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Poultry Housing Tips

Propane (LPG) vs. Natural Gas

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With rising prices for liquified petroleum gas, commonly referred to as propane, many growers are wondering whether it would be cheaper to heat their houses with natural gas. Though the two fuels are very similar and can do an equally good job of keeping houses warm during cold weather, there are significant differences between the two that need to be considered before a switch to natural gas can be made.

First, natural gas is piped directly to the house in the form of a gas while propane arrives at the farm in a tank truck and is pumped as a liquid into 500 or 1,000 gallon holding tanks. The gas “evaporates” into the air space at the top of the tank and is then piped into the house in the form of a gas. A second difference is that the propane heating systems operate at 11" of water column pressure, while natural gas systems operate at 7" of pressure and therefore different type pressure regulators are typically required. A less obvious difference between the two is that there is less “heat” in a cubic foot of natural gas than there is in a cubic foot of propane. For instance, burning one cubic foot of natural gas produces approximately 1,012 Btu’s of heat (one match produces 1 Btu’s of heat) while burning one cubic foot of propane produces 2,520 Btu’s of heat. The exact amount of heat each produces can change a few percent because the exact composition of each can change from time to time. The net result is that it takes approximately 2.5

times the volume of natural gas to heat a house as it does propane.

Since it takes more volume of natural gas than does propane to produce a given amount of heat, the pipes supplying the gas to the brooders/furnaces have to be significantly larger in houses using natural gas. For instance, a 100 ft, one inch gas pipe will carry 333,000 Btu's/hr of propane compared to only 206,700 Btu's/hr of natural gas, a reduction of 37%. If the gas pipe size is not adjusted for this fact brooders and/or furnaces will be starved for fuel. Furthermore, the orifices in the brooders/furnaces in a house with natural gas have to be larger to produce the same amount of heat as they do in a house using propane. While placing larger orifices in brooders or furnaces is a fairly simple process, changing the pipes and pressure regulators supplying the gas to the brooders on the other hand can be a relatively expensive proposition, especially if the existing plumbing is marginal in its ability to deliver fuel to the existing propane brooders/furnaces, which is often the case. On the other hand, switching from natural gas to propane only involves switching brooder/furnace orifices and pressure regulators and of course hooking the propane tanks up to the gas lines. So, if you are building a house where you will have access to natural gas you may want to plumb the house for natural gas even if you are going to use propane to heat the houses. Though plumbing for natural gas is slightly more expensive, it will give you the option in the future to "relatively" inexpensively switch from propane to natural gas.

Just because it takes 2 ½ times the volume of gas to heat using natural gas than propane does not mean it will cost more than twice as much to heat with natural gas because the two are priced differently. First of all natural gas is sold by the "Therm" while propane is sold by the gallon. One therm of natural gas is the amount of gas required to produce 100,000 Btu's of heat, which is approximately 100 cubic feet. In comparison one gallon of propane can produce 91,500 Btu's of heat. To convert cost per therm of natural gas to an equivalent cost per gallon you need to divide the cost per therm by 1.09 (100,000 Btu's / 91,500 Btu's). Likewise to compare cost of heating with propane to the cost of heating with natural gas you need to multiply cost per gallon of propane times 1.09 to get an equivalent cost per therm. Keep in mind that natural gas users typically have a few additional service charges which can change from location to location and can add 5% or more to the bill.

Let's look at an example. Farm A uses natural gas and is paying $1.20 a therm, while Farm B uses propane and is paying $1.30 per gallon. If we take the price Farm A is paying for natural gas and divide by 1.09 you would get the equivalent cost in terms of propane, namely $1.10 per gallon. Therefore, all things being equal it will cost approximately 15% less to heat Farm A than Farm B.

Some interesting facts about natural gas and propane:

1) Natural gas is 60% lighter than air, propane is 156% heavier than air.

2) There is essentially no difference between the flame temperature of natural gas (3550^{o}F) and propane (3573^{o}F).

3) Natural gas typically consists of:
   - 94.8% Methane
   - 2.9% Ethane
   - 0.8% Propane
   - 0.2% Butane
   - 0.1% Carbon Dioxide
   - 1.2% Nitrogen

4) Liquid petroleum gas (LPG) is not 100% propane. It is typically a mixture of at least 90% propane, 2.5% butane and higher hydrocarbons, and the balance ethane and propylene. As a result the exact Btu's produced by a gallon of LPG can change slightly based on the exact mixture.

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