

Net-zero: Building new processes, optimizing old ones

Last November, the federal government tabled a bill to establish the Canadian Net-Zero Emissions Accountability Act, which would appoint an advisory body to set rolling five-year emissions-reductions targets so Canada can meet its “net-zero” goal by 2050. The legislation mentions “sectoral strategies,” so, should the bill pass, we can assume that there will be specific instruction forthcoming for pulp and paper.

What we know is that greenhouse gas (GHG)–producing heavy industries such as pulp and paper would have to completely offset their GHG emissions by capturing carbon before it reaches the air in order to achieve “net-zero.”

This industry has made major improvements to capture carbon over the last 30 years, reducing its GHG emissions by 70 per cent since 1990 through processes such as electrification and cogeneration. Plants are already making and using their own electricity as a way to reduce emissions. Some have established cogeneration facilities, which use steam turbines or reciprocating engines to turn waste from one process into energy for another.

But fossil fuels are still a significant component of many processes. With pulp and paper, iron and steel, mining, refining/smelting and cement accounting for over 75 per cent of Canada’s total industrial energy use, large industrial emitters will be a major focus of the government’s net-zero plan.

Much of this industrial energy is required for heating, drying and steam generation – and because pulp and paper processes use so much heat, it’s difficult to further reduce the amount of energy used. A report submitted to the United Nations by Environment and Climate Change Canada after the 2016 signing of the Paris Agreement offers suggestions for decarbonization in heavy industry, but also recognizes the challenges that lie therein, including international trade competition, global market prices that affect cost of production, and the level of government investment required to make more environmentally responsible processes financially viable.

The report says that process optimization will play a key role in emissions reductions, from operations and control improvements, to regular maintenance, to upgrades for heating, cooling and power production and recovery. The sector will need to explore new processes, such as fuel switching and carbon capture and storage systems, and reimagine old ones to reduce energy – for example, by drying paper with chemical additives to reduce heat consumption, or by recycling recovered paper. With those solutions, though, new issues arise – like the proper reuse or disposal of chemicals, or the fact that paper can only be re-pulped so many times before the fibres are too short for reuse.

Regardless, the feds’ plan means low-carbon fuels, increased recycling and changes to existing processes are on the horizon. So we’re pleased to present a number of ways to improve processes in this issue, starting with the first technical paper in a three-part series on industrial cogeneration from Natural Resources Canada’s clean-tech research firm CanmetENERGY. The researchers explore optimization at the supervisory level for steam plants (p. 18). We’ll publish the next two papers in upcoming issues.

Further downstream, we’re exploring the new ways that process analyzers use near-infrared spectroscopy to improve process control (p. 10 and p. 16).

Continuous improvement is something pulp and paper producers do on a daily basis. No matter what comes next with the net-zero plan, this is an industry that has adapted before – and it’ll do so again.



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