World Business Council for Sustainable Development

2023 Update

WBCSD Business Brief Report: IEA's Net Zero Roadmap

→ A Global Pathway to Keep the 1.5°C Goal in Reach

WHAT'S INSIDE?

Introduction

*On 28 September 2023, the International Energy Agency (IEA) published an update to its Net Zero Roadmap. The report presents an updated Net-Zero Emissions (NZE) scenario to guide the energy industry and policymakers in the sector's contribution to limiting global warming to 1.5°C above pre-industrial levels, as outlined in the Paris Agreement. The report can be viewed **here**. The energy sector, which is the largest source of greenhouse gas emissions, plays a pivotal role in advancing the goal of reaching net-zero emissions by 2050.*

Since the publication of the Net Zero Roadmap in 2021, there has been a surge in climate and energy events. On the climate front, there has been a recent surge of events that have troubled the climate and energy space. On climate, an increasing number of extreme weather events could be observed[1] and July and August 2023 were recorded as the hottest months on record. The energy sector has also witnessed two major destabilizations, an energy demand surge after the COVID-19 pandemic, and the Russian invasion of Ukraine leading to a global energy supply crisis. All these events highlight the urgent need for action to accelerate the transition to an affordable, reliable, net-zero energy system. Despite the demand and supply shocks, the 2023 update to the Net Zero Roadmap conveys a message of optimism – the spectacular progress made in clean electricity developments over the last two years keeps the hope alive that we can reach the Paris goal.

> "The pathways to 1.5°C require the world to come together quickly. The good news is we know what we need to do, and how to do it."
>
> *Faith Birol, Executive Director, International Energy Association*

This World Business Council for Sustainable Development (WBCSD) Business Brief summarizes the key messages of the IEA's report for business and highlights ten actions for business, identified by the IEA, to transform the energy sector and align with the NZE Scenario. The final section outlines WBCSD projects and initiatives that member companies can engage in to take action and achieve the goal of reaching net-zero emissions by 2050.

1 https://spiral.imperial.ac.uk/handle/10044/1/105549

Key *Messages:*

The 1.5°C window has narrowed but it is still achievable

Since the publication of the first roadmap edition in 2021, there has been remarkable progress in adopting clean energy technologies such as solar photovoltaics (PV), batteries, and electric vehicles (EVs). These technologies are advancing at the necessary pace to achieve the 1.5°C target by 2050. In 2021, the IEA concluded that 50% of the essential technologies needed to achieve net-zero emissions by 2050 exist. The 2023 update revises this figure upwards to 65%. These advancements have transformed the debate into a probable reality and no longer a theoretical concept.

There is still much to do to transform the energy sector

To tackle the climate crisis, we must switch to renewable and low-carbon energy solutions. The IEA underscores the 'fierce urgency of now' to transform the energy sector. In particular, it highlights the critical period between now and 2030 to achieve key targets outlined in the roadmap. Achieving rapid decarbonization requires implementing effective policies and financial support. However, redirecting finances towards clean energy faces significant challenges, especially against the backdrop of fossil fuel subsidies reaching a record USD $7 trillion in 2023[2] and the high cost of capital in developing countries. The IEA indicates that current measures and policies lack the necessary pace of decarbonization in line with the NZE Scenario, suggesting that more ambitious policies and business transformation efforts are needed now.

The cost of inaction is greater than the cost of action

The usual scenario. Firstly, transitioning to a clean energy system can create more jobs than the fossil fuel economy it replaces. The IEA predicts a loss of 13 million jobs in fossil-related industries by 2030, but anticipates the creation of 30 million new jobs. Additionally, there are economic benefits of transitioning to clean energy through reduced spending on fossil fuels. Despite demanding substantial investment, anticipated to reach USD $4.5 trillion in the early 2030s and peak at USD $4.8 trillion in the latter half of the decade, clean energy technologies, although initially capital-intensive, offer long-term savings. These savings are achieved through lower operational costs and higher efficiency compared to existing technologies. Finally, total GDP spending on fuel and investment will decrease from 11.2% to 6.4% in 2050, achieving savings of USD $12 trillion between now and 2050.

The IEA notes that the economic implications of inaction will be significantly higher than the NZE Scenario. The "delayed action case", a sensitivity on when action is taken relative to the NZE Scenario finds that postponing stronger measures would cost an extra USD $1.3 trillion annually. This is due to the expense of removing increased emissions using more expensive carbon removal and storage technologies at a later date.

2 https://www.imf.org/en/Blogs/Articles/2023/08/24/fossil-fuel-subsidies-surged-to-record-7-trillion

Action is needed in both advanced economies and emerging market and developing countries (EMDCs)

In the NZE Scenario, advanced economies will need to collectively reduce emissions by 80% and EMDCs by 60% by 2030. To facilitate this, clean energy investment will need to rise from USD $1.8 trillion in 2023 to USD $4.5 trillion by the early 2030s, with a significant portion of this funding directed towards EMDCs. Annual concessional funding for clean energy in EMDCs will need to reach around USD $80-100 billion by the early 2030s.

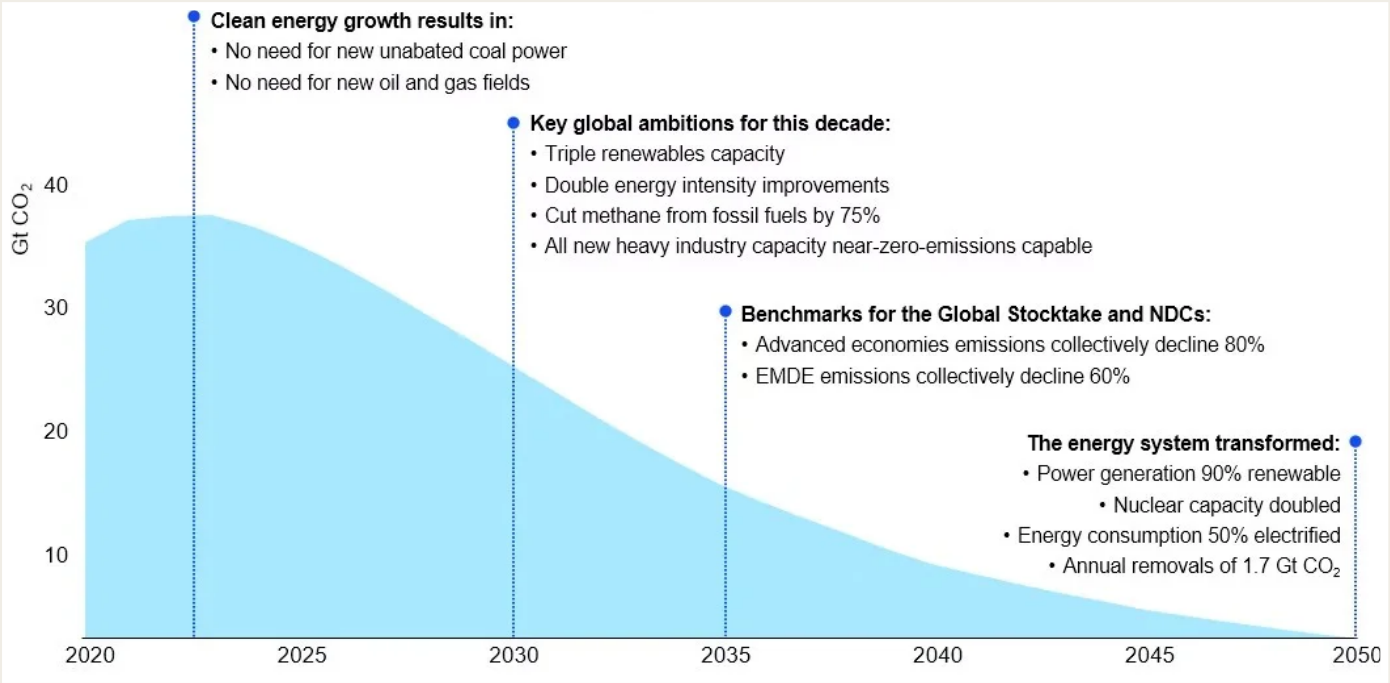
Looking ahead, greater cooperation and not fragmentation is needed

Executive Director of the IEA, Faith Birol, stressed the need for enhanced cooperation to achieve the common objective of 1.5°C. This is particularly relevant ahead of COP28 and the first Global Stocktake of the Paris Agreement, which represents a crucial window of opportunity to boost ambition and enhance implementation efforts. COP28 will host critical discussions about adopting a new global goal to triple renewables by 2030 and phasing out 'unabated' fossil fuels.

The Net Zero Roadmap for the Energy Sector Until 2030

The private sector is key in driving finance and innovation to ensure that the energy sector remains on track to achieve each target and eventually the overarching 2050 net-zero target. To align with the NZE Scenario, the IEA has proposed twelve interim targets, serving as a roadmap or comprehensive 'to-do list' until 2050. Figure 1 displays the IEA roadmap and the twelve interim targets they have set to align the energy sector with the NZE scenario.

Figure 1: IEA Net Zero Roadmap



Source: IEA Net Zero Roadmap, 2023

What This *Means for Business*

*As outlined in WBCSD's **Vision 2050** and the **Business of Climate Recovery**, the private sector has a critical role in transitioning the energy sector to align with the IEA's NZE Scenario. The burning question now is not 'if' but 'how' to rise to this challenge and the world is increasingly turning to business to provide solutions. This section details the cross-cutting areas **identified by the IEA**, where business can lead in driving transformation in the energy sector.*

To align with the NZE Scenario, WBCSD has identified the ten most applicable targets for business from the IEA's Roadmap.

By 2023

- → Do not invest in new unabated coal power, and oil and gas fields. Fossil fuel investments in existing projects will be required to provide an orderly transition.

By 2030

- → Renewable electricity capacity to be tripled to at least 11,000 gigawatts
- → Energy intensity improvement to double
- → Methane emissions to be reduced by 75%
- → EVs sales to account for approximately 65% of new car sales by 2030
- → Heat pump sales to triple

By 2050

- → Global power generation to be 90% renewable
- → Nuclear capacity doubled
- → Energy consumption 50% electrified
- → Annual removals of 1.7 Gt CO_2

Restrict licenses for new unabated coal, power and oil and gas fields

Fossil fuel investment will need to be limited to existing projects. The report highlights that there is an excess of existing fossil fuel production assets operational worldwide, making it challenging to remain within the 1.5℃ threshold. It calculates that USD $3.6 trillion will be invested in infrastructure and projects between 2023 and 2035, which will have to be abandoned prematurely if global warming is to remain below 1.5℃.

Increase renewable electricity capacity

Achieving net zero carbon emissions by 2050 implies an increasing reliance on electricity. With power demand surging in the coming decades and the share of variable renewable generation rising rapidly, our power grids need vast extensions and modernization. To achieve the NZE Scenario, renewable electricity will need to triple by 2030 to at least 11,000 gigawatts and account for 90% of global power generation by 2050. Increasing renewables capacity threefold will be the largest driver of emissions reductions to 2050. This tripling is led by solar PV and wind accounting for 40% of renewables by 2030. The IEA suggests this target is highly achievable, with capacity additions over the last decade more than quadrupling. Maintaining the current pace of growth towards 2030 would put the renewable electricity sector on course to align with the net-zero emissions scenario.

Increase energy intensity

The IEA signals that achieving the NZE Scenario is facilitated by doubling energy improvements to enhance energy intensity – the amount of primary energy needed to produce a dollar of economic output. The IEA highlights three important actions: improving the technical efficiency of equipment, switching to more efficient fuels, and using energy more efficiently. Electrification significantly reduces energy intensity in the NZE Scenario by enabling more efficient conversion of electricity into energy services compared to traditional fossil fuel-based technologies.

Reduce methane emissions from fossil fuels

By 2030, methane emissions will need to be reducedd by 75%, mainly due to the rapid deployment of emissions reduction measures and technologies. By 2050, the drop in methane emissions from fossil fuels will need to reach 98% due to further technological development and demand reductions.

Increase EV sales

In the NZE Scenario, EV sales will need to account for approximately 65% of new car sales by 2030. The transition to electrification occurs more rapidly in the transportation sector compared to other end-use sectors. Recent trends indicate that electric car sales will comprise two-thirds of new car sales by 2030, a pivotal milestone in the NZE Scenario. However, while there have been substantial cost reductions and robust policy support in major markets, the pace of progress is notably accelerated in the NZE Scenario.

Increase heat pump sales

Heat pumps are a particularly promising means to turn heat electric as they are the only technology capable of achieving thermal efficiencies well over 100%. Last year, we published a **report** highlighting how market and policy trends are boosting the business case for heat pumps. It outlines actions to maximize heat pumps' financial and strategic advantages. Heat pump sales will need to triple by 2030 and account for 20% of heating needs in the building sector by 2030. In the NZE Scenario, the global buildings sector sees electricity's share in energy use grow from 35% today to nearly 50% by 2030. This shift is primarily driven by the widespread adoption of heat pumps, which are significantly more efficient than electric resistance heaters.

Increase nuclear capacity

To align with the NZE Scenario, the IEA estimates that nuclear capacity will need to double by 2050, meaning an average of 26 GW of new capacity will need to come online every year from 2023 to 2050. This calls for an average annual investment of over USD 100 billion, triple the level in recent years. After three decades of modest growth, the IEA see a changing policy landscape opening opportunities for a nuclear comeback. Several countries have announced strategies that include a significant role for nuclear power, including Canada, China, France, India, Japan, Korea, Poland, the United Kingdom and the United States.

Nascent technologies will need to be part of the solution

Achieving net-zero emissions requires the crucial development of carbon capture, utilization, and storage (CCUS), hydrogen and hydrogen-based fuels, and sustainable bioenergy, with substantial progress required by 2030. By 2050, the NZE Scenario suggests that annual removals will need to reach 1.7 Gt of CO_2. While there has been a recent uptake in CCUS and hydrogen projects, most are still pending final investment decisions and require additional policy support to stimulate demand and enable the necessary infrastructure. The report encourages greater use of CCUS, but cautions that it cannot be an excuse for reducing fossil fuel demand.

The areas outlined by IEA above will be key for business to ensure they are on track to achieve the 1.5℃ goal. However, acting on these areas should be underpinned by the two following objectives key to ensuring energy transition is both equitable and nature positive.

Act equitably and promote a Just Transition

The energy transition requires broad societal support if it is to succeed in an orderly manner. Low income households need financial aid to afford and adopt efficient, low-carbon solutions. The IEA recommends using revenues from carbon taxes and emission trading systems to reduce the energy bills of poorer households. While the IEA foresees that two clean energy jobs are created for every fossil fuel job lost, many new jobs will be in different places, require other skills and may pay lower wages. Policies are needed to support workers and communities during the transition.

Recognize the role of nature in achieving net zero

The degradation and destruction of forests for agriculture is a major source of greenhouse gases, second only to fossil fuel emissions. To stay on track, we need an **exponential effort** and go from 12.5 Gt of greenhouse gas emissions from land each year, to net zero by 2030, a 5 Gt sink by 2040 and a 10 Gt sink by 2050. Whilst the IEA made no specific reference to the role that nature plays in achieving global net zero, WBCSD strongly supports it and recognizes that the protection, improved management and restoration of nature must play a key role in the climate mitigation strategy of state and non-state actors. As also recognized by the **IPCC**, the reduced conversion of natural ecosystems, carbon sequestration in agriculture and ecosystem restoration, afforestation, reforestation are the three solutions that have the highest climate change mitigation potential, after solar and wind.

How Business *Can Act*

The IEA has painted a clear picture of the action needed to transform the energy system before 2030 to meet the goals of the Paris Agreement. To achieve the NZE Scenario, business play a pivotal role in facilitating the systemic transformation of the energy sector. WBCSD works with its membership of 230+ of the world's leading multinational businesses to collectively accelerate the systems transformation needed to secure a net zero, nature-positive, and more equitable future. We drive transformative solutions into value chains based on science, data and cross-sector collaboration. Across the key transformation drivers outlined in this Business Brief, we work with members and partners on the following projects, initiatives, coalitions, and partnerships that are helping to drive energy systems transformations.

Climate Action

SOS 1.5: The SOS 1.5 project supports companies from all sectors to stay within the 1.5°C safe operating space and effectively deploy mitigation instruments. The WBCSD flagship project makes 'mission possible' 'mission probable' by helping companies identify the barriers to overcome and actions needed to accelerate their transition. Replacing the Low Carbon Technology Partnership Initiative, SOS 1.5 provides sector-specific deep dives and a tailored roadmap for any company to achieve climate mitigation action, regardless of where they are on the journey.

Equity Action

Business Commission to Tackle Inequality (BCTI): WBCSD convenes The Business Commission to Tackle Inequality, a cross-sectoral and multi-stakeholder coalition of organizations and their leaders who have come together to put addressing inequality at the heart of business' agenda for sustainable growth. In May 2022, the BCTI published its **flagship report** with ten priority areas for business to begin addressing inequality within their operations and value chains. Action 10 presents a just energy transition framework, providing useful guidance for companies on some key business action categories to ensure a just transition.

Energy

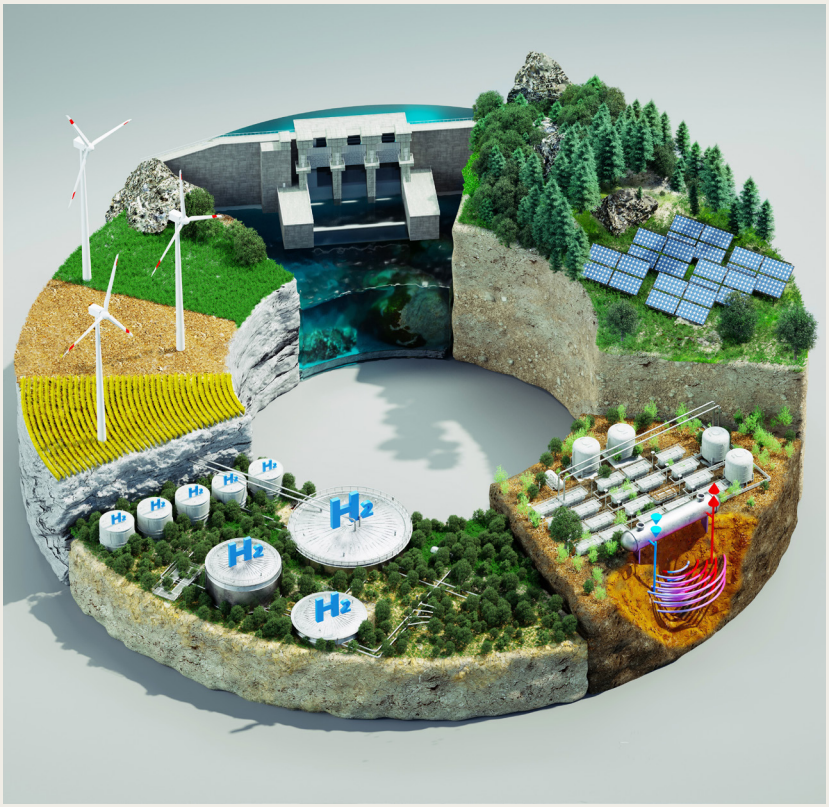
Decarbonization of Heat: More than **90% of low and medium temperature heat** (representing **half of all heat demand**) can be decarbonized using current technologies. Today, however, more than **three quarters** of industrial heat is sourced by burning of fossil fuels and result in around **10% of global CO2 emission**. We aim to guide the light industry with decarbonizing their thermal energy consumption by deploying renewable heat solutions, including **Heat-as-a-Service solutions** to decarbonize commercial and industrial heat use with third-party capital investments.

Low-Carbon Hydrogen: Hydrogen offers significant potential as a new technology to unlock deep decarbonization. 35 companies from across the globe and various sectors have pledged to drive growth in the demand for, and supply of, hydrogen in a joint initiative between WBCSD and the Sustainable Markets Initiative (SMI). WBCSD has also defined **investment guidelines** to ensure hydrogen projects align with a net-zero emissions scenario curve. At present, this work focuses on low-carbon hydrogen demand policy measures, guiding policymakers on how to grow demand, as well as increase investments into hydrogen projects via guidance on how to structure risk allocations in hydrogen purchase agreements. This will help drive investment, accelerate supply and mature the nascent low-carbon hydrogen markets.

Carbon Capture, Storage and Removal: The NZE Scenario and the 6th IPCC Synthesis Report both outline that limiting the global temperature rise to 1.5°C is almost impossible without the significant deployment of carbon capture and storage (CCS). CCS is a critical transitionary technology for the hard-to-abate industrial sectors, where other technological solutions are not yet viable. WBCSD's work on Carbon Capture, Storage and Removals addresses the technical, financial and industry barriers associated with the deployment of CCS to ensure it can be deployed at scale. WBCSD recently published guidance for companies seeking to invest in carbon removals '**Removing Carbon Responsibly**', which outlines how to build a portfolio of different carbon removals based on natural and technological removals.

TCFD/ISSB Guidance for Oil and Gas Sector: Before COP27, we released **The Business of Climate Recovery: Accelerating Accountability, Ambition and Action** to sharpen corporate carbon performance and accountability by COP28. Given the recently published International Sustainability Standards Board (ISSB) Sustainability Standards and emerging regulations in several jurisdictions, WBCSD and oil and gas members of the Energy Pathway have taken on the challenge to gather best practices to enhance corporate transparency. The efforts and an upcoming how-to guide focus on a vital corporate reporting aspect: how to quantify and disclose climate-related financial impacts in the face of significant transitioning uncertainty. This is important for investors and companies because investors increasingly seek a better understanding of how climate risks affect the oil and gas sector, and companies need to align corporate carbon performance and financial planning to meet net zero targets.

Nature Positive Roadmap for the Energy System: Business has a unique opportunity to reshape its relationship with nature and embrace much-needed transformation. As well as needing to respond to increasingly immediate, business-critical, nature-related risks, companies are facing a rapidly evolving accountability system. WBCSD has developed **foundational guidance for all businesses**, as well as an **additional roadmap** for the **energy system**. Following the steps laid out in the WBCSD Nature Positive Roadmaps will prepare companies for setting **science-based targets for nature**, reporting against the Taskforce for Nature-related Financial Disclosures (TNFD) **v.1**, and taking priority actions in line with the **post-2020 Global Biodiversity Framework**. Our collective efforts will continue in 2024 with a continuation of the initial roadmap focusing on performance and accountability, supporting the testing and using of indicators for nature disclosure, and defining science-informed targets (aligned with TNFD and SBTN).



Built Environment

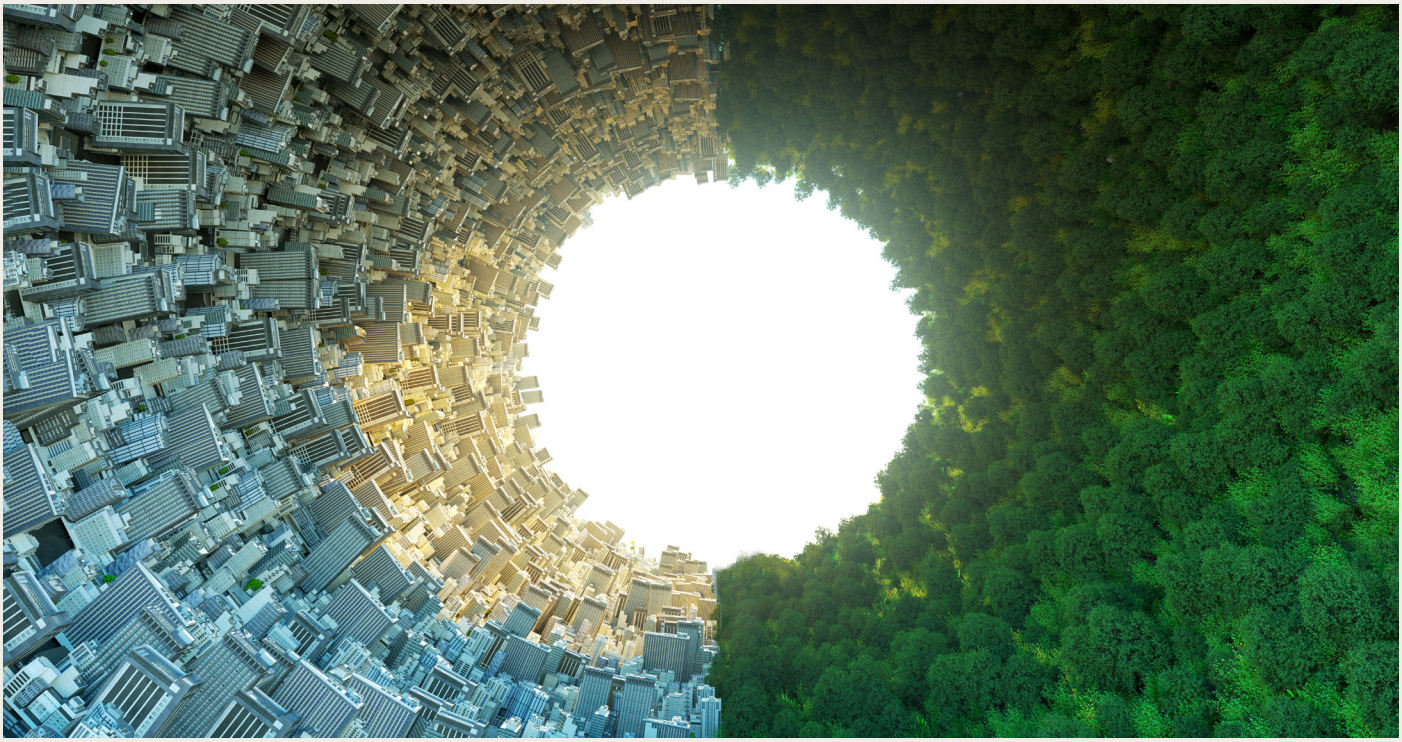
Net Zero Buildings: Together with our members, we are leading the narrative on systems transformations for the built environment. This focuses on creating the alignment around a common language and demonstrating key actions businesses can take to achieve a net zero built environment across the entire value chain. By taking a whole-life carbon and system-level approach, as highlighted in the **Buildings System Carbon Framework**, WBCSD informs about **where do we stand** on the entire carbon emissions of buildings and how we can **halve construction emissions** – or embodied carbon – today. The current work, to be launched in November this year, will highlight the state-of-the-art definitions and practices for achieving net zero emissions during the operation of buildings (space and water heating, cooling, etc.). This will be followed next year by action-oriented guidance on holistic strategies and solutions for achieving meaningful net zero operational buildings.

Built Environment Market Transformation: In the run-up to COP28, WBCSD is leading the development of a broad-based "Global Action Agenda for Market Transformation in the Built Environment" aimed at overcoming the key barriers along the value chain that keep us from delivering decarbonization of buildings at scale. This work builds on the foundational **Market Transformation Levers** WBCSD developed together with the Global Alliance for Buildings and Construction (GlobalABC). We bring together stakeholders from every segment along the value chain (manufacturing, architecture, engineering & construction, real estate, finance, and end users) as well as policy makers, in order to drive consensus on (i) what - exactly - needs to be done, (ii) who - exactly - needs to do it and (iii) how - we can call to action global governments to support through the Buildings Breakthrough Agenda and the first Global Buildings and Climate Forum in Paris in March 2024. The Action Agenda will focus on a series of targeted interventions along the value chain that will be implemented in a one to three-year horizon to shift the system into delivering decarbonization at scale.

Mobility

Mobility Decarbonization: WBCSD's Transport and Mobility Pathway mobilizes CEOs for the rapid transition to zero-emission vehicles (ZEV). The objective is to reach 60% of global ZEV market share and scale digital mobility solutions for efficiency to abate road transport emissions to circa 4Gt of CO 2, while helping the automotive sector to reduce 50% of GHG emissions by 2030. To accelerate this transition in line with the Paris Agreement, the mobility decarbonization project convenes leading CEOs, public authorities, and investors to collectively design transformative projects that can implement solutions for zero-emission transport at scale.

ZEV-EM Initiative: As one of the main partners of the **ZEV-EM Initiative**, we have been mobilising leading businesses, who along with the US, UK, and 17 other nations, will at COP28 announce new transformative private-public agreements for transport decarbonization in emerging markets, mobilizing co-investments along the value chain supported by enabling policies. Starting with collective freight action in India and Mexico, announced agreements will help to bridge the gap to global transport decarbonization targets.



Conclusion

The IEA Net Zero Roadmap offers a positive outlook on the energy sector transition towards 2050 with the simple key message that the world is still within reach of achieving the goals of the Paris Agreement. Multistakeholder collaboration between governments, business and finance is critical to ensure that the key targets outlined in the roadmap are achieved to align the energy sector with the NZE Scenario. The technologies for the clean energy transition are available; it is now a question of both corporate and political will.

WBCSD will be driving an ambitious agenda at our Council Meeting and COP28 in Dubai in November and December to demonstrate that business has the ambition, action and accountability needed to catalyze energy systems transformation.

Contact

If you are interested in joining any of the initiatives or dialogues mentioned in this briefing, please email:
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About WBCSD

The World Business Council for Sustainable Development (WBCSD) is a global community of over 220 of the world's leading businesses, representing a combined revenue of more than USD $8.5 trillion and 19 million employees. Together, we transform the systems we work in to limit the impact of the climate crisis, restore nature and tackle inequality.

We accelerate value chain transformation across key sectors and reshape the financial system to reward sustainable leadership and action through a lower cost of capital. Through the exchange of best practices, improving performance, accessing education, forming partnerships and shaping the policy agenda, we drive progress in businesses and sharpen the accountability of their performance.

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