

**Hearing called by PUC about the electricity surcharge for HELCO and HECO rate payers, to subsidize AKP's biofuel – Kailua-Kona, HI, 2 August 2011. Comments by**

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**PROBLEM:** HELCO-AKP's proposal is to have rate-payers subsidize production of 16 MGGE/y (Million Gallons of Gasoline Equivalent per year) with a surcharge of 1/3 c/kWh on some 10 billion kWh, which is equivalent to some ~33 M\$/year or worth ~2 \$/GGE.. Do I think that is fair? I do not yet. Let me tell you why.

**COMMENTS:** I am a semi-retired chemical physicist and analyst, but will try to make my comments as easy-to-understand as possible, and be as constructive and helpful as a rate payer should be – to help our one and only utility make smart choices, which we hope will be a win-win for all. In that spirit, let me make the following 6 separate points:

1. **Fossil Fuels** -- We all want to get away from high-priced, imported fossil fuels of uncertain availability. This will not be easy, so that we really have to work together very hard.
2. **BioFuels** -- Few of us would disagree that biofuels are important components of the mix of clean and sustainable energy sources and solutions we should strive for.
3. **Work Together** – By way of background and after (a) reviewing the history of this AKP project, (b) reading about a HELCO's Keahole Power plant project and (c) my personal experience with HELCO's unwillingness to share operating, benchmarking and accounting data, makes me believe that we have to create an environment in which we can brainstorm and work together more openly and harder than before, to listen to each other's concerns more and respond to questions received in a more timely manner.
4. **Inform Ratepayers** – (And I am coming now to the meat of my comments) -- What comparative benchmarks has AKP provided and what options were considered before AKP and HELCO selected the path they are requesting approval for? In that respect I just have three questions:
  - How do we know and validate that AKP's process is not efficient enough to produce and sell bio-fuel for ~2 \$/GGE, which would not require rate-payer subsidy? Lets call this plan "A"
  - How do we know and validate that AKP could not produce electricity directly for HELCO, leading to a lower kWh retail price of ~12 c/kWh; or why not sell AKP's biomass as pellets for HELCO's boilers? Lets call this plan "B"
  - What alternatives like other bio-processes or geothermal electricity generation have been considered, the latter also offering a lower-cost electricity retail solution? (Plan "C")

Let us consider one alternative "B" in more detail -- the one in which biomass is converted to electricity, either at AKP or at HELCO. (Option "A" is the subject scenario w/o subsidy):

- Assume that the input to the AKP-HELCO system is biomass at 50 \$/ton\*,
- Biomass is then converted at 25% efficiency, to either a bio-fuel costing ~1.3 \$/gal, or ~4 c/kWh. The math is simple:  $\text{Cost} = 50 / (2000 * 8000 * 1054 / 3600000) / 0.25 = 0.042 \text{ $/kWh}$ .
- Amortization of the 320 M\$ capital over 7.5 years plus O&M costing, and yielding a levelized, 30-year ROI of 10%/y may increase the AKP electricity by 3-4 c/kWh to ~ 8 c/kWh.
- HELCO's distribution and overhead costs may then result in a retail price of ~12 c/kWh.
- However – if HELCO makes electricity with 2 \$/GGE fuel at 30%, we end up with 21 c/kWh even before amortization, O&M and distribution costs, ending up again at the old retail price of ~30 c/kWh, which no one likes.

We would encourage AKP and HELCO to inform us about such relevant analyses they must have made, so that we can jointly contribute to arriving at informed choices. If my numbers need corrections, I'd welcome any such information.

\* biomass "prices are in the \$50 to \$65 per ton range in the US ,“ see

[http://www.khoslaventures.com/presentations/What\\_Matters\\_in\\_Biofuels\\_2011.pdf](http://www.khoslaventures.com/presentations/What_Matters_in_Biofuels_2011.pdf)

5. **Available Options:** (A) Continue to use fuel (fossil or bio) to make electricity to retail at **30 c/kWh**  
(B) Convert biomass directly to electricity to retail at **12 c/kWh**  
(C) Use existing and new geothermal sources of 12 to 6 c/kWh to retail at **16-10 c/kWh**  
Clearly, "B" and "C" are options of much lower \$/kWh cost than "A", all without federal or people subsidies.
6. **Call to Action:** My colleagues and I would be happy to sit down with PUC, HELCO, AKP to help explore, qualify and quantify available options. However, engaging in a substantial effort and energy loss of 30-60%

to make fuel to then convert it to electricity with another 60-70% loss is a losing proposition when direct and much more efficient **“biomass-to-electricity” or “geothermal-to-electricity”** conversions are available for stationary power plants. Bio- and geo-to-H<sub>2</sub> fuels should only be used as road, air and marine transportation fuels, where direct conversion of biomass to engine power is much less available or practical. Lastly, lets also work together to transmit and make use of extra wind and geo electricity, presently curtailed and not needed by the grid, to make such transportation fuels from air and water: CO<sub>2</sub> from air and H<sub>2</sub> from water + energy >> renewable fuels such as gasoline, aviation fuel, diesel and/or ammonia. Lastly, let me put in a plea to AKP to disclose the nature of the emissions they expect to get an EPA permit for 250 tons/year (760 ppm of biomass weight) for each component or for total noxious emissions?