



10-14-09

1,059-year-old German village has created the bioenergy future

By Jon H. Harsch

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Note: Senior Editor Jon Harsch just returned from an intensive week-long program of visits with German government agencies, renewable energy research organizations, and private companies. This is his final report from that trip. For more coverage, go to www.Agri-Pulse.com

What convinced Gerd Paffenholz back in 2000 to help the rural German village of Jühnde build a biogas plant was photos showing how a Swiss glacier has disappeared over the last 50 years. Responding to the threat of climate change, he signed up as a member of a village cooperative formed to create fossil-fuel-free energy independence for the village. The result: today Jühnde sells biogas-generated electricity to the national electric grid and its biogas system also provides enough heat to heat all the co-op members' homes except for cold snaps when its woodchip-fired boiler provides extra heat.

Among the benefits:

- Biogas plant guide Gerd Paffenholz and his fellow co-op members don't worry about high world oil prices – or the fear that Russia could restrict the flow of natural gas to Germany.
- Jühnde's crop farmers don't worry that fertilizer prices could soar – because their N, P and K are simply recycled through the village's biogas plant, returned to them in biogas plant's nutrient-rich slurry residue.
- Jühnde's dairy farmers – just as devastated as the U.S. dairy industry by milk prices far below production costs – at least don't face complaints about stinking manure pits or springtime spreading. Their manure goes directly to the biogas plant to be turned into electricity and heat. The non-smelly residue returned for spring spreading comes back without the high costs of commercial fertilizer.
- A transformed local economy. After more than one thousand years since it was founded in 950 AD, rural Jühnde was seeing its young people leave. Now they're staying and thriving Gerd says.

Paffenholz acknowledges that Jühnde's transformation couldn't have happened without outside help. First, it was Göttingen University researchers who came up with a plan to turn Jühnde into a model "bioenergy village" – an offer other German towns had turned down as too risky. The village co-op did the hard work of signing up villagers to buy the proposed plant's heat; signing up farmers to provide the needed grain crops, wood, and

manure; and then designing the plant sized to fit both the supply and the demand. But what's made it all work has been the German government's feed-in tariff which enables the village to sell its renewable electric power into the national grid at above-market rates.

Once Jühnde's system was working, some of the skeptics "who said it couldn't work" signed up as co-op members so that 143 homes now are heated by the biogas plant, nearly matching the plant's capacity. Interestingly, the village's new awareness of energy issues has led more homeowners to add insulation and tighter windows. The result is that the plant designed for 140 homes soon may be able to heat 150 homes or more.



Gerd Paffenholz explains a rural German village cooperative's bioenergy system. The silage/manure mix in the green tank on the left generates biogas which fuels the gas turbine generator housed in the sound-proofed steel shipping container on the right. Jühnde's biogas-fueled generator feeds electricity to the national grid and the system provides enough heat to heat the village except for cold snaps when a woodchip-fired boiler kicks in to provide extra heat. Photo: *Agri-Pulse*.

Depending on your view of the already apparent costs of climate change such as more severe weather events, rising sea levels, and crop regions shifting northward, government regulations which force utilities to pay more for renewable energy can be seen either as a wasteful government subsidy or as a public investment that will pay valuable returns. Paffenholz has no doubts. He says the investment has already produced a trifecta: the village's polluting CO₂ emissions cut by over 3,300 tons per year, energy independence for the village, and 350,000 Euros (\$540,000) a year paid to local farmers for silage to feed the biodigester. "This money is still here in the village," says Gerd, "and doesn't go to Russia or the Middle East."

One question that Germany's bioenergy experts can't answer: whether the proposed cap-and-trade system being considered by the U.S. Congress would be as effective as

Germany's feed-in tariffs as way to incentivize a national shift from fossil fuels to renewable energy.

Jühnde – just the facts

- 750 inhabitants.
- Initially, 60% of the village committed to buy hot-water heat from the planned biogas plant. Signup jumped to 75%, or 140 homes, once “the pipeline was on their doorstep.”
- The biogas plant is supplied with corn, wheat, rye, triticale, grass and manure from Jühnde's nine local farms with 3,200 crop acres, 2,000 acres of forest, and 400 cows.
- The biogas plant's daily diet: 35 tons of silage and 30 cubic meters of liquid manure. Additionally, the plant burns 1,800 cubic meters of wood each winter.
- The biogas plant is a 2nd generation co-gen plant providing 700 kW electrical and 740 kW thermal energy. (Some 4,000 1st generation plants throughout Germany generate electricity without using the waste heat from the gas turbine generator.)
- Total cost to install the biogas plant: \$3 million.
- Gerd Paffenholz's annual heating costs today: \$3,000, about 30% less than he would have been paying if he'd stayed with oil heat.

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