Least Regrets Analysis

• Assessment of the five future worlds has identified areas of common functionality between the worlds

• These areas could present opportunities to implement aspects of smart grid now

• We are interested in your thoughts on this work to inform our next steps
Defining Least Regrets - Process

• SGAM Modelling

• List of all activities common to 5 worlds

• Workshops to assess those areas already covered by ON/other industry work – see Appendix

• Highlight areas that are not being addressed and prioritise with advisory group input

• Allocate to Work Streams to assess as potential products for 2019
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Least Regrets by Function
Areas of no regrets tend to be aligned with achieving whole-system objectives through long-term planning establishing regulatory frameworks.
<table>
<thead>
<tr>
<th>Function</th>
<th>Potential Product Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Coordination</td>
<td>• Define guaranteed standards of performance between DSO and ESO for utilising flexibility on the distribution network&lt;br&gt;• Define the IDNO/IDSO role in the Smart Grid&lt;br&gt;• Create consistent Outage Plans across the networks&lt;br&gt;• Design a consistent and effective feedback loop for those providing services – e.g. ratings/penalties?</td>
</tr>
<tr>
<td>Investment Planning</td>
<td>• Design Contracts and Terms &amp; Conditions for procuring ancillary services (DER)&lt;br&gt;• Create a visible measure of flexibility on the networks&lt;br&gt;• Present customer information of opportunities in a consistent way – heatmaps etc.&lt;br&gt;• Should there be a design standard for generation in the same way as there is for demand? (P2) (similar to SQSS)</td>
</tr>
</tbody>
</table>
## Least Regrets by Function

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<thead>
<tr>
<th>Function</th>
<th>Potential Product Areas</th>
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</table>
| Network Operation              | • Unified approach to LV system monitoring and visibility of data  
                                 | • Unified approach to Voltage Level monitoring  
                                 | • Consistent methodology/approach for the management of constraints  
                                 | • Consistent approach on the use of Dynamic Stability Mechanisms (to manage power quality) utilising ancillary services  
                                 | • Publishing timely and consistent outage data  
                                 | • What level of data should be visible at an operational level? |
| System Defence and Restoration | • Protocols for short-term contingency planning between DSO & ESO utilising ancillary services  
                                 | • Designing last-resort mechanisms (shift from market-led to control-led). What constitutes market failure?  
                                 | • Designing Whole System Network Resilience and Defence Mechanisms with ancillary services  
<pre><code>                             | • ‘Islanding’ Mechanisms/‘Islanded’ Networks |
</code></pre>
<table>
<thead>
<tr>
<th>Function</th>
<th>Potential Product Areas</th>
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<tbody>
<tr>
<td>Services and Market Facilitation</td>
<td>• Develop consistent best practice for end to end process of procurement, activation, dispatch and settlement of D-network connected flexibility</td>
</tr>
<tr>
<td></td>
<td>• Consistency in exchanging real-time T &amp; D network operational data across networks</td>
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<td></td>
<td>• Universal contract for flexibility providers</td>
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<td></td>
<td>• Develop good practice and consistency for post-event evaluation – review service provision</td>
</tr>
<tr>
<td>Service Optimisation</td>
<td>• Contract Process</td>
</tr>
<tr>
<td></td>
<td>• Activation, dispatch and settlement</td>
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<tr>
<td></td>
<td>• Review and rate flexibility service provider</td>
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<td></td>
<td>• Scope out mechanics for activation of last resort provision under market failure – notification, dispatch and reporting.</td>
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<tr>
<td></td>
<td>• Development and activation of emergency assistance services under market failure.</td>
</tr>
</tbody>
</table>
## Least Regrets by Function

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<th>Potential Product Areas</th>
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</thead>
</table>
| Connections and Connection Rights | • Design a common Connection Agreement & Flexibility Agreement  
• Assess impact of distribution network ancillary services on agreements DSO has with ESO at boundary  
• Do contracts for Transmission-connected services need to be reviewed?  
• Defining firmness of connection for commercial customers as part of the connection agreement  
• Should we trial secondary markets for capacity etc.?  
• Should we trial a combined platform?                                                                 |
| Charging                        | • Should a review of BSUOS (e.g. to include more forward looking signals) be included in the current charging review?  
• How do you achieve increased visibility and consistency, including network impact, as part of the charging review?  
• Ensuring POC Analysis and Cost Calculations are consistent.                                                                                                                                 |

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Least Regrets Next Steps
Least Regrets - Next Steps

- All of the outputs from Least Regrets have been considered for the 2019 PID

- Potential products assessed by Workstream leads on a range of criteria including technical feasibility, timescales, alignment with ON objectives, 3rd Party interests

- Priority Least Regrets areas from the above criteria to become products included in 2019 PID

- Least Regrets areas not being progressed, deferred or progressed by other areas of the industry to be summarised after finalisation of the 2019 PID
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Least Regrets Appendix
## Existing Products

<table>
<thead>
<tr>
<th>Function</th>
<th>Current ON Products</th>
<th>Other Working Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>System Coordination</strong></td>
<td><strong>WS1 2</strong> DER Services Procurement</td>
<td>• EU Network Codes SOGL/TERRE</td>
</tr>
<tr>
<td></td>
<td><strong>WS1 3</strong> Industry Framework Interaction</td>
<td>• SNAPS</td>
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<td></td>
<td><strong>WS1 8</strong> System-Wide Resources Register</td>
<td>• Regional Development Plans</td>
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<tr>
<td></td>
<td><strong>WS1 12</strong> Data Requirements</td>
<td>• Power Potential</td>
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<tr>
<td></td>
<td><strong>WS1 13</strong> Operational Data &amp; Control Architectures</td>
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<td></td>
<td><strong>WS1 1</strong> Investment Processes</td>
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<tr>
<td></td>
<td><strong>WS1 2</strong> DER Services Procurement</td>
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<td></td>
<td><strong>WS1 5</strong> Whole System FES</td>
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<td></td>
<td><strong>WS1 6</strong> Regional Service Requirements</td>
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<td><strong>WS1 8</strong> System-Wide Resources Register</td>
<td></td>
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<td></td>
<td><strong>WS1 9</strong> TSO-DSO Transmission Impacts</td>
<td></td>
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<tr>
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<td><strong>WS1 12</strong> Data Requirements</td>
<td></td>
</tr>
<tr>
<td><strong>Investment Planning</strong></td>
<td><strong>WS1 1</strong> Investment Processes</td>
<td>• Individual Distribution-level Initiatives – CMZ’s etc.</td>
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<tr>
<td></td>
<td><strong>WS1 2</strong> DER Services Procurement</td>
<td>• P2 Working Group EWTR130</td>
</tr>
<tr>
<td></td>
<td><strong>WS1 5</strong> Whole System FES</td>
<td>• SQSS Working Group &amp; SQSS Panel</td>
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<tr>
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<td><strong>WS1 6</strong> Regional Service Requirements</td>
<td>• Regional Development Plans</td>
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<td></td>
<td><strong>WS1 8</strong> System-Wide Resources Register</td>
<td>• WPD Strategic Study</td>
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<td><strong>WS1 9</strong> TSO-DSO Transmission Impacts</td>
<td>• Flexibility Roadmap</td>
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<td><strong>WS1 12</strong> Data Requirements</td>
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<td>Network Operation</td>
<td><strong>WS1 2</strong> DER Services Procurement</td>
<td>• RfG &amp; RoCoF</td>
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<tr>
<td></td>
<td><strong>WS1 7</strong> ANM Information</td>
<td>• G89 and G99</td>
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<td><strong>WS1 13</strong> Operational Data &amp; Control Architectures</td>
<td>• SMETS Data</td>
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<td></td>
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<td>• LCT Group – management of LCT</td>
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<td>• Thermal and voltage – BAU by DNO</td>
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<td></td>
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<td>• CNAIM – visibility of assets</td>
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<td>• NG EFR EFCC Project</td>
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<tr>
<td>System Resilience</td>
<td><strong>WS1 2</strong> DER Services Procurement</td>
<td>• RoCoF/RfG/DCode</td>
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<td><strong>WS1 4</strong> Reliability Standards and Emergency Requirements</td>
<td>• Fault Ride Through</td>
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<td><strong>WS1 12</strong> Data Requirements</td>
<td>• NG Code Mod for Storage</td>
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<tr>
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<td><strong>WS1 13</strong> Operational Data &amp; Control Architectures</td>
<td>• LFDD Group</td>
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<td>• Emergency Planning Managers Forum</td>
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<td>• Emergency &amp; Restoration Code</td>
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<td>• Protection Approval Panel</td>
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<td></td>
<td></td>
<td>• NPG Microgrid Project</td>
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<td>• NINES (SSEN)</td>
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<td></td>
<td></td>
<td>• NG ‘Synthesised Inertia’</td>
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<td></td>
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<td>• NG &amp; Scottish Power NIC Project on Black Start</td>
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</tbody>
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<tr>
<td>Services – Market Facilitation</td>
<td>• <strong>WS1 P13</strong></td>
<td>• Existing DNO Activities – Piclo, Flexible Power, CMZ</td>
</tr>
<tr>
<td></td>
<td>• <strong>WS1 P13</strong> (focussed on principles of resolving conflicts b/w T&amp;D)</td>
<td>• Ofgem are already considering this for RIIO 2.</td>
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<td></td>
<td>• <strong>WS1 P8</strong> (system wide resource register)</td>
<td>• BAU (RDPs)</td>
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<td>• Project Entire</td>
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<td></td>
<td>• ICCP (int’l std for linking DERMS. being used by some DNOs).</td>
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<tr>
<td>Services – Service Optimisation</td>
<td></td>
<td>• CFF</td>
</tr>
<tr>
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<td>• <strong>WS1 P1 (NOA)</strong> + existing derogation process</td>
</tr>
</tbody>
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## The Voice of the Networks

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<td><em>WS1 7</em> ANM Information</td>
<td>• EU Code (RfG, DCC, HVDCC) - Moving to harmonised T&amp;Cs</td>
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<td><em>WS1 8</em> System-Wide Resources Register</td>
<td>• Storage – Grid Code GC96 &amp; DCode</td>
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<tr>
<td></td>
<td><em>WS1 9</em> TSO-DSO Transmission Impacts</td>
<td>• BAU site specific flexibility by DNOs (firm and non-firm)</td>
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<td><em>WS1 11</em> Facilitating Connections – Action Plan</td>
<td>• CUSC Mod 298 on SoW</td>
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<td><em>WS2 4</em> Information on Flexibility Services</td>
<td>• Ofgem Summer Consultation – Access Reform Project</td>
</tr>
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<td></td>
<td><em>WS2 5</em> Good Practice following Connection Apps</td>
<td>• Principle of access report from Flexible Plug and PlayTERRE Mod &amp; P344</td>
</tr>
<tr>
<td></td>
<td><em>WS2 6</em> Guidance on Post Connection Changes</td>
<td>• MARI, FCR, FRR, RR</td>
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<td><em>WS2 7</em> Provision of Constraint Information</td>
<td>• BM Access and ESO Strategy</td>
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<td><em>WS2 2017</em> Paper on Connection Options</td>
<td>• Piclo</td>
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<tr>
<td></td>
<td><em>WS4 1</em> Connection Charges for Flexible Connections</td>
<td>• Power Responsive</td>
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<tr>
<td></td>
<td></td>
<td>• Flexible Power</td>
</tr>
<tr>
<td></td>
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<td>• Transition, EFFS and Fusion</td>
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| Charging | **WS4 1** Connection Charges for Flexible Connections  
**WS1 9** TSO-DSO Transmission Impacts | • Ofgem Access Reform Project & TCR – DUOS and TNUOS |