

DOCKETED	
Docket Number:	25-IEPR-04
Project Title:	Hydrogen
TN #:	265030
Document Title:	Presentation - Hydrogen Demand Scenarios for Use in SB 1075
Description:	6D. Quentin Gee, CEC
Filer:	Raquel Kravitz
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	7/28/2025 12:54:16 PM
Docketed Date:	7/28/2025



Hydrogen Demand Scenarios for Use in SB 1075

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July 29, 2025



Acronyms and Initialisms

ACC2 – Advanced Clean Cars II Regulation

ACF – Advanced Clean Fleets Regulation

BEV – Battery Electric Vehicle

CEC – California Energy Commission

GWh – Gigawatt hour

H2 – Hydrogen

IEPR – Integrated Energy Policy Report

kg - Kilogram

MDHD – Medium- and Heavy-Duty

OGV – Ocean-Going Vessel

OOS – Out of State (aviation)

SB 100 – Senate Bill 100 (De León, Chapter 312, Statutes of 2018)

SB 1075 – Senate Bill 1075 (Skinner, Chapter 363, Statutes of 2022)

ZE – Zero-Emission



Hydrogen Demand for Transportation in SB 1075

- SB 1075 requires that the CEC models potential growth for hydrogen in the transportation sector
- Hydrogen demand scenarios from CEC's Demand Scenarios Project, specifically those used in SB 100 reporting, are the logical choice for the hydrogen demand inputs
 - Policy Scenario
 - Policy Scenario with High Hydrogen Use
- Demand Scenarios Project input is simply **Demand for Hydrogen** (in kg H₂) for Transportation
 - SB 100 reporting evaluates hydrogen supply and associated input energy and processes in a way distinct from SB 1075 modeling and reporting

Note: The Demand Scenarios Project employs different scenario naming conventions than SB 100 reporting – terminology in this presentation is based on the Demand Scenarios Project



Demand Scenarios Project Framework for Transportation



Existing Policies (mostly captured in the IEPR forecast)



Near-term policies recently or expected to be adopted



Goals with clear technological pathways informed by market analysis



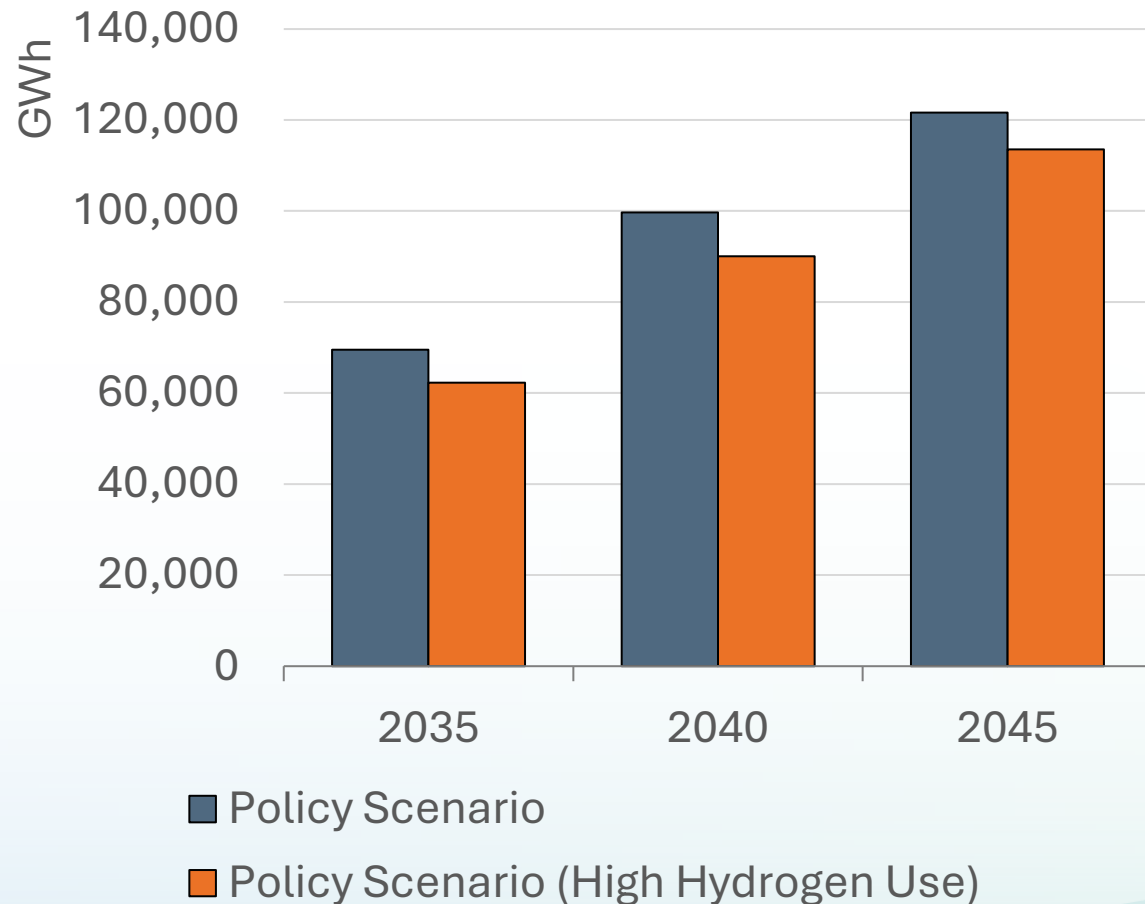
Transportation Scenario Comparisons

	Policy Scenario	Policy Scenario with High Hydrogen Use Sensitivity
Light-Duty Vehicles	ACC2 as modeled in the 2023 IEPR, extended to 2050	Same as Policy Scenario
Aviation	ZE fuel substitution of jet fuel for in-state aviation starting 2030, 10 percent electricity and 10 percent H2 by 2045 (5 percent for OOS Aviation)	Same as Policy Scenario
In-Use Locomotive Regulation	ZE fuel substitution starting in 2027, diffusion to 100% by 2058	Same as Policy Scenario
Freight Trucks	ACF + ZE Truck Measure (faster adoption of ZE trucks than ACF)	ZE Truck Measure, higher adoption of fuel cell trucks in lieu of BEVs
Off-Road (non-rail)	Enhanced Electrification to align with 100% ZE port operations by 2045	Same as Policy Scenario
OGVs	5% OGV energy demand replaced by hydrogen by 2045	25% OGV Energy Demand replaced by hydrogen by 2045

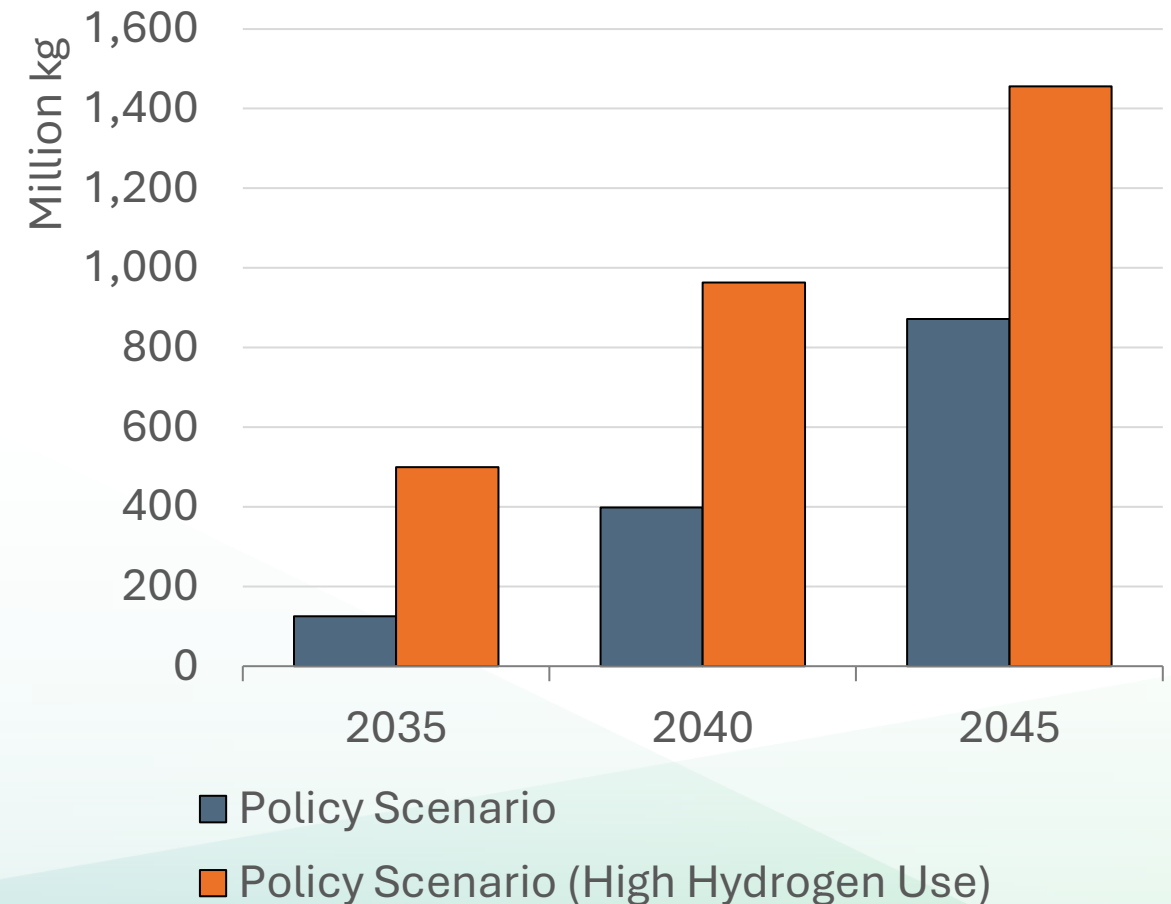


Comparing Transportation Energy Demand Differences

Transportation Electricity in SB 100 Demand Scenarios



Transportation Hydrogen in SB 100 Demand Scenarios



Note: Does not include electricity demand from hydrogen production



Hydrogen Results and Recommendations

High (Policy Scenario with High Hydrogen Use Sensitivity)

- Increased hydrogen demand (72% more than the Policy Scenario), primarily from freight trucks

Low (Policy Scenario)

- CEC demand scenario with additional expected policies beyond the IEPR managed forecast
 - More electricity demand than the High Hydrogen Use scenario, primarily from zero-emission freight trucks, favoring BEVs

Note: The Demand Scenarios Project employs different scenario naming conventions than SB 100 reporting – terminology in this presentation is based on the Demand Scenarios Project



Transportation Integration Into SB 1075

- Annual hydrogen demand derived from Demand Scenarios Project Scenarios used in SB 100
- SB 1075 also analyzes and evaluates daily hydrogen demand aligned with BEV electricity demand for freight trucks in the Demand Scenarios Project
 - Freight truck BEV electricity demand varies by season and weekend/weekday, which plays into daily demand and SB 1075 hydrogen production dynamics

Thank You!



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