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NeoCharge Smart Splitter - Clean and Affordable Home EV Charging and Electrification

Additional submitted attachment is included below.

CALIFORNIA ENERGY COMMISSION

ELECTRIC PROGRAM INVESTMENT CHARGE 2021-2025 (EPIC 4)
RESEARCH CONCEPT PROPOSAL FORM

The CEC is currently soliciting research concept ideas and other stakeholder input for the EPIC 4 Investment Plan. For those who would like to submit an idea for consideration, we ask that you complete this form and submit it to the CEC by 5:00 p.m. on **July 2, 2021**.

To submit the form, please visit the e-commenting link, https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=20-EPIC-01, enter your contact information, and then use the "choose file" button at the bottom of the page to upload and submit the completed form. Thank you for your input.

1. Please provide the name, email, and phone number of the best person to contact should the CEC have additional questions regarding the research concept:

   Spencer Harrison CEO, Spencer@neocharge.io, 858-952-8117

2. Please provide the name of the contact person's organization or affiliation:

   NeoCharge

3. Please provide a brief description of the proposed concept you would like the CEC to consider as part of the EPIC 4 Investment Plan. What is the purpose of the concept, and what would it seek to do?

   NeoCharge has developed a wifi-connected 240-volt smart splitter with smart grid software that addresses issues of access and equity in home electric vehicle (EV) charging while improving the efficiency and reliability of the grid. NeoCharge's Smart Splitter plugs into a standard 240-volt AC single-phase outlet, eliminating the need for permits, rewiring, and expensive panel upgrades needed for EV charging and home electrification. As the only UL Safety Certified Smart Splitter on the market, the NeoCharge Smart Splitter provides customers safe and reliable access to 240 volt outlets with added smart features that lower energy costs and reduce greenhouse gas (GHG) emissions from charging. At scale, the NeoCharge Smart Splitter unlocks the benefits of home electrification for millions of homeowners and renters, by simply sharing any 240-volt outlet to charge two cars, share an appliance and charger, or even to power two appliances. At NeoCharge it's our mission to make this transition to electric as seamless as possible so more people can go electric. Addtiionally, the Smart Splitter has intelligent sensing and diagnostics that safely manages power between two devices without overloading circuits in the home, while

providing average installation savings of $3,000 and reducing installation delays from a few days to less than 5 minutes with self-installation.

4. In accordance with Senate Bill 96, please describe how the proposed concept will **"lead to technological advancement and breakthroughs to overcome barriers that prevent the achievement of the state's statutory energy goals."** For example, what technical and/or market barriers or customer pain points would the proposed concept address that would lead to increased adoption of clean energy technologies? Where possible, please provide specific cost and performance targets that need to be met for increased industry and consumer acceptance. For scientific analysis and tools, what data and information gaps would the proposed concept help fill, what specific stakeholders will use the results, and for what purpose(s)?

California has a goal of converting 5 million of all vehicles (representing ~one-fifth of registered automobiles) on its roads to zero-emissions vehicles (ZEVs) by 2030 to help the state meet its goal of cutting greenhouse gas (GHG) emissions to 40 percent below 1990 levels by 2030 (SB-32) and meet health-based air quality requirements based on the Clean Air Act. Furthermore, Gov. Gavin Newsom issued an Executive Order (EO N-79-20) requiring sales of all new passenger vehicles to be zero-emissions by 2035. At the end of 2020, this number totaled 635,602 including 369,364 battery electric vehicles (BEVs) and 259,109 plug-in hybrid electric vehicles (PHEVs). While the Governor's EO will no doubt help California meet its statutory energy goals, there are several challenges to widespread electric vehicle (EV) adoption that must be addressed for these goals to be achieved.

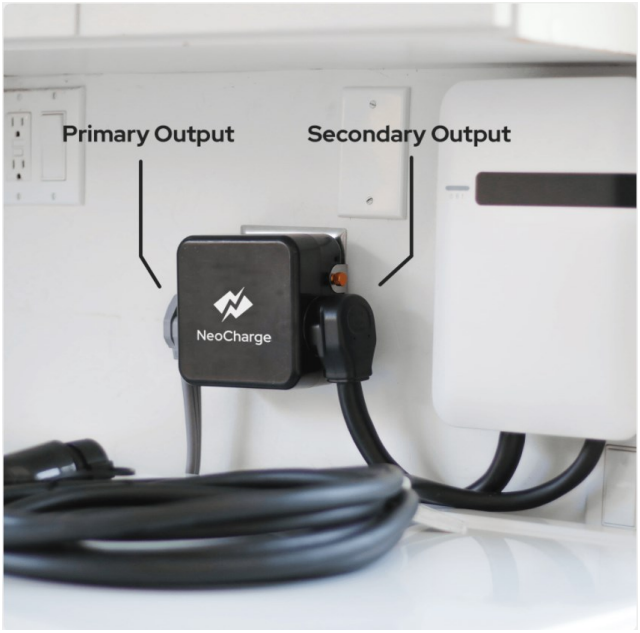
First, electric vehicle ownership must be affordable and accessible to all Californians, including electric vehicle charging. While California is updating policy to ensure that public charging is more accessible and affordable (SB-454), it is more challenging to regulate home EV charging. Yet, EV owners do more than 80% of their charging at home. Currently, installing home chargers that can charge EVs safely and efficiently often results in electrical panel upgrades in order to avoid overloading standard circuits. Panel upgrades are costly, ranging in cost from $1,500 to $5,000+ in most cases, plus the cost of the charger. These costs are especially prohibitive to residents in low-income and disadvantaged communities who often do not have the agency to make structural changes to the properties they lease. However, these communities would benefit most from the overall cost savings EVs provide long-term ($6,000-10,000 compared to a gas-powered ICE vehicle) as well as the reduction in air pollution and GHG emissions.

Second, charging EVs and a shift in electric appliance loads in the home will significantly increase demand on the electric grid. When combined with an increased push for electrification (e.g., mandates against natural gas appliances in new homes) and behind-the-meter renewable energy generation (e.g., mandated solar on all new homes in California) this creates difficulties for utilities in forecasting demand. In addition, renewable generation is most often mismatched with energy consumption. Specifically, daytime peak solar generation does not correlate with evening peak demand periods. Technologies,

such as managed EV charging, are needed to shift non-time-dependent loads to periods with higher renewable generation to optimize utilization of these resources, which will help the state meet its renewable energy goals and reduce GHG emissions. On top of benefiting California and its ratepayers, managing EV charging and home appliances loads is crucial to reducing hundreds of millions of dollars in infrastructure upgrades that come with managing the increase in peak electricity demand.

NeoCharge has developed a wifi-connected 240-volt Smart Splitter with smart grid software that addresses issues of access and equity in home electric vehicle (EV) charging and electrification while improving the efficiency and reliability of the grid. NeoCharge's Smart Splitter plugs into a standard 240-volt AC single-phase outlet, eliminating the need for permits, rewiring, and expensive panel upgrades needed for EV charging and electrification. As the only UL Safety Certified Smart Splitter on the market, the NeoCharge Smart Splitter provides customers safe, easy, and reliable access to 240 volt outlets with added smart features that automatically lower energy costs, track charging, and reduces greenhouse gas (GHG) emissions from charging.

At scale, the NeoCharge Smart Splitter unlocks the benefits of home electrification for millions of homeowners and renters, by simply sharing any 240-volt outlet to charge two cars, share an appliance and charger, or even to power two appliances. This will increase electrification and save ratepayers, utilites, homeowners, and renters thousands of dollars on installation costs. With customers across North America, we've seen first hand how crucial a solution like the Smart Splitter is in the decision to go electric.



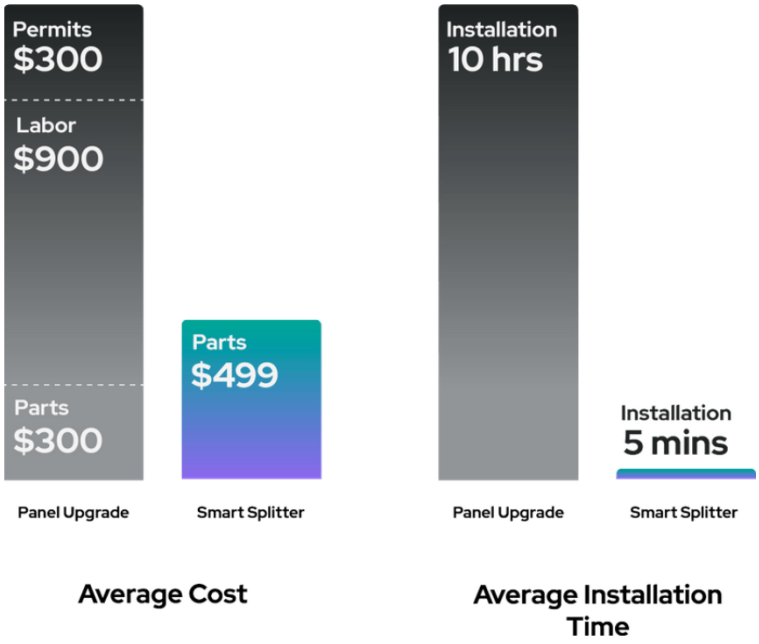


Table 1. NeoCharge Smart Splitter Technical Specifications

Specification	40-Amp Smart Splitter	24-Amp Smart Splitter
Output Power	40A/9.6kW	24A/5.7kW
Input Voltage	240 VAC nominal, single phase	240 VAC nominal, single phase
Input	NEMA 14-50P or 10-50P	NEMA 14-30P or 10-30R
Outputs	2 x NEMA 14-50R or 10-50R	2 x NEMA 14-30R or 10-30R
Dimensions	5.25” x 5.25” x 2.8”	5.25” x 5.25” x 2.8”
Weight	2.5 lbs	2.5 lbs
Warranty	2 years	2 years
Built in the USA	Indoor use only	Indoor use only

On top of the EV charging and appliance access the Smart Splitters provide, NeoCharge is building a software platform that enables their Smart Splitters to provide ratepayers the choice of automatically charging with cleaner and more affordable energy. NeoCharge’s integrated solution will provide advanced sensing to analyze appliance and EV usage patterns with predictive grid conditions to take advantage of clean energy on a 5-minute interval. By intelligently charging EVs and appliances according to renewable energy generation, on-site solar, and lowest cost, NeoCharge’s software acts as a virtual power plant with growing capacity as they provide additional Smart Splitters in communities across North America.

This software will provide the opportunity to aggregate the largest electrical loads in the home, reduce carbon emissions, and encourage the use of cleaner energy through a reward system. NeoCharge will enable this at a fraction of the cost of energy storage while increasing renewable energy consumption. Their software will be free to EV drivers and automatically schedule charging according to customer-specified parameters, such as energy savings or minimum charge. As a free solution with the potential to reduce carbon emissions by up to 90%, save customers up to $80 per month on their utility bills, and provide additional rewards, NeoCharge will substantially reduce the cost of EV ownership for homeowners and home renters in California's communities of concern.

5. Please describe the anticipated outcomes if this research concept is successful, either fully or partially. For example, to what extent would the research reduce technology costs and/or increase performance to improve the overall value proposition of the technology? What is the potential of the technology at scale?

   In small quantaties and at scale, the Smart Splitter provides easy and affordable opportunities for electrification. The Smart Splitter saves thousands of dollars on installation costs of EV charging and appliances in homes and with it's associated software, will further reduce carbon emissions by up to 90% on certain days, save money on utility bills, and reduce peak load on the grid.

   With widespread adoption through pilots, grant opportunities, and awareness, California will be providing homeowners, renters, and disadvantaged communites a crucial technology for the adoption of EV's and home electrification.

6. Describe what quantitative or qualitative metrics or indicators would be used to evaluate the impacts of the proposed research concept.

   As laid out in section 4, installation savings, carbon reduction, peak load reduction, and utility bill savings are crucial indicators to evaluating the impacts of our Smart Splitters and its software.

   Through pilot projects with CCA's such as SVCE and through funding from the CalSEED program, we have clearly understood the key indicators of our technology. With further support from the CEC and the EPIC 4 investment plan, we can further pilot our Smart Splitter and increase access to electrfication. As a part of LACI and Cleantech San Diego we have directly seen the benefits from the CEC and the EPIC program and we are looking forward to additional support ahead that EPIC 4 creates.

7. Please provide references to any information provided in the form that support the research concept's merits. This can include references to cost targets, technical potential, market barriers, etc.

   Wattime EV charging carbon report: https://www.watttime.org/news/report-201909-emissions-optimized-electric-vehicle-charging/

Zero Emission Vehicle and Infrastructure Statistics. https://www.energy.ca.gov/data-reports/energy-insights/zero-emission-vehicle-and-charger-statistics.

"Charging at Home." *Energy.Gov*, https://www.energy.gov/eere/electricvehicles/charging-home. Accessed 8 June 2021.

www.getneocharge.com