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Geothermal Power Generation as a Means to Obtain Renewable, Emissions-Free Hydrogen

I want to address 2 questions listed in the workshop agenda:

1. How should fueling infrastructure planning requirements regarding siting, accessibility, safety, distribution, and throughput be approached? and
2. How should renewable hydrogen procurement requirements be approached?

The point I will make is that there is significant potential to achieve renewable, carbon-free hydrogen production through the use of geothermal resources within and adjacent to the footprints of both the Port of Los Angeles (POLA) and the Port of Long Beach (POLB).

It has long been recognized that evidence exists for high temperature geothermal fluids in this area. However, since emphasis in this region has been on oil and gas production, little attention has been paid to this renewable, emissions-free power source. Obviously, the time has come to seriously reconsider this potential.

Three lines of evidence point to the existence of local geothermal resources at modest depths in this area.

1. In the early 1940s an exploration well to evaluate the possibility of deep oil reservoirs was drilled near the Huntington and Wilmington oilfields. But, drilling had to be terminated because it encountered temperatures exceeding 420 F at depths of ~9,000 feet. Such temperatures at that shallow depth are very unusual. Because such temperatures destroy oil, and oil was the interest, the pursuit of deep oil in this area was abandoned.
2. Recent studies published in the scientific literature have documented the presence of chemical and isotopic properties of fluids that are characteristic of fluid movement from very deep levels "more than 20 miles down. These fluids occur within fault zones and are within the same geological structures that the high temperature well I just mentioned was drilled.
3. Very recent computer models of a portion of the Wilmington oil field in the vicinity of the deep hot well gave results that were nearly identical to those seen in that deep well, despite the fact these models were run completely independently of that prior data.

These results suggest that multiple 10 MW to 50 MW geothermal power plants could be built within the footprint of each port, for the purpose of producing renewable, emissions-free hydrogen.

I would like to suggest that an important research area to consider should be rigorous, quantitative assessment of the potential for geothermal power generation dedicated to hydrogen production within and proximal to the POLA and POLB footprints. This research should address:

- 1) 3D mapping of the resource at high resolution;
- 2) evaluation of the immediate and levelized cost economics of such power production;
- 3) infrastructure requirements to achieve efficient fuel distribution;
- 4) how best to manage power production among different additional potential

applications such as desalination, micro-grid loads, and feeds into the greater Los Angeles power grid.