



WORLD ENERGY ISSUES MONITOR 2024

REDESIGNING ENERGY IN 5D

ABOUT

WORLD ENERGY COUNCIL

The World Energy Council is the world's oldest independent and impartial community of energy leaders and practitioners. Through our Humanising Energy vision, we involve more people and communities in accelerating clean and just energy transitions in all world regions. Formed in 1923, the Council has convened diverse interests from across the full energy ecosystem for a century, and today has over 3,000 member organisations and a presence in nearly 100 countries. Our global network draws from governments, private and state corporations, academia and civil society, as well as current and future energy leaders. We effectively collaborate on impact programmes and inform local, regional and global energy agendas in support of our enduring mission: to promote the sustainable use and supply of energy for the benefit of all people.

Further details at www.worldenergy.org and on [LinkedIn](#) and [Twitter](#).

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WORLD ENERGY ISSUES MONITOR 2024

The World Energy Issues Monitor provides a snapshot of what keeps CEOs, Ministers and experts awake at night in over 100 countries.

The Monitor helps to define the world energy agenda and its evolution over time. It provides a high-level perception of what constitute issues of critical uncertainty, in contrast to those that require immediate action or act as developing signals for the future. It is an essential tool for understanding the complex and uncertain environment in which energy leaders must operate, and a tool through which one can challenge one's own assumptions on the key drivers within the energy landscape.

This 14th iteration of the World Energy Issues Monitor is based on insights of nearly 1,800 energy leaders in over 100 countries to provide 40 national assessments across six world regions.

World Energy Issues Monitor 2024, published by the World Energy Council.



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FOREWORD

NET ZERO AND BEYOND...

In the words of Alfred North Whitehead, “We think in generalities, but we live in detail.”

This year’s World Energy Issue Monitor reveals a fragmented energy leadership landscape, marked by increasing uncertainty and extreme polarization. The resulting confusion and anxiety fuels social outrage and apathy and impedes effective collaboration and bottom-up engagement.

The outlook for humanity is tumultuous, with energy transitions facing the risk of U-turns and detours in all regions. It’s widely acknowledged that our current energy systems are no longer fit for purpose, demanding urgent redesign for the betterment of billions of lives and the planet’s health.

While the direction towards zero emissions energy systems by mid-century is clear, the journey to a sustainable future is fraught with challenges. No single entity - be it a country, company, or community - can manage energy transitions alone nor by focusing on a single-issue agenda, and there is no silver or green technology bullet.

The risk of disorderly energy transitions looms large as various visions and diverging technology pathways emerge globally. Five key global drivers of change - Decarbonisation, Digitalisation, Decentralisation, Disruption, and Diversification - are shaping energy transitions worldwide.

Collaboration emerges as a crucial design choice amidst these complexities. The interconnectedness of the “5Ds” underscores the importance of engaging more people and diverse communities and addressing regional demographic trends and global demands for energy equity and climate justice.

While we may understand the technical aspects of achieving Net Zero and beyond, the political and social hurdles remain formidable. Many and new ways of aligning diverse needs and interests and sustaining effective cooperation are essential and emerging.

Redesigning energy for people and planet raises a ‘mother-of-all’, complex coordination opportunity and a ‘father of all’ strategic knowledge sharing challenge.

The best way forward involves hundreds and thousands of smaller steps, forming new energy ecosystems and pathfinding guided by the evolving trilemma of security, sustainability and social equity. Accelerating the pace of decarbonisation with justice and building dynamic resilience to polycrisis is achievable if, and only if, more people and diverse communities understand their roles and choices.

The World Energy Council has played a pivotal role in convening power for the common good, connecting the dots and change making for a century. The World Energy Issues Monitor is one of the tools our members and wider stakeholders use for redesigning energy systems to meet current needs and future demands.

As the world’s foremost energy community, we are committed to fostering faster, fairer, and more far-reaching energy transitions. A flexible and shared sense of the fragmenting, fast and fundamentally shifting world energy leadership landscape is not easy to develop and we thank our remarkable community of energy leaders for this remarkable set of global, regional and segmented maps.

Join us at the Rotterdam World Energy Congress to continue this humanising energy dialogue and learn with us to connect the dots and drive meaningful change for the well-being of 10 billion lives and a sustainable planet.



Angela Wilkinson
Secretary General & CEO
World Energy Council



EXECUTIVE SUMMARY

In a world where the demands for secure, affordable and sustainable energy are ever-increasing, global and national energy systems are showing signs of deficiencies and strains everywhere. There is an urgent need for collaboration across the entire energy ecosystem to redesign energy systems that enable the improvement of billions of lives on a healthy planet.

In this complex landscape, characterised by the interplay of various energy transition pathways, there is no one-size-fits-all solution. The imperative for energy transitions necessitates profound system-level changes that transcend traditional policy frameworks. Energy transitions go beyond technological advancements, fuel substitution, electrification, or decarbonisation; they encompass a holistic approach that addresses wider and wiser uses of energy.

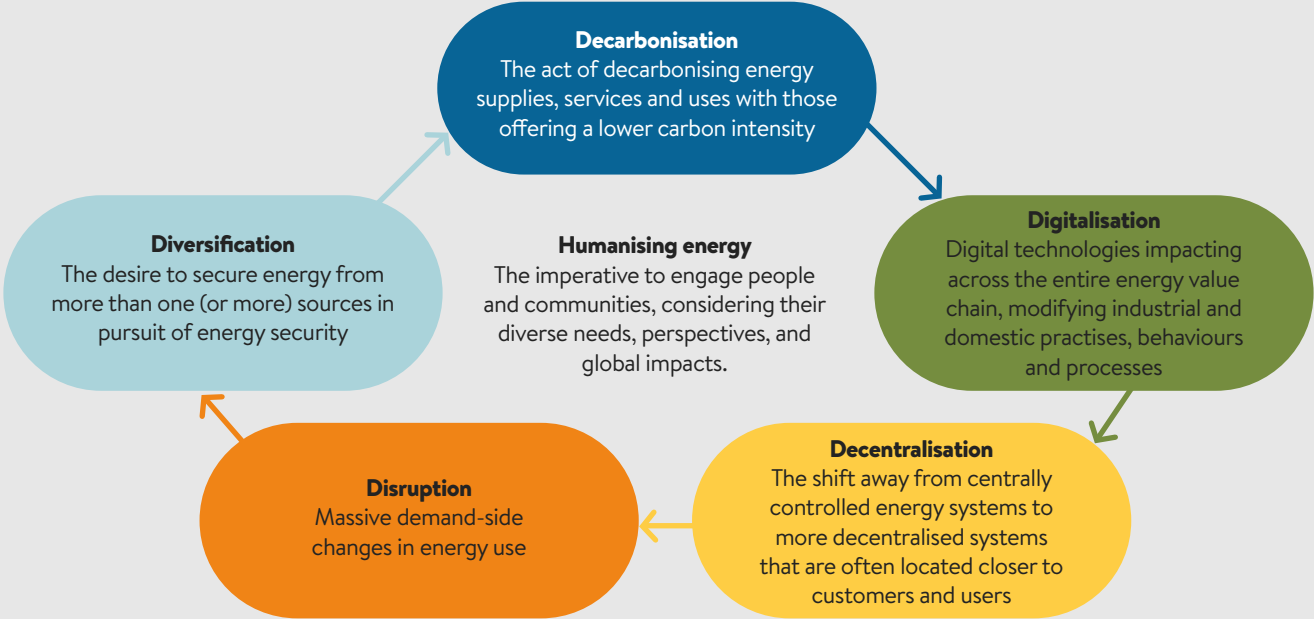
Energy transitions’ transformative impacts extend far beyond the energy sector alone. They intersect with other vital systems such as industry, agriculture and urban infrastructure, reshaping the fabric of society. To catalyse faster, fairer and more far-reaching energy transitions, diversity must be activated, and people empowered, including women, workers and the next generation.

As energy transitions unfold within the broader context of systemic shifts, they signify a fundamental reorientation of our relationship with energy. Energy transitions underscore the importance of equipping diverse communities with the knowledge and agency to shape the future of energy, reflecting a deeper understanding of our interconnectedness with the planet and each other.

Following the conclusion of COP28 in the United Arab Emirates, this edition of the World Energy Issues Survey captures the perspectives of nearly 1,800 energy leaders across more than 100 countries, providing a timely and insightful snapshot of the dynamic global energy landscape. As an essential tool for navigating the complexities and uncertainties faced by energy leaders, the World Energy Issues Monitor prompts a reconsideration of assumptions regarding the key drivers shaping energy transitions.

Moreover, when considered in conjunction with the Council’s [World Energy Trilemma Framework](#) and the [World Energy Scenarios](#), these resources collectively provide a comprehensive understanding of current advancements, future challenges and emerging opportunities in the global energy sector. Together, they offer valuable insights that can guide strategic decision-making and policy formulation in the energy domain.

The 2024 World Energy Issues Monitor reaffirms the World Energy Council’s “5 Ds” that are driving change in energy systems across the world.



These “5Ds” are connected and shaped by regional diversity and differences in demographic patterns, energy needs and wants. The survey results offer a rich and diverse set of views on global energy issues, shedding light on key trends and priorities, and their implications for the five global drivers of change shaping energy transitions in all regions. Key insights include:

- **Old and new geopolitical agendas are vying for pole position.** The ongoing war in Ukraine and instability in the Middle East escalate uncertainty, affecting energy trade and security. The expansion of BRICS with 6 new members illustrates changing global political affiliations and partnerships, impacting energy dynamics and collaboration. The geopolitics of energy are extending beyond oil and gas resources to supply chains and data.
- **Energy security concerns have evolved beyond conventional supply side security to demand driven shocks and disruptions and the impacts of climate change.** These include resilience, diversity of supplies, climate change, the energy-water-food nexus, shifts in supply chains and accessibility of critical minerals and metals. The shift towards resilience is observed in both this report and the 2024 World Energy Trilemma Report. Demand management policies and a transition of control towards end users.
- **Investor confidence in de-risking clean energy investment has grown significantly** – except in Africa and Latin America and the Caribbean. While de-risking investment in energy has exhibited one of the lowest levels of uncertainty in the global average, the start-ups and innovators group indicate a higher level of uncertainty, necessitating leadership attention. There is an urgent need for a greater flow of finance and investment into infrastructure and the scaling up of new technologies to facilitate energy transitions towards a more sustainable, low carbon future.
- **Key technologies are emerging as pivots in energy transitions, disrupting the energy landscape** and reshaping the sector as they gain traction. While increasing the supply of renewable electrification in the energy mix is common to all, there is significant difference in how key technologies pivot. Hydrogen and P2X technologies are increasingly becoming pivotal in achieving net zero emissions. Uncertainties still exist in some regions, notably the Middle East and Gulf States. Scaling up these key technologies requires essential enablers such as appropriate and timely regulation, as well as financial innovation. Carbon Capture, Utilisation and Storage (CCUS) hardly features, with Middle East and Gulf States being a notable exception where it is considered an action priority.
- **Transmission grid strengthening and expansion, as well as more flexible energy storage solutions, including demand management, are globally recognised areas of focus and action.** An exception is observed in Latin America and the Caribbean. Urgent action and investment are needed to upgrade and integrate electricity transmission grids globally, particularly to accommodate the increasing demand for energy, expand and integrate renewable energy sources, and enhance climate resilience. Whilst much of the debate around energy transitions centres around energy sources, a strong infrastructure is required to deliver energy to hungry markets. There is no transition without transmission.
- **Climate action priorities, encompassing mitigation, adaptation, and compensation, vary across regions** and extend to broader concerns about energy for sustainable development including water stress and food security. Mixed views on climate adaptation exist, with high uncertainty among respondents from Asia and Latin America and the Caribbean. The interdependence of water, energy and food systems is a top priority for African respondents but remains uncertain for those in Latin America and the Caribbean.
- **New mixes of policy and regulations are needed to manage the multiple objectives in redesigning energy for people and planet.** Uncertainty increased regarding policy environments necessary to transform energy demand across sectors, including energy efficiency, requiring a reevaluation of policies and stakeholder collaboration. Demand management is a new policy imperative for a stable electricity system. This issue was firmly in the uncertainty domain for all regions and groups, except for start-ups and



Innovators where it was an action. There are marked regional differences in progressing peer-to-peer and peer-to-market trading solutions.

- **Social transformation gains momentum: demands for shared benefits, social inclusivity and justice increasingly influence energy strategies.** Bottom-up engagement is weaker than needed and better-quality leadership dialogue and enhanced stakeholder coordination are essential to address interconnected issues such as demand management, quality energy access, and wider and wiser uses of energy. Changes in mindsets are required to generate new forms of collaboration. The polarisation of views about energy, notably the “good” vs “bad” energy, is unhelpful and can hinder tangible progress. The complexity of engaging diverse stakeholders and finding new ways of collaboration cannot be underestimated. While many locally appropriate novel approaches are emerging, the next challenge lies in scaling and connecting these initiatives.

The 2024 World Energy Issues Monitor underlines the complex nature of energy transitions, emphasizing their multifaceted character where a one-size-fits-all strategy proves inadequate. Signals of deficiency, stress and strain are everywhere emphasizing that redesigning energy for people in planet is imperative, making faster fairer and more far-reaching energy transitions happen is not easy. Regional priorities and uncertainties varied significantly as did responses from key stakeholder groups such as Future Energy Leaders and Start-ups and Innovator. Multiple energy transition pathways are emerging in all regions and increasing the supply of renewable electrification in the mix is common to all, but significant difference in baskets of technology pivots (H2, CCS, storage and grids) exist. This divergence hints at varying risk appetites or awareness, differences in culture, resource endowment, economic and intergenerational distinctions as well as differences between established organisation and burgeoning start-ups.

Central to the success of energy system transformations is the imperative to lead with diversity, leveraging and learning from differences, and fostering quality dialogues to reconcile divergent perspectives and enable collaboration tailored to each distinct context.

The 2024 World Energy Issues Monitor is akin to an energy Rubik’s Cube, offering a multifaceted view of the energy landscape where each issue represents a colourful facet, yet only a portion of the whole can be examined at a time, providing a snapshot of emerging trends and transformations.

Beyond where you are directing your focus in 2024, how do you interpret the concept of diversity in orchestrating orderly transitions and how can we effectively leverage these differences to drive meaningful action and collaboration?

Our commitment lies in redesigning energy for people and planet, as we strive to connect the dots in a faster-paced, fundamentally shifting and increasingly fragmented leadership landscape. Through our convening power for common good, we endeavour to engage a broader spectrum of people and diverse communities, ensuring that new voices are included in better quality dialogues. We are a community of change makers, seeking to make energy transitions happen that are faster, fairer and more far-reaching. This involves scaling a multitude of smaller steps and designing innovative policy mixes to achieve multiple objectives, including security, affordability, and sustainability, while emphasising dynamic resilience and broader justice.

We invite you to harness the power of this tool not just for reading and reflecting, but also as a catalyst for action and collaboration in our pursuit of making faster, fairer and more far-reaching energy transitions happen.

ABOUT THE WORLD ENERGY ISSUES MONITOR

For the past 15 years, the World Energy Council has diligently monitored energy leaders' perspectives on issues impacting energy transitions through the annual World Energy Issues Monitor, serving as a vital global source of critical information guiding action priorities for faster, fairer and more far-reaching energy transitions. The World Energy Issues Monitor assesses the impact and uncertainty of pre-identified energy transition issues by soliciting feedback from policymakers, CEOs and leading industry experts. It offers insights into a) **Action Priorities**, representing areas where countries are actively advancing their energy transition efforts; and b) **Critical Uncertainties**, highlighting issues that are of concern to energy leaders and require leadership attention.

For this edition of the World Energy Issues Monitor, the Council surveyed nearly 1,800 energy leaders and global experts drawn from its global network spanning over 100 countries. The survey also included two distinct groups: the World Energy Council Future Energy Leaders, comprising energy professionals under 35 years of age, and Start-ups and Innovators, consisting of companies founded less than 10 years ago that can present a functioning prototype with a proved scaled model. The survey was conducted in early 2024, following the conclusion of the 28th Conference of the Parties (COP28), which was held in Dubai in the United Arab Emirates in November 2023. The 2024 World Energy Issues Monitor should be considered within this context.

The World Energy Issues Monitor survey questionnaire underwent a thorough review and update to ensure its alignment with the evolving context and the imperative to redesign energy systems to improve billions of lives on a healthy planet. The 2024 survey included 33 core energy transition issues, organised into six categories. The full descriptions of the issues give more context and will help guide the reader in reaching new insights and connections.



Table 1: Issues' Categories and Definitions

	Short name	Full description
Geopolitical issues	Risk to Peace*	War/extended conflicts/risk to peace
	Supply Chains	Supply chain disruptions (solar, wind, etc)
	Critical Minerals	Critical minerals and metals bottlenecks
	Investment	De-risking investment
	Commodity Prices*	Commodity price volatility
	International Collaboration*	Effective International collaboration
Economic issues	Capital Cost*	Cost of/access to capital
	Global Growth	Global economic growth
	Domestic Growth*	Domestic growth outlook
	Workforce*	Workforce transitions
Societal issues	Accessibility*	Accessibility – access to reliable and clean energy services
	Affordability*	Affordability – cost of energy services
	Acceptability	Acceptability – permit/licence delays
	Societal Needs	Active engagement from a critical mass representing broader societal needs
	Stakeholder Coordination	Complex coordination and collaboration of multiple stakeholders
	Populism	Rise of populism
Regulatory regimes	Fossil Subsidies*	Removal/reduction of fossil subsidies/tax breaks
	Infrastructure	Infrastructure action planning - strategically building and upgrading physical systems
	Demand management	Policy environment to transform energy demand across sectors
	Trilemma Management	Energy transitions trilemma management - working across policy silos
Technology gamechangers	Artificial Intelligence*	Artificial Intelligence (AI)
	Energy Storage*	Energy storage
	Circularity	Circularity - Closed loop systems that reduce, reuse, recycle, restore
	Transmission Grids	Transmission grids
	CCUS	Carbon Capture, Utilisation and Storage (CCUS)
	DAC	Direct air capture (DAC)
	H2 and P2X*	Hydrogen and Power-to-X
Environment and climate change	Food-Energy-Water*	Food-energy-water nexus
	Climate Adaptation*	Adaptation to the impacts and risks of climate change
	Ecosystems Reparation*	Carbon removals and repair/restoration of ecosystems
	Climate Mitigation*	Mitigation/net zero implementation to prevent and offset emissions
	Compensation	Compensation to offsets losses/damages due to climate impacts
	Life Cycle Impact	Full life cycle impact of renewable energy solutions

Issues with an (*) can be tracked from previous surveys since 2009, to show trends over a longer period.



GLOBAL PERSPECTIVES

Since the 2022 Issues Monitor, there have been a plethora of changes in the energy sector, fundamentally altering uncertainty and outlook. The impact of the COVID-19 pandemic has faded, and energy demand has rebounded due to economic stimulus packages and a decline in the impact of the virus on key economic sectors.

The impact of the war in Ukraine on the energy sector has been significant and sustained. It led to volatility in energy prices and shortages of some energy commodities. This has resulted in energy security concerns and economic impacts due to higher prices and uncertainty. Given the importance of energy in underpinning economic growth, many countries have increased energy resilience measures such as diversification and new or increased energy trade flows. The effects of the war have a disproportionate impact on poor countries due to inflationary pressures globally.

COP28 in late 2023 was aimed at shifting the conversation to “deliver on old promises and raise new ambitions on adaptation, mitigation and means of implementation”. The agenda set by the UAE Presidency centred on fast-tracking a just and orderly energy transition, fixing climate finance, focusing on people, nature, lives, and livelihoods, and fostering inclusivity. The conference stood out in its approach by embracing diversity and recognizing the importance of hearing different voices to maintain global temperatures below 1.5 degrees Celsius and, importantly, to “leave no one behind.”

Nearly 200 countries reached consensus on their response to the first Global Stocktake under the Paris Agreement, known as the UAE Consensus. A plan was put forward to close implementation gaps to 2030, “ratchet up climate action before the end of the decade” and define a roadmap to net zero which includes:

- Recognition of the need to “transition away from fossil fuels in energy systems, in a just, orderly and equitable manner”
- A target to triple renewables and double energy efficiency by 2030
- Phasing out fossil fuel subsidies

A focus on the global financial architecture, a new loss and damage mechanism to assist vulnerable developing countries deal with climate change impacts and a focus on trade for the first time at a COP were also notable areas of progress.

Other key energy-related developments included the announcement of the Global Decarbonisation Accelerator (GDA), comprising a series of initiatives, including an Oil & Gas Decarbonisation Charter, aimed at expediting energy transitions, and reducing global emissions. Additionally, various multi-stakeholder initiatives to accelerate the transition to clean energy, such as the Powering Past Coal Alliance and the Coal Transition Accelerator, were highlighted. Furthermore, pledges by 20 countries to launch the Declaration to Triple Nuclear Energy by 2050 were notable achievements.

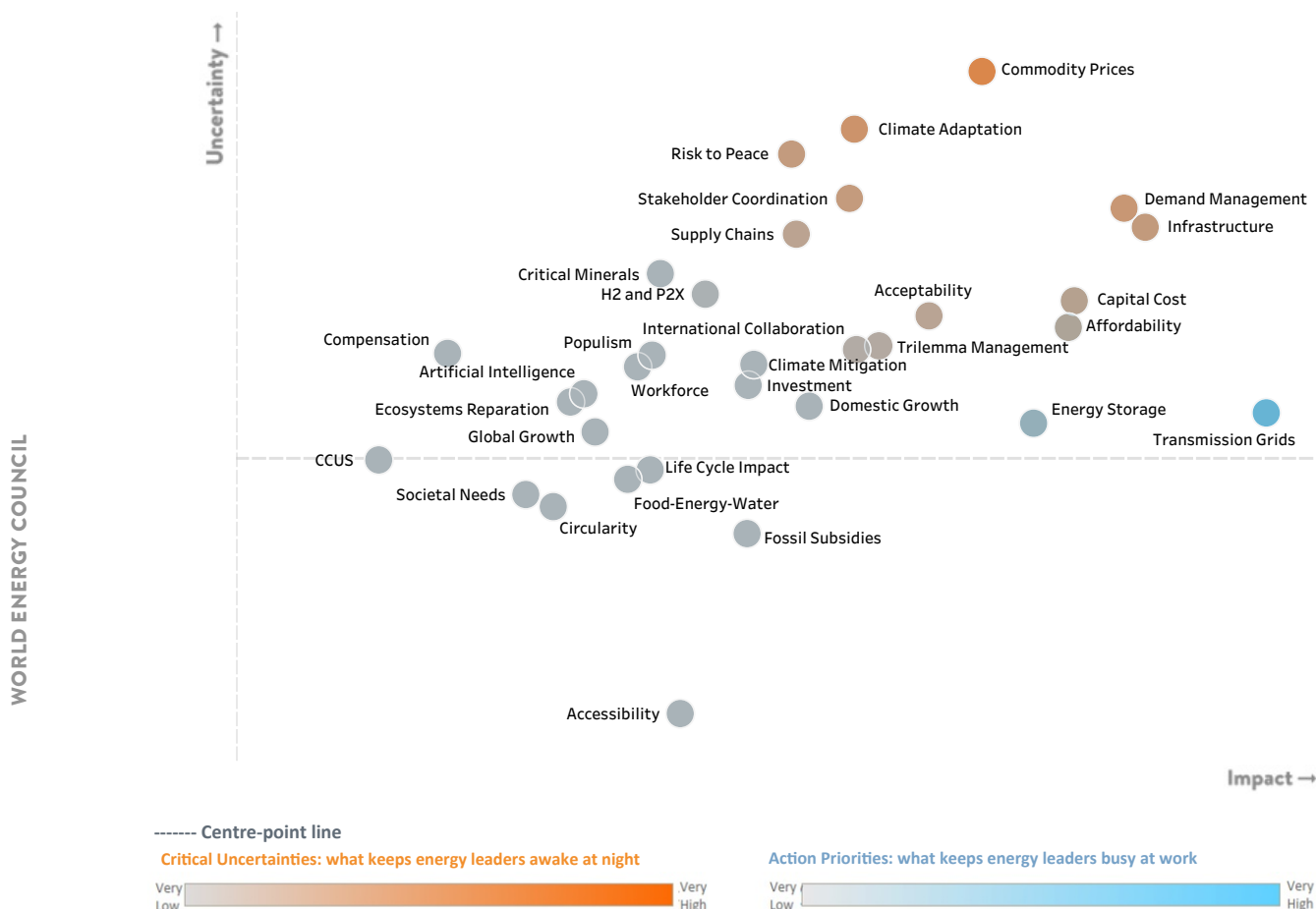
This edition of the World Energy Issues Monitor Survey was undertaken immediately following COP28 and represents the current views of nearly 1,800 energy leaders from more than 100 countries. It offers a snapshot of the evolving landscape of global energy transitions, serving as an indispensable tool for navigating the complex and uncertain environment faced by energy leaders. Additionally, it encourages the reader to challenge their own assumptions regarding the key drivers shaping the energy landscape. When read independently or in conjunction with The Council’s [World Energy Trilemma Framework](#) or the [Council’s World Energy Scenarios](#), these resources collectively offer a comprehensive understanding of current advancements, future challenges and emerging opportunities in the energy sector. This work uniquely informs energy leaders worldwide, helping prioritise uncertain issues for further analysis while identifying actionable ones. This aids decision-making, fostering flexibility and agility in a competitive,

uncertain world. This work uniquely informs energy leaders worldwide, helping prioritise uncertain issues for further analysis while identifying actionable ones. This aids decision-making, fostering flexibility and agility in a competitive, uncertain world.

Against this backdrop, what is keeping energy leaders busy at work (Action Priorities) and what is keeping them awake at night (Critical Uncertainties)?

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Global



GEOPOLITICS ARE IN POLE POSITION, IMPACTING ENERGY SECURITY

Geopolitical issues stood out as key drivers of the energy market. This was reflected in the perceptions of energy leaders and echoed in the 2024 World Energy Trilemma Report which concluded that the need for resilience in the face of geopolitical uncertainty is a critical attribute. **Risk to peace** was top of mind (more so in some regions than others) and market uncertainty and volatility is exacerbated by the on-going war in Ukraine and instability in the Middle East. Concerns about the impact of these geopolitical developments on energy trade and energy security continue. In this changing context with many interrelated issues, **commodity prices** remained as the highest critical uncertainty together with **supply chains**. Commodity prices were uncertain and top of mind in all the regions except for North America, where it was an action priority.

Upcoming elections in numerous countries, may also have ripple effects on geopolitics across multiple policy areas such as multilateralism, energy, trade and climate change. This may not manifest as a direct policy change, but could also mean a shift in emphasis, political stance, or affiliation. The expansion of the BRICS to include six new members (Argentina, Egypt, Ethiopia, Iran, Saudi Arabia and the United



Arab Emirates) signifies shifting global political affiliations, reformulation of international alliances, new partnerships and forms of collaboration. This expansion will further augment the 2019 [World Bank's](#) estimated BRICS footprint, encompassing 41% of the world's population, 30% of its geographic area, 24% of Gross Domestic Product (GDP) and 16% of international trade.

Geopolitical developments are causing a change towards action with for example, **Hydrogen and Power-to-X (P2X)**. This game changing technology is crucial for tackling decarbonisation of hard to abate sectors, enhancing energy diversification and security. While clear steps are being taken in this direction, they are intricately linked to the increasing demand for and accessibility of **critical minerals** and metals required for electrolysis and other large-scale clean and renewable energy production, as well as the establishment of new supply chains. Leaders in Europe, Africa, Asia and North America indicate greater, yet still conservative actions towards hydrogen and P2X technologies. The Latin America and Caribbean countries were less optimistic and Middle East and Gulf States respondents ranked it as the highest critical uncertainty. The diversity of views and moderate impact reflect the maturity of the technology and sector and are expected to evolve as uptake increases.

RENEWABLE ENERGY UPTAKE IS INCREASING AND SO IS THE NEED FOR TRANSMISSION GRIDS

The **electricity transmission grid** was identified as the key area in need of receiving urgent attention and action for advancing energy transitions in 2024, both globally and across most regions. Serving as the backbone of modern energy systems, multi-directional, integrated and smart grids with dynamic storage require significant investments, technology innovation and regulatory frameworks to facilitate the shift toward cleaner, more sustainable and resilient energy.

RENEWABLES REMAIN AN ESSENTIAL INGREDIENT TO JUST ENERGY TRANSITIONS

For several years, **renewable energies** were clear action priorities in the global issues maps, standing out from other issues. As it was clear that the large scale roll out of renewable energy across the world was continuing unabated, a decision was taken to remove it from the list of issues and focus on emerging, game changing technologies. This does not mean that renewables have declined in priority, rather that they are no longer uncertain. The [International Energy Agency](#) (IEA) reports that the growth in Solar PV between 2022 and 2023 was 116% and 66% for wind in the People's Republic of China alone, with the global share of renewables in the electricity mix predicted to be more than 42% by 2028. This is bolstered by **climate mitigation**, policy incentives, a continued decline in costs and supporting technologies that deal with intermittency such as **energy storage**. Further demand for renewables is expected for green hydrogen production. Other emerging and adjacent issues that are noted and now included in this year's survey edition include **life cycle impacts** of renewable energy solutions and **circularity, access to critical minerals and metals, supply chains disruptions** and the required **workforce transition**. New jobs and skills will be required, in large volumes for the roll out of renewables and this provides an opportunity to amplify the benefits of renewable energy through economic stimulation towards just transitions.

New grid developments often occur in areas abundant in renewable resources, supporting electricity generation but also green **hydrogen and P2X** production. Investment in smart grid upgrades and digitalisation is crucial for effectively managing variable electricity sources. However, while artificial intelligence offers radical efficiency gains across the value chain and for smarter energy usage, its impact on advancing energy transitions in 2024 is not anticipated to be significant. Given the substantial investment needed for grid upgrades and the integration of decentralised renewable energy plants, addressing these challenges is expected to remain a top priority in the coming years.

Investor confidence has increased and so has action towards **de-risking investment**, except for Africa and Latin America and the Caribbean. Energy transition **investment** rose 17% in 2023 from 2022. This growth was faster than investment in fossil fuels, with the **IEA** speculating that overall energy investment will be USD 2.8 trillion in 2023, concentrated among a few dominant countries, including China. Given the diverse energy contexts, these investment priorities will differ widely, evidenced in the regional difference in perceptions on key technologies such as **CCUS** and **hydrogen and P2X**. Of deep concern, however, was energy related **infrastructure action planning** and availability. New infrastructure is required such as new or modified ports, water supply infrastructure and railways to support energy operations. A lack of adequate infrastructure has many interconnected implications and can hamper progress in the transition to cleaner technologies and molecules and have a catalytic impact on economic growth.

CLIMATE ACTION IS INCREASING

Climate change action is increasing but falls short of what is needed, and a changing climate is increasing vulnerability and uncertainty across the board. By unbundling climate policy to reflect adaptation and mitigation as separate issues, a clear difference in perception of the two issues emerged. **Climate adaptation** is uncertain and requires greater leadership attention, whilst **climate mitigation** has leadership attention but requires greater action to effectively deliver on climate objectives. This emerged in all the regions except North America, where climate adaptation was perceived as an action priority.

The resilience of regions to the impacts of climate change such as Africa and Latin America and the Caribbean may be lacking, and adaptation is becoming more critical as the number of extreme weather events increase and energy, other infrastructure and value chains are negatively impacted. Notably, although carbon removal and **Ecosystems Reparation** has leadership attention at a global level, it varies widely in the regions from a critical uncertainty (Middle East and Gulf States and Latin America and the Caribbean) to action priority (Africa, North America and Europe). As adaptation is an issue that can only increase in priority, the differences in opinions about its importance for immediate action may be explained by immediate needs in very vulnerable regions of the world needing **compensation to offset losses** and regions already building resilience.

More certainty and action at a national level is emerging for **climate mitigation** as increased clarity around policy intent emerges and governments operationalise plans for a lower carbon trajectory towards 2050, together with declining renewable energy and other energy technology prices. The removal or reduction of **fossil subsidies and tax breaks** is clearly receiving government attention, which correlates with the outcomes of COP28 where it was agreed to *transition away from fossil fuels in energy systems*. The acceleration of investment in renewable energy has shifted the focus from simply adopting renewable sources to considering their entire **life cycle impact**. This change reflects a broader trend away from a narrow focus on decarbonisation and electrification, towards a more holistic transformation of the entire energy system, emphasizing **circularity and closed loop systems**. The grouping, interplay and action orientation of **circularity, trilemma management**, the **food-energy-water nexus** and the active engagement from a critical mass representing broader **societal needs** demonstrates a pattern of change towards more holistic, inclusive and longer-term considerations in decision making, and addressing interconnected challenges.

NEW ENERGY POLICY AND REGULATIONS ARE NEEDED FOR THE CHANGING ENERGY SYSTEM

Uncertainty regarding the policy environment necessary to transform **energy demand** across sectors, including energy efficiency, was noted. The shift towards managing energy demand rather than a single focus on energy efficiency is an increasingly complex issue. New energy markets for demand response and energy storage, together with smart grids, are essential tools to deal with intermittency, changing demand profiles and ensuring a stable grid.



Decentralisation of energy generation and management is enabling a much higher degree of control by energy consumers. Current policy may no longer be relevant and require review and critical engagement and collaboration with stakeholders to define practical and proactive policy. This is therefore an issue where laser focus on action is needed going forward.

African energy leaders viewed **energy accessibility** as a high impact area but with uncertainty around how it will be resourced and implemented. As Africa has the highest number of people in the world that do not have access to reliable and clean energy services, this is expected.

ENERGISING POSSIBILITIES: TECHNOLOGY GAMECHANGERS

As technological innovation is changing the face of the energy sector in an unprecedented manner, the new category of Technology Gamechangers was included in this year's survey. Technological developments are enabling not only new forms of energy and clean molecules, but are also changing how we transport, manage, interact with and use energy. Therefore, the limits of the "traditional" energy sector are expanding and morphing into a more interconnected and electric system. **Supply chains, workforce requirements, lifecycle impacts** of renewable energy solutions, active engagement from a critical mass representing **broader societal needs** and business models are being moulded to fit this altered global reality.

Perceptions of the impact and uncertainty of these technologies varied widely amongst survey respondents. This is expected as different people, groups and countries will view these developments in a variety of ways both positive and negative, but also as not commercial yet or too expensive. One technology gamechanger (**Direct Air Capture**) was removed from the maps as it was an outlier in all cases. While the Intergovernmental Panel on Climate Change (IPCC) recognises that carbon removals are critical to achieve net-zero emissions, including emissions from hard-to-abate sectors such as shipping and aviation, what needs to be done to unlock innovation and financing in this area is not yet on the radar of survey respondents.

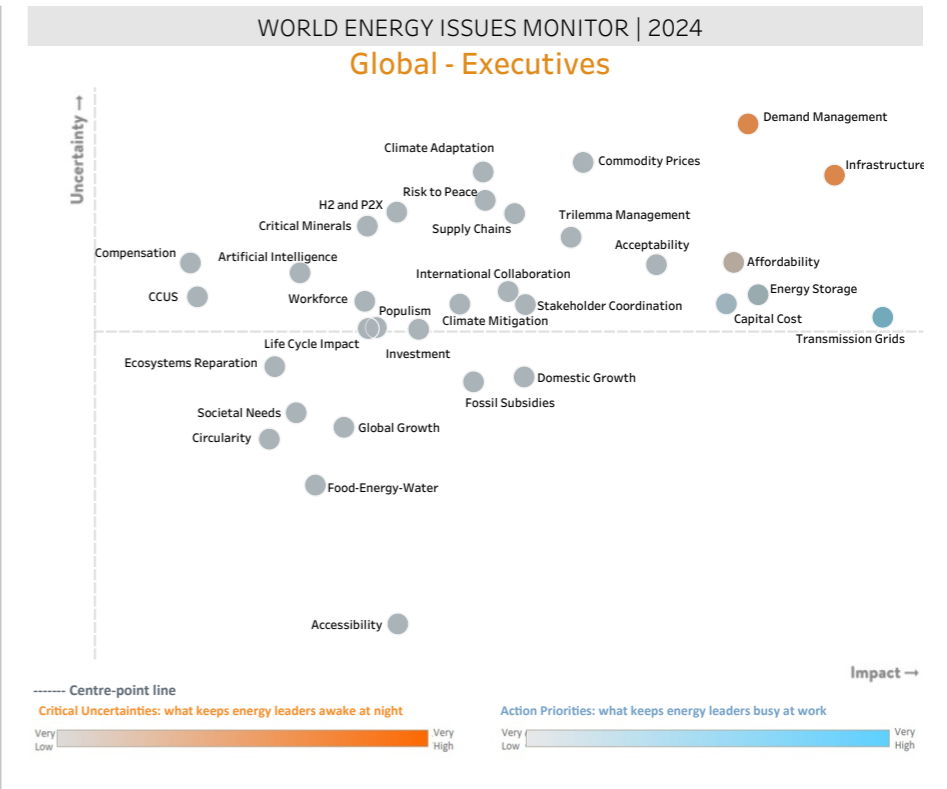
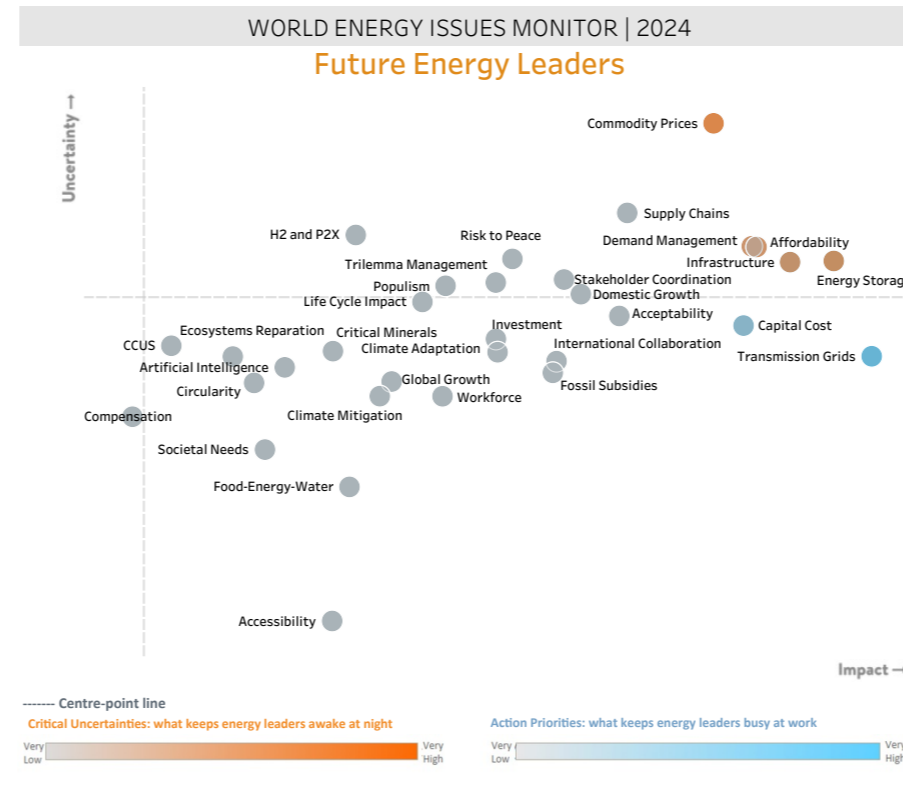
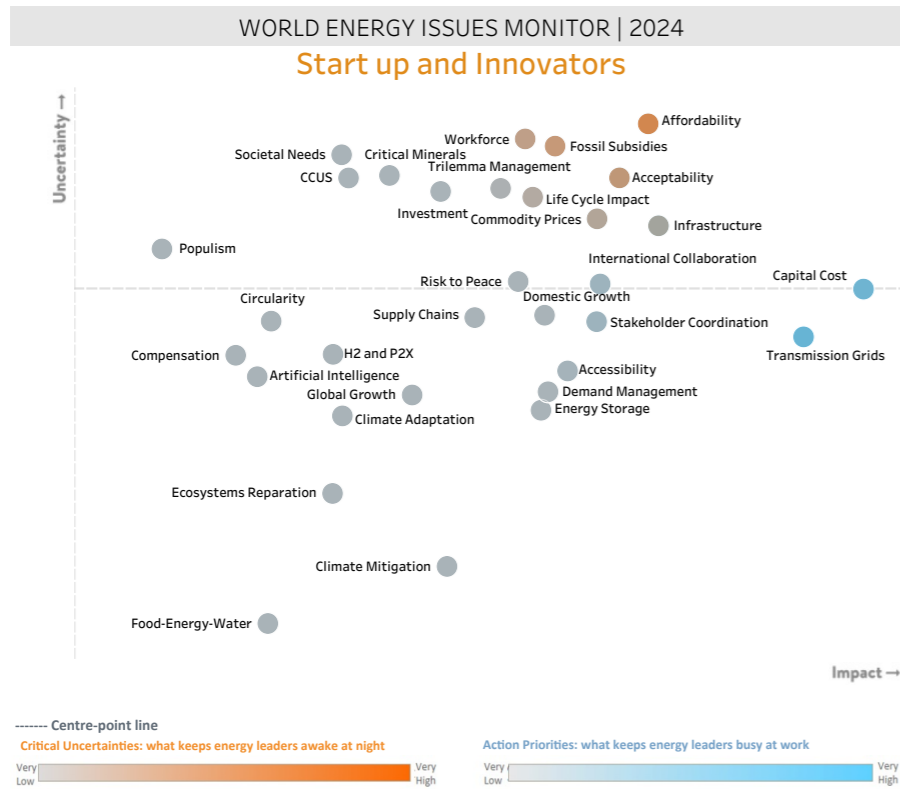
As part of the survey, respondents were asked to indicate which game changer technologies had not been included but which should be considered. Issues that were commonly suggested included distribution grids, nuclear, fusion, floating offshore technologies, small modular reactors and accurate weather prediction technologies as early warning systems. The technology gamechangers will be reviewed on an on-going basis and included where appropriate.

SOCIETAL ISSUES ARE KEY TO ACCELERATING PROGRESS

This year the socioeconomic issues were expanded beyond accessibility and affordability in recognition of the critical need to involve more people and diverse communities to accelerate energy transitions whilst ensuring social inclusivity and social justice in all its forms. It highlights the growing influence of stakeholders in decision making, holding companies to account and driving change. Whereas **accessibility** has an element of stakeholder coordination, it has been on the agenda for a long time and is firmly perceived as an action priority. **Stakeholder coordination and collaboration** of multiple stakeholders is inexorably linked to a cluster of other issues that drive the need for increased stakeholder engagement such as **acceptability, trilemma management, affordability** and **populism** which collectively became less ambiguous. Societal issues are shaping the approach for financial institutions, governments and activist shareholders and changing the way in which energy sector players are engaging stakeholders and co-creating solutions and future pathways. This societal cluster is expected to grow in importance over time and move into the action priorities domain.

PERCEPTIONS VARY WIDELY AMONGST STAKEHOLDER GROUPINGS

To deepen the insights in energy in more than geographical differences, the results from Start-Ups and Innovators and Future Energy Leaders were compared to the global results. Almost 500 executives, stakeholders with decision-making abilities, completed the survey in 2024. Their responses were also ringfenced and examined for further insights through a different lens or perspective. Particularly stark were the differing views on **workforce, demand management, supply chains, fossil fuel subsidies** and **accessibility**.



DIFFERENCES IN PERCEPTIONS ACROSS VARIOUS GROUPS

CRITICAL UNCERTAINTIES

- Affordability
- Fossil subsidies
- Workforce

ACTION PRIORITIES

- Capital Cost
- Transmission Grids
- Stakeholder Coordination

CRITICAL UNCERTAINTIES

- Commodity Prices
- Demand Management
- Supply Chains

ACTION PRIORITIES

- Transmission Grids
- Capital Cost
- Acceptability

CRITICAL UNCERTAINTIES

- Demand Management
- Infrastructure
- Commodity Prices

ACTION PRIORITIES

- Transmission Grids
- Energy Storage
- Capital Cost

The variations in perceptions were stark but expected, as the context of these diverse groups are quite different. Start-Ups and Innovators and Future Energy Leaders were focused more on action than the global average. This divergence suggests differing risk appetites or risk awareness, but also intergenerational differences and differences between established organisations and start-ups. Especially prominent was the indicated importance of greater **stakeholder involvement and coordination** in making energy transitions happen as an action priority. Respondents from both groups recognise that energy transitions are multi-dimensional and complex, requiring more and innovative ways to align and collaborate.

The Start-ups and Innovators group differed from the Future Energy Leaders' and global views on **commodity prices** and the **life cycle impacts** of renewable solutions perceiving it as being less uncertain and highlighting **demand management** as an action priority. Notable variations were also evident between the start-ups and the global views on **climate adaptation, stakeholder coordination and supply chains**. As start-ups and innovators are in the preliminary stages of business development, their attention tends to be focused on issues related to setting up new businesses such as dealing with multiple stakeholders for financing, regulatory approval and establishing their supply chains. Furthermore, start-ups have the advantage of being able to integrate and manage risks such as **climate adaptation** and cost management, so they are included in the start-up process. This could be due to the level of knowledge around the issue, technology development or risks being already fully integrated into business models and processes. Many of the game changer technologies such as **AI, hydrogen and P2X** and **energy storage** are action priorities for start-ups, indicating a more optimistic approach to new technology uptake. Top critical uncertainties for the Start-ups and Innovators were the removal or reduction of **fossil subsidies/tax breaks, affordability, acceptability** and **workforce transition**. As innovative businesses cases are developed, this stakeholder group must deal with policy and public perception about new technologies and put the necessary workforce in place.

The Future Energy Leaders' views were more like the global views, than the start-ups and innovators views, and more oriented towards action. Similarities between the Future Energy Leaders' and global views were on **commodity prices, supply chains** and **demand management** (critical uncertainties), **transmission grids** and **energy storage** (action priorities). Noticeable distinctions in stark contrast to the global view include effective **international collaboration, critical minerals, capital costs** and **climate adaptation** where the Future Energy Leaders perceived them as being action priorities that require adequate resourcing.

In contrast to global perspectives and those of next-generation leaders and companies, executives perceived **demand management** policy to transform energy demand and **infrastructure action planning** as critical uncertainties. They concurred with the prevailing regional view that **transmission grids**, along with **energy storage**, exerted the highest impact on energy transitions, thus highlighting their urgency for action. Like Start-ups and Innovators and Future Energy Leaders, enhancing **stakeholder engagement** emerges as a vital area requiring more concerted action to expedite energy transitions that are faster, fairer and more far-reaching.

COLLABORATION NO LONGER A NICE TO HAVE

Given the scale of the challenges facing the energy sector, international collaboration will be required if we are to achieve the Sustainable Development Goals, confine average global temperature increases to below 1.5 degrees Celsius and carefully manage the World Energy Trilemma trade-offs of energy security, affordability and accessibility and sustainability.



A WORLD ENERGY SCENARIOS PERSPECTIVE

As we navigate the complexities of the global energy landscape, it becomes increasingly apparent that traditional modes of collaboration may not suffice to address the multifaceted challenges we face. In line with the evolving perspectives outlined by the World Energy Scenarios, new collaborative paradigms start to emerge, particularly in the context of the digitally enabled economy. These innovative modes, often facilitated by platforms, transcend the boundaries of traditional nation states and corporations, operating at smaller scales yet possessing the capacity for significant systemic impact when aggregated.

Moreover, these collaborations are not confined to homogenous groups but rather encompass diverse stakeholders with distinct perspectives, converging around shared interests that emerge organically from their unique vantage points. In this pluralistic landscape, it becomes imperative to acknowledge the role of intermediate institutions alongside conventional market mechanisms and governmental bodies. Such recognition underscores the importance of understanding competitive dynamics and harnessing the potential for positive change by strategically aligning stakeholders throughout the supply chains, starting from end-users and extending upwards.

This acknowledgment of diverse and uneven forms of coherence signals a departure from traditional top-down approaches, highlighting the importance of fostering collaboration at various levels of scale to effectively address the intricacies of global energy challenges.

As geopolitics shift, climate and social risks rise, and diverse regional policy and technology choices diverge, doubts remain about international cooperation and shared sustainability goals. Amidst this backdrop, novel forms of collaboration are emerging, extending beyond market and state involvement to encompass industries and communities, exemplified by initiatives launched at COP28. A profusion of new energy collaborations and initiatives was announced at COP28 including the Oil & Gas Decarbonisation Charter; the Global Cooling Pledge; Utilities for Net Zero Alliance; the Global Renewables Alliance; the Global Energy Alliance for People and Planet; the Global Electric Cooking Coalition, Grid Power Operators and the Industrial Transition Accelerator.

Challenges such as national competitiveness, trade issues and industrialisation persist as government priorities and require careful management in the wider context of energy system transformation. Given the diversity of needs, constraints and priorities across regions, new forms of collaboration are essential and emerging. It is unrealistic to think that global collaboration is easily achievable and, in many cases, it is not necessary. Regional, value chain based, multi-stakeholder and sector-specific collaborations, among other approaches, will be vital to tackle the global energy challenges comprehensively. All forms of collaboration are imperative and must be nurtured collectively – in all their diversity - to advance progress at all levels.



*Action without vision is only passing time, vision without action is merely day dreaming, but vision with action can change the world. **Nelson Mandela***

REGIONAL PERSPECTIVES

The Council's regional energy communities will be engaged on the various regional maps during March 2024 and the insights and evaluation gathered will be added to the analysis and shared after the 26th World Energy Congress taking place 22-25 April 2024 in Rotterdam, the Netherlands. The comparison of common and unique uncertainties and priorities for each region, and the highlights from the survey results, provide initial insights on the regional energy leaders' perspectives from this survey iteration.

CRITICAL UNCERTAINTIES ACROSS REGIONS

(WHAT IS KEEPING ENERGY LEADERS AWAKE AT NIGHT)

AFRICA



Commodity Prices
Stakeholder Coordination
Capital Cost
Affordability
Investment

ASIA



Commodity Prices
Stakeholder Coordination
Climate Adaptation
Supply Chains
Risk to Peace

EUROPE



Commodity Prices
Climate Adaptation
Supply Chains
Risk to Peace
Demand Management

LAC



Commodity Prices
Stakeholder Coordination
Climate Adaptation
Populism
Compensation

MEGS



Commodity Prices
H2 and P2X
Investment
Ecosystems Reparation
Climate Mitigation

NORTH AMERICA



Societal Needs
Infrastructure
Populism
Acceptability
Transmission Grids

UNIQUE REGIONAL ISSUES

- **Africa:** Affordability, Capital Cost
- **Europe:** Demand Management
- **Latin America and the Caribbean:** Compensation
- **Middle East and Gulf States:** H2 and P2X, Ecosystems Reparation, Climate Mitigation
- **North America:** Societal Needs, Infrastructure, Acceptability, Transmission Grids

FREQUENT OCCURRING ACROSS SEVERAL REGIONS


- Commodity Prices
- Stakeholder Coordination
- Climate Adaptation



ACTION PRIORITIES ACROSS REGIONS


(WHAT IS KEEPING ENERGY LEADERS BUSY AT WORKS)

AFRICA



- Transmission Grids
- Energy Storage
- Food-Energy-Water
- Domestic Growth
- Demand Management

ASIA




- Transmission Grids
- Energy Storage
- Climate Mitigation
- International Collaboration
- Artificial Intelligence

EUROPE




- Transmission Grids
- Energy Storage
- Affordability
- Infrastructure
- Capital Cost

LAC



- Transmission Grids
- Energy Storage
- Capital Cost
- Affordability
- Trilemma Management

MEGS



- Transmission Grids
- Energy Storage
- CCUS
- Domestic Growth
- Demand Management

NORTH AMERICA



- Transmission Grids
- Demand Management
- Stakeholder Coordination
- Capital Cost
- Investment

UNIQUE REGIONAL ISSUES

- **Africa:** Food-Energy-Water
- **Asia:** Climate Mitigation, International Collaboration, Artificial Intelligence
- **Europe:** Infrastructure
- **Latin America and the Caribbean:** Trilemma Management
- **Middle East and Gulf States:** CCUS
- **North America:** Stakeholder Coordination, Investment

FREQUENT OCCURRING ACROSS SEVERAL REGIONS

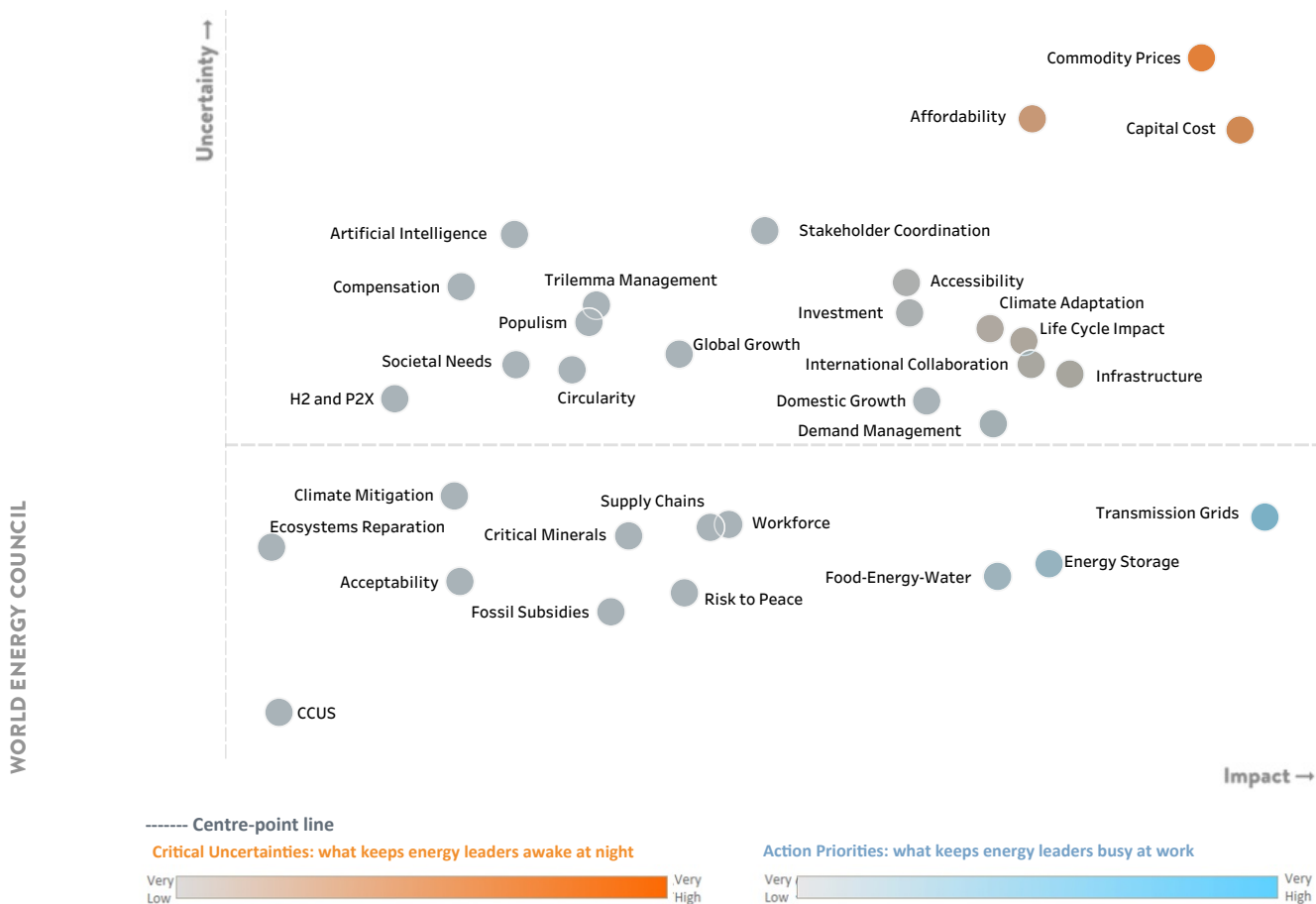
- Transmission Grids
- Energy Storage
- Capital Cost
- Demand Management



AFRICA

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Africa



Commodity Prices remain Africa’s most critical uncertainty, together with **capital cost** and concerns over **affordability**. Delving deeper into the issue cost of and access to capital, Africa’s relationship with major players like China, United States and the EU becomes apparent. China’s economic engagement with Africa has experienced significant growth over the past two decades, characterised by substantial investments across various sectors. However, recent developments such as China’s decision to reduce financial support to Africa, announced during the 2021 China-Africa Cooperation Forum, from \$60 billion to \$40 billion over three years, have stirred an increased interest from the United States and EU to counterbalance China’s influence. Nevertheless, there are stark differences in the approach taken by these parties, each coming with their own set of challenges and concerns for Africa over debt traps, economic dependence and prioritisation of foreign interests over local needs. Consistent with the global picture is the action priority on **transmission grids** and **energy storage**. There is a greater emphasis on **supply chains** and **workforce**, clearly due to the global demand for critical minerals increasing and new skills and competencies being required for new energy transition technologies such as renewables and **hydrogen and P2X**. The **food-energy-water nexus** has become more of an action priority than previously, but **climate adaptation** remains uncertain to a degree, indicating the level of vulnerability and lack of resilience on the continent. Interestingly, **risk to peace** is moving into the action priority quadrant, in contrast to other regions.



CONVERSATION STARTERS

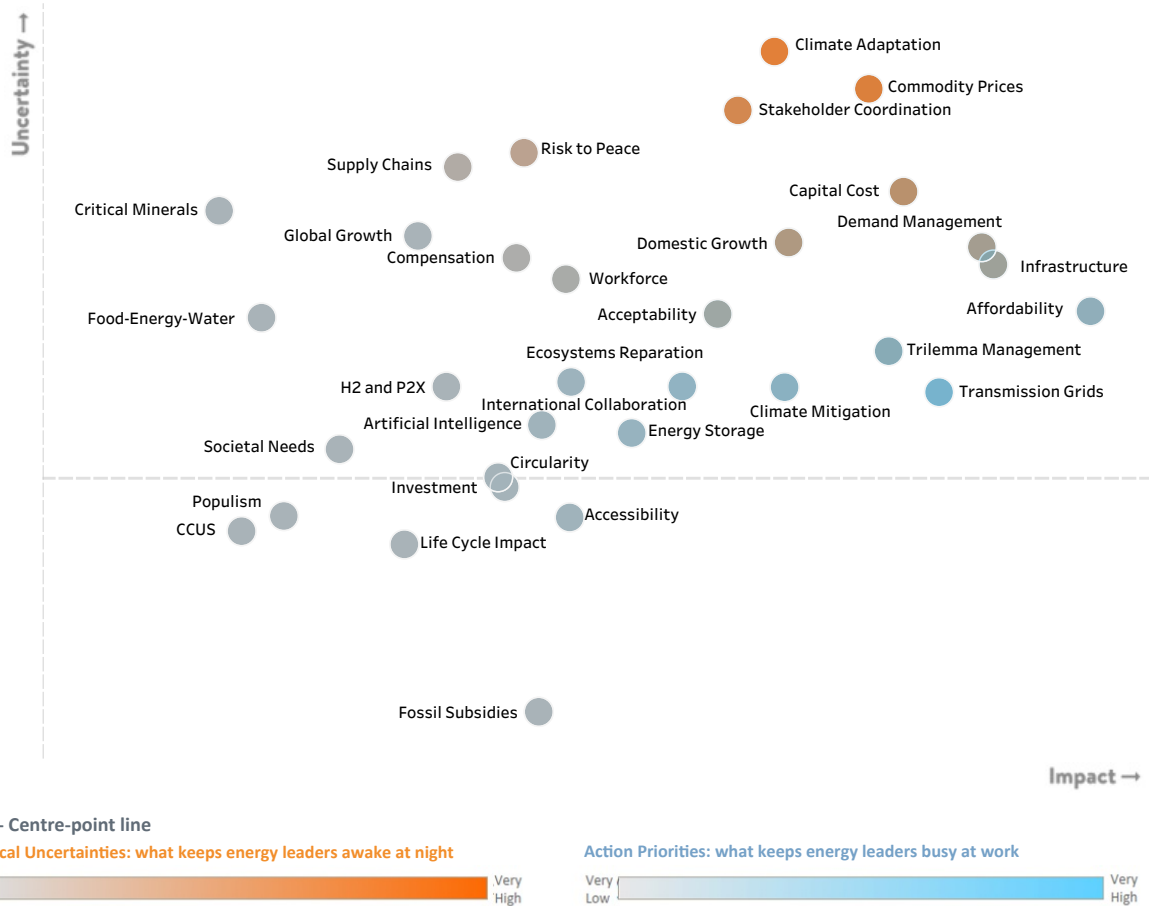
- What are the specific challenges anticipated in the regional energy context in the year ahead, considering factors such as geopolitical disruptions, energy security, gas crises, workforce shifts, social unrest and equity concerns?
- Is the evolving policy and regulatory landscape in the region aligned with the principles of a just energy transitions? How is a just energy transition defined and prioritised within the continent? What new conversations should be held?
- How can we address the complex interplay between critical uncertainties surrounding capital costs and affordability in the energy sector? What implications does this have for energy access?
- What efforts are being made to promote industrialization around critical minerals to foster economic development and social upliftment? Additionally, what steps are necessary for achieving a just transition, and what are the trade and energy trilemma implications?
- In what ways can prioritising action on transmission grids help to better interconnect the continent and enhance resilience to climate change? How can climate finance play a role in accelerating these efforts?
- What innovative mechanisms of stakeholder coordination can be employed to enhance accessibility and effectively manage the energy trilemma?



ASIA

WORLD ENERGY ISSUES MONITOR | 2024

Asia



Overall, the picture in Asia is one of high uncertainty. **Climate adaptation** and **commodity prices** are Asia’s most critical uncertainties, which is consistent with the picture in the 2022 World Energy Issues Monitor. A new critical uncertainty, **stakeholder coordination** and collaboration clearly stand out from the other issues as an area requiring leadership attention and action. In contrast to the global picture, **transmission grids** are not the most critical action priority, as it is eclipsed by **demand management** policy, **infrastructure** action planning and **affordability**. An unambiguous difference are bottlenecks associated with **critical minerals** and **metals** which although uncertain, the impact is thought to be considerably lower than the global average. **Fossil subsidies** are firmly in the action domain and indicates the continued uptake of lower carbon technologies seen in many parts of Asia. The cluster of **game changer technologies** along the central line is in line with the levels of technology innovation and uptake in Asia.



CONVERSATION STARTERS

- What are the specific challenges anticipated in the regional energy context in the year ahead, considering factors such as mega city development, security and gas crises, technology uncertainty and decoupling energy and economic growth?
- What measures need to be taken to enhance the resilience of the energy sector in Asia to the impacts of climate change? What are the associated risks to capital costs and supply chains?
- Are the changes in policy and regulation in the region effectively supporting transitions to a just energy system? What innovative approaches could be considered?
- While affordability remains a significant issue, uncertainty is on the rise. What novel strategies are being explored in the region to address this uncertainty?
- The uncertainty surrounding hydrogen and P2X has notably decreased. How does this trend align with related systemic issues such as infrastructure and workforce readiness? How can new forms of collaboration help scale up?
- In what ways can artificial intelligence contribute to the energy transition, particularly when considered alongside other factors such as transmission grid upgrades, smart home technologies

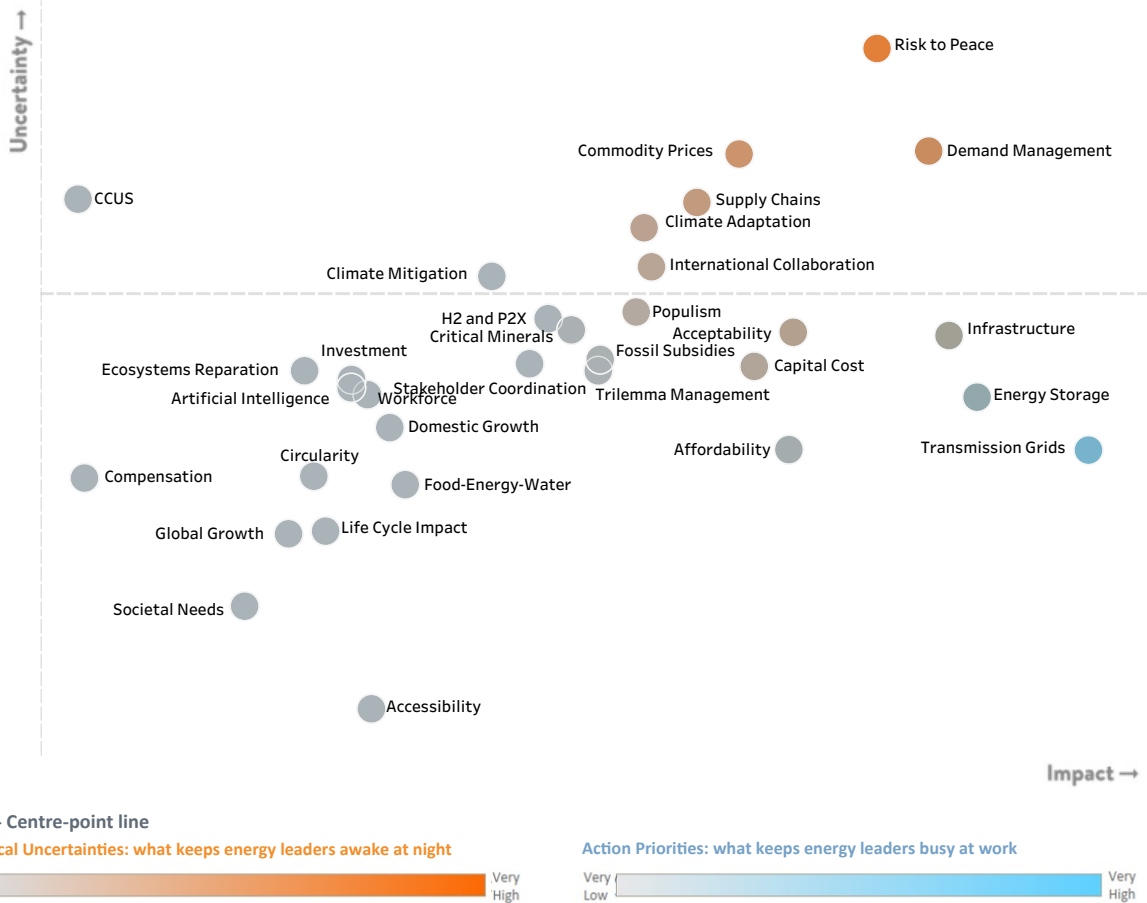


EUROPE

WORLD ENERGY ISSUES MONITOR | 2024

Europe

WORLD ENERGY COUNCIL



Not surprisingly, standing out amongst other regions and the global average, Europe’s highest critical uncertainty is **risk to peace**, an issue closely linked to other critical uncertainties such as **supply chains** and **commodity prices**. Another key differentiator is that most of the issues are in the action priority zone, a significant difference from the last edition, where most of the issues were perceived as being more uncertain. This noticeable shift could be due to increased policy certainty as the EU begins to implement the elements of the EU Green Deal or proactive risk management to avoid future energy security and climate change related risks. Innovation and global competitiveness play a crucial part in this difference, as all **gamechanger technologies** are action priorities, except for **CCUS**.



CONVERSATION STARTERS

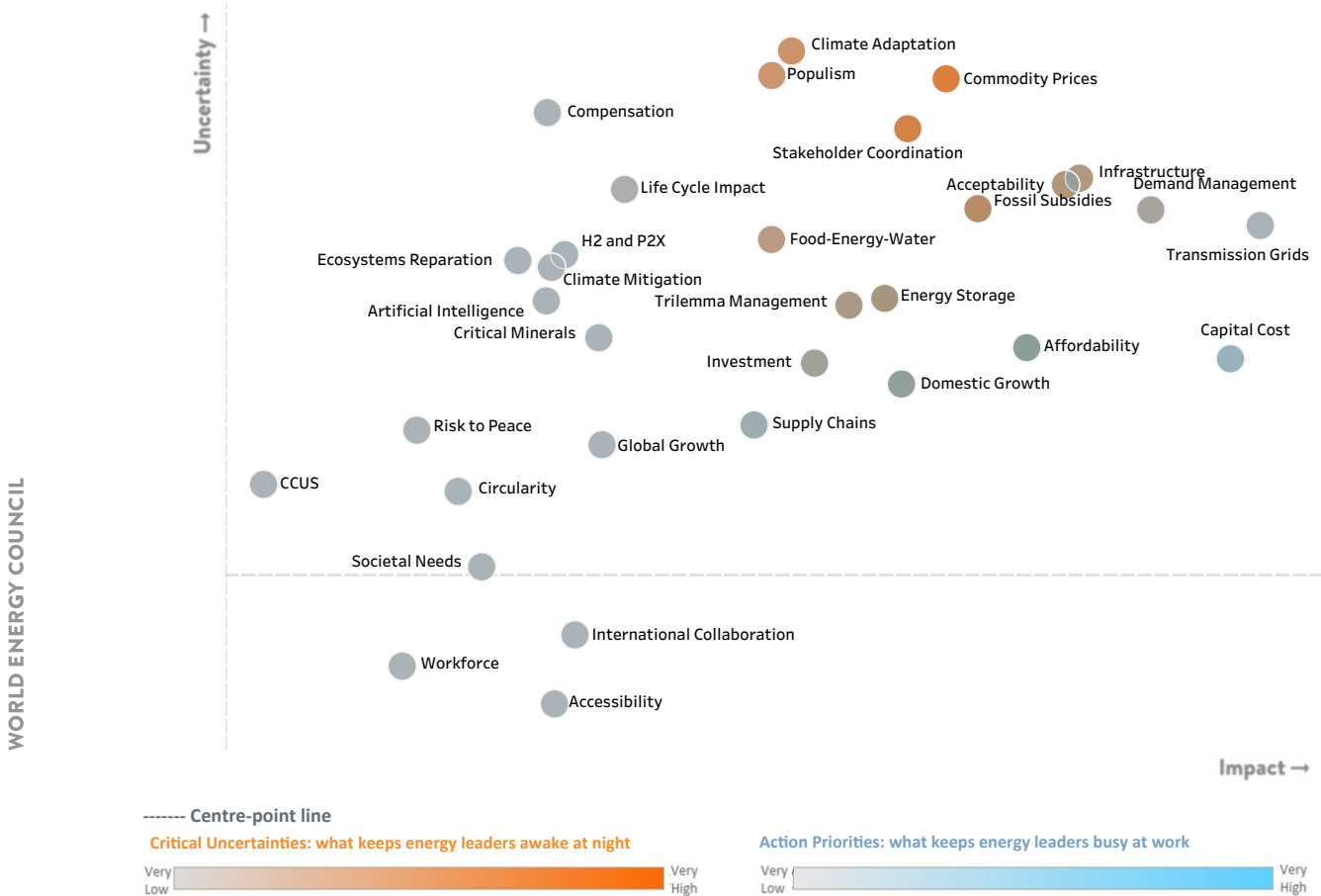
- What are the specific challenges anticipated in the regional energy context in the year ahead, considering factors such as geopolitical disruptions, energy security, risk of deindustrialisation, workforce transition and cost of living crisis?
- What lessons have been learned in stakeholder coordination, and what new approaches are proving effective? How do these efforts contribute to future-proofing the regulatory environment and avoiding compartmentalization and misaligned policy?
- As technology gamechangers are being embraced, what are the implications for the workforce, trade, and research and development? What lies ahead for Carbon Capture, Utilisation and Storage (CCUS)?
- What new policies are necessary to ensure a comprehensive and lower-risk approach to demand management?
- Considering that international collaboration is a critical element for change, how does this interplay with risks to peace, commodity prices, critical minerals and supply chain disruptions? What approaches are no longer effective, and what needs to be done differently?



LATIN AMERICA AND THE CARIBBEAN

WORLD ENERGY ISSUES MONITOR | 2024

Latin America and the Caribbean



Due to a high degree of political uncertainty caused by sharp changes in the direction of government, exemplified by recent elections in Brazil or Argentina, a greater sense of overall uncertainty and perceived inaction prevails. This climate of uncertainty is mirrored in the critical challenges confronting the Latin America and the Caribbean region, encompassing **climate adaptation, commodity prices volatility, stakeholder coordination and populism**. This marks a dramatic shift from the previous report, where economic growth was the primary concern. While domestic and global growth also remain uncertain, there are issues in the action domain, notably **international collaboration, workforce development and accessibility**, albeit of lesser perceived impact on energy transitions. This contrasts with the findings of the previous report, where none of these issues were identified as action priorities, indicating a shift in leadership attention. However, despite the undeniable impact of **transmission grids** on the success of energy transitions, they do not feature as action priorities in the region. Moving forward, the priority for the region is to maintain momentum towards actionable solutions.



CONVERSATION STARTERS

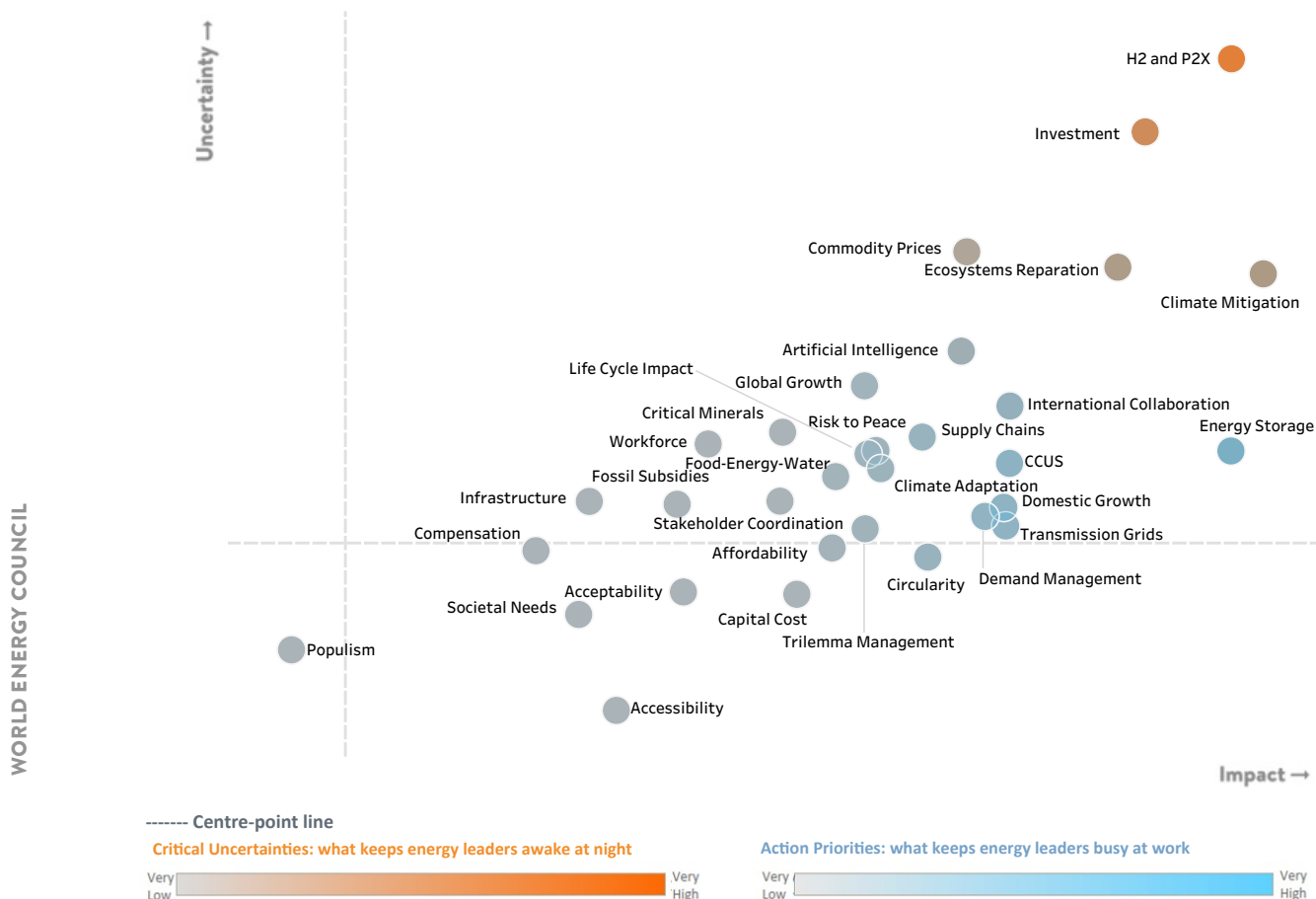
- What are the specific challenges anticipated in the regional energy context in the year ahead, considering factors such as political changes, energy equity, climate adaptation, fuel prices, infrastructure planning and critical minerals?
- What impacts on energy security are being observed due to climate change? How has the policy environment either supported or hindered energy security, and what emerging opportunities exist?
- What climate adaptation measures should be implemented, and how do these measures relate to the energy-water-food nexus?
- How can efforts to promote energy equity be expanded, and how does energy equity intersect with infrastructure action planning, affordability and climate mitigation?
- Why is agility essential in advancing permitting and financing for projects aimed at advancing energy transitions? How do countries manage the complex coordination and collaboration of multiple stakeholders with diverse interests?
- How is the capital cost affecting affordability and domestic growth in the energy sector? What are the implications of this for the energy industry?



MIDDLE EAST & GULF STATES

WORLD ENERGY ISSUES MONITOR | 2024

Middle East and Gulf States



In the Middle East and Gulf countries, unlike the other regions, **hydrogen and P2X** was the highest uncertainty, closely followed by **investment**. **Commodity prices** was not a critical uncertainty, differing from the global average and previous Middle East and Gulf States surveys. The biggest impact issue was **climate mitigation** as expected, given the economic dependency on fossil fuels in many countries in the region. **Energy storage** stands out as an action priority, but many of the other issues are clustered around the centre line, with not a great deal of differentiation. A cluster of issues (**climate adaptation, domestic growth, transmission grids and circularity**) are action priorities. Notably, **CCUS** is more in the action space than on the global map. This is expected considering the regions' interest in establishing a circular carbon economy framework that helps identify economic opportunities by assigning a monetary value to CO2 emissions when kept in the loop through various processes such as carbon capture and utilisation (CCU), carbon capture and storage (CCS) and carbon recycling. **Demand management** is receiving leadership attention but is less certain than the narrower energy efficiency in previous surveys. **Ecosystems reparation** and **life cycle impact** of renewable energy solutions were perceived as much higher than other regions in both uncertainty and impact.



CONVERSATION STARTERS

- What are the specific challenges anticipated in the regional energy context in the year ahead, considering factors such as hydrogen and P2X, investment, commodity prices?
- Why is uncertainty regarding hydrogen and P2X so high and what are the available energy sources for producing hydrogen? Which of these sources is best suited for the region and what actions can be taken to prioritise it?
- How is the UAE Consensus perceived to impact action priorities in the region, and how do the region's economies plan to adjust their priorities to meet the ambitious goals set at COP28?
- What strategies could be employed to effectively integrate circular carbon economy principles and scale up CCUS technologies in the Middle East, thereby fostering sustainable economic growth, reducing carbon emissions and enhancing energy security?
- What are the interlinkages and synergies between climate mitigation, international collaboration, critical minerals and metals and supply chain disruption in the region?
- What progress has been made on the water-energy-food nexus in the region, and what are the next steps to address remaining challenges?

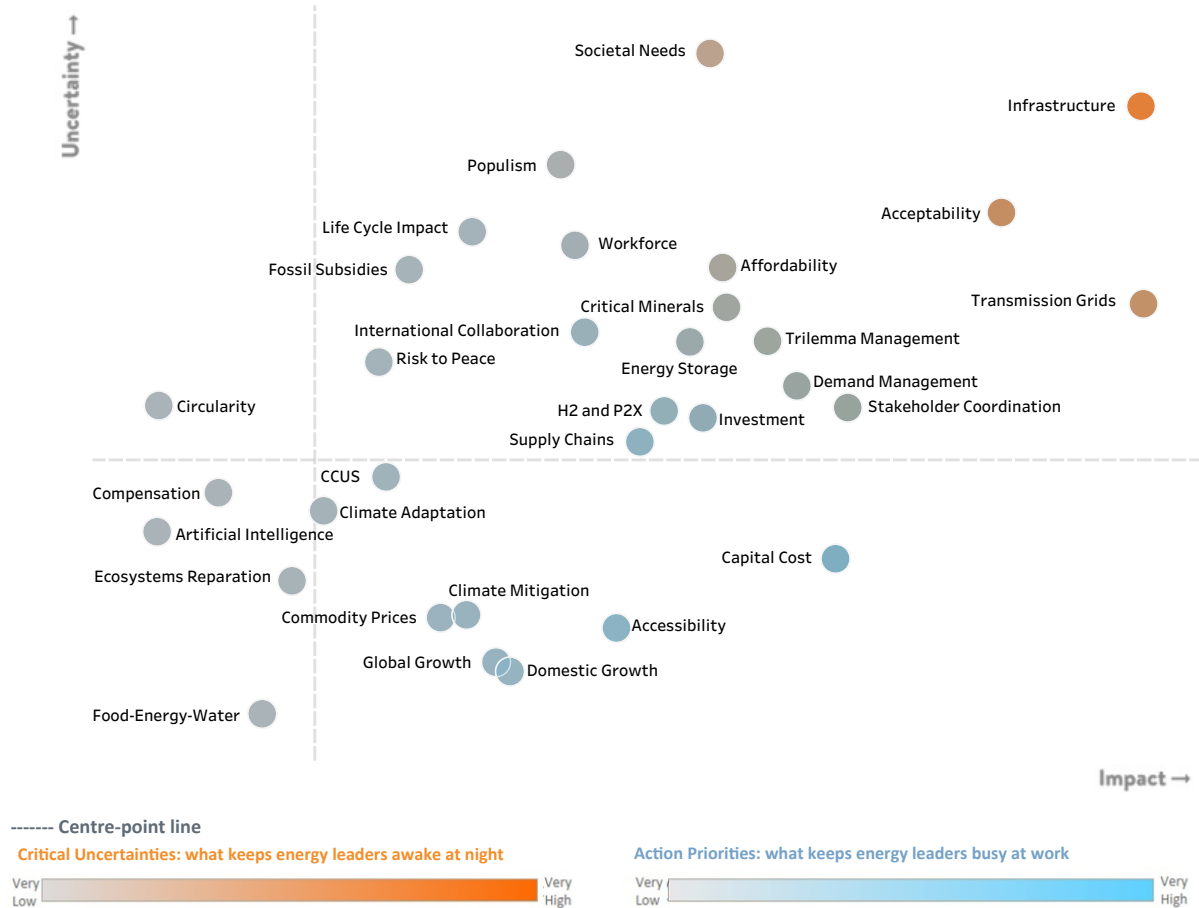


NORTH AMERICA

WORLD ENERGY ISSUES MONITOR | 2024

North America

WORLD ENERGY COUNCIL



As was the case previously, North America stands out from other regions and the global picture as active engagement from a critical mass representing broader **societal needs** and **infrastructure action planning** are critical uncertainties, along with concerns around **populism** and **acceptability**. **Stakeholder coordination, demand management, capital cost** and **investment** are action priorities. While the importance of **transmission grids** for successful energy transitions was recognised, uncertainty remains around technology advancements, regulatory frameworks, investment and financing. **Climate change management**, previously the highest critical uncertainty, is now in the action space, albeit in its unbundled form of **climate mitigation and adaptation**.



CONVERSATION STARTERS

- What are the specific challenges anticipated in the regional energy context in the year ahead, considering factors such as infrastructure action planning, acceptability and active stakeholder engagement?
- How do energy storage, critical minerals, supply chains and international collaboration interact with each other, and what implications does this interplay have?
- How is the active engagement of people and communities representing broader societal needs evolving, and what new approaches can be taken to reduce uncertainty?
- Why has uncertainty around hydrogen and P2X significantly declined, and what measures are needed to unlock their potential further?
- What factors have led to climate mitigation and adaptation transitioning from being the highest uncertainty to being in the action space? Is there an established acceptable level of climate resilience, and what additional conversations with stakeholders and supply chains may be necessary?
- The life cycle impacts of renewable energy solutions are a moderate uncertainty. Is this aspect gaining more attention and moving onto the radar, and if so, why?

CONCLUSION

The 2024 World Energy Issues Monitor underscores the diverse nature of energy transitions, revealing similarities in uncertainties such as commodity prices and climate adaptation, alongside shared priorities like transmission grids, energy storage and capital costs. This reflects the multifaceted journey of energy transitions across regions and sectors.

Recognizing that there is no one-size-fits-all solution, the report emphasizes the importance of prioritizing diversity in leadership, fostering meaningful dialogues and leveraging differences to enable tailored collaboration. This shift in mindset towards a global perspective is essential for finding implementable and scalable solutions.

Moving away from repetitive dialogues, dynamic and interactive conversations that explore differences are vital for insight and learning. Addressing global imperatives demands a focus on locally relevant, sustainable solutions, necessitating recognition of diverse needs and circumstances and embracing engagement and alignment through new forms collaboration.

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<u>Greece</u>	<u>Singapore</u>	
<u>Hong Kong (China)</u>	<u>Slovenia</u>	
<u>Iceland</u>	<u>South Africa</u>	

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