Senate Bill 671 Initial Viable Network

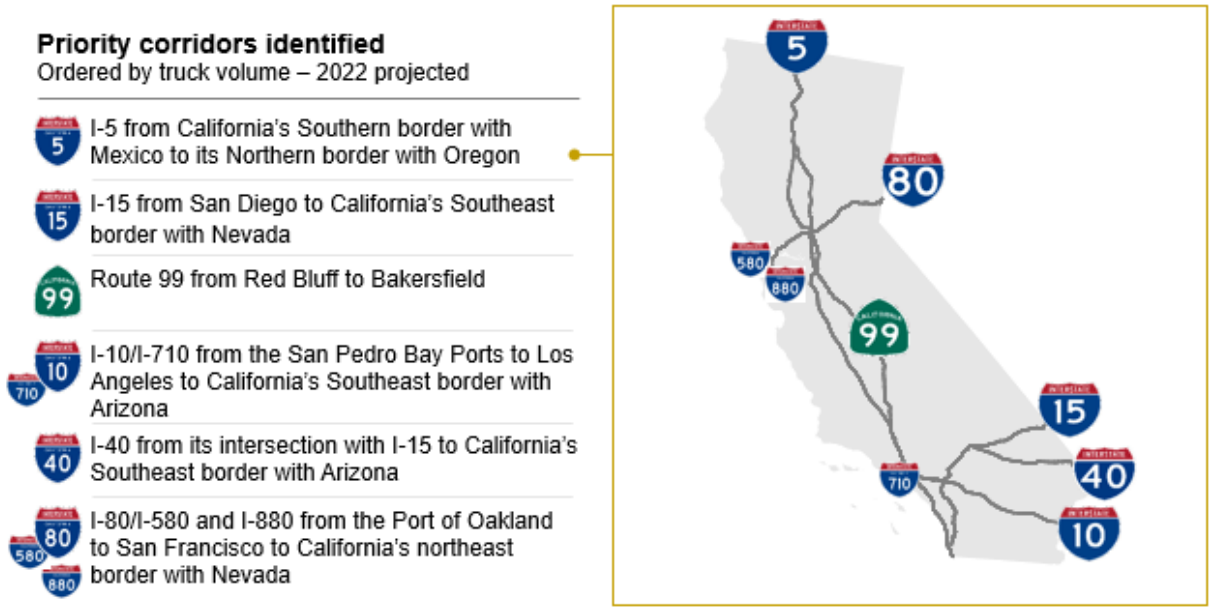
Initial Viable Network

For the Senate Bill (SB) 671 Clean Freight Corridor Efficiency Assessment (Assessment), California Transportation Commission (Commission) staff defined "zero-emission freight infrastructure needs" as the electric charging and hydrogen fueling stations needed to support zero-emission trucks.

The Commission's Assessment outlines a path forward for California to plan and implement zero-emission freight infrastructure by identifying the initial infrastructure needed to support zero-emission goods movement.

To identify the initial infrastructure needed, the Commission first identified the top 6 freight corridors in California. The "Top 6" freight corridors were defined as corridors greater than 50 miles in length, with the highest concentration of goods movement and highest average daily truck vehicle miles traveled.

Exhibit 1. Top 6 Freight Corridors



To identify the charging and hydrogen fueling stations needed statewide, three potential scenarios of infrastructure needs were assessed due to the uncertainty surrounding which type of technologies are likely to be adopted by fleets in the future. This creates a range of potential needs that can help policy makers plan.

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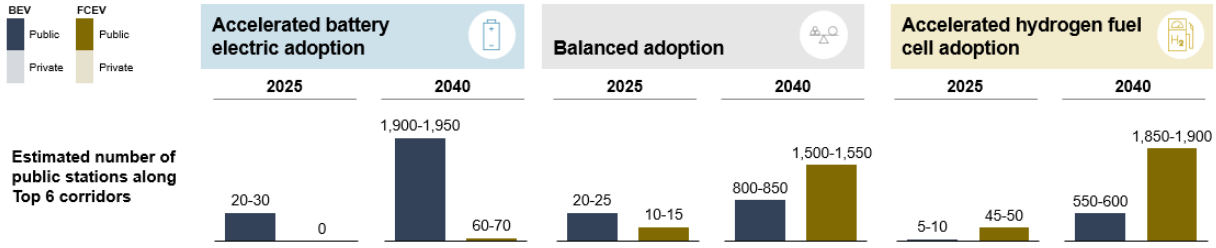
Exhibit 2. Assumptions for 3 Zero-Emission Infrastructure Scenarios

Key assumptions behind the three scenarios

	Accelerated battery electric (BEV) adoption	Balanced adoption	Accelerated hydrogen fuel cell (FCEV) adoption
Cost of ownership	**Battery electric trucks become more cost effective over time** accelerating incorporation into commercial fleets	**Balanced adoption of zero-emissions technologies** over time	**Fuel cell trucks become more cost effective over time** accelerating incorporation into commercial fleets
Technology choice	**BEV trucks and charging become viable for long haul trips**	**No predominantly used technology across use cases;** BEV continues to be used mostly for medium-duty short and regional trips, FCEV for heavy-duty and long-haul	**FCEV trucks and refueling become a viable choice for short haul trips**

To build an initial viable network, the study assumes charging and fueling stations for trucks will first be needed along the top 6 freight corridors.

Exhibit 3. Publicly Available Charging and Hydrogen Fueling Stations Needed Along the Top 6 Freight Corridors - known as the Initial Viable Network (demand-based)



When determining the number of charging and hydrogen fueling stations needed along the top 6 freight corridors, known as the initial viable network, you can base the total number on estimated demand for electricity and hydrogen, as shown in the exhibit above, or you can limit the number of stations needed based on the maximum distance between the stations along the top 6 corridors that would ensure a reliable system of stations to support zero-emission trucks.

To determine a logical maximum station distance for charging stations to support medium- and heavy-duty battery electric vehicles (BEVs), the following approach was taken (please note that “kWh” stands for kilowatt hour and “mi” stands for mile in exhibit 1 below):

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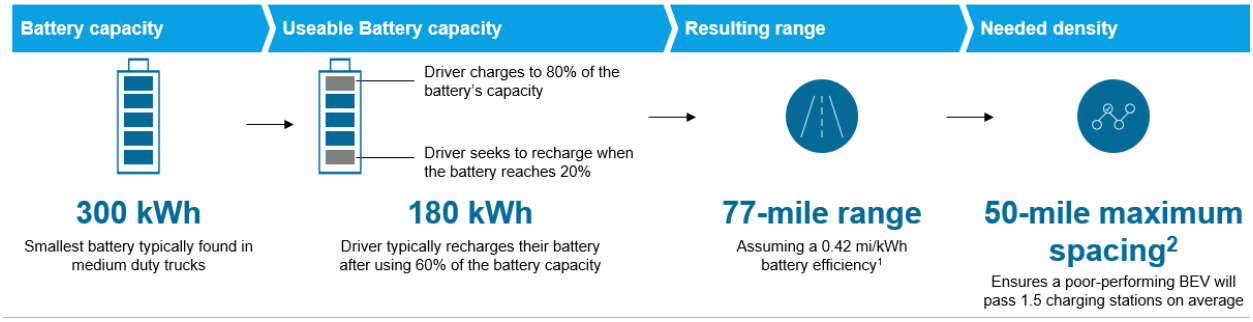
Exhibit 4. Approach to Establish Initial Viable Network for Battery Electric Vehicles



Using a 50-mile maximum station spacing, the initial viable network for battery electric vehicles would require 75 - 78 charging stations along the top 6 freight corridors.

To determine a logical maximum station distance for hydrogen fueling stations to support medium- and heavy-duty hydrogen fuel cell electric vehicles (FCEVs), the following approach was taken:

Exhibit 5. Approach to Establish Initial Viable Network for Fuel Cell Electric Vehicles

Using a 270-mile maximum station spacing, the initial viable network for fuel cell electric vehicles would require 15 hydrogen fueling stations in total along the top 6 freight corridors.

By investing in a initial viable network, there could be enough stations along these corridors to provide a sufficient network to spur further adoption of zero-emission trucks.

In addition to stations along the six priority freight corridors, stations near the United States/Mexico border, maritime ports, and where priority freight routes cross into neighboring states are essential.

These stations within the initial public initial viable network could be underutilized in the short term since zero-emission truck adoption could take some time. However, an initial network could be required to facilitate trucks' goods and freight movement statewide without range anxiety (running out of charge or fuel because of pockets with no stations).

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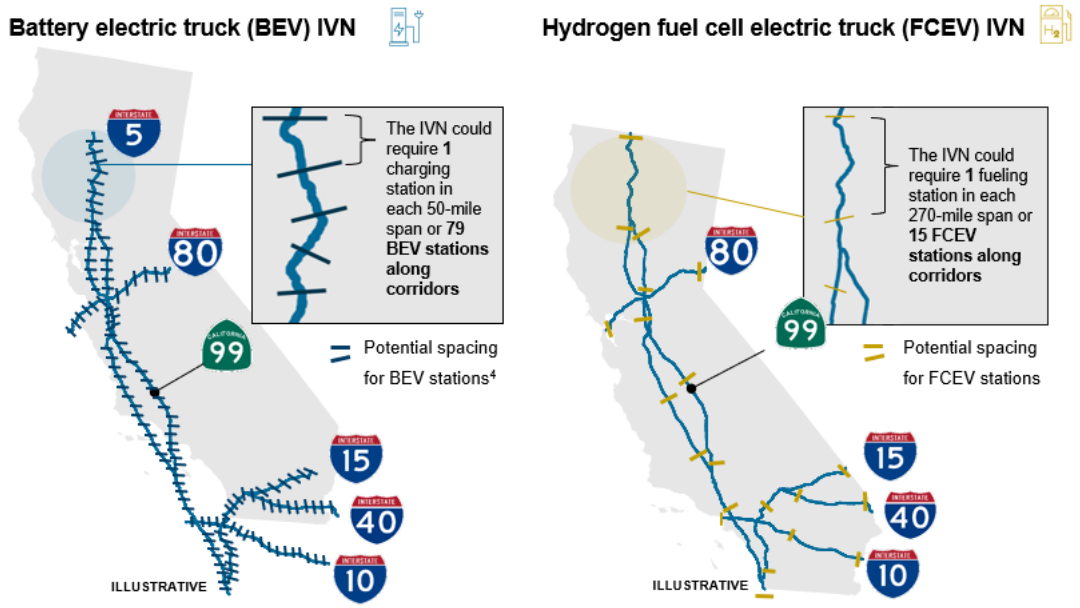
Exhibit 6. Initial Viable Network Along Top Six Freight Corridors



In the future, additional work can be done to further refine specific station locations throughout the entire state. To this end, staff have identified the location of existing infrastructure, such as electric grid infrastructure, truck parking, logistics depots, and warehouses, to see where existing infrastructure can support the buildout of zero-emission truck charging and hydrogen fueling infrastructure (see Exhibit 7).

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Exhibit 7: Maps of Existing Infrastructure and truck GPS data

Map Legend:

500-1000
1000-1500
1500-2500
2500-5000
5000 - 3126667

Existing or funded and planned zero-emission infrastructure for medium-duty and heavy-duty vehicles

Average Annual Truck Trips per Day based on truck GPS data