

Strategic Incentives 2020 Proposals Consultation

9 March 2020



Strategic Incentives 2020

We are in a time of unprecedented change on the electricity system as we move to a low carbon future. EirGrid is at the forefront of guaranteeing that this change is brought about in a timely and cost effective manner while realising a wide range of benefits for end users and market participants. We do this by maintaining a safe, secure and reliable power system while integrating an ever increasing number of renewables. This is supported by our development of a wide variety of innovative projects and the roll out of new system services. The CRU recognised this in its Price Review 4 (PR4) Decision (CER/15/296) through the provision of a €5m allowance for strategic incentives.

The framework for these strategic incentives was further elaborated on in the CRU's 2018 Information Paper on PR4 Reporting and Incentives (CER/18/087). The decision states that the 'TSO shall be subject to a financial incentive on delivery against its strategic objectives relating to its role in supporting and managing the transition to a low carbon energy system', that 'Performance shall be measured through an annual assessment of evidence submitted by the TSO, against objectives and criteria endorsed by the CRU, and reflecting stakeholder input'.

This paper sets out EirGrid's strategic incentive proposals for calendar year 2020. As per the CRU's direction we have focused on outcome based indicators, and where these are intermediate have sought to clearly articulate the link between the input and the outcome. It is important to note that the vast majority of EirGrid's work in this area is based on multi-year projects and while the system is in a period of rapid change, the transition will not happen overnight. Nevertheless, to ultimately deliver the transition to a low carbon energy system, there are critical milestones which we must achieve in each year. The works we aim to complete over the coming years will lead to beneficial outcomes for market participants and end users for many years into the future. Our proposals reflect these complexities.

In summary our proposals for 2020 cover the following, under the broad headings provided by the CRU in Annex F of CER/18/087:

“Managing the impact and costs of the energy transition”

- Procurement of additional volume / capability for the 12 existing services from new and existing service providers;
- Deployment of Distributed Series Reactors (DSRs); and
- Digital Performance Monitoring System.*

“Delivering the Energy Transition”

- Increase SNSP:
 - RoCoF setting changes completed for all TSO/DSO connected parties in Ireland;

- Introduction of a number of Decision Making Tools to the Control Centre;
- Achieve planning consent and project agreement with ESNB for the Voltage Uprate Trial;
- Type testing initiated to add Composite Poles to the Innovation Toolbox for the use in the Transmission Network;
- Complete QTP 2020 tender process and issue 3 month progress report;
- Establish and mobilise the DS3+ programme;* and
- Facilitate FlexTech industry forum 2 and 3.*

**New in 2020*

How to get involved

Seeking the input of stakeholders is incredibly important to EirGrid and we now seek your views on that which we have proposed as strategic incentives for 2020. The total strategic incentive allowance available in 2020 is €1.68m. We have not apportioned any value to the individual proposals at this time, as we believe that your views are an important factor in setting these. We would ask that as part of your response, you would rank the incentives in terms of importance. Having taken account of all feedback, we will submit a final proposal to the CRU. This paper will include apportionment of the €1.68m taking into account all feedback received.

All responses should be submitted to regulation@eirgrid.com by 3 April 2020.

Managing the impact and costs of the energy transition

Reduced Energy Costs	
2019 Deliverable	System Services - <i>Delivery of Fixed Contracts arrangements.</i>
Proposed Deliverables 2020	System Services - Procurement of additional volume / capability for 12 existing services from new and existing service providers.
Incentive Value proposed	TBC – Stakeholders are invited to provide their views on the ranking of importance of the proposals and the proportion of the €1.68m pot that should be attributed to them.
Rationale for the incentive value propose	One of the key work streams in the DS3 Programme is the System Services work stream. The aim of the System Services work stream is to put in place the correct structure, level and type of services in order to ensure that the system can operate securely with higher levels of non-synchronous renewable generation (up to 75% instantaneous penetration).
Outcomes for Customers (Costs & Service Quality, e.g. constraint costs)	Operating in the manner described above will reduce the level of curtailment for wind (and solar) farms and should deliver significant savings to consumers through lower wholesale energy prices.
Outcomes for Market participants (commercial certainty & market opportunities)	The System Services work stream will improve the technical capability of the generation fleet and the system more generally by incentivising capability valuable to the system at high levels of renewable penetration there delivering value to consumers and a secure, sustainable power system.
Benchmarks or Target Levels (e.g. timing, cost or quality of energy transition)	Volume Uncapped Gate 2 and 3 milestones for 2020: <u>Gate 2</u>

	<ul style="list-style-type: none"> • Contract Execution Date for 12 Services - 1 April 2020 <u>Gate 3</u> <ul style="list-style-type: none"> • Publication OJEU Notice for 12 Services April 2020 • Contract Execution Date for 12 Services - 1 October 2020
link between input and outcome if proposing intermediate outcomes	N/A
Relationship between metric and behaviour of TSO	DS3 System Services aims to provide a framework for industry to invest in technology to provide those services. In some cases investment decisions may be entirely based on system services revenues. The TSO therefore has a responsibility to progress these arrangements in a timely manner, in order to facilitate delivery to the system.
2021 Indicative deliverable	Volume Uncapped Gate No 4. Anticipated Contract execution date April 2021 Volume Uncapped Gate No 5. Anticipated Contract execution date October 2021
Stakeholder views/engagement/consideration	

Reduced Network Costs	
2019 Deliverables	<p>Distributed Power Flow Control Deployment of Distributed Series Reactors (DSRs)</p> <ul style="list-style-type: none"> • Complete the public procurement phase and award the contract • Completion of a reduced Line Project Assessment Report (LPAR) for the circuit • Identify and confirm circuit for deployment of DSRs and achieve capital approval from the TIC (Assuming LPAR confirms circuit is suitable)
Proposed Deliverables 2020	<p>Distributed Power Flow Control</p> <ul style="list-style-type: none"> • Complete Gateway paper for deployment of DSRs on selected OHL. • Issue revised CPP to ESNB for deployment of DSRs on selected OHL. • Prepare Implementation plan and scoping of project in collaboration with ESNB and vendor. • Secure outage window for 2021 outage plan
Incentive Value proposed	TBC – Stakeholders are invited to provide their views on the ranking of importance of the proposals and the proportion of the €1.68m pot that should be attributed to them.
Rationale for the incentive value propose	Distributed Series Reactors are distributed power flow control devices that operate by diverting power flows to under-utilised circuits (overhead lines and underground cables), thereby maximising the use of the existing transmission network and potentially avoiding or deferring network investment.
Outcomes for Customers (Costs & Service Quality, e.g. constraint costs)	<ul style="list-style-type: none"> • Optimisation of transmission assets - The DSRs operate by diverting power flows to underutilised assets, maximising the use of existing transmission network. • Modular – Ecologically sensitive areas can be avoided i.e. the devices can be installed anywhere along the line as electrically the effect is identical. <p>The TSO expects that deploying the power flow controllers will reduce the need for new network infrastructure, provide long term cost savings for society while reducing impacting amenity of citizens from future network requirements.</p>

Outcomes for Market participants (commercial certainty & market opportunities)	If successful, distributed power flow controllers could be deployed to alleviate system constraints and allow for increased output from wind generation (or other high merit order generation).
Benchmarks or Target Levels (e.g. timing, cost or quality of energy transition)	<p>Since 2013, the TSO and the DSO have jointly been investigating the use of Distributed Series Reactors (DSRs) on Transmission System OHLs to resolve existing or anticipated thermal loading issues.</p> <p>Following on from the successful small scale trials of DSR technology on the Cullenagh – Waterford 110 kV circuit, this technology is being proposed for full scale deployment onto the transmission network.</p> <p>Target deployment year is 2021.</p>
link between input and outcome if proposing intermediate outcomes	If initial deployment successful the devices will be incorporated into TSO technology toolbox and network planning process and therefore maximising the use of the existing transmission network and potentially avoiding or deferring network investment.
Relationship between metric and behaviour of TSO	Optimisation of transmission assets is achieved by improving the distribution of power flow across existing circuits and this can be achieved by deploying power flow controllers.
2021 Indicative deliverable	Commence testing and validation phase in National Control Centre.
Stakeholder views/engagement/consideration	

Reduced System Service Costs	
	2020
2019 Deliverables	N/A
Proposed Deliverables 2020	<p>Digital Performance Monitoring System (DPMS)</p> <p>Deliverable: Detailed business requirements completed and procurement initiated.</p> <p><i>Digital Performance Monitoring System (DPMS): Is a highly automated and auditable system required to effectively manage the performance monitoring of 14 systems services¹, and any new services, across a diverse range of providing technologies. DPMS is an evolution of the existing systems that will facilitate the performance monitoring of an increased volume of services and providing units as we transition to operating the system to 90% SNSP.</i></p>
Incentive Value proposed	TBC – Stakeholders are invited to provide their views on the ranking of importance of the proposals and the proportion of the €1.68m pot that should be attributed to them.
Rationale for the incentive value propose	The SEM Committee Information Paper on the DS3 System Services Future Programme Approach ² provided for the establishment of a 'glide path' for the increased expenditure on DS3 System Services through to 2020. In 2019, expenditure on services will be sanctioned up to a cap of €195 million. This rises to €235 million for 2020. Given the potential expenditure, it is deemed imperative that units are properly incentivised to perform as required and that payments are reduced where poor performance is identified.

¹ The TSO currently procures 12 system services, the additional services “DRR” and “FPFAPR” will be procured in line with system requirements.

² SEM Committee Information Paper on the DS3 System Services Future Programme Approach

<https://www.semcommittee.com/sites/semcommittee.com/files/media-files/SEM-17-017%20DS3%20System%20Services%20Future%20Approach%20Information%20Paper.pdf>

Outcomes for Customers (Costs & Service Quality, e.g. constraint costs)	DPMS will play an important role in providing value for money to the end consumer in ensuring that service providers not meeting their contractual requirements are not overpaid.
Outcomes for Market participants (commercial certainty & market opportunities)	With the implementation of a highly automated and auditable system which operates in line with the DS3 system services protocols, it is envisaged that providing units will have increased confidence in the performance assessments reports generated. DPMS will be a single repository for each providing unit's assessment reports and data packs, this should result in a proportional reduction in the number of queries and disputed outcomes arising out of the performance monitoring process.
Benchmarks or Target Levels (e.g. timing, cost or quality of energy transition)	DPMS should be initiated during 2020 as per the SEM Committee decision paper on DS3 System Services Procurement Design and Emerging Thinking ³ . In order to deliver what was outlined in this decision the TSO needs to take the actions outlined so that the system operates in the most efficient manner for all stakeholders.
link between input and outcome if proposing intermediate outcomes	<p>There is far greater reliance now on units behaving as expected, as the envelope of system operation is pushed towards its limits (i.e. less inertia, higher rates of change of frequency, very high levels of non-synchronous plant).</p> <p>The DPMS will manage the performance monitoring of systems services in an efficient manner which ensures that units are properly incentivised, that payments are reduced where poor performance is identified and delivers value for money for the end consumer.</p>
Relationship between metric and behaviour of TSO	The power system is undergoing a large change, and it will continue to be transformed as we seek to decarbonise the system. To manage the transformation it is essential that a detailed

³ SEM Committee Decision Paper on DS3 System Services Procurement Design and Emerging Thinking
<https://www.semcommittee.com/sites/semcommittee.com/files/media-files/SEM-14108%20DS3%20System%20Services%20Decision%20Paper.pdf>

	understanding of the changing characteristics of the power system is developed. At the core of this understanding is the need to systematically monitor the actual performance of all users over a wide range of operating conditions and disturbances.
2021 Indicative deliverable	The delivery of the 2021 project milestones that are identified within the detailed business requirements developed in 2020.
Stakeholder views/engagement/consideration	

Delivering the Energy Transition

Increasing SNSP	
2019 Deliverables	<p>The target of moving to 75% SNSP on an enduring basis is critical to facilitating renewable generation and ensuring that Ireland’s renewable energy targets are met while maintaining a safe, secure and reliable electricity system. In 2019, we aim to achieve a number of milestones which will pave the way for the planned move to 75% by the end of 2021. These are:</p> <ul style="list-style-type: none"> • RoCoF setting changes complete for all TSO & DSO connected parties in Ireland • Introduction of a number of Decision Making Tools to the Control Centre
Proposed Deliverables 2020	<p>The target of moving to 75% SNSP on an enduring basis is critical to facilitating renewable generation and ensuring that Ireland’s renewable energy targets are met while maintaining a safe, secure and reliable electricity system. In 2020, we aim to achieve a number of milestones which will pave the way for the planned move to 75% by 2021. These are:</p> <ul style="list-style-type: none"> • Deploy new policy to Control Centre to Start 70% Trial • RoCoF Transition 0.5 to 1 Hz/s Phase2 Trial Commencement • Implementation of a number of Decision Making Tools to the Control Centre
Incentive Value proposed	TBC – Stakeholders are invited to provide their views on the ranking of importance of the proposals and the proportion of the €1.68m pot that should be attributed to them.
Rationale for the incentive value propose	The TSO has a responsibility to enable increased levels of renewable energy generation on the power system while making sure that the system is operated safely and securely. In 2010 our analysis identified 50% as the then maximum allowable level of renewable generation on the power system, referred to as the System Non Synchronous Penetration (SNSP) limit.

	<p>The DS3 programme has enabled SNSP to be increased to 65%, on a permanent basis from 9 April 2018. EirGrid TSO will work with SONI TSO to increase the all-island SNSP limit in the coming years to 75% by 2021. Actions taken by the TSO in 2020 will include RoCoF Transition 0.5 to 1 Hz/s Phase 1 Trial completion, deploying a new policy to Control Centre to Start 70% Trial and introducing a number of Decision Making Tools to the Control Centre. These changes will have a material impact on the ability of the system to facilitate more renewable generation, will support Ireland in reaching its policy targets and will reduce wind curtailment.</p>
<p>Outcomes for Customers (Costs & Service Quality, e.g. constraint costs)</p>	<p>Actions taken by the TSO in 2020 will include RoCoF Transition 0.5 to 1 Hz/s Phase 1 Trial completion, deploying a new policy to Control Centre to Start 70% Trial and introducing a number of Decision Making Tools to the Control Centre. These changes will have a material impact on the ability of the system to facilitate more renewable generation, will support Ireland in reaching its renewables targets and will reduce wind curtailment which will in long medium term reduce the level of renewable constraint on the system and potentially place downward pressure on energy costs.</p> <p><u>RoCoF Trial Completion</u></p> <p>As we facilitate increasing levels of renewables, at levels which are in excess of other comparable systems, the inertia will continue to decrease which will lead to increased rates of RoCoF during system events. As such, the level of RoCoF which the system in Ireland can withstand (without system instability) need to be increased. If it is not increased across the island as a whole, this parameter will become a binding limit of the system and limit the amount of renewable energy which can be accommodate on the system at any given time.</p> <p>Increasing the levels of RoCoF that can be safely accommodated is a critical element of the DS3</p>

programme. Such an increase in standards will lead to lower wind curtailment, will significantly contribute to meeting public policy objectives and will drive down system expenditure, which will ultimately benefit the consumer.

Control Centre Tools

The projected increase in electricity production from renewable sources, in particular wind and solar energy, will have significant implications for the control of system voltages in steady-state and transient scenarios. Similarly, the future generation portfolio will create considerable challenges for system frequency control. Given the increased complexity involved in operating the power system, there will be increased focus required on tools to assist with situational awareness and decision - making in the control centres.

This DS3 Control Centre Tools project will deliver a suite of Control Centre Tools to enhance the stability analysis, voltage control and frequency management capability of the control centre. This capability enhancement is critical to facilitate increased levels of SNSP.

New Operational Policy (70% SNSP)

The operational challenges associated with managing high levels of renewable generation on an island power system with limited interconnection are considerable.

The way electricity is generated and transported is changing and will continue to change. Developing solutions to the challenges associated with the shift in the electricity sector such as increasing levels of renewable generation, particularly with regard to secure power system operation, will require significant amounts of detailed analysis to be undertaken. Analysis will be carried out to deliver a new operational policy for operating the system to 70% SNSP.

	<p>Changes to Operational Policy undergo a two-stage review process under the Operational Policy Review Committee (OPRC). The first stage is Pre-OPRC review panel made up of designated senior OPI staff members who are nominated by OPR managers as subject matter experts. The second stage is the OPRC meeting which comprises of managers in the Operations, Planning and Innovation function who assess and approve any new policy changes brought forward.</p> <p>Analysis will be carried out to deliver a new operational policy for operating the system to 70% SNSP and it will be brought to the OPRC for approval.</p>
<p>Outcomes for Market participants (commercial certainty & market opportunities)</p>	<p>This programme of work provides a clear investment signal; market participants can decide to position themselves to take advantage of the higher SNSP levels by participating in the system services arrangements or the capacity market.</p> <p>This programme of works also aims to reduce wind curtailment on the system.</p>
<p>Benchmarks or Target Levels (e.g. timing, cost or quality of energy transition)</p>	<p><u>Deploy new policy to Control Centre to Start 70% Trial</u></p> <ul style="list-style-type: none"> • Complete 70% Study by March 2020 • Create 70% Policy by April 2020 • Get 70% policy approve for Control Centre deployment by May 2020 • Deploy new policy to Control Centre to Start 70% Trial by November 2020 <p><u>RoCoF settings changed</u></p> <ul style="list-style-type: none"> • TSOs Confirm that 1 Hz/s Operational Policy by November 2020 <p><u>Control Centre Tools</u></p> <ul style="list-style-type: none"> • Ramping tool (enduring) live in the Control Centre by October 2020 • Look Ahead Stability Assessment tool live in the Control Centres by May 2020

	<ul style="list-style-type: none"> • Voltage Trajectory Tool live in the Control Centres by October 2020
link between input and outcome if proposing intermediate outcomes	<p>These milestones will bring about immediate benefits to the Irish electricity system and all its users. They will also significantly assist in one of the TSO's primary objectives in supporting the transition to a low carbon energy system which is the facilitation of 75% SNSP on the system on an enduring basis by the end of 2021</p>
Relationship between metric and behaviour of TSO	<p><u>RoCoF settings changed</u></p> <p>Should the level of RoCoF which the system in Ireland can withstand (without system instability) not be increased, this parameter will become a binding limit of the system. As such, there will be increased times where the TSO will need to curtail wind to ensure that the RoCoF rates experienced do not lead to system instability.</p> <p><u>Control Centre Tools</u></p> <p>Tools expected to be live in the Control Centre by the end of 2020 are:</p> <p>Look-Ahead WSAT: enables Grid Controllers to analyse the stability of the power system in the near future, facilitating optimal system operation with higher levels of wind integration.</p> <p>Voltage Trajectory Tool: enables Grid Controllers to assess the impact of varying sources of reactive power across the power system to ensure that local voltage management issues are managed.</p> <p>Ramping Tool: enables Grid Controllers to accurately schedule and dispatch the Ramping Margin services, and manage changing demand and generation profiles, with increased wind integration.</p>

	<p>It is the TSO's responsibility to have these tools in place.</p> <p><u>Deploy a new policy to Control Centre to Start 70% Trial</u></p> <p>Maintaining the resilience of the power system through the natural changes of day to day life including weather, outages, demand behaviour so that energy supply is not interrupted is core remit of the TSO. A structured operational policy review mechanism allows for changes to operations to be made in a prudent manner.</p>
2021 Indicative deliverable	TSO to confirm 75% SNSP Operational Policy in place in 2021.
Stakeholder views/engagement/consideration	

Enhanced Grid Utilisation	
2019 Deliverables	<p>Innovative Infrastructure Solutions</p> <p><u>Voltage Uprate Trial</u></p> <ul style="list-style-type: none"> • Achieve planning consent for the installation of the new towers. • Achieve Project Agreement with ESNB to enter into the construction phase. <p><u>Composite poles</u></p> <ul style="list-style-type: none"> • Type testing underway to add Composite Poles to the Innovation Toolbox for the use in the Transmission Network
Proposed Deliverables 2020	<p>Innovative Infrastructure Solutions</p> <p><u>Voltage Uprate Trial</u></p> <ul style="list-style-type: none"> • Prepare scope of works for desktop feasibility study on the Tower Up voltage option using PVI Composite Insulator technology on an existing 220 kV OHL. • Complete the desktop feasibility study. • Achieve Project Agreement with ESNB to enter into the construction phase on the Donard Test line. • Carry out Mechanical Testing of the PVI Composite Insulator arrangement. <p><u>Composite poles</u></p> <ul style="list-style-type: none"> • Formal introduction of the composite pole technology into the technology toolbox. • Prepare scope of works for a constructability trial of the Composite pole at Portlaoise training school. • Evaluate a selection of suitable OHLs currently being scoped for refurbishment for adopting the composite pole technology.

Incentive Value proposed	TBC – Stakeholders are invited to provide their views on the ranking of importance of the proposals and the proportion of the €1.68m pot that should be attributed to them.
Rationale for the incentive value propose	We will need to develop the grid in order to meet Ireland’s and Northern Ireland’s renewable energy targets. Increases to grid capacity are required to provide renewable generators access to the grid so that they can supply electricity when it is generated. Increasing the capacity of the grid improves the attractiveness of renewable energy developments, reduces the amount of renewable electricity generation that is constrained and will ultimately contribute towards achieving renewable energy targets.
Outcomes for Customers (Costs & Service Quality, e.g. constraint costs)	The TSO recognises that we must seek out innovative ways to adapt how we approach the deployment of infrastructure so we can minimise the impact on the local environment. In our 2015 consultation Your Grid, Your Views, Your tomorrow we set out that we will build new infrastructure only when this is the right solution. We will select appropriate technology to get more from existing grid infrastructure, depending on the needs and circumstances in each case.
Outcomes for Market participants (commercial certainty & market opportunities)	N/A

<p>Benchmarks or Target Levels (e.g. timing, cost or quality of energy transition)</p>	<p><u>Voltage Uprate Trial:</u></p> <p>Complete Voltage Uprate Trial</p> <p>On complete Voltage Uprate Trial, the feasibility study will deliver the design information to allow these structures to be considered for larger scale deployment on the transmission system</p> <p><u>Composite Poles:</u></p> <p>On validation of the poles through successful type testing, including destructive testing, the feasibility study will deliver the planning application and design information to allow these structures be used in planning of the transmission system.</p>
<p>link between input and outcome if proposing intermediate outcomes</p>	<p>The TSO seeks to increase the number of transmission options which have reduced environmental and social impact while maintaining deliverability and cost and is investigating an approach to delivering an innovative infrastructure solution involving a trial to up-voltage an existing 220 kV tower. The approach would involve up-voltaging the existing 220 kV line to facilitate a higher voltage level (400kV). If the trial is successful this will allow these structures to be considered for larger scale deployment on the transmission system</p> <p>EirGrid is developing a number of transmission line support structures available for selection for use in refurbishments, uprates and new line construction.</p> <p>Composite poles are made from an advanced composite material that combines fiberglass and polyurethane resin. The technology is considered an innovative alternative solution to traditional steel lattice and wood pole strictures and the technology has been adopted in other transmission systems.</p> <p>Composite poles are lighter than comparable components made from wood steel and concrete and</p>

	<p>have the following physical benefits:</p> <ul style="list-style-type: none"> • Lighter duty equipment leading to lower logistical costs • Faster construction timelines. • Reduced maintenance and longer service life
Relationship between metric and behaviour of TSO	<p>These innovative infrastructure solutions are key to delivering a range of potential benefits and efficiencies including better utilisation and enhancement of the existing infrastructure capability combined with integrating, at system level, the large scale deployment of new technologies (e.g. wind farms, DSM, Smart metering, HVDC technologies, and electric vehicles).</p>
2021 Indicative deliverable	<p><u>Voltage Uprate Trial</u></p> <ul style="list-style-type: none"> • Complete Line Design and Electrical assessment of PVI Composite Insulator technology on existing 220 kV OHL. • Development of Functional Specification for PVI Composite Insulators. • <p><u>Composite Pole</u></p> <ul style="list-style-type: none"> • Select an OHL for trialling the composite pole on the live transmission system
Stakeholder views/engagement/consideration	

Facilitate New Technologies	
2019 Deliverables	<p>Implementation of 2018/2019 Qualification Trial Process (QTP)</p> <p>The trial is designed to be bespoke with a focus on innovative technologies and strategy. The 2018/19 Qualification Trial Process will include Provenability, Distribution Impact and Standard & Compliance trials to demonstrate capability in the reserve, ramping and fast-acting services.</p>
Proposed Deliverables 2020	<p>2020 Qualification Trial Process (QTP)</p> <ul style="list-style-type: none"> • 2020 QTP Tender issued, evaluated and awarded • Trials underway from Oct 2020 and 3 month progress report finalised by the end of Dec 2020
Incentive Value proposed	TBC – Stakeholders are invited to provide their views on the ranking of importance of the proposals and the proportion of the €1.68m pot that should be attributed to them.
Rationale for the incentive value propose	The increasing penetration of embedded solar and distributed storage (e.g. electric vehicles, residential storage) will provide significant benefits along with new challenges to ensuring a safe, secure, reliable and efficient supply to consumers. These types of new technology can play an important part in the further facilitation of renewables for the benefit of the consumer.
Outcomes for Customers (Costs & Service Quality, e.g. constraint costs)	Facilitating new technologies to provide System Services on the system will increase competitive pressures on the long-term costs of System Service provision to the consumer by expanding the range of Service Providers.
Outcomes for Market participants (commercial certainty & market opportunities)	It is critical that these new technologies are enabled to demonstrate their capabilities for providing services and support to the system. By providing a route for such technologies to prove their capabilities, the TSO provides a strong signal for potential investment and via the QTP which remunerates providers that can demonstrate service-providing new technologies.
Benchmarks or Target Levels (e.g. timing, cost or quality of energy transition)	The budget allocated for the QTP is €450,000; this value refers to the volume of services and one off payments to the trial participants. The TSO has not exceeded this value to date and will stay within the upper limit of this budget.

link between input and outcome if proposing intermediate outcomes	The Qualification Trial Process (QTP) is designed to be a bespoke trial process with a focus on innovative technologies. The QTP will focus on embedded technology with the emphasis of Proving Technology, gaining a greater visibility and control of technology at DSO level. This will ultimately lead to the facilitation of new technologies to provide System Services on the system and increase competitive pressures on the long-term costs of System Service.
Relationship between metric and behaviour of TSO	This metric will enable the TSO to utilise services from greater range of technologies and providers, supporting the operation of the system at higher levels of renewables and ensuring a safe, secure, reliable and efficient supply to consumers.
2021 Indicative deliverable	Close out report of 12 month trial published.
Stakeholder views/engagement/consideration	

Establish and mobilise DS3+	
2019 Deliverables	N/A
Proposed Deliverables 2020	<p>Establish and mobilise DS3+</p> <p>Deliverable: DS3+ key milestones to 2025 identified and communicated with stakeholders.</p>
Incentive Value proposed	TBC – Stakeholders are invited to provide their views on the ranking of importance of the proposals and the proportion of the €1.68m pot that should be attributed to them.
Rationale for the incentive value propose	<p>DS3+ is a programme of work which seeks to address issues which need to be overcome to manage a real time operational limit of over 90% SNSP by 2030.</p> <p>The power system characteristics will be transformed by 2030 if we are to meet the RES-E targets for Ireland and Northern Ireland. This change will mean that at times we will need to be operating at over 90% of the system from new renewables from on and off shore wind and solar.</p> <p>We will need to be operating the System with:</p> <ul style="list-style-type: none"> • System non-synchronous penetration (SNSP) circa 90-100% • Minimum Generation of less than 400 MW <p>We need to develop:</p> <ul style="list-style-type: none"> • Incentives to address scarcities on the system which will result from the increased levels of renewables will need to be developed. • Credible standards and enforcement for new technologies providing services to address these scarcities. • Methods to allow for dynamic use of network and methods to use new technologies to utilise the existing system as much as possible.
Outcomes for Customers (Costs & Service Quality, e.g. constraint)	The main outcome of the DS3+ programme is the facilitation of renewables onto the system, enabling us to address public policy priorities and ensure the energy system does its part to deliver

costs)	the energy transition. Higher renewables can facilitate lower energy market prices in the Single Electricity Market, to the benefit of every energy consumer.
Outcomes for Market participants (commercial certainty & market opportunities)	The benefits to undertaking the “DS3+” programme include : <ul style="list-style-type: none"> • Enabling significant increases in levels of electricity from renewable energy and a reduction in carbon emissions • The ability to manage newly connected RES effectively • Ultimately driving down price of electricity • Meeting public policy objectives effectively
Benchmarks or Target Levels (e.g. timing, cost or quality of energy transition)	Action 24 of the Climate Action Plan: Facilitate very high penetration of variable renewable electricity by 2030 (both SNSP and average) through system services and market arrangements. <ul style="list-style-type: none"> • The achievement of 70% SNSP is the first step in a series of targets with regard to SNSP and the facilitation of wider policy targets. As part of its PR5 submissions to the CRU, EirGrid has provided the CRU with a ranged of targets and metrics aimed at facilitating increased SNSP and facilitating further integration of renewable electricity onto the transmission system.
Link between input and outcome if proposing intermediate outcomes	Establishing the DS3+ programme is the first step in transforming the power system to one that can operate at 90% SNSP and enable Ireland’s 2030 RES-E ambitions. The targets outlined in this paper will lay the foundation for the series of targets that EirGrid has set out for PR5.
Relationship between metric and behaviour of TSO	Electricity from renewable sources will play a vital role in the response to the climate crisis. Demand for power will grow as heating and transport switch to electricity. This change cannot happen unless the power system is transformed from one based on burning fossil fuels, to one able to perform reliably at 90% SNSP. The TSO has the expertise needed to deliver a low-carbon, cost-effective power system. That is why we are making a commitment to take real responsibility for many elements of this energy transition, of which DS3+ is a key element.
2021 Indicative deliverable	Technical analysis looking at issues which need to be overcome to manage a real time operational

	limit of over 90% SNSP by 2030.
Stakeholder views/engagement/consideration	

Enhanced Collaboration to Deliver the Energy Transition	
2019 Deliverables	N/A
Proposed Deliverables 2020	<p>FlexTech</p> <p>2nd & 3rd Industry Forums held by the end of 2020</p>
Incentive Value proposed	TBC – Stakeholders are invited to provide their views on the ranking of importance of the proposals and the proportion of the €1.68m pot that should be attributed to them.
Rationale for the incentive value proposed	<p>The Climate Action Plan requires that by 2030, 70% of Ireland’s electricity needs shall be met by renewables. In order to achieve this, we will need to operate the system at SNSP levels > 90%. This change will be transformative and multifaceted;</p> <ul style="list-style-type: none"> • The scale of RES-E must increase significantly. • The nature of RES-E technology will diversify, for example solar technology, offshore and small scale generation are likely to become far more prevalent. • RES-E generation is likely to become more decentralised and distributed which will require greater interaction and co-operation with our Distribution and Network Operator partners. • Disruptive technologies (such as in-home controllers, EVs) and participants (such as large energy users and micro generation) will present both opportunities and challenges to system flexibility and system management. • System demand will increase dramatically given the increase in penetration of large energy users and the electrification of heat/ cooling and transport. • Increased consumer participation with the role out of smart meters and smart devices which will lead to further changes to consumer behaviour. <p>The FlexTech Integration Initiative, “Action 24” of the Climate Action Plan, will provide a comprehensive platform through which we engage with industry, Regulators and our System Operator partners. The initiative is designed to maximise opportunities for effective use of new and</p>

	existing technologies and to identify and break down key barriers to the integration of renewables.
Outcomes for Customers (Costs & Service Quality, e.g. constraint costs)	<p>FlexTech is a key enabler in delivering the energy transition and enabling Ireland to reach its public policy objectives.</p> <p>It will streamline the approach for customers and stakeholders to engage with both of the system operators (TSO and DSO), this provides an efficient mechanism to break down barriers and diversify the range of technologies that can support the energy transition.</p>
Outcomes for Market participants (commercial certainty & market opportunities)	The FlexTech Integration Initiative will provide a structured approach to identify capability gaps, define the enduring review process, prioritise focus areas and develop solutions in line with the TSO's strategic objectives. In addition to the external benefits, the intended internal structure will allow for greater cross functional collaboration on key challenges, cross pollination of ideas and knowledge as well as greater efficiency in how we tap into the expertise within the organisation.
Benchmarks or Target Levels (e.g. timing, cost or quality of energy transition)	<p>Action 24 of the Climate Action Plan: Facilitate very high penetration of variable renewable electricity by 2030 (both SNSP and average) through system services and market arrangements.</p> <p>Steps Necessary for Delivery: Technical and market design, using findings from Flex Tech initiative, for the evolution of System Services to enable renewable electricity targets for 2030 by Q4 2021</p>
link between input and outcome if proposing intermediate outcomes	The FlexTech platform will break down key barriers to the integration of renewables and allow for progress towards 90% SNSP and to help facilitate Ireland's transition to a low carbon energy future
Relationship between metric and behaviour of TSO	FlexTech is a TSO led platform which aims to provide a framework for industry to engage with the TSO and the DSO, the TSO must have the support of the DSO in order to break down barriers that exist across the transmission system and the distribution system.
2021 Indicative deliverable	Technical and market design developed, using findings from Flex Tech initiative, for the evolution of System Services to enable renewable electricity targets for 2030.

Stakeholder views/engagement/consideration	
---	--