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California Energy Commission

Overview of Transportation Demand Forecasting: Methods & Scenarios

IEPR Workshop on Transportation Energy Demand Forecast

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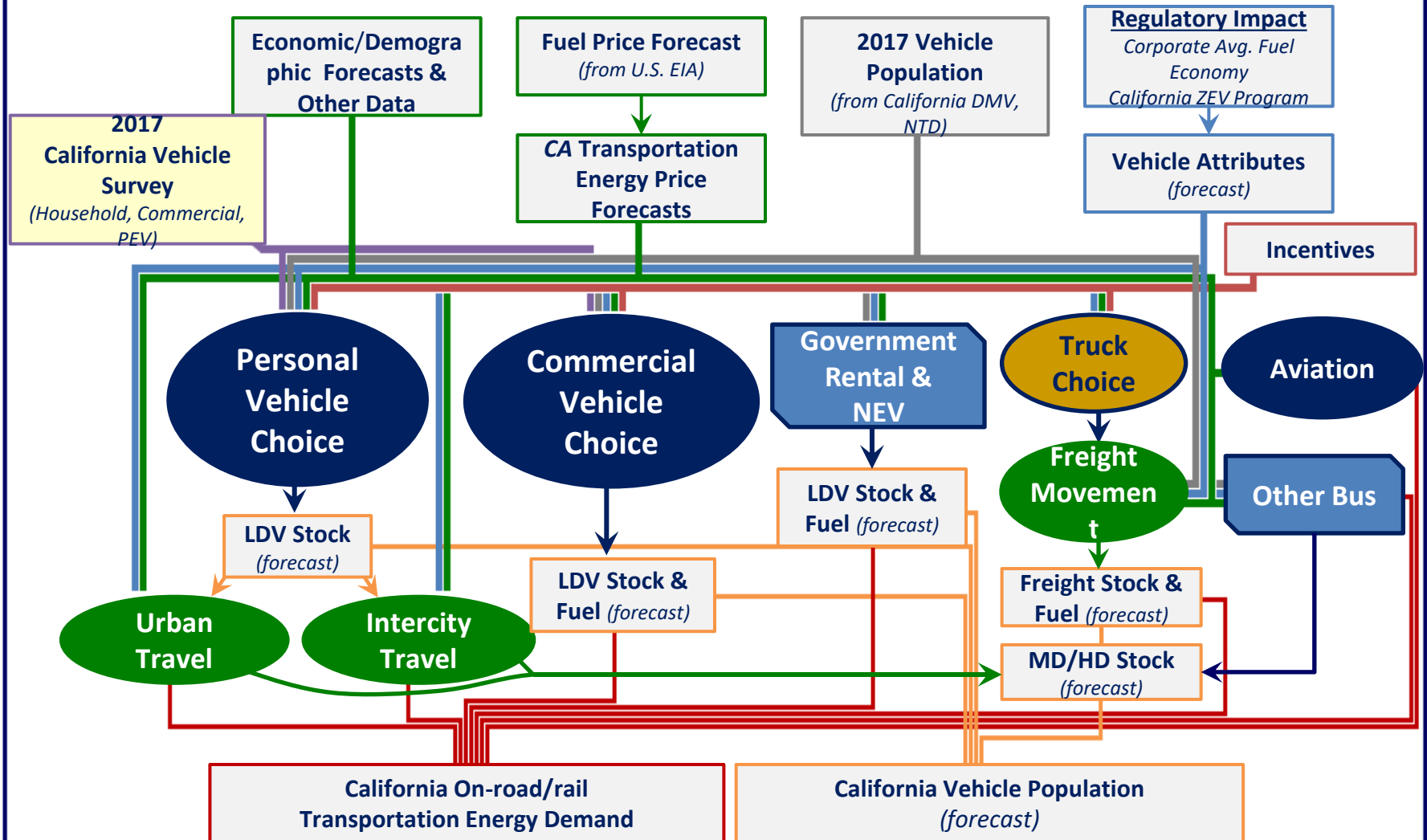


Overview

- Models
- *Key Inputs*
- *Key assumptions*
- *Scenarios*



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Accounting for a Wide Array of Choices

- **Light Duty Vehicles:** Choices between 15 size class and 7 fuel/technology types for each of the 362 household types (size, income, Number of Workers)
- **Trucks:** Choices between 8 class and 9 fuel/technology types
- **Short Distance Travel:** Choices between automobiles, light rail, bus for people movement, and truck only for freight
- **Long Distance Travel:** Choices between automobiles, air travel, rail and Bus for people movement, and between truck and rail for freight



Light Duty Vehicle Choice Models Based on LDV Survey

California Vehicle Survey (CVS) is used to assess consumer preferences in the commercial and residential light duty vehicle choice models.

- 2019 IEPR light duty forecast is based on the 2017 CVS.
- **2019 CVS**
 - Data collection phase was completed in June, with 2000+ Commercial Surveys, and 4000+ residential surveys, including over 900 ZEV owner surveys.
 - Survey results for use in the 2021 IEPR forecast.



Key Inputs & Outputs

Base year (2017) Values

- Vehicle Stock by sector, size class and fuel type (DMV, CARB's 2017 EMFAC, NTD, Staff)
- Household type distribution (2017 ACS, Staff)
- Fuel consumption (2018 BOE, Staff)
- VMT (Caltrans, 2017 NHTS, 2017 CalVIUS, Staff)

Projected Inputs (2018-2030)

- Economic & Demographic data (Moody's, DOF, Staff)
- Energy prices (EIA, staff)
- Vehicle attributes (Contractor, Staff)
- Transit & School Bus Population (CARB 2017 EMFAC & regulations, Staff)
- Freight Analysis Framework 4.4 (FAF 4.4, Staff)



Vehicle Attributes & Incentives

Light Duty Vehicles

- 15 different size/body classes & 8 Fuel/Technology Types
- Vehicle Price, maintenance cost, Fuel cost per mile, MPG, range, acceleration, Refueling time, Time to fuel station
- **Incentives:** Tax Credit, State Rebate, HOV lane access

MD/HD Vehicles

- 8 different size/body classes, 9 Fuel/Technology Types
- Vehicle price, fuel price, and MPG (by Range of Operation, for trucks only)
- **Incentives:** HVIP (on-road Trucks only)



Key Assumptions

- Statewide incentives apply to all households & commercial entities, regardless of income. No regional/local incentives.
- All vehicles drive the same number of miles regardless of their fuel type.
- Average statewide residential electricity rates apply to all California households, and commercial electricity rates apply to all other sectors.
- Petroleum Fuel & Vehicle Prices not affected by California Demand.
- Make and model of the vehicles, or their country of Origin, do not matter to the consumers.



Uncertainties

- Economic Growth
- Demographic Dynamics
- Transportation energy prices
- Future vehicle technologies
- Vehicle attributes
- Transportation Policies & Standards
- Clean vehicle incentives & funding
- Trade policies



Demand Forecasting Cases: Electricity Centric

Demand Case	Population Growth	Income Growth	Fuel Prices	
			Petroleum Fuels	Electricity Natural gas Hydrogen
High Demand	High	High	High	Low
Mid Demand	Mid	Mid	Mid	Mid
Low demand	Low	Low	Low	High



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2019 IEPR Light Duty PEV Scenarios

	ZEV SCENARIOS, 2019				
INPUTS	Low	Reference	High	Aggressive	Bookend
PREFERENCES					
Consumers' PEV Preference	Constant at 2017 Level	Increase with PEV market growth	Increase with PEV market growth	Increase with PEV market growth	Increase with PEV market growth
INCENTIVES					
Federal Tax Credit	Decreasing starting 2019, Eliminated after 2022	Decreasing starting 2019	Decreasing starting 2019	Decreasing starting 2019	Decreasing starting 2019
State Rebate	To 2025	To 2025	To 2025	To 2030 for BEV/FCV	To 2030 for BEV/FCV
HOV Lane Access	To 2021	To 2023	To 2025	To 2025 for PHEV, to 2030 for BEV/FCV	To 2025 for PHEV, to 2030 for BEV/FCV
ATTRIBUTES					
Availability of PEVs (in 2030)	PEV models available in 11 of 15 BEV and 14 of 15 PHEV classes	PEV models available in 12 of 15 BEV and 14 of 15 PHEV classes	PEV models available in 13 of 15 BEV and 14 of 15 PHEV classes	PEV models available in 13 of 15 BEV and 14 of 15 PHEV classes	Models available: BEV in 15, PHEV in 14, FCV in 8, PHFCV in 7 CEC LDV classes
Vehicle / Battery Price (by 2030)	PEV prices based on battery price declining to ~\$120/kWh	PEV prices based on battery price declining to ~\$100/kWh	PEV prices based on battery price declining to ~\$80/kWh	PEV prices based on battery price declining to ~\$70/kWh	PEV prices based on battery price declining to ~\$70/kWh
Max Range (Midsize, 2030)	~333 miles	~341 miles	~341 miles	~341 miles	~341 miles
Refuel Time (2030)	15 -21 min	15 -21 min	10-16 min	10-16 min	10-16 min
Time to Station (2030)	7-8 min	Same as gasoline	Same as gasoline	Same as gasoline by 2025	Same as gasoline by 2025
FORECAST RESULTS					
2030 ZEV Population	2.7 million	3.7 million	4.7 million	5.5 million	5.7 million



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