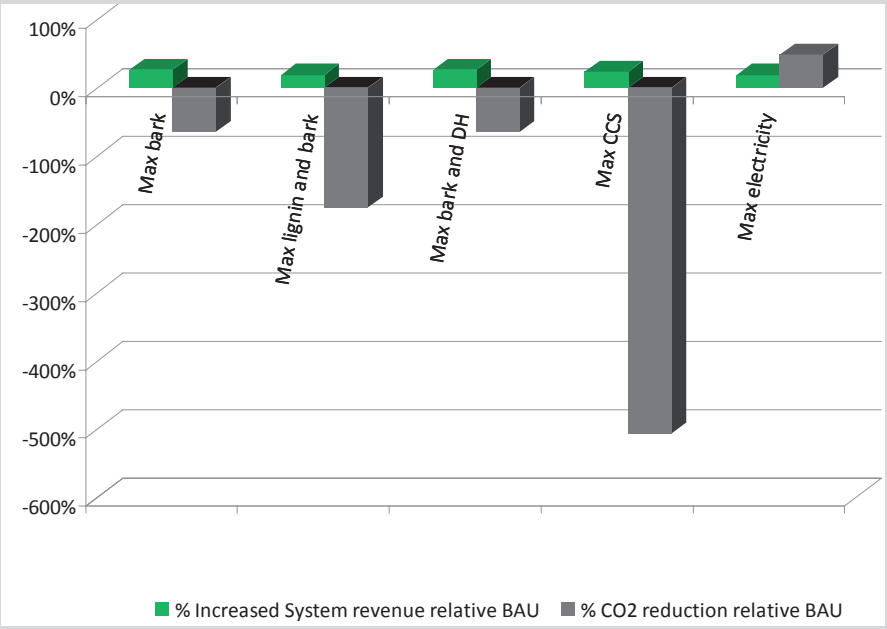
Pulp and paper industry

Trade-offs between different technology pathways for kraft pulp mills

For chemical pulp mills there are many technology pathways which can increase energy efficiency and thus contribute to reduction of global CO_2 emissions. Which technology pathway that holds the greatest potential for future profits and reduction of global CO_2 emissions depends both on mill specific conditions and on the surrounding energy system (e.g. policy instruments and energy market prices).

In the paper four different technology pathways for utilization of excess heat at a chemical kraft pulp mills are investigated: 1) Increased electricity production in new condensing turbines, 2) Production of district heating, 3) Increased sales of biomass in the form of bark and/or lignin and 4) Carbon capture and storage.



In a scenario with a high CO_2 charge all of the technology pathways are profitable compared to business as usual (BAU), but the combination of maximum bark and district heating (DH) sales is the most profitable solution. The reduction of global CO_2 emissions, however, varies and for increased electricity production the global emissions even increase.

The results show that conventional pathways such as increased electricity production, selling bark and district heating production are economically robust, while the profiability of emerging technology pathways such as carbon capture and storage and lignin extraction are more dependent on the development of the energy market. However, emerging technologies hold a larger potential for reduction of global CO_2 emissions.

Consequently it can be concluded that applying a high cost of CO_2 alone may not be enough to reach the full potential of CO_2 emissions reduction since this would profit the existing technology pathways. To reach the full potential the new and emerging technology pathways may also need some direct support, e.g. technology specific subsidies.

For further information:

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