KraftSIM | PAPERWEEK 2025

PaperWeek 2025 Conference
Tuesday – February 11, 2025
1:30 p.m. – 3:00 p.m. (EST)

ENERGY AND DECARBONIZATION WORKSHOP

KraftSIM – Modelling and Simulation for Energy and Emission Reduction

- *CADSIM simulation platform for assessment of new technologies and processes in kraft mills.*
- *Provides cross-departmental insights on energy, steam, emissions, biomass consumption, water, and chemicals.*

INDUSTRIAL CONTEXT

Kraft pulping processes present valuable opportunities to accelerate the energy transition. By harnessing biomass combustion and capturing biogenic carbon emissions, kraft mills can significantly contribute to decarbonizing other industries while offsetting emissions. This dual role highlights their critical importance in driving the shift toward a low-carbon economy.

KRAFTSIM

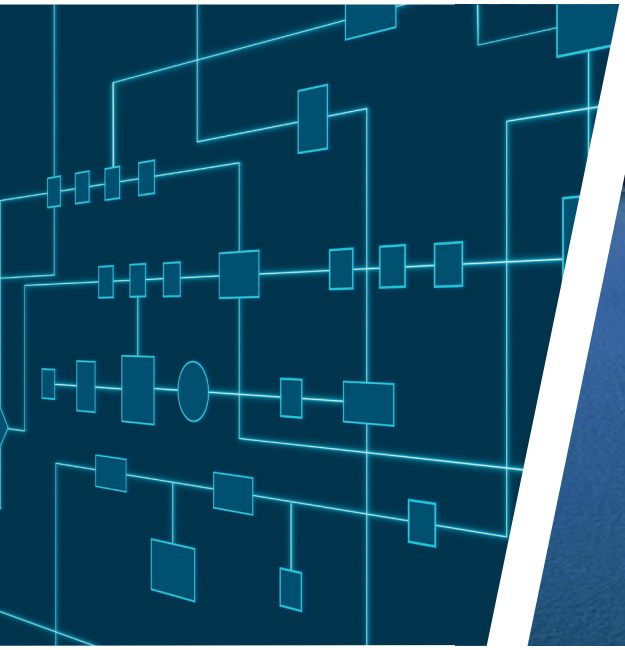
KraftSIM is a free and publicly available modelling tool created to support the pulp and paper industry to adopt process improvements, transition to carbon neutral/negative operation, and explore forest product diversification. **KraftSIM** was developed to evaluate existing kraft mill efficiency and limitations, explore pathways for future technology implementation, and investigate opportunities for increased pulp production.

The **KraftSIM** base case was calibrated with average Canadian kraft mill data to create a representative Canadian kraft mill. **KraftSIM**, developed utilizing CADSIM Plus, can also be easily adjusted to represent mill-specific control loops, chemistry, and process flows to generate tailored results. The performance of various technologies can be assessed from various perspectives: energy (fuel, steam, power), chemical recovery, emissions, water and chemical consumption, and operating cost.

"UNDERSTANDING SYSTEM INTERACTIONS AND THEIR DIRECT AND INDIRECT IMPLICATIONS ON RESOURCE UTILIZATION AND EMISSIONS IS CRITICAL FOR STRATEGIC DECISION-MAKING."

MODELLED TECHNOLOGIES

A number of technologies, including advanced evaporation systems, black liquor membrane concentration, oxygen delignification, and pulp displacement washing by use of a horizontal belt washer, can be assessed independently and in combination. **KraftSIM v2** (release date not yet available) is set to include black liquor and biomass gasification, multi-fuel oxyfiring in the kiln, calcium looping, amine carbon capture, various carbon capture pathways, ammonia and methanol production from syngas and more.



SIMULATION INSIGHTS

- Gain a deeper understanding of energy, emissions, and chemistry, manage inventory, and track costs
- Investigate process changes and their implications on the heat and water network
- Assess new technologies or retrofit efficiency improvements of existing assets
- Develop new control strategies, optimize heat integration, and evaluate “what-if” scenarios

REFERENCES

KraftSIM was designed by *CanmetENERGY in Varennes*, a Natural Resources Canada research centre, in collaboration with *AUREL Systems*. Platform operates on CADSIM Plus v3.4.

Rogerson, A., Savulescu, L., Bernier, E., et al., TAPPI Journal 23(6):336(2024). https://doi.org/10.32964/TJ23.6.336

For more information on **KraftSIM**, please contact us: canmetenergy-canmetenergie@nrcan-rncan.gc.ca or adam.rogerson@nrcan-rncan.gc.ca

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