H2 Stations In California

HTAC – NOVEMBER 18TH, 2014

CALIFORNIA GOVERNOR'S OFFICE OF BUSINESS AND ECONOMIC DEVELOPMENT

Getting Stations Permitted & Constructed

Codes & Standards

- **California Fire Code**
  - First to adopt NFPA 2 (2011 Version)
  - DOE has been instrumental
    - LH2 is the next frontier

- **CA Permitting Guidebook**
  - Out for public comment very soon
  - Feed into H2USA effort

Supporting Station Permitting

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- Community Outreach & Response
- Tracking & Troubleshooting

Last Updated	Permit Status	Station & Task Name	Who has the ball?	Projecte Capacity (kg/day)	Stn. Developer	Address	Start Date	Estimatec Operation Date	Station Deadline	Progress Status	Pie Visual	Comments	Commissioning
		Permit Report Card:								32		pre-funding/contracting	
Permitted to Build*		14								14		Funding/contracting/site control complete	
Permit apps submitted		7								1		Permitting Complete	
Permit app to be submitted		37								4		Construction Complete*	
		**Includes one bus-only station (Oakland). All others = light duty*								9		Commissioned and open	
												**Includes one bus-only station (Oakland)*	
10/28/14		**Diamond Bar - SCAQMD**	Station Developer	180	Air Products	21865 E. Copley Drive, Diamond Bar, CA 91765	06/02/10	12/01/14		Commissioning		Commissioning process has resumed in earnest. Assuming all proceeds as expected, commissioning expected to be complete in November.	**63%**
10/28/14		**Irvine - UCI (upgrade)**	Station Developer	180	Air Products	19172 Jamboree Rd., Irvine CA 92612	06/02/10	01/30/15		Permit - Submitted		Addressing final comments. Key challenge remaining = power supply approach. UCI has changed its requirements - both parties working toward a resolution.	
10/28/14		**Irvine - Walnut Ave.**	Station Developer	180	Air Products	5410 Walnut Ave., Irvine CA 92604	06/02/10		**12/31/14**	Permit Submitted		Received full comment package back from City on 10/7/14. Developer working the response, expect to re-submit early November. Review uncovered a planning issue - the project will require a CUP. This is a 3-4 month process.	
10/28/14		**Lawndale - Inglewood Ave.**	Station Developer	180	Air Products	15606 Inglewood Ave., Lawndale, CA 90260	06/02/10		**12/31/14**	Design		Detailed Site Plan in process. On target for early November submittal to City.	
10/20/14		**Los Angeles - Beverly Blvd**	City/County	180	Air Products	7751 Beverly Blvd., Los Angeles, CA 90036	06/02/10	12/31/14	**12/31/14**	Permit Submitted		Fire, Electrical have been approved. Building is ready to issue once real estate documentation is buttoned up (the site's old documentation needs to be updated - a minor issue).	
10/28/14		**Los Angeles - West LA 2**	Station Developer	180	Air Products	11261 Santa Monica Blvd., Los Angeles, CA 90025	06/02/10	01/20/15	**12/31/14**	Under Construction		Construction has begun (Contractor on-site October 20th). Tenant is taking [illegible] week ([illegible]	

Lessons Learned

- Developers should connect with City Staff early
- Biggest Issue = Site Control
- Local Communities are generally very supportive
  .....But Education is Key
- Aesthetics matter

Getting Stations Commissioned

Selling H2 to Retail Consumers

- **Regulatory Driver**
  - Dispense hydrogen by the kilogram "as soon as possible"
  - Motor fuel dispensers must receive a *Certificate of Approval* before they may be used in commerce in California

- **Setting**
  - National Institute of Standards and Technology Handbook 44
  - Modifications adopted by CDFA included new accuracy classes

- **Next Steps taken:**
  - Fabrication and evaluation of reference standards
  - Joint CARB/DMS statewide field testing program
  - Results promising to date

California's New 2014 Accuracy Classes* and Tolerances for Hydrogen Fuel

Accuracy Class	Acceptance Tolerance	Maintenance Tolerance
2.0	1.5%	2.0%
3.0 installed before 2020*	2.0%	3.0%
5.0 installed before 2020*	4.0%	5.0%
10.0 installed before 2018*	5.0%	10.0%

* No new installations after the end of the designated calendar year unless regulations are further amended. Existing installations allowed to operate until decommissioned.

2014/15 California Test Schedule
As of October 30, 2014 and Proposed

Testing Order	Station	Expected Evaluation Outcome	Initial Test Date	Permanence Test Date
1	Emeryville	Temporary Use Permit	March 3 – 7, 2014	N/A
2	Thousand Palms	Accuracy Assessment / Temporary Use Permit	March 24 - 28, 2014	TBD
3	Torrance	Accuracy Assessment (PVT)	April 1 – 4 , 2014	N/A upgrade planned in 2015
4	Burbank	Accuracy Assessment (PVT)	April 14 - 18, 2014	N/A upgrade planned in 2015
5	CSULA	Temporary Use Permit	April 21 – 25, 2014	New initial test Oct 20-24
6	Newport Beach	Temporary Use Permit	May 5 - 9, 2014	New initial test requested early 2015
7	West Los Angeles	Temporary Use Permit (35Mpa)	May 12 - 16, 2014	TBD
8	Diamond Bar	Full Type Evaluation	Dec 8- 12, 2014	Feb 2015
9	Anaheim	Full Type Evaluation	March , 2015	May , 2015
10	West Sacramento	Full Type Evaluation	Oct 8 - 10, 2014	Dec, 15 – 19, 2014

Some Metrology Conclusions To Date

Initial Test
- State Pays for test

→

Temp Use Permit
- H2 sold by Kg

→

Permanence Test
- Applicant pays for test

→

Full Type Evaluation
- Dispenser certified for mass market.

- To date - No tested dispenser meets the 1.5/2% NIST standard
- The three temporary new accuracy classes appear warranted
- Some current dispensers are capable of meeting the new classes
- First Temporary Use Permits have been issued, and H2 has been sold by the kg!

Verifying Safe Fueling

- **HySTeP device in process, thanks to H2First and DOE**
  - HyStEP Device: capable of performing key tests defined in CSA HGV 4.3
  - **Purpose: Help validate station fueling according to SAE J2601 protocols**
  - Benefit: Reduce need for repeat OEM vehicle visits to validate fill protocol performance
  - Device features 35 And 70 Mpa capabilities:
    - 4 – 7 kg capacity tank or tanks
    - Pressure and temperature sensors
    - Appropriate temperature and pressure relief devices
    - IrDA capability
    - Vent stack for testing

HyStEP Next Steps

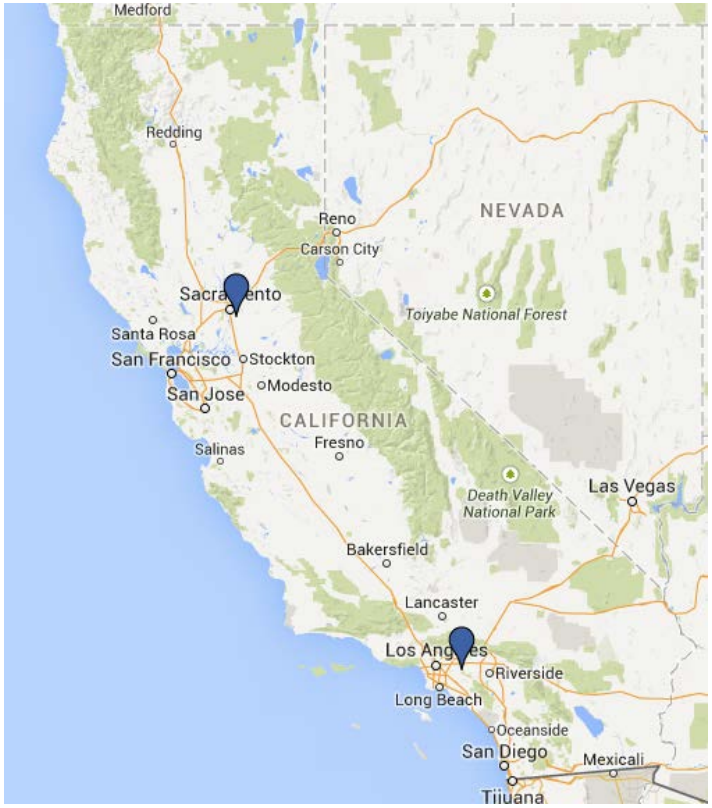
- **HyStEP device California delivery date November 2015**
- **Form California Project Team - Implementation**
  - Stakeholders – OEM, technology suppliers, operators, regulatory agencies, etc.
  - Data deliverables, template
  - Determine "legal consequences" of testing
  - Assemble testing team and budget
  - Determine station testing schedule
  - Determine potential "handoff " to private entity

Hydrogen Purity at the Station

Every Station has potential to deliver bad H2

- California Code of Regulations requires – fuel meet SAE J2719
- California Department of Food and Agriculture authority to field test
- CEC funding condition requires 6 month full suite testing minimum
- Experience dictates the need for
  - Sampling at more frequent intervals
  - Possibly an onsite "Contamination Detector"

Two Testing Labs in the State:



Keeping Stations Open

Economics

- O&M funding until volumes support operating expenses

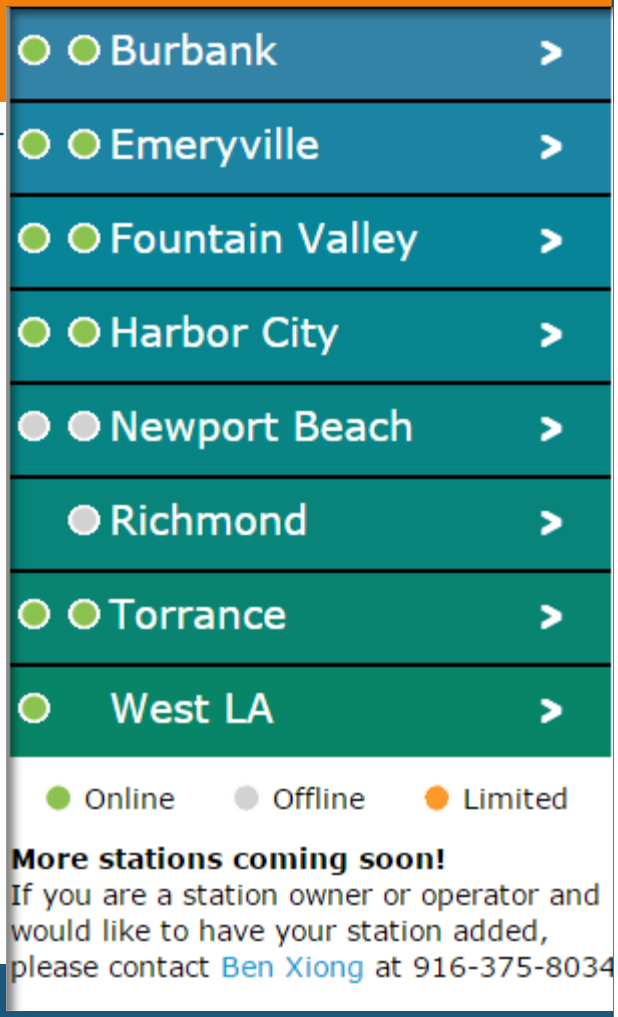
Regularly Scheduled Maintenance is critical

- Weak Link = Compressors

Dependable Quality Monitoring

Back-to-Back-to-Back Fueling Challenges

- Mercedes Customer dinner example

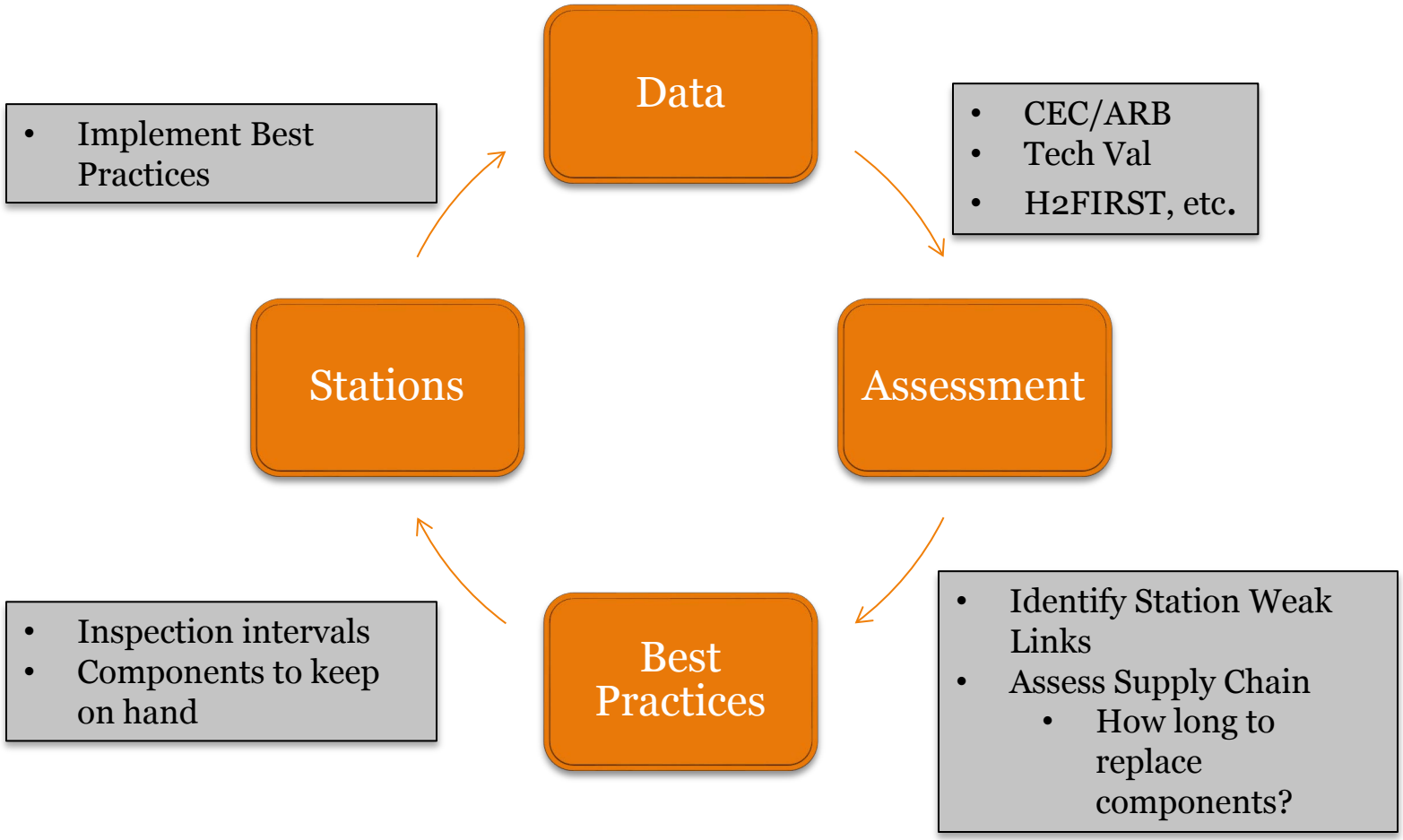


System Reliability Ideas

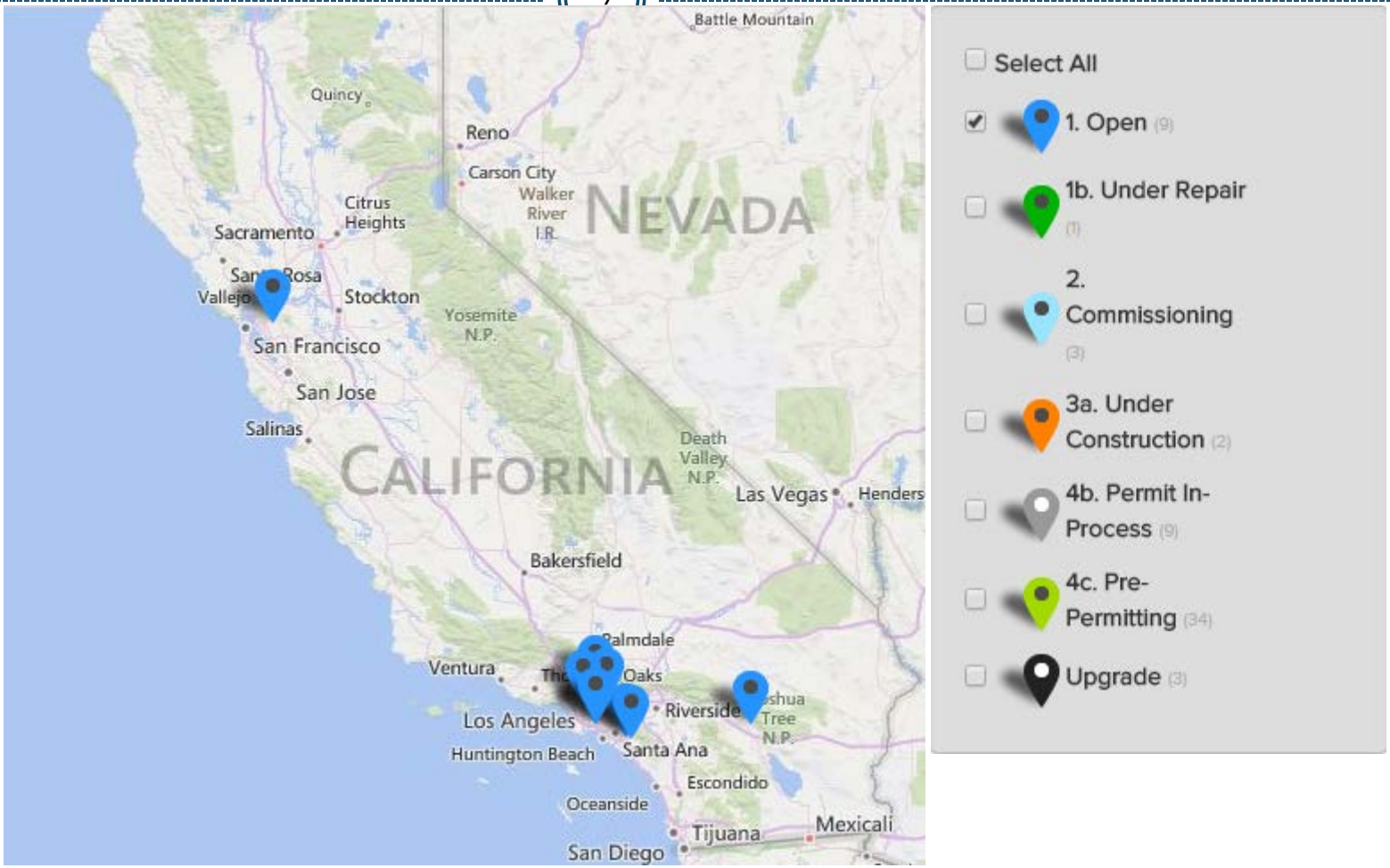
CEC O&M Funding = O&M Data. Use to:

- Identify Station Weak Links/Operations Costs/etc.
- Assess Supply Chain – how long to replace components?
- Establish Best Practices for:
  - Inspections and maintenance
  - # of (and which) components to be keep on hand

Leveraging CA Station Data – Reliability



Network Snapshot – as 11/14/14



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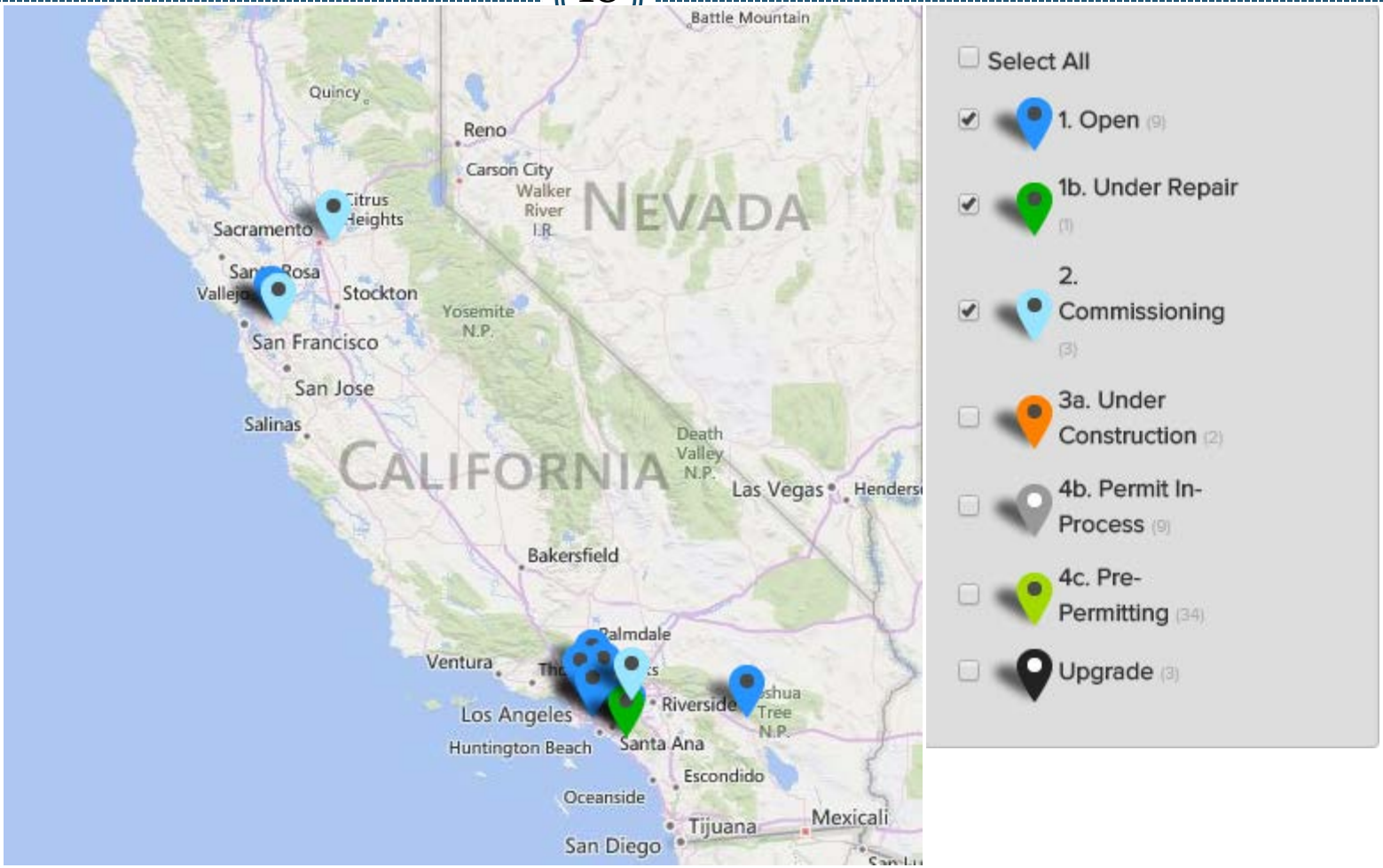

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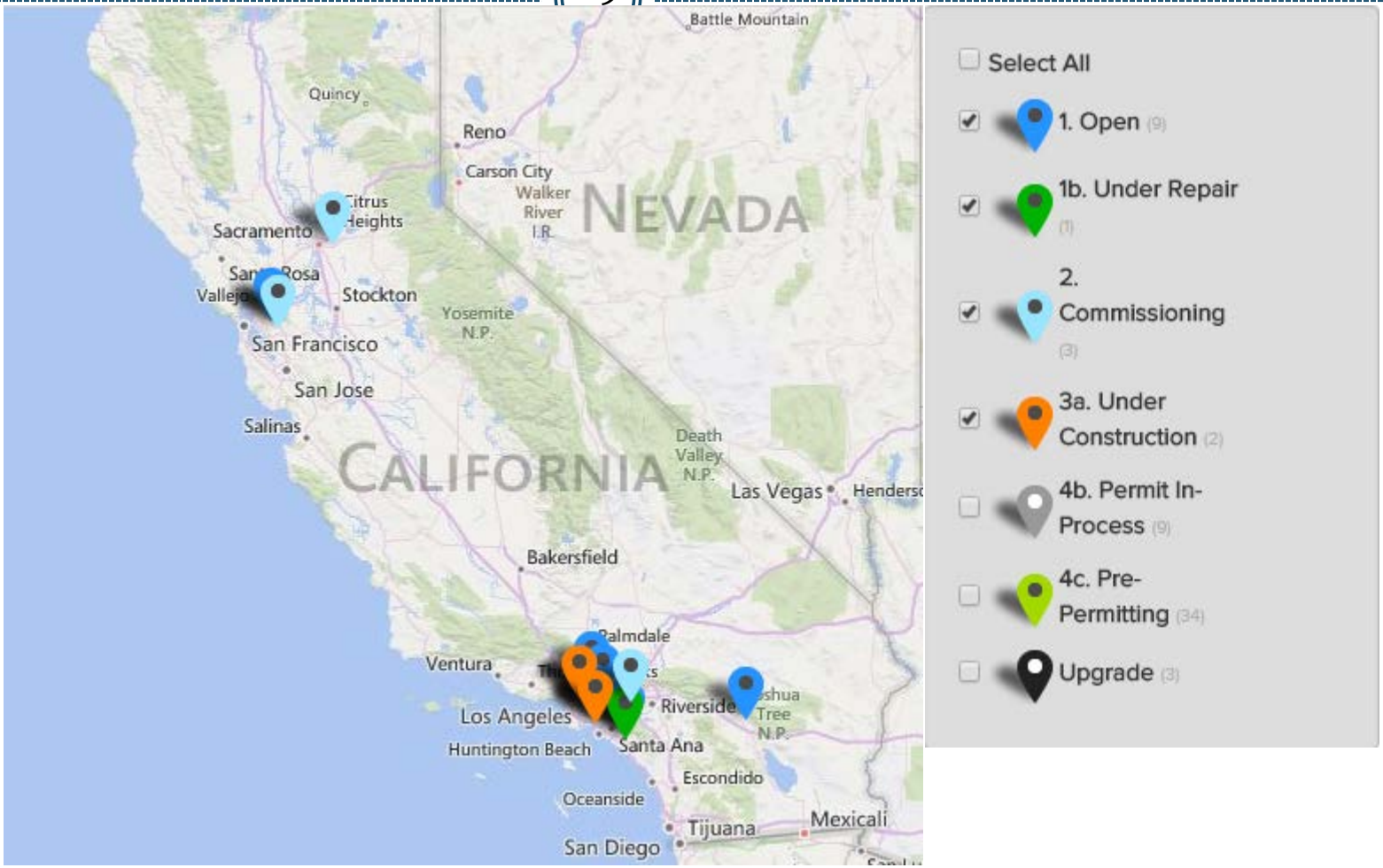

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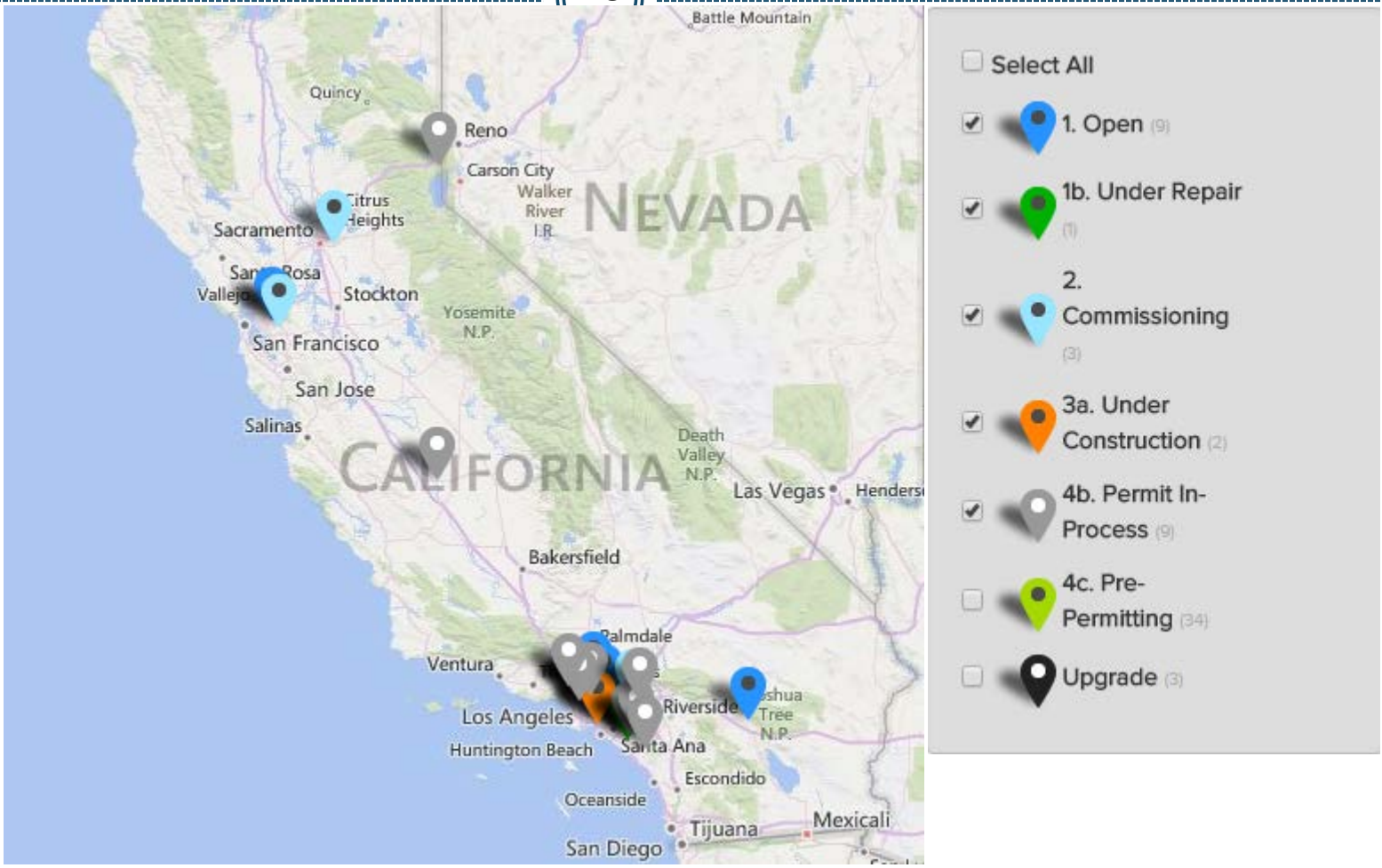

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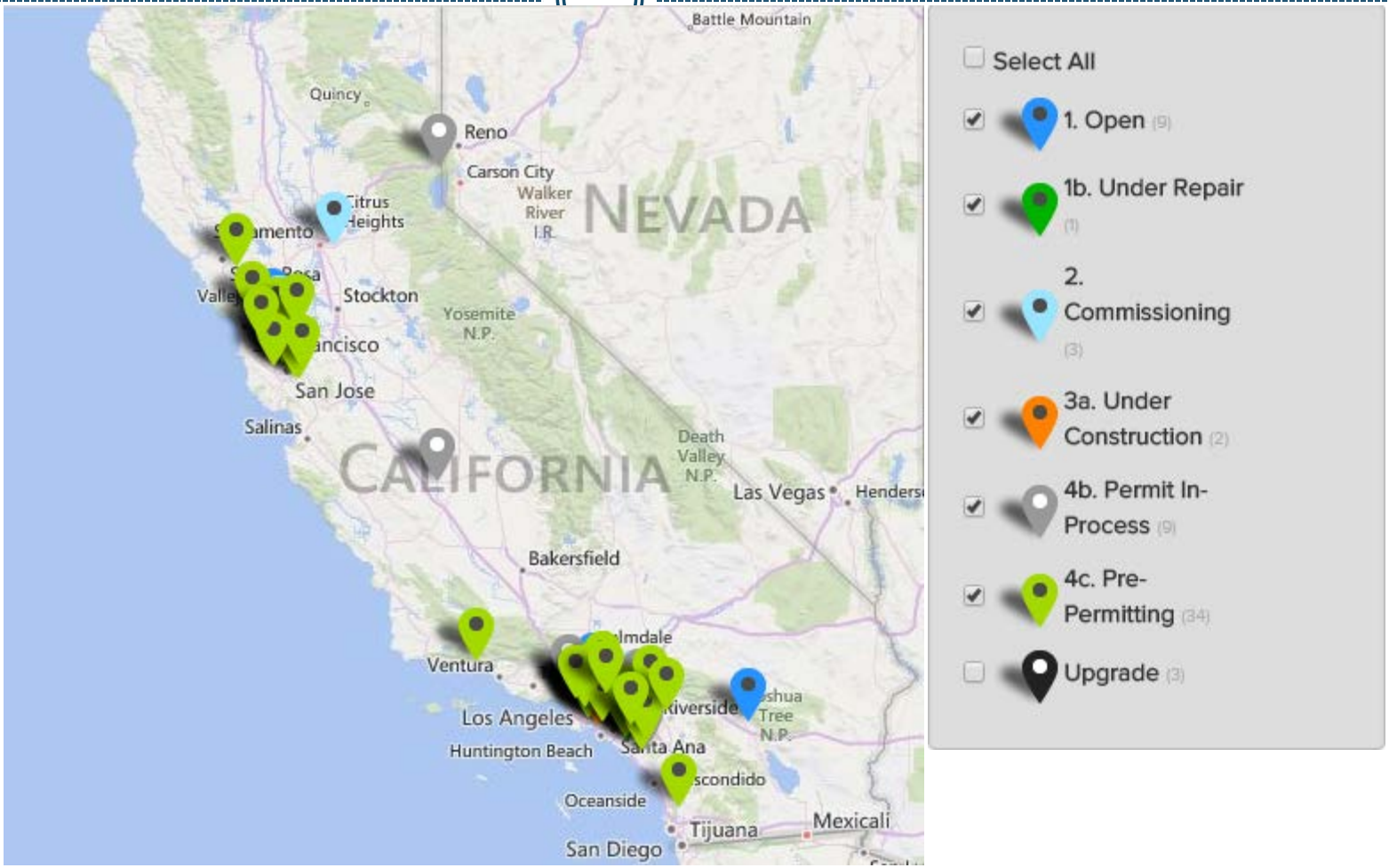

Thank You

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