

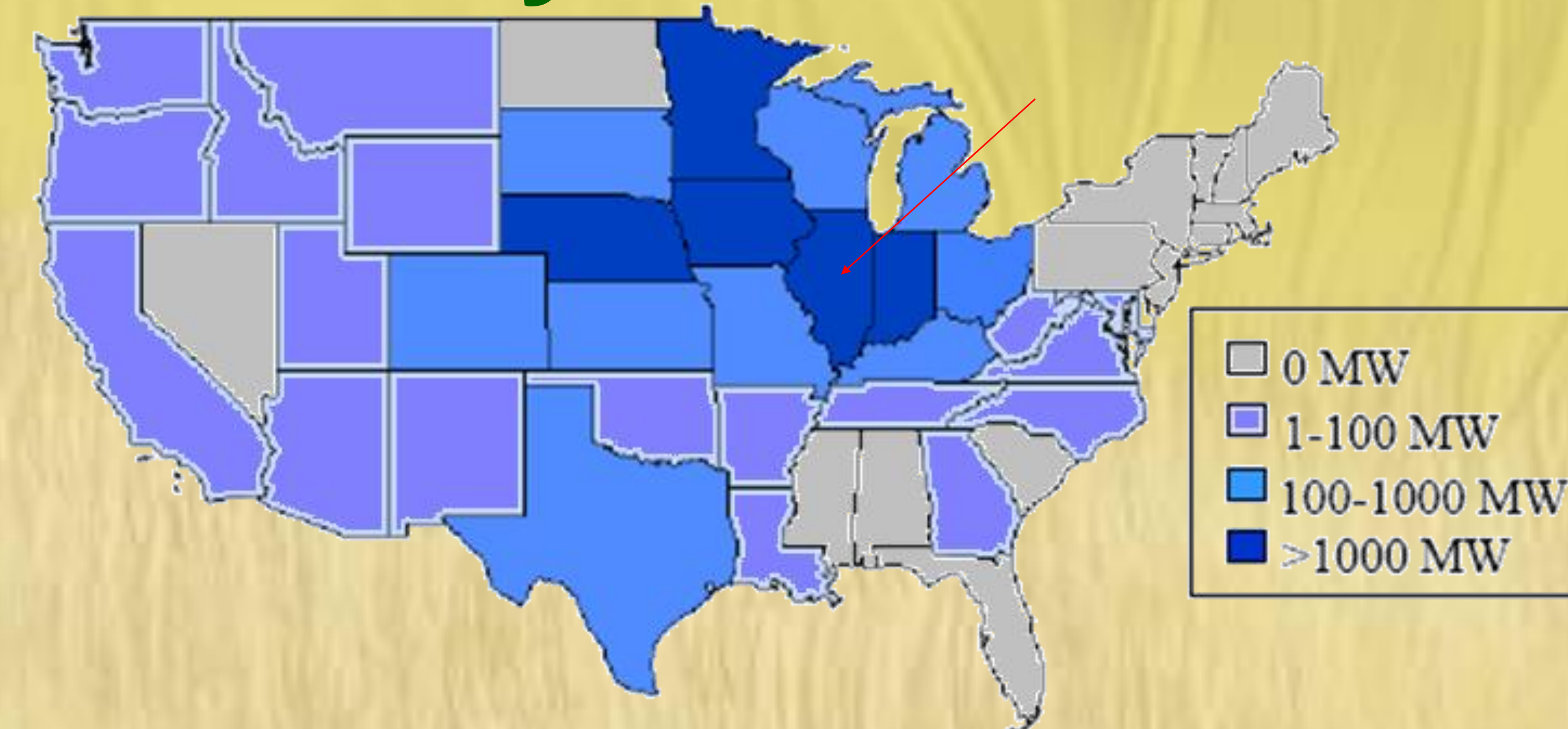
IPRO 349: Solid Fuel from Biomass for Cogeneration

Background

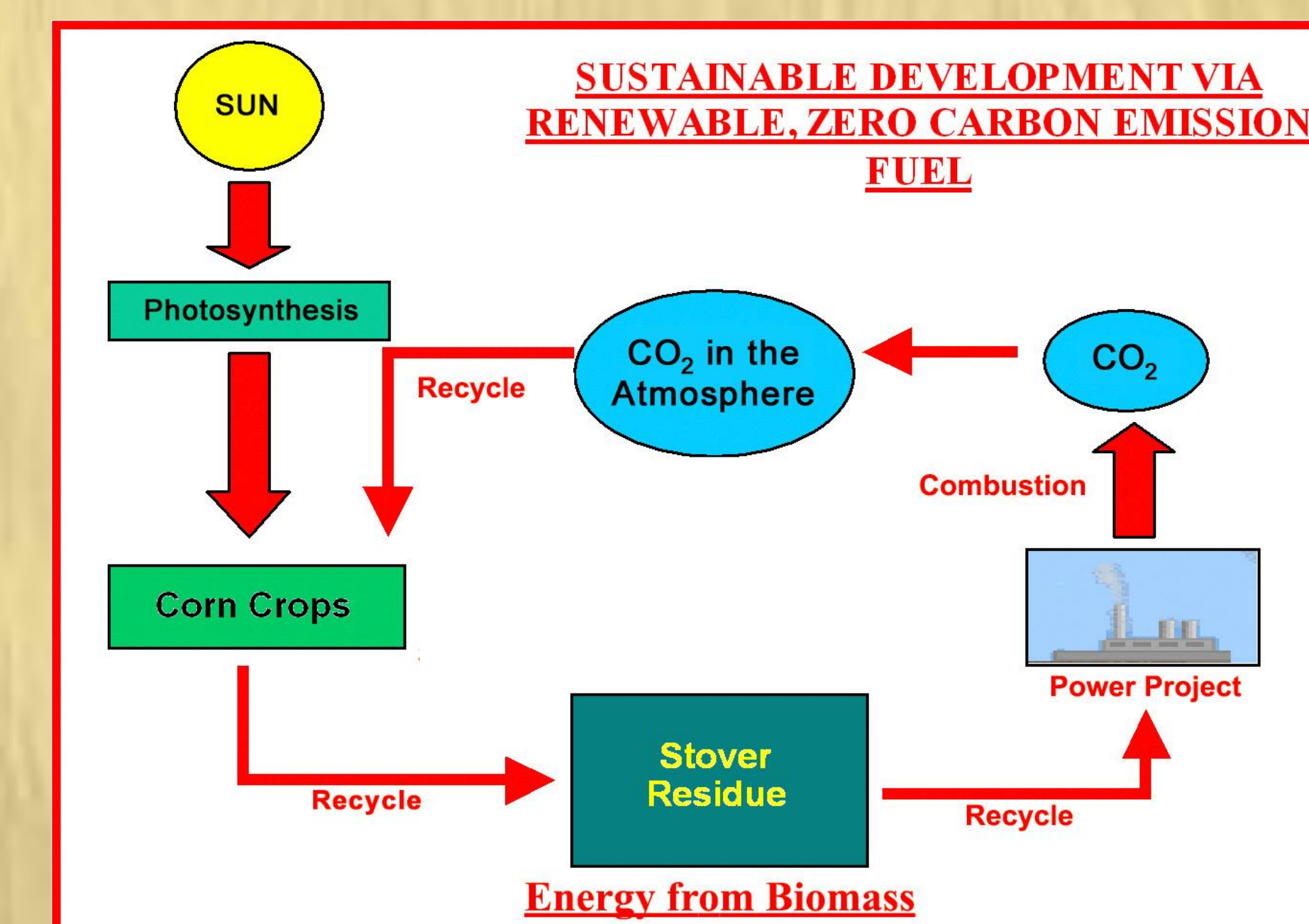
• **Illinois** currently generates half of its electricity with fossil fuels. Not only are fossil fuels a nonrenewable resource, they emit several toxic compounds into the atmosphere when used. The consequence of continued fossil fuel use will affect future generations, so alternative fuels must be researched **NOW!** IPRO 349 investigated the possibility of using **corn stover as an alternative fuel** to generate electricity in Illinois. Corn stover consists of the leaves and stalks, but not the corn kernel itself.

The Future of Fossil Fuels			
Fossil Fuel	Current Reserves (billion barrels of oil equivalent BBOE)	Current Consumption (million BOE/day)	Years until depletion
Oil	1,277,702	77	45
Gas	1,239	47	72
Coal	4,786	54	252

Why corn stover?



MW-generation potential from corn stover in the United States (Antares Group Inc., 2003)



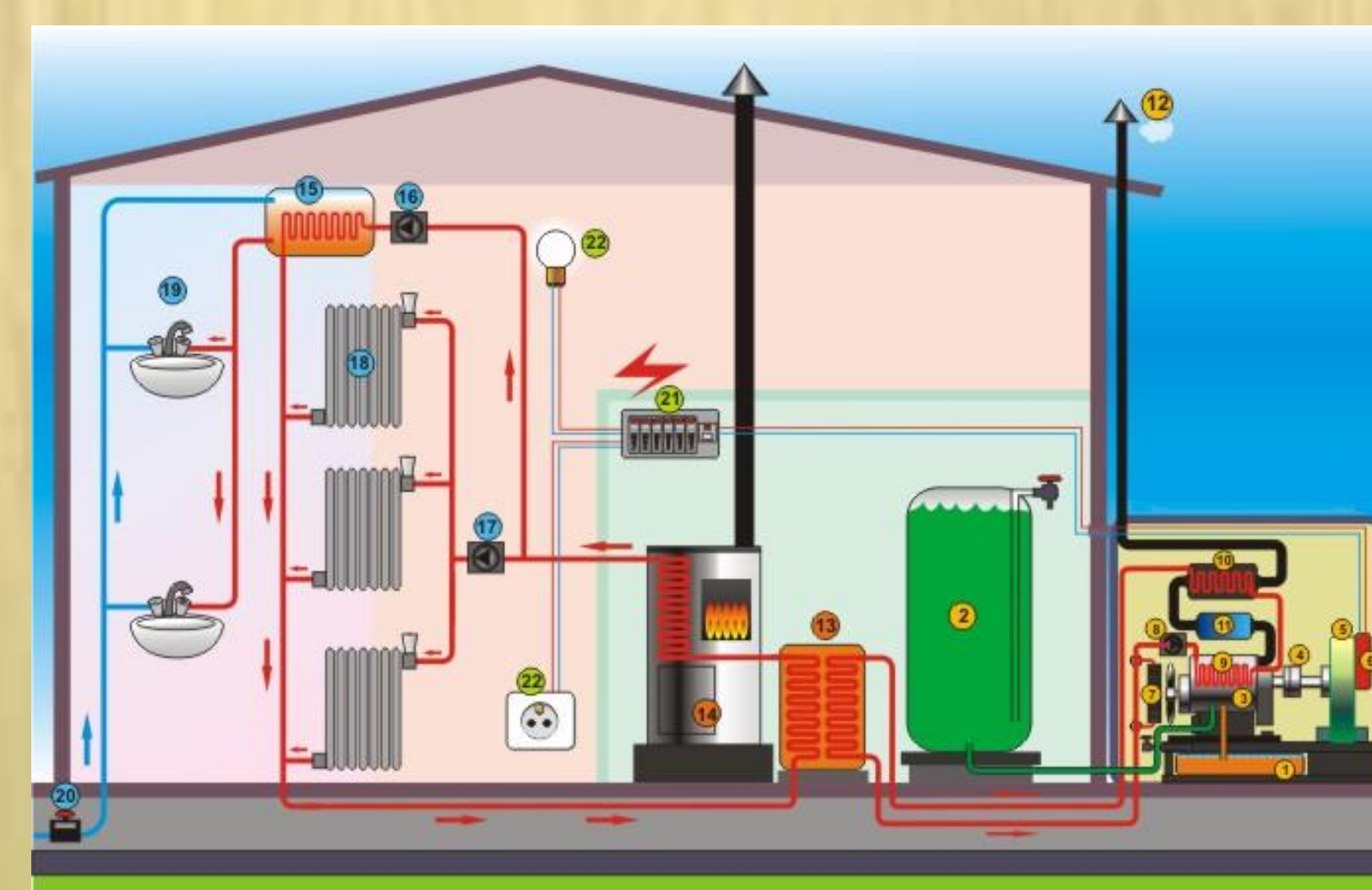
Corn stover as an electric fuel is environment friendly due to zero carbon emission. (http://www.chemisar.com/images/co2_cycle.jpg)

Objectives

- **Examine the logistics** for the collection of stover in Illinois.
- **Conceptualize the technology** needed, in the form of a process flow sheet.
- Form a conclusion that evaluates the overall **energy** and **economic potential** of such an approach.

Results

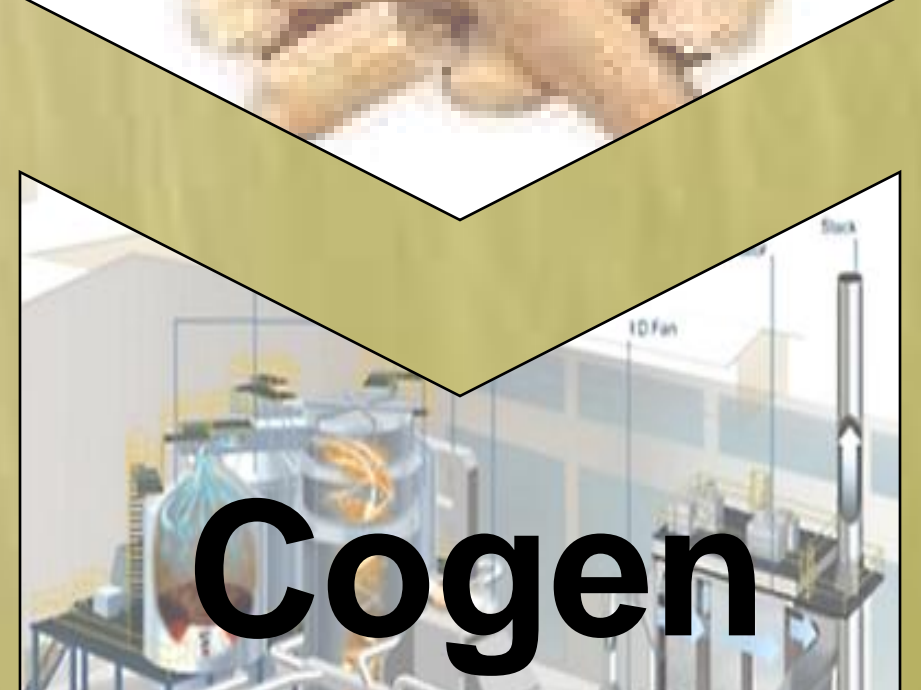
- IPRO 349 researched the categories on the left in order to generate an energy and process **flow chart** for two cases: **large scale and small scale**
- Small scale considers just the farmer growing the corn using the corn stover as an electric power source. Not only was this case energetically and economically feasible, but farmer's can also use heat generated from the corn stover in **cogeneration**
- Large scale considered powering a **50 MW/day** plant using stover from multiple farmers. This case was also economically and energetically feasible.



(Energiestro)

Conclusion/Future Recommendations

- **IPRO 349** explored the several benefits of converting corn waste that would otherwise be left on the field for no further use to a commodity that could provide **power and heat** to numerous facilities. Collaboration of the work of both the business and research teams has led to an final conclusion which describes all the logistics taken into consideration. Additional equipment costs/requirements by future IPRO teams would further support that corn stover is indeed a **novel fuel for generating electricity**.



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