**How can the moon give us clean energy?**

by Julia Layton

A few decades ago, the pursuit of clean energy was "green." Now, it's a necessity. Not only is our power consumption propelling the human race toward a hot, watery, lonely end, but clean energy tends also to be renewable. And renewable energy is the name of the game when current primary power sources are dirty, finite or both.

In short, Earth is in an energy crisis, and some experts are looking beyond terrestrial elements for a long-term solution. Some scientists are turning to the moon.

Moon energy is not an entirely new concept. One power source already in operation relies on the moon's gravitational pull to spin its generators. Tidal power plants arranged like hydroelectric dams have been around for decades. They trap water during high tide and then, during low tide, release it through turbines. According to Energy Quest, one plant in France that opened in 1966 still powers hundreds of thousands of homes.

Tidal undercurrents can also spin freestanding "tidal turbines" placed strategically on the sea floor. Still in testing stages, one turbine in Norway's Kvalsund Channel began powering 35 homes in 2003, and a project at the bottom of New York's East River is planned to provide thousands of homes with electricity in coming years. Moon-as-energy-source, though, gets a whole lot more sci-fi than that.

The helium-3 approach to clean energy, on the books since the mid-1980s, isn't even close to viability, but its promise is hard to discount. The He3 ions in the moon's upper crust — about 1 million metric tons, according to proponents — could keep U.S. lights on for about a thousand years, according to Energy Bulletin. All it would take is some nuclear fusion to release the potential.

Oh, and a mass-scale mining project on the lunar surface.

The possibilities are dramatic. The whole thing starts with a fusion reactor, which isn't yet a viable technology. The reactor would combine helium-3 ions to produce helium-4 (the regular stuff found on Earth) and energized protons. According to Energy Bulletin, the process would release no greenhouse gasses. It would, however, produce a whole lot of energy. According to Artemis, the protons produced by a fusion reactor fed with the moon's available He3 could produce 10 times more power than the combustion of every bit of fossil fuel found on Earth.

Here's the rub, though. That He3 isn't exactly "available."

Many challenges face the potential lunar energy source. First, as of 2010, the United States, for one, isn't going back to the moon to establish a permanent colony. That most likely dampens, or at least postpones, any plans to develop an He3 mining project.

What's more, some experts say it's actually pretty difficult to mine He3. It would require heating lunar soil to extreme temperatures that may simply be prohibitive, as far as lunar-mining goes.

And then there's the fact that a large-scale fusion reactor is at least half a century away.

Still, the theory persists. He3 could provide more energy, and more-renewable energy, than current power sources. And all that energy would be so clean, energy credits would be a thing of the past.

At least once He3 replaced rocket fuel, anyway.