The State of the Charge

2017 Report of California's Electric Vehicle Charging Industry

OCTOBER 2017

Electric Vehicle Charging Association

INNOVATION FOR CLEAN MOBILITY

Flashback to 2015

In October 2015, the Electric Vehicle Charging Association (EVCA) published its inaugural "State of the Charge" report, a case study evaluating the electric vehicle (EV) charging industry in California. The Golden State had identified itself as a leader in the emerging multi-billion dollar industry with Governor Jerry Brown's target of putting 1.5 million zero-emission vehicles (ZEVs) on the roads by 2025,[i] and was well on its way to surpass that goal with projections between 2 million and 2.4 million EVs by 2024.[ii]

The global EV charging industry was valued at $675 million[iii] with the United States acknowledged as one of the top markets. Within the United States, California topped the leaderboard with more than twice the charging infrastructure availability, more than three times the electric model availability, and more than four times the electric vehicle market share as compared to national averages.[iv] The day the report was published, the state had more than 9,500 public and private EV charging ports.[v]

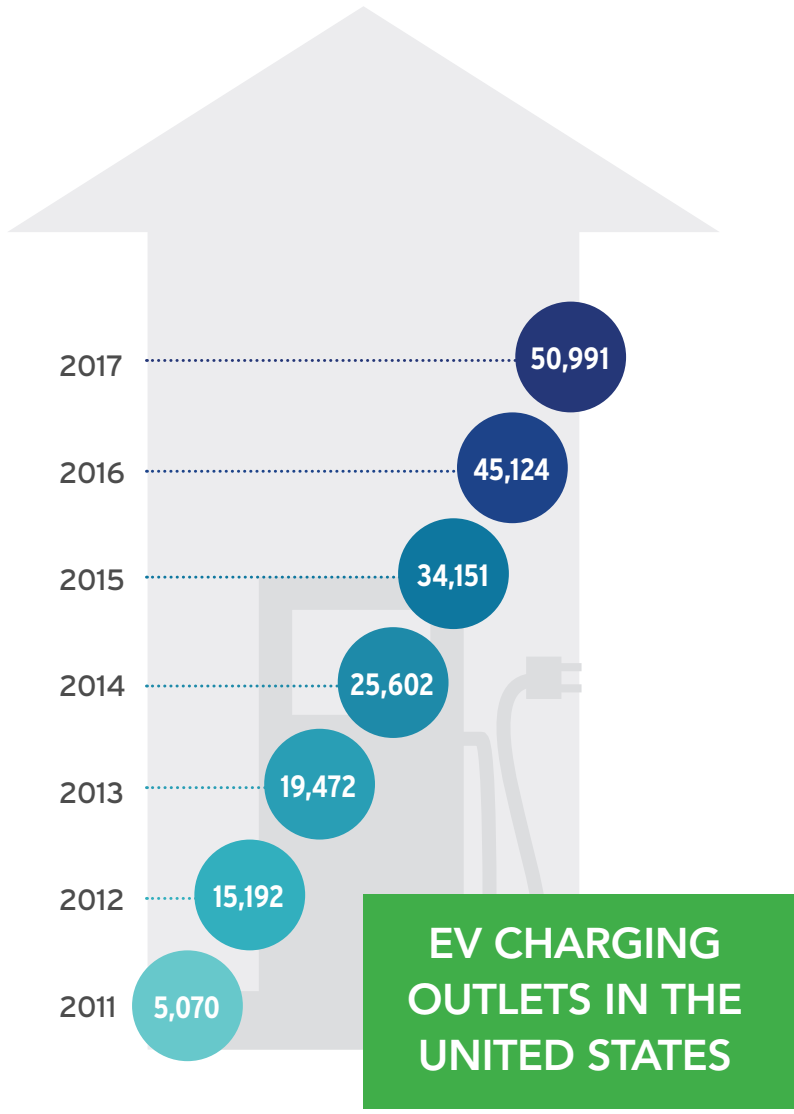
Fast-Forward: Where We Are Now

Despite threats from fossil fuel giants and climate change skeptics, "the electric car has already left the garage," as a *New York Times* report put it. [vi] In just two years since the 2015 report was published, the multi-billion dollar industry has grown exponentially. It is becoming increasingly clear that the EV revolution is no longer a vision of the future, but a reality.

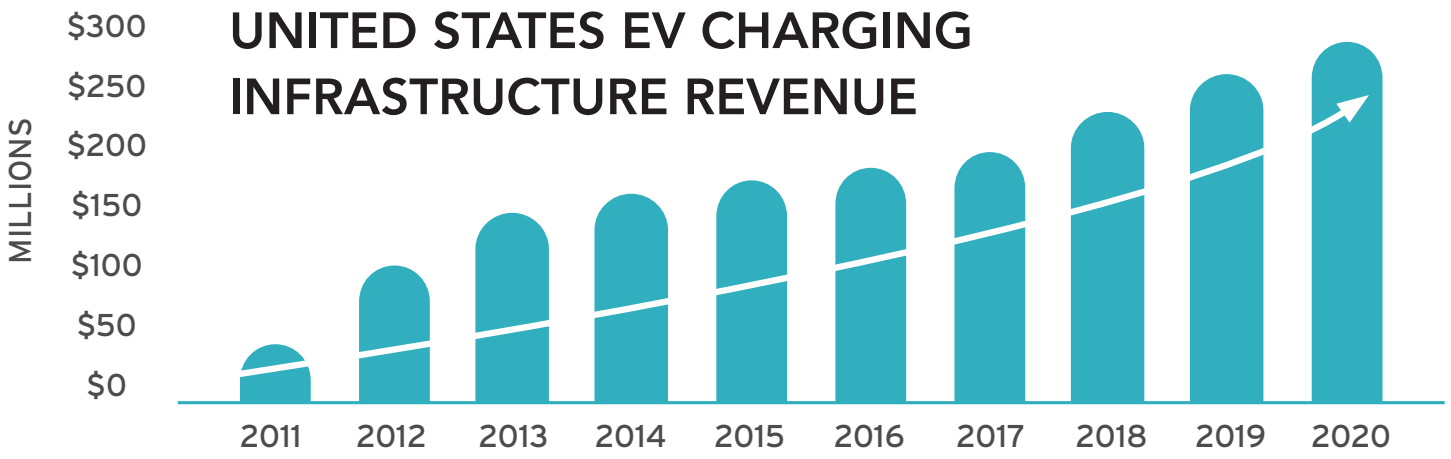
Nationally, plug-in electric vehicles (PEVs) and battery electric vehicles (BEVs) total more than 699,700 cars on the road.[vii] Annual sales are expected to exceed 1.2 million by 2025, a 7% share of total annual vehicle sales.[viii] The projected rising level of annual sales will help build the national EV fleet to 7 million by 2025,[ix] a 900% increase from today's stock.

EV drivers in the U.S. are currently able to access 50,991 public and private charging outlets.[x] National sales of electric vehicle supply equipment (EVSE) units are expected to reach about 500,000 in 2020,[xi] providing much-needed infrastructure support for the rapidly expanding EV fleet.

Globally, the EV charging infrastructure industry is expected to grow at a compound annual growth rate of 46.8% from 2017 to 2025, reaching $45.59 billion in revenue by 2025.[xii] In the U.S. alone, **revenue increased by 576% over five years, growing from $27 million in 2011 to $182 million in 2016.**[xiii] If the annual increase in revenue matches the 11% growth rate from 2015 to 2016, the U.S. could see more than $276 million by 2020.



Source: U.S. Department of Energy, Alternative Fuels Data Center citing historical figures accessible by contacting technicalresponse@icfi.com (https://www.afdc.energy.gov/fuels/stations_counts.html). As of 10/23/17.

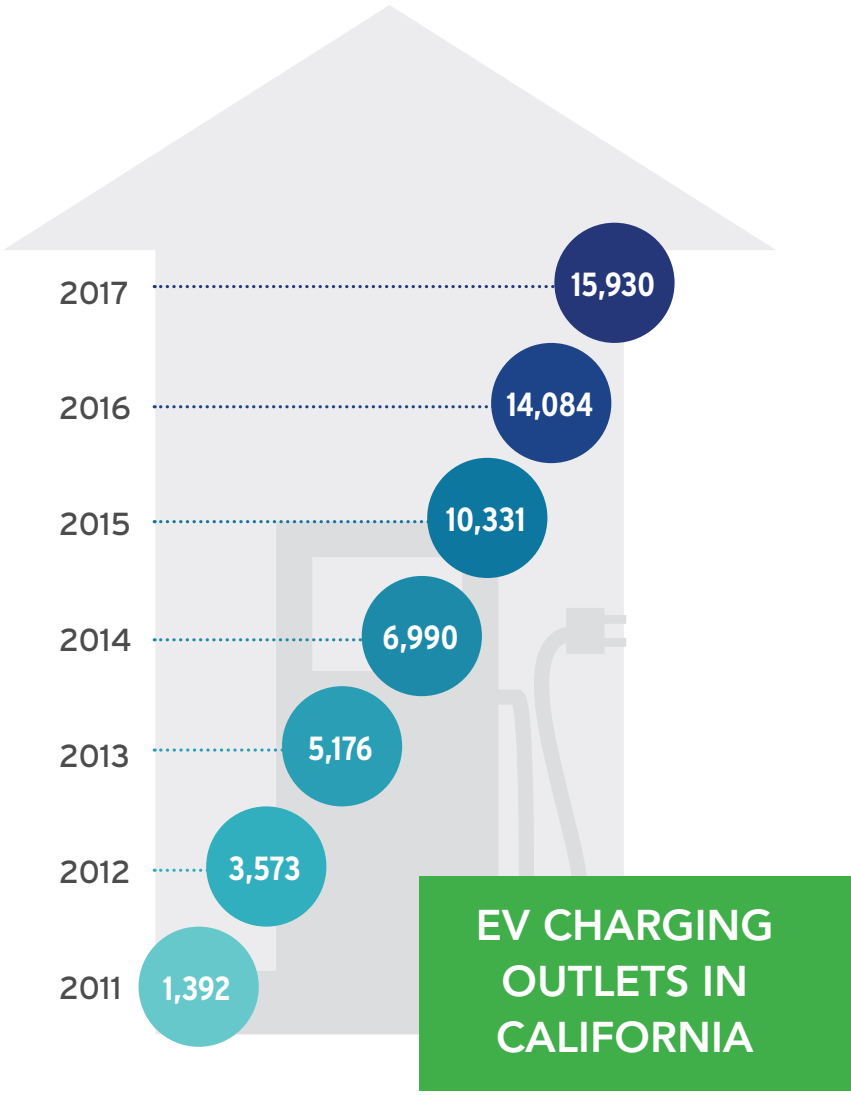


Source: Advanced Energy Economy, "Advanced Energy Now 2017 Market Report."

Driving the Revolution in California

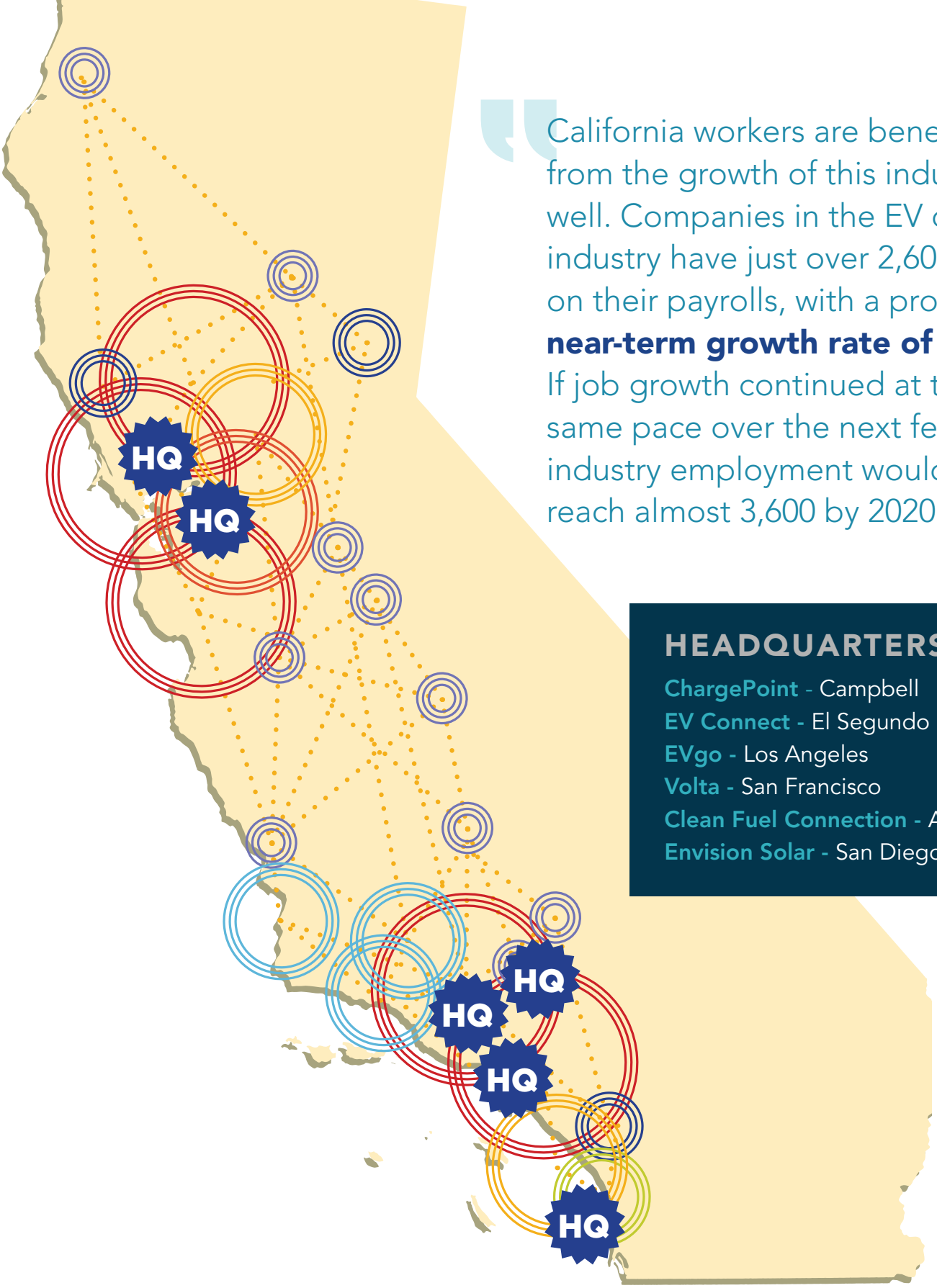
California remains the national leader in charging infrastructure deployment and best practices development. Items of note include the recently negotiated settlement with Volkswagen under its Electrify America plan that will contribute $800 million in investments in EV charging infrastructure over 10 years,[xiv] and various policy-making discussions between legislators and industry stakeholders to forge public-private partnerships that propel innovation.

California is overrepresented in national EV sales, accounting for 12% of the total auto market but 54% of EV sales in 2015.[xv] The state has added more than 295,500 EVs on the road since 2010,[xvi] and has increased its available public and private charging outlets by 67% since the original "State of the Charge" report was published. Today, California has about 15,930 charging outlets, not including residential outlets.[xvii]



Source: U.S. Department of Energy, Alternative Fuels Data Center citing historical figures accessible by contacting technicalresponse@icfi.com (https://www.afdc.energy.gov/fuels/stations_counts.html). As of 10/23/17.

Thirty cities in the state have shares of EV sales amounting to 8 to 25 times 2015 national averages, and 5 times the public charging infrastructure per capita.[xviii] Leading the efforts are Los Angeles, San Francisco, San Jose and San Diego, with San Jose accounting for the highest EV share, workplace charging per capita, and public charging infrastructure network of any metropolitan area nationally.[xix] Eight of the 10 top cities in the U.S. for direct current (DC) fast charging networks are in California, with San Diego at the top of the list registering an average of more than 6,000 charging sessions per month.



> California workers are benefitting from the growth of this industry, as well. Companies in the EV charging industry have just over 2,600 workers on their payrolls, with a projected **near-term growth rate of 8%.**[xxi] If job growth continued at the same pace over the next few years, industry employment would reach almost 3,600 by 2020.

HEADQUARTERS:

ChargePoint - Campbell
EV Connect - El Segundo
EVgo - Los Angeles
Volta - San Francisco
Clean Fuel Connection - Arcadia
Envision Solar - San Diego

Source: U.S. Department of Energy, Alternative Fuels Data Center (http://www.afdc.energy.gov/fuels/stations_counts.html). As of 10/23/17.

Players, Partnerships and the Public

The EV charging industry has evolved to include a variety of perspectives on the best practices for advanced grid technologies, EVSE development, charging infrastructure deployment, station maintenance and other services. National leaders include ABM, ChargePoint, Clean Fuel Connection, Envision Solar, EVgo, EV Connect, SemaConnect, and Volta—all but two of which are headquartered in California.

Four companies, ChargePoint, EV Connect, EVgo, and SemaConnect, collectively operate 49% of all public and private charging outlets in the U.S. for a total of more than 25,000, and 57% of California outlets for a total of 9,072.[xxii] Their headquarters include the greater Bay Area and Los Angeles metropolitan area.

With leaders such as these allying themselves with each other to advocate for best practices in the industry, innovation and advancement are all but guaranteed to continue for years to come, much of it expected to originate in California. As the Golden State continues to position itself as the gold standard for progressive EV regulatory policies, state and local policymakers elsewhere are looking to California as a template for driving public-private partnerships.

> ***"The California experience suggests that if electric vehicle models are brought to more markets and there is supporting policy in place, market growth will continue…California's playbook could be a helpful example to other regions seeking to encourage electric vehicle uptake."***
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> —**The International Council on Clean Transportation**,
> "Leading Edge of Electric Vehicle Market Development in the United States: An Analysis of California Cities."

As it was in 2015 when the first "State of the Charge" report was published, a home-dominant charging scenario reigns across the United States. Even with 80% of charging done at home,[xxiii] it remains imperative to encourage expeditious deployment of public and workplace charging infrastructure. When consumers recognize there are more and more charging stations popping up, their range-anxiety is eased and they are more likely to make the switch to an EV.

Even more influential in encouraging EV adoption than the number of charging stations is the quality of the charge and station location. With the deployment of more public Level 2 and DC fast charging stations, drivers won't have to spend as much time charging and can get where they are going without a hassle. Strategically deploying chargers at high-traffic commercial centers and along transportation corridors makes it easier for drivers to charge up and makes the stations more profitable as well.

Investing in lower-income communities is another priority of the industry, extending the same opportunity of EV adoption to those often neglected by markets despite being disproportionately exposed to the impacts of excessive greenhouse gas emissions. Volkswagen has guaranteed that disadvantaged communities will receive more than 35% of its initial $200 million investment in California as a result of its Electrify America settlement, and the industry as a whole has made it a priority to work with state and local policymakers to provide access to these underserved areas.[xxiv]

INNOVATION SNAPSHOT

The EV charging industry has been busy in the past two years since the last State of the Charge report was published...

ABM is a leading provider of facilities solutions, and also top installer of EV charging stations in the U.S. ABM sells, installs, services, and maintains thousands of EV charging stations—and solar and battery storage solutions—at commercial and municipal facilities, as well as multi-family residential complexes. In 2017, the company partnered with other clean energy leaders to create the "Charge to Work" program, engaging employers in and around New York City to provide incentives for the installation of EV charging stations at workplaces. And most recently, the company is helping Prospect Silicon Valley assess, install, and maintain charging ports at public and privately owned facilities throughout the San Francisco Bay Area and Northern California.

Clean Fuel Connection is a respected leader in EV charging infrastructure, partnering with leading manufacturers to distribute and install EVSE in accordance with its mission of supporting the commercialization of such alternative fuel technologies. The company has developed a family of products that provide easy-to-use, comprehensive platforms for utilities, municipalities and corporations to deliver EV charging for drivers everywhere.

Envision Solar is a San Diego-based sustainable technology innovation company. Envision invents, designs, engineers and manufactures solar powered products that enable vital services and amenities with free and clean electricity in locations where it is too expensive, environmentally impactful or just impossible to deliver traditional utility grid electricity. Their products dramatically reduce the time and cost associated with the installation of grid-tied electricity, and reduce vulnerability to expensive and dangerous blackouts and other grid interruptions. In 2017 Envision Solar entered into a three-year contract with New York City for any city department to order Envision Solar's EV ARC™ product as needed, most recently taken advantage of by the Department of Citywide Administrative Services ordering 32 EV ARC™ units.

EVgo is the largest provider of public DC fast-charging in America. The company owns and operates its stations, providing the best driver experience and reliability in the industry at speeds up to eight times faster than other public charging networks. EVgo broke ground on the first 350 kW public charging station in the U.S. in December 2016, providing speeds seven times faster than other currently available chargers. In 2017 EVgo partnered with ABB to deploy high-power fast-charging stations three times as fast as the standard public fast-charging station. Also this year, the company opened its 950th DC fast-charging station in the U.S., and helped complete the DRIVEtheARC corridor of fast-charging stations from Monterey to Lake Tahoe.

ChargePoint: With nearly 40,000 charging spots, ChargePoint is the world's largest EV charging network. The company manufactures charging stations, allows other charging hardware to run on its network, and provides cloud software and support. ChargePoint announced in 2016 that it would be building new DC fast-charging locations along popular California corridors, funded in part by the California Energy Commission. In 2017, ChargePoint expanded on its charging capabilities and unveiled its Express Plus ultra-fast DC charging platform, capable of charging the EVs of today and tomorrow at maximum capacity. Also this year, ChargePoint acquired GE's entire EV charging network, adding thousands of commercial and residential charging spots to its already expansive network.

EV Connect has created the most innovative, robust and hardware agnostic cloud-based software platform for managing the EV ecosystem. Its platform provides charge station-agnostic command and control, enterprise and energy stem integration via an open API, driver communications and support, and demand-response functionality across multiple networks. In 2016 EV Connect entered into a five-year, multi-million dollar contract with New York to install and manage 300 Level 2 charging stations in addition to its already-managed 100 stations in the state, and was contracted by the California Energy Commission to help complete the West Coast Electric Highway.

SemaConnect is the leading provider of EV amenities to the North American commercial and residential property market. A complete EV support partner, SemaConnect delivers a truly modern property experience through innovative, elegantly designed charging stations and a robust and open network. The company's EV product line includes a Smart Personal Charging Station, its newest technology that allows two or more cars to share a station in multi-family residential properties with dedicated parking.

Volta: Founded in 2010, San Francisco-based Volta has developed, proven and fine-tuned an innovative approach to EV charging. Partnering with national brands that sponsor the public amenity, Volta deploys and operates networked chargers at prominent and convenient community venues such as shopping centers and civic entertainment districts. Charging is offered free to drivers, while site hosts benefit from hardware, installation and lifetime maintenance at no cost. The strategic destinations and careful siting of Volta community charging drive both high utilization and high visibility, establishing Volta as an incredibly effective catalyst for EV adoption. Last year in California, Volta stations powered more than 7 million free electric miles, avoiding nearly 3.1 million pounds of CO2 and delivering an industry-record average of 7 charges per Level 2 port daily. More than two thirds of non-EV drivers who see Volta's charging amenities say they will consider a plug-in electric vehicle for their next car purchase.

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i. EVCA, "The State of the Charge: 2015 Report of California's Electric Vehicle Charging Industry."

ii. Ibid.

iii. Ibid.

iv. The International Council on Clean Transportation, "Identifying the leading regional electric vehicle markets in the United States."

v. Calculations do not include residential outlets. Charger types included are AC Level 1, AC Level 2, and DC fast charging. U.S. Department of Energy, citing historical figures dated October 26, 2015 accessible by contacting technicalresponse@icfi.com (https://www.afdc.energy.gov/fuels/stations_counts.html).

vi. The New York Times Editorial Board, "A Brighter Future for Electric Cars and the Planet" (https://www.nytimes.com/2017/07/18/opinion/a-brighter-future-for-electric-cars-and-the-planet.html).

vii. EV Hub, citing figures dated October 23, 2017 (https://app.powerbi.com/view?r=eyJrIjoiYWMwOGNiMmItMjBmYi00NmQ0LWFiYjYtMmU4YzA3ODBiY2Q0IiwidCI6IjFiYjQ4ZGE0LTMxNDMtNDAzMS1iZGFlLWNjYzA0MDc1MDhmZSIsImMiOjF9&pageName=ReportSection)

viii. Edison Electric Institute, "Plug-in Electric Vehicle Sales Forecast Through 2025 and the Charging Infrastructure Required."

ix. Ibid.

x. Calculations do not include residential outlets. Charger types included are AC Level 1, AC Level 2, and DC fast charging. U.S. Department of Energy, citing figures dated October 23, 2017 (http://www.afdc.energy.gov/fuels/stations_counts.html).

xi. ENERGY STAR, "Market and Industry Scoping Report: Electric Vehicle Supply Equipment (EVSE)."

xii. Grand View Research, Inc., "Electric Vehicle (EV) Charging Infrastructure Mark Analysis By Charger Type (Slow Charger, Fast Charger), By Connector (CHAdeMo, Combined Charging System), By Application, By Region, And Segment Forecasts, 2014-2025."

xiii. Advanced Energy Economy, "Advanced Energy Now 2017 Market Report."

xiv. The *Los Angeles Times*, "Volkswagen gets green light for charging stations under settlement plan" (http://www.latimes.com/politics/essential/la-pol-ca-essential-politics-updates-volkswagen-gets-green-light-for-1501199610-htmlstory.html).

xv. The International Council on Clean Transportation, "Leading Edge of Electric Vehicle Market Development in the United States: An Analysis of California Cities."

xvi. EV Hub, citing figures dated October 23, 2017 ((https://app.powerbi.com/view?r=eyJrIjoiYWMwOGNiMmItMjBmYi00NmQ0LWFiYjYtMmU4YzA3ODBiY2Q0IiwidCI6IjFiYjQ4ZGE0LTMxNDMtNDAzMS1iZGFlLWNjYzA0MDc1MDhmZSIsImMiOjF9&pageName=ReportSection))

xvii. Calculations do not include residential outlets. Charger types included are AC Level 1, AC Level 2, and DC fast charging. U.S. Department of Energy, citing figures dated October 23, 2017 (http://www.afdc.energy.gov/fuels/stations_counts.html).

xviii. The International Council on Clean Transportation, "Leading Edge of Electric Vehicle Market Development in the United States: An Analysis of California Cities."

xix. The International Council on Clean Transportation, "Identifying the leading regional electric vehicle markets in the United States."

xx. EVgo, "EVgo Reveals the 10 Most Charged Up Cities in the U.S." (http://www.prnewswire.com/news-releases/english-releases/evgo-reveals-the-10-most-charged-up-cities-in-the-us-300498062.html)

xxi. Advanced Energy Economy, "Advanced Energy Jobs in California."

xxii. Calculations do not include residential outlets. Charger types included are AC Level 1, AC Level 2, and DC fast charging. U.S. Department of Energy, citing figures dated October 23, 2017 (http://www.afdc.energy.gov/fuels/stations_counts.html).

xxiii. U.S. Department of Energy, "Charging at Home" (https://energy.gov/eere/electric-vehicles/charging-home)

xxiv. California Air Resource Board, "CARB approves $200 million VW zero-emission vehicle investment in California" (https://www.arb.ca.gov/newsrel/newsrelease.php?id=946)