

The Circularity of Paper: Inside the Paper Mill

Welcome to 3 minutes with Two Sides. I'm Kathi Rowzie

We know the circular life cycle of North American paper products begins as wood from sustainably managed forests where trees are purpose-grown, harvested and regrown in perpetuity. But once that wood reaches a pulp and paper mill, how does the manufacturing process contribute to circularity and minimize environmental impacts of paper products?

Significant advances in technology, data management, process engineering, predictive maintenance and reliability have made today's pulp and paper mills more efficient than ever before, especially when it comes to the use of critical resources like water and energy. It's a well-known fact that papermaking requires lots of both, but that's really just the beginning of the story.

The circular path of water in the papermaking process is really quite remarkable. The process requires large quantities of H₂O, but actually consumes very little. According to NCASI - the National Council for Air and Stream Improvement - water used in a typical U.S. paper mill is recycled 10 times or more. Then it's cleaned to meet strict federal and state water quality standards, and around 88% of it is returned to its source. Only about 1% is retained in the paper products themselves, and the rest just evaporates back into the environment. On top of this, the American Forest and Paper Association reports that the U.S. paper industry has reduced its overall water use per ton of production by more than 8% since 2005.

Yes, paper manufacturing requires large amounts of energy, but renewable energy meets, on average, around 2/3 of the energy needs at U.S. mills. And around 58% of that energy is self-generated using renewable, carbon-neutral biomass, mostly bark, small limbs and other leftovers recycled from the papermaking process. Nearly all of this energy is generated using high-efficiency combined heat and power systems -- what's often referred to as CHP technology. The U.S. Environmental Protection Agency says that CHP technology can achieve efficiencies of over 80% by capturing and recycling heat that would otherwise be wasted and converting it to thermal energy. This compares to 50% efficiency for traditional energy technologies like boilers.



As a result this high level of bioenergy use, advances in technology and process improvements, U.S. paper mills reduced greenhouse gas emission by more than 24% between 2005 and 2020, and the EPA reports that the industry contributes only six tenths of one percent of total U.S. greenhouse gas emissions.

For more information about the circular life cycle of paper and Two Sides, be sure to visit our website at twosidesna.org. And don't forget to catch us next time on Three Minutes with Two Sides.