Project Overview
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Company Background
Lincoln Electric System is the public power provider for Lincoln, Nebraska and the surrounding area. In 1966, LES was founded as a single electric utility providing electricity to the service territory. In 1970, Lincoln residents voted to form a semi-autonomous board of local citizens that oversee the operations of the company. LES is made up of over 500 employees serving the community through the safe, affordable, and reliable generation of electricity. LES electricity is generated with 34% renewables including wind, solar, and hydro as well as natural gas and coal. Lincoln Electric System is a progressive leader in the electric utility industry and is now committed to producing net-zero emissions by 2040.

Project Description
An important piece of electrical distribution construction is the deadend. Carrying the horizontal load of the power lines, a deadend maintains tension in the lines and is an essential piece of the grid. Typical deadends are manufactured from wood, but recent industry advancements have made fiberglass a viable option. This project analyzed the costs, lifespan, and conducted a life cycle assessment to determine if a conversion to fiberglass deadends on the LES system was a cost effective, sustainable choice.

Pollution Prevention Benefits
Choosing sustainable materials for the built environment is an important step towards a net-zero future. The individual materials that we use each come with their own impacts associated with the transport, manufacturing, and disposal of the product. By selecting a construction material, in this case a deadend, that reduces manufacturing and transportation impacts, LES is able to ensure that the built environment is built on a solid foundation of environmental sustainability. This project illustrates the method by which a life cycle assessment can be used to make the correct material choice.

Fiberglass Deadend Benefits
As described below, LES can switch to fiberglass deadends without incurring a large upgrade cost. This was an early concern, but the increased lifespan has resulted in a net savings over the life of the product. Over 1000 lb of CO2e emissions will be avoided during the manufacturing process of the deadends used each year well. Other benefits include a reduction in fossil fuel usage and lower contribution to eutrophication.

Summary of Savings Using Fiberglass Deadends

Benefit	20 Year Cost	Lifespan (yr)	CO2e (lb/yr)	Fossil Fuel (MJ/yr)	Eutrophication (lb N eq/yr)
Net Change	$18,500	15	1030	46740	28260

Indirect Benefits
As a result of the adoption of fiberglass deadends, the indirect benefits include:

- Lighter weight, easier to manipulate
- Less preventative maintenance
- Safer for line crews to install or maintain
- Easier to design, specifications will be simplified
- Less likely to fail during overloading
- Lower outage potential
- Cheaper shipping and stocking cost

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