1. **BACKGROUND**

System Operability Framework

Industry Consultation

1. Future Energy Scenarios document[[1]](#footnote-1) is developed annually with stakeholders for use in our electricity and gas planning processes. This document describes a range of scenarios considering amongst other aspects the developments in electricity generation onshore and offshore, electricity and gas use, progress against national environmental targets and interconnection. A key use of FES has been the identification of extra transmission capacity required across the network. The results of this assessment and a high level impact of FES on system operation are annually published in the Electricity Ten Year Statement[[2]](#footnote-2) (ETYS).
   1. System Operability Framework has been developed to study in-depth, year-round impact of FES on system operability. The process begins by assessing existing network performance, identifying the root causes of incidents and constraints observed on the system in recent years, and highlighting potential new changes in system dynamics in future years based on system studies.
   2. FES demand and generation data is then used together with previous year’s actual hourly generation and demand information in order to extrapolate system behavior for future years, highlighting the key variances in system operability parameters and assuring that risks associated with future system operability are identified.
   3. This approach ensures the mitigating measures are developed early enough to allow for full economic assessment of potential solutions and allow timely implementation.
   4. National Grid is committed to stakeholder engagement and action on the feedback we receive. The views of our stakeholders are crucial as we enter a period where the energy industry has to meet the challenges of providing secure and affordable energy, replacing ageing assets and moving to low carbon generation sources to meet the environmental targets.
   5. It is important that we consult on the developed System Operability Framework to ensure the information that our stakeholders require in order to make investment decisions vital to maintain system operability is articulated, allowing your business to make such decisions and plan for the future. This consultation therefore focuses on:
      1. The methodology of the framework, including the topics analysed, and
      2. The services and solutions proposed to maintain future system operability.
   6. This document has therefore been prepared to facilitate the responses to the consultation on System Operability Framework. Responders are not restricted to this template and are welcome to provide supplementary material.

**Question 2**

In your opinion, are the topics included in the current version of the SOF report the complete set of operability-related issues with respect to the transmission system?

**Question 1**

Should the topics relating to system operability be studied using the Future Energy Scenarios, operational experience or both?

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**Question 3**

In your view, are there related issues, beyond those purely associated with the transmission system, with wider system impact that you would wish to highlight as areas that SOF should investigate in the future?

1. **FRAMEWORK PROCESS**
   1. The assessment process is focused on areas where there are anticipated changes in the characteristics of transmission network connections or their relative proportions are expected to change, and areas where the dynamic characteristics of the network (with respect to the narratives considered as part of NETS SQSS[[3]](#footnote-3) and the Grid Code[[4]](#footnote-4)) are changing.
   2. These conditions are leading to greater variation and lesser predictability of system behavior and the capability of the network to remain resilient in its response to conditions that fall outside of the scope of NETS SQSS and the Grid Code, but which nevertheless have in the past been partially or fully observed on the GB system.
   3. For each of the operability areas the assessment process seeks to define
      1. The nature of the problem (national or regional), the scale, its load duration and the pertinent measures of the issue (e.g. the ratio of non-synchronous generation to demand)
      2. The expected change in terms or rate of occurrence and significance for the time period covered by the ETYS compared to today’s base case
      3. The extent of the impact
      4. Current management and mitigation actions and required future developments or improvements.
   4. Lastly, taking all of the above into account, a priority ranking system can be applied to each of the operability measures: **1** Need to start working on mitigation measures, **2** Keep under close review and **3** Not a risk / solutions are available.

**Question 4**

Is the representation of the degree of the challenge by use of “load duration curves” and the priority ranking system a useful way of highlighting impact and the extent of the various aspects of operability?

**Question 5**

Are you comfortable that the significance and management requirements associated with each of the operability areas are appropriately highlighted?

**Question 6**

Are there any particular areas that you think should be assessed using a different methodology than that outlined in this section? If yes, please state the reasons for this.

1. **SERVICES AND SOLUTIONS**
   1. For each of the operability topics assessed, a range of solutions and mitigation approaches may be available, and often particular solutions will have a positive impact on not just one, but on an array of aspects. These potential solutions may be divided into four groups based on the stage of their development and availability
      1. Theoretical – subject to R&D to demonstrate a substantive practicable benefit

**Question 8**

Do you consider any of the proposed solutions and services to be inappropriate or inefficient? If so, please provide further information.

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* + 1. Test-bedding – subject to initial implementation trial and analysis
    2. In development & delivery – new technology and/or concepts commercially available and suitable for integration into the transmission system
    3. Established – well known solutions from past experience

**Question 9**

Are there any particular considerations that should be taken into account with respect to the cost benefit analysis of proposed solutions that have not been highlighted? Do you have any particular views or proposals on how such considerations should be addressed?

* 1. In addition to technical challenges with respect to each of the solutions, there may be further restrictions in terms of e.g. commercial viability and resourcing. Solutions will vary between those unique to Transmission Owners, System Operator or a user community and those that can be applied and delivered across these areas. Some solutions will require Network Code development and additional definitions in existing codes and frameworks across the electricity industry; others will require additional support from technology manufacturers and research institutions to drive progress.

**Question 10**

In each of the areas considered in SOF, what key principles should guide the development of market or other arrangements to facilitate the identified solutions?

* 1. In each case, it is our intention over time to apply those same principles as illustrated in ETYS under the Network Development Process to the assessment of options for solutions identified as part of System Operability Framework – an approach founded upon industry and customer cost benefit whilst seeking to respect the broader environmental challenges affecting future energy strategy.

**Question 11**

What commercial arrangement do you believe facilitate the development of solutions which require capital investment by service providers?

* 1. Where appropriate, National Grid will at a later stage seek to develop market solutions in necessary areas to facilitate the implementations of overall the most beneficial solutions.

**Question 7**

Is the list of options discussed in the current edition of the SOF report complete, or would you suggest other options that would merit consideration? If so, would you be supportive of collaborative work in examining such options further?

System Operability Framework

Industry Consultation Response Proforma

Industry parties are invited to respond to this consultation expressing their views and supplying the rationale for those views, particularly in respect of any specific questions detailed below.

Please send your responses by **10th October 2014** to [box.transmission.sof@nationalgrid.com](mailto:box.transmission.sof@nationalgrid.com)

Please note that any responses received after the deadline or sent to a different email address may not receive due consideration.

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| --- | --- |
| **Respondent:** |  |
| **Company Name:** |  |

**Industry Consultation Questions**

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| --- | --- | --- |
| 1 | Should the topics relating to system operability be studied using the Future Energy Scenarios, operational experience or both? |  |
| 2 | In your opinion, are the topics included in the current version of the SOF report the complete set of operability-related issues with respect to the transmission system? |  |
| 3 | In your view, are there related issues, beyond those purely associated with the transmission system, with wider system impact that you would wish to highlight as areas that SOF should investigate in the future? |  |
| 4 | Is the representation of the degree of the challenge by use of “load duration curves” and the priority ranking system a useful way of highlighting impact and the extent of the various aspects of operability? |  |
| 5 | Are you comfortable that the significance and management requirements associated with each of the operability areas are appropriately highlighted? |  |
| 6 | Are there any particular areas that you think should be assessed using a different methodology than that outlined in this section? If yes, please state the reasons for this. |  |
| 7 | Is the list of options discussed in the current edition of the SOF report complete, or would you suggest other options that would merit consideration? If so, would you be supportive of collaborative work in examining such options further? |  |
| 8 | Do you consider any of the proposed solutions and services to be inappropriate or inefficient? If so, please provide further information. |  |
| 9 | Are there any particular considerations that should be taken into account with respect to the cost benefit analysis of proposed solutions that have not been highlighted? Do you have any particular views or proposals on how such considerations should be addressed? |  |
| 10 | In each of the areas considered in SOF, what key principles should guide the development of market or other arrangements to facilitate the identified solutions? |  |
| 11 | What commercial arrangement do you believe facilitate the development of solutions which require capital investment by service providers? |  |

1. http://www2.nationalgrid.com/uk/industry-information/future-of-energy/future-energy-scenarios/ [↑](#footnote-ref-1)
2. http://www2.nationalgrid.com/UK/Industry-information/Future-of-Energy/Electricity-Ten-Year-Statement/ [↑](#footnote-ref-2)
3. http://www2.nationalgrid.com/UK/Industry-information/Electricity-codes/System-Security-and-Quality-of-Supply-Standards/ [↑](#footnote-ref-3)
4. http://www2.nationalgrid.com/UK/Industry-information/Electricity-codes/Grid-Code/ [↑](#footnote-ref-4)