

CM4861 Utility Costs
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Marginal Utility Costs: (Cost to provide an additional unit from an existing supply)

Energy Costs: (Does not include any efficiency losses)

Energy Source, Unit	BTU/Unit	\$/Unit	\$/MM BTU
Crude Oil, barrel	5.5 MM	\$83	\$15.09
Gasoline, gallon	125,000	\$2.70	\$21.60
No. 2 Fuel Oil, gallon	138,000	\$2.48	\$17.97
No. 6 Fuel Oil, gallon	152,000	\$2.00	\$13.16
Kerosene, gallon	136,600	\$3.20	\$23.42
Natural Gas, 1000 SCF	1 MM	\$6.00	\$6.00
Wood, full cord, 8 ft logs	22 MM	\$200	\$9.09
Wood chips, dry, 30% moist., ton	16 MM	\$30	\$1.88
Coal, ton	24 MM	\$55	\$1.95
Electricity, kwh	3,412	\$0.16	\$46.89

Notes: 1 U.S. oil barrel = 42 U.S. gallons
1 Chemical barrel = 55 U.S. gallons
1 SCF measured at 60 deg. F and 1 atm.

Air: Process - \$0.20/1000 SCF
(SCF is at 60 deg. F)
Instrument - \$0.30/1000 SCF

Steam: Assume 1000 BTU/lb_m net for vapor at all pressures.
600 psig - \$9.00/1000 lb
300 psig - \$8.00/1000 lb
150 psig - \$7.00/1000 lb
Exhaust, 50 psig - \$1.50/1000 lb
Lost condensate - \$1.00/1000 lb

Catalyst (all ex-noble metals): \$/lb
"Commodity" : \$1.00
"Low tech": \$6.00
"Moderate tech": \$15.00
"High tech": \$40.00
Catalyst life: 2 years

Water: Cooling water: \$1.00 / 1000 gallons
City, process: \$2.00/1000 gal.
Softened: \$4.00/1000 gal
Deionized: \$7.00/1000 gal

Others:
Mixed distillates: \$55.50/BBL
Naptha: \$51.75/BBL
LPG: \$40.50/BBL
Fuel Gas \$6.00/1000 SCF
Hydrogen: \$3.60/1000 SCF

Absorbant: \$2.00/lb

Labor rate: \$30/hour = \$60,000 /year

Refrigeration:

Water to 50°F - Electrical rate at COP of 3
Ammonia to 34°F - Electrical rate at COP of 2
From 34 to -20°F - Electrical rate.

POTW liquid waste disposal: \$0.12/1000 gal

Spec: BOD: 200 mg/liter max
COD: 300 mg/liter max
Benzene: 0.050 mg/liter max
BETX: 0.750 mg/liter max
Temperature no greater than 104°F
Ph no less than 5, no greater than 12.

Allocated Investment Costs: (Includes cost to build supply unit)

Electricity: \$150/KVA
Steam: 600 psig - \$15/(lb/hr)
300 psig - \$13/(lb/hr)
150 psig - \$10/(lb/hr)
Cooling tower water: \$80/GPM

On-site sewage treatment works: \$0.04/1000 gal
Liquid hazardous waste disposal: \$200 / 55-gal drum
Solid non-hazardous waste disposal: \$60/ton