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Concrete and potential measures to reduce losses on GBs electricity networks

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Came into force in UK 26 June 2014, Regulation 6 reads:

Assessment of energy efficiency potential of gas and electricity infrastructure

- Before or on 30th June 2015 the Gas and Electricity Markets Authority must deliver to the Secretary of State—
 - (a) an assessment of the energy efficiency potentials of the gas and electricity infrastructure of Great Britain in particular regarding transmission, distribution, load management and interoperability, and connection to energy generating installations, including access possibilities for micro energy generators;
 - (b) a list identifying concrete measures and investments for the introduction of cost-effective energy efficiency improvements in the network infrastructure, with a timetable for their introduction.
- We agreed with DECC and the network operators to focus on losses.

<http://www.legislation.gov.uk/ukxi/2014/1403/introduction/made>

Objectives

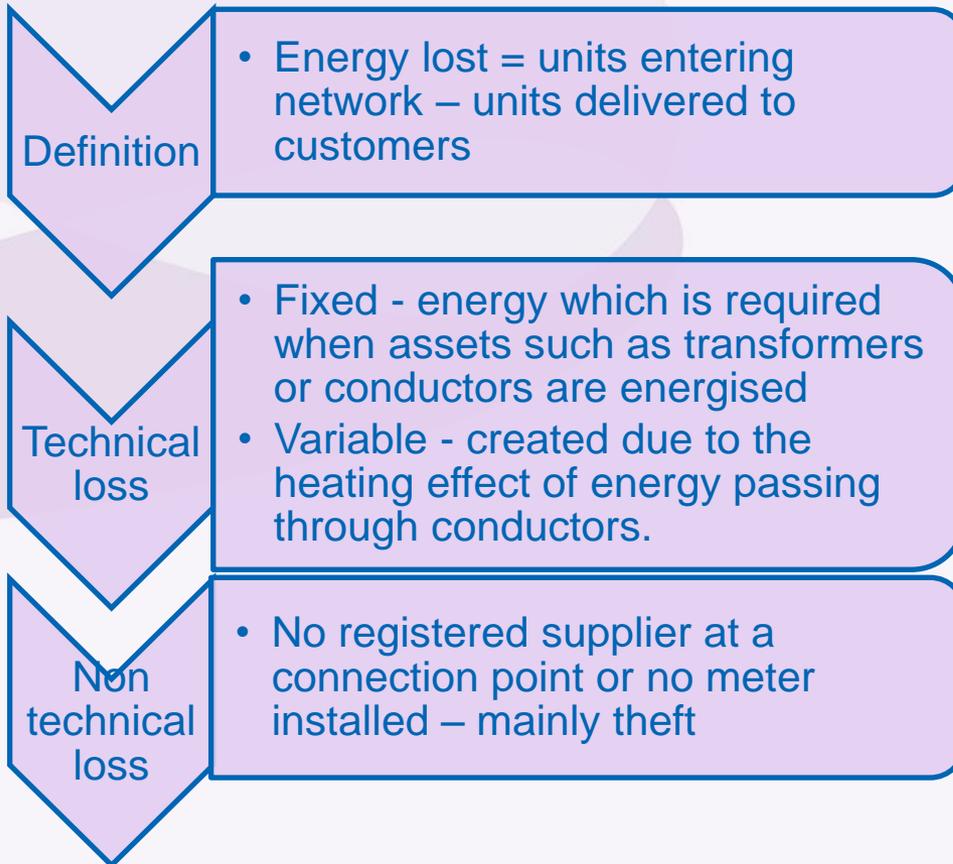


- The objectives were to:
 - Present a background to losses with a baseline/starting point of losses on GBs networks
 - Present a complete list of concrete measures to reduce losses on the networks assumed from losses strategies
 - Present a timeline for the measures' introduction
 - Present a complete list of potential measures (that do not currently have a net positive NPV, or DNOs haven't committed to in business plans)
 - Conclude with the overall losses reduction potential of GBs networks

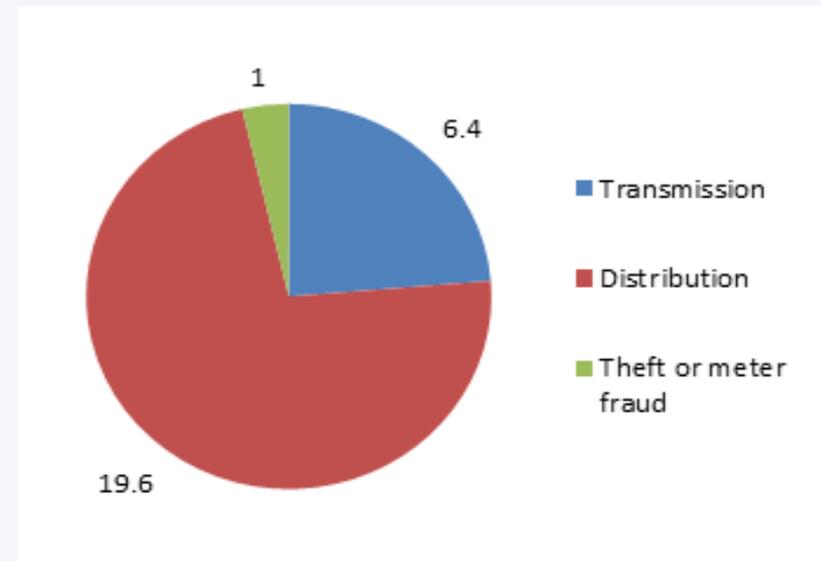
Losses



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- 2013 losses, as a proportion of demand, were estimated to be 7.2 per cent – 27TWh



Total electrical losses split between transmission, distribution networks and theft in 2013 (TWh)

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/337649/chapter_5.pdf

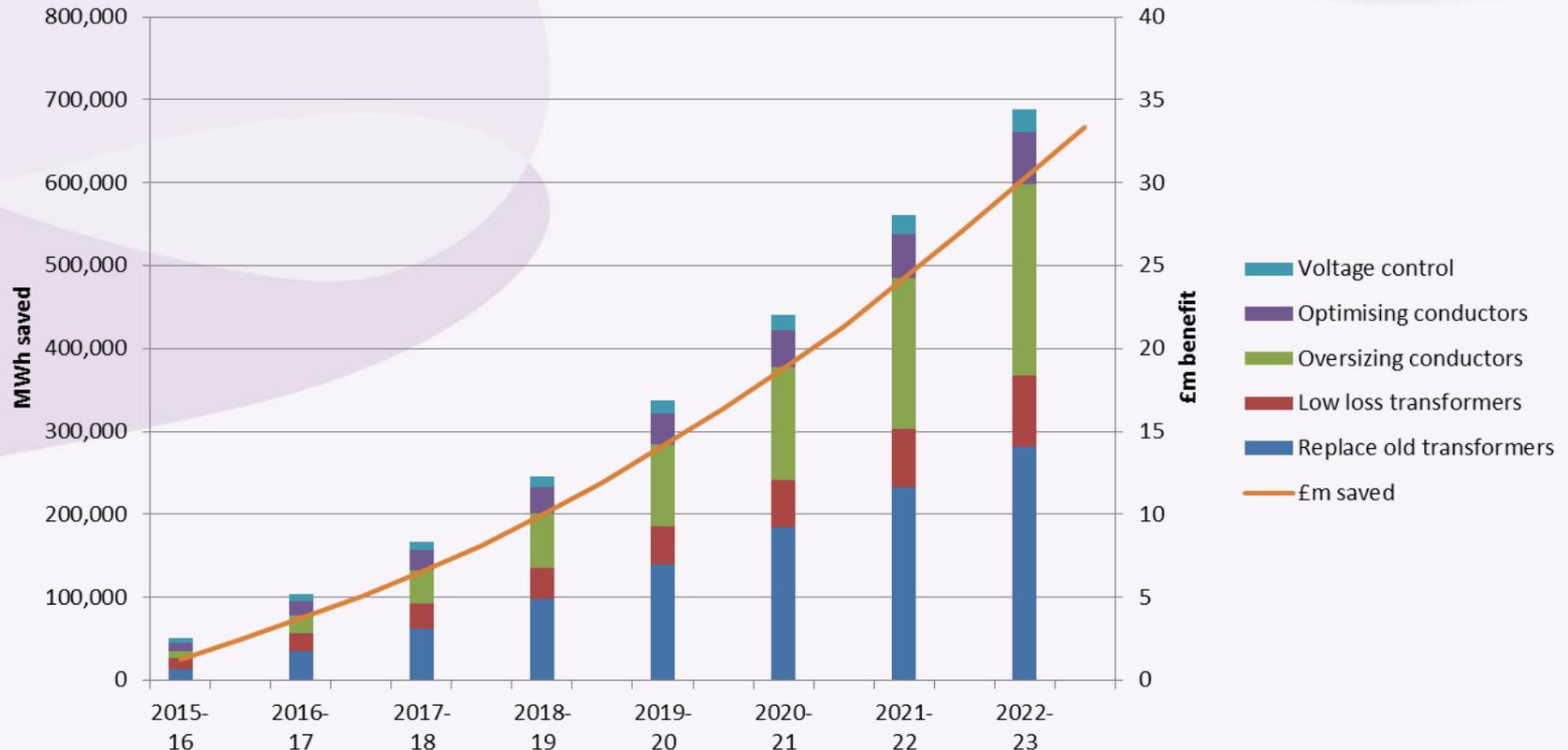


RIIO-ED1 price control framework runs from 2014/15 to 2022/23:

- A licence obligation for DNOs to ensure that losses are as low as reasonably practicable
- A licence obligation for DNOs to investigate and resolve any cases of 'relevant theft of electricity' from their distribution systems
- A requirement to maintain and act in accordance with a distribution losses strategy
- Ex-ante funding for efficient loss reduction activities
- A reporting requirement on loss reduction actions taken and actions planned each year
- A discretionary reward for efficient and innovative loss reduction initiatives of up to £32m, available over the RIIO-ED1 period.

Concrete measures

Cumulative benefits from concrete measures being implemented by all DNOs over the current price control period



- Cost benefit analysis takes a 'whole life' approach to network reinforcement and sets the cost of losses at £48.42/MWh (in 2012-13 prices).

Potential measures



- DNOs also set out a number of potential measures that could be introduced in the current price control (list not exclusive)
- Cables and lines - conductor type - increasing the cross sectional area, change the conductor material from aluminium to copper
- Transformers – reduced winding resistance - material change or cross section of material
- Active network management - dynamic generation control system – can be set to optimise loss reduction)
- Smart meters and Demand side management – peak shaving?
- Distributed generation – can increase or decrease losses
- We expect to see smarter measures being adopted that address losses – updated Losses strategies
- Many factors affect the potential – understanding of losses impact, cost, supply, interaction with other measures etc.

- **For losses reduction measures, there will always be a compromise which considers cost versus benefit**
- Mainly low loss transformers and installing larger conductors than needed
- Smart meters (2021) will enable more accurate losses monitoring
- No concrete measures from Transmission – reinforcement led by generation – increases losses
- Around 0.69TWh over period 2015-2023 from a 2013 baseline of 19.6TWh.
- 3.5% reduction in distribution losses, 312,772 tonnes of CO2 emissions
- Potential measures could reduce losses by a further 0.17TWh to 0.35TWh (a further 1 - 2%)
- Our work on flexibility may address wider network energy efficiency issues
- Final report:
- <https://www.ofgem.gov.uk/publications-and-updates/energy-efficiency-directive-assessment-energy-efficiency-potential-great-britain-s-gas-and-electricity-infrastructure>

Thank you for your attention



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