60 YEARS IPMA international project management association

SHAPING THE FUTURE WITH PROJECT MANAGEMENT

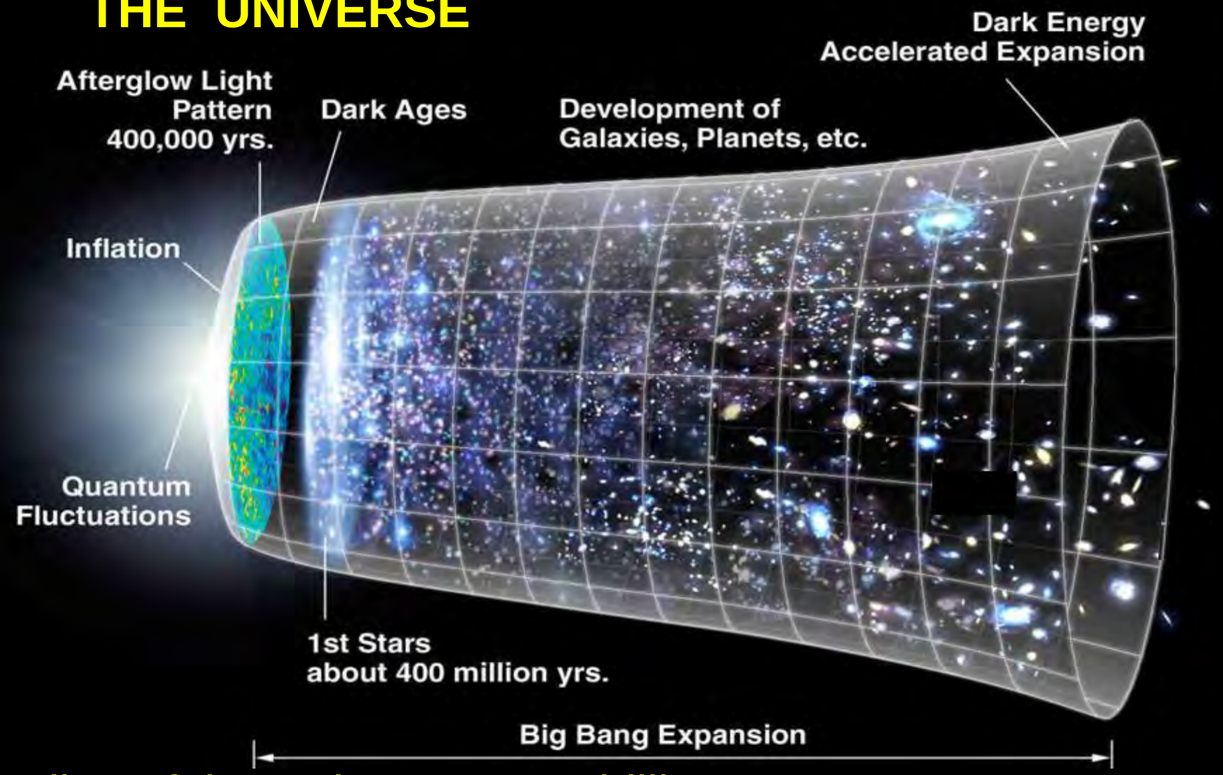
FUTURE OF HUMANITY –

WHAT PROJECT MANAGEMENT CAN DO?

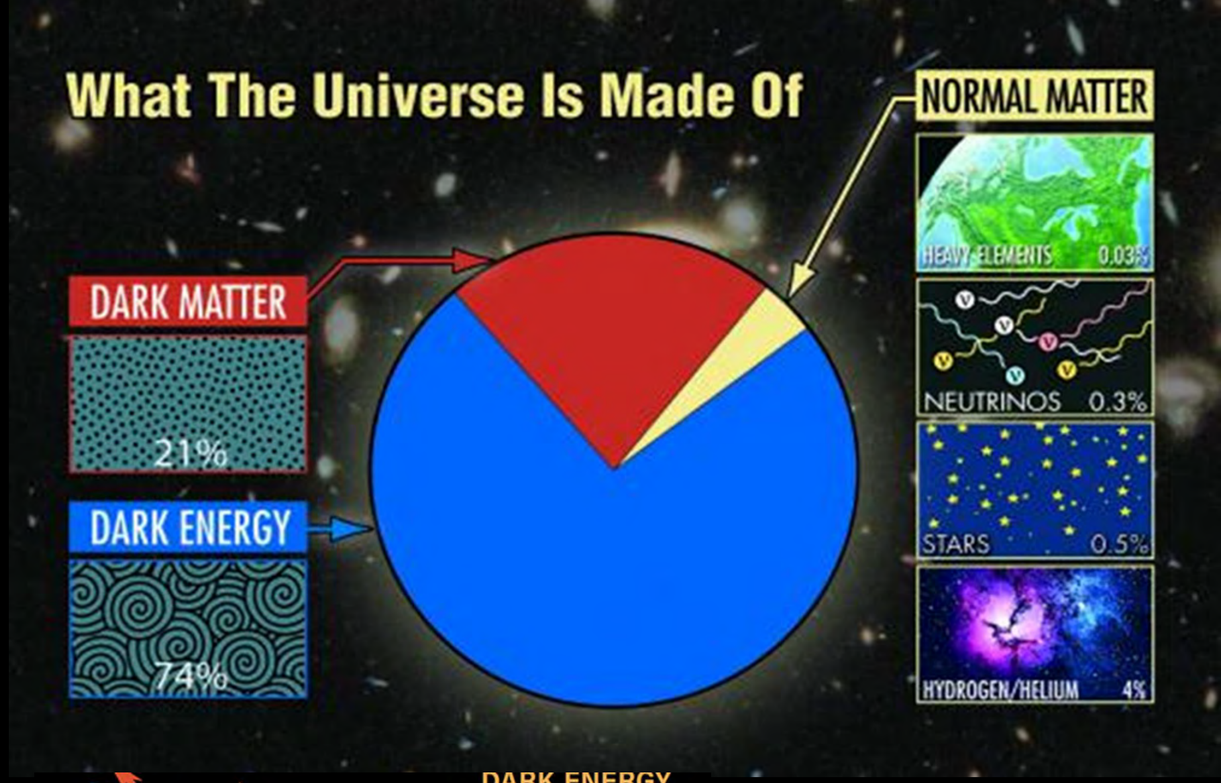
DR. A. SIVATHANU PILLAI, PMA-INDIA

BERLIN 19-SEP 2025

THE UNIVERSE



Timeline of the Universe- 13.8 billion years

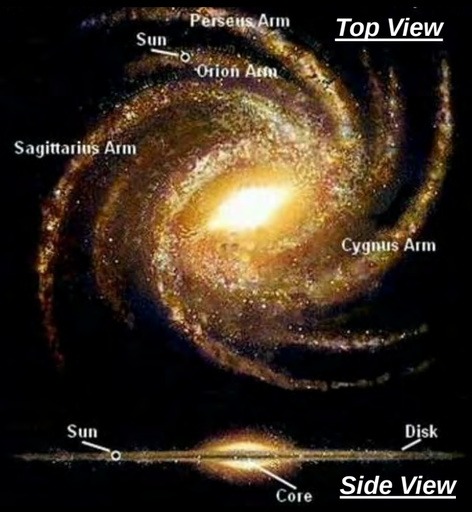


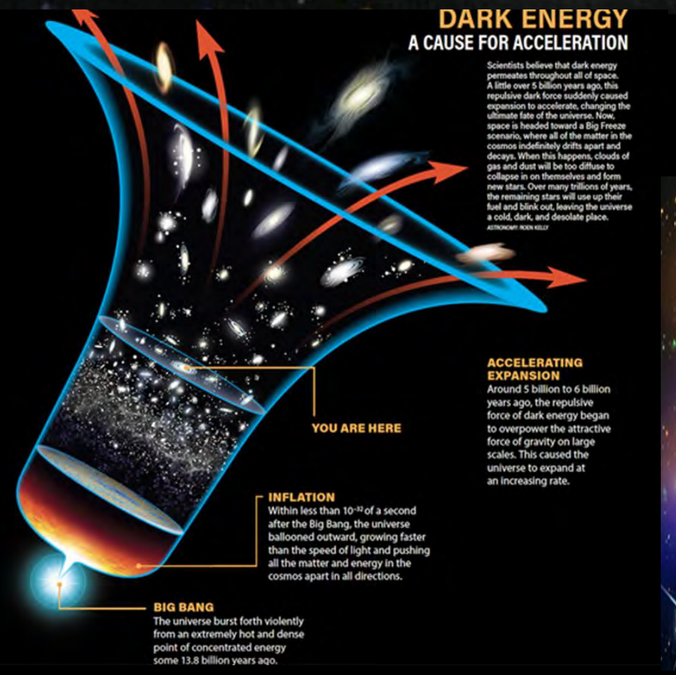
The Universe

92 billion light years across,
13.8 billion years old

Speed of Light: 300,000 km/s
1 LY= 9.4 trillion Km

MILKYWAY 13.2 billion years





DARK MATTER
Keeps galaxies together
With their stars

FORMATION OF LIVEABLE EARTH & MOON

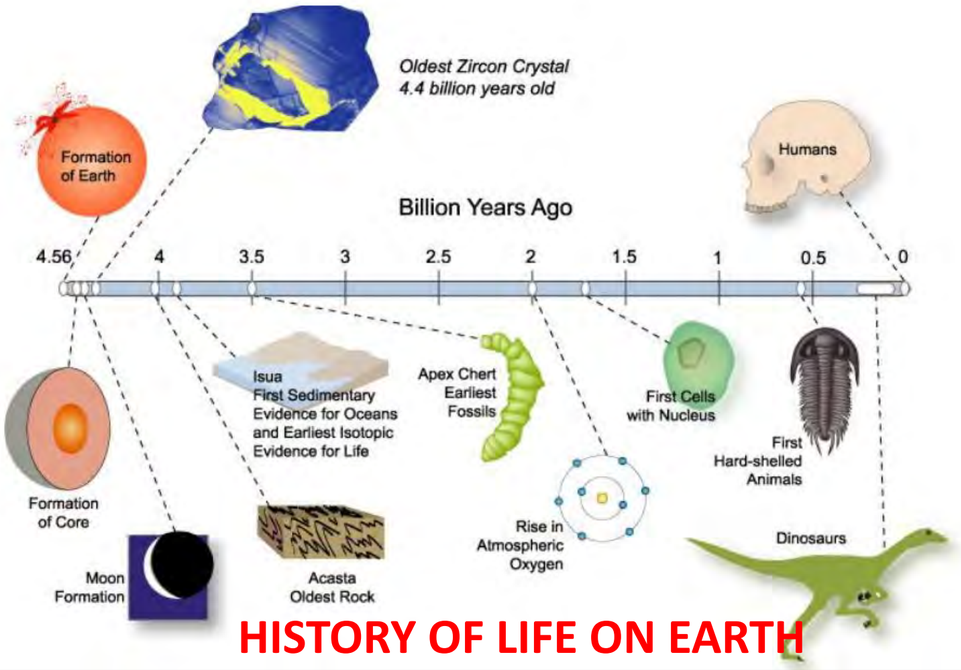
1 About 4.5 bn years ago the Earth is struck by Theia, an object size of Mars

2 Intense heat is created by the impact and huge amounts of debris from both Theia and the Earth are thrown into space

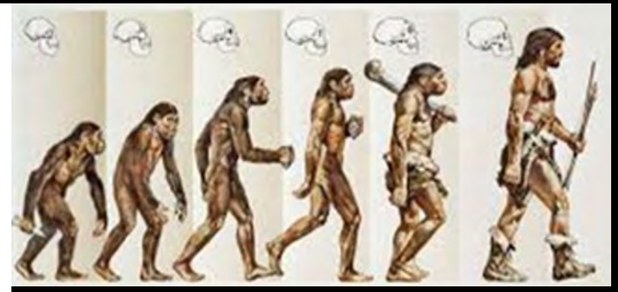
3 Earth got tilted by 23.5^0

The debris coalesces as it orbits the earth

4 The moon is formed from this debris.



HISTORY OF LIFE ON EARTH

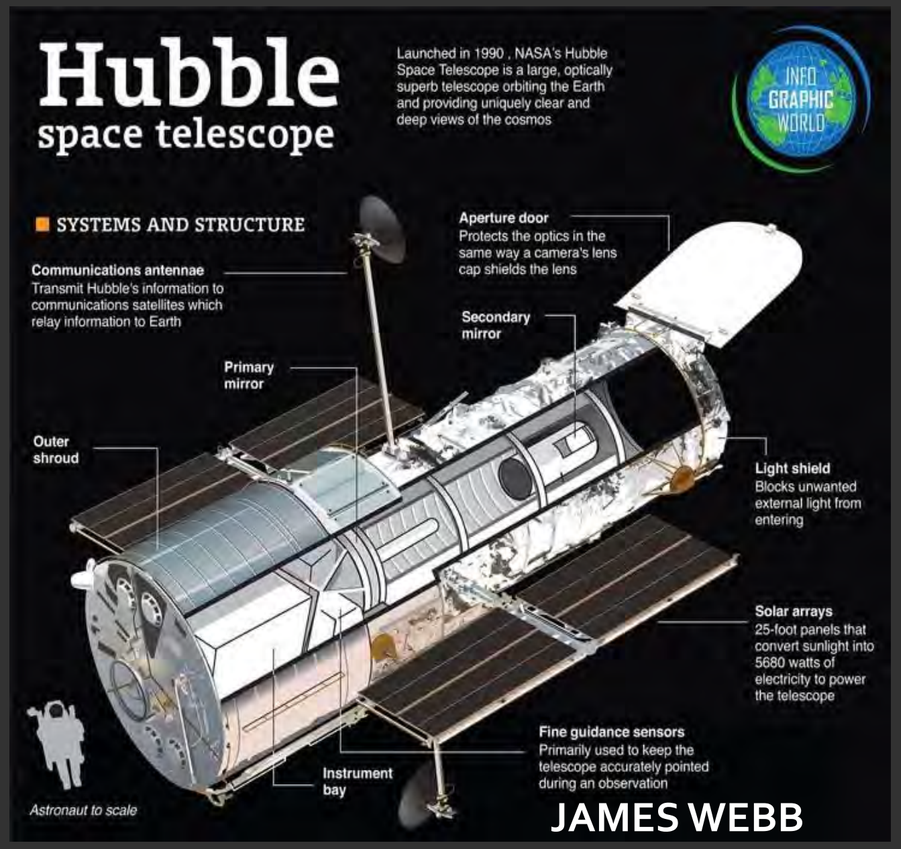


HUMAN EVOLUTION

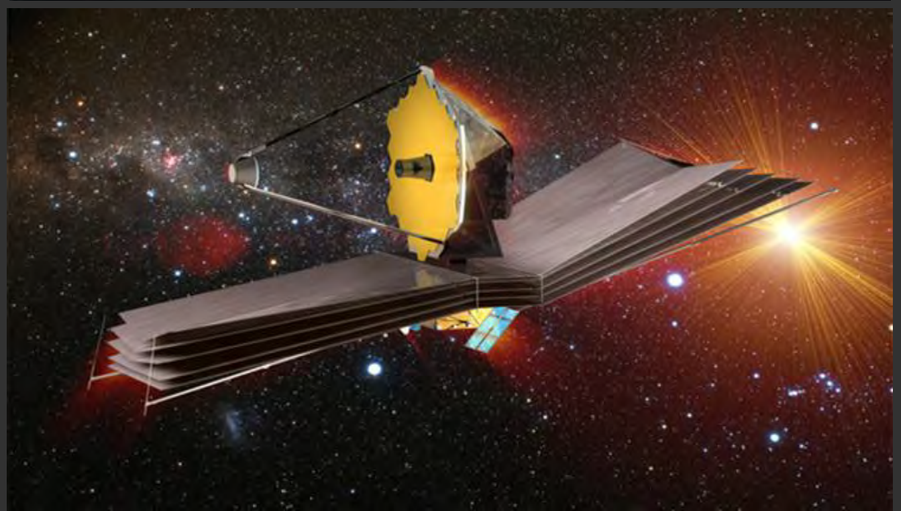
Extinction of dinosaurs occurred 65 million years ago, most likely due to a massive asteroid impact that triggered a global chain of environmental disasters, including a "nuclear winter" effect from dust blocking sunlight.

DANGEROUS ASTEROID HITTING ON THE EARTH

SPACE TELESCOPES

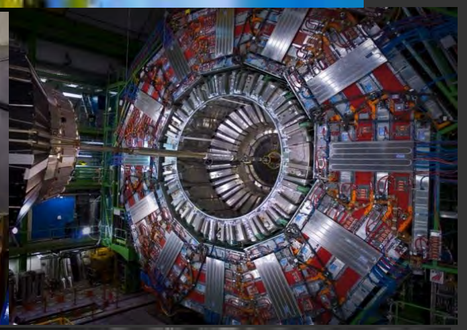


JAMES WEBB

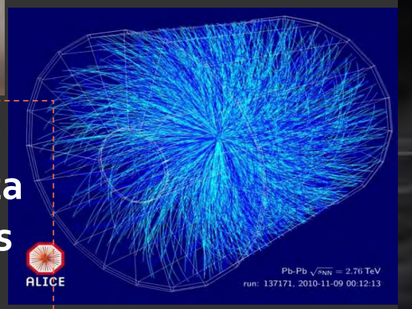


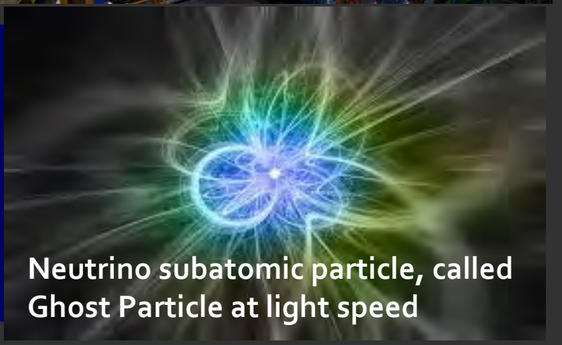
Large Hadron Collider – CERN

World's largest and most powerful particle accelerator for finding God Particle



CERN's Large Hadron Collider Publicly Releases Huge 300 TB Experiment Data Bank. Online experiments and analysis of High volume of data in real time

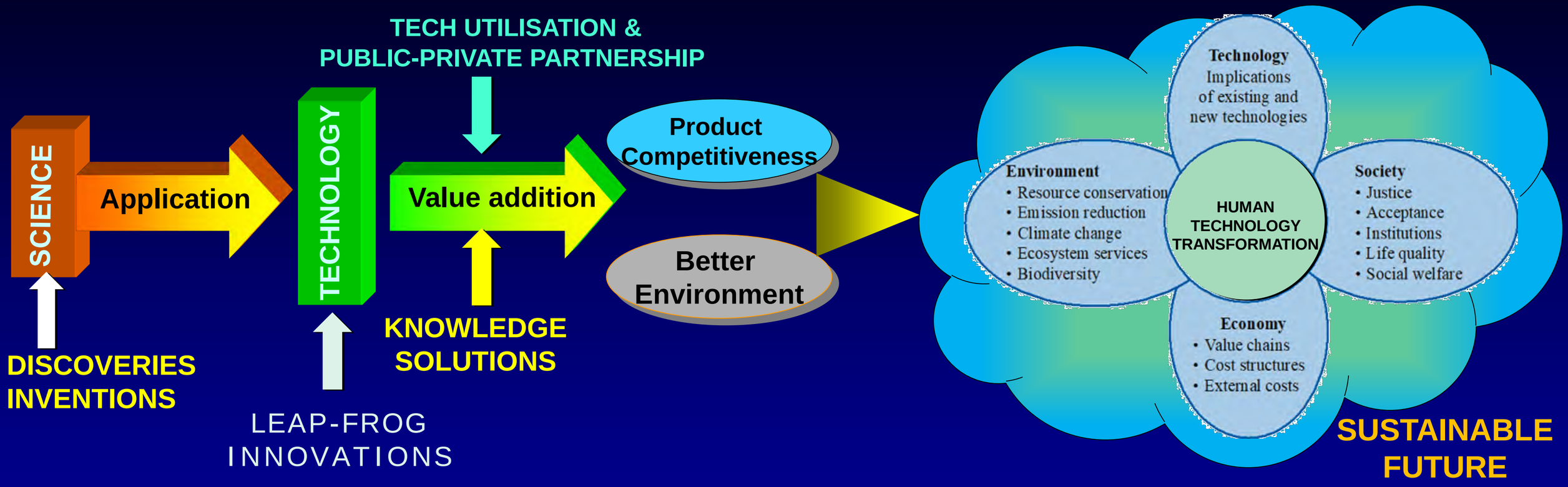




Neutrino subatomic particle, called Ghost Particle at light speed

UNDERSTANDING THE UNIVERSE AND FINDING THE ORIGIN - GOD PARTCLE

TECHNOLOGICAL EXCELLENCE DRIVES ECONOMIC PROSPERITY AND SOCIETAL TRANSITION



<u>Technological Innovations</u> can effect the most fundamental changes in the ground rules of economic competitiveness and environment, resulting sustainable development to the society.

TECHNOLOGY IN HUMAN LIFE- STONE AGE TO QUANTUM AGE

EARLY INNOVATIONS - SCIENCE FROM WEST SCIENCE

Stone Age | Bronze Age | Iron Age | Chemical Age | Plastics Age | Space Age | Nuclear Age | Biotechnology Age | Nanotechnology Age | Info & Knowledge Age (AI, QUANTUM COMMPUTING)

19th Century | 20th Century | 21st Century

5000 BC | 2000 BC | 0 | 1000 | 1500 | 1800 | 1900 | 1940 | 1960 | 1980 | 1990 | 2000 | 2020 | 2100

TECHNOLOGY EVOLUTION

Improved quality of Arts & Entertainment

Improved Material Quality of Life

Increased Knowledge Base

Beyond Knowledge Society

Brain on Chip

Bronze Statue

Panchloha Statue of Nataraja (8th Century AD)

RENAISSANCE

Tipu's Rocket (1792)

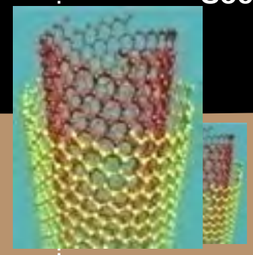
Nuclear

* WORLD WAR I

* WORLD WAR II

DNA

* COLD WAR



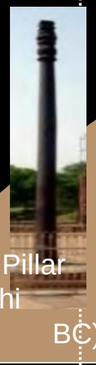
MW CNT

- HYPERSONICS
- CYBER PHYSICAL SYSTEMS
- MOLECULAR BIOLOGY, HMI
- SPACE RESOURCE EXPLOITATION
- TRANSHUMAN
- NETZERO CARBON

INDUSTRIAL REVOLUTION

INDUSTRY 4.0

CIVILISATION



Iron Pillar at Delhi (912 BC)

SCIENTIFIC INNOVATIONS

POWER INDUSTRY AIRCRAFT

COMPUTERS, LASER, GENETIC ENGG., INTERNET

EMERGENCE OF AI, ROBOTICS & INTELLIGENT BIO-MATERIALS & SENSORS, CYBERWARE

Natural Sources & Craftsmanship

Synthesis, Engineering, combinatorial, simulation Strategies

5000 BC | 2000 BC | 0 | 1000 | 1500 | 1800 | 1900 | 1940 | 1960 | 1980 | 1990 | 2000 | 2020 | 2100

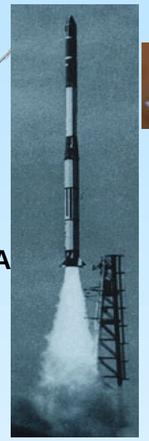
SOCIETY → AGRI | INDUSTRY | INFO | KNOWLEDGE

INDIA MOVING AHEAD FASTER – DEVELOPED NATION BY 2047

TECHNOLOGY PROGRESS IN INDIA-

Missions with Academy & Industry Partnership


ARYABHATA


SLV-3


IRS

INSAT

ASLV


PSLV


GSLV


LVM-3


NEW SPACE MISSIONS


BRAHMOS


MARS



ADITYA


Laser


NGLV


HYPERPLANE


FACTORY ON MOON


Hypersonic Cruise Missile


PRITHVI


AGNI


ALH


MBT


LCA (TEJAS) AMCA
Defence: $100 bn



Arihant


Pharma Hub
(Mkt. $40 bn)


EV
NET ZERO


Industry 5.0

5G/6G

One bn + Connections
(Fixed & Wireless)


SHAKTI
Micro processor


IT & ITES
Rev. $290 Bn

S/W STRENGTH &
SUPER COMPUTERS


PARAM PORUL


PETA FLOPS


QUANTUM COMPUTING


PARAM SUPERCOMPUTER


100 GFLOP


GREEN REVOLUTION
1970


WHITE REVOLUTION
1980


MAPS

500 MW FAST BREEDER REACTOR


WIND ENERGY
41.84 +23.7 GW
1990


SOLAR POWER
Target:200 GW
2000

HYDROGEN


NUCLEAR POWER GEN.
Present:
7380 MW
Target:
22380 MW
2010

Present: 300 MT
Target: 500 MT


PRECISION FARMING
2020-30

NISAR

1947

TARGET-2047

30 tn $ GDP

1 bn skilled Youth in 1.7 bn

Project Management Beyond Earth's Boundary

INDIA'S MOON MISSON

+First Soft Landing near the Lunar South Pole by India

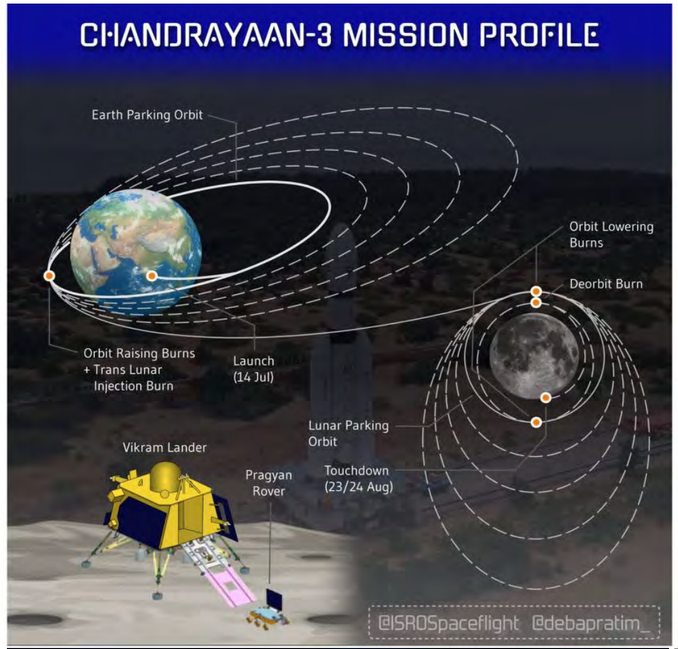
+Precision and Cost-Effectiveness

Mission cost **$75 million USD**, the most economical lunar missions in the world

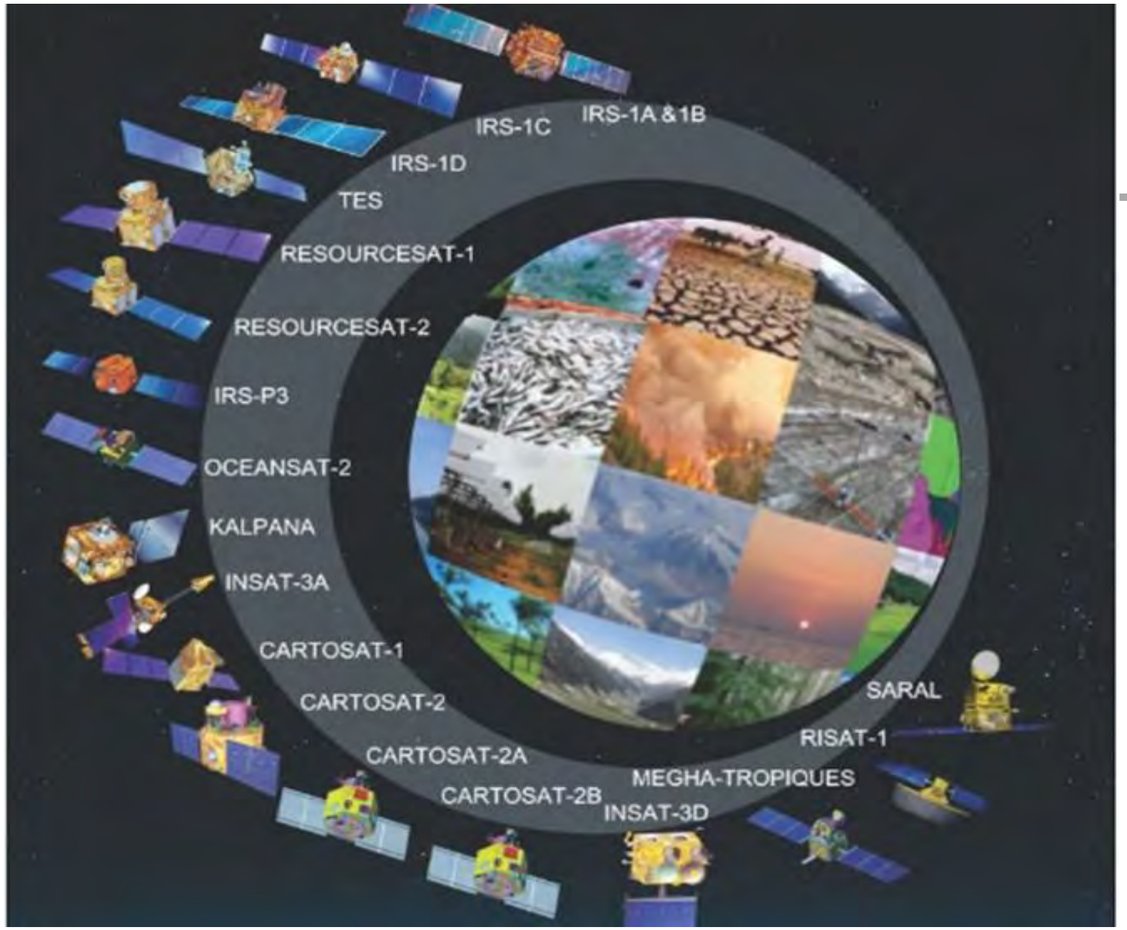
+Mission Management Excellence

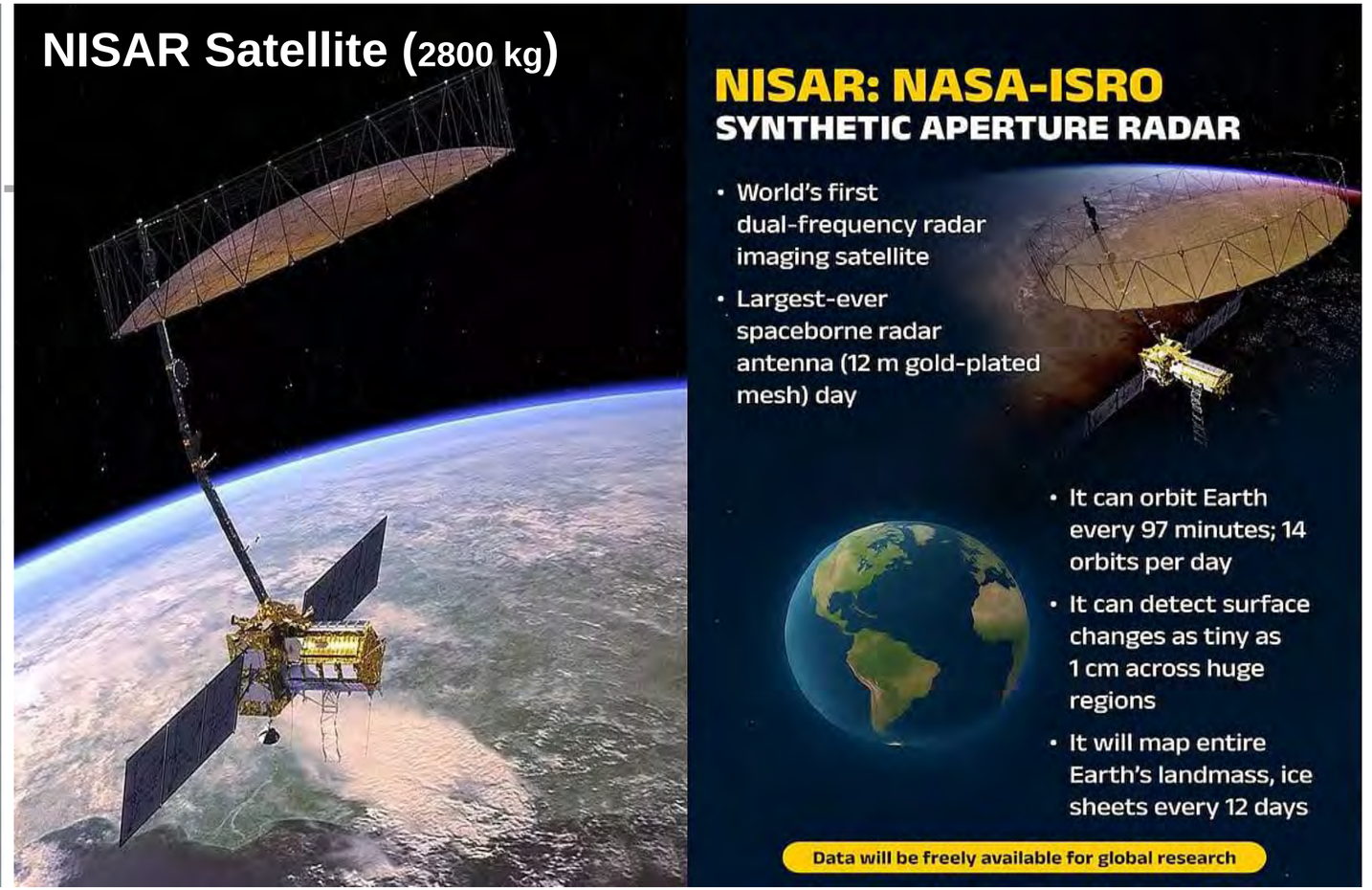
innovation and precise project management for world-class results.

+Paved the way for future international collaborations &Factory on the Moon in 2047



Earth Resource Satellites of India - Exploring the Earth with PM Wisdom





ISRO leverages sophisticated PM frameworks for mission success –NASA, ESA, Roscosmos, JAXA

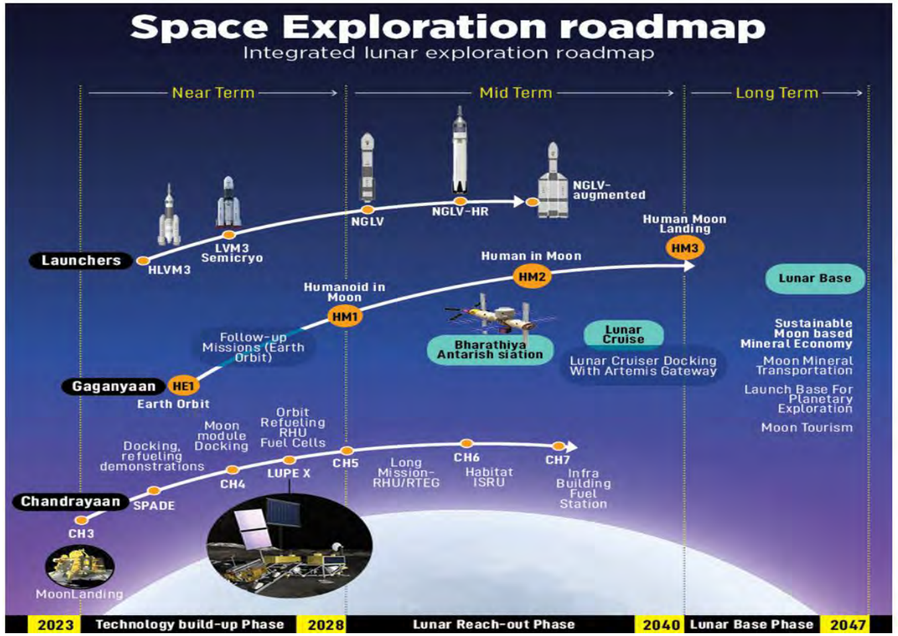
Modular mission architecture enables flexible, responsive space exploration

Multi-generational projects require specialized governance structures

NISAR (NASA-ISRO Synthetic Aperture Radar) will use radar imaging to study Earth's surface. The satellite was launched on 30 July 2025 by ISRO (GSLV MkII)

STRATEGIC ALIGNMENT

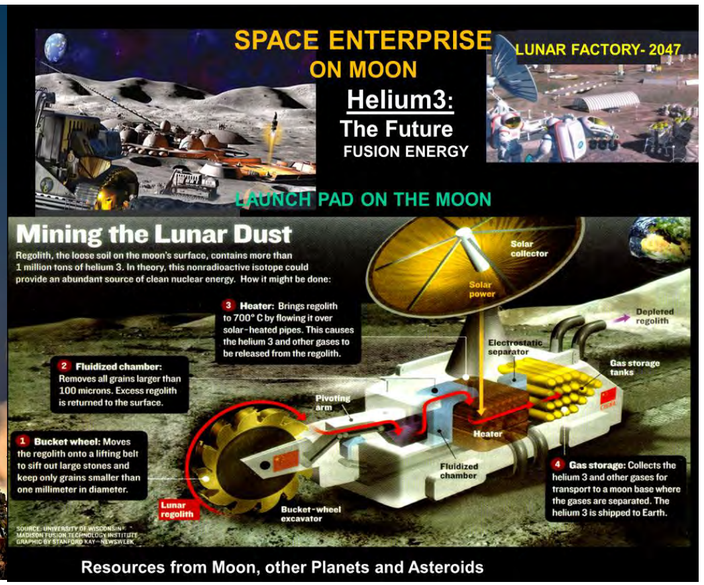
PM SUCCESS STORY - INDIA'S SPACE GLOBAL COMPETITIVENESS- SPACE ECONOMY



435 Foreign satellites from 36 countries launched so far by ISRO

Huge market for Small Satellites (100-200 kg class) - $15 billion/yr market

36 + 36 satellites each 150 kg in LVM3 for UK



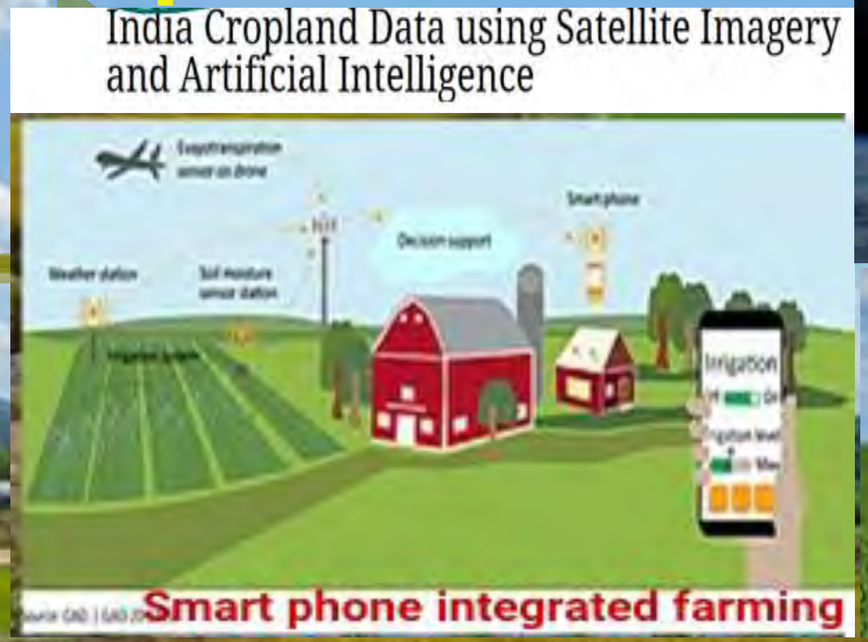
SSLV-03

SINGLE PSLV WITH 104 SATELLITES

ISRO+INDUSTRY (LV+SAT PRODUCTION)

SPACE TECHNOLOGY, AI, DRONE, ROBOTS FOR PRECISION FARMING

'SATSURE – SUCCESSFUL STARTUP'



GEO-imaging satellite & Polar Satellites

GENERATIVE AI SOLUTIONS FOR SATELLITE DATA UTILIZATION

- Computer Vision for satellite imagery analysis
- Real-time Data Processing to enable faster decision-making and timely responses
- Data Integration
- Predictive Analytics to forecast weather based on historical data

Satellite/Drone based Laser-induced breakdown spectroscopy (LIBS) has emerged as a powerful tool, enabling rapid and accurate elemental analysis of soil composition

PM SUCCESS STORY

TRAVEL IN UNEXPLORED PATH - BRAHMOS

Integrating Core Competencies of Two Nations

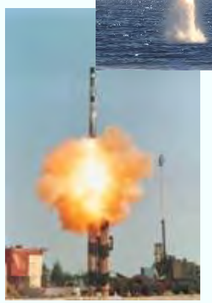
India
DRDO
50.5%

Russia
NPOM
49.5%

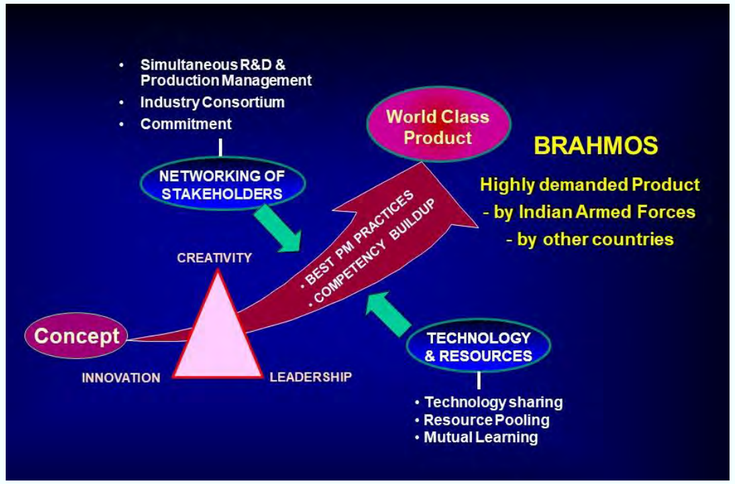
RESPONSIBILITIES
- Resources
- Capabilities
- Core Competencies

RESPONSIBILITIES
- Resources
- Capabilities
- Core Competencies

Joint Venture
Joint Design, Development, Manufacture and Marketing
(MIND TO MARKET)



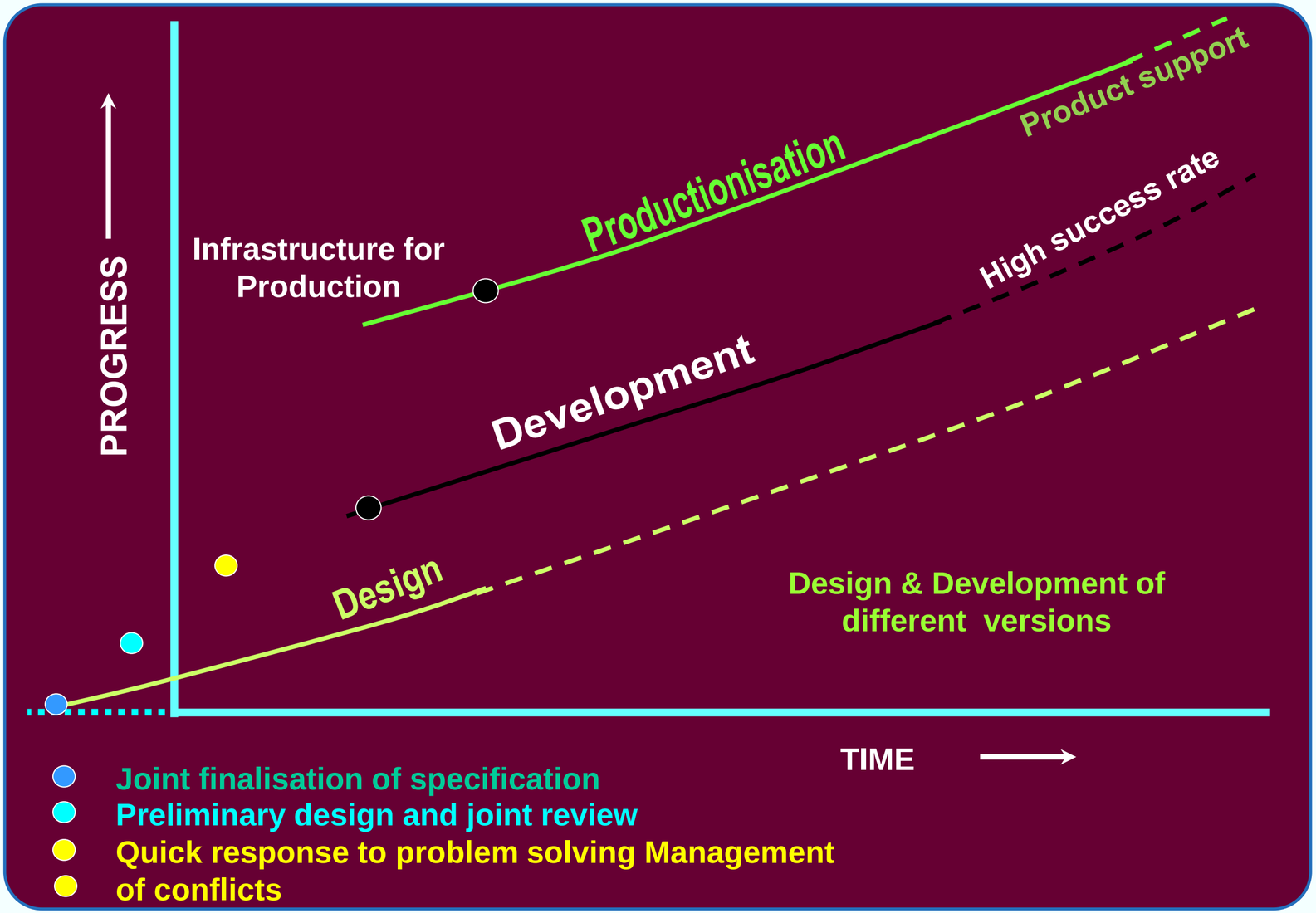
BRAHMOS SUPERSONIC CRUISE MISSILE
Speed, precision & power



BRAHMOS - THE ONLY OPERATIONAL SUPERSONIC CRUISE MISSILE IN SEA, LAND & AIR IN THE WHOLE WORLD

BRAHMOS PM STRATEGY

– *CONCURRENT DESIGN, DEVELOPMENT & PRODUCTIONISATION*



- **Joint design & development (R&D + Industry)**
- **Large scale industrial Consortium – Both Public and Private as Consortium**
- **Technology sharing for mfg. of critical systems**
- **Common Inspection Standards for product acceptance**
- **Holding System Design, System Engineering, System Integration and System Management with core JV**

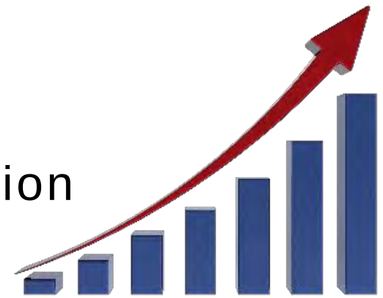
- **Faster realization of Product & entry to market**
- **Brand Image**
- **Customer Focus**

Brand image, timely delivery and perceived quality are three game-changers in maintaining competitiveness

INDIA'S INFRASTRUCTURE ROADMAP FOR 2047

HIGHWAYS

- 75,000 kms of greenfield Highway expansion

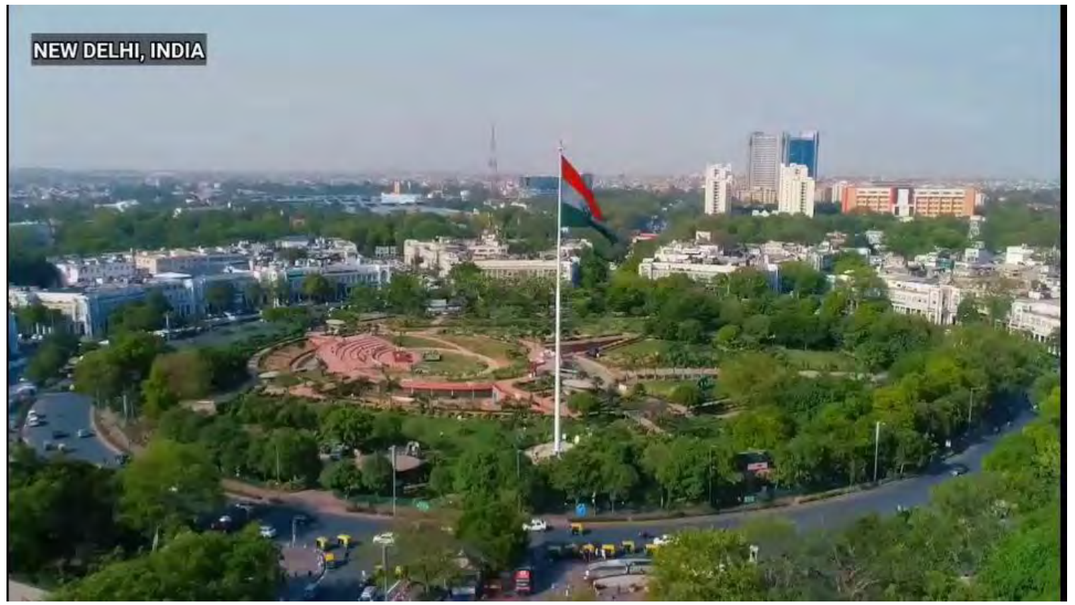


RAILWAYS

- 200,000 kms of Rail Network for upgrade/expansion
- A fully functional network of **Hyperloop, Bullet Trains.**

MARITIME INFRASTRUCTURE

- 4X Increase in Total Port Capacity from 2600 MTPA to 10000 MTPA
- 6 Mega Port Clusters to be developed, with capacity of 300 – 500 MTPA per port



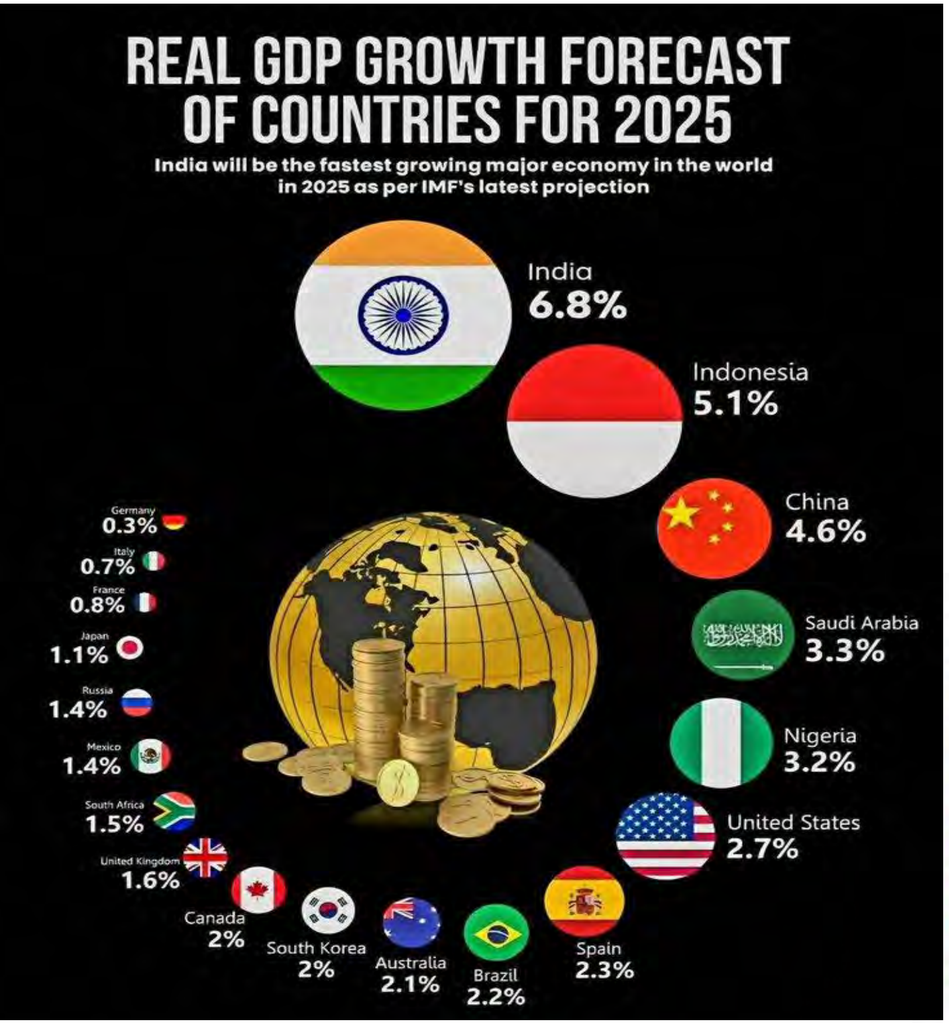
AVIATION INFRASTRUCTURE

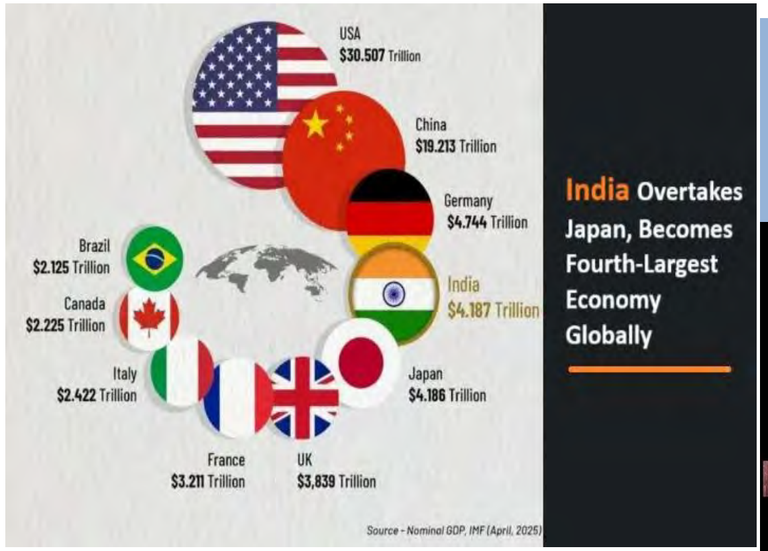
- Number of Airports to be doubled to 300

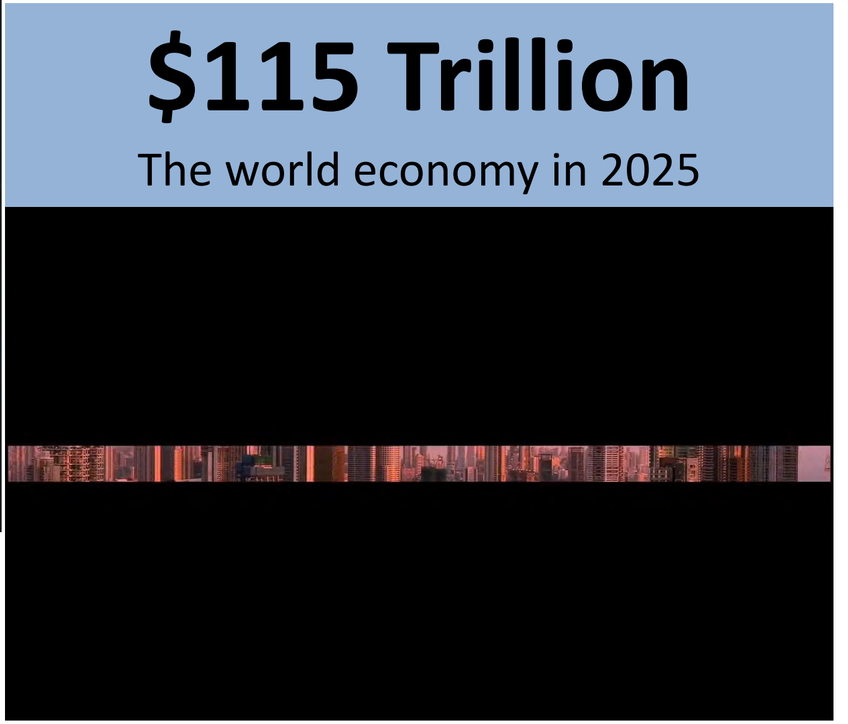
ENERGY INFRASTRUCTURE

- 10X Increase in RE Capacity from 150 GW to 1500 GW

World Economy in 2025





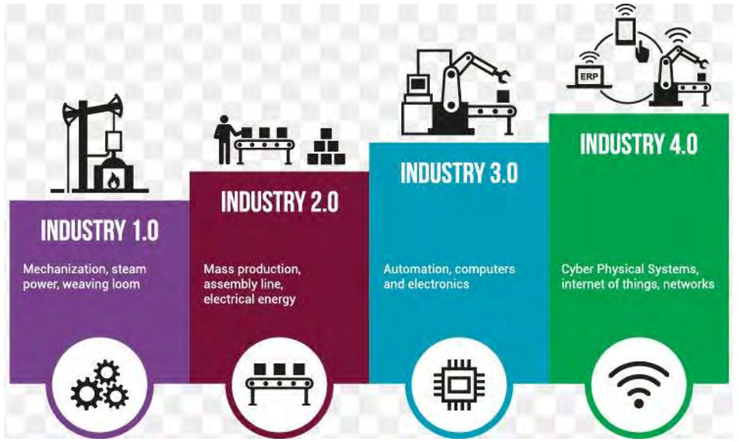


World Economy Trend (predicted by experts)

2029 – $ 9 trillion India Number 3, after USA and China. (Overtaking Germany)

$ 30 Trillion by 2047

Transition to Industry 5.0

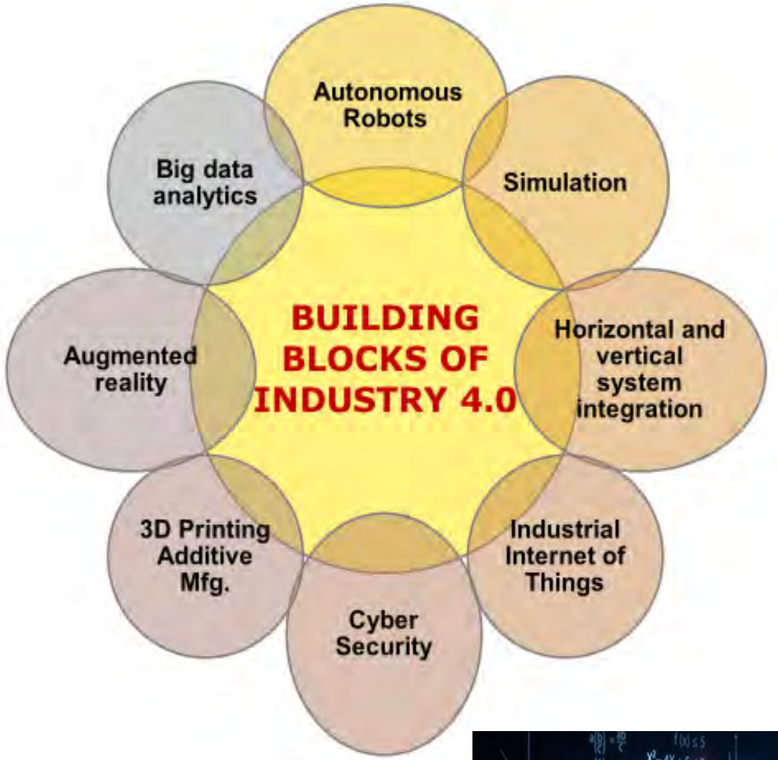


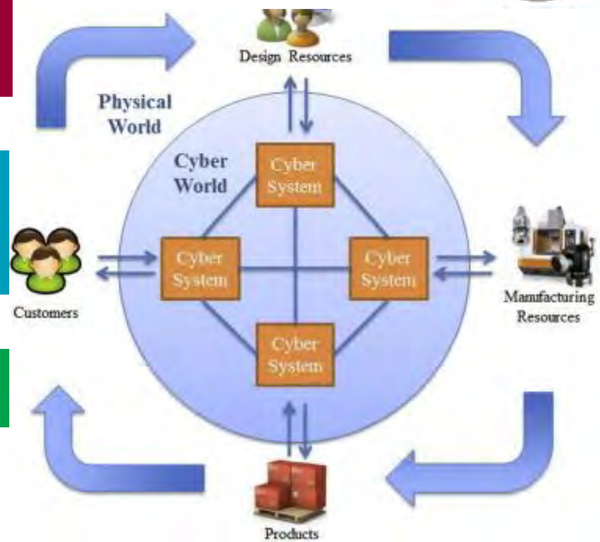
Mechanization, steam power, weaving loom

Mass production, assembly line, electrical energy

Automation, computers and electronics

Cyber Physical Systems





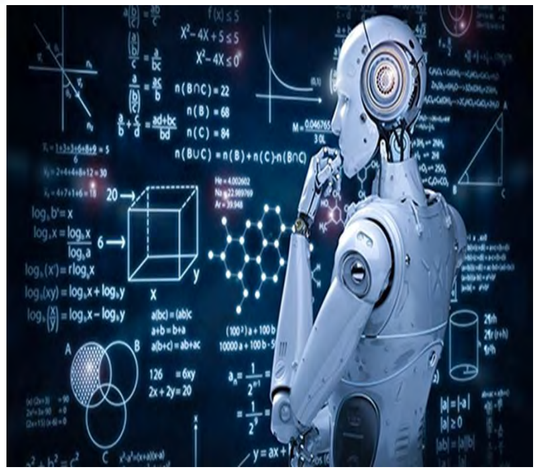
INDUSTRY 5.0

+GENERATIVE AI

+ *Sustainable Human centric and resilient Industry.* + 6G

S

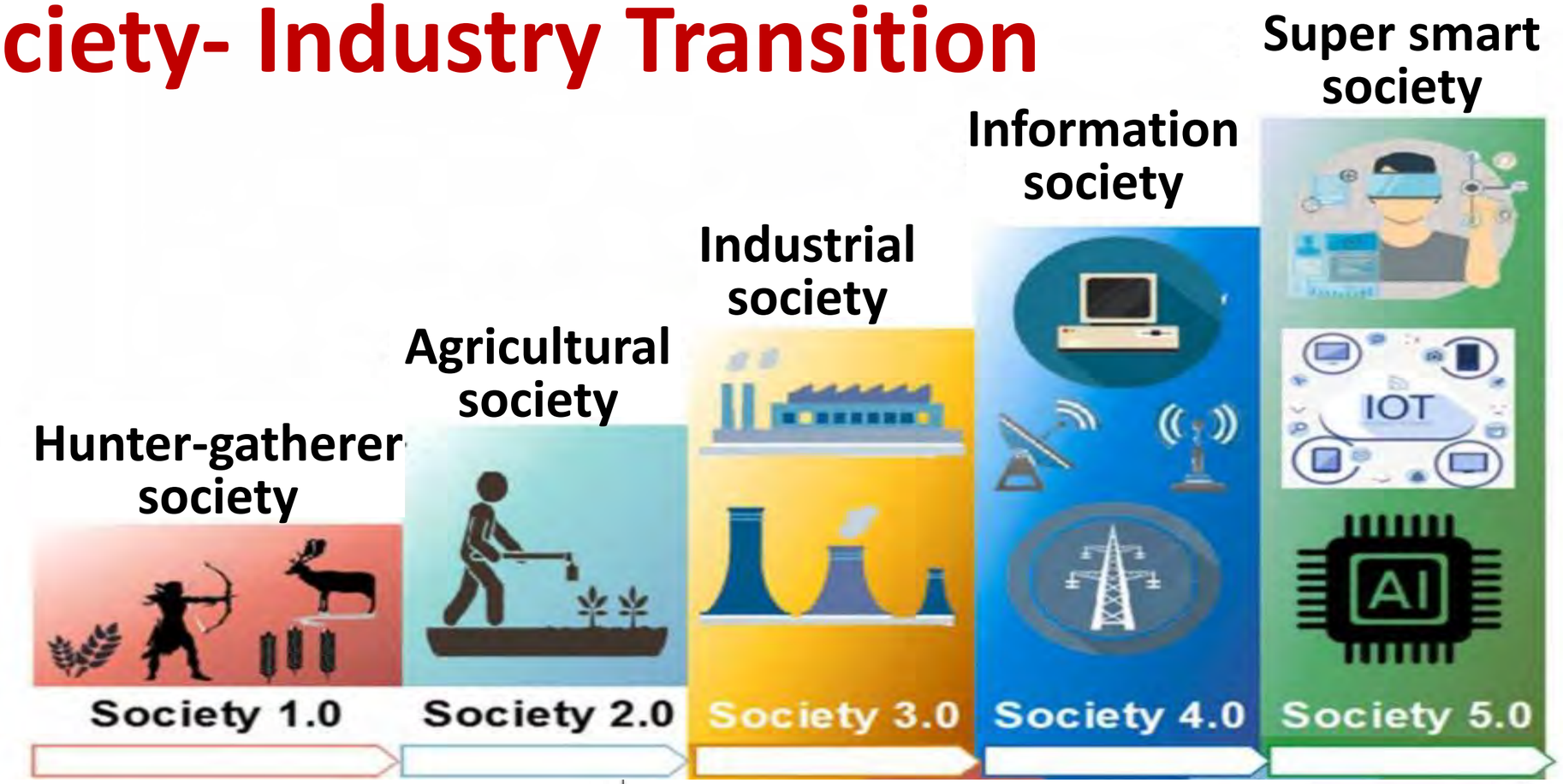
- ***Cost optimization***
- ***Greener Solutions***
- ***Personalization &Creativity***



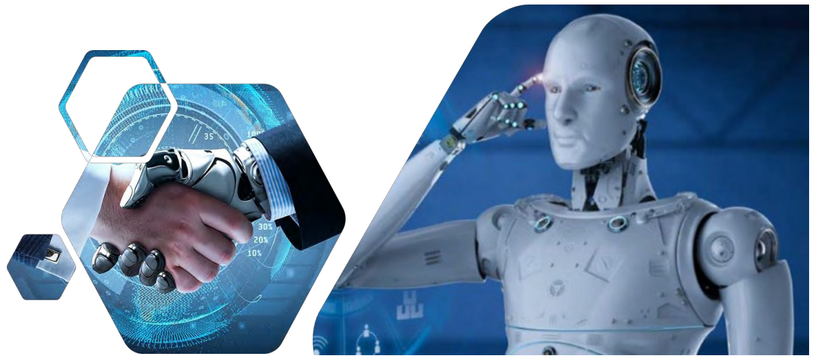
Industrial Robots

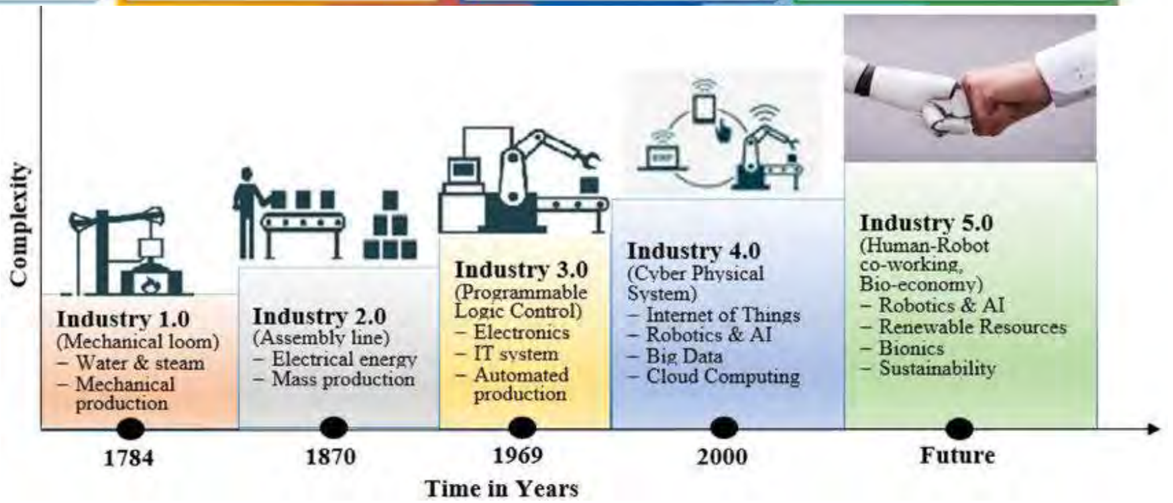
EMERGENCE OF AGI

Society- Industry Transition



"AI-Powered Project Management: Transforming Strategies into Success"





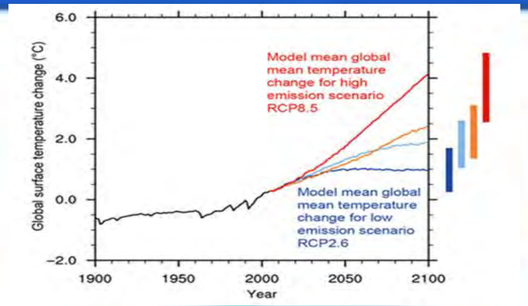
BUT…..

CLIMATE CHANGE

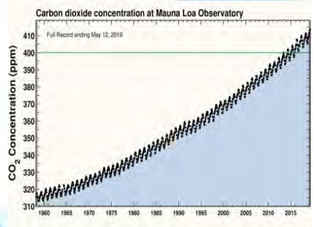
Impacts, Causes and Solutions

ARCTIC

The Arctic sea ice extent has **decreased by approximately 3.1% per decade** since satellite records began in 1979
(Source : NASA)



CO2 EMISSIONS



The concentration of carbon dioxide in the atmosphere has **increased by 48%** since pre-industrial times, with current levels at 417 parts per million
(Source : NASA)

OCEANS

The ocean has absorbed approximately 93% of the excess heat from greenhouse gas emissions since the 1970s resulting in coral bleaching, ocean acidification and changes in ocean current (Source : IPCC)

GLOBAL WARMING

Global temperature have increased 1.1 degree Celsius since pre-industrial times, and are projected to increase by at least 1.5 degrees Celsius by the end of the century (Source : IPCC)

CORAL REEFS

Earth has **lest an estimated 50% of its coral reefs** in the last 30 years due to ocean warning and acidification
(Source : NOAA)

Renewable Energy

Renewal energy sources such as wind and solar power **accounted for 72% of the new power generation** capacity installed worldwide in 2019.
(Source : International Energy Agency)

APPLICATIONS OF GREEN TECHNOLOGY IN SUSTAINABLE DEVELOPMENT –PPP Model

Food Production

- Green technology for Agriculture- Precision Farming

Climate Engineering

- Reduction of CO2 in air (Carbon Sequestration)
- Cooling of Earth

Clean Energy Generation

- Bio-Fuel
- Synthetic Natural Gas
- Power through Municipal Solid Waste
- Solar, wind, Ocean energy, Green H2

Clean Environment & Circular Economy

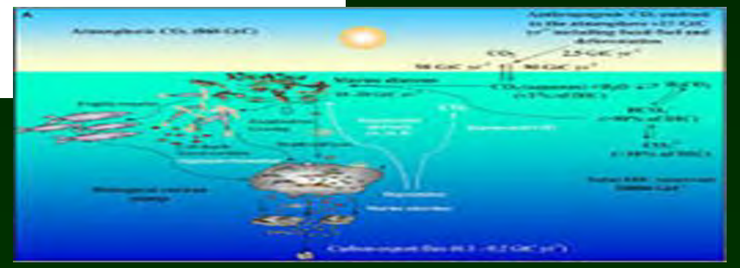
- Plastic tar road
- E-waste management
- Green Computing
- Liquid waste management & Bioremediation of floating oil

Green buildings

Herbs for Health

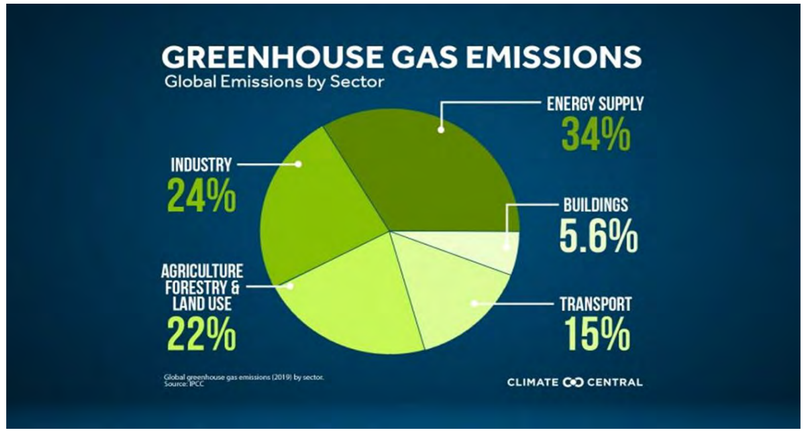
Use of Artificial Intelligence

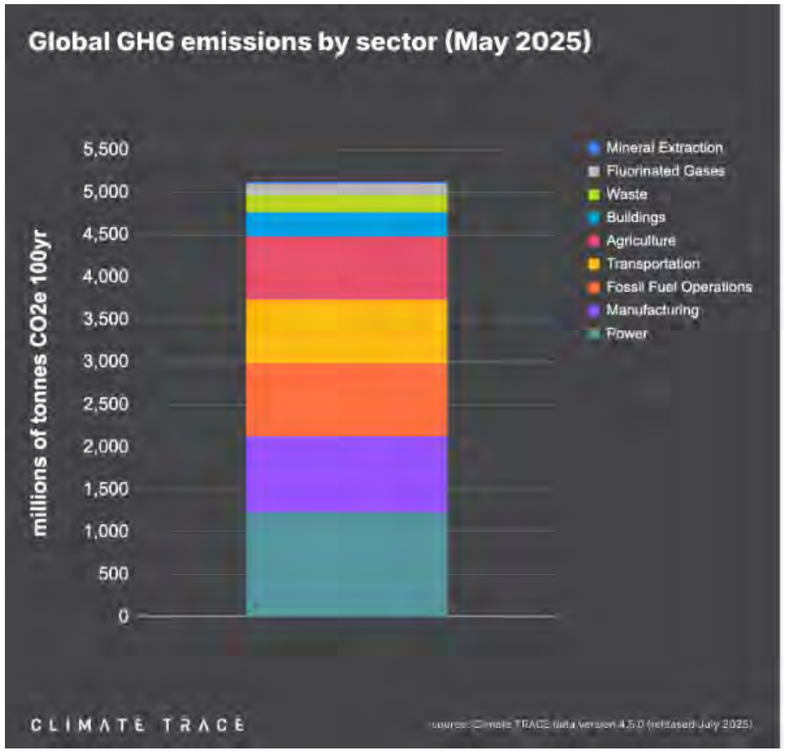
- Climate Forecasting, Modelling & Monitoring, integrated with Satellite Data
- Clean Energy Integration & Optimization
- Support for Precision Agriculture
- Transport planning, & Route Optimization in cities



Scientists have discovered that microscopic plants called diatoms can absorb 10-20 billion tons of carbon dioxide (CO_2) every year as they float on the surface of the ocean

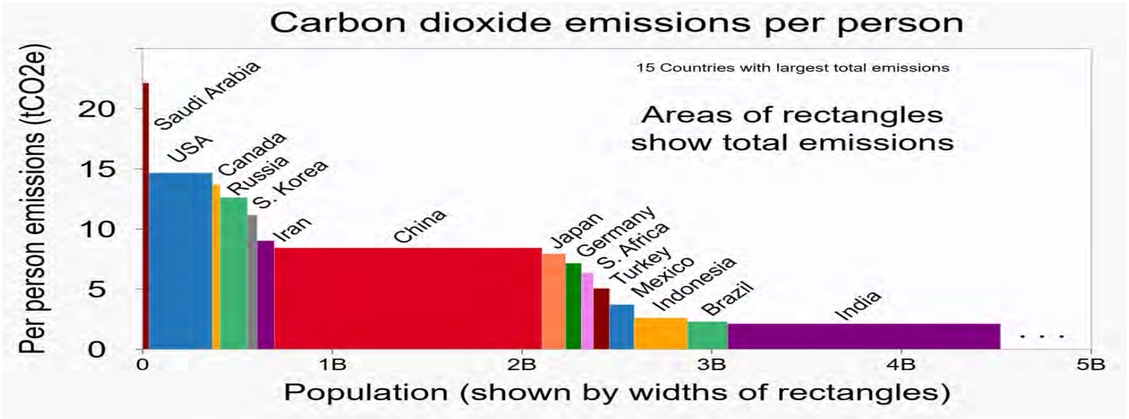
CO2 Emissions – Sector wise



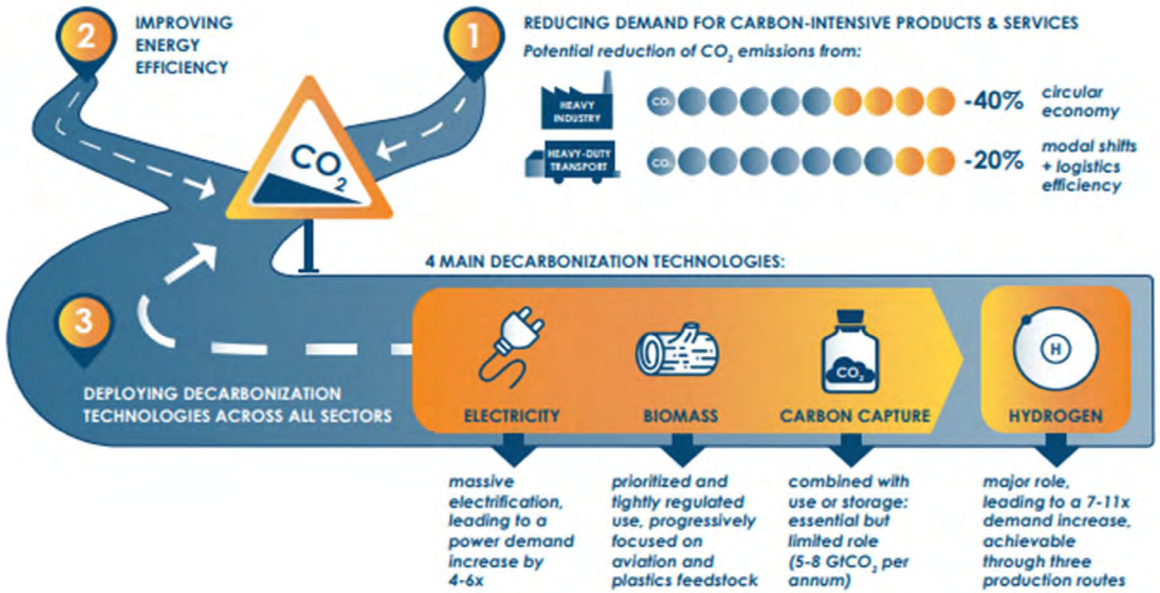


1900 2100

HUMANS GENERATE 51 BILLION TONS OF GHG EVERY YEAR

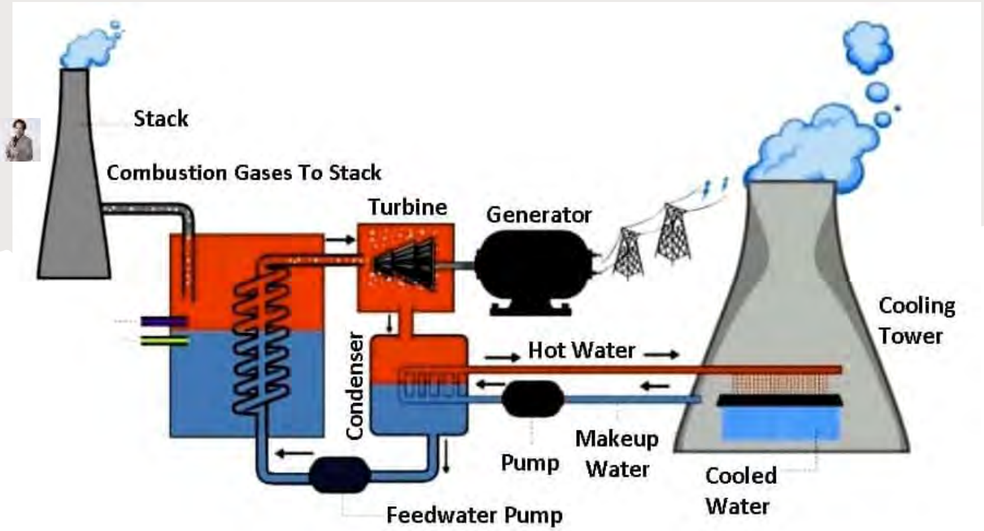


© Satista 2025

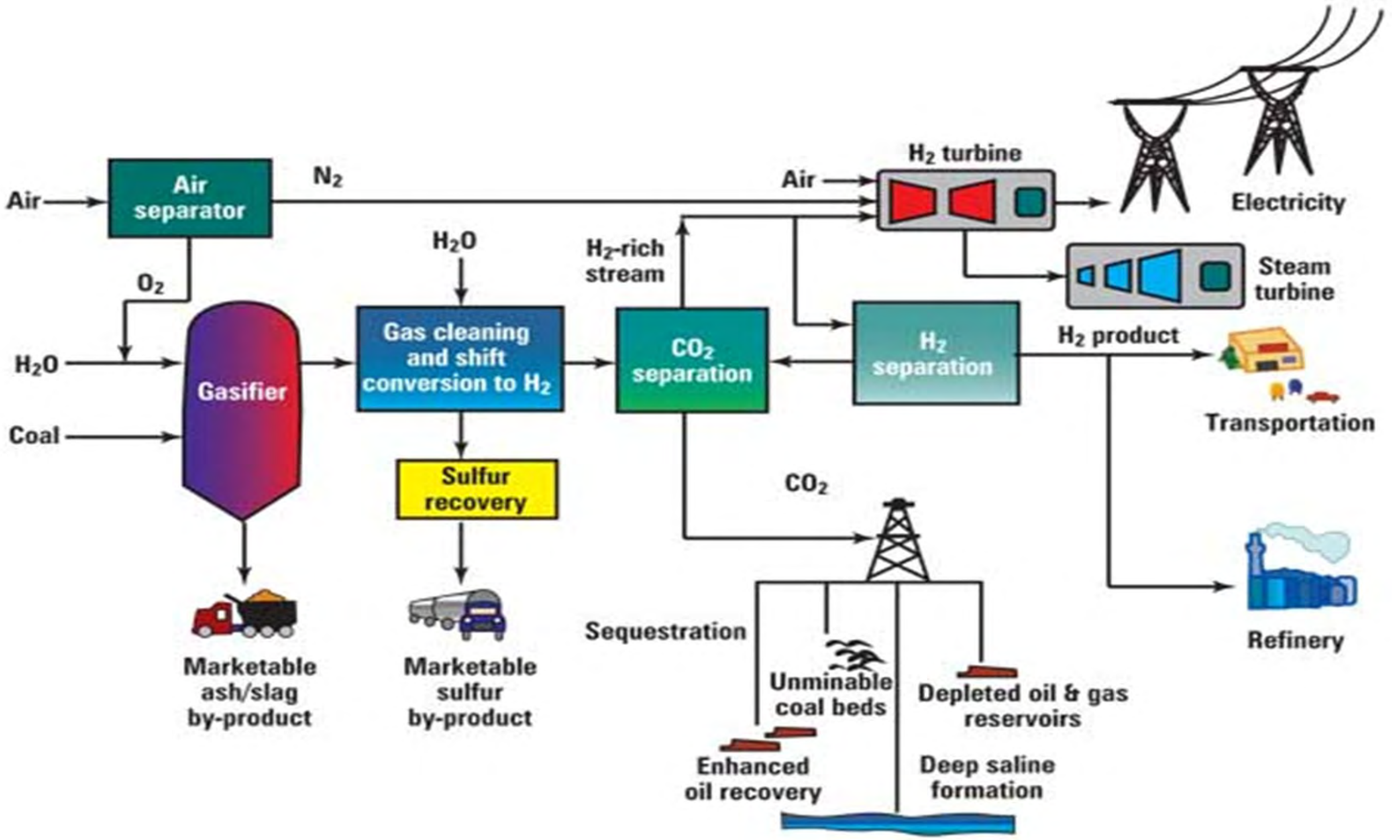


Complete Road map for Decarbonaization

Zero-Emission Power Plant



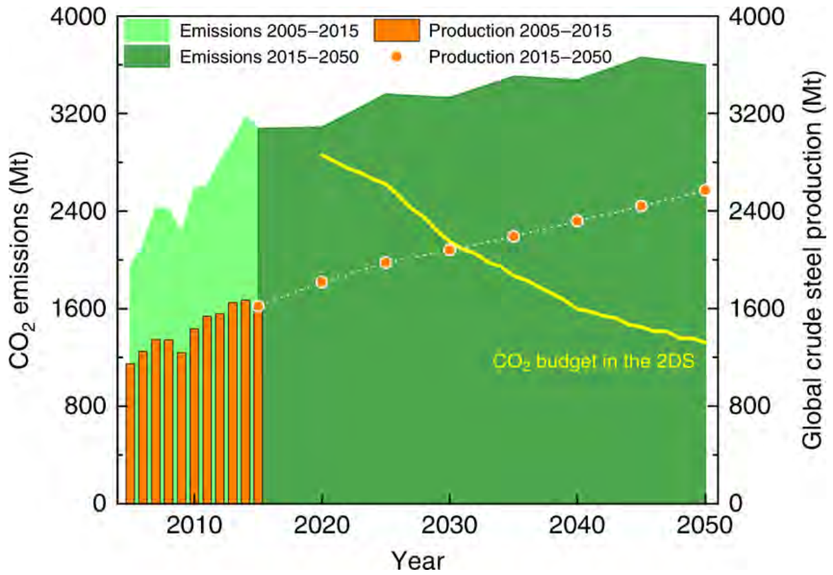
Thermal Power Plant

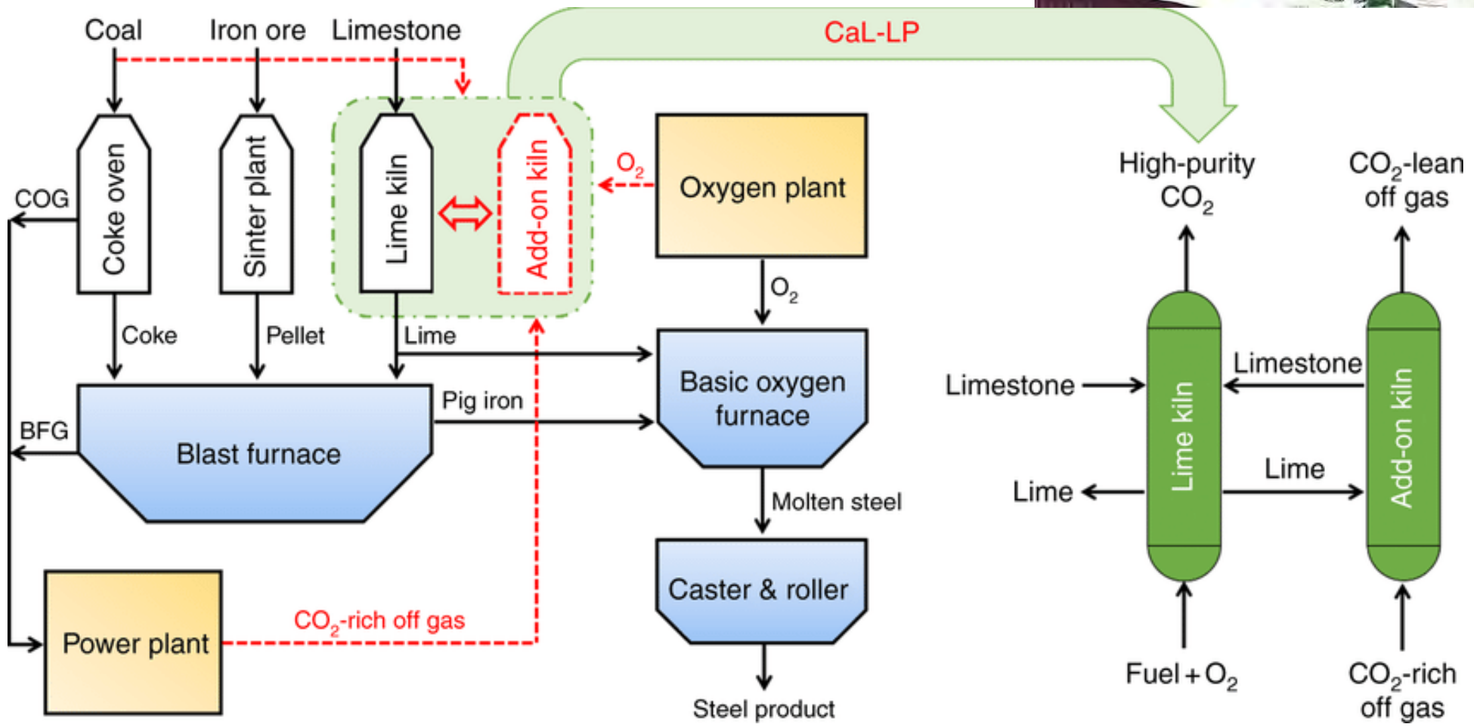


A thermal power plant converts heat energy into electricity, typically by burning fuels like coal, natural gas, or oil to heat water in a boiler, producing high-pressure steam

DECARBONIZING STEEL

Inherent potential of steelmaking to contribute to decarbonization targets via industrial carbon capture and storage.



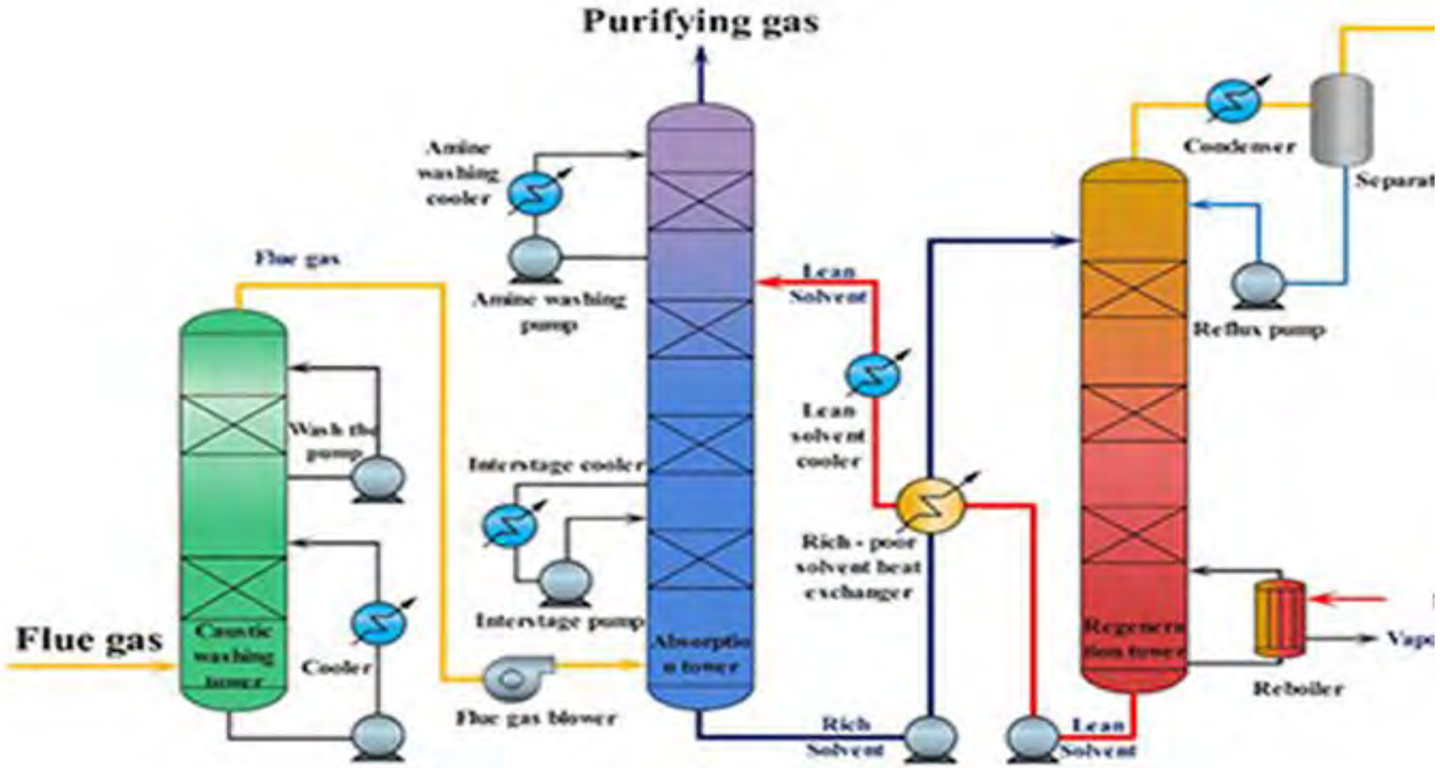


Schematic of the conventional integrated steel mill implementing the calcium-looping lime production (CaL-LP) scheme for steelmaking with inherent CO2 emission reduction. The mass flows through the add-on kiln related to the CaL-LP scheme and existing manufacturing facilities in the steel mill are indicated with the red dashed and black solid lines, respectively. COG, coke oven gas; BFG, blast furnace gas

Source: Nature Communications

DECARBONIZING CEMENT

100,000 tons/year CCUS carbon and nitrogen cogeneration



Capture-Utilization-Sequestration in cement plants

PM ACTIONS

- **Progressing cement decarbonization technologies:**
- **CCUS, leading supplementary cementitious materials, new cement production processes, (petroleum) waste-derived fuel, biomass-derived fuel, kiln/calciner electrification, hydrogen fuel, concentrated solar power for the kiln/calciner**

Reducing the amount of clinker and supplementing it with fly ash / slag

Benchmarking of cement decarbonization solutions (cost, TRL, decarbonization potential)

Drivers and barriers for reaching a net-zero cement sector (including impacts of green premiums and cement standards)

Regulatory and private sector drivers for low-carbon cement production business case (i.e. CBAM, ETS, procurement, book and claim)

Global cement market to reach $592.38 bn by 2032, growing at 4.3% CAGR

E-MOBILITY

FOCUS AREAS

CHARGING INFRASTRUCTURE

Developing extensive, accessible and fast-charging networks

BATTERY PRODUCTION & RECYCLING

Minimizing the environmental impact of battery production and developing efficient recycling systems for spent batteries

GRID CAPACITY & SCALING

Upgrading Energy grids and integrating RE sources

INNOVATIONS DRIVING E-MOBILITY

NEXT GENERATION BATTERIES

Solid-state batteries, with their higher energy density and faster charging capabilities

WIRELESS CHARGING

Inductive charging methodology

SMART CHARGING SOLUTIONS

Smart charging networks allow vehicles to charge during off-peak hours, balancing grid demand and reducing costs

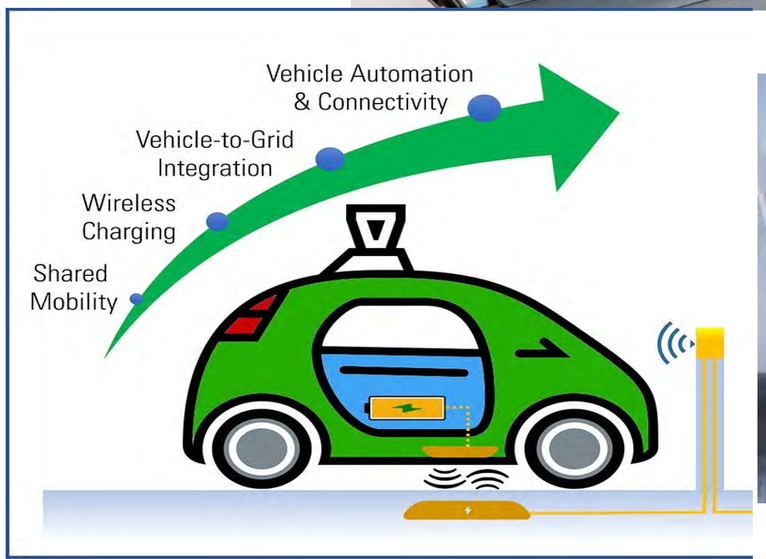
LIGHT WEIGHT MATERIALS FOR EVs

Help reduce vehicle weight, increasing energy efficiency & driving range

Future of Mobility

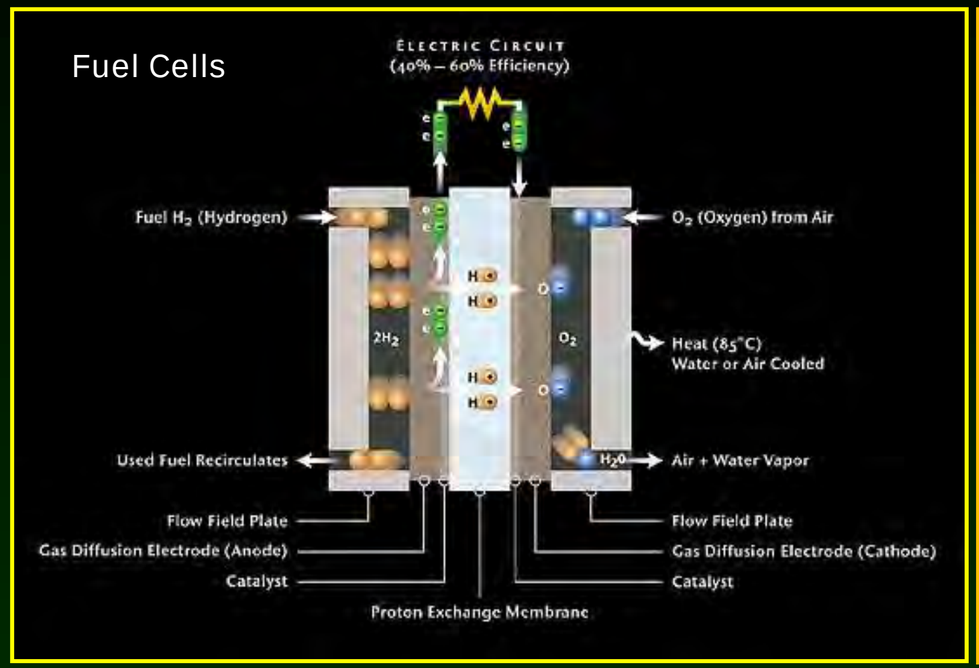
Human-centric, smart and green.

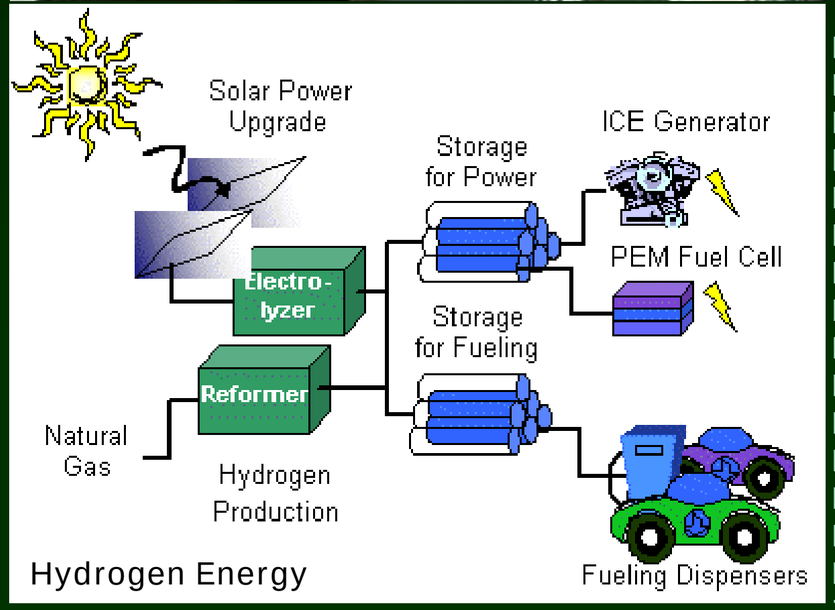
Future-ready technologies – hydrogen-powered internal combustion engines, efficient fuel delivery systems, battery electric powertrains and hydrogen fuel cell powered electric will accelerate the adoption of clean mobility.



Wireless charging

CLEAN ENERGY GENERATIONS – Sources

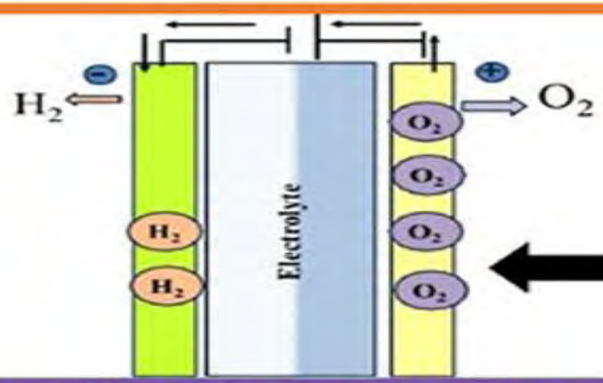




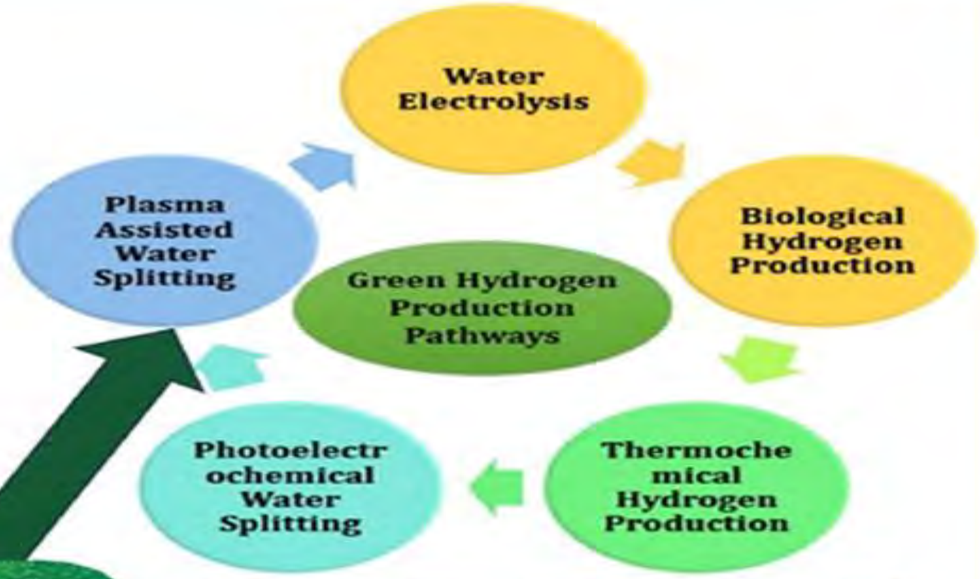
Energy from Ocean

CLEAN ENERGY- GREEN HYDROGEN ROADMAP

Types of Hydrogen



Alkaline water, AEM, PEM, SOM Electrolyser

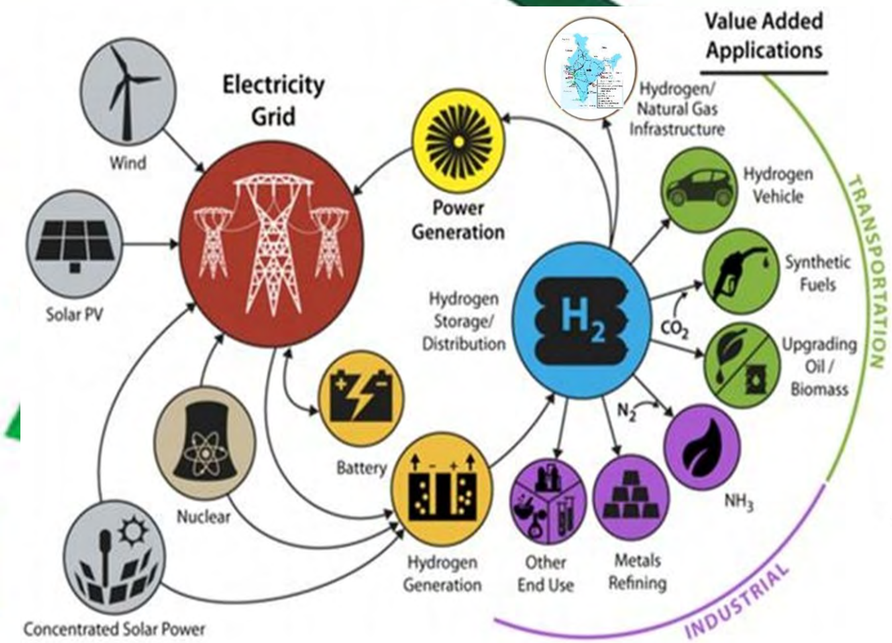


Green Hydrogen Methods

PEC Water Splitting

Agriculture

Environmental Impact & Sustainable applications

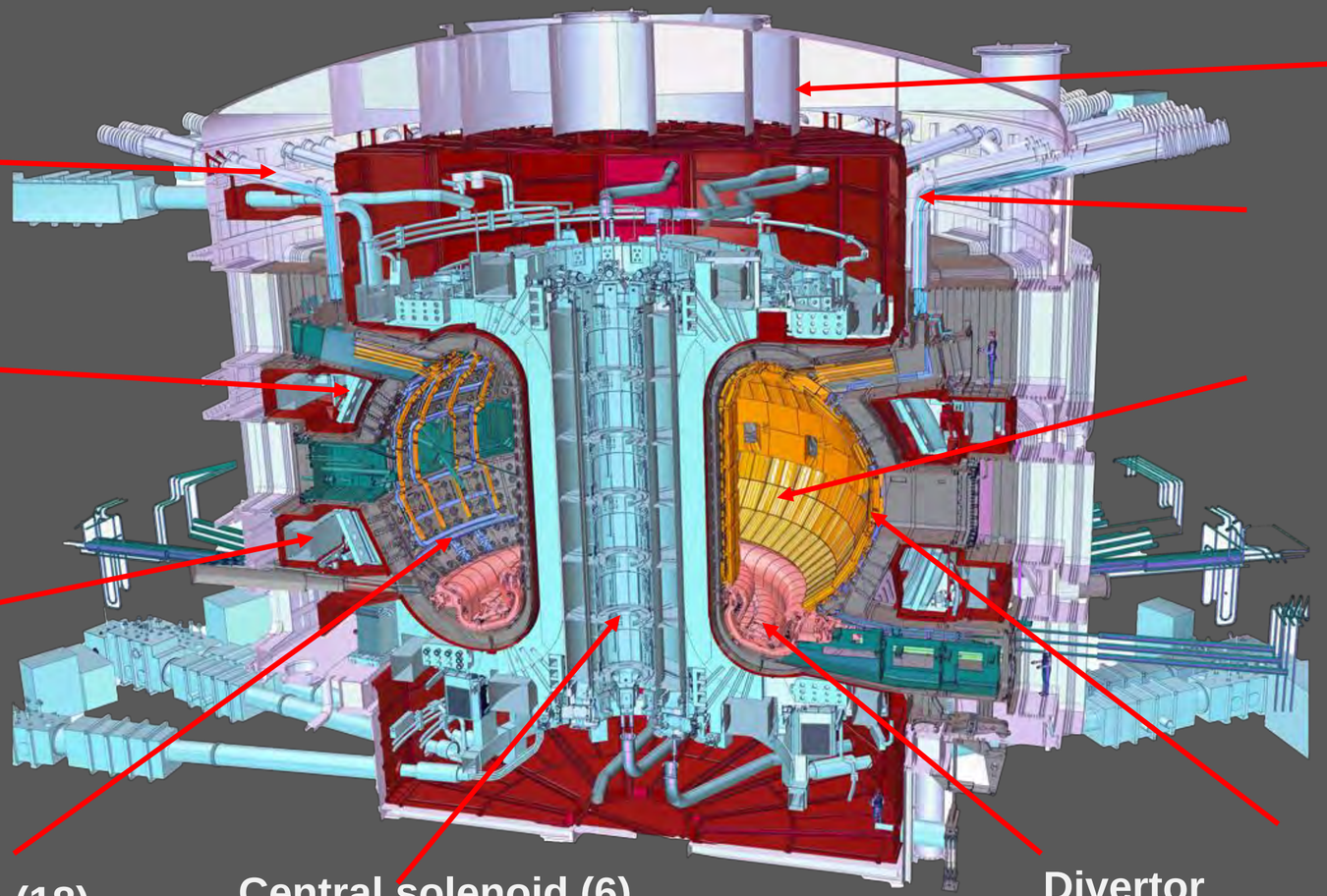


Applications of Green Hydrogen

Source: sciencedirect.com

FUSION ENERGY- ITER (500MW)

7 Nations consortium to master Fusion Technology



Feeders (31)

Cryostat

Thermal shield

Toroidal Field coils (18)

Vacuum vessel

Poloidal field coils (6)

Blanket modules

Correction coils (18)

Central solenoid (6)

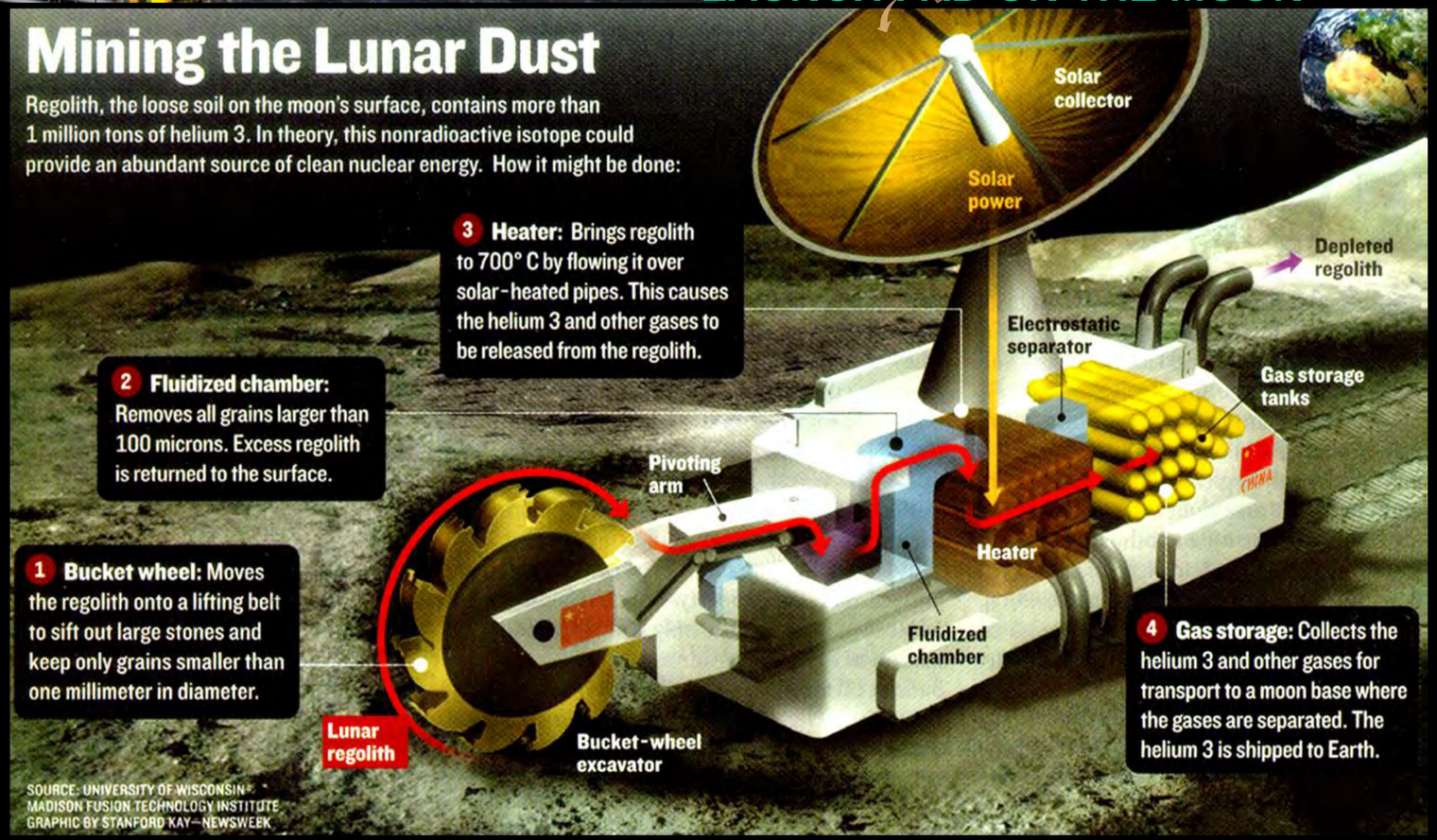
Divertor

Public (AEC- IPR) & Private (L&T) Partnership

SPACE ENTERPRISE

Helium3:
The Future
FUSION ENERGY

LAUNCH PAD ON THE MOON

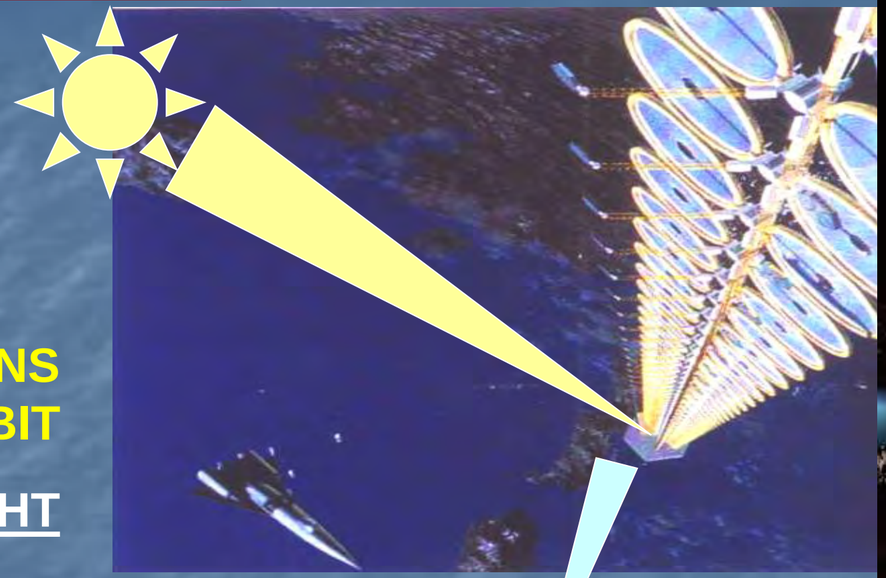


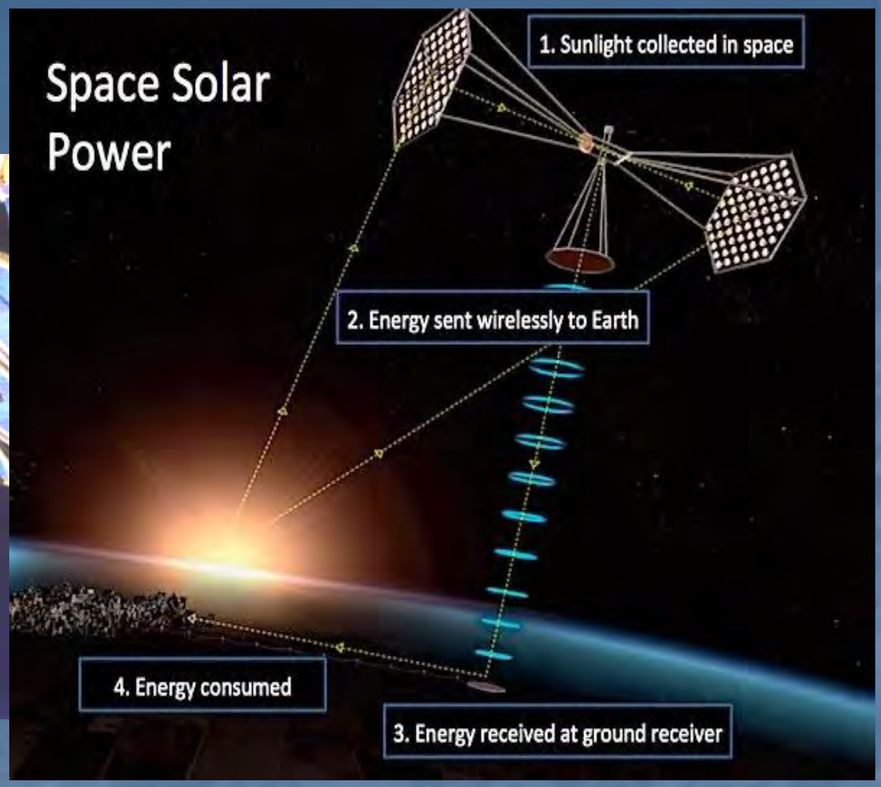
LUNAR FACTORY- 2047

For billions of years, the action of solar wind has released high-energy particles, including helium-3, which has accumulated on the Moon in the absence of an atmosphere. A renewable resource by definition, the isotope is regularly deposited on the Moon's surface under the constant activity of the Sun.

Resources from Moon, other Planets and Asteroids

GLOBAL ENERGY & WATER MISSIONS BY SOLAR POWER SATELLITES

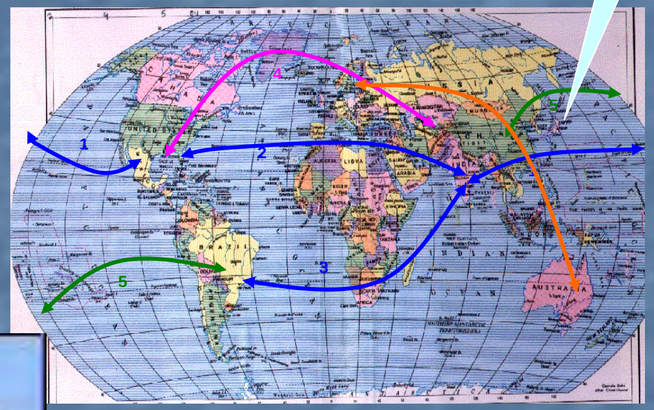


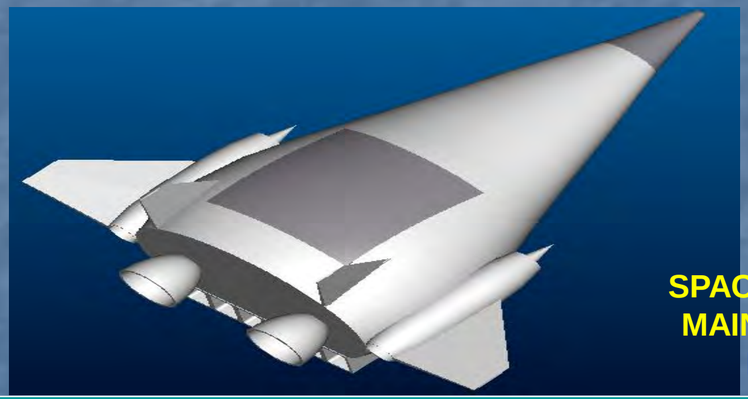


SPACE SOLAR POWER STATIONS IN EQUATORIAL EARTH ORBIT

1 GW ~24 HRS SUNLIGHT

ACUTE SHORTAGE OF POWER & DRINKING WATER





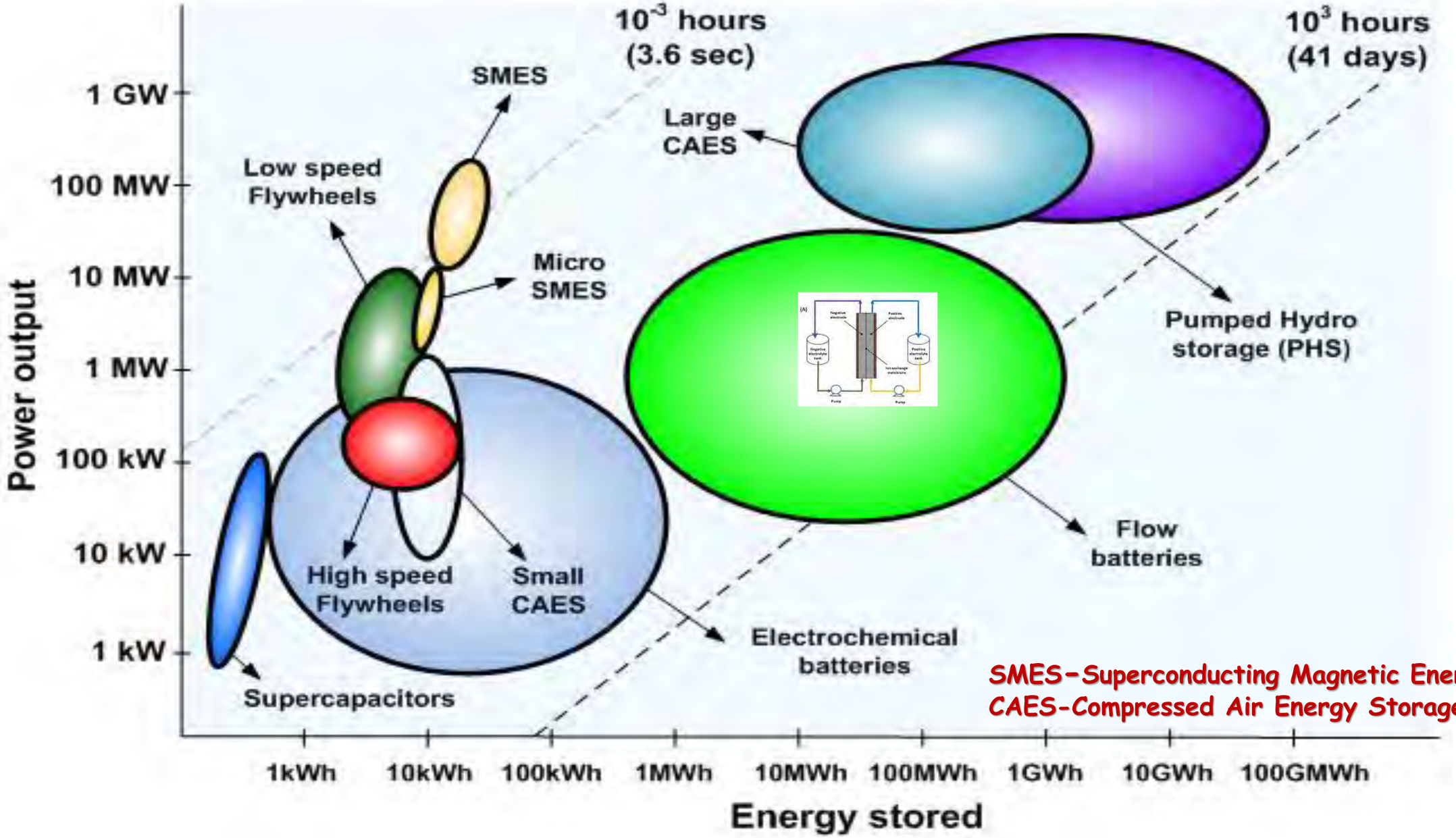
SPACE ASSEMBLY, MAINTENANCE & REPAIRS

SEAWATER DESALINATION USING SPACE SOLAR POWER

SPACE INFRASTRUCTURE BUILD-UP

NEED FOR TECHNOLOGIES FOR LOW-COST ACCESS TO SPACE

Application of Energy storage technologies



SMES-Superconducting Magnetic Energy Storage
CAES-Compressed Air Energy Storage

Path To Energy Security (*Carbon - free*)

Expand RE Portfolio - Particularly Utility Scale Solar

- Solar Power Technology to increase efficiency, minimize Project Risks
- Carbon Sequestration
- Large Scale Grid Integration of Renewable Energy
- Develop Energy Storage Solutions for enhanced reliability

Geopolitical Risks vs. Native Fuels

- Invest in green hydrogen
- *Tap Ocean Thermal Energy and Uranium*

Futuristic - Very Long-term Solutions

- Helium 3 from the Moon as fuel for future Nuclear Fusion Power Plants
- Solar Power Satellites

IPMA's ICB 4 standard for Sustainable Project Management

Focus on ESG Alignment

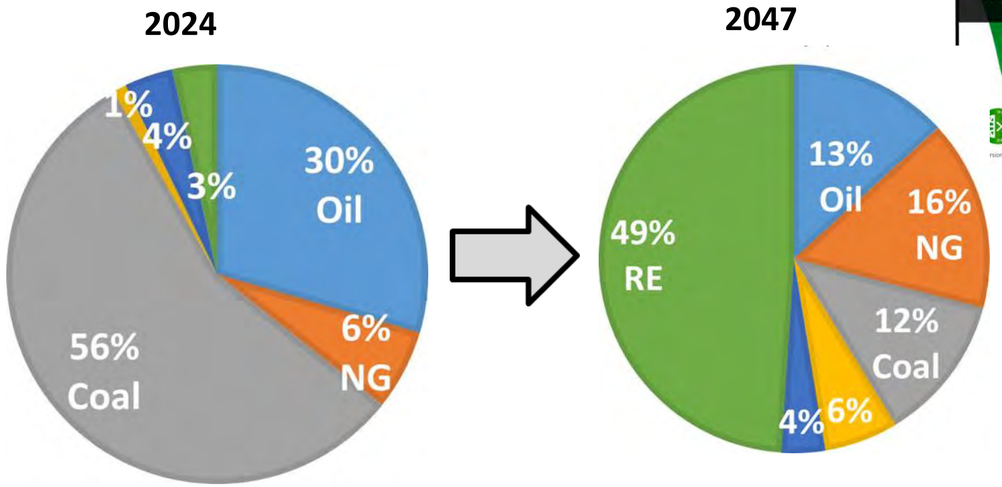
+Connecting project outcomes with an organization's Environmental, Social and Governance (ESG) strategies, promoting responsible project management practices

Comprehensive Framework

+Embedding sustainability into every phase of a project, from initial planning to execution

Industry-Applicable Strategies

Clean air initiatives, water purification projects and waste management systems using systematic project approaches and stakeholder coordination

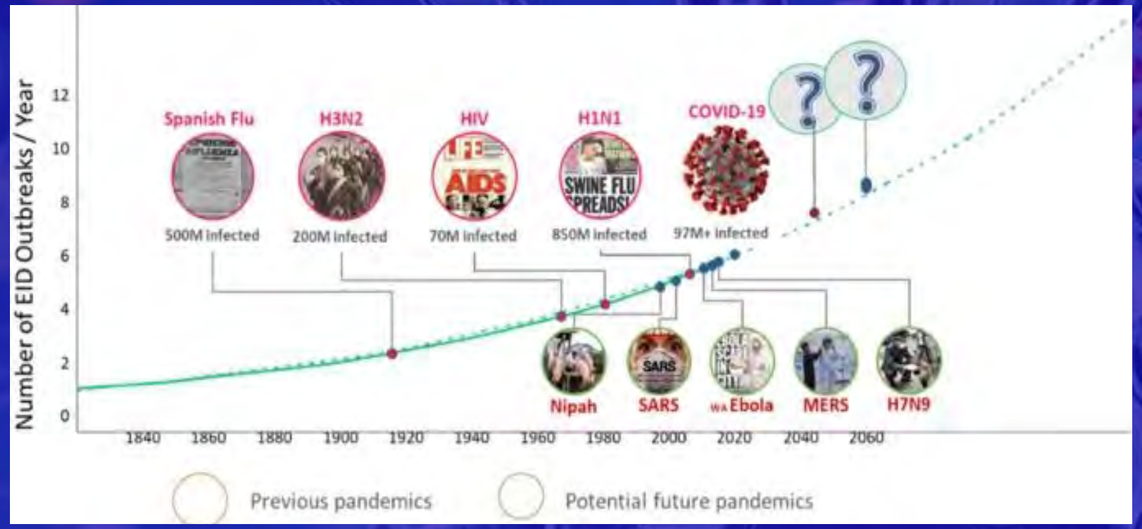


INDIA'S ESG ALIGNMENT-statement @ COP26

INDIA-Achieve net zero emissions by 2070

Future preparedness for newly emerging infectious diseases

PANDEMICS & DISEASE OUTBREAKS



Infectious diseases can collapse healthcare systems, disrupt global supply chains, and halt human progress overnight...

7M
COVID-19 deaths globally

$12T
Global economic impact

3.3B
At risk from future pandemics

PM Solution: Pandemic Preparedness & Response

Global surveillance networks, rapid vaccine development programs, and coordinated international health emergency responses

CASE STUDY: COVAX INITIATIVE

Global Vaccine Delivery Through PM Excellence

- Delivered 1.9 billion vaccine doses globally
- Coordinated 190+ countries and territories
- Managed $18.8 billion in funding
- Established complex global supply chains
- Real-time tracking and monitoring systems
- Reduced global mortality by millions

PM enabled the fastest vaccine development and distribution program in human history

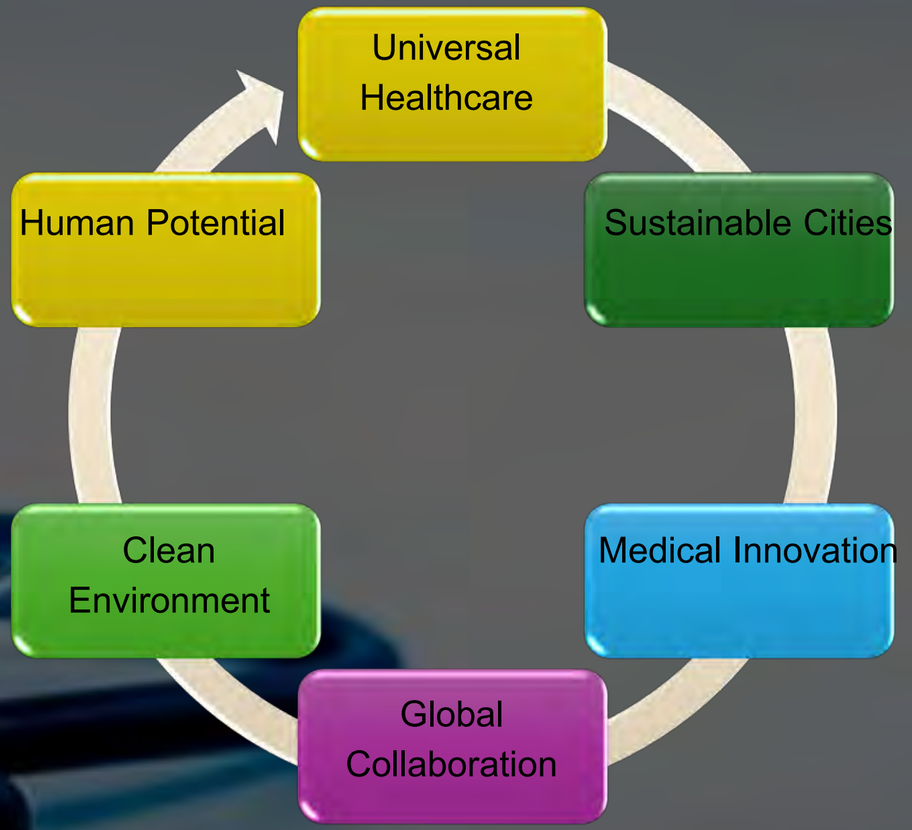
Source

https://onehealthoutlook.biomedcentral.com/articles/10.1186/s42522-023-00080-7

Global Surveillance Landscape: | GCS Network

HOW PROJECT MANAGEMENT RESPONDS TO HEALTH THREATS

PM SOLUTION FLOWCHART



VISION 2047 – A HEALTHY, RESILIENT FUTURE

Stakeholder Alignment

Resource Optimization

Risk Mitigation

CORE PM PRINCIPLES

WHERE WE ARE HEADED STEP-BY-STEP TILL 2047"

"This future is achievable through strategic Project Management"

MEASURING PM SUCCESS IN GLOBAL HEALTH

Project Management has proven to be humanity's most effective tool for solving complex global health challenges at scale

50M
Lives saved through PM initiatives

$2T
Economic value created

200+
Countries implementing PM health programs

85%
Reduction in preventable diseases

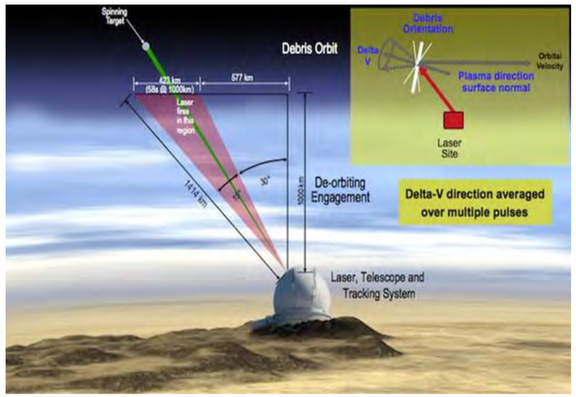
THE TIME FOR ACTION IS NOW

Identify Priorities → Build Partnerships → Mobilize Resources → Execute Projects

Every successful PM initiative saves thousands of lives.
The future of humanity depends on our collective action today

SPACE DEBRIS REMOVAL & DIVERTING ASTEROIDS-PM ACTIONS

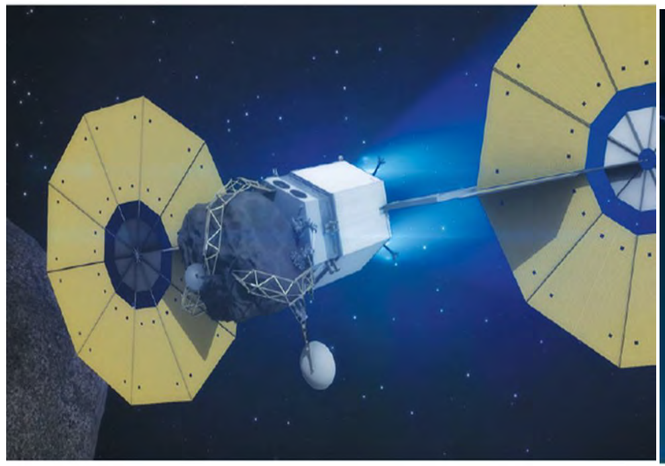
Haystack radar observatory NASA
DEBRIS MONITORING



Space claw-ESA

PM Solution:

Early warning systems, and coordinated international response & Projects to remove Debris & Divert Asteroids, with NASA



SOLAR ELECTRIC PROPULSION SYSTEM OR SOLAR SAIL

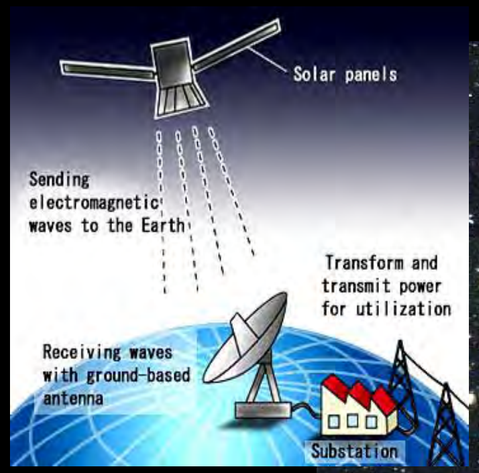
DART- Double Asteroid Redirection Test

PM ENABLED STRATEGIC COLLABORATIONS BEYOND BOUNDARIES

MOON/ MARS INDUSTRY

MINING IN PLANETS/

ASTEROIDS



SOLAR POWER SATELLITE

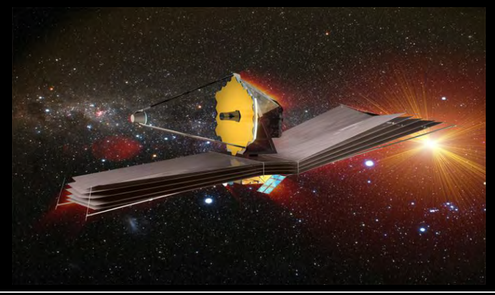
UNMANNED COMBAT AIR VEHICLE

3rd GEN. REUSABLE LAUNCH VEHICLES

- SPACE TOURISM
- INTER PLANETORY TRAVEL
- NEW EARTH TO LIVE

BLENDED WING BODY

HYPERPLANE



EXPLORE LIVING ORGANISMS AND ESTABLISH HABITAT IN PLANETS IN OTHER SOLAR SYSTEMS

2030 2050 2100

Role of Project Management

TURNING VISION INTO REALITY

Big ideas alone do not change the world. Execution does.
Project Management provides the frameworks, tools, and governance to translate ambitious visions — like renewable energy adoption; global space missions into reality

STRATEGIC ALIGNMENT

Competent Project Management ensures that projects are not isolated activities but aligned with global goals, national policies, and local needs. This alignment transforms high-level targets into actionable roadmaps

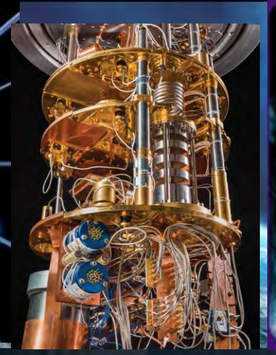
SCALING SUSTAINABLE SOLUTIONS

PM frameworks such as **Sustainable Project Management** integrate environmental, social and governance (ESG) principles into every phase of the project lifecycle

BRIDGING GLOBAL COLLABORATION

Project Management fosters cross-border collaboration, ensuring diverse cultures, skills and priorities align towards common goals — whether it is reducing carbon emissions or building climate-resilient infrastructure

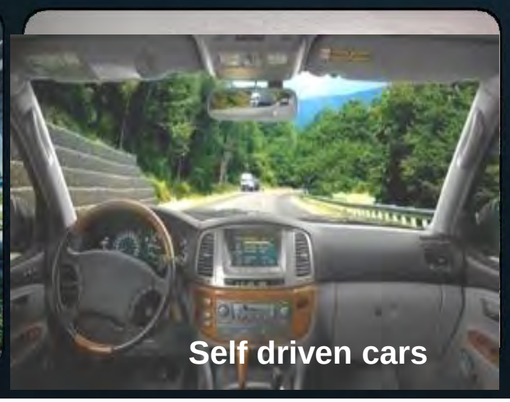
Brain On A Chip




Quantum Teleportation

THE FUTURE IS A PROJECT WE MANAGE TOGETHER

The best way to predict the future is to create it through disciplined project management


Self driven cars


Robots


Future Robots


Bionic Eye


Cell Phone with integrated hologram

Project Management strategic vision
Academic papers on future of project management

WHAT WE MUST DO TODAY

PROJECT MANAGEMENT PRIORITY ACTIONS

Integrate PM Education into STEM Curricula
Building PM skills from primary school to higher education

Develop Specialized PM Frameworks
For climate action, space exploration and emerging challenges

Establish Int. Collaboration Platforms
Using standardization PM approach to coordinate global efforts

Invest in PM Research
To develop new methodology that address emerging global efforts

Recognize PM as a Strategic National Capability
Elevating PM to core component to development strategy


SHAPING THE
FUTURE
WITH PROJECT
MANAGEMENT
Thank You

POWERED BY GPM

Berlin 2025 | IPMA 34th World Congress

SHAPING THE FUTURE WITH PROJECT MANAGEMENT

60 YEARS IPMA international project management association

WELCOME

to the 34th IPMA World Congress

worldcongress-ipma.com

FUTURE OF HUMANITY WHAT PROJECT MANAGEMENT CAN DO?

DR. A. SIVATHANU PILLAI

DR. A. SIVATHANU PILLAI

The Indian PMA President Dr A. Sivathanu Pillai is a globally recognised expert in project management, IPMA® Level A - Certified Project Director and former Vice President of IPMA. He has played a key role in the development of innovative methods and management systems for complex aerospace and defence projects. He is a keynote speaker at international conferences, promoting best practice in strategic project management and sustainable development.