QUALLION

QUALLION LLC – IMPACT STATEMENT

Electric Drive Infrastructure Technical Workshop
Docket No. 09-ALT-1

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October 12, 2009

I. Introduction

"No single issue threatens the health and prosperity of our world, or provides a greater opportunity for economic success than climate change - and that is why California has stepped up to take the lead. … Our green economy has grown and our policies have influenced the world,"[1] said Governor Schwarzenegger in a September 2009 press release. Over the past three decades, California has implemented some of the most stringent environmental laws in the country. A prime example, AB 32, the world's first comprehensive law to reduce greenhouse gas (GHG) emissions, "mandates a reduction of California's GHG emissions to 1990 levels by 2020 and calls for an 80 percent reduction from 1990 levels by 2050."[2] California also has the "highest standard in the nation for reducing diesel emissions" with the objective of cutting "diesel soot emissions 85 percent by 2020."[3] However, though the leader in standards legislation and new technology adoption, California is losing its edge on innovation. California has the potential to become the first all green, self-sufficient, economy – from energy production and regulation through manufacturing and consumer products.

Historically, California been the home of Green Technology development and several environmental movements, but today California is importing technologies developed in other states and countries. In order to regain its position as the leading economy with regards to promoting innovation and revolutionizing how a robust commercial manufacturing industry can be sustained in harmony with the environment, **California must implement policies which encourage investment and change to transition to a Green Economy**.

To achieve this vision of a comprehensive Green State, California must strategically invest its funds to fuel development of Green Technologies and the underlying capacity to sustainably manufacture these enabling technologies. California needs to invest in technologies that have potential long-term benefits that can help meet the stringent regulations already passed by the state. These include electric anti-idling APUs to cut diesel pollution, PHEVs to reduce traffic emissions, solar and wind energy production to reduce the state's external reliance and energy technologies like the smart-grid to effectively manage the energy produced. To strengthen California from within, the state must investment in manufacturing infrastructure for these industries, establish rebates and voucher programs to spur consumer acceptance of the emerging programs and encourage intra-state business to perpetuate the cycle of growth.

Significantly, this need for robust investment in our manufacturing infrastructure is coming at a time of unprecedented financial crisis. While the commercial markets appear to have stabilized over the year, access to private capital, either through direct investment or loans, remains largely out of reach to most companies, and in particular small and mid-sized firms. In light of this dynamic, it is imperative for the state to weigh in with strategic investments in key technologies that will help invigorate the economic underpinnings of California's future growth.

[1] http://gov.ca.gov/issue/energy-environment/
[2] http://gov.ca.gov/issue/energy-environment/
[3] http://gov.ca.gov/press-release/13428/

II. The Criticality of Advanced Battery Manufacturing in California

The crux of each of the Green Industry technologies referenced above is being able to store energy effectively for later use. The key enabling technology for this capability is advanced battery systems. In the future, batteries are going to serve a central role in all aspects of our society. Solar and wind energy must be stored when not being used, an electric vehicle will need a power source for its motor, a diesel truck needs reserve energy for its cabin and the grid needs a reliable, cost effective, non-polluting energy supply to address load leveling in peak hours.

As a California based lithium-ion battery manufacturer and the largest producer of lithium-ion cells batteries in the United States today, Quallion is poised to meet each of these needs with a manufacturing facility that produces a modular product. Quallion's technology offers a standardized solution that can be scaled to a variety of applications thus offering the cost competitiveness of economies of scale.

Quallion's technology also facilitates cost savings and environmental benefits by providing a "closed loop" system where the battery's useful life is maximized through repeated re-use and then ultimately recycling. For example, batteries used for heavy-duty truck diesel reduction can be transferred to grid applications when they can no longer meet the heavy use profile of a truck. These batteries can be used as load-leveling agents and then finally recycled to extract lithium.

Quallion will serve as the cornerstone to California's reinvention of the industrial age in a "Green Revolution", using the synergy of California's strategic investments to help accomplish a sustainable economy.

III. Proposed Regulatory Action to Strategically Position California for the Green Economy

A. Manufacturing Infrastructure Investment Grants

Manufacturing is not only leaving California, but is rapidly moving off shore from all sectors of the United States manufacturing base. Many claim the recent recession is a direct result of a service based economy. In order to counteract this trend, California ought to provide a manufacturing friendly environment to help stimulate the economy with new jobs and development. Many states such as Nevada and Arizona are providing such encouragement for their manufacturers. Yet, instead of encouraging investment and helping the manufacturing infrastructure, California has "spent the past decade divesting …[the] state of the once vibrant manufacturing job sector – Another 120,000 manufacturing jobs left California" in 2008.[4] **If California wants to make headway in the green jobs industry, manufacturers need incentives and assistance in providing manufacturing jobs to the populace. The state can do this by being a funding partner for manufacturing facilities and providing tax rebates for investments.**

Companies need help establishing green manufacturing because of the substantial up-front investment requirement. In either a new facility or a retro-fitted facility, the transition to green technology necessitates heavy investments including the following: land, building, equipment, installation, product

[4] http://cssrc.us/web/17/publications.aspx?id=6861&AspxAutoDetectCookieSupport=1

development and product qualification. This initial investment causes sales and profit to lag, making it difficult to achieve from a cash-flow perspective for most companies. State funded manufacturing build-out defrays the cost to companies, making it possible to facilitate the transition. Consequently, manufacturers can spur economic growth by requiring jobs in a multitude of industries: From building the actual sites, to product development, through production and maintenance of the facilities.

Critically, this funding needs to be guaranteed on a multi-year basis. It typically takes two to three years to establish a full scale manufacturing operation. This typically involves making funding commitments in year one that need to be fulfilled in years two and three as land and facilities are prepared, equipment is procured and installed. Thus, a company setting up such an infrastructure may not spend all the required capital in year one, but it will have obligated itself to completing the entire project in the first year by entering into commitments that require payments in later years. Typical government funding cycles operate on fiscal years which do not lend themselves to this sort of long term spend plan. Rather, government agencies typically face a "spend it or lose it" dilemma at the end of each fiscal year. California can break this cycle by providing by offering multi-year commitments to fund an entire project.

Notably, this investment in manufacturing is cost-efficient because of the jobs created through the process. More importantly, manufacturing facilitates new developments through corporate investment in research. California can be at the leading edge of new technology instead of at the mercy of an external provider.

B. Vouchers and Rebates

In addition to assisting the manufacturers with production establishment, California should help provide an incentive for consumers to adopt the new technologies. For example, the tax credits offered on hybrid vehicles have spurred acceptances so that as of 2007, "Los Angeles, San Francisco, and Sacramento together accounted for over 20 percent of the nation's hybrid vehicle registrations."[5] **Such measures need to be established for all green technologies such as anti-idling APUs for heavy duty trucks**.

The initial high costs of Green Technology manufacturing infrastructure and R&D investment contribute to high product costs for consumers. These costs can be prohibitive for technology adoption which is crucial for success. To assist the growth of the market for Green Technology, a rebate or voucher should be offered to off-set the costs to consumers. Greater product demand in turn helps lower costs even further through economies of scale and contributes to quicker development of newer versions of products in a positive feedback-loop that the state needs to state.

By way of example, rebates should be present for anti-idling systems for heavy-duty truck to reduce diesel emissions. Diesel exhaust with its more than 40 cancer-causing components has the potential to cause many health and environmental problems. "California identified diesel exhaust as a toxic air contaminant" in 1998 and legislated to reduce "emissions from trucks, buses, off-road equipment, ships,

[5] http://www.areadevelopment.com/stateResources/california/location-california-2009-green-manufacturing01.shtml?Page=1

locomotives, port equipment and a variety of other sources." [6] According to the EPA, truck idling results in the emission of 11 million tons of CO_2 and consumes of 960 million gallons of diesel fuel annually. Argonne National Laboratory estimates that approximately 460,000 long-haul trucks operating in the United States use 838 million gallons of fuel per year while idling six hours per day. That wasted diesel fuel translates into $1.4 billion annually, much of which could be saved by drivers using idle reduction technologies.[7] Reducing idle time could also reduce engine wear and associated maintenance costs. The total benefits are even larger when idle reduction strategies are applied to light- and medium-duty vehicles and school buses as well. When the idling of these vehicles is added to that of heavy-duty trucks, estimates of annual fuel use due to idling approach 3 billion gallons. Responding to the crisis, several states have enacted anti-idling laws to help curb the problem. Notwithstanding such laws, recent studies have shown that truckers continue to ignore anti-idling regulations.[8]

The upfront investment for early adopter truckers converting to an all electric anti-idling APU may be as high as $10,000-25,000 since volumes are low and prices for technology are high. However, state aid in the form of vouchers, rebates, or tax credit would help off-set this and encourage more truckers to transition. Though an up-front investment, the use of all electric APUs is cost-effective. The current market alternative to idling is a diesel motor generator which may cost ~$3,600 less than an all electric system. However, the diesel APU motor requires up to 2 gallons a night. At $3/g, and an average 1,830 hours a year, the system costs $1,098 per year just for fuel. Even thought the all electric system costs more at the onset, it offers a savings of $5,400 through the 5-year life of its batteries. Additionally, the diesel APU still releases significant NOx and other emissions into the atmosphere. **Figure 1** shows a comparison of emission of the all battery system vs the current and diesel options.

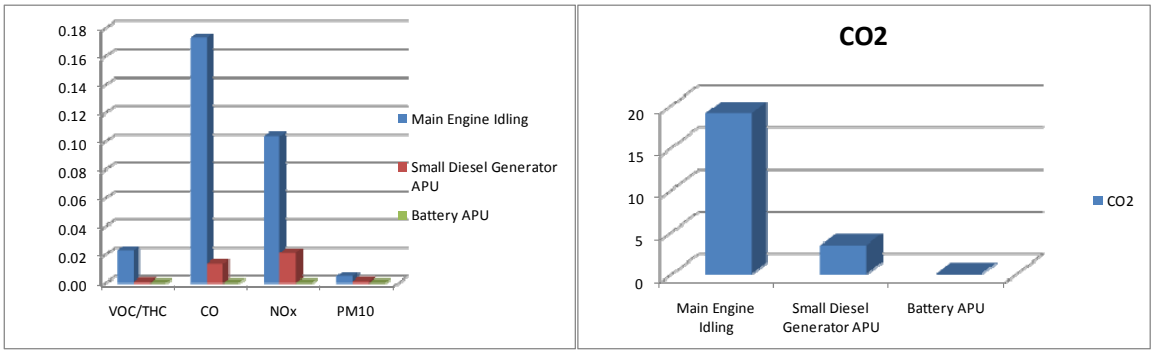

Figure 1: Average Idling Emission Reduction Tonnage per Vehicle/Year

C. Promote Intra-State Business

In addition to manufacturing incentives for producers and tax incentives for consumers, intra-state business must be emphasized. As the world's 8th largest economy with more than 36 million residents,

[6] http://gov.ca.gov/press-release/13428/
[7] *See* Argonne National Laboratory, Center for Transportation Research, "Analysis of Technology Options to Reduce the Fuel Consumption of Idling Trucks."
8 Gary Gereffi, Kristen Dubay and Marcy Lowe. "Carbon-Reducing Technologies and U.S. Jobs." Center on Globalization, Governance & Competitiveness, Duke University

countless universities, and green friendly businesses California has the ability to become a self-sustained green-economy. Rebates, vouchers, or tax incentives that work like the Zero Emission Vehicles (ZEV) policies and promote intra-state commerce need to be established. **Rebates, vouchers, and credits should be established that have contingencies and preferences mandating that components and raw materials are "Made in California."** For example, truck manufacturers should be provided incentives to use battery OEMs in California when selling truck APUs that are eligible for a rebate. Likewise, utilities receiving incentives to help in the implementation of smart-grid technologies in California should be encouraged to use Californian electronics and battery companies. Manufacturers receiving investment assistance should be encouraged to buy within California, ensuring the largest economic output for dollars invested.

By coupling any state funding for green technologies (e.g., tax credits to power companies or rebates for ZEV vehicles) to a "Made in California" policy that prefers California manufacturing, the state can fully leverage its investments in Green Technologies to not only encourage "green" savings but to also insure a robust economy.

D. Cost Sharing

To insure a measured commitment on the part of program participant, the state should require cost sharing as a component of any grants. The source and form of the cost share should be flexible (e.g., in-kind, cash, federal and city funding). The quality, type and amount of the cost share could be used as a specified merit criterion in evaluating and comparing proposals.

E. Loan Program

In addition to grants, the state should offer low cost loans and/or loan guarantees to help facilitate access to credit. It is unlikely the state will be able to fully fund all aspects of infrastructure expansion, and loan guarantees are a unique way for the state to leverage is limited resources. These loans could be provided at low interest rates with streamlined origination procedures to facilitate a rapid deployment of funds. Repayment terms should include initial zero-payment grace periods as the new projects are unlikely to generate revenues for the first 3-4 years.

IV. Quallion Project Description

Quallion is seeking a multi-year investment from the CEC to expand its current production capabilities in Los Angeles by establishing a high-volume, state-of-the-art lithium ion cell and battery factory in Southern California. It is anticipated that the cells and batteries will be designed for the following applications: Anti-idling for heavy-duty trucks, PHEV, HEV and EV motors, smart-grid applications as well as military and medical applications. The spectrum of applications includes every Green Front California has invested in as well as Quallion's existing markets.

Specifically, Quallion intends to establish a lithium ion cell, module and battery production line capable of delivering 10,000 kWh per year. The battery designed will be modular in nature so that different assemblies of the same base pack can be used as the building block for each application. For example, the

smart-grid would require the largest pack of maybe 20 modules, whereas an anti-idling APU would require a smaller pack of one module. This approach simplifies the design and applicability of the production of batteries and provides economies of scale benefits to battery production.

Upon receipt of the requested funds, Quallion intends to immediately begin either retrofitting an existing structure and begin new construction on a site in Southern California. It is estimated that the duration of construction will be three years, with an estimated production start date of late 2012.