



Exposing the myths, defining the future: It's time to get real to secure tomorrow's energy today

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Complexity and uncertainty are increasing at an accelerating rate and energy leaders in both the public and private sectors need to make inspired decisions. Action is needed now.

We have found through our multi-year in-depth studies and issues-mapping with energy leaders that we are in a much more challenging world than previously envisaged.

The WEC's analysis has exposed a number of myths which influence our understanding of important aspects of the global energy landscape. If not challenged, these misconceptions will lead us down a path of complacency and missed opportunities.

Much has, and still is, being done to secure our energy future, but the WEC's studies reveal that current pathways fall short of delivering on the global aspirations of energy access, energy security, and environmental sustainability.

Energy leaders in both the public and private sectors agree on many of the actions necessary, but significantly are not aligned on the nature, value and importance of political and institutional risks and their critical impact on investment.

If we are to derive the full economic and social benefits from energy resources, then we must take incisive and urgent action to modify our approach to energy solutions. The usual business approaches are not effective. The focus has moved from large universal solutions to an appreciation of regional and national contexts and sharply differentiated consumer expectations.

Faced with an ever-changing kaleidoscope of issues, we have to embrace this new reality and define enhanced norms of performance and agility.

It's "Time to get Real" in defining our future.

Challenging the myths

Myth 1: Global energy demand will flatten out

The Reality: Energy demand will continue to increase and double by 2050, primarily driven by economic growth in non-OECD countries.

Myth 2: Peak Oil - there is an imminent shortage of fossil fuel resources

The Reality: There is no shortage in sight. The continued discovery of new resources and the emergence of new technologies that both enable the release of unconventional

oil and gas and improve the recovery rates from existing fields have already multiplied the available fossil fuel reserves by a factor of four, and this trend will continue.

Myth 3: Demand growth will be fully met by the new clean energy sources

The Reality: WEC analysis in the *World Energy Scenarios* shows that despite significant growth in the relative contribution of renewables from 15 per cent today to a figure between 20 per cent and 30 per cent in 2050, in absolute terms the volume of fossil fuels used to meet global energy demand will be 16,000 MTOE in the Jazz (the more consumer-driven scenario) and 10,000 MTOE in Symphony (the more voter-driven scenario), compared to 10,400 MTOE in 2010. This represents a 5 per cent decrease in the absolute amount of fossil fuels in Symphony but a 55 per cent increase in Jazz.

Myth 4: We can reduce global GHG emissions by 50 per cent by 2050

The Reality: According to the WEC's *World Energy Scenarios*, even in the best case we will see a near doubling of global greenhouse gas (GHG) emissions by 2050, compared to where we should be in 2050 to meet the 450 parts per million CO₂ reference adopted by many. At worst GHG emissions could increase by over four-fold.

Myth 5: Current business models and markets are delivering.

The Reality: WEC analysis shows that energy markets are becoming increasingly complex, driven by accelerated change in energy policy, technological innovation, and consumer expectations. Current market designs and business models are unable to cope with the increasing renewable shares, decentralised systems, or growing information architecture.

Myth 6: Current programmes will deliver universal access to energy within the next 10 to 15 years.

The Reality: Universal access is far from becoming a reality. While acknowledging recent progress and current programmes to reduce energy poverty, the WEC's analysis shows that on current paths, between 730 million and 880 million people for Jazz and Symphony respectively will still be without access to electricity in 2030, and between 320 million and 530 million people in 2050, globally.

Myth 7: On a global scale capital is cheap and abundant.

The Reality: Capital is extremely sensitive to perceived political and regulatory risks. Moreover, due to the growing pressures on public finances in most countries, public funds will not be available to substitute or augment the private financing of energy initiatives.

Defining the future

The global energy environment has increased in complexity. The global aspirations on energy security, access and environmental sustainability are destined to fail unless incisive and urgent actions are taken to both develop and transform the energy system.

1. We are looking in the wrong place. The focus of current thinking about the energy system is biased and inadequate:

If we want to get the greatest social and economic benefits out of our energy systems, the focus must shift from the supply mix to demand efficiency. We need more demand-side investments, innovation, incentives and stronger technical standards to reduce energy intensity. Price controls, subsidies, trade barriers and absolute targets for individual technologies distort the market and can have unintended consequences, so policymakers must use them only sparingly.

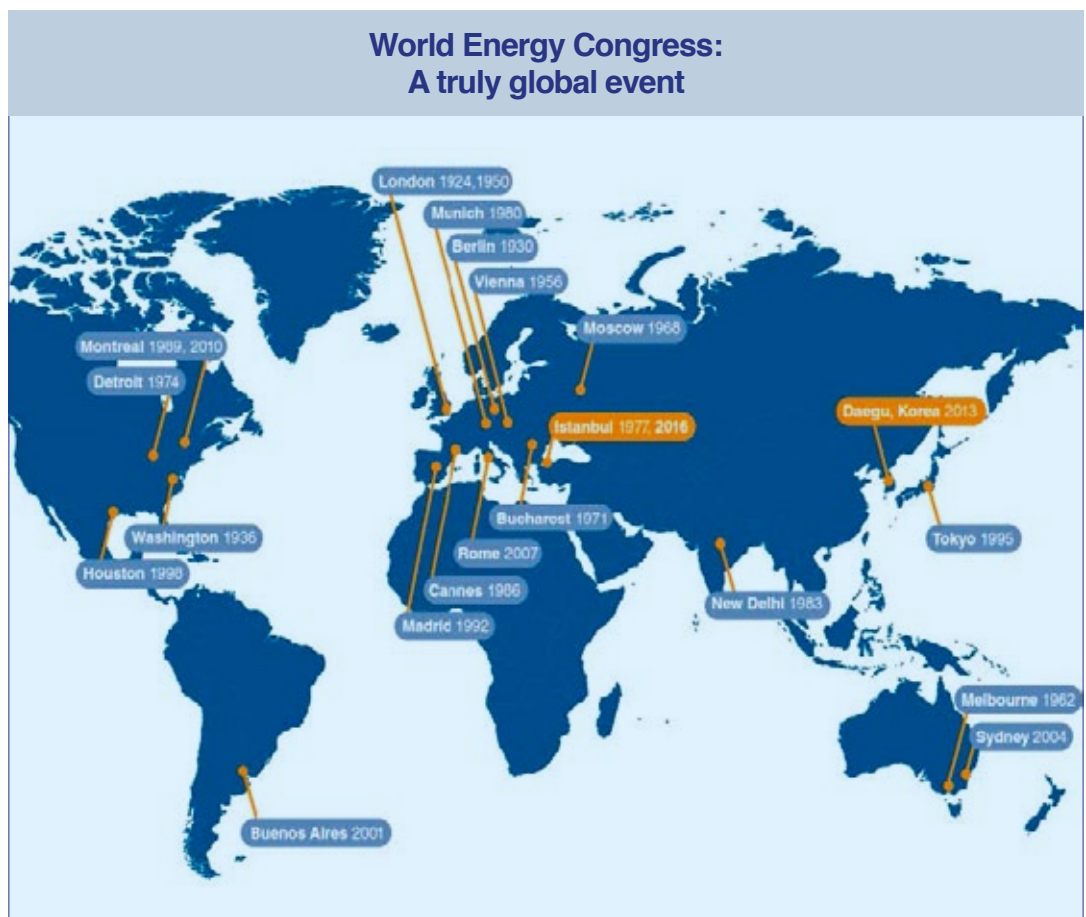
2. In order to attract the needed investment national policy and regulatory frameworks have to be balanced:

We need robust,

predictable and transparent frameworks that allow the market freedom to exercise informed choices in terms of innovation, technology and investment. The “Energy Trilemma” provides a solid framework for every country to assess its own political risk and work towards balanced, predictable and stable policy and institutional frameworks. The WEC’s analysis reveals that there is little agreement between investors and governments on nature, price, and value of risks. It is therefore critical to improve the understanding of the nature of risk and the way to price it. In the absence of such understanding, investment will not flow.

3. We need significant investments in RD&D:

We urgently need to realise the potential of breakthrough technologies such as electricity storage and CC(U)S. WEC analysis shows that the 450 parts per million CO₂ goal cannot be achieved without CC(U)S. It is essential,



therefore, that there are clear and unambiguous policy and institutional frameworks to support investment in this technology to justify its inclusion in roadmaps and carbon emission reduction strategies.

4. The energy map is changing and our institutions need to change to keep pace with developments:

The centre of gravity in energy has moved outside OECD countries – and so are interactions between the countries and regions. In addition, consumer groupings and civil society expect to influence our energy future. Existing multilateral and plurilateral energy institutions need to reflect these changes, be more inclusive and responsive, or risk becoming obsolete.

5. To ensure universal access to energy, policy and institutional frameworks and funds are urgently needed to de-risk and support entrepreneurial approaches:

WEC recognises the need for urgent additional action and supports the objectives of the UN Secretary General's Sustainable Energy for All initiative. WEC further supports the inclusion of universal energy access as a key and distinct element in the post 2015 Millennium Development Goals. Supporting mechanisms and suitable funding are essential in order to achieve this goal.

6. It's no longer just about mitigation:

Risks from the energy-water nexus, extreme weather events, or cyber attacks (to name but a few) expose our energy infrastructure to potential disasters. We need to urgently adapt, re-think, and redefine the resilience for energy infrastructure.

Some of the regional implications of non-action are:

- In Sub-Saharan Africa 250 to 400 million people could still lack access to energy in 2050.
- Asia will have the highest need for investments in energy infrastructure until 2050, a staggering US\$10 to \$12.5 trillion, compared to US\$3 to \$4 trillion for Europe or North America.
- The Middle East will struggle with increasing demand and energy intensity.
- Europe will struggle with balancing increasing energy prices and GHG objectives.
- North America will struggle with ageing and incremental energy plus issues of transport capacity and infrastructure.
- In Latin America, large hydropower will continue to dominate the energy mix until 2050 and building necessary infrastructure will struggle to meet the expected demand. □

22 Key Takeaways from the 22nd World Energy Congress

- 1. WEC's Energy Trilemma has become a primary concern for heads of State.**
- 2. All sources of energy will be needed to meet the rapid increase in global energy demand.**
- 3. Mind the gaps: Climate negotiations are an urgent priority.**
- 4. Achieving universal access clearly requires a scale of efforts we have never seen before.**
- 5. Even more focus on energy efficiency is critical.**
- 6. We are systematically underestimating the power of innovation.**
- 7. Political risks must be mitigated to ensure tomorrow's energy investments.**
- 8. Shale gas is a revolution, but US shale gas won't change Asian LNG dynamics.**
- 9. China is the key to oil market pricing.**
- 10. Coal demand will continue to accelerate, but policy uncertainty is killing CC(U)S.**
- 11. Without "Symphony," the future of nuclear is uncertain.**
- 12. Renewables see a bright future ahead, but regional dynamics are very different.**
- 13. The utilities industry needs to adapt to a smart and decentralised system.**
- 14. Russia seeks closer energy ties with Asia.**
- 15. East Asia weighs up the super-grid plan.**
- 16. The outlook for Asian green growth is black.**
- 17. The US looks set to achieve net energy self-sufficiency within two decades.**
- 18. Latin America is struggling with energy integration.**
- 19. A common European energy market is at risk of remaining a pipe dream.**
- 20. Untapped resources in Eurasia promise great rewards and challenges.**
- 21. MENA: Supply and demand imbalances plague the world's richest energy region.**
- 22. Energy access is the golden thread to unleash African development.**