


# BY THE NUMBERS — ELECTRIC IS BETTER!

Cost calculations for maintaining 30,000 gallons of asphalt cement at 300° F over 24 hours (1 MMBTUs)\*

<u>FUEL TYPE</u>	<u>QTY PER</u> <u>1 MMBTUs</u>	<u>UNIT</u>	<u>X</u>	<u>COST</u> <u>PER UNIT</u>	<u>÷</u>	<u>ESTIMATED</u> <u>EFFICIENCY</u> <u>OVER TIME</u>	<u>=</u>	<u>OPERATING</u> <u>COST PER</u> <u>24 HOURS</u>	<u>PER HEATER</u> <u>ANNUAL**</u> <u>ENERGY COST</u>	<u>+</u>	<u>PER HEATER</u> <u>ANNUAL</u> <u>STACK PERMIT</u>	<u>=</u>	<u>PER HEATER</u> <u>ANNUAL</u> <u>TOTAL COSTS</u>
Natural Gas	1.0	MCF	X		÷	80% at year 1 50% at year 8	=			+		=	at year 1 at year 8
LP Propane	10.9	Gal.	X		÷	80% at year 1 50% at year 8	=			+		=	at year 1 at year 8
No. 2 Oil	7.2	Gal.	X		÷	80% at year 1 50% at year 8	=			+		=	at year 1 at year 8
No. 6 Oil	6.4	Gal.	X		÷	80% at year 1 50% at year 8	=			+		=	at year 1 at year 8
Electric 	293.0	kW	X		÷	100% at year 1 100% at year 30+	=			+	No Cost!	=	at year 1 at year 30+

## FUEL COST COMPARISON PER 1,000,000 BTUs (1 MMBTUs)

\*Add your energy Cost Per Unit by Fuel Type and your Annual Stack Permit Cost to calculate your Per Heater Annual Total Costs.

\*\*Cost for 1 MMBTUs over 365 days.



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# A Note on Asphalt Heating Method Comparisons

Operators often choose a method of heat based on current energy prices, but the cost of natural gas, LP gas, fuel oils and electricity have all fluctuated over the years. Fifteen to 20 years ago, electricity was much cheaper to use as an energy source for heat than other fossil fuels. Today, natural gas is less expensive.

When choosing an asphalt heating method, it's important to look at the entire picture. Cost-per-unit of energy to heat asphalt and emulsions is not the only cost. Also important is the heater's thermal efficiency. Heatec Inc.'s Technical Paper T-140, "Heating and Storing Asphalt at HMA Plants," states that a small difference in efficiency can make a big difference in how much fuel a heater burns over its lifetime.

Most fossil-fuel-fired burners operate at 80 to 85 percent efficiency when new. So, at best, 15 to 20 percent of the burner's heat is wasted – going into the air as exhaust, along with burner emissions. With age, the burner's efficiency drops. Also, fuel-fired asphalt heaters are maintenance-intensive. If the proper maintenance and tuning are not conducted to keep the efficiency up, then the efficiency drops even more dramatically. In fact, by the time the burner is 7 to 8 years old, this efficiency can easily be at only 50 to 60 percent, meaning that up to 50 percent of the heat is wasted – going into the air as exhaust.

An electric-powered asphalt tank heater or hot oil heater, in comparison, operates at 100 percent efficiency; there is no heat or emissions exhausted into the air. And over the lifetime of the heater, that efficiency never drops.

In the chart on the other page, the fuel cost comparison is between different forms of energy per 1 million BTUs (the approximate number of BTUs required to maintain 30,000 gallons of asphalt cement at 300° F over 24 hours in a tank with 3 inches of insulation, per Heatec's T-140 technical paper).

At first glance, it appears that natural gas and No. 6 oil are the cheapest forms of heat energy. But that is only if you are assuming that all heater types operate at 100 percent efficiency. As mentioned previously, it is widely accepted within the industry that fossil-fuel burners, at best, operate at 80 to 85 percent efficiency – and that is with a new burner that receives timely maintenance. The far-right column in the table shows the cost of various energy forms with dropping efficiencies, which take place over time with aging burners and poor maintenance practices. Keeping in mind that electric heaters operate at 100 percent efficiency throughout their lifetime (meaning that 100 percent of the heat is applied to the product, and is not wasted as emissions), you can see that the energy costs not only level out – but typically is better!

An additional benefit customers enjoy with PHCo electric heaters is they typically last for more than 30 years, providing 100% efficient heat over their entire lifetime, without incurring the capital cost created by replacing fossil-fuel-fired heaters every 8 to 10 years. And, in keeping with NAPA's The Road Forward initiative, electric heat is also clean and sustainable within your plant.



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