


<b>DOE Hydrogen and Fuel Cells Program Record</b>		
<b>Record #:</b> 15011	<b>Date:</b> August 20, 2015	
<b>Title:</b> Low Volume Production and Delivery Cost		
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**Item:**

The current cost estimates for producing, delivering and dispensing (untaxed) hydrogen at 700 bar for fuel cell electric vehicles (FCEVs) in the near term market are between \$13–\$16/kg without incentives.

**Central Production and Delivery:**

The current cost of hydrogen produced at a central production site and delivered to a station via gaseous or liquid truck within 200 miles of the point of production at delivered volumes of 500–1000 kg/month is reported to be between \$6.00–\$8.00/kg in 2014\$.<sup>i</sup> This assumes that the production plant and the delivery infrastructure are already in operation and fully utilized through other markets.

**Compression, Storage and Dispensing at the Station:**

The additional cost to compress, store and dispense hydrogen at 700 bar refueling stations for the light duty vehicle market is estimated to be between \$6.50–\$8.00/kg for a 300 kg/day station.<sup>ii</sup> This range accounts for low (~10%) utilization of the station in the early market ramping to full utilization as the market matures.

**Results:**

Adding these two costs together the untaxed cost of hydrogen from central production and dispensed to 700 bar light duty FCEVs is \$12.50–\$16.00/kg.

**Price at the Pump:**

The selling price at the pump was documented at \$13.59/kg at the first fully retail station in northern California on January 22, 2015 and \$15.00/kg at a station in southern California on February 25, 2015. The impact of the 85% capital incentive from the California Energy Commission (CEC) on the hydrogen cost is approximately a \$3.50–\$4.50/kg decrease in the station cost contribution.<sup>iii</sup>

**Table 1: 700 bar Hydrogen Fuel Cost**

	Production and Delivery Cost	Station and Dispensing Cost	Total Cost
Without incentives	\$6.00 – \$8.00	\$6.50 – \$8.00	\$12.50 – \$16.00
With 85% incentive	\$6.00 – \$8.00	\$2.00 – \$4.50	\$8.00 – \$12.50

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<sup>i</sup> This estimate is based on actual costs provided by industrial gas suppliers and end users to DOE managers. The estimate is inclusive of both gaseous and liquid delivery.

<sup>ii</sup> This is based on the results reported in the H2FIRST Reference Station Design Report in Table 8 scaled to 2014\$ and rounded to the nearest half dollar (<http://www.nrel.gov/docs/fy15osti/64107.pdf>). These results were derived by simulating near-term station designs in the Hydrogen Refueling Station Analysis Model (HRSAM, [http://www.hydrogen.energy.gov/h2a\\_delivery.html](http://www.hydrogen.energy.gov/h2a_delivery.html)). HRSAM's algorithms to calculate station costs are based on significant input from original equipment manufacturers (OEMs) and station developers in the hydrogen industry.

<sup>iii</sup> The impact that the CEC's 2014 incentive has on the levelized cost of hydrogen was determined using HRSAM. The station designs provided in the Reference Station Design Report were simulated in HRSAM, with the assumption that 85% of funding is from the CEC.