



**SIEMENS**

*Ingenuity for life*

## How are pulp and paper mills becoming future ready?

*While pulp and paper mills must address both aging infrastructures and workforces, more and more they must also start to consider making their mills more future ready. By deploying highly integrated drive systems, with advanced electrical and instrumentation (E&I) and automation technologies, this can help prepare for more profitable futures – by saving costs, boosting efficiencies, and gaining agility.*

### **Turning dual challenges into strategic opportunities**

Across the pulp and paper industry, mills everywhere are taking steps to modernize their capital-intensive

machinery. With much of its plant machinery decades old, it's time to take advantage of the latest drivetrain technologies, plus advanced electrical and instrumentation (E&I) and automation technologies, to digitalize their operations much more. In doing so, they are turning their plant infrastructures from depreciated cost centers into strategic assets – and sources of competitive advantage.

The next-generation upgrades that mills are undertaking today are much needed: Plants must be agile and responsive to new opportunities, while delivering ever greater efficiencies and

lower costs. At the same time, investments in the upgrades and modernization of mill machinery not only can pay for themselves quickly, but they can also provide greater cumulative returns on invested capital in years to come.

Although old pulp and paper machinery might already be fully depreciated, its day-to-day operating costs will inevitably rise because of its age. Many mills are still operating machines that spun their first paper rolls back when the millennial generation was in diapers, disposable paper ones most likely. As years go by, maintenance and repairs can be increasingly costly and spare parts more difficult to find. Disruptive downtime can become more frequent.

Moreover, a large part the industry's workforce is nearing retirement – the so-called "grey tsunami." Finding up-and-coming pulp and paper manufacturing expertise and skills among millennials and younger is a growing challenge. That's especially true for E&I talent, which is alternatively drawn to industries such as automotive, aerospace, and biotech, where much more advanced digitalization technologies are already deployed.

**Making the case for sole-sourcing**

To be sure, the key to maximizing investment returns on major plant upgrades (and new builds) is not a patchwork approach to sourcing advanced drivetrain, E&I and automation components.

First, sourcing from different vendors, especially if multiple bids are involved, can be complicated, time-consuming, and costly.

Second, the integration will typically be complex, requiring time and skills most mill staffs lack, in addition to the coordination of multiple vendors.

Third, testing and commissioning can be risky, especially when taking into account production cost.

Finally, ongoing support and service for a multi-vendor drivetrain (plus E&I and automation from many vendors) can be a frustrating, time-consuming experience and even disrupt production.

**Easier optimization.** Because paper machines can have as many as 125 different drive points, it can be hard to ensure that each one is delivering the optimal torque at all times. It's even harder to do that in a mixed vendor environment. That's why the case for sole-sourcing with a single, qualified vendor of both an integrated drivetrain, plus advance E&I and automation, can be quite beneficial.

For example, as shown in Figure 1, drivetrain components – switchgear, variable frequency drives, motors, geared motors, gearboxes, and couplings – can arrive pre-tested, ready for quick integration, then fine-tuned to deliver optimal performance for the most accurate specifications across the full span of a mill's pulp and paper production.

**One call versus many.** Just as important, lifecycle service and support is available via a single contact point, making maintenance, troubleshooting, and repairs faster, while minimizing downtime disruptions. During decades of use, upgrades of components with new innovations can be made without the risk of unintended consequences disrupting production. Spare parts can also be better assured – and fewer needed, reducing idle capital and boosting returns on capital even more.

**Same applies to E&I systems.** Mills must deal with enough variability in their operations that by having E&I components from many different vendors. Should not be one. A single-source approach here can deliver a wide range of benefits, along with the increased operational visibility that comes with improved data flows and granularity from the entire length of pulp and paper production.

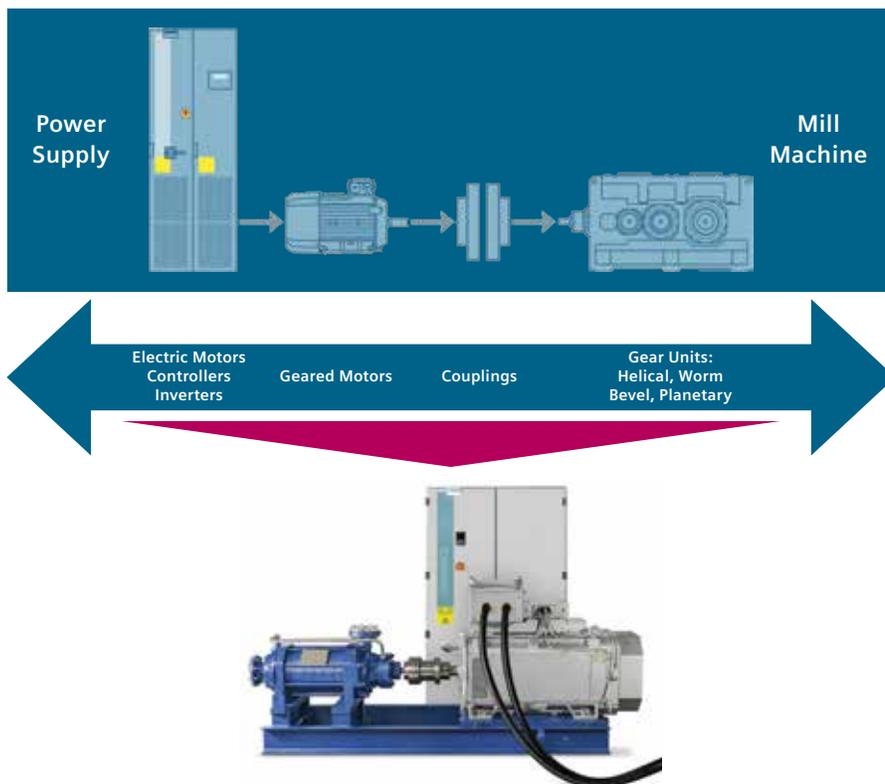


Figure 1. Illustration of a Siemens Integrated Drive System shows how all the drivetrain components are designed and engineered to easily and quickly integrate. Lifecycle service and support are simplified, too.

North- and southbound Communications between the various plant networks can be streamlined and conducted in real-time. This can eliminate a lot of manual data gathering and error-prone data entry. It can also provide much greater operating visibility into overall mill performances, including predictive maintenance and remote diagnostics.

Highly secure, industrial wireless networks can also eliminate costly cable runs, while adding greater flexibility to plant layouts and operations and data accessibility to plant operational staff.

**Fully integrated E&I and automation.** Single-sourcing E&I and automation is especially critical when it comes to component procurement, deployment, and configuration. For example, the Siemens Totally Integrated Automation (TIA) portfolio of modular components – sensors, programmable logic controllers (PLCs), human machine interfaces (HMIs), industrial PCs, and much more – are all designed and engineered for plug-and-play integration, including self-configuration. In addition, they come with safety integrated, plus self- and remote diagnostics.

TIA's biggest time saver is in software engineering and programming with the TIA Portal. This is a common development framework with a point-and-click interface and proven libraries of code to which mill operators can add and manage their own – or adapt any of its existing code libraries for their own needs. Siemens customers report an average time savings in their software engineering and programming of 30 percent, while many have reported time savings of up to 50 percent.

#### **How mills are using integrated drives and advanced E&I to save costs**

In many cases, mills take the lowest-cost approach to procuring their drivetrain, E&I and automation components. While this approach may look great on a spreadsheet or in an executive presentation, it discounts, if not ignores, the hidden project costs and risks of upgrading a mixed vendor environment and the resulting higher total cost of ownership, as previously discussed.

But taking an integrated approach can have substantial cost savings right from the start, with large reductions in deployment time and risk, too. Some of the largest mills in North America have realized substantial cost benefits via highly integrated, sole-sourced drivetrains and E&I systems from Siemens.

For example, one of the largest mills in the U.S. sought in 2016 to modernize its machinery to support a strategic decision to convert its facility from newsprint to tissue production. It selected a Siemens Integrated Drive System for a coordinated approach to its machinery's drives, motors, and switchgear.

Siemens experts sat down with the mills engineering team to learn and fully understand their requirements, then came back with a plan to re-engineer the load centers and power requirements. Result? Hardware was reduced by 33 percent, saving \$750,000 up front. The fresh approach to meeting torque demands also generated a commensurate reduction in spare parts inventory, enabling the mill to reduce the capital tied up in that inventory by hundreds of thousands of dollars.

In addition, the mill benefitted from having a single bill of materials covering the most important parts of its drivetrain and E&I components. It also had just one project manager to oversee the entire design, engineering, installation, onsite testing, and final commissioning. The components arrived onsite, all at the same time ready for installation, with factory acceptance testing completed.

#### **No better time for integrated drivetrains and advanced E&I and automation**

The pulp and paper industry's widespread modernization and digitalization of its mills will help address their growing issues of aging infrastructures and workforces. But given that these upgrades – along with any new-builds – involve a generational, decades-long commitment to decisions made today, mill owners and operators should carefully consider the many advantages of sole-sourcing highly integrated drivetrains, plus advanced E&I and automation systems.

In effect, their choice of supplier will become their strategic partner. That partner should have the expertise and financial resources to ensure the lasting viability of their solution through its entire lifecycle. Of course, we would suggest that Siemens be put on the short list of candidates for evaluation. We also suggest that there is no better time than now to begin to modernize mill facilities. The sooner upgrades are done, the sooner the return on investment will begin, not only in terms of money but also in terms of time, flexibility, operational visibility, and competitiveness. These are the steps mills must take to ensure their own futures – and their future profitability.



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