Alaska Wildland Adventures

Hydro System at Kenai Backcountry Lodge

Alaska Wildland Adventures is proud to continue working to promote the quiet beauty of the Kenai National Wildlife Refuge. We lessened the dependence on generators at Kenai Backcountry Lodge by installing a hydropower system in time for the 2000 operating season. The system was designed to generate the adequate energy necessary to provide a comfortably rustic experience. Lodge guests are fascinated by the hydro system and truly appreciate the lack of generator noise that is common to most other backcountry lodges.

The hydropower system:

- Took three years of researching and planning.
- Is a very small-scale system that utilizes the power of a nearby creek flowing down its natural course. The creek water travels through a series of PVC pipes and a small turbine to trickle charge the lodge's battery bank.
- Ultimately stores the energy necessary to run all the lights and water in the kitchen, main lodge, and bathhouse as well as lodge laundry facilities (though not necessarily all at the same time!).

Technical Specifics

In the past, Kenai Backcountry Lodge used a generator to charge the batteries, and the batteries powered the appliances necessary to run the lodge. Hydro system in place, the battery bank is now trickle-charged 24/7, providing consistent energy both day and night. The small hydro project consists of creek water traveling through 6“ PVC pipe that drops a total of 18 vertical feet over 200 feet into a turbine. The PVC pipe is lashed to wooden supports that travel above ground and down the hillside from the creek above the lodge. The pipe is reduced to two 2” flexible hoses and finally two 1” nozzles as it enters the turbine. As the water's pressure is elevated, it spins the turbine and the resulting electricity travels through wires that charge the batteries in the bank. The water that spins the turbine continues on its usual course out the other side of the turbine housing and into Skilak Lake. The batteries are stored in a nearby shed and the wires are buried underground. The battery bank consists of 24 six-volt batteries. They are electric golf cart batteries that weigh about 60 pounds each and are connected in a series of four batteries deep.

It takes a bit of extra work, but we haul out the batteries at the end of the operating season so they do not freeze and completely lose their charge over the winter. They are stored at one of our front country locations where they are monitored by caretakers.

The “low drop/high flow” turbine was obtained from a company in New Brunswick, Canada. It is a small turbine that directly and fully charges the batteries. Because DC power comes out of the batteries, we have an inverter that converts the power to AC before it is used by the appliances. There is a power regulator built into the wall next to the Trace 2400 Inverter in a shed where the batteries are stored. The regulator notes the charging level of the batteries and also insures that the batteries do not become overcharged. If there is an overcharging situation, the regulator transfers the power to a heat sink: a series of large resistors with a fan that dissipates the extra energy as heat. As one would imagine, this is not necessary when guests are at the lodge and using power.

To monitor and conserve energy use at the lodge, there is a timer on the freezer. We check the amount of energy stored in the batteries before running the laundry machines. If necessary, we wait until the charge is built back up sufficiently before we do the laundry.

The total cost of the system was approximately $3,000 not including the design time or construction labor.

CJ North, a local resident who lives on Caribou Island on Skilak Lake, designed the system. Alaska Wildland Adventures staff constructed it.

If you have any questions or would like more information, please call Alaska Wildland Adventures at 800.334.8730.

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