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The Value of Lost Load project

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What is the value of lost load (VoLL)?

The mechanism used by the electricity industry to attribute a value on the financial and social cost of supply interruptions to customers in £ per kWh

Provides a price signal about the adequate level of supply security in GB

VoLL varies considerably for domestic and SME customers

The existing single VoLL is aggregated to provide an overall estimate of the lost value

VoLL has existed since 1990
2013 - London Economics ~£17k/MWh average value (excluding I&C)

Ofgem used ~£16k/MWh for incentives in RIIO ED1

Objectives of the VoLL project

A better understanding of customer impact by segment

Allows network services to be tailored to customer need

How each segment is best served eg better communications & resilience

Key output:

A model by customer segment showing relative value

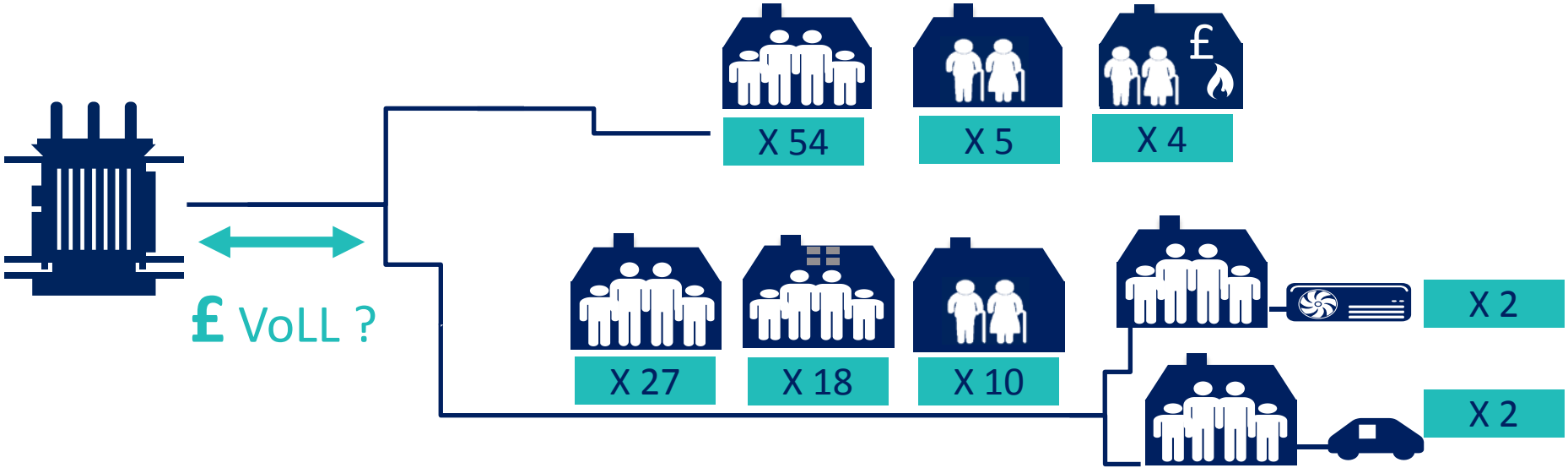
Demonstrate how segmented values would help DNOs improve planning models & guide investment strategies

More targeted decisions, driven by customer need

Guidance on optimum customer strategies

Application of a revised VoLL matrix

Efficient use of resources driven by customer needs



More targeted investment decisions based on a network's composite VoLL
Customer segmentation using standard industry data

VoLL overview

Interviews with key stakeholders to guide research approach

4 ECP panels of domestic and SME customers

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20 depth interviews

6,000 interviews across GB with domestic and SME customers

Engagement with industry

Revised VoLL model

Recommendation to Ofgem

Statistically robust & representative research
to establish VoLL by key customer segments now and in the future

Why we need a reliable measure of VoLL

The Value of Lost Load (VoLL) is a critical component of infrastructure investment decision making

It needs to be:

- Accurate – a realistic and robust quantification in £/MWh
- Representative – covering a range of values across customer groups

The objective of this study is to establish robust measures of VoLL across the full spectrum of customers

VoLL methodology

Phase 1	Phase 2	Phase 3
		
Literature review to understand the problem & previous research Consultation with key stakeholders with a vested interest in the study	Extensive **qualitative** customer research	Extensive **quantitative** customer survey **Revised VoLL matrix** Final report and recommendations to Ofgem

The key questions

Five key questions

1. How do customers measure & value lost load?
2. What is the financial impact in £ per MWh?
3. How will VoLL change in the future?
4. How does this vary by customer segment?
5. How can DNOs mitigate the cost of lost load to customers?

How customers measure & value lost load? What they told us:

Perception of reliability	Reliability means constant availability Perception characterised by frequency & duration
Expectations of reliability	Rural & worst-served have lower expectations but greater tolerance & resilience than urban customers
Opinions on investment	Rural & worst served - Expect more investment in worst networks for parity in service - but don't want bills to increase Urban & SMEs wont pay more to improve reliability for others
Uniform VoLL	Consumers believe a single VoLL is no longer appropriate Want more granular matrix, reflecting needs of specific groups
Financial & social impacts	SMEs place greater emphasis on financial impact of lost load Domestic customers more concerned with non-financial impact
Mitigating the impact	Achievable with: Better information and improved channels of communication

Service attributes appraised by customers

1 How do customers measure & value lost load?

Type of power cut	Advance warning	Frequency of power cuts
Duration of the power cut	Time of day	Day of week
Assistance for customers vulnerable during the power cut	Proactive information about the power cut	Quality of information provided

The one-off payment you pay to avoid this happening/
The one-off amount you receive for this happening

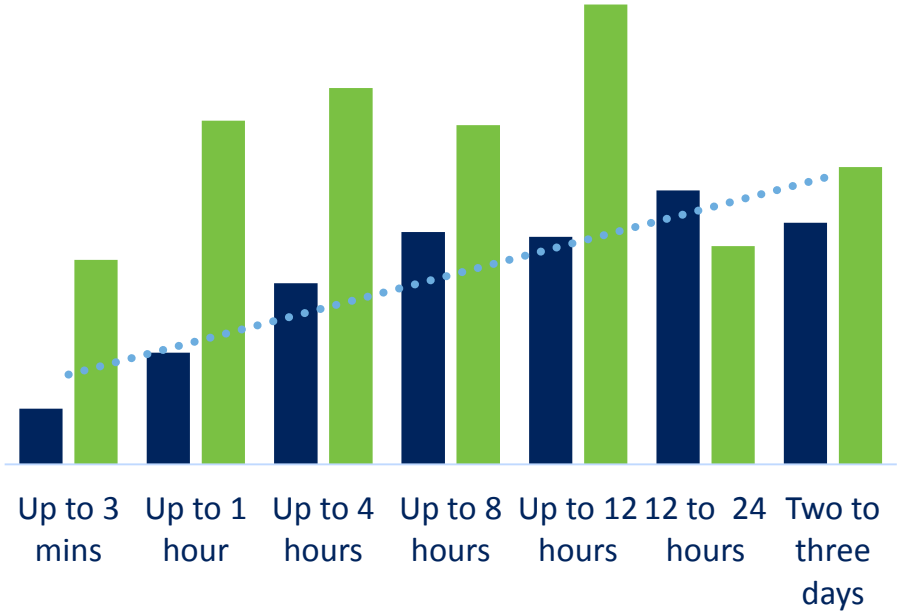
High priorities:
Cost, duration, frequency & information

	High	
One-off payment to avoid this happening		Duration of the power cut
Additional support payment		Proactive information about the power cut
Duration of the power cut		The one-off payment you pay to avoid this happening
Frequency of power cuts		Additional support payment
Advance warning		Assistance for customers vulnerable during the power cut
The one-off amount you receive for this happening		Quality of information provided
Proactive information about the power cut		Frequency of power cuts
Assistance for customers vulnerable during the power cut		Time of day
Quality of information provided		Advance warning
Time of day		Day of week
Additional amount received with support		The one-off amount you receive for this happening
Day of week		Additional amount received with support
	Low	

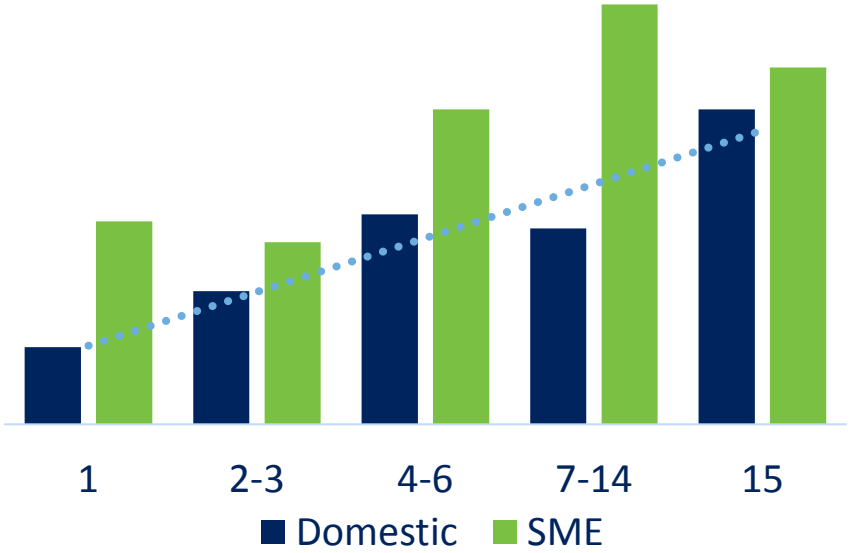
Importance

How do customers measure VoLL

Duration of the power cut



Frequency of power cuts



What is the financial impact in £ per MWh?

As expected WTA estimates are much larger than the comparable WTP estimates

Willingness to pay £/MWh	**£2,000**	**£13,500**
Willingness to accept £/MWh	**£3,700**	**£35,700**

What is the financial impact in £ per MWh for domestic customers?

VoLL 2016	£2,000	£2,000	London School of Economics 2013
	Willingness to pay £/MWh		
VoLL 2016	£3,700	£12,000	London School of Economics 2013
	Willingness to accept £/MWh		

The one-off payment expected by customers to accept the base case is significantly higher in the LE study, a reflection of the frequency of interruptions in that study being set at once every 12 years

Imagining a future LCT context

Willingness to pay £/MWh

£2,000	£13,500
Future?	Future?

Willingness to accept £/MWh

£3,700	£35,700
Future?	Future?

EHP future scenario

FUTURE SCENARIOS

WTP **£2,000**

WTA **£3,500**

Electric Vehicles

Slightly higher

Slightly higher

PV

No difference

No difference

Electric Heat Pumps

Slightly lower

Slightly higher

Current behaviour

WTP		WTA
£2,000	All domestic	£3,700
-	Domestic LCT users	x4
-	Domestic PV users	x2
-	Imagined future LCT users	-
x1.2	Domestic - high usage	x1.5

Current LCT users have a higher WTA than imagined users

Understanding VoLL by segment

Low VoLL	High VoLL
Urban	Rural
Less affluent	More affluent
Not Vulnerable	Vulnerable
Older	Younger

VoLL has significantly different values across the various segments of the customer base; for example, rural customers compared to urban

WTA & WTP value index (domestic)

	WTP
All Domestic (n=669)	**£1,956**
Impact of power cut - Low (n=239)	127
High usage (n=54)	123
Dissatisfied (n=100)	121
Medically Dependant (n=60)	119
Want to improve worse served (n=157)	113
Want to improve reliability (n=67)	110
Want to keep reliability (n=198)	104
Medium usage (n=336)	100
Power cuts (n=358)	100
Low usage (n=277)	97
Satisfied (n=536)	96
No power cuts (n=283)	95
Want to keep bills constant (n=247)	88
Impact of power cut - Medium (n=81)	79
Impact of power cut - High (n=60)	58

	WTA
All Domestic (n=669)	**£3,709**
Impact of power cut - Low (n=239)	245
Want to improve supply (n=67)	181
Low usage (n=277)	143
Want to keep reliability (n=198)	136
High usage (n=54)	131
Want to improve worse served (n=157)	117
No power cuts (n=283)	116
Satisfied (n=536)	100
Medically Dependant (n=60)	97
Dissatisfied (n=100)	90
Power cuts (n=358)	88
Medium usage (n=336)	76
Want to keep bills constant (n=247)	69
Impact of power cut - Medium (n=81)	52
Impact of power cut - High (n=60)	21

Customer impacted most by power cuts have the lowest WTP/WTA
High energy users have the highest

Relative importance of service

Phone call(s) made directly to your mobile or landline	x 3
Accurate information about when the power is expected to be restored	x 3
Short message service (SMS) sent to your mobile phone	x 3
Automated text-to-speech message	x 3
A justified reason for the power cut	x 3
A Welfare Pack to help you cope with the power cut	x 3
Confirmation that your electricity is back on	x 3
Sending a mobile catering van to provide hot food and drinks	x 2
Advice on what to do during a power cut	x 2
Public address/tannoy system	x 2
Sending a mobile unit that allows you to charge mobile phones/ tablet devices	x 2
Nominated friend, family member or colleague who can be sent updates instead of, or in addition to us contacting you	x 2
Home visits to offer help and advice at any stage	x 2
Social media (Twitter, Facebook etc.)	x 1

Mitigating VOLL - most important support element
Providing information by phone

WTA & WTP value index (domestic)

	WTP
All Domestic (n=669)	**100**
18 – 29 (n=126)	115
Vulnerable (n=379)	106
AB (n=165)	106
Off-gas (n=126)	106
Rural (n=68)	105
C2 (n=123)	104
30 – 44 (n=138)	104
Female (n=119)	103
Urban (n=138)	101
Male (n=98)	98
45 – 59 (n=175)	97
C1 (n=209)	96
DE (n=170)	96
60+ (n=230)	94
Fuel poverty (n=39)	93

	WTA
All Domestic (n=669)	**100**
Fuel poverty (n=39)	195
AB (n=165)	170
18 – 29 (n=126)	138
30 – 44 (n=138)	126
Rural (n=68)	126
Vulnerable (n=379)	118
Female (n=119)	108
C2 (n=123)	100
Male (n=98)	95
60+ (n=230)	94
C1 (n=209)	88
45 – 59 (n=175)	81
Urban (n=138)	81
Off-gas (n=126)	81
DE (n=170)	80

Customers in fuel poverty have lowest propensity to pay more for additional support and the greatest expectation of compensation

Early indications

- The VoLL methodology is robust
- The VoLL model quantifies variations across segments
- VoLL is not linear
- Some segments support a strong VoLL, hence potentially higher investment
- Early adopters of LCT are indicative of a future VoLL
- Enhanced support and information is valued highly
- We are confident of producing a reliable segmentation model

Next steps

1	2	3	4	5	6
Lessons learned from the pilot survey (including peer review)	Refine survey instrument	Winter survey December 2016 - February 2017	Summer survey July 2017 to August 2017	Publish interim analysis from model by October 2017	Final survey report including lessons learned by January 2018