Sustainable Aftermarket Solutions

Tyler Fordos, Connor Denman, Marlee Robertson, Josh Shoults

Northwood University

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Abstract

Sustainability has become a rather large topic in the Automotive Aftermarket industry in past years. The question is how does the aftermarket industry define what sustainability really is, and how are sustainable solutions being implemented. Looking into how leaders in the aftermarket are currently implementing sustainability in their organizations can give insight into the growth we have already made, as well as the growth that needs to occur for the protection of our future resources. Scheduling times throughout the fiscal years of businesses to focus on the data and reports companies are creating helps to adapt a sustainable organizational focus. Along with the cultural shift to "go green", there is the hovering topic of electrical vehicles and their exponential growth in the near future. It is indisputable that this shift will have a large impact on the automotive aftermarket. This begs the question of whether they are sustainable or not, and are they the future? Preserving the aftermarket industry's resources and environment for the future is the goal of sustainability in the industry. European countries have taken this goal and have developed a sound strategy to implement. A strategy meaningful enough to look at implementing in the United States Aftermarket Industry.

Definition of Sustainability

Many people may wonder what the correct definition to sustainability really is. There are many ways that sustainability is defined, in simple terms sustainability is "fulfilling the needs of the current generations without compromising the needs of future generations, while ensuring a balance between economic growth, environmental care and social well-being." Sustainability has been a topic for many years and will continue to be well into the future. Sustainability affects all types of things, especially businesses who are having to adapt to more sustainable or "greener ways" of doing their manufacturing, and many other aspects of business such as ways of shipping products all over the world. Creating a more sustainable business makes corporations more attractive to new customers, other companies and even their own employees.

Sustainability is not only defined by the definition itself but also by each company who must define within their organization what they can do differently to clean their processes up. In the Automotive Aftermarket there is no different definition than in any other type of business, each one must investigate how they can make a change for the better. Although sustainability talk has a lot of focus on the Automotive Industry as a whole and has brought quite a bit of change to the industry there is still a lot of work to be done by each.

When defining Sustainability, it is important to understand that it is broken into three separate pillars that are all linked in a way. (What is Sustainability, 2013)

- Environment: The process of the environment being preserved. When using resources they are used at a rate that they are able to replenish themselves. (What is Sustainability, 2013)
- Economics: Communities are able to sustain financial independence and are able to get the resources they need while maining financial sustainability. Example of this would be being able to have secure sources of livelihood. (What is Sustainability, 2013)

- Social: Human rights are taken into account, resources required to live are easily attainable by all humans to keep their health and safety at the top of their priority. Rights of humans are protected, and everyone is protected from discrimination. (What is Sustainability, 2013)

(What is Sustainability, 2013)

To fully understand sustainability, it is important to evaluate how we stay sustainable in our environment. With the push to electrification in the market for vehicles, the topic of how sustainable it is having been a key discussion today. According to EPA.gov, greenhouse gas emissions are significantly reduced when driving an EV vehicle. This is because fossil fuels are not used in the daily consumption of the vehicle while driving like a gasoline or diesel-powered vehicle. What is in high use however in EV vehicles is lithium. China is the largest producer in the market today for lithium and with concerns of safety and followed processes, other countries have relied on China to mine and source these materials. (EPA, 2023)

In each country, safety protocols and regulations for business are regulated differently. This leads to the United States for example holding off on mass sourcing of the lithium material. With the major push for use of EV vehicles, the containment of old lithium has been heavily evaluated on how we can stay sustainable. Lithium is a toxic chemical and if it is to leak into the earth, this can lead to catastrophic side effects that can harm the environment. Most countries are reliant on EV manufacturers to take this responsibility to dispose of material according the BBC.com, but how sustainable is this process? EV companies are sent the responsibility and it is up to the representative countries implementing EV vehicles to oversee these processes are followed efficiently and sustainably. (Woollacott, 2021)

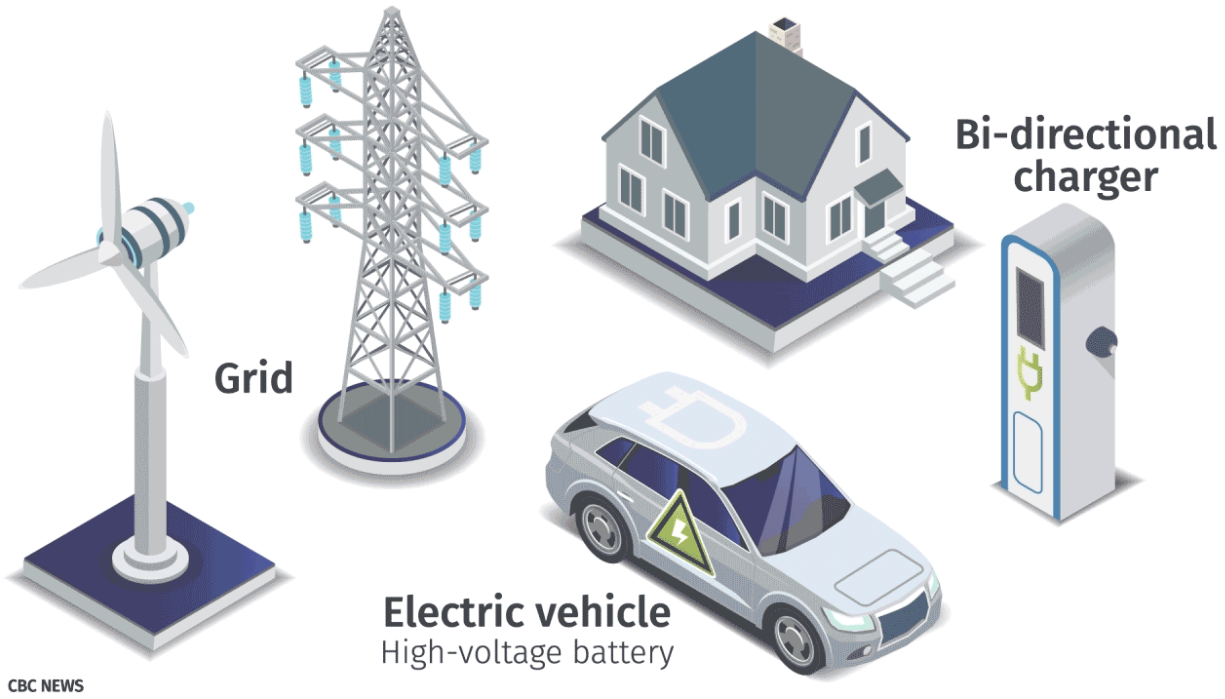
Another key factor in the implementation of EV vehicles and sustainability is the overall sustainability of the power grid. In many countries, power grids are not ready for the implementation and have hindered the power consumption for many societies. In Germany for example, the major push for implementation has led to heavy regulation of what electricity can be used. At certain times of the day, residents are unable to use heat in their homes and businesses so electric vehicles can be charged. The sacrifice of other electric luxuries while the power grid is upgraded has led to many businesses suffering. Is this the most sustainable method of implementation now? It depends on the country's views. Surrounding countries that have seen these concerns have either followed suit or have held off with major push while they build their power grids. Even in the United States, states like California have faced blackouts due to the added stress on the power grids.

In our home state of Michigan for example, moving above ground power lines below the surface has been a major step to beefing up the power grid. According to DTE, moving power lines underground away from environmental impacts such as hurricanes and snow does not only help with reduced blackouts for homes and surrounding businesses, but it also helps with the

implementation of newer lines that can build our grids to a level where we can consider larger EV vehicles presence. This process is also being worked on in other states throughout the United States such as states like Florida where hurricanes and mass floods regularly take out above ground power lines. California with mass forest fires in the southern part and flash floods in the north have also considered similar processes as they are the outstanding state pushing for heavy electrification of vehicles to be implemented. In a society leaning towards electric vehicles the downfalls are often ignored. One more step to making EV a sustainable process in our society! (Pearson, 2023)

For the last 75 years have been spent developing diesel info structure throughout the United States. When switching to EV heavy duty trucks it would require the equivalent of 10-15 homes using electricity every day to be charged and able to operate each day. Operating a home takes approximately 30 kw of electricity to run operations each day, to charge one heavy duty truck battery system it would take 300 kw and with a fast-charging system this number will increase. The power grid infrastructure cannot support this. (Shaw, 2023)

As sustainability is an important topic to always consider when making decisions, it is good to see past and present examples that have worked. EV may be a concerning implementation today, we have the ability as a society to create processes that are sustainable and efficient for future generations. The future is bright when we follow sustainability.



(Chung, 2014)

Timeline of Sustainability

While other nations have been implementing sustainable efforts for quite some time, the United States aftermarket has just begun taking sustainability more seriously and implementing practices. It seems that there has been a great amount of effort put into coming up with new innovations. Many of the companies in the aftermarket have committed to finding ways of reducing resource use. One of the companies that stands out is LKQ.

LKQ, which was founded by a guy named Donald Flynn, had a vision to bring dead parts back to life. “Back in 1998, the world saw a fragmented Salvage and recycled auto parts industry. Our founders, however, saw an opportunity — To provide quality, high-value alternatives for the automotive replacement parts marketplace” (LKQ, 2023). It first started with LKQ forming through many different wholesale recycling businesses throughout Michigan,

Wisconsin, Ohio, and Florida. Then, on February 13, 1998, LKQ introduced their first three acquisitions: Triplett Auto Recycles, Damron Auto Parts, and Star Auto Parts. After that, in 2003, LKQ became a publicly traded company, and goes by the name LKQX as their IPO symbol. When entering the industry in 2004, their Action Crashed Parts acquisition gave them the confidence to take their aftermarket parts divisions into new heights. All in all, LKQ is providing well put together parts to increase vehicle lifespan (LKQ, 2023).

In addition, "People are keeping their cars longer than ever before. Over the last ten years, the average age of the American car has increased by 17 percent to 11.9 years old. That's older than in Europe, where the average age of the passenger car fleet is 10.8. COVID-19 is expected to drive this trend even further, as people tighten their budgets, avoid public places, and engage in less travel" (Pregis, 2021).

VEHICLES IN USE – EUROPE 2019
PASSENGER CAR OWNERSHIP

		2018	2017	2018	2018	2018	2018	2018	2017	2018	2015	2018
		Austria	Belgium	Croatia	Denmark	Finland	France	Latvia	Netherlands	Poland	Slovenia	Sweden
Households with no car	%	23.0	18.0	–	39.1	26.0	15.1	48.8	28.8	33.8	18.1	17.4
Households with at least 1 car	%	77.0	82.0	–	60.9	74.0	84.9	51.2	71.2	66.2	81.9	82.6
Households with 1 car	%	50.0	–	–	44.1	54.0	48.4	33.9	48.2	–	–	–
Households with 2 cars	%	21.0	–	–	14.6	17.0	31.2	11.7	18.8	–	–	–
Households with 3 cars or more	%	6.0	–	–	2.2	3.0	5.3	5.6	4.2	–	–	–
Average ownership period	years	–	–	–	–	3.4	5.6	–	–	–	–	–
Share of second-hand cars	%	–	–	–	–	–	58.5	97.6	–	–	–	–
Average distance travelled	km	13,900	14,770	12,688	15,882	15,101	11,900	14,157	13,024	–	12,653	12,000
Avg distance travelled (petrol)	km	–	9,861	–	13,365	11,205	8,290	10,107	10,529	–	10,235	8,970
Avg distance travelled (diesel)	km	–	18,480	–	22,002	20,327	14,540	16,240	23,240	–	16,879	16,930

(ACEA, 2021)

Keeping cars on the road longer is an effective method to support sustainability, in many different ways. Less resources are used to create a new car. Vehicles in operation also limit the vehicles not in use from sitting in a junk yard deteriorating which happens to not be a sustainable

practice. This would leave more resources for future generations. Another great aspect of using less resources is that there is more innovation put into finding new ways to use current materials. By keeping cars on the road longer, it reduces the number of emissions being created. “A study by Toyota found that 28 percent of the carbon emissions produced over the life of a car will occur during the manufacturing and shipping process. The longer consumers avoid buying a new car, the lower their environmental footprint could be, even if they’re driving a traditional, gasoline-powered vehicle instead of a new hybrid or fully electric car” (Pregis, 2021).

“Even vehicles advertised as environmentally friendly can have a large carbon footprint. For example, a hybrid car can have a larger impact during the manufacturing process because of how it is designed. Think about it, two engines under one hood. While it lowers the impact of emissions while on the road, how long would it take to make up for the output of carbon dioxide during manufacturing? Even electric cars, while seemingly a more environmentally responsible option, can have a negative environmental impact if the outlet in which they are charged is not connected to a renewable energy source” (Hart, 2021). Taking into consideration everything that was just said, it looks like keeping cars on the road longer is a great option for sustainability. But how will it be obtained (Hart,2021)?

Well, it will take serious investment, and here is what Pregis (2021) has to say about it: “However, maintaining cars for longer periods requires significant investment in maintenance and replacement parts. As a result, the global aftermarket automotive industry has grown to be worth an estimated $722.8 billion (€604.2 billion).” Investment in servicing cars is a big deal. There is a lot of money in making sure vehicles stay on the road. According to Statista (2023) “In the fourth quarter of 2021, there were nearly 239,100 auto repair and maintenance centers in the U.S., a two percent increase from the previous year.” That many auto shops must be wasting a bunch of parts that can probably be recycled (Pregis, 2021). Furthermore, sustainable efforts

need to be considered when throwing away parts, like a core charge, different types of parts can be recycled, as proposed by the writer.

All things considered; the timeline of sustainability can be ruined because of the efforts not put into safety. That's why the government of the United States of America came up with the Environmental Protection Agency (EPA) and California came up with their own, it's called California Air Resources Board (CARB). Both were built to keep the air of the United States and the environment all around the USA clean. After the two organizations were built, the standards for sustainability became stricter, as proposed by the writer.

Starting in December of 1970, the EPA, which is in Washington, DC, works with the government to provide instructions on how to protect the environment. It keeps companies in check by keeping track of the actions they commit on the environment. According to Kenton (2021), the EPA are into everything that affects the environment (Kenton, 2021). Here are some key takeaways:

- The EPA is a USA government agency in charge of protecting environmental and human health (Kenton, 2021).
- The EPA manages the distribution, processing, manufacturing, and use of pollutants and other chemicals (Kenton, 2021).
- The EPA imposes its findings through sanctions, fines, and other policies (Kenton, 2021).
- The agency supervises programs encouraging environmental stewardship, pollution prevention, air and water quality, sustainable growth, and energy efficiency (Kenton, 2021).
- The EPA doesn't cover wetlands, wildlife, nuclear waste, and food safety (Kenton, 2021).

When adding to the list of things the EPA does, the agency cares about the citizens of the USA, and worldwide. The organization doesn't let companies get away with heinous crimes, especially the one from Volkswagen. Here's what happened:

Volkswagen, a company that strives to be the number one automotive car manufacturer through providing the best of products and service, was caught in a scandal. "Volkswagen installed emissions software on more than a half-million diesel cars in the U.S.—and roughly 10.5 million more worldwide—that allows them to sense the unique parameters of an emissions drive cycle set by the Environmental Protection Agency. According to the EPA and the California Air Resources Board, which were tipped off by researchers in 2014, these so-called "defeat devices" detect steering, throttle, and other inputs used in the test to switch between two distinct operating modes" (Atiyeh, 2021).

Now, this doesn't seem bad; but consider that it drives in a different mode on the road, that means it is by-passing the emissions check. "In the test mode, the cars are fully compliant with all federal emissions levels. But when driving normally, the computer switches to a separate mode—significantly changing the fuel pressure, injection timing, exhaust-gas recirculation, and, in models with AdBlue, the amount of urea fluid sprayed into the exhaust. While this mode likely delivers higher mileage and power, it also permits heavier nitrogen-oxide emissions (NOx)—a smog-forming pollutant linked to lung cancer—up to 40 times higher than the federal limit" (Atiyeh, 2021). Ultimately, "On January 4, 2016, the U.S. Department of Justice first sued Volkswagen on behalf of the EPA. Volkswagen will now pay $14.7 billion to settle with three federal agencies suing the automaker for its excessive diesel emissions, the highest ever paid by a company for violations under the Clean Air Act" (Atiyeh, 2021).

While Volkswagen is a huge company and employs 313,010 people worldwide (about half the population of Wyoming), it doesn't give the organization a free pass to be unethical (Zippia, 2023).

On the other hand, the EPA is a national agency, while California has its own standards. On August 30, 1967, the California board came together to address the statewide air pollution problems. It was formed by merging the Bureau of Air Sanitation and the California Motor Vehicle Pollution Control Board. By implementing standards, California passed a bill to keep the geography of the state safe from air pollution coming out of vehicle tail pipes. Also, the territory was also the first state to discover smog. "In fact, the history of California's pioneering efforts to reduce air pollutants dates back even further. The first recognized episodes of 'smog' occurred in Los Angeles in the summer of 1943. Visibility was only three blocks. People suffered from burning eyes and lungs, and nausea. The phenomenon was termed a "gas attack" and blamed on a nearby butadiene plant" (CARB, 2023).

In the end, it is important to consider where the start of the "timeline of sustainability" was, and where it's heading soon. Considering all of the following would help conclude that sustainability isn't just about electrification; it has a broader meaning.

(Here are some pictures provided to have an idea of what the smog looked like in Los Angeles.)

(waterandpower.org, 2023)

In 1940, before smog checks – there are three cars seen driving down the road (waterandpower.org, 2023).

(waterandpower.org, 2023)

In 1949, standing above the Hill Tunnel Street, looking down on smog (waterandpower.org).

Implementation of Sustainability

With the increase in strict legislation sustainability has become a heavily discussed topic that is gaining a large amount of traction and is being pushed by not only company executives and employees, but by consumers and the public too. There is a considerable amount of recent and current legislation that is very notable and requires understanding from many automotive and aftermarket manufacturers going forward into the future. The Clean Air Act of 1970 was a federal law that was implemented to monitor the emissions in the air from both stationery and mobile sources. The purpose of this act was to set standards for air pollution and to implement monitoring of those pollutants in all 50 states by 1975. The Clean Air Act was amended in 1977 due to some states not meeting the deadline previously set. The act was later amended in 1990 to set new goals and deadlines for the act. It was also amended to address failing areas of urban pollution, permits, and increase restrictions on motor vehicles and the fuels they require. The amendment of 1990 tackled three key areas for motor vehicles. Firstly, it tightened the allowable amount of tailpipe emissions of hydrocarbons, carbon monoxide, and nitrogen oxide being allowed by vehicles of the model year 1994 and after. Secondly, it tackled fuels. By 1995 fuels containing less aromatics were to be adopted by the nine cities that recorded the worst ozone pollution. With gasoline blended with alcohol to be sold during the winter in the nine cities with the worst ozone pollution. Lastly, the amendment initiated a program called “clean cars” to provide California with 150,000 cars the met tighter vehicle restrictions by incorporating the two prior amendments of emissions and cleaner fuels.

The Clean Air Act was met with a direct response from the aftermarket industry with the RPN Act of 2016. The RPN Act moves to protect the transformation of street vehicles that are to be solely used as racecars. Updates from (“RPM Act Is Reintroduced In

The US Senate," 2019) stated that "the RPM Act cleared several major legislative hurdles in the previous Congress, including passage by the U.S. House Energy and Commerce (E&C) Committee. The bill also received hearings in both the House's and Senate, which underscored the importance of motorsports as a great American pastime and economic stimulus in communities across the country. Lawmakers were able to find a pathway to consensus on the language of the bill last session, positioning it to become law in the 2019-2020 Congress." With organizations like SEMA still trying to remind and push lawmakers to pass the RPM Act.

Another organization that is creating big waves in the automotive industry is the California Air Resources Board, also known as CARB. CARB is pushing and implementing many regulations with the intention of bringing California to zero emissions by the deadline of 2035. CARB is currently implementing the second phase of their "clean cars" program. "The Advanced Clean Cars II regulations will rapidly scale down light-duty passenger car, pickup truck and SUV emissions starting with the 2026 model year through 2035. The regulations are two-pronged. First, it amends the Zero-emission Vehicle Regulation to require an increasing number of zero-emission vehicles, and relies on currently available advanced vehicle technologies, including battery-electric, hydrogen fuel cell electric and plug-in hybrid electric-vehicles, to meet air quality and climate change emissions standards. These amendments support Governor Newsom's 2020 Executive Order N-79-20 that requires all new passenger vehicles sold in California to be zero emissions by 2035. Second, the Low-emission Vehicle Regulations were amended to include increasingly stringent standards for gasoline cars and heavier passenger trucks to continue to reduce smog-forming emissions. (California Air Resources Board," 2022)

Increased legislation puts the pressure directly on companies to implement change. A company to highlight that has arisen to this challenge is East Penn. East Penn has made sustainability the core of their business as they continue to make strides and improvements in their sustainability journey. Truly going above and beyond the mandatory compliance requirements and setting a very high standard as a truly green company. East Penn was founded on sustainability as the company started off by rebuilding used batteries from recycled materials. East Penn has from then continued to build upon and improve their recycling and sustainable processes. The data from East Penn's 2023 sustainability report is truly remarkable showing that nearly 187 million pounds of lead are recycled annually. Over 8.5 million pounds of plastic are recycled annually. Their acid reclamation plant, the industry's first, recycles over 5.6 million pounds of acid annually. 100% of East Penn's industrial wastewater is recycled, amounting to 41.2 million gallons of recycled water annually. ("Sustainability Report 1811," 2023).

Companies like East Penn have perfected the sustainability approach and with their recycling ingenuity. East Penn's sustainability report shows that they process and recycle roughly 30,000 batteries each day by recycling virtually 100% of each battery. East Penn employs the use of high efficiency air filters to reduce the release of lead into the air. They actually boast a very impressive statistic of producing air that is actually cleaner than the surrounding air. With their systems being powered by renewable energy sources like wind and solar power.

As seen from innovative companies like East Penn, remanufacturing is the future for sustainability. From an article released by TWI Global, remanufacturing is defined as the industrial process by which a previously sold, worn, or non-functional product can be rebuilt and recovered. Through the disassembly, cleaning, repair and replacement of worn

out and obsolete components, the piece can be returned to a ‘like-new’ or ‘better-than-new’ condition and will be just as reliable as the original product. Remanufacturing plays an important role in the concept of a circular economy (“What Does Remanufactured Mean?,”n.d.). East Penn capitalizes on this by creating a circular loop of recycled parts and using the recycled resources to manufacture new batteries. Repeating the process every single day, maintaining the loop of sustainability. There aren't any clear-cut limitations on what can be remanufactured. Nonetheless, some characteristics of an item in general make remanufacturing procedures easier. Remanufacturing is typically chosen by a corporation for products and parts that are sophisticated, robust, and expensive. A product is particularly ideal for remanufacturing if it utilizes or is made of long-lasting technology and is composed of precious or high-quality materials. Additionally, because the core is the component that is typically the subject of remanufacturing, it must be strong and versatile. In the majority of instances of this procedure, the core is put back to action after being remanufactured.

Another company to highlight in the remanufacturing scene is ZF Friedrichshafen. ZF has invested into the sustainability cause knowing that resources are limited. Which is why ZF depends on the industrial reprocessing of their old parts. ZF boasts many achievements from investing into sustainable and green remanufacturing, ZF posted an article titled “*The Achievements of Remanufacturing”* highlighting three impressive statistics showcasing these achievements. Firstly, ZF has been reusing waste products, with 95% of this material utilized to create new ZF products. The development and construction phases already take into account the fundamental technical requirements for remanufacturing, ensuring that each component has the ability to regain the qualities it had in its initial state for quality you can rely on. Secondly, when compared to making a new part, remanufacturing a unit

can save up to 90% of the energy as opposed to producing a new part. This allows ZF to maintain their commitment to sustainability and cut CO2 emissions by getting rid of this operating procedure and significantly reducing energy use. This opens the door to greener, renewable energy sources to power manufacturing plants as they require less. Lastly, when compared to making a new part, remanufactured automotive parts can save anywhere from 50 to 90% of the materials. It can increase the service life of older vehicles whose series production is discontinued and is more cost-effective. Remanufacturing is a proven way to improve a manufacturing companies' sustainability and green impact on the planet. By recycling old materials, reducing energy costs, and reducing the number of required materials to continue production.

Tires are an area of much needed improvement. An article from Ray Hatch (2022) shows that according to a Federal Highway Administration Research and Technology report, approximately 280+ million used tires are discarded each year. Only about 30 million of these tires are retreaded or reused, leaving the remaining 250 million scrap tires to be managed. Mismanaged tires can cause fires in landfills that burn for days. Tires can also pollute the soil as they break down and deteriorate. This is where companies like Bridgestone come in. Bridgestone, as a member of the U.S. Tire Manufacturers Association (USTMA) has a vision for its sustainability for the future. Bridgestone boasts on their website that their retail locations recycle 100 percent of the spent tires that they remove from their vehicles. This adds up to about 10 million tires annually. Many of the highlighted companies and organizations are involved in the global market. Complying with the standards and legislation implemented by organizations like the California Air and Resource board to ensure that their business is green and environmentally friendly. Being a

global company requires you to follow the separate nations legislative, economic, geographic, and demographic differences.

European Sustainability

Sustainability has become a vision that companies are striving towards. Being able to brand a company as "going green" has the power to not only protect future generation's resources, but also substantially increase sales and revenue. European countries have taken the topic of sustainability and have developed a sound strategy to implement. A strategy meaningful enough to look at implementing in the United States Aftermarket Industry. Generation Z takes pride in sustainable practices and puts effort into finding companies that are willing to do the same. For a company to take part in this vision they must have the intention of contributing their time and effort to a sustainable society. They must prioritize their customers, as well as future generations. They must consider their market position and who they are trying to reach, as well as the image they are trying to present to this market. Lastly, the company must be committed to continuous improvement in order to remain competitive in the aftermarket industry (Sukitsch, M., Engert, S., & Baumgartner, R. (2015).

The European Union (EU) has been a key player in the vision toward automotive sustainability. The organization has made strides towards a climate-neutral economy. They have integrated the development of the "European Green New Deal" in society, this has been a movement across the country to protect resources and contribute to innovative sustainability.

One of our many issues since Covid-19 has been global supply chains. The corporate Sustainability Due Diligence Directive (CSDDD) reveals that the supply chain represents 60-90% of a company's environmental impact. Overseeing and reducing carbon production within the global supply chain could be the most impactful way to establish a climate-neutral environment (Brightest, n.d.).

Despite these differences, both Europe and the US are taking steps towards sustainability, with businesses and individuals increasingly prioritizing environmental concerns. However, the approaches and priorities vary between the two regions. Europe's sustainability strategy in the automotive business is focused on reducing the environmental impact of vehicles and promoting sustainable transportation.

According to the European Environment Agency, the Automotive industry is one of the main resources of GHG Emission. Over-the-road Automobile transportation brings the highest proportion of overall transport emissions. "In 2020 the automotive industry emitted 77% of all EU transport GHGs (including domestic transport and international bunkers)*." (Thomas Pohl, Senior Director Marketing, Automotive, SAP).* Taking Europe's holistic approach to sustainability is a great place to start being conscious of our limited resources in the current state of society. Using recycled material and putting into use lean six sigma protocols is a step towards the preservation of the automotive legacy.

A plan of action that Europe has taken into place is the CO2 regulations. The EU has set CO2 emissions targets for new cars and vans, with a goal of reducing emissions by 37.5% by 2030 compared to 2021 levels. This has incentivized automakers to produce more fuel-efficient vehicles and promote the adoption of electric vehicles. The EU encourages the public sector to purchase low-emission and electric vehicles through green public procurement policies. This helps to increase demand for sustainable vehicles and reduce emissions from government fleets.

(Jasiński et al., 2021)

The EU is investing in the development of a comprehensive charging infrastructure to support the adoption of electric vehicles. This includes funding for charging stations, research on battery technology, and regulations to standardize charging equipment across the region. The EU is also promoting a circular economy approach in the automotive industry, which emphasizes the reuse and recycling of materials and components. This includes policies to encourage the remanufacturing of parts and the recycling of end-of-life vehicles.

Overall, Europe's sustainability strategy in the automotive business is focused on reducing emissions and promoting sustainable transportation through regulations, incentives, and investments. The goal is to create a more environmentally friendly and efficient transportation system. The United States can add to Europe’s strategy by implementing green logistics and reverse logistics into everyday business practices. Green logistics covers any business procedure

that protects resources and ensures a positive environmental impact. Intelligent businesses are rushing to understand and embrace sustainable logistics management, supported by powerful technologies such as artificial intelligence, machine learning, and advanced analytics. The second practice, reverse logistics refers to the continual use of resources within a supply chain. This can include repairs and maintenance, returns of defects, and recycling practices.

Conclusion

Resources are much more limited than they were over 100 years ago. Aftermarket Businesses are not only implementing these sustainability strategies to build up rapport in the market, but also to set up the legacy of their companies. They must reevaluate everything from the design and engineering stages, through the manufacturing and shipping processes, all the way to how vehicles operate, how they are serviced, and how they are dealt with at the end of the product lifecycle. Sustainability isn't just about electric vehicles; findings have brought a whole

new perspective on sustainability. By giving points about what there is to look for in the sustainable factor of the aftermarket, companies can use this research to talk about what ideas are out there and what organizations are doing to brighten the future for coming generations.

When discussing sustainability, it is important to be definitive to understand what protecting resources looks like for every industry, not exclusively the Aftermarket industry. The growth and success of the aftermarket industry depends on how adaptable businesses can be with the changes in government regulation concerning our environment.

Our research indicates we need to stray away from "Mega-trends", while using technology to the aftermarket industry's advantage. As Gen Z is coming into the workforce change is happening radically, just as the demand for vehicles is coming from an environmentally conscious market. To ensure a company provides an adaptable work environment employers can stay up to date with the changes of our industry by offering Lean Six Sigma courses to their employees can help improve overall resourcefulness in the company, in effect there is an increase in company revenue.

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