



3rd Floor North
200 Aldersgate Street
London EC1A 4HD
Tel: 03000 231 231

citizensadvice.org.uk

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Dear RAB Strategy Team

We are writing in response to your consultation on a Regulated Asset Base ('RAB') model for new nuclear projects. This submission is entirely non-confidential and may be published on your website.

The application of a RAB model to infrastructure assets is not new, and it has formed a durable and attractive way of financing a range of monopoly assets. But it has not been applied to nuclear generation before, and with good reason. The build time and cost overrun potential of this type of investment, and the ability to benchmark efficient costs, differ markedly from those of more formulaic investments like pipes and wires, creating significant risks to consumers were it used in this area. RAB is also most frequently used in relation to monopoly assets, whereas we have a competitive generation market in the UK.

The current investment regime for low carbon generation was established relatively recently, through the Energy Act 2013. This in turn was the culmination of an exhaustive four year process of analysing electricity market reform options that commenced with Ofgem's Project Discovery in 2009, transferring to DECC following the 2010 general election. As part of that process, DECC actively considered whether it should adopt a RAB model for low carbon generation. It concluded that it should not, and was critical in its assessment of the problems with that model, noting that RAB:

'transfers a construction risk, which generators are better suited to manage, to the consumer. It would represent the most fundamental change to the current arrangements of all the options; making such a radical change would be high risk. Moving to a RAB system would require the Government to sacrifice all market benefits and competitive pressures for greater efficiency, optimal operation and innovation that could be retained under other options considered as part of this project. The generation sector – where competition is viable and a key feature of the current market – is different to the natural monopoly market for the provision of transmission and distribution

networks. As such, the Government does not consider this an attractive option for reform.’¹

Those concerns remain pertinent. While the model put forward in your consultation tries to address some of the fundamental flaws identified in 2010, such as by trying to create efficiency incentives through gain/pain-sharing factors, the application of RAB remains particularly problematic to new nuclear. This is because new nuclear projects frequently suffer significant time and cost overruns. The RAB model would push these very high materiality risks at least in part from investors on to consumers - and consumers have no way to manage them.

BEIS’s determination to try and find new ways forward for new nuclear appears to be driven by its firm belief, stated again in the current consultation, that it is an essential, unavoidable, part of the pathway to decarbonising our economy. We find it plausible that new nuclear has a role to play, and certainly agree that any negative environmental implications of this form of power production are likely to be dwarfed by the contribution it could make to reducing catastrophic climate change. But several of the government’s own advisors, including both the Committee on Climate Change² and the National Infrastructure Commission,³ are less definitive on the case for new nuclear than it is. If new nuclear is an option rather than a necessity its economics come more sharply in to play, and they are challenging when compared to a range of other low carbon options.

Given the lack of consensus on need, and the risks associated with delivery through a RAB model, if the government wishes to take this option forward, we think that it needs to do more to explain its thinking and evidence base for reaching that position. We encourage the government to consider publishing a strategic business case for new nuclear so that all stakeholders can understand its thinking.

In the remainder of this response we address the six questions posed in your consultation.

Question 1: Have we identified a model which could raise capital to build a new nuclear power station and deliver value for money for consumers and taxpayers?

No, we do not think so.

¹ ‘Electricity Market Reform: Consultation Document,’ DECC, 2010. <https://tinyurl.com/yyznntz>

² ‘Net Zero - Technical Report,’ Committee on Climate Change, May 2019. <https://tinyurl.com/y4ttrpnx>

³ ‘Ministers must seize the “golden opportunity” to switch to low cost energy,’ National Infrastructure Commission, 10 July 2018. <https://tinyurl.com/y2rq6wjy>

While there are credible reasons to believe that a RAB model would reduce the cost of capital associated with bringing forward new nuclear power stations, these are outweighed by the risk of highly material increases in the volume of capital that consumers will need to finance.

The reason for this is that new nuclear projects frequently turn up late and over-budget. Sovacool et al found that in a global sample of 180 new nuclear plants, some 97% came in over-budget and that the mean cost escalation was 117%.⁴ Flyvbjerg et al found that in a sample of 194 nuclear plants the median cost overrun was 68% and the median schedule overrun was 40%.⁵ In 2008, EDF estimated that the cost of power from Hinkley Point C would be around £45/MWh (£48/MWh in 2012 prices).⁶ The eventual deal struck with government was around twice that price, £92.50/MWh (also in 2012 prices). EDF has just announced that the estimated construction costs of Hinkley Point C have increased by a further £1.9-£2.9 billion.⁷ The cost of the EPR project at Olkiluoto in Finland has nearly tripled, and construction is running ten years late.⁸ The cost of the EPR project at Flamanville in France has quadrupled, and construction is also running ten years late.⁹

The consultation document acknowledges the risk of cost overruns, but considers that these are outweighed by reductions in the cost of capital, that 'consumer savings would be robust to significant cost overruns or construction delays.' In support of that view, it cites NAO analysis suggesting that 'for a project with a WACC of 6% (nominal), costs could overrun by between 75-100% before consumer costs would be equivalent to that of a project with a WACC of 9% (nominal).'

That argument implies that a cost overrun of 75-100% is very unlikely to happen. But as the evidence we put forward in previous paragraphs highlights, overruns of that scale - or larger - are not unusual.

Under a RAB model, consumers would bear exposure to the risk of construction cost or time overruns, though how much risk is as yet unclear as the model consulted on does not define what (if any) risk sharing factors might be in place, the level of any Funding Cap at which risk is transferred from citizens as consumers to citizens as taxpayers, or any backstop provisions that might cap or reduce their exposure to costs. We touch on some of those design questions in later sections of

⁴ 'Risk, innovation, electricity infrastructure and construction cost overruns: testing six hypotheses,' Sovacool, Gilbert and Nugent, Energy 74, 2014.

⁵ 'Quantitative cost and schedule risk analysis of nuclear waste storage,' Budzier, Flyvbjerg, Garavaglia and Leed, 2018.

⁶ 'Hinkley Point C,' National Audit Office, June 2017. <https://tinyurl.com/ydfyamao>

⁷ 'Update on Hinkley Point C project,' EDF, 25 September 2019. <https://tinyurl.com/yxgye8s2>

⁸ 'Areva's Finland Reactor to start in 2019 after another delay,' Reuters, 9 October 2017. <https://tinyurl.com/y6mube2g>

⁹ "'Curse of Flamanville" strikes again as cost of EDF's reactor soars,' The Times, 10 October 2019. <https://tinyurl.com/y4q582xo>

this response, though the lack of detail on how many aspects of the proposals might be parameterised in practice severely restricts how detailed this feedback can be.

Question 2: Do you have any comments on the components of the Economic Regulatory Regime ('ERR') as described?

We agree that the ex ante cost settlement approach appears to be preferable to the ex post, though this should not be confused with supporting the model - it is the 'least worst' of the two options, rather than a good option.

The ex post option is likely to serve neither investors nor consumers well. Investors may well be spooked by the risk that significant unexpected costs incurred in construction could be disallowed by the regulator. This could reduce the profitability of the venture, or render it loss-making. This is likely to deter the types of low risk, long term investors who traditionally favour RAB based infrastructure investments. The risk of lower returns, or material losses, would also be likely to increase the cost of capital, undermining the perceived benefit of moving to a RAB based model.

Consumers are also likely to be badly served by the ex post settlement model. This is for two core reasons: the difficulty in assessing whether costs have been efficiently incurred, and the 'too big to fail' nature of the assets in question.

We have no economic regulator of RAB backed nuclear assets and one would need to be created. The cost of running it would need to be funded for the lifetime of whatever contracts were agreed. It is likely to have extreme difficulty in assessing whether overspend has been efficiently incurred because of the lack of available benchmarking data, given how few comparator projects there are. What comparator projects there are, if any, may be outside the regulator's jurisdiction and it may be unable to gather relevant cost information. Its ability to provide oversight on consumers behalf is therefore highly limited.

These projects are likely to be considered critical pieces of national infrastructure. As an example, Hinkley Point C alone is expected to meet around 7% of national demand, and future projects may be similarly sized. To date, the investor pool for new UK nuclear has been largely populated by firms backed by foreign governments, including those that we may need to strike trade deals with in the coming years, meaning that there are political as well as economic considerations at play. These factors would make it extremely hard for any regulator to take any steps that might result in the abandonment of a new nuclear project, even if costs

were to escalate significantly. This would dilute their ability to act in consumers best interests.

The ex ante option is more workable, though it currently lacks detail in a range of highly material areas, such as what sharing factors would apply and the level of any Funding Cap.

Our understanding of your description is that it would effectively impose mechanical sharing factors that would share any overspend, or underspend, between consumers and investors. These factors would be known upfront, and the regulator would not be called on to make any judgments on whether costs should be disallowed or not.

This might make it easier for investors to understand how the risk sharing factors would be applied, when compared to the greater discretion on gain/pain that exists under the ex post approach. But it does not follow that this approach will be seen as low risk by investors as that will depend on their perception of the likelihood that they will be exposed to the gain/pain-sharing mechanism, and on how much gain or pain is involved. If they perceive that they are at risk of pain-sharing - which would seem quite likely given the track record of nuclear cost overruns - this may increase the cost of capital, undermining the perceived benefits of moving to a RAB based model.

From a consumer perspective, the limited benefits are similar. While history suggests that the likelihood of projects coming in under budget is low, it contains a gain-sharing mechanism that appears to be absent from the ex post approach. Across whatever range of cost outcomes are exposed to the gain/pain sharing mechanism, there should be incentives on project developers to keep their costs down. It should be noted that this does not equate to a guarantee that costs will not escalate however - they have on many other nuclear projects despite the presence of incentives to keep costs down.

The extent both of consumer exposure to risk, and the strength of the incentives on the project developer, will depend heavily on how the gain/pain sharing factors are configured. For example, who bears most of the risk - consumers or investors? Is the exposure subject to caps/floors and if so where are they set? Are the sharing factors constant (linear) or are they sculpted (kinked) in some way that means the strength of incentives varies depending on the scale of under/over-spend?

Those factors are so crucial - the potential materiality associated with them is so gigantic - that it is not possible to provide support for this model without further

detail. At this point we would simply make the observation that economic theory suggests that risk is usually best allocated to those most able to manage it. Consumers have no ability whatsoever to manage any of the project risks associated with mega projects of this kind. Developers do. The starting assumption must be that the bulk of any risk should lie with the developers under this model.

Question 3: Do you have views on how consumer interests are protected under the proposed approach? What else should be considered to protect consumer interests?

Consumers are badly served by any model that exposes them to the construction cost risks associated with nuclear new build, given their high frequency and magnitude. An entirely laudable desire to reduce the cost of capital could easily be outweighed by any inflation in the volume of capital that consumers need to pay off.

As highlighted in the previous section, there are very material (£bns materiality) consumer implications resulting from how any pain/gain sharing mechanisms are configured. The absence of detail on the possible parameters that may be applied prevents more detailed comments, but they will need very detailed design work and further consultation as they are developed.

Consumer interests could be further protected by the inclusion of some form of Funding Cap that set an absolute limit on the revenues that could be recovered through bills, to protect them in the event of severe cost overruns. It should be noted that this would not reduce risks or costs, simply move them from bill-payers to taxpayers, but it would nonetheless mean that any such costs would be less regressively recovered. It follows from this that we would favour setting the lowest possible Funding Cap, i.e. that if cost overrun risks have to be borne by society, not the investors, then we think they should be borne in their entirety by taxpayers, not bill-payers. Clearly there are potential implications on the public balance sheet from any kind of Funding Cap or Government Support Package. The government's consideration of any detrimental impact on public borrowing would need to be carefully weighed against the detrimental distributional impact of pushing costs on to bill-payers instead.

While the consultation contains some theoretical approaches to mitigate against cost overruns it contains little to mitigate against time overruns. Late delivery would cost consumers money. They would have to fund alternative generation or demand reduction to fill the gap, while, under a RAB model, also funding the construction of the plant that has not turned up yet. The relative economics of the plant compared to any alternative provider of megawatts or negawatts will also be evolving, and may

have deteriorated. Under RAB, they are also paying in advance towards the construction of the asset, whereas for other generation they are only paying on delivery. This has impacts on affordability and on inter-generational fairness.

The pressing need for generation to turn up on time, particularly when it is being part funded in advance, means that it would be appropriate for the scheme design to include clear incentives tied to timeliness. This should include provisions to cancel or shorten the contract in the event of delayed delivery. It would also be appropriate to include explicit penalties or allowed revenue adjusters that kick in if project milestones are missed.

Question 4: Do you agree that consumer risk sharing could be value for money for consumers if it achieves a lower expected overall cost for consumers compared to a Contract for Difference model?

It has not been proven that this model would deliver a lower overall cost for consumers. This model has not been tested in the marketplace.¹⁰ Nor has it been impact assessed at all.

Further, the cost of capital assumptions are likely to be highly influenced by a wide range of regulatory contract parameters that are yet to be defined. For example, what the gain/pain-sharing factors are (see our answer to question 2), or how prompt delivery is incentivised (question 3). The more that mechanisms are put in place to mitigate consumer risk associated with overruns, the greater the likely cost of capital as these risks are transferred back to investors.

In summary, an argument can be made that the RAB model might decrease total cost to consumers if - and it is a big if - reductions in the cost of capital outweigh increases in the volume of capital and the effects of consumers incurring costs earlier than they would under a pay-on-delivery model. But it has not been demonstrated that this is the case.

Question 5: Do you have views on the potential way to design the revenue stream for a nuclear RAB model that we describe, and are there alternative models we should consider?

The intermediary body envisaged by the consultation appears to have considerable similarities with the approach taken for recovering and recharging liabilities for contracts for difference. As such, it appears to be a workable model.

¹⁰ The existence of RAB models for other types of infrastructure investment does not provide a reasonable precedent for its application here, because the likelihood and materiality of overruns is of an entirely different order to that which applies in, say, the delivery of transmission and distribution network infrastructure.

Suppliers having freedom to recover costs as they see fit is also a feature of the baseline for other energy policies, though as detailed elsewhere in this consultation it has a regressive impact when compared to paying for policies through taxation.¹¹ We have commissioned a piece of research considering alternative cost recovery mechanisms for energy policies, both bill and tax based. It was not available in time for the creation of this response, but we would be happy to share it with you in due course.

While the retail market is in a state of rapid evolution and the following may not therefore always hold true, it is currently the case that the principal acquisition product of most suppliers are fixed term, fixed price contracts. Because these do not allow for the retailer to re-open the price of the contract, they need to have confidence that they can supply the customer profitably (or at a manageable loss, if being sold as a loss leader) over the life of that contract.¹² That requires an ability to reasonably forecast what costs may become due. In so far as suppliers cannot predict costs accurately, this creates a risk that they either have to 'pad out' their prices to try and dampen that risk (resulting in higher consumer prices) or that they face a heightened risk of being unable to recover their costs (which may ultimately result in them going out of business). As such, a key design criteria when looking at how RAB revenues should be recovered is that it needs to be predictable and transparent to suppliers. We encourage you to work with suppliers, and with representative bodies like Energy UK, to consider the best model to do this. Your consideration should also include whether there are differences in the predictability of costs between the build and operate phases, and in particular for how market visibility is maintained on the likely timing of any event that may modify the RAB.

In addition, consideration should be given to credit and payment default issues. On credit, a balance will need to be found between the need to mitigate the risk that suppliers do not pay liabilities when they become due and the need to avoid over collateralisation, the costs of which would ultimately be borne by consumers. Noting that suppliers will be separately paying for other policy instruments, like contracts for difference, there may be value in pooling their liabilities so that credit needs to be lodged in as few places as possible. On payment default, we think there are some lessons to be learnt from recent issues with suppliers defaulting on their

¹¹ There is a real risk that those that cannot engage with the future retail energy market will face paying a disproportionately high burden of decarbonisation costs. Our recent report, Future for all, sets out some of the challenges that policymakers will need to tackle in order to manage the low carbon transition fairly. 'Future for all,' Citizens Advice, July 2019. <https://tinyurl.com/yvryy78o>

¹² This issue is also true for standard variable tariffs, albeit to a lesser extent. While the prices of standard variable tariffs are more easily changed than fixed-term contracts (albeit subject to their own constraints, such as abiding by any regulatory price caps that are in place, etc) there are practical reasons why frequently modifying the pricing of these tariffs is undesirable (increased call centre traffic, the need to notify every affected customer, etc) that could generate costs that are passed through to consumers.

payments under the Renewables Obligation. The need to settle those liabilities annually has resulted in significant bad debt building up, where suppliers are subsequently unable to pay. This could and should be mitigated by moving to quarterly or monthly payments. Any scheme design for nuclear RAB should seek to mitigate the risk that failing suppliers could build up significant bad debt.

The suggestion (in 64 (c)) that in operation payments should be linked in some fashion to the difference between a market reference price and the allowed revenue under the RAB appears sensible to us in providing signals to generate, particularly at times of scarcity, and has some parallels with the approach taken under contracts for difference of these only topping up the market price rather than wholly replacing it. In theory, this could mean that at times of high wholesale prices there are no additional payments to be made to the generator. Consideration should be given to following the CfD approach and requiring the RAB generator to pay back the difference in any time periods where the reference price exceeds the allowed revenue under the RAB.

Question 6: Do you have views on our proposed approach to assessing a new nuclear project under a nuclear RAB model and determining whether it is value for money for consumers and taxpayers?

BEIS needs to be more transparent in explaining its thinking on the strategic business case for new nuclear. It is notably more confident on the need for new nuclear than its advisors. For example, in your current consultation you indicate that new nuclear is definitely needed, noting that:

‘While advances in technologies, system flexibility and energy storage may eventually provide additional options for fully decarbonising the power sector, it is clear that a significant capacity of new nuclear power stations and gas-fired plants with CCUS, alongside renewables, will also be required.’¹³

But in its recent report on the route to net zero emissions by 2050, the Committee on Climate Change was less definitive, describing it as only ‘possibly’ needed:

‘Reducing emissions towards net-zero will require continued deployment of renewables and possibly nuclear power and other low-carbon sources such as carbon capture and storage and hydrogen, along with avoiding emissions by improving energy efficiency or reducing demand.’¹⁴

¹³ ‘RAB model for nuclear: consultation on a RAB model for new nuclear projects,’ BEIS, July 2019.

¹⁴ ‘Net Zero - Technical Report,’ Committee on Climate Change, May 2019. <https://tinyurl.com/y4trpox>

The first National Infrastructure Assessment, published by the National Infrastructure Commission last year, suggested that generation investment should pivot towards renewables and away from nuclear, noting that ‘in the longer term, an energy system based on low cost renewables and the technologies required to balance them may prove cheaper than building further nuclear plants, as the cost of these technologies is far more likely to fall, and at a faster rate.’¹⁵

Recent years have seen our understanding of how much renewable generation can be accommodated by the system, and therefore how much baseload generation is required, constantly confounded. The former CEO of the electricity system operator has described the idea of using large coal or nuclear plants to provide baseload as outdated.¹⁶ Increasingly other tools that provide flexibility, such as demand side response and storage, are providing, and will provide, alternative ways to manage the variable output of some renewables. This is not to argue that no baseload generation will be required on the system in future, but that the amount needed is unclear, and may well drop considerably.

Because of this, there is a need for BEIS to demonstrate the procurement need for new nuclear, if it wishes to proceed with further projects. This is particularly acute given the very limited pool of potential project developers, which limits its ability to test the market and drive costs down, and given the long track record of cost overruns detailed previously.

This strategic business case needs to be published before it makes any procurement decision, not after. In the case of the Hinkley Point C deal, the government’s value for money assessment was only published after the deal was legally binding and was initially extremely limited in its scope, running to only three pages. Even the more detailed value for money assessment, published nine months later, only stretches to 18 pages. For a deal that the National Audit Office estimates may receive £30bn in public subsidy over its lifetime,¹⁷ such a limited, late, explanation of the business case by the department was suboptimal. It is likely to have been a contributory factor to the public criticism that deal has faced. To improve public confidence in the value for money offered by any future bilateral nuclear deal, whether backed through a RAB model or any other, there needs to be greater transparency on the business case, and it needs to be made available at a time

¹⁵ ‘Ministers must seize the “golden opportunity” to switch to low cost energy,’ National Infrastructure Commission, 10 July 2018. <https://tinyurl.com/y2rq6wiy>

¹⁶ ‘Steve Holliday, CEO National Grid: “The idea of large power stations for baseload is outdated”,’ energypost.eu, September 2015. <https://tinyurl.com/y6x9b8hz>

¹⁷ ‘Hinkley Point C,’ National Audit Office, June 2017. <https://tinyurl.com/ydfyamao>

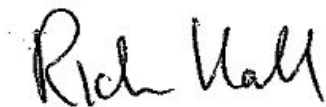
when meaningful public scrutiny is still possible (i.e. before the deal becomes legally binding).

Regarding the three specific factors that you identify as relevant to the value for money assessment, we note that the 'wider benefits' test is open to quite broad interpretation. It appears to envisage capturing the benefits of the project that do not relate to either tackling climate change or providing power - presumably alluding to issues like job creation and economic stimulus.

Those factors are relevant benefits that it is entirely reasonable for BEIS to consider in its decision making processes. However they are not benefits that accrue to consumers as electricity bill payers, but rather that accrue to us as citizens in wider society. Paying for policies through bills rather than taxes is widely acknowledged to be regressive - those in the lowest seven income deciles would be better off if the cost of energy policies were moved from bills to taxes.¹⁸ There are strong arguments for moving the cost of energy policies from bills to general taxation, and the case for asking electricity bill-payers to pay for benefits that have nothing whatsoever to do with the provision of electricity is particularly weak.

We therefore think you should consider whether any wider benefits that are found under the third test should be paid for through bills, or should instead be picked up by taxpayers. While this may not reduce the total cost of the project, it would at least result in a less regressive impact on those least able to bear the cost.

Yours sincerely



Richard Hall
Chief Energy Economist

¹⁸ 'Funding a low carbon energy system: a fairer approach,' UKERC, March 2018. <https://tinyurl.com/y4xbuxcc>