Session III: POWER SYSTEMS OF THE FUTURE

Presentation by Mr. Tim YEO, Chairman,
The New Nuclear Watch Institute (NNWI), London, UK

The Industry Viewpoint

The New Nuclear Watch Institute was established five years ago as a London based pro-nuclear think tank. It is supported by a consortium of European, Asian and North American companies.

NNWI strongly supports the Paris accord targets and believes those targets can't be met without substantial investment in new nuclear capacity.

It aims to promote recognition of nuclear as part of the solution to climate change and as an essential element in the global energy mix.

In the opening session this morning I explained why I believe that every country and every region must now speed up the decarbonisation of the electricity generation industry.

Science, popular opinion, politics and business all point in the same direction. Southeast Europe cannot avoid this trend.

Indeed the risk, maybe the probability, is that EU climate policy may well get even tougher in the face of stronger scientific evidence and increased political pressure from the green lobby.

So the power systems of the future will look very different in all parts of the world from what they are today.

Unabated coal has no medium term role to play. And since the date on
which economically viable carbon capture and storage will be available remains unknown it would be reckless for policymakers to assume that coal can continue to be consumed if irreversible climate change is to be prevented.

For the same reason even gas has only a transitional role. After 2050 its contribution will be very limited as we move towards a net zero world.

Replacing coal with gas won't reduce GHG emissions sufficiently to meet the requirements of either the Paris Accord or the EU.

In any case there are risks for countries which depend on imported gas if they choose to increase that dependence. In Southeast Europe for example it would mean more dependence on Russia.

There is also a price risk associated with gas. The EU carbon price has risen 400% in 2 years. There's a growing consensus that carbon pricing is needed in some form or other to overcome climate change. The use of carbon pricing may soon become widespread. So the high probability is that the move away from fossil fuels accelerate

What is also certain is that the power systems of the future will have to deliver not less but more electricity. Modern economies are becoming increasingly electricity intensive.

Surface transport for example, including autonomous vehicles, at some point will largely depend on electricity and the application of electricity intensive data processing technologies is increasing fast.

So while fossil fuels are phased out demand for electricity continues to rise. There are many ways in which this challenge can be addressed. Much more energy efficiency, smarter grids, better demand side management are some of them.

I want to focus today on electricity generation. Here the unquestioned success story is renewable energy. The NNWI unreservedly welcomes both the expansion of renewable energy capacity and the fall in price of variable renewable energy (VRE) especially.

Renewable energy is a very big part of the answer to climate change, though delivering the mind blowingly large expansion of renewable energy capacity that is needed will have its own challenges.

For example much of the future growth of renewable energy will be from VRE. As the OECD Nuclear Energy Agency points out the system costs of VRE rise rapidly when VRE contributes a growing share of a country's needs.

For example, according to the OECD NEA, at a 10% penetration level the system costs are not very significant at around €6/MWh. At 50% penetration these costs are estimated to rise to €27/MWh. At even higher levels of penetration they could rise to €45/MWh.

Remember that renewable energy will have to provide 80% or more of global electricity generation capacity after 2050 if the share of nuclear does not increase.

There's also the storage issue. No doubt there will be breakthroughs. But as of now the world does not have large scale, long term, flexible, low cost electricity storage available. Until it does there's a limit on how far a modern economy, which requires an uninterrupted elec supply, can rely on VRE.

The land use implications of a very big expansion of wind and solar energy are also considerable. In France for example, a very large country, to generate from wind the same amount of electricity that is currently produced by nuclear would involve covering 5% of the country's total land mass with wind turbines.

Public acceptance of land use change on this scale cannot be taken for granted.

So while I fully support the ambitions of the renewable energy industry, and I'm sure it will play a huge role in overcoming climate change, I doubt it can do it unaided.

I question whether relying on renewable energy to meet all the world's low carbon electricity generation needs is a secure sustainable and best value for money solution.

All of which brings us to nuclear energy. At present nuclear is the only low carbon source of large-scale dispatchable power which also enhances energy security.

This is recognised in China, India, Russia and in much of the Middle East. But in Europe attitudes are mixed. Some EU member states like Austria oppose nuclear in principle. Others who've backed it in the past are phasing it out.

The example of Germany shows what happens when they do. In Germany phasing out nuclear has raised prices, increased pollution, prevented climate targets from being reached and weakened energy security. That is a uniquely disastrous outcome.

I therefore want to make the positive case for nuclear as part of the solution to climate change. I emphasise it’s only part of the solution. But in my view, it's an essential part.

Last week the International Energy Agency unveiled its first report on nuclear for nearly 20 years. This report "Nuclear power in a clean energy system" was launched at the Clean Energy Ministerial in Vancouver.

This report concluded that "Without action to provide more support for nuclear power global efforts to transition to a cleaner energy system will become drastically harder and more costly."

It continued "Wind and solar energy need to play a much greater role in order for countries to meet sustainability goals. But it is extremely difficult to envisage them doing so without help from nuclear".

The Report states that "a range of technologies, including nuclear power, will be needed for clean energy transitions around the world".

It confirmed that "nuclear plants contribute to electricity security in multiple ways." These include helping "to keep power grids stable." According to the IEA nuclear plants "can adjust their operations to follow demand and supply shifts. As the share of VRE like wind and solar PV grows the need for such services will increase. Nuclear plants can help to limit the impact of seasonal fluctuations in output from renewable energy and bolster energy security by reducing dependence on imported fuels".

The wide availability of nuclear fuel from a variety of sources also means that increased use of nuclear strengthens the security of a country's energy supply.

The most common objection to the construction of new nuclear plants is that they are too expensive to be competitive. There are three reasons why this objection is wrong.

Firstly comparisons between the cost of nuclear and other technologies are not always made on a like for like basis.

The IEA report recommends establishing "a level playing field for nuclear power with other low carbon sources in recognition of its environmental and energy security benefits and remunerating it accordingly."

It also recommends "designing the electricity market in a way that properly values the system services needed to maintain electricity security, including capacity availability and frequency control services."

It recommends "making sure that the providers of these services, including nuclear power plants, are compensated in a competitive and non-discriminatory manner"

Adopting these recommendations would significantly improve the competitive position of nuclear plants.

Secondly one of the largest elements in the cost of new nuclear plant is the cost of capital. The very capital-intensive nature of nuclear plant and the long construction period mean this is particularly significant.

Reductions in the cost of capital can be achieved either through vendor finance packages or by governments providing loans during the construction period. Such loans do not need to be subsidised but merely be made at the interest rates available to sovereign borrowers.

Thirdly the cost of new nuclear plants can be substantially reduced by choosing a single design and building multiple units. In the UK the cost of new nuclear has been made much higher by the constant failure of government to back a single technology.

So for all those reasons I am confident that new nuclear can be competitive with other low carbon technologies. Indeed, I believe that for nuclear to fulfil its potential it must show it is competitive.

To conclude it is my view that the power systems of the future will only be completely sustainable and secure if they include an element of nuclear power alongside renewable energy.

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