

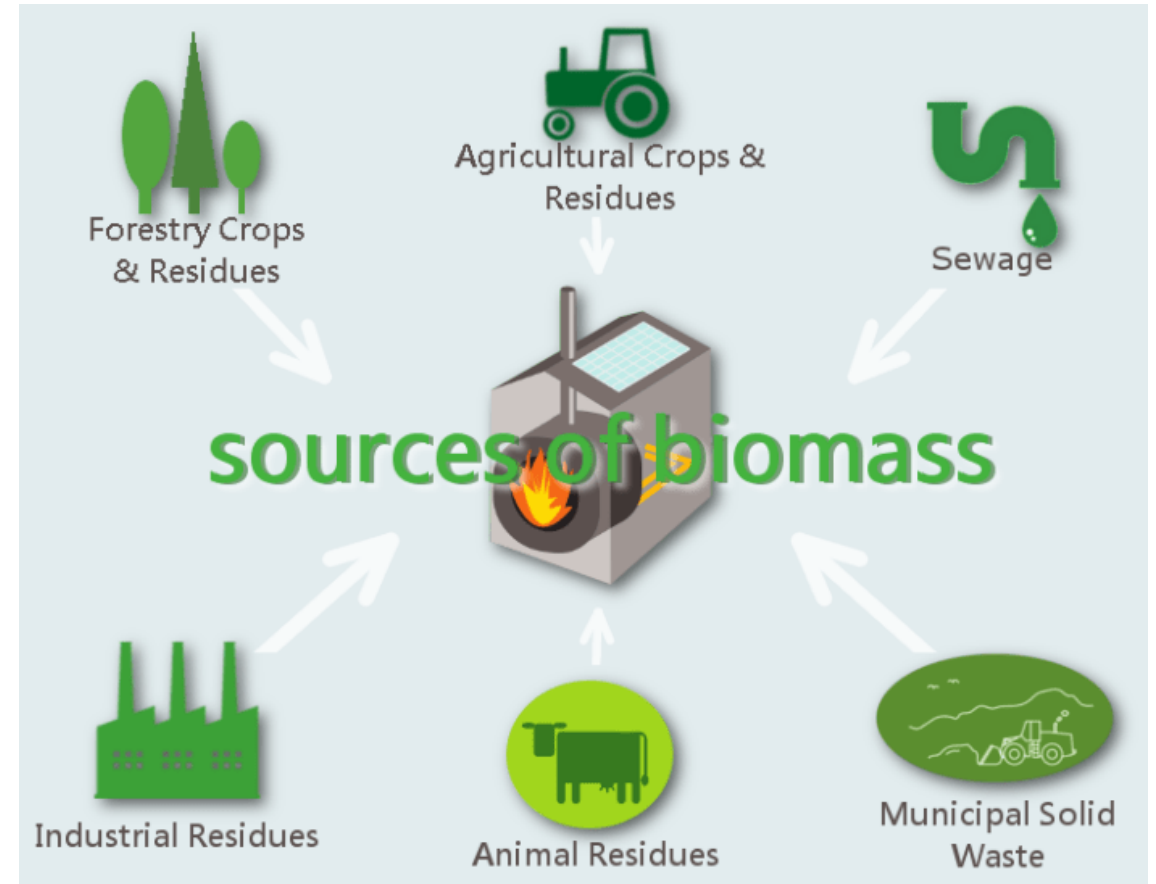
# *Biomass as an Alternative Energy Resource at Alfred*

Dr. Wallace B. Leigh

Department of Electrical Engineering,  
Alfred University, Alfred, New York, 14802.

# Biomass systems

- Variety of biomass solutions depending on feedstock type:
  - Gasification
  - Anaerobic Digestion
  - Direct Combustion
- Also possible combined heat and power systems (CHP).



# Biomass Opportunities

- An opportunity to replace aging power distribution infrastructure and outdated protection systems
- Reduce Electrical outages due to storms (resiliency)
- Need for potential job growth in the area
- Increasing need for renewable responsible energy for lower GhG emissions
- Reduce agricultural, food waste, and municipal waste
- Renewable resource with little or no energy storage requirement

# Concentrated Animal Feeding Operations (CAFO)

- About 1/3 of Municipal and industrial waste produced each year is Agricultural waste. (USDA Ag Research Service FY-2005 Annual Report)
- One Dairy with 2500 cows produces as much waste as a city of 411,000 residents. (USPA Nationwide Risk Management Laboratory (2004).
- CAFO results in stockpiling manure which loses N and P, and CO<sub>2</sub> emissions over time.

# Calgren Dairy Fuels LLC

- 58 million gallons of Fuel ethanol per year in a refinery powered by cow manure from 100,000 cows in 14 dairies.
- Also co-generate 11 MW of electric power. Plant is not connected to the grid.
- 5 MW sold back to California Edison.
- CO<sub>2</sub> emissions from the plant are captured and liquefied for the food beverage industry.

# Biomass Challenges

- Is there sufficient feedstock in an area where wood industry is not self-sustaining and most agriculture is subsistence farm?
- Cost of training and licensing.
- Biomass does not enjoy production tax credits as other renewable sources such as wind and solar.
- Opposition from ASHRAE. No codes for CHP.
- No universal federal regulations.
- Non-electric renewable is not generally considered as a GhG reducer.

# Opportunities

- Many Biomass plans for our area are affordable, particularly when CHP and GhG reductions are calculated along with NYS subsidies.
- However financial institutions tend to consider biomass as a volatile commodity
  - Is a localized market that does not have open or forward pricing.
  - Depends on things such as the weather
  - Low value market
  - Can depend upon other markets such as the lumber industry