

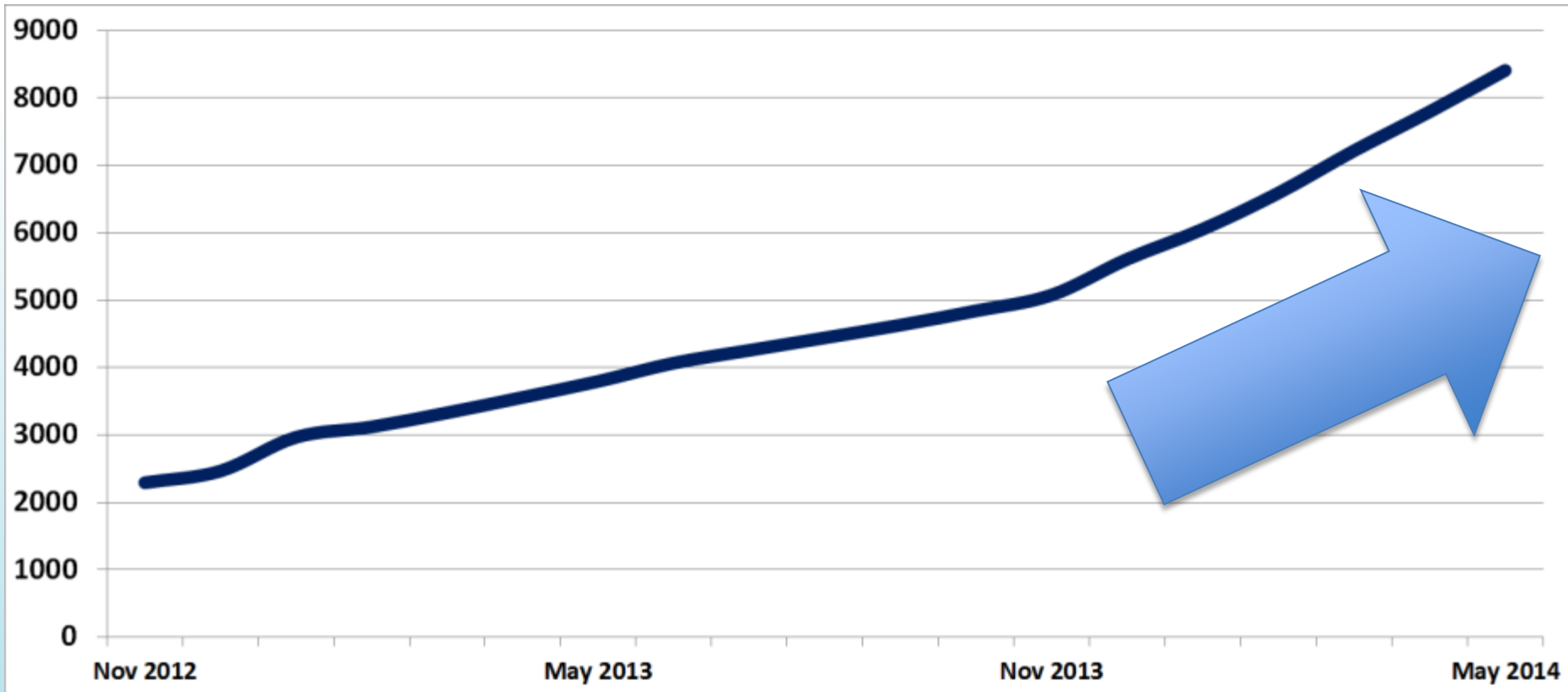
Best Practices for Alternative Fuel Infrastructure

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SDG&E - Clean Transportation Group



San Diego Regional EV Growth



San Diego EV Stats:

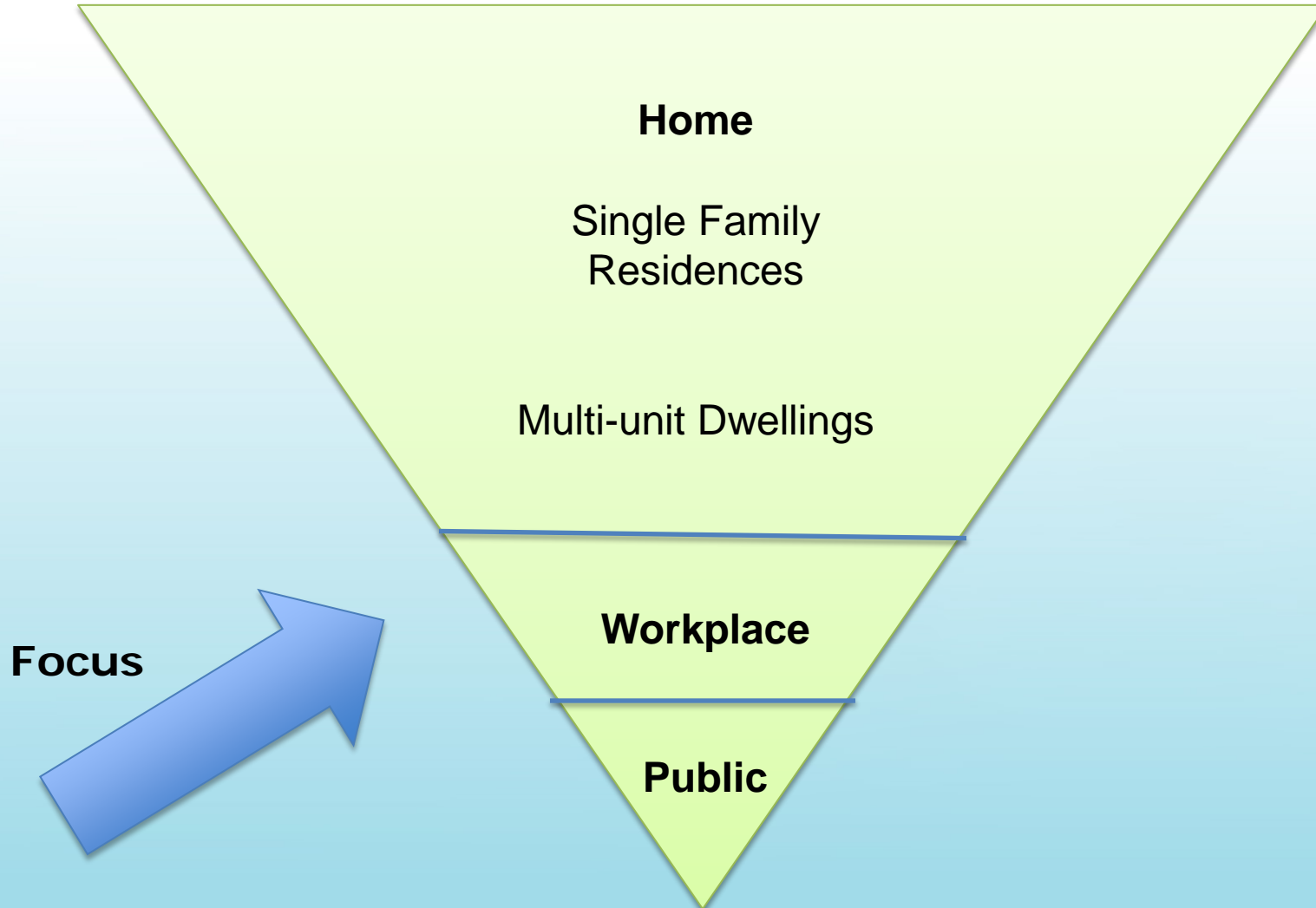
As of June 1, 2014:

- Approximately 8,500 electric vehicles on the road
- Over 650 Level 2 commercial charging stations in service
- 20 DC Fast Chargers in service; more coming...



Plug-in Electric Vehicle Charging

Where will PEVs charge?



EV Charging Basics – Level 1

- Level 1 (120v, usually at 12 Amps)
 - Typically adds 4-6 miles of range per hour
 - Most cars come with AC Level 1 cord set
 - Will run on standard 15 amp circuit

- **Advantage: Can be used anywhere**
- **Disadvantage: Slower charging**
- **Grid Impact: Mild**



EV Charging Basics – Level 2

- Level 2 (208-240v at 3.3 kW, 6.6 kW, 9.6 kW, & 19.2 kW)
Range of 20 – 80 Amps
 - Most 2011-2012 cars using Level 2 draw 3.3 kW (LEAF, Volt)
 - Many newer models will draw 6.6 kW (2013+)
Focus EV, LEAF & PHEV Honda Accord
 - Adds ~ 12-24 miles of range per hour (3.3 – 6.6 kW)
 - Toyota RAV4 EV will draw 9.6 kW (32-48 mi/hr range)
 - Tesla Model S can draw up to 19.2 kW
 - Needs a dedicated 208-240v circuit
 - **Advantage: Faster Charging**
 - **Disadvantage: Higher Cost**
 - **Grid Impact: Moderate**



EV Charging Basics – DC Fast

DC Fast Charge (208v or 440v/3-phase – up to 120 kW)

1) Nissan LEAF, Mitsubishi “i” use CHAdeMO
Japanese Standard

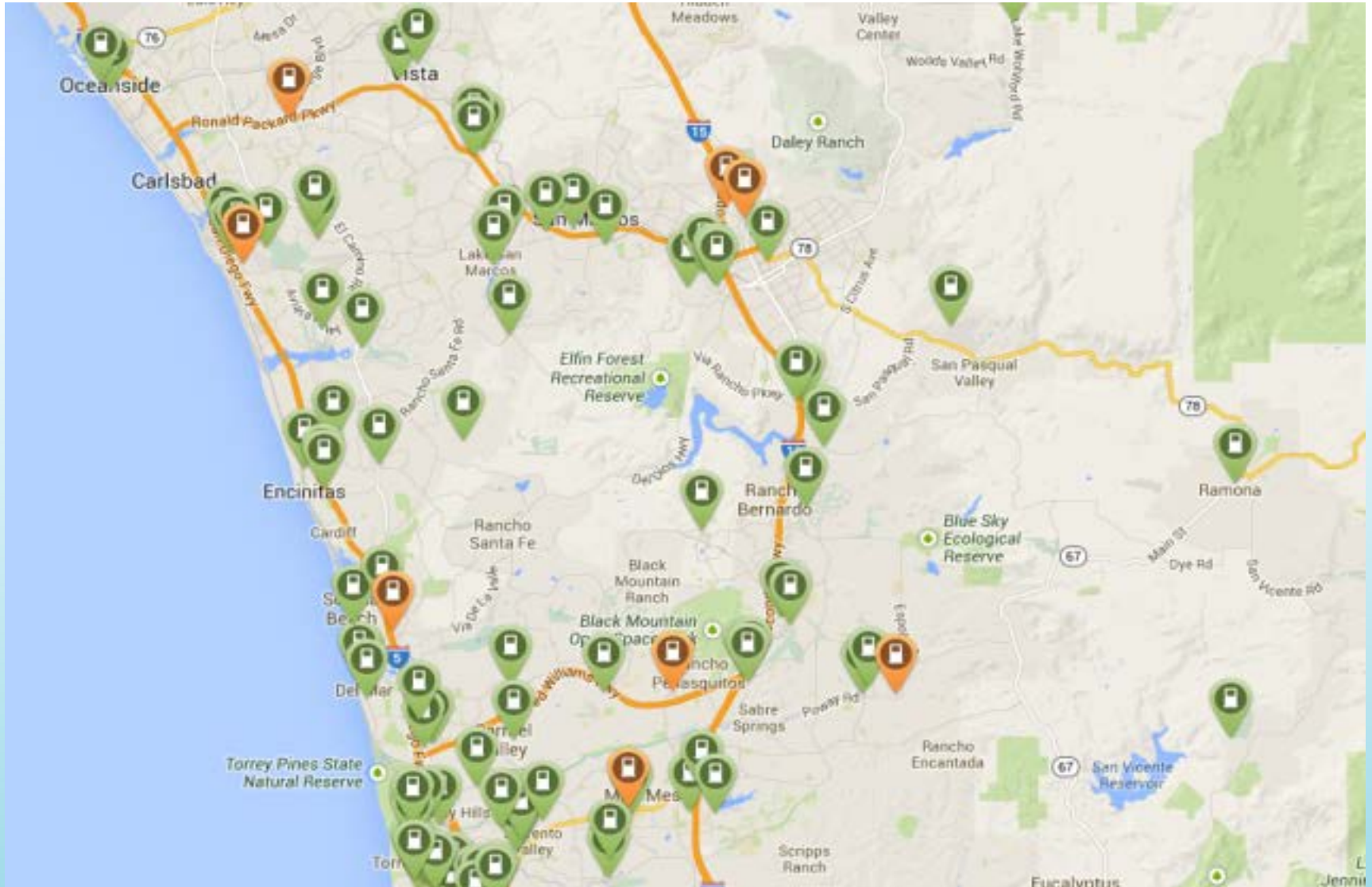
2) Tesla Connector (Tesla only)

3) BMW i3, Chevy Spark use SAE Combo
USA Standard



- **Advantage: Convenient (time)**
- **Disadvantage: Expensive (to install and use)**
- **Grid Impact: High**

San Diego EV Charging - North



Multi Unit Dwelling Charging

- Very little MuD charging currently exists
- Approximately 50% of San Diegans live in Multi-Unit Dwellings
- Single family residents currently own the most Evs
 - Home charging is the most convenient
- Many MuD residents want to purchase EVs but have charging station difficulties
 - Meter room may be full
 - Parking place may be far from electric panel
 - HOA / Property Manager has to consider the bigger picture
 - Billing / parking issues
- Persistence pays off for EV owners
- Plug-in Electric Vehicle Collaborative MuD Materials:
- <http://www.pevcollaborative.org/multi-unit-dwelling>

Workplace Charging

- There is currently some penetration of workplace charging in the region
- Other than home, EVs are parked longest at work
- Workplace charging provides PHEV drivers an opportunity to recharge and drive more electric miles
- With workplace charging, a BEV driver can commute a longer distance successfully
- Workplace charging also benefits EV drivers that don't have access to home charging
- There are some issues that employers will need to figure out with respect to billing, location, parking policy, etc.
- Plug-in Electric Vehicle Collaborative Workplace Materials:
- <http://www.pevcollaborative.org/workplace-charging>

Process/Steps for Installing EV Charging Stations:

- **What?** Choose Charging Stations (Type, Size, and Quantity)
- **Where?** Power Source (Existing panel or new electric service)
- **Resources?** In-house / Hire Engineering Firm & Contractor / Charging Provider
- SDG&E Assistance (Clean Transportation, Planner)
- Site Selection (Power Location, ADA, Parking, Usability)
- Obtain Permits (After design / drawings complete)
- Construction phase (Wiring / equipment / ADA)
- Obtain Permit Inspection / Approval
- Energize / Test stations (new meter)
- Parking policy (for workplace locations)



EV Charging Guidance:

What?

- Workplace / MuD Charging & Billing Requirements
 - Level 1 (lower power), Level 2, DC Fast (higher power)
- How many charging stations?
 - Costs; economies of scale
 - How many employee / resident cars?
 - Move cords not cars



EV Charging Guidance:

Where?

- Power Source
 - New Electric Service
 - Transformer proximity
 - Trenching
 - Existing Panel
 - Available capacity
- Parking
 - ADA Requirements
 - Balance - Power Availability vs. Parking Convenience
 - Reserving Spots / Striping
 - Consider Flexible Signage



EV Charging Guidance:

Resources?

- Typical Project
 - Consult with utility on electrical requirements
 - New service, transformer loading
 - RFP Process (if applicable)
 - Hire engineering firm to design project
 - Electrical / ADA requirements
 - Hire contractor to build project
 - Procure equipment & materials
 - Get permits
 - Construction takes place
 - Approvals / Testing / Commission
 - Misc. issues
 - Parking Policies for employees
 - Billing EV drivers



Charging Station Incentives:

Periodically Available:

- California Energy Commission Grants

Now Available:

- ChargePoint: MultiCharge San Diego Program (MuDs)
- NRG eVgo: Ready-for-EV Program (Workplace & MuDs)

Future Availability:

- SDG&E's Vehicle to Grid Program (subject to CPUC approval)
 - Workplace and MuDs



MultiCharge San Diego



- For a limited time, Multi Dwelling Units (MDU's) in San Diego county can apply for free electric vehicle chargers. This demonstration project is being funded by the California Energy Commission. The project is a collaborative effort by ChargePoint, SDG&E, SANDAG, City of San Diego, and the California Energy Commission.

- **Scope:**

- Deploy 206 Level 2 (L2) charging in MDU's throughout San Diego County

- **Program Offer:**

- Free charging station (CT4000)
 - Participant is responsible for installation costs
- Free 2 Years service (billing, maintenance and authentication software)
- Free 2 year warranty





Ready for Electric Vehicle (REV) Program

*Complete Electric Vehicle Charging Solutions for
Multi-family Communities*

Andy Hoskinson

Ready Electric Vehicles (REV)

Cell: (619) 206-6428

Email: andy.hoskinson@nrgenergy.com

www.eVgoNetwork.com



#eVgoREV

@evgonetwork

Ready-For-EV (REV): A Solution Created for Multi-Family Charging

Value to Property Owners/Manager



- 100% free charging equipment.
- No maintenance or administrative costs.
- Reimbursement for electricity consumed.
- Up to \$20,000 in electrical upgrades for qualified California communities.
- Free comprehensive marketing toolkit to attract EV drivers and outreach to the community.
- No under-utilized EV parking spaces.
- A commitment backed by NRG, a Fortune 300 company with deep expertise in providing smarter, cleaner energy choices.

Value to Tenants



- A dedicated charger, ensuring access and eliminating overcrowding.
- Eliminates expensive upfront costs for charging equipment and installation.
- Optional access to eVgo's public fast-charge network.
- Affordable, simple charging plans.
- No risk of equipment technology obsolescence.
- Customer support 24 hours per day, 365 days per year.

SDG&E Vehicle Grid Integration Pilot ***Seeks:***

- CPUC approval for ratepayer funding to provide no-cost EV charging infrastructure to efficiently integrate and manage charging loads with the grid
- CPUC approval to allow SDG&E to install charging in both multi-unit communities and places of work on new electric services
- A new hourly rate to provide MuD and Workplace EV drivers the electricity they need at the best price possible
- Third parties to build, install, operate and maintain charging equipment to SDG&E specifications (550 facilities with 10 charging stations each)
- To have charging billed to an EV drivers' SDG&E bill



Web Page Resources

MuD EV Charging Decision Guides - California PEV Collaborative:

http://www.pevcollaborative.org/sites/all/themes/pev/files/docs/MuD_Guide_1_final.pdf

http://www.pevcollaborative.org/sites/all/themes/pev/files/docs/MuD_Guide_2_final.pdf

http://www.pevcollaborative.org/sites/all/themes/pev/files/docs/MUD_Comm_guide6_12230

http://www.pevcollaborative.org/sites/all/themes/pev/files/docs/MUD_Guidelines4web.pdf

SDG&E Website MuD EV Page:

<http://www.sdge.com/clean-energy/residential/apartments-and-condos>

Thank you - Questions?

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