

Development of a Low Profile High Capacity Single Circuit 132kV Design

SSEN Transmission Engineering



Scottish & Southern
Electricity Networks

EaSTS– Earthed Steel Trident Structures

- Developed by SSEN with Energyline as designer
- Project Kickoff January 2022
- Project Brief – to create a stronger version of 132kV trident pole structures
- Offgems Network Innovation Allowance (NIA) funded project – designs will be published via the [smarter networks portal](#)



Key Opportunities

- Connections consistently requested at higher altitudes above 350m
- Connections increasing to 200+MVA



- Forces use of steel lattice or cables

- Creosote banned from market from 2025 (potentially 2029)



- Lack of products/infrastructure for wood pole treatment



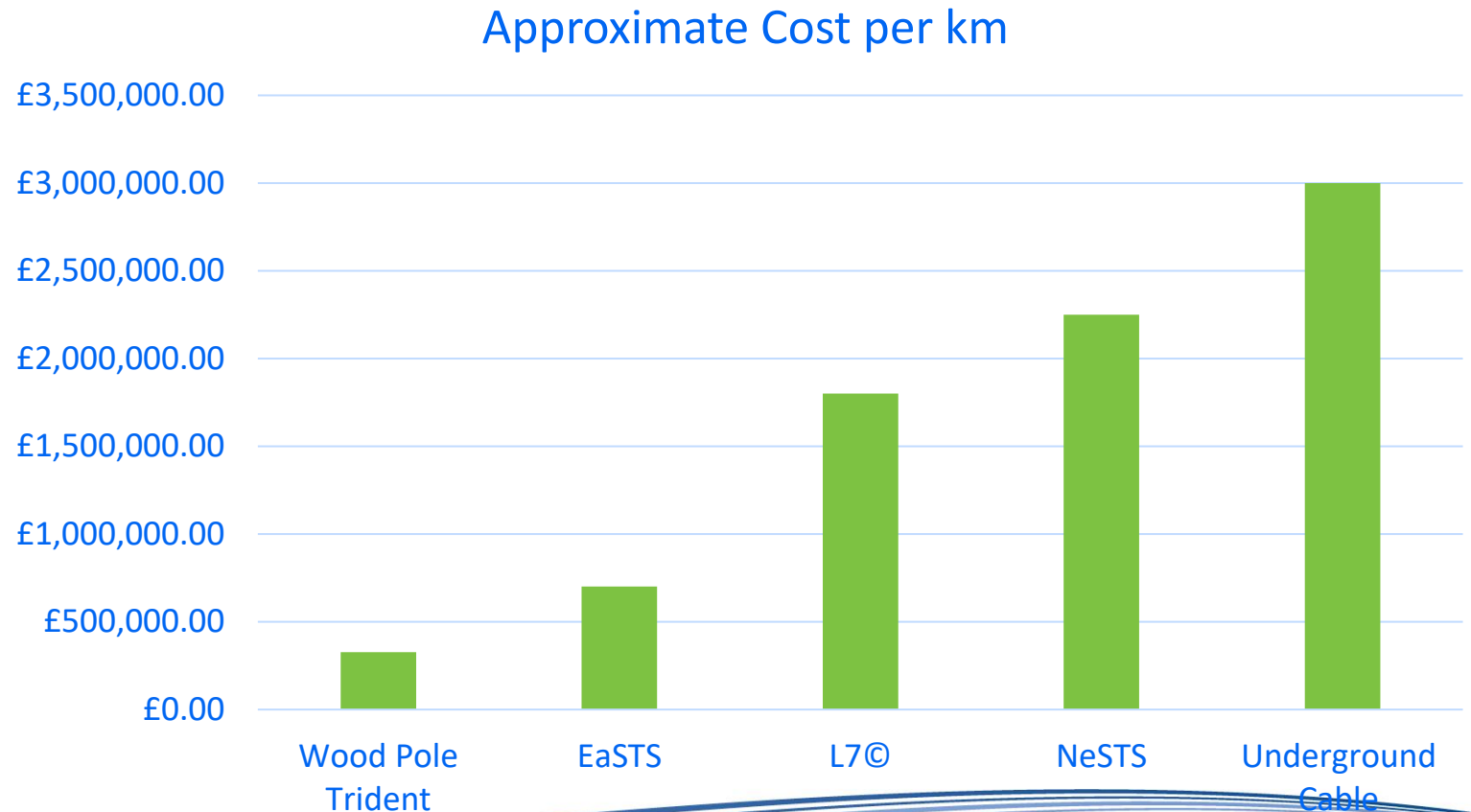
Steel Low Profile High Capacity Single Circuit 132kV Design

- **Key Deliverables**
- High strength steel design for High Altitudes
- Construction methodologies with minimal access work, direct embedment of Structures
- Similar appearance to existing trident



Earthed Steel Trident Design

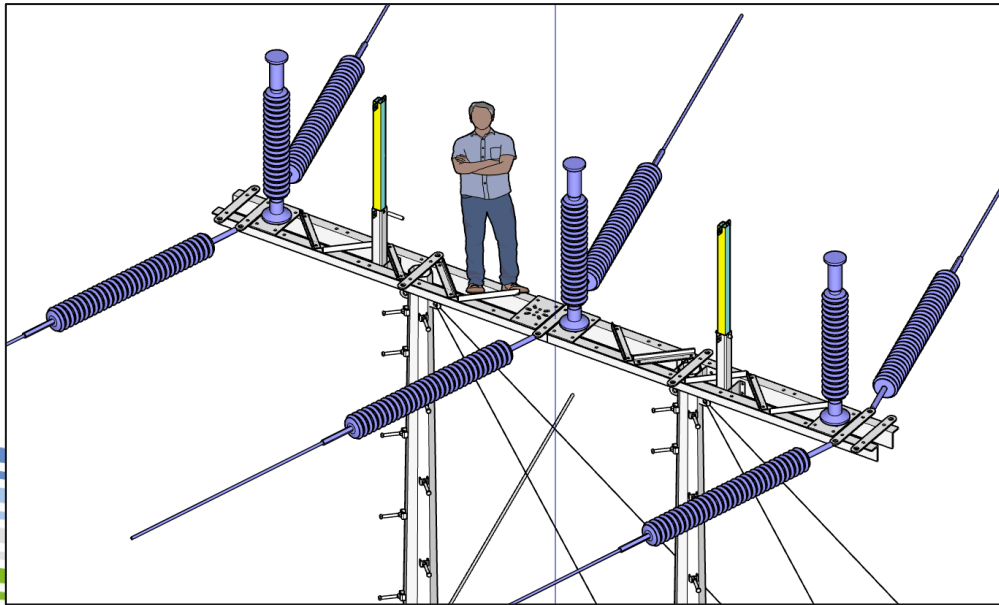
- Design basis of 100m span at 500m altitude with upas Conductor
- Totara and Rubus Feasible at lower altitudes
- Current cost estimates of approx. £700k/km



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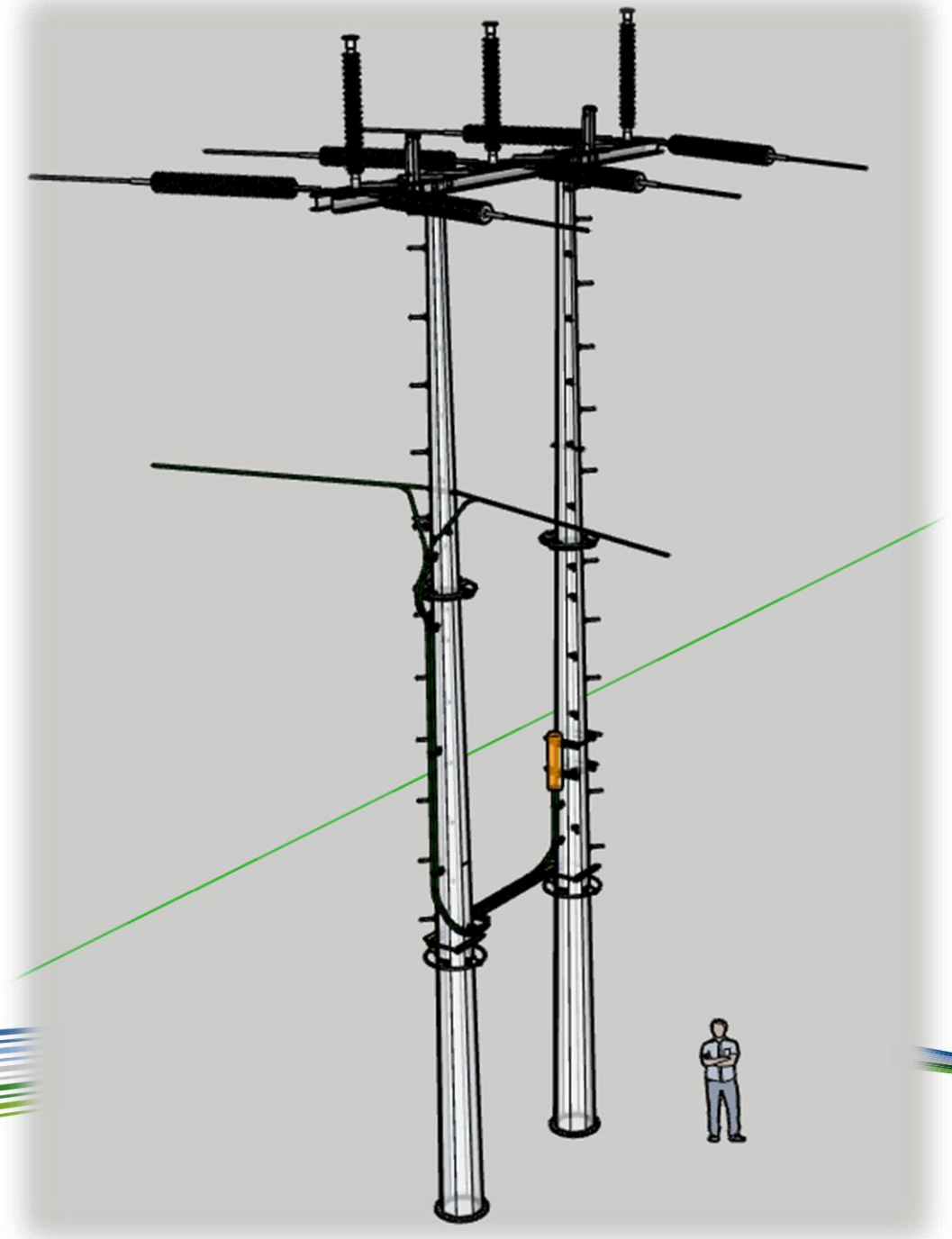
- Same shape as wood pole Trident
- Standard structure heights 9m/11m/13m/15m/17m
- Steel poles rather than wood
- Underslung OPGW to provide earthing continuity
- Installed with the same construction techniques and plant





Next Steps

- Type Testing
 - Structure testing & Foundation testing
- Identification of projects for use
 - High altitude connections of up to 200MVA
Lower altitude connections of up to 270MVA
- Publish Results, Designs, Models and Specification on [Smarter Networks Portal](#)



Aberarder Windfarm Connection

- 75 MVA Wind farm connection at approx. 600m altitude approx. 5km circuit length
- Was planned for single circuit NeSTS/Steel Lattice Structures
- Redesigned with Low Profile structures with Upas offering a potential saving of 55%* of project costs

*Based off per km costs of £700k/km for steel trident and £1.7m/km for steel lattice towers.



Kergord – Yell Overhead Line

- 220MVA 18km circuit required
- Capacity not possible with standard conductors
- Two potential options
 - Use a high novel composite conductor
 - Use underground cable
- EaSTS option approximately 76%* cheaper than the cable option & uses standard apparatus

* Based off per km costs of £700k/km for steel trident and £3m/km for steel lattice towers.



Questions and Discussion



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