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Scaling Hydrogen Infrastructure for Heavy-Duty Trucking: A U.S. Scenario-Based Analysis

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Executive Summary

This study evaluates the potential scale-up of fuel cell electric vehicles (FCEVs) in the U.S. truck sector using modelling & simulation to project adoption through 2040 and assess the resulting infrastructure, energy use, and emissions through 2060. Deployment is expected to begin in 2027, led by California, followed by hydrogen hubs and nationwide expansion. A logistic growth model estimates ~20,100 trucks and 200+ stations by 2030, rising to 1.6 million trucks and 8,000 stations by 2060. However, early Supply and Value Chain development presents challenges, making this scenario unlikely without strong Public Policy and Promotion. These projections align with the National Zero-Emission Freight Corridor Strategy, anticipating station spacing to shrink from about 600 miles in 2027 to 18 miles by 2040, as demand rises. Achieving these targets will depend on coordinated infrastructure efforts, robust fuel cell systems, and sustained policy support to ensure long-term efficiency and performance across the freight network.

Keywords: Fuel Cell Electric Vehicles, Modelling & Simulation, Supply and Value Chain, Public Policy and Promotion, Fuel Cell Systems

1 Introduction

The transition to a low-carbon transportation sector in the United States (U.S.) is gaining momentum through national initiatives to scale hydrogen (H_2) infrastructure and adoption [1]. Heavy-duty trucking, a significant contributor to freight emissions, presents a critical opportunity for decarbonization through hydrogen-powered Fuel Cell Electric Vehicles (FCEVs) [2] [3] [4]. The U.S. Department of Energy (DOE) has set ambitious hydrogen deployment targets for 2030, with hydrogen hubs playing a central role in expanding production, distribution, and refueling infrastructure [5]. Additionally, the National Zero-Emission Freight Corridor Strategy highlights the importance of alternative fuels in achieving long-term emissions reductions in freight transport [6]. However, the pace and scale of hydrogen adoption remain uncertain, influenced by factors such as infrastructure development, cost competitiveness, and regional policy support.

This study evaluates the potential scale of hydrogen trucking demand by modeling the adoption of hydrogen-powered heavy-duty vehicles, estimating hydrogen demand, and determining the number of hydrogen refueling stations (HRS) required between 2027 and 2060. Using a logistic growth model, it projects adoption trends and identifies the saturation point where hydrogen truck deployment stabilizes. The analysis assumes that up to 50% of Class 7 and 8 trucks per hub could transition to FCEVs, with adoption rates varying based on regional hydrogen hub targets and investment timelines.

Beyond estimating vehicle adoption, the study assesses the infrastructure needed to integrate hydrogen hubs into a cohesive national network, extending the analysis to states not currently participating in hub initiatives. Given uncertainties in scaling hydrogen trucking, such as infrastructure costs, technology pathways (e.g., gaseous vs. liquid hydrogen storage), and the availability of refueling standards, this research provides insights into the conditions necessary for widespread hydrogen adoption. The findings aim to inform policymakers and industry stakeholders on the feasibility of scaling hydrogen in the freight sector and its role in achieving long-term sustainability goals by evaluating potential market trajectories and infrastructure requirements.

2 Methodology

This paper's methodology is divided into four main parts: assessing national program goals, modelling scenarios, projecting H_2 adoption, and analyzing the national zero-emissions freight corridor strategy. Table 1 presents the detailed methodology of this study.

Table 1. Methodology.

Step 1	**Step 2**	**Step 3**	**Step 4**
Assessing goals	Modelling scenarios	Projecting H2 adoption	Analyzing National Zero-Emissions Freight Corridor Strategy
• Assessing H_2 hubs production goals with a focus on the freight sector. • Assessing the freight corridor strategy goals with a focus on how hubs and non-hubs merge to create the U.S. low-carbon network.	• Defining the starting point in the logistic curve for hubs and non-hub regions based on class 7 and 8 vehicles. • Defining the saturation point for the regions. • Defining the annual growth for hubs and non-hubs based on global trends and projected H_2 adoption.	• Implementing a logistic curve to assess the H_2 adoption from 2027 to 2060. • Calculating the H_2 demand and HRS required based on the logistic curve results. • Calculating an average distance between stations based on the zero-emissions freight strategy proposed network and the logistic curve results.	• Assessing the routes included in the strategy to compare the distance with the HRS results obtained from the logistic curve.

2.1 Step 1: Assessing Hydrogen Hubs and Net-Zero-Emissions Freight Corridor Strategy Goals

The first step in this analysis is to assess the selected hydrogen hubs across the U.S., focusing on their locations, funding, and proposed targets for the transportation sector. The U.S. Department of Energy and the Office of Clean Energy Demonstrations (OCED) have outlined that these hubs will support multiple end uses, including power generation, industrial applications, and transportation [7]. However, publicly available information on specific hydrogen demand allocations remains limited. While each hub is expected to contribute to decarbonization goals, most have not provided detailed strategies or explicit deployment targets for hydrogen-powered heavy-duty trucking.

Among the awarded hubs, only the ARCHES and Appalachian hydrogen hubs have released fact sheets with more detailed objectives [8] [9]. ARCHES explicitly states a goal of deploying 5,000 heavy-duty hydrogen trucks by 2030, making it the most concrete benchmark for estimating potential adoption. Given the absence of similarly detailed plans from other hubs, this study uses ARCHES' transportation sector goal as a reference point to model adoption scenarios. This approach assumes that other hubs may scale hydrogen trucking at a comparable rate, albeit with potential delays in implementation.

As additional details emerge, such as specific deployment targets from other hubs, this study will incorporate them into scenario adjustments. Table 2 summarizes the known attributes of each hub, including location, allocated funding, and primary hydrogen end uses, providing a baseline for assessing hydrogen's role in freight decarbonization.

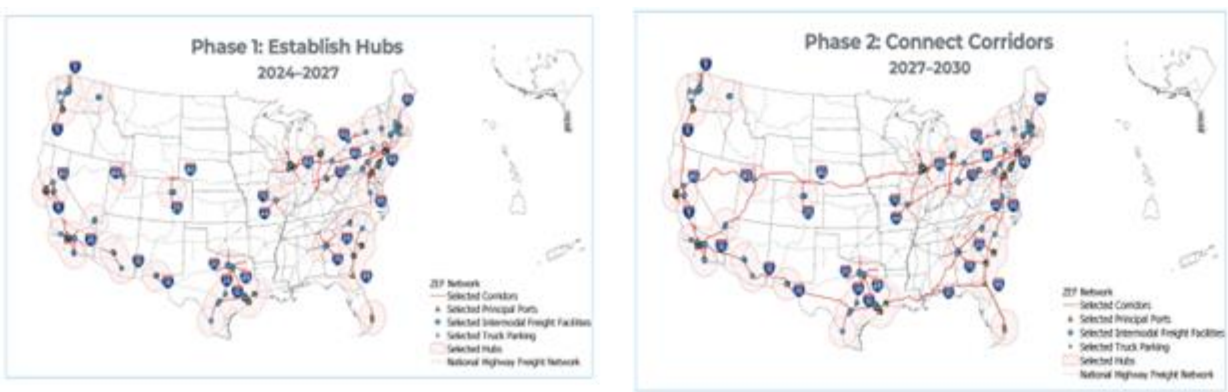
Table 2. H_2 hubs' detailed information.

Hub	Funding (Million USD)	End-Uses
ARCHES H_2 Hub	1,200	Power generation, transportation, industry
Pacific Northwest H_2 Hub	1,000	Agriculture, transportation, industry
Gulf Coast H_2 Hub	1,200	Power generation, transportation, industry
Heartland H_2 Hub	925	Power generation, industry
Midwest H_2 Hub	1,000	Power generation, transportation, industry
Appalachian H_2 Hub	925	Power generation, transportation, industry
Mid-Atlantic H_2 Hub	750	Power generation, transportation, heating, industry

In addition to analyzing hydrogen hub deployment, this study incorporates the National Zero-Emission Freight Corridor Strategy to assess the broader development of a hydrogen-powered freight network. This includes evaluating the strategy's phased implementation plan and its implications for national infrastructure expansion.

By integrating hydrogen hub development with the corridor strategy, this study aims to align the projected growth of hydrogen trucking in both hub and non-hub regions. This involves assessing the demand for hydrogen, the expected number of fuel cell heavy-duty vehicles, and the hydrogen refueling station (HRS) network required to support these phases.

Figure 1 illustrates the phased approach proposed in the National Zero-Emission Freight Corridor Strategy, providing a timeline for infrastructure expansion and network connectivity. This framework serves as a basis for evaluating the feasibility of hydrogen adoption across the national freight system, ensuring that the projected growth scenarios reflect real-world infrastructure planning efforts.



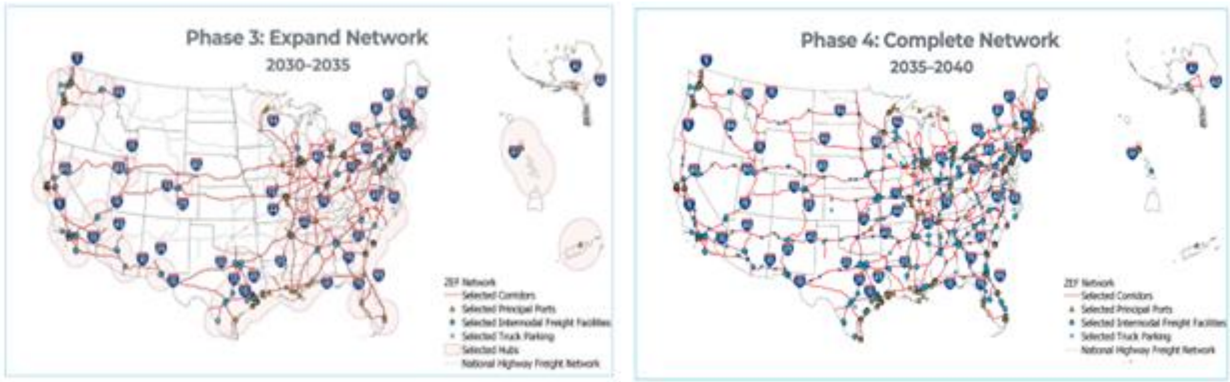


Figure 1. National Zero-Emission Freight Corridor Strategy [6].

Note: This study follows the data center truck's classification based on weight from the alternative fuel data center. Class 7 includes heavy-duty vehicles from 26,001 to 33,000 pounds [10].

3 Step 2: Modelling Scenarios

This study applies a logistic growth model to project hydrogen demand and adoption trends for class 7 and 8 heavy-duty vehicles from 2027 to 2060. The model accounts for key factors, including the initial number of vehicles per hub, vehicle hydrogen consumption rates, annual growth projections for vehicles and HRS capacities, and the expected market saturation point. These projections are developed for hub and non-hub regions to assess the broader scalability of hydrogen trucking across the U.S.

3.1 Defining the Saturation Point

An important assumption in this analysis is that by 2060, 50% of class 7 and 8 heavy-duty vehicles registered in each state will be fuel-cell electric vehicles (FCEVs). This study relies on data from the Transportation Energy Data Book [11] and the Federal Highway Administration (FHWA) [12] to determine the total number of these vehicles per state.

While the FHWA provides state-level vehicle registration data, it does not specifically categorize trucks by class. To estimate the share of class 7 and 8 vehicles in both hub and non-hub regions, the study uses a proportional calculation based on 2020 data. Specifically, it derives the percentage of heavy-duty vehicle (HDV) registrations by comparing total truck registrations reported by the FHWA to the total HDV registrations documented in the Transportation Energy Data Book. This analysis finds that 1.85% of all registered vehicles correspond to class 7 and 8 trucks. This percentage is assumed to remain constant for scenario modeling and is applied to estimate the total number of HDVs in 2060. These projections form the basis for determining the saturation point for FCEV adoption in each state.

Table 3 presents the vehicle registration values used in this study and the corresponding projections for the saturation point of 2060.

Table 3. Vehicle registration data.

U.S HDVs registration in 2020	2,979,000 [11]
U.S Truck Registration in 2020	161,443,328 [12]
Percentage of Class 7 and 8 in U. S	1.85

3.2 Growth Rate - Vehicles

The study estimates the annual vehicle growth rate using the Compound Annual Growth Rate (CAGR) projected by Markets and Markets. It also includes an adaptation based on the authors' perspective and publicly available estimations on hydrogen adoption in the transportation sector [13][14][15]. This adaptation considers current public policy promotion and announcements, investment trends, and infrastructure deployment plans.

Markets and Markets forecasts a 36.6% annual growth rate for fuel-cell electric vehicle (FCEV) trucks through 2035 [13]. This projection serves as a baseline for this study, but adjustments are made to align with regional hydrogen hub targets and anticipated adoption rates in non-hub areas. The growth rate assumptions for both hubs and non-hubs at the beginning of the assessed period are detailed in Table 4.

By incorporating these growth trajectories, the study aims to capture the pace of hydrogen trucking expansion under varying regional conditions while reflecting real-world constraints and public policy-driven accelerations.

Table 4. Annual vehicle growth rate by region

Region	Annual Growth Rate	Assessed Period
ARCHES H_2 Hub	40%	2027-2060
Rest of the Hubs	36%	2030-2060
Non-Hubs	30%	2030-2060

The ARCHES hydrogen hub was assigned a higher annual growth rate than other hubs and non-hub regions due to its leadership in the low-carbon energy transition and its ambitious deployment targets. In contrast, the remaining hydrogen hubs maintain an annual growth rate of 36%, while non-hub regions were assigned a slightly lower rate of 30%. This difference accounts for the financial and public policy advantages that hubs receive, which are expected to accelerate hydrogen vehicle adoption compared to non-hub areas. Despite assigning the lowest growth rate to non-hub regions, the study maintains an optimistic outlook by setting the rate at 30%, reflecting the potential for market expansion outside designated hydrogen hubs.

Regarding the assessed timeline, the analysis begins earlier for the ARCHES hydrogen hub than for other regions. This decision is based on its commitment to early adoption and the existing public policy framework supporting hydrogen deployment. While ARCHES has announced a target of 5,000 hydrogen trucks by 2030, this study uses a logistic curve to estimate truck adoption from 2027 onward, ensuring a trajectory that aligns with the hub’s stated goals while providing a consistent modeling approach across regions.

3.3 Number of Vehicles at the Beginning of the Assessment Period

This study establishes the initial number of hydrogen-powered trucks based on the deployment trajectory of the ARCHES hub, which provides the most detailed vehicle targets. Using a logistic growth model, the study estimates that approximately 1,600 FCEVs will be operational in California by 2027, ensuring a smooth adoption curve leading up to the 2030 goal.

The study assumes a proportional approach for other hydrogen hubs and non-hub regions, where initial vehicle numbers are not publicly available. It calculates the share of heavy-duty vehicles (HDVs) in California relative to total truck registrations according to the FHWA [12]. This ratio is applied to estimate the starting vehicle count in other regions. Table 5 presents these estimates, outlining the assumed vehicle distribution at the beginning of the assessment period.

Table 5**.** Share of HDV in CA and calculated initial number of vehicles for the period assessed.

Share of HDV = Initial number of Vehicles in the Assessed Period / Total Vehicles Registered in CA
Share of HDV = 1,600 / 303,854
Share of HDV = 0.5%

Region	Share of HDV (assuming the same HDV share for CA)	Total HDV Registered	Initial number of HDV (assessment period)
California H_2 Hub	0.5%	303,854	1,600
Gulf Coast H_2 Hub	0.5%	281,243	1,481
Appalachian H_2 Hub	0.5%	266,729	1,405
Mid-Atlantic H_2 Hub	0.5%	193,300	1,018
Pacific Northwest H_2 Hub	0.5%	161,859	852
Midwest H_2 Hub	0.5%	309,757	1,631
Non-Hub	0.5%	1,705,785	8,529

Additionally, this study acknowledges that while most hydrogen hubs have not specified vehicle deployment targets, they have indicated their intended end-use sectors for hydrogen (see Table 1). Given this, the Heartland H_2 Hub was excluded from the analysis, as its plans do not include hydrogen adoption in the transportation sector. This exclusion ensures the study remains aligned with hubs actively pursuing hydrogen-powered trucking as a development strategy.

3.4 Vehicle consumption and refueling station capacity

This study uses a hydrogen consumption rate of 40 kg H_2/day per HDV and an HRS capacity of 4,000 kilograms H_2/day based on the author's perspective and publicly available reports[16] [17] [18]. Refueling stations are modeled to operate at 80% of their total capacity to prevent overestimating hydrogen demand.

Additionally, station capacity is set to increase annually, ensuring a continuous expansion of refueling infrastructure to meet growing hydrogen demand. Rather than projecting station closures, the analysis assumes a steady rise in station output over time. Table 6 presents the yearly growth rates assigned to refueling station capacity throughout the study period.

Table 6. Annual Hydrogen Refueling Station Growth Rate

2030-2040	5%
2040-2051*	4%
2052-2060	0%

*2040 - 2047 for CA due to faster growth compared to other hubs, and 2040 – 2048 to non-hubs due to sooner demand met.

4 Step 3: Projecting H_2 adoption

This study uses a logistic growth model to project hydrogen adoption from 2030 (2027 for California) to 2060. The model is based on data from Step 2 to estimate the annual demand for H2 and hydrogen refueling stations (HRS) in million tons. Figure 4 presents the results for hydrogen hubs and compares them with the OCED’s H2 production targets for 2030. Figure 3 shows the H_2 hubs and HRS demand from 2030 (2027) to 2060.

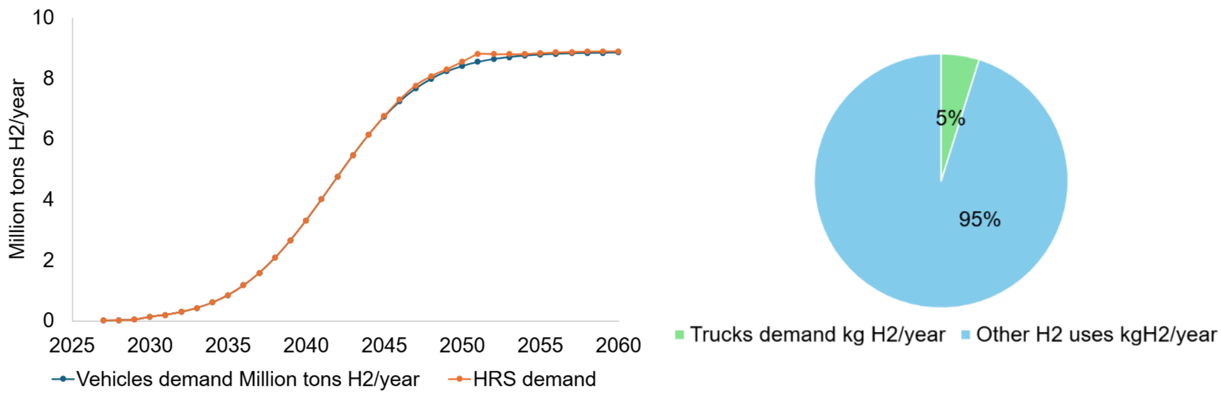


Figure 3. Hubs H_2 vehicle and HRS demand (Left) and comparative demand analysis with the OCED production H_2 goals announced (Right).

The hydrogen demand projection reveals three distinct growth phases. From 2025 to 2035, demand will grow slowly as the hydrogen economy enters its early adoption stage, with gradual rollouts of hydrogen vehicles and refueling infrastructure. Between 2035 and 2050, the growth rate will accelerate due to the widespread adoption of hydrogen technologies and the rapid deployment of refueling stations. After 2050, demand stabilizes as vehicle adoption and infrastructure development reach saturation.

Vehicle and HRS demand align throughout the projection period, showing that infrastructure supports vehicle growth. However, slight mismatches near 2050 arise due to the modeling approach. Instead of projecting a decline in the number of stations as demand stabilizes, the model assumes continued growth in HRS stations with gradual capacity increases to accommodate the expanding vehicle fleet.

The rapid growth phase between 2035 and 2050 highlights the need for public policy interventions to ensure adequate infrastructure and market readiness. Governments and industry stakeholders must collaborate to scale hydrogen vehicle fleets and expand refueling infrastructure. Incentives for station upgrades, strategic placement, and coordinated planning will be essential during this period.

The projection also identifies the saturation point, representing the maturity of the hydrogen market and infrastructure capacity constraints. This milestone, expected between 2050 and 2055, signals vehicle and infrastructure expansion stabilization.

These demand projections depend on assumptions, including saturation levels, growth rates, and infrastructure design choices. Sensitivity analysis could explore how variations in these inputs, such as station capacity growth rates or changes in market saturation, might affect the results.

Additionally, this study compares the OCED's hydrogen production goals with projected hydrogen demand by 2030. The results indicate that if the hubs aim to match California's vehicle count by 2030, hydrogen demand from HDVs will account for 5% of the total hydrogen production projected by the OCED. This suggests that the remaining 95% of hydrogen production must support other sectors, such as heating, industry, power generation, and light-duty vehicles (LDVs).

Figure 4 illustrates the projected demand for hydrogen-powered HDVs and corresponding hydrogen demand across H_2 hubs and non-hub regions from 2027 to 2060.

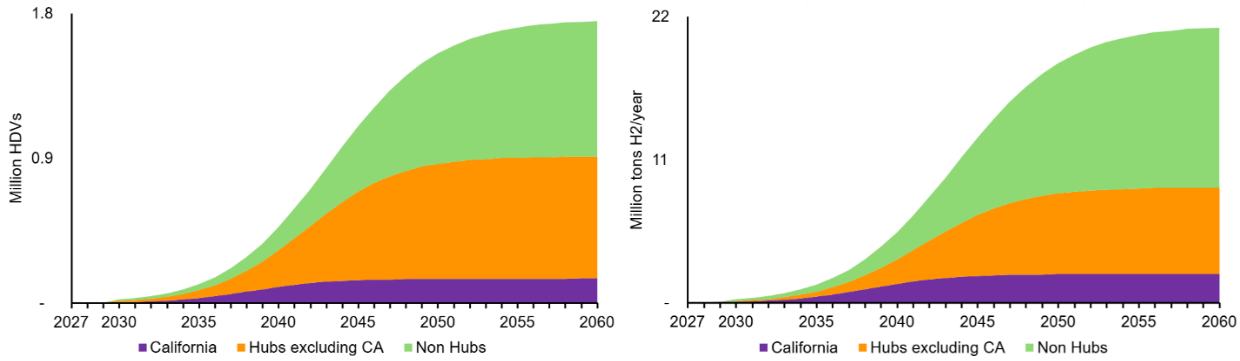


Figure 4. HDVs demand (Left) and corresponding H_2 demand (Right).

The results emphasize the growing role of hydrogen hubs in early adoption while highlighting the need to expand hydrogen deployment beyond these regions to meet long-term national decarbonization goals. Initially, hydrogen hubs, notably California, drive early adoption, but over time, the distribution of HDVs and hydrogen demand shifts. Although hubs dominate demand early, non-hub regions experience rapid growth after 2045. By 2060, non-hub regions will lead in vehicle adoption and hydrogen consumption, surpassing the contribution from hubs. This shift underscores the importance of expanding hydrogen infrastructure beyond initial deployment zones to support long-term sustainability targets.

Hydrogen demand grows proportionally with vehicle deployment, reaching about 20 million tons annually by 2060. While hubs remain key enablers in the early stages, the projections show that a successful hydrogen economy requires widespread adoption in non-hub regions. This reinforces the need for public policy frameworks and investment strategies that incentivize infrastructure development beyond designated hubs. In later years, the increasing share of non-hub regions suggests that hydrogen adoption will extend beyond specific corridors, integrating into the broader transportation network and creating a more resilient and distributed supply and value chain.

Moreover, the findings suggest that while hubs initiate the transition, national-scale hydrogen adoption depends on successful expansion into non-hub regions. Ensuring continued growth in hub and non-hub areas will be essential to achieving the projected deployment and positioning hydrogen as a key decarbonization strategy for heavy-duty transportation in the U.S.

5 Analyzing Refueling Station Spread based on the National Zero-Emissions Freight Corridor Strategy

This study uses the National Zero-Emission Freight Corridor Strategy to assess the average distance covered by the highways included in the strategy, comparing it with the number of stations projected by the logistic curve. The aim is to determine the average distance between stations for each strategy phase, from 2024 to 2027.

Based on the data in Figure 2, Table 7 presents the corridor lengths included in each phase of the National Zero-Emission Freight Strategy. The data was sourced from the GIS files provided in the strategy document.

Table 7**.** National Zero-Emission Freight Strategy corridor length per phase (miles)

Phase 1 (2024-2027)	12,044
Phase 2 (2027 – 2030)	18,798
Phase 3 (2030 – 2035)	37,104
Phase 4 (2035 – 2040)	48,575

By 2040, the National Zero-Emissions Freight Corridor Strategy envisions a total network of 48,575 miles connecting states and establishing a nationwide low-carbon corridor. This infrastructure is critical for supporting the transition to hydrogen-powered vehicles and facilitating decarbonization in freight transport.

In alignment with this infrastructure development, the study models the growth of HRS to meet the increasing hydrogen demand from HDVs. As shown in Table 6, the annual growth rate of HRS capacity is initially set at 5% for the first 10 years, gradually tapering to 4% over the following decade. However, this growth rate differs for California and non-hub regions due to the accelerated hydrogen adoption discussed earlier, leading to a halt in HRS expansion around 2047 in California and 2048 in non-hub areas. By 2051, the vehicle demand and the HRS supply curves are projected to reach their saturation points, signaling the system's equilibrium. Figure 7 presents the estimated number of HRS per year, distinguishing between hubs and non-hubs, highlighting the different growth trajectories across regions.

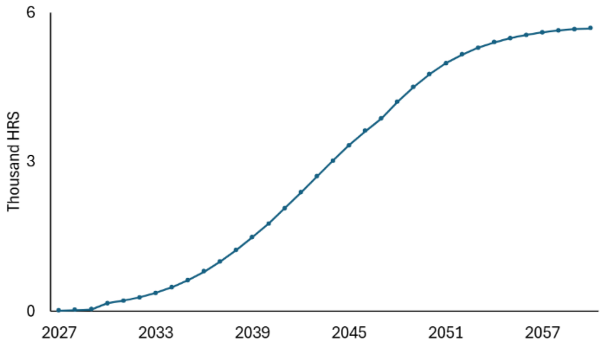


Figure 5. Estimated number of HRS per year for hubs and non-hubs (combined)

The results presented in Figure 5 illustrate a significant increase in HRS, rising from 20 in 2027 to 2,746 by 2060. Based on these projections, this study calculates the average distance between HRS for the period outlined in the National Zero-Emissions Freight Corridor Strategy. It is essential to emphasize that these calculations are not based on a spatial analysis but rather serve as an estimate of the average distribution of hydrogen infrastructure over time.

Table 8 presents the corresponding results for the average distance between stations at each phase, reflecting the anticipated expansion of the HRS network. This approach provides a broad overview of how infrastructure may evolve to meet growing hydrogen demand, without delving into precise locational data.

Table 8. Average distance between stations for each phase.

Year		**Number of HRS**	**Average distance between stations (mi)**
2024	Phase 1	-	-
2027		20	602.18
2027	Phase 2	20	939.91
2030		222	84.49
2030	Phase 3	222	166.77
2035		897	41.35
2035	Phase 4	897	54.13
2040		2746	17.69

This study excludes the initial phase of Phase 1 in 2024, as it falls outside the scope of the analysis. The results in Table 8 demonstrate a significant reduction in the average distance between hydrogen refueling stations, decreasing from 602.18 miles in 2027 to 17.69 miles in 2040. This sharp decline highlights the rapid expansion of hydrogen infrastructure, driven by the accelerated deployment of refueling stations to support the transition to zero-emission freight transportation.

The decreasing average distance underscores the growing station density, which will enhance fueling accessibility, alleviate range anxiety, and make hydrogen a more viable alternative for heavy-duty vehicle operations. This trend suggests strong public policy promotion and support, sustained investment, and technological advancements are central to scaling hydrogen infrastructure, especially in high-demand corridors.

A denser network will improve hydrogen logistics by reducing the need for long-distance fuel transportation. Still, station capacity and operational efficiency improvements will be required to meet the rising demand.

These findings reinforce the critical role of infrastructure expansion in the Net-Zero Freight Strategy and emphasize the importance of continued investment, regulatory incentives, and innovations in storage and distribution. Achieving large-scale hydrogen adoption in freight transportation hinges on these efforts, ensuring the infrastructure can effectively support the rapid growth of zero-emission freight solutions.

6 Conclusions

This study analyzes the hydrogen demand and refueling infrastructure needed to support the transition to zero-emission freight transportation in the U.S. It combines vehicle adoption projections with infrastructure growth under the National Zero-Emissions Freight Corridor Strategy framework. By analyzing supply and demand dynamics, the study highlights the essential role of hydrogen refueling stations in scaling hydrogen adoption for heavy-duty vehicles.

The results suggest that while hydrogen hubs will be critical in the early phases of adoption, the future success of hydrogen-powered freight depends on expanding infrastructure beyond these initial regions. Over time, non-hub areas will experience rapid growth, and by 2060, they will surpass hub regions in terms of vehicle adoption and hydrogen demand. This shift underscores the need for a national effort to expand hydrogen infrastructure and ensure that all regions are adequately supported in the transition to zero-emission freight.

As the hydrogen refueling network grows, the average distance between stations is projected to decrease significantly, from over 600 miles in 2027 to less than 18 miles in 2040. This ever-increasing density of stations will enhance the feasibility of hydrogen adoption, making refueling more convenient and reducing concerns about vehicle range limitations. The anticipated network expansion reflects strong public policy support, increasing investments, and the steady progress of technological advancements in hydrogen distribution.

Despite these promising projections, several uncertainties remain. The scalability of hydrogen trucks remains a key question—though growth rates for vehicle adoption and infrastructure are estimated, it is unclear if these will lead to the economies of scale necessary for cost-competitive hydrogen solutions. Additionally, while California is leading the way, whether the number of trucks is sufficient to drive meaningful production scale and infrastructure expansion without other hubs following suit is unclear; still, in any case, California would only be a small part of the final system depicted in this national scenario. These uncertainties highlight the need for further investigation into the economic viability and market growth drivers that could support widespread hydrogen adoption.

Moreover, the methodology used in this study, while informative, has limitations. The lack of a detailed economic model to assess the cost-competitiveness and the right balance of vehicle adoption, demand, and infrastructure capacity means these projections should be considered part of a broader exploratory framework. Further work is needed to refine these models, especially to address integrating economic factors such as infrastructure costs, economies of scale, and potential public policy incentives. Efforts to link the scenario to needed policies are also needed. However, the scenario will require heavy investment by hubs and nationally to support the hydrogen system and trucking rollout.

6.1 Challenges and Future Work

While the study offers important insights into hydrogen infrastructure development, several challenges remain. The scalability of hydrogen trucks, particularly cost-effectiveness, is still uncertain. Without a clear understanding of the economic feasibility of these vehicles at scale, it isn't easy to assess whether the projected adoption rates will be met.

The success of the hydrogen economy also hinges on the commitment of the hydrogen hubs. While these regions will play a key role in the early transition, it is unclear if they will achieve the necessary scale to support national hydrogen deployment. Long-term success will require expanding infrastructure beyond initial hubs to ensure all regions are adequately equipped to transition to zero-emission freight.

Further research should focus on refining economic models and addressing the complexities of infrastructure scaling. Evaluating the impact of cost reductions through technological innovation, economies of scale, and public policy-driven incentives will ensure that hydrogen adoption remains viable. Furthermore, future work should consider the effects of market dynamics, regulatory changes, and external factors that could influence the growth of the hydrogen economy.

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Presenter Biography

Laura Restrepo is a mechanical engineer and a master's student in the Transportation, Technology, and Policy program at UC Davis within the Institute of Transportation Studies. Her research focuses on hydrogen projects, including H_2 leakage and its climate effects, hydrogen hub analysis, and vehicle and station projections. She is also involved in an international project comparing California and the EU hydrogen policies. Laura aims to conduct impactful research that supports global decarbonization efforts beyond the U.S.