Summary of National Grid's Uncertainty Mechanisms in RIIO-T1

	Investment Category				
	Generation Connections	**Demand Connections**	**Wider Works**	**DNO Mitigation**	**Undergrounding**
Description	Connection works including local substation, OHL and cable to the existing network (excludes sole-user work, turn-ins, and cross-site cables).	Connection works including local substation, OHL and cable to existing network (excludes sole-user work, turn-ins, and cross-site cables).	Wider network reinforcement subject to NOA decisions (all circuits assumed to be OHL, as undergrounding covered by separate mechanism).	Work on DNO network when required by the DCO planning process, e.g. taking over a 132kV route and rebuilding at 400kV.	Undergrounding of wider works circuits when required by the DCO planning process.
Baseline description	Phased generation connecting to achieve the GG12 scenario across the 8-year period.	Phased delivery of SGTs required to deliver the GG12 scenario across the 8-year period.	Phased incremental boundary capacity required to deliver the GG12 scenario minus some specific projects.	Zero baseline.	Zero baseline.
Output definition	MW 'using' network (TEC) km of OHL / cable 15 cable types (e.g. cores per phase, cross-section, and route length)	Number of SGTs km of OHL / cable 15 cable types (e.g. cores per phase, cross-section, and route length)	MW of boundary capacity provided on 15 specified network boundaries	Number of new DNO bays km of new DNO OHL km of DNO OHL removal km of DNO cable (u/g)	km of cable 15 cable types (e.g. cores per phase, cross-section, and route length)

	Investment Category				
	Generation Connections	**Demand Connections**	**Wider Works**	**DNO Mitigation**	**Undergrounding**
Basis of unit cost allowance (UCA)	£/MW average based on expected cost and capacity of future contracted connections. See extract of data used at end of document. £/km OHL and cable based on 2012 IET report. Full project cost included in UCA calculation, i.e. spend in prior price control periods.	£/SGT based on expected cost of future contracted connections. £/km OHL and Cable based on 2012 IET report. Full project cost included in UCA calculation, i.e. spend in prior price control periods.	UCAs for each boundary, tiered according to the level of capacity provided. Each UCA considered the cost & capacity provided by a group of ~2-4 schemes. Construction costs only in UCA; pre-con crudely estimated and then funded by fixed allowance. See extract from licence for UCA example.	Unit costs extracted from Ofgem-published Electricity Distribution cost data.	£/km cable based on 2012 IET report.
Experience in T1	Worked well given (and despite) the level of change i.e. 26GW to 13GW. Portfolio has a balanced mix of projects, so that UCA has remained broadly representative.	Worked reasonably well given the level of change i.e. 72 SGTs to 40 SGTs. Several below average cost projects in the baseline are not proceeding; UM has tended to 'clawback' too much. UM is only triggered by SGT delivery; does not consider alternative solutions.	Change in energy backgrounds has changed the types of investment progressed and the capacity provided. This has given rise to over / under recovery risks on a boundary-by-boundary basis.	Only required for one project in T1, so not extensively tested.	Not required in T1, so not extensively tested.
Thoughts for T2	Review cost drivers to test if more complexity is justified, i.e. more than a single, national UCA.	Review cost drivers to test if more complexity is justified, i.e. more than a single, national UCA.	Evolution required to reduce volatility.	Assume need remains but update costs.	Assume need remains but update costs.

Generic operation (and practical issues)

- Allowance adjustment only triggered in the year an output is delivered (or not delivered). Creates volatility in funding, and hence charges.
- Allowances adjustments phased over delivery based on generic spend profiles (different for each investment category).
- UMs also consider outputs delivered in first 2 or 3 years of RIIO-T2 as a partial solution for dealing with price control edge effects, i.e. regulatory WIP.
- UCAs adjusted for inflation and ex ante forecast of real price effects.
- We have struggled to satisfy Ofgem's desire for scheme-level allowances, which is complicated by UCAs based on an average project.
- UMs claw back all costs including TPCR4 costs.
- Pre-construction of wider works separately funded by fixed allowances (likely to have been underestimated).

Possible areas where new UCAs might be required

Area of spend	Arrangements in T1	Considerations for T2
Shunt reactors (and other investments) to manage voltage issues	Funded through fixed allowances (through 'general wider works'	A new UM would allow a future framework to manage uncertainty in the volume of work that TOs will be required to undertake. For example, while there is a strong future need to manage voltage, there may be instances where a DNO is best placed to provide a solution.
Embedded generation impacts	Funded by UM only when new SGT is required	Decentralisation of energy is a key trend of future networks and this is a feature of all future energy scenarios. The impact of embedded generation can be considerable, ranging from installing an active network management scheme to rebuilding low voltage substations (to manage fault levels). We believe that a new UM is needed to manage uncertainty in the network impact.
Small transmission connected generation and demand	Funded by existing UMs e.g. for generation, £27/kW	We have observed a considerable number of small (<~100MW) generation & demand customers considering (and contracting) connections to the transmission system. A simple UCA based on £/unit does not adequately reflect the investment cost when the size of the output is low (i.e. there is a minimum cost of connecting a customer)
Pre-construction	Fixed allowance based on percentage of scheme cost (IWW) or project-specific estimate (SWW)	During T1, the needs of the network have evolved and many new reinforcements have been developed. The NOA has also sought to keep multiple options open during early development stages. This has meant pre-construction costs have exceeded allowances. In T2, we expect there to be need to develop schemes that don't necessarily deliver an output because (i) the need has changed, (ii) the work is subject to onshore competition, or (iii) whole system assessment considers a DNO solution to be preferable. TOs need mechanisms to ensure the full breadth of pre-construction activities can take place and be appropriately remunerated.

Simplified Example – A new generation connection

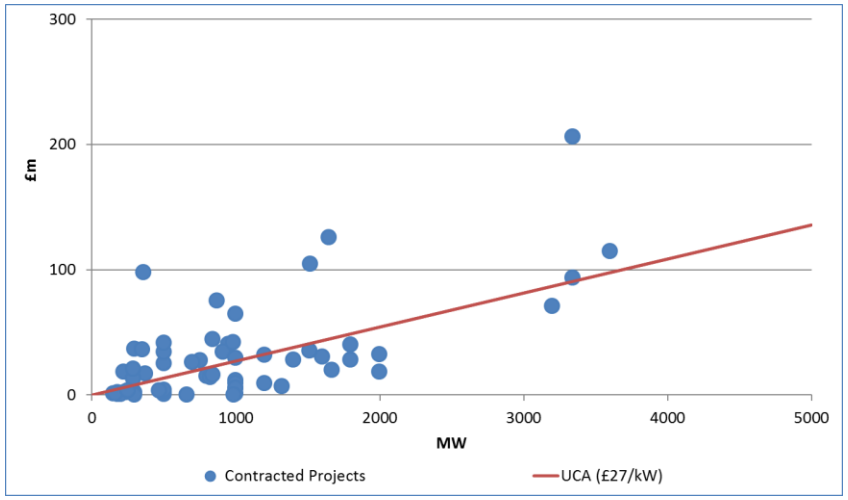
A new 1000MW generator, above the ex-ante baseline, is required in 2016/17. There are no OHL or cable works.

The UCA for generation is £27/kW (in 2009/10 prices and ignoring impact of RPEs)

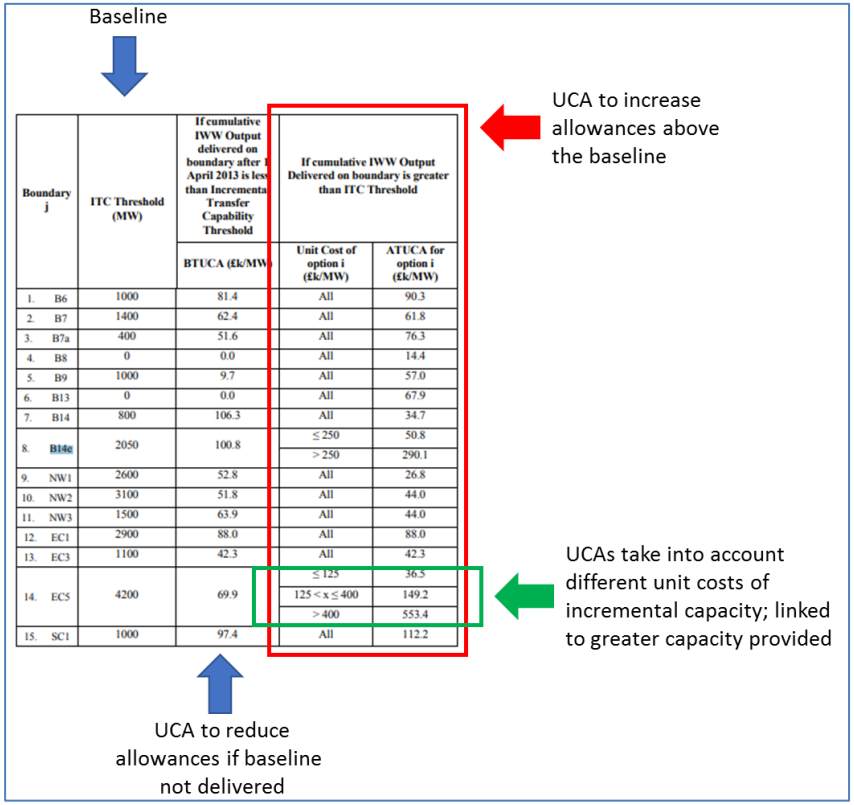
The baseline allowance is increased in 2016/17 by £27m (in NPV neutral terms), as shown below.

	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	TOTAL
Initial Allowance	130.5	185.2	184.1	220.7	117.4	96.0	42.5	20.7	997.1
Final Allowance	134.8	193.7	192.6	226.4	117.4	96.0	42.5	20.7	1,024.1
Adjustement	4.3	8.5	8.5	5.7	-	-	-	-	27.0

Sample of data used to determine generation MW UCA (gradient is £27/kW)



Extract from NGET Licence to illustrate UCAs for Wider Works



Boundary j	ITC Threshold (MW)	If cumulative IWW Output delivered on boundary after 1 April 2013 is less than Incremental Transfer Capability Threshold	If cumulative IWW Output Delivered on boundary is greater than ITC Threshold	
		BTUCA (£k/MW)	Unit Cost of option i (£k/MW)	ATUCA for option i (£k/MW)
1. B6	1000	81.4	All	90.3
2. B7	1400	62.4	All	61.8
3. B7a	400	51.6	All	76.3
4. B8	0	0.0	All	14.4
5. B9	1000	9.7	All	57.0
6. B13	0	0.0	All	67.9
7. B14	800	106.3	All	34.7
8. B14e	2050	100.8	≤ 250	50.8
			> 250	290.1
9. NW1	2600	52.8	All	26.8
10. NW2	3100	51.8	All	44.0
11. NW3	1500	63.9	All	44.0
12. EC1	2900	88.0	All	88.0
13. EC3	1100	42.3	All	42.3
14. EC5	4200	69.9	≤ 125	36.5
			125 < x ≤ 400	149.2
			> 400	553.4
15. SC1	1000	97.4	All	112.2