

Sensitivity Analysis and Validation

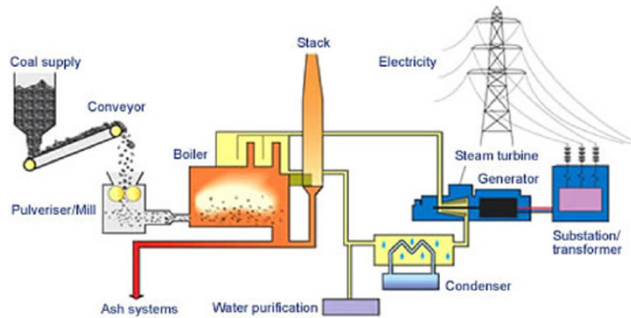
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The goal of this set of slides is to give a taste of a few examples of sensitivities that can be run and open to discussion

Coal sensitivities



Coal type

Mining

Mine gas content

Transportation distance

Combustion vs. gasification

Carbon Capture and Storage

Co-fire coal and biomass

Natural gas sensitivities



Drilling type (onshore, offshore, etc...)

Gas quality



Transportation distance

Biomass Sensitivities

- ▶ Feedstock type (Ag residues, perennials, wood feedstocks)
- ▶ Transportation distance (Feedstock and finished product)
- ▶ Make-up nutrients (Ammonia for urea)
- ▶ Soil erosion (loss of soil mass and soil carbon due to residue removal)
- ▶ Finished fuel (ethanol, higher alcohols, biocrude, etc...)



Biomass Feedstock

- Trees
- Grasses
- Agricultural Crops
- Agricultural Residues
- Animal Wastes
- Municipal Solid Waste

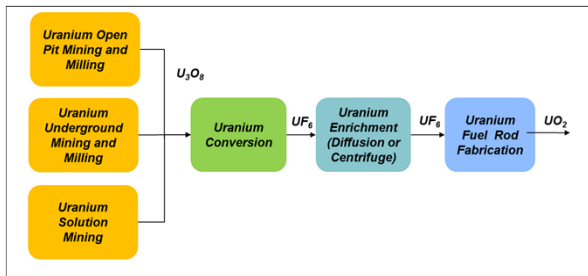


Conversion Processes

- Enzymatic Fermentation
- Gas/Liquid Fermentation
- Acid Hydrolysis/Fermentation
- Gasification
- Combustion
- Co-firing

- USES**
- Fuels:**
- Ethanol
 - Renewable Diesel
- Power:**
- Electricity
 - Heat
- Chemicals**
- Plastics
 - Solvents
 - Chemical Intermediates
 - Phenolics
 - Adhesives
 - Furfural
 - Fatty acids
 - Acetic Acid
 - Carbon black
 - Paints
 - Dyes, Pigments, and Ink
 - Detergents
 - Etc.
- Food and Feed**

Nuclear Sensitivities



- ▶ Mine type
- ▶ Transportation distance
- ▶ Enrichment type (Gaseous diffusion vs. centrifuge)
- ▶ Power generator (Gen II vs. Gen III+)

Product LCAs

- ▶ Solid state lighting vs. incandescent vs. CFL
- ▶ Asphalt from renewable resources
- ▶ Your products....

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