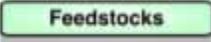
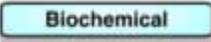


## Appendix A: Technology Pathway Structure

High-level block flow diagrams for each biorefinery pathway are presented in Figures A-1 through A-5. These diagrams show the current process (if it exists today) and current products, including fuels, chemicals, and power; options for improvements; and associated new products. *These diagrams are not intended to be all inclusive; many other viable processing options are possible.* These diagrams do not display options for pathways that are considered mature commercial technology.

The blocks and paths on the diagrams are coded as follows:

-  – Feedstocks R&D
-  – Biochemical Conversion R&D
-  – Thermochemical Conversion R&D
-  Bold blocks – Highest priorities
-  Dash blocks – Medium and low priorities
-  – New routes to biofuels, with heavy lines indicating the highest-priority routes
-  – Potential new enabling non-fuel products
-  OR → – Existing processing steps in current biorefineries
-  – Indicates that an “option” exists on how to process the stream. The options must be evaluated and compared against each other to identify the best overall pathway configuration. For pathways representing existing industry segments, the options include the status quo. The options analysis may compare options that would take the full stream or fractions of the full stream. The ability to add and evaluate options within a pathway results in a flexible framework for considering innovative new ideas in the future.

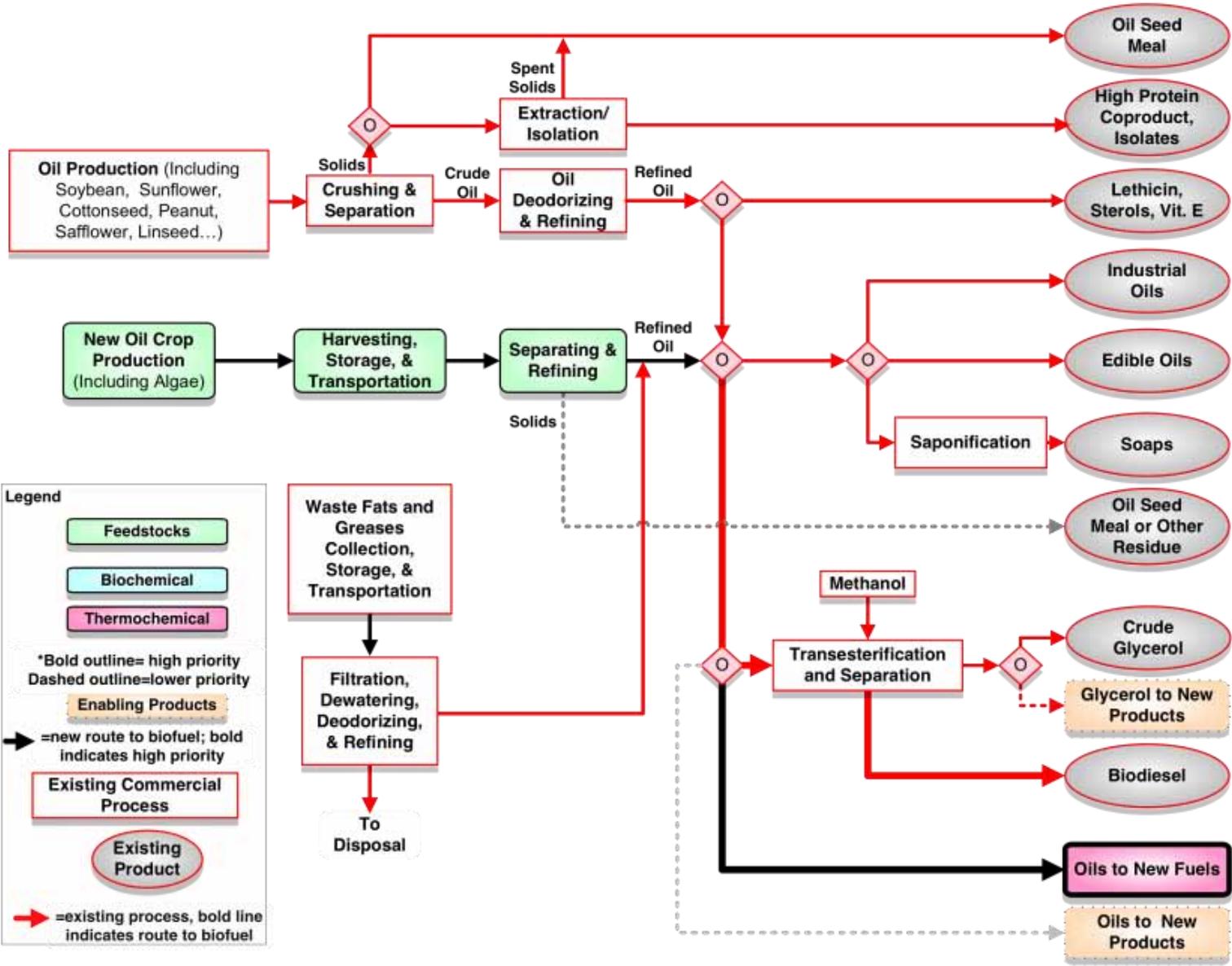


Figure A-1: Natural oils pathway

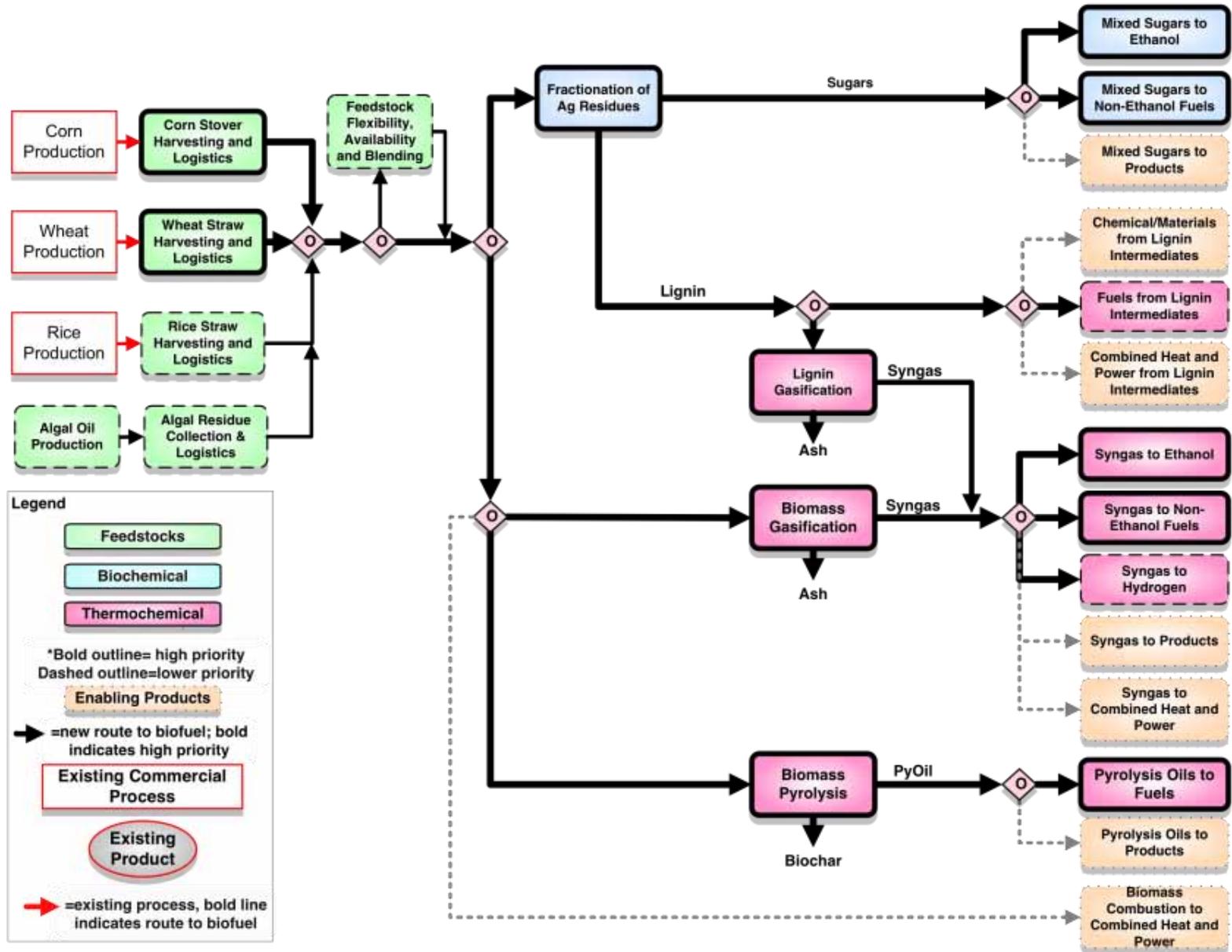


Figure A-2: Agricultural residues pathway

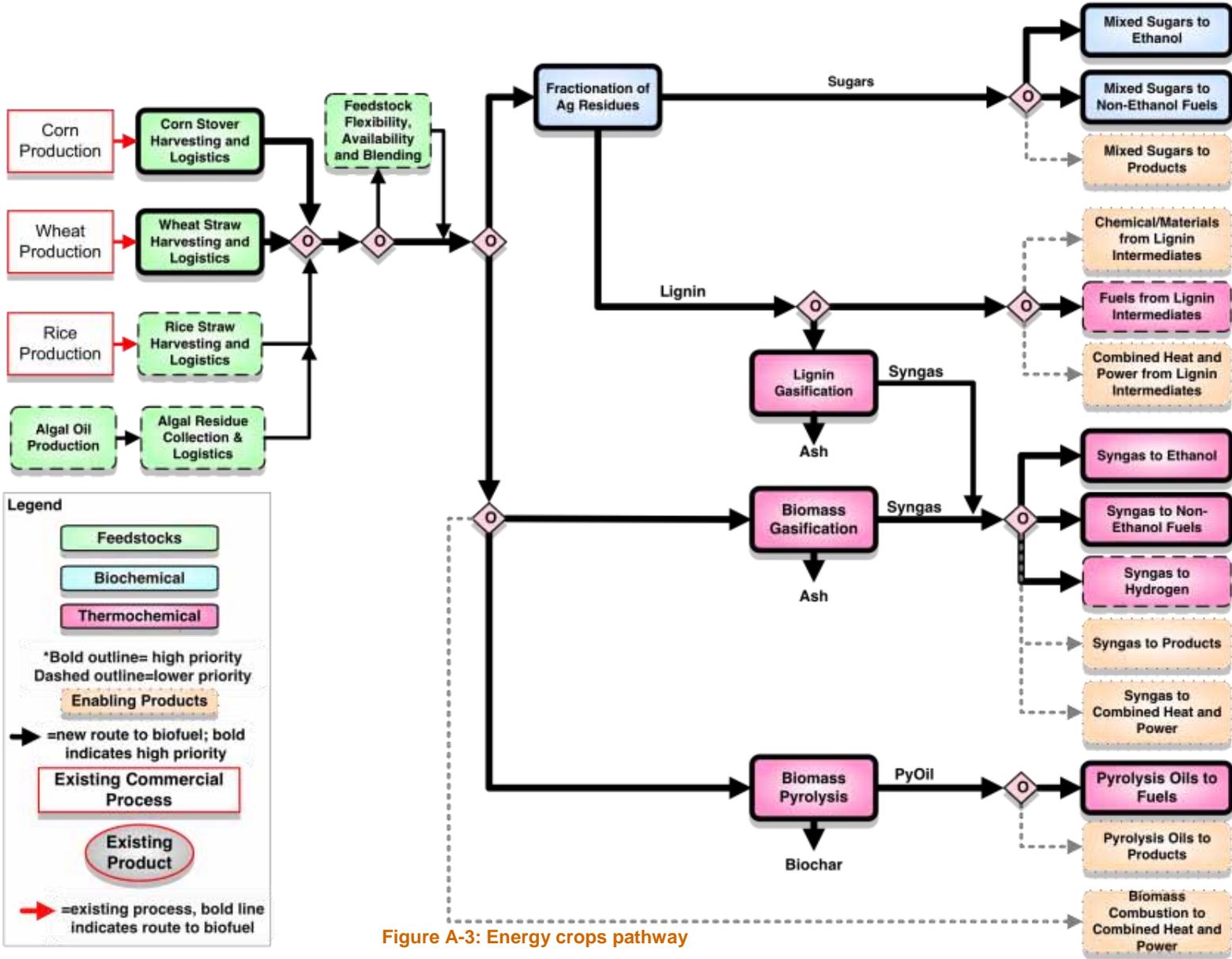


Figure A-3: Energy crops pathway

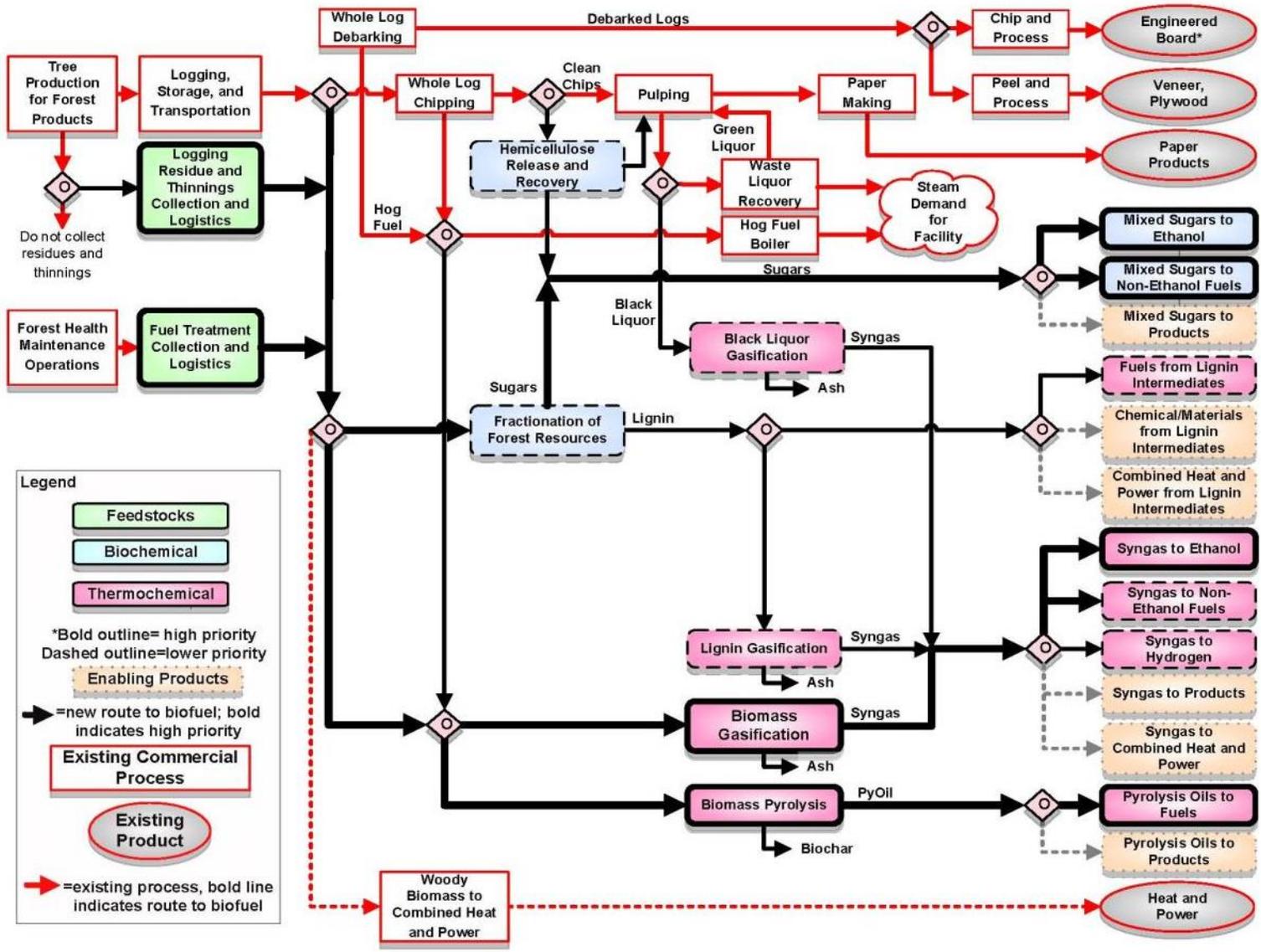


Figure A-4: Forest resources pathway

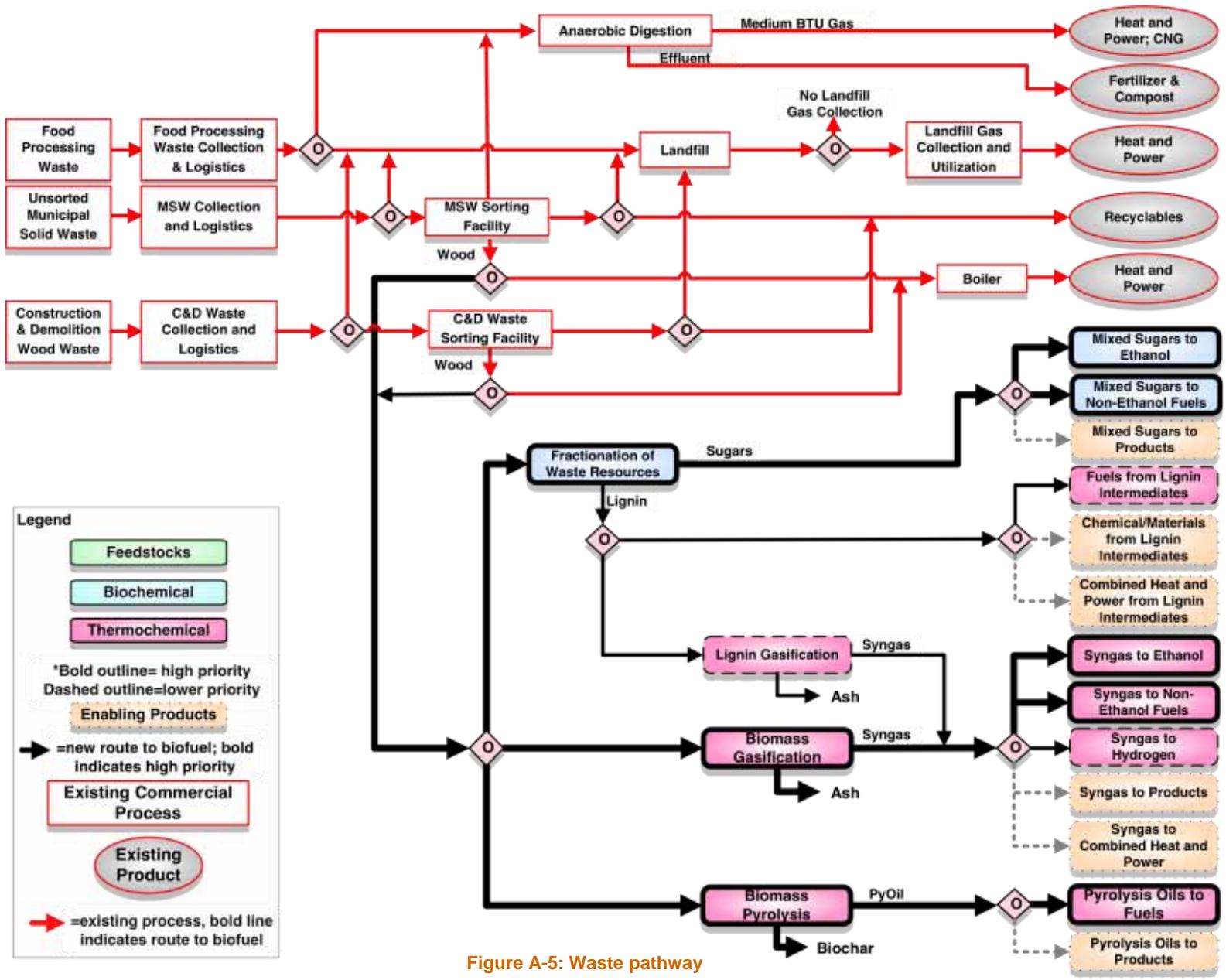


Figure A-5: Waste pathway