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railalliance

# We need to reduce emissions

Alex Burrows, MD, BCRRE / Rail Alliance

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## Hypothesis

- Electrification is the ultimate answer to powering the railway
- Electrification is the **best** solution for railways that provide:
  - More than 6 trains per hour per direction, and/or
  - 100mph+ operation
- We need to decarbonise the railway as quickly as possible
- Alternative solutions (ie hydrogen, battery) can assist in reducing emissions/replacing diesel
- But ultimately an electric railway is the most efficient way of moving lots of people and freight around

# This is not a new debate…

- The view in the 1950s (the 1955 Modernisation Plan + several reports plus 30 years experience from the Southern Railway plus developments on other railways…)

| PROs | CONs |
|---|---|
| ▪ Greater availability of rolling stock;<br>▪ More efficient working at terminal stations;<br>▪ Greater acceleration and improved performance;<br>▪ Size of the motive power unit;<br>▪ No smoke;<br>▪ Stimulation of demand;<br>▪ Improved staff conditions (for both drivers and station staff);<br>▪ Lower operating costs;<br>▪ Greater operational efficiency;<br>▪ Already a proven technology; | ▪ Significant capital cost of electrification;<br>▪ Prioritisation of the required investment;<br>▪ Steam traction was established, known and comfortable for the industry;<br>▪ Diesel traction also provides benefits without capital required for infrastructure; |

# Key moments in UK rail electrification policy

1950s: Modernisation Plan

1970s: West Coast electrification

1980s: East Coast electrification

2007: DfT White Paper

2009: DfT White Paper + new electrification schemes announced

2012: Several new electrification schemes announced

2015: Electrification schemes paused

2017: Electrification schemes cancelled

2019: Rail decarbonisation + several electrification schemes delivered

## Ongoing public policy factors

**FOR**

- Efficient operations
- Environmental performance
- Passenger experience

**AGAINST**

- Capital cost
- Competing priorities (investment and political)

# GB electricity is getting rapidly ‘cleaner’

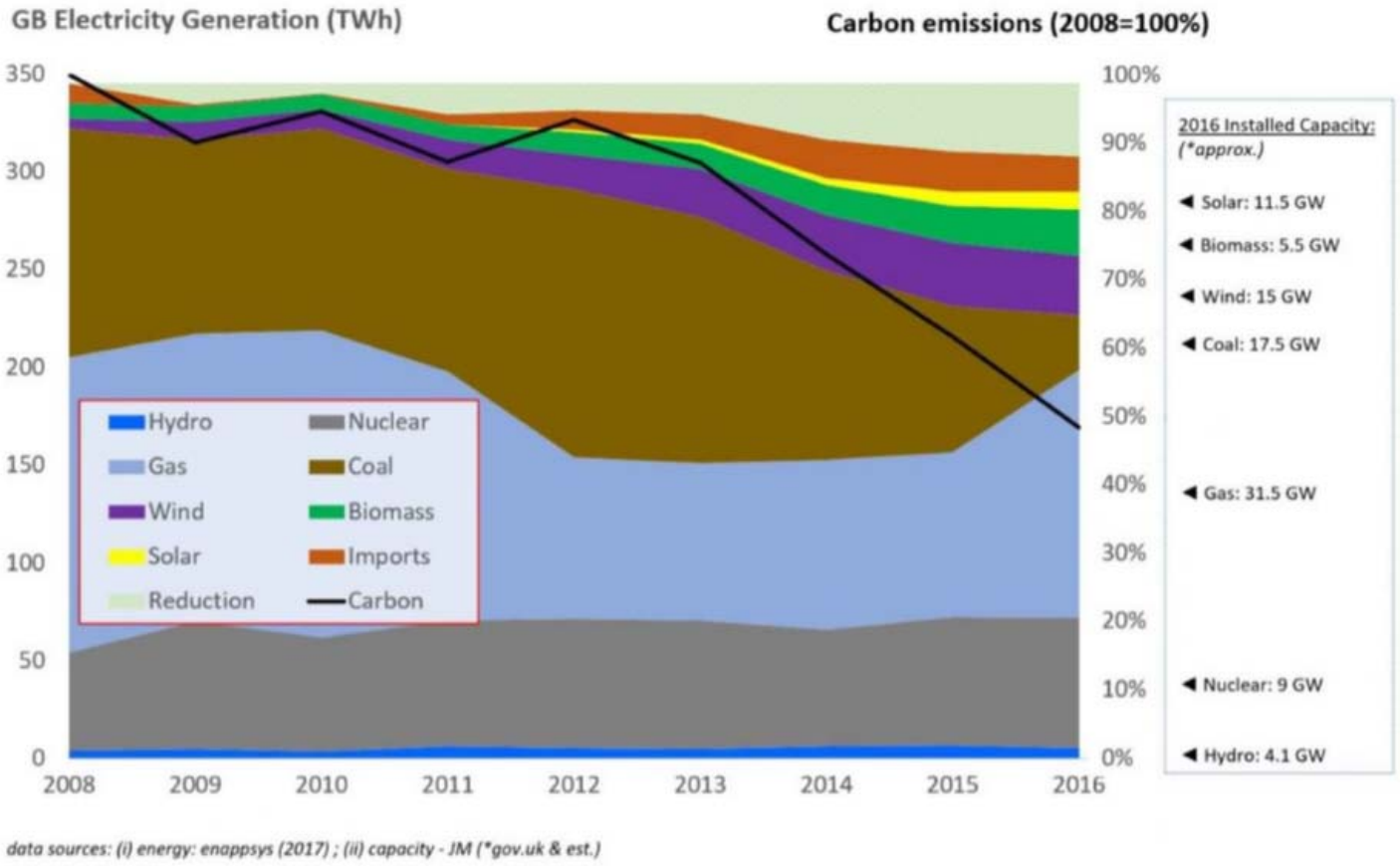



*Figure 2 – UK Generation Mix & Carbon Emissions (Grey Cells Energy with permission)*

*“The electricity generation mix has radically changed, with coal being gradually phased out, and considerable growth in renewable energy”*

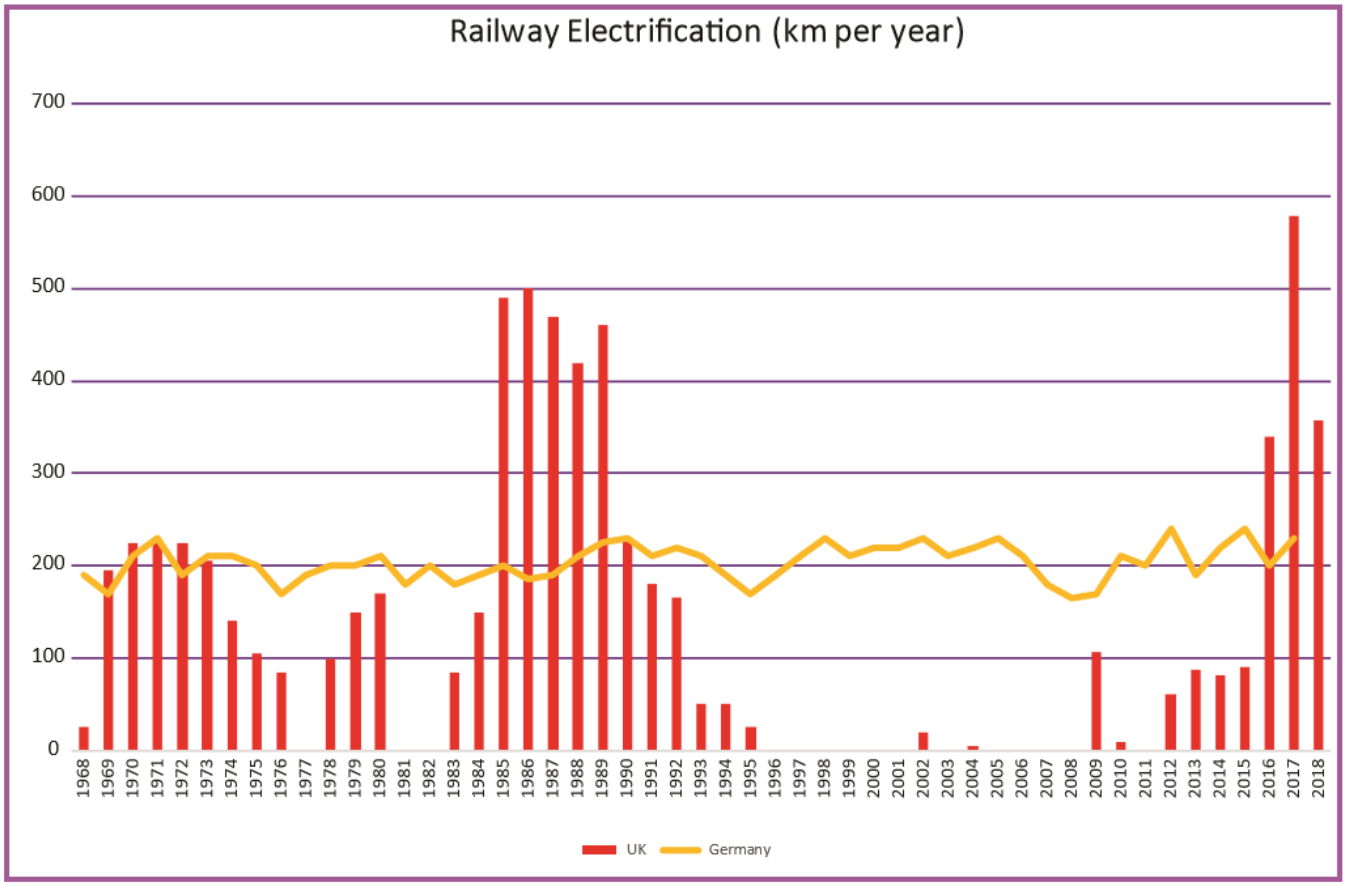
*“CO2 emissions per unit of energy have halved over the 8 year period, and look set to decline further in coming years”*

# Key conclusion from recent report:
# T1145 - Options for Traction Energy Decarbonisation in Rail

- ***The carbon emission from overhead electrification are currently less than half that of diesel, and expected to fall further as the UK power generation mix decarbonises further in coming years.*** *It therefore makes sense to:*
  - *make use of overhead electrification wherever available, which suggests that the use of bi-mode trains should continue to be pursued;*
  - ***plan to electrify those lines which are heavily used, but for which there is no credible alternative way of achieving zero (or near zero) carbon emissions – this would specifically include passenger lines with linespeeds greater than 75mph, and mixed traffic lines that see (or are likely to see) significant freight flows;***
  - *in the near term, consider bi-modes with a clean, modern diesel engine for partially electrified routes, but the level of performance off-wire needs to be restricted in order to keep the size, mass, cost and emissions of the diesel mode to an acceptable size;*
  - *in the medium term, bi-modes with a hydrogen fuel cell would be a better solution, but current fuel cell technology probably restricts this to 75mph operation off-wire unless a significant reduction in operation range were deemed acceptable;*
  - *For non-electrified lines, a significant reduction in carbon emissions of the order of 40% could be achieved using advanced hybrid diesel propulsion, but for a reduction beyond this, hydrogen fuel cells powered by hydrogen look to be the best option;*

# And what about cost…?

*Fig 10 - Railway Electrification Volume in UK and Germany in the last 50 years*




*(Source: Noel Dolphin, Campaign to Electrify Britain's Railway)*

RIA's recent Electrification Cost Challenge sets out effectively why we can expect significant improvement on the cost of delivering electrification – this graph might also help to partially illustrate this reasoning…!

## Conclusions

- If a primary policy objective is decarbonisation – you need to invest in electrification
- To ensure electrification is cost-effective – you need a strategic ongoing programme of electrification
- To obtain best value for money – you need to commit to a long term CONSISTENT strategic plan

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**THANK YOU!**

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