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Nuclear Plants May Look To Ethanol Plants To Market Excess Steam

Some proponents of nuclear power are looking to the ethanol industry as a possible market for low-temperature, low-value steam from nuclear power plants as a heat source for fermentation and distillation as well as to dry the distillers dry grain co-product, nuclear industry and DOE sources say.

The cost of energy for corn-ethanol plants runs second only to the cost of the corn feedstock. Volatile natural gas prices have caused some ethanol plant operators to turn to coal to meet energy needs, sullyng the argument for reducing greenhouse gas emissions that ethanol proponents have promoted. Nuclear proponents note the energy from a light-water reactor, whether it is electricity or steam, results in no greenhouse gas emissions.

The proposal comes at a time when some nuclear power plants have completed, or are in the process of, applying to the Nuclear Regulatory Commission for license upgrades, allowing them to produce more power. Some of these upgrades, as high as 20 percent, do not result in more electricity being produced because the economics does not justify changing out exiting turbines and replacing them with larger ones to take advantage of the plant's higher level of steam output, a nuclear industry official explains.

What is being proposed is that the excess steam could be piped to ethanol plants for use in their various processes requiring heat. A number of nuclear power plants are located in the Corn Belt, where most of the ethanol plants are also located. As one DOE official put it, some nuclear power plants are located "literally in the middle of corn fields." The DOE official has calculated a "commercial nuclear reactor ... could provide the process energy [steam and electricity] for 5 million gallons of ethanol per day or about 1.8 billion gallons per year." This represents more than one-third of all current U.S ethanol production.

A nuclear industry official suggests the steam from nuclear power plants could be supplied during off-peak hours at night when electricity demand is down but ethanol production is ongoing. It would be a cheap, emissions-free source of energy for the ethanol plant, allowing them to avoid the higher cost of natural gas or coal, a proponent of the idea notes. For the nuclear reactor operator, it is a source of unanticipated income for a product which otherwise has little value.

The nuclear industry official says steam could be piped as far 10 miles or more to existing ethanol plants. Many buildings in older U.S. cities, including government buildings in Washington, D.C., are heated by steam supplied through a labyrinth of tunnels running beneath the streets, referred to as district heat. In Switzerland and Russia, nuclear power plants supply some of the steam used for district heat, a DOE nuclear program official points out.

Another option being suggested would be to construct ethanol plants outside the security perimeter of existing nuclear power plants so they can take advantage of the low-cost steam. There are dozens of ethanol plants in various stages of development and planning, all looking to technologies and other advantages to cut production costs.