Nuclear energy

Why bigger doesn't mean better for nuclear power

The development of small-scale nuclear plants is more simple, safe and cost-effective

Energy Source

Profit. Power. Politics.

November 24, 2020 11:02 am by Derek Brower , Myles McCormick and David Sheppard

***One thing to start:* John Kerry will be Joe Biden's climate envoy.**

The reaction was swift — and positive.

"To lure Kerry back to government after he was secretary of state, Biden named him Secretary of Planet," said Kevin Book, of Clearview Energy Partners, a Washington consultancy. "His naming seems to have won support from two restive frontiers: progressives and Europeans."

Jason Bordoff, a former White House adviser who now runs Columbia University's Center on Global Energy Policy, said the appointment "signals [Mr Biden's] recognition that climate is a critical foreign policy issue for the US".

Where does nuclear lie in Mr Biden's climate and energy plans? Our first note talks to some in the industry who think fission's future is brightening again.

Our second is on the UAE, which just announced a huge new oil discovery — and seems suddenly less sure that, with big output expansion plans in mind, it wants to remain in Opec.

To our US readers: Happy Thanksgiving! Energy Source will be back next Tuesday.

Thanks for reading. Please get in touch at energy.source@ft.com. You can sign up for the newsletter here. — Derek Brower

Biden's bet on small-scale nuclear

"Nuclear energy is an important piece of the puzzle as we race against the clock to reduce carbon emissions and address climate change," said Cory Booker, a Democratic senator, as he introduced bipartisan legislation to revitalise and expand American nuclear power last week.

Expect similar rhetoric as nuclear emerges as one of the key planks of Joe Biden's plan to wean US power off carbon-spewing forms of generation by 2035.

As part of his decarbonisation drive, the president-elect wants to spur development of small-scale nuclear plants, or "small modular reactors" (SMRs), so that they can help balance the grid alongside surging renewable output. Here are some of the reasons for the SMR push (even if this new technology probably won't start generating power for the better part of a decade):

1. **Simplicity:** SMRs would be constructed in a factory assembly line, in theory making them more reliable and ending nuclear's notorious cost overruns. Modules of less than 100MW could be bought as required and bolted on to ramp up generation, allowing projects to be brought online twice as fast.

2. **Safety:** Mass production would allow for in-factory quality assurance. Reactors would also have an "indefinite coping period" meaning they would automatically shut down if necessary without the need for water to be pumped in to prevent meltdowns.

3. **Cost:** Mass production would allow economies of scale to drive down cost. Mr Biden reckons SMRs would be around "half the construction cost of today's reactors". NuScale, which recently became the first company to have its SMR designs approved by the Nuclear Regulatory Commission, says its first 684MW plant will cost $3bn to build and subsequent ones will cost $2.5bn. In comparison, the 3,260MW Sizewell C facility being built

in the UK will cost £20bn ($27bn).

4. **Complement renewables:** SMR output could be ratcheted up or down to provide peaking power alongside intermittent renewables. Larger reactors must run at a more or less constant rate.

The climate case

Small modular reactors sit among a host of other advanced technologies that the nuclear campaigners hope will revive their industry as climate change becomes more pressing.

NuScale says it should be ready to build commercially by 2027, with government support helping its first customer overcome any risks. Mr Biden's plans bolster support for nuclear. The president-elect has proposed creating a new research agency, ARPA-C, to help develop SMRs and iron out other issues with nuclear.

For many, the associations with accidents such as Three Mile Island, Chernobyl and Fukushima still loom large.

"None of the fundamental problems with nuclear power have ever been addressed," said John Coequyt, global climate policy director at the Sierra Club. "From transportation, to storage, to waste that remains lethal for more than 100,000 years, nuclear plants pose numerous threats".

> “There’s no reason to keep throwing good money after bad on nuclear energy when it’s clear that every dollar spent on nuclear is one less dollar spent on truly safe, affordable, and renewable energy sources like wind, solar, energy efficiency, battery storage, and smart grid technology,” Mr Coequyt said.

But the industry is confident the urgency of addressing climate will ultimately trump the stigma attached to it.

“Nuclear will always have a unique challenge because of its image in popular culture and the ties with nuclear weapons and environmental damage,” Craig Piercy, chief executive of the American Nuclear Society, told ES.

> “I think the conversation is changing and it is changing because we are looking at the existential threat of climate change and how we address it,” Mr Piercy said.

© REUTERS

Nuclear versus gas

Small-scale nuclear's biggest rival will be natural gas — which can already be ordered off the shelf and constructed quickly and cheaply.

And while SMRs would be much cheaper to build than older nuclear plants, they would still require significant up front capital investment in contrast to gas. Industry players reckon at a cost of around $5 per million British thermal units, SMR nuclear would be competitive with gas. But prices today are sub-$3/mbtu. That dynamic would change if a carbon tax were introduced.

"As people begin to do the math problem of climate they're beginning to realise that you can't solve the equation without nuclear in it," said Mr Piercy.

That, the industry hopes, should lead to widespread uptake of SMRs once projects begin to get off the ground.

Within the next two decades, said Hans Gougar, manager of product engineering at X-Energy, another forerunner in SMR development, "you'll see a substantial portion of our generating structure in smaller nuclear power".

> "
>
> "It's going to take a little while to get there. Because we're not just building a plant, we are building and rebuilding an entire industry. That takes a long, long time," he said.

(Myles McCormick)

Is trouble brewing in the Opec family?

The UAE has long been seen as a "core" member of the oil cartel, allying with other Gulf states such as Opec kingpin Saudi Arabia and Kuwait to co-ordinate their approach to production cuts.

But reports in the last week suggest the long-term alliance might be fraying, with officials in the UAE starting to question whether Opec membership is really in its interests.

The rumours picked up again over the weekend with the announcement of a huge new oil discovery in Abu Dhabi, giving more credence to the UAE's plan to increase its oil-output capacity by a quarter in the next 10 years.

That would sit awkwardly with Opec, where large production cuts have been in place since the summer.

Still, an exit from Opec does not appear to be imminent. The UAE's alliance with Saudi Arabia goes far deeper than oil, and its energy minister rushed out a statement pledging its "support" of the alliance.

Rumblings of discontent from the UAE do, however, illustrate the challenge Opec faces in a world where oil demand is increasingly seen as likely to peak within the next decade.

The UAE's expansion plan arguably takes on greater urgency as oil demand growth becomes less assured. Better to produce what you can now before everyone starts competing over a shrinking market.

© AFP via Getty Images

The UAE's oil production is also tied to its own domestic gas consumption, which was offered as one excuse for why the Gulf state initially shirked part of its share of production cuts this summer.

That resulted in a rare public rebuke from Saudi Arabia's oil minister, Prince Abdulaziz bin Salman, which may have ruffled feathers with an increasingly assertive leadership in the UAE.

The Gulf state is arguably in a stronger position than some of its allies if it does decide to maximise production, though it has been far from immune to this year's slump in prices.

Its economy is more diversified than Saudi Arabia's, with Dubai being a hub for commerce in the Middle East. But the IMF still forecasts that it needs an oil price of almost $70 a barrel to balance its budget, not far off the near $80 a barrel required in Riyadh for fiscal break-even. Brent is unlikely to average much more than $40 a barrel this year.

But if significantly higher oil prices are going to be difficult to achieve in the coming years, as many in the industry expect (Brent contracts for 2025 are still below $50 a barrel) then prioritising production volume over price may become more attractive.

The issue for the UAE is that if they were to break away, the likelihood of other Opec members ramping production at the same time increases dramatically. Saudi Arabia already showed in March what it was prepared to do when it briefly fell out with Russia over production policy, launching an all-out price war and flooding the market with heavily discounted barrels.

A conservative Gulf state like the UAE is likely to proceed cautiously, if at all. But as peak oil demand edges closer, it's hard not to see further strains emerging in Opec's cohesion. *(David Sheppard)*

Data Drill

Markets have been buoyant since positive vaccine news surfaced this month — and the biggest beneficiary? Out-of-favour oil and gas producers. The S&P 500 energy index has

risen 30 per cent, outperforming all other sectoral indices and the wider market since November 6, the last trading day before Pfizer and BioNTech announced their vaccine results. Brent oil is also up by about 16 percent, close to its pandemic high.

Power Points

- Battery life: the race to find a storage solution for a green energy future
- FTI axed by clients in fallout over oil industry work
- Propane supplies feel heat as Covid drives dining outdoors
- The CFTC names no culprits for WTI's negative trade in April
- Yemen's Houthi rebels claimed to have hit a Saudi oil facility in a missile attack

FT Energy Transition Strategies Summit

This year's FT Energy Transition Strategies Summit on

December 1-2 has the fingers on the pulse of the disruption in the industry. Apply for a complimentary ticket here to join our distinguished panel of policymakers, industry experts and investors as they discuss net-zero goals, the future of power markets, how the pandemic has reshaped the energy transition and more.

Endnote

Oil and gas companies risk alienating younger people unless they clean up their image.

That is the key takeaway of a new survey of 1,000 people in the early stages of their energy sector careers, published this week by the Energy Institute, a global professional membership body.

According to the findings of the survey, "The Generation 2050 Manifesto", almost 60 per cent of young people said they got into energy to tackle climate change. Most worry the world will not be able to meet the goals of the Paris climate accord and nine in 10 reckon their career puts them in a position to make a difference.

Steve Holliday, Energy Institute president, said the manifesto was a "fresh wake-up call".

> "It exposes the do-or-die conundrum facing many traditional energy companies. They will only attract the talent they need if they are responsive – and I mean with concrete actions – to the environmental and social demands of Generation 2050," he said.

Energy Source is a twice-weekly energy newsletter from the Financial Times. Its editors are Derek Brower and Myles McCormick, with contributions from David Sheppard, Anjli Raval, Leslie Hook and Nathalie Thomas in London, and Gregory Meyer in New York.

View comments

Latest on

Nuclear energy

EDF workers strike in France as plans to reshape energy group advance

December 17, 2020 10:53 am

Spanish companies vie for EU recovery aid, UK nuclear plans

December 16, 2020 5:00 am

EA's counter-offer gives Codemasters' board an extra life

December 14, 2020 6:49 pm

Britain must tread with caution on new nuclear

December 14, 2020 6:19 pm

UK enters formal EDF talks over £20bn Sizewell C nuclear plant

December 14, 2020 8:52 am

Latest from

Energy Source

Diamondback's Permian purchases: there goes the neighbourhood
December 22, 2020 11:30 am

Why no one is impressed with Exxon's emissions pledge
December 15, 2020 11:00 am

The distinctly unsexy energy job Biden should fill
December 10, 2020 11:00 am

What to make of Big Oil's emission pledges
December 8, 2020 11:15 am

Biden's climate agenda goes global
December 3, 2020 11:00 am