Forum: Special Conference on Balancing Infinite Opportunities (SPECON)

Issue: Mitigating the production of vehicles utilizing non-exhaustible resources

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Position: Deputy President

Personal Introduction

Dearest Delegates,

My name is Tsampika Theodora Koutounidi, I am a 10th grade student at the American College of Greece (ACG - Pierce) and it is my utmost honor to serve as Deputy President for the Special Conference on Balancing Infinite Opportunities (SPECON) of this year's American College of Greece Model of United Nations (ACGMUN). I would like to introduce you to the following topic: "Mitigating the production of vehicles utilizing non-exhaustible resources" as to help you understand the subject in depth and thus form strong resolutions for a fruitful debate.

Before I proceed, I cannot describe my incomparable joy that the MUN community is growing so rapidly and cannot help but offer my warmest congratulations to all of you for choosing to become a member of it! Regardless of being a first-timer or experienced delegate, I would like to personally welcome you all to this year's conference. MUN is a unique experience that becomes a passion and has a permanent impact on you. For me, the most important thing that the conferences offer is the ability to understand that there is always another perception concerning a certain matter, and in this way, to value and respect other people's opinions. Every conference changes you. It teaches you skills and builds new friendships. That is the reason behind my strong encouragement for your active participation because only then you will understand the true value of MUN.

This study guide examines the issue of "Mitigating the production of vehicles utilizing non-exhaustible resources". It is a fascinating topic, vital in resolving major world issues and ameliorating the "health" of our planet. This study guide contains important background information. However, I suggest you all conduct further research to gain more knowledge on your country's policies and position on this topic, so as to ensure a lively discussion and develop effective clauses for our resolutions.

If you have any questions, please do not hesitate to contact me via email at tkoutounidi@gmail.com. Looking forward to meeting you all in March!

Yours truly,

Tsampika Theodora Koutounidi

Topic Introduction

In a world where humans seem to rapidly exhaust the non-renewable resources that the planet has offered and undermine the non-exhaustible ones, it has become an imperative need to turn our attention to finding a way to relieve the earth. The problem has reached a point where it can no longer be ignored or pushed aside. That is why we need to replace exhaustible resources with unlimited ones in every sector possible. One of those sectors is the production of vehicles, where balancing infinite opportunities with sustainability becomes essential for ensuring progress without further harm to the planet.

Nowadays, most of the population has cars. However, the problem in this situation arises when you take into consideration that half of those vehicles use petrol or diesel as fuel. In fact, according to a recent survey of the European Automobile Manufacturers' Association (ACEA), named “New car registrations: +1.1% in October 2024; year-to-date battery-electric sales -4.9%”[1] that was conducted in October 2024, “30.8% of cars use petrol while 33.3% are hybrid electrics”. It is therefore understood that the percentage of electric cars has surpassed the percentage of petrol cars. However, even those positive statistics are not enough to combat the problem. The planet cannot wait until humanity has finally stopped exhausting its very limited resources, since if that behavior does not stop immediately, there will not be any of those resources to exhaust.

Despite the fact we live in the year 2025, in which technology has progressed in a variety of fields, vehicle production using non-limited energy is not one of the main ones. Moreover, despite the effort to establish planet-friendly vehicles, such as electric or hydrogenic cars, most people still prefer gasoline-powered cars. Therefore, a change is needed. The problem that arises does not only concern the fuel that those cars use but also the sources the factories use to produce these vehicles. It is imperative that incentives are given to the automaker factories in order to encourage them to use alternative energy resources and to aid them in every aspect possible.

Definition of Key Terms

Electric Vehicles

“An electric vehicle (EV) is defined as a vehicle that can be powered by an electric motor that draws electricity from a battery and is capable of being charged from an external source. An EV includes both a vehicle that can only be powered by an electric motor that draws electricity from a battery and a vehicle that can be powered by an electric motor that draws electricity from a battery and by an internal combustion engine (plug-in hybrid electric vehicle).”[2]

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[1] European Automobile Manufacturers' Association. "New Car Registrations: +1.1% in October 2024; Year-to-Date Battery-Electric Sales -4.9%." *ACEA*, 21 Nov. 2024, https://www.acea.auto/pc-registrations/new-car-registrations-1-1-in-october-2024-year-to-date-battery-electric-sales-4-9/. Accessed 28 Feb. 2025.

[2] U.S. Department of Energy. "Electric Vehicle (EV) Definition." *Alternative Fuels Data Center*, 3 June 2021, https://afdc.energy.gov/laws/12660 . Accessed 23 Nov. 2024.

Energy Efficiency

Energy efficiency is the use of less energy to perform the same task or produce the same result" and "one of the easiest and most cost-effective ways to combat climate change, reduce energy costs for consumers, and improve the competitiveness of U.S. businesses, since it is "a vital component in achieving net-zero emissions of carbon dioxide through decarbonization."[3]

Green Manufacturing

"The development and use of manufacturing processes that minimize or eliminate waste streams and the use of toxic materials is commonly referred to as green manufacturing."[4]

Hybrid vehicles

Hybrid vehicles are "automobiles available to the mass market with power systems that combine internal combustion and other power sources, while recovering energy during braking."[5]

Non-Exhaustible Resources

"Any resource, such as wood or solar energy, that can or will be replenished naturally in the course of time"[6] and thus is "sustainable despite its consumption by humankind. Renewable resources for the production of energy are considered especially important for their potential to replace nonrenewable, or finite, resources." They are also known as non-exhaustible or unlimited resources.[7]

Life Cycle Assessment (LCA)

"LCA is a method for environmental assessment considering all the phases of life cycle such as collection, transportation, pre-processing, treatment and disposal. It enables to identify issues of concern and possible policies for mitigating more effectively taking into account the direct and indirect impacts associated with a particular waste management system."[8] It assesses EVs' environmental impact from production to disposal by identifying the main concerns and suggesting sustainable policies and waste management.

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[3] U.S. Department of Energy. "Energy Efficiency in Buildings and Industry." *Energy.gov*, Office of Energy Efficiency and Renewable Energy, https://www.energy.gov/eere/energy-efficiency-buildings-and-industry. Accessed 22 Dec. 2024.
[4] "Green Manufacturing." *JSTOR*, https://www.jstor.org/stable/10.7249/tr649tbnateda.18. Accessed 23 Nov. 2024.
[5] Silberglitt, Richard, et al. *Energy Futures and Urban Air Pollution: The Benefits of Hybrid Electric and Fuel Cell Vehicles*. RAND Corporation, 2009, https://www.jstor.org/stable/10.7249/tr649tbnateda.17 . Accessed 23 Nov. 2024.
[6] "Renewable Resource." *Dictionary.com*, https://www.dictionary.com/browse/renewable%20resource. Accessed 23 Nov. 2024.
[7] "Renewable Resource." *Investopedia*, https://www.britannica.com/science/sustainability. Accessed 23 Nov. 2024.
[8] "Life Cycle Assessment (LCA)." *JSTOR*, https://www.jstor.org/stable/resrep00728.23. Accessed 23 Nov. 2024.

Net Zero

"Net zero means cutting carbon emissions to a small amount of residual emissions that can be absorbed and durably stored by nature and other carbon dioxide removal measures, leaving zero in the atmosphere."[9]

Renewable Energy Certificate (REC)

"A renewable energy certificate, or REC is a market-based instrument that represents the property rights to the environmental, social, and other non-power attributes of renewable electricity generation. RECs are issued when one megawatt-hour (MWh) of electricity is generated and delivered to the electricity grid from a renewable energy resource."[10] It promotes the usage of electric vehicles by ensuring the electricity used for charging comes from renewable sources.

Sustainability

"Sustainability is the long-term viability of a community, set of social institutions, or societal practice. In general, sustainability is understood as a form of intergenerational ethics in which the environmental and economic actions taken by present persons do not diminish the opportunities of future persons to enjoy similar levels of wealth, utility, or welfare."[11]

Background Information

Historical Background

It is evident that throughout history, humans have persistently tried to ameliorate their lives in all fields through the exploitation of the planet's resources, with the production of vehicles not being an exception.

In 1888, a chemist named William Morrison built an electric carriage, which was the first appearance of an electric vehicle in modern history. It featured "a front-wheel drive, 4 horsepower, a speed of 20 mph, and 24 battery cells, that had to be recharged every 50 miles."[12] It was such an innovative invention during that time that it was showcased at the 1893 Chicago World's Fair, widely known as World's Columbian Exhibition.

On October 1901 Ferdinand Porsche and Jacob Lohner created the Lohner-Porsche Mixte, the world's first hybrid electric car, due to Porsche's expertise and Lohner's marketing skills. It used

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[9] United Nations. **"Net-Zero Coalition."** *United Nations*, https://www.un.org/en/climatechange/net-zero-coalition. Accessed 22 Dec. 2024.
[10] "Renewable Energy Certificates (RECs)." *U.S. Environmental Protection Agency*, https://www.epa.gov/green-power-markets/renewable-energy-certificates-recs. Accessed 23 Nov. 2024.
[11] "Sustainability." *Encyclopedia Britannica*, https://www.britannica.com/science/sustainability. Accessed 23 Nov. 2024.
[12] "The History of Electric Cars." Car and Driver, www.caranddriver.com/features/g43480930/history-of-electric-cars/. Accessed 24 Nov. 2024.

a gasoline engine to generate electricity, which powered the wheel motors, making the vehicle dependent on the fuel in the tank. Despite these innovations, before World War II, technology was dominated by gasoline, forcing the majority of factories with electric vehicles to replace their electric motor with internal combustion engines, which are machines that burns fuel to produce power, or disappear. In this way, the mass production and usage of electric cars wasn't until much later.

On the 10th of December 1997, Toyota Prius, the first mass-produced hybrid vehicle in the world was released in Japan. It had a 1.5-liter gasoline engine alongside an electric motor, making it more eco-friendly, but still not completely.

Just a day later, on the 11th of December 1997, the Kyoto Protocol was adopted. Its main objective was to limit and reduce greenhouse gas emissions globally. It offered effective mechanisms such as the Clean Development Mechanism (CDM), which encouraged the collaboration between More Economically Developed Countries (MEDCs) and Less Economically Developed Countries (LEDCs), so as to achieve a holistic participation in the net-zero projects. A key part of this protocol was the shift to clean energy, which included the utilization of vehicles with electric motors powered by renewable resources as a step towards combatting climate change.

As the years passed and the 21st century came, new eco-friendly inventions were introduced and new conferences aimed at helping the planet were held. In October 2008, Tesla Motors introduced its first car, the well-known electric Roadster, which is the founding base of modern electric vehicles.

Moreover, on June 20th to 22nd 2012 the United Nations Conference on Sustainable Development (UNCSD), also known as Rio+20 took place in Rio de Janeiro. Amongst the most significant programs that the conference implemented was the UNEP Global Electric Mobility Program,[13] showcasing sustainable transportation models in support of global goals for development. Since then, the program has taken action so as to achieve its main goals, with some being raising awareness on electric mobility benefits for stakeholders, supporting policies for renewable energy and involving private sector participation to prepare the ground for electric mobility markets.

However, despite the production of electric vehicles, many companies continued to produce gasoline-powered cars as well, making it difficult for those vehicles to thrive. That is why people were happily surprised when on the 5th of July 2017, Volvo announced the termination of the internal combustion engine,[14] and stated that all the new models it would introduce in the following years

[13] "Electric Mobility." United Nations Environment Programme (UNEP), www.unep.org/gef/focal-areas/climate-change-mitigation/our-work/electric-mobility. Accessed 24 Nov. 2024.
[14] "Volvo's Hybrid Electric Car." The New York Times, 5 July 2017, www.nytimes.com/2017/07/05/business/energy-environment/volvo-hybrid-electric-car.html. Accessed 24 Nov. 2024.

which would use renewable resources. Specifically, Volvo mentioned in detail five models from 2019 to 2021 that would run solely on electric power.

Most dominant factories in producing electric vehicles (EVs)

The most dominant factories in producing electric vehicles vary in headquarters and models, offering to people around the world the opportunity to reduce their carbon footprint.

Firstly, Tesla has established itself as a global leader in the production of Battery Electric Vehicles (BEVs), holding a 20% share in global BEV sales[15]. The company operates several Gigafactories worldwide, including facilities in Shanghai, Berlin and the United States, such as those in Nevada and Texas. However, Tesla's market share declined from 23.6% in 2023 to 19.0% in 2024, with car registrations totaling over 386,000 units during this period[16]. Despite that, the company still holds one of the most promising positions in the market of electric vehicles.

Furthermore, Build Your Dreams (BYD) is a prominent Chinese automobile company making significant strides in the global Battery Electric Vehicle (BEV) market. As the second-largest company in the BEV sector, it is renowned for producing affordable yet high-end electric vehicles. While headquartered in China, the company is expanding internationally with branches in Thailand and Mexico. BYD also leads in the plug-in vehicle market, delivering 624,000 units, nearly double Tesla's, due to its diverse lineup that includes both all-electric and plug-in hybrid vehicles.[17]

Volkswagen, a company located in Germany introduced its first all-electric model named "Elektro Transporter", in the 1970s. The company has pooled resources to enable this transition to the mass production of electric vehicles, with Zwickau in Germany being one of the largest plants in Europe focusing on EV manufacturing. Volkswagen's MEB platform serves the production of various electric vehicle models, namely those from Audi, Skoda, and SEAT, while enhancing the production process through additional flexibility and economies of scale.

Becoming the fifth-largest electric vehicle company globally as of October 2023[18], General Motor is one of the most dominant factories in the United States. The automaker is on the road to all-electricity, phasing out gas and diesel cars by 2035. The transition will embrace all GM core brands, such as Chevrolet, Buick, GMC and Cadillac.

Lastly, the Dutch automobile company "Stellantis" has set a mind-blowing vision for the year 2030. "We want to sell 100% battery electric vehicles (BEVs) in Europe and 50% BEVs in our U.S. markets," they stated. The company strives to achieve a record high target of "5 million BEV sales

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[15] "The Largest Electric Vehicle Companies in the World." The Motley Fool, www.fool.com/research/largest-ev-companies/. Accessed 24 Nov. 2024.
[16] "World's Top Automotive Groups by Sales in Q1 2024." InsideEVs, 2024, https://insideevs.com/news/719284/world-top-automotive-groups-sales-2024q1/ . Accessed 24 Nov. 2024.
[17] World's Top Automotive Groups by Sales in Q1 2024." InsideEVs, 2024, insideevs.com/news/719284/world-top-automotive-groups-sales-2024q1/ . Accessed 24 Nov. 2024.
[18] "The Largest Electric Vehicle Companies in the World." The Motley Fool, www.fool.com/research/largest-ev-companies/. Accessed 24 Nov. 2024.

across the globe every year," which is clear for the company's commitment to sustainable future and transition to electric mobility.[19]

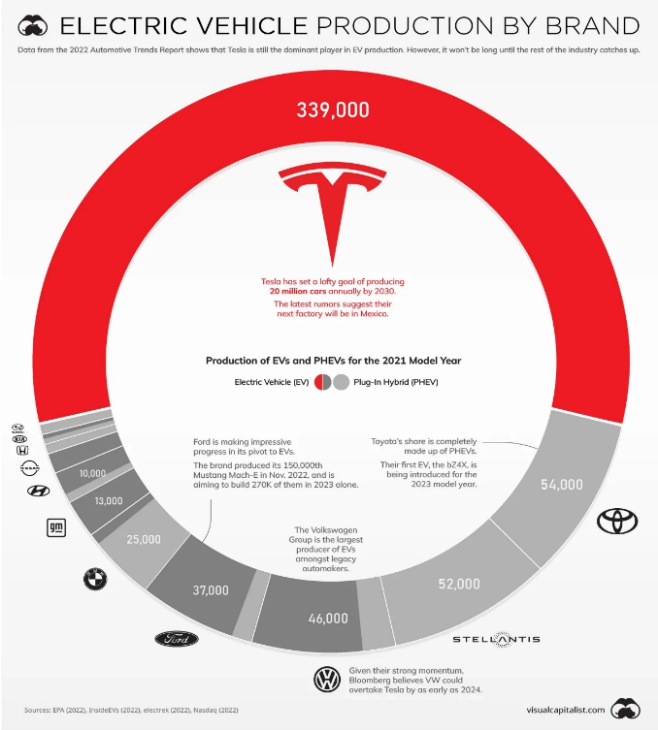

Figure 1: Image depicting the “electric vehicle production by brand” in the year 2021.[20]

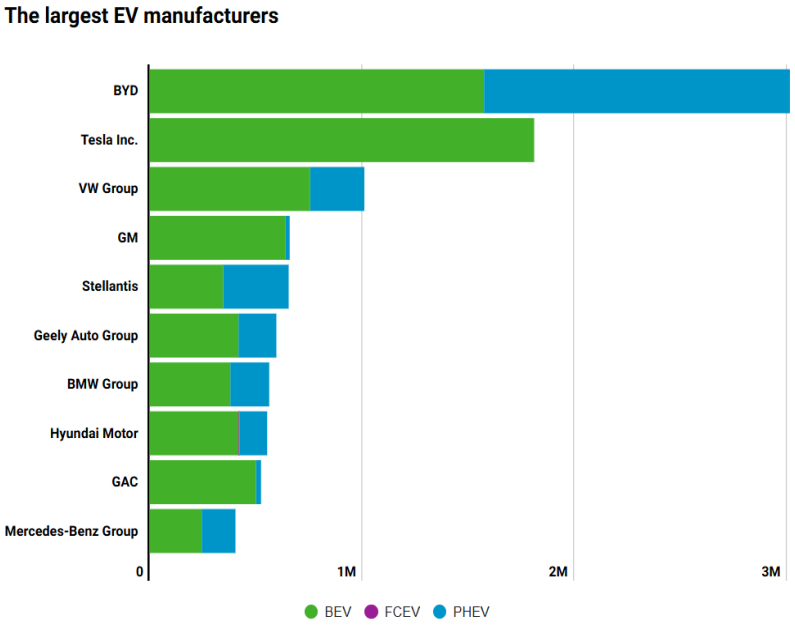

Figure 2: Graph depicting the “largest EV manufacturers” concerning each type of vehicle.[21]

[19] "The European Green Deal." European Commission, https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en . Accessed 25 Nov. 2024.
[20] Voronoiapp: "EV Production in the U.S. by Brand." Voronoi App, https://www.voronoiapp.com/other/EV-Production-in-the-US-by-Brand-31 Accessed 24 Nov. 2025.
[21] The Motley Fool: "The Largest Electric Vehicle Companies in the World." The Motley Fool, https://www.fool.com/research/largest-ev-companies/ . Accessed 24 Nov. 2025

Most dominant factories in using renewable energy to produce vehicles

Even though the utilization of electric vehicles is of great significance for the planet's future, using renewable energy for their production is another factor worth mentioning.

To begin with, Tesla strides in integrating renewable energy into its manufacturing processes. In particular, mostly in the Gigafactory in Nevada the entire rooftop is covered by solar panels, which support the batter, powertrain and electric vehicle production.

Promoting itself as a manufacturer of batteries, Northvolt proved its commitment to sustainability by using almost 100 percent renewable energy at its factories. In Sweden, its factories are powered by hydropower, further confirming the company's intention to shift to environmentally friendly production methods.

Moreover, the German automobile company Leipzig shows commitment towards a sustainable future by hosting a plant, which integrates wind turbines to support renewable energy use. It also partners with renewable energy providers, such as Iberdrola, to ensure its manufacturing processes align with its sustainability targets.

Additionally, Volvo is actively working toward achieving climate-neutral production by 2025. Its Swedish factories are all operating on renewable energy, such as wind and hydropower, aligning with Sweden's goals of reducing carbon emissions and increasing renewable energy use in the industrial sector.

Lastly, Build Your Dreams (BYD) produces batteries and powertrains, allowing for effective control of the carbon footprint and sustainable production practices. BYD has set its bus factory in Hungary as a centerpiece for the transition to electric public transport across Europe. In this way, the company has a primary role in the shift towards electric public transport across Europe

Positive Impact of Electric Vehicles

Electric vehicles are a key step towards achieving net-zero emissions, which is the primary goal of humanity nowadays. In particular, according to a research that was conducted in 2020, named “Benefits of electric cars on the environment”, “over a year, just one electric car on the roads can save an average of 1.5 million grams of CO2.”[22] They have a lower carbon footprint than gasoline-powered cars, since they produce zero-emissions. Furthermore, they aid in the amelioration of the planet, since with zero-emissions they slow climate change. Concerning the economical sector, they have lower fuel costs and thus are more beneficial in the long run.

[22] Silberglitt, Richard, et al. Energy Futures and Urban Air Pollution: The Benefits of Hybrid Electric and Fuel Cell Vehicles. RAND Corporation, 2009, https://www.jstor.org/stable/10.7249/tr649tbnateda.17 . Accessed 23 Nov. 2024.

Positive Impact of Utilizing Renewable Energy in Production

The usage of renewable resources in production of electric vehicles is vital, since in this way the companies aid in achieving a sustainable future. They are energy independent and thus, the concern of relying on other companies for their production is diminished. Also, the companies that shift to non-exhaustible energy receive many incentives by the government, given that they play a crucial role in net-zero emissions. Lastly, those companies are globally recognized for their eco-friendly methods. In this way, the population prefers them since they want to reduce their personal carbon footprint.

Components of Electric Vehicles that are Harmful to the Environment

Even though electric vehicles are deemed environmentally more beneficial than the traditional Internal Combustion Engines (ICE), there are still negative effects caused by production procedures. Higher emissions are produced due to the complex nature of batteries in constructing electric vehicles. In fact, the mining and processing of lithium, cobalt, and nickel, among other materials, into lithium-ion batteries, may promote degradation of the environment as well as water and habitat pollution. Lithium-ion batteries also contain heavy metals and chemicals that when not disposed of properly can leach into soil and water.

Battery cell refining and assembly also consumes enormous amounts of energy and releases great amounts of greenhouse gas emissions in manufacturing process. Moreover, charging electric vehicles has a considerable impact depending on what local energy sources are applied in. If fossil fuels are the dominant sources from which a region gets electricity, then the same resources will charge the electric vehicle making one become quite counterproductive as far as electric driving benefits are concerned.

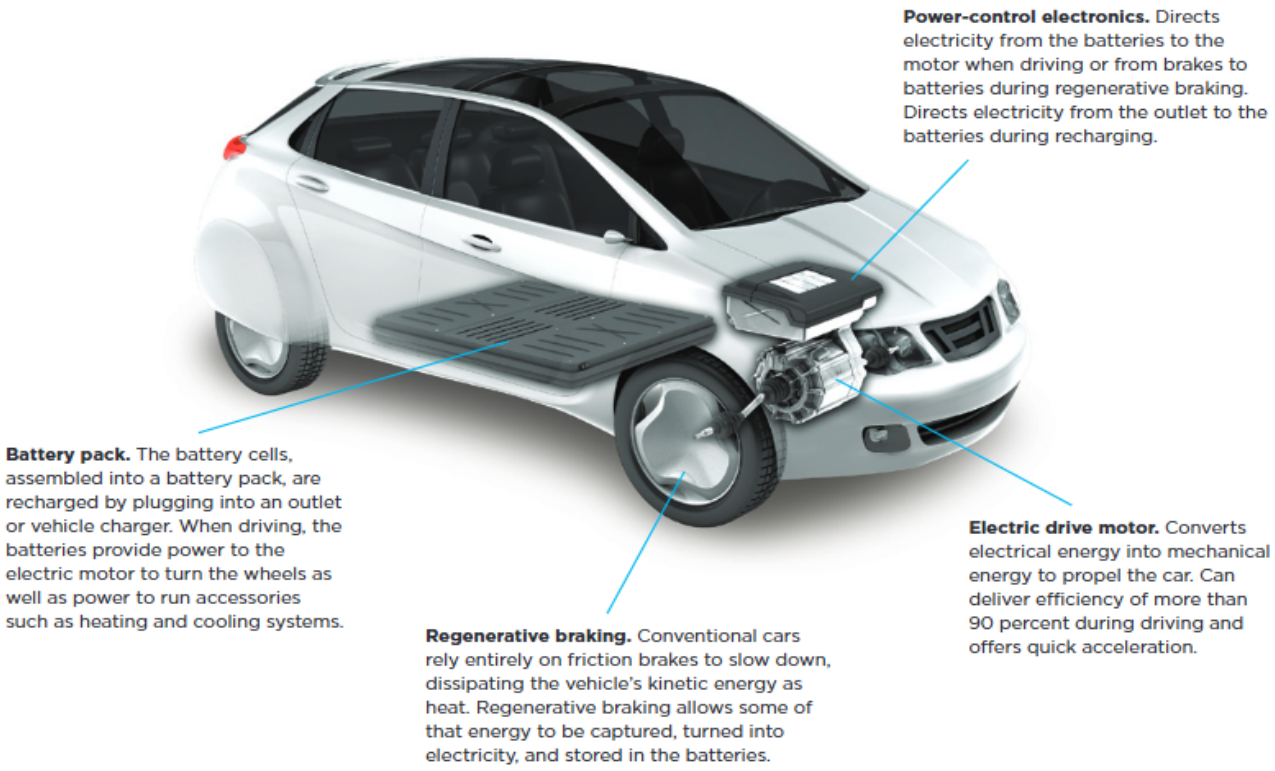

Figure 3: Image depicting the most important components of an electric vehicle[23]

Useful Renewable Energies for EV Production

Renewable energy sources play a pivotal role in maintaining the sustainable manufacture of electric vehicles (EVs). Solar energy is harnessed via solar panels on factory rooftops or solar farms by turning into electricity with the sunlight to drive machinery and lighting. Wind energy is harnessed by means of turbines to generate electricity into grids that supply energy to factories producing EVs, while excess energy is stored inside batteries for later consumption. Hydropower relies on the construction of hydroelectric plants along rivers to transform its energy resource-renewable energy which is very important for energy-demanding processes such as aluminum smelting. Geothermic energy, which can be found in such areas as Iceland with geothermal reservoirs, converts underground heat into power and steam to drive some manufacturing processes for a cleaner production cycle.

[23]JSTOR, Silberglitt, Richard, et al. "Decarbonising the Transport Sector: Accelerating the Transition to Electric Vehicles." JSTOR, 2022, https://www.jstor.org/stable/resrep17225.8 . Accessed 24 Nov. 2025.

Major Countries and Organizations Involved

Norway

Norway plays a leading part in the electric vehicles market, with 80% of its vehicles being electric. This is because Tesla sells hundreds of cars in this country, with more than 21,000 already sold. Above all, high awareness from the citizens regarding EVs, their reduced cost and the greater long-term benefits that they promise in real life contribute in this widespread adaptations.

China

China is the largest producer of electric vehicles globally for a variety of reasons. Firstly, due to the lower labor rates there are more working hands than in most countries with the same budget. Moreover, the generous government subsidies and the more favorable battery costs impel the population. However, despite that, the country is the largest consumer as well, due to the affordable prices. Particularly, Chinese EV manufacturers have competitive prices, without significantly compromising on quality or features, which makes the vehicles more attractive in both national and global markets.

Germany

Germany constitutes as a home to a plethora of factories that utilize renewable resources to produce electric vehicles. For example, Volkswagen is an automobile company, whose 100% of the external electricity supplied to the European plants comes from renewable energies. BMW as well announced in July 2020 that all the electricity sourced externally derives from renewable sources. Another key part, needed to be mentioned, is that the government offers subsidies for electric vehicle purchases, so as to encourage the citizens to shift to mobilization means that don't include a high carbon footprint. However, despite these initiatives, the transition to electric vehicles has been slower than anticipated, due to the high initial cost of EVs, even with subsidies, and the insufficient charging infrastructure in rural areas.

United States of America (USA)

The United States has a significant role in EV production, hosting companies such as Tesla and Rivian, making the country major in solving the problem. At the end of 2023, 36% of electric car usage was in California. Also, former President Joe Biden gave an Executive Order that the country's goal is achieving a 50% of all vehicles sold in the US to be net-zero emitters of greenhouse gases by 2030.[24] Lastly, the continuous renewable energy projects, such as the 3 new U.S Plants in Phoenix show the country's willingness and dedication to net-zero emissions. Nonetheless, the U.S.

[24] "How Many Electric Vehicle Charging Stations Are There in the U.S.?" USAFacts, www.usafacts.org/articles/how-many-electric-vehicle-charging-stations-are-there-in-the-us/ . Accessed 25 Nov. 2024.

still faces political divisions over climate change policies and EV adoption, with certain states resisting federal mandates on clean energy and EV transition.

Democratic Republic of Congo (DRC)

The DRC is a significant player in the global supply chain of the electric vehicles as more than 70 percent of the entire cobalt produced in the world, which is a very important component in lithium-ion batteries for electric vehicles, is mined in the country. With this kind of representation, the country does not manufacture electric vehicles within its borders, but it remains a major factor in the production process of electric vehicles around the world. However, the cobalt mining industry in the DRC faces serious obstacles. Abuses of human rights and environmental concerns are very much present, and it has been reported that severe human rights challenges are witnessed in mining operations.

India

India is a rising country in the EV industry. Companies like Tata Motors, Ola Electric, and Mahindra have now started focusing on cheap EVs for national and overseas markets. Particularly, recognition was achieved through the Tata Motors' model named Nexon EV, that combines advanced features with affordability, thus making them widely appealing. Ola Electric dominates the electric two-wheeler segment and has a considerable share of the market. Mahindra Electric focuses on such vehicles as entirely green. That is why the Indian government launched the Faster Adoption and Manufacturing of Electric Vehicles FAME II with an allocation of 10,000 crores to promote the adoption of EVs through incentive measures and to enable local manufacture.

International Renewable Energy Agency (IRENA)

International Renewable Energy Agency (IRENA) is a platform for international cooperation of governments, so as to assist countries on their journey towards energy transition. It provides comprehensive data and analysis on relevant areas including technology, innovation, policy, finance and investment, through an objective and transparent decision-making process. IRENA also fosters new collaborations and dialogue among stakeholders while encouraging the share of best practices. However, IRENA cannot always ensure that its recommendations are fully implemented by member countries. The agency’s encouragement for rapid adoption of renewable energy is often met by political, economic, and social challenges that slow down the transition. This happens particularly in LEDCs, since they more than often struggle to ensuring the needed financial support and technological advancements.

Electric Vehicle Association (EVA)

The Electric Vehicle Association (EVA) is a North American non-profit organization that addresses public education and promotes the adaptation of electric vehicles. EVA provides resources, awareness of the association, and advocacy for transportation sustainability. This plays a key role in the mission of promoting EV benefits and the eventual transition toward a cleaner and greener future.

Blocs Expected

Countries with leading role in the production of electric vehicles

The first block that is expected to be created would consist of countries that have a significant position in producing electric vehicles. At the same time, those are the same countries that are most developed in harnessing renewable sources of energy for vehicle production and are adopting or indeed utilizing advanced technologies. They also implement requisite policies or strict regulations against carbon emissions and give people incentives to encourage them towards renewable energy. They establish timelines for phasing them off fossil fuel power vehicles and thus, they open the door to electric mobility.

Less advanced in this field countries

The other block would consist of countries that concerning adopting renewable resources in vehicle production are slow. That is mostly due to economic reasons, like lack of funds, technology, infrastructure, as well as weak and not regular policies against carbon emissions which tend to inhibit transition to clean and electric vehicle production.

Timeline of Events

Date	Description of Event
1888	William Morrison, created the first commercially viable EV in the U.S.
October 1901	Ferdinand Porsche created the Lohner-Porsche Mixte, the world's first hybrid electric car.
10 December 1997	Toyota introduced the first hybrid vehicle in Japan, which later, in 2000, became available to the mass market.

11 December 1997	The Kyoto Protocol was adopted.
October 2008	Tesla Motors released its first car, the infamous completely electric Roadster.
20-22 June 2012	The United Nations Conference on Sustainable Development (UNCSD), also known as Rio+20 took place in Rio de Janeiro.
12 December 2015	The adoption of the Paris Agreement (COP21).
5 July 2017	Volvo became the first automaker to announce the termination of internal combustion engine, and state that all the vehicles it will introduce the following years will use renewable resources.
11 December 2019	The implementation of the European Union (EU) green deal 2019.
October 2020	The initiative for greening North Atlantic Treaty Organization's (NATO) military operations was officially endorsed.
31 October-12 November 2021	The Glasgow Climate Pact (COP26) was agreed on.

Relevant UN Resolutions, Treaties & Events

The Paris Agreement (COP21), 12th of December 2015 (A/RES/75/300)

The Paris agreement (COP21), adopted and signed on 12 December, 2015, is a treaty of global legally binding measures to address climate change. It was established on November 4, 2016, firstly aiming to limit temperature increases to 1.5 degrees C above pre-industrial levels. As

an agreement, emissions were to peak in 2025 and then decline 43% by 2030. Additionally, there was the demand for every country to formulate for itself a climate action plan, then termed as nationally determined contributions (NDCs). Besides that, the Paris Agreement also addressed developing nations in terms of the different types of funding, technical, and capacity building mechanisms to support such countries to meet climate goals.

The Glasgow Climate Pact (COP26), 31st of October – 12th of November 2021

The 26th Conference of the Parties to the United Nations Framework Convention on Climate Change (cop26), or widely known as The Glasgow Climate Pact, was held from October 31 to November 12, 2021. It was built on the commitments made under the Paris Agreement to accelerate climate action globally. This pact has increased by double the financial assistance to developing countries to enable them to adapt much better to the adverse impacts of climate change. Its main feature was the introduction of an "Enhanced Transparency Framework" which provided definitive timeframes for periodic assessment reports and thus building trust and facilitating cooperation around the world. More than 30 countries, six major vehicle manufacturers, and others have committed to ensuring that all new car and van sales would be zero-emission vehicles, globally by 2040 and in leading markets by 2035. The main goal of this measure was and still is to boost the decarbonization of the road transport sector, which accounts for about 10 percent of global greenhouse gas emissions.

Previous Attempts to Solve the Issue

European Union (Eu) Green Deal 2019 (December 11, 2019)

The European Union (EU) Green Deal has ambitious objectives towards attaining no greenhouse gas emissions by 2050. It aims at improving economic growth from resource consumption, so that development is not at the expense of the environment. The Green Deal undertakes to ensuring that "no person and no place is left behind," thus promoting inclusiveness and fairness in the transition. First among its advantages is the thrust towards renewable resources and green innovations, resulting in employment in many areas, from clean energy technologies and electric vehicles to infrastructure. In this way, this strategy creates a paradigm for the EU on the international stage to fight climate change.

Greening North Atlantic Treaty Organization (NATO)'S Military Operations

NATO has been constantly involved in greening the operations of the military, as seen in efforts that include the use of renewable energy resources and member-states' military electric vehicles. These actions put forth a stronger defense network to overcome any earthly energy disruptions, making it cheaper in business practice. This includes the increase of sustainable

practices and creation of better resilience against operations while working towards the global vision of changing the climate. Specifically, NATO initiated the Green Defense Framework, which focuses on energy efficiency, emission reductions, and sustainable military technologies. Moreover, the Organization added a further 45% emission reduction in its Climate Change and Security Action Plan by the year 2030 and the goal to achieve net-zero by 2050. The establishment of the NATO Climate Change and Security Centre of Excellence in Montreal depicts its commitment to climate-related security risks and its operational effectiveness margins.

The Nordic Cooperation at COP29

The Nordic Cooperation showcased at COP29, how the Scandinavian countries, Norway, Sweden, Denmark, Finland, and Iceland, are cooperating in green mobility projects. These countries presented their plans to attain environmental and social sustainability through common infrastructure development. Being front-runners in sustainable transportation, they intervened in the deployment of electric vehicles, hydrogen fuel cells, and biofuels, which are all steps towards progressive action towards innovation and climate change mitigation. In alignment with the European Green Deal and international climate commitments, these countries emphasized the importance of renewable energy certificates (RECs) to ensure that transport vehicles are powered by clean energy sources. In particular, the Norwegian model of widespread EV adoption, which is implemented with the aid of government incentives and sufficient charging infrastructure, was showcased as a role model for other countries. Lastly, the Nordic region showed its support for the circular economy practices to minimize environmental harm and the acceleration of the decarbonization of the transport sector.

Possible Solutions

Encouraging Renewable Energy Investments and Standardized Practices in Supply Chains

It is important that certification programs that motivate suppliers to invest in renewable energy sources are encouraged and global cross-border collaborations for standardized sustainable practices are facilitated. In this way, the domination of renewable energy in supply chains will be encouraged and further implemented. However, the expensive implementation cost, especially for electric vehicles and renewable infrastructures, remains a critical impediment. Financial incentives or collaborative sponsorships would be essential for offsetting these costs, thus achieving broader adoption.

Collaboration Of Automakers with Renewable Energy Providers

It would be prudent for car manufacturers to seek renewable energy supply partners to ensure a constant supply of green energy for their production plants. This not only provides a way of getting

clean energy, but it also stabilizes energy costs and gives the automaker the chance to support sustainability. The main challenge in this case, is the possible dependence of the factory on the supplier, thereby exposing it to risks on the supply. Again, the slow pace of implementation in some areas due to financing can deter the possible entry into renewable energy, calling for some strategizing and planning around investments.

Implementing Circular Economy Practices

The implementation of circular economy practices can pave the way for a great decrease in dependency on limited resources. It can enhance the life of vehicle components like engines, batteries, and other electronic parts by remanufacturing them, for whose manufacture, new raw materials will be required. Additionally, advanced recycling programs prove crucial for the recovery of these precious materials from end-of-life vehicles, such as lithium, cobalt, and nickel, and their reuse in the production of new products. But, because of that, the cost and complexity involved in developing effective recycling and remanufacturing technologies along with its infrastructure are prohibitively high and tough discouraging its undertaking especially among small manufacturers.

Material Substitution

Material substitution in manufacture of vehicles involves research and development of synthetic substitutes or replacement materials toward non-renewable resources as rare earth metals. For instance, magnesium has considerable capability in replacing aluminum and precious metals in catalytic converters can be scaled down from its high performance to the use of less abundant and more efficient alternatives. However, one of the most challenging aspects is the considerable research and testing that needs to be conducted in order to verify that these substitutes achieve the intended level of performance, safety, and durability. This painstaking and expensive process can delay the widespread use of alternatives.

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