

DOCKETED

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FirstElement Fuel Leader in Hydrogen Energy

**Matt Miyasato, Ph.D.
IEPR Workshop: Potential Growth of Hydrogen
September 8, 2023**



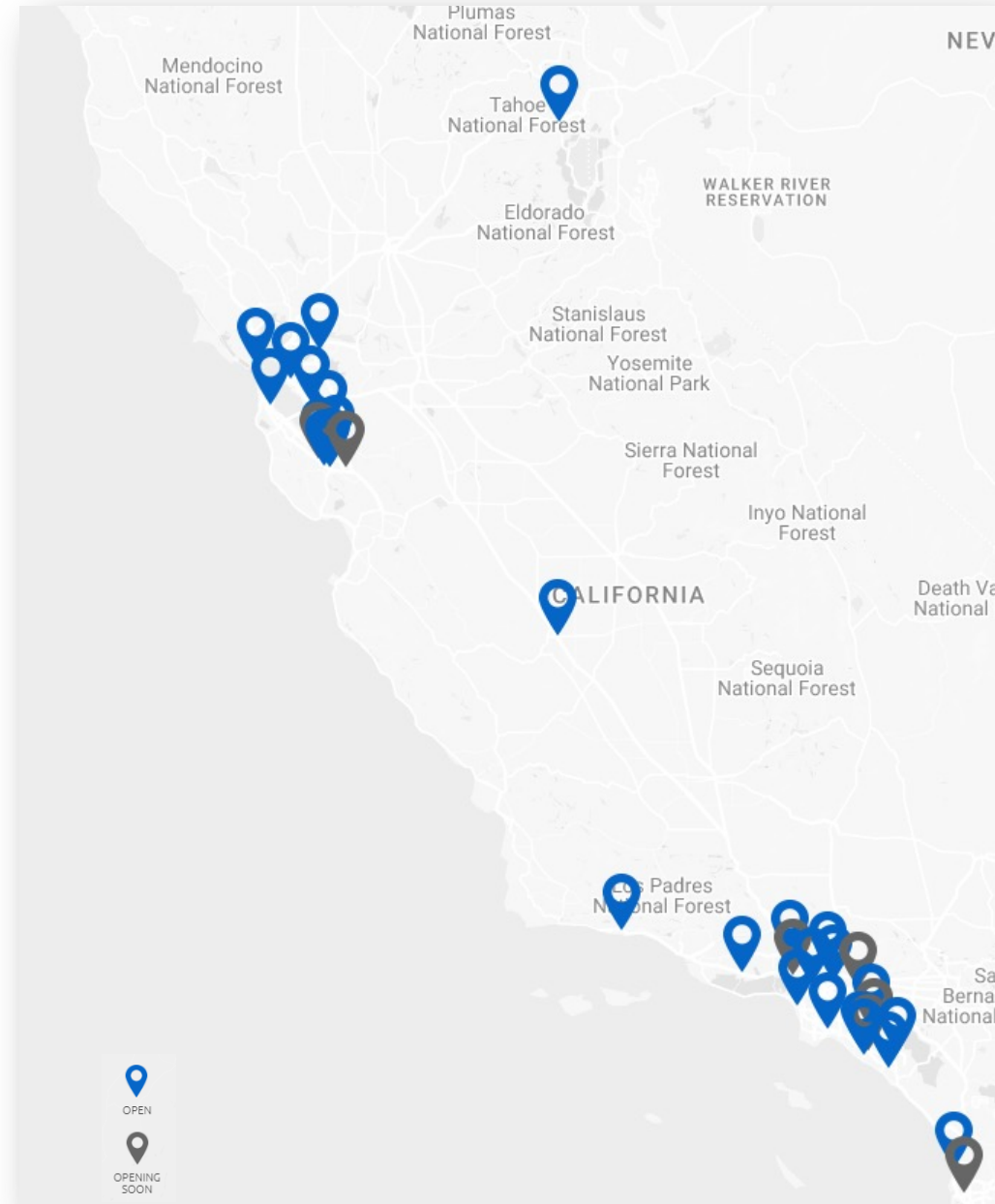
Who is FirstElement Fuel (FEF)?

- Founded in 2013, FEF designs, develops, owns, and operates retail hydrogen fueling stations
 - ❖ True Zero is FE's retail-facing brand
- We currently operate 85 retail dispensers across 40 hydrogen stations in CA
 - ❖ 2 others in construction
 - ❖ 27 additional stations in eng & permitting
- Focus on safety, reliability, and customer satisfaction
- Dedicated in-house service team of 60 people located throughout California
- FE's first 10 years has been an invaluable education in filling vehicles and continuously increasing scale

More than 5.5 million kgs sold since 2015.

Over 2 Million successful fills.

357 million miles replaced with ZE miles.





State-of-the-art
Equipment



South Pasadena 2018

Using Liquid-based Hydrogen Stations to Achieve Scale

FEF has developed station and fuel delivery systems that are capable of:

- Four simultaneous fueling positions
- Refueling ~450 vehicles per day (capable of more in the future)
- A positive business case while achieving cost parity with gasoline
- Meeting the needs of heavy duty and commercial vehicles





San Diego



Fountain Valley



Cupertino



Costa Mesa

Leveraging Light-Duty Experience for Heavy-Duty

- First-ever real-world HD station with fast-fill capability
- Part of the CTE NorCal Zero jointly funded project by CARB and CEC
- Two simultaneous truck fuelings and back-to-back fills
- Under 10 minutes (70 kgs)
- 30-100 trucks per day
- Includes 4 passenger car fueling positions



Hyundai Fuel Cell truck fueling at LD station in Aliso Viejo, CA



Two Hyundai Fuel Cell trucks
fueling at Livermore Refueling Hub

Policy Issues/Challenges



H2 Retail Fueling is New

Equipment and Supply Chain are immature

Working to resolve but takes time



State Incentive Structure

Clean Transportation Program

Low Carbon Fuel Standard

Both in Limbo – need certainty



Pathway to Zero Emissions

Batteries and Fuel Cells

Too soon to foreclose options

2023 (today)

Passenger Vehicle Sales



16 Million

ZEVs
282,492

FCVs
2,707

Drayage Trucks



205,000

ZEVs
135

FCVs
30

2035 (12 years)

Passenger Vehicle Sales



16 Million



ZEVs



FCVs

Drayage Trucks



205,000



ZEVs



FCVs

It's Not a Sprint.



A low-angle, close-up shot of a runner's legs as they stride forward on a dark asphalt road. The runner is wearing grey athletic socks and dark-colored running shoes with light-colored soles. A bright yellow dashed line runs down the center of the road, receding into the distance. The background shows a flat, arid landscape under a sky filled with soft, grey clouds, suggesting a late afternoon or early morning setting. The overall mood is one of endurance and determination.

**It's Not a Sprint.
It's a Marathon.**

A low-angle, close-up shot of a runner's legs as they stride forward on a dark asphalt road. The runner is wearing grey athletic socks and dark-colored running shoes with light-colored soles. A bright yellow dashed line runs down the center of the road, receding into the distance. The background shows a flat, arid landscape under a sky filled with soft, grey clouds, suggesting a late afternoon or early morning setting.

**It's Not a Sprint.
It's a Marathon.
Pace Yourself.**

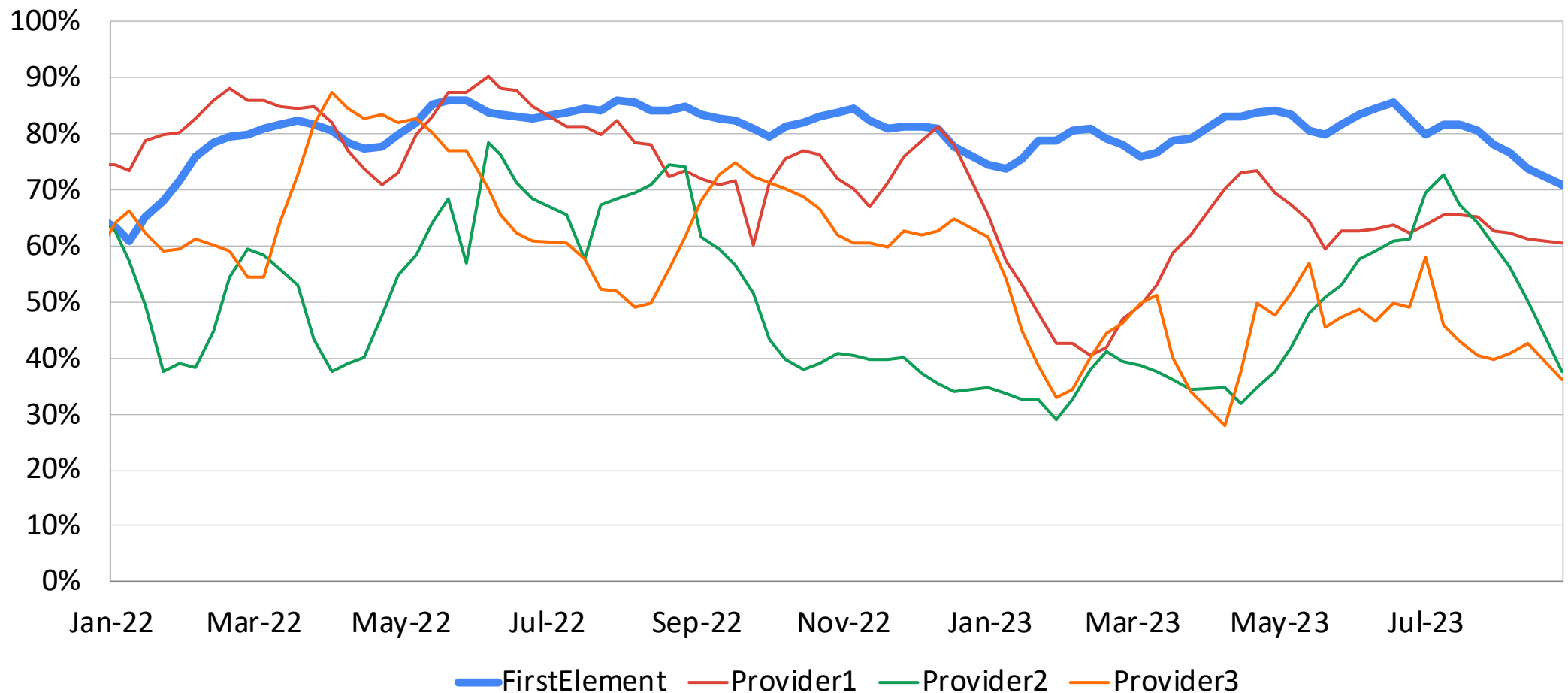
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Thank You

Industry Leading Uptime



- Over 50% of FEF staff are in Operations
- This is due to unreliable equipment
- We are addressing with significant engineering projects and R&D efforts



Cryopump Example

Pump Average Operating Hours Between Failure

