



Active fault level management

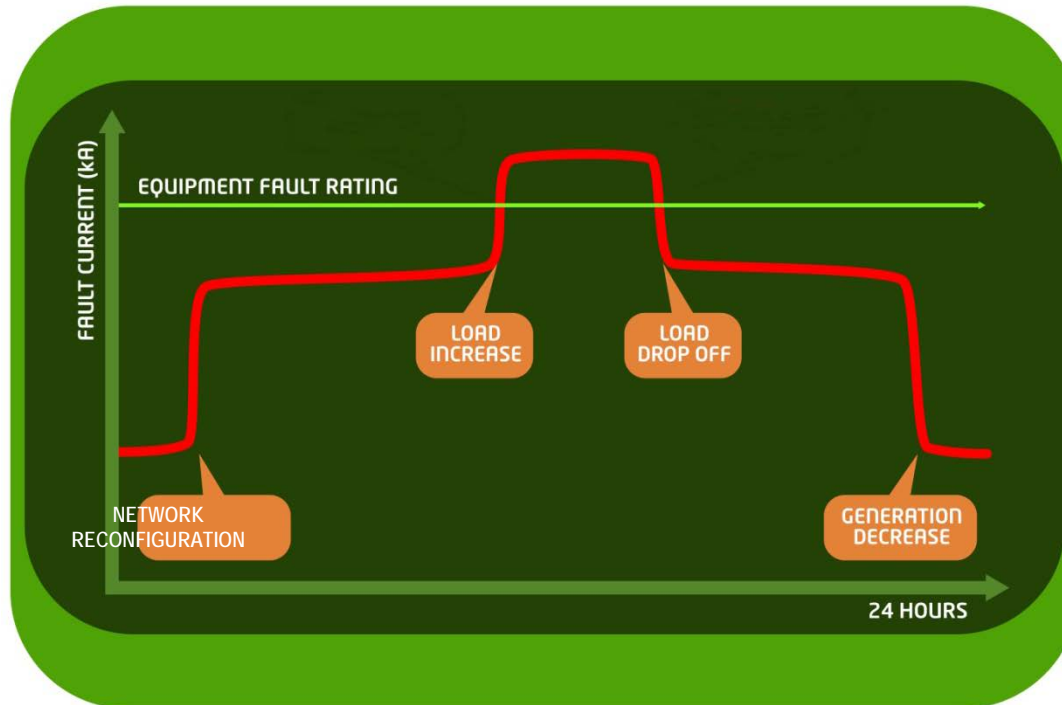
Introducing the
Fault Current Limiting service



Fluctuating fault level

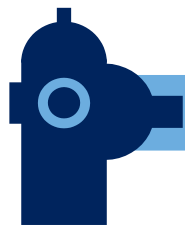


Fault level reinforcement is disruptive, lengthy and expensive which can discourage connection of new demand/ generation



Can we manage these issues without expensive reinforcement ?

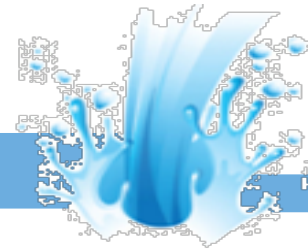
What is fault current?



Water pump



Valve



Leak



Generators



Circuit breaker



Fault

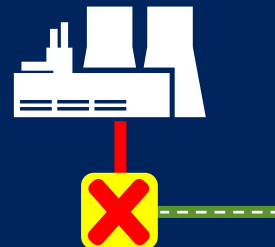
Turning off some of the flow of electricity from generation sources, for just a few minutes when a fault occurs will prevent damage to the electricity network

Fault Current Limiting (FCL) service at up to five external sites



electricity
north west

Bringing energy to your door



Fault current generated by customers can be disconnected using new technology



Financial benefits to customers taking part and long term to all customers



We are now engaging with customers, to take part in a trial of the FCL service

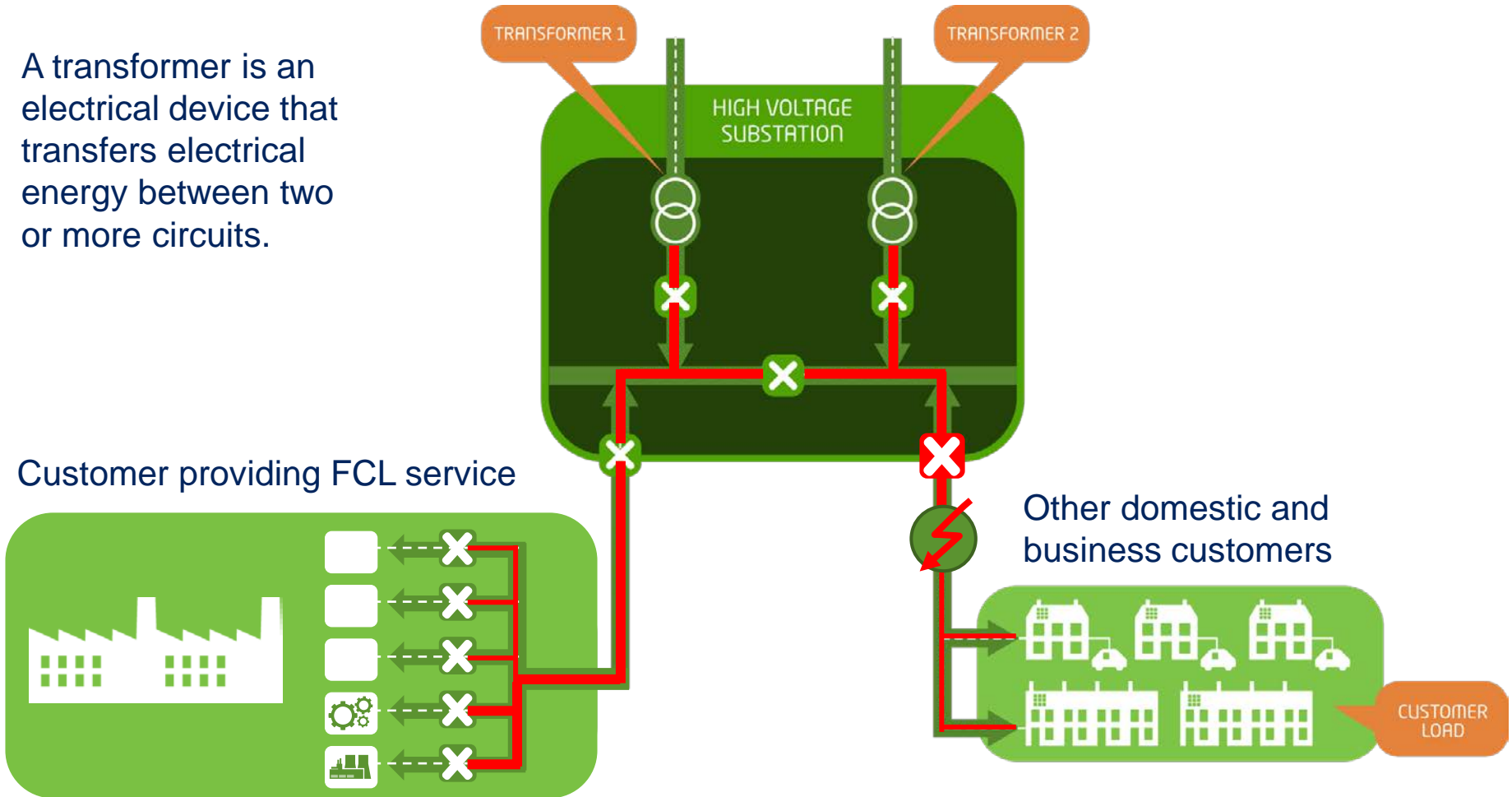
Suitability for the FCL service is dependent on:

The demand or generation capacity of your equipment / your organisation's operating voltage / the fault level on the part of the network that supplies you.

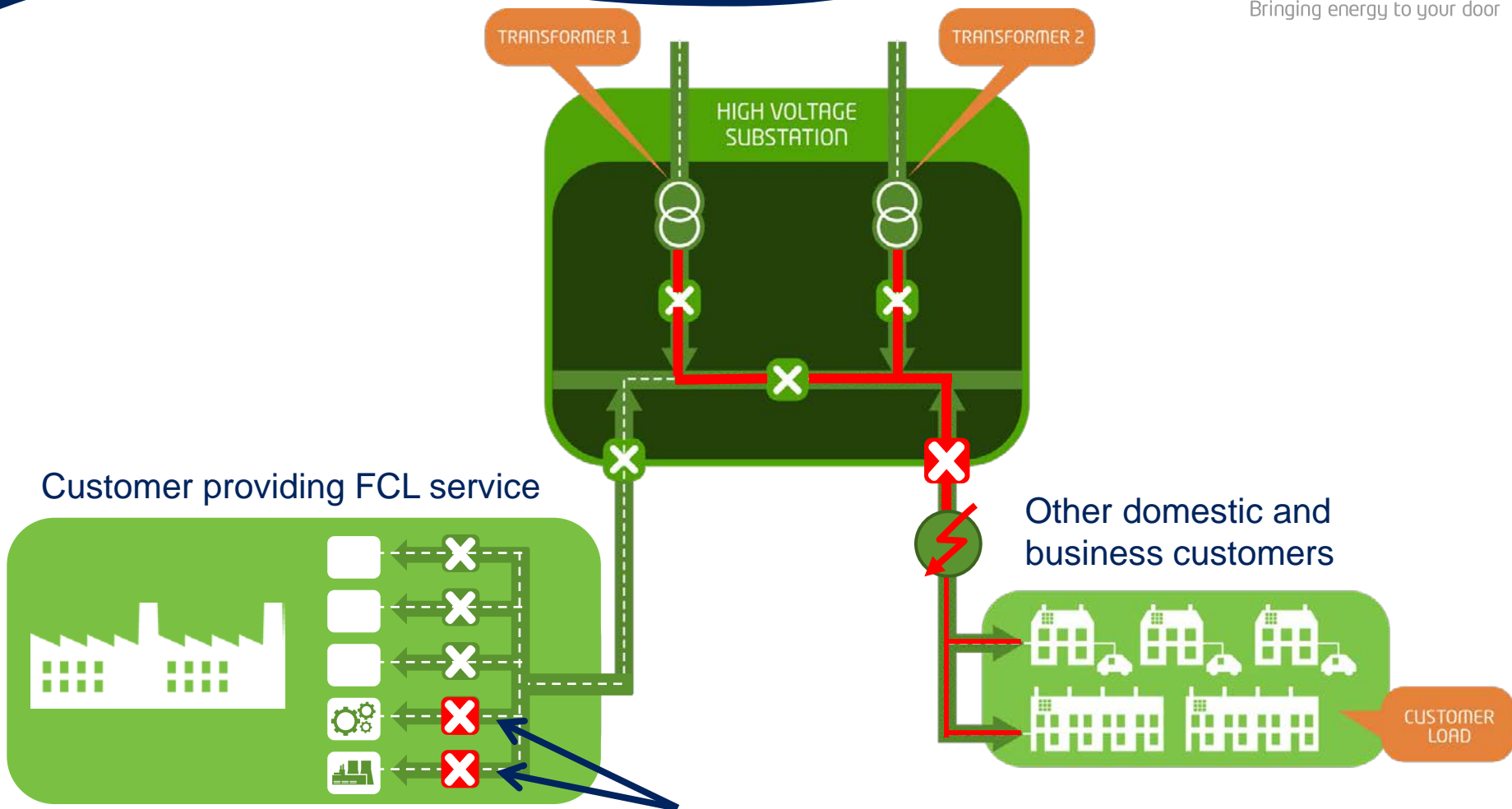
Current situation: Total fault current could overload a circuit breaker



A transformer is an electrical device that transfers electrical energy between two or more circuits.



Respond scenario: Fault current reduced by customer providing FCL service



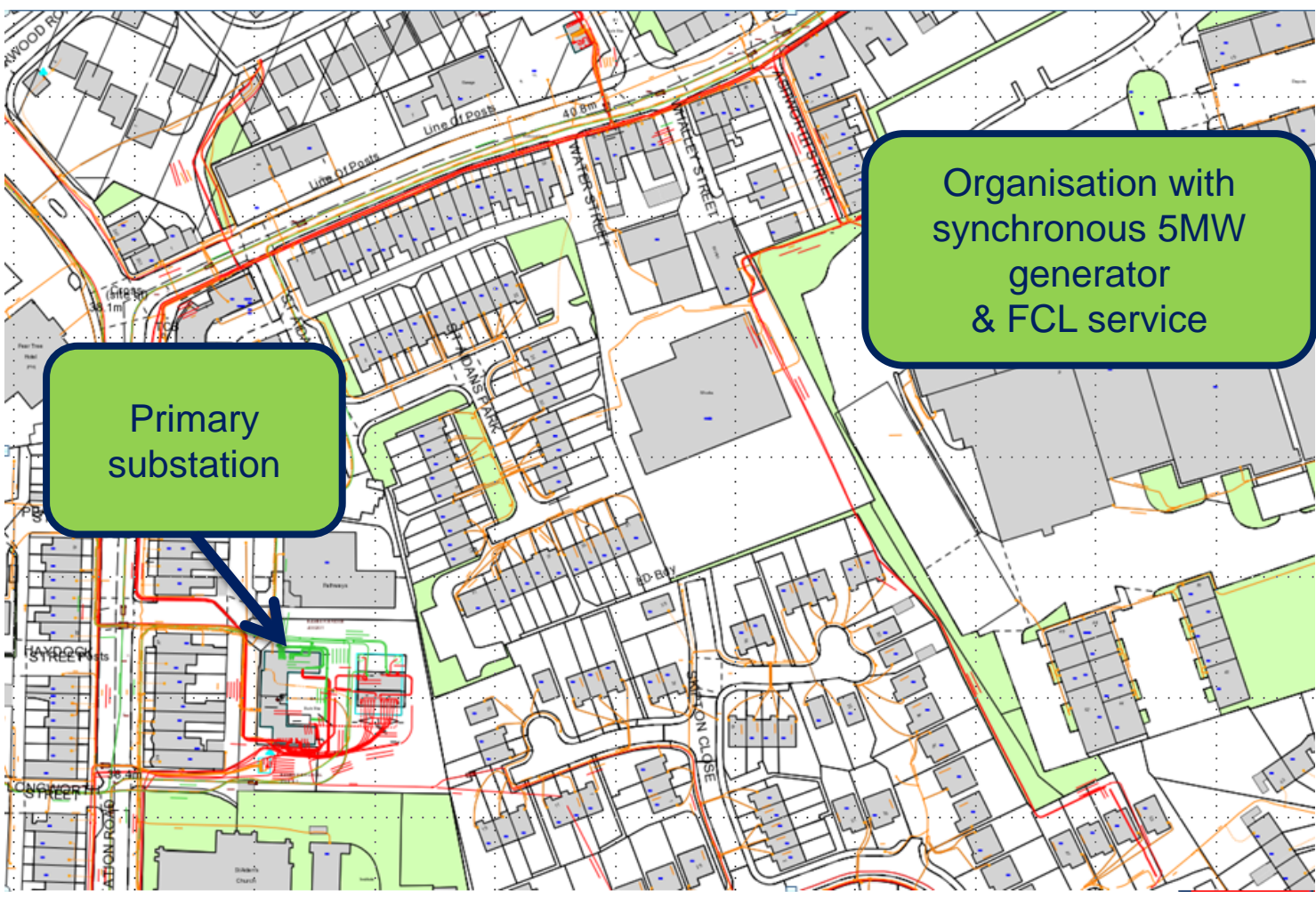
Customer providing FCL service

Other domestic and business customers

Customer protection operates before our CB

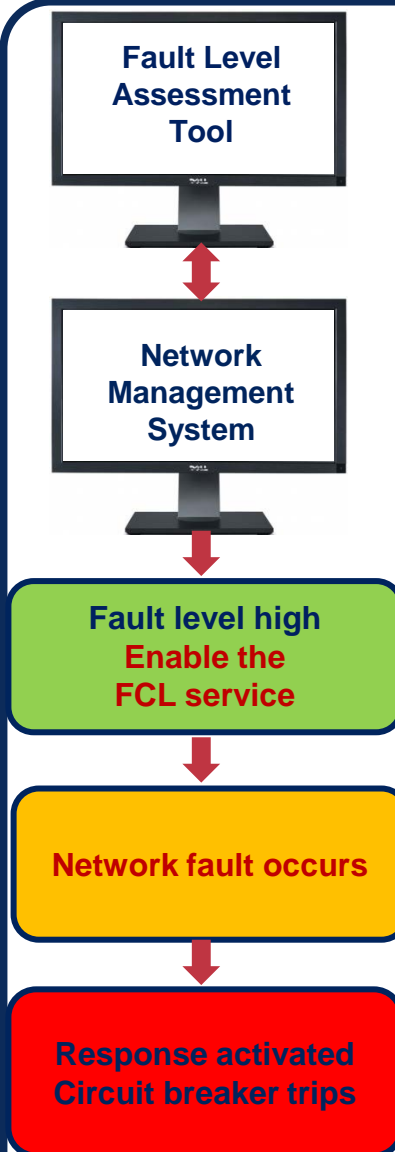
Motor or generation source remotely turned off by Electricity North West for just a few minutes, so that it no longer contributes to the fault current.

Customer A : 5MW generator near to the primary substation



Organisation with synchronous 5MW generator & FCL service

Primary substation



Your fault history (last 5 years)



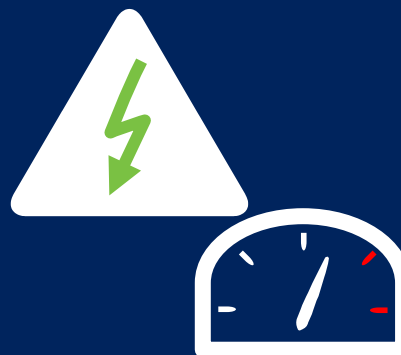
Fault History



Loss of supply



Enabling the FCL service



Activating the FCL service



40 faults
in **5** years
on circuits out of the
primary substation
supplying your site
8 each year
on average

In 5 years your factory
has experienced
1
fault that interrupted
your electricity supply

Of these 40 faults
8
where the type that
could have activated
the FCL service
But **only if** fault level
was high at the time

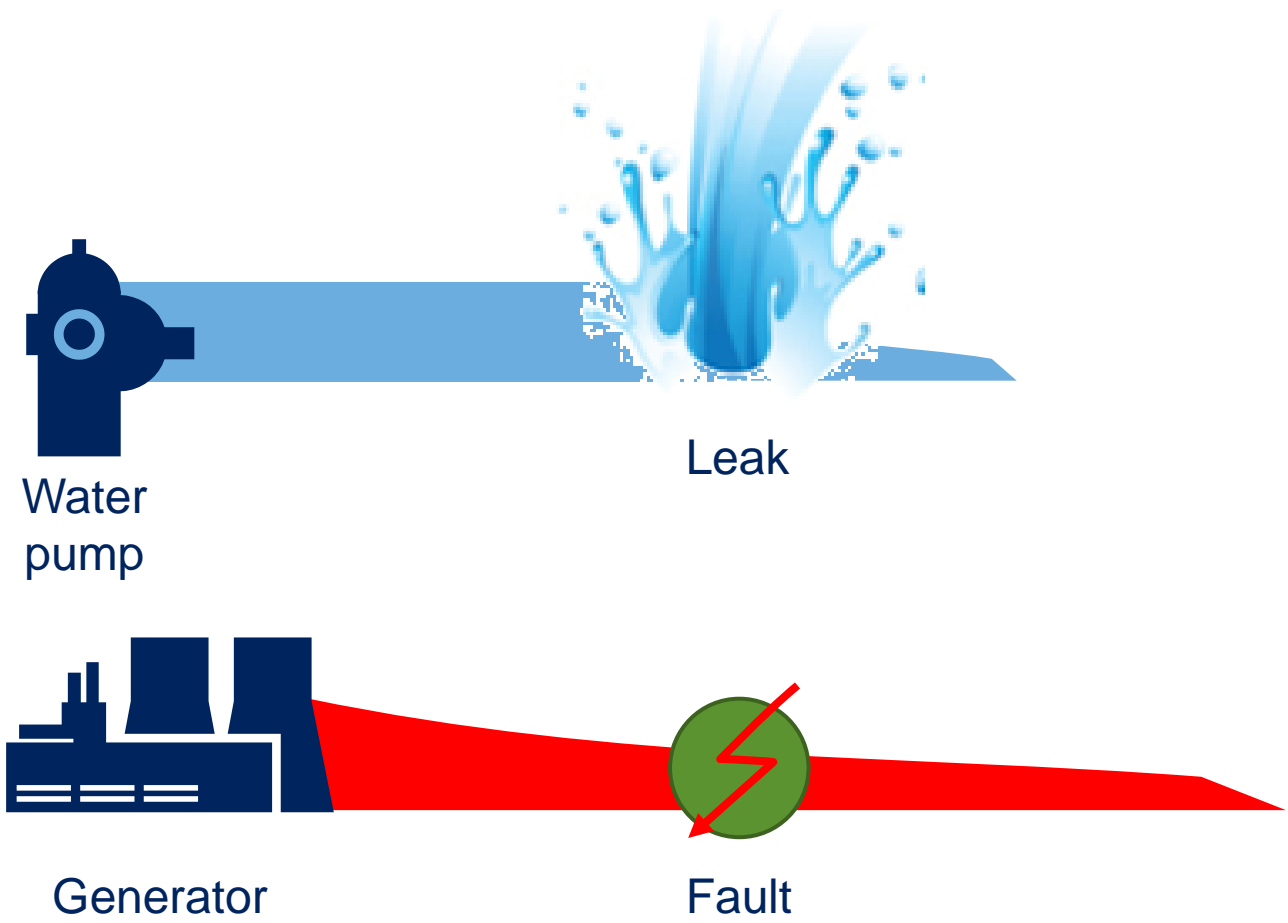
On average
twice
per annum

Customer A: contribution to fault level and indicative payments available

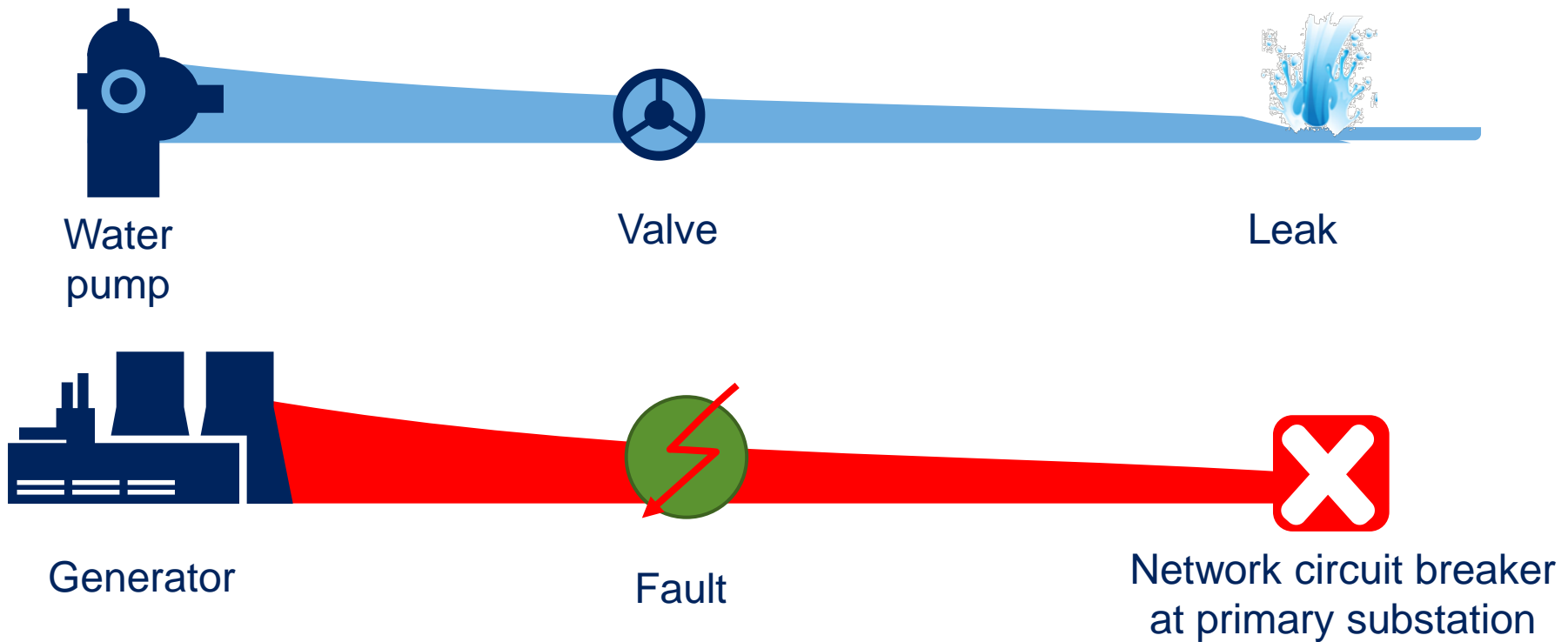


Generator type	Synchronous	
Capacity of generator (MW)	5 MW	
Operating capacity	Full	
Operating frequency	Constant	
Fault level contribution (multiplier of MVA nameplate rating)	6 X	
Maximum fault level contribution (MVA)	30 MVA	
Distance to primary substation	0	
Actual fault level contribution at primary substation	30 MVA	Term of contract (years)
Historical fault events per year	2	
Annual availability payment	£53,065	1
	£63,678	2
	£76,291	3
	£84,904	4
	£95,517	5

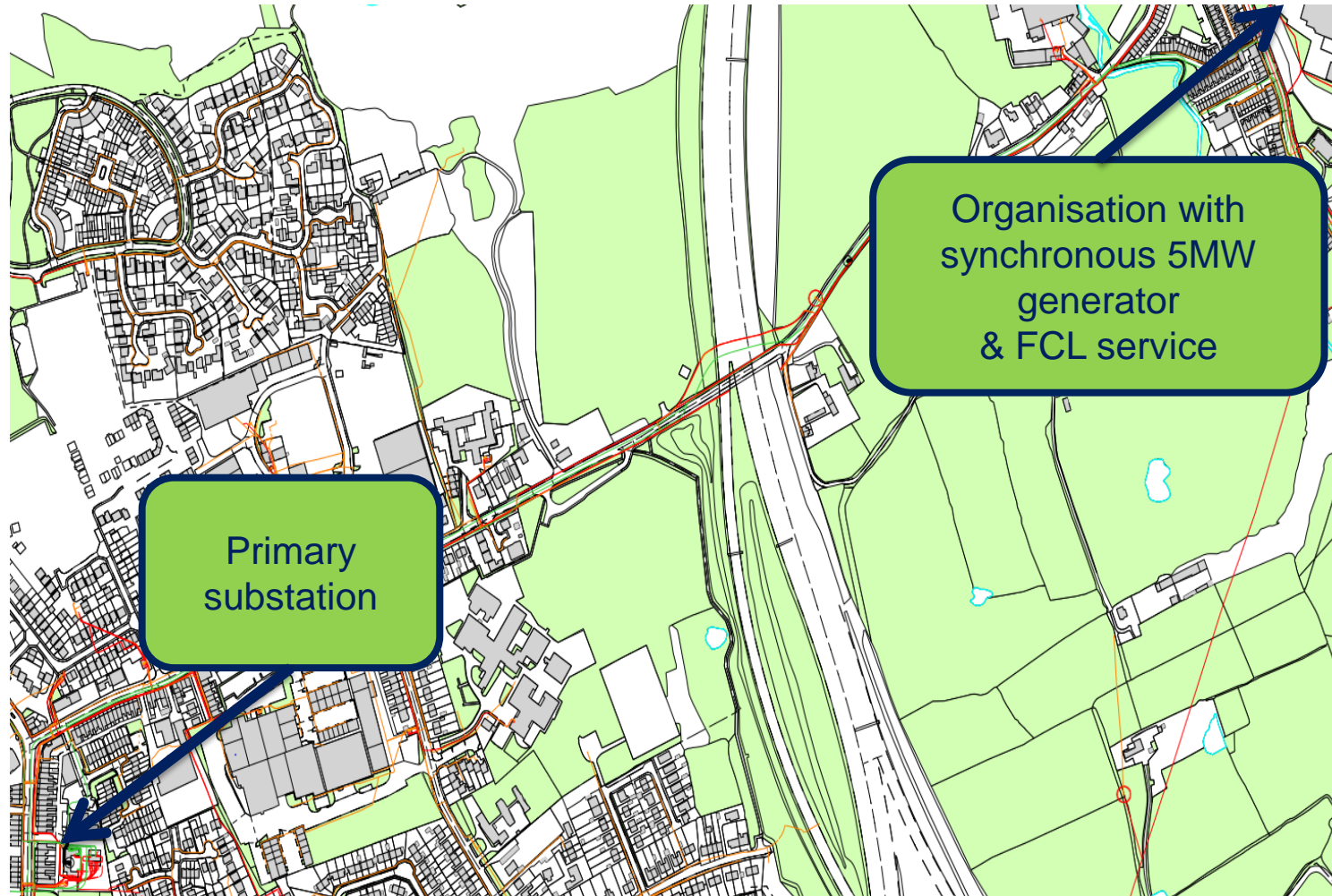
FCL service: contribution to fault current (water analogy)



FCL service: effect of impedance

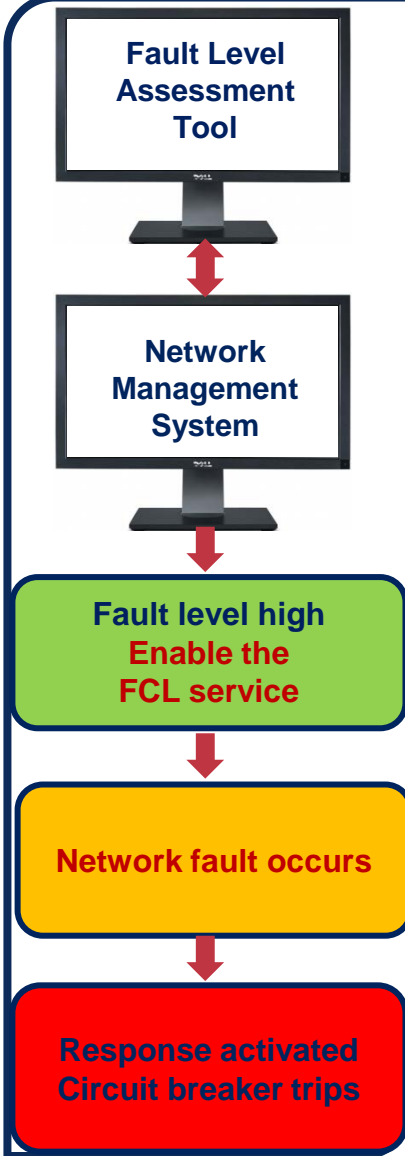


Customer B: 5MW generator a distance from the primary substation



Primary substation

Organisation with synchronous 5MW generator & FCL service



Fault Level Assessment Tool

Network Management System

Fault level high
Enable the FCL service

Network fault occurs

Response activated
Circuit breaker trips

Customer B: contribution to fault level and indicative payments available



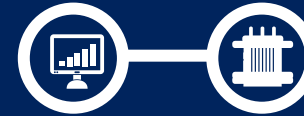
Generator type	Synchronous	
Capacity of generator (MW)	5 MW	
Operating capacity	Full	
Operating frequency	Constant	
Fault level contribution (multiplier of MVA nameplate rating)	6 X	
Maximum fault level contribution (MVA)	30 MVA	
Distance to primary substation Impedance calculation (length, size & type of cable)	Site embedded further out in the network	
Actual fault level contribution at primary substation	6 MVA	Term of contract (years)
Historical fault events per year	2	
Annual availability payment	£10,613	1
	£12,736	2
	£14,858	3
	£16,980	4
	£21,226	5

Getting involved in the FCL service trial



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Bringing energy to your door



You have equipment that can contribute to fault current

Are you willing for equipment to be disconnected if required?

What commercial arrangements need to be in place?

What technical arrangements need to be in place?

Is there a long-term benefit to all GB customers?
What is the scale of the benefit?

For more information on Respond



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Bringing energy to your door



www.enwl.co.uk/respond



www.enwl.co.uk/respond-survey



www.enwl.co.uk/respond-videos



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Thank you for your time and attention



QUESTIONS & ANSWERS

