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A supply chain network design model for biomass co-firing in
coal-fired power plants

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Highlights

- We design a hub-and-spoke in-bound distribution network for biomass delivery to coal plants.
- Estimate in-bound logistics costs for biomass to cofiring coal plants.
- Evaluate the role of truck and unit train shipments for delivering biomass to cofiring coal plants.

We propose a framework for designing the supply chain network for biomass co-firing in coal-fired power plants. This framework is inspired by existing practices with products with similar physical characteristics to biomass. We present a hub-and-spoke supply chain network design model for long-haul delivery of biomass. This model is a mixed integer linear program solved using benders decomposition algorithm. Numerical analysis indicates that 100 million tons of biomass are located within 75 miles from a coal plant and could be delivered at \$8.53/dry-ton; 60 million tons of biomass are located beyond 75 miles and could be delivered at \$36/dry-ton.



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Keywords

Hub-and-spoke network design; Network optimization; Supply chain design; Densified biomass; Rail transportation; Unit train

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