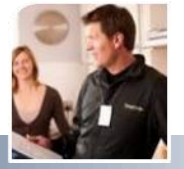
Assessing Network Operating Costs

Electricity North West
29 May 2012


Network Operating Costs

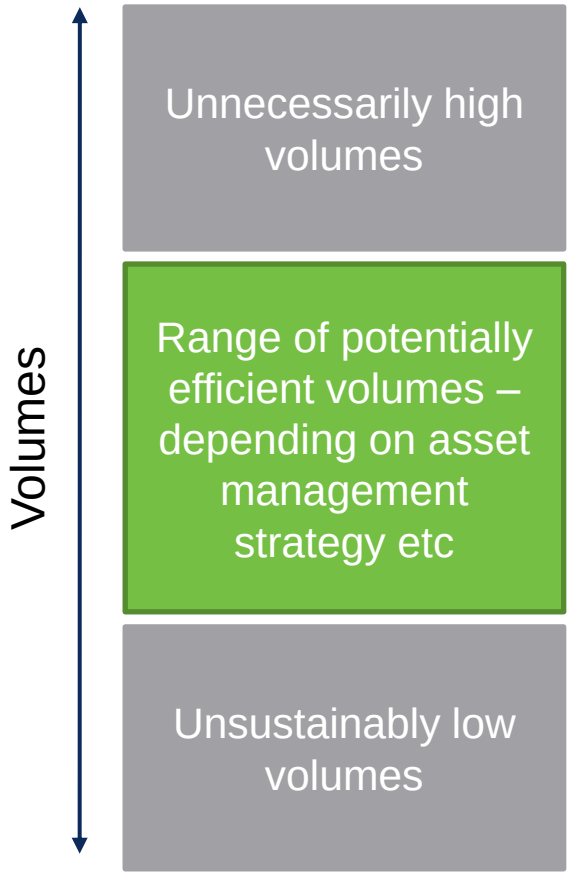
- Network Operating Costs Comprise
  - Troublecall
  - Inspection & Maintenance
  - Tree Cutting
  - NOC Other

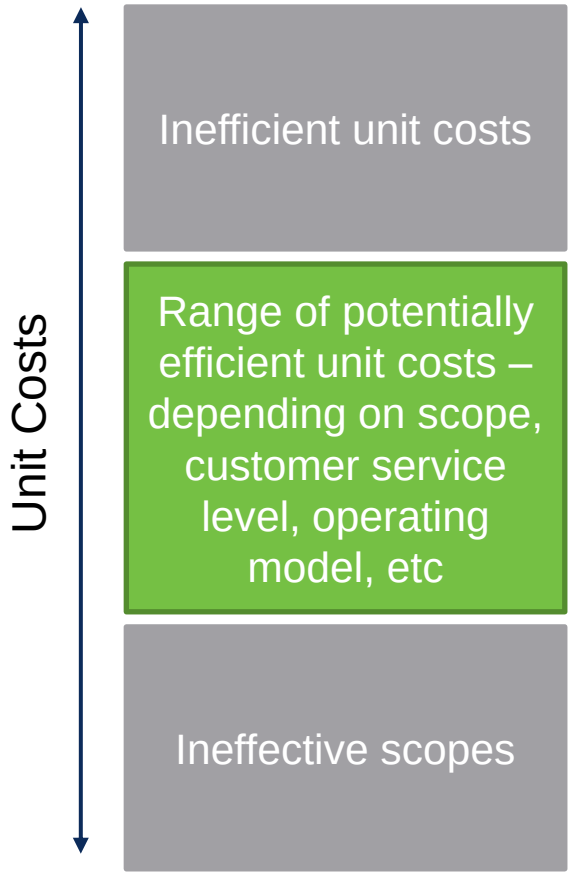
- Two aspects of assessment required in assessing NOC costs: assessment of efficiency of volumes undertaken and efficiency of delivery
- Different models address these separately or in combination

- Following slides consider a number of approaches to undertaking this analysis
- But first – a few key challenges that we must recognise in undertaking analysis

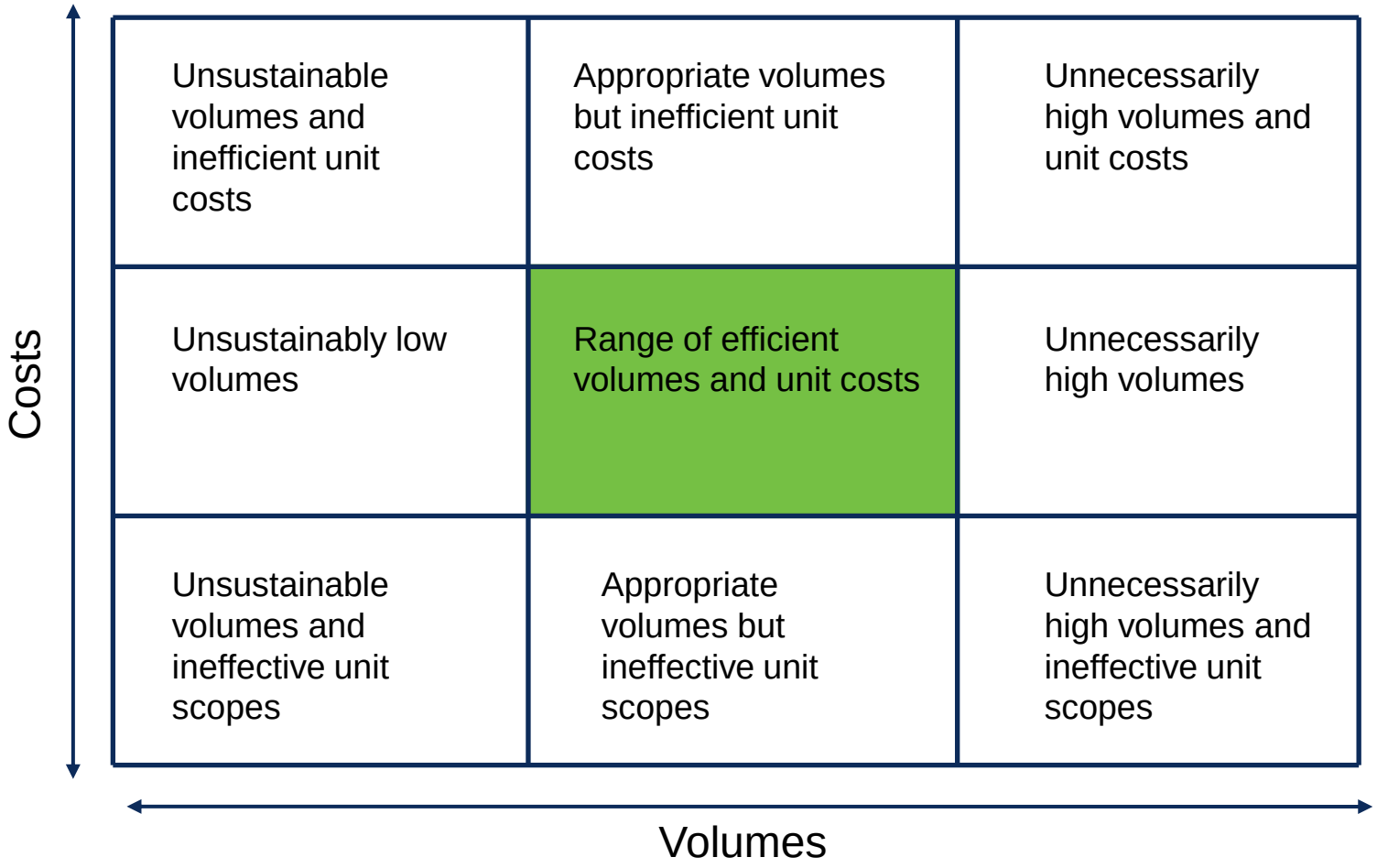
Network Operating Costs – key challenges

- Assessing volumes
- Assessing unit costs





Network Operating Costs – key challenges



- It is not always easy in models to differentiate between these categories
- Definition of “efficiency” in both dimensions will depend on company asset management strategy

Factors affecting reported costs

- A number of legitimate factors can affect the volumes DNOs deliver, the unit cost of the work they undertake and where activity is reported in cost and volume pack

	Volumes	Unit cost	Reporting of costs
Troublecall	Asset mix Asset health Exceptional events	Fault mix Level of automation/ remote control IIS incentive rates	Delivery structure Policy of reactive asset replacement
Inspection & maintenance	Asset management strategy	Scope of maintenance & inspection activities	Delivery structure
Tree cutting	Cutting strategy eg cyclic/ reactive Vegetation type (growth rate) Local weather	Extent of cut	Delivery structure Whether tree cutting inspection undertaken as part of OHL inspection
NOC Other	Levels of redundant assets in area Levels of interference with assets Electricity use at substations	Location specific job scope	Delivery structure

Troublecall – unit costs

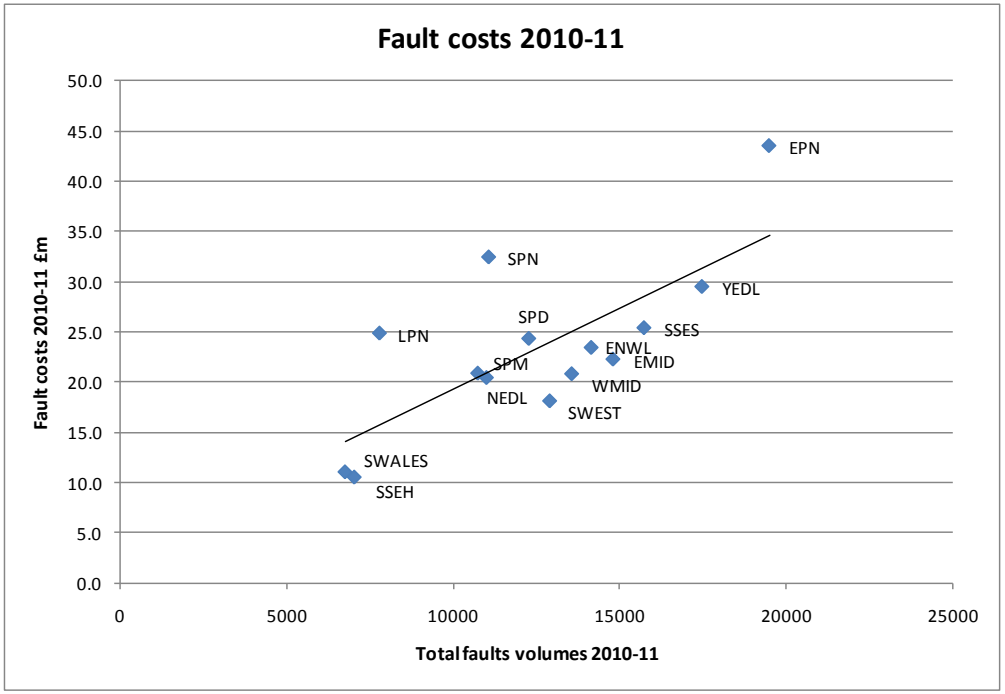
- Assume IIS incentive plus fault rate outputs incentivise volume efficiency
- RRP data allows fault unit costs to be calculated

- Confidential data table.

- Need to combine unit costs with volume of faults to assess overall efficiency

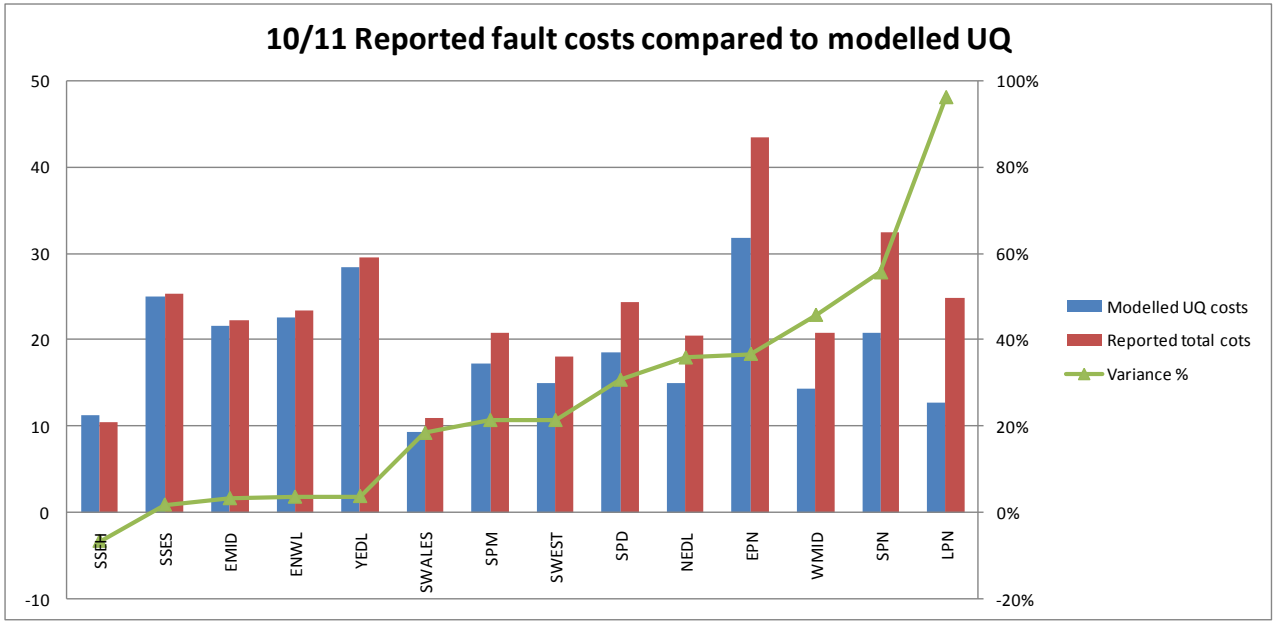
Quite wide range on unit costs for some asset categories. For higher voltages could be expected, lower voltages suggests reporting inconsistencies

Total Troublecall (QoS)



- Regressing total fault cost against total fault volumes gives high level view of efficiency
- Does not take into account different asset and fault mix across companies

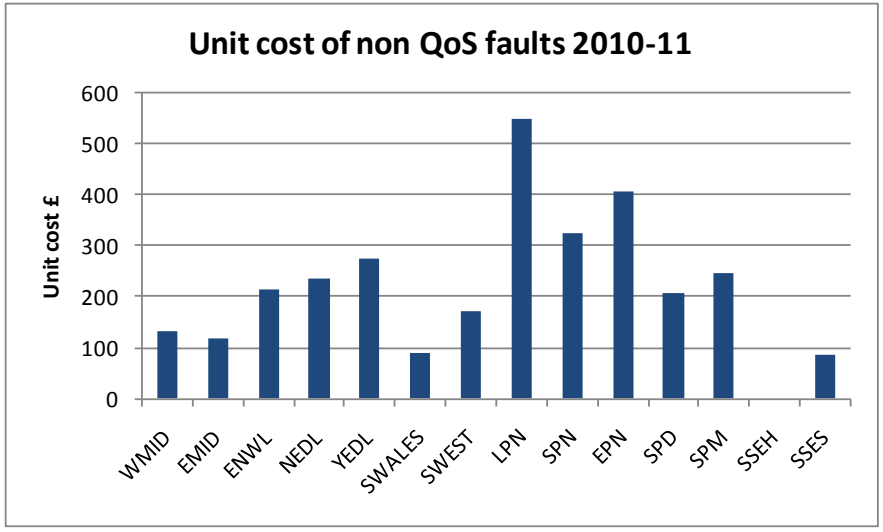
Troublecall – unit costs

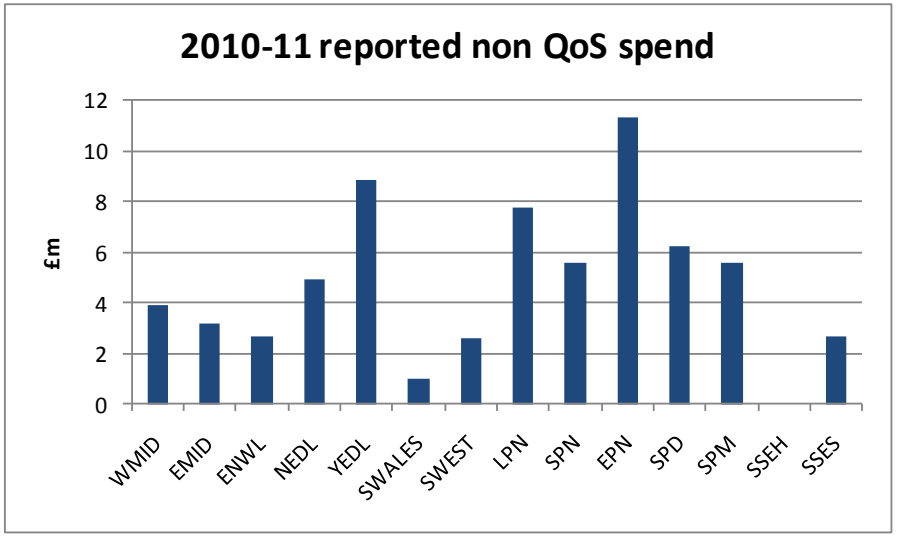


- Multiplying DNO actual volumes by calculated upper quartile for each asset type gives indication of relative unit cost efficiency taking fault mix into account
- Gives slightly different answer as to which DNOs most efficient. Demonstrates that disaggregation between asset types and between voltages is necessary to assess efficiency
- However, comparator is a very cherry picked value and cannot be used for allowance setting
- Note, these values include some costs reported as asset replacement – need to avoid double counting in allowance setting

Troublecall – non QoS

- Detailed analysis fraught with data issues eg
  - SSEH reports zero costs despite reporting volumes against 7 categories
  - SSES only reports costs against streetlights/Street Furniture/Unmetered Services/Unmetered Cut Outs despite reporting volumes for 8 categories
  - 5 licensees (3 x UKPN and 2 x WPD) report zero costs and zero volumes for emergency disconnections
- Possible to attempt overall unit cost analysis

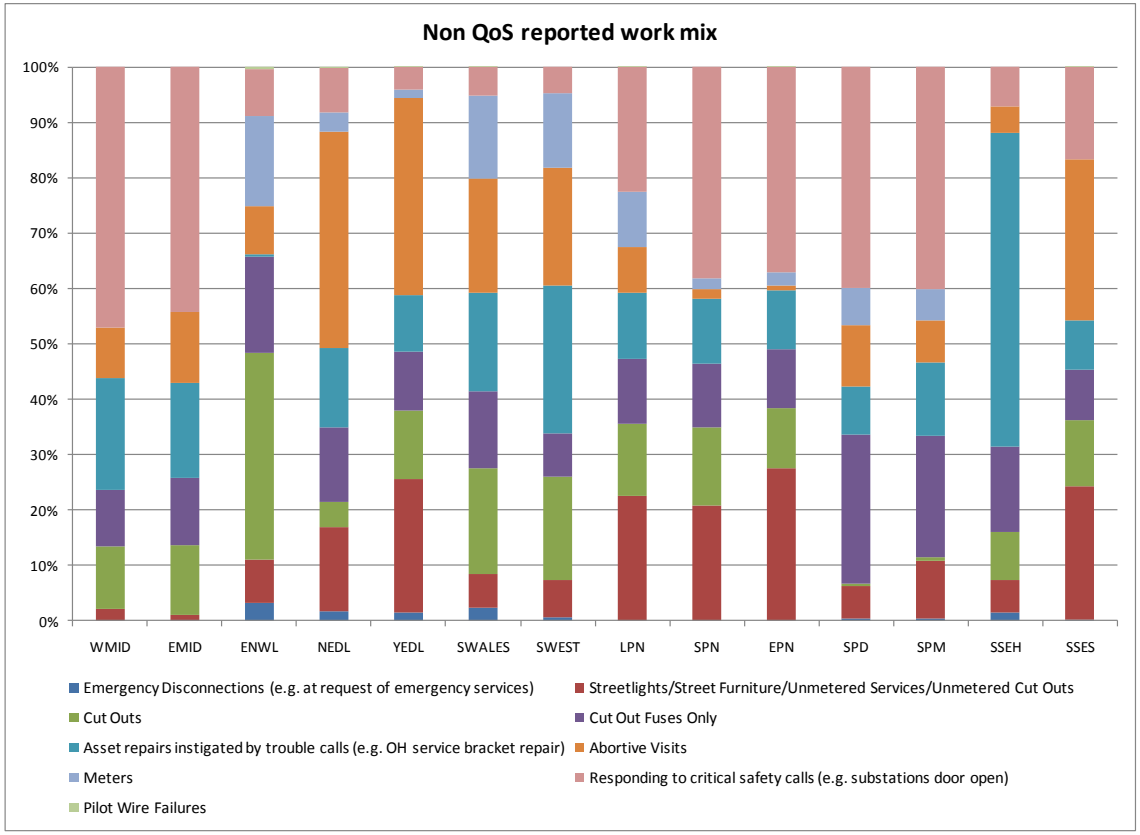




- Unit cost analysis reveals very different unit costs
- Very different levels of reported spend – suggests possible reporting differences. However, could be influenced by work mix

Troublecall – non QoS

- Very different work mix reported across DNOs – although possibly a volume reporting issue



- Priority for this work area is sorting data out before any conclusions can be drawn on efficiency

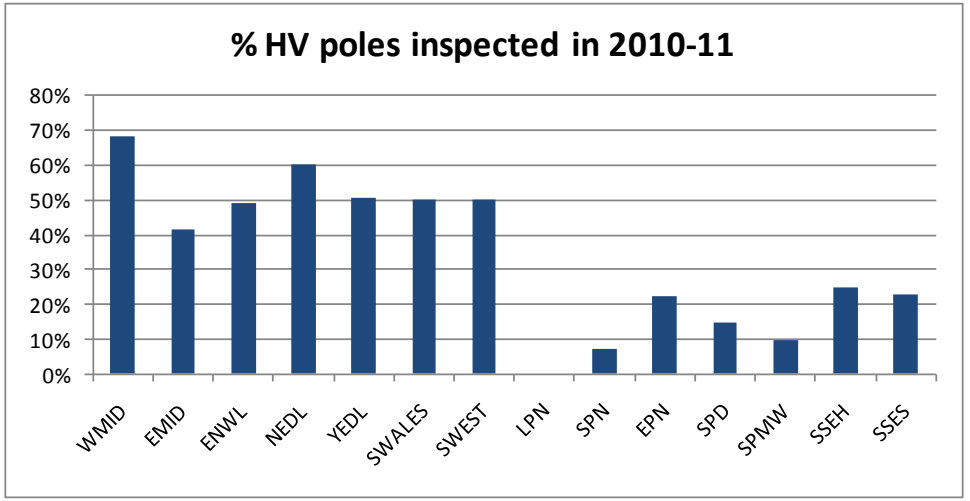
Inspection & Maintenance

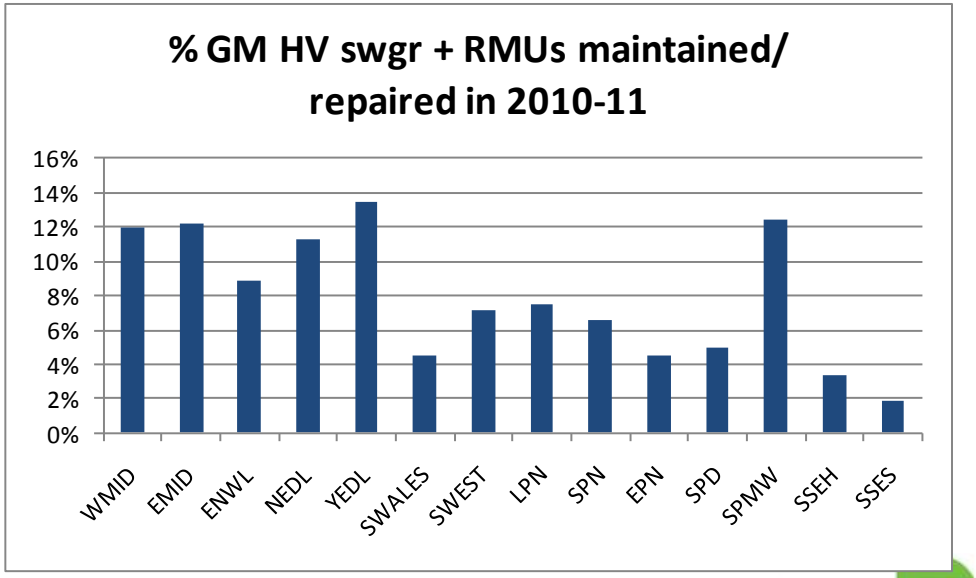
- Cost and volume pack provides significant detail on volumes and unit costs
- However, 2010-11 data appears to be inconsistent between DNOs – analysis presented to illustrate possible approach, but care needed in interpretation

- Assessment of efficiency requires
  - Assessment of volumes of interventions per asset
  - Assessment of unit costs
  - Assessment of contribution of I&M costs to overall costs of managing asset base

I&M - Volumes

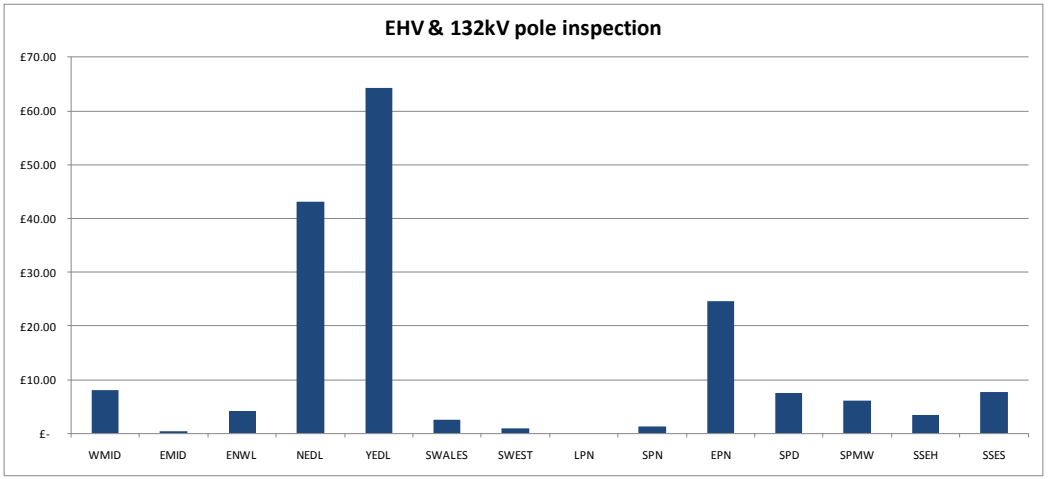
- Cost and volume data allows I&M volumes to be compared to asset base
- Suggests DNOs intervening on different proportions of asset base
- This form of analysis does not assess the extent to which activity on I&M supports or suppresses activity elsewhere
- Need to investigate whether these differences are due to different asset management strategies, reporting differences (including in legacy asset base data) or fundamentally different volumes of work

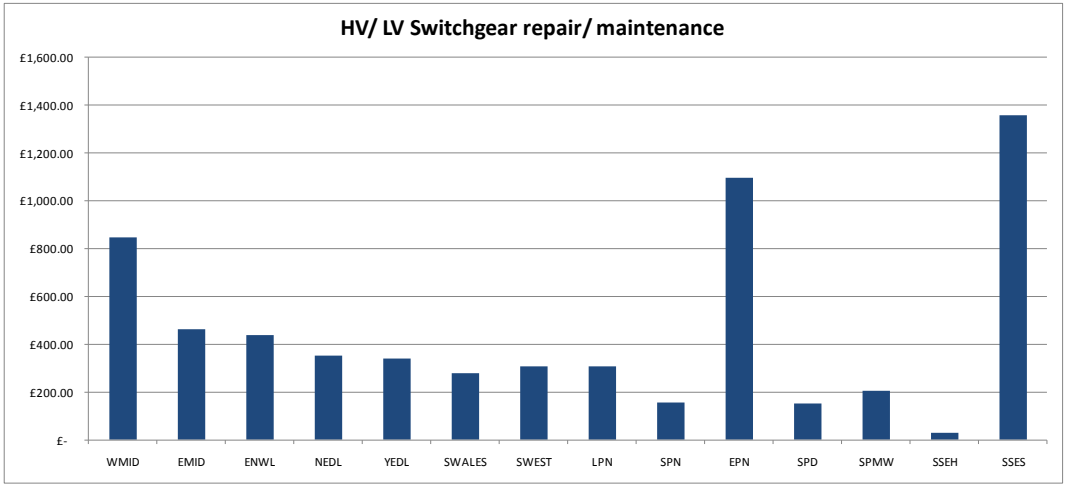




I&M - Unit costs

- Unit cost analysis shows significant range of unit costs
- Some differences may be real due to eg diagnostic condition testing inbetween main maintenance
- However, we suspect more work required on data consistency





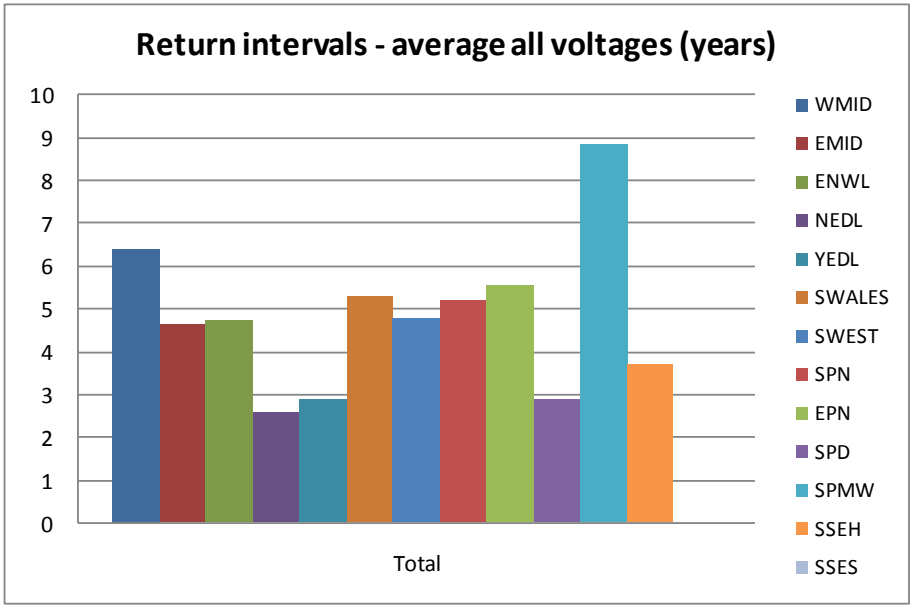
HV/ LV switchgear repair/ maintenance unit cost includes Circuit Breakers (GM) Primary, Circuit Breakers (GM) Secondary, X Type RMU, GM Switchgear (Exc CBs and X Type RMU), HV Pole Mounted CB, HV Pole Mounted All Other

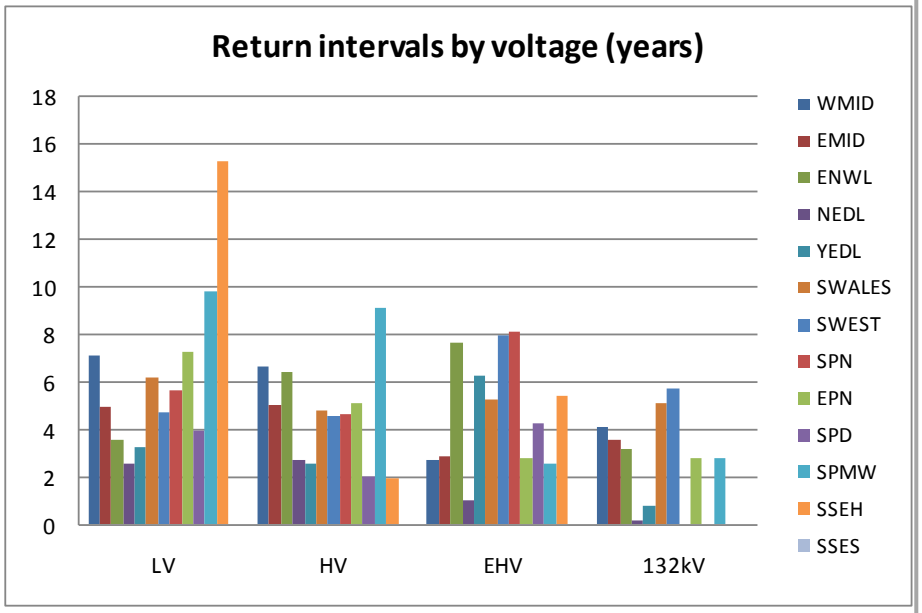
Inspection & Maintenance

- Different DNOs may have different asset management strategies which may result in different levels of inspection and maintenance costs (unit costs and total costs) eg
  - Extent of condition data captured on inspection
  - Frequency of oil testing outside of main maintenance interventions
  - Use of deep maintenance to extend asset life
- Analysis of inspection and maintenance must be supplemented by analysis of costs by asset type across all activities (I&M, refurbishment, asset management)

Tree cutting - Volumes

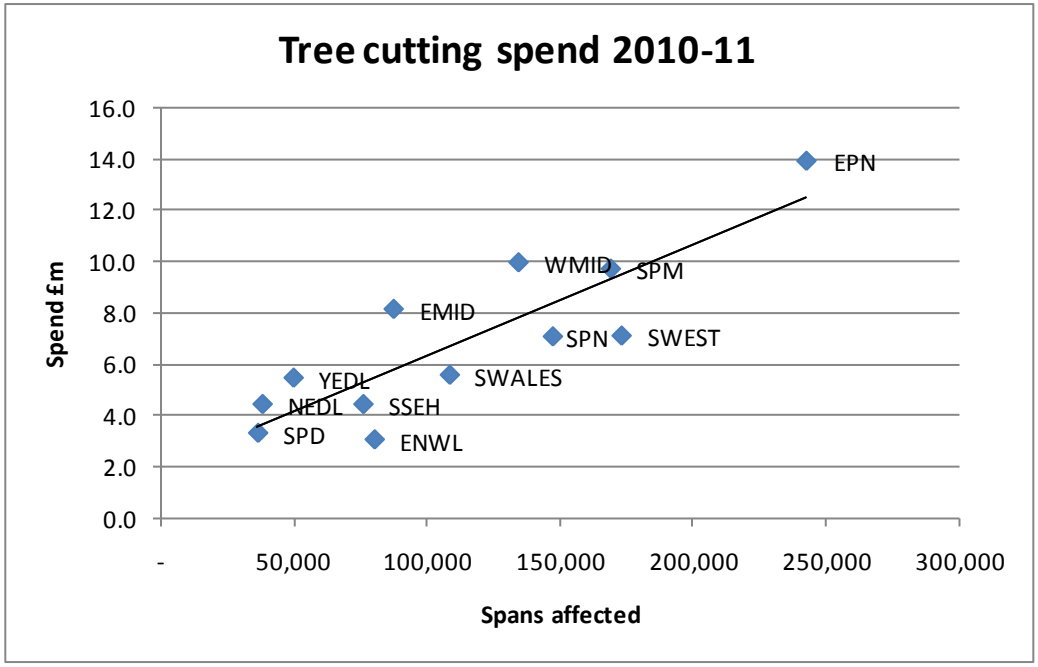
- Some differences in reported proportion of affected spans cut in 2010-11





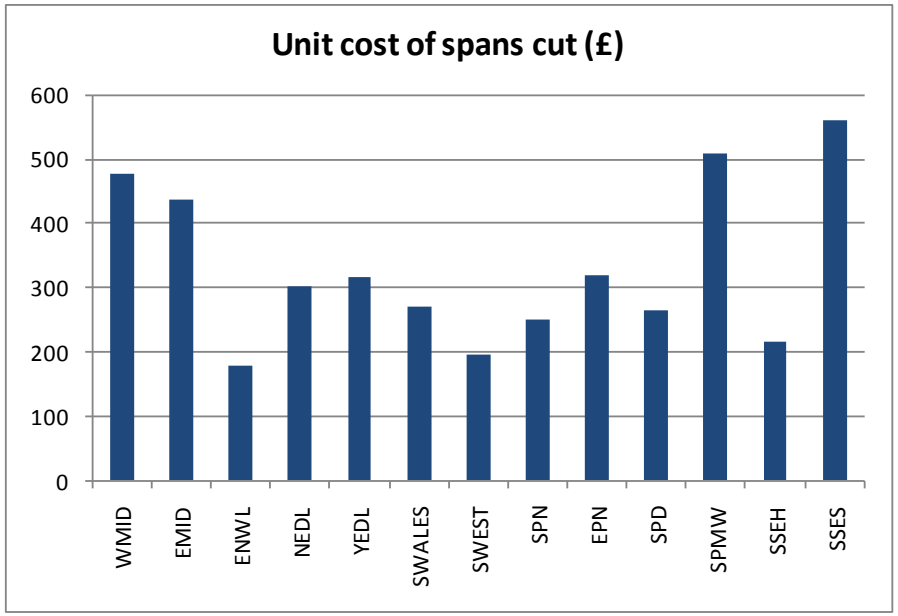
- Unclear extent to which ESQCR change still distorting volumes
- Sensible to compare to DNO stated cut cycles to identify differences
- Single year snap shot by voltage less helpful – tree cutting teams may move between voltages
- Some data issues
  - SSES didn't report spans affected
  - SPN reported zero spans affected at 132kV (but cut 861)

Tree cutting – Total cost analysis



- Reasonably strong correlation between spend and spans affected by trees ($R^2 = 0.73$)
- Provides possible option for assessing efficiency of tree cutting costs. However, this analysis does not distinguish between efficiency of volumes (measured by return interval in the case of trees) and the efficiency of delivery (unit costs)
- If volumes still affected by ESQCR compliance programmes may need to revert to spans cut for analysis

Tree cutting – Unit costs



- RRP analysis suggests some quite different unit costs observed (based on 43-8 cuts)
- Broadly consistent with results of total cost analysis
- Analysis shown for ‘all voltages’.
- This analysis based on total costs / spans cut, ie the cost function will include ‘inspected, not cut’. As a result any company with significant survey or inspection costs in the year may have distorted unit costs.
- Similar approach possible for ETR 132 – however many common elements with 43-8 and some cost sharing may distort results

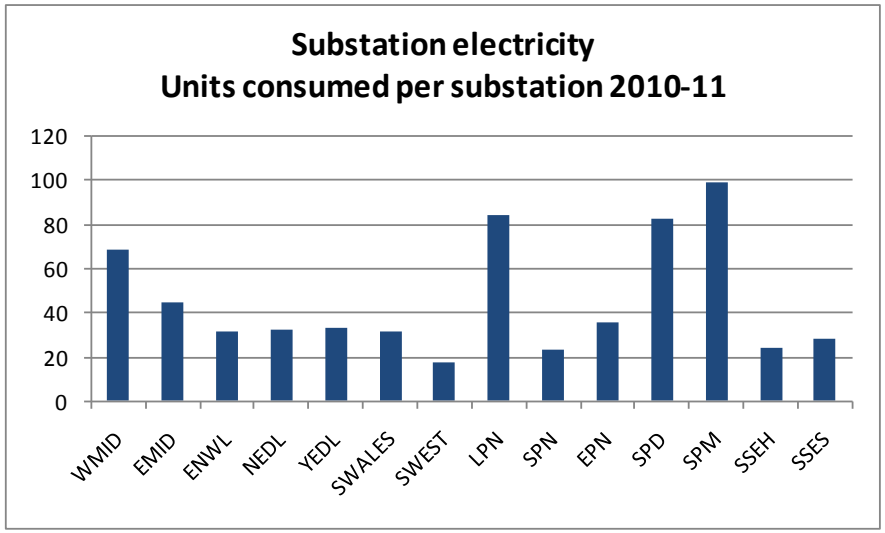
NOC Other

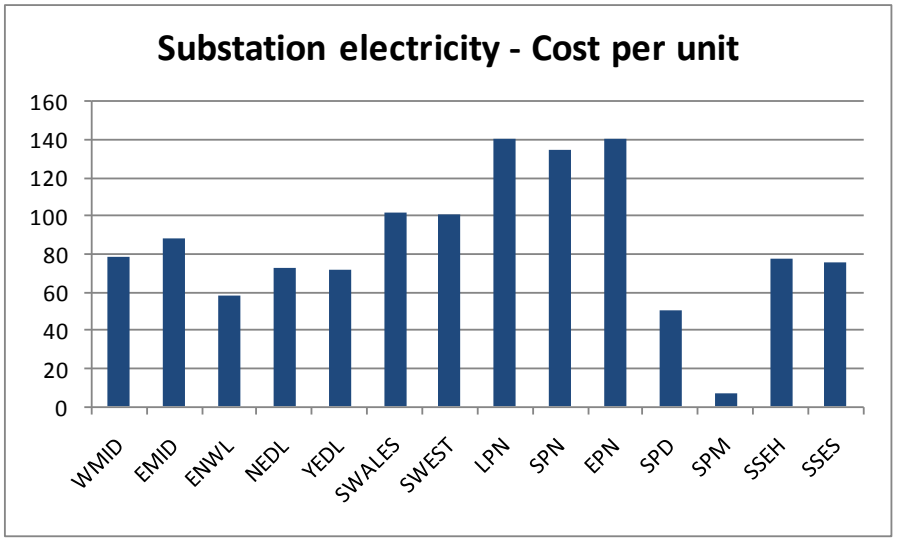
- NOC Other includes three distinct (and very different) cost categories
  - Substation electricity
  - Remote location generation
  - Dismantlement

- Remote location generation and dismantlement are best reviewed by assessment of need and solution cost
- Scope for comparative assessment of substation electricity costs

Substation Electricity

- To assess efficiency of volume used need to normalise by 33kV and 132kV substations
  - May be distorted by indoor/ outdoor split and by assumptions of unmetered use
- RRP data provides cost per unit

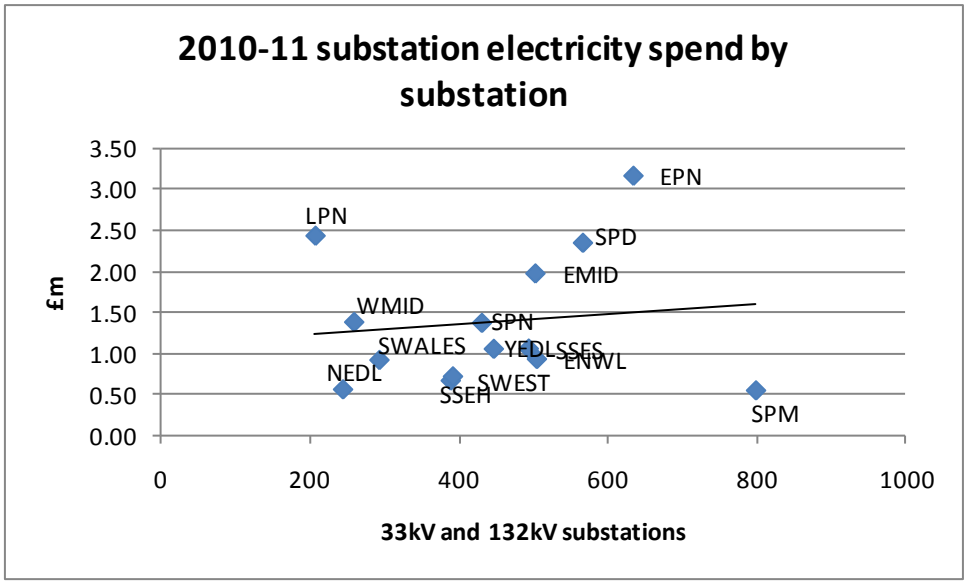




- Quite different data suggests some inconsistency in reporting basis – but once reporting inconsistencies resolved we will have data available to make this assessment

Substation Electricity

- Combine into overall assessment of cost per 33 and 132kV TX



- Weak correlation $R^2 = 0.01$ – unclear extent to which apparent reporting issues distort relationship, whether due to use of proxy driver or whether imperfect assessment tool

Allowance setting for NOCs – Summary
Data quality

Area	Volume clarity	Spend clarity	Boundary issue
Inspections	Reasonable. May need to clarify relationship with surveys	Reasonable. Condition surveys more expensive than inspections – not all activity is equal	With Maintenance when done as a combined activity.
Maintenance	Wide variety of activity may count as a volume (eg function testing)	Reasonable in RIG V3	With wider asset management strategy. With refurbishment if whole asset not replaced. De minimis threshold for poles – unclear for other assets (especially civils)
Tree-cutting	Clear in RIG V3 – better spans inspected definition	Clear in RIG V3	Not really. Spans cut as part of other work should get unwound.
Troublecall (QoS)	Incident reporting clear in NADPR RIG	Definitions relatively immature. Becomes important if doing disaggregated analysis	With Asset replacement on RAR (solved by assessing including memo costs)
Troublecall (non QoS)	Unclear - based on DNO reporting of data	Unclear - based on DNO reporting of data	With Maintenance in terms of response to notified incidents.
Substation electricity	Not clear whether reported differences are due to definition issues or different volumes	Reasonably clear in RIG V3	No obvious boundary

Allowance setting for NOCs - Summary

- Assessment of efficiency network operating costs requires consideration of efficiency of volumes and of unit costs – wherever possible in modelling approach that allows both aspects to be considered
- Annual reporting structure provides good data breakdown to assess efficiency of unit costs
- Proposed approach
  - Troublecall – analysis using fault numbers as cost driver, disaggregated by asset type and voltage. Will need normalising to DNO's average fault rate with adjustment made for future exceptional events.
  - Non QoS fraught with data consistency issues – this needs sorting before any conclusions can be drawn
  - Tree cutting – analysis using costs per span affected – subject to cross check to ensure low costs not due to unsustainably low volumes
  - I&M - Efficiency of volumes is harder to assess for I&M as there are trade off between this cost category and other categories of spend involved in whole life management of assets – requires assessment of overall costs of managing asset class across all activities as cross-check. Analysis of unit costs should be possible once reporting differences resolved
  - NOC Other – detailed review of remote location generation and dismantlement.
- Must take care to ensure robustness of forecast of volumes where unit costs are being used to assess forecasts
- As with all disaggregated modelling – great care must be taken in aggregating results to avoid cherry picking and to recognise potential trade-offs