Thoughts on “HARVEST”

by Dave Youssef

We commonly think of an energy grid as a distribution system for energy produced in a power plant, or some other centralized source, to be sent out across a vast swath of territory to power individual households, workplaces, and other infrastructure. But in recent days, the adoption of renewable energy technologies for individual household use has altered how energy grids are perceived. Once energy is *produced* from multiple nodes within a grid’s distribution network, it becomes possible to see such a network as something resembling more of a “bank” than a delivery system. When someone feeds the energy they produce from, say, a solar panel into the grid, it is not *physically* being stored there for that person’s future use. But, because the energy is then traded either for cash or credit, this is effectively a way of “storing” the energy that cannot be used at the time it is produced, for a time when it *can* be. However, many utility companies have sought to prevent their customers from becoming energy producers by tacking on fees and extra costs when they try to transfer their energy to the grid, effectively working to privatize the infrastructure. The future of renewable energy partially hinges on our ability to store it, and if the grid is becoming increasingly privatized, this stands in the way of people taking the initiative to produce their own energy.

The tech-art installation “Harvest” explores the possibility, as well as perhaps the necessity, of finding other ways of using existing infrastructures, grid-like or otherwise, to store or trade harvested renewable energy. “Harvest” uses wind energy to power a computer, connected to the internet via satellite or 4G uplink and souped-up with the most advanced graphics card, to mine the cryptocurrency Zcash. Currency-miners compete against one another with the most sophisticated gear to be the first to solve math problems generated by the Zcash software, and whoever wins will receive a newly minted unit of Zcash currency in exchange. These math problems, in and of themselves, are not significant, but they are correlated with something called a “block-chain.” A block-chain is essentially a list of Zcash transactions that need to be secured and monitored in order to prevent fraud, similar to what a bank would do to ensure the security of its transactions. But Zcash guarantees security for its transactions—and hence the credibility of the currency—by enlisting the processing power from miners’ computers to safeguard the “block” of transactions. Block-chain transactions are protected because a community of observers are all monitoring them simultaneously—even though only one miner per block-chain will actually be compensated for his or her efforts in the end.

Because of the competition inherent within Zcash mining, the gear required to have any chance at cashing in is quite sophisticated, expensive, and very costly in terms of energy. This has cut into the profits of miners significantly, and has forced many to move their operations into regions where energy is cheap or less regulated. “Harvest” tackles this problem by bringing energy costs down to practically zero, but while still using the most competitive gear. While “Harvest” is an experiment in reducing both the costs *and* the carbon footprint of powering the mining process, its deeper significance lies in the coupling of a renewable energy resource with a socially useful process that can provide monetary rewards—but without having to use the electrical grid. Additionally, and maybe most importantly, “Harvest” doesn’t even need to oppose the grid or create something to replace it; the point is simply to store the energy one produces in a socially useful process in exchange for credits, and at same time, to find a use for all the energy one produces, so that it does not go to waste. In this regard, “Harvest” has found a way to use the Zcash mining-system as a kind of “battery” for the wind energy it generates.