ZEV Scenarios and Methods, 2019-2030

DAWG Transportation Meeting

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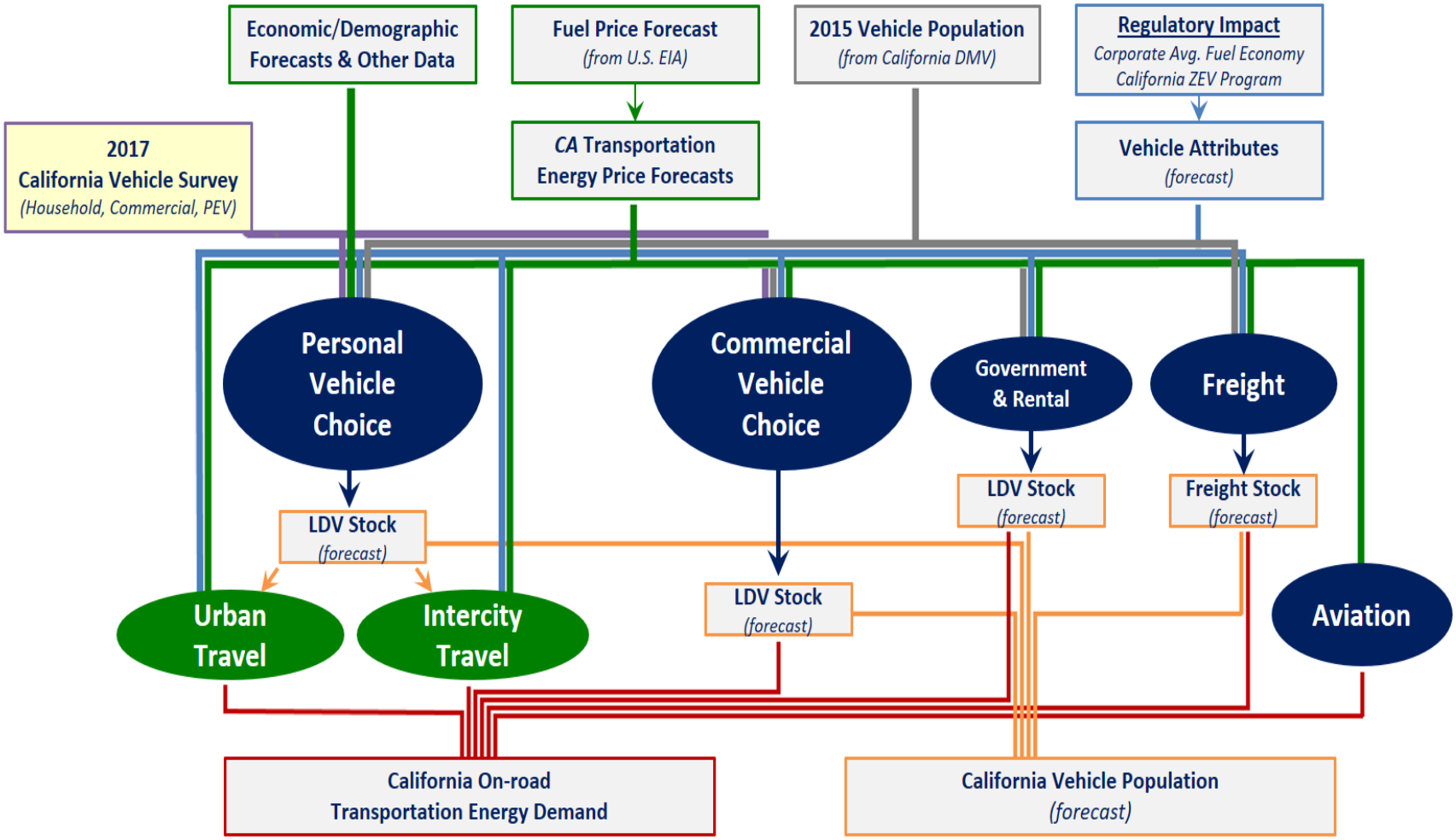
Overview

- Overview of transportation models
- *PEV scenarios*
- *Hydrogen Question*

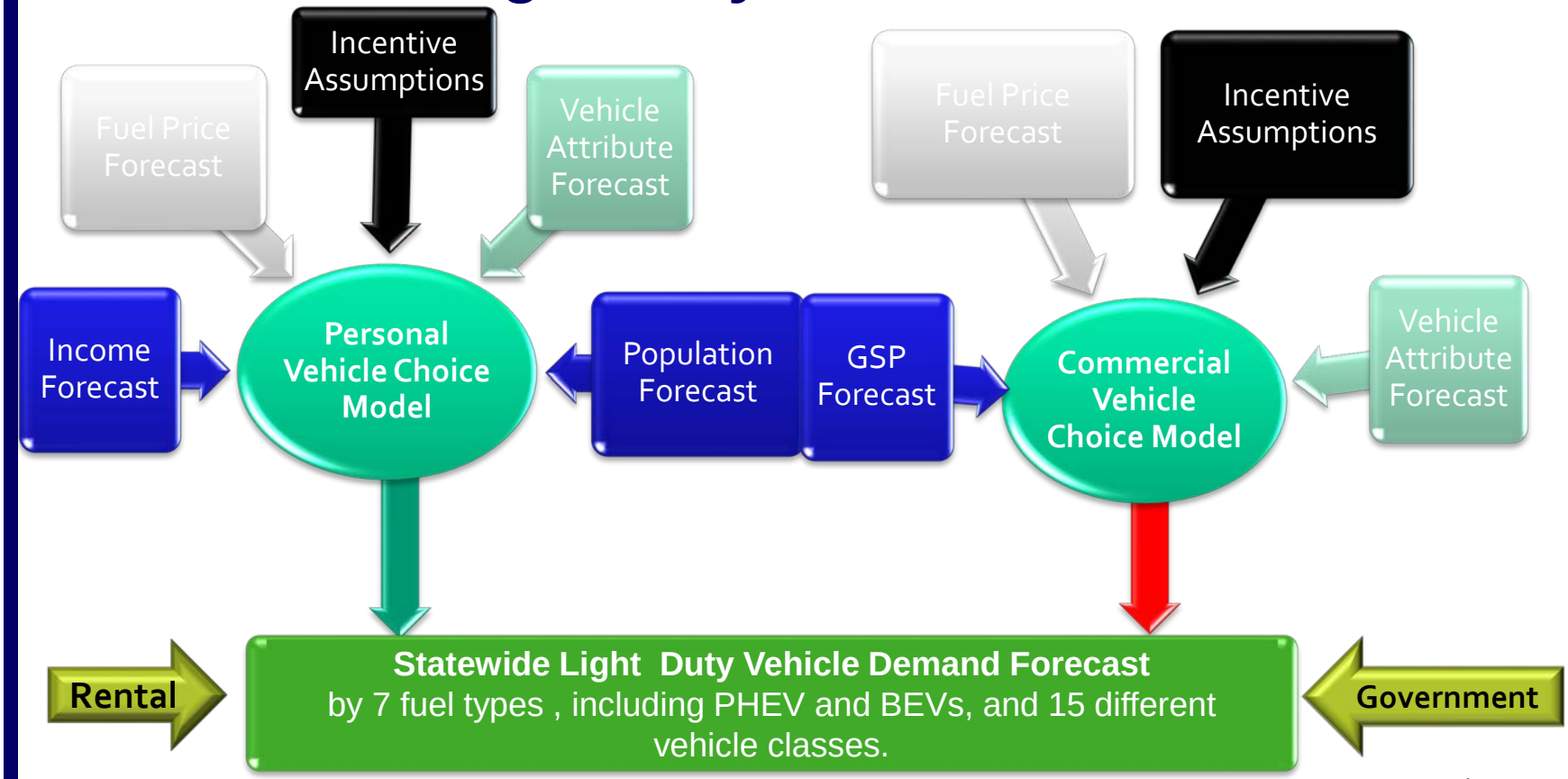
Next:

Transportation Energy Demand Forecast Workshop, July 22

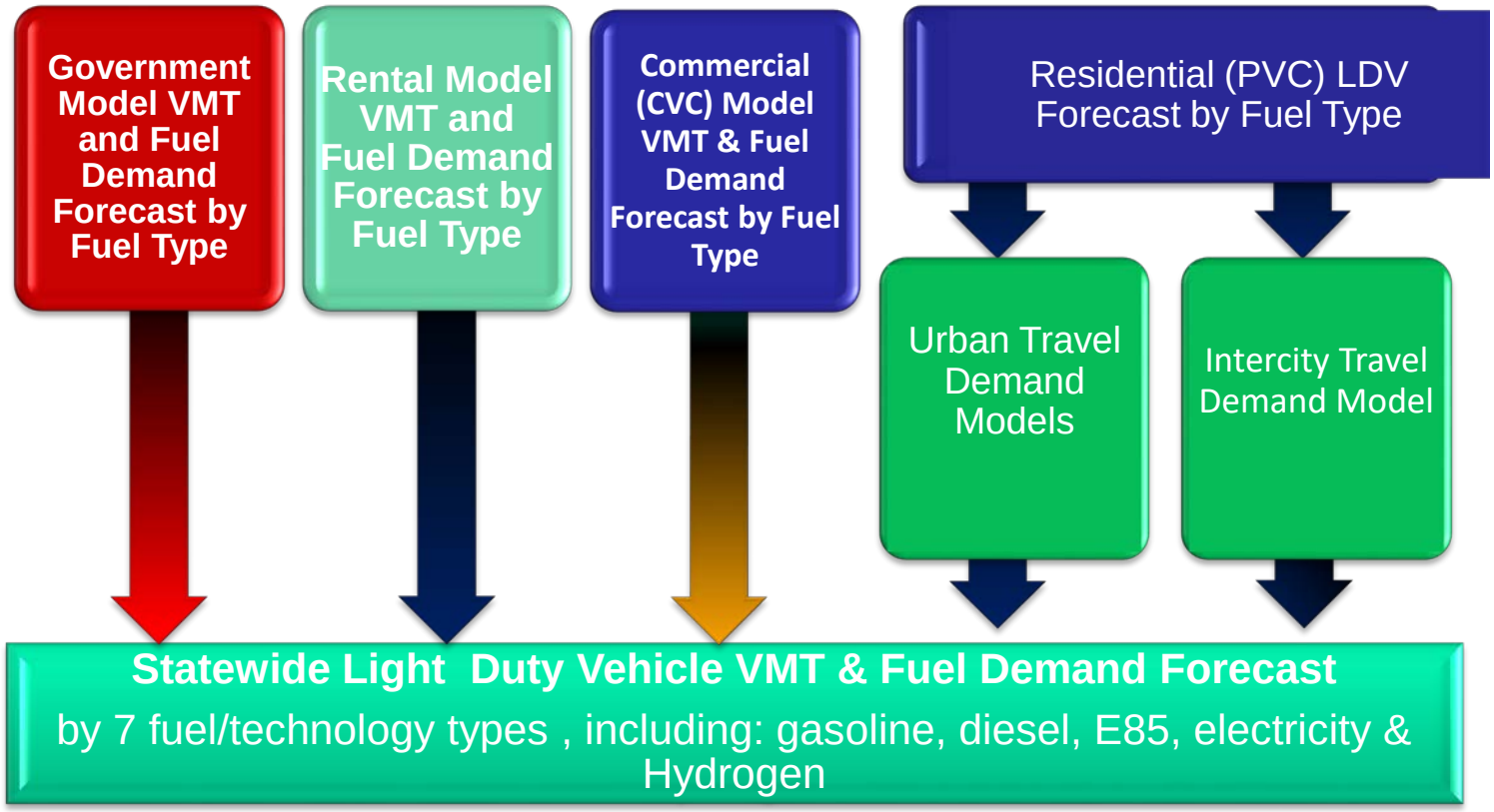
Transportation Forecasting Models



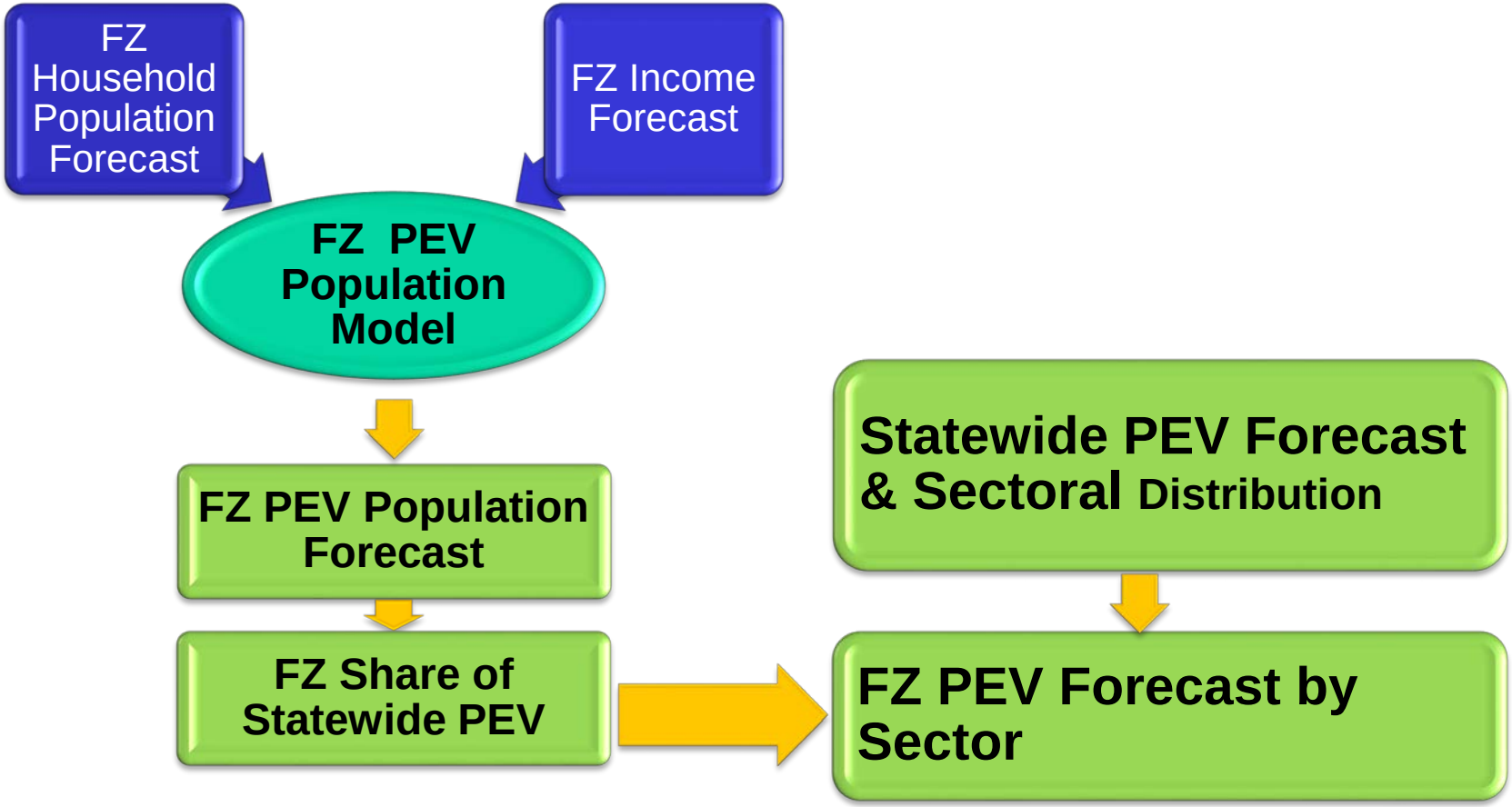
Behavioral Light Duty Vehicle Choice Models



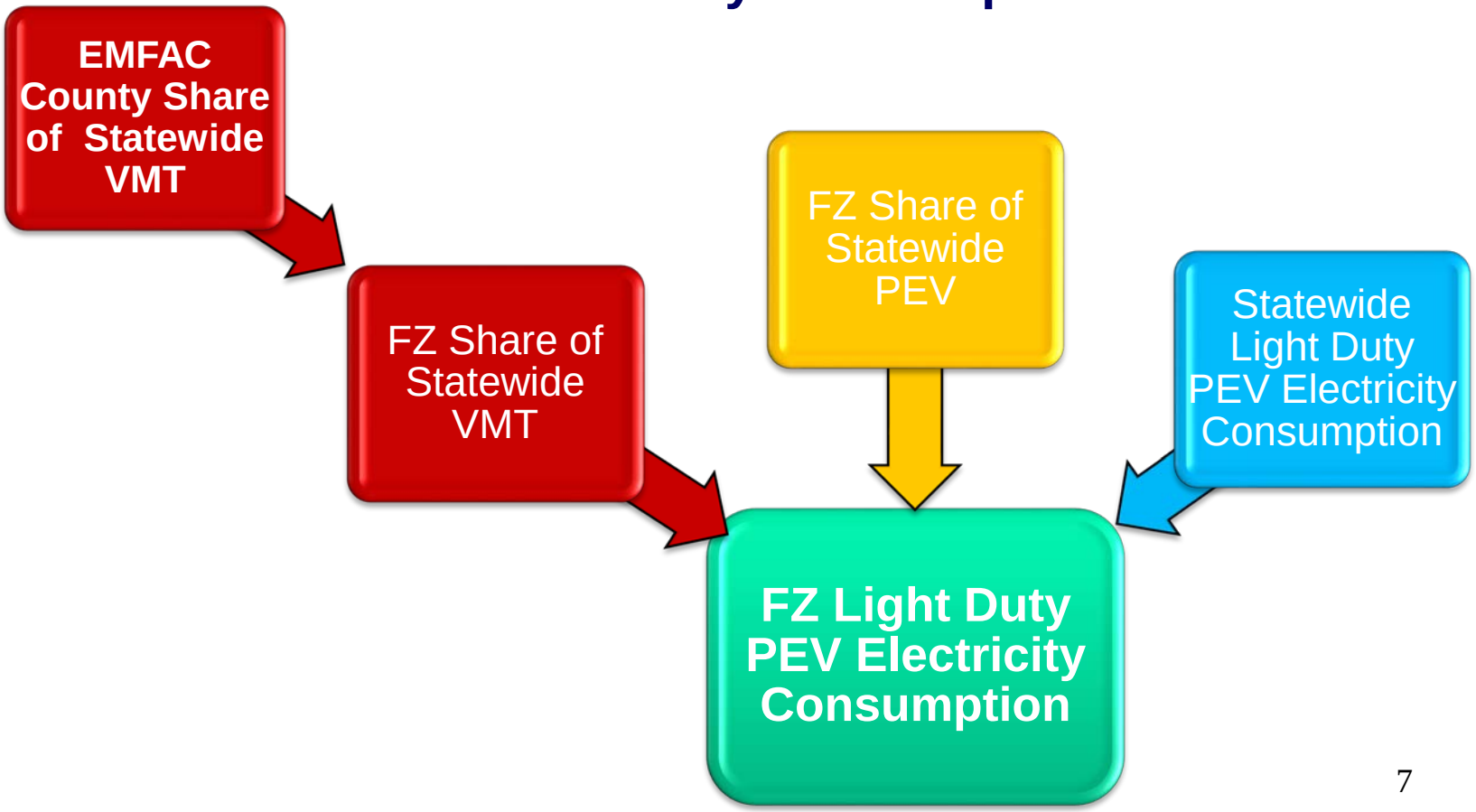
Statewide Light Duty VMT & Energy Demand Forecasting Models



Forecasting Zone (FZ) Distribution of Statewide PEV Population Forecast, by Sector



Forecasting Zone (FZ) Distribution of Light duty PEV electricity Consumption

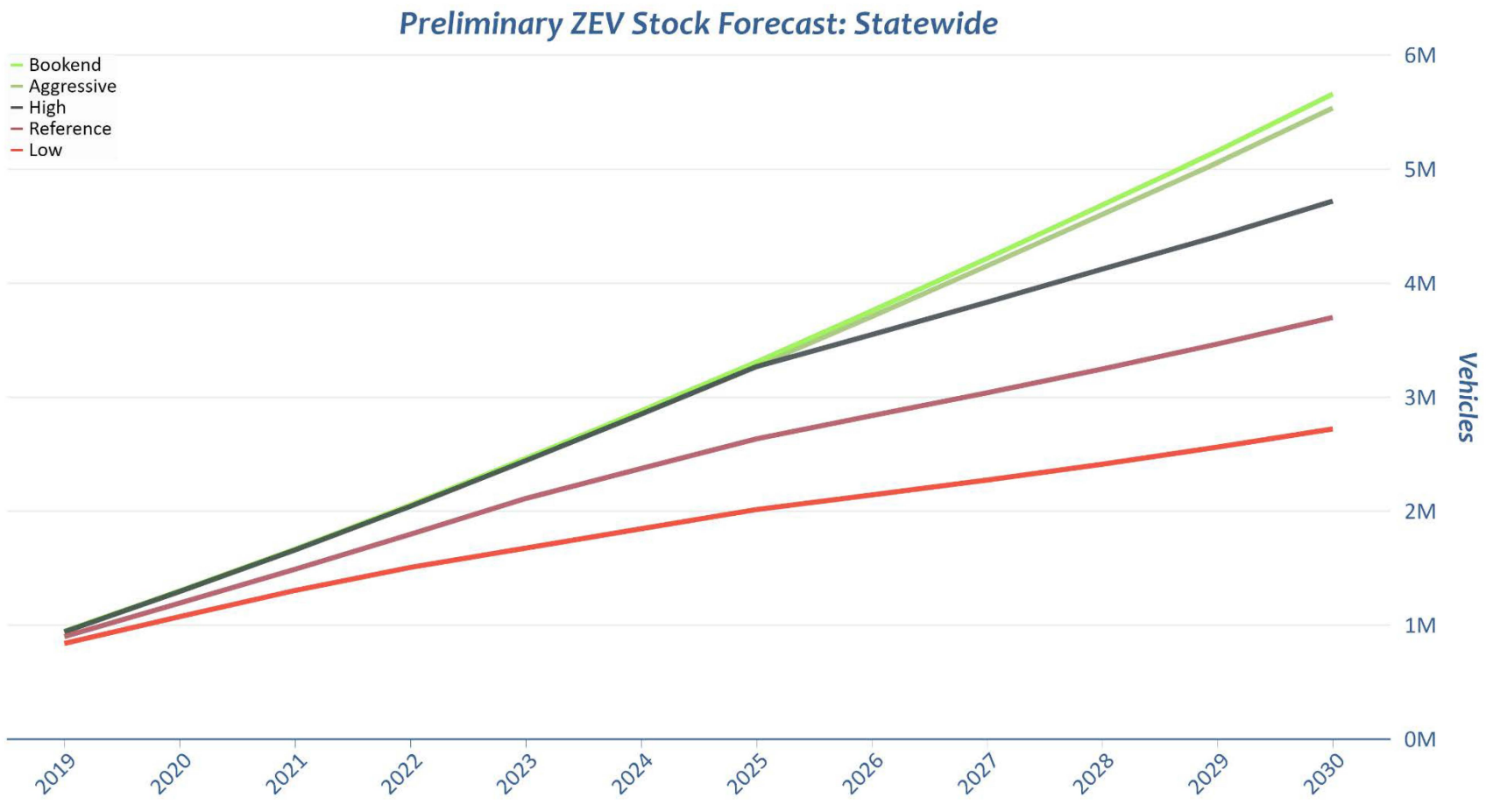


PEV Scenarios

2019 IEPR PEV Scenarios

	PEV SCENARIOS, 2018 UPDATE				
INPUTS	**Low**	**Mid**	**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	Eliminated after 2019	Decreasing starting 2019	Decreasing starting 2019	Decreasing starting 2019	Decreasing starting 2019
State Rebate	To 2025	To 2025	To 2025	To 2030	To 2030
HOV Lane Access	To 2021	To 2023	To 2025	To 2030	To 2030
ATTRIBUTES					
Number of Models Available in 2030	PEV models available in **14** of 15 CEC LDV classes	PEV models available in **14** of 15 CEC LDV classes	PEV models available in **15** of 15 CEC LDV classes	PEV models available in **15** CEC LDV classes	Models available: BEV in **15**, PHEV in **13**, 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 EV Range (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					
ZEV Stock (2030)	**2.7**	**3.7**	**4.7**	**5.5**	**5.7**
Cumulative Adjusted Rebate Expenditure (2030)	**2.3**	**2.9**	**3.4**	**5.8**	**5.9**

California Energy Commission



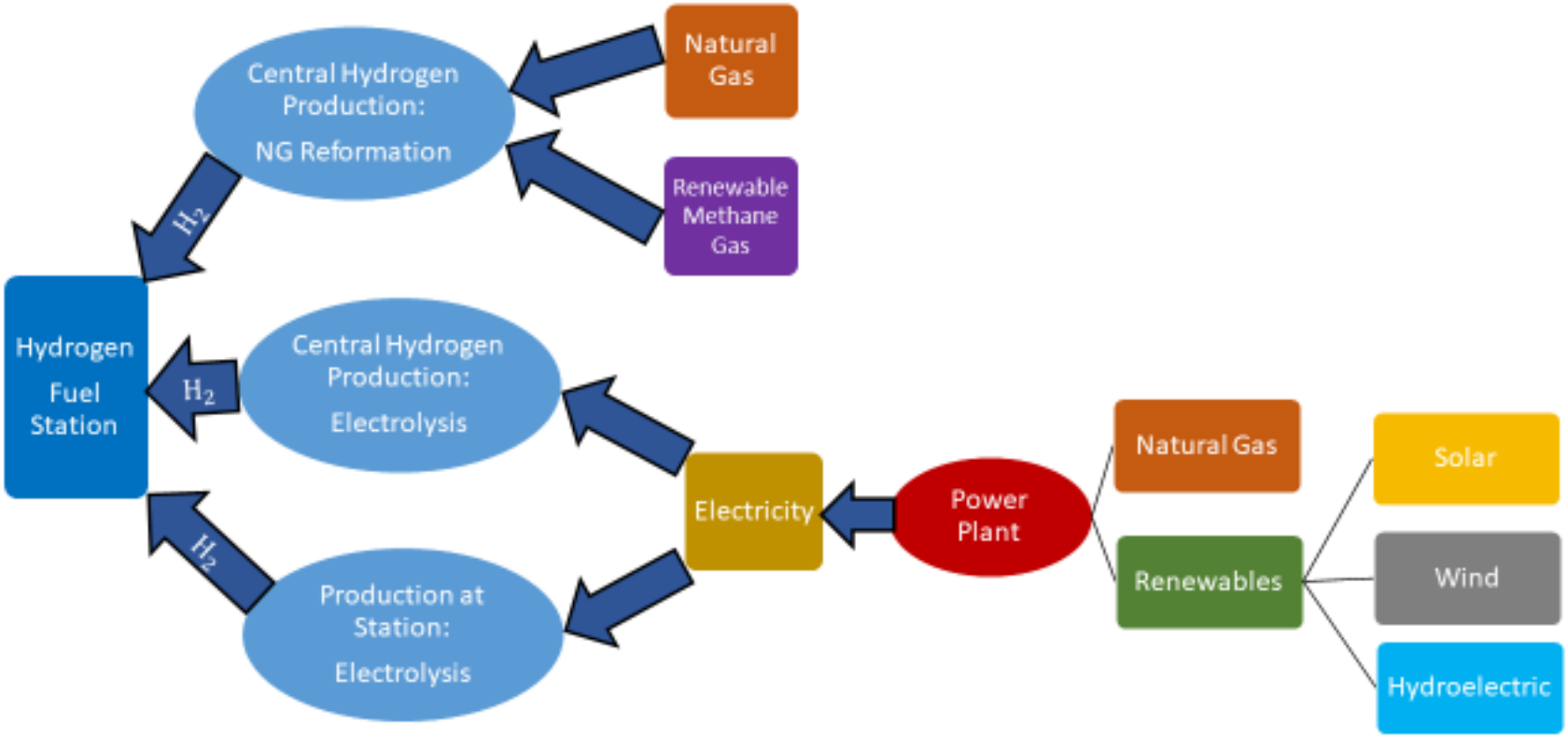
Source: California Energy Commission.

Hydrogen Question

Hydrogen & Electricity Demand

- So far our transportation electricity demand forecasts have focused on light duty PEVs as well as MD/HD electric vehicles.
- But, hydrogen produced for transportation can use different production processes including:
  - Natural gas reformation, currently the dominant process
  - Electrolysis
    - Processed at the station (5 stations currently funded)
    - Processed at a central production facility (2 projects under consideration)

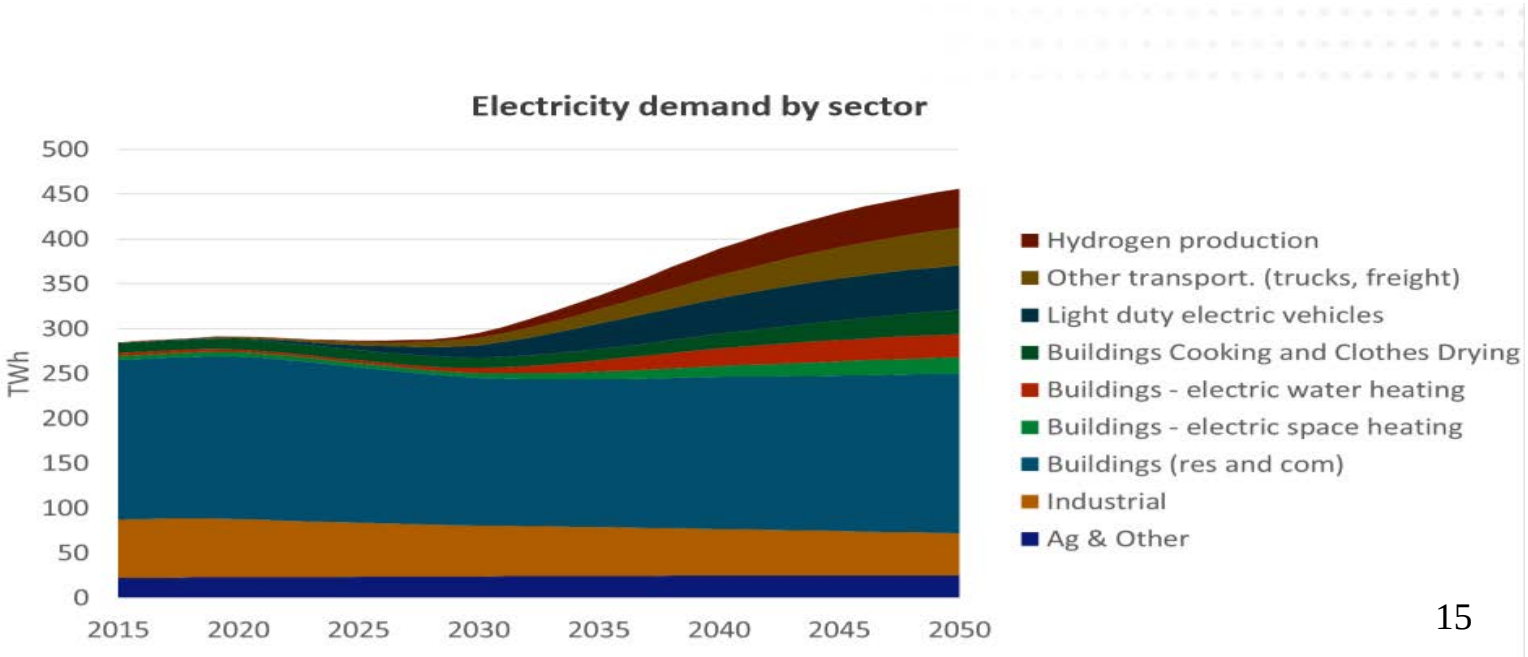
Main Hydrogen Production Options



How Many FCEVs?

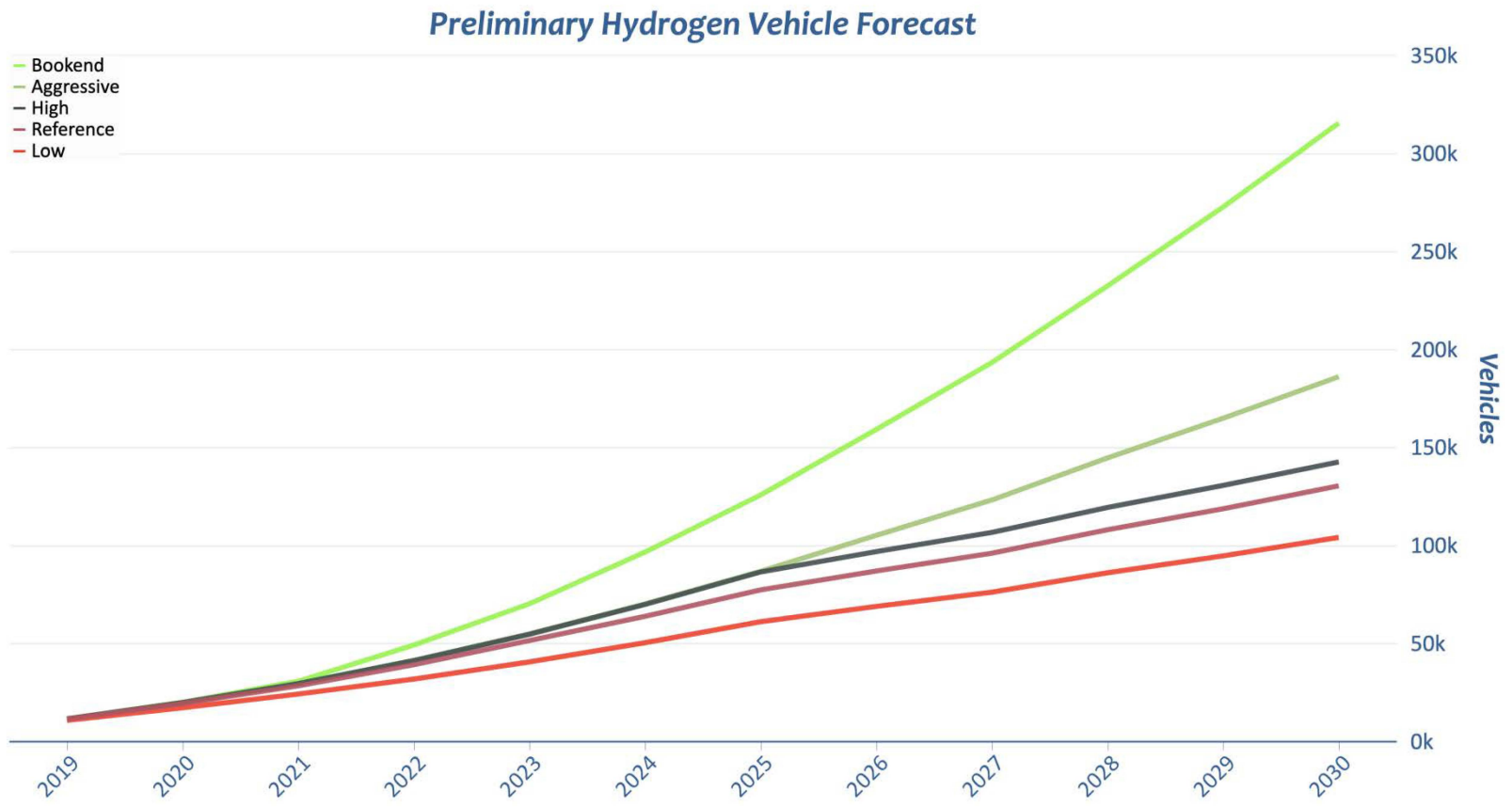
- Hydrogen can be used for both LDVs as well as MD/HDVs, with a more advantageous range for long distance travel.
- E3's 2018 decarbonization pathways included one with a large share of the transportation electricity, in the high electrification scenario, originating from production of enough hydrogen to supply 800,000 FCEVs in 2030.
- Our current high demand forecast is less than 150,000 light duty FCEVs in 2030

Electricity Demand by Sector, E3 Pathway



Source: E3 Deep Decarbonization in a High Renewables Future - Implications for Renewable Integration and Electric System Flexibility, June 20, 2018 Energy Commission Workshop

California Energy Commission



Source: California Energy Commission.

Green Hydrogen

- Prior legislation requires 1/3 of hydrogen produced by state-funded station to be made from renewables.
- SB 662 (Archuleta) requires the CPUC and the Energy Commission to consider opportunities to increase grid-responsive production of green electrolytic hydrogen for use in transportation sector, and incorporate "green electrolytic hydrogen" into various transportation electrification definitions.

Your Thoughts?