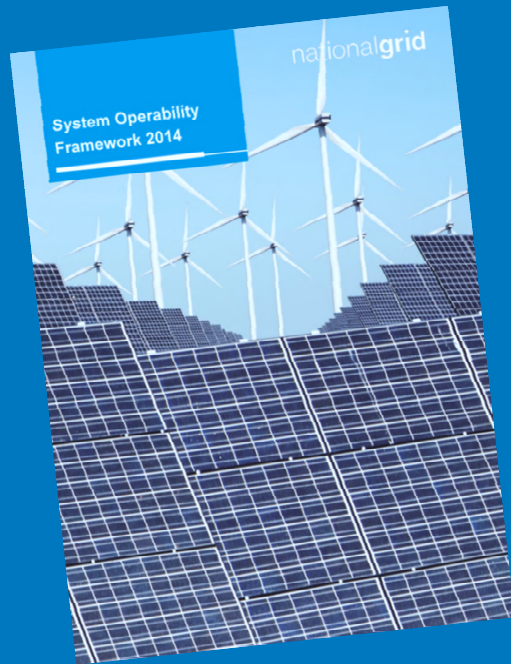


SQSS Review Panel

System Operability Framework (SOF)



**System Operability
Framework 2015**

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

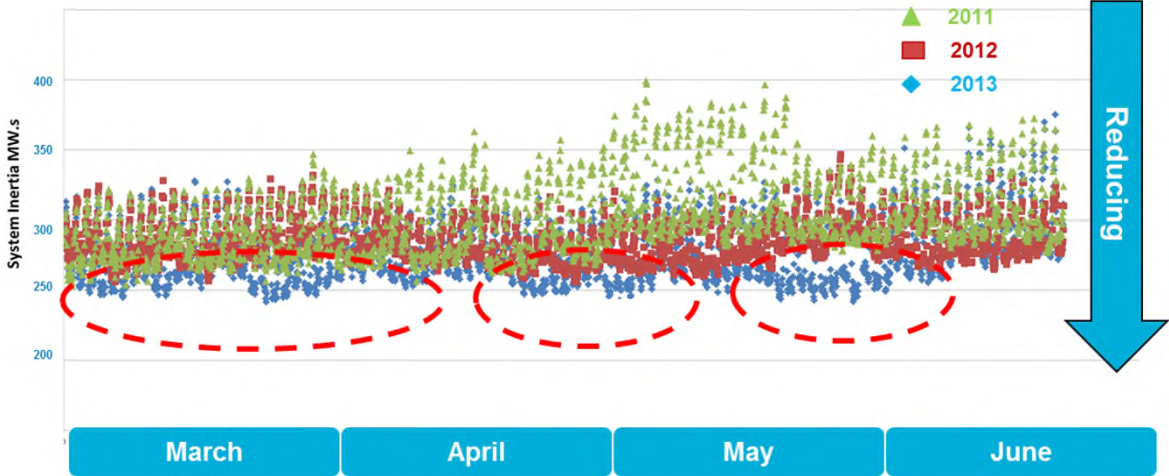


Demand

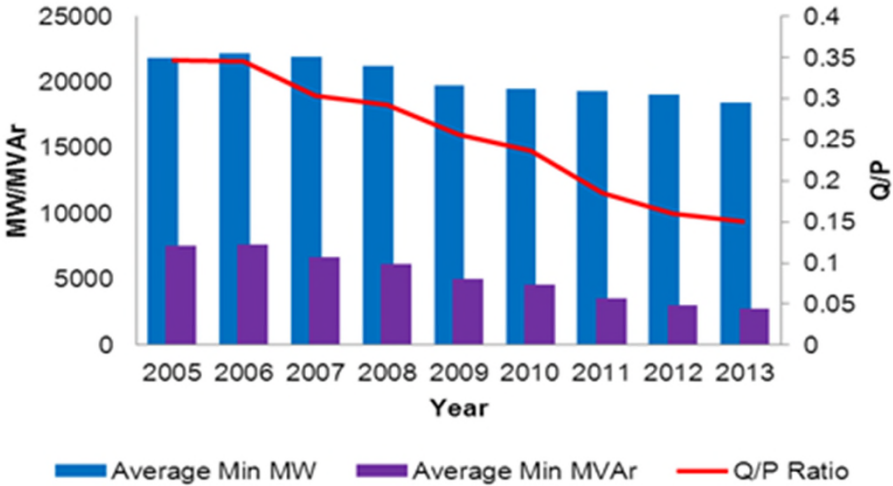


And the Impact?

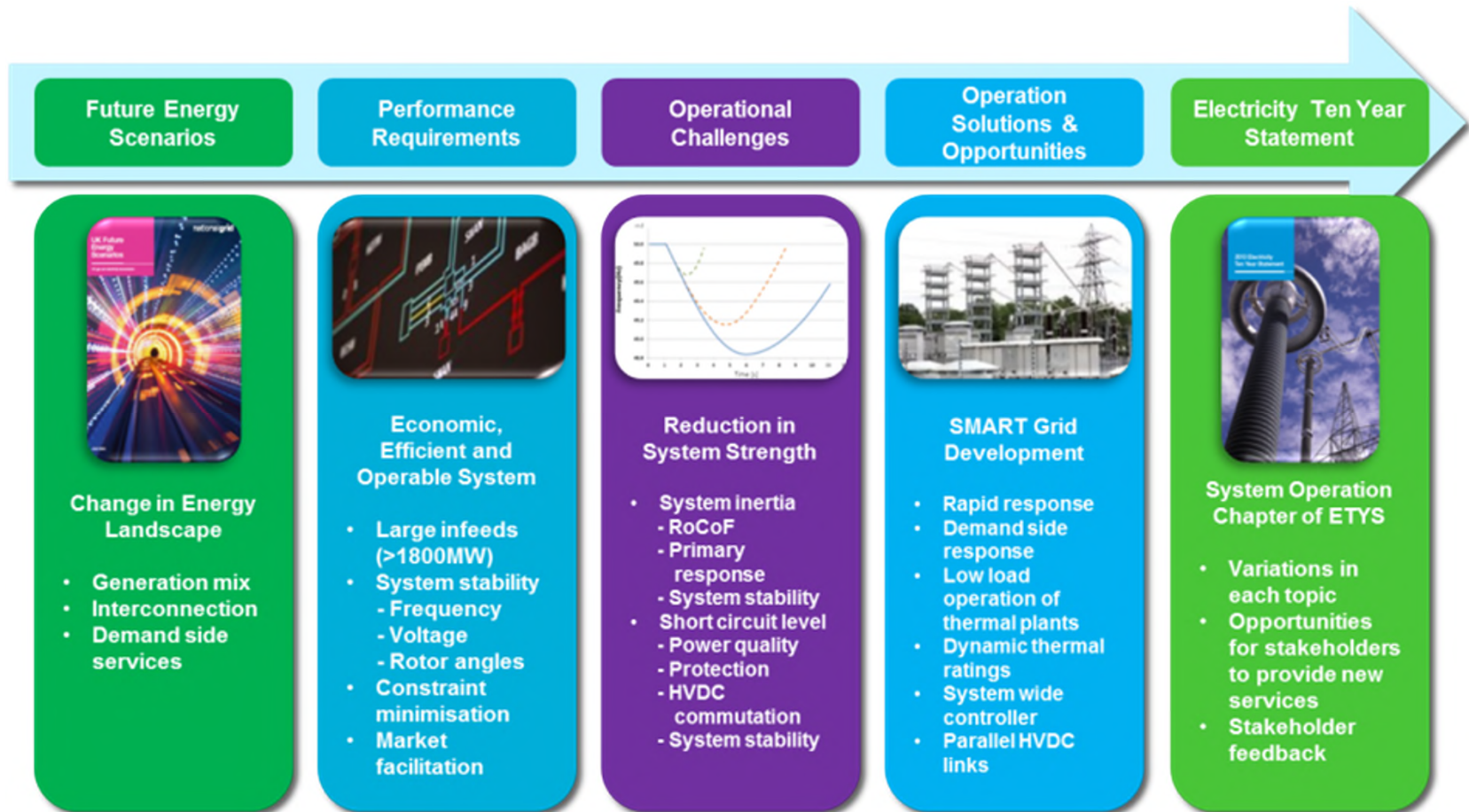
System Inertia



MVAr Demand



SOF Process



Future Energy Scenarios (FES) Input

24 Affordability
 More money available
24 Affordability
 Less money available

Low Carbon Life

Economic – Growing UK economy.

Political – Short term political volatility but long term consensus around decarbonisation.

Technological – Renewable generation at a local level. High innovation in the energy sector.

Social – High uptake of electric vehicles but consumers not focused on energy efficiency. "Going green" is a by-product of purchasing desirable items.

Environmental – Carbon target hit. No new environmental targets introduced.



Carbon Capture and Storage

No Progression

Economic – Slow UK economic recovery.

Political – Inconsistent political statements within Government, resulting in investor uncertainty.

Technological – Gas is the preferred choice for generation over renewables. Little technological innovation occurs in the energy sector.

Social – Consumers not engaged with energy efficiency. Low uptake of electric vehicles and heat pumps.

Environmental – Targets are missed, no new environmental targets introduced.



Gone Green

Economic – Growing UK economy.

Political – Domestic and European policy harmonisation, with long term certainty provided.

Technological – High levels of renewable generation with high innovation in the energy sector.

Social – Engaged consumers focused on drive for energy efficiency. This results in high uptake of electric vehicles and heat pumps.

Environmental – All targets hit, including new European targets post 2020.



Slow Progression

Economic – Slow UK economic recovery.

Political – Political will for sustainability but financial constraints prevent delivery of policies.

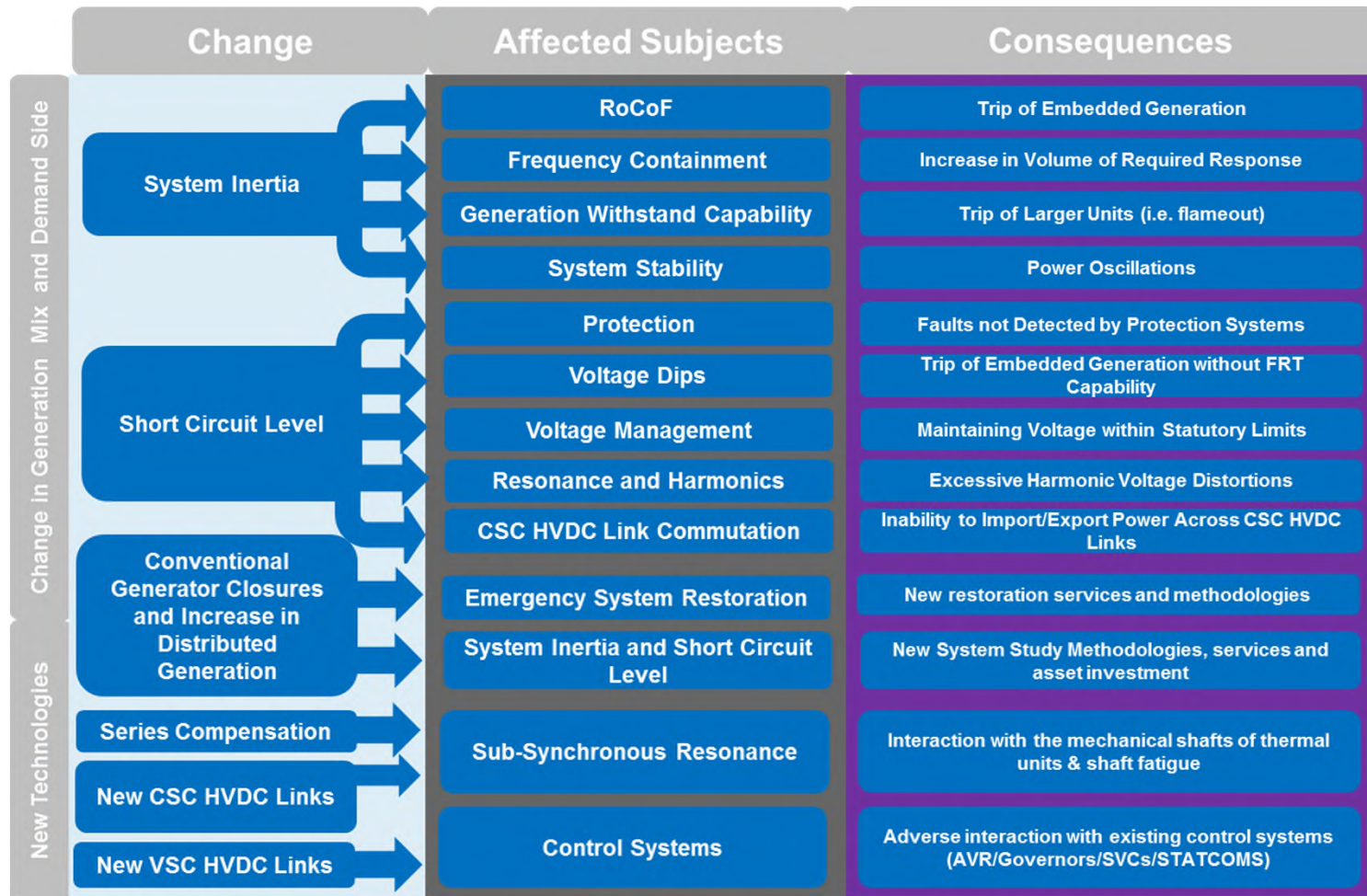
Technological – Renewable generation chosen over low carbon generation. Low levels of innovation in the energy sector.

Social – Engaged consumers focused on drive for energy efficiency but with low uptake of electric vehicles and heat pumps due to affordability.

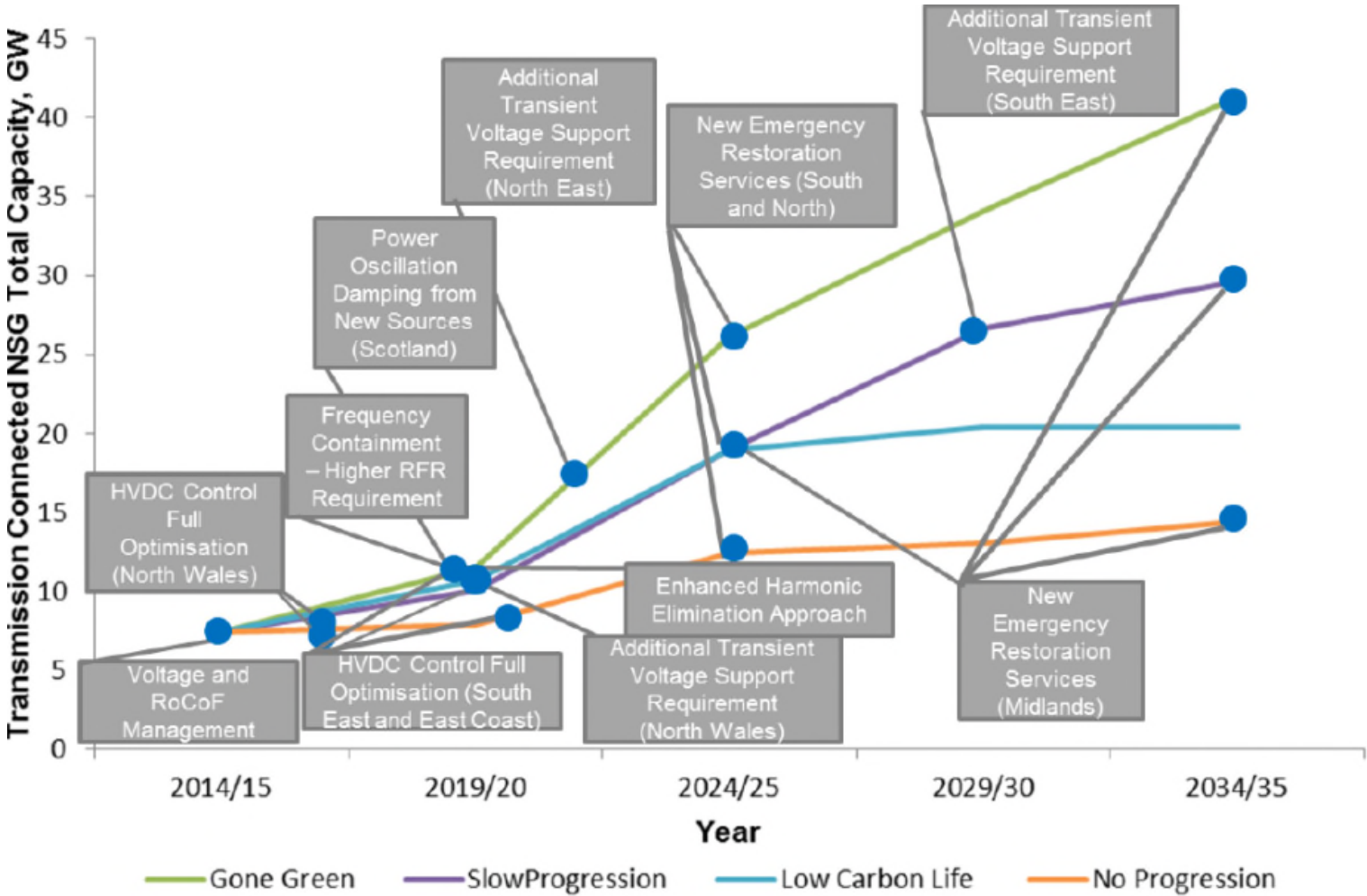
Environmental – Environmental targets missed but hit later. New European targets introduced.

Sustainability
Less emphasis
 Sustainability
More emphasis

SOF Topics (2014)



SOF Findings (2014)



Summary of SOF 2014 Industry Consultation

- **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

Operational Forum - Grid Code Review Panel - Compliance Meetings

- New services
- New generation technologies
- Generation withstand capability
- Modelling issues
- Installations worldwide
- Compliance issues
- Grid services to the generators
- Joint innovation projects

Transmission

SQSS - STC – JPC- Grid Code Review Panel - Liaison Meetings

- Investment optimisation for design and operation
- New transmission technologies
- Operability and regional strategies
- SQSS and Code development
- Modelling issues and data exchange
- Joint innovation projects

Distribution

ENA Grid Code & Distribution Code Review Panel – T&D Liaison

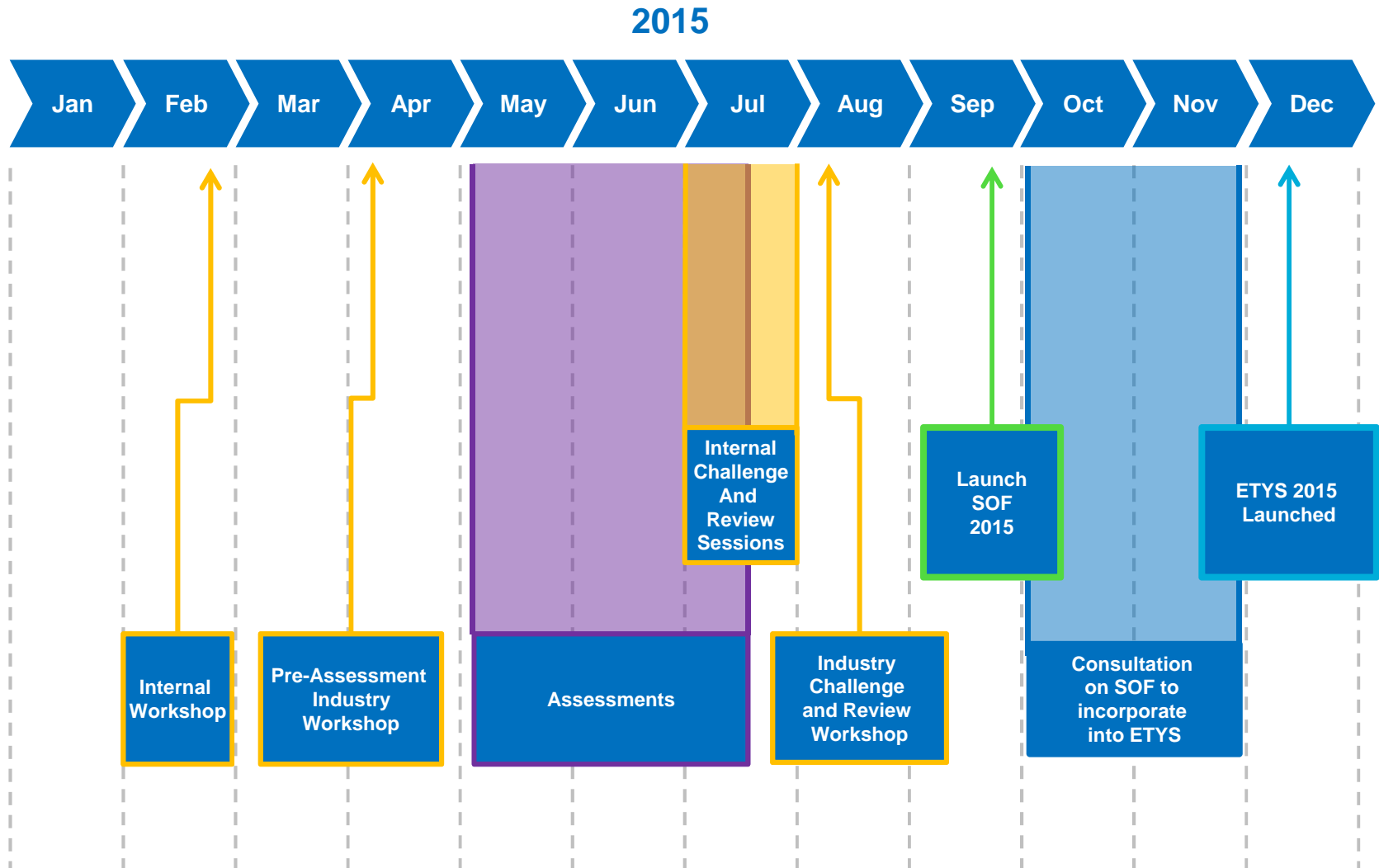
- Investment optimisation for design and operation
- New demand side technologies (i.e. heat pumps, DSR, storage)
- Operability and regional strategies
- SQSS, Grid Code and Distribution Code development
- Modelling issues and data exchange
- Joint innovation projects

Supply Side

Operational Forum - Liaison Meetings

- Demand Side Services
- Code development
- Operability of new technologies
- Modelling techniques (i.e. modelling DSR effects)
- Joint innovation projects

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

The screenshot shows the National Grid website interface. At the top left is the 'nationalgrid' logo. To the right are links for 'Corporate', 'UK', 'US', and 'Media'. Below these is a search bar with a magnifying glass icon. A navigation menu includes 'Home', 'Our services', 'Our company', 'In your area', 'Industry information', and 'Careers'. The 'Industry information' menu is expanded, showing a red banner with a grid pattern. Below the banner, the page title is 'System Operability Framework'. The main content area is divided into two columns. The left column contains a list of links under the heading 'Industry information': 'Domestic gas customer satisfaction survey', 'Gas Commercial Frameworks', 'Gas Distribution Shipper information', 'Gas capacity methodologies', and 'Gas Transmission operational data'. The right column contains the main text of the page, which discusses the Future Energy Scenarios (FES) document and the System Operability Framework (SOF). It mentions that the SOF is developed annually with stakeholders and is used for electricity and gas planning. It also states that the SOF has been developed to study the in-depth, year-round impact of FES on system operability. The text concludes with a statement about consulting on the developed SOF to further develop the framework and appreciating stakeholder participation. At the bottom right of the page, there is a 'Privacy' link.

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