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Green Business Strategies: Profitability Through Sustainable Practices

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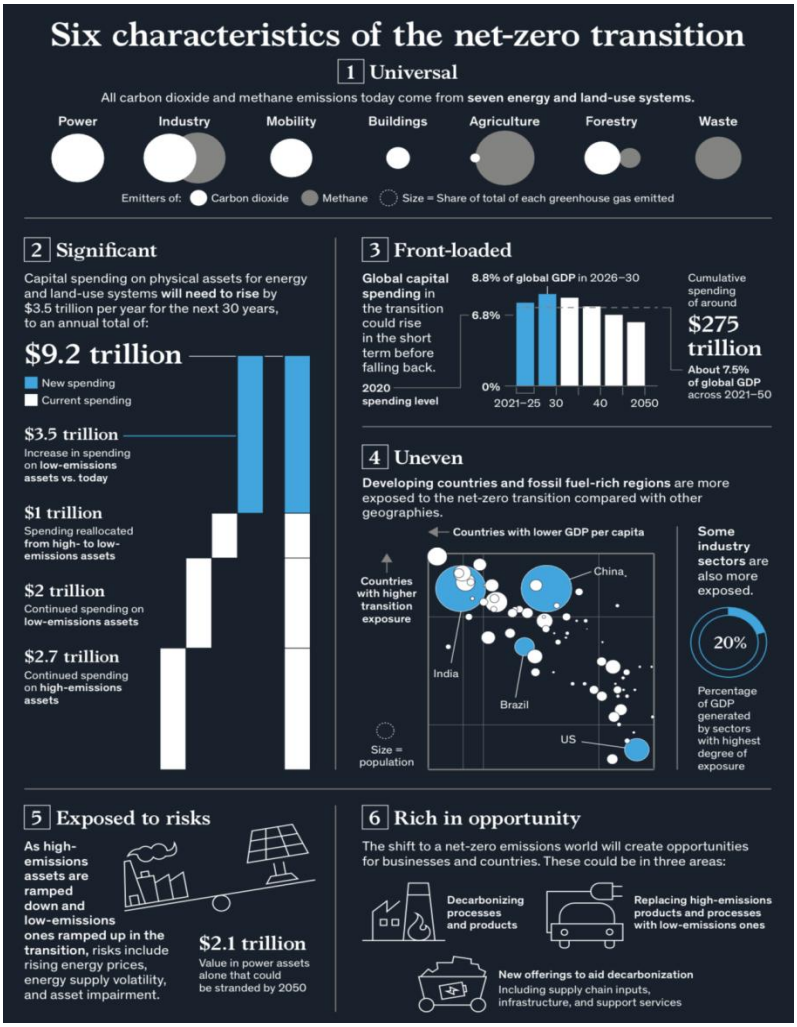
Abstract: ***Green businesses or sustainable businesses are economic opportunities that have minimal negative impact and potential positive impacts on the environment, community, society and economy, and such business ventures also strive to enhance the bottom line. Furthermore, the global net-zero 2050 challenge involves decreasing worldwide carbon dioxide emissions to net zero by 2050, along with endeavors to restrict the long-term rise in average global temperatures to 1.5˚C. This consequently impacts business activities which cause environmental damage, hence, leading to the transformation in the economic impacts on product demand, capital allotment, expenses and job opportunities across energy and land-use strategies. This report highlights the virtues associated with green businesses, varied types of green business initiatives and the concept of green marketing. Going deeper into green business strategies, it further discusses the global concern of drowning in plastic pollution associated with single-use plastic packaging, suggesting sustainability views on reusable packaging options and bringing to attention various options related to the scientific disposal of hazardous industrial waste, thereby diminishing the emissions of toxic and greenhouse gases, and decreasing environmental pollution. The white paper concludes with the obstacles green businesses encounter to achieve the net zero 2050 scenario - the transitional challenge.***

Keywords: Green Business, marketing, sustainability, environmental management

Virtues Related to Green Businesses

Socially responsible decisions are the cornerstones of green business techniques. Such businesses underline ethical consumerism, manufacture safe and non-toxic products and aspire to support the well-being of the community as a whole. Green businesses are sustainable business ventures which pursue utilizing environmentally friendly processes — for manufacturing final products, sourcing raw materials, packaging, marketing and labelling purposes as well as for delivery services. All such corporations strive to reduce - carbon footprints, global warming, waste accumulation and harmful emissions of non-biodegradable waste or pollutants which unfavourably affect land, water, air and life on our planet. Green businesses along with their economic activities believe in taking measures to stimulate afforestation, improve soil fertility, utilize clean renewable energy resources and practice water conservation techniques. Such organizations associate with eco-friendly supply chains from the beginning to the end of the production process and reduce manufacturing as well as social costs. Examples of green businesses are spread over all industries: sustainable housing, recycled products, eco-friendly cleaning detergents, non-toxic dyes, solar energy equipment, motion sensor lighting, LED lighting, power-saving electronic devices, etc. Figure 1 illustrates the advantages of green business activity.



Source: The net zero transition, McKinsey and Company, 2022

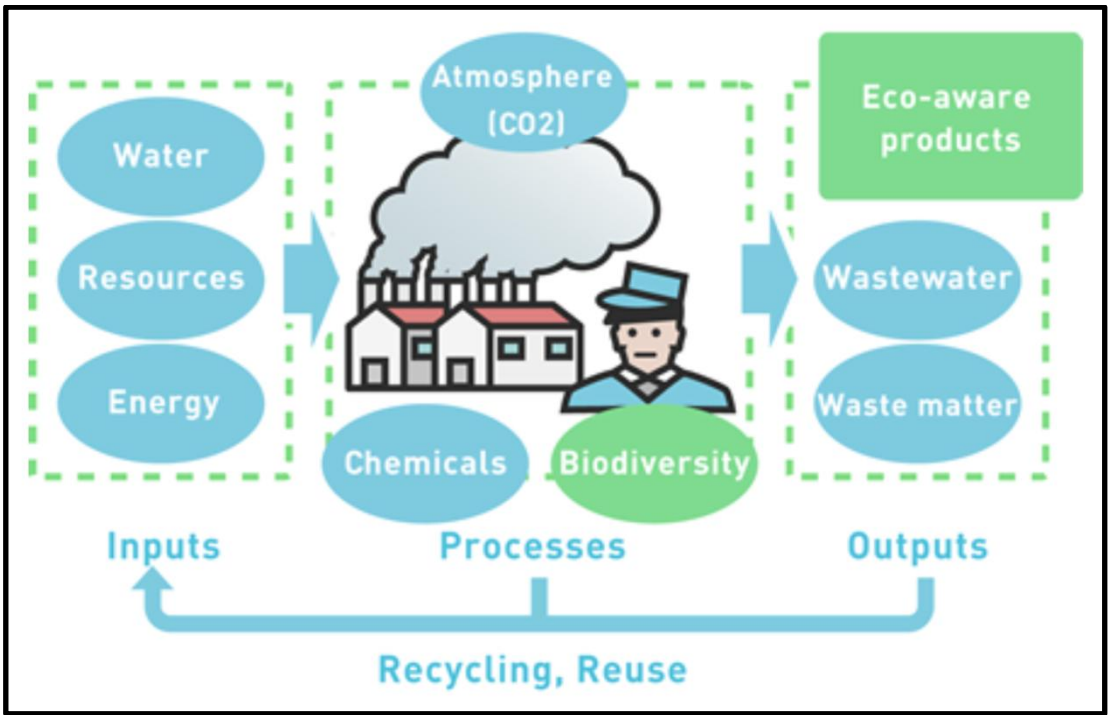


Figure 1: Benefits of Green Businesses
Source: Ministry of the Environment + Business

Even though green businesses seem to be costly in their initial stages, the long-term impacts on human health and the environment have changed both producer and consumer decisions, bending them towards sustainable business

activities. Listed here are a few benefits related to green business strategies.

Environmental benefits: Eco-friendly businesses utilize clean renewable alternative energy resources, preserve natural resources, mitigate pollutants and prevent global warming, hence safeguarding the environment for future generations. It believes in sustainability and the effective usage of resources. Refer to Figure 2 which depicts the rise in the emissions of carbon dioxide and other greenhouse gasses have increased since 1970. Furthermore, Figure 3 portrays the top ten global emitters of carbon dioxide and methane emissions, which account for 62% and 49% respectively of these gas emissions. Hence, initiating green businesses will aid in diminishing the impact of these greenhouse gasses which raise global temperatures and negatively impact human health and the environment.

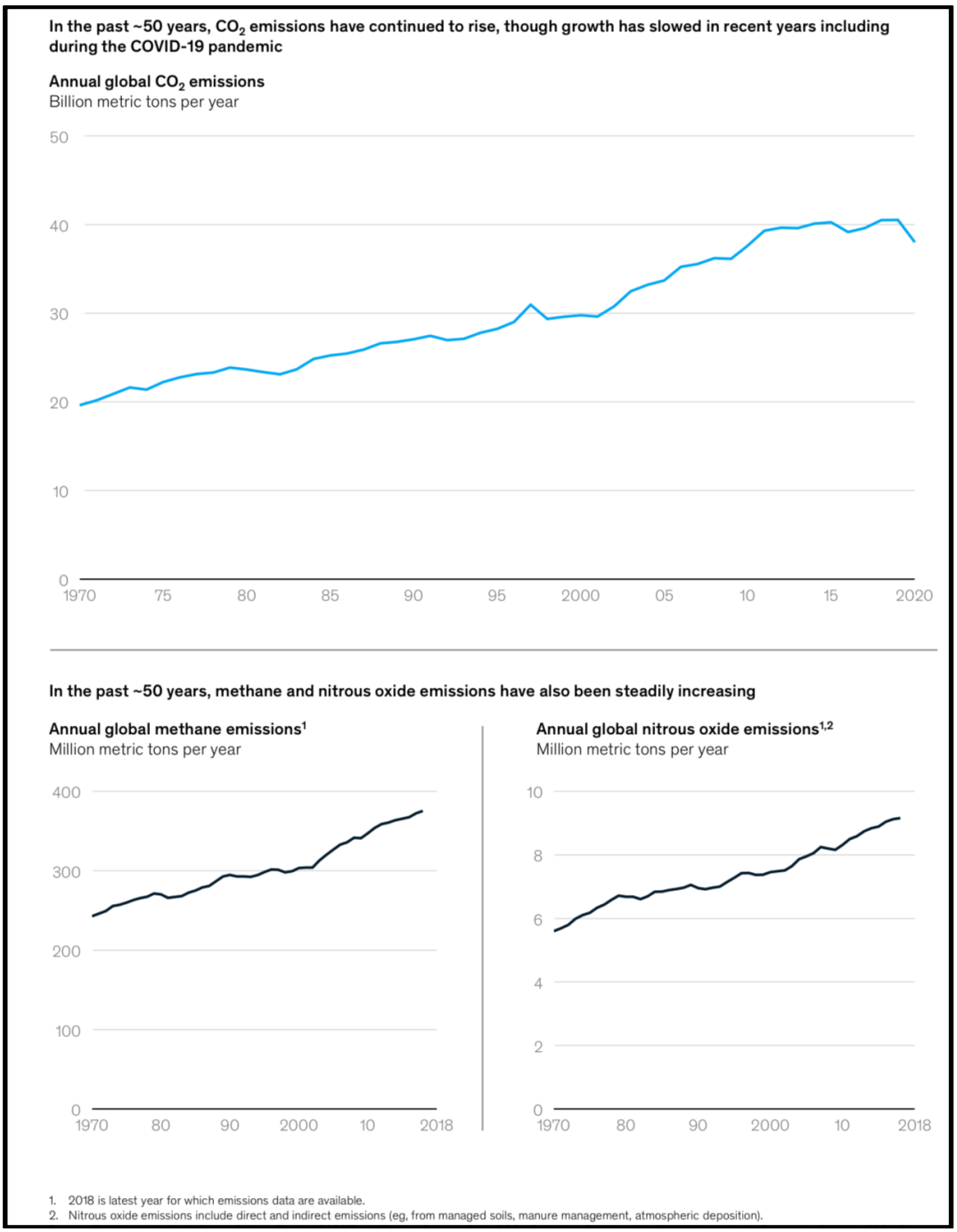
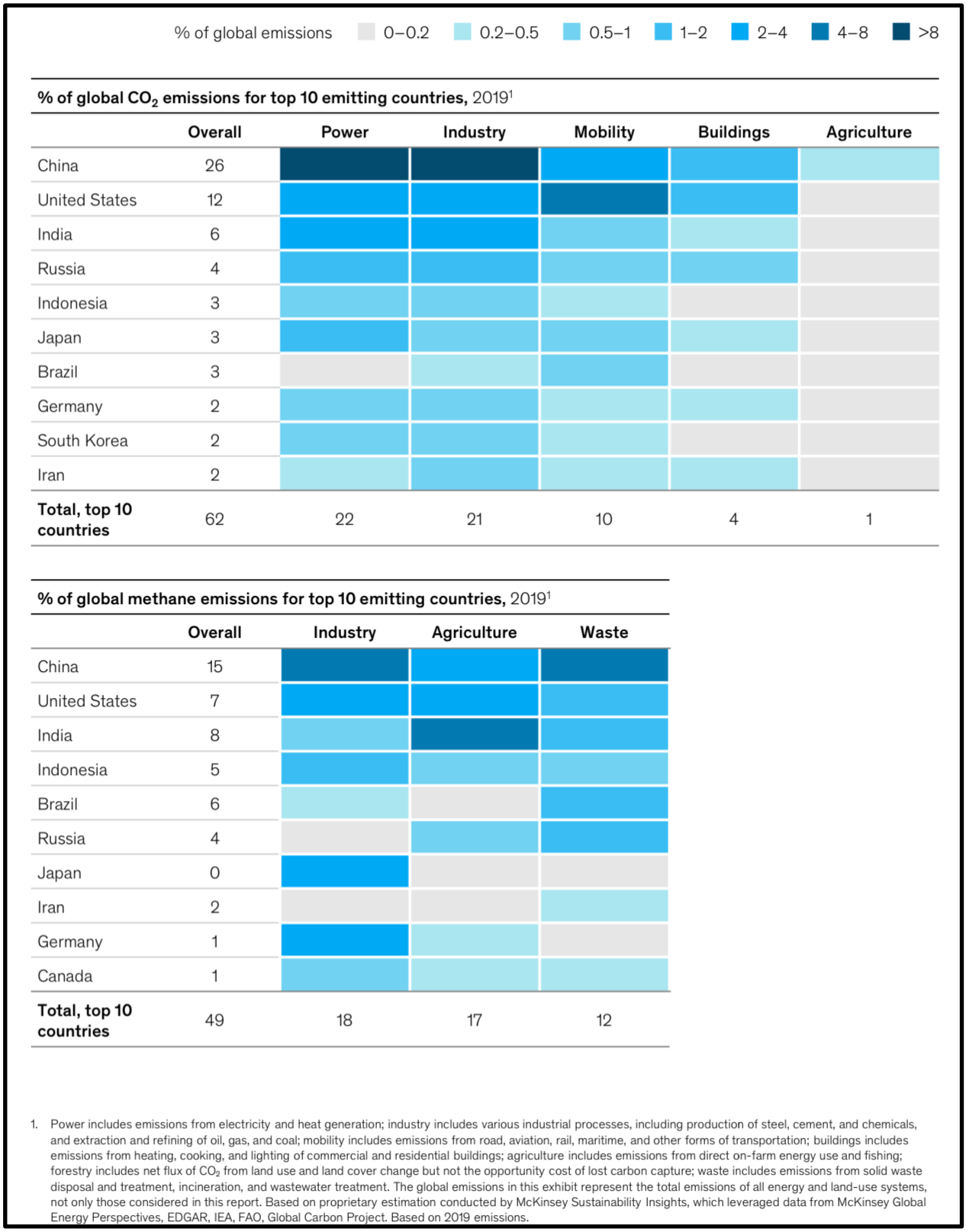


Figure 2: Emissions of carbon dioxide and other greenhouse gasses (methane and nitrous oxide) have increased since the 1970s

Source: Friedlingstein et al.; Global Carbon Budget 2021; Earth System Science Data, 2021; Emissions Database for Global Atmospheric
Research v6.0, May 2021; Crippa et al., 2021; Liu et al., 2020; McKinsey Global Institute analysis



% of global CO_2 emissions for top 10 emitting countries, 2019[1]

	Overall	Power	Industry	Mobility	Buildings	Agriculture
China	26					
United States	12					
India	6					
Russia	4					
Indonesia	3					
Japan	3					
Brazil	3					
Germany	2					
South Korea	2					
Iran	2					
Total, top 10 countries	62	22	21	10	4	1

% of global methane emissions for top 10 emitting countries, 2019[1]

	Overall	Industry	Agriculture	Waste
China	15			
United States	7			
India	8			
Indonesia	5			
Brazil	6			
Russia	4			
Japan	0			
Iran	2			
Germany	1			
Canada	1			
Total, top 10 countries	49	18	17	12

1. Power includes emissions from electricity and heat generation; industry includes various industrial processes, including production of steel, cement, and chemicals, and extraction and refining of oil, gas, and coal; mobility includes emissions from road, aviation, rail, maritime, and other forms of transportation; buildings includes emissions from heating, cooking, and lighting of commercial and residential buildings; agriculture includes emissions from direct on-farm energy use and fishing; forestry includes net flux of CO_2 from land use and land cover change but not the opportunity cost of lost carbon capture; waste includes emissions from solid waste disposal and treatment, incineration, and wastewater treatment. The global emissions in this exhibit represent the total emissions of all energy and land-use systems, not only those considered in this report. Based on proprietary estimation conducted by McKinsey Sustainability Insights, which leveraged data from McKinsey Global Energy Perspectives, EDGAR, IEA, FAO, Global Carbon Project. Based on 2019 emissions.

Figure 3: The top ten emitters account for 62% of global carbon dioxide emissions and 49% of methane emissions
Source: EMIT database by McKinsey Sustainability Insights (September 2021); McKinsey Global Institute analysis

Financial advantages: Energy-conservative technology and mechanisms decrease manufacturing expenses in the long run, hence boosting earnings for producers and decreasing the final price for buyers.

Customer satisfaction: Eco-friendly green characteristics of merchandise attract more buyers towards it, as they deliver significant satisfaction to consumers.

Health advantages: Consumption or final disposalof eco-friendly and biodegradable merchandise doesn't produce negative externalities on human health.

Recycling prospects: Eco-friendly merchandise can be recycled and associations can establish recycling centres within their factories to decrease garbage accumulation.

Also, recycling packaging materials are utilized often to develop a lesser burden on the environment and economy.

Tax benefits and subsidies: To promote green business initiatives taxliabilities are reduced and such businesses receive subsidies and tax credits for producing and marketing eco-friendly products and services.

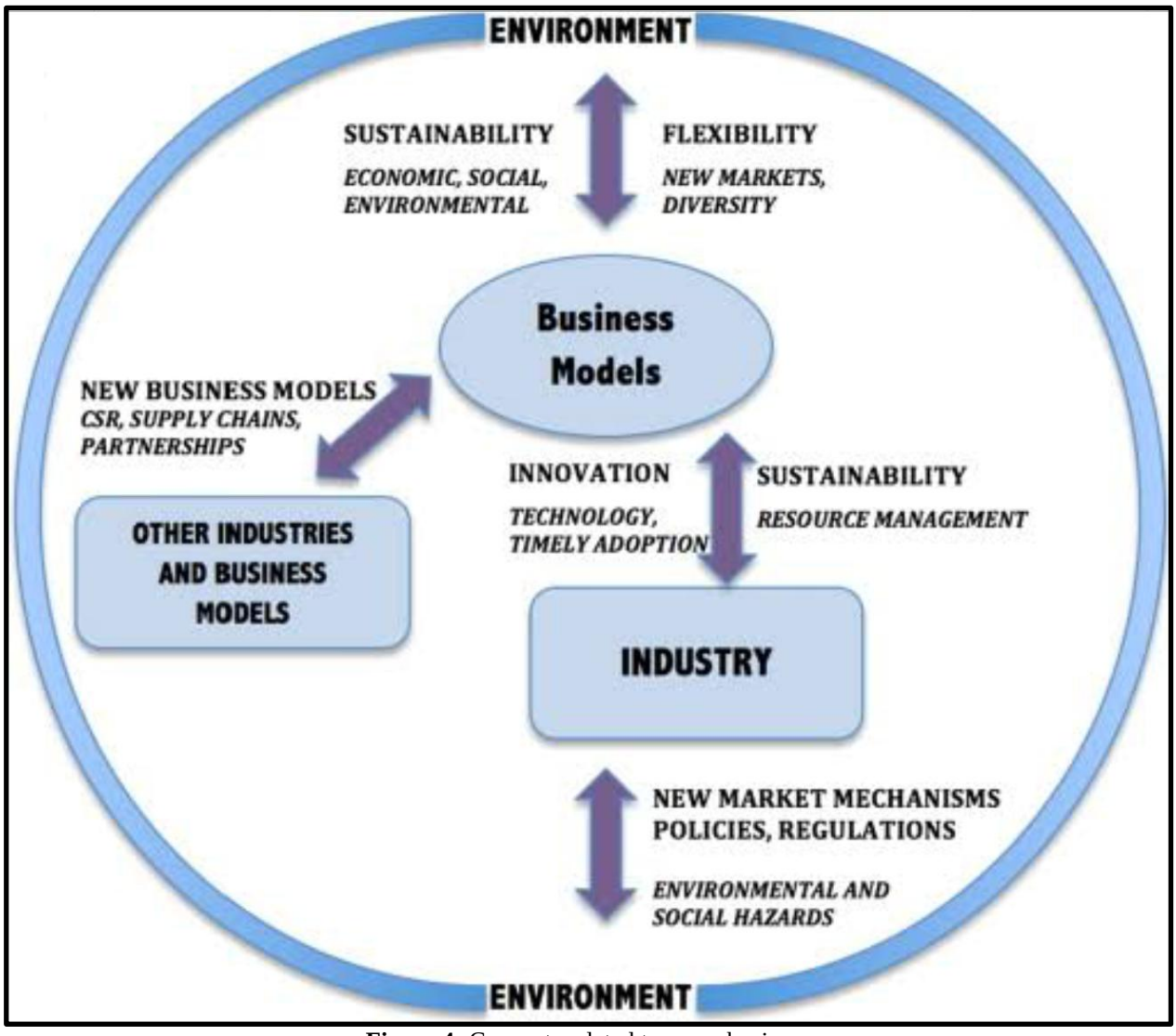


Figure 4: Concepts related to green business
Source: A Complete Guide on Green Marketing, Its Importance & Benefits

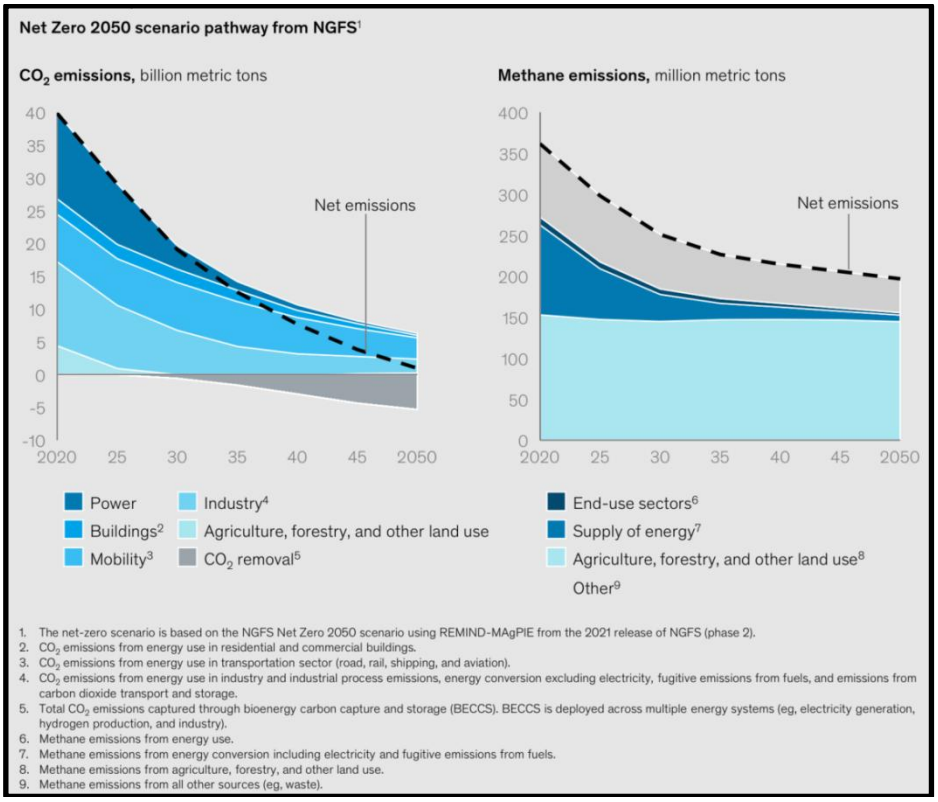
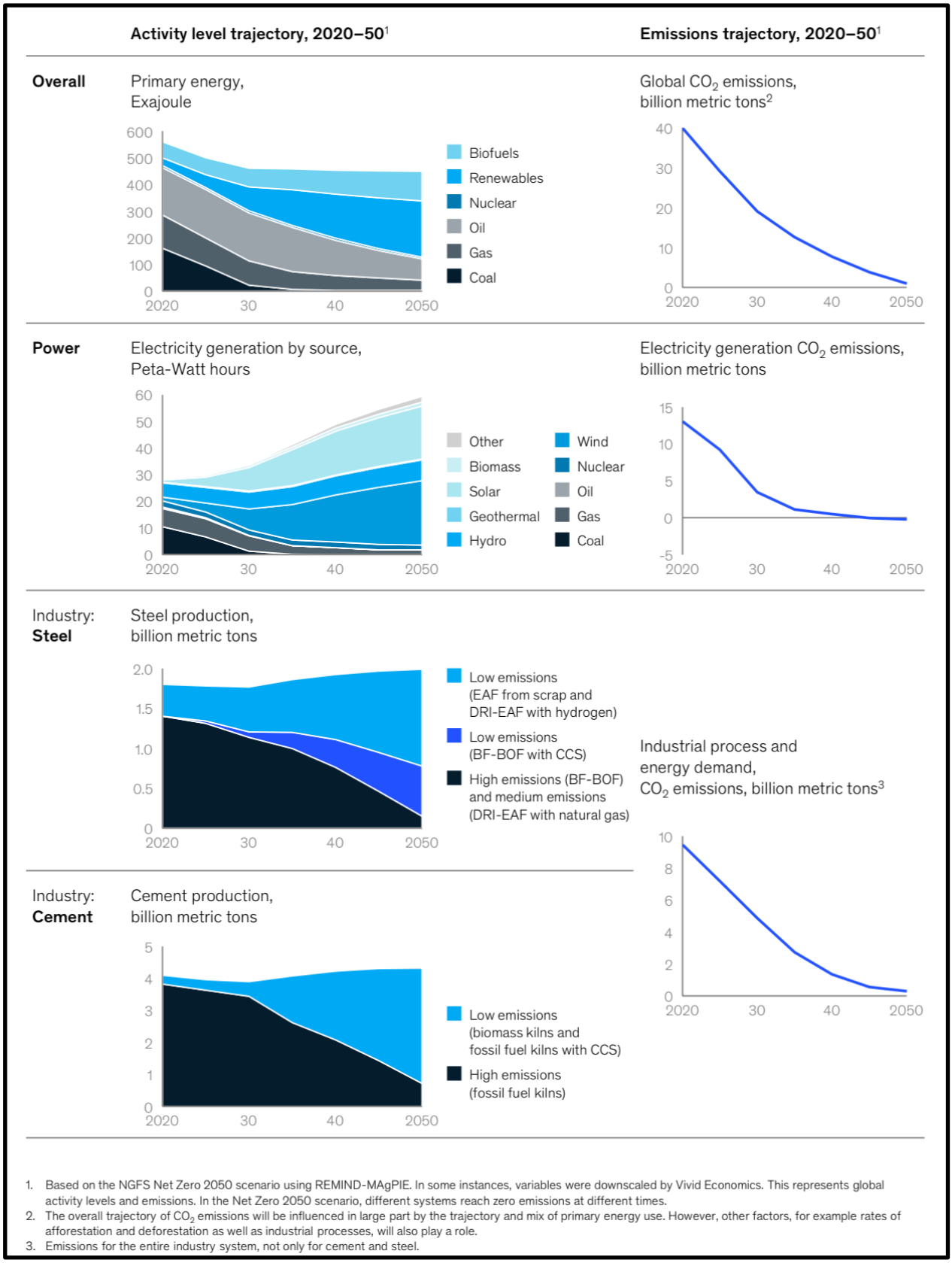


Figure 5: Utilizing green business strategies for multiple industries the international aspirations to reduce harmful carbon dioxide and methane emissions by nearly 50% by 2030 and to net zero by 2050
Source: Network for Greening the Financial System scenario analysis 2021 phase 2 (Net Zero 2050 scenario) REMIND-MAgPIE model; McKinsey Global Institute analysis

Green Business Initiatives
Listed in this section are examples of different green businesses globally and how existing businesses can choose several opportunities to going green. Refer to Figures 6, 7, 8 and 9 for a detailed understanding.

Types of green business ventures followed in India:
1) Green Architecture
2) Organic Food & Drinks
3) Alternative Energy
4) Eco-Fashion
5) Beauty & Personal Care
6) Green Automobiles
7) Waste Management
8) Eco-Tourism
9) Herbal Medicine
10) Organic Agriculture
11) Water Conservation & Treatment
12) Eco-friendly Packaging
13) Green Media
14) Green Gadgets



1. Based on the NGFS Net Zero 2050 scenario using REMIND-MAgPIE. In some instances, variables were downscaled by Vivid Economics. This represents global activity levels and emissions. In the Net Zero 2050 scenario, different systems reach zero emissions at different times.
2. The overall trajectory of CO_2 emissions will be influenced in large part by the trajectory and mix of primary energy use. However, other factors, for example rates of afforestation and deforestation as well as industrial processes, will also play a role.
3. Emissions for the entire industry system, not only for cement and steel.

Figure 6: Global trends to initiate green business activities in various sectors to attain the net zero target by 2050
Source: NGFS Net Zero 2050 scenario using REMIND-MAgPIE (phase 2); Vivid Economics; McKinsey Sustainability Insights; McKinsey Global Institute analysis

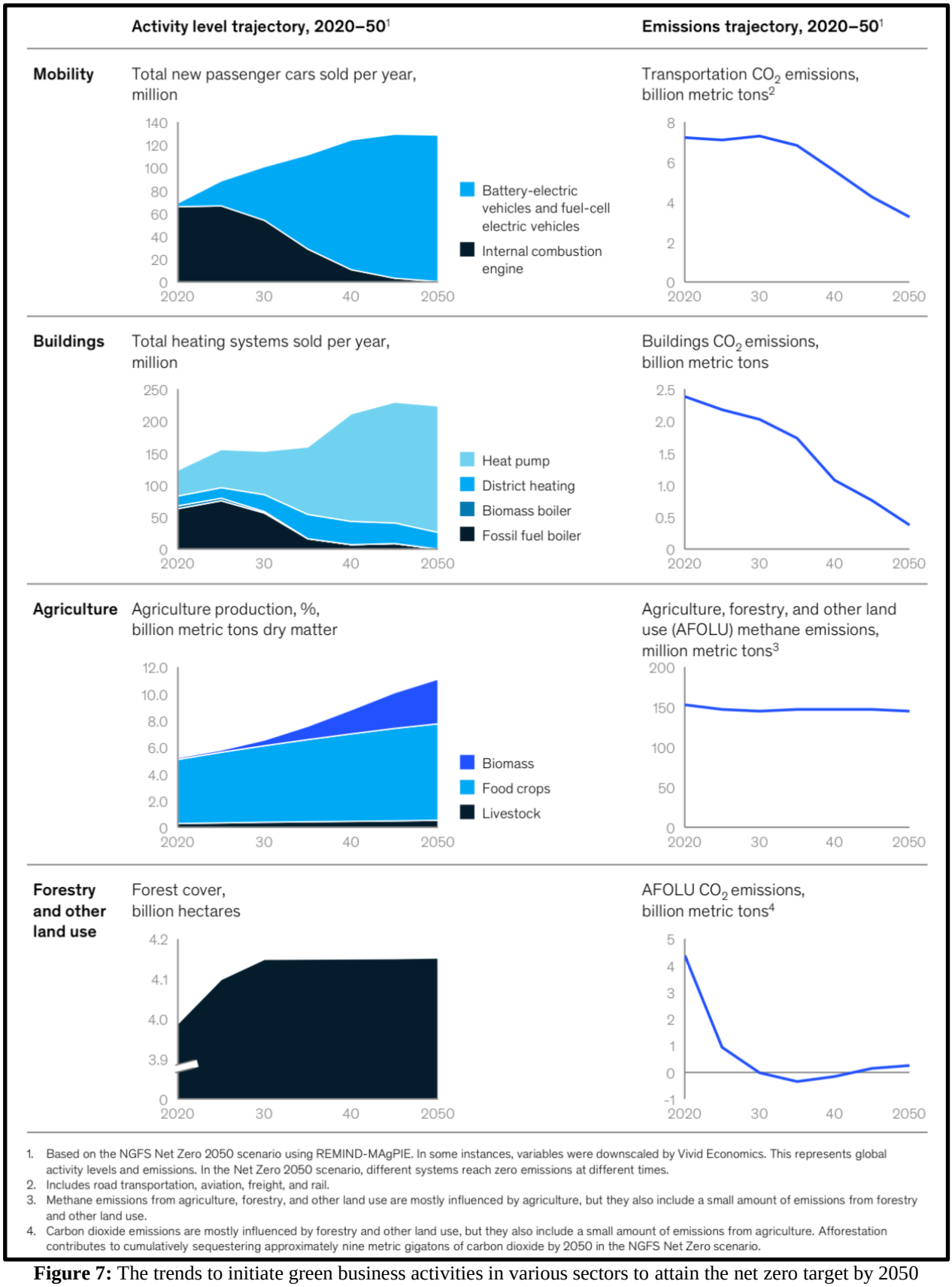


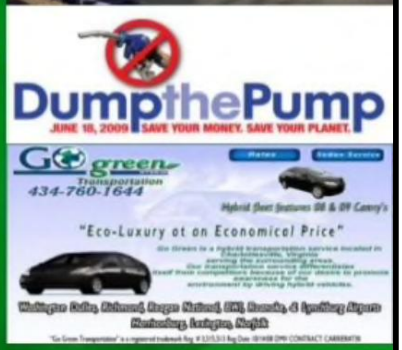
Figure 7: The trends to initiate green business activities in various sectors to attain the net zero target by 2050
Source: NGFS Net Zero 2050 scenario using REMIND-MAgPIE (phase 2); Vivid Economics; McKinsey Sustainability Insights; McKinsey Global Institute analysis

Wipro	Green IT	Reduction of carbon foot prints, environmental measures.
Wipro Infotech	Green Machines	Wipro Green ware desktops and laptops which reduce e-waste.
Tata Motors	Econ Friendly Showroom	Natural building, energy efficient lights.
Taj Hotel	Eco Rooms	Energy efficient mini bars, organic bed linen and napkins made from recycled paper.
Indian Railways	Digital Ticket	E-Tickets on their laptop and mobiles
HCL Info Systems	Green IT	ISO 14001 Standards, Go green participation, RoHS Laptops
LG India	Eco-friendly Products	Eco-chic including platinum coated two door refrigerator and washing machine with steam technology, 40 % less energy consumption, minimum usage of halogen or mercury.
HCL	Eco-friendly Notebook	Poly Vinyl Chloride (PVC) and other harmful chemical free,
Samsung Electronics	Eco-friendly features	LED backlight without mercury or lead, 40% less energy consumption, split ACs saving 60 % energy.
Voltas	Green Product	Air Conditioners with Energy star ratings
Panasonic India	Energy Conservation	Home appliances using sensor and control technologies
MRF Tyres	Eco friendly Product	Tubeless Tyres made from unique silica based rubber compounds for fuel efficiency
ACC Ltd	Conserve Natural Resources	'Concrete plus' manufactured out of fly ash (industrial waste)
Grassroot	Environmental friendly brand	Eco friendly & Organic fabrics
Vivanta by Taj	Earth Friendly	Follows United Nations Earth Summit endorsed by 200 countries Monitored by Green Globe.
Yes Bank	Climatic Change	First Indian signatory to the carbon Disclosure Project by documenting its Carbon Footprint.

Figure 8: List of green initiatives taken by Indian business organizations
Source: Going Green in Business-A Study on the Eco-friendly Initiatives towards Sustainable Development in India

TRANSPORTATION SERVICES:

- Wide spread public transport system
- Heavy investment to avoid use of diesel
- Using recyclable products
- Electric vehicles for rent



EDUCATIONAL INSTITUTIONS:

- Use of electronic media to avoid paper and other stationary
- Make students participate in social welfare activities
- Maintain greenery in the campus
- Discourage the use of personal vehicles
- Use power efficient equipment

MEDICAL SERVICES:

- Donation camps
- Rural areas visits
- Free check-up
- Free medication
- Integration of all services under one roof
- Paper covers instead of plastic

Figure 9: Green business strategies used by different economic sectors
Source: Green Marketing

Concept of Green Marketing

Enriched awareness of environmentally friendly matters has directed an evolution in both producer and consumer behaviour towards a green lifestyle. Green marketing, which strives to safeguard the ecological environment, is a procedure that entails endeavours to create perceptivity among manufacturers, marketers and buyers towards green merchandise and eco-friendly services in business and consumption patterns. It is a diversified advertisement method which demonstrates the adoption of ingenious product manufacturing techniques and transformations, energy-saving technologies and recycled packaging materials and prevents the disposal of hazardous products.

Figure 10: Essentials of Green Marketing
Source: A Complete Guide on Green Marketing, Its Importance & Benefits

Figure 11: The 4 P's Of Green Marketing
Source: Green Marketing

The following factors listed in this section examine the heightened market reliance on green merchandise:

Green consumerism: More and more production of environmentally friendly products has stimulated the Green Business Revolution. Buyers as well as manufacturers are gradually promoting greenness into their lifestyles evaluating considerations on health, product purity and quality.

Corporate Social Responsibilities (CSR): Awareness has evolved to underscore environmental advantages to be clubbed jointly with corporate culture and financial significance has been assigned to environmental deterioration, namely Natural capital cost. Companies have begun discovering end solutions by trading effluents to the environment by recycling waste into valuable inputs for additional production activities.

Eco-friendly regulations: Policies and laws are framed by government administrations to safeguard consumer welfare and to stimulate environmentally friendly matters such as waste management, limit the production and distribution of toxic products, audit the usage of water resources and other natural resources and efforts to diminish air, soil and water pollution.

Formulatingeco-friendly technology: Progressin manufacturing strategies and innovation has directed the extraordinary production of environmental-friendly products. Multiple enterprises have utilized fresher processes to revise production, marketing, distribution, use and aftermath of production and consumption practices.

Competitive enthusiasm: The notion of rising greenism has provided a greater edge to those producers who are following environmental-friendly procedures. For example, McDonald's changed their clamshell packaging to waxed paper, with consumer apprehension about polystyrene production and ozone depletion.

Green marketing has been an effective tool regarding the need for all of us to be more aware of how our lifestyle has impacted our environment. Green consumerism has brought about tremendous changes to sustainable development, as consumers have started preferring green products despite higher prices. Also, government regulations to protect natural resources have helped to grow eco-friendly business practices. Producer social responsibilities have played a positive role in designing green products as well as dealing with the aftermath of harmful emissions of manufacturing processes and disposal of products.

Despite industries, governments, civil societies and consumers responding to handling disequilibrium between economic profit and environmental benefit, there is an immediate need for the calculation of environmental liabilities and natural capital costs related to economic activities. Every business should conduct a SWOT analysis to review the impact of business on the environment.

Drowning In Plastic Pollution: Single-Use Plastic Packaging

Green business strategies aim to diminish the use of plastic utilisation in its activities. Since 1964, plastic production has risen approximately 20 times till 2014, reaching 311 million tonnes in 2014. Refer to Figure 12. Plastic production is anticipated to reach twice as much again in 20 years and almost quadruple by 2050. Plastic production and consumption have set off all alarms.

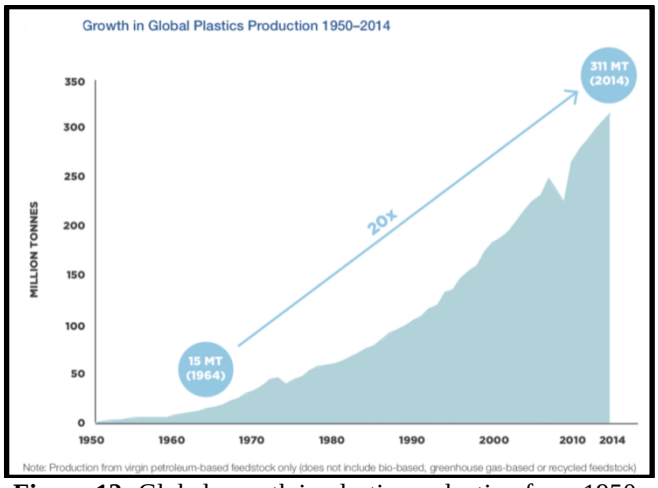


Figure 12: Global growth in plastic production from 1950-2014
Source: PlasticsEurope, Plastics – the Facts 2013 (2013); PlasticsEurope, Plastics – the Facts 2015 (2015)

According to the "Plastic and Climate" report published in 2019, the production and incineration of plastic would contribute to the production of 850 million tonnes of carbon dioxide and by 2050 this could be increased to 56 billion tonnes, which would be 15% of the earth's carbon budget. The emission of greenhouse gasses by this process leads to global warming. Refer to Figure 13 and 14 which discusses the negative externalities related to single-use plastic and anticipated plastic production

Figure 13: Negative externalities related to single-use plastic from 2014-50
Source: lessplastic.org.uk

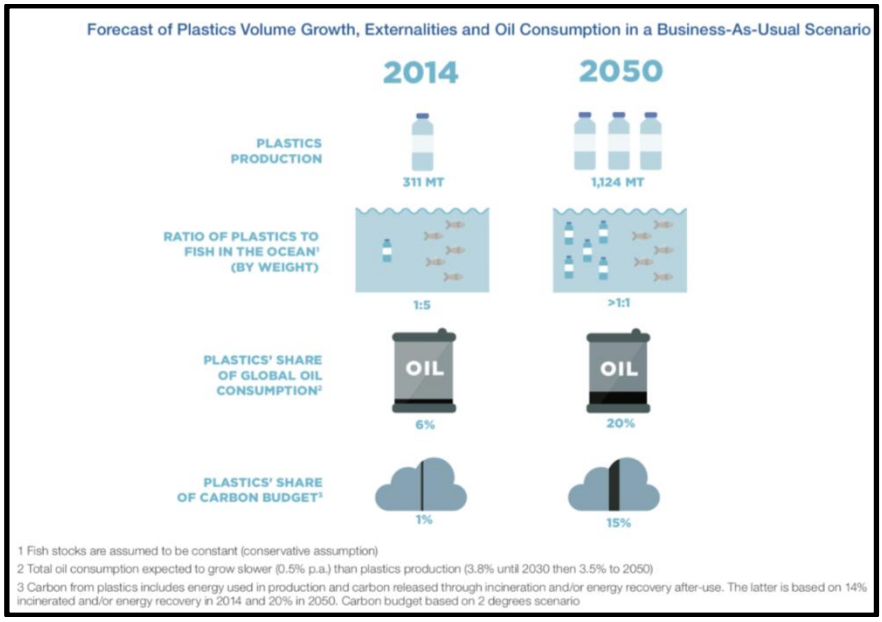


Figure 13: Plastic production and waste-related externalities
Source: WEF_The_New_Plastics_Economy

Plastic packaging is the largest application of the plastic industry. The packaging industry is also a dominant plastic waste generator, as plastic packaging has a very short life span. In comparison, other industries use plastic over a longer period. For example, the life of plastic is approximately about 6 months in the packaging industry while in the building and construction sector plastic use is averaged at 35 years. Refer to Figure 14 for a deeper understanding of the content.

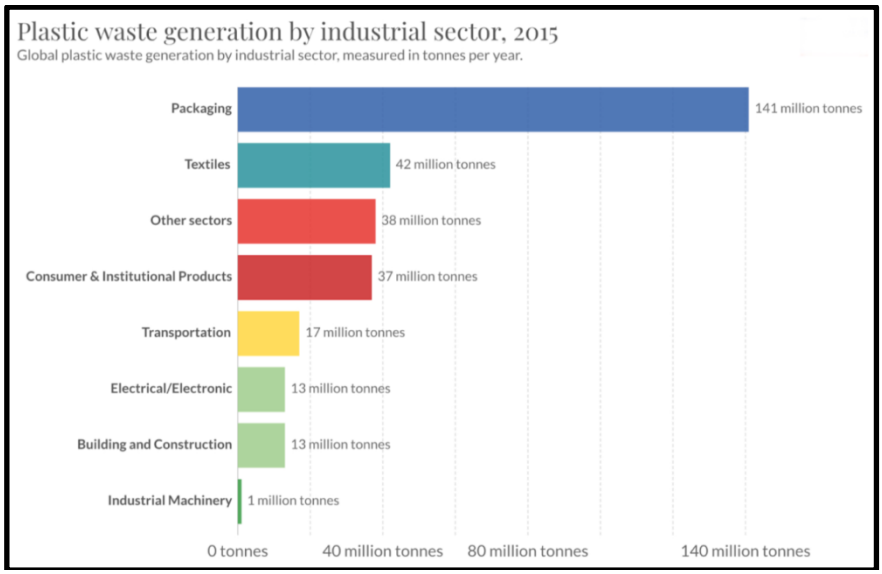


Figure 14: Generation of plastic waste by different industries in 2015
Source: Geyer et al.(2017)

The New Plastic Economy World Economic Forum report in 2016 listed some apparent drawbacks of plastic packaging utilisation and the subsequent waste disposal studied. In 2015 it was estimated that 95% of plastic packaging material has a short first-use cycle only and there is an economic loss of about $80-120 billion. Only 14% of the plastic packaging material is collected for recycling. Also, plastics that are recycled are mostly transformed into lower-value applications that cannot be again recycled after use.

It is estimated that in 2013 only 14% of the plastic packaging material is recycled and 14% is sent for incineration or energy recovery process and 72% of the plastic packaging material isn't recovered as 40% is landfilled and 32% leaks out of the collection system. Also, pollutants are generated during the energy recovery process, which can have negative impacts on health. Refer to Figures 15 and 16 for further details.

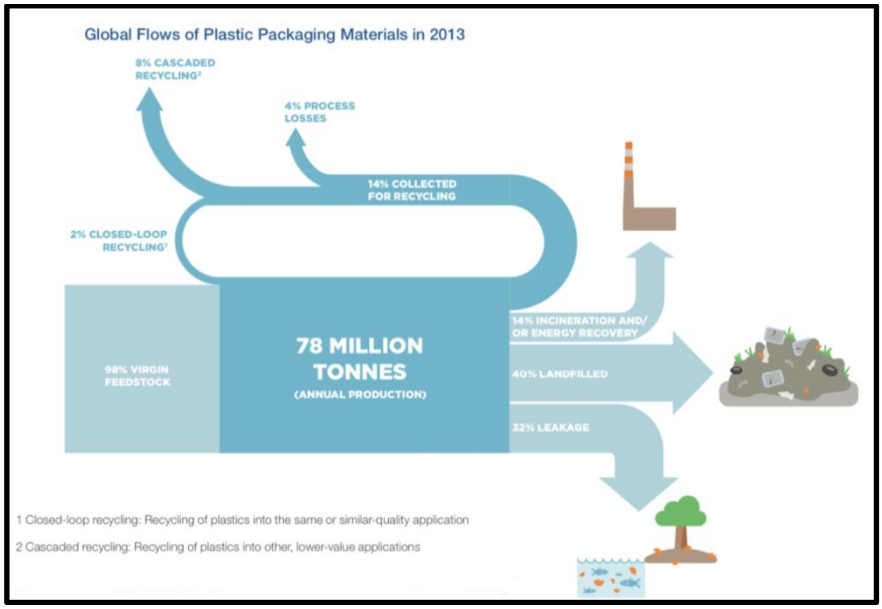


Figure 15: Estimates of worldwide plastic packaging material disposal
Source: Project Mainstream Analysis

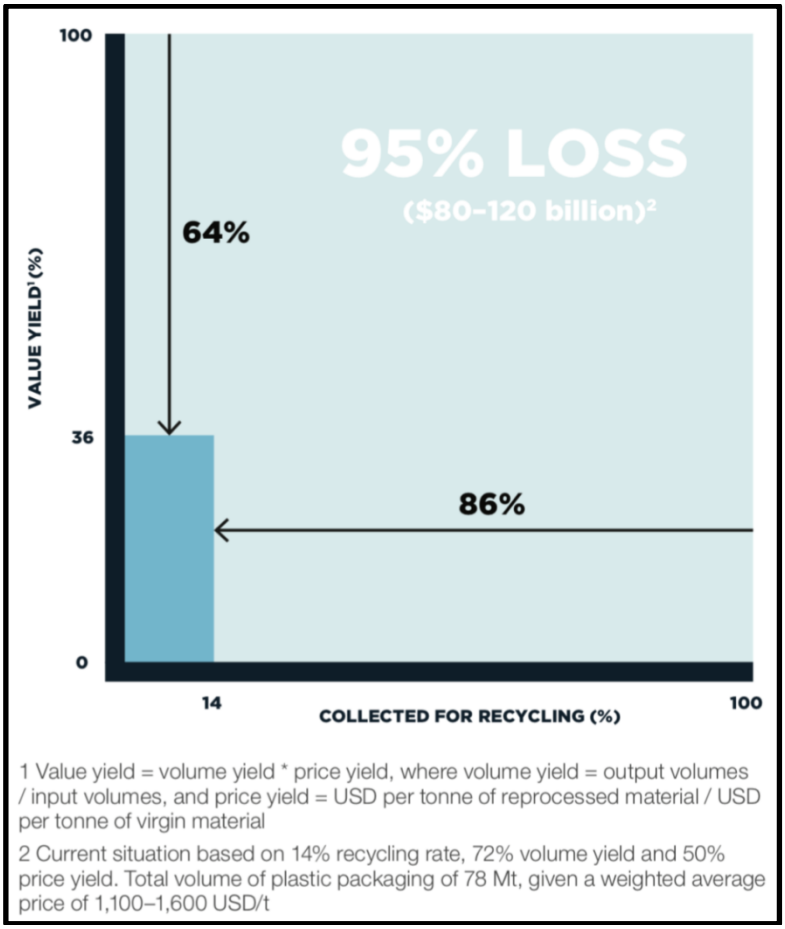


Figure 16: Plastic packaging material value loss after single-use cycle
Source: Expert interviews; Plastic News; Deloitte, Increased EU Plastics Recycling, Environmental, Economic and Social Impact Assessment – Final Report (2015); The Plastics Exchange; plasticker; EUWID; Eurostat

The cost associated with the production of greenhouse gasses while manufacturing plastic and the cost of after-use externalities for plastics is estimated at $75 billion/year, which exceeds the plastic packaging industry's profit pool.

Worldwide records state that there are low plastic recycling rates due to the complexity of sorting and processing, unfavourable economics and also consumers are confused about which plastics are recyclable. Plastics have a low recycling recovery rate due to their low melting points which prevents other materials from being driven away

during reprocessing. Also, the recycling of plastic polymers is challenging as they have low density and low value. Due to the limitations of the economic viability of recycling plastic, recyclers have struggled to make a meaningful contribution to plastic supply chains.

According to the report - "Plastic Pollution - Our World in Data" - before 1980 recycling and incineration of plastic waste was negligible and 100% of the plastic waste was discarded and treated as single-use plastic. However, in the 1980s incineration of plastic waste was introduced and in 1990 plastic waste recycling was started.

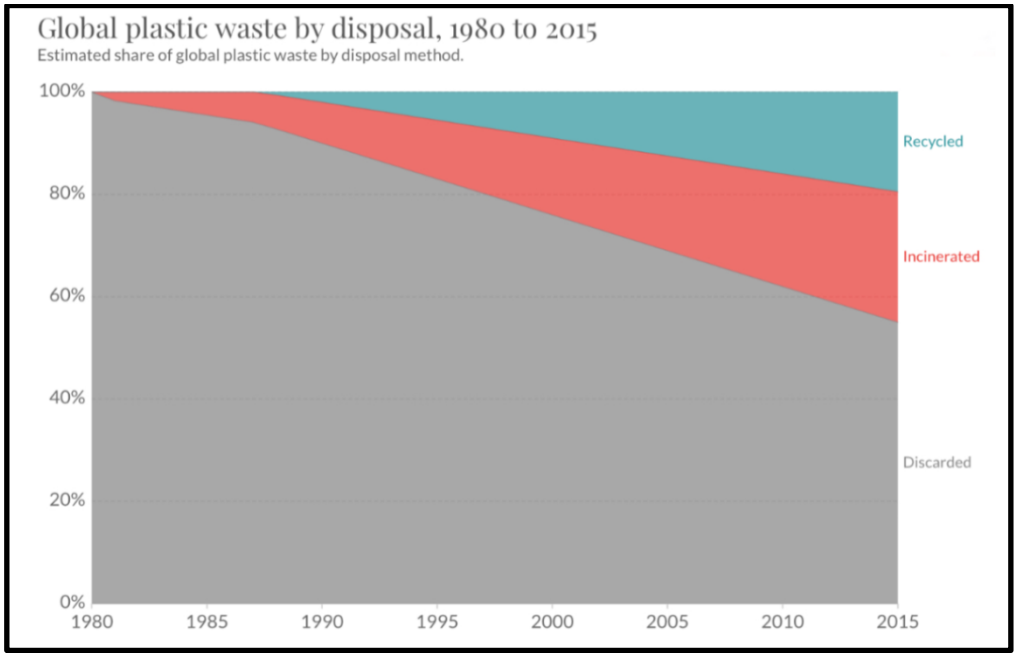


Figure 17: Global plastic waste disposal trends
Source: Geyer et al.(2017)

Sustainability Views On Reusable Packaging

The packaging industry is a primary user of virgin materials. According to Plastics Europe 2018 reports, in Europe 40% of plastics and 50% of paper is used for packaging and 36% of municipal solid waste comprises plastic. This is due to developments in retail trade and the consequences of supply chains increasingly using single-use packaging. Also, Ellen MacArthur Foundation, 2019 estimated that 20% of plastic packaging could be replaced by reusable systems. The table attached in the report in Figure 18 discusses diverse types of sustainable packaging options, associated with green business strategies.

Type of packaging	Packaging description	Product examples
Refillable by Bulk Dispenser	Customers use their packaging or brand's refillable packaging in-store or at a mobile truck, making the use of further packaging unnecessary.	Cereals, grains, candy, wine, juice, mineral water, beer, olive oil, vinegar, detergent, soap, hair care products, perfume, body and face lotion
Refillable Parent Packaging	**Bottle, container, pouch, pod, tablet, powder**The refill packaging is made with less material than parent packaging. Parent packaging can be refilled by: - pouring product inside parent packaging; - placing container inside of parent packaging; - diluting concentrated product in water inside parent packaging.	Makeup, dental floss, tooth and mouth wash tabs, deodorant, perfume, cosmetics, cleaning products, hair care products, flavoured water
Returnable Packaging	**Container, bottle, cup, plate, bowl,...** Customers return empty packaging which will be cleaned and refilled for future use by the retailer/producer (can be combined with a deposit system to provide a financial incentive).	Beer, soft drinks, mineral water, perishables, detergent, soap, cosmetics, hair care products. Reusable cups, containers, plates. (for events, cafes, restaurants)
Transit Packaging	**Boxes, containers, soft packages** Customers receive the product in reusable packaging which is returned by door delivery/pick up, or through the post office. **Crates, pallets, wrappers** Customer reuses packaging multiple times before being returned to the producer or disposed of.	Reusable packaging for transport or shipping of perishables or non-perishables. B2C: for moving home or office location or e-commerce delivery of apparel, furniture or perishables. B2B transport from producer-warehouse-

Figure 18: Sustainable packaging solutions
Source: Sustainability of reusable packaging–Current situation and trends | Elsevier Enhanced Reader

Scientific Strategies For Management Of Hazardous Industrial Waste

Rapid industrial growth and commercialization have led to the generation of immense quantities of hazardous waste. There is a lack of awareness on the negative externalities related to the improper disposal of hazardous waste among the masses and the non-availability of an organized system for waste collection and disposal has caused environmental and human health degradation. Hence, the improper disposal and unscientific treatment of hazardous industrial waste has become a social liability. This toxic waste needs effective recycling or reprocessing and scientific disposal techniques. Listed here are a few hazardous wastes related to several industries.

Hazardous waste	Source	Health effects
Heavy metals		
Arsenic	Mining, non anthropogenic geo-chemical formation	Carcinogenic, cardiac disorders, anemia,
Cadmium	Mining, fertilizer industry, battery waste	Carcinogenic, damage to livers and kidneys, chronic obstructive pulmonary diseases, cardiovascular and skeletal disorders.
Chromium	Mining areas, Tanneries	Kidney damage, skin disease, acute tubular damage.
Lead	Lead acid battery smelters	Lead poisoning, neurotoxic, mental impairment in children, damage to brain, kidney and liver
Manganese	Mining areas	Respiratory disease, neuropsychiatric disorder
Mercury	Chlor-alkali industries, health care institutes	Hg poisoning affects human brain, central nervous system, kidneys and liver. High Hg exposure causes vision, speech and hearing impairment. May lead to death
Nickel	Mining, metal refining	Lung and nasal cancer, damage to gastrointestinal system, cerebral edema, respiratory failure
Hydrocarbons		
Benzene	Petrochemical industries, solvents	Headaches, nausea, leukemia, damage to bone marrow
Vinyl chloride	Plastics	Carcinogenic (liver and lung cancer), depression of central nervous system, embryotoxic
Pesticides	Insecticides	Cancers, genetic damage, stillbirths, immune system disturbances, embryo damage
Organic chemicals		
Dioxins	Waste incineration, herbicides	Cancer, birth defects, skin disease
PCBs	Fluorescent lights, E-waste, Hydraulic fluid	Skin damage, possibly carcinogenic, gastro-intestinal damage

Figure 19: Hazardous wastes associated with multiple industries
Source: Environmental management of industrial hazardous wastes in India, Indian Journal of Environmental Health 48(2):143-50, Dutta et al.(2006)

Some of the likely negative externalities linked to non-scientific disposal of hazardous waste:

1) Fire hazards at landfills
2) Emissions of air pollutants, dust and unpleasant odours
3) Ground and surface water contamination and soil pollution, also a reduction in soil fertility due to chemical solvents, dyes, detergents, oil spills, pesticides, and paint residues
4) Production of leachate and toxic compounds at landfills
5) Negative impact on human health causing - cancer, asthma, mutation-related disorders, skin allergies, radioactive impacts on human health

Green business strategies initiate the following steps to support the safe disposal of hazardous industrial waste -

Recycling hazardous waste: Processing of hazardous waste can be done to extract valuable resource inputs. Examples of such waste are - used oil from industrial sectors or engine oil, battery waste, solvents, asbestos, fluorescent tubes, pesticides, and non-ferrous compounds like zinc and lead. Recycling e-waste is the need of the hour as it reduces the energy required to make new electronics, which are in high demand. Reusing and recycling raw materials from obsolete e-products helps in conserving natural resources, mitigating pollutants and preventing global warming.

Use of hazardous waste as a fuel: The cement industry, in particular, plays a vital role in using hazardous waste as energy inputs, which otherwise would be channelized to landfills, thus reducing the load on scarce fuel-generating resources and also preventing carbon footprints and emission of greenhouse gases. The cement manufacturing process is high energy-intensive and uses industrial waste in the form of fuel to cut down production costs.

Industrial waste in the form of liquids - wash solvents, metal cleaners, machine lubricants, coolants, used oil or sludge, asphalt slurry; solid waste - battery cases, paper packaging, wood and rubber residue, sawdust, plastics; gaseous waste fuels - landfill gas, coke oven gases, refinery gases; can be used as alternative fuels by the cement industry.

However, care needs to be taken while processing waste in the kilns so that there is a complete breakdown of the waste, otherwise, it can lead to emissions of harmful pollutants. Apart from the cement industry, these alternative fuels derived from hazardous waste can be used by thermal power and steel industries. Also in the aluminium industry, the waste generated called spent pot-lining can be used as an alternative fuel instead of coal in iron-melting blast furnaces. Scrap tyres can help generate pyro lytic gas for further use in other industries. Refer to Figure 20 which provides information on alternative fuels.

Waste type	Calorific values (kcal/kg)
Refuse-derived fuel from municipal solid waste	2800–3800
Used tires	6700–7700
Hazardous waste	4000–9500
Industrial plastic waste	4070–6620
Biomass	2500–3800
Slaughterhouse waste	700–1400
Poultry litter	2700–3800
Dried sewage sludge	1700–1900

Note: the corresponding calorific value of coal is 2700–5200 kcal per kg.

Figure 20: Alternative fuels and their calorific values
Source: Resource recovery as an alternative fuel and raw material from hazardous waste Chakradhar et al. (2019)

Destruction of toxic compounds through incineration: Incineration of toxic waste at high temperatures, say about 1200 degrees Celsius approximately breaks down all organic matter - cardboard, paper packaging etc. However, if the waste isn't incinerated at high temperatures, this process releases air pollutants like dioxins and furans. Incineration at high temperatures serves a dual purpose of reduction of both toxicity and the volume of waste at landfills. Also, gases released through incineration can be used as energy resources for turbines to generate power.

Challenges Green Business Initiatives Encounter
Particularly in developing nations, industries are confronting multiple obstacles to commencing and sustaining green enterprises. A few of these challenges are listed in this section:

Financial Obstacles: Taking up green business strategies from production to the sales process requires high capital costs initially, as it requires new energy-saving techniques, special equipment to mitigate pollutants, requires renewable and recycled material and research and development, which subsequently increase costs.

Expenditure on physical assets for energy and land-use systems to attain the net zero targets by 2050 would increase to about US$9.2 trillion yearly or approximately US$3.5 trillion more than the current expenditure. Refer to Figure 21 for further information. However, businesses using eco-friendly strategies in the long term will have reduced costs. For example, installing solar panels to generate solar energy would prove to be costly in the initial years, but over time it reduces electricity bills.

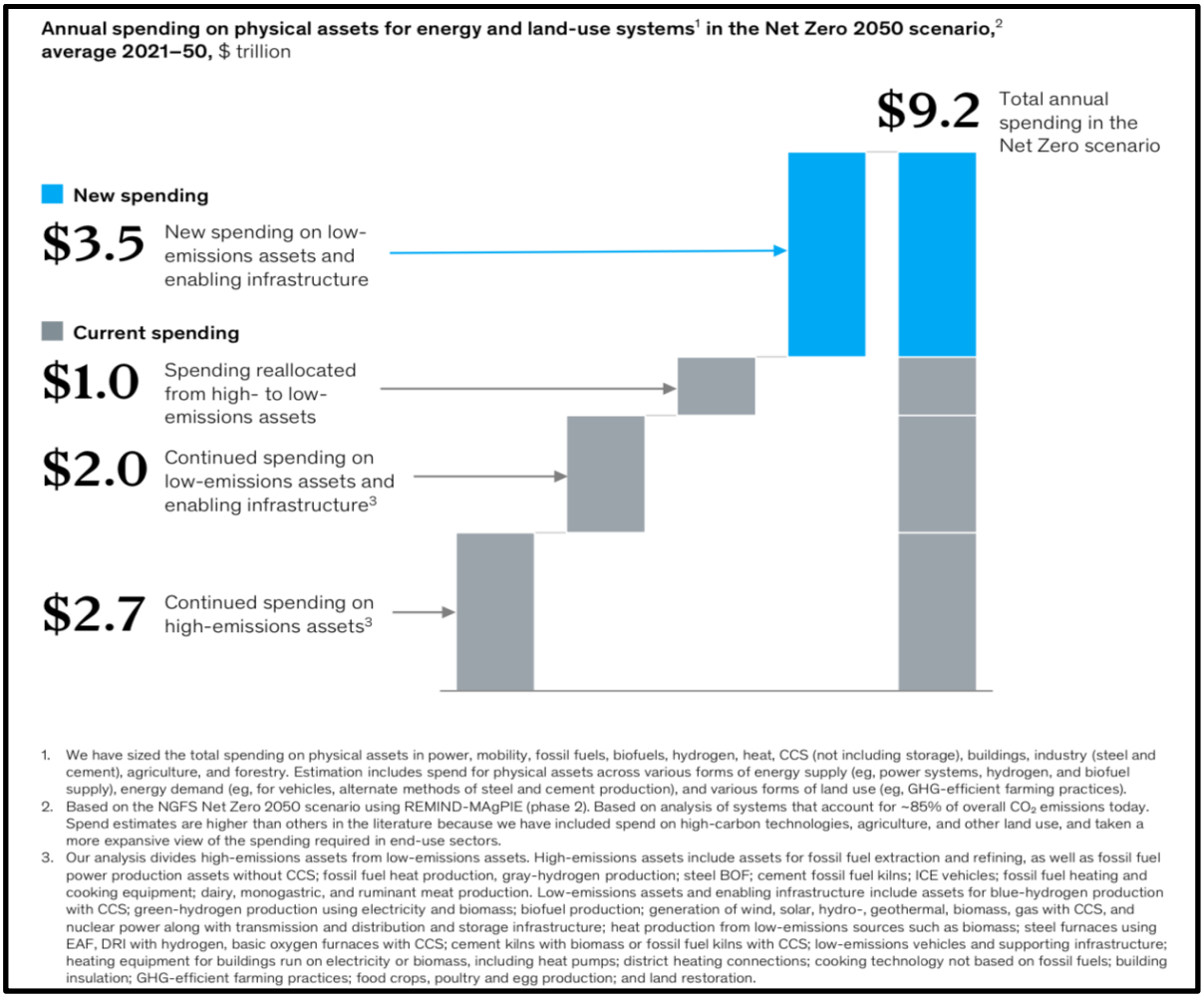


Figure 21: Anticipated expense on physical assets for energy and land-use systems to attain the net zero targets by 2050
Source: McKinsey Center for Future Mobility Electrification Model (2020); McKinsey Hydrogen Insights; McKinsey Power Solutions; McKinsey–Mission Possible
Partnership collaboration; McKinsey Sustainability Insights; McKinsey Agriculture Practice; McKinsey Nature Analytics; McKinsey Global Institute analysis

As per the Central Banks and Supervisors Network for Greening the Financial System (NGFS), launched at the Paris "One Planet Summit" in December 2017, attaining the net zero 2050 target would require about US$275 trillion in cumulative investments over 30 years and roughly US$250 trillion more estimated as compared to the current policies. Figure 22 provides the global industry breakdown values.

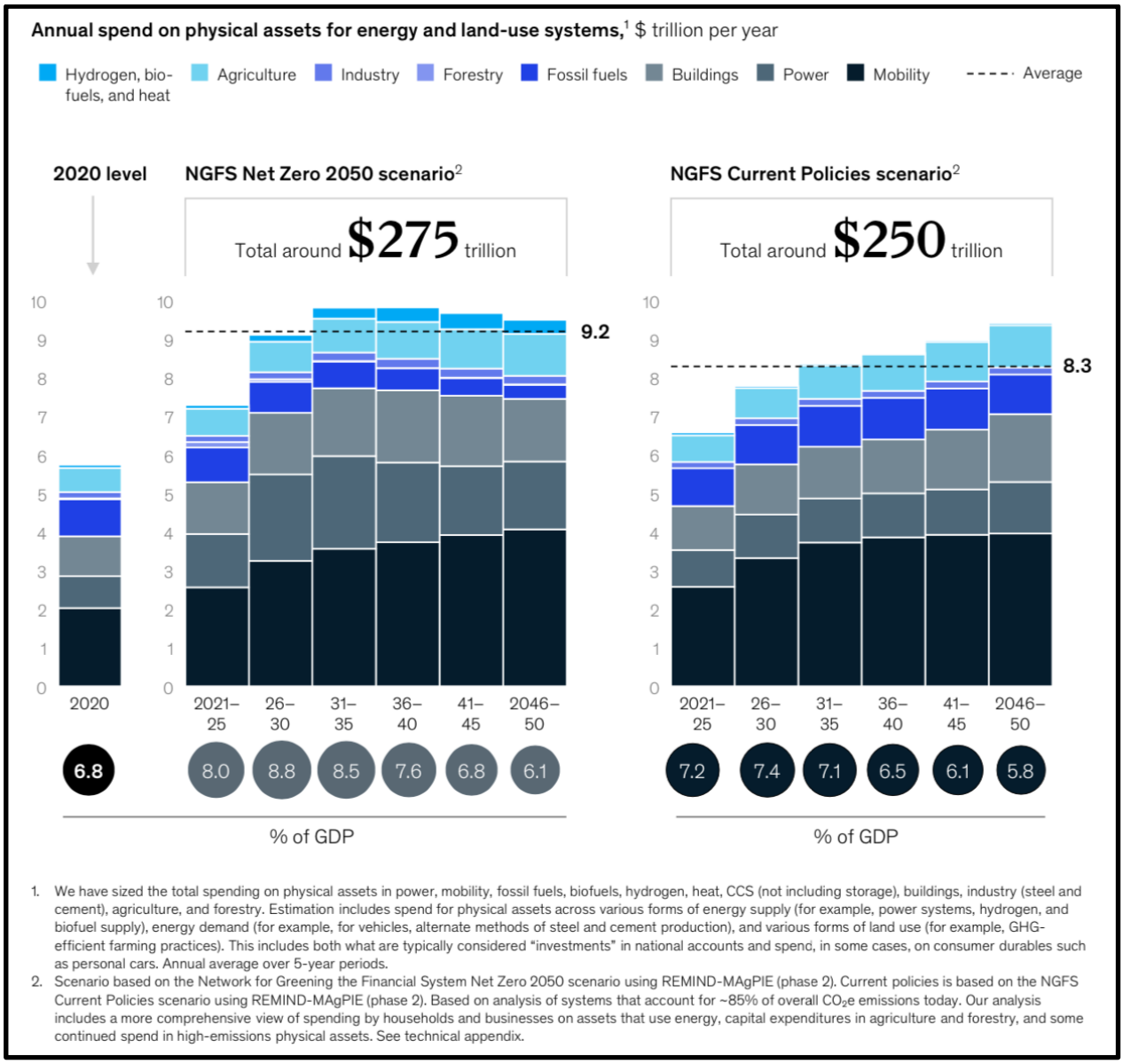


Figure 22: Yearly expenditure on physical assets and land use systems
Source: Network for Greening the Financial System 2021 (Net Zero 2050 scenarios) REMIND-MAgPIE model; Vivid Economics; McKinsey Center for Future Mobility Electrification
Model (2020); McKinsey Hydrogen Insights; McKinsey Power Solutions; McKinsey–Mission Possible Partnership collaboration; McKinsey Sustainability Insights;
McKinsey Agriculture Practice; McKinsey Nature Analytics; McKinsey Global Institute analysis

Figures 23 and 24 depict the carbon dioxide and other greenhouse gas emissions by utilizing different fuels and energy and land use systems for several industries. Furthermore, energy consumption is responsible for 83% of the carbon dioxide ejected from energy and land-use systems worldwide. Power and industry are the primary energy consumers and jointly they produce around 60% of carbon dioxide emissions globally.

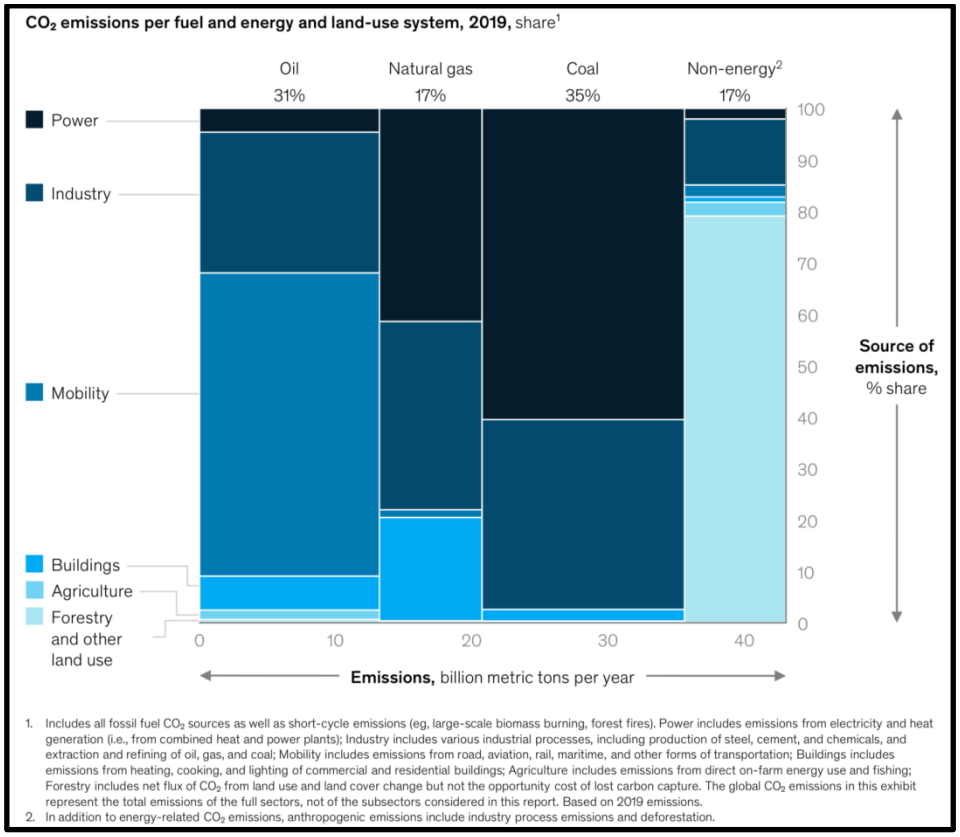


Figure 23: Carbon dioxide emissions from utilizing different fuels and energy and land use systems in 2019
Source: EMIT database by McKinsey Sustainability Insights (September 2021, data for 2019); International Energy Agency; McKinsey Global Energy Perspectives; McKinsey Global Institute analysis

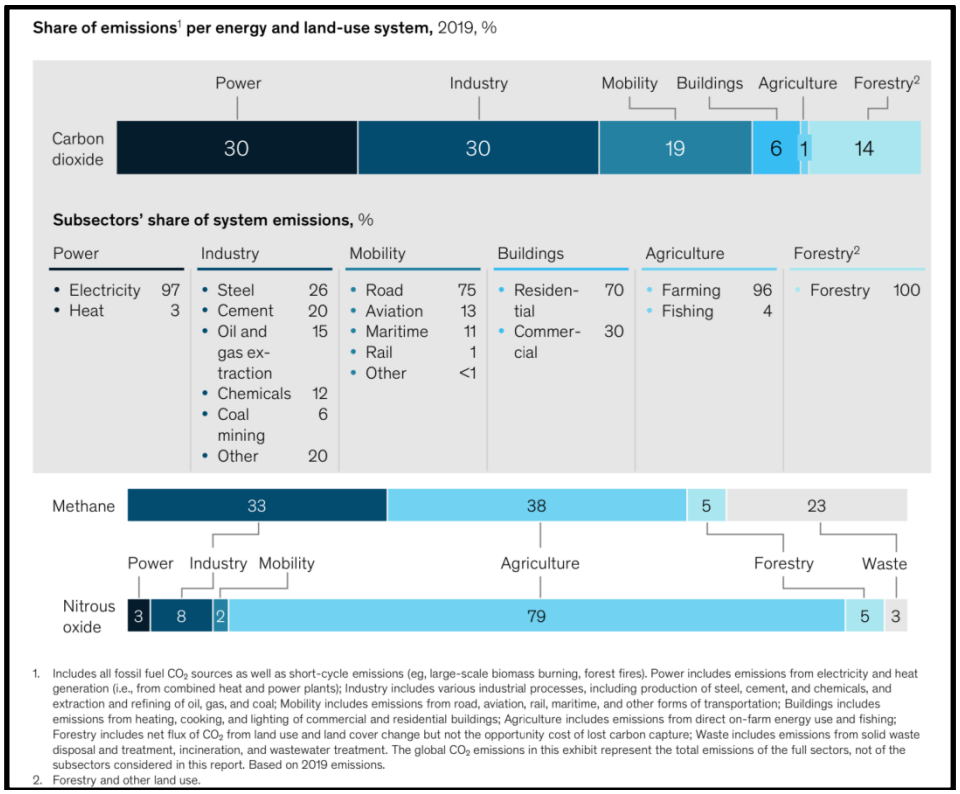


Figure 24: Percentage share of carbon dioxide, methane and nitrous oxide emissions per energy and land-use systems in 2019 for various industries
Source: EMIT database by McKinsey Sustainability Insights (September 2021, data for 2019); McKinsey Global Institute analysis

Persuasive decarbonisation efforts comprise moving the energy sources mix away from fossil fuels and towards zero-emissions electricity and alternative low-emissions energy carriers like hydrogen. These clean renewable energy fuels need to acclimate to industrial and agricultural techniques, boosting energy efficiency and fulfilling the energy demand, operating within a circular economy; utilizing lesser emissions-intensive products, deploying carbon capture, utilization, and reducing ejections of greenhouse gases. Afforestation is extremely significant for reducing greenhouse gases.

Figure 25 depicts the delivered cost of electricity to attain net zero in 2050. The transnational average expenditure on electricity to attain the net zero 2050 target is likely to increase in the short term and then decline back from its peak value. Figure 26 depicts the total global shift in jobs in various industries to attain net zero in 2050. As per the NGFS Net Zero 2050 strategy, approximately 200 million direct and indirect jobs could be earned and 185 million forfeited by 2050.

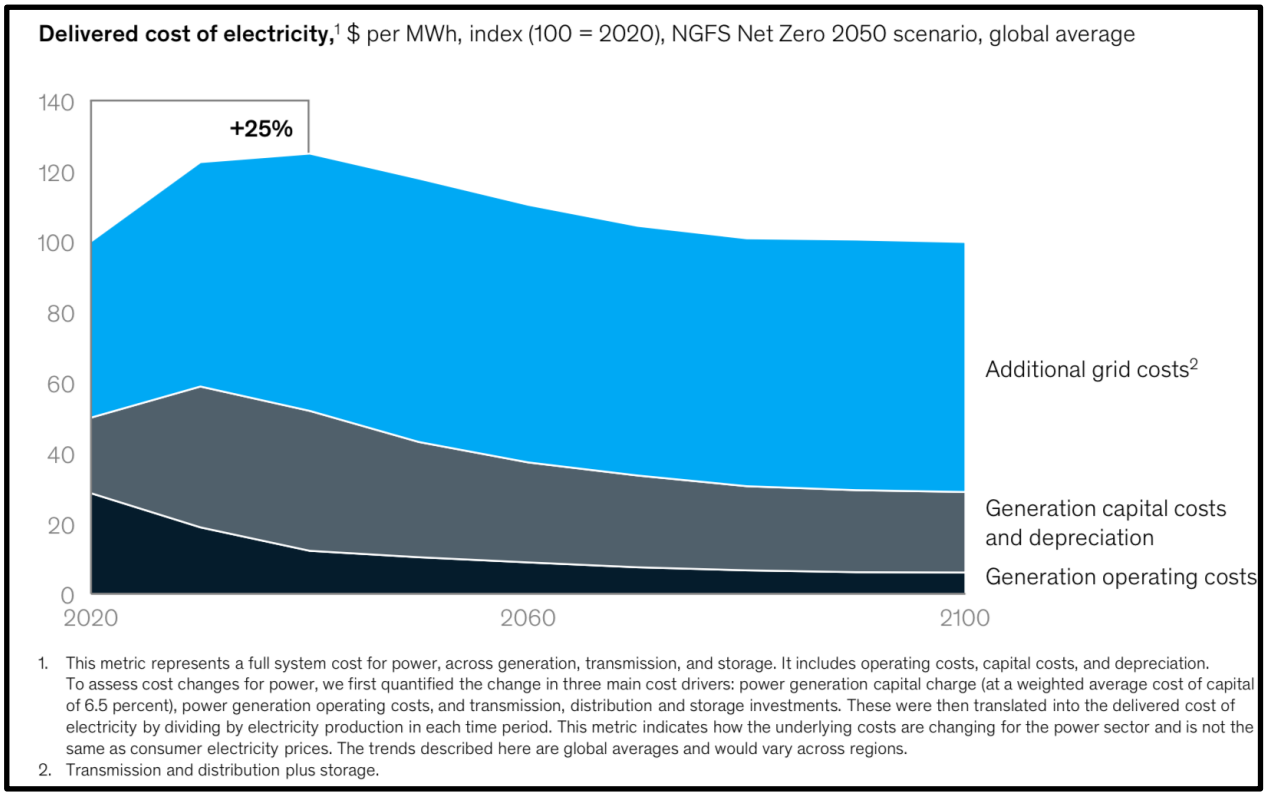
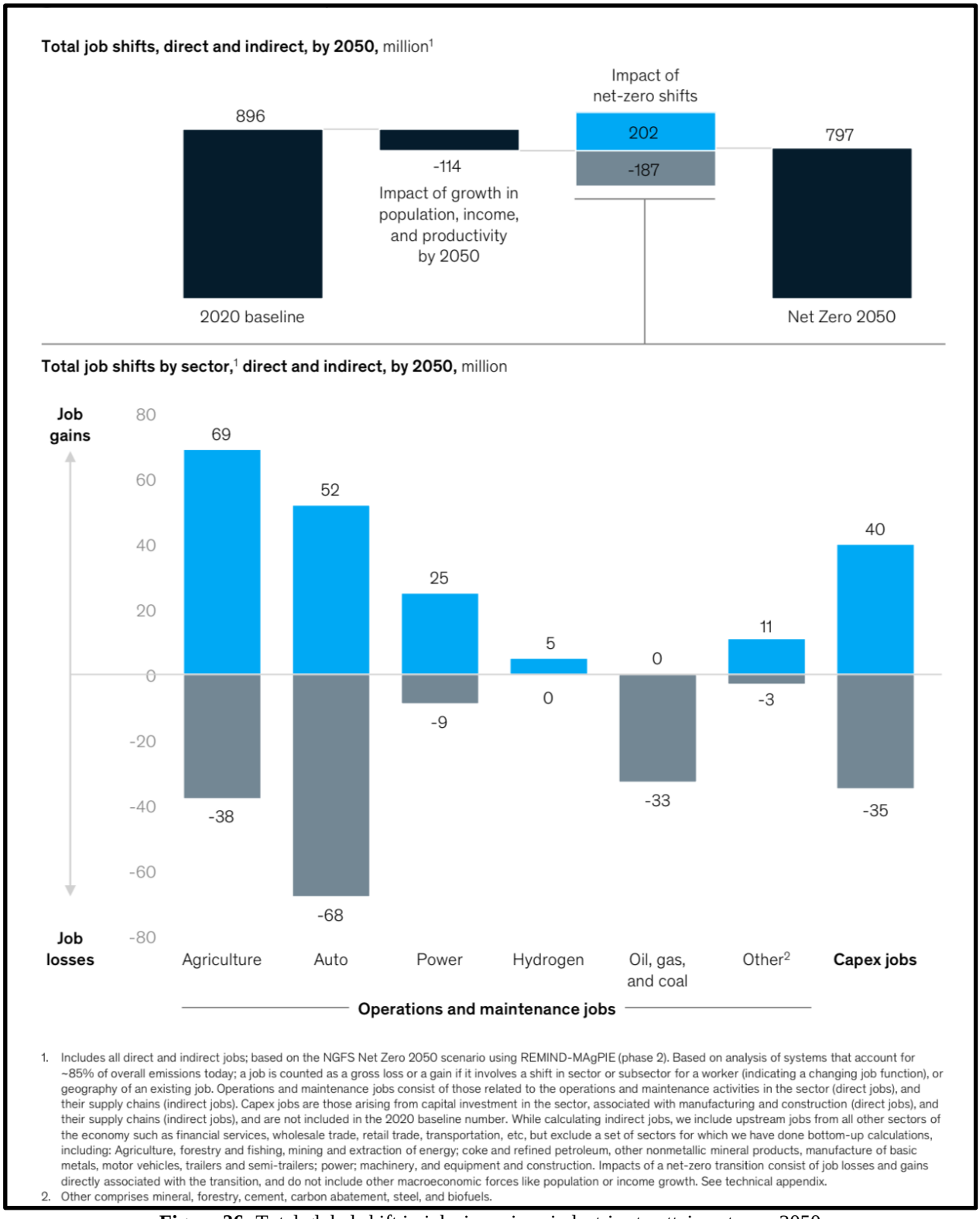


Figure 25: The trends in the average electricity expenditure to attain net zero in 2050

Source: Network for Greening the Financial System scenario analysis 2021 phase 2 (Net Zero 2050 scenario) REMIND-MAgPIE (phase 2) model; Vivid Economics; World Resources Institute Power Plant Database; McKinsey Power Solutions; McKinsey Global Institute analysis

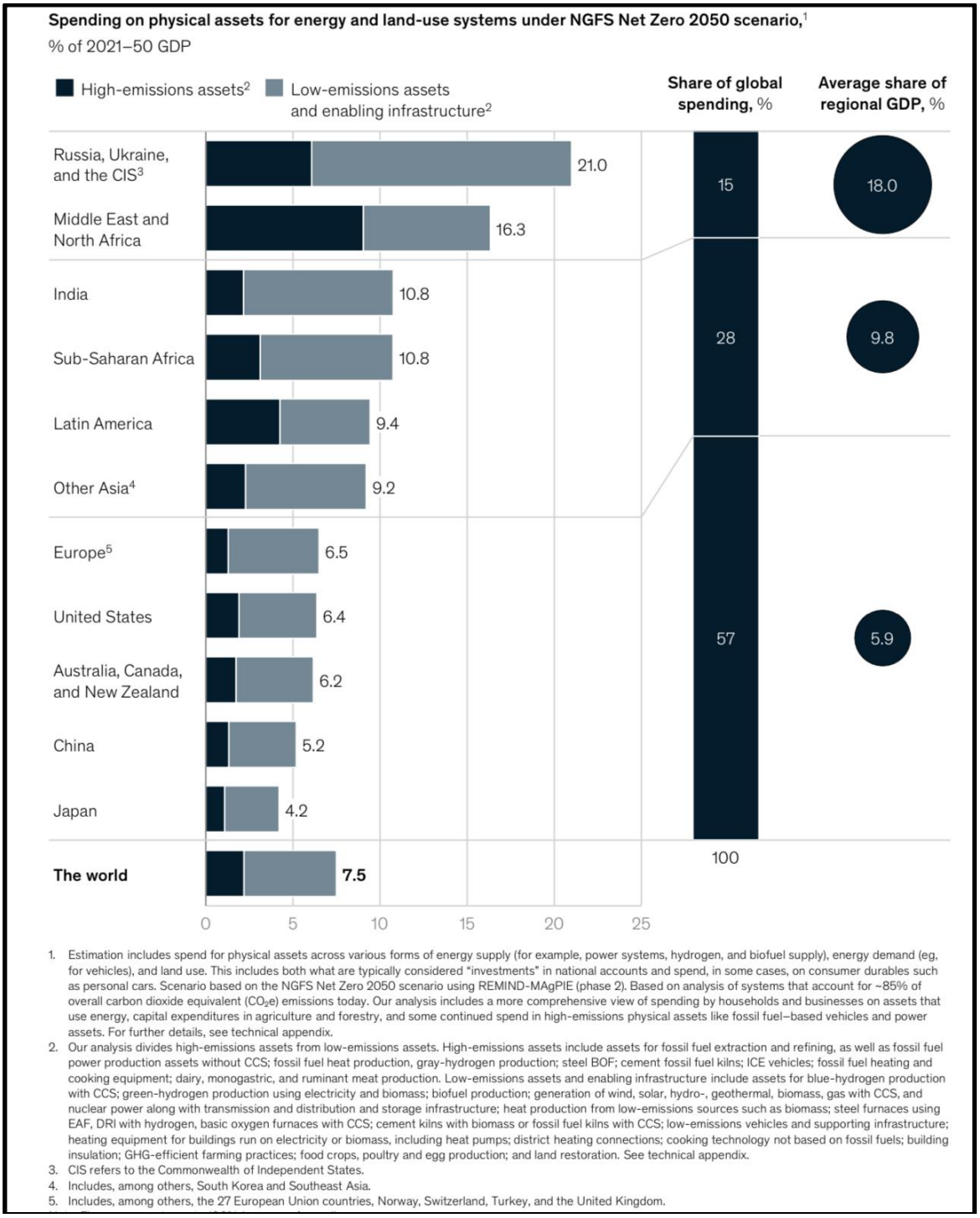


1. Includes all direct and indirect jobs; based on the NGFS Net Zero 2050 scenario using REMIND-MAgPIE (phase 2). Based on analysis of systems that account for ~85% of overall emissions today; a job is counted as a gross loss or a gain if it involves a shift in sector or subsector for a worker (indicating a changing job function), or geography of an existing job. Operations and maintenance jobs consist of those related to the operations and maintenance activities in the sector (direct jobs), and their supply chains (indirect jobs). Capex jobs are those arising from capital investment in the sector, associated with manufacturing and construction (direct jobs), and their supply chains (indirect jobs), and are not included in the 2020 baseline number. While calculating indirect jobs, we include upstream jobs from all other sectors of the economy such as financial services, wholesale trade, retail trade, transportation, etc, but exclude a set of sectors for which we have done bottom-up calculations, including: Agriculture, forestry and fishing, mining and extraction of energy; coke and refined petroleum, other nonmetallic mineral products, manufacture of basic metals, motor vehicles, trailers and semi-trailers; power; machinery, and equipment and construction. Impacts of a net-zero transition consist of job losses and gains directly associated with the transition, and do not include other macroeconomic forces like population or income growth. See technical appendix.
2. Other comprises mineral, forestry, cement, carbon abatement, steel, and biofuels.

Figure 26: Total global shift in jobs in various industries to attain net zero 2050

Source: Network for Greening the Financial System 2021 (Net Zero 2050 scenarios) REMIND-MAgPIE model; Vivid Economics; McKinsey Center for Future Mobility Electrification
Model (2020); McKinsey Hydrogen Insights; McKinsey Power Solutions; McKinsey Sustainability Insights; McKinsey Agriculture Practice; McKinsey Nature Analytics; Jobs baseline
(ILO, OECD, MinSTAT, INDSTAT, IHS, WIOD, IEA, US BLS, India NSS-Employment Survey, China-NBS, IRENA); Jobs multipliers (McKinsey Economics Analytics Platform, GTAP,
Asian Development Bank, US BEA, OECD, Oxford Economics); McKinsey Global Institute analysis

Figures 27 and 28 depict the expenditure on assets to transit to the net zero 2050 scenario and the archetype of physical risk through the transition exposure versus the GDP per capita for various nations respectively. As a percentage share of gross domestic product, fossil fuel–producing nations and emerging economies would pay additionally as compared to other countries on physical assets for energy and land-use systems. Nations with lower GDP per capita and fossil-fuel resource producers have elevated transition exposures to attain a net zero scenario.



1. Estimation includes spend for physical assets across various forms of energy supply (for example, power systems, hydrogen, and biofuel supply), energy demand (eg, for vehicles), and land use. This includes both what are typically considered "investments" in national accounts and spend, in some cases, on consumer durables such as personal cars. Scenario based on the NGFS Net Zero 2050 scenario using REMIND-MAgPIE (phase 2). Based on analysis of systems that account for ~85% of overall carbon dioxide equivalent (CO_2e) emissions today. Our analysis includes a more comprehensive view of spending by households and businesses on assets that use energy, capital expenditures in agriculture and forestry, and some continued spend in high-emissions physical assets like fossil fuel–based vehicles and power assets. For further details, see technical appendix.
2. Our analysis divides high-emissions assets from low-emissions assets. High-emissions assets include assets for fossil fuel extraction and refining, as well as fossil fuel power production assets without CCS; fossil fuel heat production, gray-hydrogen production; steel BOF; cement fossil fuel kilns; ICE vehicles; fossil fuel heating and cooking equipment; dairy, monogastric, and ruminant meat production. Low-emissions assets and enabling infrastructure include assets for blue-hydrogen production with CCS; green-hydrogen production using electricity and biomass; biofuel production; generation of wind, solar, hydro-, geothermal, biomass, gas with CCS, and nuclear power along with transmission and distribution and storage infrastructure; heat production from low-emissions sources such as biomass; steel furnaces using EAF, DRI with hydrogen, basic oxygen furnaces with CCS; cement kilns with biomass or fossil fuel kilns with CCS; low-emissions vehicles and supporting infrastructure; heating equipment for buildings run on electricity or biomass, including heat pumps; district heating connections; cooking technology not based on fossil fuels; building insulation; GHG-efficient farming practices; food crops, poultry and egg production; and land restoration. See technical appendix.
3. CIS refers to the Commonwealth of Independent States.
4. Includes, among others, South Korea and Southeast Asia.
5. Includes, among others, the 27 European Union countries, Norway, Switzerland, Turkey, and the United Kingdom.

Figure 27: Expenditure on assets to transit to net zero 2050 scenario

Source: Network for Greening the Financial System 2021 (Net Zero 2050 scenarios) REMIND-MAgPIE model; Vivid Economics; McKinsey Center for Future Mobility

Electrification Model (2020); McKinsey Hydrogen Insights; McKinsey Power Solutions; McKinsey–Mission Possible Partnership collaboration; McKinsey

Sustainability Insights; McKinsey Agriculture Practice; McKinsey Nature Analytics; McKinsey Global Institute analysis

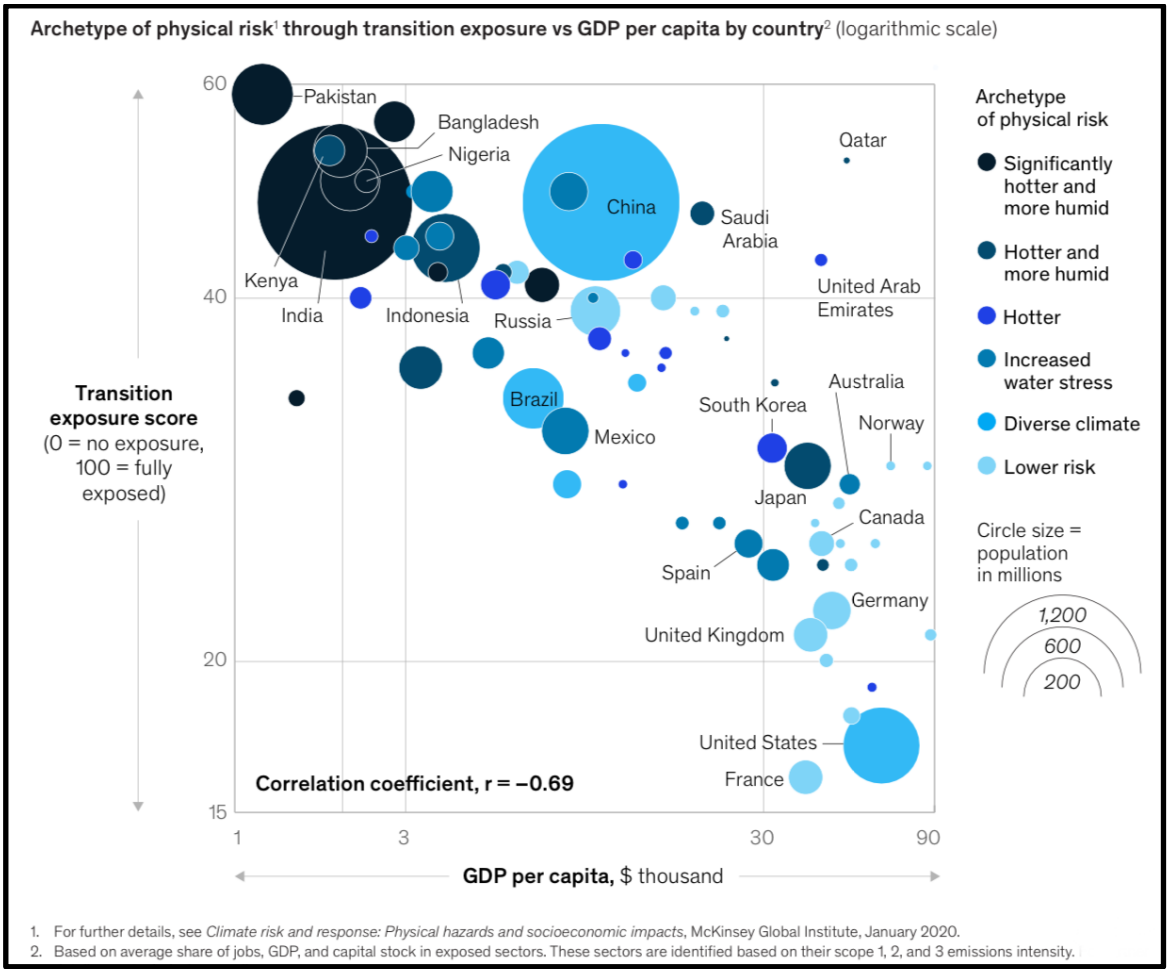


Figure 28: Archetype of physical risk through the transition exposure versus the GDP per capita for various nations
Source: Oxford Economics; OECD; ILO; World Input-Output Database; IHS Connect; World Bank; International Energy Agency; US Bureau of Labor Statistics;
India NSS-Employment survey; China National Bureau of Statistics; UN; International Renewable Energy Agency (IRENA); MINSTAT; INDSTAT; Global Solar Atlas;
Global Wind Atlas; US Geological Survey; WEF; McKinsey Nature Analytics; McKinsey Global Institute analysis

Also, green products prove to be more expensive as compared to non-green products and consumers as well as producers need to pay a premium to purchase green final products or raw materials respectively. Furthermore, the concept of green businesses is new to a majority of the community residing in developing nations. There is a need to create awareness and educate both consumers as well as producers on the hazardous impacts caused by non-green products on human health and the environment.

Green products prove to be a bridge between environmental protection and customer satisfaction, but if there is a misjudgement or imbalance among any of the two concepts it may prove to be harmful. Going green strategies involve paperless transactions, which means lack of security of information, leading to theft and piracy. Manufacturers of certain non-green goods can put false propaganda about environmental friendliness which is called green washing.

Hence, to popularize green products strategies shouldn't ignore the economic and social costs related to manufacturing and quality of merchandise. Green marketing is still at the infancy stage and further research needs to be developed to uncover its full potential to improve awareness for green products and services.

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