



Sustainable Aluminum Manufacturing Opportunities for Indiana

Aluminum is a strong and lightweight metal, essential for vehicle manufacturing, energy infrastructure, and electronics.

While the United States used to be the world leader in aluminum production, it now accounts for less than 2% of global production. This is due to a shift in production from countries with high energy costs to countries with lower energy costs. As energy markets become more volatile, the U.S. has continued to lose primary smelting capacity. The Alcoa Warrick primary smelter in Indiana, which reopened in 2018, faces the challenge of transitioning from coal to low-cost renewable power to remain viable in Alcoa's portfolio. Indiana will need to provide support for this transition while also building up the aluminum value chain and recycling infrastructure.

Primary aluminum smelting is highly energy intensive, with electricity estimated to account for up to 40% of the cost.

Coal-powered smelters are more than 4x as polluting as renewable-powered smelters.

Opportunities

- Decarbonizing the electric grid and switching to renewable energy eliminates most emissions from aluminum smelting.
- There are multiple federal incentive programs available to support clean energy developments in Indiana, especially in coal communities. The Alcoa facility has adequate space to accommodate, behind the meter, a large portion of the renewable power required to supply the >550 MW smelter demand.
- Transformational technologies such as the Elysis inert anode could eliminate the remaining aluminum manufacturing emissions.
- Indiana is well set up to support growing regional aluminum value chains such as EV production, packaging, and production for the DoD.

Challenges

- Stranded coal assets, the cost of decommissioning mines, and state regulations could make it difficult to transition away from coal.
- Ensuring power supply from renewable sources is adequate, affordable, and consistent to support the smelter's need for uninterrupted energy may require Alcoa to assemble a combination of off-site renewable energy contracts, behind-the-meter generation, and energy storage.



Paths Forward

Large aluminum companies such as Alcoa are committed to cutting emissions and growing the aluminum market sector in the coming decades. Demand pulls from lightweight electric vehicles and aluminum packaging, in particular, are expected to increase dramatically. For Alcoa to meet the need from downstream industries for low-carbon aluminum, as well as meet its own stated sustainability goals, renewable energy sources must replace coal in powering the Warrick smelter and an adequately trained workforce must be available to grow the aluminum value chain in Indiana. Success will require public-private partnerships and substantial economic investments, with strategic federal support.