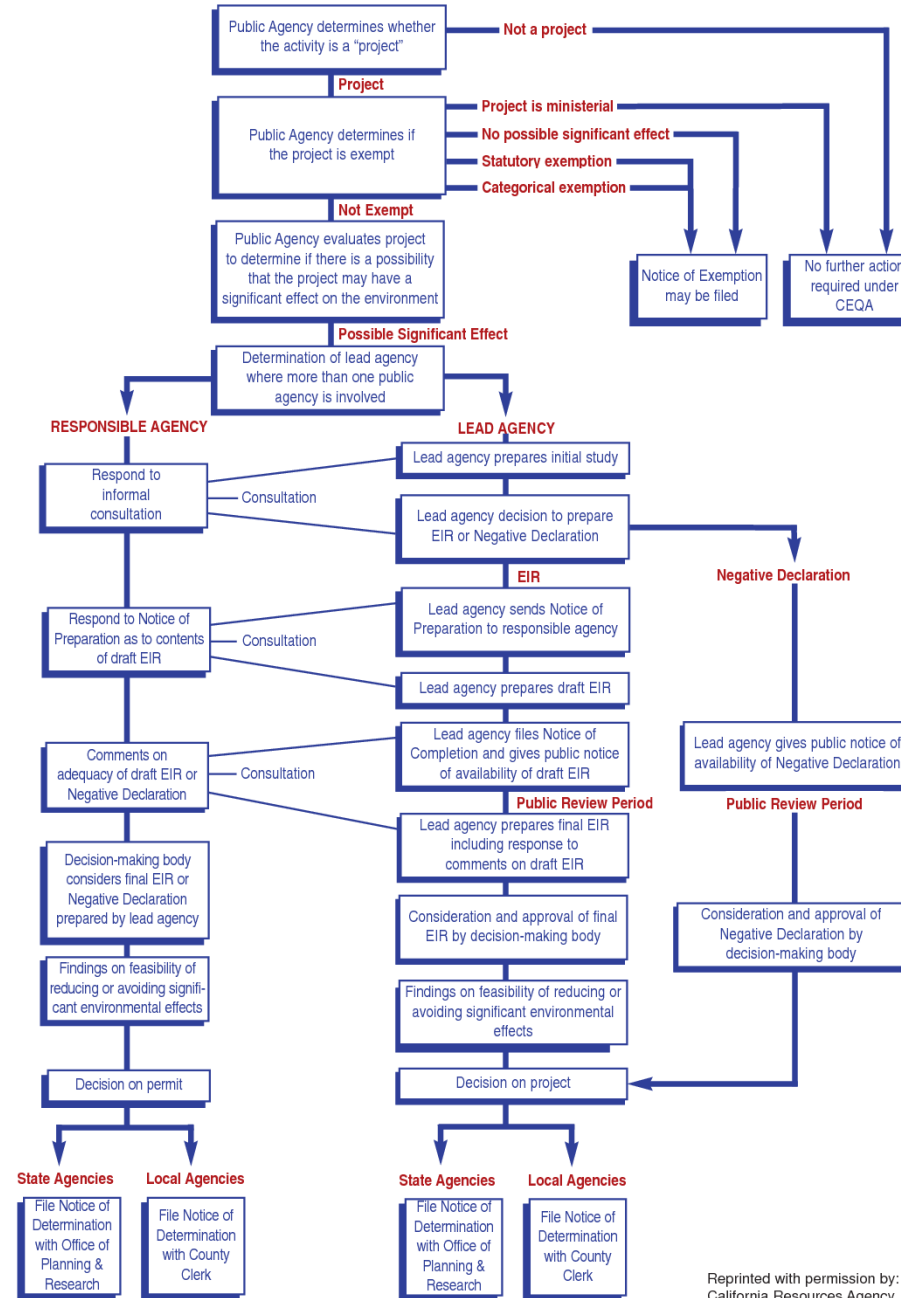
SB 375 – Sustainable Communities & Climate Protection Act of 2008

Per Capita GHG Reduction Targets

	2020	2035
Bay Area	-10%	-19%
Sacramento Area	-7%	-19%
San Diego Area	-15%	-21%
Southern California	-8%	-21%

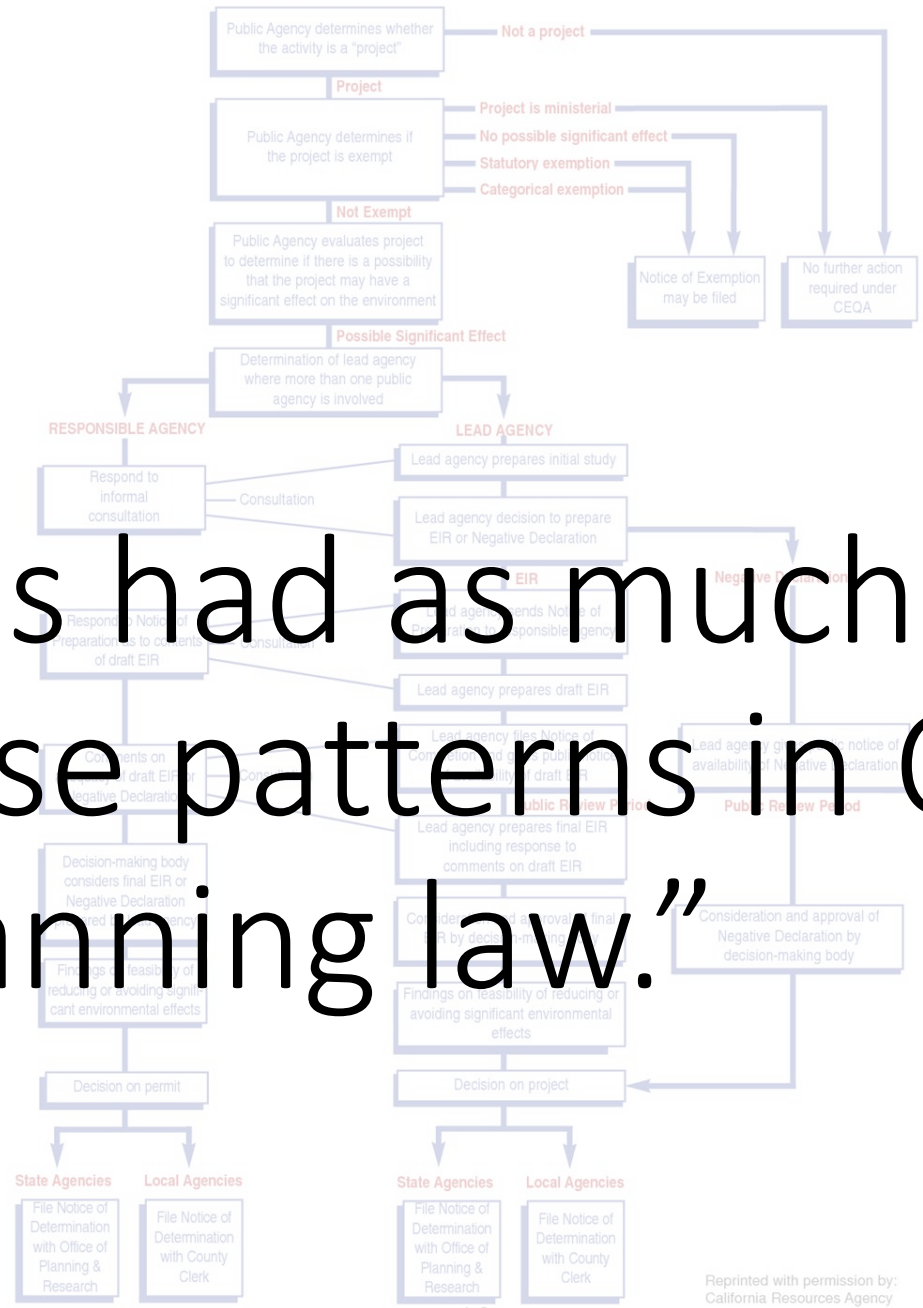
CEQA PROCESS FLOW CHART

California Environmental Quality Act



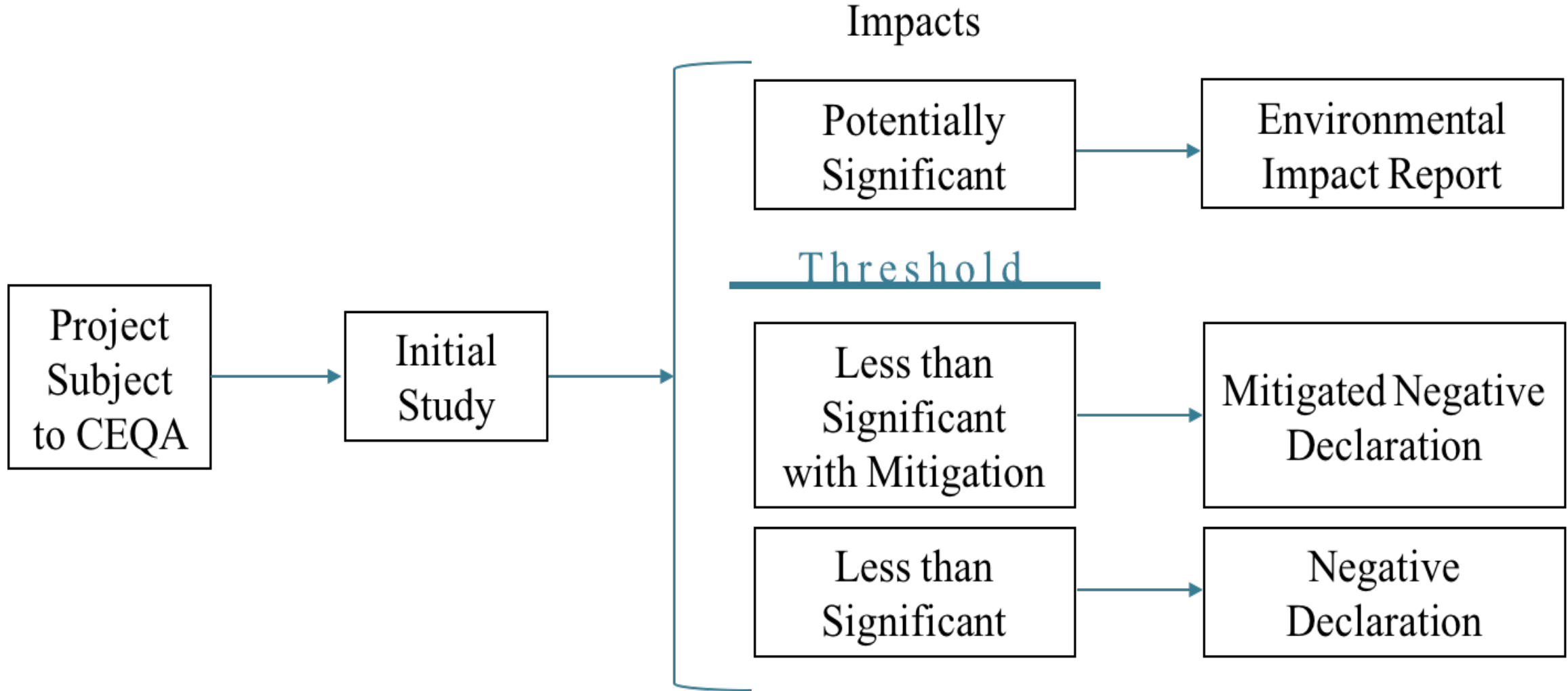
CEQA PROCESS FLOW CHART

California
Environmental
Quality
Act



“CEQA has had as much influence on land use patterns in California as any planning law.”

Fulton & Shigley 2012



“Adverse effects on **traffic** circulation ... can be significant environmental impacts.”

Fourth District Court of Appeal, *City of Orange v. Valenti* 1974

Level of Service (LOS)

Qualitative measure of the effect of a number of factors, which include:

- **vehicle speed** and travel time
- traffic interruptions
- freedom to maneuver
- safety
- **driving comfort** and **convenience**
- operating costs

“New methodologies under CEQA are needed for evaluating transportation impacts that are better able to promote the state’s goals of **reducing greenhouse gas emissions** and traffic-related air pollution, promoting the development of a **multi-modal transportation system**, and providing clean, **efficient access** to destinations.”

Senate Bill 743 (2013)

“**Vehicle miles traveled** is the most appropriate measure of a project’s potential transportation impacts.”

Senate Bill 743 (2013)

So what difference does it make?

LOS

VMT

A yellow spotlight effect is shown, originating from the top right corner and shining down onto the text 'VMT'. The spotlight is represented by a yellow cone that tapers towards the top right, with a yellow oval at its base directly under the 'VMT' text.

Implications of a Switch

The Nishi Gateway



Nishi Gateway

High-density residential,
retail, R & D

50 acres

650 HHs

Significant Impacts from Nishi Gateway

Increase delay at local intersections

Increase delay at freeway interchange

Construction activities would increase traffic congestion

Mitigations for Significant Impacts

Design and construct roundabout at local intersections

Fair-share funding of freeway interchange reconfiguration

Prepare Construction Traffic Control Plan

SB 734-Based Impacts from Nishi Gateway

Near Transit – within ½ mile of rail or frequent bus service

Less than Significant

Low-VMT Residential Area

Less than Significant

Low-VMT Employment Area

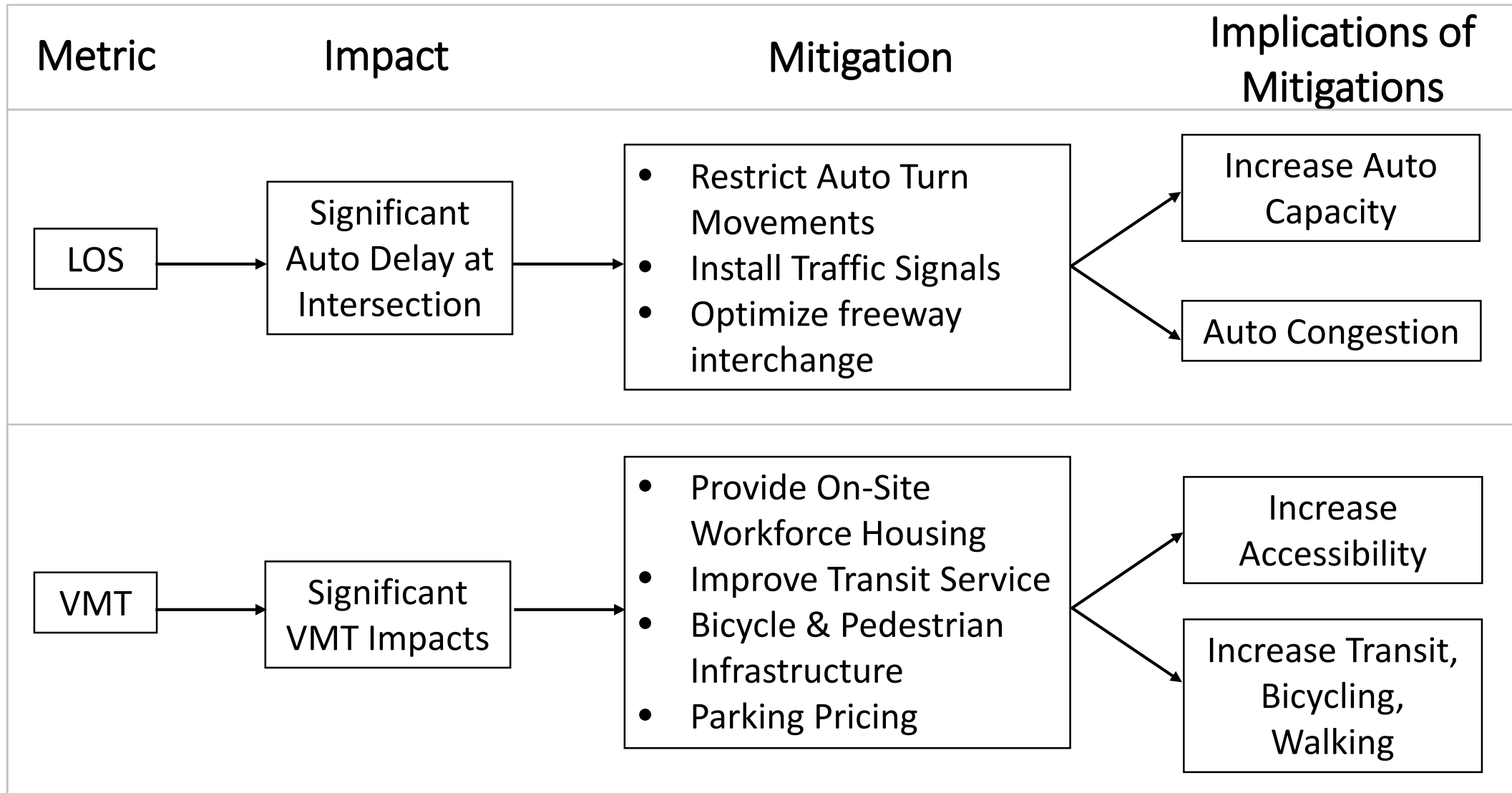
Not Less Than Significant

Locally-Serving Retail

n/a

SB 734-Based Mitigations

None Required



Metric	Impact	Mitigation	Implications of Mitigation
<div style="border: 1px solid black; padding: 10px; text-align: center;">LOS</div>	<div style="border: 1px solid black; padding: 10px; text-align: center;">↓ Auto Flow Rate</div>	<div style="border: 1px solid black; padding: 10px; text-align: center;">↑ Auto Flow Rate</div>	<div style="border: 1px solid black; padding: 10px; text-align: center;"> ↑ Auto Capacity ↑ Driving Volume </div>
<div style="border: 1px solid black; padding: 10px; text-align: center;">VMT</div>	<div style="border: 1px solid black; padding: 10px; text-align: center;">↑ Driving</div>	<div style="border: 1px solid black; padding: 10px; text-align: center;">↓ Driving</div>	<div style="border: 1px solid black; padding: 10px; text-align: center;"> ↑ Accessibility ↓ Driving Volume </div>

Questions?

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