

Net Zero: A project management perspective¹

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Abstract

“Net Zero” has become a buzz word today. Its importance and initiatives related to it cannot be underestimated. Organizations, businesses and governments are all into it and every effort is being made to thwart the potential problems due to climate change, now and in the future.

What is Net Zero? and how does it impact the project management profession? This is broadly the subject of this paper. In particular the following topics will be discussed and deliberated.

- ◆ Understanding Net Zero - the basics & current status
- ◆ Agreements & commitments by organizations, governments and UN
- ◆ Reasons, benefits and challenges
- ◆ Net Zero projects - Domains / Industries - Examples
- ◆ Opportunities for project professionals

For project managers, the concept and policies related to Net Zero are of special interest. Sustainability as a broad ethos is well understood and all principles enunciated towards its use e.g., circular economy, use of resources, climate change etc. can be viewed as higher level objectives. These need to be broken down to methods which are implementable. Net Zero is one way to meet this and project managers can contribute considerably here.

For project and product managers this topic will interface with other related areas like Sustainability, New project and product development and Stakeholder management.

This paper can be used as a first course (or as a refresher for those who are already informed) to implement Net Zero projects in their organizations and the community.

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Understanding 'Net Zero'

As per the World Economic Forum *Net Zero* applies to a situation where global greenhouse gas emissions from human activity are in balance with emissions reductions. At net zero, carbon dioxide emissions are still generated, but an equal amount of carbon dioxide is removed from the atmosphere as is released into it, resulting in zero increase in net emissions.

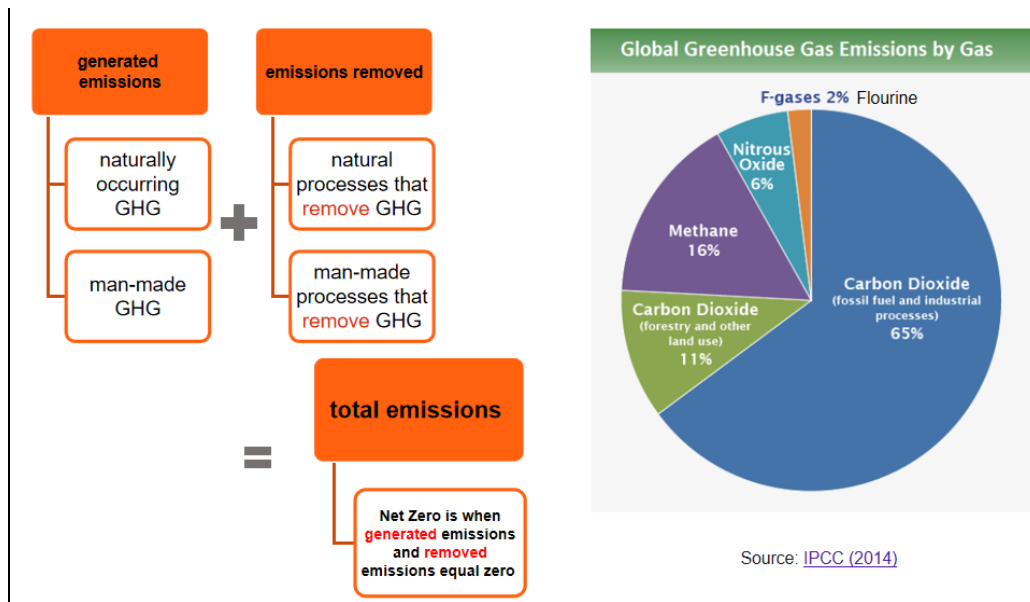
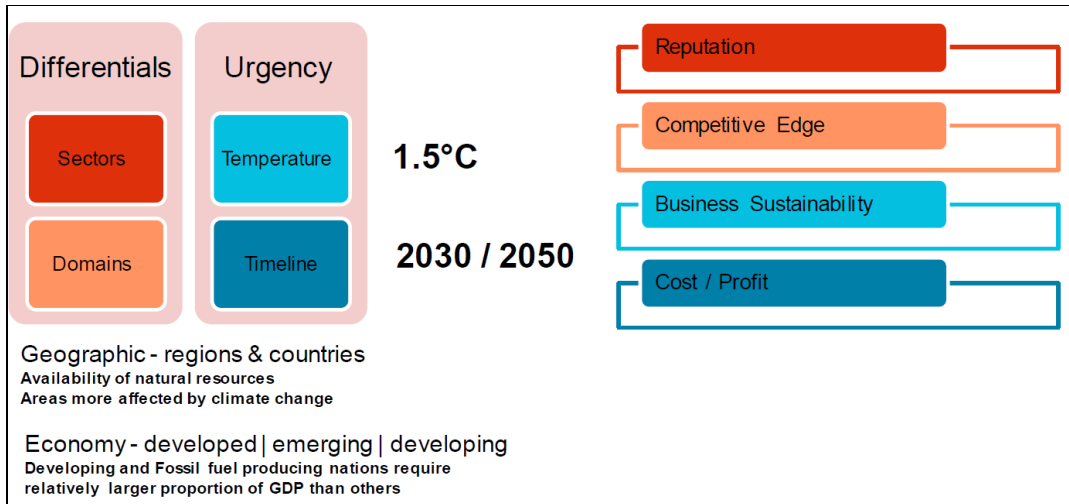


Exhibit 1: What is Net Zero ?

Greenhouse gases or GHG can be classified as natural and man-made with the latter being contributed largely due to the onset of industrial revolution and subsequent years of economic activity.

A large part of GHG is CO₂ (about 65%) and therefore some measure the Net Zero in terms of carbon (CO₂) as most of the organization activity relates to carbon products and not to the other gases.

Why Net Zero? and its benefits



Source : The net zero transition: Its cost and benefits | Sustainability | McKinsey & Company

Exhibit 2: Why we need Net Zero and what are its benefits ?

Urgency: Successive agreements and commitments since 1987 have emphasized the importance of taking action to reduce GHG as a solution to avoid pollution. This has culminated in a call to limiting increase in temperature of 1.5 deg C over pre-industrialized times. Further time-lines of years 2030 to 2050 have been set for achieving goals.

Differentials: The complexity of the problem is because of conflicting goals and aspirations of various countries and continents. These differences, which are due to economic development and geopolitical compulsions, make it challenging to achieve objectives set by various global bodies and governments.

Climate change: Achieving net zero emissions has numerous benefits for both the environment and society. Investing in nature-based solutions, transitioning to sustainable practices and clean energy sources, and reducing carbon emissions can help alleviate the negative effects of climatic emergencies, including higher temperatures and sea levels, more extreme weather events, and limited access to food and water.

Pollution abatement / Public health: Transition to renewable energy like wind and solar power can have health benefits by reducing air pollution. This will mean better public health outcomes and improved environmental justice.

Jobs & Economic opportunities: Reducing our carbon footprint also creates economic opportunities by developing new industries and jobs in various sectors.

Research shows that transitioning to a net-zero economy produces strong net economic benefits, creating jobs across a wide range of occupational skill sets, industries and regions. A challenge is identifying and preparing workers for these new opportunities. This requires creative solutions specifically targeted and focused on exposure, localization, innovation and transition. As per McKinsey, in the NGFS² Net zero 2050 scenario about 200 million direct and indirect jobs could be created and 185 million lost. This means we would still be positive (gained vs lost) though it would require considerable shifts requiring re-orientation, re-skilling and up-skilling.

Cost / Profit & Business Sustainability: Businesses that become more sustainable and deploy improved practices towards energy consumption and emission decrease inefficiencies and operational costs.

Competitive Edge / Reputation: Sustainable businesses benefit from improved brand recognition and become known and popular in the market. This is more so with the newer generation e.g. Gen Z and the Alpha. They tend to place more value on sustainable products and are even willing to pay higher price for it, Further, as compared to other players, organizations with a sustainable mindset get a competitive edge in the marketplace.

Type of emissions

Scope 1 and 2

Scope 1: direct emissions from an organization's owned operations including owned vehicles.

For e.g., emissions due to fuel combustion from boilers, fugitive leaks e.g. refrigerant gas, owned cars that burn fuel and process plants.

Usually, they are the easiest to manage and mitigate.

Scope 2: indirect emissions from purchased electricity, steam, heating and cooling.

For e.g., emissions created by the power plant that provides power for the facility.

Organizations don't control or own the sources that generate Scope 2 emissions but need to be reported because they are indirectly caused by them.

² Network for Greening the Financial System <https://www.ngfs.net>

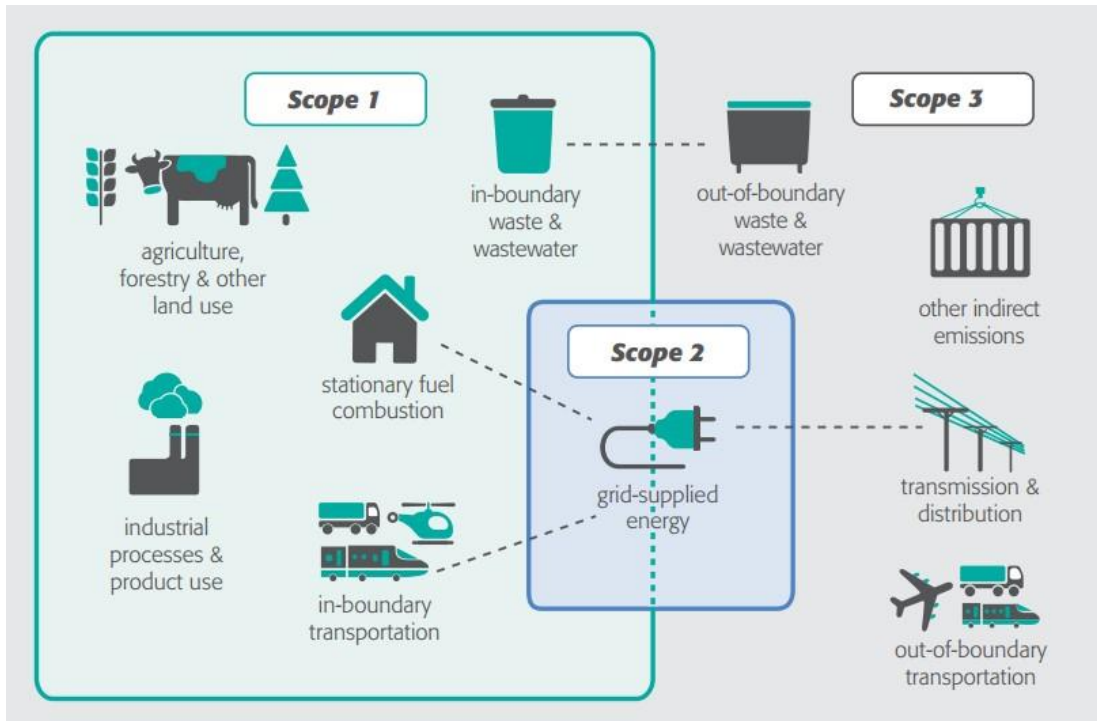


Exhibit 3: Types of emissions

Scope 3

Scope 3: all other indirect emissions generated throughout an organization's value chain. They are not directly produced on-site or happen due to its direct consumption.

For e.g., purchased goods and services, waste generated, transportation and distribution, use of sold products, investments, franchises, and employee commuting.

Many countries and organizations require scope 1 and 2 emission to be reported, whereas measuring scope 3 emissions is voluntary for most.

Jargon, Acronyms, Agreements and Commitments

Sustainability literature has developed considerably, and this has given rise to plenty of new jargon and acronyms. It is important to become familiar with them to appreciate the issues involved and have a discussion on them. Here are some of the more important ones. Further, there are many agreements and commitments in the area of climate change and environment and many of them are listed below.

Net Positive: GHG removals, internal and external, exceed its emissions.

Net Zero Carbon /Carbon Neutral: net contribution to CO2 emissions for the area is zero.

Decarbonize: The process of shifting from energy derived from hydrocarbons such as oil, coal and natural gas, to sources of energy that do not put carbon and other greenhouse gases into the atmosphere.

Offsetting: Reducing GHG emissions or increasing GHG removals through activities external to an actor, in order to compensate for GHG emissions, such that an actor's net contribution to global emissions is reduced. Offsetting is typically arranged through a marketplace for carbon credits or other exchange mechanism.

Green Washing: Promoting a financial product or strategy as sustainable without measures or a methodology to justify the claim.

IPCC: Established in 1988 by the UN Environment Programme and the World Meteorological Organization. It is the UN body for assessing the science related to climate change and provides governments at all levels with scientific information that they can use to develop climate policies.

Science Based Targets Initiative: SBTi Targets are considered 'science-based' if they are in line with what the latest climate science deems necessary to meet the goals of the Paris Agreement – limiting global warming to well-below 2°C above pre-industrial levels and pursuing efforts to limit warming to 1.5°C.

Paris Agreement 2015: Deals with greenhouse gas emissions mitigation, adaptation and finance and it is the Net Zero 2050 initiative which hopes to accomplish those goals.

Kyoto Protocol: International treaty that extends the 1992 United Nations Framework Convention on Climate Change (UNFCCC). Adopted 1997 in force from 2005.

Agreements & Commitments

1987,1990,1992	Montreal , IPCC, Rio Inter-governmental Panel on Climate Change	Agreements /Protocols
1992	UNFCCC	UN Framework Convention for Climate Change
1997/2005	Kyoto Protocol	192 parties
2015	SBTi Science Based Target Initiative	UN Global Compact WRI WWF CDP
2015/2016	Paris / COP21 Conference of Parties	196 parties
2015	Net Zero 2050	195 parties

Exhibit 4: Climate Change: Agreements & commitments

Domains & Sectors

Broadly, we can categorize the areas where emissions are occurring as **Energy**: contributed by activities in **Industry, Transport and Buildings** sector and **Agriculture**. To this we can add **ICT** (Information & Communication Technology) and **Finance**. Both these sectors are important enablers for projects and initiatives to be implemented.

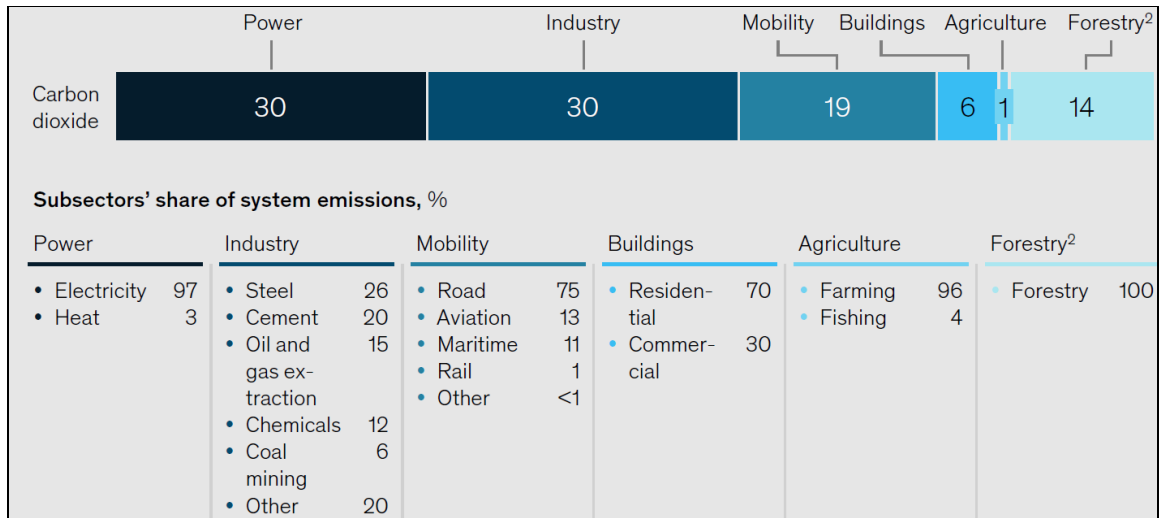


Exhibit 5: Data as of 2019. Proportion of Co2 emissions by domains /sectors.

There are many ways by which we can interpret the generation of greenhouse gases globally. Exhibit 1 shows the distribution of GHG and indicates that a large part of is CO2 followed by methane and nitrous oxide. About 60% of carbon dioxide generation is due to the **Power** (Energy - Electrical & Thermal) & **Industry** - (Exhibit 5). The same in case methane & nitrous oxide is high for agriculture with methane generation comparatively higher for industry - (Exhibit 6).

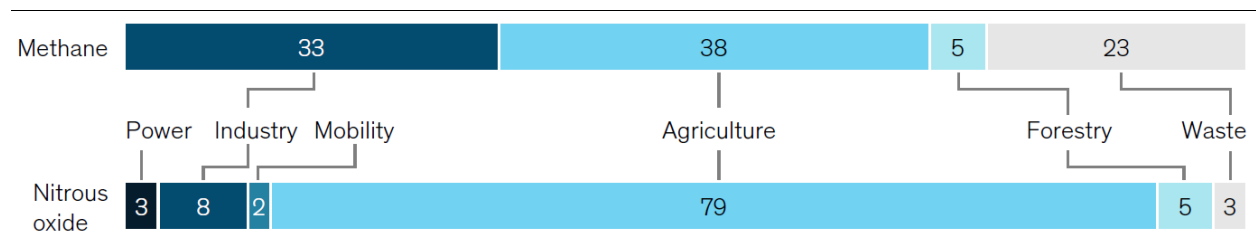


Exhibit 6: Data as of 2019. Proportion of Methane / Nitrous oxide emissions by domains /sectors.

Source report: the net zero transition Jan 2022 McKinsey Global Institute

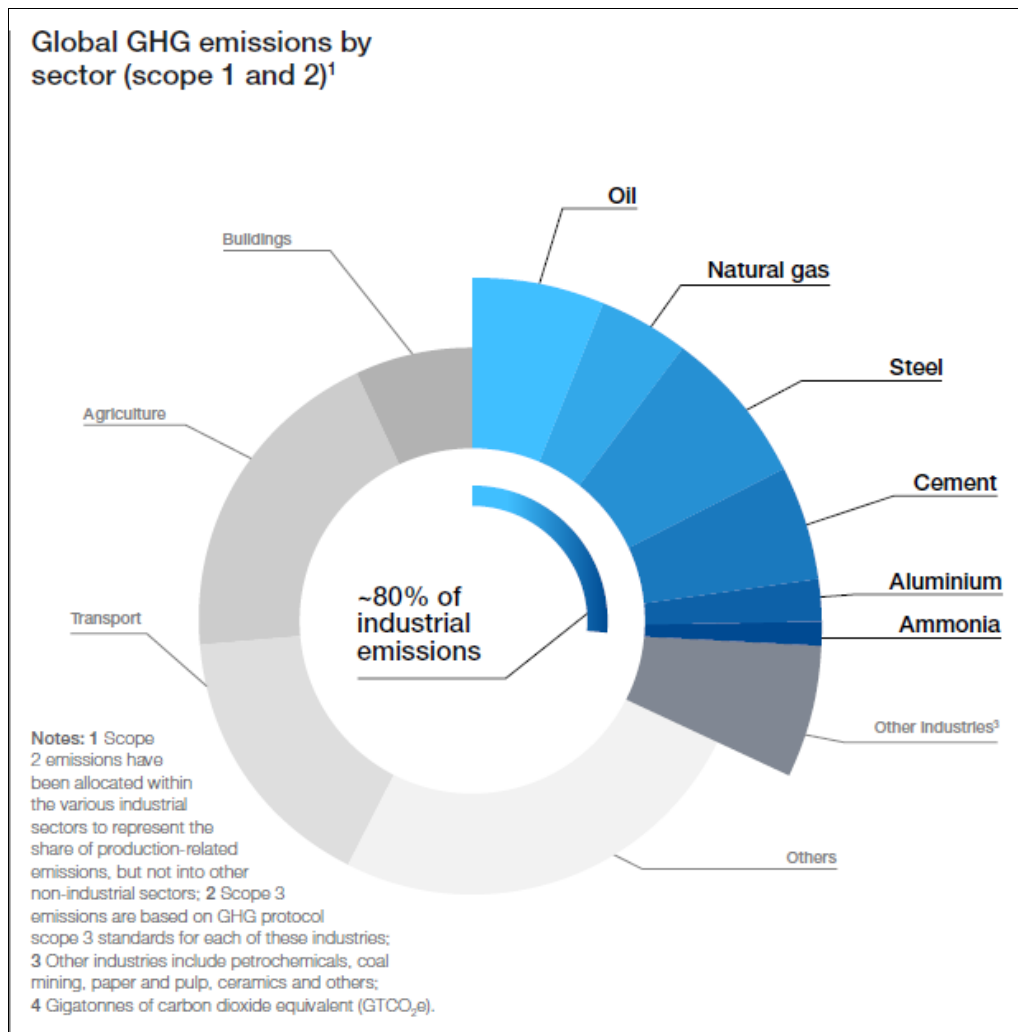


Exhibit 7: Proportion of GHG emissions by domains /sectors source: wef net-zero industry tracker 2022

If we look at the picture from the utilization in specific industries Exhibit 7 shows that globally six major industries are responsible for 80% of the industrial emissions, with industries contributing to 30% of the total. These six are power intensive industries. Scope 1 and 2 categories are covered here. The power (electricity & heat) consumed by these sectors and the source of the power is included in the calculation. “Other Industries” mentioned in the graphic include petrochemicals, coal mining, paper & pulp, ceramics & others.

Both the above graphics and data give us pointers to the areas that we should address if we have to work on progressing to reach net zero targets.

Greenhouse gas emissions can also be measured country-wise or as a region. A figure of emission in terms of GDP of a country is an additional way of understanding the enormity of the situation. Refer Exhibit 8 and Exhibit 9.

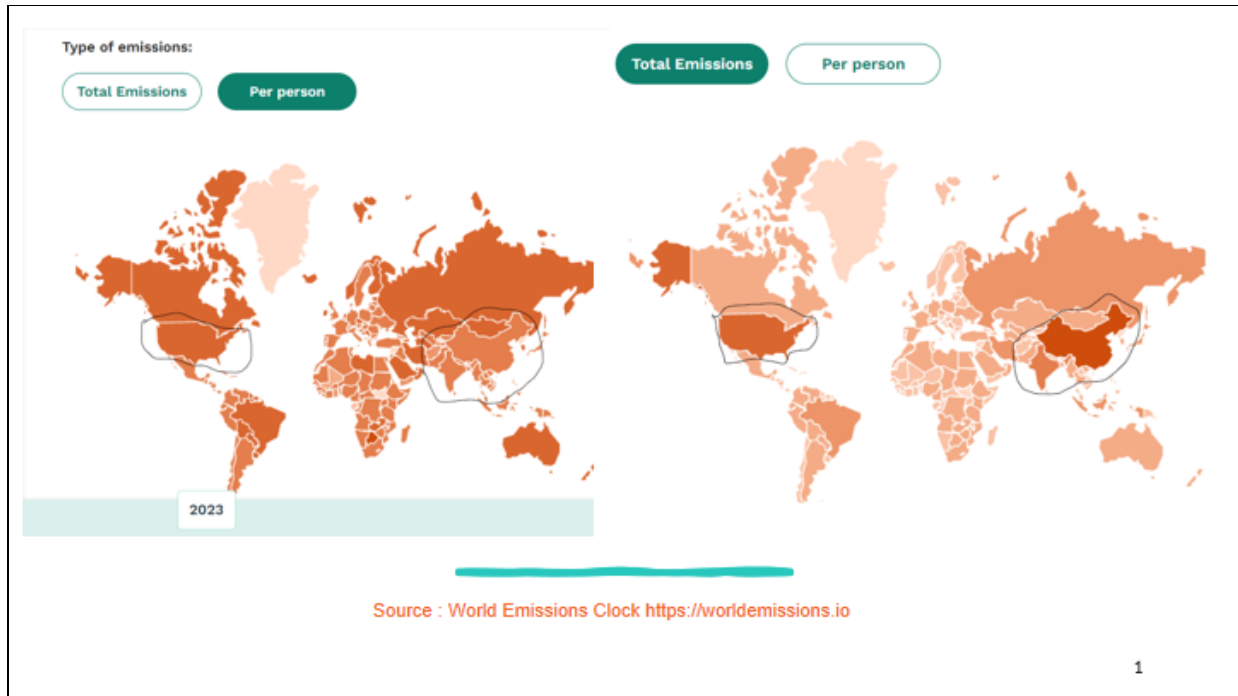


Exhibit 8: Per capita emissions and country-wise emissions comparison

It is interesting to note from the colour of shading in the Exhibit 8 that some countries have high total emissions but lower per capita emissions. The opposite is also true for some countries. Examples of these can be seen in Exhibit 9.

GHG Emissions Co2 equivalent 2023			
	Per person in tonnes	Total	Major Source
India	2.8	4.0 GT	Energy
USA	18.4	6.2 GT	
China	10.4	14.8 GT	
Canada	23.5	896.6 MT	
Oman	31.4	152.7 MT	
Saudi Arabia	26.2	953.1 MT	
United Arab Emirates	30.1	319.6 MT	
Brazil	12.9	2.8 GT	
Mongolia	31.8	104.8 MT	Agriculture
Botswana	59.3	148.8 MT	

Source : World Emissions Clock <https://worldemissions.io>

GT gigatonne MT megatonne 1 GT = 1000 MT

Exhibit 9: Per capita emissions and country-wise emissions comparison - some examples

Circular Economy

By moving to a circular economy from a linear model, we could impact the Net Zero initiative in the following ways:

- ✓ Material Re-circulation (recycling)
- ✓ Product materials efficiency (wastage)
- ✓ Circular business models (sharing)

These are opportunities of abatement from the demand side and are often Scope 3 category of emissions.

The Project Perspective

“To stay below the 1.5 deg C target of the Paris Agreement, this must be the “decade of delivery” for governments, industries and organizations” - World Economic Forum

This presents a great opportunity and responsibility for project professionals to provide the requisite services and support to make this happen.

Capex

As per McKinsey, capital spending on physical assets for energy and land-use systems in the net-zero transition between 2021 and 2050 would amount to about \$275 trillion, or \$9.2 trillion per year on average, an annual increase of as much as \$3.5 trillion.

from the year 2022. In addition, some amount approximately \$1 trillion needs to be reallocated from high-emissions to low-emissions assets. The spending would be front-loaded, between 2026 and 2030 before falling in later periods. Many of these investments have positive return profiles even after considering risks and should not be seen as merely costs. Further, technological innovation could reduce capital costs for net-zero technologies faster than expected.

Net Zero Projects

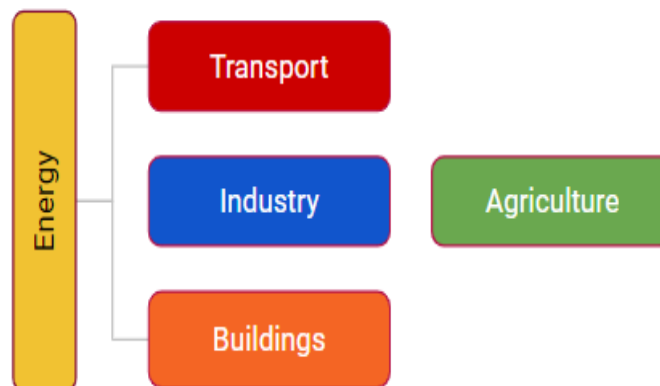


Exhibit 10: Major categories of Net Zero projects

Under the above broad categories, we can consider initiatives which can be implemented in various time frames from 2020s up to 2040s. Some examples from the list mentioned in Exhibit 11 are:

- ✧ Transport: Ramp up EV markets, Turn over fleets to zero-emission vehicles: cars and vans before HGVs
- ✧ Industry: Reduce waste, increase recycling rates, initial CCS clusters
- ✧ Buildings: Efficiency, heat networks, heat pumps (new-build, off-gas, hybrids)
- ✧ Agriculture: Healthier diets, reduced food waste, tree growing and low carbon farming practices.
- ✧ Energy: Largely de-carbonize electricity: renewables, flexibility, coal phase-out

Acronyms: CCS Carbon Capture and Storage HGV Heavy Goods Vehicle EV Electric Vehicles

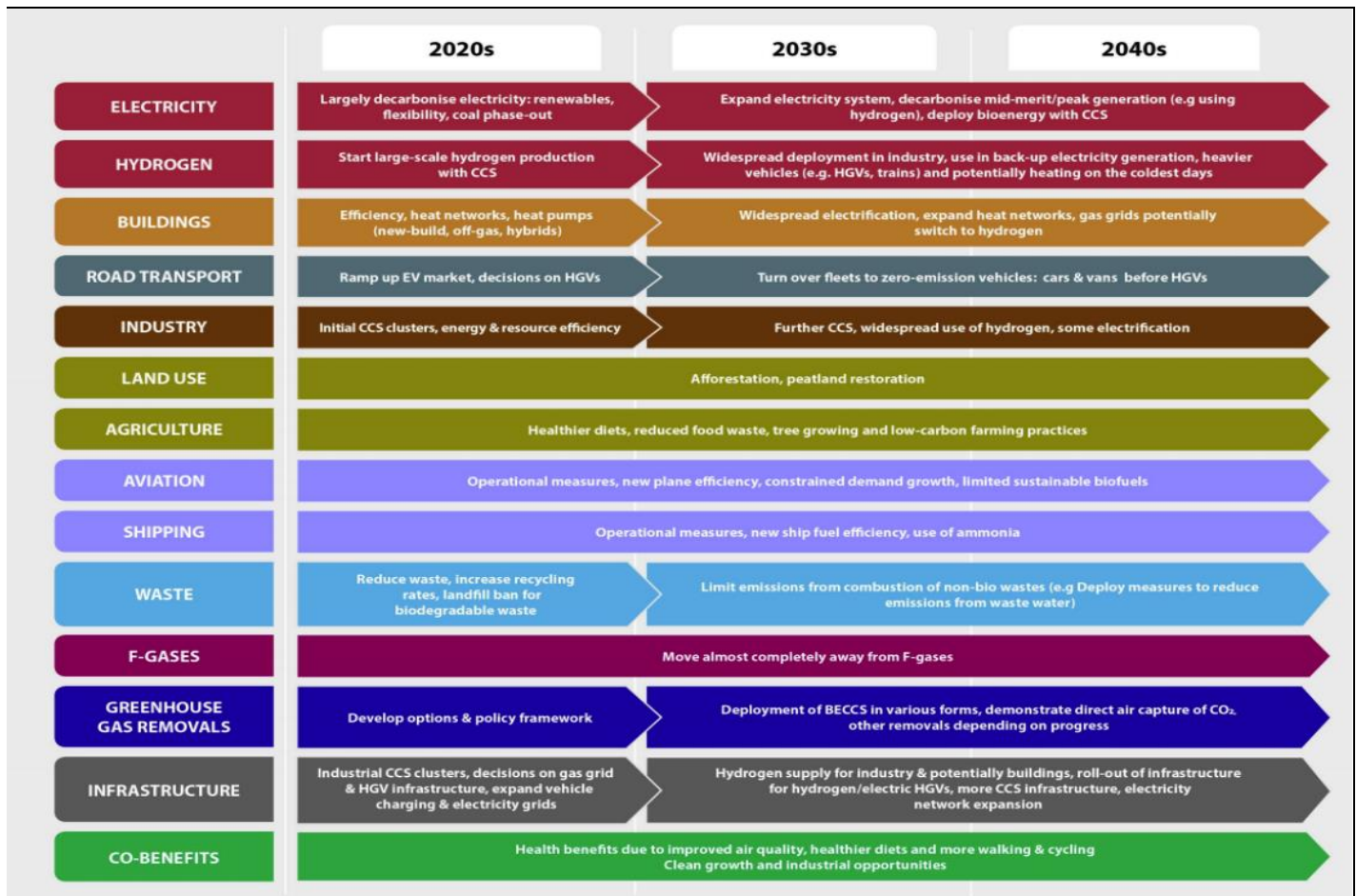


Exhibit 11: List of possible Net Zero projects

Implementation - Challenges

Though there is huge opportunity for Net Zero projects now and in the future, it is not without challenges. The broader construction ecosystem includes the following:

- ✧ Political: citizens, consumers and community members.
- ✧ Financial: global network of asset owners, investors, lenders and insurers.
- ✧ Project Delivery: global network of developers, operators, technology providers, engineers, constructors, service providers and suppliers.

The demands on the global project delivery system are critical in implementing the massive portfolio of projects. Moving forward they have to collaborate and transform to help deliver the outcomes.

The net-zero projects portfolio calls for substantial construction activity over the next thirty years. The capital projects face challenges in five areas:

Speed, Predictability, Technology and Capacity in addition to Safety & the Environment.

- ✧ Speed
 - Decision Making; Infrastructure is generally long duration and so changes to be affected to reduce the time for decision making.
 - Design & Construction methods: To be re-imagined improving productivity.
- ✧ Predictability
 - Schedule | Cost | Scope & Risk | Resources: Manage unanticipated delays & cost over runs, constraints.
 - Stakeholders: Conflicting priorities between profit/growth vs sustainability parameters
 - Supply Chain: newer supply chain models while moving from linear to circular economy.
- ✧ Technology
 - De-carbonization: complexity in engineering construction and operations planning /resourcing.

- ICT: Digital and Analytics technology
- ✧ Capacity
 - People & Skills: Upgradation and Up-skilling
 - Organizational transformation: By owners/operators and engineering, construction, and specialty service providers.

Collaboration

Projects involving net-zero are characterized by various challenges and at the minimum by

- ✧ Longer project timelines
- ✧ Multiple Agencies involved.
- ✧ Conflicts among stakeholders due to different goals over time frames

Collaboration among various actors with suitable frameworks or models could be a key workaround for this problem. This has to be customized for net-zero type of projects or include sustainability as its major plank.

An example of a collaboration in this space is GFANZ or Glasgow Financial Alliance for Net Zero which lists four financing strategies as part of its framework.

- ✧ Climate Solutions: Technologies, services and tools that mitigate, eliminate or remove GHG emissions.
- ✧ Aligned: Entities that are already aligned to a 1.5 degrees C pathway
- ✧ Aligning: Entities committed to aligning to a 1.5 degrees C pathway
- ✧ Managed Phaseout: High-emitting physical assets that can be phased out before end of life.

Further the framework provides guidance for implementation in terms of five themes: **Foundations, Implementation Strategy, Engagement Strategy, Metrics & Targets and Governance.**

Examples & Case Studies

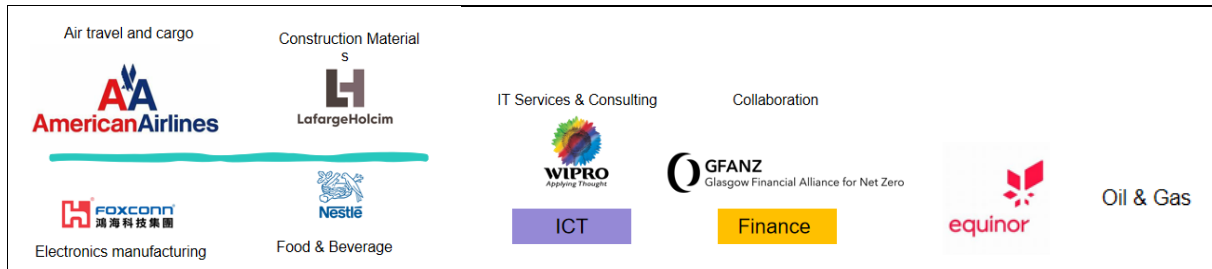


Exhibit 12: Examples of organizations implementing Net Zero initiatives.

American Airlines: Transport sector, Renewable energy, improving fuel efficiency, improving air traffic control to reduce emissions, shifting to fuel from renewables.

Equinor: Oil & Gas sector, Renewables, hydrogen fuel & CCS in Heat/Power, Industry and Transport.

Lafarge Holcim: Buildings sector, substituting fossil fuels, renewable energy, thermal substitution, CCS, low carbon products, use construction and demolition waste (CDW),

WIPRO: ICT sector, use less energy, increase renewable energy, green building design,

GFanz: Financial support sector, developed a framework and guidance in implementing net-zero projects for which financial support is provided.

Nestle: Food & Beverage sector, Deforestation, renewables: electricity & thermal, recyclable packaging, regenerative agriculture, tree planting.

Foxconn: Electronics Manufacturing sector, Wastewater recycling, renewable energy, zero waste to landfill, green procurement, chemicals tracking & management.

The concept of Net Zero can be implemented not only with large corporate enterprises or businesses but also with other companies, educational or not-for-profit organizations.

An example is the initiative taken at the National Institute of Technology, Tiruchirappalli, India. Three areas were covered as part of this exercise: Replacement of electrical fixtures, installation of solar energy panels and tree planting. This example shows that the net-zero concept can be applied gainfully even at most rudimentary levels with simple measures and projects.



Exhibit 13: Implementation of Net Zero at Educational Institutions - An Example

Opportunities for Project Professionals

Domain Knowledge

Net-zero as a concept and all the knowledge that goes with it for its implementation is necessary as domain knowledge for project professionals. This is particularly so because the subject brings about its own set of jargon and information generated over the last few decades. Fortunately, there is considerable material and information available on the internet in the public domain and it is easy for anyone to get up to speed on the learning curve.

Personal & Community projects

While project professionals will find it beneficial to use the knowledge and best practices for implementing net-zero initiatives in their own organizations, they could also get involved in projects outside for their community and as a personal interest. For. e.g., on the four areas of installing solar panels, ev usage, waste management and tree plantation,

may be considered as low hanging fruit and could provide quick results on implementation.

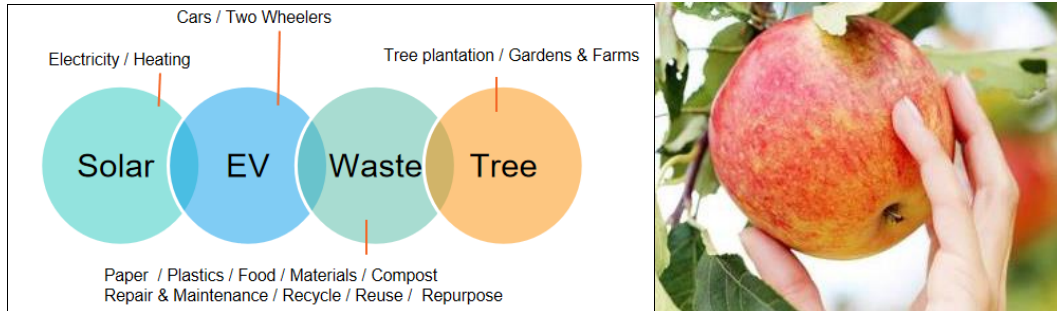


Exhibit 14: Low hanging fruit for implementation of net-zero projects

Final Thoughts

- ✧ The crisis of climate change has resulted in the formulation of the Net Zero initiative and has helped to speed up action. It is gaining momentum though there is a considerable gap between intention and action.
- ✧ One of the major challenges identified is the delivery of the policies formulated. There is a need for the project management community to provide timely support as a responsibility towards maintaining a sustainable planet.
- ✧ Net Zero provides many opportunities now and in the future for professionals to manage projects, consult and influence stakeholders towards climate action and sustainability. It is also an avenue for individuals to participate and support projects in their community.

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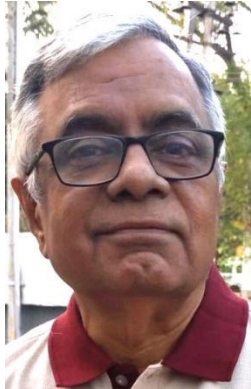
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About the Author



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Raju Rao is an author, speaker and social entrepreneur.

He is the Founder of Xtraplus Learning & Consulting and has been a trainer, consultant and coach for nearly two decades. He often writes for professional journals and is the co-author of two books on project management. He has been a speaker in many global conferences and seminars.

Raju has been involved in the development of many standards in project management. He has worked as a volunteer with PMI and similar organizations for many of their initiatives and projects. He is the Founder of the not-for-profit Forum for Food Recovery, an organization involved in advocacy and education in food waste and recovery management. He is an Ambassador for GPM Global which is dedicated to advancing regenerative solutions and practices for sustainable project management. He is a member of International Society of Sustainability Professionals.

Raju is a Distinguished Toastmaster and has been an active member of Toastmasters International. He also dabbles in writing fiction and is interested in cooking, running and listening to music.