

Metal Melt Modernization

Bingham and Taylor (B&T) is a gray iron foundry that has operated in Culpeper, VA since the 1940s. Until recently, the metal melting process was performed via cupola technology. The cupola used coke fuel to heat. B&T initiated the Metal Melt Modernization project in 2021 when it began considering replacements for the cupola, and finished the project in 2022 when the **electric induction furnaces** (EIFs) were installed and took over all metal melting operations for the foundry. The EIFs are powered completely by electricity.

Review of cupola operations and coke usage (Jan 2020 – Dec 2021) versus EIFs and electricity usage (July 2022 – June 2023) demonstrate that **the EIFs use 43% less KWH / ton metal melted on average**. Energy usage for the cupola evaluated tons of coke fuel used, while energy usage for the EIFs evaluated KWH of electricity used.



Processes that were not evaluated in these calculations include: the cupola start-up process, which uses natural gas; transportation off-site of fly ash; and other down-line process changes. In comparison, the EIFs do not have extraneous fuel sources for start-up and accumulate waste in-need of transport (particulate filtrate) more slowly. In addition to the energy savings, this project **significantly reduces greenhouse gases and particulate matter emissions** from the metal melting process.

B&T has operated under a Title V permit under the cupola. Following the completion of this project, B&T is now in the process of **updating Virginia Department of Environmental Quality (VDEQ) air permits to synthetic minor status**. B&T worked closely with VDEQ during this project. Extensive discussions were held between the two parties to permit the new EIFs and provide VDEQ with insight on B&T's long-term facility permitting plan. **This allowed B&T to integrate its new equipment without any permitting-related shutdowns of the foundry**. B&T is proud of the hard work and collaboration that has led to these energy savings.

Between July 2022 and June 2023, **3,459,282 KWH were saved**. This project has a **projected yearly savings of 3,580,038 KWH** (assuming rate of metal melting remains the same).

The **Virginia Energy Efficiency Council**, a member-based 501c3, launched the Energizing Efficiency Campaign in 2023 to further the mission of advancing EE across the state by showcasing incredible work being done in our communities and inspiring others to act. Learn more at VAEEC.org/Energizing-Efficiency-Campaign.

