

NAVIGATING THE ENERGY FUTURE

Taking the Energy Pulse

The Energy Pulse

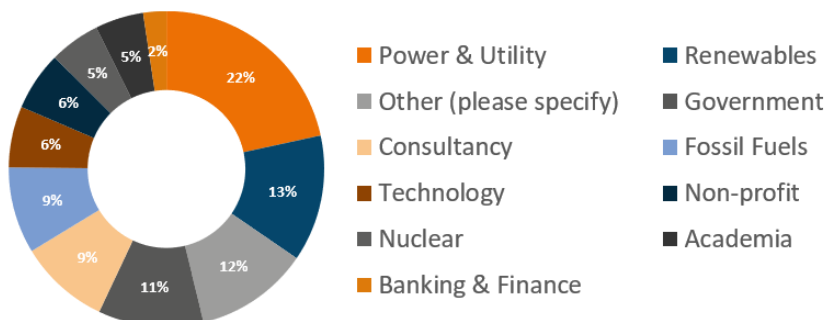
The Energy Pulse blends data with expert knowledge to bring you insights into the latest energy trends that will shape the future.

We launched the Energy Pulse at the 24th World Energy Congress in Abu Dhabi, United Arab Emirates. Over a two-week period, we asked energy leaders from 100 different countries a series of questions. We then collected this data and selected key experts to make sense of the aggregated responses.

Who took the survey?

500+ energy professionals, all attending the event

Largest representation from: **Europe (30%)**, **Middle East & Gulf States (28%)**



We asked the following questions:

- What will be the biggest source of tension within the energy industry in 2040?
- What will lead to the biggest growth in energy demand by 2040?
- Which measures/technology will have the biggest impact on how energy is consumed by 2040?
- Which technology will have the biggest impact on how energy is produced by 2040?
- Are energy leaders paying enough attention to the issue of affordability when thinking about energy transitions?

Before diving into the survey responses, let us identify the experts who blended the data with their industry experience and leadership to bring you key insights that should help you today with your energy decisions that will shape the future.

The experts are:

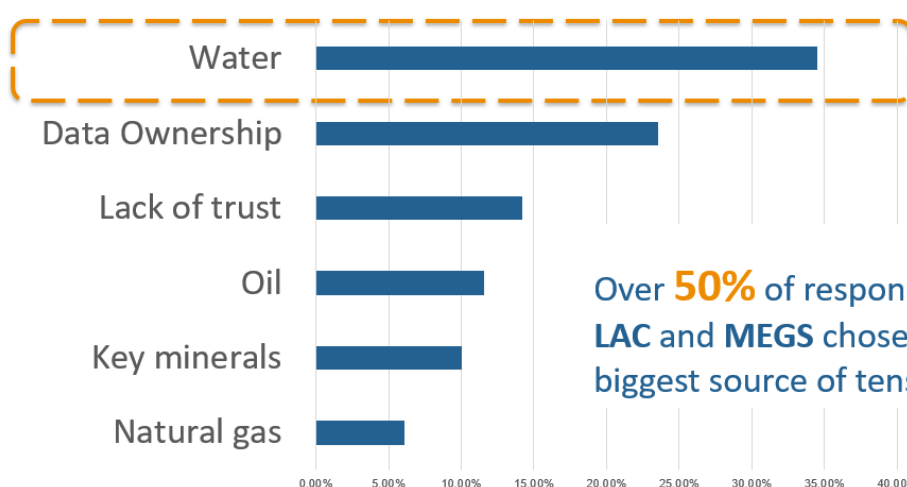
- Dr Michael Webber, Chief Science and Technology Office, ENGIE
- Dr Adnan Shihab-Eldin, Director, Kuwait Foundation of the Advancement of Science
- Filippo Gaddo, Director – Energy Economics and Regulation, ARUP
- Jon Dee, Founder and Managing Director, DoSomething Foundation
- Dr Tatiana Mitrova, Director, Moscow School of Management Skolkovo
- Anya Ivanova, Crypto Economist, Power Ledger

Key Insights - Blending Data with Expertise

Water is thought to be the biggest source of tension in 2040, followed by data ownership and lack of trust.

What will be the biggest source of tension in 2040?

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Over **50%** of respondents from **Asia, LAC and MEGS** chose **water** as the biggest source of tension in 2040.

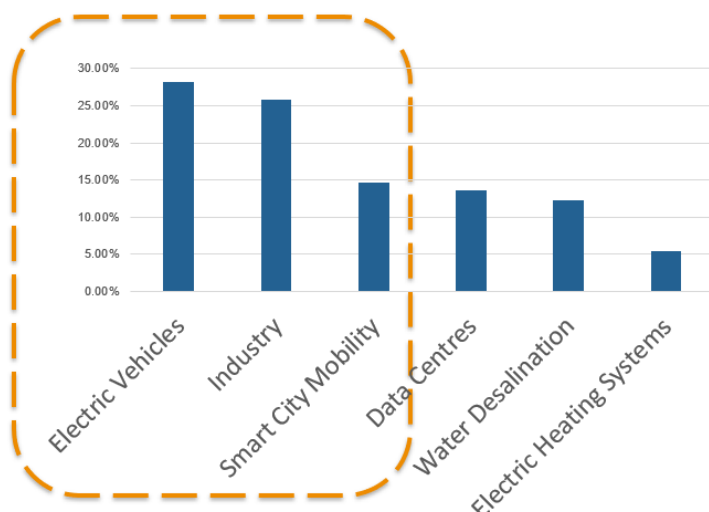
Our experts, too, agree that **water** will be the main source of tension in 2040 mainly because of the way climate change manifests itself through the changes to water cycles. The more intense the climate change, the more we get floods or droughts. For the energy sector operator, lack of water will affect the level of production.

Our experts also provided context about **data ownership** and its ever-increasing role in the decentralized energy systems. The belief is that the market will need to provide platforms for personal data where consumers have control of their own data.

Another area where the data collected from 100 different country representatives aligned was around **electric vehicles** and its impact on energy demand. The figure below illustrates how participants responded to the question of biggest growth in energy demand.

What will lead to the biggest growth in energy demand by 2040?

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All sectors and regions agree on the **impact of electric vehicles** on energy demand. The power & utility sector also largely focused on data centres, while the fossil fuel sector focused on industry.

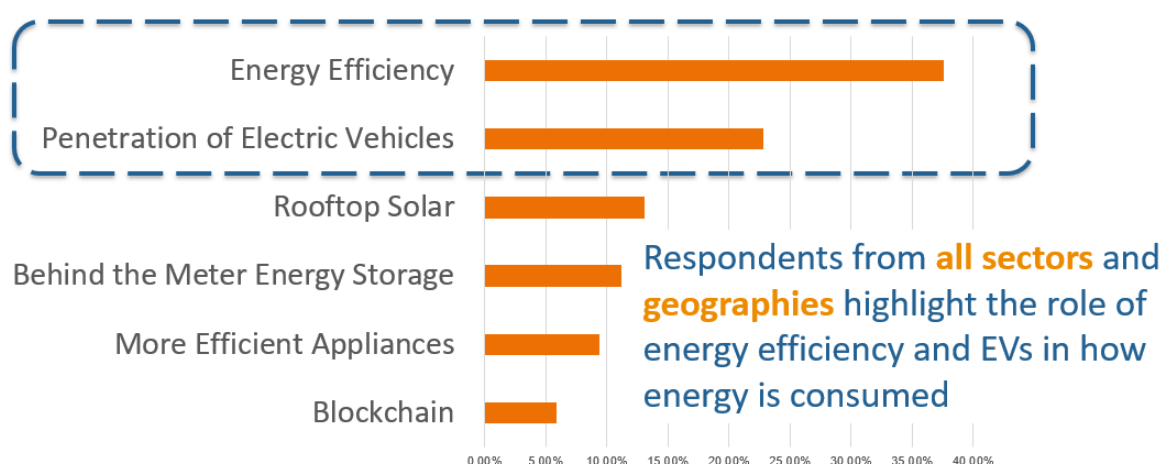
The experts first highlighted the fact that the biggest energy growth is happening in Southeast Asia, Africa, and the Middle East; in regions and countries where you have large populations and energy availability has not reached 100% access.

As for the technology, although electric vehicles took the biggest share, our experts shifted the discussion towards the role of **hydrogen** and agreed that it will play a big role in decarbonizing the energy sector, with main applications in the heavy-duty trucks, buses, marine shipping, and airplanes. Our experts forecast that there will be **increased competition between electric vehicles and hydrogen fuel cell cars by 2040**.

Hydrogen fuel cell cars alongside electric vehicles will have a significant impact in the global demand growth for energy, but what measure will have the biggest impact on energy consumed? We posed this question to the Congress participants who again as noted above represent 100 different countries. Interestingly and rather delightfully, the respondents selected **Energy Efficiency**. See below for the full results.

Which measures/technology will have the biggest impact on how energy is consumed by 2040?

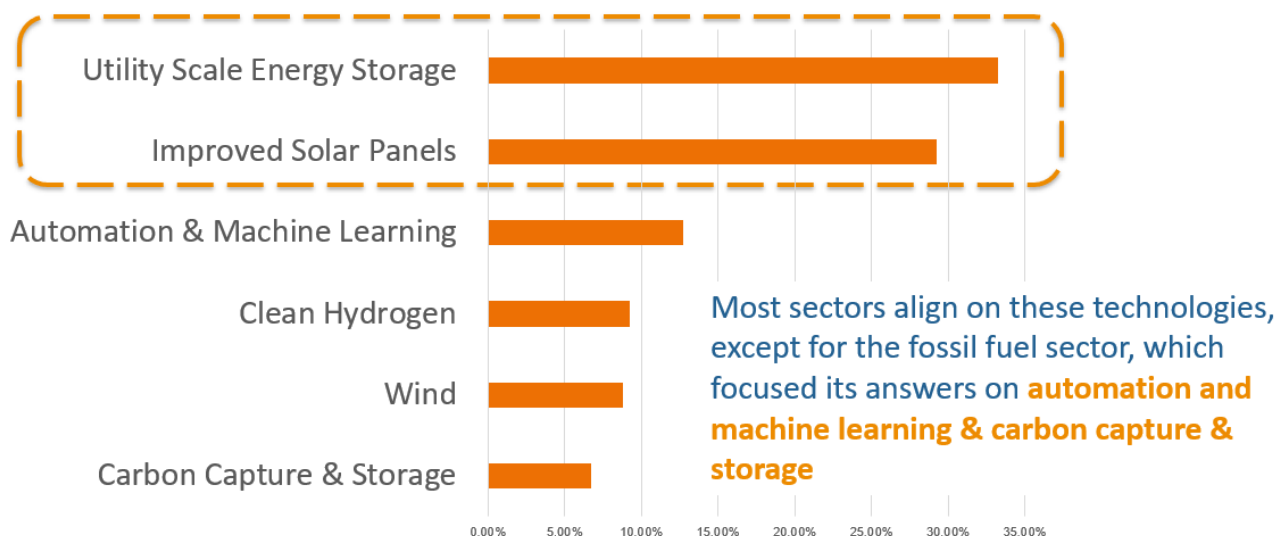
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Our experts supported this finding and further elaborated on the fact that **energy efficiency is about the low hanging fruit and at the same time the cleanest and cheapest form for energy**, because it reduces demand through minor evolutionary changes from the consumer side; and, importantly, it's about changing human behaviour. **Human behaviour** may be the single most important factor in tackling climate change and bringing to life a decarbonized economy. However, our experts warned about the challenge in terms of industrial consumption, with products nowadays requiring much more energy than 15 years ago, for example. Our experts also discussed the role of **plastics** as a hinderance to energy efficiency.

Following up on this discussion about energy efficiency being a measure to tame demand, next we asked participants how energy will be produced in 2040? Will the dominance of fossil fuels continue, or will the rise of renewable energy and related technologies change the balance in 2040?

Which technology will have the biggest impact on how energy is produced by 2040?



Our experts explained that utility scale energy storage will be a game changer for the energy industry by 2040. First, because it can handle the various fluctuations in demand especially when there are major variability and dynamics of supply. Utility scale storage has the ability to smooth out supply and demand in an effective way.

A second reason for utility scale storage is purely economics according to our experts. The power sector is a multi-trillion-euro sector in terms of capital, however, we use less than half of it at any given time. The power sector is built to meet peak demands, whether that be the hottest hour of the hottest month for cooling, or the opposite for heating, therefore under-utilizing our generation capacity. However, if we build more storage into our power plants, we can get up to 80-90% utilisation rate out of the power plants rather than 45%.

Key Insight

This combination of data and expert insights highlights the importance of the role of large-scale storage and consumer behaviour change in progressing affordable decarbonisation. Water and data ownership challenges highlight the need for energy leaders and their organisations to better prepare for new and fast emerging systemic risks associated with digital security and global environmental changes.

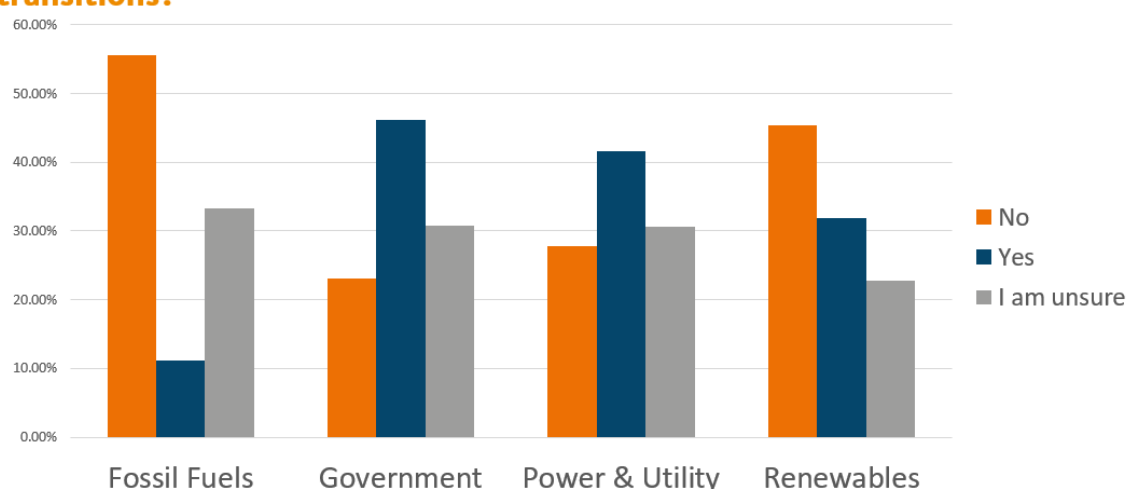
Action to address these challenges is in hand - see the Council's new framework on Dynamic resilience and our Innovation Insights series, which include energy blockchain(s), alternative storage pathways, and the new hydrogen economy.

Finally, we asked participants whether the energy industry was paying enough attention to affordability of energy as we transition to a decarbonized economy. Based on the results below, the perspectives of the fossil fuel industry - and to some extent RE player - are less positive than the government and utilities.

We invite you to tell us why and whether you think the energy industry as a whole is paying enough attention to issues of affordability in delivering the benefits of sustainable energy for all.

Are energy leaders paying enough attention to the issue of affordability when thinking about energy transitions?

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Please contact us with your thoughts on affordability and also what other topics or events should be the Energy Pulse focus on to blend data with expert knowledge in order to bring you insights into how energy decisions will shape the future.

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