










STCP Modification Proposal Form (System Operator – Transmission Owner Code)	
<h1>PM0XX: System Performance Monitoring – development of a new STCP</h1>	<div>01</div> <div>Initial STCP Modification Proposal Form</div>
<p><b>Purpose of Modification:</b> This proposal seeks to introduce requirements for the Transmission Owners' System Performance Monitoring to be provided to the System Operator creating a new STCP into the STCPXX series.</p>	
	<p><b>The Proposer recommends that this modification should be:</b></p> <p><b>Taken to a workgroup to facilitate creation of a New STCP and then</b></p> <ul style="list-style-type: none"> <li>Approved and implemented at a future STC panel meeting, likely to be June 2018</li> </ul>
	<p><b>High Impact:</b> Yes for all onshore Transmission Operators.</p>
	<p><b>Medium Impact:</b> None identified</p>
	<p><b>Low Impact:</b> None identified</p>

Contents		 Any questions?
1	Summary	3
2	Governance	3
3	Why Change?	3
4	Impacts & Other Considerations	5
5	Relevant Objectives	Error! Bookmark not defined.
6	Implementation	7
7	Legal Text	7
<b>Timetable</b>		<b>Contact:</b> <b>Code Administrator</b>  <a href="mailto:Lurrentia.Walker@nationalgrid.com">Lurrentia.Walker@nationalgrid.com</a>  07976 940 855 <b>Proposer:</b> <b>Fiona Williams</b>  <a href="mailto:Fiona.Williams@nationalgrid.com">Fiona.Williams@nationalgrid.com</a>  01926 653412
<b>The Code Administrator recommends the following timetable:</b>		
Proposal Form Submitted to Code Administrator for review		
Proposal form submitted to STC Panel Secretary		
STCP's are presented and approved by the Panel		
Sign off		
Implementation		

### Impact on Core Industry Documentation.

*Please mark the relevant boxes with an "x" and provide any supporting information*

<b>BSC</b>	<input type="checkbox"/>
<b>Grid Code</b>	<input type="checkbox"/>
<b>CUSC</b>	<input type="checkbox"/>
<b>Other</b>	<input type="checkbox"/>

This new STCP is not expected to affect any other core industry document.

## 1 Summary

### Defect

- As a result of growing volumes of asynchronous generation, the continued reduction in system inertia and increasing levels of variability in system power flows, the electricity network is markedly more complicated to operate and control.
- The current policy of National Grid (NG) (as the System Operator (SO)) of requiring any user greater than five times large to provide system monitoring, is no longer effective. This approach, combined with the relatively small number of new connections, has led to poor inconsistent geographic coverage of the GB network.

### What

A common methodology should be agreed by the SO and TOs and codified as a new STCP.

### Why

Codification will ensure both transparency and common application of the methodology. This will reduce the risk of differences across each TO and of potential discrimination to Users.

### How

Prior to submission a series of Workshops have been held with NGESO, NGETO, SPT and SHET to develop a common methodology. It is proposed to codify this in a new STCP. It was agreed that radially connected OFTOs need not be involved since offshore monitoring will be provided by the generator and at the onshore GSP the onshore TO will provide the monitoring. All onshore TOs were agreeable to pursue this proposal via a workgroup. Ofgem have not been consulted at this stage.

- NGSO proposes that Transmission Owners (TO) provide system performance monitoring data to the SO in a manner which benefits both the SO and TO.
- It is considered that a new STCP should be created and that a workgroup made up of TOs would work collaboratively with all stakeholders to formalise the data sharing arrangement.

## 2 Governance

Section B 7.3 states amendments for an STCP need approval from the STC Modification Panel. The Proposer recommends that this modification should be approved and implemented at a future 2018 STC Panel meeting.

## 3 Why Change?

This new STCPXX-XX aims to provide all parties with appropriate and accurate data to monitor and improve the electricity networks performance and reliability. This will help to ensure secure operation, optimum network utilisation and the ability to clearly identify the cause and sequencing of system-disturbance events. It will also enable the TOs to accurately monitor the performance of their assets and to instigate preventative actions where required.

Continual monitoring and tuning of the power systems performance, in line with the expected behaviour from offline models, is now vital to the secure operation of future power networks. Increased visibility and understanding of emerging system conditions in real-time is also necessary. The information from System Monitoring equipment will be used in post-event analysis to validate the systems performance in line with the Security and Quality of Supply Standard (SQSS) and in comparisons with the expected system behaviour, as determined by system models. In addition the information gathered will allow assessment of future networks as outlined in the System Operability Framework (SOF).

The information will also be used in real-time by the Electricity National Control Centre (ENCC) for oscillatory stability monitoring, enhanced state estimation and Negative Phase Sequence (NPS) monitoring and location identification.

This will be achieved in real-time:

- By the ENCC having enhanced visibility of emerging system conditions
  - Good quality voltage data showing voltage changes, excursions and oscillations
  - Dynamic and transient stability issues
  - Oscillatory stability analysis
  - Frequency monitoring – islanding resynchronisation and black start
  - Phase unbalance
  - Enhanced state estimation

This will be achieved offline:

- Through enhanced post-event analysis of system events:
  - Frequency events and RoCoF/inertia studies
  - Stability studies – the source/cause of oscillations and the impact to the wider system
- Greater understanding of the systems performance will enable improvements to system models:  
Offline Modelling and Analysis – improving our understanding of post-fault system behaviour to enable greater utilisation of system assets and enable improved base-lining of system behaviour. This will also enable great improvements to future network studies.

The experience of Transmission System Operators (TSO) globally has shown that large scale blackouts could have been avoided if enhanced monitoring through synchronised Phasor Measurement Units (PMU) had been employed<sup>1</sup>. The devices measure three phase voltage, current (magnitude and phase), frequency and rate of change of frequency (RoCoF) at typical rates of 50Hz/60Hz, providing wide area visibility of emerging system events facilitating direct comparisons with power system models. This is in comparison with typical Supervisory Control and Data Acquisition (SCADA) systems, which monitor at an update rate of between 4 – 10 seconds.

## 4 Impacts & Other Considerations

### STC Parties' Assessments

#### National Grid (SO)

Would provide increased visibility of system behaviour. Need to develop a system of collecting data.

#### National Grid (TO)

Would require investment on the network in areas of poor coverage.

#### Offshore Transmission Owners (OFTOs)

No impact, while OFTOs are radially connected, there will be sufficient monitoring from the offshore generator and the onshore GSP.

#### Scottish Hydro Electric Transmission plc (SHET)

Would require investment on the network in areas of poor coverage.

#### SP Transmission Limited (SPT)

Limited impact since system monitoring is very developed in SP area.

### Impact on STC/STCPs

A new STCP is required to specify SO data requirements

### Relevant Objectives

#### Impact of the modification on the STC Applicable Objectives and STCP Assessment Criteria:

Relevant STC Objective	Identified impact
(a) efficient discharge of the obligations imposed upon transmission licensees by transmission licences and the Act	positive
(b) development, maintenance and operation of an efficient, economical and coordinated system of electricity transmission	positive
(c) facilitating effective competition in the generation and supply of electricity, and (so far as consistent therewith) facilitating such competition in the distribution of electricity	None
(d) protection of the security and quality of supply and safe operation of the national electricity transmission system insofar as it relates to interactions between transmission licensees	positive

(e) promotion of good industry practice and efficiency in the implementation and administration of the arrangements described in the STC.	positive
(f) facilitation of access to the national electricity transmission system for generation not yet connected to the national electricity transmission system or distribution system;	positive
(g) compliance with the Electricity Regulation and any relevant legally binding decision of the European Commission and/or the Agency.	positive

In addition for an STCP Change, Section B 7.3.2 details that the following should be considered:

Provision	View of the Proposer
the amendment or addition does not impair, frustrate or invalidate the provisions of the Code	N/A
the amendment or addition does not impose new obligations or liabilities or restrictions of a material nature on Relevant Parties which are not subsidiary to the rights and obligations of the Relevant Parties under the Code	disagree
the amendment or addition is not inconsistent or in conflict with the Code, Transmission Licence Conditions or other relevant statutory requirements	N/A
the Relevant Party Representatives deem that the amendment or addition is appropriate to support compliance with the Code	Agree

The Proposer believes that this change will better facilitate relevant objective(s) A & E and Section B 7.3.2 is satisfied.

## 5 Solution

A new STCP is proposed.

## 6 Implementation

PM0XX would be implemented following the conclusion of the workgroup and implementation of the new STCP.

## 7 Legal Text

To be submitted on completion of the workgroup

## 8 Recommendation

Approve that a new STCP is introduced.

## 9 References

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1. North American Synchrophasor Initiative, [www.naspi.org](http://www.naspi.org) 2017