

Consultation Questions:

1 Background and scope of this review

1. Do you agree with our four desired outcomes for the code governance landscape by the mid-2020s? Yes/No/Don't know. Please explain.

If you disagree, please explain what you consider the outcomes should be.

We would agree that “the gradual evolution of code governance has left the overall framework fragmented, complex and poorly coordinated, with weak incentives to drive timely change and would agree in principle with the four stated desired outcomes.

In particular, in terms of “Providing strategic direction”, we concur that many of the rules and practices governing the sector have evolved piecemeal and were designed in times when the energy system was very different. Furthermore, the rules and practices developed for the electricity system have largely been developed in terms of the behaviour and characteristics of legacy system equipment – particularly AC synchronous machines which the UK is presently forecasting will be largely phased out to achieve a net zero electricity system.

However, the AC synchronised grid is the sole electricity system design which has been utilised since it was invented by Tesla and Westinghouse in the last 19th century. In providing strategic direction, we strongly recommend that our net zero GHG emissions energy system goal in the UK be treated as an enterprise with the future electricity system design basis treated as foundational to ensure that in future the electricity can be designed and operated accurately, reliably and safely as has been done in the past.

2. Do you agree with the problems we have identified (in chapter 1 – Background – and in later chapters), and that they present a persuasive case for reform of the current framework for energy codes? Yes/No/Don't know. Please explain.

IMechE is generally supportive of the Energy System Catapult and Institution of Engineering and Technology’s Future Power System Architect project concept. However, the focus in the published project documents on governance without also recognising the extent that present and future governance arrangements require to be founded on technical principles (defined by the laws of physics and engineering principles) is a concern.

3. Do you have additional evidence on the performance of the current framework?

Existing system operability requirements, including transient stability and critical fault clearance times, have been developed based upon the expected response of a legacy high inertia system.

Intuitively, a lower inertia system will accelerate more quickly under fault conditions – and is likely to require faster critical clearance times – e.g. for faults on the 400kV supergrid system. However, there is a physical limit to the reduction that could be achieved in terms of present critical fault

clearance times based upon the capability of presently installed 400kV circuit breakers.

Changing the composition of the electricity system (as proposed) with equipment which has different characteristics and behaviour from legacy equipment will change the system response and performance. The future system will not be able to entirely replicate the existing system design basis. Therefore, it is anticipated that technical evidence will need to be generated to inform decisions around the extent to which the existing design basis might be maintained, versus changing the design basis (as expressed and specified in the existing electricity industry codes).

While it is important that any future code reform unlocks innovation and provides benefits to consumers, it is also essential that this is considered within the envelope of what is technically feasible to maintain system operability, resilience and security of supply.

4. Do you agree with our proposed scope reform? Yes/No/Don't know. Please explain. If not, which additional codes or systems do you think should be included/excluded?

We would not disagree with the proposed scope but are concerned that the scope does not expressly include a technical element which is intended to support evidence based decision making when seeking to reform the present energy industry codes.

5. Are there any codes or systems that we should only apply a limited set of reforms to? Yes/No/Don't know. Please explain.

Not answered.

2 Vision & options

Not answered. Likely to be driven and constrained by the existing and future system design basis which has still to be fully determined.

6. Do you agree that the four areas for reform are required? Please provide reasons for your position and evidence where possible.

7. Do you agree with the two broad models outlined? Please provide reasons for your position and evidence where possible. – further detail can be found on each model in the chapters that follow.

8. Which model do you believe will best deliver on our desired outcomes? Please explain. NB: – further detail can be found on each model in the chapters that follow.

9. Do you agree with the changes to the role of code signatories we are proposing?

3 Providing strategic direction

10. Do you agree there is a missing strategic function for codes development in the energy sector and introducing a strategic function with the responsibilities outlined in chapter 3 is the best way to address the lack of strategic direction? Yes/No/Don't know. Please explain.

As detailed above, it is anticipated that reform of the existing energy system codes requires to be led by a technical focus which considers both new technology and innovation proposals and also the existing system design basis and operability constraints to develop a technically feasible envelope of operation which can be used as a basis to determine what the potential range of future system

solutions might look like in detail.

It can be demonstrated from first principles that the existing engineering principles used to define the electricity system in the past will not remain valid if AC synchronous machine generating units are largely replaced by DC converter connected power supplies (whether wind or solar power parks, HVDC interconnectors or battery storage units). Therefore, new engineering principles will need to be developed which new codes could be built around. Engineering principles and the laws of physics are somewhat immutable so it is unlikely to be possible to develop new codes working the other way around.

Who is best placed to fulfil the strategic function and why?

It is unlikely that any one person or body is best placed to fulfil the strategic function: it will require to be a collaborative enterprise – especially when considering the UK's energy systems as a whole.

Although National Grid has historically provided a lead technical role for the electricity system since privatisation, their ability to do so is increasingly being reduced – e.g. with increased volumes of embedded generation. This technical aspect may be intended to be covered elsewhere and therefore deliberately excluded from the scope? If that is the case, then it would have been extremely useful to make this more explicit since the technical framework the codes have been built upon is foundational.

11. Do you agree with the objectives and responsibilities envisaged for the strategic function, and are there any additional objectives or responsibilities the strategic function should have?

A Future Power System Architect type role should originate with the future technical design basis, system requirements and system specification with an evidence based decision making process applied when making any proposed changes.

This is anticipated to be a pre-requisite of other updates, e.g. in terms of governance reform, rather than the other way around.

12. How may this new function potentially impact the roles and responsibilities of other parts of the framework? Do you foresee any unintended consequences?

If technical requirements are not a foundational aspect of any proposed reform then there is a risk that we fail to adequately manage technical and governance changes seamlessly.

13. What are your views on how the strategic direction should be developed and implemented (including the option of establishing a strategy board to aid engagement)?

14. Do you think that the scope of the strategic function should be limited to taking account of the Government's vision for the energy sector and translating it into a plan for the industry codes framework, or are there other areas it should address? (for example, impact on vulnerable consumers)? Yes/No/Don't know. Please explain.

4 Empowered and accountable code management & independent decision making

Not answered: response has been focused on the technical aspects of code reform. Other aspects should be considered in light of such foundational outcomes.

15. Do you agree that in addition to the current responsibilities that code administrators have, that a. the code manager function should also have the following responsibilities: a. identifying, proposing and developing changes (analysis, legal drafting etc.), including understanding the impacts; b. making decisions on some changes, or making recommendations to the strategic body; and c. prioritising which changes are progressed.

Yes/No/Don't know. Please explain.

16. What is the best way to ensure coherent end-to-end changes to the codes and related systems? For example, is it through having end-to-end code and system managers?

17. Should the approach differ on a case-by case basis (i.e. depending on the code or system in question)? Yes/No/Don't know. Please explain.

18. Do you agree that the code manager function should be accountable to the strategic body and that this should be via a licence or contract? Yes/No/Don't know. Please explain.

Please note questions 19- 26 only apply in respect of Model 1 (code manager function and a strategic body).

19. Are there more effective ways that a code manager function's accountability to the strategic body could be enshrined other than in a licence or contract? Please explain.

20. Do you agree that we should not consider further a model whereby code managers are accountable to industry? Yes/No/Don't know. Please explain.

21. Do you have views on whether the code manager function should be appointed following a competitive tender process or other competition? Yes/No/Don't know. Please explain.

22. Do you think the code manager function should be established by the strategic body creating a body or bodies? Yes/No/Don't know. Please explain. If the code managers were established in this way, would we need to consider any alternative approaches to funding or accountability? Yes/No/Don't know. Please explain.

23. In terms of establishing/choosing the code manager function, do you agree that we should not consider further: a. requiring an existing licensee to become the code manager; and/or b. requiring a licensee (or group of licensees) to create the code manager?

Yes/No/Don't know. Please explain.

24. What would be the most effective way to ensure the code manager function offers value for money (for example, through price controls or budget scrutiny)? More broadly, what is the right incentive framework to place on the code manager function? Please explain.

25. Are there any factors that: a. would stop parties (including code administrators) from becoming a code manager b. should prevent parties from becoming a code manager (e.g. do you agree that licensees should not be able to exercise control of the code managers).

26. How should the code manager function be funded (for example through licence fees or by parties to the code(s)?

5 Code simplification & consolidation

27. Are there any quick wins that could be realised in terms of code consolidation and simplification?

It is important that in considering any quick wins that we don't also inadvertently create any downside outcomes. Especially from a technical perspective which seems largely omitted from the present consultation scope.

28. How many codes would best deliver on the outcomes we are seeking under these reforms?

29. Which option (one code manager versus multiple) would best deliver on the outcomes we are seeking under these reforms?

30. Which of our consolidation options would best deliver the outcomes we are seeking to achieve? Please provide evidence for your examples.

31. Do you agree that the codes should be digitalised? Yes/No/Don't know. Please explain.

6 Monitoring and compliance

32. What role should industry have in monitoring code compliance or making decisions on measures needed to address any identified non-compliance?

33. Which of the two models we propose would better facilitate effective monitoring and compliance arrangements? Please explain.

34. With Model 2 - integrated rule-making body - should the IRMB have responsibility for imposing measures (where a party is non-compliant with the code) or should this be for another organisation? Please explain.

Please note this question only applies in respect of Model 2 (integrated rule-making body)