

Energy Innovation Summit 2025



BOSTON SPA

energy efficiency trial

Case study: Smart meter insights:
powering energy efficiency with BEET

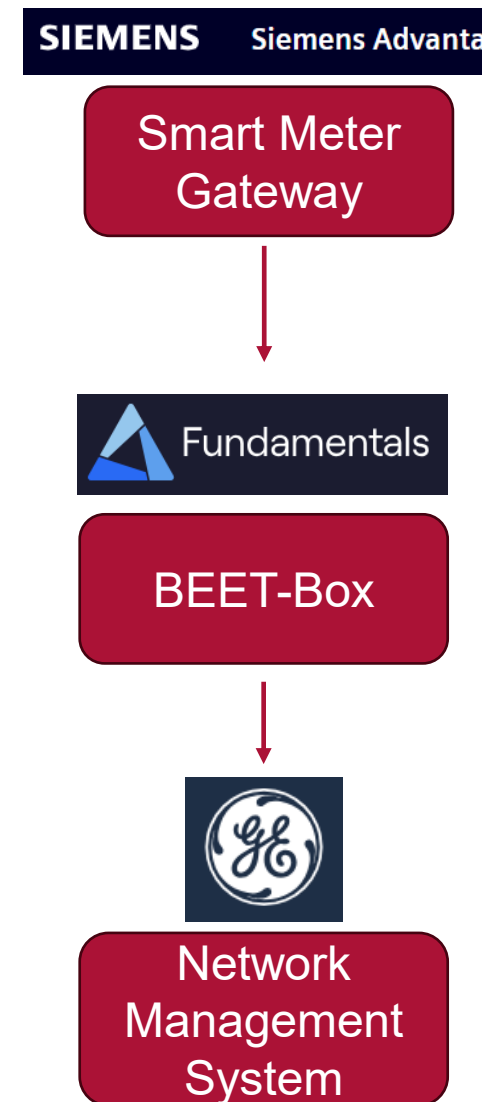
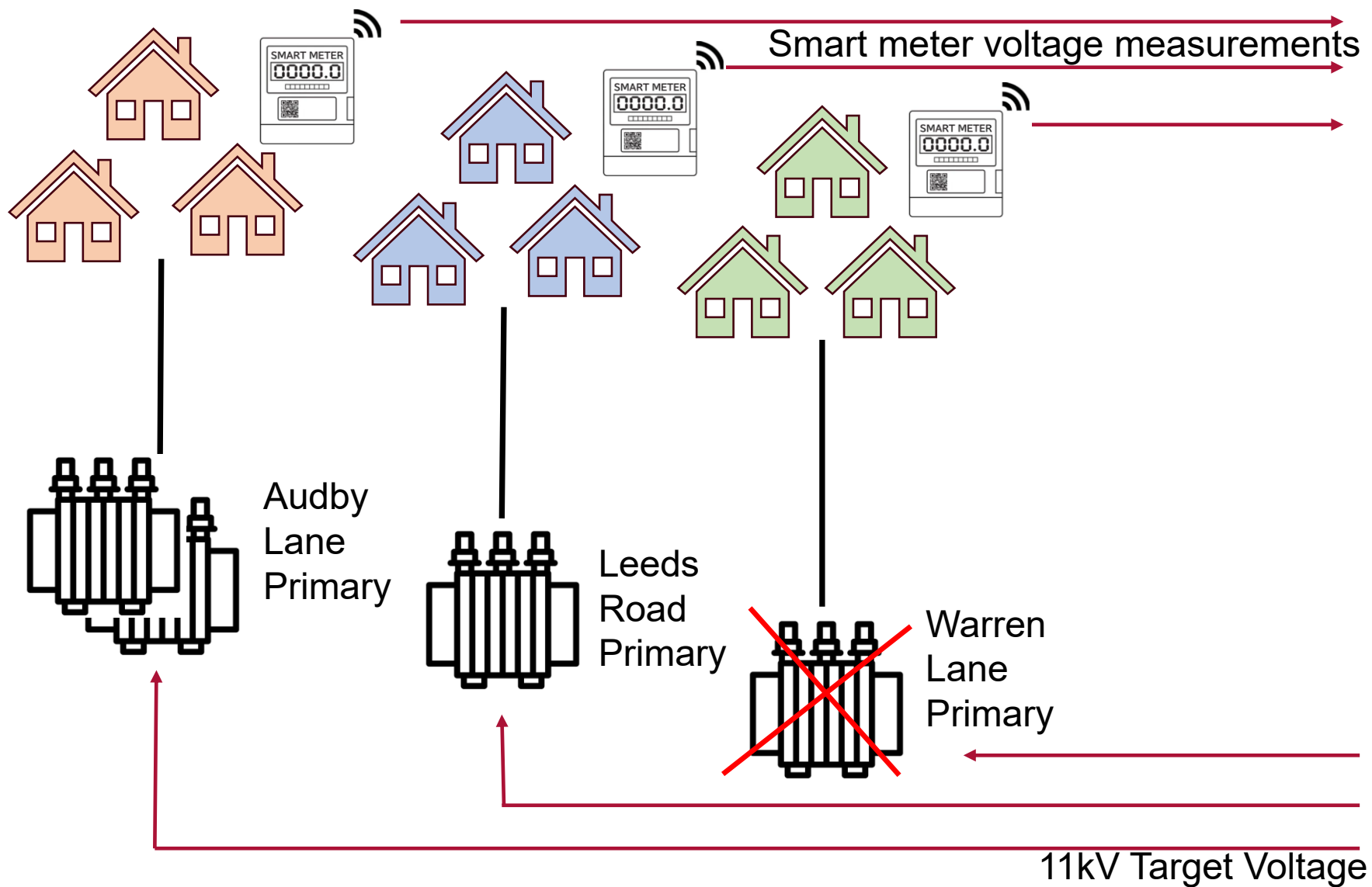
Francis Shillitoe, BEET Project Manager

Who has heard of Conservation Voltage Reduction?

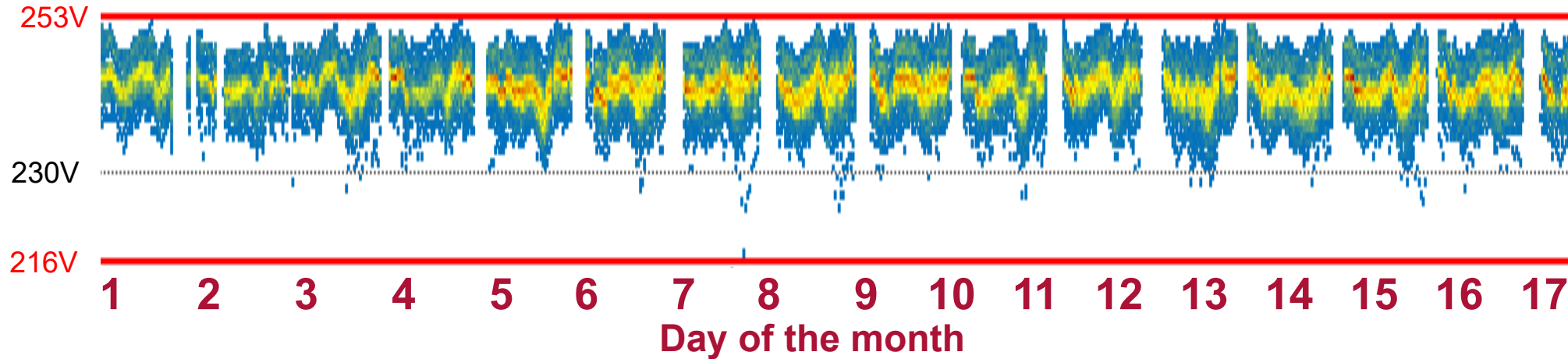
The concept of lowering voltage to reduce energy consumption

Who thinks that Conservation Voltage Reduction works?

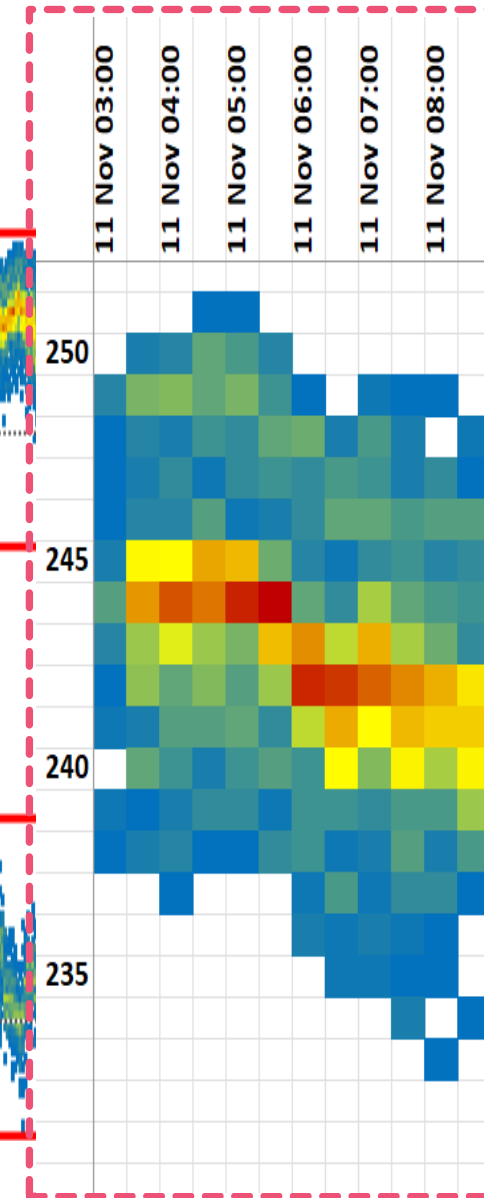
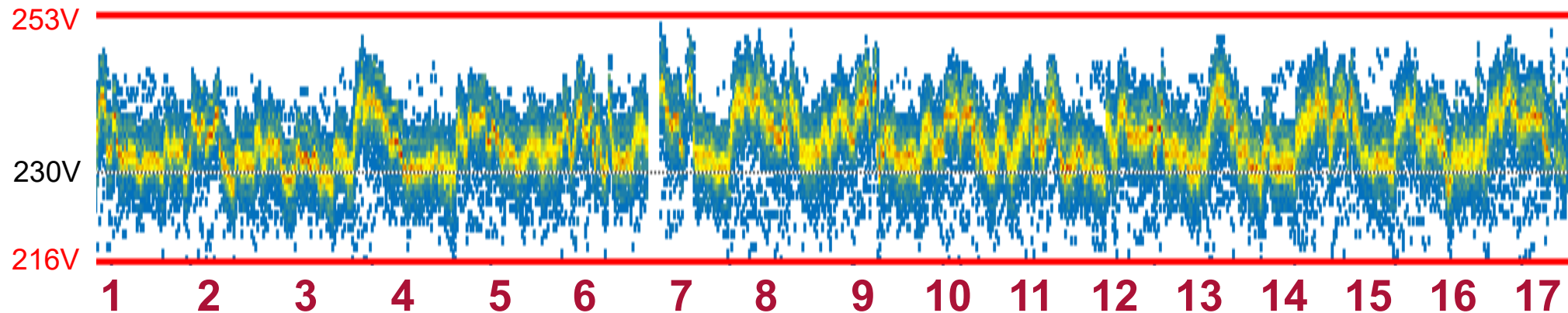
I.e. reducing a customer's voltage lowers their energy consumption

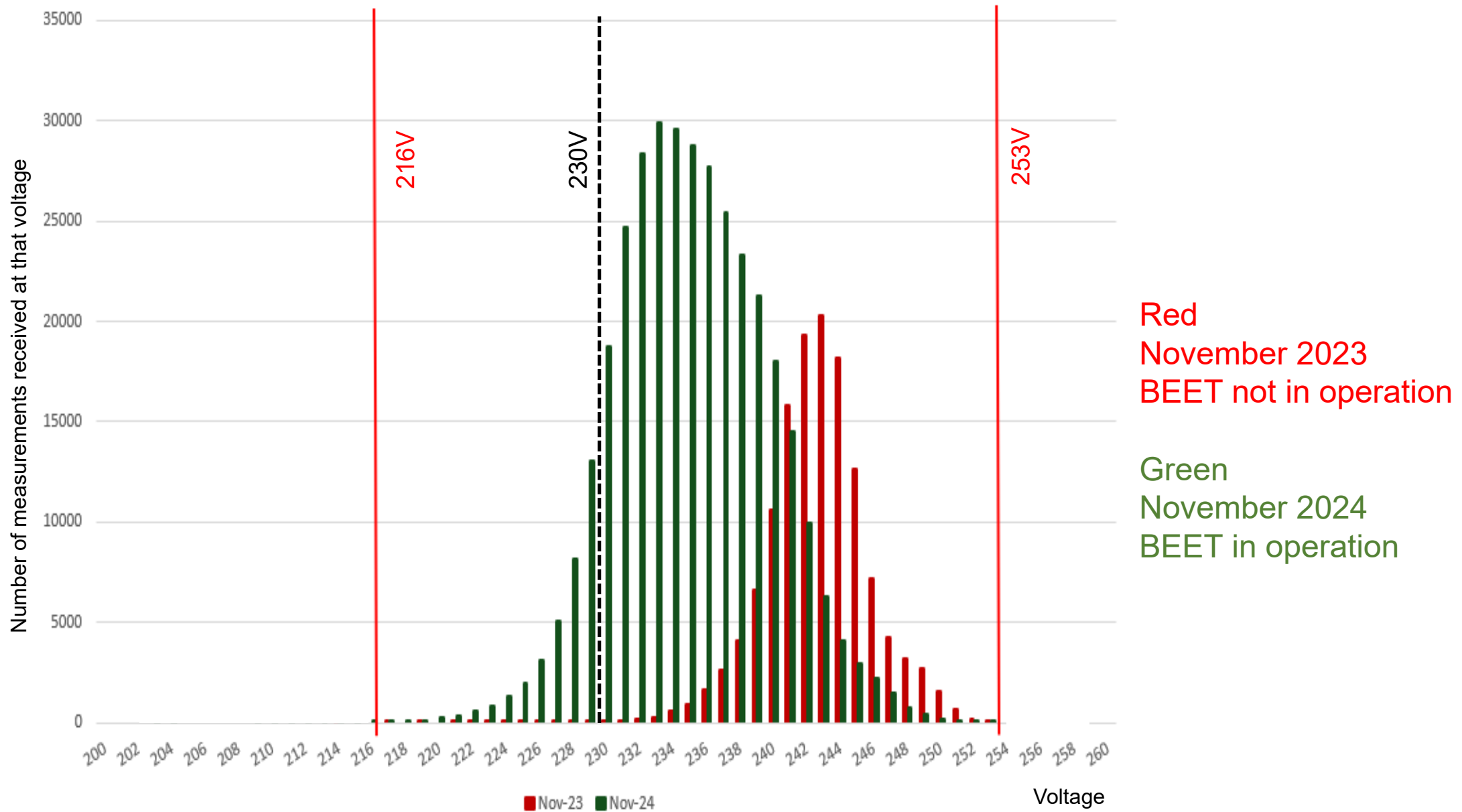


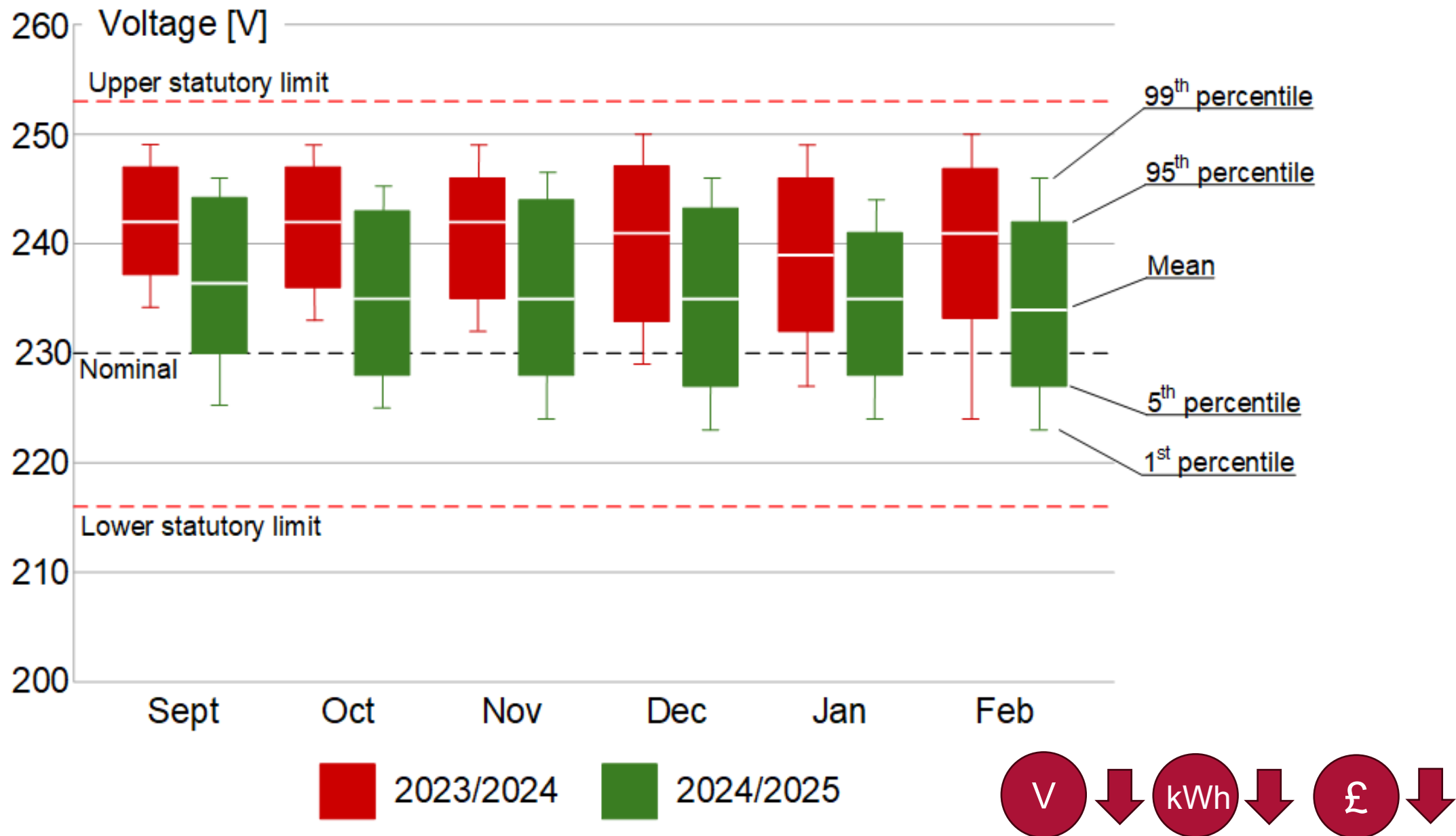
November 2023 - BEET not in operation only monitoring



November 2024 - BEET in operation







Impact of 3% voltage reduction over 12 months

Scale	Annual consumption	Estimate of annual savings*	Carbon benefits**
Typical domestic	3,000kWh	£23	18 kg
BEET trail area (15,000 customers)	45,000MWh	£337k	280 tonnes
Northern Powergrid (3.9m customers)	11,700GWh	£87m	73 kilotonnes
Great Britain (29.5m customers)	85,500GWh	£641m	528 kilotonnes



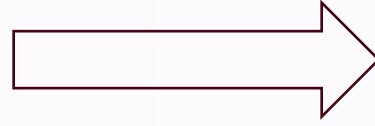
How do we get from here...

to here?

1:1 CVR_f => 1% voltage reduction gives a 1% energy reduction

* unit cost 25p per kWh

** using carbon intensity of c207 kilograms of carbon dioxide equivalent (kgCO₂e)/MWh



2024/2025	ED2 / ED3
2 primary substations	~400 primary substations
BEET-Box, single server, single point of failure	Smart grid platform, VMWare, redundancy across multiple servers and locations
Uncertain smart meter performance	Hefty performance testing required of smart meter infrastructure. Supplement smart meter readings with LV monitors.
Lots of data and hard work to analyse in Excel	Data analytics platforms and employing data scientists
Limited availability of Control Room staff	Are we going to employ more? Grid operation is only getting more complicated with smart grids.
Limited availability of Operational Technology and Cyber Security engineers	Ditto

