WORLD ENERGY COUNCIL AUSTRIA

2021 ISSUES MONITOR

The Austrian Perspective in a Global and Regional Context

Meeting Global Visions

WORLD ENERGY COUNCIL AUSTRIA

Managing global Energy Transitions and enabling the benefits of sustainable energy to be shared by everyone is the most pressing and urgent leadership challenges of modern times.

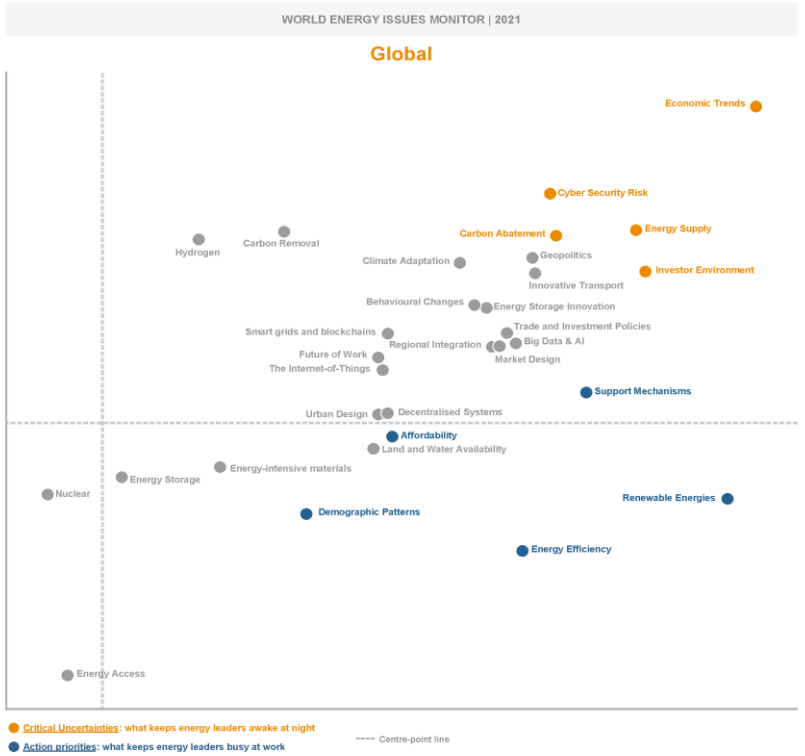
The issues monitor survey is a practical and flexible tool that can be used by energy leaders as a reality check to define and clarify the current state of national, regional and global Energy Transitions.

It can also be used to forge a global energy leadership agenda that facilitates new and better collaborative innovation in meeting global vision and goals.

World Energy Issues Monitor 2021

First time maps for Australia and Hong Kong

Welcoming back Dominican Republic, Kazakhstan and Saudi Arabia



78%

of TOTAL GLOBAL ENERGY CONSUMPTION represented in the 2021 Country Maps

GROWING REPRESENTATIVENESS

>2 500 responses from 108 countries

>1 000 Senior Management or higher, including C-Suite and Board

60 Country Maps (new record)

60 Country Maps + FEL100

Africa
Algeria
Botswana
Cameroon
Congo (Democratic Republic)
Côte d'Ivoire
Egypt
Kenya
Malawi
Namibia
Nigeria
South Africa

Asia
Australia
China
Hong Kong
India
Indonesia
Japan
Mongolia
New Zealand
Sri Lanka

Europe
Austria
Belgium
Bosnia and Herzegovina
Bulgaria
Croatia
Estonia
Finland
France
Germany
Greece
Hungary
Iceland
Ireland
Italy
Kazakhstan
Latvia
Lithuania
Malta
Poland
Portugal
Romania
Russian Federation
Serbia
Slovenia
Spain
Turkey
United Kingdom

Latin America and the Caribbean
Argentina
Brazil
Chile
Colombia
Dominican Republic
Ecuador
Panama

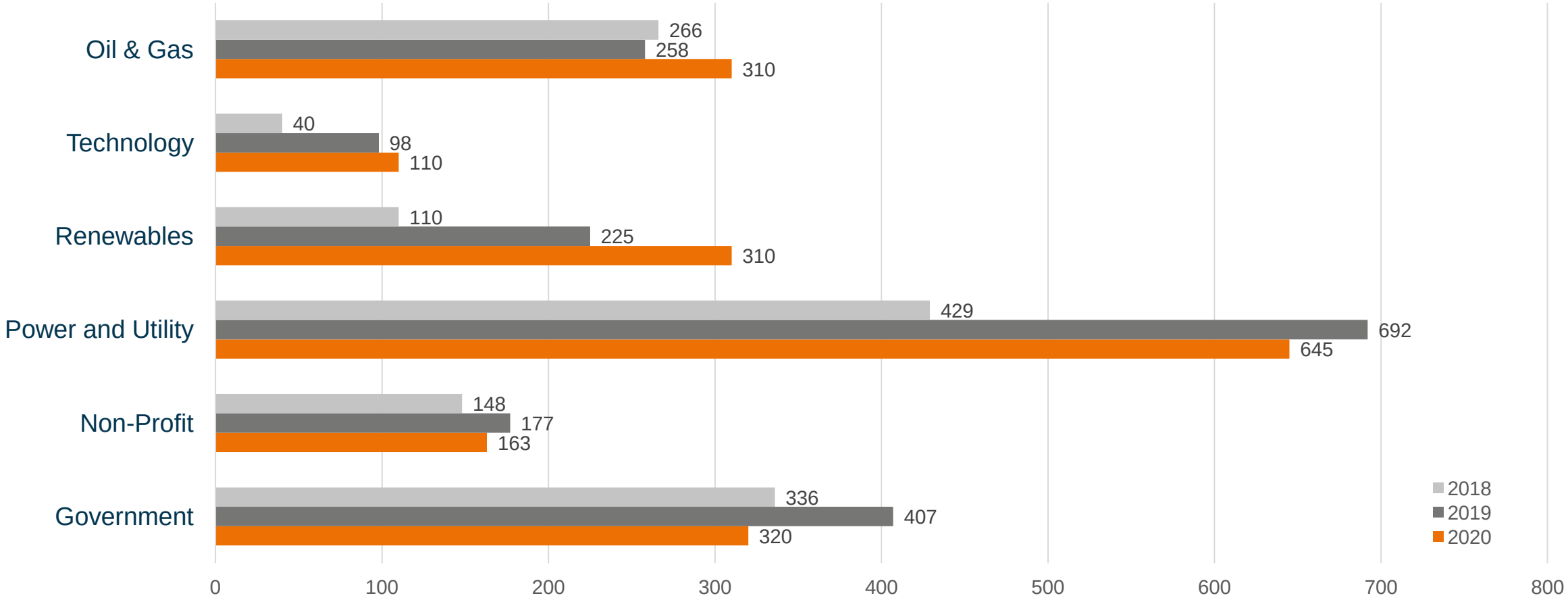
Middle East and Gulf States
Lebanon
Saudi Arabia
United Arab Emirates

North America
Canada
Mexico
United States of America

Community
FEL100

Issues Monitor Survey Respondents

Sector Analysis (selected sectors)



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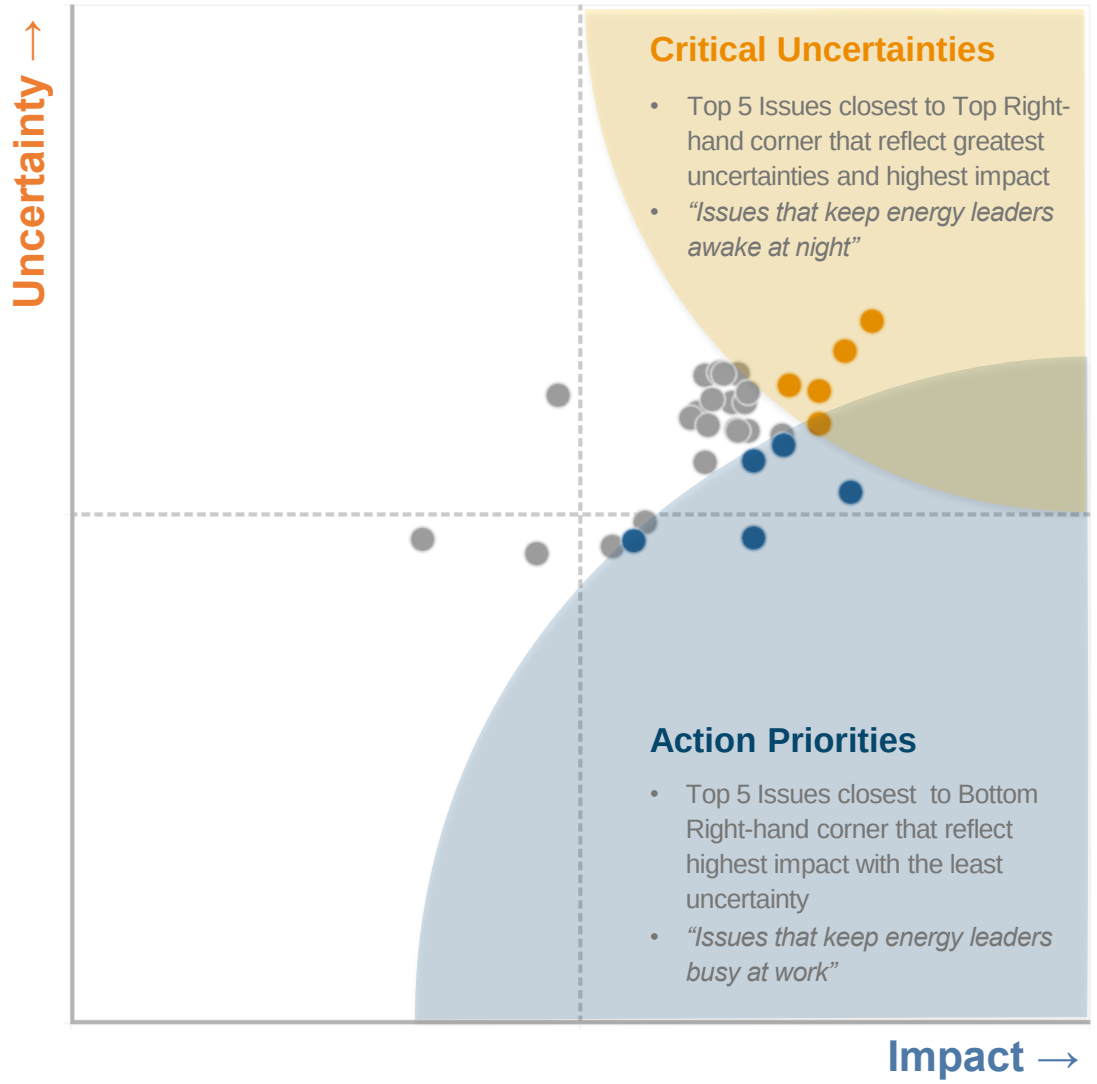
MAPS METHODOLOGY & HOW TO READ

Understanding the Issues Monitor



Country Maps:

- Every response has the same weight.
- Map points reflect simple average of country responses.

Regional and Global Maps:

- In order to avoid any bias from under or over representation in the survey, all countries are weighted based on their
  1) energy consumption,
  2) energy production and
  3) national income per capita

  to reflect their relative role in the energy system.
- Map points reflect a weighted average of countries' scores.

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GLOBAL PERSPECTIVES

Issues Monitor 2021: Global Map

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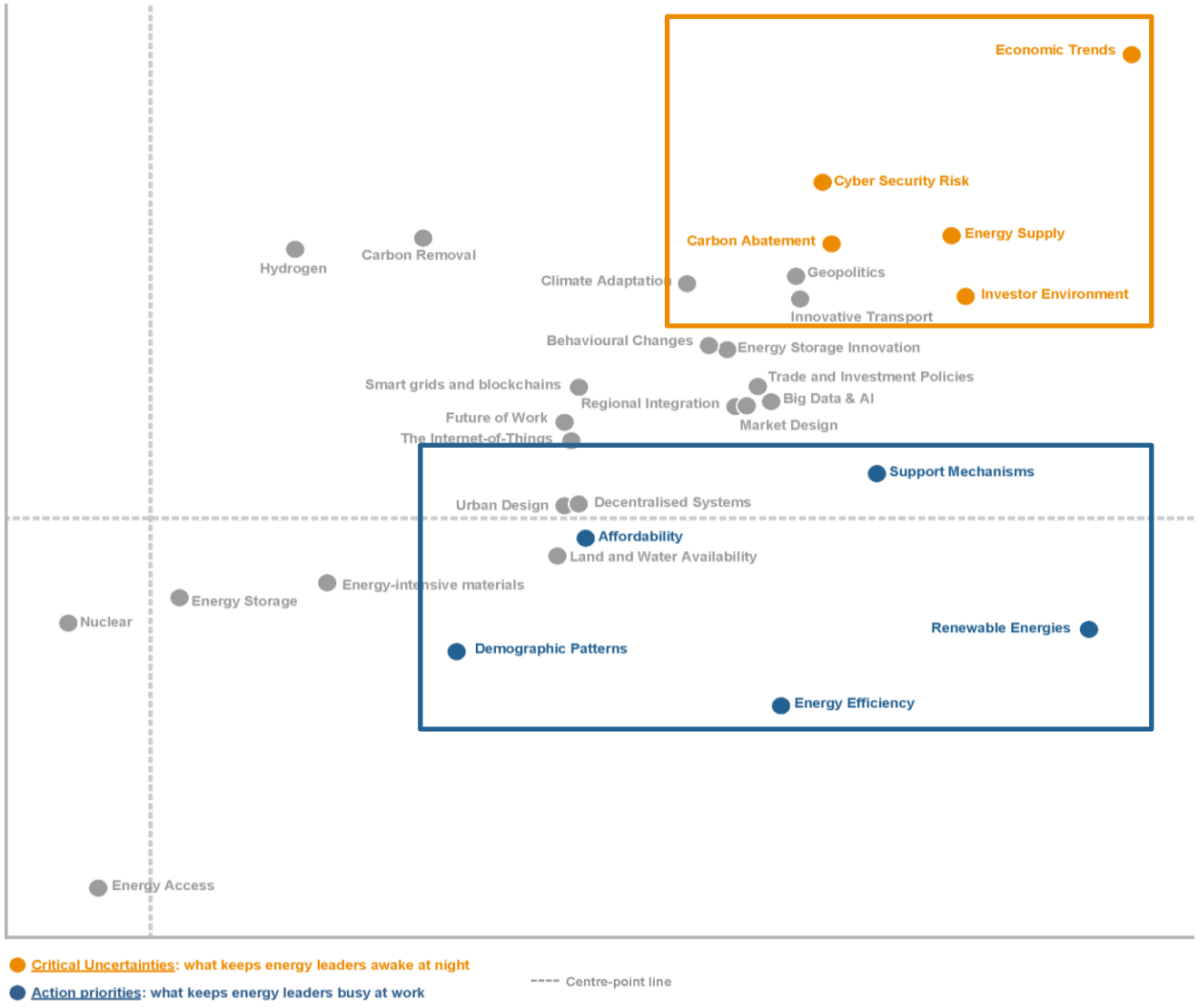


Critical Uncertainties

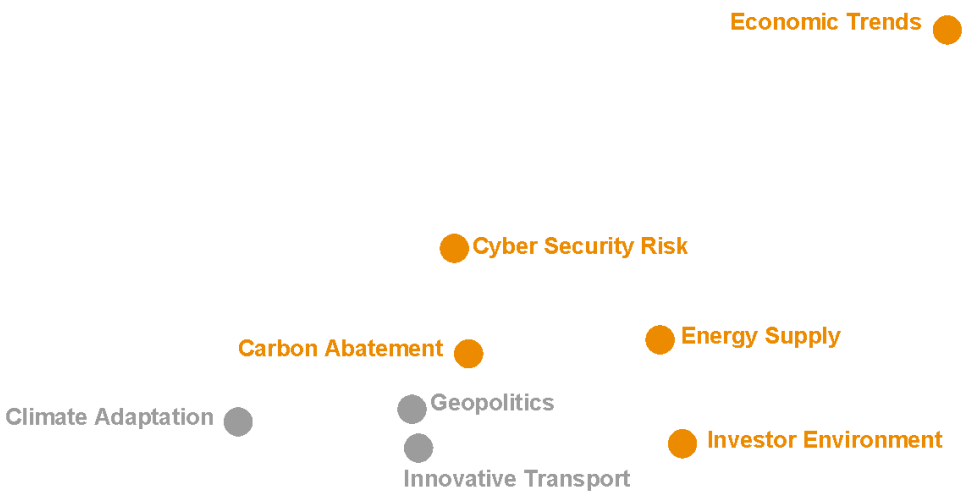
- Economic Trends
- Cyber Security Risk
- Carbon Abatement
- Energy Supply
- Investor Environment

Action Priorities

- Support Mechanisms
- Affordability
- Renewable Energies
- Demographic Patterns
- Energy efficiency

Issues Monitor 2021: Global Map

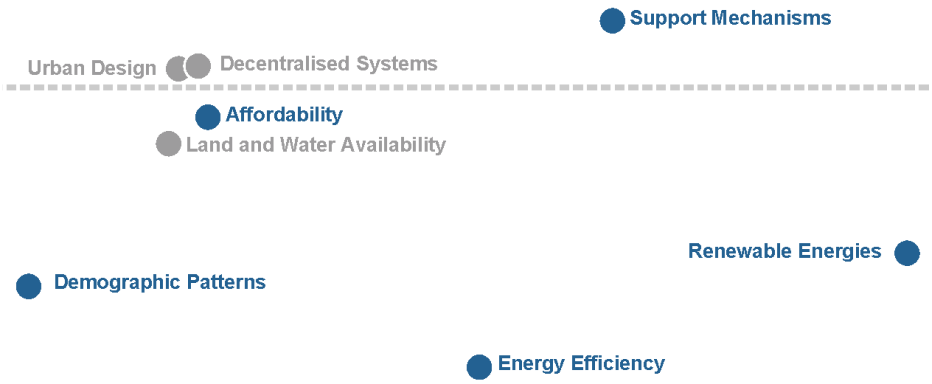
Critical Uncertainties - What is keeping energy leaders awake at night?



- **Certainty of economic uncertainties** – clear COVID-19 context of looming economic recession in the short-term, with uncertainty about economic recovery in the medium to longer term and subsequent implications about the shape and direction for energy transition.
- **Investor environment** – closely linked to economic situation with greater uncertainty on investments, availability of funds and on what / where to invest. Will there be economic support mechanisms in the post-pandemic recovery?
- **Energy supply** – energy sector has kept the lights on and the systems "wet" but longer-term concerns about demand destruction and how demand might change.
- **Cyber security risks** – digital solutions have helped mitigate economic impacts of pandemic raising awareness of cyber security. Wide perception that energy companies experienced more cyber-attacks in 2020.
- **Carbon abatement** – becoming essential to enable continued use of existing hydro-carbon assets while meeting meet lower carbon goals. For producer countries this can be circular carbon economy while use of carbon abatement technologies such as CCS, may enable longer-term use of gas / coal plants.

Issues Monitor 2021: Global Map

Action Priorities - What is keeping energy leaders busy at work?



- **Renewables** – long-standing Action Priority as energy sector implements proven technologies and make them work within energy system.
- **Energy efficiency** – longer-term policy aspiration with energy sector looking for continuous improvement.
- **Affordability** – high profile with pandemic exposing longstanding societal issues related to cost / access.
- **Demographic patterns** – country specific, where developing countries with rising urban populations need to consider increasing demand while some developed countries anticipate flat or declining demand being exacerbated.
- **Support mechanisms** – in short-term for COVID response and long-term for feed-in tariffs or post-COVID recovery.

Issues Monitor 2021: Global Map

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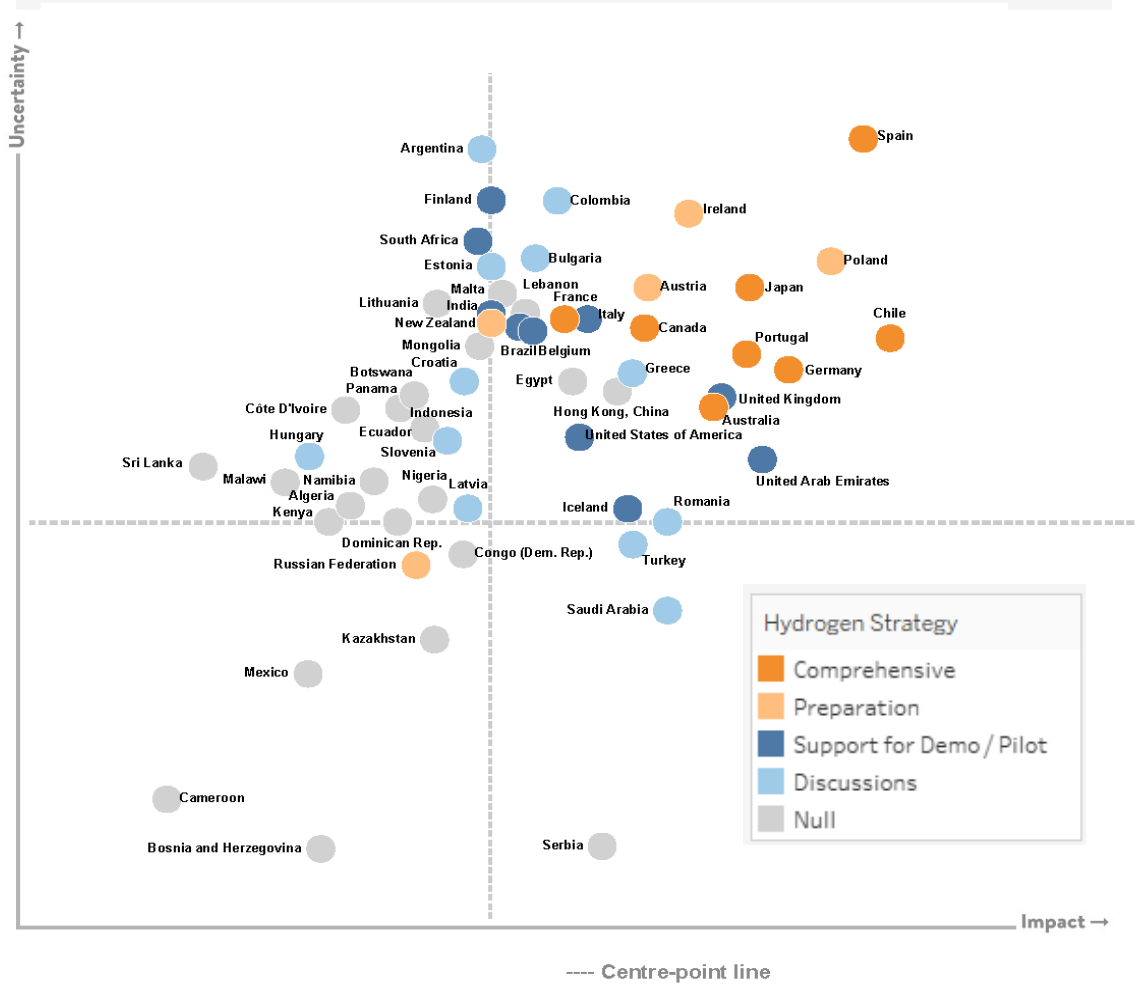
Hydrogen Strategy



- Enhanced view of hydrogen's **potential to decarbonise** those sectors and uses that are particularly difficult to electrify.
- Countries with **net-zero targets** prompted to start developing national hydrogen strategies, but **perspectives differ** significantly between countries.
- **Hydrocarbon asset rich countries** see hydrogen as an opportunity to continue to utilise their existing assets in conjunction with carbon abatement technologies.
- **Developing countries** lower but emerging interest in exploring how hydrogen might be used within their energy systems.

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REGIONAL PERSPECTIVES

AFRICA Energy Issues Monitor 2021

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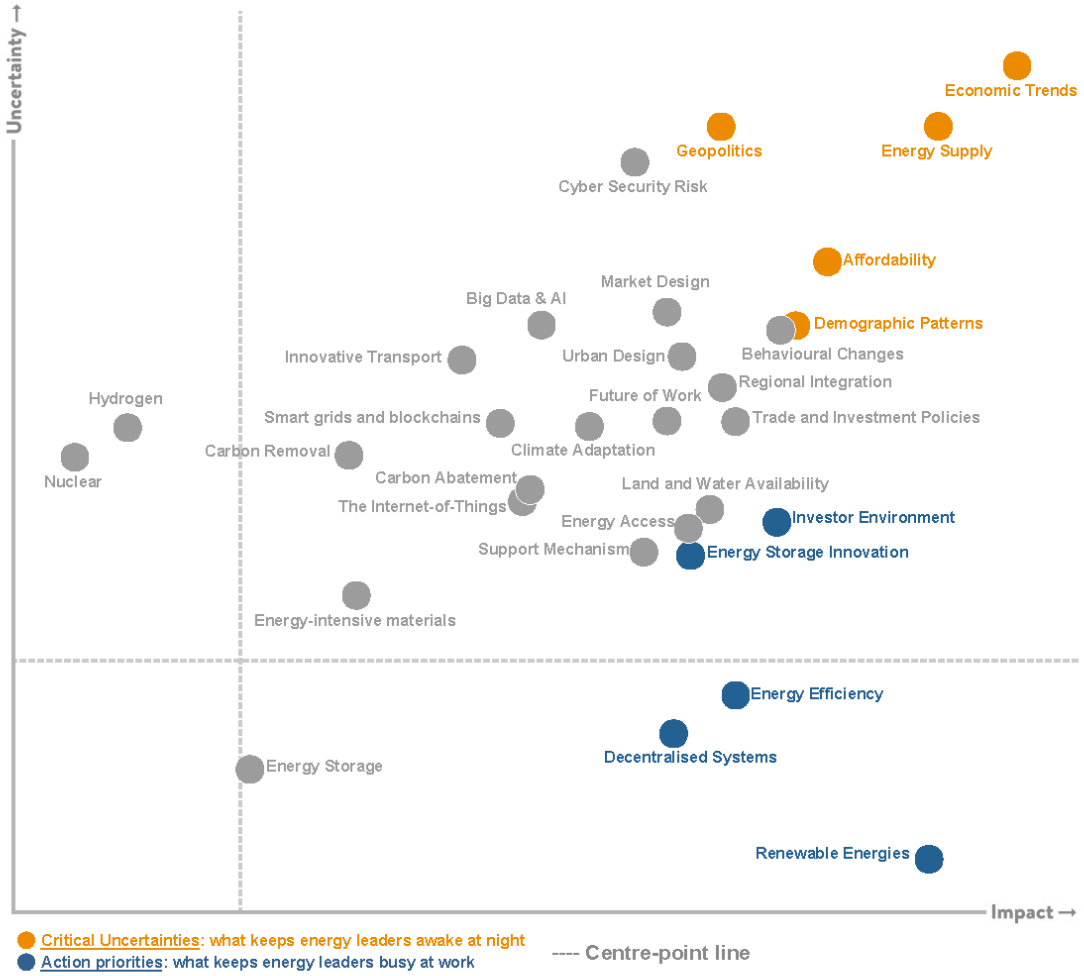

- Pandemic's re-exposure of unevenness increased motivation to use existing and additional solutions that empower local communities. Energy storage seen as an opportunity to increase energy access and localise manufacturing.
- Travel restrictions reinforced the ambition to build local capacity and expertise to increase resilience. Oil and gas exporters looking to replace lost exports with local markets to boost regional resilience.
- Bigger focus on end consumers to address their ability and willingness to pay for new services to be a "bottom-up pull" rather than a "top-down push". Region's success with mobile money provides unique opportunities for leapfrogging.

ASIA Energy Issues Monitor 2021

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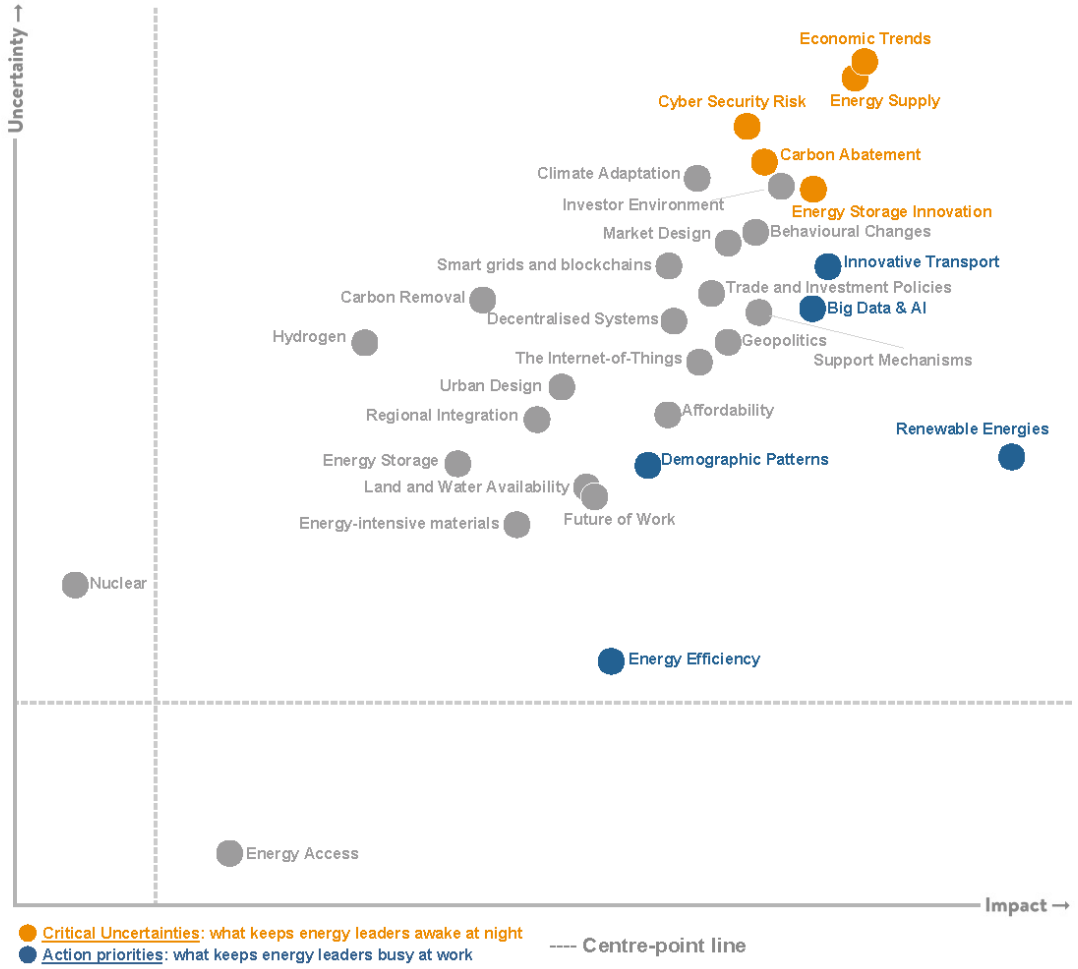

- Pandemic pushed the need to accelerate the pace of transition to carbon neutrality, but the ‘how’ is unclear. Carbon abatement becoming more important given the continued need for fossil fuels to meet increasing demand.
- Market design seen as a key enabler, although there are differing perspective on potential evolution. Investment remains essential as supply quality continues to be a substantive issue for many countries.
- Potential power grid interconnection opportunities, notably in southeast Asia. Many countries anticipate greater investment in smart grids with more demand response mechanisms.

EUROPE Energy Issues Monitor 2021

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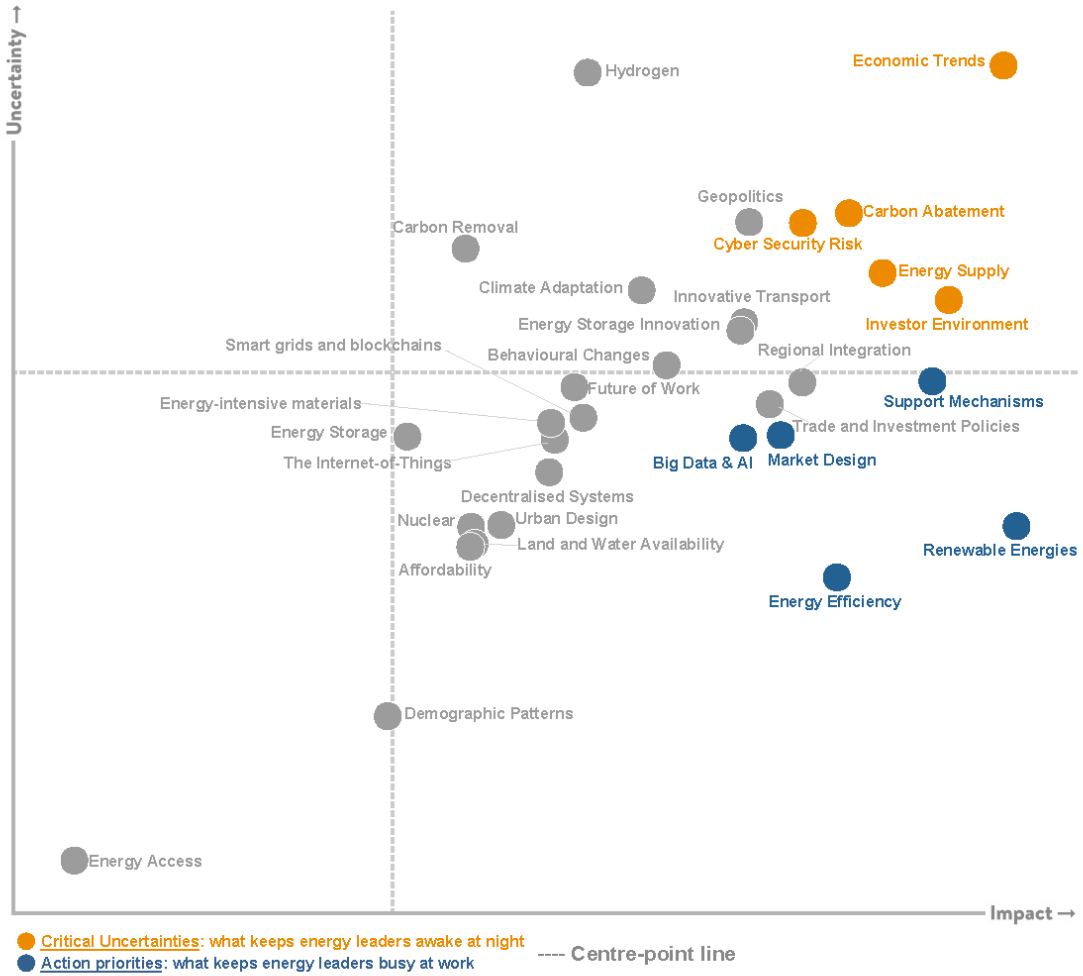
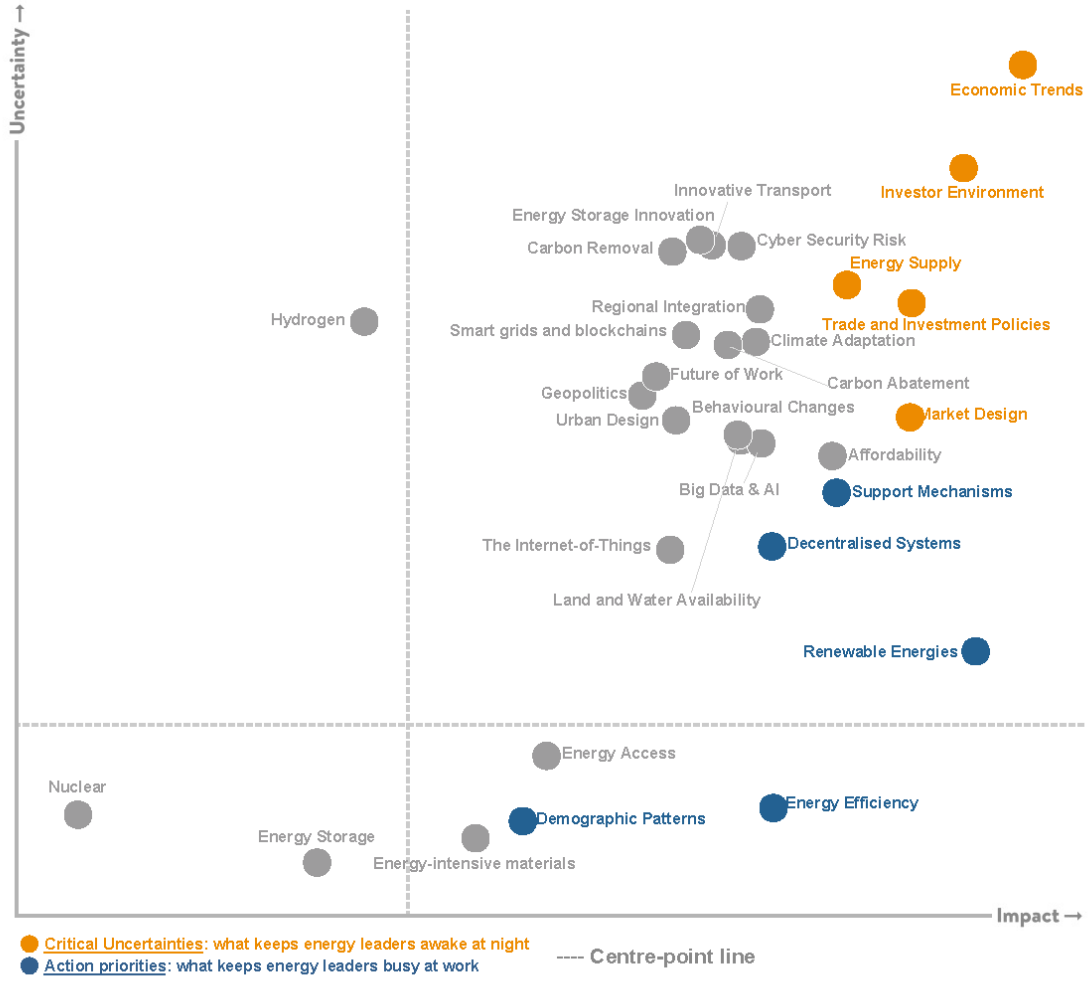


- European climate ambitions are being reinforced by post-pandemic recovery plans. European Commission supporting a package of measures under the green new deal banner. Delayed COP26 raising ambition for the UK as the host. Russia looking to explore nuclear venue for carbon neutrality.
- Pandemic amplifies the need for just transition. With many poorer households hit harder financially, energy leaders are increasingly aware of the importance of addressing energy poverty amongst European consumers.
- Net-zero targets will require markets to be able to incorporate effectively new technologies and business models that will need the existing regulatory frameworks and market design to be updated.

LATIN AMERICA & THE CARIBBEAN EIM 2021



- Pandemic exacerbated existing socio-economic challenges but renewed motivation to tackle social unevenness. Revival of bottom-up community action to try to address deep-seated challenges with innovative solutions.
- Incorporating more variable generation will require redesigning the existing market design to be more flexible and decentralised. Further work is needed to encourage inward investment, and a rebalance of support mechanisms for new technologies and vulnerable customers.
- Need for cleaner and more efficient transportation is recognised across the region. Challenges to enable grid infrastructure and address finances as fuel taxation can account for 40% of state revenues in some countries.

MIDDLE EAST & GULF STATES EIM 2021

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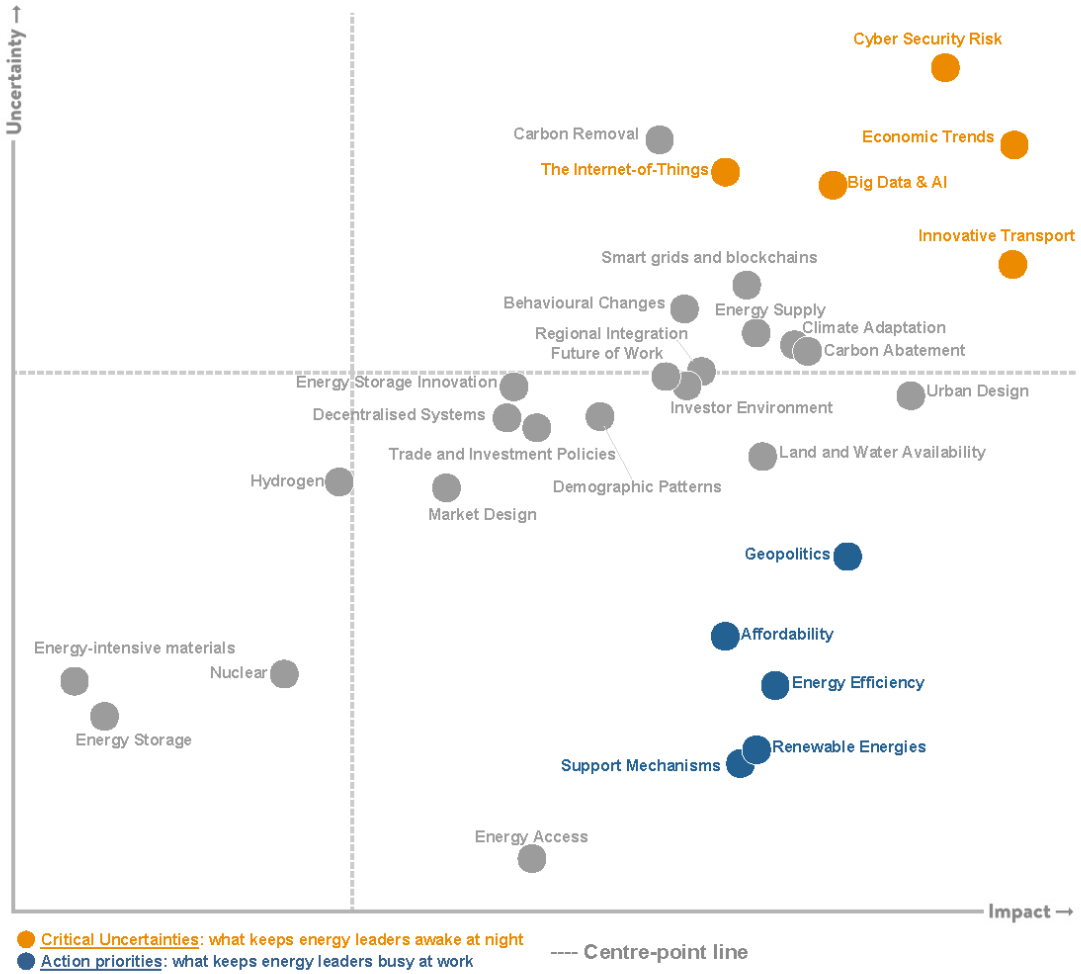

- Pandemic's impact reducing demand in the short term, longer-term concerns about demand destruction combined with lower oil prices helped to reaffirm regional energy agenda to diversify reliance on hydrocarbons.
- Energy producers exploring using CCUS with existing hydrocarbon assets based on the 4 R framework of 'Reducing, Reusing, Recycling and Repurposing'. This approach can help move towards a circular carbon economy aligned with other countries' net-zero ambition for energy transition.
- Consumer engagement is the next big challenge given the need to re-purpose rooted fuel subsidies and to implement demand management tools along with new energy sources.

NORTH AMERICA Energy Issues Monitor 2021

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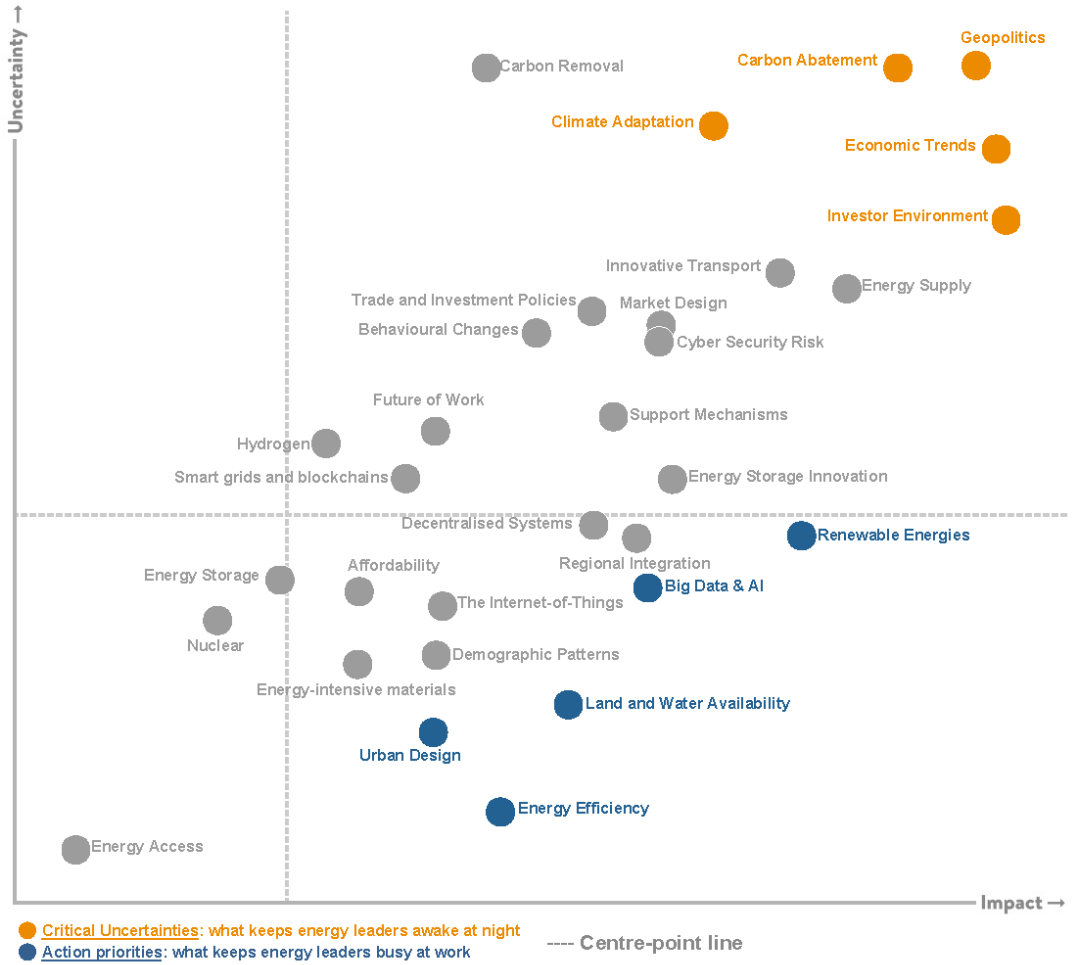

- US Presidential election reflected a political reset more broadly while clarifying the policy direction for the energy sector. The return of the US to the climate change agenda provides renewed impetus to the COP26 negotiations later this year, with the Biden administration targeting net-zero by 2050.
- Contrast between North American Big Oil increasing shale assets and European International Oil Companies (IOCs) increasing clean energy portfolio and transforming into International Energy Companies (IECs).
- Advances in big data & AI from the technology sector feeding into the development of autonomous vehicles. Technology, vehicle manufacturers and energy companies cooperating and competing. Challenge to accelerate transition without leaving any communities behind.

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AUSTRIAN PERSPECTIVE

AUSTRIA Energy Issues Monitor 2021

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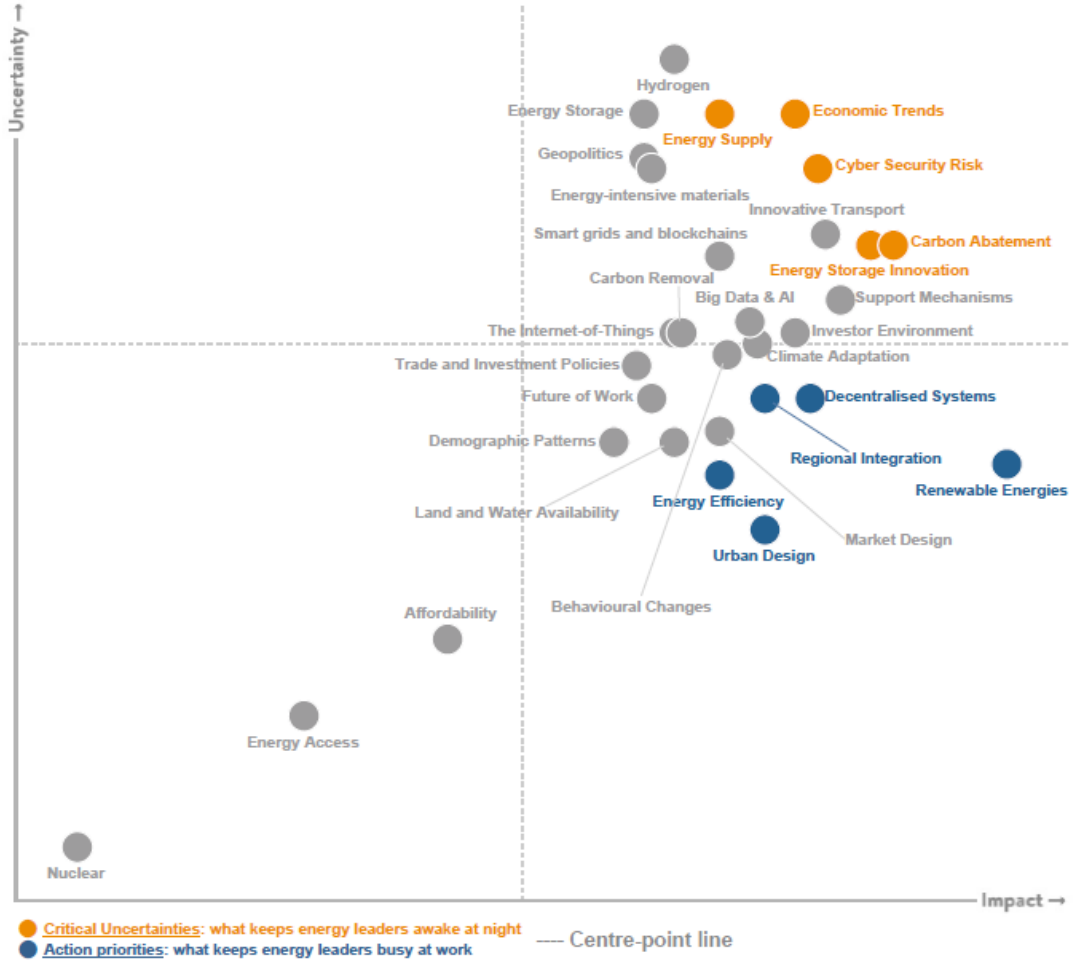

- Austria's energy leaders have introduced Energy Supply, Economic Trends and Cyber Security Risks in the Uncertainties section, as these issues are perceived as having greater impact.
- Other uncertainties include Energy Storage Innovation and Carbon Abatement.
- Action Priorities focus on Regional Integration, Decentralised Systems and Renewable Energies as well as Energy Efficiency and Urban Design.

Critical Uncertainties - AUSTRIA

Energy Supply, Digitalisation, Cyber Security Risks, Economic Trends

WORLD ENERGY COUNCIL AUSTRIA

- The Austrian federal government is committed to the Paris Agreement and to European climate change policy and has set ambitious targets, with the aim of positioning Austria as a pioneer of climate protection in Europe. The government's policy programme for 2020 to 2024 (Austrian Federal Chancellery: Out of a Sense of Responsibility for Austria) includes its stated objective of achieving climate neutrality for Austria by 2040. The planned measures include phasing out the use of fossil fuels for building heating from 2020 onwards, "1 million roofs" photovoltaic programme, covering 100% of total electricity consumption (national balance) from renewable energy sources by 2030. This represents a considerable challenge for the Austrian energy sector.

- The digital transformation of the energy industry is an integral part of energy system transformation. This also increases cyber security risks towards operation within the supply chain. Digitalisation requires new, agile risk management approaches to match it's the evolving risk profile and ensure the energy system continues to be effective and reliable.

- Austria's energy leaders are not only concerned with the challenges of energy transition and cyber security risks. Current and future economic development are also seen as uncertain. The Covid-19 pandemic and the containment measures implemented have plunged the Austrian economy into a deep recession.

Action Priorities - AUSTRIA

Regional Integration, Decentralised Systems, Renewable Energies

- Action Priorities focus on Regional Integration, Decentralised Systems and Renewable Energies. The “Renewable Energies Expansion Act” (EAG) also currently being drafted is an important step towards energy transition and climate neutrality.

- The ambitious climate protection targets require a secure and complete integration of renewable energies at all levels of the electricity grid. Cross-border power transmission takes place physically only at the extra-high voltage level via interconnectors. RES-E also requires direct cross-border interaction between distribution grids beyond pure physics in order to achieve more efficient integration of decentralised energies and stabilisation of the Pan-European electricity grid.

- The change to 100% RES-E is a change from a centralised to a decentralised energy supply, from a few large power plants to a multitude of small- and micro-generation units. This is in clear contrast to the current structure of the energy market. The centralised system with a few market players is being replaced by a small-scale, heterogeneous system with a large number of players. This means a reversal of today’s supply structures and represents a particular challenge in terms of security of supply. This can only be ensured with a massive expansion of the network and storage facilities, coupled with an IT upgrade.

For any further information please contact:

Dr. Robert Kobau

Secretary General of WEC Austria
Brahmsplatz 3, A-1040 Vienna, Austria

office@wec-austria.at
www.wec-austria.at

Thank you!