RES SUPPORT LOLE

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1. ISSUES IN RES SUPPORT

RENEWABLES SUPPORT ACTIVELY DISINCENTIVISES RENEWABLES FROM PROVIDING FLEXIBILITY

THE PROBLEM

- Support mechanisms are long-run price signals intended to enable investment: proxies for a carbon price, that also fix absence of long-term contracting on the buy side
  - Pure FITs completely isolate RES from the prompt market
  - RO and CfD can restore some market signals – depends on detailed implementation
- But all GB schemes pay out in proportion to metered energy production
  - Big distortions: eg, RES would have to forgo [£70]/MWh to provide frequency support
  - Random contamination of short-run despatch economics by long term support
- Paradigm used to be "priority despatch" for RES* – but RES should be permitted to compete to help solve system operation challenges to which they contribute
  - Frequency response, synthetic inertia, turn-down
  - European wind and solar associations confirm they'd love to provide flex products
- Without this RES are priced out, and we will see inefficient overinvestment in other technologies – eg batteries

* Indeed, does OFGEM still hold this paradigm? "Whole system optimisation is likely to maximise the use of renewable energy sources by reducing curtailment, contributing to both decarbonisation and renewable targets." - Future arrangements for the electricity system operator: its role and structure, 12 January 2017

THE SOLUTION

- NOT the “six hour rule” (CfD support stops if day-ahead price <0 for >6 consecutive hours)
  - Cures symptom, not cause
  - Could have unforeseen consequences
- From 1 April 2016 large wind and solar installations have to provide a real-time “Power Available” signal
  - Use this, or a proxy, for settling CfD difference payments
- There are other solutions
  - Link CfD to capacity market
  - Spanish model – pays subject to a minimum number of running hours
  - Danish (?) model – pays for a maximum number of [lifetime/annual] hours

2. ISSUES IN THE USE OF LOLE

WE DON'T LOOK AT LOLE FROM A CUSTOMER'S PERSPECTIVE

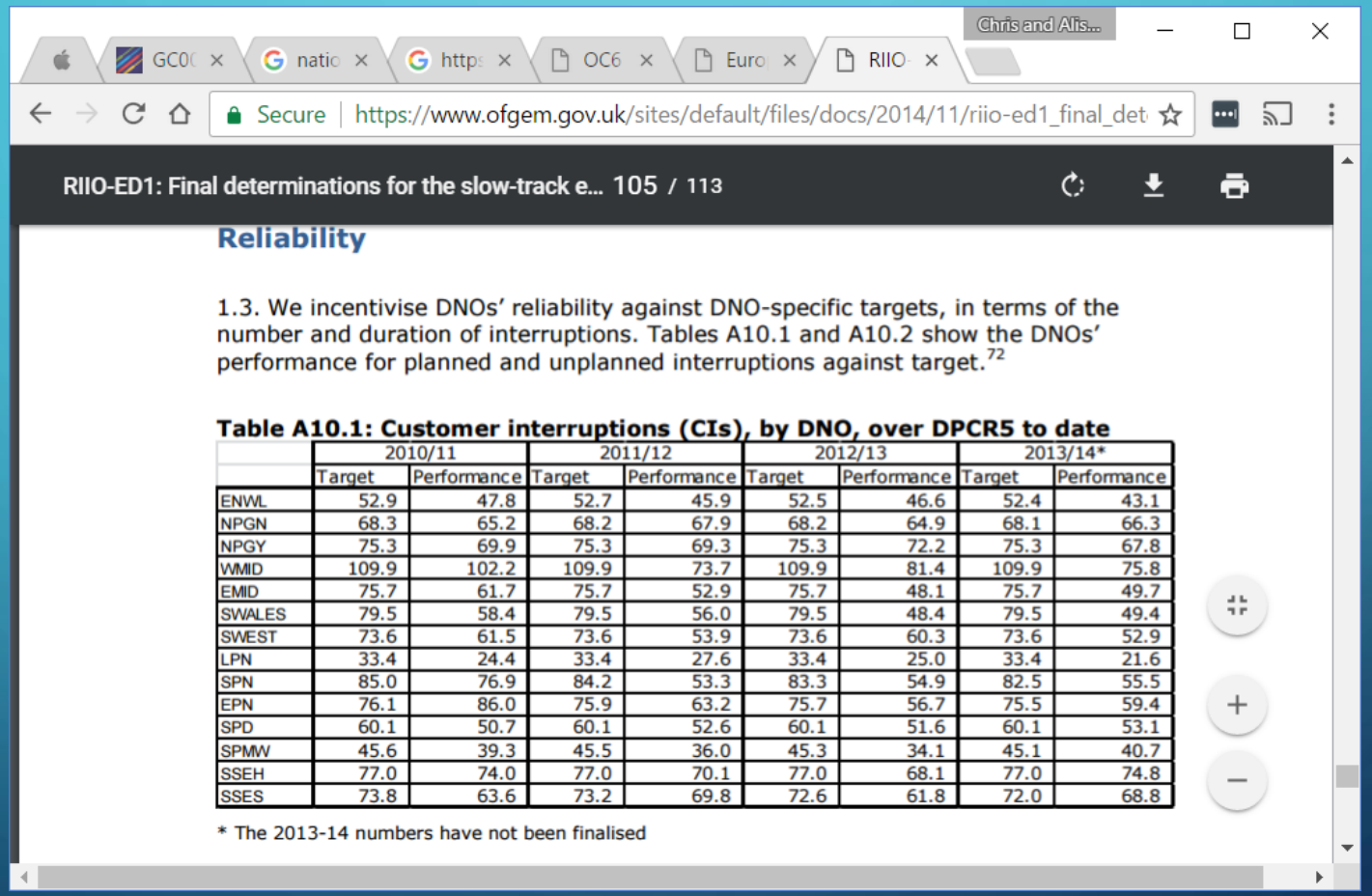
WHAT WOULD A CAPACITY SHORTFALL LOOK LIKE?

- OC6 on generators, DNOs and non-embedded customers deals with voltage reduction, disconnections and automatic low frequency disconnection
- Energy Act 1976 deals with rota disconnections
- Voltage reduction barely noticeable, if it works?
- Disconnections **will not affect everyone at the same time** (unless Grid fails to rescue the system)
- So what does 3 hours per year LOLE really mean for customers?
- How does it compare with what we're used to?

NATIONAL LOLE VERSUS REALITY

- What we're used to:
  - Customers routinely experience disconnections
  - Distribution failure averages 50 minutes per customer per year across GB, big outages occurring every one to two years (latest data I can find – 2014/15)
  - More in rural areas than cities
- What we're targeting – a system LOLE of three hours per year
  - Assume a 2.5GW shortfall and for some reason voltage reduction is totally unavailable. That affects 5% of customers, giving an average disconnection time of 9 minutes per year. Even if we make it 5GW of customers it only rises to 18 minutes.
  - Assume more in rural areas than cities – as now?
- So aren't we over-egging LOLE?
  - We can't separate probability of a shortfall from its depth: **it won't normally affect everybody.**

WHAT ARE CUSTOMERS USED TO? (1)



Secure | https://www.ofgem.gov.uk/sites/default/files/docs/2014/11/riio-ed1_final_det

RIIO-ED1: Final determinations for the slow-track e... 105 / 113

Reliability

1.3. We incentivise DNOs' reliability against DNO-specific targets, in terms of the number and duration of interruptions. Tables A10.1 and A10.2 show the DNOs' performance for planned and unplanned interruptions against target.[72]

Table A10.1: Customer interruptions (CIs), by DNO, over DPCR5 to date

	2010/11		2011/12		2012/13		2013/14*	
	Target	Performance	Target	Performance	Target	Performance	Target	Performance
ENWL	52.9	47.8	52.7	45.9	52.5	46.6	52.4	43.1
NPGN	68.3	65.2	68.2	67.9	68.2	64.9	68.1	66.3
NPGY	75.3	69.9	75.3	69.3	75.3	72.2	75.3	67.8
WMID	109.9	102.2	109.9	73.7	109.9	81.4	109.9	75.8
EMID	75.7	61.7	75.7	52.9	75.7	48.1	75.7	49.7
SWALES	79.5	58.4	79.5	56.0	79.5	48.4	79.5	49.4
SWEST	73.6	61.5	73.6	53.9	73.6	60.3	73.6	52.9
LPN	33.4	24.4	33.4	27.6	33.4	25.0	33.4	21.6
SPN	85.0	76.9	84.2	53.3	83.3	54.9	82.5	55.5
EPN	76.1	86.0	75.9	63.2	75.7	56.7	75.5	59.4
SPD	60.1	50.7	60.1	52.6	60.1	51.6	60.1	53.1
SPMW	45.6	39.3	45.5	36.0	45.3	34.1	45.1	40.7
SSEH	77.0	74.0	77.0	70.1	77.0	68.1	77.0	74.8
SSES	73.8	63.6	73.2	69.8	72.6	61.8	72.0	68.8

* The 2013-14 numbers have not been finalised

i.e. one lengthy Distribution interruption every one to two years – see Glossary

WHAT ARE CUSTOMERS USED TO? (2)

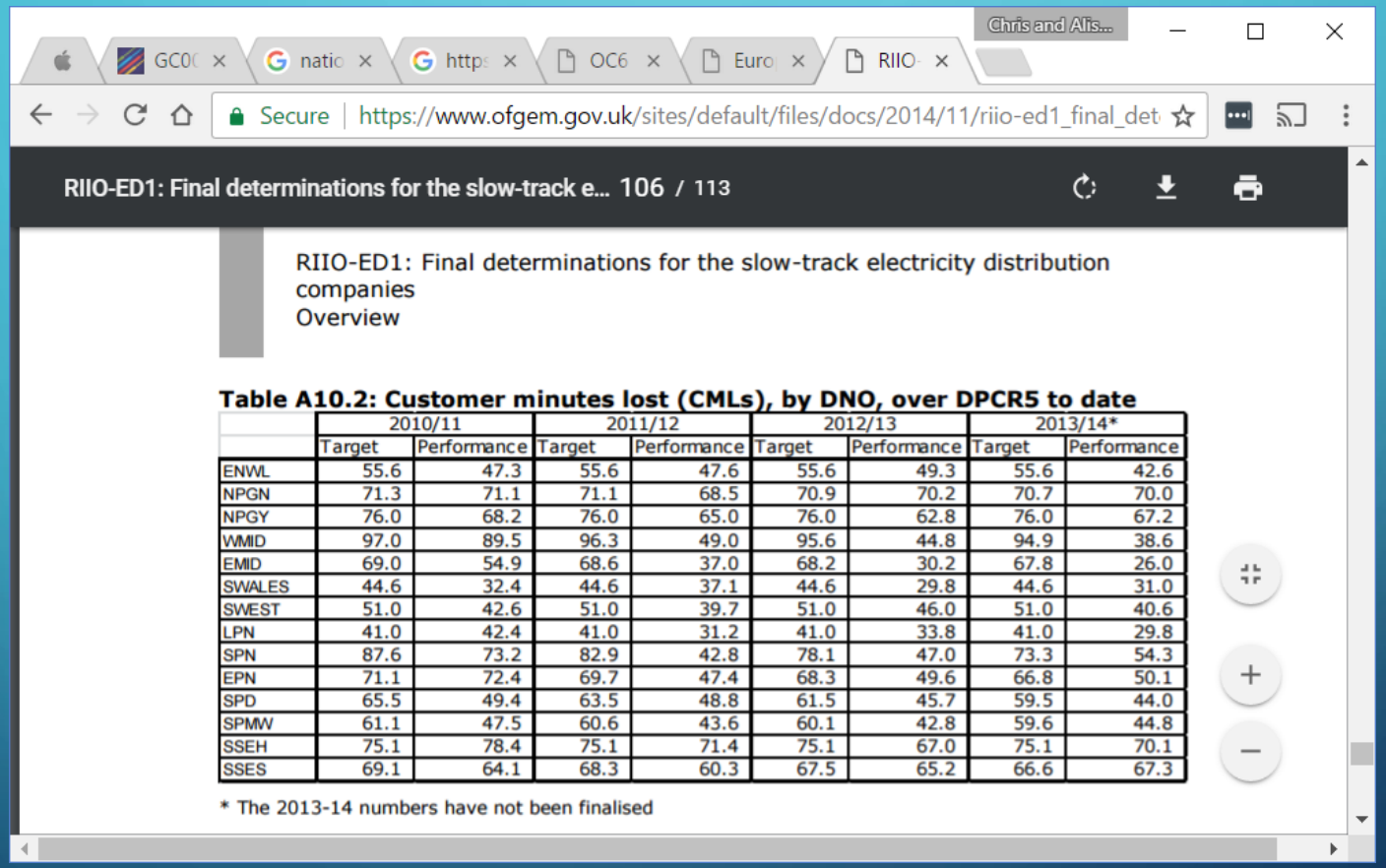


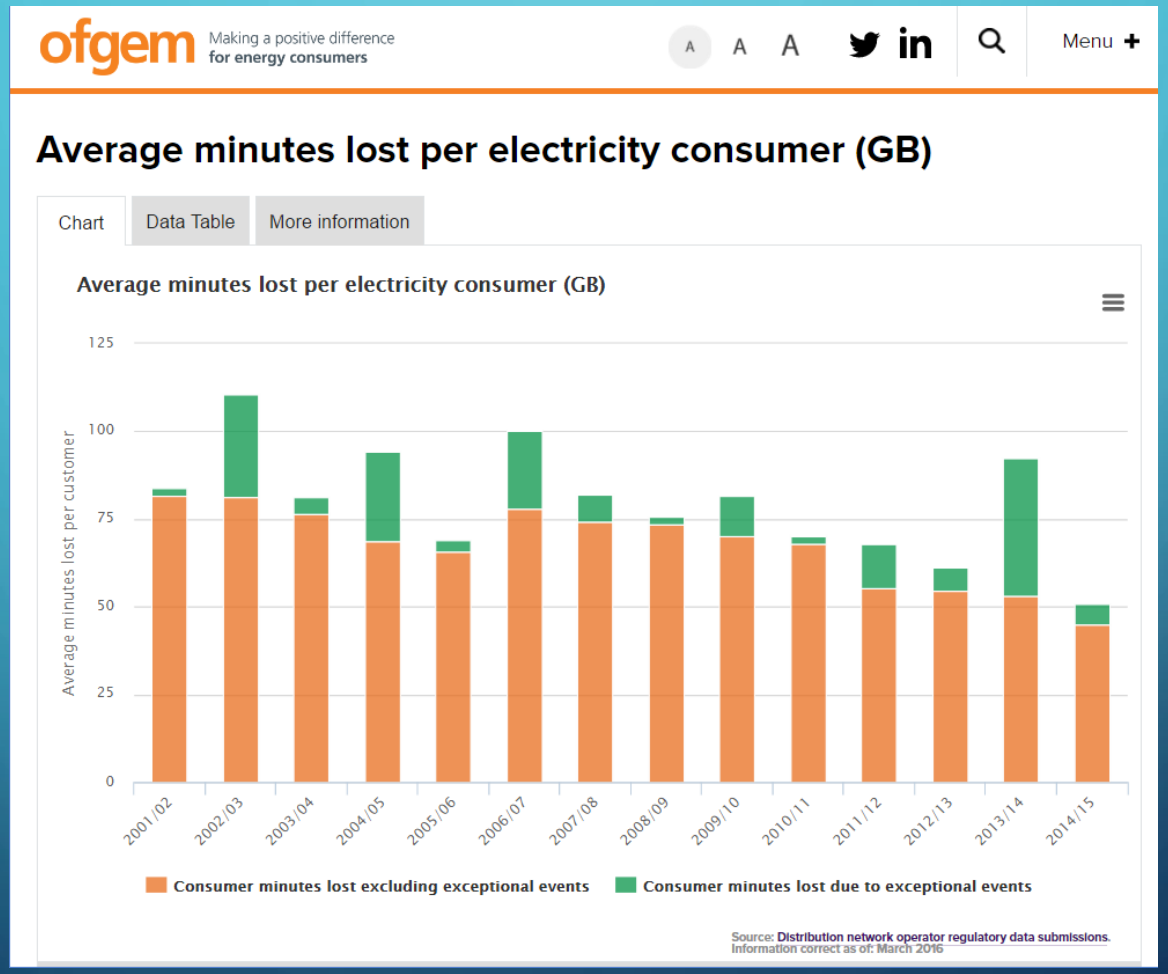
Table A10.2: Customer minutes lost (CMLs), by DNO, over DPCR5 to date

	2010/11		2011/12		2012/13		2013/14*	
	Target	Performance	Target	Performance	Target	Performance	Target	Performance
ENWL	55.6	47.3	55.6	47.6	55.6	49.3	55.6	42.6
NPGN	71.3	71.1	71.1	68.5	70.9	70.2	70.7	70.0
NPGY	76.0	68.2	76.0	65.0	76.0	62.8	76.0	67.2
WMID	97.0	89.5	96.3	49.0	95.6	44.8	94.9	38.6
EMID	69.0	54.9	68.6	37.0	68.2	30.2	67.8	26.0
SWALES	44.6	32.4	44.6	37.1	44.6	29.8	44.6	31.0
SWEST	51.0	42.6	51.0	39.7	51.0	46.0	51.0	40.6
LPN	41.0	42.4	41.0	31.2	41.0	33.8	41.0	29.8
SPN	87.6	73.2	82.9	42.8	78.1	47.0	73.3	54.3
EPN	71.1	72.4	69.7	47.4	68.3	49.6	66.8	50.1
SPD	65.5	49.4	63.5	48.8	61.5	45.7	59.5	44.0
SPMW	61.1	47.5	60.6	43.6	60.1	42.8	59.6	44.8
SSEH	75.1	78.4	75.1	71.4	75.1	67.0	75.1	70.1
SSES	69.1	64.1	68.3	60.3	67.5	65.2	66.6	67.3

* The 2013-14 numbers have not been finalised

i.e. around one hour per year of Distribution interruption – see Glossary

DNO PERFORMANCE IS IMPROVING



GLOSSARY

Acronym	Meaning
RIIO	OFGEM's regulatory framework for distribution price controls following RPI-X@20 project. "Revenue = Incentives + Innovation + Outputs"
RIIO-ED1	Price control review for period 1/4/15 to 31/3/23
DPCR5	Distribution Price Control Review 5 for period 1/4/10 to 31/3/15
CMLs	Average customer minutes lost per customer per year where interruption lasts >3 minutes
CIs	Number of customers interrupted per year per 100 customers, where interruption lasts >3 minutes; only one per incident counts (ie excludes attempted re-energisation)

Ref: https://www.ofgem.gov.uk/ofgem-publications/89065/glossary.pdf