

# Biomass to Bioenergy

Bioenergy is becoming an increasingly attractive energy choice in the United States due to high fossil fuel prices, a desire to lessen the environmental impact of energy use, and concerns about national security. The benefits of increased biomass use can include enhanced energy independence, security, and reliability; economic development; and improved environmental performance. The following map illustrates the conversion of different biomass fuels/feedstocks into a variety of final products.

## Biomass Fuels/Feedstocks

## Conversion Technologies/Platforms

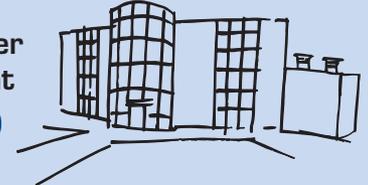
## Products

### Waste/Opportunity Fuels

### Central Plants/Power Plants

On-site Power and/or Heat

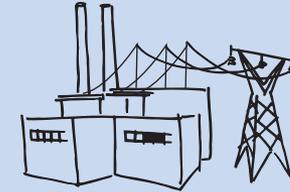
 **CHP**



- Landfill Gas
- MSW
- Agriculture & Forest Residues
- Urban Wood Waste
- Wastewater Treatment Sludge
- Animal Manure

- Direct Combustion (Turbine/Boiler/Engine)
- Co-Firing (Boiler with Steam Turbine)
- Anaerobic Digestion (Turbine/Boiler/Engine/Fuel Cell)
- Gasification (Turbine/Boiler/Engine)

Syngas



Utility Power and/or Heat

 **CHP**

### Energy Crops

### Refineries\*

### Liquid Fuels

- Switchgrass
- Urban, Agriculture, & Forest Waste Residues
- Rapeseed
- Soybeans
- Vegetable Oils
- Animal Fats
- Corn
- Sorghum
- Sugarcane

- Thermochemical (Chemical Refining)
- Biochemical (Biorefining)
- Thermochemical (Transesterification)
- Sugar Platform (Fermentation)

- Cellulosic Ethanol
- Biodiesel
- Ethanol



\* **CHP** can be used within biofuel refineries to provide efficient power and heat for energy crop refining.