Revolutionizing Montana's Energy Future

Carbon Core Technology Leading the Charge for Safer, Smarter, and More Efficient Transmission

If Montana takes the bold and decisive step toward modernizing its electrical grid by adopting composite-core conductors it could also land a manufacturing facility for the production of conductors for North America.

Epsilon Composite is excited to explore opportunities for domestic production within the United States, particularly in the state of Montana. Their interest in Montana stems from the state's forward-thinking policies and the proactive efforts of the Montana Public Service Commission.

Epsilon spokesman, Joseph Sylvia, expressed the following:

"The state's supportive regulatory environment aligns perfectly with our goal of expanding the production of advanced composite solutions. Additionally, Montana's diverse landscape offers an ideal setting for testing and refining our composite solutions, providing a unique platform to demonstrate their effectiveness in various environmental conditions. We are particularly enthusiastic about the potential to establish a local workforce in Montana."

By setting up production facilities in Montana, Epsilon would provide valuable training and employment opportunities to the community. Epsilon believes, their commitment not only supports the local economy but also ensures that their products are manufactured to the highest standards, leveraging the skills and dedication of Montana's workforce.

In evaluating potential sites for domestic pultrusion factories, Epsilon emphasized how Montana stands out as a top contender. Although not the only site under consideration, Epsilon is drawn to the state's progressive initiatives and the cohesive, collaborative spirit of its people, which together cultivate an environment ideal for innovation and growth—aligning seamlessly with Epsilon's vision for a future manufacturing site. As Epsilon continues to expand their operations, they are confident that partnering with Montana is a significant step toward achieving their goals in the domestic production of composite solutions.

Montana, likewise, should be working to attract technology companies like Epsilon, a leader in composite-core conductors, also known as carbon core technology. This technology mitigates wildfire risks, improves efficiency, and reduces power grid operational costs. Under the leadership of Commissioner Randy Pinocci, the Montana Public Service Commission (PSC) has played a pivotal role in pushing forward the critical transition from steel core to composite-core conductors.

At the heart of this effort is Senate Bill 301 (SB 301), a legislative initiative designed to accelerate the integration of composite-core conductors into Montana's transmission infrastructure. Although SB 301 has been gutted of the mandate to upgrade Montana transmission lines to this new conductor technology, it isn't too late for Montanans to ask the House to add it back in.

By prioritizing these innovative materials over outdated steel-core alternatives, the state is aligning its energy policies with modern engineering advancements. This strategic move aims to enhance grid reliability, prevent transmission failures, and lower costs for consumers. Electricity costs in Montana have risen over the years, reflecting broader trends in energy prices across the U.S. In 2019, the average residential electricity rate in Montana was approximately 14 cents per kilowatt-hour. By 2025, this rate has increased to around 18 cents per kilowatt-hour, marking a 30% increase in cost.

Despite Montana's forward-thinking approach, the broader utility industry has been slow to embrace this technological shift. This resistance is largely due to entrenched interests promoting steel-core conductors, despite their inherent disadvantages. Misleading narratives persist, often influenced by lobbying efforts that downplay independent research, lab data, and field performance studies. Unlike other regions that remain stagnant, Montana's initiative prioritizes science and proven field data over outdated industry practices.

The Case for Composite-Core Conductors

The adoption of composite-core conductors is driven by several compelling advantages that directly address the shortcomings of traditional steel-core conductors. Composite cores, made from high-strength carbon fiber, eliminate many of the challenges that have plagued steel-core technology for decades.

- **Weight Reduction & Increased Efficiency:** Composite-core conductors are 70% lighter than steel-core alternatives. This weight reduction allows for approximately 28% more conductive aluminum to be added without increasing overall conductor weight, significantly improving electrical efficiency.

- **Minimal Thermal Expansion & Sag:** Steel expands significantly under heat, leading to excessive sag, clearance violations, and potential infrastructure failures. Composite cores, with a coefficient of thermal expansion (CTE) 10 times lower than steel, maintain stable performance under high loads and extreme temperatures.

- **Corrosion Resistance & Longevity:** Steel-core conductors are susceptible to rust and corrosion, requiring costly maintenance and early replacement. Composite cores, by contrast, are immune to corrosion, ensuring a longer operational lifespan with minimal upkeep.

- **Structural Integrity & Elasticity:** Over time, steel undergoes plastic deformation, meaning it permanently elongates under stress. Composite cores remain fully elastic, returning to their original shape after high loads, ensuring long-term reliability.

As Montana embraces these advancements, it stands to be the national leader setting the example for safety and energy cost-effective delivery that sets a precedent for other states to follow, demonstrating the benefits of transitioning to modernized transmission solutions.

Dispelling Common Misconceptions About Steel-Core Conductors

Despite the overwhelming benefits of composite-core conductors, misconceptions persist. Many of these misconceptions stem from outdated industry norms or misinformation spread by steel-industry lobbying efforts. Montana's Legislators need to focus on factual, data-driven decision-making to ensure that policy changes are rooted in engineering reality rather than outdated industry bias.

Let's address some of the most prevalent myths:

1. **"Steel-core conductors are more cost-effective than composite-core conductors."**
   - While steel-core conductors may have a lower upfront cost, they require extensive maintenance, experience higher energy losses, and often need premature replacement due to sag and corrosion. Over time, the total lifecycle cost of steel is significantly higher than that of composite-core alternatives.

2. **"Line losses are an unavoidable cost of transmission."**
   - Not true. Energy lost due to resistance costs utilities millions of dollars annually. Composite-core conductors reduce line losses by up to 40%, ensuring more efficient power delivery and lower operational costs.

3. **"ACSS/TW conductors are optimized for high-temperature operation."**
   - This statement is misleading. While ACSS/TW conductors can withstand higher temperatures, they do so at the expense of excessive sag. Composite-core conductors operate efficiently at high temperatures while maintaining their structural integrity and minimizing clearance issues.

4. **"Composite cores are expensive."**
   - The reality is that composite cores allow for greater aluminum content without weight penalties, increasing ampacity while using existing infrastructure. They provide higher capacity transmission often without requiring costly upgrades to towers and support structures.

5. **"Steel Core has the ability to do what composite core conductors can do."**
   - Unlike modern carbon core conductors, steel core lines lack the ability to integrate fiber optics within their core. This technological limitation prevents real-time monitoring of the line's condition. Without fiber optics, steel core systems cannot precisely detect and pinpoint issues—such as damage, overheating, or breaks—down to within inches of the problem.
   - In contrast, carbon core conductors with integrated fiber optics provide advanced diagnostic capabilities. They allow for immediate identification of faults and relay this information directly to maintenance crews. This precision minimizes downtime, reduces repair costs, and enhances overall grid reliability. By eliminating the guesswork, crews can be dispatched swiftly and accurately to address specific maintenance needs.
   - The lack of this capability in steel core lines further underscores the urgency of transitioning to modern carbon core technology. These advanced conductors not only improve safety and efficiency but also represent a smarter, more resilient approach to energy infrastructure.

Overcoming Industry Resistance & Accelerating Adoption

Despite clear technological superiority, composite-core conductors have yet to see widespread adoption across the United States. This delay is not due to a lack of technical merit but rather the nature of the industry. Steel-based solutions continue to dominate U.S. markets due to entrenched supply chains and business interests, despite their technical shortcomings.

Internationally, however, the shift is well underway. Asia has already adopted composite-core technology at scale, recognizing the long-term financial and operational benefits. Even Europe, despite some resistance, is transitioning toward composite-core solutions. The United States, however, lags behind. Montana stands as a counterpoint to this stagnation, demonstrating that data-driven policies and proactive decision-making can lead to significant grid modernization efforts.

By leading the charge, Montana is proving that utilities can and should prioritize innovation over outdated industry practices. The state's investment in composite-core conductors sends a clear message that performance, reliability, and cost-efficiency should dictate infrastructure choices, not lobbying efforts.

Conclusion: The Future of Energy Transmission

Montana's decision to embrace composite-core conductors is more than just a policy shift, it is a forward-thinking commitment to modernizing the power grid. Companies such as Epsilon Composite's advanced transmission solutions offer a range of benefits that steel-core conductors simply cannot match:

✅ Higher strength-to-weight ratio for improved performance

✅ Elimination of thermal sag issues, ensuring grid stability

✅ Total corrosion resistance, reducing maintenance costs

✅ Up to 40% lower transmission losses, improving efficiency

✅Cost-effective grid modernization without excessive structural upgrades

Montana's leadership in this area sets a powerful example for other states and utility providers. By rejecting outdated materials and prioritizing composite-core technology, the state is making a long-term investment in safer, more efficient, and more reliable energy transmission.

The rest of the country must take note. The future of energy transmission lies in innovation, not tradition. Montana cannot only be the industry leader in this area, but in doing so may also be able to land a manufacturing facility from Epsilon that would serve North America. The time for innovative change is now.