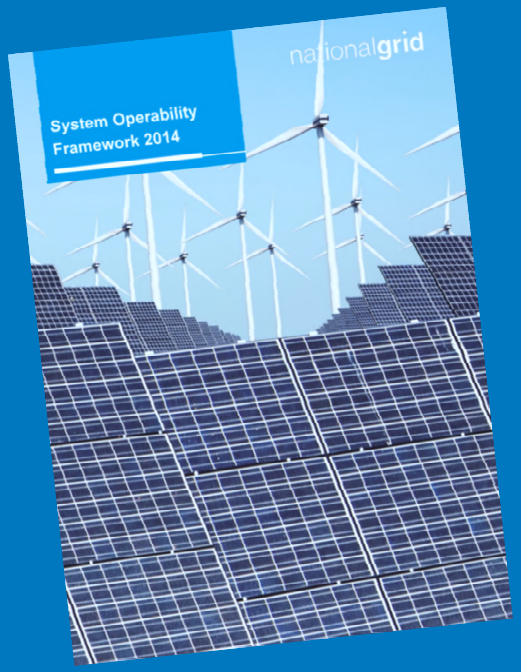
# SQSS Review Panel

## System Operability Framework (SOF)




**System Operability Framework 2015**

**Jordan Darley -** SMARTer System Performance Team - Transmission Network Services

# Agenda

- Why do we need a SOF?
- SOF process
- Review of SOF 2014 and consultation responses
- Next steps and how SOF 2015 will be developed

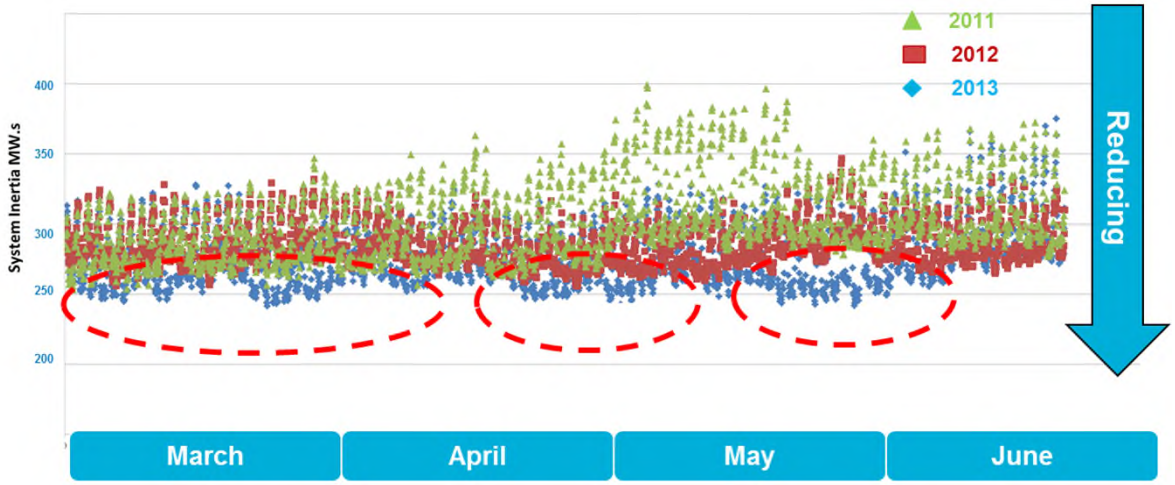
# Our System is Evolving…

## Generation

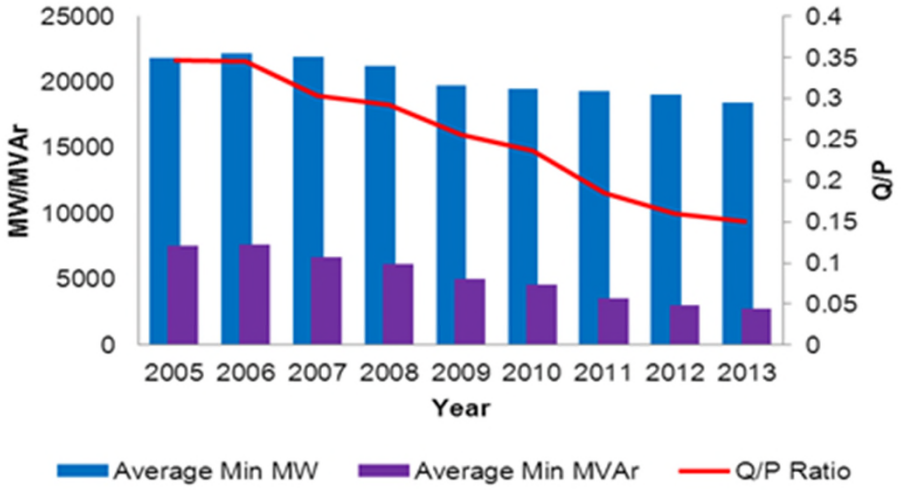
## Demand

# And the Impact?

**System Inertia**




**MVAr Demand**



# SOF Process

| Future Energy Scenarios | Performance Requirements | Operational Challenges | Operation Solutions & Opportunities | Electricity Ten Year Statement |
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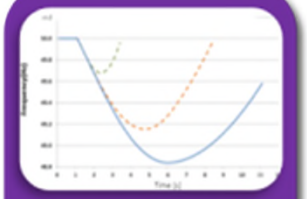
|  |  |  |  |  |
| **Change in Energy Landscape**<br>• Generation mix<br>• Interconnection<br>• Demand side services | **Economic, Efficient and Operable System**<br>• Large infeeds (>1800MW)<br>• System stability<br>- Frequency<br>- Voltage<br>- Rotor angles<br>• Constraint minimisation<br>• Market facilitation | **Reduction in System Strength**<br>• System inertia<br>- RoCoF<br>- Primary response<br>- System stability<br>• Short circuit level<br>- Power quality<br>- Protection<br>- HVDC commutation<br>- System stability | **SMART Grid Development**<br>• Rapid response<br>• Demand side response<br>• Low load operation of thermal plants<br>• Dynamic thermal ratings<br>• System wide controller<br>• Parallel HVDC links | **System Operation Chapter of ETYS**<br>• Variations in each topic<br>• Opportunities for stakeholders to provide new services<br>• Stakeholder feedback |

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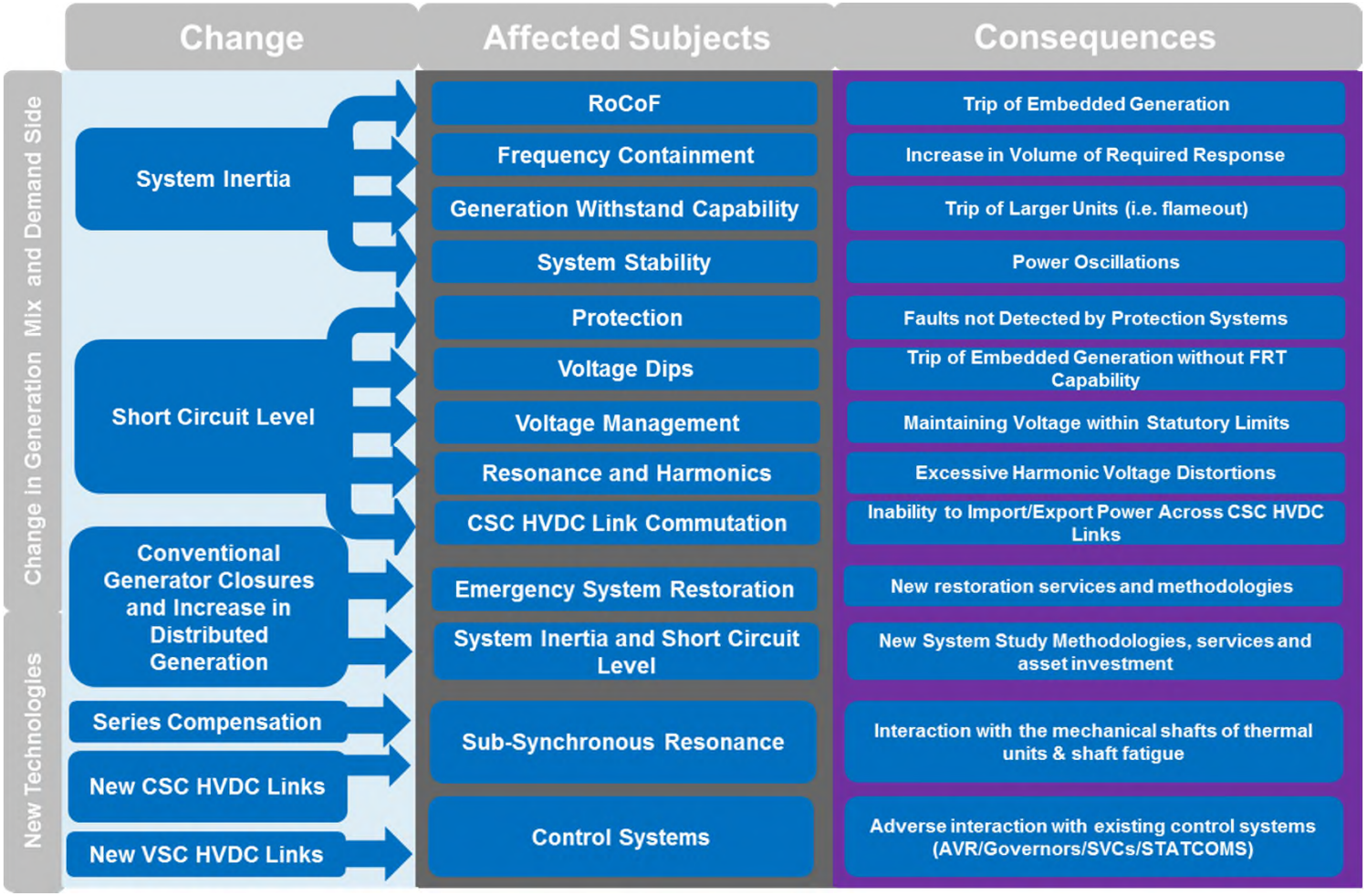
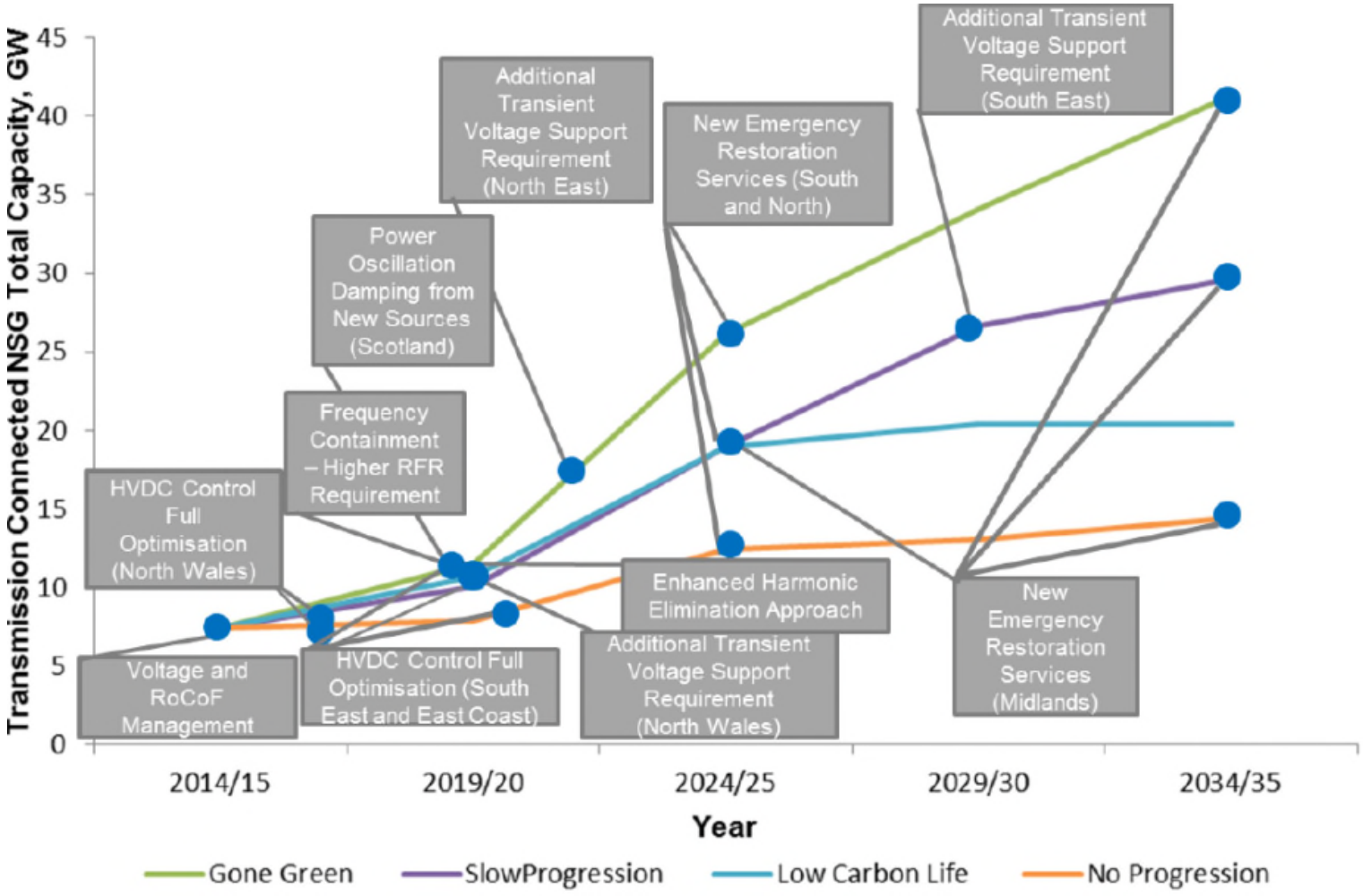
# Future Energy Scenarios (FES) Input

# SOF Topics (2014)



# SOF Findings (2014)



# Summary of SOF 2014 Industry Consultation

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- Generally positive (very good engagement)
- SOF Topics
  - Number of comments indicated the impact of change at the distribution level needs to be better articulated, i.e. DSR, EVs, etc.
- SOF Solutions
  - Better balance between market based products (i.e. wherever the technology is already capable) and new requirements
  - Solutions in long terms which require contract at early stages (i.e. synchronous compensator)
  - Solutions capable of providing number of services (i.e. interconnectors, storage)
- SOF Engagement
  - Strong desire to be involved at different stages of development of SOF with an increased focus on the entire end-to-end Power System

# Existing Engagement Forums

## SOF Engagement

| Generation | Transmission | Distribution | Supply Side |
|---|---|---|---|
| Operational Forum - Grid Code Review Panel - Compliance Meetings | SQSS - STC – JPC- Grid Code Review Panel - Liaison Meetings | ENA Grid Code & Distribution Code Review Panel – T&D Liaison | Operational Forum - Liaison Meetings |
| • New services<br>• New generation technologies Generation withstand capability<br>• Modelling issues<br>• Installations worldwide<br>• Compliance issues<br>• Grid services to the generators<br>• Joint innovation projects | • Investment optimisation for design and operation<br>• New transmission technologies<br>• Operability and regional strategies<br>• SQSS and Code development<br>• Modelling issues and data exchange<br>• Joint innovation projects | • Investment optimisation for design and operation<br>• New demand side technologies (i.e. heat pumps, DSR, storage)<br>• Operability and regional strategies<br>• SQSS, Grid Code and Distribution Code development<br>• Modelling issues and data exchange<br>• Joint innovation projects | • Demand Side Services<br>• Code development<br>• Operability of new technologies<br>• Modelling techniques (i.e. modelling DSR effects)<br>• Joint innovation projects |

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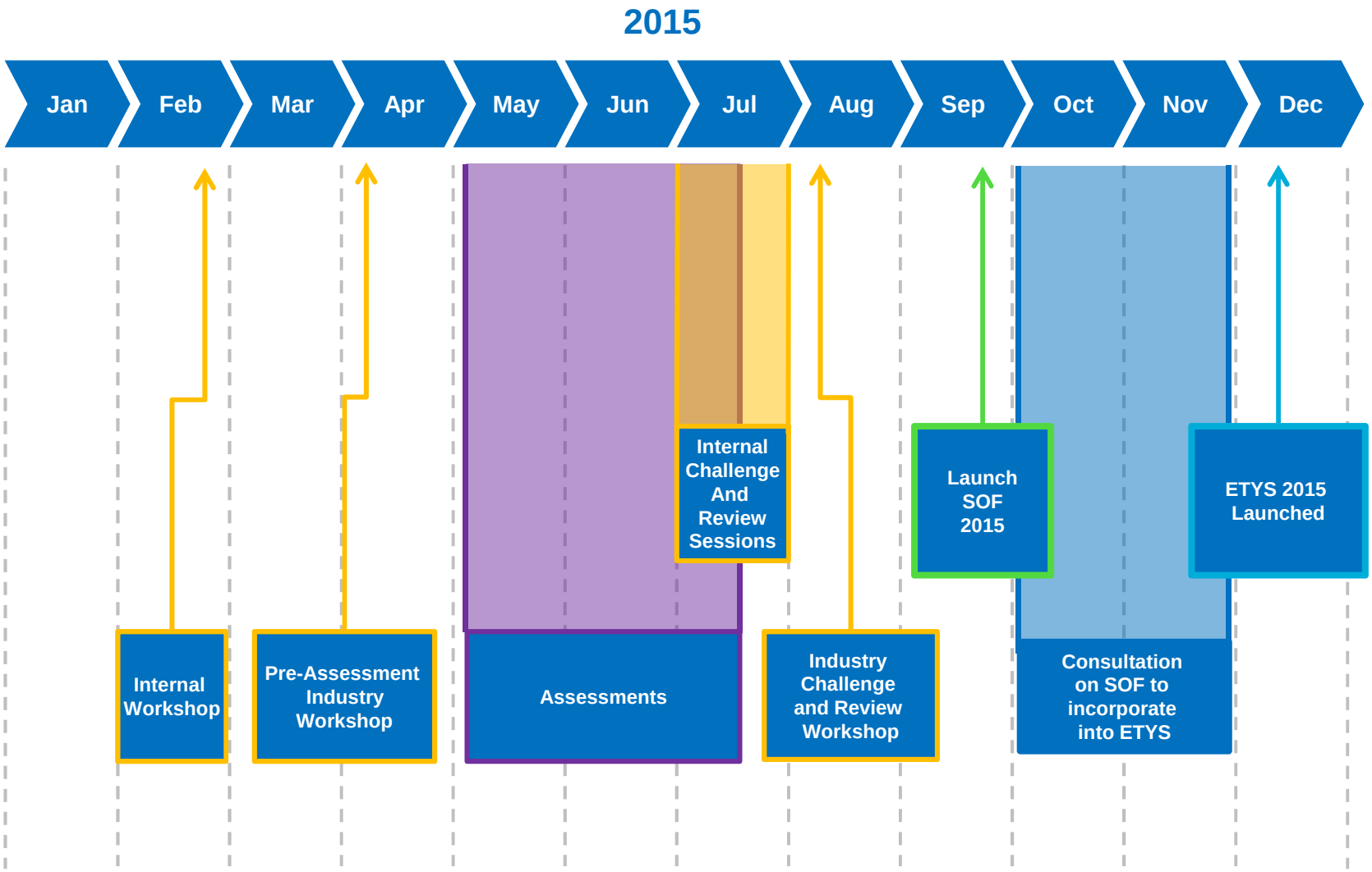
# High Level Development Timeline



# Industry Engagement

- **Pre Assessment Workshop**
  - **2014 Consultation Response Summary**
  - **2014 Assessment Methodology; Feedback and Improvements**
  - **2015 Draft Topics; Feedback and Improvements**
  - **External Messages**

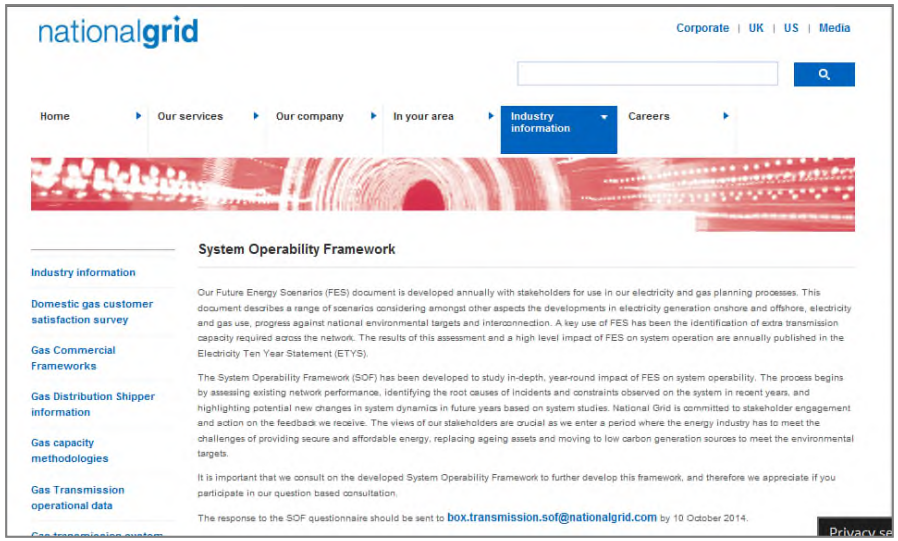
- **Challenge and Review Workshop**
  - **Update on Progress**
  - **Assessment Results; Feedback and Improvements**
  - **External Messages**

# System Operability Framework

## Thank you for your attention

For more information please email:

box.transmission.SOF@nationalgrid.com




http://www2.nationalgrid.com/UK/Industry-information/Future-of-Energy/System-Operability-Framework/