LOGAN ALUMINUM

2022

Annual Sustainability Report

Logan Aluminum Inc.

6920 Lewisburg Rd

Russellville, Kentucky 42276

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Foreword

Since opening our doors in 1983 Logan Aluminum has been built a legacy of superior quality and service. Today we are the largest aluminum sheet manufacturer in North America, supplying over 45% of the North American can market. With all this responsibility, Logan recognizes that our impact effects more than just our local community.

In this past year, Logan Aluminum has engaged our employees to become more sustainable throughout our operations. From reducing waste, to cataloging our local ecosystem, we have collaborated with stakeholders and established principles centered on sustainability. Our level of success could only have been realized with support from our entire Logan family. Our team-based culture is what makes us great.

Our Vision

Logan Aluminum is committed to maintaining our legacy of high-quality service and product while prioritizing sustainable practices and improving our ability to serve our community and customers. We will accomplish this through alignment with industry standards and continual use of innovative technology and management.

Message from our Leaders

With a constructed wetland system that is more than 30 years old, Logan Aluminum has applied principles of environmental sustainability from our beginning, and this year is no different. Our commitment to improvement can be seen in our actions. Our employees have drawn attention to areas for improvement and continue to focus on improving through the evaluation of best solutions for each environmental aspect. No issue is too small to be assessed, and this sentiment is carried on by our employees' "see something, say something" attitude. This cornerstone of our culture extends beyond plant boundaries, which is demonstrated through our recent initiatives to engage regional and local communities to improve aluminum beverage can recycling rates.

As Logan Aluminum navigates an ever-changing world, the factor we have always held paramount is the health and safety of those within and affected by our operation. In alignment with the UN Sustainable Development Goals, and collaboration with our peers at the Aluminum Association and the Aluminium Stewardship Initiative, we are assessing materiality and the extent of our responsibility. By monitoring and reporting on key criteria including air and water quality, waste and energy management, and plant-site biodiversity, we aim to continually change and adapt to the needs of our peers and other stakeholders.

In all, this year marked an important turning point for Logan Aluminum. As our team becomes more educated on what sustainability truly means, an emphasis on transparency has been the backbone of our progress. In this year of learning and establishment, it has become especially important to us that our employees are made aware of the impact our operation has, both the good, as well as our need to improve.

Logan Aluminum is going through an incredible period of growth. As we worked this year to establish a CO_{2e} baseline, we are able to understand our impact now more than ever. We will continue take pride in providing a high quality, reliable product while being conscious of our responsibility toward environmental stewardship.

-Mike Buckentin, *President*

While our efforts have been fantastic in this past year, it is important to keep in mind that there is always more to do, especially in our journey toward sustainability. While some of our adjustments may seem small, the sum of our actions have had a great impact, not only on the environment, but also through employee education and engagement.

-Paul Banks, *Plant Manager*

As we move forward, our main focus is documentation, transparency, and setting solid goals. Without all hands-on deck, we will not make the progress needed for true change. Sustainability isn't just something we are talking about today; it is something we are constantly pushing to build into the core of our business.

-Van Mitchell, *Environmental, Safety, & Security Manager*

Waste

Logan Aluminum is dedicated to allocating and handling waste in a safe and environmentally conscious manner. Thirteen of our waste-receiving partnerships use waste repurposing tactics including dross reprocessing, recycling, fuel blending, wastewater treatment, waste-to-energy, and recovery or reclamation. In addition, many waste items which do not have routes for valorization are sent to our on-site landfill, which we are continually improving to ensure proper monitorization.

Even among our best management practices there is continuous incentive in eliminating waste streams completely. Every waste, especially those of high volume, is analyzed, and disposal methods are continually reviewed for better options. This year saw several advancements towards a lower waste footprint for our operation.

Small changes with BIG impacts.

Throughout the plant, a waste stream is created from the use of rags to clean oily products. These rags are currently collected and disposed of in a waste-to-energy process. While waste-to-energy is a recognized method for reducing waste to landfill, the prospective plan offers more sustainable solution to this waste. The system is soon to be piloted at DC4, which contributes the majority of the roughly 75 drums of oily waste rags disposed plantwide per month. Our partner will supply drums of new rags, as well as drums for soiled rags. Soiled rags will then be taken off-site to be laundered 5-6 times before they are ultimately disposed of. In all, this not only lowers the amount of shipments and rag purchasing, lowering scope 3 emissions, but it is associated with large cost savings for the plant. Pending a successful trial, this program would be integrated into the rest of the plant.

Within our process, there is a significant amount of wood waste. Every coil sent out of the plant-site rests on a wooden skid pallet. These pallets are then disposed of when they reach their destination. However, in the past year three different plants have agreed to send back their skid pallets to be repurposed. Upon arrival pallets are examined and repaired before being used again. Futher, pallets deemed unusable are transported to a secondary processor which turn pallets into mulch which reenter circulation. Every reused or recycled pallet decreases our contribution to both deforestation as well as landfill overcrowding.

Another large waste is refractory, or the lining of furnaces. This waste, previously landfilled, is a constant and large waste in any metal melting process. At Logan refractory and burner balls are sent to a secondary industry partner. They take this material and blend it to make slag conditioner or synthetic slag. Slag conditioner is used in the refining process for steel mills, and our refractory/burner balls are desirable for this application due to their high alumina content.

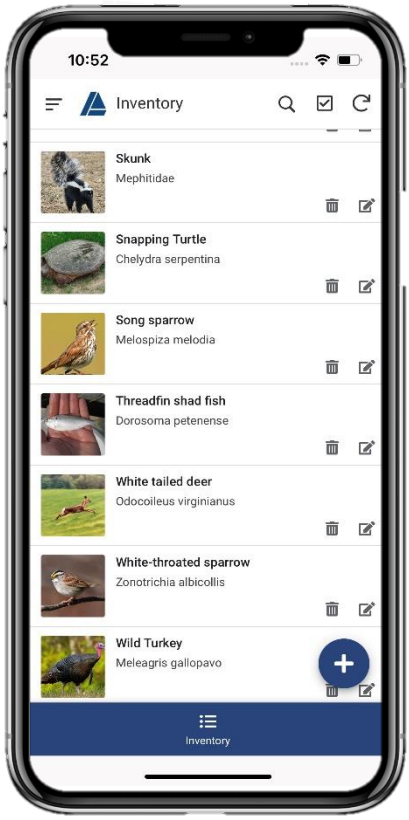
Some wastes are inherent to the aluminum industry. These sources of waste are often the most strenuous as they are continually produced in high quantities. Since current technology does not support an implied route to recycle, these wastes are given intensive attention for improvement. These projects are some of our largest regarding waste, and often involve collaboration with industry peers in research and development. In the past year, dross and baghouse lime were identified as this type of high-volume waste. In response, research has been devoted to improving the routes which these wastes take.

Dross is a biproduct of aluminum remelting and contains primarily aluminum oxide along with impurities. Aluminum can be recovered from dross; however, this process is difficult, especially with black dross. Black dross is mainly found within processes where more contamination is introduced, such as bales of used beverage cans. Two experimental trials were conducted in the past year in order to begin dross processing on-site in an effort to save time, money, material, and reduce environmental impact. This would be done by bringing aluminum recovery technology to the source of dross, rather than gathering it and shipping it. While the first trial was unsuccessful, and the second undetermined, Logan Aluminum is dedicated to finding a better solution to dross waste and plans to continue the effort.

Analysis has been conducted on baghouse lime to better understand its potential recycling applications. Baghouses function to remove particulate matter from the outgoing air steams and are therefore indispensable and necessary. However, the filter media, lime, must be replaced frequently and produces a high amount of waste which is currently being landfilled. We are constantly researching product development markets that could utilize waste lime as an input, such as concrete applications and steel production.

WASTE CLASSIFICATION	GOAL BEING INVESTIGATED	POTENTIAL OUTCOME
Dross	Integrate Dross Processing On-Site.	• Additional aluminum recovery. • Energy intensity reductions in required cooling and re-heating. • Decrease in the number of freight shipments due to interactions between secondary processors.
Baghouse Lime	Obtain a valorization route for lime.	• Elimination of upwards of 2,000 tons of waste entering landfills per year. • Cost savings.

Biodiversity



As Logan becomes more conscious to our impact on a large scale, we have also ensured our local environment and direct impact is not overlooked. With the plant surrounded by 1,000 acres containing lakes, grassland, wetlands, and woodland, our responsibility to protect our local biodiversity is clear. By developing a system to track occurrences of species on our plant site, we hope to create more awareness of our direct impact every day. The app "Logan Al Biologic Inventory" was produced for use by the environmental team to track sightings of animals, insects, and plant life quickly and easily. The app allows for notes to be taken regarding each species. This is in the hope that any effects on our ecosystem would be recognized more quickly.

While identifying key species was the first step, there are still many more goals Logan Aluminum would like to reach in regard to biodiversity. The ultimate goal is to not only know the species living on site but to further support them and allow them to flourish. It would be most advantageous to our operation, as well as the local ecosystem, to create a healthy living environment in our green buffer (the Logan owned area between the plant-site and our neighbors). Animals living directly around our operation pose risk to themselves as well as our workers. This will be done by introducing and monitoring different criteria which are necessary for any particular species to live. The criterion we are considering are guided by the National Wildlife Federation and include food sources, water sources, cover, places to raise young, and general sustainable practices, such as avoiding harsh chemicals and using water conservation tactics. Particular projects such as naturalizing fields with native wildflowers and foliage are being assessed now for implementation in the next year.




Water Resources

Our Wetlands: 30-Year Anniversary Highlight

Water is not only a precious resource, but also a key component to Logan Aluminum's operation. Water is needed in lubrication, cooling, and casting applications. In all, ~1,000,000 gallons of water are brought in every day from a local supply called Spa Lake, and ~350,000 gallons are discharged into Austin Creek. The key to our water quality has been our on-site water treatment followed by the natural filtration of our wetlands. While less natural means could be used to meet regulation regarding exiting water, the wetland system has been polishing our water with little intervention for the past 30 years.

Since their construction in 1992, the Logan Wetlands have been responsible for the filtration and buffering of wastewater before its entrance back into a local stream. The wetland system stands at 40 acres with a total of 10 basins.

Pre-treatment done through our water services removes any oils and other potentially dangerous pollutants. Discharged water is first input into a sludge pond, which is then is fed into successive holding locations and aerated, then finally it is sprayed into the wetland system.

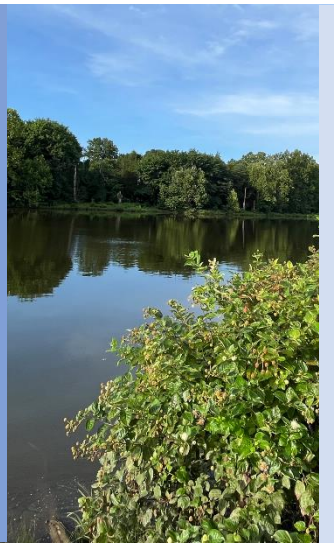
As water meanders through reed and sedge down the 80 ft drop, aluminum and trace minerals are removed, pH is stabilized, and nitrogen and oxygen levels are maintained through a combination of physical, chemical, and biological processes.

Frequent monitorization further ensures water meets discharge regulation. Water within the wetlands and the independent stormwater ponds is tested in multiple key locations on a recurring basis.

Water Resources Plan

In light of our need to become better stewards of our water usage, Logan Aluminum created a Water Resources Plan in 2022, finalized in early 2023. The plan outlines the impact Logan Aluminum has via water withdrawal and discharge as well as our current mitigation measures. Most importantly, it also served as a way for Logan to assess our major risks across all water, including wastewater, stormwater, groundwater, and potable water.

One major risk that has been identified over the last year is the plant's dependency on Spa Lake as the sole water source used in our processes. This has been identified as a risk for both Spa Lake as well as our own operation. In the event of major drought, risk of Spa Lake becoming impacted, or some similar event, Logan would have no secondary reserve to draw from. In response, Logan is giving consideration to establishing a secondary water source. While there is currently no direct evidence that Spa Lake will be unable to provide for our water needs, this secondary measure will greatly cut down on the associated risk if that time were to come. It also has the potential to improve water conservation, and reduce ecological stress associated with our withdrawal from Spa Lake.

Local Environment

Similar to the other environmental aspects, we continue to evaluate opportunities for improving water quality. Though our current systems meet all regulation and certification expectations, we continue to assess our actions to keep risk at an absolute minimum. Many of the challenges we face in ensuring that there is no impact on our aquatic environment revolve around the unique land features at our plant.

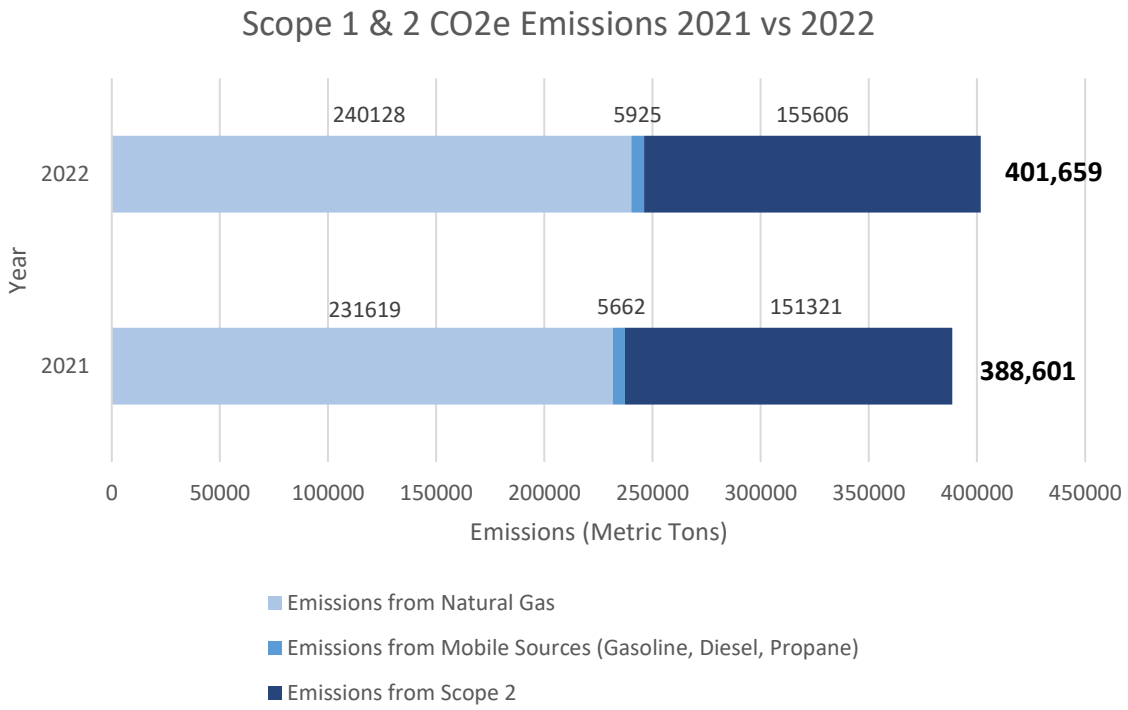
Water is in no shortage at our site. Our geography is often described as karst, as the Mississippian Haney Limestone Formation underlies the entire manufacturing building. Due to this, our property contains a subterranean stream, springs, groundwater feeding to water features, and other land features associated with a karst geology. Our land also contains a lake behind the main property which is a member of the Mud River watershed. These features add to the beauty of our campus and are a continuous reminder of why our stewardship is so important!

Carbon Reduction Strategy

Logan Aluminum is in the first phase of a three-phase strategy to reduce our carbon footprint. This phased approach, as compared to setting hard goals, will allow Logan to pivot as industry technology becomes available. By using current available technologies, Logan has set specific goals for the short term (phase 1) but has allowed room for technological shifts that will happen in the coming years (phase 2 & 3). Logan is hopeful that we will reach the end of the third phase in the next 15 years, but within those years, more goals and phases may be added as we progress through current capabilities. More details on specific initiatives mentioned follow.

Phase 1	Phase 2	Phase 3
Pursuing strategic partnerships to increase rail transportation.	Higher utilization of rail transportation.	Ongoing initiatives to identify and implement efficiencies (electric and fuel) in processes.
Lowering energy intensity across the site through efficient practices.	Continue to collaborate with industry groups and peers to align with the adoption of emerging technologies.	Continue to assess opportunities for reducing scope 3 emissions (upstream and downstream).
Developing strategic partnerships with technology innovators in carbon reduction and waste energy recovery.	Perform technical and economic feasibility assessments of preferred phase 1 technologies.	Implementation of carbon reduction technologies determined in phase 2 to be technically and financially viable.
Developing systems to better monitor scope 1 emissions.	Developing systems to better monitor scope 2 and 3 emissions.	
Increasing visibility and discussion around scope 2 and 3 emissions.	Develop a comprehensive carbon intensity benchmarking strategy.	
Pilot projects lowering scope 1 transportation emissions. (Hydrogen/electric powered industrial vehicles/equipment).	Implement proven pilot projects for industrial vehicles to reduce scope 1 carbon emissions	
Improving carbon literacy on a plant level to improve engagement and innovation.		

CO2e Monitorization



Shown above is the global warming potential (tons CO_2e) from all on-site activities (scope 1) as well as the impact from our electricity usage (scope 2) in CY2022 vs CY2021. year has seen large shifts in Logan's culture in relation to our understanding of our carbon footprint. While this data has been collected for many years, a stronger effort has been put forward into understanding this data. By taking a closer look at scope 1 and 2 emissions, how they compare, and where they are coming from, projects can be better informed for viability and need.

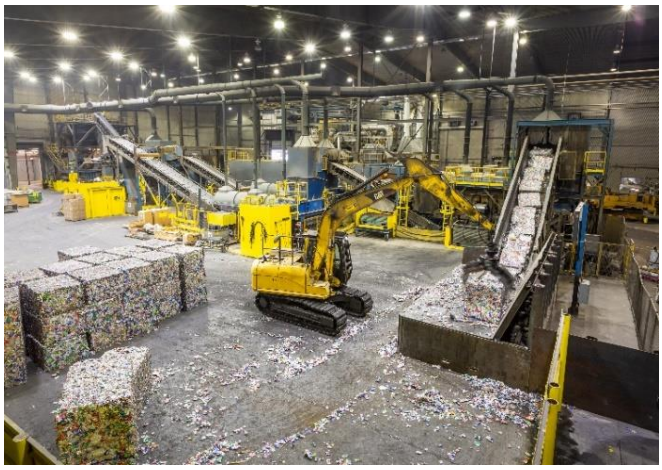
Effort has concentrated on understanding those emissions which we have not been closely tracking. This mainly includes the emissions associated with bringing material into our plant, and shipping material to our customers. This data, known as our scope 3 impacts, has been illuminated more than ever through heightened communication with our owners as well as interdepartmental file sharing. In addition, work is currently being done to create a more streamlined understanding of these factors through both data management as well as the new environmental dashboard. The hope is that these calculations and data points will be automatically configured into an easy to share format, furthering our knowledge of month-to-month changes.

The underlying reason for all these projects is setting a baseline for carbon emissions. The ultimate goal is to have a better understanding of what our output means, and what our responsibilities and options will be moving forward into a low carbon future. By first understanding how and where emissions are coming from, projects will be further informed on what their potential impact could be. In addition, these efforts have further shown what processes are major areas of concern and where inefficiencies are located.

Scope 1: Onsite Fuel Usage

Onsite Transportation

Another area identified for improvement within our process has been transportation. Due to the breadth of metal moving through our plant, there is a significant amount of carbon produced through the operation of trucks, cranes, forklifts, etc. We have taken a closer look at our on-site fuel management and usage of mobile equipment.



Currently, one focus on the plant site is to increase our efficiency in metal movement to thereby decrease the amount of traffic. This initiative improves plant logistics, increases safety, creates a more streamlined process for our workers, and decreases energy waste. Ultimately, Logan Aluminum would like to reduce their on-site transportation to an absolute minimum, but this is a long-term goal and will require a lot of logistical changes. The project is called “Operation Eat the Elephant” and focuses on “Eliminating mobile equipment dependency—one bite at a time.”

On top of these logistical changes, motions have been started to investigate alternative mobile equipment options. Specifically, hydrogen-powered, and electric fork trucks are being actively researched relating to their capabilities and possible limitations within our plant site. Within the coming year, it is expected that there will be a trial of both options to further the decision.

This is an exciting opportunity for environmental change. While diesel and gasoline usage are not the largest percentage of our carbon emissions, it would still be a significant improvement for us. Hydrogen fuel releases no carbon emissions, and electric would be reflective of our emission rate from TVA. Both of these options would also decrease spill concerns related to gasoline and diesel.

Natural Gas Reduction

Metal working industries, including aluminum, have inherent waste associated with processes which use natural gas to heat or melt metal. Heating processes are often energy intensive, include substantial wasted energy, and account for the majority of carbon output. As a result, Logan has partnered with the Novelis Energy Reduction and Sustainable Engineering (ERASE) division to evaluate opportunities for waste energy reduction. Logan Aluminum partnered with engineering professionals at the Georgia Institute of Technology to research and develop technologies.

The project, called The Energy Reduction Plan, launched in June 2022, and included an in-depth investigation of the heating processes within the plant as researchers aimed to find anywhere energy could be saved or repurposed. Products from this study included models of our processes as well as a Sankey diagram to highlight energy loss across the plant. Several different inefficiencies were identified, as well as potential solutions to these gaps.

Logistical

The study suggested that logistical changes in the plant could greatly impact natural gas usage. By following a "just-in-time" model where outputs flow more fluidly between processing steps, reducing wait times and conserving residual heat. However, while this is true, this requires a high amount of logistical precision that is difficult within our dynamic work environment. Still, these suggestions are being assessed for feasibility, and any which are deemed feasible will be trialed for implementation.

Technological

The major technological suggestion was some form of waste-heat-recovery. This is being regarded as a potential solution for processes in ingot casting, where the highest temperatures of our process can be found. The options most closely researched by our team includes an Organic Rankine Cycle, which would allow us to create energy generation from a heat exchanger application at the exit flue, or thermal batteries, which will covert thermal energy from exiting flue gas and store electricity. While neither of these options directly lower the production of CO_2e, they do add value to the natural gas waste. These processes would lower our scope 2 emissions via the production of additional clean energy. Neither option has been selected, but it is expected that these or similar technology could be piloted in Logan's future. As for now, teams are being formed to assess these options with potential vendors. These projects are being evaluated for their potential benefits and drawbacks at Logan.

Combustion Optimization

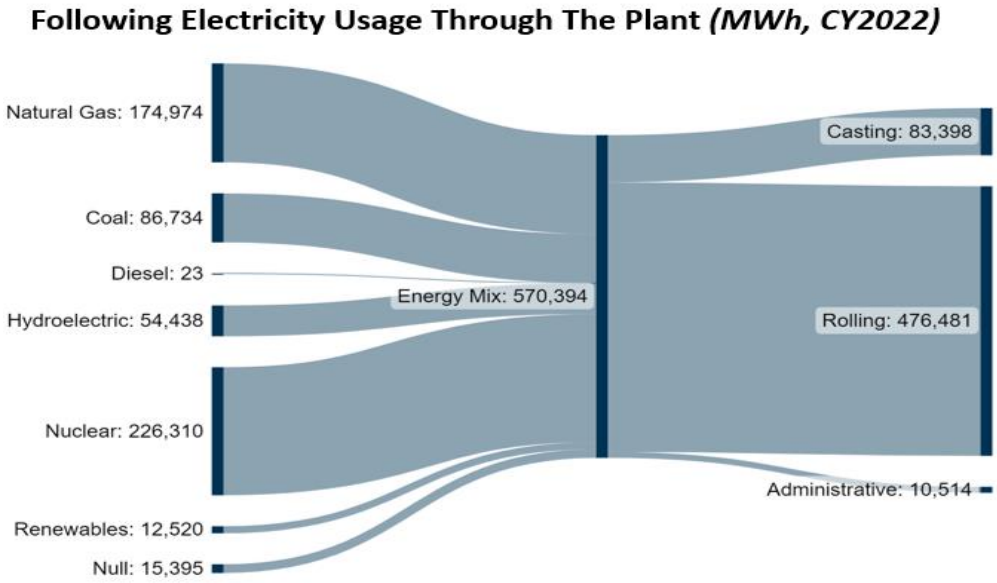
An important factor in minimizing our natural gas usage is the continuation of planned maintenance activities. Logan uses our best management practices to service equipment prior to failures through scheduled, planned outages. The most basic way we reduce natural gas usage is through maintaining the furnaces and their insulating systems. This lowers heat loss at the source, thereby reducing the need for more natural gas burning.

In addition to this, teams at Logan are investigating projects relating to control optimization around natural gas. These systems include updates to current tracking technology, adding intelligent burner controls to allow more output control, and oxygen lance systems to increase efficiency in burning.

Scope 2: Electricity

Our Energy Partner

As our energy provider, Tennessee Valley Authority (TVA) has a large impact on our own carbon footprint. TVA has instituted its 30-year decarbonization plan (starting in 2005 and ending in 2035) to decrease their carbon emissions by 80%, eventually aiming to be net-zero by 2050. We continue to collaborate with TVA in initiatives to reduce scope 2 emissions. In this past year, we have been thankful for their hard work in sustainability. From 2022 data, the latest report we have received, TVA provided our energy with a carbon intensity of 621.14 (lbs CO_2e/MWh) driven down by a 11.739% use of hydroelectric and other renewable energy and 39.676% nuclear. This was 27.1% lower than the national average, and 33.3 % lower than the regional average. Part of how we stand out from the crowd is the hard work done by our energy provider!



Increasing Efficiency

While most of Logan's electrical consumption is related to operational processes that are difficult to significantly alter efficiencies on, we are able to control a lot of our consumption within the admin building and conference spaces around our plant. Our new construction and renovations have put an emphasis on increasing efficiency and decreasing energy consumption. These modifications include things such as introducing motion sensor lights, switching lights to LED, and energy efficient electronics. While this impact may be small compared to the high consumption of plant operations, it is yet another way that Logan Aluminum commits to improvement, no matter how small.

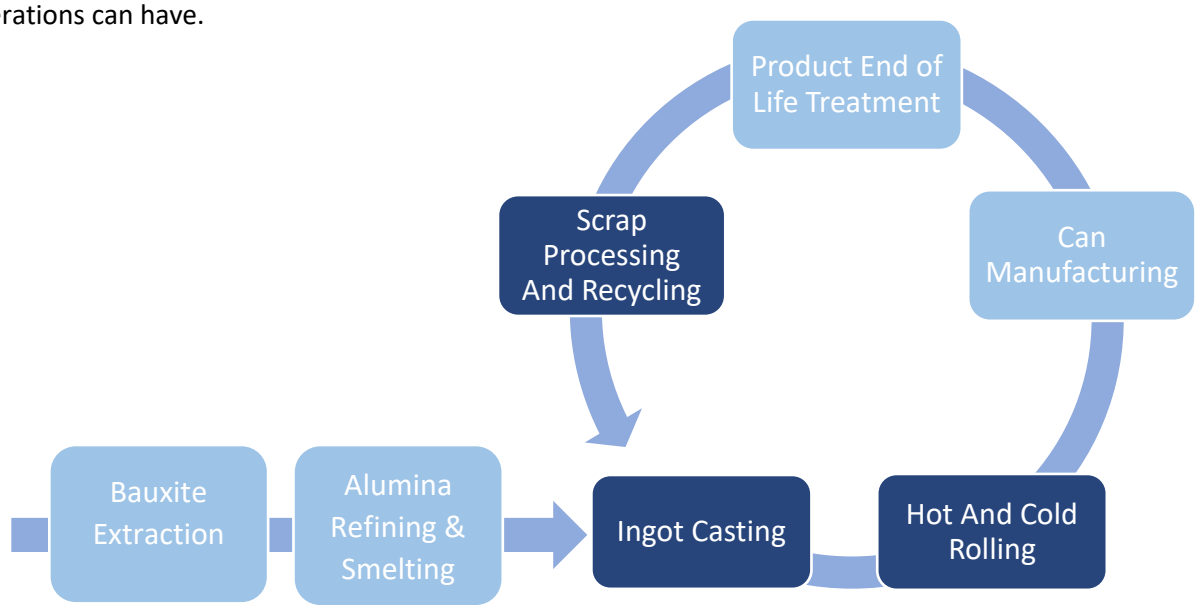
In addition, there are plantwide initiatives with the goal of reducing the departmental energy intensity. These larger projects include initiatives and goals to reduce the electricity usage per throughput pound. These projects range from small changes in the system to conversion of units to be more efficient. These projects will have more prevalence in the years to come.

Scope 3: Transportation and Imports

Logan aluminum differs from much of our competition in the fact that we are an integrated aluminum sheet rolling facility, meaning that casting, hot rolling, cold rolling, and certain coating activities are all performed in the same location. This is a great benefit to us that we are able to do more of our operation without shipping metal between process centers. However, the amount of transportation associated with our integrated operation is still an important factor in our footprint. With recycled and primary aluminum inputs entering our plant at a constant rate and being shipped to international locations as either coils or ingots, there is a significant scope 3 carbon output from our operation.

To offset off-site transportation concerns, Logan is in the preliminary phase of a major change in our plantwide infrastructure. A technical and economic feasibility assessment are in motion to introduce a rail system which will wrap around the campus. The goal of this project is to both increase our rail usage, effectively reducing truck transportation by some significant margin, as well as reducing the use of lifts on site to move metal to be processed. Rail transportation carries a far less significant carbon footprint as compared to over-the-road truck transportation and allows for less trips travelled due to the large difference in carrying capacity. For example, for a 100-mile journey carrying the average weight of a coil in 2022 (21,597lbs), there is an 87.6% decrease in CO_2 production from truck to rail. *(based on data from the greenhouse gas inventory from EPA)* As progress is made, more information on this project will become available.

In addition, Logan has made a push to speak more about the lifecycle of aluminum. Whether that be informing our own workers about the impacts bauxite mining and other upstream processes have on the planet or further pushing for recycling around the plant. A plantwide goal is to increase carbon literacy. While it is important for our employees to understand all the beneficial efforts of our environmental initiatives, it is equally important that we also understand the negative impacts our operations can have.



Used beverage cans (UBCs) and other used aluminum recyclables are a vital input for the aluminum industry. The most energy intensive step of aluminum production is the mining of bauxite and subsequent refining of alumina. Coined primary aluminum, meaning it was taken directly from ore, the full process accounts for 95% more energy consumption than the acquisition and remelting of secondary aluminum, according to research done by the aluminum association. In addition, these steps of the process are the highest polluters of the aluminum process. In this way, recycling offers an especially exciting opportunity to create the same product with less energy, less waste, and less cost.

The initiatives to increase recycling rates called “close the loop” bolster a circular economy in the hopes that one day, the mining of bauxite can decrease due to a robust recycling system. Keeping aluminum in the loop is not only beneficial to industry, but the environment as well.

Though Logan Aluminum is a downstream aluminum processing plant, our product still reflects the energy consumption from the upstream processes. Therefore, it has been a long-standing priority for both owners to be mindful of our recycled input. In support of this priority, casting operations have been constructed to increase utilization of recycled materials. DC4 houses the majority of our UBC recycling. These expansions will allow Logan Aluminum to increase our UBC recycling output from an already incredible 700 million pounds per year!

Closing the Loop Through Community Commitment

Despite the substantial impact the aluminum industry has on Kentucky’s economy, recycling has not been widely adopted as a priority for much of the state. With estimates of recycling rates falling around 16%, according to Eunomia Research group. Logan Aluminum felt an obligation to improve awareness and adoption of recycling programs within the local and regional community.

Logan Aluminum has started a partnership with Western Kentucky University, as well as growing initiatives to introduce recycling programs at local schools. These initiatives have been supported by community leaders and stakeholders. Rather than travelling to an alternative facility, these cans are brought to Logan Aluminum and recycled on our site. Logan attends WKU football games with recycling ambassadors, teaching about the importance of recycling, and facilitating recycling at the games. This allows Logan to retrieve aluminum that could have been wasted and allows our partners to have a more sustainable operation! These partnerships are one of many ways that Logan Aluminum is working to educate more people about recycling, and why it is so important.