Strategic Incentives

2019 Proposals Consultation

5 December 2018

EIRGRID

Strategic Incentives 2019

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 broad 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 May 2018 decision 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'; and
- that the incentive will be valued at €1.25m per year for the last four years of the price control.

It should be noted that given the timing of the publication of CER/18/087 and the fact that had its own public consultation, stakeholder engagement on the 2018 proposals was not feasible.

This paper sets out EirGrid's strategic incentive proposals for calendar year 2019. As per the CRU's direction we have focussed 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 2019 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"

- Deliver Fixed Contracts arrangements for DS3 System Services;
- Deploy Distributed Series Reactors;

- Complete trial of Voltage Uprates and add to innovation toolbox for deployment in network development; and
- Complete type testing of Composite Poles to add to innovation toolbox for deployment in network development.

"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;
- Complete Nodal Controller Pilot Project; and
- Complete the 2018/2019 Qualification Trial Process.

How to get involved

Seeking the input of stakeholders is incredibly important to EirGrid and we now seek your views on our proposed strategic incentives for 2019. The total strategic incentive allowance is valued at €1.25m for 2019. 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 €1.25m taking into account all feedback received.

All responses should be submitted to regulation@eirgrid.com by 28 December 2018.

Managing the impact and costs of the energy transition

Reduced Energy Costs	
Proposed 2019 Deliverables	System Services - Delivery of Fixed Contracts arrangements for all 14 System Services
Incentive Value proposed	**TBC** – Stakeholders are invited to provide their views on the ranking of importance of the proposals and the proportion of the €1.25m pot that should be attributed to them.
Rationale for the incentive value proposed	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). Operating in this manner 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 Customers (Costs & Service Quality, e.g. constraint costs)	With prospective new providers in mind, the Fixed Contact arrangements (or 'Volume Capped arrangements') aim to provide prospective market entries with fixed term contracts to enable investment decisions to be made, and providers to build technology which will further support increased levels of renewables, in a cost effective manner. These fixed term contracts will last for 6 years, with a 2 year build period, meaning new providers will be on the system by 2021 to support increasing levels of renewables post-2020.
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 generation which is of value to the system and by interacting with the energy trading and capacity markets in order to deliver value to consumers and a secure, sustainable power system. Executing the fixed term contracts is critical to ensuring certainty for new System Services providers which will facilitate the building of such projects. Without these contracts potential providers would

	not have adequate assurances to build, and these projects are critical to expanding System Services which will ensure a secure, safe and reliable system as we move towards decarbonisation. This will also serve to create downward pressures in System Services prices once the technology is on the system in 2021.
Benchmarks or Target Levels (e.g. timing, cost or quality of energy transition)	The procurement exercise in support of the Fixed Contract arrangements will be completed (contracts executed), ensuring that delivery to the system is possible by 2021 (the arrangements including a 2 year 'build period')
link between input and outcome if proposing intermediate outcomes	This is the final TSO action to facilitate the introduction of all 14 system services coming on the system. There is a 2 year build period under the arrangements so they will all be on the system by 2021.
Relationship between metric and behaviour of TSO	The TSO aims to provide a framework for industry to invest in technology to provide System Services. In some cases, such as battery storage, 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 by 2021.
Stakeholder views/engagement/consideration	

Reduced Network Costs	
Proposed Deliverables	<u>Distributed Power Flow Control</u> Deployment of Distributed Series Reactors (DSRs). 2019 Targets: • 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 (Assuming LPAR confirms circuit is suitable)
Incentive Value proposed	**TBC** – Stakeholders are invited to provide their views on the ranking of importance of the proposals and the proportion of the €1.25m 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)	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. The TSO expects that deploying the power flow controllers will reduce the need for new network infrastructure, provide long term cost savings for society.
Outcomes for Market participants (commercial	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).

certainty & market opportunities)	
Benchmarks or Target Levels (e.g. timing, cost or quality of energy transition)	Since 2013, the TSO has been investigating the use of Distributed Series Reactors (DSRs) on overhead transmission lines to resolve existing or anticipated thermal loading issues. 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.
link between input and outcome if proposing intermediate outcomes	If initial deployment is 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.
Stakeholder views/engagement/consideration	

Enhanced Grid Utilisation	
Proposed Deliverables	**Innovative Infrastructure Solutions** <u>Voltage Uprates</u> • Achieve planning consent for the installation of the new towers. • Achieve Project Agreement with ESBN to enter into the construction phase. • Complete Voltage Uprate trial. <u>Composite poles</u> • Type testing underway to add Composite Poles to the Innovation Toolbox for use in transmission network development.
Incentive Value proposed	**TBC** – Stakeholders are invited to provide their views on the ranking of importance of the proposals and the proportion of the €1.25m 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 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. Developing these

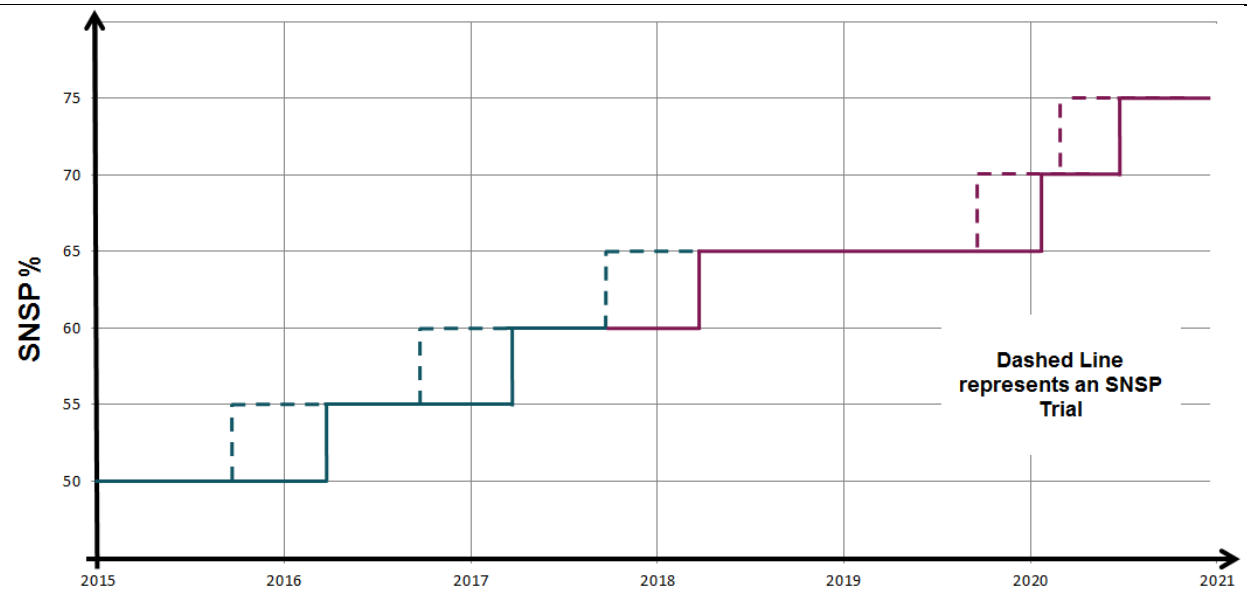
	new solutions ensures that they can be used in future grid development projects; this will alleviate the need for the building of network infrastructure and lead to savings for customers as a result.
Outcomes for Market participants (commercial certainty & market opportunities)	If successful, these solutions 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)	Voltage Uprate Trial completed: Completion of the Voltage Uprate Trial by the end of 2019 and the addition of the technology to the innovation toolbox for use in future network development. Composite Poles: 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 to be added to the toolbox and used in planning of the transmission system.
link between input and outcome if proposing intermediate outcomes	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 the replacement of the top section of the tower support structure to facilitate a higher voltage level (400kV). If the trial is successful the solution will be added to the innovation toolbox for use in future network development. This will lead to a reduction in the need to build new transmission infrastructure. If type testing is successful composite poles will also be added to the toolbox for deployment. They 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.

	Composite poles are lighter than comparable components made from wood steel and concrete and have the following physical benefits: • Lighter duty equipment leading to lower logistical costs • Faster construction timelines. • Reduced maintenance and longer service life
Relationship between metric and behaviour of TSO	These innovative infrastructure solutions are vital 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).
Stakeholder views/engagement/consideration	

Facilitation of Renewable generation and meeting renewables targets	
Proposed Deliverables	Increasing SNSP 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 EirGrid will aims to hit a number of milestones which will pave the way for the planned move to 75% in 2020. These are: • RoCoF setting changes complete for all TSO & DSO connected parties in Ireland • Introduction 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 €1.25m 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 current maximum allowable level of renewable generation on the power system, referred to as the System Non Synchronous Penetration (SNSP) limit. The DS3 programme has now enabled SNSP to be increased to 65%, on a permanent basis from 9th April 2018. EirGrid TSO will work with SONI TSO to increase the all-island SNSP limit in the coming years to 75% by 2020. Actions taken by the TSO in 2019 will include completing the change of Rate of Change of Frequency (RoCoF) settings for all TSO & DSO connected parties in Ireland 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 2020 and 2030 renewables targets and will reduce wind curtailment.

Outcomes for Customers (Costs & Service Quality, e.g. constraint costs)	<u>RoCoF settings changed</u> As Ireland facilitates 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. Increasing the levels of RoCoF that can be safely accommodated is a critical element of the DS3 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. <u>Control Centre Tools</u> 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.
Outcomes for Market participants (commercial certainty & market opportunities)	To increase the capability of the system in Ireland we have engaged in an industry-wide project which involves ensuring that electrical generators can withstand high RoCoF events and ensuring that the Distribution System Operator (DSO) can operate its network securely during high RoCoF

	events. These works will also reduce wind curtailment on the system and reduce constraints.
Benchmarks or Target Levels (e.g. timing, cost or quality of energy transition)	RoCoF settings changed Completion of RoCoF programme coordination in Ireland, including Conventional Generation studies and testing for all TSO & DSO units in Ireland by end of 2019. Control Centre Tools Ramping tool live in the Control Centre by October 2019 Look Ahead Stability Assessment tool live in the Control Centres by October 2019 Voltage Trajectory Tool live in the Control Centres by December 2019

	
link between input and outcome if proposing intermediate outcomes	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 2020.
Relationship between metric and behaviour of TSO	<u>RoCoF settings changed</u> 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.

	<u>Control Centre Tools</u> Tools expected to be live in the Control Centre by the end of 2019 are: • 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 • 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. • 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. It is the TSO's responsibility to have these tools in place.
Stakeholder views/engagement/consideration	

Facilitation of renewable generation (iii)	
Proposed Deliverables	<u>Distributed Voltage Control - Nodal Controller</u> Nodal Controller pilot project to be completed – the aim of successful project is to allow all Type B windfarms to provide SSRP (reactive power compensation) from 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 €1.25m pot that should be attributed to them.
Rationale for the incentive value propose	The TSO and the DSO have responsibilities to manage and maintain voltage levels on their respective networks. Voltage control is an essential activity for both parties and coordination of control is required to ensure that electrical power is delivered to the end customer in a secure and efficient manner. The installation of increased levels of distributed and embedded renewable generation, such as wind and solar, will make voltage control on both the transmission and distribution system more complex. Distributed voltage control schemes and policies will facilitate coordination between the TSO and DSO in controlling voltage at the interface between the transmission and distribution networks.
Outcomes for Customers (Costs & Service Quality, e.g. constraint costs)	This Nodal controller project if successful, will provide valuable reactive power support to the transmission network; and in some cases, will allow for increased wind capacity while also averting or deferring additional transmission infrastructure such as STATCOMs.
Outcomes for Market participants (commercial certainty & market opportunities)	The Nodal Controller is a means by which distribution connected generation can provide reactive power support to the TSO, whilst at the same time, ensuring that all relevant distribution parameters are kept within secure limits, thus avoiding damage to or limitation of other users of the distribution system. In essence, it takes set-points from the TSO and distributes them to participating wind farms. If any local current or voltage violations are encountered or anticipated, the Nodal Controller

	can deliver as much support to the TSO as the prevailing conditions and the commercial choices and contractual commitments of participating wind farms will allow. Participating wind farms will be able to avail of financial rewards or the provision of SSRP.
Benchmarks or Target Levels (e.g. timing, cost or quality of energy transition)	Operational Protocol document for Nodal Controller developed by TSO and DSO by the end of 2019.
link between input and outcome if proposing intermediate outcomes	TSO readiness for Nodal Controller deployment for system services and the provision of valuable reactive power support to the transmission network.
Relationship between metric and behaviour of TSO	Distributed voltage control schemes and policies will facilitate coordination between the TSO and DSO in controlling voltage at the interface between the transmission and distribution networks.
Stakeholder views/engagement/consideration	

Facilitate New Technologies & Demand Participation	
Proposed Deliverables	Completion of 2018/2019 Qualification Trial Process 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. The trials will be concluded in December 2019.
Incentive Value proposed	**TBC** – Stakeholders are invited to provide their views on the ranking of importance of the proposals and the proportion of the €1.25m 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. The Qualification Trial Process for 2018/19 will be critical in determining what new technologies can provide System Services, which has the potential to introduce new technologies to the provision of System Services, creating downward pressures on System Services costs through increased competition
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. The QTP will not only give clear indicators for successful technologies but will also inform potential market participants of what technologies will not be capable of providing system services.

Benchmarks or Target Levels (e.g. timing, cost or quality of energy transition)	Publication of technical standards and operating protocols for new technologies by 2020.
link between input and outcome if proposing intermediate outcomes	The 2018/2019 Qualification Trial Process (QTP) is designed to be a bespoke trial process with a focus on innovative technologies. The QTP for 2018/19 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.
Stakeholder views/engagement/consideration	