Energy storage for microgrids solomon islands

Energy storage for microgrids solomon islands

It turns out there are important economic advantages to including a relatively small amount of non-renewable backup power in a renewable system that might include solar and/or wind plus battery storage. And, this result shows up frequently in HOMER Pro, in many types of system configurations. In other words, backing off from the 100% renewable goal – even just slightly – can produce dramatic cost savings. The reasons are fairly technical but easy to observe in the context of HOMER(R) Pro software.

The Solomon Islands are located in the western Pacific, east of Papua New Guinea and have a population of about 600,000 people scattered among the many islands. More than 75% of the people are engaged in subsistence and fishing. Most goods, including diesel fuel for energy generation, have to be imported at considerable expense. Eighty-seven percent (87%) of the rural population or 495,000 – are without access to electricity. As a result, renewable energy offers the promise of important cost savings to the people of the Solomon Islands.

The Solomon Islands have an excellent solar resource, but like many islands and other parts of developing countries, they have a hard time supplying reliable and affordable power. The loads are either too small or too isolated for an extension of a larger grid to make economic sense. Their challenge is shared by islands and developing countries around the world. In many parts of the developing world the national utility is not supplying reliable and affordable power even to the main cities, but supplying reliable, affordable power with conventional technologies to the smaller, more isolated areas is even harder.

Fortunately, due to advances in renewable power, power electronics, and storage, these smaller more isolated areas now have new options that require new ways of thinking. Instead of simply installing a diesel generator that is relatively cheap to install but very expensive to operate, a system getting the bulk of its energy from solar (or wind) is relatively expensive to install but very inexpensive to operate. It is also a more complicated system because solar and wind do not stand on their own. They require some combination of storage, load management, and/or backup generation to provide consistent, reliable power.

One of the big advantages of these more complex systems is their ability to supply 24-hour power. All around the world there are small diesel systems that only supply part-time power because a diesel generator sized to meet a peak load is horribly inefficient for supplying smaller loads.

The challenge for designing a 100% renewable system comes during the exceptional periods when there are multiple cloudy days in a row. A system large enough to continue delivering the same level of service during those periods would have substantial excess capacity during the other 95% of the time. Alternatively, the level of service could be reduced during those periods. That would require either sophisticated load management or behavior changes on the part of the end users.

Energy storage for microgrids solomon islands

We modeled these alternatives, including an all-diesel case for comparison, and given the capital costs, operating costs, fuel consumption, and carbon emissions of these alternatives, the system with large renewable energy penetration and diesel backup – for those cloudy periods – clearly outranks the 100% renewable system for economic performance.

To all of the people suggesting various biofuels as a way to get to 100% renewables. You are absolutely right that biofuels as a backup to solar and wind can get you to 100%. Most places don’t have enough potential biomass for that to provide 100% of the energy requirements, but a combination with solar (and wind, where the resource is good) is a good pathway to 100%. Now, we just need the biomass power industry to reach a level of maturity that we are seeing with solar. In the meantime, 80% renewable is a huge improvement over the status quo.

We at Ocean Current Energy() have been working on modular portable axial turbines with a rotor diameter of 1-1!/2M that can be launched and serviced and nested from a riverbank that depending on the current speed could each produce a few KWs continuously.

We have had a successful pilot trial in the Solomons of a biomass gasifier dual fueling a diesel genset amongst other things. Fuel was coconut shell & palm chunks. Complete transition to non fossil fuel power is readily achieved within the skills & knowledge of the local community.

Have you also considered the use of pure coconut oil for Diesel engine powered generators?

Islands are becoming the case studies for microgrids. Examples are Puerto Rico and Hawaii among others. In Alaska Kodiak Island is being converted to primarily renewables. One of the lessons learned is discussed in this article about keeping conventional generation available. Nonetheless the amount of renewables is quite substantial in Kodiak. It just took a combination of equipment to make it happen.

Contact us for free full report

Web: https://www.kary.com.pl/contact-us/
Email: energystorage2000@gmail.com
WhatsApp: 8613816583346