

Biogas Uses

- Majority using IC engine/generator sets (size range 100kW to 775 kW)
- Some have tried microturbines
- Biogas-fired boilers (heat digester & meet other thermal loads)
- New technologies
 - Sterling Engine
 - Fuel cells
 - Produce hydrogen
 - Pipeline quality gas
 - Compressed gas

Biogas Uses

Challenges with electricity generation

- Electricity sales (often low)
- Cost of purchased electricity (low?)
- Cost of generating equipment
- Increased maintenance demand
- Utility interconnection issues
- Inefficiencies in conversion to electricity

Alternative Biogas Uses

- Thermodynamic efficiencies for heating applications (beyond digester heating– create value-added products)
- Gas cleanup and sale to utilities
- Gas cleanup, bottle and sell as a CNG, fleet fuel
- Gas cleanup and add to NG pipeline

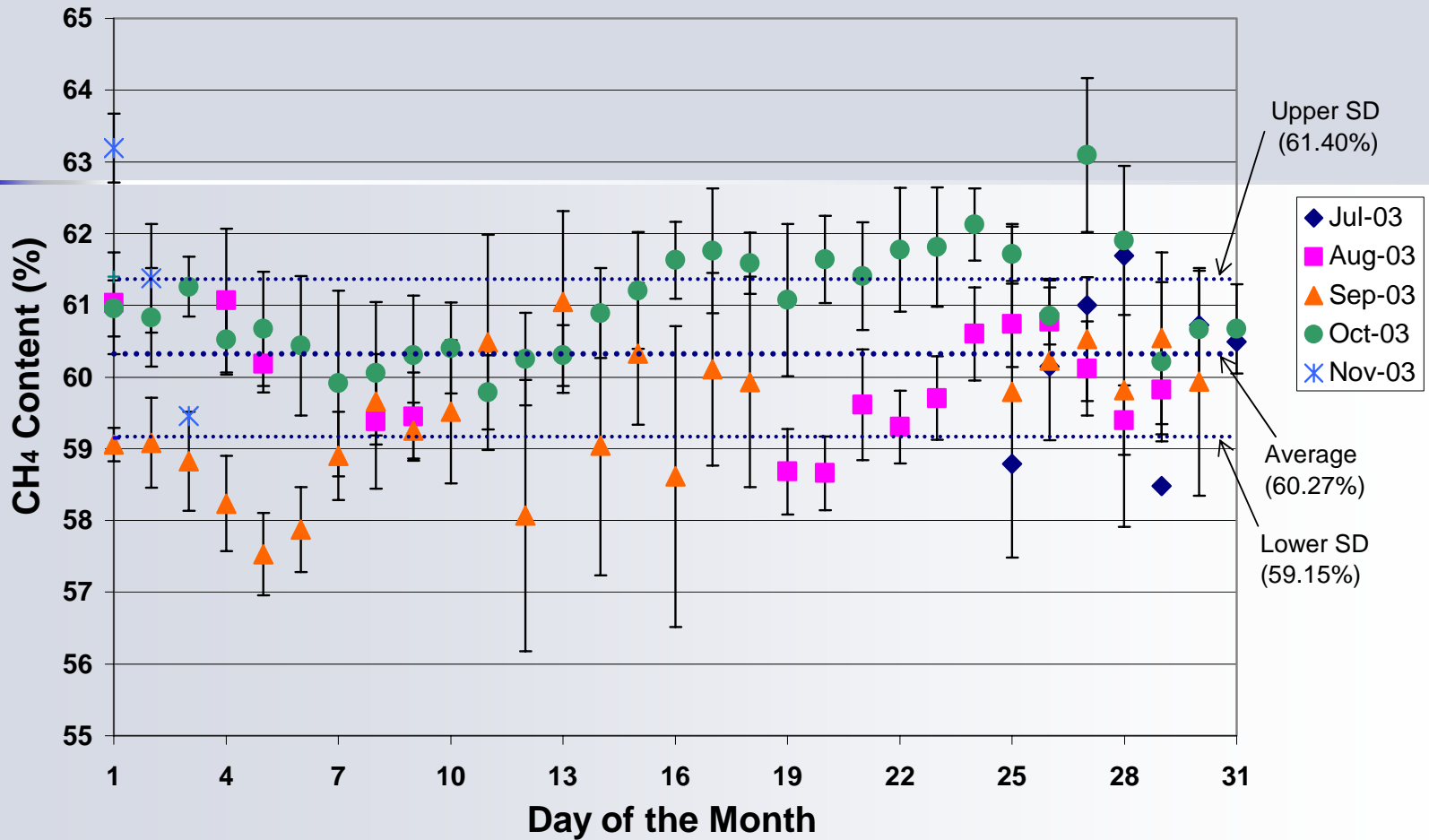


Figure 4.2 Average Daily Methane Content in Raw Biogas at DDI (July - November 2003)

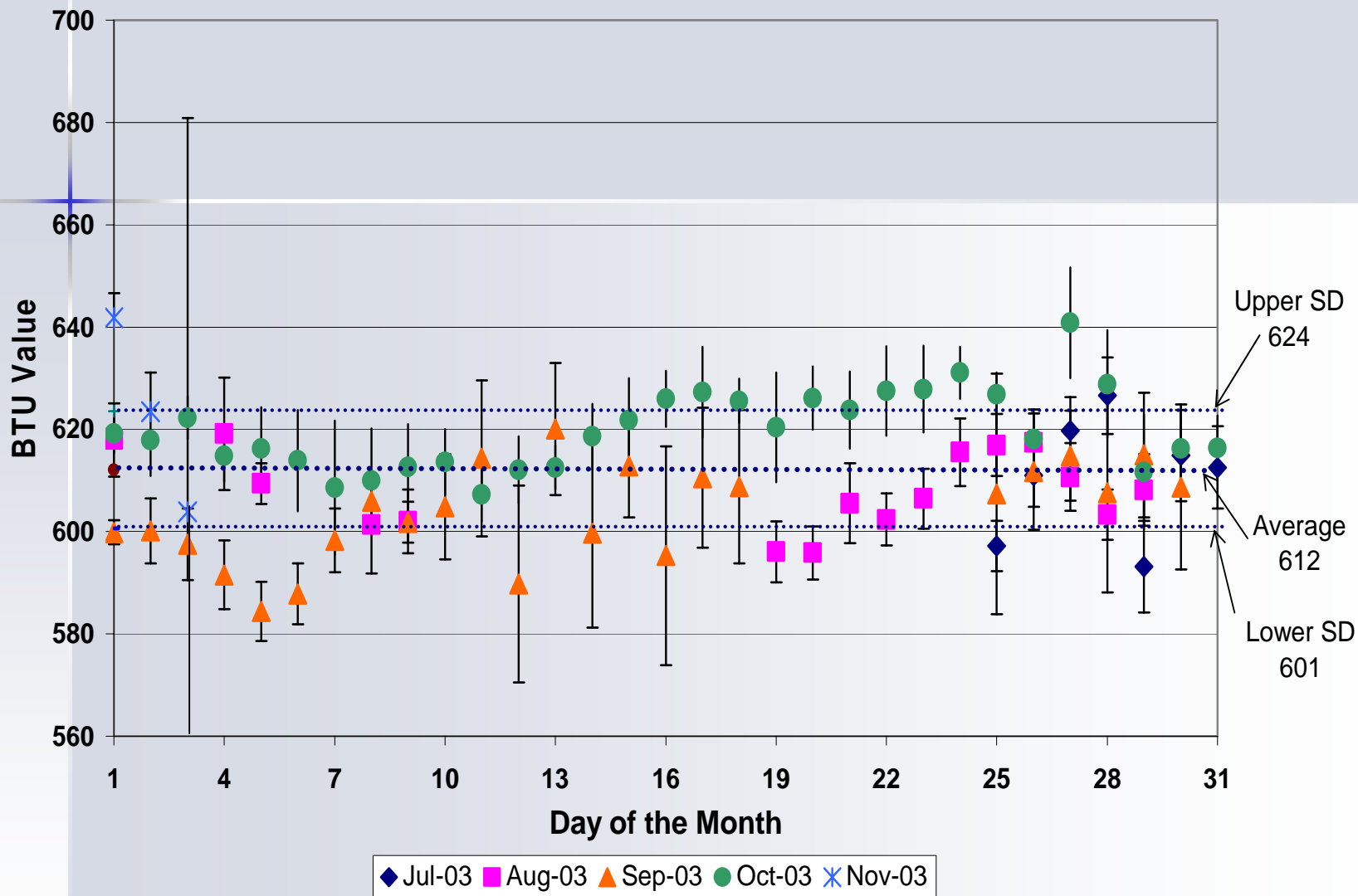


Figure 4.5 Average Daily BTU in Raw Biogas at DDI (July - November 2003)

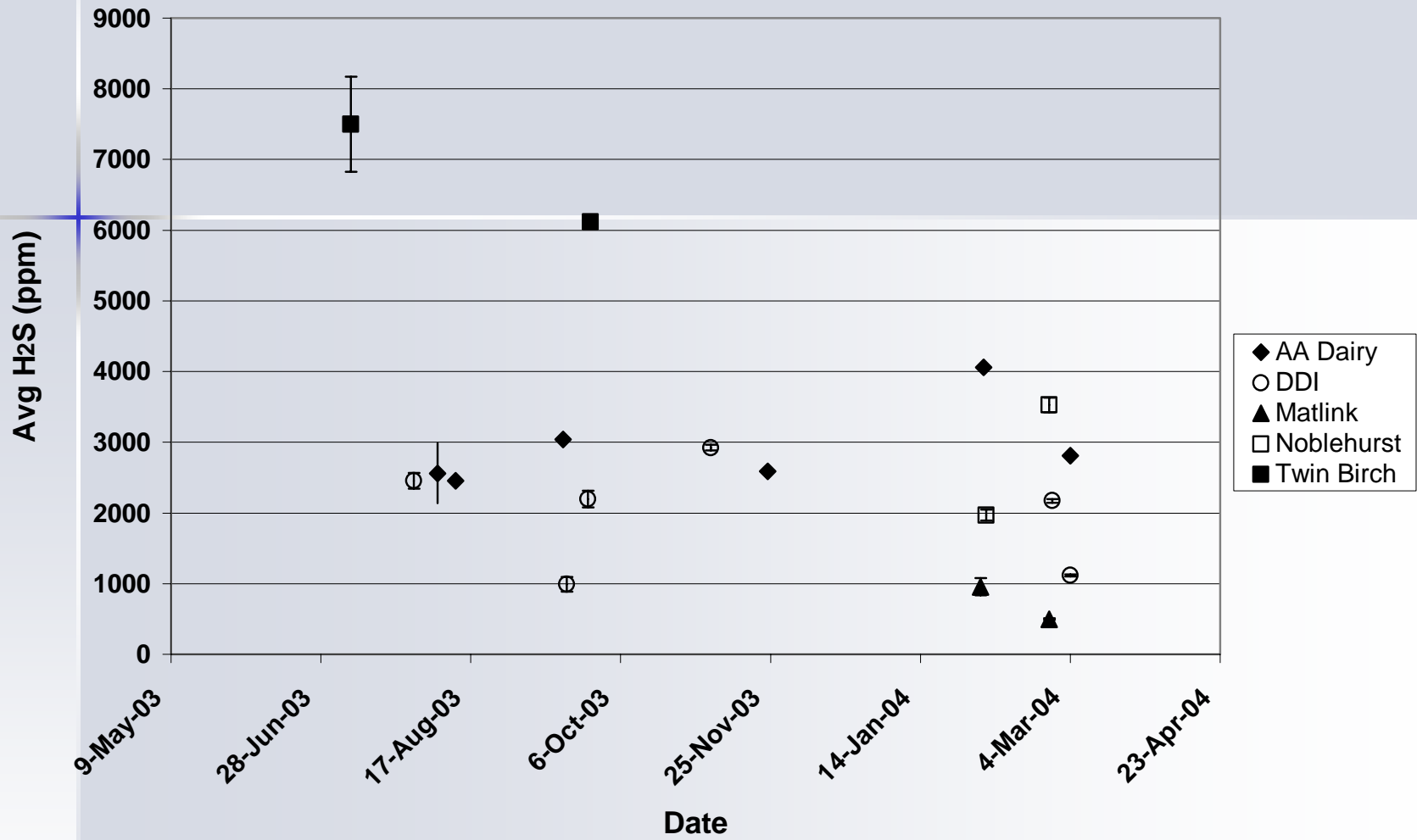
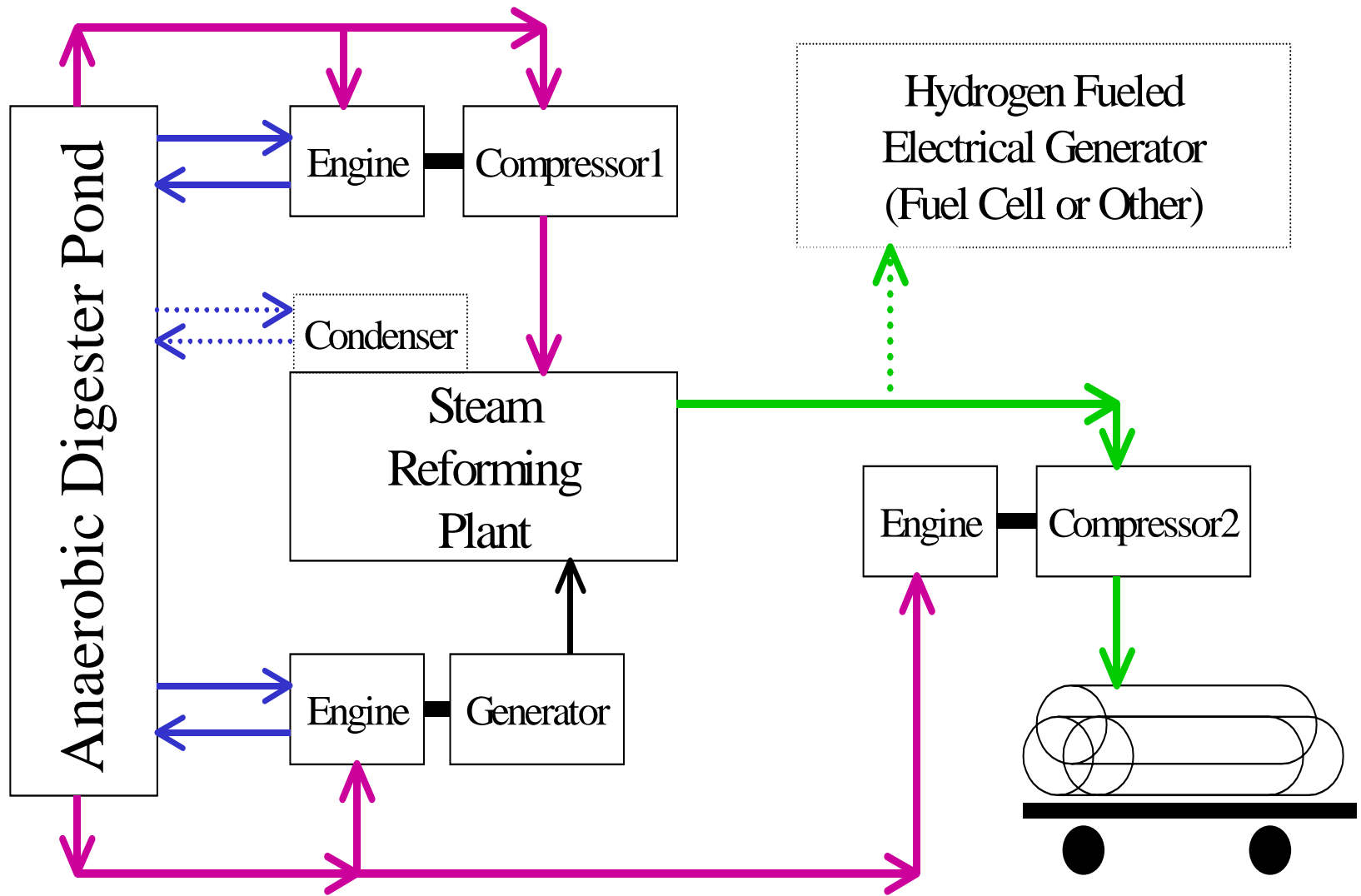


Figure 4.8 Average H₂S Concentrations at 5 NY State Dairies



Biomass Processing & Methane Production

Fuel Cell Cogeneration

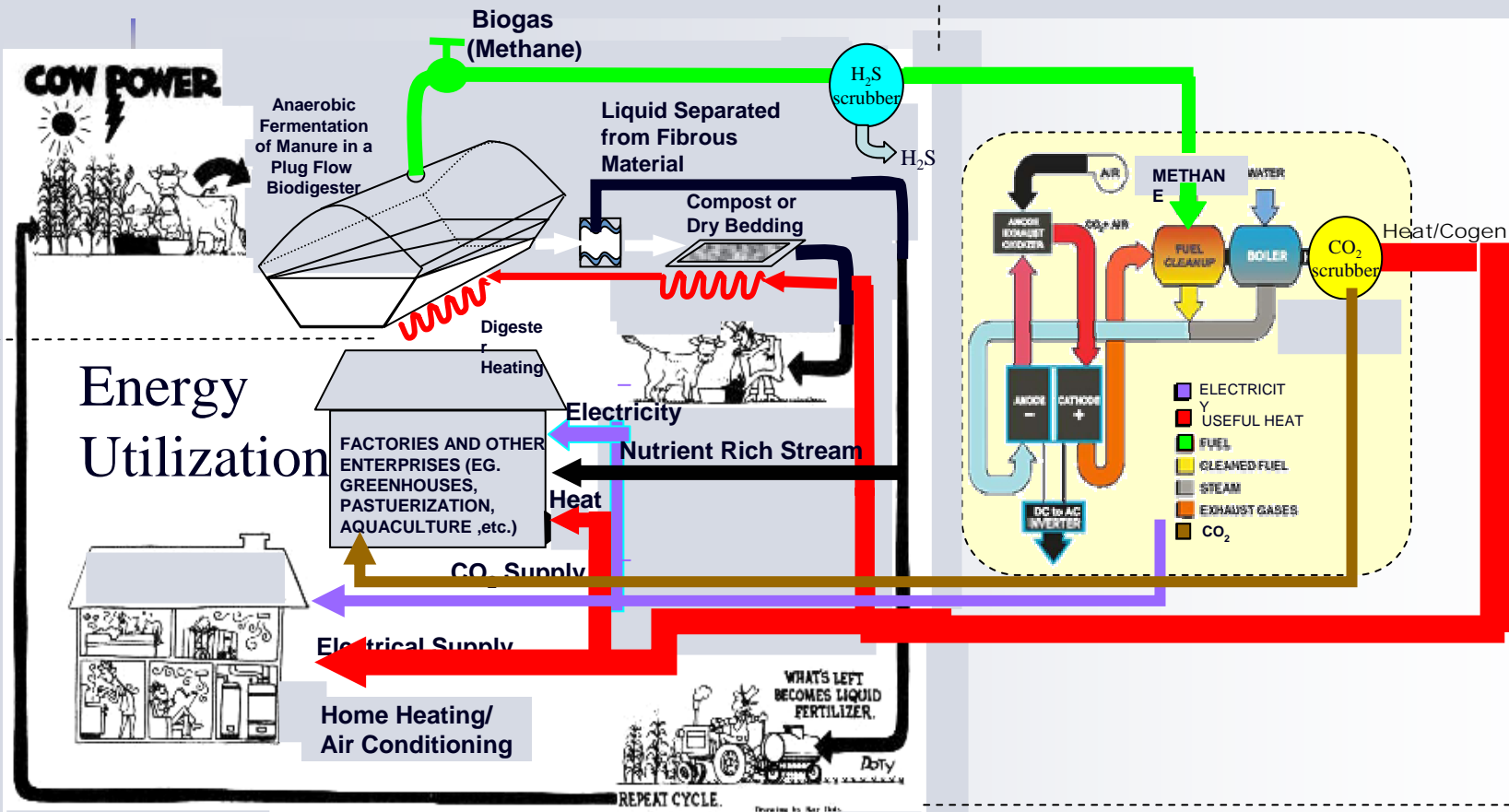


Table 4.5
 Present Worth of Biogas Sales Over a Ten-Year Period
 For NG Pipeline (3000 cows)

Capital Cost	\$991,200
Interest Rate	5%
Inflation Rate	3%
Present Worth (PW) of O & M Costs over 10 Years	\$579,130
PW of Income for the Sales of Upgraded Biogas	\$ 1,369,759
PW of Upgraded Biogas Sales	-\$200,572

Table 4.7

Present Worth of Biogas Sales Over a Ten-Year Period For NG Pipeline (10,000 cows)

Capital Cost	\$2,054,950
Interest Rate	5%
Inflation Rate	3%
Present Worth (PW) of O & M Costs over 10 Years	\$1,501,105
PW of Income for the Sales of Upgraded Biogas	\$ 4,565,862
PW of Upgraded Biogas Sales	\$1,009,807