Red Font – Statements Contested.
Blue Font – Responses to contested statements.

# Response of Paul Staples to the recently released 2011-2012 Investment Plan for the Alternative and Renewable Fuel and Vehicle Technology Program.

I wish I had the time to spend on the investment plan. The reason was mostly because I spent so much time on the RFP and previous investment plans, as well as developing a project to submit, I was not expecting such a change, at least in tone, of the investment plan. I just figured I would check the funding allocation to make sure it corresponded with the last committee meeting. I was flabbergasted by what I read. I could not help but conclude it must have been written by the Industrial Gas Industry (IGI).

The CEC, for so long, was mostly involved in collecting fines and monies from the oil industry from offshore oil drilling. Then using it in conventional energy security plans. Never funding much in the way of cutting edge sustainability. They mostly dealt with huge monolithic energy companies and took most of what was told them as true. After all, they were experts in energy. They never considered that such huge monoliths might not give them accurate information that might not benefit them. One of the reasons the RFP process was like responding to something that looked more like an Encyclopedia Britannica that an RFP. Admittedly, there have been significant improvements since then in RFPs. However, not in performing the main mission. At least not how it exist today with the covering legislation. So the dilemma is, how do we get the CEC to act as an independent government agency with the mission of developing, deploying and implementing a clean, sustainable/renewable, operationally and economically viable energy paradigm? The only way it will happen is if they get their info and advocacy from more than huge monolithic fossil fuel energy companies! That will be the most important change that will need to be made.

Also, someone needs to do a better job checking facts first before something is released. Otherwise, you either look incompetent, look like a fossil fuel industry lackey, or you end up developing programs on false information and waste millions of dollars pursuing a paradigm doomed to failure.

That is how the Hydrogen part of this plan looks like!

Below are the identified parts that are either inaccurate or biased towards the Fossil Fuel Industrial Gas companies:

## Hydrogen

Hydrogen can be derived from a number of sources, including natural gas, biomethane, electricity from fossil fuels, and electricity from renewable resources. Hydrogen produced through steam methane reformation (SMR) and used in a fuel cell vehicle **(FCV)**

(Response: FCEVs! Didn't you get the memo? Fuel Cell Electric Vehicles - FCEVs is the appropriate acronym. Not FCV – Does not properly describe the technology used or the type of drive!)

**However, a major barrier for this fuel and the vehicle technologies using hydrogen remains the economy and high cost at numerous levels.**

(Response: Misleading: This is the problem for all alternatives, not just hydrogen!).

**Vehicle production and fueling infrastructure are still at a pre-commercial stage, where industry cannot take advantage of economies of scale benefits that come with commercial production volumes**.

(Response: Again, Misleading: Assumption does nothing to indicate a solution - can be alleviated by funding large quantities of systems to bring to bare the economies of scale. That is not possible for Bio-fuels – because it is unsustainable – the more you make, the less there is left, the more it will cost, Batteries, because the materials are used in such large quantities, the costs are not sustainable, again, the more you use, the less there is left, the less the supply, the more it costs. Hydrogen is the only option that gets less expensive the more you use. Hence, economies of scale will kick in once we start mass manufacturing the components. Until then it will always remain "pre-commercial"! Just like any sustainable alternative being proposed. This is the purpose of this program, "To help bring these technologies from a "pre-commercial" stage to a "commercial" stage. However commercialization of Hydrogen fueling infrastructure is far closer to commercialization than any other alternative we have been funding for the last 40 years – see U.S.D.O.E. Merit Review, which shows that the program has met every milestone, every goal set out for it since the beginning of the program in the 1990s. My experience and research shows that clean, renewable/sustainable hydrogen could be fully commercially viable in 5 years with enough funding support for on-site, on-demand, distributed generating electrolytic fueling systems deployment.)

**However, there are indicators that cost is decreasing on both the vehicle and fuel infrastructure side**

(Response: Makes the last statement contradictory, doesn't it? So we are closer to commercial pricing than you state in the previous sentence. It is not good to contradict your conclusions. It confuses the reader, and leaves everyone with a fuzzy conclusion. The CEC is supposed to be an advocate for the programs it is funding. When you talk down about the programs you are funding, you tend to suppress turn out in response to the RFP. No one wants to spend his or her time and money on a program that the funder doesn't support and won't be continuing to support. That suppresses turnout. Could that be the CEC's intent?).

**One original equipment manufacturer (OEM) has mentioned that FCVs are now headed below the $100,000 mark**

(Response: Better than that. Why don't you refer to the D.O.E. Merit Review of the Hydrogen Program, where they have met the cost projections of $53.00/kw, equal to an ICE vehicle in drive train cost in mass production)

**The Energy Commission has also seen the cost per fueling station decrease, from a range of $3 million to $6 million to a range of $1 million to $2.5 million, over only a few years.**

(Response: Again, kind of contradicts your previous statements again. Make up your mind, is it ready for commercial deployment or not!)

As interest and opportunities for hydrogen and FCVs have risen in California, there has been a continued reduction in financial support from the federal government. For FY 2012, U.S. DOE has proposed reducing funding for hydrogen and fuel cell technologies by nearly 41 percent below the previous year's level, on the basis that the technologies will not be ready for mass markets until years from now.

(Response: Yeah, and Chu and Steven Koonin are in the pocket of BP, ARAMCO, Chevron, EXXON, and the Biofuels and Battery industries. However, this won't happen. After a public outcry over some of his flatly wrong statements about hydrogen Chu has repeatedly made after listening to Joe Romm, as well as natural gas at a recent Senate Hearing, recently at a tour in California of Fuel Cell Companies, Trulite, Inc. specifically, Chu changed his tone about hydrogen and announced (paraphrased) that, "What we need is more investment in Renewable Hydrogen Infrastructure!"

On the subject of less support from DC; it did not happen in 2009, it won't happen now, unless it is across the board reductions in the whole DOE budget. I'll take any wagers on that!).

## Fuel Conversion and Production

*Steam Methane Reformation*

The most common method for producing hydrogen is through large-scale steam methane reforming (SMR) facilities, where methane from natural gas (or bio-methane) is broken down in a reaction with high temperature steam. The resulting products are hydrogen and CO2, which is released into the atmosphere. The hydrogen is purified and compressed for storage and transport. **Large scale SMR units are relatively energy intensive installations that allow for a comparably low cost production per kilogram (kg) of hydrogen.**

(Response: This is another misleading argument continually perpetuated by the Industrial Gas Industry. It does not take into consideration what happens when it reaches full, or even 10% market penetration, the cost will go through the roof. This is because the process is less efficient than electrolysis – up to 88%, as opposed to 50% for SMR. The cost of NG will go through the roof once we add transportation to the supply demand. The reason it is cheaper now is because their industrial gas customers subsidize the process. Every emission produced by SMR is captured, processed, purified and sold to other industrial gas customers, i.e., oxygen, CO2, Nitrogen, even SOx, etc., which artificially subsidizes the cost for the immediate short term. Once, they reach quantities that exceed demand of the marketplace for those gases, which will happen relatively soon after the vehicles catch on, those gases will need to be vented, raising by large amounts the pollution footprint of the process, as well as raising the cost of the product as well. Does anyone over there ever think of these factors before writing these reports? Or do they just cut and paste from the industrial gas producers PR brochure.)

**One major in state provider, Air Products, produces its hydrogen in a large-scale industrial installation in Southern California, using natural gas derived from the pipeline. Although hydrogen is produced and traded in large quantities as an everyday industrial gas and can be produced at moderate cost today (at approximately $5 -10 per kg), it has not yet reached cost competitiveness with petroleum fuels on an energy equivalent basis.**

(Response: Not true. Right now with current electrolysis processes, hydrogen can be produced on a distributed generated, on-site, on-demand basis, for as low as $4.50/kg, sold for $5 - $7.00/kg with significant profit for the gas station – This is about $2.00 - $3.00/gge based on cost/mi. of FCEVs. Also, gas stations using this process, could be eligible to generate "Pollution Credits" for the offset of pollution generated by refining gasoline).

**Hydrogen as a transportation fuel furthermore requires higher purity levels than hydrogen for industrial uses because fuel cells stack membranes are sensitive to impurities.** Purification, mostly from by product gases, is typically performed by pressure swing adsorption, an effective but costly technology that adds to the capital and operation/maintenance cost for SMR facilities.

(Response: Wrong assumption – Industrial gas in many uses, i.e., computer chip production, food production, chemical production, pharmaceuticals, requires higher purity levels than even FCEVs – 99.5% purity, as opposed to 5 and 6 nines purity – 99.999% - 99.9999% for the aforementioned uses. On-site Electrolyzers are capable of purities even up to 5 or 6 nines pure, but it is not necessary.)

**Early hydrogen fueling station sites were equipped with on-site hydrogen production units, many using SMR technology**, others using electrolysis

(Response: Inaccurate, mostly Electrolysis – SMR on-site has never been successful, due to maintenance issues and emission issues. Only a few of these units have been demonstrated, at least in Ca., without success due to emissions, O&M, and efficiency).

**Energy Commission observations suggest that on site production often comes with relatively high maintenance and capital cost, and can produce only small amounts of hydrogen fuel.** (Response: Wrong again. On-site electrolytic h2 will perform for 60,000 hours w/o major maintenance, and there are no limits to the production capabilities. There is nothing in the technology that indicates that. When built modularly, as you indicated earlier is the approach being pursued, producing up to 1,500 kg/day – full market production levels equal to gasoline usage for a gasoline station, will not be a problem. The only reason for not producing systems that do that is because there is no reason yet to do so. Not until market demand requires it. This will occur as sales increase and demand requires deploying systems that can meet demand. It makes no sense to deploy systems of that production level that will mostly sit idle for years – not logical or financially viable. That is why we are starting out deploying systems that will meet rollout demand until full commercialization occurs requiring expansion of existing systems – resulting in significant cost reductions. Also, since the systems are modular, they can be expanded as needed as the market grows. This is common sense. It doesn't take a rocket scientist for this stuff.)

**However, it can present significant potential for renewable hydrogen production if paired with a local source of biomethane or renewable power for example from photovoltaic systems.** (Response: Wind, hydro, Geothermal, Wave – through PPAs with IPPs are truly renewable, biomethane is a loophole lobbied by Industrial Gas Companies so they can meet the 1/3rd. renewable standard, and is not renewable, because it is not sustainable and never will be.)

Senate Bill 1505 (Lowenthal, Chapter 877, Statutes of 2006) requires that all hydrogen used for transportation fuel in the state must be at least 33.3 percent from renewable sources. The ARB, which administers this mandate, has not yet fully established the requirement and is working on establishing regulations to clarify details of the mandate. For example, the ARB is considering a temporary reduction of the 33.3 percent requirement to 20 percent to account for the lack of availability of renewable hydrogen or the feedstocks necessary for its renewable production during the early years of its implementation.

**In the case of steam methane reformation, these renewable resources are likely to depend significantly on the use of biomethane. Natural gas used in the SMR process can easily be substituted for biomethane to reach a renewable hydrogen product. Another aspect that ARB is investigating for the regulations is how credits for renewable power and renewable biomethane will be applicable to the mandate and what kind of tracking mechanisms can be used for these two compliance pathways.**

(Response: A complete scam to allow fossil fuels to qualify as renewable – biomethane is a fossil fuel, whether ARB recognizes it as such or not. Chemically it is mostly identical w/o all the synthetic additives for performance.

### *Electrolysis*

Electrolysis consists of water molecules being cracked with electric power into oxygen and hydrogen. The oxygen is released into the atmosphere and the hydrogen captured and compressed for storage. **From 2002 to 2007, a few experimental and demonstration electrolysis fueling stations were built in California, funded by consortia of industry, federal government, state government, and local agencies.** Some of these stations used electrolysis to produce hydrogen on site.

(Response: Wrong, from 1994 – 2007. Clean Air Now Facility in El Segundo was the World's First of it's kind, which lead to much of what's happening today).

**However, Energy Commission observations suggest that on site electrolysis comes with relatively high maintenance and capital costs and can produce relatively small amounts of hydrogen fuel over time.**

(Response: Wrong! I don't know whom you are talking to again – The Fossil Fuel Industrial Gas Industry? Maybe it's the Electrolyzer systems you or the project developers are choosing. The ones I am talking about are 88% efficient, and operation hours of 60,000 hours before any major maintenance is required. Actually, from a practical, energy security, operational viability, and economic, and viable infrastructure perspective; on-site, on-demand, electrolytic hydrogen fueling is the only viable, short term and long term paradigm of any alternative than can work). Electrolysis possesses significant potential for renewable hydrogen production, particularly when the electricity comes from renewable sources such as photovoltaic arrays.

**This suggests that on site may not be the most cost effective option today.**

(Response: Wrong again! Conclusion based on erroneous and incomplete data, probably provided by Industrial Gas Producers.)

**In recent years, California has seen a decline of on site production fueling stations in favor distributed models with central production. SMR is dominating centralized hydrogen production due to the high cost that large scale central electrolyzers would entail while producing only moderate amounts of hydrogen. Today, central SMR seems to be favored over on site production. The general trend moving away from electrolyzers can also be observed in the recent competitive solicitation issued by the Energy Commission in fall 2010, in which no on site electrolyzers were proposed.**

(Response: Wrong again. They are not favored, they are the only option that you are funding because the Industrial Gas Industry (IGI) – ALL SMR!, are the only people you are listening to. Everyone I speak to – gas station owners, environmentalists, energy security experts, prefer on-site generation and do not like the space requirements of delivered hydrogen, also on-site needs less footprint for storage, as it generates as usage requires.)

**The same SB 1505 requirements for renewable hydrogen that were discussed under "Steam Methane Reformation" apply equally to electrolysis. Given that electrolysis does not use methane, renewable natural gas is unlikely to play a significant role in ensuring renewable hydrogen from electrolysis.**

(Response: Misleading: There is no such thing as renewable methane, not the kind that the industrial gas companies are using – landfill gas! Dependant on trash disposal in landfills – under reduction with recycling programs nation-wide, but especially in California.)

**Pairing electrolysis facilities with distributed renewable electricity generation is a more likely avenue for compliance.**

(Response: Wrong – Distributed generated renewables are unlikely to work with on-site power generation, at least not in an urban environment, possibly in rural areas for home or ranch off the grid generation. A more successful paradigm is distributed on-site, on-demand fuel production through electrolysis utilizing PPAs from IPPs through special purpose co-ops, is much more viable and is the preferred approach by every knowledgeable expert in the field.)

**Among the items the ARB is investigating before establishing its requirements is whether and how renewable electricity will be applied to this mandate as a feedstock.**

(Response: PPAs w/IPPs is the only practical approach.)

Upstream Fuel Infrastructure

**Today, centralized hydrogen production with truck based delivery to the fueling stations is more cost competitive than on site production, particularly on a cost per kg basis.**

(Response: Wrong Again! Based on what data? Sounds like you drank the IGI kool-aid! That is so wrong in so many ways! I don't know where to begin? Renewable On-site: Eliminate the footprint for storage; eliminate the cost of transportation; eliminate the fossil fuel used to deliver, and the pollution associated; eliminate the labor costs required for delivery; eliminate the amortization and cost of delivery trucks and associated infrastructure and insurance costs; eliminate the labor costs associated with the station; eliminate the wear and tear on the roads; eliminate insurance costs for transport; the liability for potential accidents associated w/delivery. There are probably many more, but for brevity, that seems enough for now.)

**This approach allows large amounts of fuel to be produced at relatively low cost and allows for significantly reducing the cost for each fueling station because much equipment is only at a single central filling station, and not at each fueling station.**

(Response: I refer to my earlier argument again: "This is a misleading argument. It does not take into consideration what happens when it reaches full market penetration, the cost will go through the roof. This is because the process is less efficient than electrolysis – up to 88%, as opposed to 50% for SMR. The cost of NG will go through the roof once we add transportation to the supply. The reason it is cheaper now, is because their industrial gas customers subsidize the process. Every emission produced by SMR is captured, processed, purified and sold to other industrial gas customers, i.e., oxygen, CO2, Nitrogen, SOx, etc. Once they reach quantities that exceed demand of the marketplace for those gases, which will happen relatively soon after the vehicles catch on, those gases will need to be vented, raising by large amounts the pollution footprint of the process, as well as raising the cost of the product as well. Does anyone over there ever think of these factors before writing these reports? Or do they just cut and paste from the industrial gas producers PR brochure.")

**On site production has proven to be a relatively high cost option, in part because of the high maintenance that on site SMR units require and also given the relatively small amounts of fuel they produce.**

(Response: Again, I refer to my earlier statement: "Wrong! I don't know whom you are talking to again – the IGI? Maybe it's the Electrolyzer systems you or the project developers are choosing. The ones I am talking about are 88% efficient, and operation hours of 60,000 hours before any major maintenance is required. That's 7 years! Show me an SMR system that can beat that! Or just match it! How about even get in the ball-park! How about 30,000 hrs?? Not a chance! Actually, from a practical, energy security, operational viability, and economic, and viable infrastructure perspective, on-site, on-demand, electrolytic hydrogen fueling is the only viable, short term and long term paradigm of any alternative than can work. He systems I am speaking about can currently operate at production levels of 300 – 500 kg/day w/little maintenance required.)

**There are multiple pathways for connecting centralized hydrogen production with fuel dispensing stations. Air Products, an in state hydrogen provider, developed the first of these pathways. The hydrogen is produced in a centralized facility, purified by pressure swing adsorption, and then compressed and filled into tube trailers at a central filling terminal located at that same facility. The tube trailers serve as means of transportation and on site storage at each fueling station. The trailer is connected to the on site equipment, including compressors (for increasing the fuel transport pressure to the dispensing pressure) and the dispenser to allow fueling of FCVs. Once depleted of hydrogen, a trailer is replaced with a newly filled trailer.**

(Response: Wrong, AP did not develop the first of these pathways for hydrogen fueling. Praxair provided the same kind of hydrogen for their project in 1994 as back-up hydrogen for the fueling station in case the system went down. CAN (Clean Air Now) and the CAN Team did the first pathway and it was on-site, on-demand, clean, renewable/sustainable hydrogen fueling. I know, I was the Project Developer and Project Director for the project, and it was the first of it's kind in the world. Back in 1994, and it was renewable electrolytic fueling. Not fossil fuel hydrogen.)

Another in state provider of hydrogen, Linde, has developed a different delivery system for its hydrogen. Its process produces liquefied hydrogen, which is filled into tanker trucks. These trucks deliver the hydrogen to fueling stations where the liquid hydrogen is pumped into a large on site tank. Liquid hydrogen is super cooled, and therefore, these tanks are built with thick, double steel walls. **The equipment at the fueling station includes vaporizers, which turn the liquid hydrogen fuel into its gaseous state on demand.**

(Response: Vaporizers produce losses of hydrogen through the process. No such problem exists with on-site electrolysis fueling.)

Intermittent storage in tube stacks assures an immediately available supply of fuel at the necessary pressure. Compressors regulate the availability and correct pressures of fuel for dispensing.

(Response: This was written by the IGIs. Wasn't it? It's like right out of their brochure or white paper! How quaint!)

Fueling stations with hydrogen production and fueling configurations located on site have been demonstrated over the past decade. These stations required no upstream infrastructure, as the production of hydrogen is collocated with fuel dispensing.

**However, both electrolyzer and SMR on site systems have significant downsides. They produce only small quantities of hydrogen and they are very cost intensive and known to be relatively high maintenance technologies.**

(Response: Wrong for Electrolysis, correct for SMR. How many times are you going to state this in one report. Do you feel that if you say it enough, people will begin to believe it? I get it, since Industrial Gas Companies want to monopolize the fueling infrastructure through centralized generation, they don't care about on site SMRs. So they don't care that they undermine on-site SMR, so long as they also undermine on-site Electrolysis. On-site SMR is exactly as you describe, lot's of heat, and wear and tear, lot's of moving parts to wear out. Using a combustible gas as your feedstock, heating it with steam, as well as burning it to make the steam to produce another combustible gas for fueling – hydrogen. Not exactly what a service station wants to deal with. Lots of maintenance all the time, and lots of space – large footprint. Electrolysis is clean, very small footprint, no moving parts in the whole system, except the compressor, and with a back-up compressor in place, very little down-time or maintenance needed.)

Given today's modern requirements for capacity and peak fueling, an on site SMR unit would need to be very large, which may not necessarily be feasible at existing gasoline stations due to lack of space.

(Response: could not have said it better myself. The most accurate statement about hydrogen stated in this report.)

**In recent years, California has seen a decline of on site production fueling stations in favor distributed models with central production.**

(Response: Stop using "Distributed model", It's very misleading, because "Distributed" refers to distributed generation, the favored approach of all environmentalist, scientists, civil engineers, and infrastructure specialists! It sounds like you are trying to link to that as some kind of environmentally preferred option, or maybe it's a cut and paste from an IGI white paper you are using to write this report. Typical industry "Green Washing" tactics. Stop trying to mislead the public. Besides, the reason you have been seeing a decline in such systems is because you guys and other agencies, have drunk the IGI kool-aid, and are trying to end funding for anything else.)

**This can also be seen in the recent competitive solicitation issued by the Energy Commission in fall 2010, in which no proposals with on site production were submitted.**

(Response: One RFP you release for this effort with an incentive for on-site fueling, and you want to throw in the towel? I am sorry I could not submit last time, we were not ready at the time. We needed to get more locations lined up. We don't have $5,000.00 per station to bribe station owners. I have to recruit them on the merits. Don't worry; you'll see one from me for the next one. Just don't try to make it more difficult by throwing more barriers in the way.)

## Localized Fuel Retail Infrastructure

*Private Fleet Fueling Infrastructure*

**Subsequent to the 2008 2010 Investment Plan, the Energy Commission provided $22 million to establish hydrogen infrastructure based on information available from public agencies, public and private organizations, and other stakeholders.**

(Response: It was supposed to be $40 mil, and the CEC have yet to spend $40 mill in the 3 years of this program! It was supposed to be $40 mill/yr. The CEC have yet to live up to the spirit of the program, much less that the letter.)

**The 2010 11 Investment Plan included up to $13 million allocation for hydrogen fueling stations, which has been reduced to $10.2 million due to revenue shortfalls. Based on the 2010 solicitation, the Energy Commission anticipates that this amount should be able to fund five to seven additional stations.**

(Response: What about the rollover from 2010. What happened to those funds! In the last committee public meeting we were told that the $8 mill. would be combined with the $10 mill. To have an RFP of at least $18 mill. What happened? Is that still the plan?)

## Recent Improvements to Fueling Infrastructure

**Earlier hydrogen fueling stations were built at a costs ranging from $3 million to $6 million per station. This relatively high capital cost has been identified as a major hurdle in establishing a viable hydrogen fueling network in California. To address this and encourage equipment providers and project proposers to take steps in lowering the cost, the 2010 solicitation used a "sliding scale" performance incentive mechanism. This tool rewarded projects with a higher share of match funding the lower the overall price tag for each single fueling station was. The successful outcome of the incentive lowered the price range for the proposed stations to about $2 million to $3 million for each station. In general, there are signs of decreasing cost for stations as the industry develops innovative production, distribution, and retail supply strategies that are more cost efficient. For instance, more modular, "all in one container" designs as well as shifting some equipment to a central production/filling location instead of at each site can contribute to these decreases.**

(Response: Not a chance in hell if we go with central generation. The only way that central generation is more efficient or even close to as economical as on-site generation is with an extensive pipeline infrastructure to every service station in the country – at an infrastructure cost in the $trillions. Not very economical. Unlikely in less than 50 years. On-site, on-demand electrolytic fueling is the only viable option of any alternative fuels or transportation.)

## Light-Duty Fuel Cell Vehicles

**Several OEM have FCVs readily available and are planning to build these for lease to selected customers. Toyota announced on January 13, 2011, that it is on schedule to sell hydrogen cars by 2015 or sooner in California, Japan, and Germany. It also announced that it has cut the cost to make hydrogen vehicles to less than $100,000 and aims to cut that cost in half (to $50,000) by the time sales begin.**

(Response: DOE & Industry experts project a cost of $53.00/kw for massed produced FCEVs. That makes it competitive with ICEVs, something that BEVs will never achieve, which is $300.00 - $400.00/kw massed produced – as per Toyota and others.)

**While some of these cars are still used today and other OEMs have experimented with HICEV as well, the technology has been observed as relatively high maintenance and low range. Accordingly, it does not seem likely that HICEV will become the prevalent hydrogen propulsion technology in the near future.**

(Response: Not true. When done correctly, HICEVs are very economical, get increased gas mileage (25% - 30%), requires little maintenance, and after 20,000 miles, showed that the oil was as clean as the day it was filled, and spark plugs were as clean as the day they were installed. The vehicles we converted for the CAN project got 150 mi/tank at 3500 psi. Increased to 5,000 psi, the range increased to 250 miles. So, all in all, except for the efficiency that FCEVs have, HICEVs are every bit as viable as FCEVs. The cost/mile is higher than fossil fuels as well. That makes the economic case for FCEVs. However, as the cost of hydrogen from renewables from on-site fueling comes down to about $2.00/kg, (about 10 years if we continue to deploy and advance the technologies and drive the renewables market), they won't have the economic disadvantage of being more expensive than gasoline and other fossil fuels.)

**Table 14: Hydrogen Funding Allocation**

| | |
|---|---|
| Hydrogen Fueling Infrastructure | $8 million (should be $40,000,000) |
| Medium- and Heavy-Duty Advanced Vehicle Technology Demonstration | *See Medium- and Heavy-Duty Vehicles Section* |
| Total | $8 Million (should be $40,000,000) |

General Response: I have never seen a business plan or investment plan from anyone that goes to such extremes to discourage investments in the very things they are investing in??? The CEC is supposed to make the case for hydrogen, not discourage it? After all the CEC is providing funding for it, and the Gold Standard for clean fuels is clean, renewable/sustainable, on-site, on-demand, electrolytically generated hydrogen fueling. You need to be supportive of it, not dismissive. There is a biased against hydrogen, and it is clean, renewable/sustainable, on-site, on-demand, electrolytically generated hydrogen, because this plan looks like it was written by the Industrial Gas Industry. Not the State of California government energy agency!

You need to make changes to the tone, as well as correct the inaccuracies in the plan. Otherwise, it will become apparent to most that read it that the Industrial Gas Companies wrote it, whether they did or not. That is what it will appear to be at least.

Sincerely,

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