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The Role of Economic Institutions in Developing Tomorrow's Green Markets and Achieving Environmental Sustainability

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Abstract. Green markets are becoming more attractive with technological developments and consumers' awareness of the environment is increasing all over the world. Organizations fall between the option of offering a net-emission product, or reducing the percentage of carbon in the product to release demand. This study highlights the role of ArcelorMittal's targeted green portfolio, which is a leader in the iron and steel markets.The targeted sectors were identified by designing the green portfolio and creating a green pricing strategy, which enabled it to support the development of a number of green food markets, such as the hydrogen market, clean energies, recycling plastics, and the electric car market, and achieving sustainability by marketing Its products that enhance sustainability and have a reduced carbon footprint in the field of transportation with its various means and infrastructure, renewable energies, construction, home appliances, and packaging.

1. INTRODUCTION

Today, the world faces many environmental problems, such as climate change and the lack of natural resources. These problems cause serious damage to nature and put pressure on ecosystems. Because of this situation, it is important to change traditional economic models so they respect the environment and protect the Earth for future generations.

Green goods markets help change the idea of economic success. They encourage production and consumption that are environmentally friendly. Companies are no longer responsible only for making profit; they also have a responsibility to protect the environment and support sustainable development.

These markets also support innovation and responsible environmental practices. Renewable energy, clean transportation, and the circular economy are becoming real solutions, not just ideas. This helps create a green and sustainable economy.

1.1. Study Problem

How can economic institutions contribute to the development of tomorrow's green markets and achieve environmental sustainability?

1.2. Hypotheses

- ArcelorMittal can contribute to the development of tomorrow's green markets by producing green products and marketing them in various sectors.
- ArcelorMittal can contribute to the development of tomorrow's green markets by achieving green raw materials used in various products in various sectors.
- ArcelorMittal can contribute to the development of tomorrow's green markets and achieve environmental sustainability by supporting renewable energies and reducing emissions.

1.3. Tomorrow's Markets

Tomorrow's markets represent a vital environment for technological innovation in economic institutions, as these markets provide effective platforms for creating and exchanging new products and assets. Providing new opportunities for investment and trade, which enhances innovation and stimulates competition. It also plays a crucial role in the transition towards more sustainable economic systems. It also enhances the ability of individuals and small companies to access global markets[1].

In December 2020, the European Council and the European Commission presented proposals aimed at developing a strong market centered on tomorrow's markets, which focuses on carbon-neutral or low-carbon raw materials and opens new horizons for production from recycled materials, and efficiency in the use of these resources. The proposed measures also develop and disseminate new carbon-free technologies. Focusing on developing clean energy infrastructure and low-carbon processing technologies is a vital step towards achieving these goals[2].

Among the new markets that could lead the economic transformation of the future are the electric car, greenhouse gas allowances, hydrogen, plastic recycling, water rights and quality credits, widespread antivirals, data, digital financial services, education and reskilling services, transportation services.Based on Hyperloop, new antibiotics, artificial intelligence, genes and

[1] : World Economic Forum, Markets of Tomorrow:Pathways to a New Economy, I N S I G H T R E P O R T O C T O B E R 2 0 2 0, Geneva Switzerland, 2020, p11

[2] : Agora Energiewende, https://www.agora-energiewende.de/fr/projets/les-marches-de-demain-des-a-present/

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DNA sequencing, satellite services, spaceflight[3].

Each of tomorrow's markets requires seven basic conditions to develop until maturity, which is shown in the following table :

Table 1. Basic Conditions for Achieving Maturity in Tomorrow's Markets.

Condition	Its concept	The question asked
Invention	A new product must be invented that can be sustainably produced.	Has a product been invented that can be sustainably produced at scale?
Production	A group of companies must be able and willing to produce and market it.	Is each product mature enough to be reliably brought to market?
Demand	Demand for the product must be sufficient to maintain a commercially viable market.	Is demand sufficient to maintain a commercially viable market?
Standards	A set of market standards for the new product must exist among ecosystem actors.	Have clear market standards emerged for new products or assets among the market ecosystem players?
Value	Society must be aligned on how the new product should be evaluated.	Is there sufficient convergence and shared judgment of the value of the new product or asset?
Codification	Legal frameworks must allow the new product to be identified, held, and exchanged.	Are there clear legal frameworks codified for this specific product or asset that make the market economically and legally viable?
Infrastructure	The necessary infrastructure (physical, digital, intangible) must be in place to exchange, distribute, and store the new product.	Is the complementary infrastructure necessary for the market to actually exist?

World Economic Forum, Markets of Tomorrow: Pathways to a New Economy, I N S I G H T R E P O R T O C T O B E R 2 0 2 0, Geneva Switzerland, 2020, p20

The table above illustrates the essential conditions for achieving the maturity of tomorrow's markets:

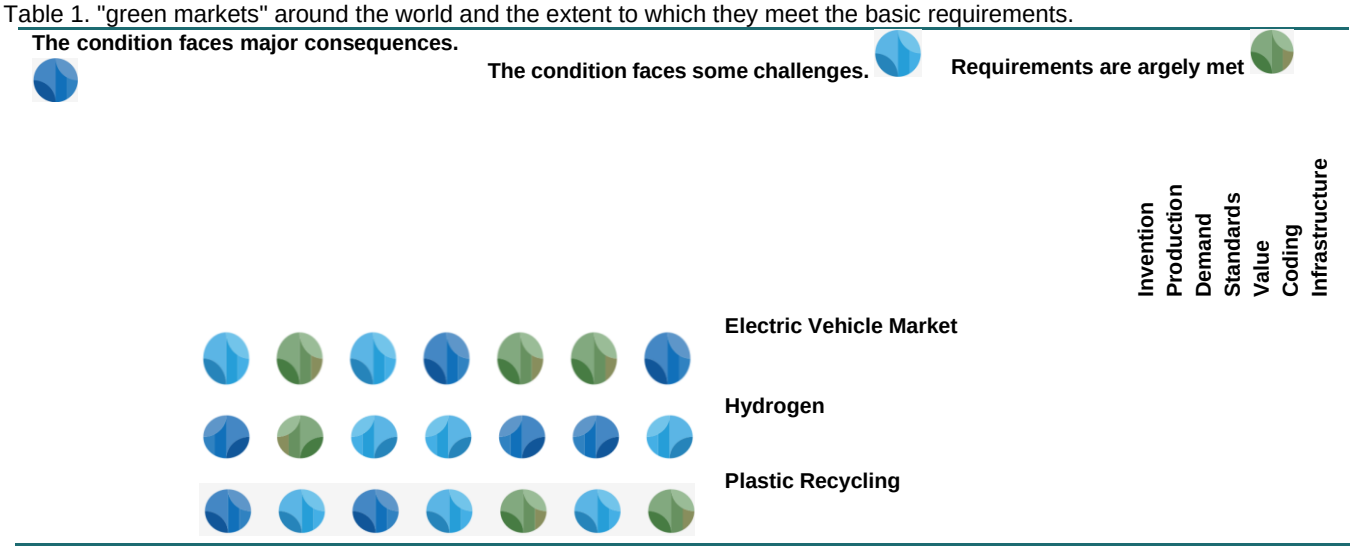
- Invention: Inventions require creative approaches that encompass different types of science, beyond the traditional focus on science, technology, engineering, and mathematics (STEM). These may be available only as prototypes or proofs of concept, or production processes tested to date may not be sustainable for environmental, social, or economic reasons.
- Production: The knowledge required for production and the necessary networks with other sources of technological expertise must be incorporated. A production sector for a new market may be created exclusively by entirely new players, such as startups, or even existing players capable of modifying and participating in the market by producing a new or complementary product.
- Demand: Supply and demand influence the market ecosystem. This makes it necessary to integrate and analyze the ecosystem into broader innovation. Government procurement has been identified in many cases as a key driver of new market ecosystems, and large corporations can also play a strategic role through their own supply chain decisions.
- Standards: Standards are critical in shaping socio-technical systems. When a new invention is transformed into a new commercial product, there is likely to be a phase of experimentation, which results in similar products with improvements or variations of the initial product.
- Value: Actors within a market ecosystem may not be able to agree on a quantifiable value for the product or asset to be exchanged. Different social and cultural patterns may influence the value judgment around an entire class of products, such as skill capital, genes and DNA sequences, or water rights. This raises questions about the willingness of societies to assign monetary value to these types of products and assets. There may also be a lack of reference points or a clear framework for assigning value to specific characteristics of each product within the same class, such as data or artificial intelligence.
- Codification: In current economic systems, the legal framework covers every product or asset that is traded. Property rights are the foundation of legal frameworks that allow for the identification of a specific product and the transfer of ownership. They also distinguish between products and assets, as any product can be transformed into an asset once the law grants it the attributes of priority, durability, transferability, and universality. - Infrastructure: Some products require specific infrastructure to be exchanged or used effectively by users. When this cost is high, it can inhibit research, production, and demand for the new product.

[3] : World Economic Forum, Markets of Tomorrow:Pathways to a New Economy, I N S I G H T R E P O R T O C T O B E R 2 0 2 0, Geneva Switzerland, 2020, p6

1.4. Maturity of a Selected "Green Markets" Around the World

The table below shows selected "green markets" around the world and the extent to which they meet the basic requirements.

Table 1. "green markets" around the world and the extent to which they meet the basic requirements.



World Economic Forum, Markets of Tomorrow:Pathways to a New Economy, I N S I G H T R E P O R T O C T O B E R 2 0 2 0, Geneva Switzerland, 2020, p20

The Green Car Market: Toyota launched the first electric car in 1997, and the transition to electric mobility accelerated with the entry of Tesla in the early 21st century. The Chinese government has also established one of the most ambitious support programs in this field. Assuming that electricity generation will be greener in the future, electric cars could contribute significantly to reducing greenhouse gases, thanks to the efficiency of the EURELECTRIC Electric Vehicle Task Force and EpoSS (European Technology Platform for Integration of Intelligent Energy Systems). The European Commission and the European Investment Bank have allocated €5 billion under the European Green Car Initiative. Electric cars are expected to represent more than 60% of new sales by 2050[4]. Among the companies producing electric cars are BYD, Volkswagen, BMW, and Hyundai[5]. Polestar also aims to create the first "climate-neutral car" by 2030, achieving zero emissions at every stage of manufacturing. Volvo Cars, which is committed to reducing emissions across its entire lifecycle, aims to recycle vehicles manufactured with at least 25 percent recycled plastic, 25 percent recycled steel, and 40 percent recycled aluminum by 2025 across its entire product line. Its production will be fossil-free by 2045. Returning to the prerequisites for achieving the maturity of tomorrow's markets, we find that the electric car market has largely met the production, value, and codification requirements. However, the invention and demand requirements face some challenges, while the standards and infrastructure requirements face major ramifications.

Hydrogen: The hydrogen market delivers a clean, safe, and affordable energy future, enabling energy production, storage, transport, and use in a variety of ways[6]. Demand for pure hydrogen includes the chemical, metallurgy, electronics, and glass industries. It is a leading option for storing and transporting renewable energy over long distances of thousands of kilometers[7]. The 1996 Hydrogen Future Act identified hydrogen's potential. Initiatives to promote fuel cells in the United States followed, while Japan recognized the potential of diversifying and cleaning up its energy mix based on hydrogen. The Hydrogen Council was launched by hydrogen industry leaders in 2017 to make hydrogen a key component of the energy transition. The European Union is currently working to establish a clean hydrogen alliance with leading industry players. SSAB aims to begin supplying fossil-free steel to the market on a commercial scale in 2026. By developing a fossil-free value chain from mine to finished steel products under the HYBRIT initiative, a pilot plant was built in 2020 that will begin producing smaller quantities of hydrogen-based steel[8]. As ThyssenKrupp presented its pilot project to develop a hydrogen pathway, both companies are actively seeking progressive customers willing to pay a “green” premium for sustainable steel[9].

Plastic Recycling: The global plastic recycling market is expected to grow at a compound annual growth rate (CAGR) of 5.00% to 6.80% from 2018 to 2026, with a further 7.9% growth expected by 2025, reaching a value of USD 66.9 billion. Global plastic waste volumes will grow to 460 million tons annually by 2030, further complicating the public outcry over global plastic pollution[10]. Four major plastic types dominate the global recycled plastic market: low-density polyethylene (LDPE), polypropylene (PP),

[4] : European Environment Agency, https://www.eea.europa.eu/articles/the-electric-car-2014-a-green-transport-revolution-in-the-making,
[5] : www.marketsandmarkets.com/Market-Reports/electric-vehicle-market-209371461.html

[6] : Fatih Birol, https://www.iea.org/reports/the-future-of-hydrogen,

[7] : International Energy Agency, The Future of Hydrogen today’s opportunities,Report prepared by the IEA for the G20, Japan, June 2019 ,p13

[8] : *SSAB .Volvo Group and SSAB to collaborate on theworld’s first vehicles of fossil-free steel* https://mb.cision.com/Main/980/3321531/1398615.pdf
[9] : Corporate Leaders Group Europe,University of Cambridge, Institute for Sustainability Leadership,Agora Energiewende.. *Business briefing: Tomorrow’s markets today Scaling up demand for climate neutral basic materials and products.* World Business Council for Sustainable Development 2021 P9
[10] : Thomas Hundertmark, Mirjam Mayer, Chris McNally, Theo Jan Simons, Christof Witte, https://www.mckinsey.com/industries/chemicals/our-insights/how-plastics-waste-recycling-could-transform-the-chemical-industry

polyethylene terephthalate (PE), and high-density polyethylene (HDPE)[11].

Most recycling occurs in China and Southeast Asia. The European Union adopted its Plastics Strategy in 2018, and the Plastic Waste Reduction and Recycling Act was introduced in the United States Congress in June 2020. Several companies are investing in advanced recycling technologies, with a particular focus on chemical recycling. Several companies are investing in advanced recycling, covering three key areas: food and non-food packaging; construction and automotive; textiles; industrial and agricultural products; and consumer goods. Looking at the key conditions for achieving maturity in tomorrow's markets, we find that plastic recycling has largely met the value proposition and production infrastructure requirements. However, production requirements, standards, and codification face some challenges, while demand and innovation requirements face major constraints.

1.5. Institutions' Contribution to Supporting the Production of Tomorrow's Market Products

Large-scale green markets will become a reality, despite high costs for early adopters. Demand for green materials is expected to outpace supply. As new green technologies expand, declining cost premiums will open opportunities for green market leadership. Consumers are willing to pay more for sustainable products[12]. There are promising sectors in terms of demand for hydrogen as a renewable energy source[13]. Prominent among these sectors are the industrial sector, particularly oil refining, steel production, and the transportation sector, as well as hydrogen-based aviation fuels. To win in green markets, companies need to revamp their go-to-market approach, which requires new thinking about pricing and partnerships, and adopting the following interconnected measures:

1. Designing a Target Portfolio: Companies should design a “green” target portfolio that serves tomorrow’s net-zero demand, focusing on the following three points:
   - Understanding future demand and willingness to pay
   - Developing a low-carbon target portfolio
   - Reshaping the decarbonization roadmap across various operations
2. Defining the Green Value Proposition: The product value proposition within this portfolio, along with emissions and other sustainability dimensions such as water, air, and biodiversity, will need to be shaped by:
   - Green product design (footprint, benefits, trajectory);
   - Developing a green branding strategy;
3. Creating a Pricing Strategy: Companies need to create a green pricing strategy based on the product, customers, and desired outcomes by:
   - Defining the outcomes of the pricing strategy;
   - Implementing a pricing structure to drive outcomes;
   - Thinking through a monetization model to align with value;
4. Developing a market environment: Companies should develop a green market environment for:
   - Working across the industry to address aggregate demand
   - Collaborating with similar companies to break down barriers
5. Transforming a company into a sustainable development company: To fully achieve performance in green markets, companies will generally need to transform internally through new capabilities, measures, incentives, and internal collaboration across business functions by putting key enablers in place across the business, including governance, capabilities, investment budget, and decarbonization, to transform to a green business.

2. APPLIED STUDY

1- Presentation of the organization and its transformation into a sustainable development company that supports green markets:

ArcelorMittal specializes in steel and mining. The company produces a wide range of high-quality and semi-finished steel products ("semis"). It sells its products to a diverse group of customers in approximately 155 countries, across various industries, including automotive, construction, household appliances, and packaging. It is the result of the merger of Mittal Steel and Arcelor to create the world's largest steel company, officially named ArcelorMittal. It is the largest steel producer in Europe, the second-largest in Africa, and the sixth-largest steel producer in the CIS region, with a smaller but growing presence in Asia[14].

The company aims to advance in its core markets by creating unique engineering solutions for customers. This has led the company to take a portfolio approach to this challenge. It has developed a vision for a targeted low-carbon portfolio, such as XCarb, for the low-carbon and carbon-free steel industry[15].

Organizations must figure out how to design green products that meet their customers' needs. They face a choice between launching a 100% net-zero product, or reducing the carbon content of the product enough to trigger demand. Will customers accept emissions reductions only from product production or only from non-fossil-based processes? What other sustainability components will be critical? The next step is to determine the other benefits the product must deliver. ArcelorMittal has worked on[16]:

- Building a Target Portfolio: The company has designed a "green" target portfolio that serves tomorrow's net-zero demand by developing a low-carbon target portfolio and understanding future demand. Its steel products are used in all sectors and

[11] : Katherine ES Locock, Jessica Deane, Edward Kosior, Hishani Prabaharan, Melissa Skidmore, Oliver E Hutt, Plastics Market: Global Analysis and Trends, CSIRO, Australia. 2017,p6

[12] : World Economic Forum, Winning in Green Markets Scaling Products for a Net Zero World, Switzerland , J A N U A R Y 2 0 2 3 p24

[13] : www.iea.org/reports/the-future-of-hydrogen

[14] : ArcelorMittal annual-report-combined-2022. Luxembourg,2023 p3

[15] : World Economic Forum, Winning in Green Markets Scaling Products for a Net Zero World, Switzerland , J A N U A R Y 2 0 2 3 p19

[16] : World Economic Forum, Winning in Green Markets Scaling Products for a Net Zero World, Switzerland , J A N U A R Y 2 0 2 3 p19

in most regions of the world. It has also sought to meet future demand through steel products used in renewable energy. Furthermore, through its manufacturing method, it seeks to utilize hydrogen, which will stimulate tomorrow's hydrogen market on the one hand and support the reshaping of the decarbonization roadmap through the operations it has initiated.

- Defining the Green Value Proposition: ArcelorMittal works to understand policies that support the transition to a low-emission future, increasing steel production using so-called end-of-life scrap based on availability. It is also working on a flexible and integrated innovation program to develop future steelmaking technologies for circular, low-emission production. It seeks to invent steel products that promote a more sustainable life and meet the current and anticipated requirements of current and future customers in terms of[17]:
- Automotive weight-reducing solutions;
- Innovative products for structures and skyscrapers;
- High-speed rail construction;
- Production of weather-resistant sheet steel;
- Customer Engagement: The company has identified promising target sectors and engaged early adopters. The highest-value target sectors were identified in the iron and steel, automotive, construction, home appliances, and packaging markets. It has also engaged several leading companies in the fields it has entered. Among the leading companies in the electronics and home appliances industries are Bosch, Siemens, Samsung, Electrolux, Whirlpool, Indesit, and Miele.
- Developing the market environment: The company has worked to develop its own green market environment. In the transportation sector, it markets its new green products through various facilities and marine carriers, including freight and cruise ships, and train transportation, whether in the materials used to manufacture train cars or railways. In the automotive sector, it works to supply the regular car market and electric cars with steel materials. In the home appliances industry, and in energy, whether renewable energy such as wind energy, solar energy, oil, gas, or nuclear energy, it also works in the construction sector.
- Transforming the company into a sustainable development company: To fully achieve performance in green markets, the company has worked on transforming internally through new capabilities, measures, incentives, and internal collaboration across business functions by putting key enablers across the business, including governance, capabilities, investment budget, and carbon removal, to transform the business to a green business.

2 - The company's sustainable operations and support for green markets: The steel industry has achieved significant improvements in energy efficiency and yield, reducing the emission intensity of steel production. The company's ongoing technological innovation will further reduce emission intensity through low-emission technology pathways. These include transitioning to new energy inputs in the form of[18]:

- Clean energy: used for hydrogen-based steelmaking, and in the long term for direct electrolysis steelmaking, also contributing to other low-emission technologies.
- Circular carbon energy sources: from biomass and plastic waste from industrial sources and agricultural waste...
- Fossil fuels: with carbon capture and storage, enabling the continued use of existing iron and steelmaking processes while converting them to a low-emission pathway.

In the future, the company seeks to make the plant capable of operating on green hydrogen. In 2019, ArcelorMittal announced the design of its Hamburg plant to demonstrate how primary iron for steelmaking could be produced using only hydrogen[19].

Given the advantages of steel[20]:

- Infinitely recyclable without loss of quality;
- Recycling rates of 90%;
- Lower carbon footprint than competing materials;
- A key enabler of decarbonization for many other technologies,

ArcelorMittal has built its low-emissions strategy around the following four components[21]:

1. Energy efficiency in steelmaking operations worldwide.
2. Exploring opportunities to increase steel production using so-called end-of-life scrap based on availability.
3. A flexible and integrated innovation program to develop future steelmaking technologies for circular, low-emission production.
4. Policy analysis and engagement to understand and advocate for policies that will support the transition to a low-emission future across the geographies in which we operate.

The company seeks to invent steel products that enhance sustainability for a more sustainable life, meeting the current and anticipated demands of current and future customers in the areas of[22]:

- Automotive weight-reduction solutions;
- Innovative products for structures and skyscrapers;
- High-speed railway construction;
- Production of weather-resistant sheet steel.

2- Industrial areas supported by the Foundation:

The company's technology portfolio enables it to pursue the full range of possible technology paths[23]. Its products are distributed across various sectors, including:

First: Transportation Sector[24]:

Marine: The company's steel products are used in the construction of all types of vessels, from general cargo carriers, container ships, cruise ships, and large tankers carrying liquefied natural gas, as well as ground-driven steel columns to support the structure used in the construction of ports and harbors.

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[17] : https://corporate.arcelormittal.com/about/research-and-development/advancing-products-processes-and-solutions
[18] : https://automotive.arcelormittal.com/sustainability/clean_power_steelmaking
[19] : https://corporate.arcelormittal.com/media/case-studies/hydrogen-based-steelmaking-to-begin-in-hamburg
[20] : https://corporate.arcelormittal.com/climate-action/steel-s-sustainability-credentials
[21] : ArcelorMittal , Climate Action Report 1 , Luxembourg , May 2019 p20
[22] : https://corporate.arcelormittal.com/about/research-and-development/advancing-products-processes-and-solutions
[23] : ArcelorMittal , Climate Action Report 1 , Luxembourg , May 2019 p23
[24] : https://corporate.arcelormittal.com/industries/transport

Railway: ArcelorMittal manufactures steel products for railway lines. In addition to the use of steel in railway cars, the company has developed ultra-high-strength steel (UHSS) for freight cars, which produces lower emissions during production and transportation.

Automotive: The company is a technology leader in advanced steel manufacturing for the automotive industry, making cars, vans, and trucks lighter and stronger. The company's primary mission is to manufacture cars using smart steel and smart steel solutions, relying on cleaner, stronger steel[25].

Second: Home Appliances: ArcelorMittal's steel is ideal for home appliances such as stoves, refrigerators, washing machines, and dishwashers. It can be easily shaped to the manufacturer's specifications. The company is constantly developing and innovating to ensure its steel meets the needs of its customers. Whether in structural components, heat resistance, or electric motors that require specialized steel, manufacturers have been able to build products that use less energy and water and meet strict environmental guidelines. Its partners in this field include Bosch, Siemens, Samsung, Electrolux, Whirlpool, Indesit, and Miele[26].

Third: Energy: Innovative steel solutions play a pivotal role in providing the energy infrastructure the world needs, from onshore and offshore wind turbines to solar power plants worldwide. Renewable energy requires innovative steel products, which are more steel-intensive than traditional fossil fuel power plants. These include[27]:

- Solar Energy: The company provides high-performance steel, coatings, and structural solutions, building the latest generation of photovoltaic and solar thermal installations. Key clients include the largest renewable energy project in Dubai and the world's largest solar power plant in Morocco.
- Oil, Gas, and Nuclear Energy: The company supplies steel for onshore and offshore platforms, liquefied natural gas (LNG) vessels, pipelines, refineries, and fuel storage, as well as pressure vessels and many other key structural applications in power generation and petrochemical processing. High-purity steel is also needed for nuclear reactors, nuclear waste transportation, and storage casks.
- Wind Energy**:** Over 80% of the components in turbines are steel, and the company supplies panels for towers, reinforcing bars, and steel for generators.

Fourth: Construction and Building: Steel is used in heavy construction equipment, hydraulic cylinders, scaffolding, and fencing. The company focuses on developing and bringing innovative steel products to the market for construction. Steel is also used in the construction of[28]:

- Office and residential buildings;
- Bridges, tunnels, canals, and highways;
- Stadiums, airports, and railway stations;
- Industrial and agricultural buildings;
- Architectural and engineering complexes;
- Fifth: By-products**:** The company works to manage steel industry waste to achieve its goal of zero waste in landfills. The steel industry produces by-products, most of which are either recycled into the steelmaking process to make it more efficient, or sold for use in road construction and crop fertilization.

Analyzing the results:

Leaders in green markets need to develop a vision for achieving a global zero-emission product portfolio. To successfully build this vision, they must measure future green demand and willingness to pay in their sector, based on the reality of decarbonization and the lack of a low-carbon market. They must also understand how their customers' targeted decarbonization ambitions will impact demand for low-carbon basic materials in the medium term.

Organizations must prioritize the development of low-carbon products in areas where expected demand and willingness to pay will be greatest. They must reshape their decarbonization roadmaps and prioritize based on value to deliver more attractive offerings to customers across all markets: steel, automotive, construction, home appliances, and packaging.

In 2021, the company outlined its roadmap to 2050. The roadmap envisions five key levers that will serve as stepping stones toward the 2030 and 2050 goals. These are[29]:

- Steelmaking Transformation: Steelmaking methods will change with the transition to natural gas-based DRI-EAF, a first step using proven technology and the lack of green electricity grid power. This will be followed by a full transition to green hydrogen, which is not yet available at anywhere near the scale required to reduce the carbon footprint.
- Energy Transformation: Energy will undergo a radical shift toward cleaner energy sources by switching to one or a combination of clean energy sources (in the form of green hydrogen or renewable electricity); reducing the use of fossil carbon with the development of carbon capture and storage options; and replacing fossil carbon with biocarbon options. Using forestry and sustainable agricultural residues for energy production, in addition to using plastic waste as an energy source.
- Increased Use of Scrap: In addition to the use of scrap in EAF, its use in the BF-BOF steelmaking process could be increased. Scrap availability is expected to increase with the increase in the amount of steel being traded, demonstrating the inherent cyclicality of steel. Riwald Recycling in the Netherlands and Zlomex in Poland in 2023 are examples of how the company is increasing its access to steel scrap to reduce carbon emissions from the steel industry.
- Access to clean electricity: The company plans to explore more diversified opportunities in the renewable energy sector to provide adequate access to clean energy, purchasing renewable energy certificates, and making greater use of direct power purchase agreements (PPAs) with suppliers. The 2022 investment in Greenko in India is an example of how businesses can directly ensure increased availability of green electricity.
- Offsetting residual emissions: Residual emissions are likely to remain, either if a technological solution is feasible or if the solution entails significant economic or social costs. For these residual emissions, the company will purchase high-quality offsets or launch projects to generate high-quality carbon credits that would not have occurred without its intervention.

Industrial sectors supported by the Foundation as part of its efforts to achieve and support the green market of tomorrow:

[25] : https://automotive.arcelormittal.com/who_we_are/overview
[26] : https://corporate.arcelormittal.com/industries/appliances
[27] : https://corporate.arcelormittal.com/industries/energy
[28] : https://corporate.arcelormittal.com/industries/construction
[29] : ArcelorMittal annual-report-combined-2022. Luxembourg,2023 p49

Automotive: ArcelorMittal holds a leading market share of nearly 15% of global automotive steel by the end of 2022. It is the first company in the world to embed its engineers within an automotive customer to provide engineering support and manufacturing assistance. Providing solutions to make vehicles lighter, safer, and more fuel-efficient. In 2010, S-in Motion began developing engineering projects for the B, C&D, SUV, pickup truck, light commercial vehicle, taxi, hybrid, and battery electric vehicle (BEV) segments, qualifying for Fortiform. Amid growing interest in sustainability in the automotive, agricultural, and heavy-duty industries, a full range of ultra-high-strength steels has been developed. Amstrong steel allows customers to reduce the weight of their equipment, increase payload, and reduce fuel consumption and CO2 emissions[30]. In 2021, the XCarb brand [31]was launched with XCarb™ green steel certification, producing recycled steel made with green energy, reducing the global CO2 footprint of the company and its products. As of March 2022, ArcelorMittal Europe - Flat Products began producing recycled XCarb, produced renewableally using EAF and renewable electricity[32].

- Energy: Steel has been developed to be corrosion-resistant and patented for use in wind towers or solar mounting systems. The company is also developing solutions for the hydrogen economy, electricity grids, carbon capture and storage, and bioenergy.
- Packaging: The company continues to respond to the need to meet evolving health and safety regulations and achieve lightweight and cost-effective designs. The steel produced by the company is well-suited for expanding its applications in packaging and replacing plastic packaging. Society will become less accepting of packaging that does not align with sustainable development goals, thanks to its ability to be recycled and disposed of as hazardous materials.
- Construction: The innovative Mega Column concept is being utilized. The ongoing challenge is to minimize the size of vertical structural elements, without compromising the economic viability of projects and limiting their impact on the floor plans of high-rise buildings. Through Steligence, steel innovations are being introduced to meet the growing demand for sustainability, flexibility, creativity, and cost-effectiveness in the design of high-performance buildings, including its ability to recycle and reduce materials used, meeting the embedded carbon footprint requirements of buildings and infrastructure[33]. For railway infrastructure, RailCorp was launched to produce corrosion-resistant rails[34].

3. HYPOTHESIS VALIDATION

- ArcelorMittal can contribute to the development of tomorrow's green markets. It is distinguished by its development of a strong market for carbon-neutral and resource-efficient raw materials, driven by the demand for hydrogen. This has stimulated the hydrogen market, particularly green hydrogen, as a result of the company's efforts to build a sustainable green product portfolio and its efforts to provide sustainable products that support new markets, such as the electric vehicle market, which requires sustainable and lighter steel, and the renewable energy market, through the sustainable steel used in every stage of its production. This confirms that:
- Arcelor Mittal can contribute to the development of tomorrow's green markets by consuming hydrogen and clean energy as alternative energy. In the future, it seeks to enable the plant to operate on green hydrogen. This is what we see in the Hamburg plant, which produces primary iron for steelmaking using only hydrogen. It also achieves the development of the electric car market through the produced batteries and the weight reduction of the vehicle, and its development is supported by demand from environmentally concerned consumers by the increased emission reduction resulting from the green steel used. In addition, it supports the development of the plastic recycling industry, which relies on it to produce alternative energy for production and reduce plastic waste, as well as by introducing new steel in the field of packaging.
- ArcelorMettal can contribute to the development of tomorrow's green markets by producing green raw materials used in green production across various sectors. The company provides solutions for reducing vehicle weight and reducing emissions; provides innovative products for structures, skyscrapers, and construction; contributes to the transportation sector by establishing high-speed railways, land transport, and all related facilities; produces sustainable sheet steel that is resistant to harsh weather conditions; and works to develop various types of renewable energy projects.
- ArcelorMittal can contribute to the development of tomorrow's green markets, achieving environmental sustainability by supporting clean, renewable energy used in production, such as green hydrogen, and contributing to low-emission technologies, relying on circular carbon energy sources obtained from biomass and plastic waste. It also achieves environmental sustainability by manufacturing low-emission steel, which is recyclable and a key enabler of decarbonizing many of the products used in production, from cars, trains, ships and their infrastructure, to household electrical materials, and even in the production of renewable energy from wind and solar energy.

4. CONCLUSION

Tomorrow's markets are of critical importance, including: electric cars, greenhouse gas emissions allowances, hydrogen, plastic recycling, water rights and quality credits, widespread antivirals, data, digital financial services, education and reskilling services, hyperloop-based transportation services, new antibiotics, artificial intelligence, genetics and DNA sequencing, satellite services, and space travel.

Among the findings are:

- Tomorrow's markets focus on clean energy infrastructure and ultra-low-carbon processing technologies.
- They are characterized by the development of a robust market for carbon-neutral and resource-efficient raw materials.
- Demand for carbon-neutral raw materials has increased.
- Tomorrow's markets ensure the industrial sector's transition to an integrated market that supports the green economy.
- Markets contribute to the innovation of a new product that can be produced sustainably, provide a group of companies

[30] : ArcelorMittal annual-report-combined-2022. Luxembourg,2023 p51

[31] : https://corporate.arcelormittal.com/climate-action/xcarb

[32] : https://europe.arcelormittal.com/sustainability/xcarb/RRP/recycled_and_renewably_produced
[33] : https://steligence.arcelormittal.com/
[34] : https://rails.arcelormittal.com/products/railcor

capable and willing to produce and market it, and set market standards for the new product.

- ArcelorMittal's success is based on its core values of sustainability, quality, leadership, and entrepreneurial audacity.
- The company has adapted its footprint to new demand realities, intensified its efforts to control costs, and reorganized its operations to outperform its competitors. • The company is developing and implementing a plan to decarbonize steel and mining and achieve carbon neutrality by 2050.
- ArcelorMittal offers products and processes that contribute significantly to sustainable development. Steel is the preferred material in the transition to a circular and low-carbon economy.
- The company's ambitions include decarbonization across various sectors, the transition to a circular economy, and adherence to sustainability standards across supply chains, from mine sites to product delivery.
- Recommendations include:
- Investigating how to develop demand for finished products made from carbon-neutral raw materials to expand and expand tomorrow's markets.
- Developing production of materials from the circular and low-carbon economy to ensure the industrial sector's transition to an integrated market that supports the green economy.
- Focusing on the electric car market, which protects the environment and reduces gasoline and natural gas consumption, as well as greenhouse gas emissions.
- Relying on green markets for a clean, safe, and affordable energy future.

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