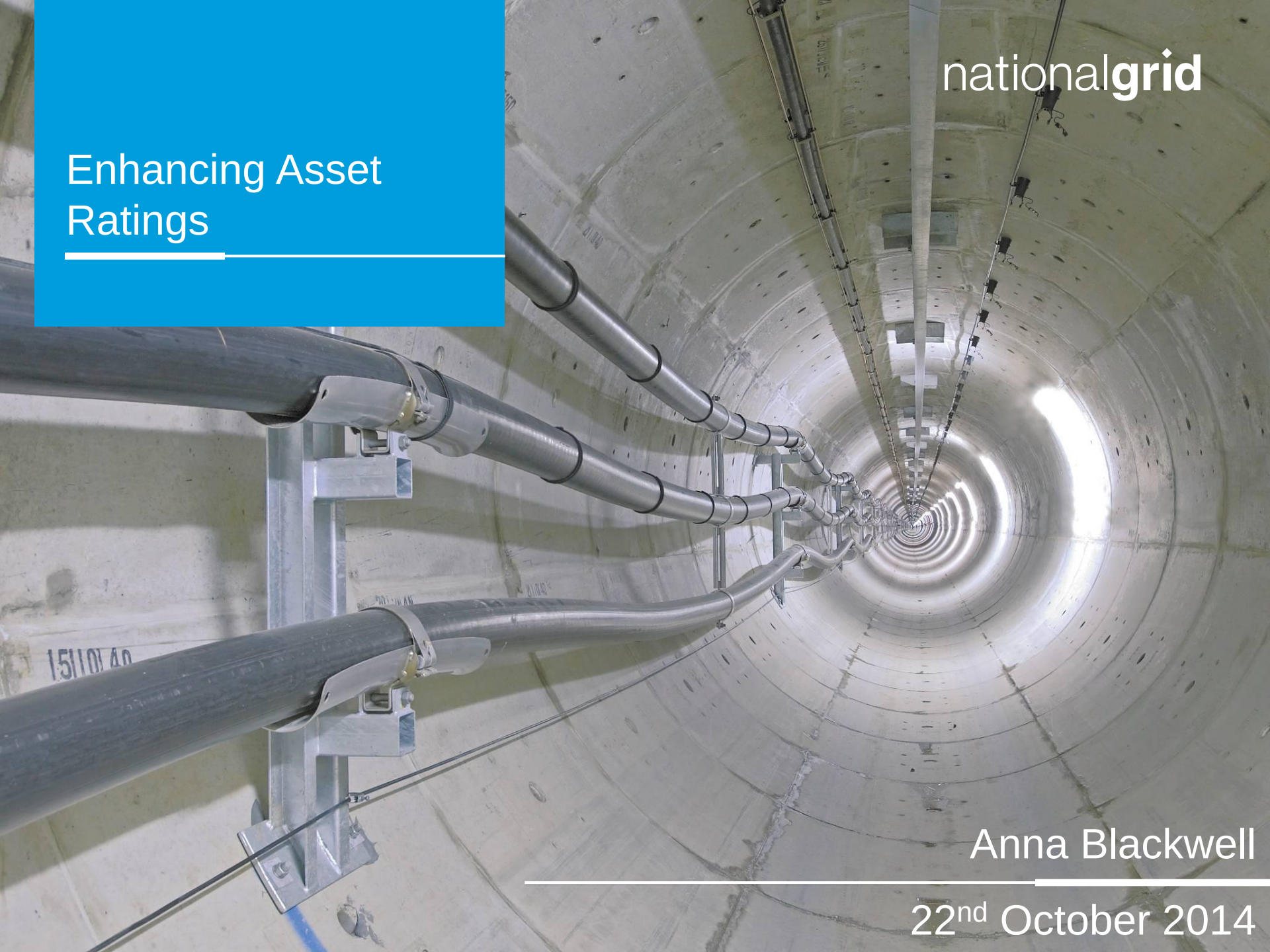

Enhancing Asset Ratings

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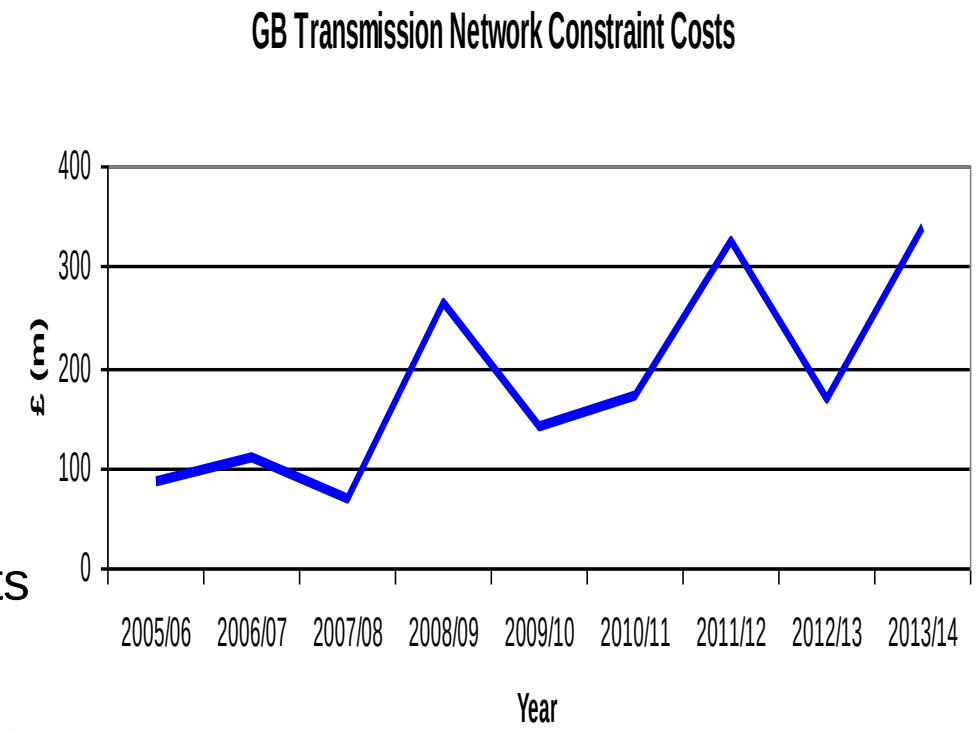
Anna Blackwell

22nd October 2014

Constraint costs

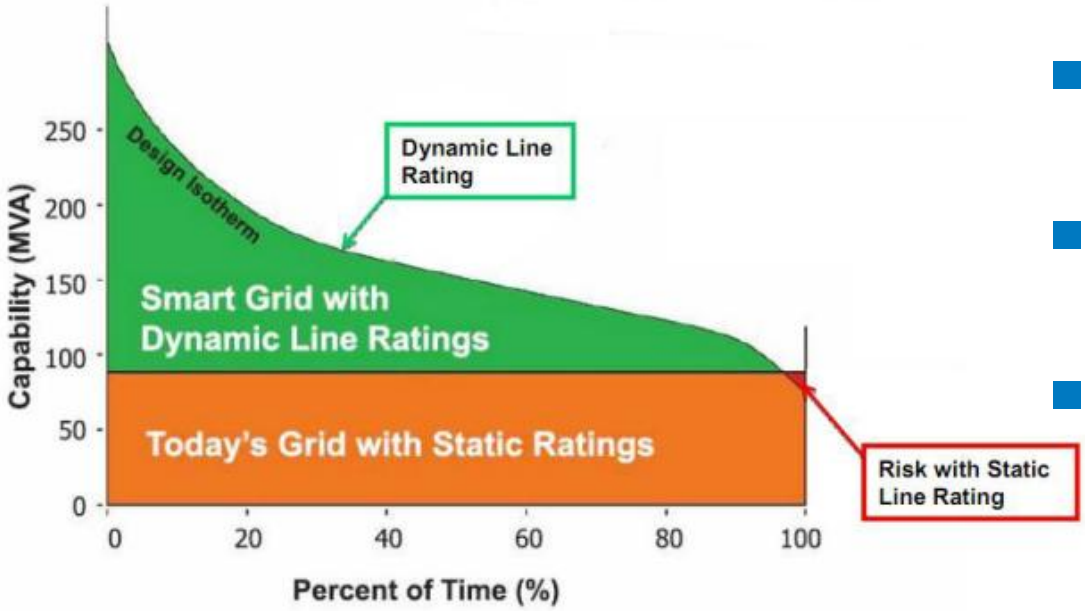
- Congestion within the transmission network increasing
- 3 types
  - Thermal – safe thermal capacity of assets
  - Voltage – maintaining voltages within safe limits
  - Stability – ability of system to return to stable condition after a fault



Seasonal rating

- Currently apply constant seasonal thermal ratings
- Conservative, actual rating varies with weather and often probably higher
- Network reinforcement costly

Ambient temp	Winter	Spring	Summer	Autumn
Buried Cable	10	10	15	15
OHL	2	9	20	9
Transformer	10	20	30	20



- Enhanced ratings utilise additional capacity
- New tools enable real-time monitoring
- How can dynamic ratings be incorporated into timely operational decisions?

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Improved Ratings

- Existing NGET methods
  - Circuit Thermal Monitor; real-time cable and transformer ratings based on load
  - Metrological Overhead Line Ratings; day ahead based on forecast weather
  - Probabilistic overhead line ratings;

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Improve asset thermal modelling

- DC cable ratings (NGET0046)
  - Modelling of transient thermal performance of DC cable
- Dynamic cable ratings (NGET0047)
  - Develop calculation methods for dynamic ratings incorporating bet thermal environment modelling

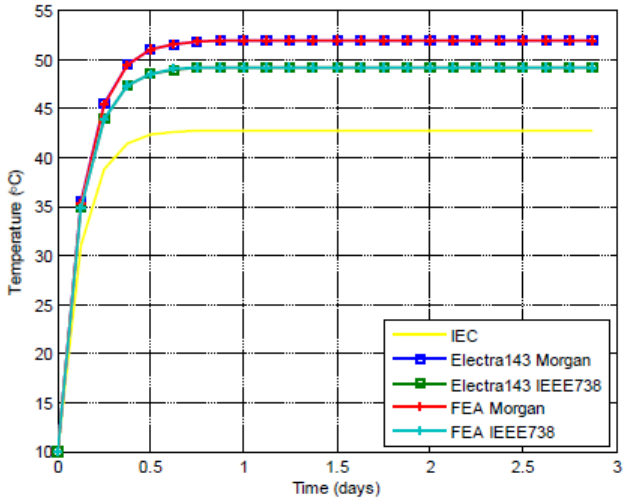

Figure 9 - Transient results from different models with constant input (natural cooling with solar radiation)

- Thermal cyclic ratings (NGET0015)
  - Understand the impact of thermal cyclic load on cable performance
- Smartzone (NGET0056) – including overhead line dynamic rating trial

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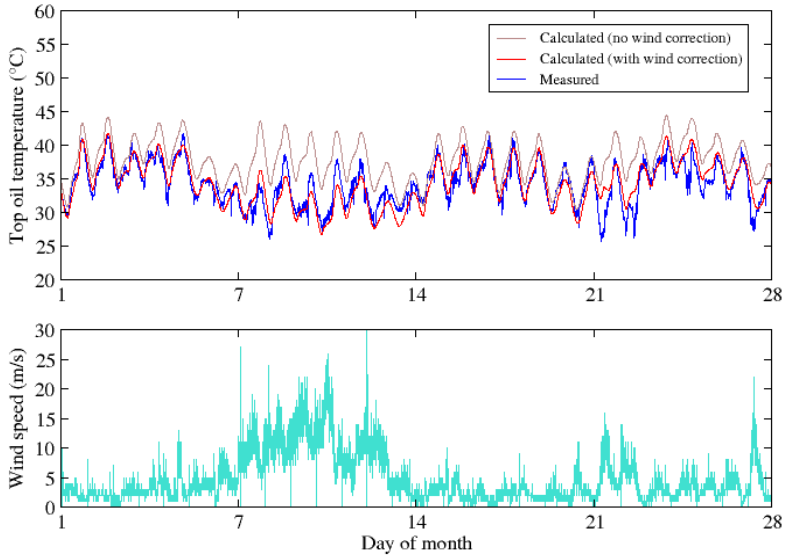
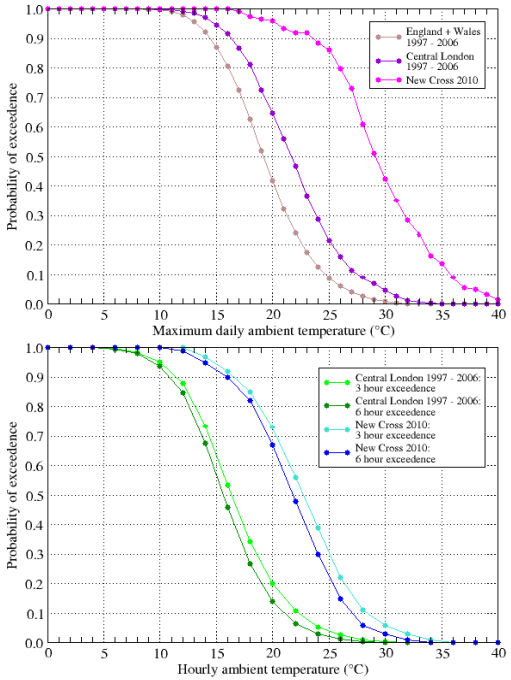
Improve asset thermal modelling

- Improved Transformer Thermal Monitoring (IFI project)
  - Refine models to consider oil viscosity and wind speed
  - Investigating the ‘correct’ ambient temperature to use





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Forecast enhanced capacity

- NGET0111 – Facilitating Enhanced Network Capacity Evaluation
  - Establish requirements for demonstrating a tool capable of forecasting ratings 48 hours ahead of real time
  - Complete circuit based rather than specific assets
  - Incorporate condition monitoring to verify models

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- NGET0105 – Enhanced weather modelling for DLR
  - Utilise spatial interpolation to forecast weather parameters
  - Forecast spare ohl rating capacity

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Benefits

- Improved asset thermal modelling optimises capacity and understand impact of loading patterns
- Increase network capacity
- Reduce constraint costs
- Optimise network reinforcement decisions
- From 2016 new Electricity Balancing System (EBS) will facilitate use of enhanced rating forecasts within decision making