

**Grid Code  
Modification Proposal Form**

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**Title of Modification Proposal:** Revised MPID 317 Signals and indications required from Users (formerly Digital Signal Lists)

**MPID** (EirGrid Use Only): MPID 317

<b>Date:</b>	02/09/2024
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<b>Grid Code Version:</b>	Grid Code Version 14.2
<b>Grid Code Section(s) Impacted by Modification Proposal:</b>	<ul style="list-style-type: none"><li>- CC.12.2</li><li>- CC.12.6</li><li>- PPM1.7.1.1.1</li><li>- PPM1.7.1.1.2</li><li>- PPM1.7.1.2.1</li><li>- PPM1.7.1.2.2.1</li><li>- PPM1.7.1.2.3</li><li>- PPM1.7.1.3.1</li><li>- PPM1.7.1.3.2.1</li><li>- PPM1.7.1.3.3</li><li>- PPM1.7.1.3.5</li><li>- PPM1.7.1.4</li><li>- PPM1.7.1.5</li><li>- PPM1.7.1.6</li><li>- PPM1.7.2.2</li><li>- PPM1.7.2.4</li><li>- PPM1.7.2.6.1</li><li>- PPM1.7.4.1</li><li>- Definition: TSO Telecommunication Interface Cabinet</li></ul>

**Modification Proposal Justification:**

Traditionally, signals and indications required to be provided by Transmission System Users were in analogue format. However, digital interface has now come into use in some User locations, with the intention to roll out digital interface to more locations pending successful commissioning.

Where the Grid Code is best placed to capture the requirements around what signals and indications are to be provided by Users, there are relevant specifications and signal lists that are best placed to capture the nuances regarding how and where such signals and indications are to be provided. Accordingly, the modification proposal brought to the March 2024 GCRP suggested removing or modifying text in Grid Code clauses that specify how and where certain signals and indications are to be provided. This modification proposal was not recommended to the CRU at the March 2024 GCRP as industry provided feedback on Demand Side Unit specific wording that should be used in the modification to prevent ambiguity.

A revised version of this modification proposal with the updated Demand Side Unit specific text will be presented at the September 2024 GCRP.

The table below outlines the clause, the revised red-line version of the text and the revised green-line version of the text.

**A Table Outlining the Proposed Changes:**

<b>Clause</b>	<b>Red Line Version Text</b> <i>Deleted text in <del>strike-through red font</del> and new text highlighted in blue font</i>	<b>Green Line Version Text</b>
<b>CC.12.2</b>	Signals and indications required to be provided by <b>Users</b> will include but shall not be limited to the following: (a) LV switchgear positions pertinent to the status of each <b>Grid Connected Transformer</b> <del>through a set of two potential free auxiliary contacts (one contact normally open and one contact normally closed when circuit breaker is open) for each circuit breaker;</del> (b) kV at transformer low <b>Voltage</b> terminals; and (c) <del>a minimum of four sets of normally open potential free auxiliary contacts in each transformer LV bay for fault indication.</del> <b>Fault indication in each transformer LV bay.</b> [...]	Signals and indications required to be provided by <b>Users</b> will include but shall not be limited to the following: (a) LV switchgear positions pertinent to the status of each <b>Grid Connected Transformer</b> ; (b) kV at transformer low <b>Voltage</b> terminals; and (c) Fault indication in each transformer LV bay. [...]
<b>CC.12.6</b>	<b>Demand Side Unit Operators</b> and <b>Generator Aggregators</b> shall provide the <b>TSO</b> the specification of the method of aggregation of SCADA from	<b>Demand Side Unit Operators</b> and <b>Generator Aggregators</b> shall provide the <b>TSO</b> the specification of the method of aggregation of SCADA from multiple

	<p>multiple sites. The minimum specifications shall be agreed with the <b>TSO</b> in advance and shall include:</p> <p>(a) signals from <b>Demand Side Unit Operators</b>, as specified in the relevant specifications and <b>Demand Side Unit</b> specific signal lists, <del>shall be relayed to the TSO Telecommunication Interface Cabinet</del> which reflect the <b>Demand Side Unit MW Response</b> to an accuracy of within 1 MW of the actual <b>Demand Side Unit MW Response</b> shall be relayed to the <b>TSO</b> within 15 seconds of change occurring to the <b>Demand Side Unit MW Response</b>; and</p> <p>[...]</p>	<p>sites. The minimum specifications shall be agreed with the <b>TSO</b> in advance and shall include:</p> <p>(a) signals from <b>Demand Side Unit Operators</b>, as specified in the relevant specifications and <b>Demand Side Unit</b> specific signal lists, which reflect the <b>Demand Side Unit MW Response</b> to an accuracy of within 1 MW of the actual <b>Demand Side Unit MW Response</b> shall be relayed to the <b>TSO</b> within 15 seconds of change occurring to the <b>Demand Side Unit MW Response</b>; and</p> <p>[...]</p>
<p><b>PPM1.7.1.1.1</b></p>	<p><b>Signals List #1</b></p> <p>The <b>Controllable PPM</b>, excluding <b>Offshore PPMs</b>, shall make the following signals available <del>at the designated TSO Telecommunication Interface Cabinet for that Controllable PPM:</del> to the <b>TSO</b> as specified in the relevant specifications and site-specific signal lists:</p> <p>(a) <b>Active Power</b> output (MW) at the lower voltage side of the <b>Grid Connected Transformer</b>;</p> <p>(b) <b>Reactive Power</b> output/demand (+/-Mvar) at the lower voltage side of the <b>Grid Connected Transformer</b>;</p> <p>(c) Voltage (in kV) at the lower voltage side of the <b>Grid Connected Transformer</b>;</p> <p>(d) <b>Available Active Power</b> (MW) at the lower voltage side of the <b>Grid Connected Transformer</b> (including separate signals for export and import from <b>Controllable PPMs</b> consisting of <b>ESPSs</b>);</p> <p>(e) <b>Grid Connected Transformer</b> tap positions;</p> <p>(f)</p> <ol style="list-style-type: none"> <li>i. <b>Power Factor</b> control mode status feedback (ON/OFF);</li> <li>ii. <b>Power Factor</b> set-point feedback (degrees)</li> <li>iii. <b>Reactive Power</b> control code status feedback (ON/OFF);</li> <li>iv. <b>Reactive Power</b> set-point feedback (Mvar);</li> <li>v. <b>Voltage Regulation</b> control mode status feedback (ON/OFF)</li> </ol>	<p><b>Signals List #1</b></p> <p>The <b>Controllable PPM</b>, excluding <b>Offshore PPMs</b>, shall make the following signals available to the <b>TSO</b> as specified in the relevant specifications and site-specific signal lists:</p> <p>(a) <b>Active Power</b> output (MW) at the lower voltage side of the <b>Grid Connected Transformer</b>;</p> <p>(b) <b>Reactive Power</b> output/demand (+/-Mvar) at the lower voltage side of the <b>Grid Connected Transformer</b>;</p> <p>(c) Voltage (in kV) at the lower voltage side of the <b>Grid Connected Transformer</b>;</p> <p>(d) <b>Available Active Power</b> (MW) at the lower voltage side of the <b>Grid Connected Transformer</b> (including separate signals for export and import from <b>Controllable PPMs</b> consisting of <b>ESPSs</b>);</p> <p>(e) <b>Grid Connected Transformer</b> tap positions;</p> <p>(f)</p> <ol style="list-style-type: none"> <li>i. <b>Power Factor</b> control mode status feedback (ON/OFF);</li> <li>ii. <b>Power Factor</b> set-point feedback (degrees)</li> <li>iii. <b>Reactive Power</b> control code status feedback (ON/OFF);</li> <li>iv. <b>Reactive Power</b> set-point feedback (Mvar);</li> <li>v. <b>Voltage Regulation</b> control mode status feedback (ON/OFF)</li> <li>vi. <b>Voltage Regulation Set-point</b> feedback (kV);</li> </ol>

	<p>vi. <b>Voltage Regulation Set-point</b> feedback (kV);</p> <p>(g) On/off status indications for all <b>Reactive Power</b> devices exceeding 5 Mvar<sup>1</sup>;</p> <p>(h) Circuit-breaker and disconnect position indication shall be required. These may include indications from circuit-breakers on individual <b>Generation Unit</b> circuits. Signals from individual <b>Generation Unit</b> circuit-breakers shall not be required. The actual circuit-breaker and disconnect signals required shall be specified by the <b>TSO</b> at least 120 <b>Business Days</b> prior to the <b>Controllable PPM's</b> scheduled <b>Operational Date</b>;</p> <p>(i) <del>A minimum of four sets of normally open potential free auxiliary contacts in each <b>Grid Connected Transformer</b> lower voltage bay for fault indications;</del> Fault indication in each <b>Grid Connected Transformer</b> lower voltage bay; and</p> <p>(j) On/off status of <b>TSO</b> remote control enable switch, which disables the ability of the <b>TSO</b> to send commands to the <b>Controllable PPM</b>.</p> <p>For the <b>Controllable PPM's</b> where the <b>Connection Point</b> is at the HV side of the <b>Grid Connected Transformer</b>, signals a), b) and c) above will also be required from the HV side of the <b>Grid Connected Transformer</b>.</p>	<p>(g) On/off status indications for all <b>Reactive Power</b> devices exceeding 5 Mvar<sup>1</sup>;</p> <p>(h) Circuit-breaker and disconnect position indication shall be required. These may include indications from circuit-breakers on individual <b>Generation Unit</b> circuits. Signals from individual <b>Generation Unit</b> circuit-breakers shall not be required. The actual circuit-breaker and disconnect signals required shall be specified by the <b>TSO</b> at least 120 <b>Business Days</b> prior to the <b>Controllable PPM's</b> scheduled <b>Operational Date</b>;</p> <p>(i) Fault indication in each <b>Grid Connected Transformer</b> lower voltage bay; and</p> <p>(j) On/off status of <b>TSO</b> remote control enable switch, which disables the ability of the <b>TSO</b> to send commands to the <b>Controllable PPM</b>.</p> <p>For the <b>Controllable PPM's</b> where the <b>Connection Point</b> is at the HV side of the <b>Grid Connected Transformer</b>, signals a), b) and c) above will also be required from the HV side of the <b>Grid Connected Transformer</b>.</p>
<p><b>PPM1.7.1.1.2</b></p>	<p>The <b>Offshore PPM</b> shall make the following signals available <del>at the designated <b>TSO Telecommunication Interface Cabinet</b> for that <b>Offshore PPM</b></del> to the <b>TSO</b> as specified in the relevant specifications and site-specific signal lists:</p> <p>(a) <b>Active Power</b> output (MW) at the lower voltage side of the <b>Offshore Connection Transformer</b>;</p> <p>(b) <b>Reactive Power</b> output/demand (+/-Mvar) at the lower voltage side of the <b>Offshore Connection Transformer</b>;</p> <p>(c) Voltage (in kV) at the lower voltage side of the <b>Offshore Connection Transformer</b>;</p>	<p>The <b>Offshore PPM</b> shall make the following signals available to the <b>TSO</b> as specified in the relevant specifications and site-specific signal lists:</p> <p>(a) <b>Active Power</b> output (MW) at the lower voltage side of the <b>Offshore Connection Transformer</b>;</p> <p>(b) <b>Reactive Power</b> output/demand (+/-Mvar) at the lower voltage side of the <b>Offshore Connection Transformer</b>;</p> <p>(c) Voltage (in kV) at the lower voltage side of the <b>Offshore Connection Transformer</b>;</p> <p>(d) <b>Available Active Power</b> (MW) at the lower voltage side of the <b>Offshore Connection Transformer</b>;</p>

<sup>1</sup> Typically the position indication from capacitor/ SVC circuit breakers

	<ul style="list-style-type: none"> <li>(d) <b>Available Active Power</b> (MW) at the lower voltage side of the <b>Offshore Connection Transformer</b>;</li> <li>(e) On/off status indications for all <b>Reactive Power</b> devices exceeding 5 Mvar<sup>2</sup>;</li> <li>(f) Circuit-breaker and disconnect position indication shall be required. These may include indications from circuit-breakers on individual <b>Generation Unit</b> circuits. Signals from individual <b>Generation Unit</b> circuit-breakers shall not be required. The actual circuit-breaker and disconnect signals required shall be specified by the <b>TSO</b> at least 120 <b>Business Days</b> prior to the <b>Offshore PPM's</b> scheduled <b>Operational Date</b>;</li> <li>(g) Fault indications for the <b>Offshore Connection Transformer</b> lower voltage bay; and</li> <li>(h) On/off status of <b>TSO</b> remote control enable switch, which disables the ability of the <b>TSO</b> to send commands to the <b>Offshore PPM</b>.</li> </ul>	<ul style="list-style-type: none"> <li>(e) On/off status indications for all <b>Reactive Power</b> devices exceeding 5 Mvar<sup>2</sup>;</li> <li>(f) Circuit-breaker and disconnect position indication shall be required. These may include indications from circuit-breakers on individual <b>Generation Unit</b> circuits. Signals from individual <b>Generation Unit</b> circuit-breakers shall not be required. The actual circuit-breaker and disconnect signals required shall be specified by the <b>TSO</b> at least 120 <b>Business Days</b> prior to the <b>Offshore PPM's</b> scheduled <b>Operational Date</b>;</li> <li>(g) Fault indications for the <b>Offshore Connection Transformer</b> lower voltage bay; and</li> <li>(h) On/off status of <b>TSO</b> remote control enable switch, which disables the ability of the <b>TSO</b> to send commands to the <b>Offshore PPM</b>.</li> </ul>
<b>PPM1.7.1.2.1</b>	<p>Wind-powered <b>Controllable PPMs</b> comprising of <b>Wind Turbine Generators</b> with a <b>MEC</b> in excess of 10 MW shall make the following meteorological data signals available <del>at the designated TSO Telecommunication Interface Cabinet for that Controllable PPM as</del> <b>specified in the relevant specifications and site-specific signal lists:</b></p> <ul style="list-style-type: none"> <li>(a) Wind speed (at hub height or as agreed with the <b>TSO</b>) - measurand signal;</li> <li>(b) Wind direction (at hub height or as agreed with the <b>TSO</b>) - measurand signal;</li> <li>(c) Air temperature- measurand signal;</li> <li>(d) Air pressure- measurand signal.</li> </ul>	<p>Wind-powered <b>Controllable PPMs</b> comprising of <b>Wind Turbine Generators</b> with a <b>MEC</b> in excess of 10 MW shall make the following meteorological data signals available as specified in the relevant specifications and site-specific signal lists:</p> <ul style="list-style-type: none"> <li>(e) Wind speed (at hub height or as agreed with the <b>TSO</b>) - measurand signal;</li> <li>(f) Wind direction (at hub height or as agreed with the <b>TSO</b>) - measurand signal;</li> <li>(g) Air temperature- measurand signal;</li> <li>(h) Air pressure- measurand signal.</li> </ul>
<b>PPM1.7.1.2.2.1</b>	<p>Solar-powered <b>Controllable PPMs</b> with a <b>MEC</b> in excess of 10 MW shall make the following meteorological data signals available <del>at the designated TSO Telecommunication Interface Cabinet for that Controllable PPM as</del> <b>specified in the relevant specifications and site-specific signal lists:</b></p> <ul style="list-style-type: none"> <li>(a) Global Horizontal Irradiance (GHI) - measurand signal;</li> <li>(b) Diffused Horizontal Irradiance (DHI) - measurand signal;</li> </ul>	<p>Solar-powered <b>Controllable PPMs</b> with a <b>MEC</b> in excess of 10 MW shall make the following meteorological data signals available as specified in the relevant specifications and site-specific signal lists:</p> <ul style="list-style-type: none"> <li>(a) Global Horizontal Irradiance (GHI) - measurand signal;</li> <li>(b) Diffused Horizontal Irradiance (DHI) - measurand signal;</li> </ul>

<sup>2</sup> Typically the position indication from capacitor/ SVC circuit breakers

	<ul style="list-style-type: none"> <li>(c) Direct Normal Irradiance (DNI) (required for solar tracking panels only) - measurand signal;</li> <li>(d) Air temperature - measurand signal;</li> <li>(e) Back panel temperature - measurand signal;</li> <li>(f) Wind speed - measurand signal;</li> <li>(g) Wind direction - measurand signal;</li> <li>(h) Precipitation – measurand signal;</li> <li>(i) Air pressure - measurand signal.</li> </ul>	<ul style="list-style-type: none"> <li>(c) Direct Normal Irradiance (DNI) (required for solar tracking panels only) - measurand signal;</li> <li>(d) Air temperature - measurand signal;</li> <li>(e) Back panel temperature - measurand signal;</li> <li>(f) Wind speed - measurand signal;</li> <li>(g) Wind direction - measurand signal;</li> <li>(h) Precipitation – measurand signal;</li> <li>(i) Air pressure - measurand signal.</li> </ul>
<b>PPM1.7.1.2.3</b>	<p><b>Controllable PPMs</b>, in excess of 5 MW, with the exception of wind-powered and solar-powered <b>Controllable PPMs</b>, shall make relevant meteorological data signals available, which may include but are not limited to solar irradiance and tidal streams, <del>at the designated TSO Telecommunication Interface Cabinet for that Controllable PPM</del> as agreed with the <b>TSO</b> and specified in the relevant specifications and site-specific signal lists.</p> <p>The actual signals required shall be specified by the <b>TSO</b> at least 120 <b>Business Days</b> prior to the <b>Controllable PPM's</b> scheduled <b>Operational Date</b>.</p>	<p><b>Controllable PPMs</b>, in excess of 5 MW, with the exception of wind-powered and solar-powered <b>Controllable PPMs</b>, shall make relevant meteorological data signals available, which may include but are not limited to solar irradiance and tidal streams, as agreed with the <b>TSO</b> and specified in the relevant specifications and site-specific signal lists.</p> <p>The actual signals required shall be specified by the <b>TSO</b> at least 120 <b>Business Days</b> prior to the <b>Controllable PPM's</b> scheduled <b>Operational Date</b>.</p>
<b>PPM1.7.1.3.1</b>	<p>Wind-powered <b>Controllable PPMs</b> with a <b>MEC</b> in excess of 10 MW shall make the following signals available <del>at the designated TSO Telecommunication Interface Cabinet for that Controllable PPM</del> as specified in the relevant specifications and site-specific signal lists:</p> <ul style="list-style-type: none"> <li>a) Wind-powered <b>Controllable PPM Availability</b> (0-100 % signal);</li> <li>b) Percentage of <b>WTG</b> shutdown due to high wind-speed conditions (0-100 %);</li> <li>c) Percentage of <b>WTG</b> not generating due low wind-speed shutdown (0-100 %).</li> </ul>	<p>Wind-powered <b>Controllable PPMs</b> with a <b>MEC</b> in excess of 10 MW shall make the following signals available specified in the relevant specifications and site-specific signal lists:</p> <ul style="list-style-type: none"> <li>a) Wind-powered <b>Controllable PPM Availability</b> (0-100 % signal);</li> <li>b) Percentage of <b>WTG</b> shutdown due to high wind-speed conditions (0-100 %);</li> <li>c) Percentage of <b>WTG</b> not generating due low wind-speed shutdown (0-100 %).</li> </ul>
<b>PPM1.7.1.3.2.1</b>	<p>Solar-powered <b>Controllable PPMs</b> with a <b>MEC</b> in excess of 10 MW shall make the following signals available <del>at the designated TSO Telecommunication Interface Cabinet for that Controllable PPM</del> as specified in the relevant specifications and site-specific signal lists:</p>	<p>Solar-powered <b>Controllable PPMs</b> with a <b>MEC</b> in excess of 10 MW shall make the following signals available specified in the relevant specifications and site-specific signal lists:</p> <ul style="list-style-type: none"> <li>(a) Solar-powered <b>Controllable PPM Availability</b> (0-100 % signal).</li> </ul>

	(a) Solar-powered <b>Controllable PPM Availability</b> (0-100 % signal).	
<b>PPM1.7.1.3.3</b>	<p><b>Controllable PPMs</b>, with a <b>MEC</b> in excess of 5 MW, with the exception of wind-powered and solar-powered <b>Controllable PPMs</b>, shall make the following signals available <del>at the designated TSO Telecommunication Interface Cabinet for that wind-powered Controllable PPM</del> as specified in the relevant specifications and site-specific signal lists:</p> <ul style="list-style-type: none"> <li>a) <b>Controllable PPM Availability</b> (0-100 % signal);</li> <li>b) Percentage of <b>Generation Unit</b> shutdown due to high resource conditions (0-100 %);</li> <li>c) Percentage of <b>Generation Unit</b> not generating due to low resource conditions (0-100 %).</li> </ul>	<p><b>Controllable PPMs</b>, with a <b>MEC</b> in excess of 5 MW, with the exception of wind-powered and solar-powered <b>Controllable PPMs</b>, shall make the following signals available as specified in the relevant specifications and site-specific signal lists:</p> <ul style="list-style-type: none"> <li>a) <b>Controllable PPM Availability</b> (0-100 % signal);</li> <li>b) Percentage of <b>Generation Unit</b> shutdown due to high resource conditions (0-100 %);</li> <li>c) Percentage of <b>Generation Unit</b> not generating due to low resource conditions (0-100 %).</li> </ul>
<b>PPM1.7.1.3.5</b>	<p>The <b>Controllable PPM</b> consisting of <b>ESPSs</b> shall make the following signals available <del>at the designated TSO Telecommunication Interface Cabinet for that Controllable PPM</del>: as specified in the relevant specifications and site-specific signal lists:</p> <ul style="list-style-type: none"> <li>a). <b>ESPS</b> available export capacity (+MWh)</li> <li>b). <b>ESPS</b> available import capacity (-MWh)</li> </ul>	<p>The <b>Controllable PPM</b> consisting of <b>ESPSs</b> shall make the following signals available as specified in the relevant specifications and site-specific signal lists:</p> <ul style="list-style-type: none"> <li>a). <b>ESPS</b> available export capacity (+MWh)</li> <li>b). <b>ESPS</b> available import capacity (-MWh)</li> </ul>
<b>PPM1.7.1.4</b>	<p><b>Signals List #4</b></p> <p>The <b>Controllable PPM</b> shall make the following signals available <del>at the designated TSO Telecommunication Interface Cabinet for that Controllable PPM</del> as specified in the relevant specifications and site-specific signal lists:</p> <ul style="list-style-type: none"> <li>a) <b>Active Power Control Set-point</b> feedback (MW);</li> <li>b) <b>Active Power Control</b> status feedback (ON/OFF).</li> </ul>	<p><b>Signals List #4</b></p> <p>The <b>Controllable PPM</b> shall make the following signals available as specified in the relevant specifications and site-specific signal lists:</p> <ul style="list-style-type: none"> <li>c) <b>Active Power Control Set-point</b> feedback (MW);</li> <li>d) <b>Active Power Control</b> status feedback (ON/OFF).</li> </ul>
<b>PPM1.7.1.5</b>	<p><b>Signals List #5</b></p> <p>The <b>Controllable PPM</b> shall make the following signals available <del>at the designated TSO Telecommunication Interface Cabinet for that Controllable PPM</del> as specified in the relevant specifications and site-specific signal lists:</p> <ul style="list-style-type: none"> <li>a) Frequency Response Curve (i.e. <i>Power-Frequency Response Curve 1 or 2 or Mode (1 to 5)</i>);</li> <li>b) <b>Frequency Response System</b> status feedback (ON/OFF);</li> </ul>	<p><b>Signals List #5</b></p> <p>The <b>Controllable PPM</b> shall make the following signals available as specified in the relevant specifications and site-specific signal lists:</p> <ul style="list-style-type: none"> <li>a) Frequency Response Curve (i.e. <i>Power-Frequency Response Curve 1 or 2 or Mode (1 to 5)</i>);</li> <li>b) <b>Frequency Response System</b> status feedback (ON/OFF);</li> </ul>

	c) <b>Frequency Response System Governor Droop</b> feedback (%) (for a <b>Controllable PPM</b> consisting of ESPSSs, c) is not applicable).	c) <b>Frequency Response System Governor Droop</b> feedback (%) (for a <b>Controllable PPM</b> consisting of ESPSSs, c) is not applicable).
PPM1.7.1.6	<p><b>Time Delays and Data Quality</b></p> <p>Digital signal changes from the <b>Controllable PPM</b> shall be relayed to the <b>TSO Telecommunication Interface Cabinet</b>, as per the relevant specifications and site-specific signal lists, within 1 second of the associated change of state event. Analogue signal changes shall be relayed within 5 seconds and with an error of 0.5% or less, with the exception of the Meteorological Data required as per PPM1.7.1.2, which shall be updated within 5 seconds and shall be accurate at least 97.5% of the time over a rolling 12-month period.</p>	<p><b>Time Delays and Data Quality</b></p> <p>Digital signal changes from the <b>Controllable PPM</b> shall be relayed to the <b>TSO</b>, as per the relevant specifications and site-specific signal lists, within 1 second of the associated change of state event. Analogue signal changes shall be relayed within 5 seconds and with an error of 0.5% or less, with the exception of the Meteorological Data required as per PPM1.7.1.2, which shall be updated within 5 seconds and shall be accurate at least 97.5% of the time over a rolling 12-month period.</p>
PPM1.7.2.2	<p><b>Active Power Control</b></p> <p>An <b>Active Power Control Set-point</b> signal shall be sent by the <b>TSO</b> to the <b>PPM Control System</b>. This set-point shall define the maximum <b>Active Power</b> output permitted from the <b>Controllable PPM</b>. The <b>PPM Control System</b> shall be capable of receiving this signal and acting accordingly to achieve the desired change in <b>Active Power</b> output. This signal shall be in the form <del>of a single analogue value and a strobe pulse to enable</del>, as specified in the relevant specifications and site-specific signal lists.</p> <p>The <b>Controllable PPM</b> is required to make it possible for the <b>TSO</b> to remotely enable/ disable the <b>Active Power Control</b> function in the <b>PPM Control System</b>. The associated status indication is described in PPM1.7.1.4.</p>	<p><b>Active Power Control</b></p> <p>An <b>Active Power Control Set-point</b> signal shall be sent by the <b>TSO</b> to the <b>PPM Control System</b>. This set-point shall define the maximum <b>Active Power</b> output permitted from the <b>Controllable PPM</b>. The <b>PPM Control System</b> shall be capable of receiving this signal and acting accordingly to achieve the desired change in <b>Active Power</b> output. This signal shall be in the form as specified in the relevant specifications and site-specific signal lists.</p> <p>The <b>Controllable PPM</b> is required to make it possible for the <b>TSO</b> to remotely enable/ disable the <b>Active Power Control</b> function in the <b>PPM Control System</b>. The associated status indication is described in PPM1.7.1.4.</p>
PPM1.7.2.4	<p><b>Voltage Regulation</b></p> <p>The following signals shall allow the <b>TSO</b> to select <b>Reactive Power</b> control mode and send <b>Reactive Power</b> control set-points to the <b>Voltage Regulation System</b>. Set-point signals shall be in the form <del>of a single analogue value and a strobe pulse to enable</del>, as specified in the relevant specifications and site-specific signal lists.</p> <ul style="list-style-type: none"> <li>• <b>Power Factor</b> control mode with <b>Power Factor</b> set-point (PF set-point)</li> <li>• <b>Reactive Power</b> control mode with <b>Reactive Power</b> set-point (Q set-point)</li> <li>• <b>Automatic Voltage Regulation</b> control mode with <b>Voltage Regulation Set-point</b> (kV set-point)</li> </ul>	<p><b>Voltage Regulation</b></p> <p>The following signals shall allow the <b>TSO</b> to select <b>Reactive Power</b> control mode and send <b>Reactive Power</b> control set-points to the <b>Voltage Regulation System</b>. Set-point signals shall be in the form as specified in the relevant specifications and site-specific signal lists.</p> <ul style="list-style-type: none"> <li>• <b>Power Factor</b> control mode with <b>Power Factor</b> set-point (PF set-point)</li> <li>• <b>Reactive Power</b> control mode with <b>Reactive Power</b> set-point (Q set-point)</li> <li>• <b>Automatic Voltage Regulation</b> control mode with <b>Voltage Regulation Set-point</b> (kV set-point)</li> </ul>



<b>PPM1.7.2.6.1</b>	Digital output commands from the <del>TSO-Telecommunication Interface Cabinet</del> shall be relayed to the <b>Controllable PPM</b> equipment within 1 second. Set-point output signals shall be relayed within 5 seconds and with an error of 0.5% or less.	Digital output commands from the <b>TSO</b> shall be relayed to the <b>Controllable PPM</b> equipment within 1 second. Set-point output signals shall be relayed within 5 seconds and with an error of 0.5% or less.
<b>PPM1.7.4.1</b>	The location of the <del>TSO-Telecommunication Interface Cabinet</del> telecommunication interface equipment shall be agreed between the <b>TSO</b> and the <b>Controllable PPM</b> <del>at least 120 Business Days prior to the Controllable PPM's scheduled Operational Date</del> early in the design stage post connection offer acceptance. A standard interface for signals will be made available to the <b>Controllable PPM</b> by the <b>TSO</b> .	The location of the <b>TSO</b> telecommunication interface equipment shall be agreed between the <b>TSO</b> and the <b>Controllable PPM</b> early in the design stage post connection offer acceptance. A standard interface for signals will be made available to the <b>Controllable PPM</b> by the <b>TSO</b> .
<b>Definition: TSO Telecommunication Interface Cabinet</b>	<del>The physical interface point between the TSO's telecommunications equipment and the Controllable PPM's control equipment.</del>	