

Indicative Marginal Operating Costs for AE Generators

Notes:

Marginal operating cost is a function of the fuel input price multiplied by the unit's energy conversion rate or "heat rate"

The natural gas unit heat rates represent btus per hour to produce a megawatt hour

In the first example the 13.5 heat rate is equivalent to 13,500 btus per hour

AE's heat rates are typical for the types of gas units shown

The heat rate conversion factor for coal is not direct representation of energy conversion like the gas units

The coal heat rate conversion factor takes into account:

- 1) the units actual avg. heat rate of 10,000 btus per Mwh
- 2) the need to state coal prices in \$ per ton vs. \$ per MMBTu and greater variability in coal heat content
- 3) the significant cost of rail transportation as part of the total cost per Mwh

Unit	Vintage	Natural Gas (\$MMBtu)	X	Heat Rate Conversion	=	\$ Per Mwh
Decker Simple Cycle Gas Turbines	1980s	\$4.00	X	13.5	=	\$54.00
Sand Hill Simple Cycle Gas Turbines	2000s	\$4.00	X	10.1	=	\$40.40
Decker 1 & 2 Steam Boilers	1970s	\$4.00	X	10	=	\$40.00
Sand Hill Combined Cycle	2000s	\$4.00	X	7.5	=	\$30.00
		Coal (\$ per ton)				
Fayette Power Project - Steam Boilers	1970s	\$9.00	X	2.5	=	\$22.50

Chart Data

	Base	Range	Total
Nuclear	\$5	\$1	\$6
Coal	\$23	\$7	\$30
Natural Gas - SHCC	\$30	\$15	\$45
Natural Gas - SHGT	\$41	\$20	\$61
Natural Gas - DST	\$40	\$20	\$60
Natural Gas - DGT	\$54	\$27	\$81
Wind	\$50	\$25	\$75
Biomass	\$70	\$55	\$125
Solar	\$160	\$40	\$200

Unit	Vintage	Natural Gas \$MMBtu	X	Heat Rate Conversion
Decker Simple Cycle Gas Turbines	1980s	\$4.00	X	13.5
Sand Hill Simple Cycle Gas Turbines	2000s	\$4.00	X	10.1
Decker 1 & 2 Steam Boilers	1970s	\$4.00	X	10
Sand Hill Combined Cycle	2000s	\$4.00	X	7.5
		Coal (\$ per ton)		
Fayette Power Project - Steam Boilers	1970s	\$9.00	X	2.5
Decker Simple Cycle Gas Turbines	1980s	\$6.00	X	13.5
Sand Hill Simple Cycle Gas Turbines	2000s	\$6.00	X	10.1
Decker 1 & 2 Steam Boilers	1970s	\$6.00	X	10
Sand Hill Combined Cycle	2000s	\$6.00	X	7.5
Fayette Power Project - Steam Boilers	1970s	\$12.00	X	2.5

Notes

Current-projected fuel amortization

Range = \$9-\$12 per ton price

Range = \$4-\$6 per MMBtu price

Range = \$4-\$6 per MMBtu price

Range = \$4-\$6 per MMBtu price

Range = \$4-\$6 per MMBtu price

Includes \$5 for avg. congestion and allowance for west vs. onshore coastal

Low end reflects land-fill methane - high end reflects Nacogdoches and similar

	\$ Per Mwh
=	
=	\$54.00
=	\$40.40
=	\$40.00
=	\$30.00
=	\$22.50
=	\$81.00
=	\$60.60
=	\$60.00
=	\$45.00
=	\$30.00

Approximate Marginal Cost per MWH by Resource Type *

