



Electrification Opportunity

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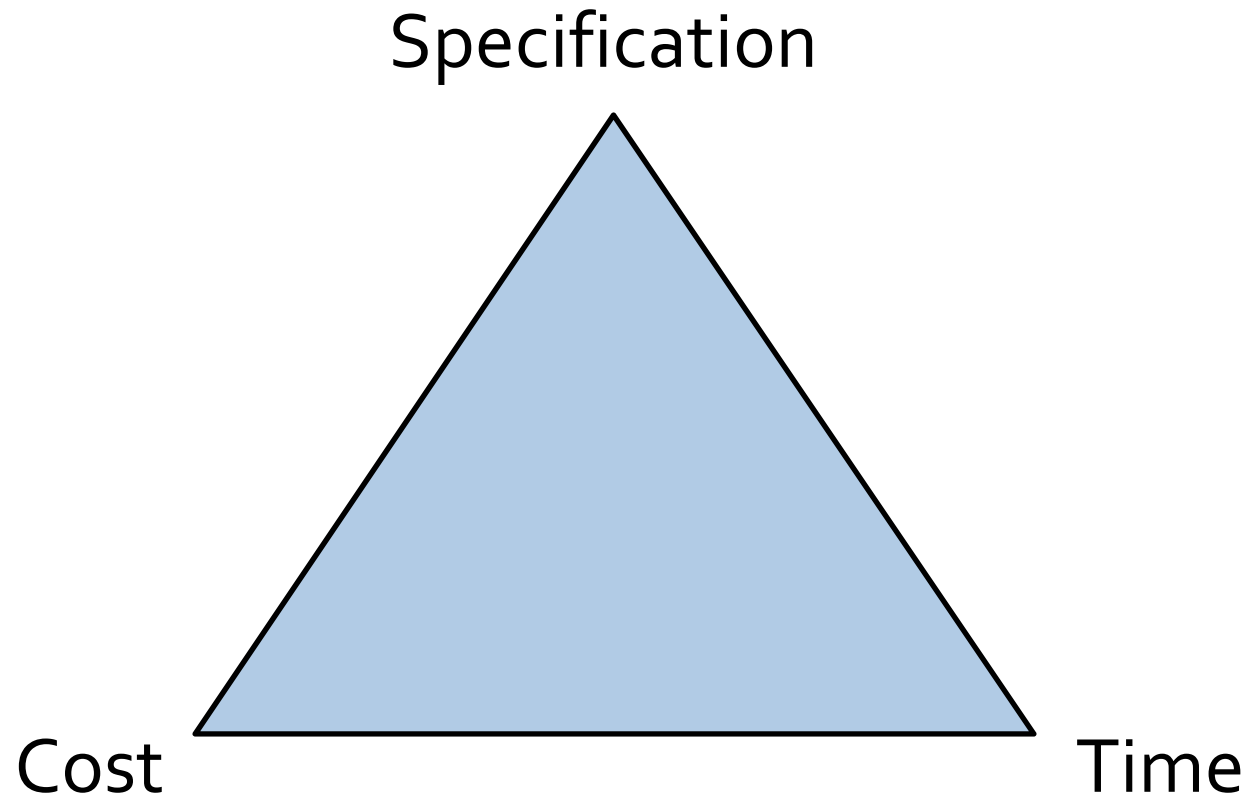
Transpennine Upgrade is the poster child for re-establishing affordable electrification

- The above statement is for England
- The Scots have already shown the way

Electrification is a whole system business change

- Only government (Dept for Transport in England) holds all the levers of change and incentivisation
- Transport Scotland has taken this role pro-actively for Scottish schemes

The eternal balance



Realism in defining the performance specification

- A business engineering savvy sponsor
- Interaction between sponsor, engineer, capital programme, operator and maintainer

Realism in specification

- Network Rail engineering centre of excellence
- Develop and use standard technical toolkit and risk-based solution
- Exploit technical opportunities to the full eg probabilistic gauging
- Avoiding unnecessary works

Understanding the risks early and agreeing how to manage them

- Early survey of clearances and constraints
- Application of risk-based specification and design
- Early discussion and agreement with approving bodies on technical approach



Ensure whole system design

- Avoid single disciplines optimising in their own space



Sequence the work logically

- Specify
- Survey
- Design
- Agree approval criteria
- Contract
- Recycle each of the above until optimised

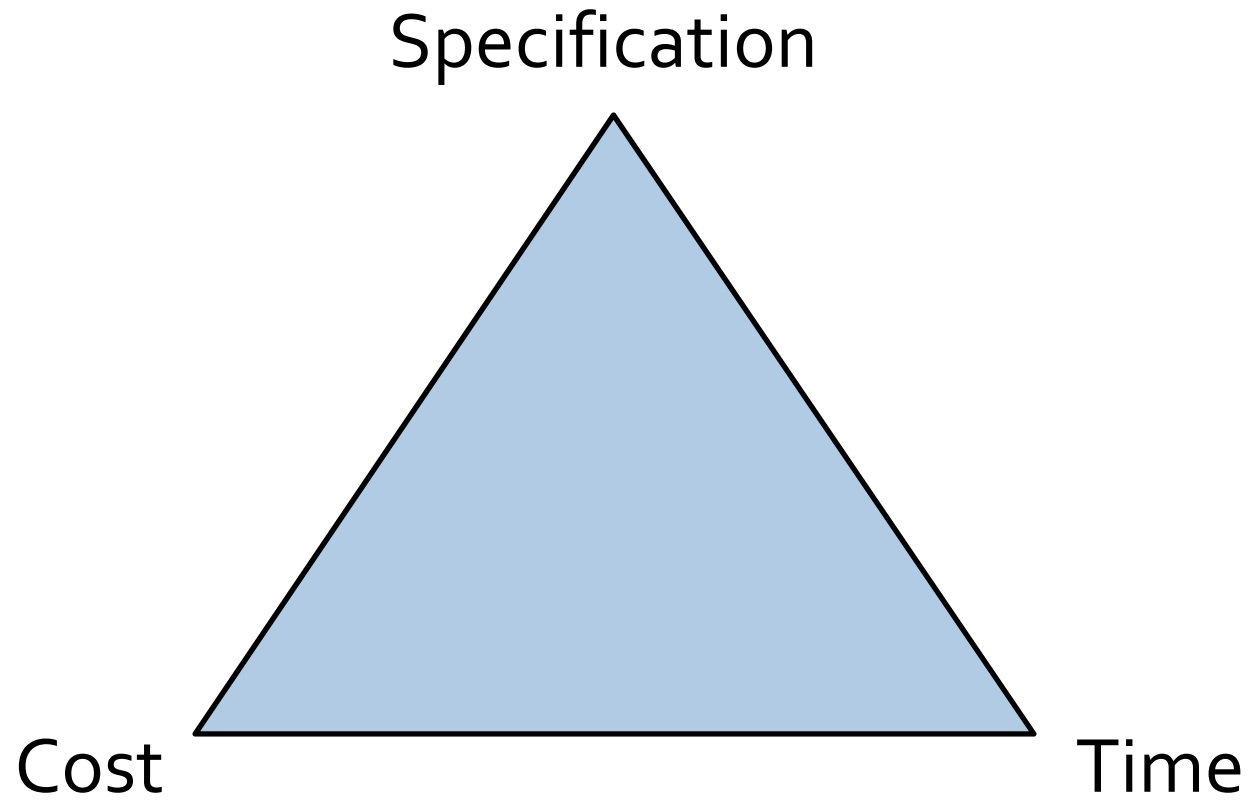
- Construct once...

- Electrification final design and construction should follow track and structures alterations

Contracting model

- Pass risks to designer and constructors only where they have the capability to manage them
- Commit to construction only when the design and the track access regime are sufficiently certain
- Incentivise contractors on the scheme delivery, not individual performance (likewise project managers)
- Client engineer has to retain the whole infrastructure system design
- Client sponsor has to retain the whole life performance

The eternal balance



Construction

- Efficiency comes from logical sequencing and continuous improvement of standard production processes