

March 8, 2013

Dear Chairman Nichols and CARB Board:

As your hearings indicated, the two largest sectors of GHG emissions are Transportation and Electricity Generation. In each of these large sectors, electrical energy storage can play a critical role in the transition to meeting the 2020 and beyond emission goals. We propose that you invest a share of Cap-and-Trade auction proceeds in programs that will accelerate the development of advanced battery technologies to hasten the commercialization and adoption of transportation and grid energy storage solutions.

Accelerating advances in battery technology will certainly require innovation at the materials level wherein new anodes, cathodes, and electrolytes are needed that are low in cost, have high energy, and high stability to ensure long life and safe operation. However, today approximately 50% of a battery’s cost is in manufacturing. Use of batteries for widespread vehicle and grid application will thus require a focus on both technology development and advanced manufacturing processes. With a relatively modest amount of targeted additional resources, California has an opportunity to leverage existing industry and federal government investments to increase its leadership position in EV adoption and GHG reductions while becoming the home of the next generation of advanced battery manufacturing. However, these strategic investments are needed now if this future is to be realized.

Transportation:

Transportation is the single largest source of emissions in CA of GHG’s, and the vast majority of those emissions are from personal vehicles. Acceleration of adoption of personal electric vehicles offers the largest potential GHG reduction, and is absolutely essential to achieving CARBs goals. While California leads the nation in sales of EVs the annual sales remains at the 3% level, characterized by conscientious early adopters. Today’s EVs come with substantial price premiums, modest range for fully electrified vehicles, and a total lifecycle savings that takes more than 10 years for break even.

The 2012 Annual Energy Outlook provided by the Energy Information Administration quantified the potential for improved battery technology to make a significant reduction in greenhouse gas emissions from vehicles, by comparing an aggressive improvement vs. a more conventional improvement path. This aggressive improvement in battery technology is characterized by going from today’s $1000/kwh to a target of $150/kwh by 2035 as compared to an estimated $350/kwh with the typical improvement path. Such a dramatic price reduction enables a 24% market penetration of battery EVs in 2035, a three-fold improvement when contrasted with a much more modest 8% in the conventional improvement path. Enabling this improved market acceptance results in a fuel savings of nearly 100 million barrels of oil per year and a net additional greenhouse gas reduction of 33 million metric tons.

The Department of Energy has recognized these challenges, and through initiatives such as EV Everywhere and the recently funded Joint Center for Energy Storage Research, they are seeding R&D investments that will catalyze the next generation of batteries, beyond today’s lithium ion technology to reduce the price premium and increase the range, making the choice of electric vehicles far more compelling and making the scenario outlined above more feasible. But realizing this potential will require far more than just R&D investment - Innovation in batteries that address the entire value chain, from materials to technology to manufacturing of vehicle battery systems is needed to realize these goals. Developing new, more efficient manufacturing methods, driving process improvement to achieve higher yields and lower costs, and proving the quality and reliability of these new battery technologies are focused areas of investment needed to complement the basic R&D portfolio.

California leads the US electric vehicle (EV) industry. Strong market demand for EVs, visionary policy, world-leading R&D, and strong venture capital investment have resulted in a large number of companies related to EVs being located across the state. The confluence of policy leadership, talent, research and development capacity, and business ecosystem makes California a natural center of gravity for electric vehicle and battery technology. These leading attributes have resulted in self-reinforcing strengths in venture capital investment, patent filings, business growth, and infrastructure.

Electricity Generation:

California has aggressive renewable portfolio standards that will require a significant incorporation of intermittent resources to meet these goals. Electrical energy storage can play a significant role in mitigating the impact of these intermittent resources, enhancing the reliability of the grid as the penetration of renewables increases, and alleviating transmission bottlenecks in major urban areas with large loads where siting additional capacity is difficult.

California, through AB 2514, has made a strong commitment to evaluating and deploying novel grid storage technologies, as has the US Department of Energy. Several DOE’s grid storage demonstration projects are focused on load shifting behind the meter such as storage of solar energy during the day to allow crop watering during periods of lower evaporation in Central Valley irrigation districts. Many of these pilot projects fall into some of the disadvantaged areas that Cal Enviro Screen has identified, and the ability to expand the deployment of these types of systems after the initial demonstrations are validated would not only ease the integration of a higher percentage of wind and solar, but meet the mandate for investment in these areas of concern.

The California Energy Storage Association, in conjunction with major utilities, has forecast that peak shifting with renewables and energy storage can provide a 26-33% reduction in GHG emissions per MW of electricity generation. Without storage to balance the intermittency of renewables, gas peaker plants have to rapidly adjust capacity, leading to inefficiencies and largely offsetting the renewable benefit in GHG reduction.

In addition to the renewable integration benefits, grid level storage has enormous potential to alleviate transmission bottlenecks in densely populated centers where electricity demand has outpaced the ability to add transmission capacity. A preferential siting of energy storage projects to provide enhanced capacity in these disadvantaged urban neighborhoods would not only provide economic opportunity in these regions but provide much needed electrical transmission relief, helping to damp the extreme time of use pricing rates in our most congested environments.

Unlocking the Potential: Focused Investment to Leverage Existing Resources

The strong ecosystem for EVs and grid storage technology in California has given rise to one of the largest concentrations of emerging battery technology companies in the US. This vibrant cluster has more than 40 companies, ranging from nascent startups to global corporations, focusing on a diversity of technologies and components needed to drive advanced energy storage technologies.

CalCharge, a partnership of Berkeley Lab, SLAC, and the California Clean Energy Fund, strives to serve as a “center of gravity” for this emerging industry and its role in California’s energy future. CalCharge brings together CA based battery manufacturers, national labs and universities, and the major companies and stakeholders that depend on battery innovations in order to identify and address the challenges to the industry’s growth and global competitiveness. By interconnecting this unique ecosystem, CalCharge will accelerate the development of new technologies, address gaps in workforce proficiency, facilitate business strategy and policy innovation, and enhance the community and identity of this growing sector.

As the nexus for this emerging industry, CalCharge has a unique capacity to identify critical research, market, and resource misalignments. Based upon this broad perspective, CalCharge believes that a compelling opportunity exists for the targeted investment of Cap-and-Trade revenue to leverage the inherent strengths outlined above. A robust program to accelerate the commercialization of these breakthroughs, that focuses on filling gaps in existing industry and federal resources, provides California a clear path to greenhouse gas reduction, a renewed manufacturing base, and an attractive return on investment.

We look forward to working with the Air Resources Board to further explore and define this opportunity.

Sincerely,

Jeff Anderson

Interim Executive Director – CalCharge

Managing Director - CalCEF