THE NETWORK OF THE REVOLUTION

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The 2030 Network Vision

How did we arrive at the network in *The Revolution*, what does it provide, and how can we get there?
DEFINING THE NETWORK OF THE REVOLUTION
Business-as-Usual projections do not indicate mass-market FCEV entry.
Why 1M FCEVs by 2030?

Independent studies confirm 1M FCEVs and 1k stations by 2030 is a reasonable expectation.

*From H2USA Locations Roadmap Working Group Publication *National Hydrogen Scenarios (2017)*

*From Hydrogen Council Publication *Hydrogen Scaling Up (2017)*

2030 milestones

- 1 in 12 cars in Germany, Japan, South Korea, and California powered by hydrogen
- Globally 10 to 15 million cars and 500,000 trucks powered by hydrogen
- Deployment of hydrogen-powered trains and passenger ships

2050 target picture

- Up to 400 million passenger vehicles (~25%), 5 million trucks (~30%), and more than 15 million buses (~25%) running on hydrogen
- 20% of today’s diesel trains replaced with hydrogen-powered trains
- 20 million barrels of oil replaced per day, 3.2 Gt CO₂ abated per year
Station Location Method

Iterative placement of stations using CHIT based on combined capacity and coverage evaluation

* Demonstration Only
Key input became gas station density template to tune hydrogen station density

Source: Air Resources Board analysis of Energy Commission PIIRA form CEC-A15 results

- Limited to two hydrogen stations per polygon
- Polygons semi-optimized to contain at least 10 gas stations
As Network Develops...

- Average Station Capacity Grows
- Network Becomes More Varied
- Smaller Stations Become Less Common
- Definition of “Small” Increases
Iterative review of scenario analysis with CaFCP members to define assumptions and parameters.
STRUCTURE OF THE NETWORK OF THE REVOLUTION
By 2030, the network coverage equivalent to gasoline, with stations densities led by core market demand and expanding market growth.
Within the timeline of AB 8, focusing on core markets with room for expansion to some fast-following markets.
Between AB 8 and EO B-48-18, begin densifying fast-following markets; After B-48-18, truly accelerate statewide growth
Station Deployment by Year

Significant Similarity to Purely Geographic Optima (this map not made with CHIT) [Covers 46% of Households, 16% of roadways]

Optimum to Cover 800 City Centers w/in 6 Minute Drive

Final years of *The Revolution* focus on capacity growth and extend the farthest reaches of the network
BENEFITS OF THE NETWORK OF THE REVOLUTION
Balanced growth that prioritizes overall network health rather than singular core area focus
Geographic distribution of stations balanced and similar to gasoline
Scenario Evaluation

- Balanced spatial optimization and market needs
- Equitable baseline coverage
- Convenience in core markets
- Long-distance travel
The network of *The Revolution* ensures fueling opportunities are equitably available across full geography and all demographics.

### Equitable Opportunity Across California

#### 64 Stations

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<tbody>
<tr>
<td>Non-DAC Subtotals:</td>
<td>52</td>
<td>262,415</td>
<td>12,118,311</td>
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<td>3,238,482 (~35% of all DAC)</td>
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<td>Totals</td>
<td>64</td>
<td>309,019</td>
<td>15,356,793</td>
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For Reference: CalEnviroScreen Indicates 9,152,024 Residents Living in Disadvantaged Communities

#### 1,000 Stations

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<tr>
<td>Non-DAC Subtotals:</td>
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<td>25%</td>
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<tr>
<td>Totals</td>
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<td>25,368,266</td>
<td>35,083,254</td>
<td>94.1%</td>
<td>100%</td>
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For Reference: CalEnviroScreen Indicates 9,152,024 Residents Living in Disadvantaged Communities

* Counts for Priority Areas include all Priority Areas that partially or wholly overlap a DAC. Data for populations in Priority Areas and 15-Minute Coverage are exact and only include population wholly contained within both the DACs and either Priority Areas or 15-Minute Coverage.
The light duty-centric network of *The Revolution* presents opportunities for co-location with fueling for other transportation sectors.
CREATING THE NETWORK OF THE REVOLUTION
Latest auto manufacturer projections for future FCEV releases show acceleration, but...
Our Current And Aspirational Trajectories

A path that meets the goals of EO B-48-18 and The Revolution enables two to three times greater FCEV deployment than currently planned.
The network of The Revolution requires different strategies than what enabled market initiation.
What Support Does the Network Need?

Success and the support strategies and timing required can vary with the network buildout scenario.
DISCUSSION