

## **RIO-2 Sector Specific Methodology Consultation Storelectric Response**

This is a very worthwhile consultation because it covers a broad remit: the challenges of the grid are broad and demand broad-minded thinking and changes; most others salami slice the challenges and therefore preclude imaginative solutions. This leads to an excess of consultations, with half a dozen or more in the last month or so between Ofgem, BEIS and National Grid, and fairly repetitive responses saying that they have missed the big picture and got it wrong. The repetitive nature makes it appear that the more we are consulted, the less we are listened to. More have been signalled. ESO consultations and reports tend to be all about process (about which I care little) rather than solutions / systems (which are fundamental to the future of the grid). And if I fail to respond to one, I'm told that I missed my opportunity to have my say – when do you expect me to do my day job? Am I meant to sleep some time?

Appended to this response:

- ◆ A 21<sup>st</sup> Century Electricity System (CSQ1, 62)
- ◆ Curtailment – the Tip of a Growing Iceberg (CSQ4, 44)

CSQ1 - your proposed approach.

1. Your salami-sliced approach is not conducive to designing a good integrated system.
2. You favour customers over the next 2-5 years, at the cost of customers after that. This is because typical supply contracts are 2 years, with possible derogations over no longer than the 5-year duration of RIO-2.
  - ◆ The cheapest way to deliver a 2-year contract is to patch up a fully amortised plant.
  - ◆ The following contract will be delivered in the same way, only it will be older and therefore more expensive to patch up and more failure prone, so costs rise for consumers in the medium term, and security of supply falls.
  - ◆ Eventually the plant will die of old age, too expensive to patch up; meanwhile, no replacement has been built and the grid is left with inadequate resources.
  - ◆ The cheapest way to deliver a 15-year contract is with a new plant - so while the electricity price during the first 2-6 years is more expensive, thereafter it's equivalent or cheaper, and the contract has financed the renewal of grid resources.
  - ◆ See the appended document A 21st Century Electricity System.
3. Contracts are of such short duration that, exactly as has happened ever since privatisation, almost no major new investment will be incentivised other than with bespoke (and therefore market-distorting) contractual structures such as CfDs, CATOs, OFTOs and ROCs. The Capacity Market has proved insufficient to incentivise new power stations, as it only covers a small fraction of their costs.
4. All innovation encouragement stops short of encouraging the introduction to the grid of large-scale innovations. There is no support of first-of-a-kind (FOAK) commercial-scale plant – especially pre-planning and pre-grid-connection-offer,

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when millions of investment are needed to get planning permission and a grid connection offer.

5. All contracts start soon after they are let, and the T-4 Capacity Market just 4 years after; whereas this is less time than is needed for a new transmission grid connection. Therefore there is not one single incentive for any major investment that needs a new grid connection, other than one of these market-distorting special arrangements.
6. There is no incentivisation of clean energy other than the carbon price which is prevented from reaching values that would de-carbonise the grid by the lack of matching carbon prices in the EU and in other sectors of the economy. This means that the grid will fail to de-carbonise sufficiently.
7. Connecting "the fuel poor" to the gas network risks converting them from electricity to gas as the emissions targets are dropping to a point at which they will have to convert back again. Therefore it is a short term fix that will impoverish them further.

The appended document A 21st Century Electricity System proposes (in outline) a regulatory structure that can simultaneously:

- ◆ Incentivise major capital investment;
- ◆ Control electricity costs;
- ◆ Incentivise greenness of electricity generation;
- ◆ Enable private finance to fund FOAKs;
- ◆ Level the playing field between different technologies;
- ◆ Improve grid resilience and energy security;
- ◆ All without a penny of subsidy.

All this is not just theoretical: we would have had 40MW / 200MWh storage built and trading 4 years ago, with further plants (probably abroad, as there are no UK long term contracts) either built or under construction in the range from that to 500MW / 2.5GWh. The only thing that has prevented us building our first is lack of support from BEIS / NG / regulations / contracts. The same applies to other companies of which I am aware, some of whom have gone out of business because the situation has gone on for so long, and countless investors have cited the inability to mitigate commercial risk as the sole or principal reason for not investing.

CSQ2 Yes, but they're just a re-phrasing of the Trilemma. The Trilemma is not dead. Even if it's being delivered, it needs to continue being delivered of the network will go even further out of kilter than it is.

However "the needs of consumers and network users" should include those of tomorrow: best to split this into two, the first part having a timescale of 1-5 years and the second a timescale of 20-50 years.

CSQ3 Yes:

1. The introduction of FOAKs at full commercial scale.
  - ◆ For technologies that can operate at both distribution and transmission scale, FOAKs need to be built at both to ensure that scaling issues are

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overcome. For this a definition would have to be introduced whereby a qualifying transmission scale FOAK is at least 5 (maybe 10) times the scale of the distribution scale FOAK.

2. The renewal of the grid.
  - ◆ Enough has to be built to keep pace with expected life cycles of all parts of the grid, as well as to keep pace with the grid's evolution.
3. The needs of consumers and network users" should include those of tomorrow: best to split this into two, the first part having a timescale of 1-5 years and the second a timescale of 20-50 years.

CSQ4: No. The framework is too short-term, not rolling (so half-way through the 5-year period the maximum derogation is 2.5 years), insufficiently supportive of clean energy / investment / FOAKs / new technology, insufficiently adaptive to constraints such as grid connection time, requires major subsidies and market-distorting ring-fenced special instruments such as CfDs, ROCs, CATOs, OFTOs etc. and even without considering these is already costing over £2bn p.a. in overt and covert subsidies, forecast to double within 5 years – see the appended document Curtailment, the tip of a growing iceberg.

Moreover, the framework is predicated on letting individual contracts for individual services without reference to other contracts. This adds greatly to the costs of balancing and ancillary services because most facilities depend on a stack of revenue streams for their profitability. A facility needs to bid high because it cannot guarantee other revenue streams within their stack, so they must play safe. And even if they already have the other revenue streams, that means that those streams' contracts will expire during the course of the contract for which the new bid is being constructed, and contracts may not subsequently be won for those other services, so the present contract will have to take a disproportionate financial load. Moreover, some services are enabled by others; for example if we were to win a contract for inertia (vastly better than EFR, though you refuse to pay for it), then we could deliver (for example) natural reactive power/load and primary frequency response because we're already synchronised; if we don't win a contract for inertia, then we can't provide primary FR at all and would have to charge very highly to offer reactive power/load. Much better: let the most difficult contracts, then see what else those winning plants can offer cost-effectively based on the fact that some of their stack is already being delivered; then put any remainder out to public tender.

You should create a paid-for contract for natural inertia to reduce the cost of providing a stable grid, and to improve the stability of the grid. EFR requires grid monitoring, identification of an issue, polling which facilities have the capability to respond in the right locations, selecting facilities to respond, sending out a signal, the facility receiving and responding to that signal. All this means not only an administrative and operational burden, but also a delay of quite a few milliseconds – in other words, a spike. Natural inertia needs none of this, meaning that if paid for at the same price as EFR, it delivers a vastly better service; and, as side benefits, delivers (for free) natural reactive power / load, phase locked loop support etc.

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CSQ 5: Price Control Deliverables (PCDs) must take into account grid connection time, which may not be pre-determinable and is certainly not in the gift of project developers. Therefore they should allow flexibility to reflect any delays and long lead times.

- ◆ Plants are very difficult to build without a measure of long term revenue certainty at least sufficient to cover the cost of capital for the entire project.

If PCDs are not implemented in the hope that better technologies will turn up in the meantime, then you are sacrificing the good on the altar of a vague and aspirational “best” that may never turn up. That is the fallacy that has driven governmental, regulatory and National Grid refusal to engage in suitable incentivisation of major new technologies and their FOAKs, which in turn is why all new large-scale technologies introduced to the UK grid have been either developed or financed overseas.

- ◆ This is gradually destroying British industry and inventiveness in solving grid-scale challenges, while our grid infrastructure ages and deteriorates, losing resilience as the entire focus is on short-termism, squeezing maximum utilisation from existing assets to avoid upgrades and investments and therefore make the grid less able to cope with developments that don't fit in with forecasts.
- ◆ Hence, for example, the inability of the grid north of Preston and in Scotland to cope with all the proposed wind assets; or west of Bristol to cope with solar.
- ◆ Hence too creating vulnerable choke points such as Connah's Quay which takes traffic from Wylfa, Dinorwig, the Hunterston interconnector, the Moyle interconnector and the southern Irish Sea wind farms, and then has only two transmission lines through which to send all this southwards – while HS2 can't get a grid connection within 25 miles and has to build its own private wire to Cellarhead.
  - ◇ Better to build a third grid line through Cheshire, and to have some by-pass Connah's Quay for resilience purposes. I'm told that there is an even worse congestion point north of Preston.
- ◆ And next winter will be the first time we will ever have insufficient domestic dispatchable generation to satisfy forecast demand, according to two scenarios of FES 2019 (and the other two by the following winter) if de-rating of capacity is applied.
- ◆ And why we're seeking to build gas-fired plant to balance renewables instead of large-scale long-duration zero-emissions storage, despite the carbon budgets that will make any new gas plant obsolete after 10 years or so of operation.
- ◆ And why National Grid is totally reliant on interconnectors to satisfy demand even though:
  - ◇ The energy transition plans of most of our neighbouring countries rely (sooner or later) on imports during times of system stress, most of which are concurrent with ours;
  - ◇ Weather patterns (e.g. the sun going down on a windless winter evening, and longer term weather patterns) kill imports through interconnectors as our neighbours need the energy;

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- ◇ In any case interconnectors can only carry uncontracted capacity to respond to such system needs, whereas they try to contract all their capacity and have none to spare;
- ◇ The only two things that stop our neighbours telling us “I don’t care how much you will pay, our consumers are more important than yours at any price” are the single market and the European Court of Justice, both of which are red lines that we’re Brexiting.

No question (table, p28): Targets must be static, because businesses cannot play efficiently on a moving playing field. But it makes sense to have dynamic bonuses that can be evaluated after the event based on the extent to which the supplier delivers additional benefits that are wanted by the operator. If the playing field were moving, then the company would have to do what it things best, and hope ... which is not a good basis for good management decisions or for investment – and would result in the companies charging premium rates for their services just in case.

CSQ6, 7: They should be encouraged to proposed modifications to their output measurement / reward regimes, and such modifications should be trialled in one region, but thereafter they should be adopted / adapted / rejected in all regions. We should not get to a point at which each region delivers different things through their grids, and thereby evolve apart – unless there are strong technical reasons (such as Manweb’s loop-type grid).

CSQ8: No – 5.0: Companies should not only have “ambition and cost-effectiveness” in their plans, but also other measures such as:

- ◆ Resilience (operational);
- ◆ Flexibility to accommodate significant variations from the forecast supply / consumption, e.g. different penetration / distribution of EVs and renewable generation;
- ◆ Cost-effectiveness for consumers 20-50 years hence.

CSQ8: No. Current plans ignore future plans of businesses and should be compelled to take them into account even if with a scaling factor to reflect the operator’s judgment of the probability of implementation. For example,

- ◆ TEN-E Regulation requires the grid operator to ensure that all Projects of Common Interest are implemented, yet no storage PCI is reflected in National Grid’s plans;
- ◆ The example above (see response to CSQ5) is an excellent example of this failure;
- ◆ Lack of early engagement with onshore wind and solar developers resulted in grid overloads and constraints in many places;
- ◆ Failure to upgrade the grid proactively adds both cost and enormous lead time to the projects – grid connections are the longest lead time items for Storelectric’s electricity storage, accounting on their own for well over half the total project lead time; if you want more responsive investment, then you need to build the grid more proactively.



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CSQ9: As long as the coordination of all gas and electricity grids is included in “narrow”, then narrow is best. But there needs to be awareness of broader developments, e.g. greater understanding (currently very poor) of the effects of EV and autonomous vehicle roll-out.

CSQ10: The poor awareness of EV roll-out is such that NG has told me that fast-charge vehicles would make them more controllable for DSR and therefore reduce the load on the grid. No awareness was shown that the same amount of energy is needed overall, and such controllability will merely give rise to huge increases in load at the lowest voltage end of the grid, as much larger currents are switched from one charge point to another.

The poor awareness of autonomous vehicle roll-out is such that NG has told me that they would mean fewer vehicles on the road and therefore less mileage. In reality mileage would increase rather than decrease, as the vehicle needs to travel (empty) between drop-off and pick-up points.

Ride sharing is blithely accepted as inevitable and huge without considering people’s wish for privacy, the dangers of isolating very small numbers of strangers (un-supervised) in close proximity to each other for long periods, or the many human-rights dangers if everyone needs to be background-checked before travelling.

No question, 5.21: “Companies that fail to demonstrate that they are meeting minimum requirements should face a consequence” – one compelling reason why targets need to be fixed, ref. comment above on No question (p28).

No question, 5.23-5.26, innovation (or is this part of CSQ 11-18?):

- ◆ Ofgem should set up a function to manage innovation that does not fit simply within any operator’s remit for innovation funding, e.g. cross-sectoral, generation, energy storage. If suitable operators take them on (e.g. a collaboration between a gas and an electricity DNO, then they manage it; otherwise Ofgem manages it and the DNOs’ priorities may not be delivered (which is an incentive for the DNOs to agree), and Ofgem charges the DNOs for both the project and the management of it. Any innovator should have a right to pitch to Ofgem if rejected by DNOs, and such rejection should not count against them in Ofgem’s assessment.
- ◆ The requirements for the Operators to own resultant IP, or for it to be put into the public domain, is an enormous disincentive for innovators to engage with such innovation funding. IP should remain with the innovators. There is a role for publication of data, but it should respect innovators’ IP.

CSQ 11-18: no comment.

CSQ19, No. All these approaches to asset investment and resilience are financial. None of them related to resilience per se, none to the needs of tomorrow, none to determining and accommodating proactively the future plans of developers; none to

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the ability to accommodate errors / evolution of forecasting, ref. comments above on CSQ 1, 2, 4 and particularly 8, 10. To this extent, they are designed to fail.

CSQ20: no comment.

CSQ21: Your definition of NARM has a number of failings, including:

- ◆ It's a statistical average, and does not accommodate actual events / variations between plan and reality such as summer minima, extreme weather events, higher- (or lower-) than-predicted roll-out (both overall and in different areas within the region) of diverse technologies (e.g. distributed generation, EVs, conversion from gas heating to heat pumps) or other measures (e.g. insulation), the fact that in extremis all distributed systems rely on the grid for back-up – so what happens to the grid if such back-up is called upon simultaneously in most places (which is a realistic scenario, e.g. weather-related exhaustion of local storage will occur simultaneously throughout the network);
- ◆ It focuses on the cost to the network company, not on the cost to consumers or the opportunity cost of developments that have been disabled by the lack of proactive planning and investment – this should be a very major element of such remuneration.

Instead, remuneration should depend on the ability of networks to accommodate the above data. A measure (with associated financial figure) should be put on each, regardless of costs, so the networks would undertake all works with a marginal net benefit. A minimal network operational cost (i.e. excluding grid planning, which should be set against the investment revenues) should be added to this. Then all operational failures would lead to charges against this revenue. The net result of this is that the total remuneration of the operator is highly dependent on both operational performance and grid strength.

CSQ22-25: No. See responses to CSQ8, 19, 21.

CSQ26: The approach outlined in the above would render such ring-fencing unnecessary.

CSQ27-31: No comment.

CSQ32-34: Your approach to cyber security is inadequate, developed before there was proven intent by malicious enemies (both state and non-state actors) to take down the internet, and to keep it down. You should require all plant to be operable manually without use of any internet and on independent communication systems. Key equipment should be totally isolated from the internet to prevent hacking – no amount of passwords suffices these days. And sanity checks should be implemented for all requests for service: one way to take down a network is to provide unreasonable requests for service analogous to the flooding of websites with spurious queries.

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CSQ35-38: All spurious because the timescale of the contracts is completely inadequate to incentivise major capital investment, refurbishments, modifications and upgrades. And if you don't do this, then either you need to put in place a plethora of market-distorting patches (CfDs, ROCs, CATOs, OFTOs and still we need more because they're not delivering the new generation, network assets, EV charging infrastructure, distributed generation connections, new transmission lines / connections or large-scale long-duration storage that the country needs) or you are just reordering the deck chairs on the Titanic. We are not investing at a rate that even remotely resembles the rate of investment to keep the grid from aging year-on-year and therefore becoming increasingly decrepit. And by sweating the assets so much, we do not have the grid resilience to accommodate slight deviations from forecasts without imposing enormous cost and time constraints on new developments as the grid has to be extended reactively rather than proactively – witness the vast majority of locations on both transmission and distribution grids that are either orange or red in terms of capacity for new grid connections. This actively prevents the implementation of the more forward-thinking technologies too, locking us even further in the past.

CSQ39: No, and sweating the assets is highly prejudicial to our future – see comments on CSQ 4, 5, 19, 21, 35-38). It is only partly true that “the future needs of the energy system are to some extent always uncertain” (7.15). For example (ref. 7.20), we don't know whether heating is going to be transformed towards hydrogen or heat pumps, but we do know that both require vast amounts of electricity for which the grid is not being prepared. We don't know exactly which electricity technologies are going to become widespread in homes (e.g. distributed generation, EVs, heat pumps), but we do know that all of them require vastly reinforced distribution networks which are not being built. Therefore we are planning to fail by falsely pleading ignorance. Low-demand scenarios can be completely discounted because almost all distributed systems retain their dependence on the grid during times of system stress when their resources are exhausted, which will usually occur concurrently for a large proportion of such distributed systems, which throws their entire demand back onto the grid and catapults them back into high-demand scenarios; we need a grid that can cope with this, and which is paid for by insurance-like network charges to distributed systems.

CSQ40: Yes, we're going in the wrong direction. Hurdles should be lowered, not raised. We are causing all kinds of problems for the future – and for the present, see comments on CSQ5 for particular examples, and CSQ39 for general ones.

CSQ41: All new network lines and substations, at least. All enabling technologies for greater capacity.

CSQ42: By forecasting them better – making reasonable forecasts of different scenarios, then upgrading the grid proactively to accommodate ALL of them and socialising these charges, reclaiming only the share of the capacity of such upgrades that each new development consumes. And by considering that storage adds to capacity rather than consuming it.



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CSQ43: The proportions between business as usual and other work need to be changed substantially. All maintenance should be business as usual. All upgrades (subtracting the maintenance avoided) and new build should be socialised, a proportion of which is reclaimed later in proportion to the capacity consumed by the asset as per comment on CSQ42.

CSQ44 No. It won't happen (network companies funding more innovation out of business-as-usual funds), because the companies involved are not only risk-averse and heavily penalised for taking risk (if it goes wrong), but also because they earn much more by driving through business-as-usual. For example, rather than enabling large-scale long-duration storage, the industry blackmails the government into creating the Capacity Mechanism subsidy and allowing more covert subsidies (see the appended Curtailment – the Tip of a Growing Iceberg) to pay for more business-as-usual. To get innovation into the system Ofgem / BEIS needs to incentivise not only the innovation but also (more importantly) the FOAKs. If NIA/NIC is removed, then the burden falls on InnovateUK whose budget would not be increased correspondingly.

CSQ45: No. The IRM is even more important than NIA/NIC: there is almost no InnovateUK funding for FOAKs, and private money will not repay it. Private finance sees three main types of risk: technical, commercial and regulatory. They can accommodate two of the three, but not all three. We have probably the world's fastest-moving regulatory system, so this is high. Technical risk is defined by them as whatever has never been done commercially before, and often "... before in the UK, widespread"; therefore this is high. So the only way to get private money to support FOAKs is to vastly reduce commercial risk; IRM is a means to do so.

But currently storage is excluded from IRM, as are some other technologies. This is madness, as such technologies are needed. A similar Ofgem-managed action (as described in comments on 5.23-5.26 above) is needed for IRM.

CSQ46: "A sharper focus" (8.24) usually means a smaller budget and/or a narrower remit, which is folly: what is needed is more innovation and roll-out (not reducing the budget), which is more innovative and therefore less able to be compartmentalised – and which will over-flow the boundaries of such narrower remit.

There are other reasons why innovations are not funded, beyond those defined as BAU (8.25), particularly commercial risk (see comment on CSQ45). Companies need to be given support to implement their solutions, even if many of the benefits accrue to the company: unless they are helped to do so, the grid (and British industry as a whole) misses out on the benefits of these innovations: security of supply, cost reductions (both direct and indirect), decarbonisation, employment, exports...

CSQ47:

There should also be a mechanism for seeking innovation and roll-out support other than competitions (8.28). The competitions are excellent for prompting / discovering

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innovations relating to a given challenge; other equally (or more) beneficial innovations also need access. And competitions require the innovations to be ready to a threshold level of development at particular dates; companies don't work that way, rather they develop the innovation to a level and then need support at that time.

Nor should collaboration between network companies and with other parties be a requirement or constraint (8.29): if an innovation is worth supporting, then it is worth supporting; if it then works, it will be adoptable / adaptable in other networks. The bigger the collaboration, the slower and more bureaucratic / costly the project, leading to designing camels (a horse designed by a committee).

Limiting the size of the projects (8.31) is completely wrong: if a larger innovation is worthy of support, then it's worthy of support. By imposing an artificial and arbitrary limit on project size and funding, then you impede the development and implementation of big solutions to big challenges, of which there are many. Better would be to have a flexible ceiling on total innovation funding by the industry, recoverable in network charges, so that all worthwhile innovations are supported. If the expected budget is exceeded, then the excess can be recovered the following year – maybe with a CPI inflationary uplift.

Innovation funding should be raised equally from distribution and transmission customers, as all benefit. It may be possible to allocate some projects between transmission and distribution, but (a) many would blur the boundaries and (b) improving the transmission system benefits distribution operators / customers indirectly and vice versa, ditto system improvements benefiting network operators and vice versa; therefore there should be an equal percentage levy from all system operators and network operators.

CSQ48: There is certainly an ongoing need for NIA. Difficulty in tracking and evaluating benefits is not an appropriate problem to cite: if the innovation has the potential to benefit the system / operation etc, then it should be supported regardless of the ease or difficulty in putting those benefits in terms of pounds and pence.

However it should be combined with NIC to form a single innovation pot: there are many projects that would fall between the two stools, and one could envisage a single project being rejected for NIA as it uses existing technologies and also rejected for NIC because its use of them is too novel.

CSQ49: All innovation should be financed by a flat percentage of company turnover of all network and system operators, on both distribution and transmission grids – see comments on CSQ47.

CSQ50:

There should be no drive to increase third party involvement in network innovation (8.43-44) or other network operators: each project should have the partners appropriate to the project, and no more. See comments on CSQ47, especially in relation to camels (horses designed by committee).

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Early-stage innovations should be funded / supported (8.45), and funding / support should continue through to commercial FOAK construction / implementation.

We agree with direct third party access to Ofgem administered network innovation funds (8.46): see comments on 5.23-5.26 above:

Ofgem should set up a function to manage innovation that does not fit simply within any operator's remit for innovation funding, e.g. cross-sectoral, generation, energy storage. If suitable operators take them on (e.g. a collaboration between a gas and an electricity DNO, then they manage it; otherwise Ofgem manages it and the DNOs' priorities may not be delivered (which is an incentive for the DNOs to agree), and Ofgem charges the DNOs for both the project and the management of it. Any innovator should have a right to pitch to Ofgem if rejected by DNOs, and such rejection should not count against them in Ofgem's assessment.

While it is right for network companies to publish collective innovation strategies (8.48-49), they should be equally free to consider innovations that do not fit neatly into these strategies to avoid the risk of groupthink compromising the development / introduction of radically different solutions.

If NIA / NIC (8.50-8.51) is considered a single pot, levied as a single percentage of turnover (see comments on CSQ47-49), then the overlap of regimes becomes irrelevant except inasmuch as the financial contribution of DNOs during the overlap period may differ.

The ESO (8.52) should contribute the same percentage as all other operators as they benefit from innovations on the various networks.

CSQ51: See comments on CSQ45-50 above. Competition should only be one of the means of accessing funds, see comment on CSQ47. CATOs and SPVs are not sufficient mechanisms for all innovations at late stage: there are many innovations that don't fit into such structures, and many companies who would be repelled by them.

CSQ52: Late competitions (8.68) are inappropriate. If they have secured planning permission, deserve funding and would not otherwise be built, then they should receive support / funding without competition.

If the network company were to get the planning permission, then it is appropriate to run a competition for construction and operation which may include ownership. But if another company gets the planning permission, then their project should simply be judged on its own merits. (8.69)

CSQ53: Assessment criteria should be flexible and allow for judgement, especially where benefits are difficult to quantify adequately, or when the stage of the innovation is early enough for there to be significant uncertainty as to the outcome

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and benefits. They should be justifiable after the event, but the justification should be qualitative as well as quantitative. The grid itself (and Dinorwig) would never have been built if the only criteria had been quantitative. Novelty is a subjective item: it can be a novel application of existing technology or using a new technology / method to do existing things; it may be transformational or incremental and even obvious when explained (though not previously implemented). Separability should not be a criterion at all: if it's beneficial, it's beneficial. High value should be qualitative as well as quantitative, and value should relate to cost of EITHER development OR implementation / roll-out. It is absolutely wrong to state that "tenders for projects valued at or above £100m are likely to attract significant market interest": in our long experience these are the hardest to fund if there is any innovation in them – see comments on CSQ45.

CSQ54: No. All sectors should be encouraged / permitted. The best innovations come from out-of-sector, e.g. the best electric automotive solutions came from non-automotive producers, the best nanosatellite systems are derived from mobile phones.

CSQ55, 56: There should be a mix of competitions (for specific identified needs that are not otherwise being addressed adequately by ongoing innovations) and non-competition applications, as per comments on CSQ47.

CSQ57: No comment.

CSQ58, 59: As per all comments on innovation, above (CSQ 45-54).

CSQ60: Partly. Competitions should only account for a fraction (maybe a substantial one) of the innovation funding. The majority should be available as discretionary awards that are justifiable and justified after the event, available to all but in response to applications outside of competitions, by companies and innovators. Useful and beneficial innovations are not constrained by one competition-running authority deciding beforehand what is beneficial; nor are they constrained by such exact designs or by such timetables. The rightful purposes of innovation competitions are:

1. To catalyse innovation to address issues that are not currently being addressed by innovation;
2. To judge between innovations in a field in which numerous companies are innovating.

In the first, the competition's purpose is evident. The second should NOT be triggered by an out-of-competition enquiry as this would add 6-12 months' delay to the funding; but if an innovation is rejected by an out-of-competition enquiry, then it should remain eligible to bid competitively as they may address the concerns in the meantime, or they may remain (one of) the more advanced solution(s). If different feasible approaches to a solution are identified within the competition they should all be funded because (a) it is unknown which will succeed, and too early to choose; (b) more than one may succeed and find that each is optimised to different usage cases;

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(c) if more than one succeed and they compete directly, costs are kept down in the subsequent procurement. Therefore competition budgets should be flexible.

CSQ61: No, because that is not the proper role of Ofgem. Your role is not to restrict profitability, but to deliver a high-performing, value-for-money grid for consumers both today and in the foreseeable future (up to 50 years).

1. The proposal appears to be riven through with the Communist attitude that profits are evil. The Soviet Union collapsed, and China only started growing when it embraced capitalism. I had thought that we were considering markets and market incentives, which are capitalist and profit-driven.
2. Forcing competitions through business plans will merely slow innovation by adding layers of bureaucracy and an additional 24-month cycle (6 months to write the plan, one year of validity, 6 months to implement it) to the innovation process which will greatly impede innovation and reduce interest among industry.
3. The proposal will further disincentivise network companies who are already disincentivised in the latter part of a RIIO period by the fact that they can recover the benefits over so few years.
4. With a mere 5-year RIIO period, assuming that R&D takes a year, and the competition takes a year to organise and determine, there are only 3 years' benefits left, into which the time taken for roll-out will eat very severely; half-way through the 5-year RIIO period there is no time at all to recoup benefits.
5. Recovering costs through Totex assumes that the competition is for roll-out implementation, not for research and development and trial implementation; if it's for roll-out, then that should be the procurement process not NIA/NIC funding.

By tying yourselves to a principle objective of trying to drive down profits, you drive down share prices and increase the cost of capital, which in turn drives down profits or increases charges to consumers.

Instead of micro-managing forecasts and profits, the role of Ofgem is to manage outcomes such as:

- ◆ Grid performance / resilience
  - ◇ Under different scenarios, e.g. after sunset on a windless winter evening; *kalte dunkel Flaute*; summer minimum
  - ◇ Under different deviations from forecast demand / supply patterns
  - ◇ Faults, fault conditions, mitigations and recovery
  - ◇ At 10-year intervals from this year to 50 years' time (as grids need to perform well for over such horizons) under each of the above scenarios and deviations, with slightly decreasing weight given to later decades as there is increasing time with which to undertake corrections to the physical grid
- ◆ Robustness of outcomes of forecasts (such as Future Energy Scenarios) – evaluated after 5 years and penalised if too many assumptions prove to have been too far out (this will stop them making ridiculous assumptions such as about the roll-out of nuclear and CCS; and incentivise them to ensure that their



## Grid-scale electricity storage using an innovative form of Compressed Air Energy Storage



forecasts happen, such as the implementation of storage at sufficient scale and duration)

- ◆ New grid connections
  - ◇ Speed of implementation
  - ◇ Availability of capacity when applied for
  - ◇ Ability to give firm connections to those who want to pay for them
- ◆ Imaginative problem solving
  - ◇ Innovation and the implementation / roll-out of innovations
  - ◇ Trying out different grid management / control / monitoring / maintenance methods

CSQ62: Competitions and non-competition funding should be for R&D, including trial implementation. Network companies should be required to undertake it, and fund it, against an allowance which is a fixed percentage of their revenues which has to be spent on it or deducted (with interest and a penalty) from the following year's / period's revenues / network charges. If the company is not using it wisely, Ofgem should take over – and charge not only an admin fee but also a similar penalty deducted from the following year's / period's revenues / network charges. which is not recoverable from the network company's assessment. Inasmuch as Ofgem runs its own projects that don't fit neatly into a network company's remit (see comment on CSQ50), then it should recover those costs without a penalty.

Network companies should also be incentivised to come up with additional non-financial support that helps innovations, e.g. enforceable letters of intent to buy the services (see A 21<sup>st</sup> Century Electricity System, appended); bilateral contracts. These should greatly reduce the overall cost of R&D, freeing up significant sums for further R&D.

CSQ63: A very poor idea in which you're appearing to kill all R&D and trial installations, and turn what should be standard purchasing practice into NIA competitions with additional bureaucracy, incentives to frigate the system and disincentives for network companies.

CSQ64: Why don't you ask about the ESO and the DSOs? Yes, like the GSO they should incentivise / run innovation initiatives, both competitions and non-competition. DNOs should transfer a portion of their innovation funding to the SOs.

The ESO should only have any gas-sector responsibilities inasmuch as a competition crosses the boundary between electricity and gas in which case the innovation should be managed by a collaboration of the ESO and the GSO with one of them (by agreement – it will usually be obvious which has the larger role) taking the lead – or it may be better to have these done within the Ofgem-supported innovation group, to keep clarity of objectives.

CSQ65: It appears crazy to base changes on Ofwat, which is presiding over an industry that is patently failing to invest or innovate, e.g.

<https://www.edie.net/news/16/Kelda-calls-for-strategic-review-of-the-UKs-water->

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[industry-over-underinvestment-crisis/3612/](#). A complete re-think should be undertaken.

CSQ66-68 I have no view on the +/-2%, but it is madness to down-grade all payments if most companies exceed targets (9.16) as you would be penalising good performance because it's too good. That will engender a more "sensible" management strategy of just doing "enough".

CSQ69: No. See comments on CSQ61.

CSQ70-80: Totally wrong-headed, and will continue to drive wrong behaviours and gaming of the system as happened with the too-high forecasts in RIIO-1, so the solution is not to double down on fundamentally wrong principles. Far too bureaucratic. See comments on CSQ61.

FQ1-37: No comment.

CSQ81: No, because that is not the proper role of Ofgem. Your role is not to restrict profitability, but to deliver a high-performing, value-for-money grid for consumers both today and in the foreseeable future (up to 50 years). See comments on CSQ61.

CSQ82: Yes.

CSQ81, 83-90, 93-98: No. See comments on CSQ61.

CSQ82, 91-92: Yes. See comments on CSQ61.