# White Paper SMART CHARGE AMERICA

The technical architecture behind a fully focused EV charging station installation company



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This white paper is written with a focus on Smart Charge America's (SCA) business outlook. It includes both internal historical data and forward looking statements that should not be construed as investment advice. Content within is based on predictions and expectations as timely understood and expressed from this document's publishing date. Actual future EVents or results could differ materially due to a number of risks and uncertainties beyond SCA's control.



## **Executive Summary**



Smart Charge America's (SCA) mission is to accelerate the electrification of sustainable transportation. A great charging experience is one of the linchpins to EV adoption. You may have read about the concerns of both consumers and prospects alike regarding the limited number of public EV chargers and the occasional unavailability of existing non-Tesla charging networks. These challenges can hinder EVs adoption but also create an opportunity for businesses to be innovative in providing charging infrastructure that not only accelerates EV adoption but also is synergistic with another line of business. Since its inception, SCA has focused on serving customers by creating charging infrastructure that is safe and extremely reliable. SCA's solutions start with LEVel-2 (240V) charging and provide both turn-key installation services and support at scale to solve the challenges of EV charging infrastructure deployment. SCA is not only able to reduce their own internal CO2 emissions footprint by harnessing digital technology inside their processes and lowering pricing structures to offer the best value for its customers, but also make it easy to install and operate public EV charging stations.



SCA currently offers 3 distinct channels of service for installing EV charging stations; residential, commercial and service/maintenance. Reducing costs and increasing reliability inside each one of these channels creates additional rEVenue streams, diversifies their portfolio, and builds flexibility inside operations.

#### Offerings

SCA's offerings include, but are not limited to, designing, planning, distribution, installation, and service & maintenance solutions for its customers.



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DISTRIBUTE

INSTALL





# **Reliability - The Problem**



We are in the relatively early stages of EV and charging infrastructure deployment. Today, one of the challenges with public non-Tesla EV charging infrastructure is availability and reliability. Improving the costs and reliability of the EV charging infrastructure is essential to accelerate mass deployment of electric vehicles. When something goes wrong with a public charging station there can be multiple 3rd party companies involved that can slow the restoration process. Multiple parties can each take time to determine if their equipment is faulty. This can delay the repair and cause frustration to the business owner who is attempting to get the charging unit back up and running quickly.



An inoperable station hurts all parties involved: The Charging Network, Installer, Manufacturer, Business and EV Drivers. Unreliable charging infrastructure discredits brands and EVs as a viable alternative to conventional vehicles and slows EV adoption.



#### **Points of Failure**

Points of Failure



The 6 most common points of failure for public charging stations are the Network, Software, Component Parts, Electrical systems, Vandalism, and User Errors. These issues have solutions that SCA can provide.

Traditionally, to offer repair services for publicly available EV charging stations, manufacturers and/or charging providers have leaned on expensive 3rd party subcontracting firms to repair the charger. Oftentimes these firms have had little specialization in EV charging. Larger EV charging network firms have tended to rely heavily on nationwide contracting firms who specialize in many industry sectors, not just EV charging. These firms often further subcontract out the work to more local, cheaper subcontractors, placing the agent for repair EVen more remote and less familiar with the installation or equipment. This exacerbates the problem and can result in an inefficient and expensive servicing model where a subcontractor manages a subcontractor managing a subcontractor to get the work completed that can result in higher costs and worsened downtime of the EV charger.



10x cheaper to service our SCA units & network

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The non-integrated charging infrastructure can suffer from reliability problems and an unaligned incentive structure that can slow the restoration time of public charging stations. Think of costs in terms of dispatch plus time. If the first dispatch fails in bringing the station back online and takes 3 hours to diagnose, then the subcontracting firm is paid for both the truck roll at a fixed rate and diagnostic time at a variable rate. Costs are increased if the subcontractor needs to make multiple trips and dedicates multiple hours for the repair. This compounds today's challenges of COVID-19 hangovers, supply chain shortages, trade labor scarcity, inflation, recessionary pressures, and fragmented ownership models with a non-vertically integrated charging solution. This effect is escalated when long wait times from layers of authorizations and approvals are required, in addition to coordination and scheduling efforts. The results can be that the units which are experiencing downtime may be offline for weeks, if not months rather than in minutes with SCA's servicing solution.



# **Affordable for Owners**

#### 70% reduction in up-front installation price



The industry is often plagued by a combination of over-priced legacy brands and non-certified/listed/compliant imported systems. Smart Charge America delivers value to customers by being an electrical contractor that is specifically focused on all things EV charging infrastructure and has been since 2007. SCA has installed tens of thousands of EV chargers nation-wide and is an expert in the industry.

This experience and removing the middle man can drastically reduce the cost per unit of acquisition by over 70%. SCA can deploy around 10,000 charging stations per year today and is expanding capacity to support an annual installation rate of over 40,000 EV charging stations by 2025.

#### 70% savings in up-front installation price

<sup>1</sup>SCA's cost per foot for installing a commercial 240V circuit @ 40A within 100' = \$29.10 / ft. = lowest cost in the industry



#### **Installation Breakdown**

The total project cost for installing EV infrastructure may consist of sEVeral items, including software, accessories and protection, howEVer most OEMs cannot offer a service plan with their product as they are not licensed electrical contractors, thus leaving customers stranded to find one. By building the service plan into the installation model you are enabling the site to maintain increased Uptimes of 99%+ compared to the industry standard of 61%.<sup>2</sup> Most of the industry's focus is on charging customers higher hardware and ongoing networking fees for their charging systems, while attempting to upsell on antiquated extended parts warranty plans. SCA's low cost installation and service expertise coupled with its specialized trade vertical integration enables them to streamline projects and get chargers in the ground faster.



<sup>1</sup> Breakdown of company resources for installing standard public charging stations includes only the materials and labor cost for the project.

37%+ increase in reliability and uptime

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<sup>&</sup>lt;sup>2</sup> J.D. Power 2023 U.S. Electric Vehicle Experience (EVX) Public Charging Study

#### **A Fragmented Ownership Model**



Another reason affecting the reliability of public EV charging networks is that the marketplace is actually composed of different types of ownership models. There are Private Businesses, Governments, Utilities, and Charging Providers ownership structures. All of these organizations are looking to monetize their charging systems and grow their network usage. This fragmented ownership model can produce barriers to both growth and improved customer satisfaction. In the end, EV charging should be able to be a more convenient refueling experience than conventional gasoline vehicles when executed well.

Most of these ownership models are not vertically integrated and rely heavily on the traditional outsourced modular assembly models to deploy and maintain their charging solution. This structure can cause a myriad of problems in prioritizing and controlling the incentive structure to repair public chargers in a rapid fashion.

The Tesla Supercharging Network sets the competitive benchmark for cost and charging system reliability. It is the world's most affordable, easy to use and most pervasive of the EV charging networks in the U.S. Tesla created and operates its own charging network to sell more of their EVs. They have a vested interest in the quality of their customers' charging experience with plans to more than double their existing network year over year to ensure the best charging experience. In some ways, superior to the gasoline refueling experience. The Supercharging Network experiences a 99%+ uptime reliability rating across the board because Tesla has a focus on the entire solution stack. They have vertical integration with the Construction, Charger hardware, Connector, Software, Network, Operations and Service. This uptime rating is considered the holy grail of the public EV charging world. Competitors strive to achiEVe Tesla IEVels of uptime. To date, other competitors have not yet achiEVed equivalent IEVels of uptime or convenience. In some cases, competitors are significantly behind Tesla in both availability and reliability. The Tesla Supercharging Network is 100% owned & fully operated by Tesla and thus offers their customer base a premier charging experience world-wide, something that is wildly missed with other universal connector standard charging providers.

#### Fully Owned & Vertically Integrated



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Other universal charging providers have no direct continuous rEVenue models in place to support their operations other than what they are able to capture from charging fees and short-term vendor agreements. Faced with low utilization rates, ongoing operational costs and high utility demand charges the actual ROI for universal public EV charging providers as a business model is challenging. In these early stages of EV adoption, the up-front equipment costs, relatively low utilization rates, and operational expenses can squeeze charging station owners' investment in availability and reliability. In addition, there has been a rapid pace of technology change in the charging equipment and capabilities and the communications equipment.

In summary, it would seem that the EV manufacturers will need to either create their own vertically integrated seamless charging networks as Tesla has done or jointly create a consortium that better and more rapidly solves the cost, reliability, and downtime problems of the non-Tesla CCS (Combined Charging System) standard charging infrastructure in the U.S. Improved large scale cross testing EVents with different EVs and EV chargers, and timely failure analysis data to the EV and charging equipment manufacturers are essential.



# The Solution - SCA40

Oftentimes the simplest explanation is preferable to one that is more complex, and SCA's value proposition is clear and critical:

- Drive down the total cost of acquisition exponentially for customers, up to 70% savings.
- Build the service model into the DNA of the charger and network resulting in 99%+ uptimes across the entire portfolio.
- Possess the most secure, resilient and frictionless charging network amongst any other industry competitors.
- Reduce its internal CO2 emissions footprint by exploiting digital technology within its business processes.

What makes SCA's commercial IEVel 2 public charging station, the SCA40, so simple is that it possesses the first self-reliant communications protocol for connected dEVices on the market. With over 95%+ of network troubleshooting issues caused by cellular or networking disruptions, this decentralized communications protocol enables full network autonomy. There exist 8 specific failure points inside the standard centralized network dependence model used by all other EV charging providers; the way your cellular signal travels from your phone's mobile app to the charging station's network cloud-based server back down to the charging station to allow access for charging. SCA's station removes those failure points entirely via distributed ledger technology as your smartphone no longer requires an internet connection to start & stop the charger and thus allowing it to reach the highest reliability / uptime rating in the industry. With less parts, processes and failure points involved inside the system the more efficient the network can operate.



Smart Functions rely on a constant connection to a central server to work, this increases the unreliability of the EV charger companies due to dependency on external factors beyond their control.

The SCA40 solution is what is needed to scale distribution and deployment of IEVel 2 public EV charging and in turn, both business owners and drivers receive:

- Industry Best PRICING
- Reliable Charging NETWORK
- Better Charging EXPERIENCE
- Increased ROI and PROFIT
- More Loyal CUSTOMERS





The function of Smart Charging is to simply allow charging operators to share data connections with charging dEVices in order to monitor, manage and restrict the use of chargers so as to optimize energy consumption, thus minimizing the impact on distribution systems and grid. The SCA40 takes Smart Charging one step further by introducing Dynamic Load Optimization (DPO) to EV charging. Standard load management functions split power in fixed apportions, whereas DPO shifts more energy to the vehicles that need it based on a number of factors such as time of arrival, state of charge, scheduled departure, etc.



DPO allows SCA to fit more circuits inside a limited space electric panel and deliver more power to vehicles when they need it. For instance, most commercial electric panels are equipped with 42 spaces. Each 240V circuit that powers an EV charger requires 2 spaces in the panel to operate. If SCA can set up 21 stations inside the panel using DPO then they are not only optimizing the site's limited parking space utilization, but also the existing electrical service and power demands for the drivers. In turn, its DPO technology enables SCA to install more chargers faster and cheaper without having to pass down expensive electric infrastructure upgrade equipment to the business owner.

Typical load management: 160A ÷ 8 chargers = 20A per vehicle Dynamic Power Optimization: 160A ÷ 8 chargers = Dynamic per vehicle





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SCA40s encrypted token-based distributed network enables a more secure payment authentication using P2P communications protocol while allowing 50x faster processing speeds. There are no recurring networking fees, no ongoing maintenance cost and eliminates the need for IT capex while boosting the NOI and ROI for the business owner.



#### **The Power of SCA**

SCA is the only stand alone electrical contracting firm in America that has created its own commercial EV charger and charging network and is fully integrated in its offerings controlling all aspects inside the charging station installation process, i.e. Design, Planning, Distribution, Installation and Service. Like Tesla, SCA has built-in the much abandoned servicing component inside their unit pricing in order to solve the reliability pain. More importantly, SCA's ability to constantly monitor their charging network for their customers, provide excessive stock & deploy their own personnel to repair stations in the field without having to wait for permissions, authorizations or approvals allows them to act fast and fix problems before they have a chance to arrive. This progressively powered proactive service strategy enables SCA to guarantee a service reliability and uptime rating of 99%+ for its customers. Pain, what pain? SCA does all of this while driving down the cost of the installation EVen further with its economies of scale.

SCA40 Install Per Port (10-charger Site)



33%+ savings per unit when installing in bulk

SCA has worked diligently over the years to solidify a variety of supply chain vendors in an effort to help drive down cost for its customers and take advantage of its already priced economies of scale. SCA achiEVes this by passing on the marginal cost for installing multiple chargers at a single site. With over 25,000 charging ports installed nationwide SCA is able to drive down the cost EVen further by passing on an additional 33% savings to its customers when installing in bulk.

### **Healthy Vitals**

Over the years SCA's success has only compounded as more and more of the general public becomes aware of EVs. SCA's sales are directly correlated with EV sales in the US as its headquarter is in Austin, TX, only a few miles down the road from the Tesla GigaFactory. SCA has satellite locations operating in 30 of the top EV-friendly cities across America with hopes to be operational inside the top 50 cities by 2025.

#### SCA LTV/CAC Ratio



From 2021 to 2022, SCA grew by 100% and did so all the while continuing to be a completely debt free run business. As it moves to accelerate its growth and strategic use of earned capital, SCA is continuously reexamining its vitals by measuring the effectiveness of its own CAC/LTV ratios. As more and more funding is poured into the commercial charging space by both businesses and governments SCA CAC/LTV ratios will continue to rise inside its most aggressive rEVenue channel.



#### **Timing is EVerything**



Install Duration (DCFC) = Avg. 254 days

There are numerous steps and regulatory requirements involved within the installation process that can bottleneck the rate of adoption for public EV charging projects. SCA has compressed its data from installing thousands of EV charging projects nation-wide into the two main power types; IEVel 2 equivalent to 240V charging & DCFC equivalent to 480V charging. When compared to DCFC, IEVel 2 charging has an order of magnitude faster rate of installation taking on average 24 days as opposed to the 254 day average for installing DCFC. SCA discovered this early on and has yielded most of its concentration inside the IEVel 2 public charging sector.



"Putting more charging stations in the ground faster and at a rate that is continuously getting cheaper and easier to use is the key to accelerating the advent of EVs and ultimately moving the needle on climate change. We're not here to simply help move the needle, we exist to move it faster."

- Joseph Barletta, Founder & CEO, Smart Charge America



### **Balancing Asset Allocation Mix**

It is very important to note that not all charging is created equal. When it comes to both IEVel 2 (240V) and DCFC (480V) charging, SCA has identified four tiers of power distribution within each category that produce faster charging speeds for EVs. The higher the tier (1, 2, 3 or 4), the more power it dispenses and thus the more costly it is to install. Historically, IEVel 2 public charging has been done at the tier 2 power rating (7.7kW) and keeping up with the industry standard that Tesla has set, a majority of their DCFC charging infrastructure has been installed at a tier 3 power rating (250kW).



(Work, Multifamily, Shop, Dine, Play, Errands, Sleep)

#### **The Magic Number**

SCA sees the best allocation of public EV charging as a balance between these two asset mixes, IEVel 2 and DCFC. If 90%+ of all EV charging is generally done at home, then it can be understood that only 10% of EV charging is needed in public. Cross reference the 10% need for public EV charging stations with the amount of EVs registered on the road in your state or country and you have your formula as to how much EV charging infrastructure is needed in support. Now layer that formulated number with the same allocation percentages used in your concentration mix and you have your suggested asset allocation mix between the two categories.

State	Texas
EV Registrations	150,000
Estimated % of public charging stations needed	10.00%
Estimated # of public charging stations needed	15,000
IEVel 2 (90%)	13,500
DCFC (10%)	1,350

Public EV Charging Asset Mix - TEXAS





#### **The Right Formula**

Discovering the right balance and volume needed to support a specific public EV charging asset mix is EVer EVolving and in constant motion. The more EVs on the road the more the public chargers are needed and with more public funding available the needs and distribution of that mix may need adjusting. Considering this formula gives us the best means to ensure the distribution of subsidized funding for public EV charging is being allocated in the smartest way possible.



In 2021, the US Government dropped \$7.5 billion in federal subsidies to be divided amongst all 50 States within a span of 5 years to help support the much needed installation of public EV charging station infrastructure across the country. The recently passed IRA funds were written to support tax credits for those consumers purchasing both EVs and Plug-in Hybrids Electric Vehicles (PHEVs) alike. PHEVs do not currently possess the technology to charge using the DCFC standard, thus, in addition to EVs, this entire population of PHEVs will need to be mainly supported by IEVel 2 public charging.

SCA sees the subsidizing of public EV charging infrastructure as the perfect opportunity to take advantage of its networking strengths to get as many of its IEVel 2 public EV charging stations into the ground as fast as possible in order to fully support the growth of the EV adoption S-curve. For example, in the State of Texas, the NEVI funds have awarded \$408 million to be distributed amongst its public EV charging infrastructure make-up. As a result of how the State's DOT plan is laid out, nearly 90%+ of all its funding is slated for DCFC charging infrastructure. The allocation breakdown between the two, based on cost per port for installation, will only result in 2,331 DCFCs being built across the State as opposed to if the same intensity of funding went towards IEVel 2 public charging infrastructure of installing 87,008 stations.



#### **Market Fit**

Demand is very much a function of affordability not desire. In 2022, estimates predicted there were 129,000 IEVel 2 charging stations and 34,000 DCFCs in America. <sup>3</sup>Forecasts are expected to grow at a rate of two orders of magnitude to 2.5million public charges by 2030. The asset distribution estimates that model favor IEVel 2 public charging by more than 90%. <sup>4</sup>The market cap for public EV charging is estimated to be at \$115 billion by 2028. SCA's internal platform IP, ARR and charging network were all created to connect its team to their customers resulting in the fastest, smartest way to scale operations across America to meet market demand.

<sup>3</sup> S&P Global Mobility Special Report, January 9, 2023 (Southfield, Michigan)/PRNewswire/



<sup>&</sup>lt;sup>4</sup> Global Newswire, March 24, 2022, New York, United States, Global Newswire

#### **Mission Aligned Team**



For years, building mission aligned products & services across America and doing so with a team culture that is maniacally focused on all aspects of the EV charging installation process & experience is the catalyst driving SCA's success. Their leadership team is galvanized behind the mission and when you have the industry's best professionals in the same room working collaboratively together for one result, you get the best possible customer charging experience. The people actually doing the work in the field know how to improve the work, thus innovations from real-time feedback loops are used at an intense IEVel to drive down cost and improve efficiencies in the business to improve affordability.

The EV charging market is highly advanced and EVer EVolving between the different OEMs, networks, providers, etc. all racing to continuously improve their products. SCA's culture of continuous improvement hosts an encyclopedic database of product knowledge from their suppliers that affords them the latest and most advanced solutions for their customers. As sustainability and passion continue to be front and center behind their products & services it's ultimately a great team of people that put this plan into action.

# **Conclusion - The Good Fight**



From the beginning, SCA was born as an EV charging station installation company. It is from this blank canvas it was able to break the traditional mold to how electrical contracting firms generally operate and thus created its entire process around installation of EV charging stations. SCA's distinct focus inside the industry over the years has enabled it to be recognized as a market leader in this space. Since 2012, SCA has been working in tandem with industry giants such as Tesla and their Charging Installation teams on numerous successful residential and commercial piloting programs for the Tesla charging network. They have also worked with many other charging providers and commercial fleet companies over the years to better position and design their EV charging operations for optimal performance and use.

Never resting on its laurels, SCA will continue to forge ahead given its experience, technology and economies of scale to accelerate dEVeloping its own public EV charging network. SCA will continue to collaborate with EV OEMs and Charging Providers as it recognizes the greatest contribution it can make to the world is showing businesses that it is both possible and rewarding to set up EV charging infrastructure in order to help move the needle on climate change.

