

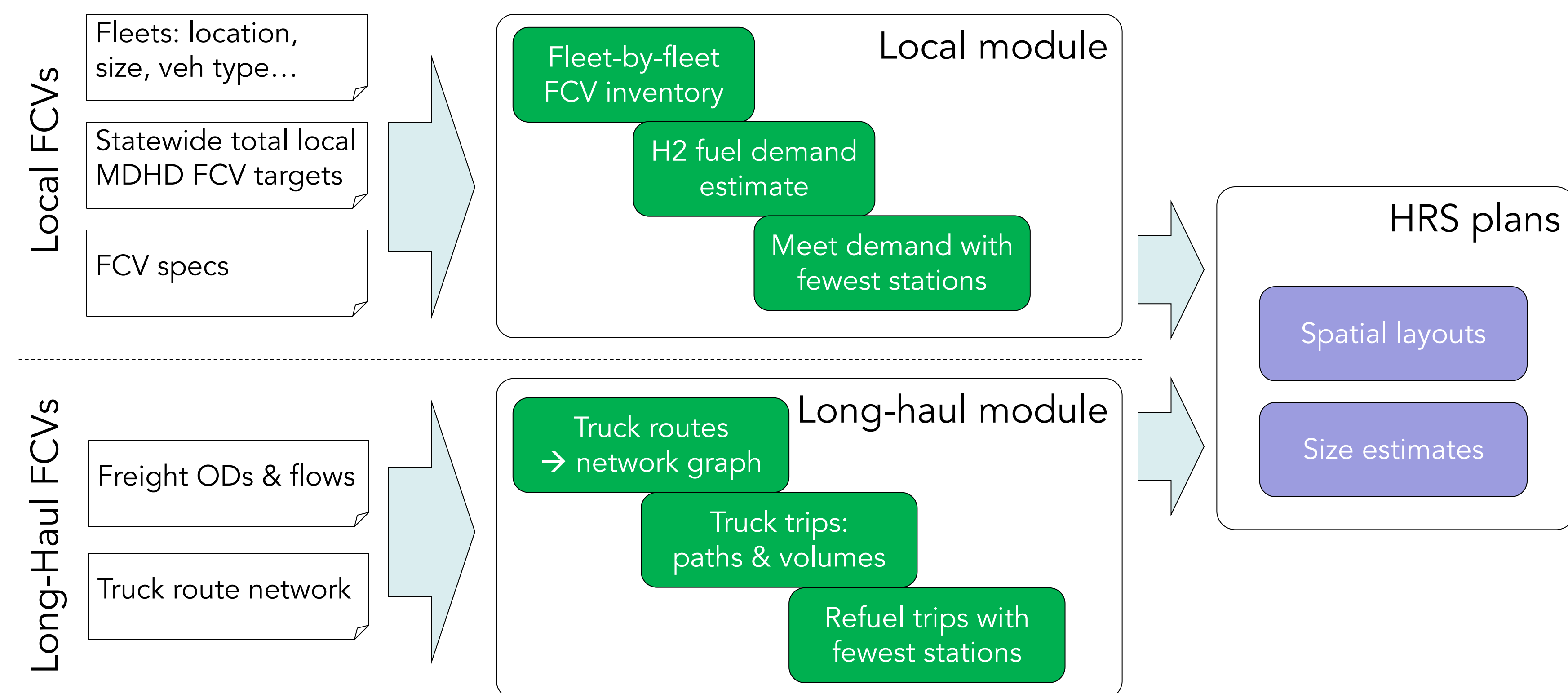
Goals

- Estimate hydrogen demand from medium- and heavy-duty (MD/HD) fuel cell vehicles (FCVs), with spatial and temporal resolution
- Optimize spatial layout of hydrogen refueling stations (HRS's)
- Estimate sizes of planned HRS's

Methods and Data

Data Sources

- California Sustainable Freight Action Plan (2016)
- CaFCP Medium- and Heavy-Duty Fuel Cell Electric Truck Action Plan
- USDOT Freight Analysis Framework
- Caltrans GIS Library
- Web crawling (e.g. commercial fleet data)
- UCD researches on H₂ trucks and infrastructure (Burke, Zhao, Miller, Yang, Ogden)
- California Statewide Travel Demand Model (CSTDm)



MD/HD FCVs: Local and Long-Haul

Two categories of MD/HD FCVs are treated separately:

Local FCVs – central refueling

- Package delivery trucks
- Drayage trucks
- Transit buses



Photo credit to: UPS



Photo credit to: AC Transit

Long-haul FCVs – en-route refueling

- Long-haul tractors



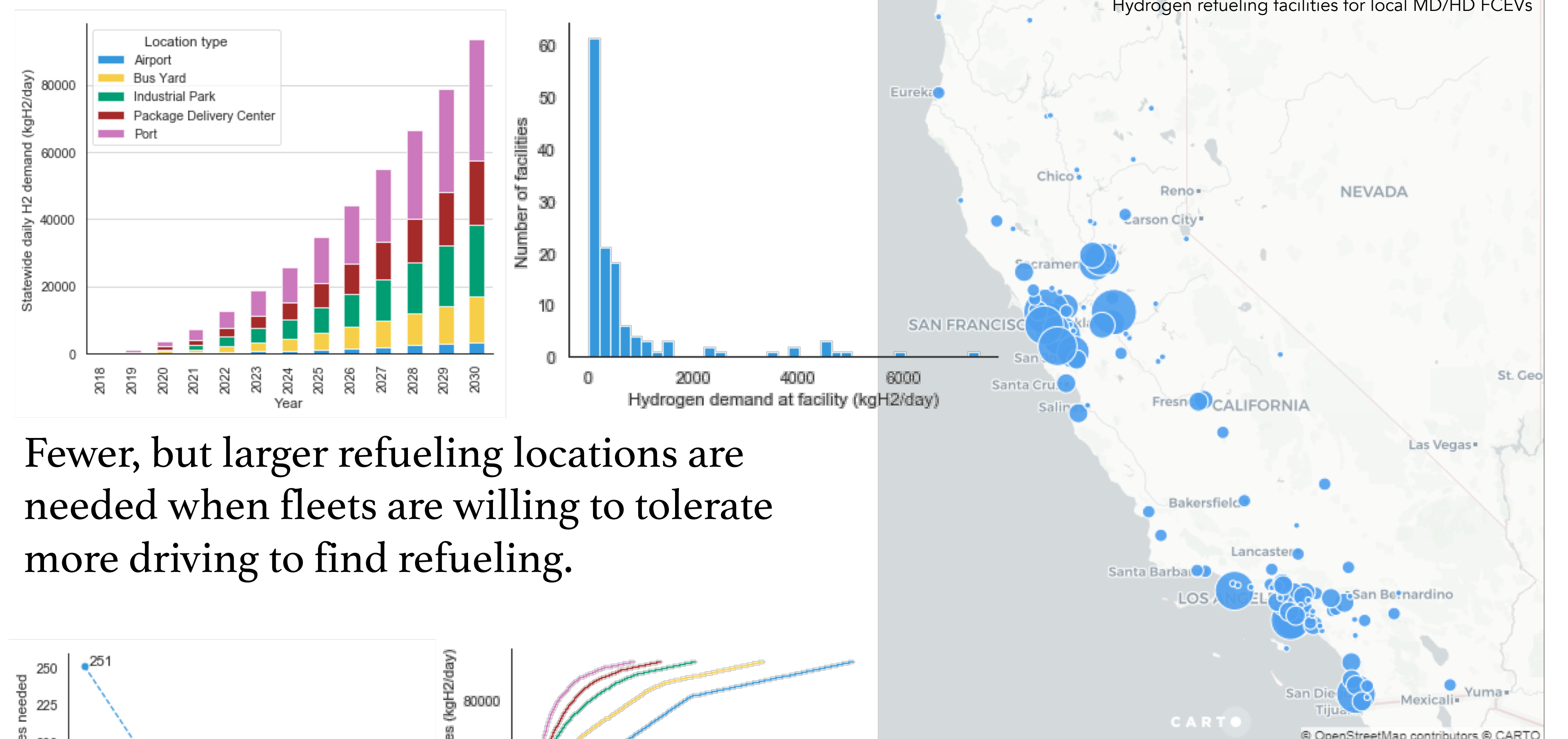
Photo credit to: Nikola Motor

Results

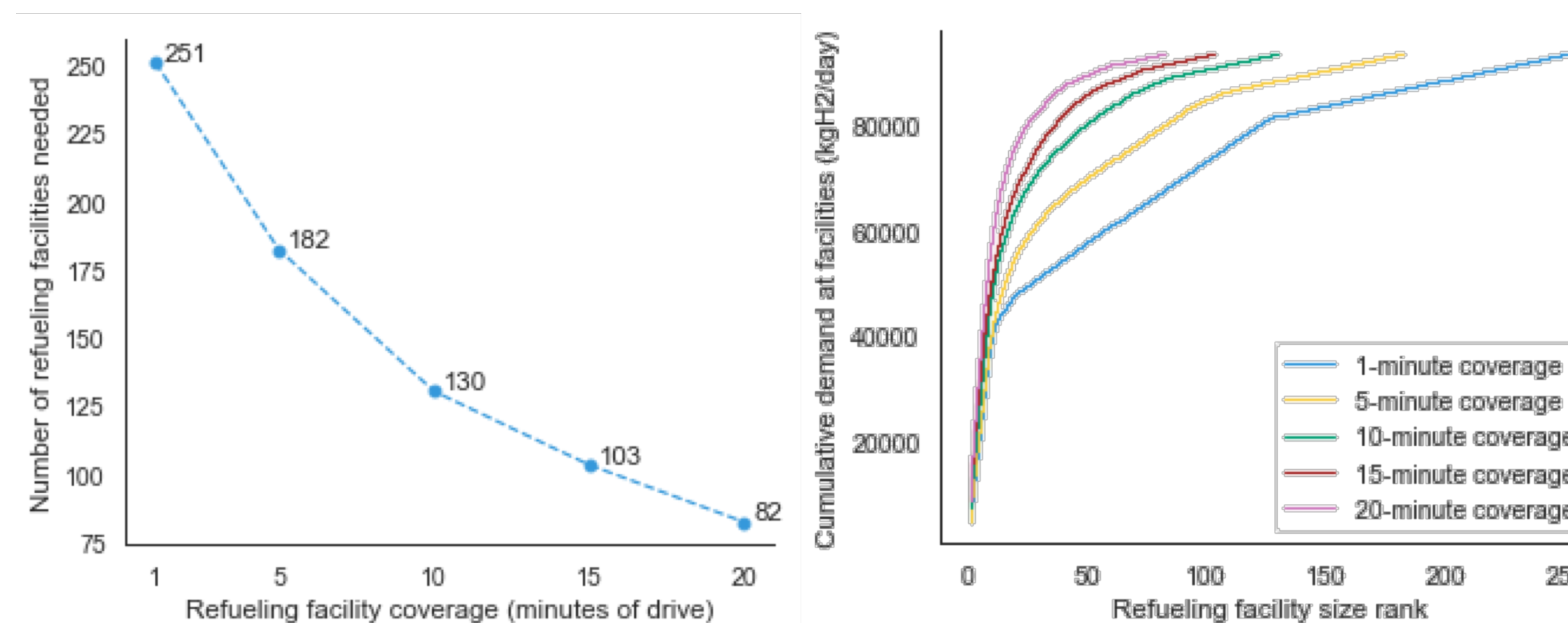
For Local MD/HD FCVs

In a baseline scenario of targeting at 10,000 local MD/HD FCEVs by 2030...

They need ~90,000 kgH₂/day by 2030, supplied at 130 facilities, each sizing between 100 and 8000 kgH₂/day – assuming fleets are ok with driving 10 minutes away from their central hub for refueling.



Fewer, but larger refueling locations are needed when fleets are willing to tolerate more driving to find refueling.



For Long-Haul MD/HD FCVs

13 refueling locations can cover California's major truck routes.

If 2% of heavy-duty commercial vehicle trips on the considered routes were done by FCVs, largest refueling facilities in this network can size up to 70,000 kgH₂/day.

