Smart Grid Savings

This document provides justification that the savings from each smart solution evidenced in our business plan but excluded in the Draft Determinations should be acknowledged in the Final Determination. A table for each solution is provided which summarises the basis for the solution being smart, the apparent issue which resulted in savings being excluded and SSEPD's view of why the savings should be acknowledged.

The tables show that in several cases, the decision to discount demonstrated savings is inconsistent with other decisions in the Draft Determinations; e.g. the solution is acknowledged as smart in Table 11.1 (p103 RIIO-ED1 Draft Determinations Business Plan Expenditure Assessment) or savings from the same solution declared by at least one other DNO have been accepted.

SSEPD view of smart: The definition of 'smart' solutions should include any innovative approach which has the potential to deliver savings to customers through the application of new ('smarter') technology and methods. In our view this should include their application to all aspects of developing and maintaining an efficient, co-ordinated and economical system of electricity distribution. Ofgem consider it is not clear that certain smart and innovative solutions "fully represent the smart approach to operating networks" but do not define the smart approach. Deliberately narrowing the definition of smart solutions to 'smart grid' or the solution set used in the Transform model may limit the range of innovations developed, trialled and deployed and therefore opportunities for savings.

SSEPD view of BAU: To be established as BAU SSEPD consider a solution should be

- Fully available for use throughout the DNO (all relevant staff and customer have access to the solution where appropriate)
- Fully Documented, legally and regulator compliant where appropriate
- Procurable through a robust supply chain
- Deployed in response to a proven application and need within DNO

In addition, where customers have contributed funding to the development or trialling of a solution, all learning, relevant procedures and procurement details should be made available to all GB DNOs.

The following table shows a breakdown of the total 'smart' savings included in our submission and the solutions which will be used to achieve these savings. SSEPD had provided evidence to show where in the Business Plan each of these savings is located. The table also shows which savings we believe have been recognised in the Draft Determinations, and which have been excluded.

Smart solution	Saving (£m)	Recognised or Excluded
Energy efficiency measures	12.00	Recognised
Fault current limiter	0.63	Recognised
Additional fault current limiter	1.50	Excluded
Transformer condition monitoring	6.60	Excluded
Wood pole condition monitoring	4.45	Excluded
Asset condition monitoring including partial discharge and submarine cables	6.60	Excluded
Ecoplugs	7.60	Excluded
Automatic demand side response (ADR) in commercial premises	5.00	Recognised
Additional ADR in commercial premises	2.00	Excluded
Intelligent control devices (EV), Dynamic network configuration and Generation network support	4.90	Recognised
Voltage regulators on LV	13.00	Excluded
Meshing and Dynamic line rating	7.02	Excluded
Hybrid generators, LV fault location, Weather impact and Live line tree felling	13.50	Excluded
ANM for generation	10.00	Recognised
Safety and security including copper theft prevention and detection	2.00	Excluded
Alternatives to wood poles	3.20	Excluded
Total savings	**100.00**	
Total excluded in Draft Determinations	**67.50**	

The tables below provide summary information for each solution and SSEPD's view on the treatment of the savings from each solution in the Draft Determination.

Smart solution	**Energy efficiency measures**
Benefits in March 2014 Business Plan	£12.00m
Location in March 2014 Business Plan	CV101 - Circuit reinforcement - Primary network - (n-1) - 132 kV (SEPD)
Basis for being 'smart'	Benefits attributed to deployment of this smart solution have been accepted as valid smart grid savings
Issue	n/a
SSEPD view	Decision consistent with Draft Determinations policy

Smart solution	**Fault Current Limiter**
Benefits in March 2014 Business Plan	£0.63m
Location in March 2014 Business Plan	CV101 - Fault Level Reinforcement Schemes - For Fault Level Issues On Switchboard/ substation busbars - EHV (SEPD)
Basis for being 'smart'	Benefits attributed to deployment of this smart solution have been accepted as valid smart grid savings
Issue	n/a
SSEPD view	Decision consistent with Draft Determinations policy

Smart solution	**Additional Fault Current Limiter**
Benefits in March 2014 Business Plan	£1.50m
Location in March 2014 Business Plan	CV101 - SEPD
Basis for being 'smart'	Benefits attributed to deployment of this smart solution at named sites during RIIO-ED1 (as above) have been accepted as valid smart grid savings
Issue	Benefits from deployment of this solution at as yet unnamed sites later in RIIO-ED1 have not been accepted
SSEPD view	Inconsistency in treatment of savings from the same solution

Smart solution	**Transformer Condition Monitoring**
Benefits in March 2014 Business Plan	£6.60m
Location in March 2014 Business Plan	CV3 - Asset Replacement - 132kV Transformers (SEPD)
Basis for being 'smart'	This solution will involve data from sensors on plant in service being transferred by comms links and ICT systems to provide SSEPD with accurate models of the asset being monitored; increased visibility of assets and their condition to allow more efficient network management is a feature of smart grids.
Issue	Solution is not in the Transform model catalogue of solutions
SSEPD view	The Transform catalogue of smart solutions should not be treated as an exhaustive list The Transform list represents consensus view compiled through dialogue between DNOs and other parties. However treating this as an exhaustive list fails to recognise that there had to be a limit to the number of solutions included in this tool and artificially restricts the range of potential smart solutions available to DNOs to deliver savings. Solutions not on the list should be assessed on their own merits. In this case the solution is an innovative combination of techniques (not only chromatic analysis of insulating oil) to improve visibility of asset condition and therefore allow more informed decisions on investment at a considerably lower cost than methods currently used or planned to be used by other DNOs during RIIO-ED1.

Smart solution	**Wood pole condition monitoring**
Benefits in March 2014 Business Plan	£4.45m
Location in March 2014 Business Plan	CV3 - Asset Replacement (SEPD)
Basis for being 'smart'	The solution under trial by SSEPD is substantially different to the best available BAU method and offers cost savings
Issue	Draft Determinations claim BAU, so not smart
SSEPD view	The solution under trial by SSEPD involves a handheld instrument operated at ground level which allows non-intrusive assessment of the entire pole's condition. Current BAU products are all restricted to detecting rot in close proximity to the point at which the measurement is taken. If successful the new solution will allow lower cost condition monitoring, reduce health and safety risk associated with techniques that require working at height or digging around the base of the pole, and provide a more comprehensive assessment of condition than current techniques. No other DNOs have yet adopted this innovative product as BAU.

Smart solution	**Asset condition monitoring including partial discharge and sub-marine cables**
Benefits in March 2014 Business Plan	£6.60m
Location in March 2014 Business Plan	CV3 / CV15 - SEPD and SHEPD
Basis for being 'smart'	The solution under trial by SSEPD is substantially different to the best available BAU method and offers cost savings
Issue	Draft Determinations claim BAU, so not smart
SSEPD view	The solution under trial by SSEPD involves new variants of partial discharge monitoring for Distribution networks which include fixed installations that triangulate the results to provide discharge locations, air born solutions that allow rapid monitoring of overhead lines, and cable connected solutions that can provide information on the internal condition of cables (including submarine cables). Current BAU application of partial discharge monitoring by most DNOs is in the form of a portable handheld detector. These are used prior to switching, to investigate unusual plant behaviours and often as part of routine inspection. There is no integration of partial discharge monitoring into remote monitoring solutions as BAU. One other DNO (UKPN) proposed this solution as 'smart' but none proposed its application to submarine cables.

Smart solution	**Ecoplugs**
Benefits in March 2014 Business Plan	£7.60m
Location in March 2014 Business Plan	CV14 - Tree cutting (ENATS 43-8) – HV Spans (SEPD and SHEPD)
Basis for being 'smart'	This solution involves an innovative method of reducing tree cutting requirements, offering financial savings
Issue	Solution is not in the Transform model catalogue of solutions and it is not considered clear it "fully represents the smart approach to operating networks"
SSEPD view	The Transform catalogue of smart solutions should not be treated as an exhaustive list The Transform list represents a consensus view compiled through dialogue between DNOs and other parties. However treating this as an exhaustive list fails to recognise that there had to be a limit to the number of solutions included in this tool and artificially restricts the range of potential smart solutions available to DNOs to deliver savings. Solutions not on the list should be assessed on their own merits. In this case the solution offers clear cost savings by reducing tree re-growth and therefore cutting requirements. It also offers non-financial benefits including less exposure to health and safety risks associated with tree cutting and less disruption to landowners. No other DNO proposed application of this solution.

Smart solution	**Automatic demand side response (ADR) in commercial premises**
Benefits in March 2014 Business Plan	£5.00m
Location in March 2014 Business Plan	CV101 - SEPD and SHEPD
Basis for being 'smart'	Benefits attributed to deployment of this smart solution have been accepted as valid smart grid savings
Issue	n/a
SSEPD view	Decision consistent with Draft Determinations policy

Smart solution	**Additional ADR in commercial premises**
Benefits in March 2014 Business Plan	£2.00m
Location in March 2014 Business Plan	CV101 - SEPD and SHEPD
Basis for being 'smart'	Benefits attributed to deployment of this smart solution at named sites during RIIO-ED1 (as above) have been accepted as valid smart grid savings
Issue	Benefits from deployment of this solution at as yet unnamed sites later in RIIO-ED1 have not been accepted
SSEPD view	Inconsistency in treatment of savings from the same solution

Smart solution	**Intelligent control devices (EV), Dynamic network configuration and generation network support**
Benefits in March 2014 Business Plan	£4.90m
Location in March 2014 Business Plan	CV103 - SEPD and SHEPD
Basis for being 'smart'	Benefits attributed to deployment of this smart solution have been accepted as valid smart grid savings
Issue	n/a
SSEPD view	Decision consistent with Draft Determinations policy

Smart solution	**Voltage regulators on LV**
Benefits in March 2014 Business Plan	£13.00m
Location in March 2014 Business Plan	CV101 - SEPD and SHEPD
Basis for being 'smart'	Voltage regulators on LV are a type of Enhanced automatic voltage control, a smart solution listed in Draft Determinations. The voltage regulators under trial by SSEPD are substantially different from current voltage regulators used as BAU and offer cost savings.
Issue	Savings not recognised, although solution is on Draft Determinations list of smart solutions
SSEPD view	Inconsistency in treatment of smart solutions. The solution under trial by SSEPD involves power electronics to provide voltage control, these devices are significantly more flexible than existing LV voltage regulators and able to provide faster, broader control of the network voltage. The solution will allow phase balancing, harmonic management, fast response, fault level management and bi-directional functionality. These features make the new variant applicable to a wider range of network issues, including those caused by LCTs and general load growth. Current BAU products are usually moving coil regulators and are used in conjunction with static balancers to stabilise voltage and reduce flicker.

Smart solution	**Meshing and dynamic line rating**
Benefits in March 2014 Business Plan	£7.02m
Location in March 2014 Business Plan	CV101 - SEPD and SHEPD
Basis for being 'smart'	Network meshing and Dynamic line ratings are both smart solutions listed in Draft Determinations.
Issue	Savings not recognised, although solutions are on Draft Determinations list of smart solutions
SSEPD view	Inconsistency in treatment of smart solutions. The Draft Determinations recognise retrofitting mesh architectures to previously radial networks is a smart solution, although traditional mesh networks exist as BAU. As SSEPD does not have traditional mesh networks, it is a smart solution. The Draft Determinations also recognise Dynamic line rating as a smart solution. No DNO proposed this as BAU.

Smart solution	**Hybrid generators, LV fault location, Weather impact and Live line tree felling**
Benefits in March 2014 Business Plan	£13.50m
Location in March 2014 Business Plan	CV15 - SEPD and SHEPD
Basis for being 'smart'	**LV fault location**: Savings from the same solution proposed by ENWL have been accepted as valid smart savings and are used in Draft Determinations to estimate savings to be applied to other DNOs. **Hybrid generators, Weather Impact and Live line tree felling:** solutions offer innovative methods of reducing fault costs, outages and fuel costs
Issue	**LV fault location**: Draft Determinations claim some methods of LV fault location BAU, so not smart **Hybrid generators, Weather Impact and Live line tree felling:**: Solutions not in the Transform model catalogue of solutions
SSEPD view	**LV fault location**: Inconsistency in treatment of smart solutions and savings. The solution proposed by SSEPD is the same as that proposed by ENWL; applying savings to all DNOs on the basis of the ENWL proposals and simultaneously discounting SSEPD's already declared savings from this solution is a double penalty. **Hybrid generators, Weather Impact and Live line tree felling:** The Transform catalogue of smart solutions should not be treated as an exhaustive list The Transform list represents a consensus view compiled through dialogue between DNOs and other parties. However treating this as an exhaustive list fails to recognise that there had to be a limit to the number of solutions included in this tool and artificially restricts the range of potential smart solutions available to DNOs to deliver savings. Solutions not on the list should be assessed on their own merits. The **hybrid generator** solution combines battery energy storage with a generator to reduce the cost of temporary power supply during faults or routine maintenance. As the battery can also be charged by distributed generation (DG) it also maximises use of domestic DG when the network is disrupted. No other DNO proposed application of this solution. The **weather impact** solution involves modelling techniques to predict faults based on weather conditions. Better anticipation of faults will allow more efficient deployment of resources during storms to restore supply more efficiently at lower cost. No other DNO proposed application of this solution.

	The **live line tree felling** solution allows felling without outages, in situations where an outage would be required if BAU methods were used. This reduces tree cutting costs and outages. No other DNO proposed application of this solution.

Smart solution	**ANM for generation**
Benefits in March 2014 Business Plan	£10.00m
Location in March 2014 Business Plan	CV101 - SHEPD
Basis for being 'smart'	Benefits attributed to deployment of this smart solution have been accepted as valid smart grid savings
Issue	n/a
SSEPD view	Decision consistent with Draft Determinations policy

Smart solution	**Safety and security including copper theft prevention / detection**
Benefits in March 2014 Business Plan	£2.00m
Location in March 2014 Business Plan	CV15 - SEPD and SHEPD
Basis for being 'smart'	Cameras to detect theft and new technology to detect copper earthing removal from substations will enable remote detection of theft and a quicker response: intervention of thefts and earlier remediation
Issue	Solution is not in the Transform model catalogue of solutions
SSEPD view	The Transform catalogue of smart solutions should not be treated as an exhaustive list The Transform list represents a consensus view compiled through dialogue between DNOs and other parties. However treating this as an exhaustive list fails to recognise that there had to be a limit to the number of solutions included in this tool and artificially restricts the range of potential smart solutions available to DNOs to deliver savings. Solutions not on the list should be assessed on their own merits. These solutions to detect theft in smarter ways will limit damage from theft to deliver cost savings and potentially provide further savings by acting as a deterrent to reduce theft. It also provides safety benefits to the public and staff. No other DNO proposed application of this solution or declared savings from it.

Smart solution	**Alternatives to wood poles**
Benefits in March 2014 Business Plan	£3.20m
Location in March 2014 Business Plan	CV3 - SEPD and SHEPD
Basis for being 'smart'	Alternatives have the potential to increase asset life and reduce life time operating costs
Issue	Solution is not in the Transform model catalogue of solutions
SSEPD view	The Transform catalogue of smart solutions should not be treated as an exhaustive list The Transform list represents a consensus view compiled through dialogue between DNOs and other parties. However treating this as an exhaustive list fails to recognise that there had to be a limit to the number of solutions included in this tool and artificially restricts the range of potential smart solutions available to DNOs to deliver savings. Solutions not on the list should be assessed on their own merits. This solution addresses the need to eliminate creosote (EU legislation). By trialling innovative alternatives to other more costly options, SSEPD will deliver cost savings. No other DNO proposed application of this solution or declared savings from it.