CAWG 8

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Repex regressions

11 April 2019

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1. GD1 approach re-fresh

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Principles of a cost driver

A good cost driver should

- 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

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Calculating synthetic unit costs

Cost driver made up of Ofgem's unit cost and reported workload

- Ofgem sets a common industry-wide unit cost for each type of work – e.g. different pipe lengths
- Each GDN reports its workload for each type of work
- Workload multiplied by unit cost equals "synthetic unit cost"
- Sum of SUC over all types of work is total synthetic cost…
- …which is used as the cost driver for repex regression

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Pros and cons of synthetic unit costs

We use synthetic unit costs because…

- Repex is large/repetitive activity – so unit cost analysis is informative
- Approach accounts for different mixes of work across GDNs
- An alternative band-by-band analysis could create allocation distortions

Problems with unit costs

- Unit cost input relativities need to be accurate – these have not been updated since GD1
- Method does not test whether workload levels are efficient

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2. GD1 data analysis

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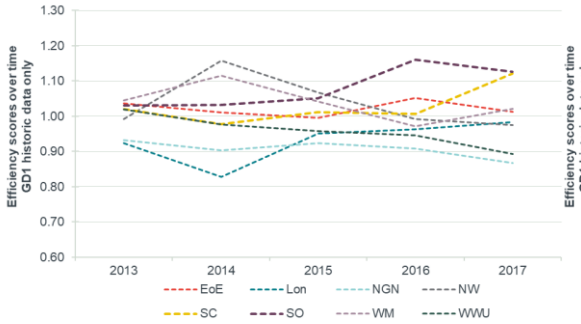
Re-running GD1 models

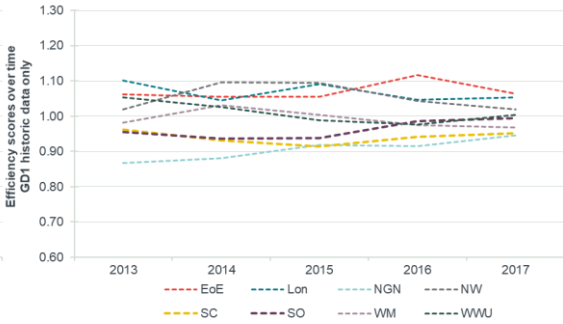
Updated results using latest outturn data

- Big movements year-on-year:
  - Eg "C" 17% swing up in 13-14 then 9% swing down in next year 14-15
- Potentially unfair to use a single-year snapshot
  - Eg "B" consistently most efficient, but ends fourth on 2017 snapshot
  - "F" has one atypical year (2017)
- Wide range of scores in 2017 – arguably results are implausible
- Overall suggests something is missing – synthetic unit cost does not give a full picture of efficiency

Repex workload	GD-1 Historic	2013	2014	2015	2016	2017	Average
Efficiency score	A	1.04	1.01	1.00	1.05	1.01	1.02
	B	0.92	0.83	0.95	0.96	0.98	0.93
	C	0.99	1.16	1.07	0.99	0.97	1.04
	D	1.04	1.12	1.04	0.97	1.02	1.04
	E	0.93	0.90	0.92	0.91	0.87	0.91
	F	1.02	0.98	1.01	1.01	1.12	1.03
	G	1.03	1.03	1.05	1.16	1.13	1.08
	H	1.02	0.98	0.96	0.95	0.89	0.96
	Upper quartile	*0.98*	*0.96*	*0.96*	*0.96*	*0.95*	*0.96*

Repex scores (left) more variable than totex scores (right)





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Investigating data by band

Unit costs have changed since GD1

- Table shows Ofgem's unit cost assumption vs. GD1 outturn data
- Smallest band has no material change
- Other bands have bigger changes – particularly higher diameter
- Unit cost assumption needs to be accurate to avoid unfairly penalising work mix variation (see next slide)

2017/18 prices

Diameter band	Ofgem (existing)	GD1 average	% change
<=75mm	102	102	1%
>75mm to 125mm	113	120	6%
>125mm to 180mm	188	195	3%
>180mm to 250mm	320	296	-7%
>250mm to 355mm	431	379	-12%
>355mm to 500mm	640	690	8%
>500mm to 630mm	962	1526	59%
>630mm	1157	1757	52%

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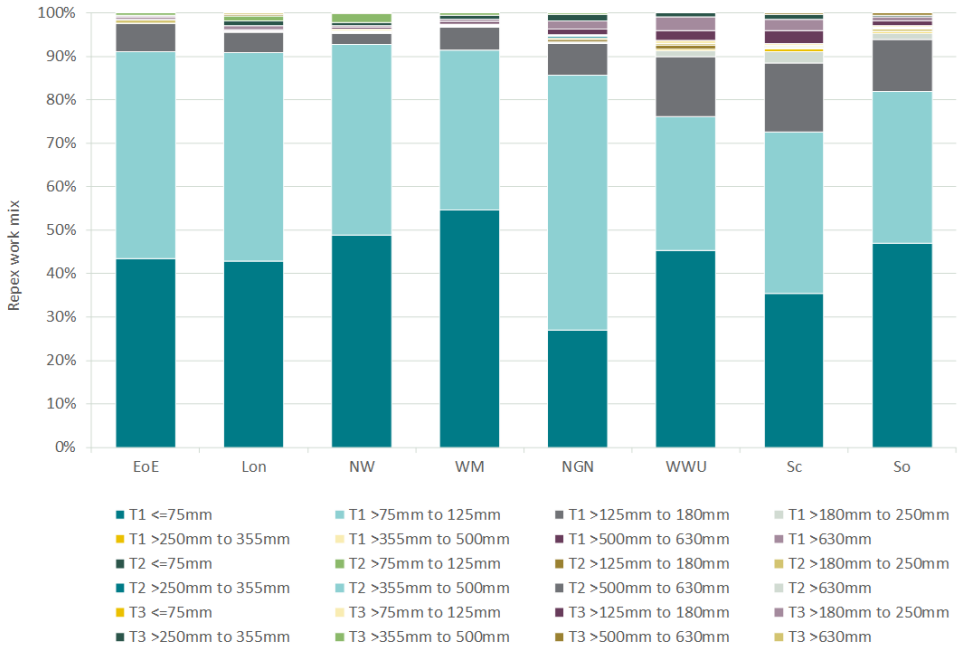
GDN work mix

Using 2017/18 data – clear that GDNs have different mix

- Chart shows proportion of work mix per GDN
- Clear that there is still variation in mix
- Potentially means distorted results given unit cost changes (see previous slide)



Discussion point: what is the best way to update unit cost inputs?

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Higher diameter issues

Larger bands have more variable costs

- We plotted outturn cost vs. outturn length laid
- R-squared (see table) shows variation around the average unit cost of pipe laid…
- …work on larger pipes has greater volatility
- Large pipe work is often bespoke
- The range of practice means innovative methods may have unequal effects; or simply not be reflected in scores.

Diameter band	R-squared
<=75mm	0.9668
>75mm to 125mm	0.9593
>125mm to 180mm	0.9599
>180mm to 250mm	0.8315
>250mm to 355mm	0.8215
>355mm to 500mm	0.6501
>500mm to 630mm	0.7727
>630mm	0.2158

Discussion point: is synthetic unit cost appropriate for larger pipe diameters? Should more bespoke analysis be done?

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3. Options for further testing

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Options for further testing

Issue	Options to test
Volatility in results creates doubt in a single snapshot year	1. Average score over multiple years 2. Smooth or aggregate costs/workload over GD1
Potential distortion in higher diameter bands due to lower volumes or more bespoke activity - are some segments/bands distorting results?	Regressions for different tiers: • Tier 1 only (and/or <=180mm only) • Tier 2/3 only • Strip out relay after escapes
GDNs not rewarded for optimising design and finding ways not to lay replacement pipe	Test options for using decommissioned pipe data - test robustness of data and results
Link between repex and quality:	1. Compare results vs. length off risk 2. Compare results vs. interruptions 3. Others? (e.g. customer service)

Other suggestions?

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