WORLD ENERGY SCENARIOS | 2019

EUROPEAN REGIONAL PERSPECTIVE

EXECUTIVE SUMMARY

In collaboration with the Paul Scherrer Institute

WORLD ENERGY COUNCIL

The European region[1] comprises over 30 national energy systems, including some of the world's largest importer-exporter nations. There is increasing diversity in the overall energy mix, which includes community/district and industrial heating; centralised and decentralised electricity grids; hydrocarbon molecules; and renewable, hydro and nuclear power generation. Compared with other regions, the European region is also well endowed with both new and ageing national and cross-border energy infrastructures.

Whilst the future of energy cannot be predicted with any degree of precision, managing successful energy transitions necessitates a bigger-picture perspective.

The exploratory scenarios contained in this report describe three plausible alternative pathways for European regional energy systems. None of the scenarios is the preferred or most likely future. Instead, the set of scenarios can be used by energy leaders to engage constructively with uncertainty and to better prepare for emerging systemic risks and new opportunities.

The three scenarios indicate the following as the main challenges facing European energy transition leaders.

1 EUROPEAN ENERGY SYSTEMS ARE ALREADY APPROACHING AN INVESTMENT CLIFF.

All the three scenarios assume that an an increase in energy investment will be forthcoming, but none of them delivers the full vision of successful energy transition and the achievement of the Paris Agreement. Despite the relative wealth of its highly industrialised urban societies, the global abundance of cheap capital and an increase in green finance, it is a challenge to attract the investment needed to manage and maintain existing systems, decommission or repurpose (where it makes sense), build new infrastructures and manage stranding of assets. It is clear that a mix of public-private investment will be required, and yet there is no certainty that adequate investment will be forthcoming.

2 NEW GLOBAL GROWTH OPPORTUNITIES ARE EMERGING IN ENERGY, WHILST GEOSTRATEGIC COMPETITIONS ARE INTENSIFYING.

Recent years have seen a re-emergence of old and new political tensions, including between the West and Russia, which will affect the future of gas in Europe. In parallel, new opportunities for accelerating global energy transition are emerging, including new pathways for global clean energy trade. As more and more European nations explore new energy for prosperity opportunities associated with power-to-X and the hydrogen economy, will timely, pan-European energy cooperation be forthcoming?

3 DIGITAL ENERGY COMPETITIVENESS IS KEY TO A NEXT ERA OF REGIONAL PROSPERITY.

Digitalisation is a key feature in all the three scenarios, but pace of change and scale of impact varies considerably among the scenarios. The impact of digitalisation is increasing in every part of all types of energy value chains. Digitalising gains include increased resource and energy efficiency through digital design, digital manufacturing, digital distribution, digital maintenance,

[1]European region includes EU 31,Eastern Europe and Russia. Please see the annex for additional definition.

smart systems integration and business information management. Digitalisation is facilitating the rise of active, data-empowered consumers across Europe. As a result, value is migrating from resources to the attributes of power (energy-plus services) and to new demand aggregators, including new and non-traditional market entrants. The continued fall in the cost of renewable energy technologies and the expected fall in the costs of battery storage are also enabling a new phenomenon of renewable communities and net-zero carbon cities across the region. In turn, the increasing democratisation in energy is creating new challenges associated with the fragmented privatisation of supply and storage infrastructure, including visibility, reliability and cyber security of hybrid electricity grids.

4 EUROPEAN SHARED VALUES IMPLY THAT THERE CAN BE NO ENERGY TRANSITION WITHOUT SOCIAL INVOLVEMENT AND PUBLIC ACCEPTANCE.

All the three scenarios highlight different facets of the shift to a more democratic and consumer-centric energy system shaped by active consumers, active citizens and active local communities. The recent phenomenon of the Gilets Jaunes movement in France highlights the growing demand for a socially just and fair transition. In the UK, in order to meet the nationally declared climate emergency, citizens will need to be engaged in discussions about the role of low-cost domestic nuclear power and the potential need for greater reliance on more diverse energy imports in a post-Brexit era. Similarly, achieving the German Energiewende means that citizens and small and medium-size companies will bear a large share of the upfront costs. This situation is unlikely to be socially acceptable for more cost-sensitive consumers in other European countries. The full costs of transition to a sustainable energy future must become more transparent and must be shared more fairly throughout the whole of society.

5 NEW ECONOMICS OF WHOLE SYSTEM TRANSITION ARE NEEDED THAT AVOID INCREASING EMOTIONAL REACTIONS AND ESTABLISH A LEVEL PLAYING FIELD IN THE CONSIDERATION OF ALTERNATIVE NET-ZERO CARBON TECHNOLOGIES TRANSITION PATHWAYS.

The scenarios can be used to explore whole energy system transition costs and the inevitability of new winners and losers. Whole energy system transition costs are not the same as marginal cost pricing. Despite increasing digital transparency, however, the development of true cost accounting (inclusion of costs of reliability, reflection of social and environmental externalities, calculation of co-benefits, etc.) is not straightforward. Achieving a pragmatic way forward will involve education and awareness-raising among consumers and the many and increasingly diverse set of actors involved in energy transition within and beyond the energy sector.

6 DEVELOPING INTEGRATED ENERGY-INDUSTRIAL STRATEGIES AND PROMOTING SECTOR-COUPLING POLICIES ARE PIVOTAL IN ENABLING AFFORDABLE AND DEEPER DECARBONISATION, IN PARALLEL WITH CREATING JOBS AND STRENGTHENING REGIONAL ECONOMIC COMPETITIVENESS.

The scenario narratives direct attention to how energy transition in the European region is being shaped by global developments and, in particular, the journey called the 'Grand Transition', which implies wider and fundamental shifts beyond the world of energy, e.g., socio-economic transformation to post-normal, post-industrial and so-called Creative Society; the shift to a circular economy; the rise of prosumers and a shift in social norms from ownership to sharing. In this wider context, the links between energy transition and industrial competitiveness and transformation are in flux, and there is an opportunity to look beyond traditional policy trade-offs and to leverage new synergies and co-benefits. Integrated policy pathfinding using the Council's Energy Policy Trilemma Index in combination with these European Regional Scenarios can help identify new

policy options for improving both competitiveness and purchasing power. Other world regions are more pragmatic in this regard. Europeans can be both pragmatic and creative in progressing more effective and innovative energy-industrial policy.

7 THERE IS A NEED TO BUILD NEW CAPABILITIES IN DYNAMIC RESILIENCE AND CROSS-SCALE GOVERNANCE IN ORDER TO SECURE THE BENEFITS OF GLOBAL AND LOCAL FLOWS OF CLEAN, RELIABLE AND AFFORDABLE ENERGY FOR EVERYONE, ANYTIME, ANYWHERE.

The role of national governments in energy security policy is shifting. The geopolitics of energy are broadening beyond oil and gas, and systemic risks of decentralised and renewable energy systems include extreme weather events and cyber crisis. At what level should decisions about energy security and resilience be made? Some decisions are best made at the pan-European level; others at the local community level. Europe promotes a policy rhetoric of subsidiarity – now it needs to effectively translate this into practice.

RECOMMENDATIONS

Meeting these seven challenges will require different and collaborative action from key energy transition leaders across the region, including:

Policy makers should:

- Engage citizens in honest discussions of whole energy transition costs and re-localisation of new market designs
- Promote integrated policy pathfinding in relation to energy-industrial development
- Promote sector-coupling strategies to achieve socially affordable and deeper decarbonisation
- Develop proactive energy infrastructure action planning, including repurposing of pipelines to progress hydrogen mandates

Energy business leaders should:

- Leverage digitalisation to help identify and secure new co-benefits and synergies, e.g., smart systems integration, switching supply and storage

Climate finance and investment community should:

- Promote technology neutrality in financing net-zero carbon pathways

Macro risk management should:

- Seek/encourage investment
- Focus on regional integration of pipelines and grid to enhance dynamic resilience

The Council promotes and uses plausibility-based, technology-neutral scenarios to support well-informed, globally inclusive and better quality strategic dialogue and decision-making and to forge a shared understanding of common energy challenges.

ABOUT THE FULL REPORT

The main section of the full report presents the three regional storylines to 2040, with supporting comparative analysis of energy sector implications; additional country focused insight; and illustrative, model-based quantification. There is also a section on ‘how to use’ the scenarios, describing how business leaders and policy makers can effectively use these scenarios to: (1) engage in leadership dialogues; (2) enable integrating policy pathfinding; (3) stress test and translate new energy visions into action; (4) redesign energy businesses.

ABOUT THIS REPORT

The scenarios provides an inclusive and strategic framework that enables big-picture thinking. They are designed to be used as a set to explore and navigate what might happen and support a better-quality global strategic dialogue on the future of energy systems.

These regionally focused scenarios are produced using a World Energy Council framework, that was developed by the Council and its scenarios partners, Accenture Strategy Energy and the Paul Scherrer Institute.

The report is following a medium-term time horizon of 2040 and focuses on European region, which includes EU 31, Eastern Europe and Russia. It explores three plausible pathways for a region in Modern Jazz, Unfinished Symphony and Hard Rock futures, provides comparative analysis and a broader view on 'how to use' the scenarios.

The regionally focussed scenarios were informed by insights from 15 deep-dive regionally focussed leadership interviews, regional workshops in Paris, Berlin and Tallinn, and wide experts' engagements.

THE WORLD ENERGY COUNCIL

The World Energy Council is the principal impartial network of energy leaders and practitioners promoting an affordable, stable and environmentally sensitive energy system for the greatest benefit of all.

Formed in 1923, the Council is the UN-accredited global energy body, representing the entire energy spectrum, with over 3,000 member organisations in over 90 countries, drawn from governments, private and state corporations, academia, NGOs and energy stakeholders. We inform global, regional and national energy strategies by hosting high-level events including the World Energy Congress and publishing authoritative studies, and work through our extensive member network to facilitate the world's energy policy dialogue.

Further details at **www.worldenergy.org** and **@WECouncil**

The full report can be found at **www.worldenergy.org/publications**

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