



# DOE Hydrogen and Fuel Cell Program H2 AMR 2018

State-Funded Hydrogen and Fuel Cell  
Activities Panel California Energy  
Commission  
Jean Baronas

June 14, 2018



# Focus on Hydrogen Refueling Infrastructure

- The consumer's acceptance of fuel cell electric vehicles (FCEVs) correlates with the availability of reliable fueling.
- The consumer's ability to reliably fuel FCEVs and drive to their destinations are integral to decisions to purchase and lease FCEVs.





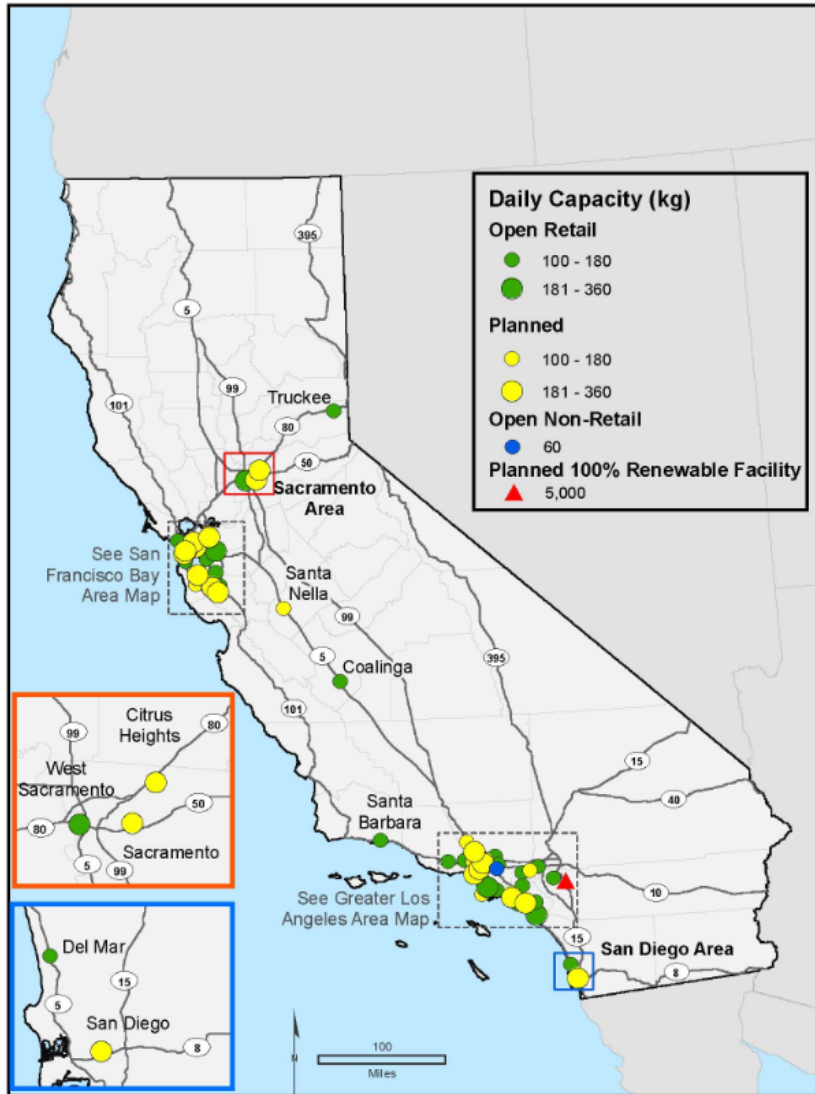
# California Energy Commission



**35 open retail hydrogen refueling stations  
fuel over 4,200 fuel cell electric vehicles (FCEVs)**



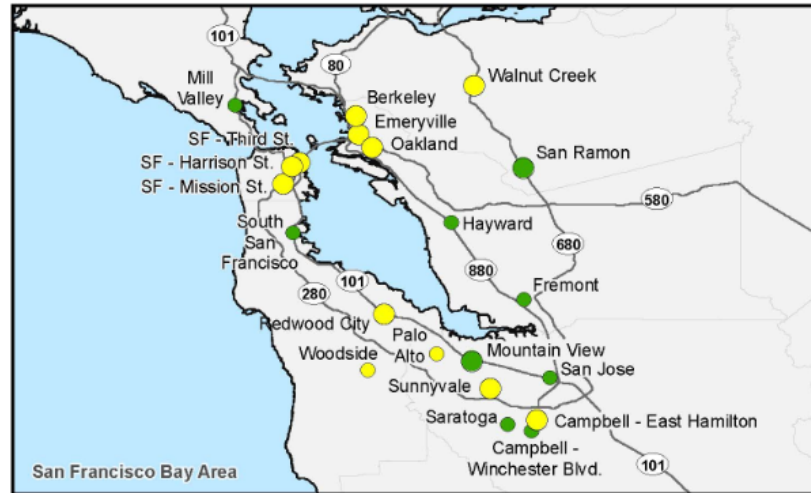
## California Energy Commission



Statewide view of the Alternative and Renewable Fuel and Vehicle Technology Program (ARFVTP) funded stations (4 regions)



# California Energy Commission



View of the locations of the core market areas around the San Francisco Bay and Greater Los Angeles



# Network Activities

- Community outreach
- Station capacity evaluation
- Quantitative and qualitative performance assessments
- Location streamlining
- Permitting streamlining



Nick Barillo, Hydrogen Safety Panel,



# Station Nameplate Capacity Hydrogen Station Capacity Model (HyC)

- Compression and dispensing
- Pre-cooling
- On-site and delivered sources of hydrogen
- Station storage for each pressure level



**Danny Terlip, NREL,**  
Researcher and Engineer



**Jennifer Kurtz, NREL,**  
Laboratory Manager



# Public and Private Sector Collaboration On Station Reporting

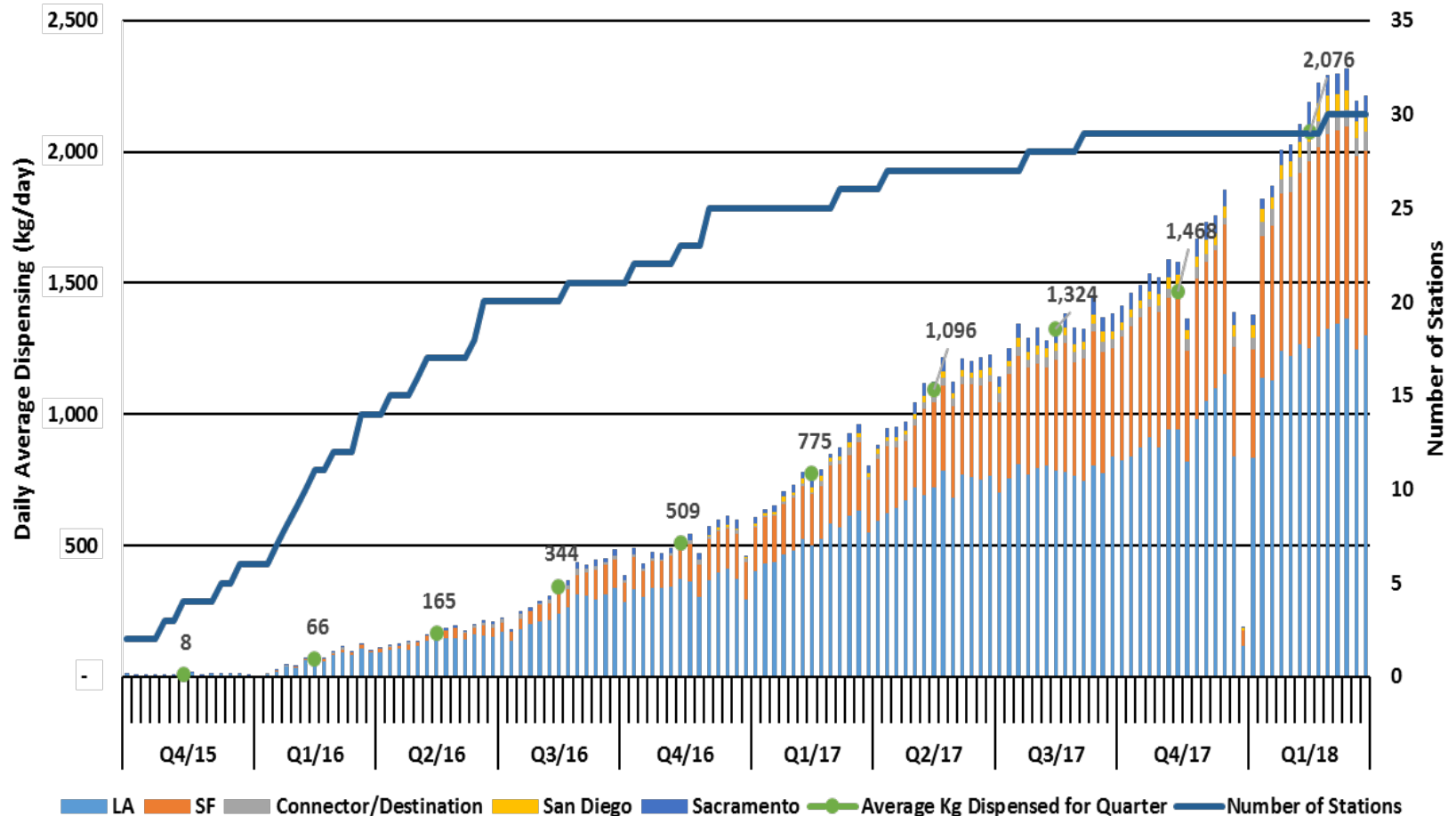
- National Renewable Energy Laboratory (NREL) data collection tool
  - Amount of hydrogen stored, compressed and dispensed
  - Energy consumption
  - Fuel logs
  - Parts replacement and cost
  - Monthly operating costs

Sam Sprik, NREL,  
Researcher and  
Engineer





## Weekly Hydrogen Dispensing



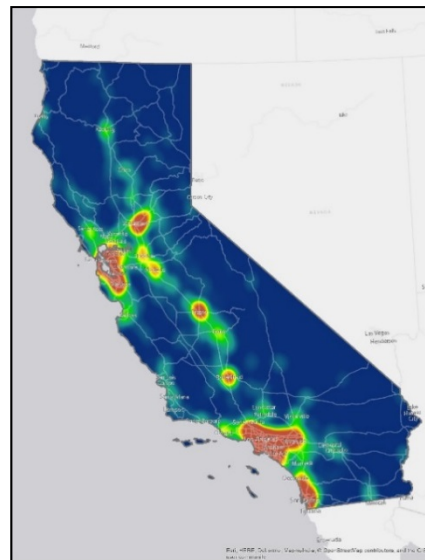


# Streamlined Station Location Techniques

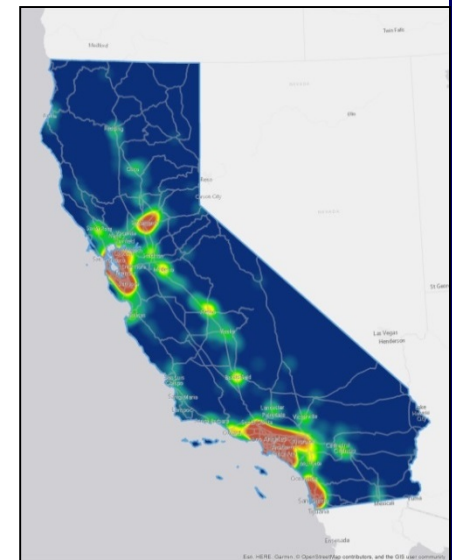
- CARB is working to project the station network development through 2030 and the proposed CaFCP Roadmap may include.



**Andrew Martinez,**  
CARB, Air Resources  
Engineer



**Density map of approx.  
8,000 retail gas stations  
(actual)**



**Density map of approx.  
1,000 retail hydrogen  
stations (potential)  
(2030)**

Source: CARB



# Trend Toward Larger Stations

- Higher capacity in GFO-15-605
- Multiple fueling positions and serving more customers is a **future** trend

Funding	Number of Stations Funded	Total Capacity Funded (kg/day)	Average Station Capacity (kg/day)
PON-09-608	10	2,140	214
PON-12-606	4	730	183
Upgrade Contract	3	480	160
PON-13-607	27	4,745	176
GFO-15-605	20	6,420	321
Network Totals	64	14,515	227

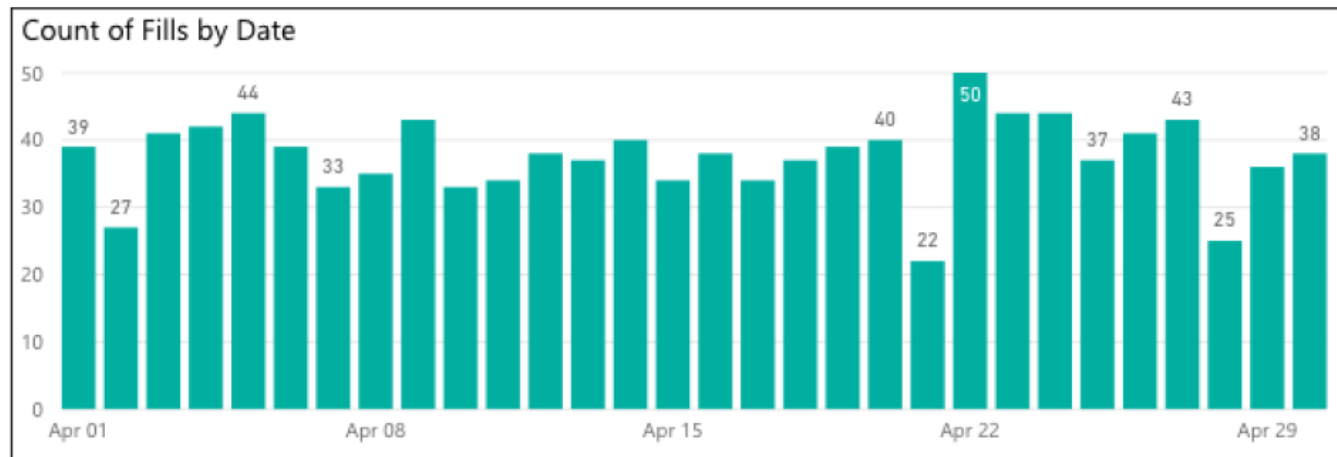


# Station and Network Performance

- Monthly progress reports

ARV-15-030: Long Beach-Long Beach Blvd.

- 1127 Fills – 3.68k Total Kgs



- Quarterly NREL Data Collection Tool



# Streamlined Administration, Local Planning, and Permitting

- Partner with Governor's Office of Business and Economic Development (GO-Biz)
  - Permitting Guidebook
  - Outreach to local officials
  - Community outreach
- Coordinate with other California agencies

Gia Brazil Vacin,  
GO-Biz, Project Manager



Tyson Eckerle,  
GO-Biz, Deputy Director



# Conclusions

- Network coverage, capacity, and performance impacts vehicle uptake
- Network activities include outreach, capacity evaluation, performance, location streamlining, and permitting streamlining
- Significant collaboration is needed with public and private sector



## California Energy Commission

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