Useful information to discuss energy calculations regarding Vacuum drying principles.

Positive Air Drying is the principle where the direction of the heating air through the dryer is the same as the direction of the cooling air. (or lower heating air if Full Heat)
Also defined as Low Profile Dryers

Vacuum Cool Drying is the principle of reversing the cooling air and drawing the heating air through the cooling section of the dryer. MC Tower Dryers (Outside ambient air is raised 43 degrees with this process)

FACTS

BTU's/hr = Total Drying CFM X Temperature Rise X 1.1
92,500 BTU/gal LPG
100,000 BTU/ Therm of Nat. Gas
1040 BTU/ Cubic Foot of Nat Gas
Price/ gal LPG should be 92.5% less than Price/ therm of Nat Gas to be equal.

Suggested Energy analysis using Vacuum Cool drying vs. positive air drying

Note:
The following is an example of energy calculations and drying cost simulations using Vacuum cooling verses positive air full heat or full cool drying. Calculated rise to ambient temp is 43 degree F when drying 20% moisture corn (with Vacuum Cool dryers)

Example:

Positive Air Dryer:
34,000 cfm X (210 degree Plenum – 50 degree ambient) 160 (degree temp rise) X 1.1 = **5,984,000BTU**

Same dryer using vacuum cooling:
34,000 cfm (210 degree Plenum – 50 degree ambient- 43 degree warm air return) 117 (degree temp rise) X 1.1 = **4,375,800 BTU/hr**

5,984,000 BTU/hr – 4,375,800 BTU/hr = 1,608,200 BTU/hr saved

1,608,200 BTU/hr / 92,500 BTU/gal LPG = 17.39 gal/hr saved

17.39 gal X $1.10/gal = $19.13/hr saving X 20 hour drying day = $383/day savings

With all things equal, meaning no further increase in energy cost, no wetter grain than 22% and no cooler ambient temp than 50 degree the savings are 27% plus per year.

If last years drying cost for a producer was $30,000 drying a much dryer crop in a warmer fall then expected payback in this application is $8,100/year or $81,000 over the next ten years. Note: a 34,000 cfm dryer is a 10730MC equivalent most likely targeting a production scope of 170,000 bu./yr plus or minus (or 1000 acre producer). It becomes obvious that the larger the producer the more annual saving that are generated. Example: 2000 acre producer may experience $160,000 over next ten years.

WHAT ARE THE CHANCES ARE THAT ALL WILL REMAIN AT THESE LEVELS…..MOST AGREE THAT THEY WILL BE EVEN MORE!!!!

Additional Example:

1195MC in 2006 Harvest dried 430,000bu. of grain. Average moisture removal was 7 points and daytime/nighttime average temperature from 3rd week in Sept to 1st week in Nov. was 40 degrees. The Natural Gas was contracted at 82c per therm. (This was 36% less than last year) Note: This operation dried 600,000 bu. last year in a warmer fall removing 3.5 points of moisture. 2005 Natural Gas cost $60,000…..2006 Natural Gas cost $47,600.

With 36% cheaper gas drying 30% less corn this only generated 20% reduction in Gas cost.

THE POINT HERE IS!!!!! Energy now is the single most contributing factor to the bottom line. Offering Corn producers a way to manage it will pay HUGE dividends for many more decades of farming.

This producer could have saved $15,000 last year with a dry crop and would have saved $18,000 this year with a short crop with the use of Vacuum Cool drying.

HAD NATURAL GAS REMAINED AT LAST YEARS LEVEL 2006 SAVINGS WOULD HAVE EXCEEDED $24,000.

Another comparison:

@ 25%-30% fuel savings and with current hybrid technology pushing yield to 170bu-180bu average…..it can be projected that @$1.10 LPG the producer would be saving $8.50/ acre by just selecting or changing to a different method of drying (vacuum cooling)

Example: 13.29cents/bu – 8.57cents/bu = 4.72cents/bu savings
4.72 cents X 180 bu. crop = $8.50/ acre reduction in input cost.
Its should be noted (see simulations) that for the first time ever….total drying cost are predicted to exceed $24.00/ acre. Never before has drying cost been considered on a per acre basis. It is now a significant contribution in calculating input cost for future production along with seed cost, herbicide program, and tillage methods.

Even with latest upward movement in grain prices economist are warning producers not to get sloppy and to continue to manage INPUT cost to survive. Grain Prices will always be an unknown.

Hope this helps. Below is a table to help calculate different levels of savings:

@ 180/bu acre yield
@ $1.10 LPG = 1.19/therm Nat Gas (Note: Ave Nat Gas cost in 2005 were $1.30/therm)

Grain	20% wet grain	22% wet grain	25% wet grain
Savings per Bushel	4.19 cents	4.72 cents	6.23 cents
Savings per Acre	$7.50	$8.50	$11.21