

The Statewide Committee for Research honors Alaska's

Northern Innovators



Gwen Holdmann The Dog Musher

Northern Innovators Hall of Fame Member

Bathed in brilliant spring sunshine, 41 sled dogs lounge on and around their plywood-cube houses. Nearby, three preschoolers ride plastic sleds down the hardpack driveway. Gwen Holdmann's husband, Ken Anderson — his face tanned coffee brown, just home from Kotzebue and the Kobuk 440 dog sled race — moves his diesel dog truck so the kids will have a clear run-out.

Facing the toothy peaks of the Alaska Range, the array of solar panels in front of Holdmann and Anderson's log house absorbs enough juice to charge the row of batteries within their home. The wind turbine high on a tower behind the house is idle, its blades calm. With sun pouring over their hilltop homestead and passively heating their house, the family's energy demand is low today, in contrast to the long, dark days just passed.

Even then, during the recent extra-long, cold subarctic winter, the family did not pull any power from the Fairbanks grid. Holdmann, an Alaska resident for more than 20 years, has never written a check to the local utility.

Because there are easier and cheaper ways to live, not many northerners attempt to harvest their own electricity. But Holdmann, the animated dog musher and mom of three, seems to enjoy to punching through snowdrifts and other things in her way.

When she worked at Chena Hot Springs Resort on a number of projects to help the place to energy independence, she refined and improved a chiller system that keeps Bernie Karl's ice museum frozen all year. She also helped him figure out Chena's power plant, which produces electricity from differences in water temperatures and is the recipient of the only R&D magazine top 100 award that has gone to an Alaska project.

Years before, when a Fairbanks employer wouldn't give her five weeks of unpaid leave to run the Iditarod, she quit, mushing away from

her first-ever job with benefits. She has finished both the Iditarod and the Yukon Quest, the premier long-distance dog races in the world.

"I'm pretty stubborn," she says. "When I decide I want to do something, I do it."

Holdmann, 40, is the director of the Alaska Center for Energy and Power at the University of Alaska Fairbanks, a job that seems invented for her. Almost 20 years ago, with a dream of becoming a dog musher, she moved north from Illinois after transforming a full-ride tennis scholarship into dual degrees of physics and engineering.

Pulled to the mushing Mecca of Interior Alaska, her first home was a vacant, rent-free cabin in the Goldstream Creek valley outside Fairbanks. The 10-foot by 10-foot structure, bequeathed to her by a friend, featured no electrical wires or water pipes. Hidden in spruce woods, the cabin was a half-mile walk from where she parked her Chevy Luv pickup. When she needed to start the truck at 30 below, Holdmann aimed the wand of a propane weed burner at its engine.

That experience, embarked upon because the cabin was a good place for her growing collection of sled dogs, was a lesson in appreciation.

"It made me much more aware of how we use energy," she says. "The way I grew up, you flipped on a light switch, plugged stuff into an outlet, turned on a water faucet. I never thought about where this stuff really comes from.

"Living out in that cabin, I couldn't take it for granted. If I didn't chop wood, I wasn't going to have heat. If I didn't go haul water in my bucket from the creek, my dogs weren't going to have water. It made me really, really think about how we use energy."

Every working day now, Holdmann ponders the extremes involved behind the electricity that

flows from wall sockets from Ambler to Annette. She thinks other places with "islanded grids" might have something to learn from Alaska communities that are receiving power from diesel generators, wind turbines and corkscrew-shaped generators suspended in great rivers.

"How do you fit all the pieces — wind, hydro, etcetera — together on the islanded microgrids across the state?" Holdmann says as she gives a tour inside the test facility of the Alaska Center for Energy and Power, located on the UAF campus. "How do we optimize all these different technologies?"

At the center, researchers working with Holdmann simulate the varied sources of power used in communities around Alaska.

"(In our lab) we've recreated all crazy things that happen in the real world — poorly behaved kinds of loads, wind gusts," she says. "We try to break the system."

Researchers at the center want to develop control systems and other strategies to allow smooth operation of complex energy systems typical of rural Alaska. The potential market is immense. More than 1 billion people in the world have no electricity; many of them live in small villages just like Alaska's.

"Manufacturers are really interested," Holdmann says. "How do they integrate their product (like a wind turbine or river-or-ocean-power system) into a real grid? We can really become knowledge exporters to some degree here. How can we apply this to other places in world, as other places become electrified? That's our long-term vision."