



IF YOU CAN'T HANDLE THE HEAT ...

Then don't install a ground source heat pump

By Kirkner

Since the last issue of the Green Sheet (October 2012), we've heard more and more about the benefits of ground source heat pumps, systems using the heat inside the ground, which in Mammoth constantly remains at 63 degrees, to warm interior spaces.

Since our chat with Robert Creasy in the fall, we've now come to find out that not only will a ground source heating expert be coming to town on April 30 to give the kickoff lecture to the Sierra Nevada Aquatic Research Laboratory (SNARL) annual series, but SNARL itself, will be looking into ground source heat for a new classroom currently in the preliminary design phase. So, we thought we'd give you the current breakdown of the past, present and future of ground source heat pumps on the Eastside.

Past

As promised, we checked in with Creasy this spring to see how his first winter with his newly installed ground source heat pump went. Here's what he had to say:

"The system has been running very well and is providing a constant level of comfort that used to take 3-4 cords of wood and a few hundred gallons of propane to achieve.

"It's a bit difficult to assess the cost savings since a lot of our heat was through the hard labor of wood. But we've burned less than one cord (saving about \$900 in wood and a couple thousand more in labor) and have saved probably close to \$2,000 in propane (especially since the system preheats our hot water to 98 degrees).

"The system monitor shows a daily cost of about \$3.50 to keep the house comfortable around the clock and preheat our water — so the total cost to operate is about \$100 a month or \$800-

900 for the winter." Creasy said his past heating cost, including domestic hot water was around \$3,500.

"So to sum it up, I'd estimate that our heating costs are about 25% of what they used to be."

Present

On April 30, John Geyer of John Geyer and Associates, Inc. presents "Heating and Cooling Buildings with Ground Source Heat Pumps: What it is, How it Works, and Why it's Worth Using" at SNARL's opening lecture of the 2013 season. The lecture is being co-sponsored by the High Sierra Energy Foundation.

The Green Sheet spoke with Geyer recently to find out who he is and why we should be listening to him when it comes to this type of technology.

Geyer is a geothermal designer, trainer and consultant who works on community buildings and schools rather than residential homes.

He has 20 years of experience working with the federal government through the Environmental Protection Agency (EPA) and the Department of Energy (DOE). He's also worked locally in Mammoth over the last 10 years designing projects such as the street melt system on Lake Mary Road, and getting involved in the drilling for ground source heat on Alpine Circle for the Mammoth View project.

Geyer explained that "in the Eastern Sierra, heating loads are high, fuel sources are limited and expensive, and the community is forward-thinking, which makes it a great place for geothermal operation."

While the rest of the country has been very conscious of ground source heat for many years, Geyer explained that California is about 25 years behind the curve.

"Things are happening in California,

but slowly," he said, explaining why we're just catching onto the idea, locally, when we're in such a great location to be implementing the technology.

"Ground source heat pumps are like other heat pumps," Geyer said. "But they run on water not air cooling."

In regard to who should be looking at installing ground source heat pumps, Geyer listed the following, "Motivated, self-starting homeowners with land, tax-based public facilities and profit-focused private companies, and the U.S. military."

The land required for homeowners might be the trickiest part of the equation, locally, as Geyer explained that you need the same amount of land as the square footage of your actual home for the vertical drilling required for installing the system.

Learn more about Geyer and his expertise on this subject on April 30 at 7 p.m. at the Green Church. Lectures are free.

Future

On the horizon for ground source heating is its potential use at a new classroom at SNARL set to break ground exactly one year from now, according to Dan Dawson, the Laboratory's Director.

"We are still in a very preliminary design phase," explained Dawson. "The building will be a combination classroom/lecture hall located on the main SNARL campus adjacent to our dorm building and connected to that building with a large deck. It will replace the function of the Green Church for our public lectures but provide us with classroom space for visiting college and university classes as well as our K-12 programs. We are losing the use of the Green Church as a place of public assembly due to expansion of Mammoth Yosemite Airport. In



SUBMITTED PHOTO

John Geyer presents "Heating and Cooling Buildings with Ground Source Heat Pumps: What it is, How it Works, and Why it's Worth Using" at the opening SNARL lecture of the 2013 season on April 30 at the Green Church.

the TOML's recently submitted (but not yet FAA-approved) Airport Land Use Plan, the Town proposes changing the classification of the airport. If that is approved the RPZ (Runway Protection Zone) expands to include the land under the church."

The proposed classroom would be funded with a combination of State Bond Funds (Prop. 84) and donor funds.

"Our goal is to make the building a minimum of LEED Gold (a UCSB requirement) and also a net-zero energy consumer," Dawson said. "For the latter our goal is to use ground-source heating and cooling driven by PV generated electricity so our net draw on the utility companies is zero. However, it a bit preliminary to know if we can do so. Our early estimates of the electrical loads required by the pumps and compressors for the ground source could exceed the amount we can generate."

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Act.

The Navy is pursuing replacing the traditional radioactive, uranium-fueled nuclear reactors in submarines and aircraft carriers. And if you know anything about aircraft carriers, a hydrogen reactor capable of safely powering those "floating cities," some of which can have crews of up to 6,000, can keep up with the needs of Mammoth Lakes.

New Jersey-based Lawrenceville Plasma Physics, Inc (LPPX) is also developing a prototype boron/hydrogen-fueled nuclear reactor, which according to Griffin would be practical and safe. Such a plant would function without generating poisonous, radioactive, Plutonium-contaminated waste material, which has to be sealed and stored

in special processing facilities.

The Lawrenceville project originated as a research project at Texas A&M University, with research funds from the National Aeronautic and Space Administration and Pasadena's Jet Propulsion Laboratory (JPL), for a rocket to propel interplanetary space vehicles. Another of the project's key partners is the University of Chile, which is located not far from concentrations of boron ore deposits found in the high, dry deserts regions of Bolivia, Peru and Chile.

"During my lifetime, the population of the world has doubled from 3 billion to 6 billion persons," Griffin said. "The human population will continue to expand and concentrate in metropolitan centers that have outgrown the avail-

ability of clean air, water and electrical power from natural weather patterns of rain, wind and snow. This is even true of the town of Mammoth Lakes."

According to Griffin, Mammoth Lakes could construct a small nuclear reactor perhaps located at the sewer processing facility that provided electrical power for the town and Mammoth Mountain Ski Area. Manufactured hydrogen gas from the plant could be piped to heat the homes of the town of Mammoth Lakes to replace propane gas, a fossil fuel Griffin would like to see the world get away from more and more.

The gas could also be piped to the top of MMSA's gondola station for hydrogen fuel cells that would pro-

duce both electrical power for the ski lifts and yield pure, distilled water that could be stored in a buried tank to in turn feed a hydroelectric generating station and reservoir located at a lower elevation to provide electrical power and extra water for the town.

Hydrogen, both in fuel cell and liquid form, has already been tested in vehicles, such as the BMW H7. The future of both hydrogen vehicles and power plants will be dependent on capital to develop desalination plants to provide clean water from the Pacific Ocean to cities and rural areas. The long-term results, though, could mean power supplies for high-speed rail and subways, airports and other infrastructure, as well.