The Future of World Energy

BY HISHAM KHATIB

Influencing factors

There are a few distinctive features relevant to the energy system which are going to influence its future

- The inertia of the energy system (political as well as economic). This is going to slow change (due to its size, huge existing assets embedded in the system, and enormous investments required if a low carbon world is to be achieved). Reshaping existing energy practices will take years and years.
- The existence of large reserves of currently relatively low cost, tradable and highly efficient naturally available fossil fuels.
- Money is becoming more expensive. Investors in highly capital energy projects are becoming more cautious (particularly global oil companies).
- Existing, but also growing, powerful environmental lobbies.
- There are real concerns about global climatic change and its potential consequences, but also uncertainties, which require carefully considered precautionary policies and actions.
- The IEA estimates cumulative global energy supply investment over the period 2016-2040 at $50 trillion (2015 $). Only 18% are in low carbon technologies.
- Large numbers of people remain unable to access electricity and other modern energy services.

The Future

All this is leading us into:

The powerful growing environmental lobby

This is strong (locally and globally) and it is getting stronger. It involves many well-intentioned people, organizations, and vested interests.

It is going to (slowly but surely) change the energy mix by negatively affecting the future share of fossil fuels (mainly coal). The speed and costs of shifting to a low carbon future remain uncertain, but there will be those adversely affected as well as beneficiaries. Insufficient attention is paid to costs and uncertainties – the latter including uncertainties about the scale and direction of global climatic change.

The proliferation of renewables, and it is gaining an unjustified share of the power market.

This is driven by the globally powerful "clean energy lobby".

The future of RE will continue to be uncertain due to the absence of economic storage on the required scale. The intermittency of wind and solar, the need to locate wind turbines and solar panels in optimal locations, and the desirability of transmitting the resultant energy flows to points of final consumption will provide ongoing challenges for lowering the costs and raising the efficacy of these forms of renewable energy. Exploitation of biomass and biofuels will raise challenges for sustainable development more widely. Other possible avenues, such as exploitation of hydrogen and wave power, have scarcely begun.

Vested financial and political interests can be expected to continue seeking ways of manipulating opinion and public finances.

Hisham Khatib
is Honorary Vice Chairman of the World Energy Council

The demise of nuclear (in OECD countries)

Nuclear power (with proper regulatory measures) is very expensive > $10,000 /KW.

No rational OECD investor is going to put his money into nuclear where much cheaper and safer alternatives exist.

Nuclear, assisted by state subsidies, may continue to grow in centrally planned economies.

Overall nuclear share in the energy mix seems likely to continue to decline.

Decoupling of energy/the economy

The growth of the global economy is becoming less closely aligned to similar or proportional growth in energy use.

This is mainly due to technological advancement, the awareness and introduction of more efficient energy apparatus, particularly in lighting (LED). The emergence of non-traditional energy sources, particularly cheap shale gas; and an increasing share of cheap NG in the energy mix (CCGT), mainly at the expense of coal and nuclear.

Oil demand is going to continue to be strong or weaken only slowly. It is relatively abundant (at least for the next twenty years or so), highly efficient and tradable, and easy to use and handle. The world's vehicle fleet, especially of private passenger vehicles, is currently overwhelmingly dependent upon oil products. Electric vehicles will increase substantially in number, but the availability of electricity, the proximity of charging points, and the accessibility of vehicles with adequate ranges without re-fuelling, will continue to pose significant hurdles.

Electrification of (light) transport

This is likely to happen as indicated, so in a slow and orderly manner (not in a revolutionary way).

There are now one billion ICE cars on the roads.

These are not going to disappear, even in the very far future. But what about marine, air and heavy transport vehicles?

Do not write the ICE off. 2019 is likely to see the commercialization of the new energy efficient "Spark Controlled Compression Ignition (SPCCI)" cars. Less emissions, 18-20 kms./lit. Not far from EV but much cheaper and no range limitations.

Transport electrification is going to improve the fortunes of RE.

U.S. as an energy exporter

The U.S. is going to be a sizeable energy exporter (particularly for LNG) with wide political and global energy implications.

The Arabian Gulf is likely to become less important as a global oil and natural gas exporter.

Energy poverty

This term is defined as people who do not have access to modern energy services.

Over 2.5 billion people remain largely reliant upon, or are heavy users of, traditional biomass.

Over 1 billion people still remain without access to electricity, although since 2010 that number has been falling by over 100 million per year. Those still enduring energy poverty are mainly in India and elsewhere in South and South-East Asia; and in sub-Saharan Africa. These include some 240 million in India, some 350 million elsewhere in Asia (for China where the figure is reportedly under 10 million), and some 550 million in sub-Saharan Africa (Nigeria 80 million; Congo 68 million; etc.)

Energy/electricity poverty is declining slowly but surely.

Main impediments for its elimination are the investments required to provide sufficient power generation capacity and transmission, accessibility to and in remote areas, affordability, inadequate policies and regulations, and lack of institutional support and financing for potential off-grid suppliers.

The rather different concept of fuel poverty – usually defined as where household fuel consumption costs exceed 10% of household income – is a growing burden on families in many European countries.

The Evolving Utility Scene - The growing influence and participation of consumers

The slowly but surely evolving utility scene from command and control into consumer participation and partnership.

No more monopolies but peer-to-peer partnership (p2p). Partnership between the producer and consumer. Creating proconsumers and reproducers as well. `

Future prices of energy/oil

Investments in oil and gas production amounted to $700 billion in 2014. In 2018 it is expected not to exceed $400 billion.

Declining investments in the oil and gas sector worldwide (particularly by large oil companies) plus the political instability in the Iran/Gulf area means a tight future for oil production which also means that future oil prices will remain high.

Roy and Walsh: *Are Community Energy Systems the Solution for Growing Urban Energy Demand?* Continued from page 8.

regulatory and institutional support is crucial and that the multiplicity of jurisdictional governance associated with electricity generation, transmission, and distribution means that no one community energy model can necessarily be generalized. Add to that the complexity of urban energy infrastructure, and the need to refine the urban consumer's culture of energy, and the path towards cities made up of self-reliant yet inter-connected energy communities remains a long one.

Footnotes

[1] International Energy Agency [IEA], 2016

[2] bid

[3] Government of Scotland, 2015

[4] German Federal Ministry for Economic Affairs and Energy, 2015

[5] https://www.hieropgewekt.nl/kennisdossiers/zelflevering-saldering