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Can 100% renewable energy by 2045 be reliable, affordable?

By **Clint Churchill**
and **Ed MacNaughton**

A recent letter to the editor compared the cost of utility scale electricity production with the ratepayer cost of about \$0.33 per kilowatt hour ("Clean energy transition needs to happen now," Star-Advertiser, March 16). The wholesale vs. retail comparison overlooks significant components of the electricity we depend on, including transmission, grid management, maintenance, installations, administration and an allowable return to Hawaiian Electric investors.

The comparison brings up two important issues. The goal of 100% renewable electricity by 2045 was established, in the words of one legislator, without having done any due diligence as to how this was to be accomplished. While climate change is real and this 100% goal is

both noble and aspirational, there are two critical factors that must be understood by all: dependability and affordability.

The state Public Utilities Commission (PUC) is charged to oversee HECO, in part, to ensure 100% dependable electrical service. Brownouts and blackouts are unacceptable. To get to 100% renewable on Oahu, solar is by far the most viable option. Windmills have become problematic due to the visual blight, health concerns and strong pushback from rural communities.

The challenging issue with solar is that we have cloudy days. Energy from the sun is great, but it is an intermittent resource and thus not dependable. Let's say most days in 2045 are powered by renewables — perhaps 80% or more from solar. But when we get three consecutive cloudy days, where will the energy come from? HECO's utility scale

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Kailua resident Clint Churchill, left, and Kahala resident Ed MacNaughton represent the Practical Policy Institute of Hawaii.

solar "power purchase" providers typically provide battery backup for only four times their peak capacity which, on a sunny day, translates to less than a full day's electricity production. This stored electricity is typically consumed the same day it is produced so HECO can meet the peak demand hours between 6 and 10 p.m. There will need to be a source of "firm

power" if we want the same level of reliability as currently provided.

Enter the issue of affordability. It's becoming apparent that achieving dependability will be quite expensive. Install huge battery farms? Burn trees? Find some other nonfossil fuel? Space in this article won't allow exploring each, but a utility scale battery farm under construction at Kapolei is instructive. At a cost of some \$200 million, the battery farm (once charged from whatever source) will provide about 3% of Oahu's total demand — for one day.

If half of Oahu's electricity demand in 2045 is provided by other sources on cloudy days (such as some solar production, wind, HPOWER and homeowner batteries), this battery farm would provide only 6% of demand. Will it take 16 of these battery farms to achieve dependable power for one

day? Or 48 for three cloudy days? Or is there another plan to significantly increase coupled battery storage in HECO's future solar power purchase agreements? Now add in the increased demand to charge electric cars and trucks in the expected vehicle transformation. Could we be painting ourselves into a multibillion-dollar corner if we count on battery storage? There can be no doubt that this cost — plus a return — will be repaid by HECO's customers.

The point of this article is that there's far more to meet the eye than simplistically comparing the per-kilowatt-hour cost of utility scale solar farm production with the rate paid by the customer. This is a complex and perplexing challenge that will need to be addressed by the Legislature, the PUC, HECO and all of us in the community in the years ahead.