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11-IEP-1L

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November 30, 2011

California Energy Commission
Dockets Office MS-4
Re: Docket No. 11-IEP-1L
1516 Ninth Street
Sacramento CA 95814-5512

Subject: 2011 IEPR – LCFS Analysis

CEC IEPR Staff:

Thank you for the opportunity to submit comments on the November 14, 2011 Staff Workshop on the Role of Alternative Fuels in California's Transportation Energy Future, held in preparation of the 2011 Integrated Energy Policy Report (IEPR). We appreciate the effort staff has made in conducting the analysis.

Our comments below focus on the projected costs of hydrogen and fuel cell electric vehicles (FCEVs), as presented in the "Perspective & Context of Historic Demand and Alternative Fuels" presentation. We believe these costs have been overestimated for the purposes of the IEPR.

Hydrogen Fueling Stations Costs:

Over the past few months, Energy Independence Now (EIN) has been intimately involved in a collaborative process to develop a system to install hydrogen-fueling stations in the state. Through this process, we have collaborated with industrial gas suppliers, UC Davis, UC Irvine, the National Renewable Energy Lab (NREL), oil marketers, and automakers to develop a model to capture the expected hydrogen infrastructure build out costs. While we cannot predict future station costs with absolute certainty, we can definitively say that industry fully expects hydrogen fueling station costs to decrease.

The analysis presented in the Perspective & Context of Historic Demand and Alternative Fuels presentation relies on a costs collected from 2010-2011 AB 118 Applications, which represent *pre-commercial* stations. A cost of \$2,798,408 per 240 kg/day station is not representative of expected early commercial stations, resulting in substantial overestimate of hydrogen costs in the IEPR.

Based on our work with UC Davis, we have used the following capital costs in our modeling efforts:

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Time frame	Capital Cost	Annual O&M cost \$/yr
<u>Phase I (<2013)</u> 100 kg/d -> 170 kg/d 250 kg/d (has more ground storage)	\$1 million \$1.5 million	\$100 K (fixed O&M) + 1 kWh/kgH ₂ x kg H ₂ /yr x \$/kWh (compression elec cost) + H ₂ price \$/kg x kg H ₂ /y (H ₂ cost delivered by truck)
<u>Phase 2 (2014)</u> 100 -> 170 kg/d 250 kg/d	\$0.9 million \$1.4 million	Same as above
<u>Phase 3 (2015+)</u> 100 -> 170 kg/d 250 kg/d 400 -> 500 kg/d	\$0.5 million \$0.9 million \$1.5-2 million	Same as above

These costs have been verified by industrial gas companies and are in line with NREL's preliminary findings on a blind survey they conducted with a number of gas suppliers.¹ At worst, in 2013, industry expects a 250 kg/day station to cost \$1.2 million less than the costs collected based on 2010-2011 AB 118 applications. By 2015, a 400 to 500 kg/day station is expected to cost \$1.5 to \$2 million to install. We believe that incorporating these costs into your analysis will show a more realistic representation of the costs associated with hydrogen fueling stations.

Fuel Cell Electric Vehicle (FCEV) Costs

While we cannot predict the purchase price of commercial scale FCEVs, we believe that a \$50,000 incremental cost of FCEVs, when compared to a gasoline engine, is overly conservative. Toyota has already reduced the production costs of its FCEV prototypes to \$100,000 and aims to halve that price by the time commercial production and sales begin in 2015.² Hyundai is aiming to sell its FCEVs below \$50,000.³ For reference, based on 2012 model pricing, a \$50,000

¹ NREL has not yet published data, but has verified that our estimates are in the ballpark of the early estimates they found with their effort.

² <http://www.bloomberg.com/news/2011-01-13/toyota-advances-hydrogen-plans-amid-industry-s-battery-car-push.html>

³ <http://www.autocar.co.uk/News/NewsArticle/AllCars/250265/>



incremental cost would put a Toyota Highlander FCEV at a cost of \$78,000, or \$28,000 over their 2015 target cost.

Again, thank you for your work on the IEPR and the opportunity to submit comments. We urge you to adjust your hydrogen and fuel cell vehicle cost projections to more accurately reflect industry capability, and are available to provide staff with resources and information.

Sincerely,

A handwritten signature in black ink that reads "Tyson Eckerle".

Tyson Eckerle
Executive Director