ASK THE EXPERTS: Propane vs. Electricity

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I am a full-time solar dealer in California. Prospective solar-electric customers concerned about how to make the best use of energy in their homes often ask me whether they should swap their propane house furnace for an electric one. I have been very reluctant to support this idea, since my understanding was that an electric furnace would use too many kilowatt-hours to make this a better solution financially, and that propane was simply more cost effective. However, I continue to get the calls, and propane continues to get more expensive. Are there any current studies that have compared costs between propane and PV-based electric home heaters?

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This used to be a no-brainer. Historically, in most parts of the country, propane heat has been somewhat cheaper than heat from utility-supplied or PV-generated electricity. Lately, however, the cost of propane has skyrocketed, eliminating its economic edge over electricity for home heating in many places.

Propane contains 91,547 Btu per gallon. A typical furnace will convert about 85% of that to heat, which means that 1 gallon of propane provides about as much heat as 23 kilowatt-hours of electricity.

If propane costs $2.40, then electric resistance heat is cheaper if grid electricity costs 10 cents per KWH or less. An air- or ground-source heat pump could multiply the electrical energy into two to four times as much heat, making electric heat even more competitive. But air-source heat pumps are only recommended for mild climates, and ground-source pumps can be costly to install. To run your own numbers, download this spreadsheet: www.eia.doe.gov/neic/experts/heatcalc.xls.

How about using solar, hydro, or wind power for heat rather than propane? For decades, cheap propane has been the dirty little secret of "independent living," the convenient, flexible fuel that can run a generator, fridge, clothes dryer - you name it. But cheap propane, like cheap oil, is gone and probably not coming back.

Would it ever make sense to use solar electricity rather than solar thermal and passive solar design for heat? Perhaps, if you owned a small, super-insulated house in a moderate climate, although the economics of this are a stretch. But off-gridders who own a large wind or hydro generator could use their surplus this way.

Looking ahead, I expect the price of propane to increase more rapidly than that of electricity. Propane is a by-product of natural gas production. Although 30,000 gas wells were drilled in the United States last year, domestic production has fallen since 2003. The question of how best to heat buildings is destined to be a big topic in decades ahead. Those towering skyscrapers in big cities? The truth is that no one has any idea how they will be heated in 2050.

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