CAWG 7

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Emergency and Repair Regressions

Discussion Material

13 March 2019

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1. Refresh of GD1

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Refresh of GD1 models

Emergency regression

- Cost driver: Emergency CSV (80% customer numbers, 20% Total External Condition Reports)
- Two models: 5 years of outturn data (GDPCR); 2 years of forecast

Repair regression

- Cost driver: Total External Condition Reports
- 5 years outturn data; 2 years of forecast

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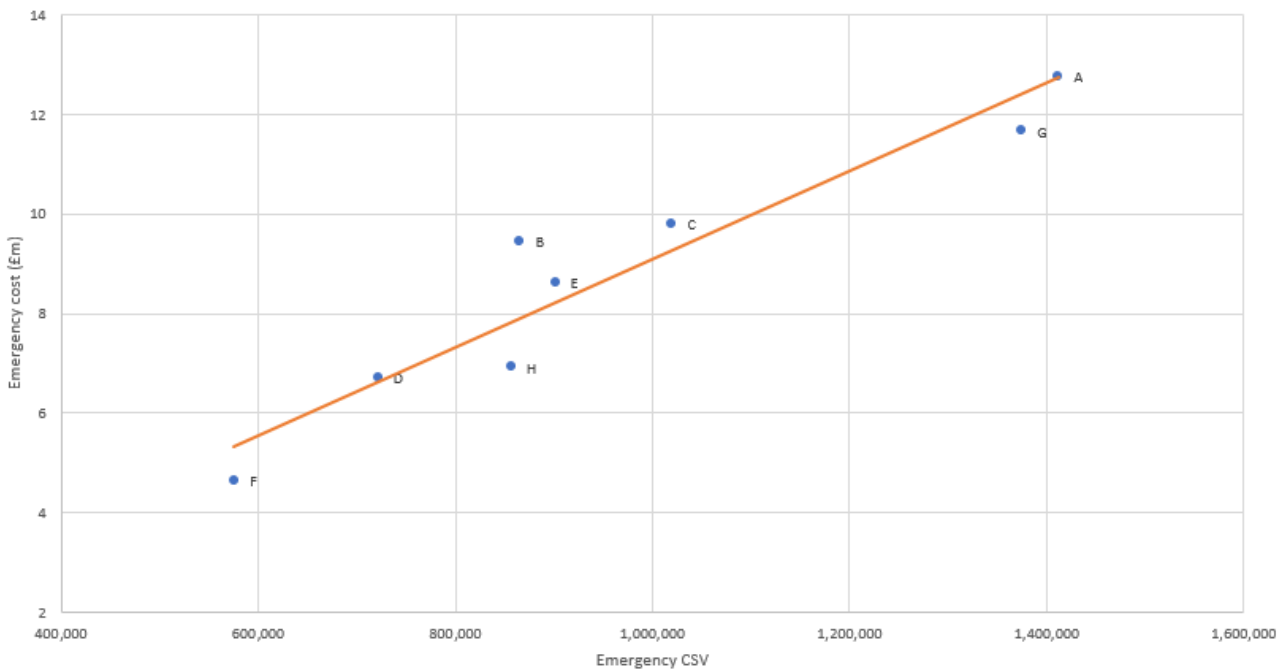
Emergency results – GD1 model

GD1 5 year historical regression



- 5-year panel, 2013/14 – 2017/18
- Base year for scores = 17/18
- Standardised score using Ofgem GD1 approach

	Std. Efficiency score annual change			
	2014/15	2015/16	2016/17	2017/18
A	0.03	-0.09	0.12	-0.04
B	0.03	-0.05	-0.11	-0.10
C	-0.06	-0.01	-0.14	0.05
D	0.04	-0.07	0.01	0.00
E	0.04	0.01	0.04	0.12
F	-0.10	0.18	0.03	-0.04
G	0.00	0.17	0.00	-0.03
H	0.03	-0.14	0.05	0.04

	Emergency			
	Normalised Cost	Modelled Cost	Standardised Efficiency Score	Rankings
A	12.77	12.74	1.00	4
B	9.45	7.90	1.19	8
C	9.80	9.27	1.05	7
D	6.73	6.61	1.01	5
E	8.63	8.21	1.05	6
F	4.66	5.30	0.88	1
G	11.66	12.41	0.94	3
H	6.93	7.82	0.88	2

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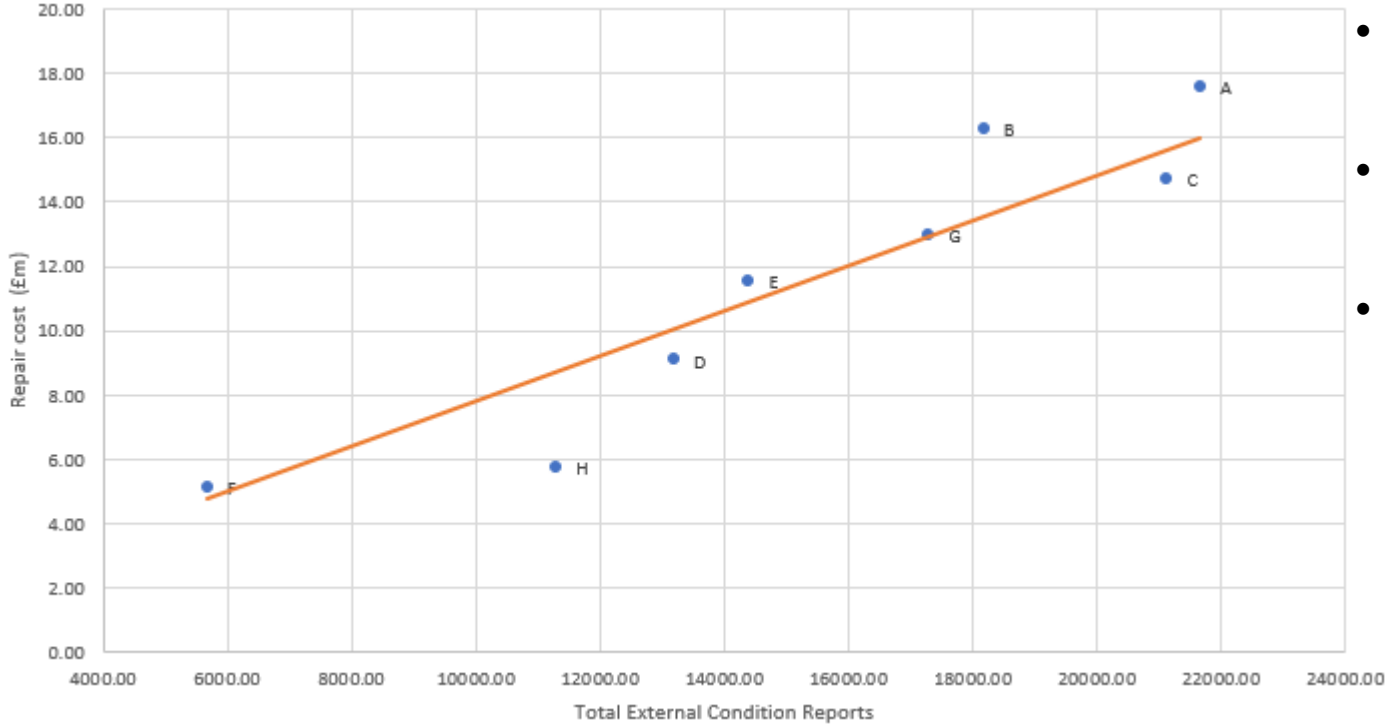
Repair results – GD1 model

GD1 5 year historical regression



- 5-year panel, 2013/14 – 2017/18
- Base year for scores = 17/18
- Standardised score using Ofgem GD1 approach

	Std. Efficiency score annual change			
	2014/15	2015/16	2016/17	2017/18
A	-0.02	0.05	0.29	-0.15
B	-0.13	0.09	0.02	0.15
C	0.03	0.01	-0.01	0.00
D	-0.04	-0.02	0.00	0.05
E	-0.01	0.15	-0.08	0.04
F	0.00	-0.01	-0.11	0.08
G	0.18	-0.25	-0.08	0.00
H	-0.01	-0.02	-0.03	-0.17

	Repair			
	Normalised Cost	Modelled Cost	Standardised Efficiency Score	Rankings
A	17.58	15.88	1.11	7
B	16.28	13.54	1.21	8
C	14.71	15.53	0.95	3
D	9.09	10.11	0.90	2
E	11.54	10.96	1.06	5
F	5.15	4.70	1.10	6
G	12.96	12.94	1.01	4
H	5.77	8.79	0.66	1

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What are we aiming for at GD2?

Cost drivers that meet Ofgem's principles

- Make economic and/or engineering sense
- Be accurately and consistently measurable
- Relatively stable relationship with costs over time
- Incorporate as much relevant information as possible
- Be beyond the control of the network company, if practicable

Results that reflect genuine differences in efficiency

- Data needs to be on a consistent basis
- Normalisations need to be considered/justified

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2. Emergency – alternative drivers

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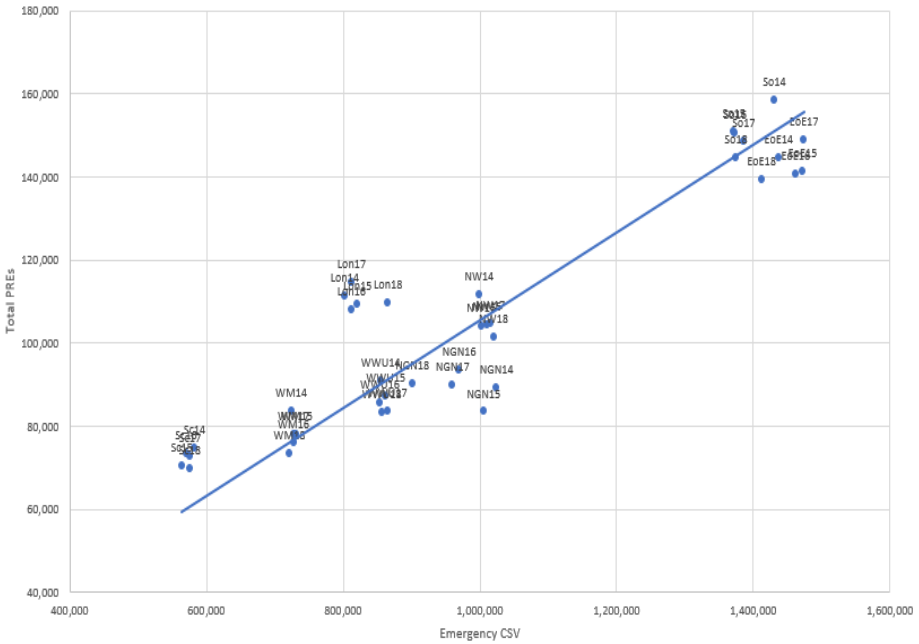
Possible evolutions for GD2

Rationale for GD2 driver not clear

- Customer no. acts as a proxy for the volume of internal emergencies; while external reports is a proxy for no. external emergencies.
- However, more direct data is available (Public Reported Escapes, PREs).
- Industry data (see chart) suggests the CSV is not a good proxy for PREs (at least, for some GDNs)
- Customer No. reporting also potentially inconsistent (e.g. IGTs)



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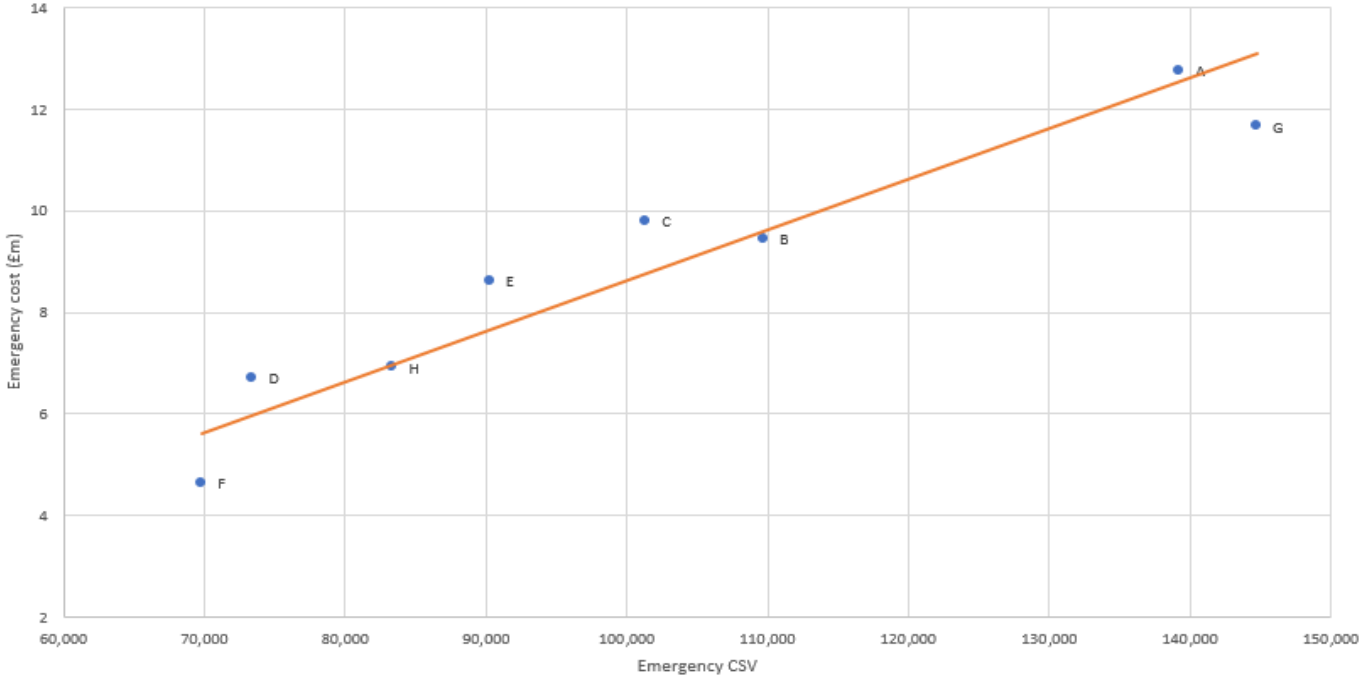
Emergency results

100% PREs

GD1 5 year historical regression



	Std. Efficiency score annual change			
	2014/15	2015/16	2016/17	2017/18
A	0.02	-0.07	0.07	-0.04
B	0.01	-0.01	-0.15	0.00
C	-0.02	0.02	-0.14	0.05
D	0.07	-0.02	-0.01	0.03
E	0.05	-0.14	0.08	0.02
F	-0.11	0.15	0.04	-0.03
G	-0.04	0.18	0.02	-0.04
H	0.02	-0.12	0.09	0.01

Emergency (100% PREs)

	Normalised Cost	Modelled Cost	Standardised Efficiency Score	Rankings
A	12.77	12.57	1.01	5
B	9.45	9.55	0.98	3
C	9.80	8.72	1.11	7
D	6.73	6.02	1.11	6
E	8.63	7.63	1.12	8
F	4.66	5.67	0.81	1
G	11.66	13.15	0.88	2
H	6.93	6.97	0.98	4

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Other issues for GD2

Weighting for CSV (if retained)

- @GD1 the assessment was that approximately 80% of emergencies are 'internal' i.e. arising in customer premises
- Latest data suggests industry average has increased to c.83%.

Sparsity and Urbanity Adjustments

- Emergency costs will be higher in sparser networks
- Reverse issue in London caused by traffic congestion etc.
- Ofgem adjusts costs pre-benchmarking to normalise
- In line with normal practice this will need reviewing for GD2

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Other issues for GD2

Smart Metering / Weather

- Emergency services are scaled to meet peak workload
- Recent mild winters impact on workload
- FCO utilization
- Smart meter roll out
- Overall GD2 allowances must therefore reflect be set recognising these industry changes – can't just assume that the future will look like the past.

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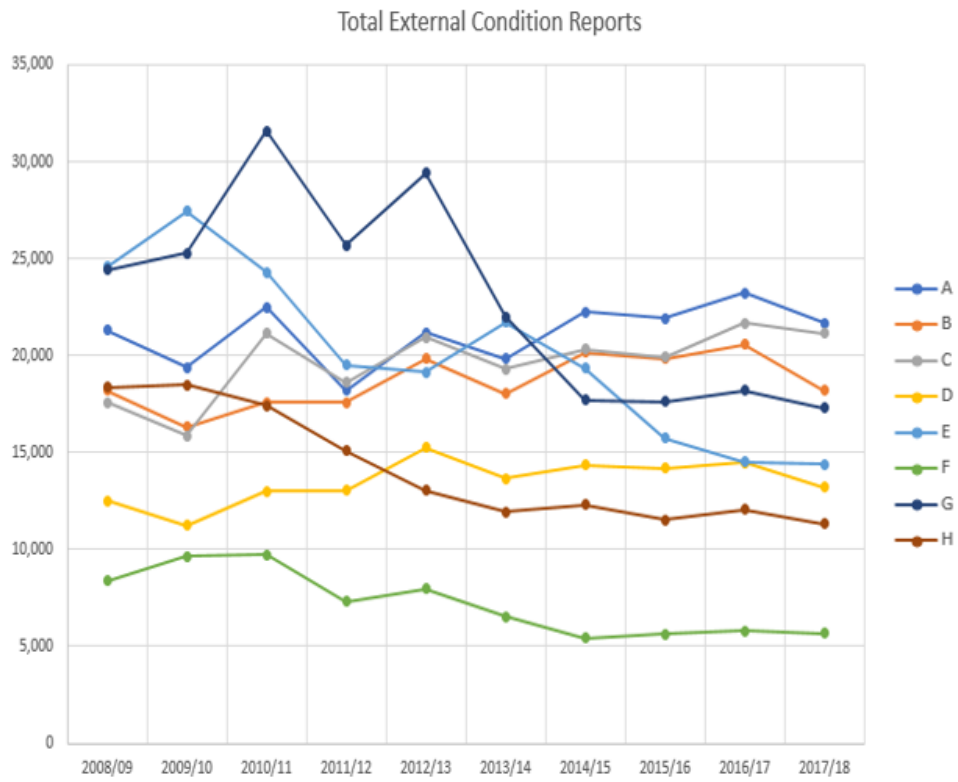
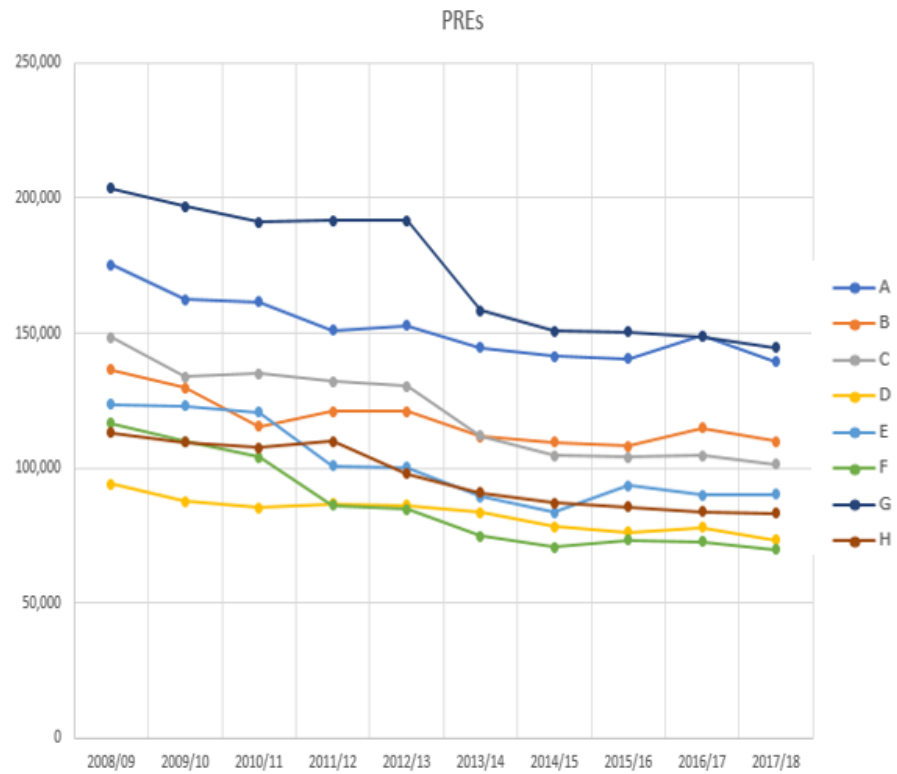
Emergency workload trends





- There are differences between GDPCR1 and GD1

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A note on quality

Table 2.07O
Percentage of gas emergencies attended within standard

GDN		Percentage of **uncontrolled** gas emergencies jobs to within the one hour standard					Percentage of **controlled** gas emergencies jobs to within the two hour standard				
		2013-14	**2014-15**	**2015-16**	**2016-17**	**2017-18**	**2013-14**	**2014-15**	**2015-16**	**2016-17**	**2017-18**
Cadent	EoE	97.91%	97.60%	97.94%	97.86%	97.08%	98.99%	98.47%	98.77%	98.60%	97.72%
	Lon	97.72%	97.39%	98.04%	98.04%	97.35%	98.53%	97.73%	98.64%	98.65%	97.78%
	NW	98.52%	98.20%	98.52%	98.49%	98.04%	99.23%	98.93%	99.14%	99.02%	98.90%
	WM	97.91%	97.52%	98.63%	98.45%	97.34%	98.83%	98.29%	99.10%	99.11%	98.23%
NGN	NGN	99.85%	99.85%	99.76%	99.76%	99.61%	99.97%	99.99%	99.96%	99.97%	99.72%
SGN	Sc	99.02%	98.75%	98.65%	98.47%	98.04%	99.80%	99.59%	99.61%	99.49%	98.56%
	So	98.52%	98.50%	98.27%	98.12%	98.29%	99.51%	99.37%	99.20%	99.23%	98.93%
WWU	WWU	98.33%	98.48%	98.59%	98.45%	98.00%	99.49%	99.60%	99.60%	99.36%	98.64%

- Differences in quality unlikely to be an issue as standard consistently achieved

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Conclusions on Emergency for discussion

- PREs as a cost driver meets Ofgem criteria better than the current CSV
- If current CSV is retained, weighting (and rationale for weights) should be re-confirmed
- Potential changes is GD2 requires allowance sense check
- Differences in quality unlikely to be an issue

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3. Repair – alternative drivers

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Possible evolutions for GD2

Repairs vs. Reports

- Variation in how many repairs are undertaken per external condition report (see table)
- Cause needs to be understood
- At GD1 Ofgem used reports instead of repairs
- We show the results of both
- Unless cause of repair variations can explain cost differences / efficiency, we would propose retaining reports as cost driver

	Average Repairs per Report (2013/14 - 2017/18 RRPs)
EoE	1.24
Lon	1.35
NW	1.23
WM	1.27
NGN	1.10
Sc	1.29
So	1.53
WWU	1.38

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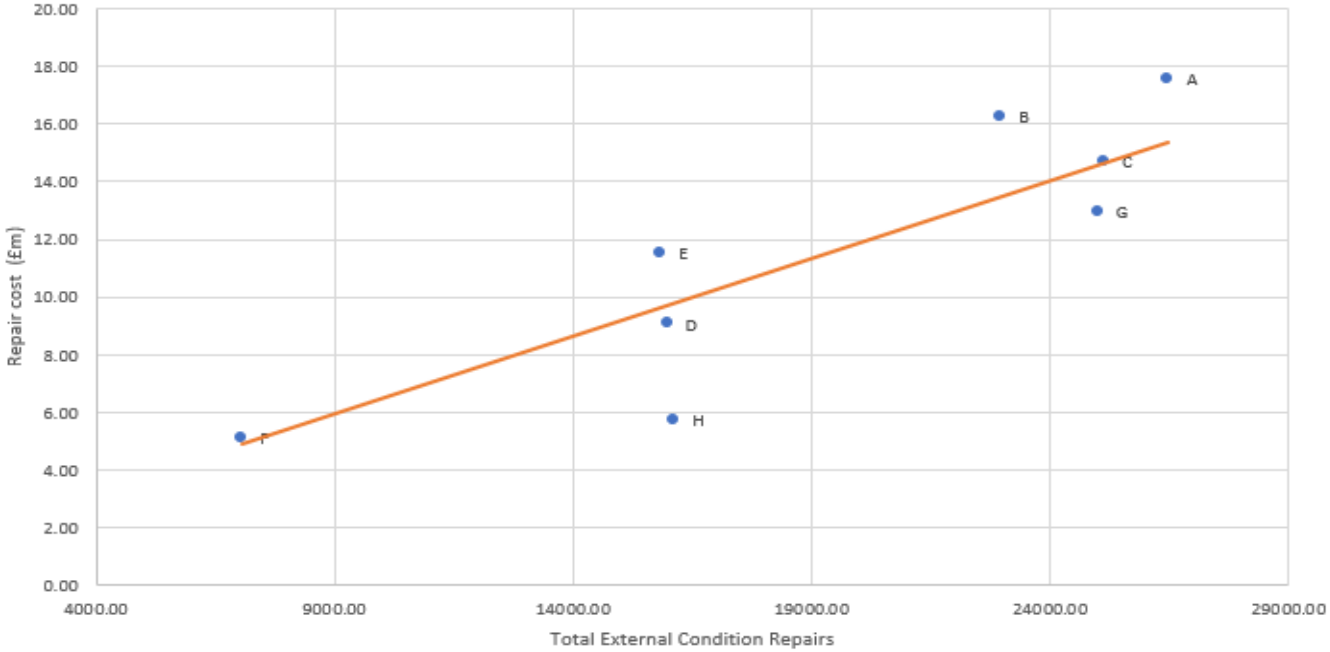
Repair (Total External Condition Repairs)

100% Total External Condition Repairs

GD1 5 year historical regression



	Std. Efficiency score annual change			
	2014/15	2015/16	2016/17	2017/18
A	0.01	-0.02	0.34	-0.18
B	-0.26	0.14	0.09	0.14
C	0.03	0.06	-0.03	-0.01
D	-0.03	-0.01	0.02	0.04
E	0.06	0.04	-0.11	0.04
F	0.02	0.00	-0.12	0.10
G	0.14	-0.16	-0.08	0.01
H	0.03	-0.06	-0.10	-0.14

Repair (External Condition Repairs)

	Normalised Cost	Modelled Cost	Standardised Efficiency Score	Rankings
A	17.58	15.27	1.15	6
B	16.28	13.48	1.20	8
C	14.71	14.59	1.00	4
D	9.09	9.81	0.92	3
E	11.54	9.73	1.18	7
F	5.15	4.79	1.07	5
G	12.96	14.52	0.89	2
H	5.77	9.89	0.58	1

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A note on quality

Table 2.08O
Gas escapes prevented within 12 hours

Company	GDN	2013-14		2014-15		2015-16		2016-17		2017-18	
		Target	Actual	Target	Actual	Target	Actual	Target	Actual	Target	Actual
Cadent	EoE	42%	50%	42%	54%	42%	52%	42%	47%	42%	49%
	Lon	43%	44%	43%	48%	43%	52%	43%	46%	43%	45%
	NW	34%	45%	34%	48%	34%	51%	34%	50%	34%	50%
	WM	36%	43%	36%	50%	36%	51%	36%	49%	36%	48%
NGN	NGN	60%	62%	60%	63%	61%	64%	61%	62%	61%	66%
SGN	Sc	60%	73%	60%	69%	60%	72%	60%	72%	60%	66%
	So	60%	64%	60%	63%	60%	64%	60%	64%	60%	63%
WWU	WWU	40%	47%	40%	49%	40%	53%	40%	47%	40%	54%

- Varying performance vs. standards (targets for 12 hour)
- Implies different cost levels – not currently captured in the model
- Could consider pre-model normalisation to reflect different performance?

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Issues for further consideration

Diameter banding/mix

- Repairing a higher diameter main is more expensive
- GDNs have different diameter mixes for repair, causing different costs
- One option is to consider if a Repex-style synthetic cost could be developed
- RRPs currently report repairs by diameter – data robustness needs checking

2017/18

	EoE		Lon		NW		WM		NGN		Sc		So		WWU	
	No. of Repairs	% split	No. of Repairs	% split	No. of Repairs	% split	No. of Repairs	% split	No. of Repairs	% split	No. of Repairs	% split	No. of Repairs	% split	No. of Repairs	% split
Diameter band A	786.29	11%	619.71	11%	1135	20%	520	12%	1106	14%	705	20%	1607	13%	1436	14%
Diameter band B	2807.5	40%	1774.5	32%	2103	37%	1792	40%	2501	33%	894	26%	4051	34%	2855	28%
Diameter band C	1564.37	22%	1085.63	20%	1159	20%	885	20%	1521	20%	772	22%	2535	21%	2277	22%
Diameter band D	636.74	9%	533.26	10%	362	6%	453	10%	847	11%	380	11%	1187	10%	1232	12%
Diameter band E	125.66	2%	67.34	1%	113	2%	94	2%	170	2%	140	4%	269	2%	309	3%
Diameter band F	742.88	11%	575.12	10%	431	8%	484	11%	1021	13%	367	10%	1282	11%	1473	14%
Diameter band G	70.19	1%	173.81	3%	106	2%	127	3%	157	2%	92	3%	372	3%	429	4%
Diameter band H	226.79	3%	574.21	10%	244	4%	131	3%	347	5%	145	4%	524	4%	245	2%
Diameter band I	18.58	0%	147.42	3%	37	1%	27	1%	23	0%	4	0%	255	2%	1	0%

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Conclusions on Repair for discussion

- We understand the reason for using reports rather than repairs
- Additional causes of cost differences need to be explored further:
  - Quality differences - normalisation ?
  - Diameter bands – synthetic unit costs ?

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4. Combining Emergency and Repair

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Possible evolutions for GD2

Reasons to merge Emergency and Repair

- Some scope for optimizing service provision across Emergency and Repair
- Some reporting/data consistency issues might be resolved by merging
- At GD1 the same driver (i.e. total condition reports) was used for both
- Possibility that merging will create better incentives

Options for cost drivers

- Propose a driver weighting 1. Emergency CSV (45%) and 2. total condition reports (55%), based on share of Emergency/Repair in total cost.
- Two options for Emergency CSV – one with customers; one with PREs.

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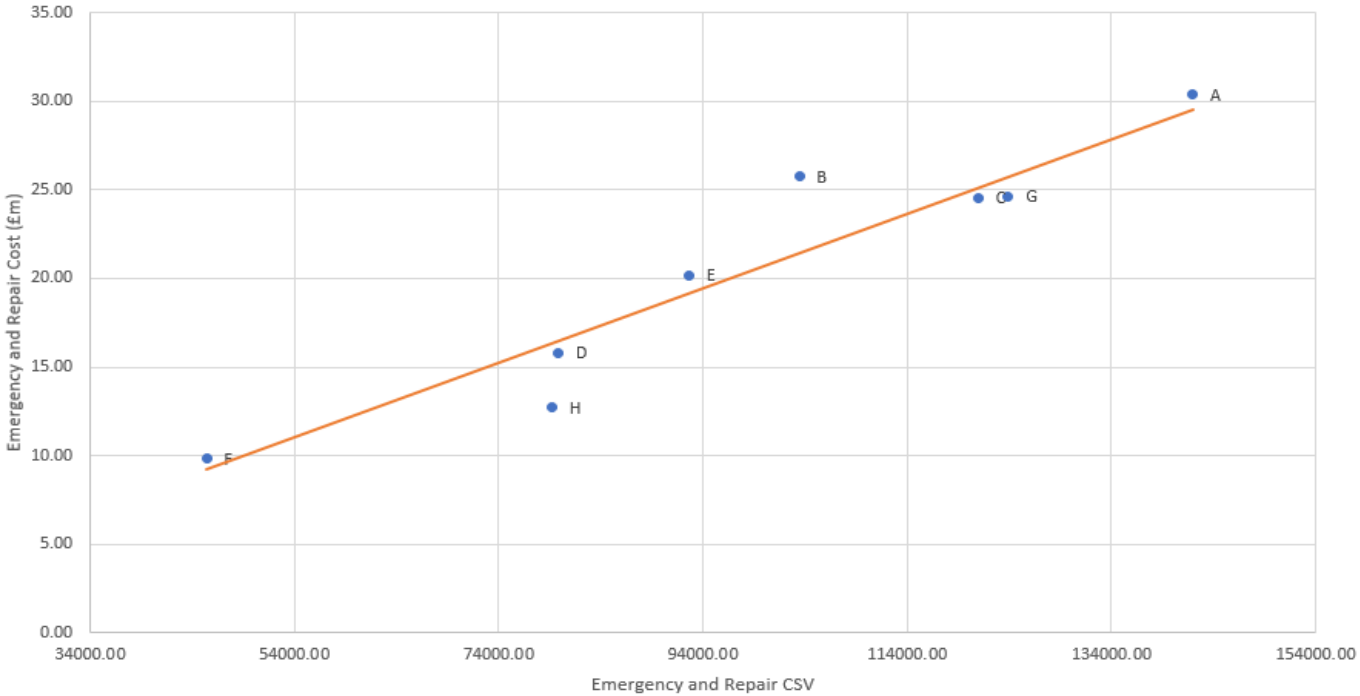
Emergency & Repair

36% Customer Numbers

64% Total External Condition Reports

GD1 5 year historical regression



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A	0.08	-0.01	0.22	-0.12
B	0.03	0.04	-0.02	0.05
C	0.04	0.00	-0.03	0.04
D	0.04	-0.03	0.00	0.01
E	-0.04	-0.03	-0.09	0.07
F	-0.15	0.14	-0.04	0.03
G	-0.03	-0.02	-0.04	-0.01
H	0.04	-0.10	0.01	-0.08

Emergency & Repair

	Normalised Cost	Modelled Cost	Standardised Efficiency Score	Rankings
A	30.35	29.56	1.03	5
B	25.73	21.43	1.20	8
C	24.51	25.13	0.98	4
D	15.81	16.48	0.96	3
E	20.16	19.17	1.05	6
F	9.81	9.29	1.06	7
G	24.62	25.75	0.96	2
H	12.70	16.35	0.78	1

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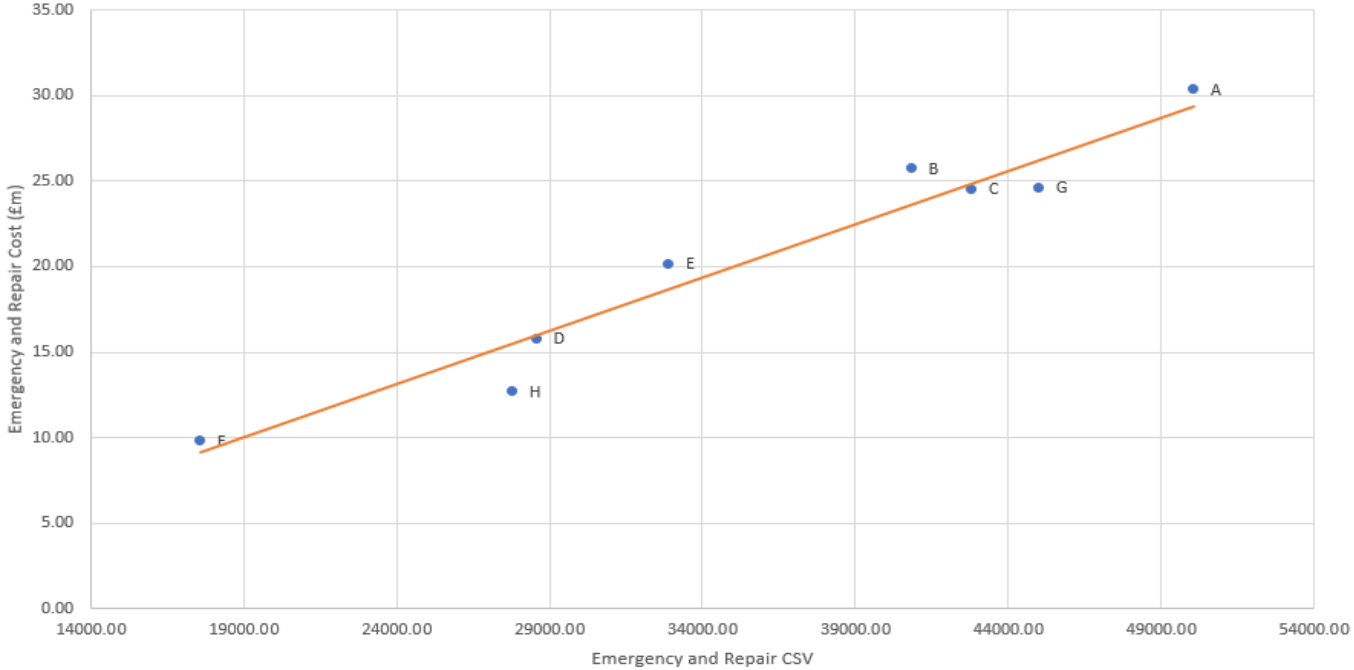
Emergency & Repair

45% PREs

55% Total External Condition Reports

GD1 5 year historical regression



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C	0.04	0.00	-0.03	0.04
D	0.04	-0.03	0.00	0.01
E	-0.05	-0.02	-0.09	0.07
F	-0.15	0.15	-0.04	0.04
G	-0.03	-0.01	-0.04	-0.01
H	0.04	-0.10	0.01	-0.08

Emergency & Repair

	Normalised Cost	Modelled Cost	Standardised Efficiency Score	Rankings
A	30.35	29.52	1.03	5
B	25.73	23.58	1.09	8
C	24.51	24.84	0.99	3
D	15.81	15.90	0.99	4
E	20.16	18.58	1.08	7
F	9.81	9.30	1.05	6
G	24.62	26.25	0.94	2
H	12.70	15.42	0.82	1

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Ops Management

- Ops Management costs include costs linked to Emergency Maintenance and Repair activities.
- Including these costs in Emergency and Repair will give a better picture of their cost efficiency.
- Costs related to maintenance needs to be stripped out

Emergency & Repair

	Normalised Cost	Modelled Cost	Standardised Efficiency Score	Rankings
A	30.35	29.56	1.03	5
B	25.73	21.43	1.20	8
C	24.51	25.13	0.98	4
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F	9.81	9.29	1.06	7
G	24.62	25.75	0.96	2
H	12.70	16.35	0.78	1

Emergency & Repair (with Ops Management Costs)

	Normalised Cost	Modelled Cost	Standardised Efficiency Score	Rankings
A	39.05	28.91	1.29	8
B	31.78	24.88	1.22	6
C	29.99	26.80	1.07	4
D	27.28	22.01	1.19	5
E	30.59	23.62	1.24	7
F	9.81	16.85	0.56	2
G	24.62	27.11	0.87	3
H	12.70	21.93	0.55	1

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Conclusions for discussion

- Volatility in year on year efficiency scores highlights the importance of look at multiple years in all regressions
- Not obvious that the blended cost driver has a reasonable economic interpretation
- Not obvious that the change would give more robust results
- There are also reasons to retain E&R separately – each cost head does have different unit drivers
- Overall we do not see value in splitting
- Maintenance portion of Ops management costs needs to be stripped out to get more reliable results.

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