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To: Dan Breedon

Fr: Ed Miller

Subj: Increased emphasis on forward looking creativity, crystalline water, LED's dark side, going off the grid

Ref A: Bill Moyer's, Passion & risk, Interview with Sara Lawrence-Lightfoot (Harvard), PBS (KIXE) 8/7/09 9-10PM (See also the program Earth on Edge available on the PBS website as audio or video)

Ref B: G.Pollack, New form of water, Research Channel 9/9/09 8-9 PM

Ref C: R. Stevenson, the LEDs Dark Secret, IEEE Spectrum, Aug 2009, pp26-31 (See also http://www.spectrum.ieee.org/the -leds-dark-secret)

Ref D: S. Adee, Empire off the grid, IEEE spectrum Aug 2009, pp34-39

Highlights and comments:

1. In Ref A, Moyer focuses on the newer generations and scattered oldsters who believe they solved many intransigent problems in the past and can knock off current and projected problems of the future. Lightfoot believes that an increased emphasis on forward looking creativity is the key to making our democracy function. As of this date the audio and video of this program is not on line. Moyer provides a BLOG for online feedback.
2. Per Ref B, water can form a gel 2-3 million molecules thick near a surface that offers the possibility of new forms of water purification treatment, electric power generation and a new understanding of biologic processes like photosynthesis and chemistry in general.
3. Per Ref C, pushing LED light sources output past 100 lumens/watt at a reasonable cost is proving difficult. We have clearly advanced well past the 16 lumens/watt of the incandescent bulb (75 lumens/watt for CFLs) but there is hope that up to 300 lumens/watt may be achieved with improved understanding of the mechanisms of "droop" in LEDs. Schubert's team at Rensselaer Poly using aluminum gallium indium nitride claim to have reduced droop by 25%. This is big business and the key to achieving near-zero average energy building structures.
4. Ref D offers an expensive example of average zero-net energy scheme for North Dumpling Island between Connecticut and Long Island. Wind, PV, deep discharge lead acid batteries, super Insulation, fancy controls and LEDs are key elements in the electrical/thermal design. Vapor-compression distillers using waste and sea water generate 1000 liters/day of medical grade potable water. An external combustion/Sterling engine provides backup power and heat.