

Benori Knowledge Series

Sustainability: Making it Tangible

November 2024

BENORI

S P E A K E R S



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AGENDA



Emissions and Net Zero Landscape

- Evolution and Expected Scenarios
- Stakeholders Ecosystem



How is Benori Supporting Businesses in their Sustainability Journey?



Q&A

AGENDA



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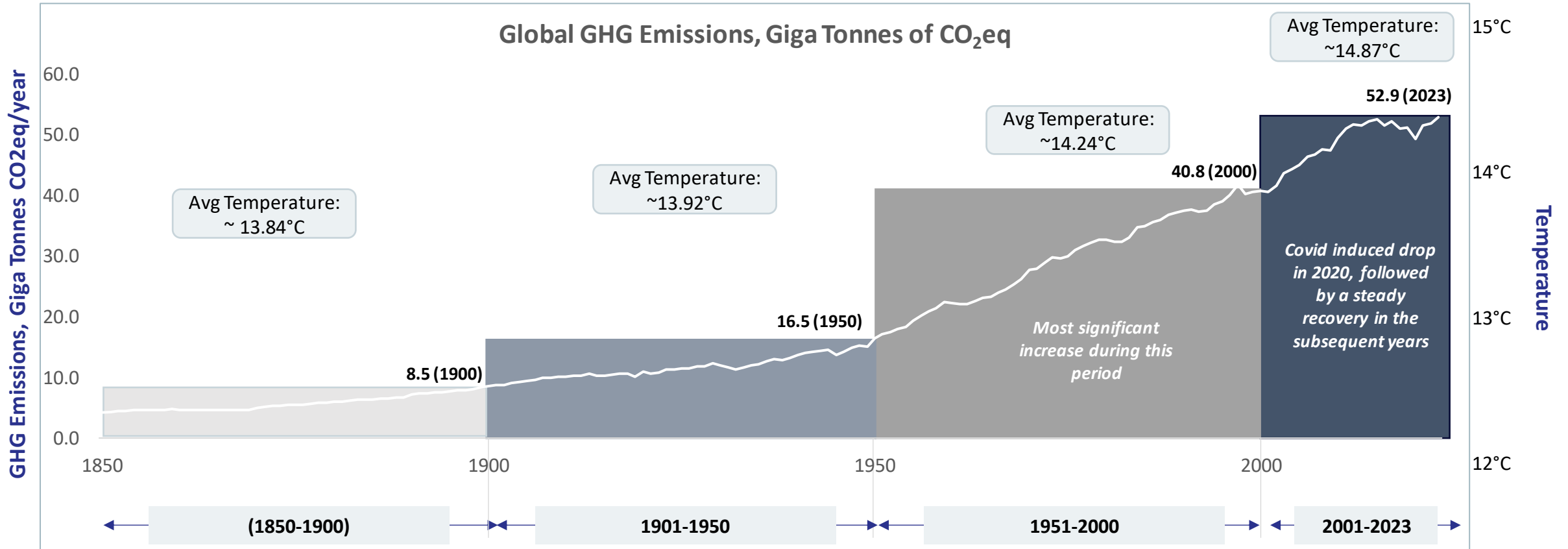


How is Benori Supporting Businesses in their Sustainability Journey?



Q&A

The Climate Crisis: History of GHG Emissions



Paris Agreement, 2015

In 2015, 196 nations signed the Paris Agreement at COP21, committing to limit global temperature rise to well below 2°C and limit the temperature increase to 1.5°C above pre-industrial levels (13.84°C)

Are we Getting Near to the 1.5°C Limit?

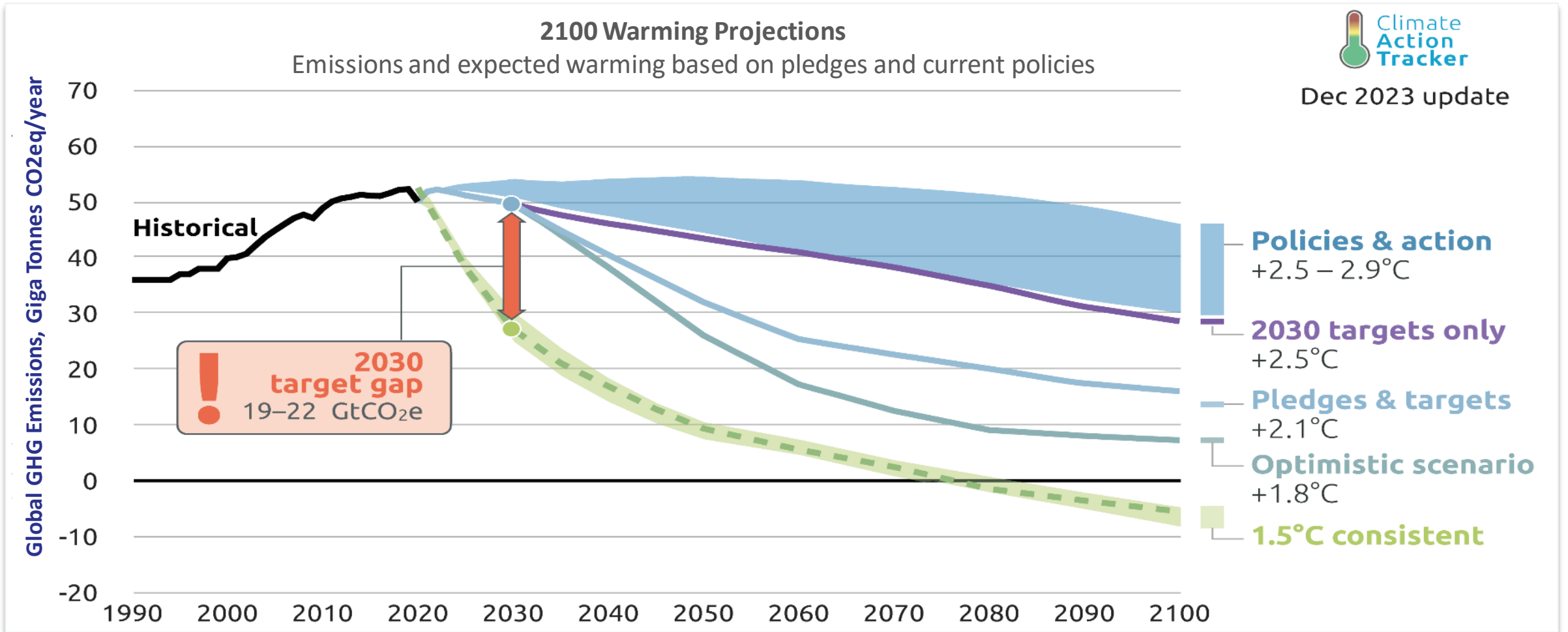
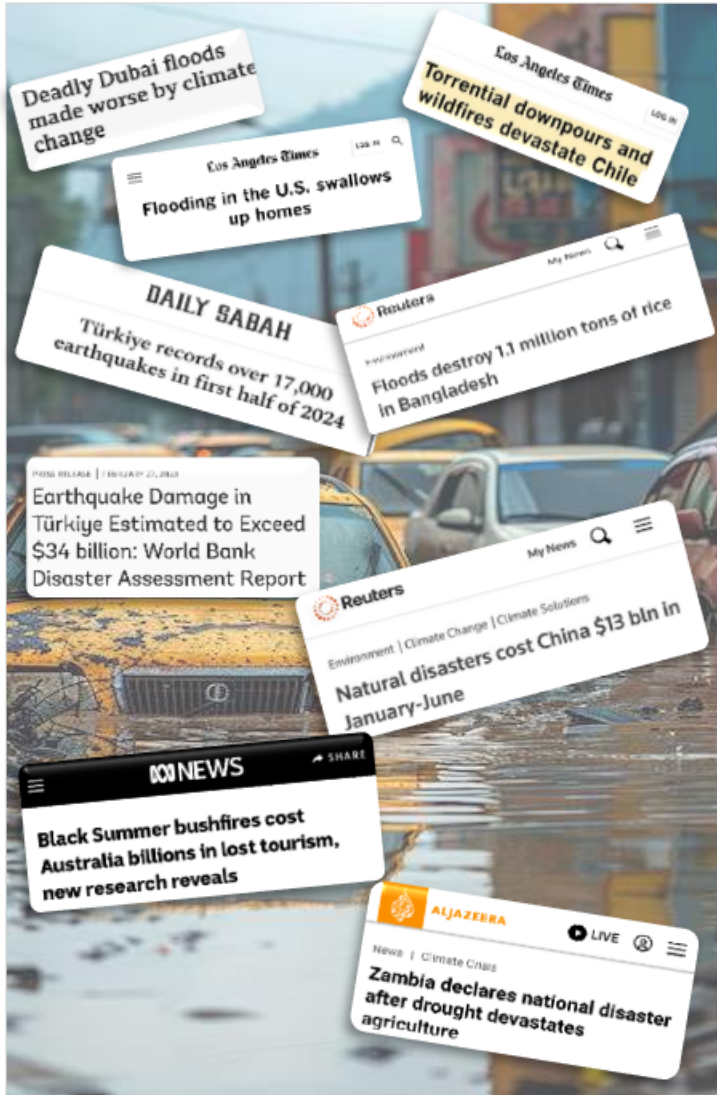


Image Source: [Climate Action Tracker](#)

The WMO warns 2024 could be the hottest year, with temperatures 1.54°C above pre-industrial levels between January and September, due to El Niño and rising greenhouse gases.

Sources: [UN](#)

The Impact of Missing the 1.5°C Mark



Environmental Impact

Increase in natural disasters

- Over **3x increase in disasters**: 124 in 1980 to 410 in 2023.
- **560 disasters projected annually** by 2030. ([UN](#))



Rise in sea level

- Sea levels **rose 20+ cm since 1900**; may rise **20-50 cm by 2100**. ([MIT](#))
- Cities at risk of submersion: **Jakarta, Bangkok, Lagos, Miami, Mumbai, etc.**



Biodiversity loss

- At 1.5°C warming, **70-90% of coral reefs may die**, risking **USD 11 Tn in ecosystem services** such as fisheries, tourism, and coastal protection ([IPCC](#))



Human Health and Livelihoods

Food security risks

- In 2023, **over 330 Mn people faced acute food insecurity**. ([UN](#))



Water scarcity

- Only 0.5% of Earth's water is usable, **with climate change causing a 1 cm annual drop in terrestrial water storage** over 20 years. ([WMO](#))



Health risks

- By 2050, there could be **an additional 14.5 million deaths**. ([WEF](#))



Economic Consequences

Economic losses

- Between 2000 and 2019, the world suffered at least **USD 2.8 Tn in loss and damage**. ([UNEP](#))
- Global annual damages estimations: **USD 38 Tn**; Range of **USD 19-59 Tn expected in 2050**. ([PIK](#))



Increased poverty levels

- There could be an **additional 68-135 Mn people in poverty** by 2030. ([World Bank](#))

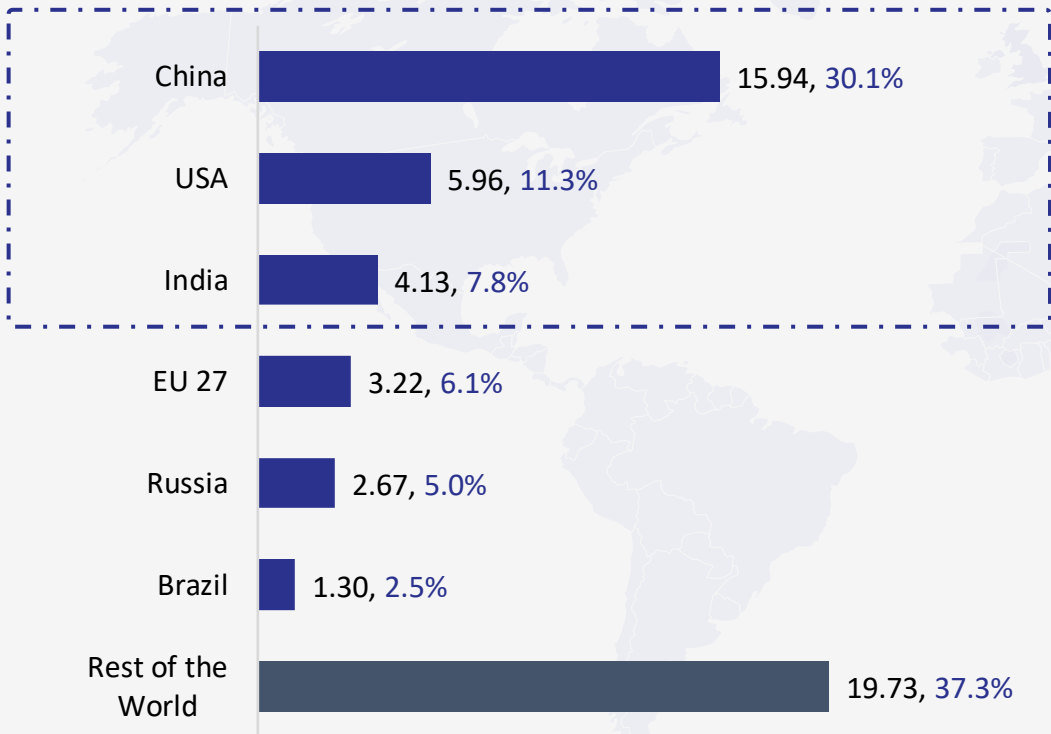


Net Zero: A Shared Responsibility

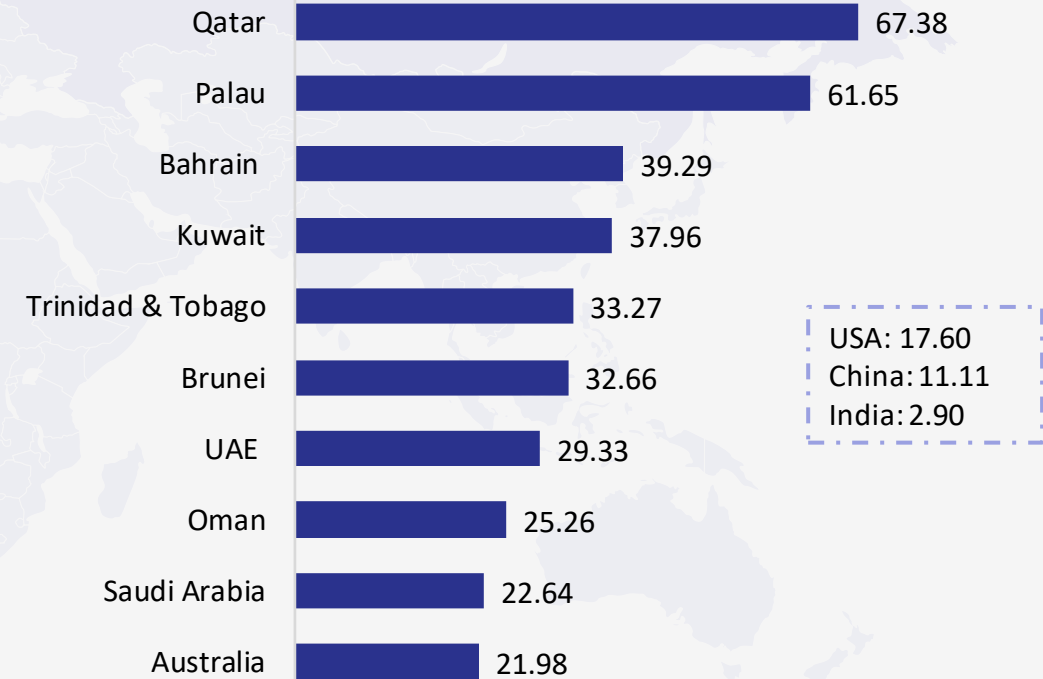


GHG Emissions: Contribution of the Top Emitting Economies

GHG Emissions – By Country (in Giga Tonnes CO₂eq and percentage of the global total, 2023)



GHG Emissions – Per Capita By Country (in Tonnes, CO₂eq, 2023)



Performance of Top Emitters

Key Area	China	US	India
Net Zero Target (2021)	2060	2050	2070
Renewable Energy	<ul style="list-style-type: none"> Surpassed its 1200 GW target for 2030, hitting 1450 GW by August 2024 	<ul style="list-style-type: none"> Targeted 30 GW annually from 2021 to 2025, surpassed it with 161 GW by February 2024 	<ul style="list-style-type: none"> Targeted 500 GW by 2030, with 201.45 GW installed by September 2024.
Electric Vehicle	<ul style="list-style-type: none"> Set a 40% EV market share (in all car sales) goal by 2030; surpassed it with 50% in August 2024. 	<ul style="list-style-type: none"> Targeted 50% EV market share (in all new vehicle) by 2030, with share rising from 7.6% in 2023 to 8.9% in August 2024. 	<ul style="list-style-type: none"> Target is 30% EV market share (in all new vehicle) by 2030, with growth from 1% in 2020 to 6% by August 2024.
Coal Dependency	<ul style="list-style-type: none"> Coal-based power reliance decreased from 60% in 2022 to 53% in May 2023. 	<ul style="list-style-type: none"> Coal-based power reliance dropped from 23% in 2019 to 16.1% by August 2024. 	<ul style="list-style-type: none"> Coal-based power reliance decreased from 72% in 2019 to 50% by August 2024.

Key Challenges

- Reconciling economic growth with emission reductions
- Transitioning energy systems away from fossil fuels
- Developing necessary green technologies
- Securing green financial investments
- Implementing effective policies

Legend: Improvement Decline Neutral

Source : [China RE](#), [US RE](#), [India RE](#), [China EV1](#), [EV2](#), [US EV](#), [India EV](#), [China Coal](#), [US Coal](#), [India Coal](#)

Climate Action: The Role of Investors & Innovators

Investors



citi

- Citi aims to mobilize **USD 1 Tn for sustainable finance by 2030** and has already facilitated USD 441 Bn in environmental and social finance by 2023.



Goldman Sachs

- Goldman Sachs plans to allocate **USD 750 Bn by 2030 toward sustainable financing**, focusing on green innovation, financial inclusion, and carbon reduction through ESG integration and stakeholder collaboration.

Innovators



ETH zürich

- Developed the **Energy Grid to store waste heat and cut CO₂ emissions**.
- Founded Synhelion in 2016, and opened DAWN in June 2024, **the first large-scale solar fuel plant**.
- Plans to build its **first commercial plant in Spain** in 2025, with a 1,000-ton annual fuel output.



- Mumbai-based startup UrjanovaC has developed a **CO₂ capture technology (CCT) that uses wastewater or seawater to convert** captured CO₂ into valuable minerals.
- Developed at IIT Bombay's NCoE-CCU and backed by DST, the technology is at TRL* 5 and **scaling with a 3-tonne per day pilot**.

Climate Action: The Role of Multilateral Agencies



United Nations Framework Convention on Climate Change

**Key Program:
Nationally Determined Contributions (NDCs)**

Outlines each country's plans for emissions reduction



United Nations Environment Programme

**Key Program:
Emissions Gap Report**

Assesses global progress toward emission targets



International Energy Agency

**Key Program:
Net Zero by 2050 Roadmap**

Outlines pathways to achieve net-zero emissions globally



Government Environment Facility

**Key Program:
Green Climate Fund**

Channels finance toward low-emission projects in developing countries

These multilateral agencies are key to shaping global climate policy, providing resources, and fostering cooperation to achieve net-zero targets, ensuring countries have the tools to transition to sustainable energy systems.

Individuals Driving Net Zero



Sustainable Commuting

The 2023 Sustainable Travel Report finds **46% of consumers willing to pay more for sustainable travel**, with 76% planning such trips next year.



Supporting Carbon Neutral Products

A 2020 survey by International Food Information Council, found **62% of consumers willing to pay more for sustainably produced food**.



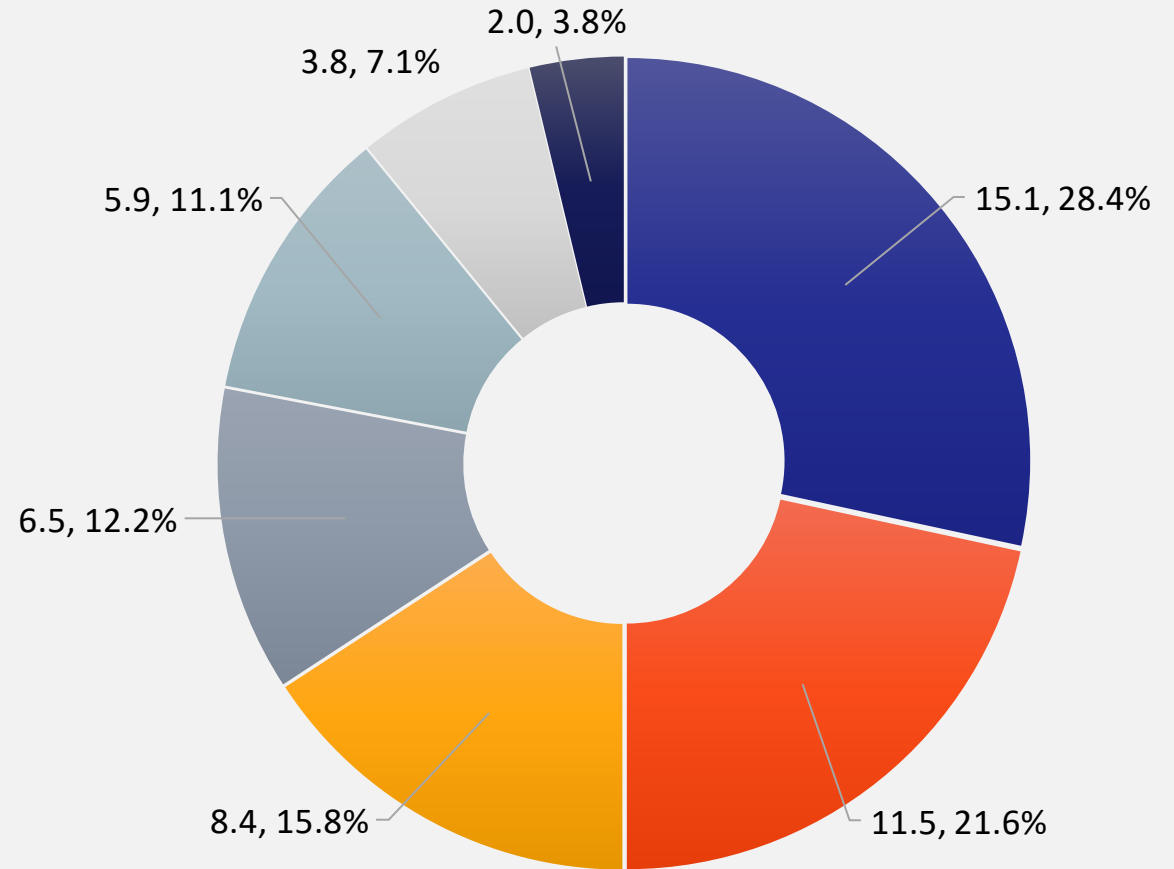
Use of Refillables

In the UK and Australia, **reusable bottles, coffee cups, and containers are widely adopted**, with many cities offering refill stations and stores providing discounts.

GHG Emissions: Contribution by Sectors

GHG Emissions in Giga Tonnes CO₂eq, 2023

- Power Industry: Power and Heat Generation Plants
- Industrial Manufacturing
- Transport: Road, Rail, Ship, Aviation
- Agriculture
- Fuel Exploitation: Production, Transformation, and Refining of Fuels
- Buildings: Small scale non-industrial stationary combustion
- Waste: Solid Waste Disposal and Wastewater Treatment



[Joint Research Centre – European Commission](#)

Corporates and their Initiatives for Net Zero

Companies
(Net Zero Target by 2050)



Decarbonization Target (2030)

- **Scope 1 & 2:** minimize **50%**, baseline **2016**
- **Scope 3:** minimize **15-20%**, baseline **2021**
- **Methane:** Net-zero

- **Scope 1 & 2:** minimize **40%**, baseline 2015
- **Scope 3:** **40%**, baseline **2015**
- **Methane:** minimize 80%

- **Scope 1,2 & 3:** minimize **50%**, baseline **2005**

- **Scope 1 & 2:** minimize **25%**, baseline **2018**
- **Scope 3:** minimize **15%**, baseline **2022**

- **Scope 1:** minimize **20%**, baseline **2015**
- **Scope 2:** minimize 63%, baseline **2015**
- **Air emission:** **0%** increase in VOC emission

- **Scope 1 & 2:** minimize **55%**, baseline **2017**

Key Initiatives



Carbon Farming in Australia

In 2020, Shell acquired **Select Carbon** to enhance carbon sequestration and reduce net emissions.



Methane Detection

TotalEnergies uses **AUSEA** technology to monitor and reduce methane emissions.



Ethylene Cracker

DOW has approved the **Path2Zero** project to build the world's first net-zero emissions **ethylene cracker** facility in Alberta, Canada.



Steam Cracker Furnace

BASF built the world's first electrically heated **steam cracker furnace** to reduce energy use and **CO2 emissions** in chemical production.



Hydrogen Power Aircraft

Airbus is introducing the world's first **hydrogen-powered commercial aircraft** by 2035.



Fuel from Waste

In collaboration with Clear Sky, Boeing invested in Firefly Green Fuels' tech to **advance sustainable aviation fuel from sewage waste**.

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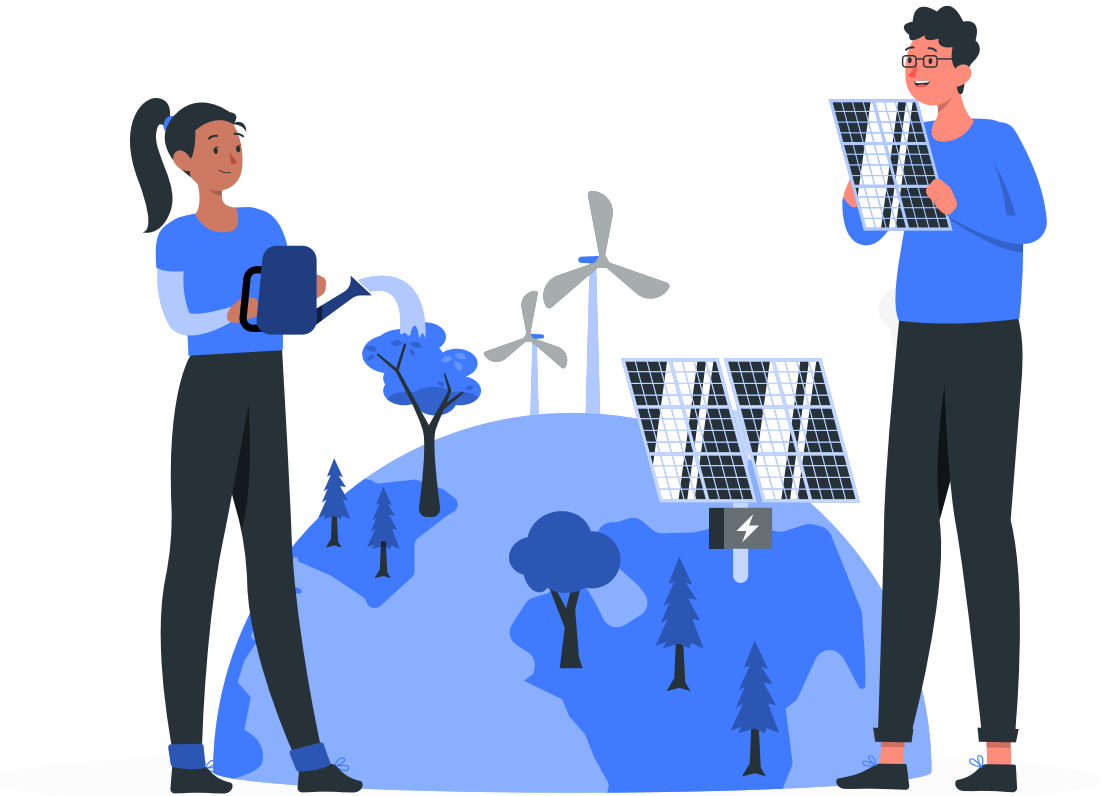
**Scope 1, 2, & 3 Emissions
Measurements Are Completed!**



Targets Have Been Set!



**Now, How Do Companies Go
About Achieving Net Zero Targets?**



Typical Problem Statements of Companies...



Materials & Packaging

- What sustainable alternatives to plastic packaging can be implemented?
- How can the raw material sourcing practices be sustainably enhanced?
- In what ways can more sustainable ingredients be incorporated into product recipes without compromising quality?



Energy

- What specific changes can be implemented in the production processes to enhance energy efficiency?
- How can logistics operations be optimized to effectively reduce greenhouse gas emissions?
- What government incentives or regulatory programs can support the transition to renewable energy sources?



Waste Monetization

- What strategies can be implemented to achieve zero waste in the production processes?
- How can water pollution be minimized in the manufacturing and processing operations?
- What waste management solutions can be implemented to optimize waste collection and disposal in the operations?

MATERIALS & PACKAGING

Green technologies or ingredients to enhance the product's sustainability

Replace raw materials with sustainable substitute

ENERGY

Process

- Energy optimization opportunities in the existing manufacturing processes – new processes, better machines, etc.
- Energy Transition - Opportunity to green the energy portfolio using solar, wind, hydrogen, etc.

Transport/Logistics

- Sustainable fleet management, switching to EVs, charging infrastructure
- Green fuels (hydrogen, biofuel, SAF), battery technology

WASTE MONETIZATION

Reduce

Reuse

Recycle

Rejuvenate

- **Circular economy:** best practices to incorporate waste reduction, reuse, recycling, and rejuvenation
- **Decarbonization strategies:** carbon capture, utilization, and storage (CCUS), greenhouse emission management, etc.

Dashboards Innovation Brand Perception

Data Assets Market Sizing Benchmarking Articles & Newsletters

Customer Insights (B2B & B2C) Prospect Identification Market Entry & Growth

Sales Acceleration Patent Claims Analysis Problem Solution Approach

Survey Based Whitepapers **Sustainability & ESG Initiatives** **Competitive Intelligence**

Competition Tracking **Regulatory Tracking & Impact Assessment** Go-to-market Strategy

Scientific Technical Writing **Partner Scouting** Thought Leadership & Marketing Support

Technology Landscape Strategy & Growth for Portfolio Firms **CXO Insights**

Industry & Company Monitoring **Commercial Due Diligence** Account Intelligence

Pricing Intelligence Financial Analysis & Valuation **Market Assessment**

Target Screening & Profiling **Supplier Intelligence** Market Surveys

Customer Satisfaction & NPS Usage and Attitude Studies

Industry/ Sector Primers

Objective

The UK-based advisory firm wanted to **quantify scope 3 emissions** for Health & Wellness and MedTech products by analyzing components at a molecular level and identifying decarbonization opportunities with industry case studies.

How Benori helped?

We analyzed product compositions at the molecular level and identified suitable proxies for materials without documented emission factors, using various databases and industry resources. This enabled the client to understand scope 3 emissions and develop decarbonization strategies by learning from industry leaders' long-term carbon reduction initiatives.

Objective

A consulting firm's end client, a **green ceramic tile** manufacturer, wanted to evaluate **market demand, supply dynamics, and competitive landscape** in China, KSA, and UAE to identify optimal plant locations and market opportunities.

How Benori helped?

Our research included market sizing, supply-demand analysis, and competitive assessment for ceramic tiles in China, KSA, and UAE, validated through primary insights from regional stakeholders. This equipped the client with a clear understanding of market dynamics to support their plant location decision.

Objective

A global FMCG firm wanted to assess its **sustainable packaging readiness by identifying scalable solutions and partners for rigid and flexible packaging**, focusing on recyclable, compostable options with low carbon footprints and zero fossil fuel feedstocks.

How Benori helped?

Through research on technologies, patents, products, start-ups, investments, and academia, we enabled the client to make strategic decisions for capability building in superior recycled rigid materials, fully recyclable flexibles, and non-persistent biodegradable options.























Marine
Resources: A
Blue Future in
CPG Industry



Overview - Marine Resources and Their Derivatives

- Marine resources are a treasure trove of valuable substances found within the ocean, including invertebrates, plants (e.g., seaweed, algae, seagrass) and microorganisms
- From these, marine derivatives are extracted or derived. The marine world offers a rich source of naturally effective products with applications across industries

Marine Resources

		Derivatives (Edible)	Derivatives (Non-edible)
 Animals-based	 Fish & Shellfish	 Food E.G., Seafood  Oil E.G., Fish Oil	 Pearl
	 Marine Mammals	 Food E.G., Seafood  Oil E.G., Fish Oil	
	 Coral Reefs	 Compounds For Drug Discovery	
 Plant-based	 Marine Plants (E.G., Seaweed)	 Food E.G., Seafood  Pharmaceuticals	 Cosmetics  Biofuel  Biomaterial
	 Minerals, Salts And Energy Resources	 Food Seasoning	 Chemical Production  Water Treatment  Petrochemicals

Sources: [Link 1](#) | [Link 2](#)

Benefits Associated with Marine Derivatives

Bioactive Compounds	Natural and Sustainable	Nutrient-Dense	Biocompatibility	Health Care
 Biopolymers	 Biodegradability	 Rich In Essential Nutrients	 Sustainable And Safe	 Anti-inflammatory Properties
 Biosurfactants	 Eco-friendly	 High Protein Content	 Reduced Toxicity	 Anti-oxidant Properties
 Biofuels	 Renewable Resources	 Abundant Vitamins And Minerals	 Support Regenerative Medicine	 Improves Immune Function
 Natural Preservative/ Colorants	 Reduced Carbon Footprint	 Low In Saturated Fat	 Low Risk Of Allergies	 Anti-aging Properties

Sources: [Link 1](#), [Link 2](#), [Link 3](#)



Food & Beverage

- **Largest consumer** of marine-derived ingredients
- Used as **nutritional supplements, functional foods, and natural food colorants**
- Players examples:



Cosmetics & Personal Care

- **Observing a significant increase** in marine derived ingredients usage
- Commonly used in **skincare products followed by hair care and body care products**
- Players examples:

L'ORÉAL

THALGO
LA BEAUTÉ MARINE

SHISEIDO



Home Care

- **Relatively new segment** in home care
- Players examples:



Recent Activities of CPG Players

ALGAKTIV

Specializes in
microalgae and
biotechnology

- Introduced DensityL, a hair care active ingredient **derived from microalgae** (*Spirulina Maxima* Extract) is a phycocyanin
- Designed to **combat hair loss and graying**
- Results backed with **in vitro and clinical testing**



Specializes in
ingredients
manufacturing

- Offers PEPHA®-CTIVE CB, **produced from microalgae** *Dunaliella salina*, rich in amino acids and carbohydrates
- Protects and **stimulates mitochondria by increasing ATP levels in the skin**, improves its radiance
- Results supported by **in-vitro and in-vivo testing**



Specializes in
Manufacturing
Ecological Products

- Frosch introduced marine-derived formulations "Frosch Marine Minerals Toilet Cleaner" as part of their eco-friendly line that contains **marine minerals and algae-derived ingredients**



Unilever
Specializes in
Product
Manufacturing

- Unilever and **Innova Partnered** to explore the **cleaning potential** of Lactam, an organic compound developed from natural chemicals in seaweed
- Lactam mimics **seaweed's unique ability to stop bacteria growing and spreading**
- Also possesses self-cleaning potential for banknotes, medical devices, etc.



Hi-Q
Marine Biotech
Specializes in
Marine
Biotechnology

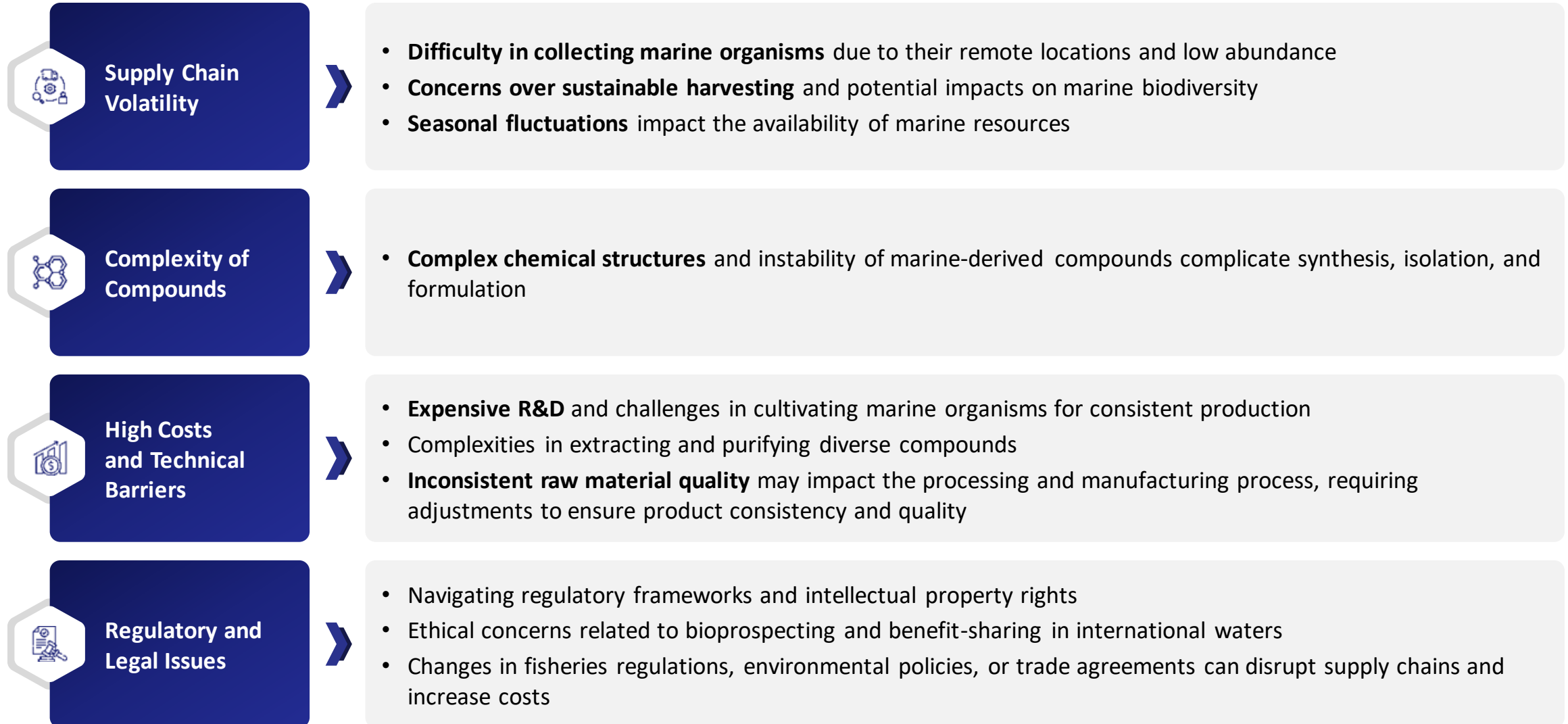
- **Hi-Q Marine Biotech** International Ltd developed FucoSkin® a **fucoidan-rich extract** derived from the brown seaweed *Laminaria Japonica*, known for its excellent **anti-aging and photoprotective benefits**



Specializes in
Health Care

- **KD Pharma** to Acquire dsm-firmenich's Marine Lipids Business; transaction includes the MEG-3 fish oil product portfolio and two associated production sites in Canada and Peru in exchange for a minority stake in the enlarged KD company

Beyond the Hype: Addressing the Challenges of Marine Derivative Use



Source: [Link 1](#), [Link 2](#)

Future Potential: The Growing Trend of Marine Derivatives



Market Growth

- Current market of **marine-ingredients** is valued at **US\$ 9,709.0 million in 2023** with estimated **CAGR of 6.4%** from 2023-2033 and reach **US\$ 18,058.5 million by end of 2033**



Consumer Demand

- Consumers are **increasingly seeking natural and sustainable products** and marine-derived ingredients align with this trend



Research & Development

- **Ongoing research** (patents and scientific publications) **to explore** new marine species and compounds
- Increasing **efforts on deep-sea exploration** to discover yet unexplored resources
- Growing focus on **sustainable extraction** methods



Government & Regulatory Support

- Many governments are **supporting the development and use** of marine-derived resources like developing research institutes, providing research grants
- Number of **regulatory approvals granted** for marine-derived products indicate growing acceptance and safety globally

Objective

A consulting firm wanted to evaluate India's **renewable energy capacity trends** since 2015, focusing on player-wise distribution, project-level insights, and tender evolution.

How Benori helped?

Through secondary research and expert interviews, created a RE Tracking Dashboard for insights on India's renewable energy capacity, market consolidation, tariff trends, and tender evolution. The dashboard segmented the capacities by operational and under-construction projects since 2015, enabling the client to strategize effectively.

Objective

The client, a private equity firm wanted support in identifying **government incentives and tax rebates for residential solar batteries, panels, and heat pumps** across the USA.

How Benori helped?

Through secondary research, we assessed the incentives and rebates, focusing on counties like Middlesex, and analyzed their impact on residents using solar batteries, panels, and heat pumps. This helped the client understand available rebates and their environmental and personal effects.

Objective

The client, a professional services firm aimed to transition to renewable energy across its offices. For this, it wanted to explore **long-term renewable power procurement and PPA options** in Europe.

How Benori helped?

We analyzed the PPA landscape and profiled key players, helping the client implement green energy, meet ESG targets, and stabilize power costs across Europe.

Renewable Energy Tracker: India

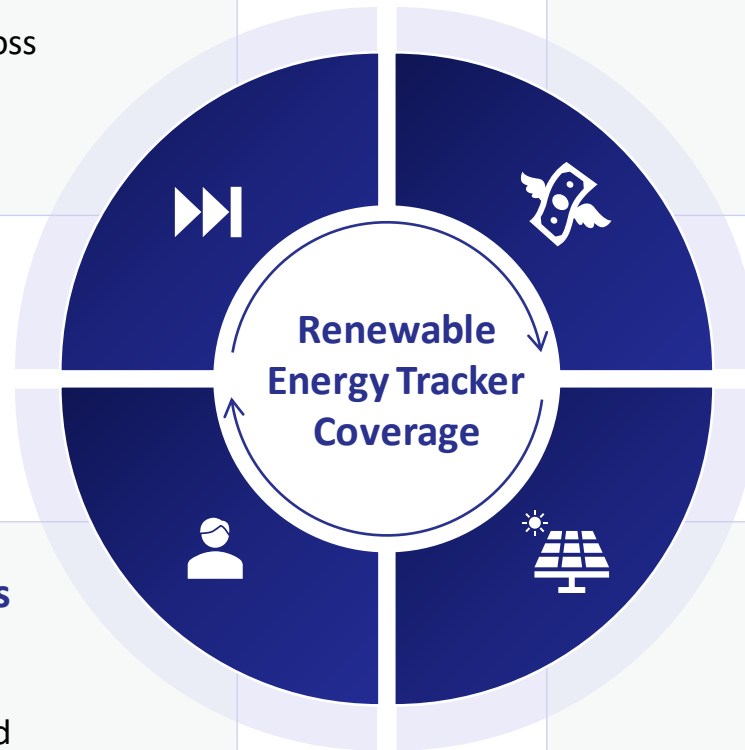


Upcoming Projects

Major upcoming renewable energy projects across India, highlighting key developments, timelines, and capacities.

State-Level Investment Trends

State-wise breakdown of India's renewable energy capacity, with key players driving the clean energy transition.



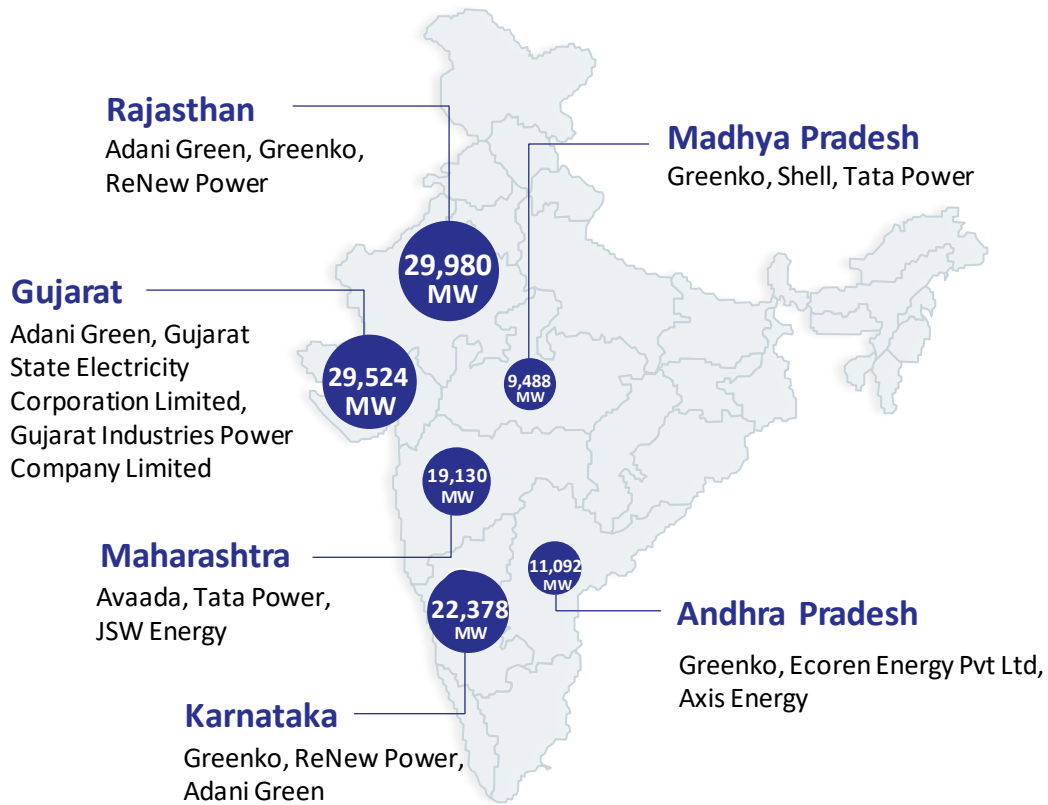
Players' Operational & Pipeline Capacities

Information on the operational and pipeline capacities of top renewable energy players, covering solar PV, rooftop solar, wind, hydro, and hybrid technologies.

Technology-Specific Capacity Splits

Analysis of operational capacity and pipeline capacity splits by technology

Top States Investing In Renewable Energy



Tracking the Operations of Leading Players



	adani	ReNew POWER	TATA POWER
Operational Capacities (MW)	11,184	9,500	1,839
Ambition (MW)	50,000	50,000	20,000
By year	2030	2030	2030

Objective

The client, a B2B e-marketplace firm, sought Benori's support to **assess the UK metal scrap e-auction market, benchmark competitors,** and identify growth opportunities.

How Benori helped?

We analyzed key UK industries generating metal scrap, their disposal practices, and challenges, while evaluating leading e-auction platforms on services, pricing, and market reach. This helped the client understand market trends, identify unmet needs, and pinpoint opportunities in the UK e-auction space.

Objective

The client, a risk and management consulting firm, sought Benori's help to understand the **Constructed Wetlands for Wastewater Treatment/ Natural Engineered Wastewater Treatment (NEWT) systems.**

How Benori helped?

We conducted secondary research to explore constructed wetlands for wastewater treatment, covering classification, vegetation, technology, pollutants treated, and leading providers. This helped the client understand the system's capabilities, treatment outcomes, and key industry players.

Objective

The client, a risk and management consulting firm, sought Benori's help to understand **the regulatory landscape and best practices for wastewater management** in oil and gas operations.

How Benori helped?

We provided regulations, technologies, and stakeholder insights in wastewater treatment, helping the client understand best practices, authorities, and how leading O&G companies manage wastewater disposal.

Benori's Sustain Monitor Launch



Materials & Packaging

Energy

Waste Monetization



Technology



Regulation



Finance



[Sublime Systems unveils innovative low-emission cement technology](#)

As per Aug 2024, MIT News, Sublime Systems has developed a cement alternative using electrochemistry, eliminating high-temperature processes and reducing carbon emissions. This innovation aims to address the cement industry's 7% share of global CO2 emissions.



[Big Tech bets on Nuclear Energy to solve AI power problems](#)

In October 2024, Google, Microsoft, and Amazon announced significant investments in nuclear power to support their data centers and address the rising energy demands of AI technologies to reduce their carbon footprints while ensuring a stable power supply.



[Royal Mint launches e-Waste plant to extract gold and tackle growing tech waste](#)

As per August 2024 BBC news, the Royal Mint in Wales has launched e-waste processing plant to extract gold from old circuit boards using innovative, low-energy, and recyclable chemical methods. The facility aims to process 4,000 tonnes of e-waste annually, recovering up to 450kg of gold worth £27 million.



[India to have 5% recycled content in non-ferrous metal products by FY28](#)

In August 2024, the Indian government announced that all non-ferrous metal products must contain 5% recycled content starting FY28, gradually increasing to 10% by FY29. By FY31, the requirements will reach 10% for aluminum, 20% for copper, and 25% for zinc. This aims to reduce dependence on primary resources and minimize the environmental impact of mining.



[China unveils plan to accelerate low-carbon transition of data centers](#)

In July 2024, China launched a plan to cut data center emissions, aiming for a PUE below 1.5 by 2025 and a 10% annual increase in renewable energy use. By 2030, data centers will target advanced energy efficiency and carbon reduction.



[Oman bans plastic bags starting September 2024](#)

Oman has implemented a ban on the import of plastic bags, including both biodegradable and non-biodegradable types. This move is part of the country's efforts to reduce plastic pollution and enhance environmental sustainability.



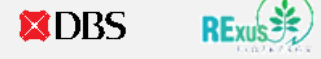
[Oban-based startup secures Green Finance](#)

In October 2024, HUID, a startup making packaging from onion peel, recently received USD 150,000 from Innovate UK and USD 20,000 from The Greenhouse to improve its processing and manufacturing.



[EBRD and EU boost green investments in Serbia](#)

In November 2024, the EBRD and EU launched the SME Go Green programme in Serbia, offering €120 Mn in credit to support green economy projects for SMEs. The programme focuses on energy efficiency, renewable energy, and sustainability.



[DBS Green Loan to fund biomass power plant in Singapore](#)

In November 2024, DBS provided a green loan to Rexus Bioenergy for Singapore's first circular biomass power plant, set to open in 2026. The plant will process 100,000 tonnes of wood waste annually, reduce landfill pressure, and explore carbon capture technology.

Benori is a trusted partner for knowledge solutions across the globe, serving clients from a wide range of industries including Professional Services, Financial Services, Consumer & Retail, Technology & Internet, Industrials & Manufacturing, and more. Our customized solutions strengthen the insights value chain of our clients, empowering them with key insights needed to drive intelligent decision-making and accelerate growth.

Headquartered in India, Benori is uniquely positioned to deliver multilingual research needs of global clients, powered by its digital agility, deep research capabilities and a highly experienced leadership team. Adopting a 360-degree approach, our team employs a combination of diverse methodologies including primary research, secondary research and data modeling, and offers detailed foresight on market trends, competitive shifts, regulatory changes and technological advancements.

Powering Growth Through Knowledge



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