APPG on Small Modular Reactors

New Nuclear with IP3 and Moltex Flex

Date: 7th December 2022

Time: 13:15

Location: Room O, Portcullis House, House of Commons, SW1A 0AA

Attendees:

- Virginia Crosbie MP (VC)
- Liz Saville Roberts MP (LSR)
- Havard Hughes (Secretariat); (HH) and,
- Daniel Paterson (Secretariat)
- Michael Hewitt, CEO and Fonder IP3 (MH)
- Amanda Moslé Friedman, Strategic Partnerships, U.K., EMEA (AMF)
- Rupert Boswall, Former Senior Partner of City Law Firm RPC. Adviser to IP3 and advocate of new nuclear SMRs solutions to climate change. (RB)
- David Landon, Moltex Flex
- Matthew Houlsby, Madano (Moltex Flex)
- Sara Tracogna, Madano (Moltex Flex)
- Rich Deakin FNucl, MIET, ISCF Challenge Director – Low Cost Nuclear (RD)
- Alasdair Harper: Acting Deputy Director, Advanced Nuclear Policy & Delivery, BEIS (AH)

Virginia Crosbie MP (VC): Opened the meeting and set out the APPG's plans ahead of Nuclear Week. VC had met with the Prime Minister for breakfast and raised the important issue of SMRs at the meeting and sought assurances that Great British Nuclear (GB Nuclear) will cover gigawatt and SMR.

VC had also met with John Glen (Chief Secretary to the Treasury) in regard to funding. VC planning to meet with members of House of Lords re 'Green Taxonomy' in the coming weeks.

Havard Hughes (HH): APPG meeting today to discuss 'Next steps for SMRs in the UK', introduced IP3 representatives and invited them to talk about IP3 plans and how they see the future of nuclear power in the UK.

Read Admiral [Ret.] Michael Hewitt (MH): Thanked the SMR APPG for the invitation to address the APPG.

There was already a great deal of agreement on nuclear power; the importance of SMR. The question of SMR is tied to U.K. national security, to U.K. industrial base and to U.K.'s role on world stage. MH believes U.K. in a good position in regard to SMR due to Rolls Royce SMR programme. IP3 involved in U.K. market for past three and half years, developing solutions and tracking policy development on the question of 24GWh.

The Regulated Asset Base (RAB) has recently given IP3 some additional momentum to put together a private sector-led, government enabled, funding strategy. The positive decisions at Sizewell with

RAB and DCO reinforce the development work that IP3 wants to do with SMRs, and demonstrate the government's support for nuclear which IP3 believes will create opportunities to accelerate decision making in the U.K.

IP3 has put together a consortium of companies to form a development company that will focus on things that vendors and the sites are unable to; in many ways creating an infrastructure company that is recognisable to government and investors (private and institutional), putting forward a plan to develop, finance, and procure the first four SMRs in the U.K.

IP3 is not as concerned about vendors, so long as they are GDA approved. As Rolls Royce SMR is in GDA, IP3 sees a clear path to put forward a plan to procure the first four Rolls Royce SMRs. Regardless of site, IP3 believe starting with four SMRs is important in order to allow IP3 to attract investment capital and Rolls Royce to de-risk and provide confidence to supply chain partners.

The opportunity to bring in off-takers early on in a project, prior even to construction is there and IP3 have had conversations with two or three interested UK businesses.

VC: Could you update the APPG as to IP3's relationship with Rolls Royce SMR and how that is going to the next step?

MH: Relationship is a good one, aside from personal friendship with Rolls Royce SMR CEO, remain in close contact with them although the relationship isn't an exclusive one. IP3 see Rolls Royce SMR as an original equipment manufacturer. Met with Chairman of Rolls Royce SMR Board earlier in the day and they are supportive of IP3 efforts going forward.

VC: Did you meet with Graham Stuart yet?
AMF: Have followed-up with Mr Stuart but not yet met. Thanks VC for the introduction following Welsh Affairs Committee.

LSR: Raised the visit by Ministerial visit to Trawsfynydd by Baroness Bloomfield in November and the existence of the public sector (Welsh Government) development company for Trawsfynydd (Cwmni Egino). Would IP3 see a role for themselves with a public sector body operating Trawsfynydd along with Rolls Royce?

MH: Yes. Both Alan Rayment (CEO, Cwmni Egino) and Paul Foster (CEO, Solway Community Power Company) are critical in the partnership. IP3 focus, however, is finance and development but IP3 would have to partner with the likes of Cwmni Egino and Solway Community Power Company at the first stage. IP3 is seeking to create a repeatable model, allowing for the simultaneous development at more than one site.

VC: To Rupert Boswall, what does 'Advocate in the UK' actively involve?

Rupert Boswall (RB): Facilitating introductions to people with influence in England and potential financiers.

VC: How is that progressing?

RB: Progress is positive. Large part of the work is education around the differences between large scale reactors and SMR. SMR ought to be the quickest, allowing for rapid deployment to address power capacity concerns, with a two to three year build time.

VC: How important is nuclear inclusion within green taxonomy in the UK?

RB: It is essential. The key is state showing support at all levels, private sector money is there but it needs certainty that Government won't change its mind on support. This requires consistency from Government in terms of messages and policy, Green Taxonomy is important element in this.

MH: Adding to that, we have the important constituencies that allow a project to go forward (population, government, vendors, plus all the other stakeholders in taking a project forward) but the private sector have their own interests and ways of measuring the success of a project. It is important, therefore, when having conversations around such projects that the desires of this new constituency are accounted for in project planning (de-risking and ensuring return on investment).

Alasdair Harper (AH): Explained the role of Advanced Nuclear Policy & Delivery team in BEIS around designing policy framework to enable the commercialisation of SMR. Pleased to be invited to APPG to listen to evidence given and interested to hear views from around the table.

VC: To IP3, what more do you need to see from the UK Government to make this happen?

MH: IP3 has positive relationship with BEIS, first conversation with them and DIT was in January 2021 in regard to the national security imperative in industry and concerns over foreign power influence. BEIS later asked IP3 to brief HM Treasury.

The missing part is ensuring that other stakeholders (such as intelligence community) are included in the energy conversation, needs to move beyond traditional stakeholders. This is different to wind and solar, it is a national security conversation.

LSR: What should we be considering in relation to national security? References, former Vice Admiral talking about security for off-shore wind; question over long-term issue around security of skills base, raw materials, supply chain.

MH: Energy security and sovereignty are important components of a country's pursuit of its energy mix and we may have been over-emphasising decarbonisation over energy security. We have now shifted and the energy security paper gives us clear guidance that energy security matters. How do we define what that is?

1. Sovereign supply
2. An energy industry a country can rely on
3. Ability to create jobs and careers in and around energy sector
4. Important that tax-payer understands that energy security matters

A homemaker paying extraordinarily high energy bills, and that it being labelled as a national security imperative is unhelpful as the cost should, on that basis, be split between homemaker and government. What IP3 told BEIS was that an alliance approach is important when it comes to energy; UK/USA needs to work together, NATO is an important participant as are Five Eyes and other such organisations.

With respect to nuclear power, if UK does not have an industry that produces nuclear power, has the skills sets and supply chain, at a very high level of national security the UK is going to be diminished at the P5+1 level – the level that discusses nuclear weapons, energy and policy globally. If UK doesn't have a robust industry, it will be 'kicked out of the club'. This is an important aspect of UK decision making around nuclear power that may not be part of the economic argument. UK needs a nuclear industry that gives it a 'seat at the table' both in respect to non-proliferation and concerns around

Russia and China's dominance in this industry. If UK is just a customer of power, it doesn't get a seat at the table. The national security element is very important in terms of the industrial base. AUKUS deal is important, involving Rolls Royce in both Royal Navy and, potentially, Australian Navy, tying back to national security

VC: Introduced Rich Deakin

Rich Deakin (RD): Challenge Director for low cost nuclear. Collaborates and works with Rolls Royce and government policy officials to manage government investment to ensure that Rolls Royce do what they need to do in the current phase of the programme. Have been working with SMR's for six years and was previously with BEIS. Prior to this ran nuclear reactors for Rolls Royce.

UK almost at an inflection point of a binary decision; does the UK want to be considered a nuclear power with civil nuclear, or does it not? Rolls Royce is best positioned to deliver for UK if it decides it wants to remain at the nuclear table, the investment community believe that as well.

Great British Nuclear cannot come fast enough, whatever that means. Hope it means GW and SMR together.

Believes that the Rolls Royce programme offers design maturity and a 'pedigree' of 90+ reactor cores. RD was at Rolls Royce over a five year period when the company delivered three, so scale is already possible. Misconception that Rolls Royce tech is not mature.

Trust and certainty is key and three key questions that have not shifted in five years are; if a developer comes forward and wants to find and fund a programme,

1. what is the mechanism for doing that,
2. who do they talk to,
3. how will sites be made available?

We need to move this on, this needs to be at pace. Rolls Royce are expending a significant quantity of money each month, their board is not Rolls Royce Group it is Rolls Royce SMR and the two should not be conflated. They are not a bottomless pit.

Rolls Royce SMR are very close to having outline designs for a manufacturing supply chain. The question is what tips them over into the place where they are able to say 'yes, we will build'. Costings don't work and supply chains don't work unless you can demonstrate that you are going to commission four sites or more.

Rolls Royce have recently completed a siting study at four preferred sites; including Sellafield, Wylfa, Drax.

The Decisions on factory build and enabling that to move forward are probably at critical within the next three to six months to maintain momentum.

VC: Met up with David Pettie last night following BEIS letter last year getting access to sites. NDA do a great job of keeping skills in the sector as we're going to really need those.

RD: Separately asked through the Royal Society to talk to people about skills. At EDF last night talking to their head of skills and eligibility.

There are two constituent parts to this;

1. There is the skills for nuclear, core design etc.
2. Then there is the enabling of construction skills which is a volume challenge.

Message from EDF last night, don't force a solution when you don't have a definition of the problem yet. At the moment the only problem that the UK had is facilitating the construction and volume into Sizewell C.

SMRs are different type of labour force and constituency; factory build. This brings some opportunities because, once factories are sited, they won't move and will continue to operate and will become very efficient. With major (GWh) projects, this isn't possible in the same way.

LSR: In regard to the construction workforce, there was a concern about construction in the UK and with the Wylfa project there had been some serious workforce planning years ahead leading to the apprentices going elsewhere to finish their training. To what degree do you think that understanding of the density of workforce is needed and how they will move within the U.K. and how do we develop those skills locally?

RD: EDF have got a very granular understanding of the skills mixture to deliver GWh construction. So at least we have an understanding of the scale of the problem. There is a little bit of confusion in the landscape as to who would deliver what. There needs to be rational delivery focus.

There is going to be a challenge moving construction skills around between major projects because a lot of those skills sit in tier two and three sub-contractors, they have no affinity to the sector.

Question: is there a small core group that somehow retains that knowledge, allowing sub-contractors to come in quickly.

The volume of the challenge to SMR is different to GWa, maximum construction crew size on SMR site is 2000-2,500, around one quarter of a GWa plant. That does not produce the same 'boom and bust' situation.

VC: Thought it was 800 head-count rather than 2,500

RD: So far as understands it, 2,500 is peak construction, the smaller number may be related to factory manning directly employed in the supply chain off site.

VC: was due to ask at education questions next week about how we get these skills and the kids excited. Talking to David Petie and his team to get schools and teachers on-side.

RD: Wherever SMR/AMR work is done, there is a good opportunity to position them as part of the community. Rolls Royce are very good at understanding what the local demographic data looks like, seeing whether their recruitment profiles will fit.

MH: Human capital development is critically important but there is a difference between large projects that bring 20,000 people to a construction site on a boom-and-bust cycle. SMR can provide a much more career orientated workforce development. It isn't a project that takes ten years and 20,000 people, it's a manufacturing assembly project that is repeatable. Human capital is important but there is a value piece to SMR careers that is different from a construction crew on a large build.

RD: Nuclear skills academy in Derby is an interesting learning point; come through collaboration through local LEPs, University, Make UK came about essentially because the submarines business had a demand signal due to the AUKUS deal. That has allowed them to instantly create 200 jobs,

with 1,000 applicants for the first cohort. That demand signal is important for industry to step forward and start funding, rather than forcing skills development before there is an outlet in sight.

VC: The Welsh Affairs Select Committee would be in the states second week of January see AP1000 and also Last Energy. The SMR APPG was also thinking of going to Springfields.

Introduced David Landon from Moltex Flex (DL).

DL: Moltex Flex are developing an advanced molten salt reactor (AMR), picking up on previous points;

1. Skills, we are talking about solving something that runs to 2050, the eight-year-olds of today are going to be the people building AMRs in ten years' time. How do you inspire those people, how do you communicate that people can be involved in such an industry that could help save the planet.
2. How does the UK create sovereign wealth? We believe our reactor can deliver energy at £30 per MWh and heat at £8.00 per MWh, this would be half the price of gas in normal times. It is safe, with Molten Salt the fission gases remain as a salt. An analogy we use is; chlorine gas vs. sodium chloride, we all know what happened in the First World War with chlorine gas but we are happy to sit with sodium chloride on a kitchen tables every day. The UK has been reticent to pick up the baton on molten salt, possibly some old science is influencing that.

There are four companies in this field, Moltex Flex in the UK, and saying that they can deliver in the next decade with all the inherent safety. Providing low-cost energy and high temperatures essential to deep decarbonisation.

AH: BEIS AMR programme was focused on high temperature gas. This was where BEIS focused limited budget not a market down selection. BEIS didn't solely see AMRS as high temperature gas.

DL: The people with the best technology tend to be in a demanding position. My question is, does the UK want to be the place with the people in the top jobs. We used to do a great deal of research but we've gone into a bit of a lull. There is a real opportunity to be different, do we want to grasp that? Molten Salt is only one technology but it has huge potential and if we're not careful we'll lose it, having already lost AMR technology to Canada. How do we create the environment so that, if we're right on Molten Salt, that technology can flourish and do so in the UK?

VC: Simon Bowen had already said GBN will be technology agnostic, so – as to your point – hopefully that is good news.

DL: At the moment only 20% of the grid is clean. We need every viable tech to make it work in the future not just bits of it.

LSR: the waste question had not gone away. The challenge was the solution to energy security for the next 30 years. But then at the same time these were the enabling technologies to give us the skillset to go in to the future and into whatever could do with fusion, waste fuel and Molten Salt.

Ideally these were not contradictory. MPs had been talking about the potentials of technologies and needed to push them into the position of being realised.

Need to be at the cutting edge not wait for Canada to do something and be the buyer in not the exporter.

AH: BEIS had therefore argued that it needed all the tools in the toolkit, Nuclear, large and small, fusion, renewables. It speaks to bandwidth and delivery challenges. There is a lot that needs to be done.

How do we avoid cross competition?

How do we harness knowledge from the sector?

We need all of it and we need it to work together.

VC: What's your view on moving from operator led model to Government balance sheet and bringing in private equity and pension fund money?

AH: can't say what see in the next six months but there are unanswered policy questions.

The white paper was all developer led through utilities pulling developers into the market. We have seen mixed success with this.

The concept of GBN is in part of the response to this. The opportunities of utilities to be creating nuclear developers isn't there, so an entity was needed for the pipeline.

There was also a need for customer pull that was more than just technology vendors pushing. Until there were all of these entities there were going to be difficulties about correct risk allocation from the project. There was something about how one encourages a situation where the market could operate with new technology vendors for products but with customers who were wanting this energy for products such as grid energy or heat to the grid. The UK is not really seeing this big investment pool from the traditional utilities at the moment.

RL: Small Nuclear, whatever technology that is, is of an order of magnitude in application that is very different to GWA, therefore it opens up the possibility that you can contract a developer, it can create a customer case or attract an industry around small nuclear.

Financing Small Nuclear in the UK 2017 report gave structures and risk allocations for small nuclear projects. It was really very relevant and good to be there. It says you do not need a vertically aligned huge structure to run. You could have a private model and create many customers through private offtake agreements. The one thing would want the group and members to go away with was the different delivery model. This has brought out a bandwidth issue within Government, how to enable this other strand to go forward while also working on Gigawatt. Need to allow pathways to develop.

AH: BEIS will listen to the sector. If there were things that we should hear then tell us. Nuclear has cross-party support, so therefore the challenge of long-term certainty is soluble. This wasn't something which BEIS can expand on much further.

VC: How does BEIS co-ordinate with HMT colleagues?

AH: HMT had its responsibility of managing public finances. The UK is in a challenging fiscal period. HMT was making difficult decisions across Government. This was a function of the way that a democratic economy worked.

There will always be disagreements. Different departments had different objectives. This was a feature not a bug. It needed to come together through mutual agreement. BEIS will have robust conversation with Treasury, the important thing is what comes out in terms of policy in the end.

LSR: What were the critical statements which would engender confidence?

MH: what had been done in Sizewell with the RAB had attracted the private sector to the infrastructure project. A DevCo that is focused on a fleet of SMR's will attract early stage private sector capital to the development phase of the project. We have already done it. What you've done with the Energy White Paper had identified nuclear as clean and ESG friendly. So for institutional investors this was considered appropriate for investment.

Meeting closed at 14:00.