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Future of Infrastructure Appraisal: Transport

Monday 9th November 2020

Moving Britain Ahead

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Contents

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Economic appraisal is an integral part of every business case

Strategic case	Proposal supported by a robust case for change, based on public policy objectives?
Economic case	Does the proposal demonstrate value for money?
Commercial case	Is the proposal commercially viable?
Financial case	Is the proposal financially affordable?
Management case	Is the proposal achievable?

Aim to ensure:
- all relevant impacts assessed
- full range of options considered
- risks and uncertainties understood

Transport modelling and appraisal techniques also feed into other cases notably strategic and financial cases

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Our approach to transport appraisal is well established

Guidance draws on over 50 years of research and practice, working with the wide transport appraisal community.

We publish:
- Technical guidance (TAG)
- Guidance on how we formulate VfM advice to ministers
- A databook reporting key assumptions
- Software to support the calculation of impacts

The courts and planning inspectors don't generally challenge DfT's modelling or appraisal guidance

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The transport economic case considers a wide range of potential impacts, regardless of whether they can be monetised

The Economic Case considers both impacts which can be monetised (and included in a BCR) and impacts which cannot be robustly valued

	Initial BCR	Adjusted BCR	Wider Considerations
Economy	- Business user impacts (e.g. time savings) - Transport provider impacts (e.g. fares) - Indirect taxation	- Reliability (business) - Agglomeration - Output in imperfectly competitive markets - Increased workforce participation	- Dependent developments - Move to more/less productive jobs - Impacts from supplementary economic modelling
Environment	- Noise - Air quality - Greenhouse gases		- Landscape - Townscape - Historic environment - Biodiversity - Water environment
Society	- Commuting and leisure user impacts - Journey quality - Physical activity - Accidents	- Reliability (commuting and leisure)	- Security - Severance - Option and non-use values - Accessibility - Affordability

These impacts are combined to inform an overall assessment of value for money.

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Recent improvements to guidance

Ongoing themes encapsulated in 2019 Appraisal and Modelling Strategy:

- Impact on people and place, building on
  - Work on value of time - doesn't vary by location although wages do
  - 'Rebalancing Toolkit' – highlighting local impacts, published Dec 2017
- Reflecting uncertainty – decline in driving, Brexit effect, new technologies
- Transformational investments and housing – what has worked, how to model impact, sit within wider strategy

Changes since then:

- Green Book Review
- Net zero carbon focus
- Oakervee HS2 review
- Covid!

Consulting now on early changes

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Handling uncertainty

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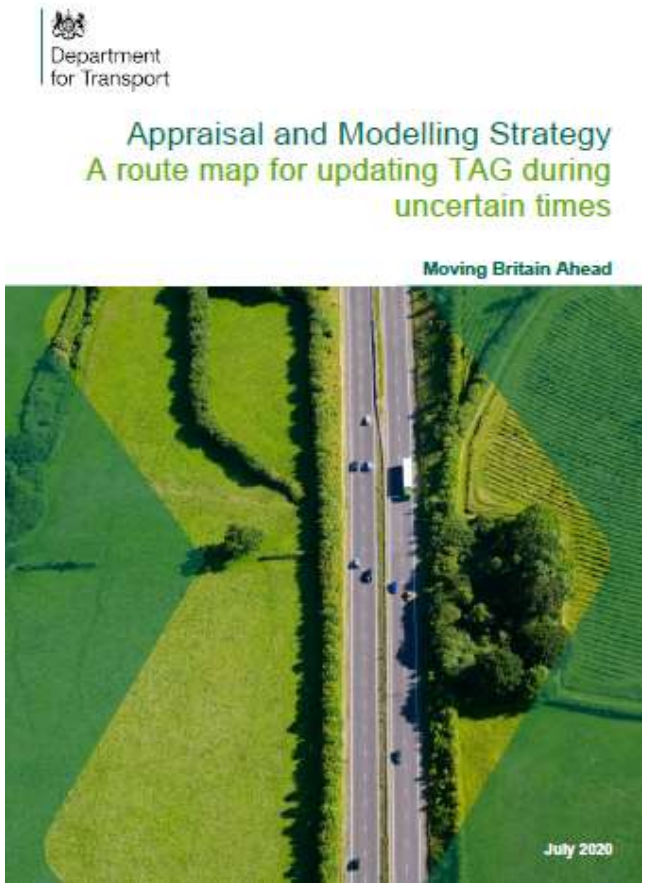
What is DfT's approach to tackling future uncertainty?

The Appraisal and Modelling Strategy 2019 commitments included:

- delivery of an **uncertainty toolkit**
- guidance on the use of **scenarios**
- develop **a set of scenarios** reflecting key national uncertainties



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Using Scenarios

- Piloting five quantified scenarios. Consider updating in light of Covid.
- Qualitative scenarios used to inform policy and strategy development and test options against a range of plausible futures
- Short term scenarios

Economy/ Demography

- High/low GDP
- High/low employment
- High/low urbanisation
- High/low migration

Behaviour

- Extrapolated trip rates
- Low driving licence holding

Regional

- Population re-distribution
- Employment re-distribution

Technology

- Connected Autonomous vehicles
- High EV uptake
- High mobility
- Reduced car occupancy

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What could an uncertainty toolkit look like?

- What tools most helpful
- Quicker models needed

- How use for decision

Possible Structure with examples of content

Types of Uncertainty

- Exogeneous vs. Endogenous
- Risk vs. Uncertainty
- Model specification and parameters

Addressing Uncertainty

- Sensitivity Testing
- Scenarios
- Monte Carlo
- Modelling approaches
- Flexible planning

Resources for addressing uncertainty

- DfT ranges around key variables
- Case studies
- Fixed scenarios

Presenting Uncertainty

- Visualisation tools
- Guidance on having impact when presenting uncertainty analysis

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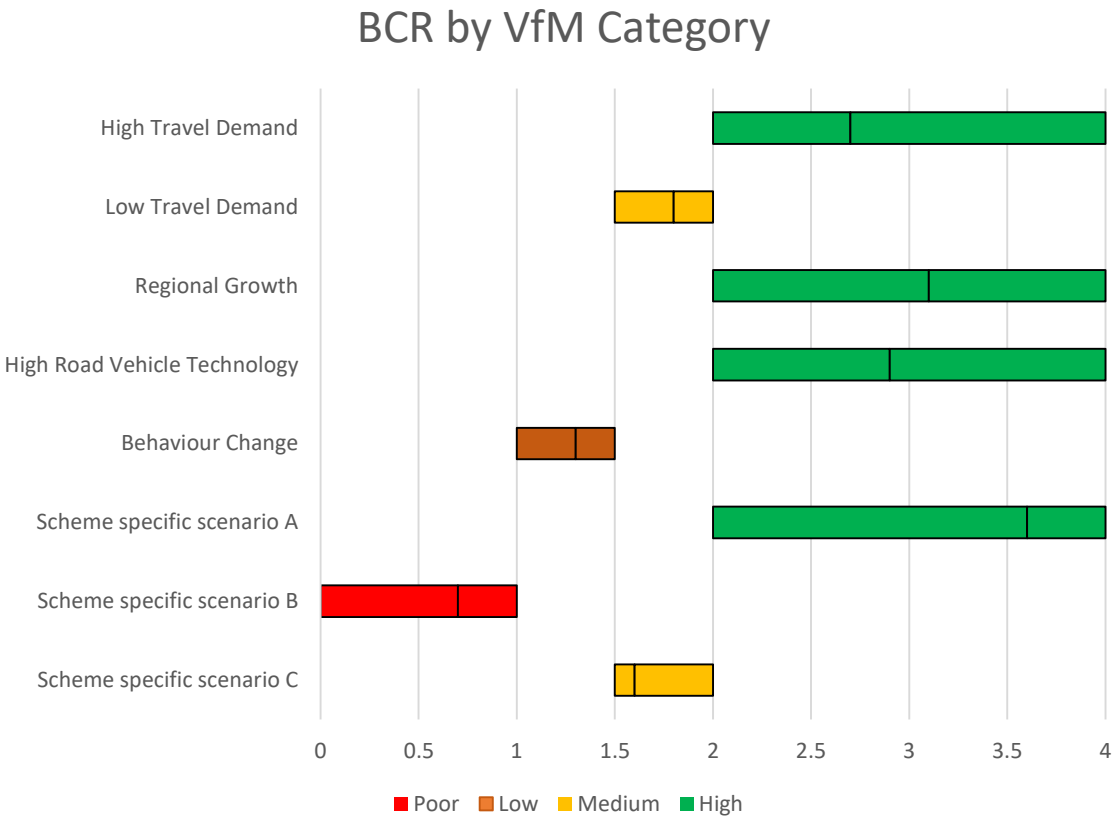
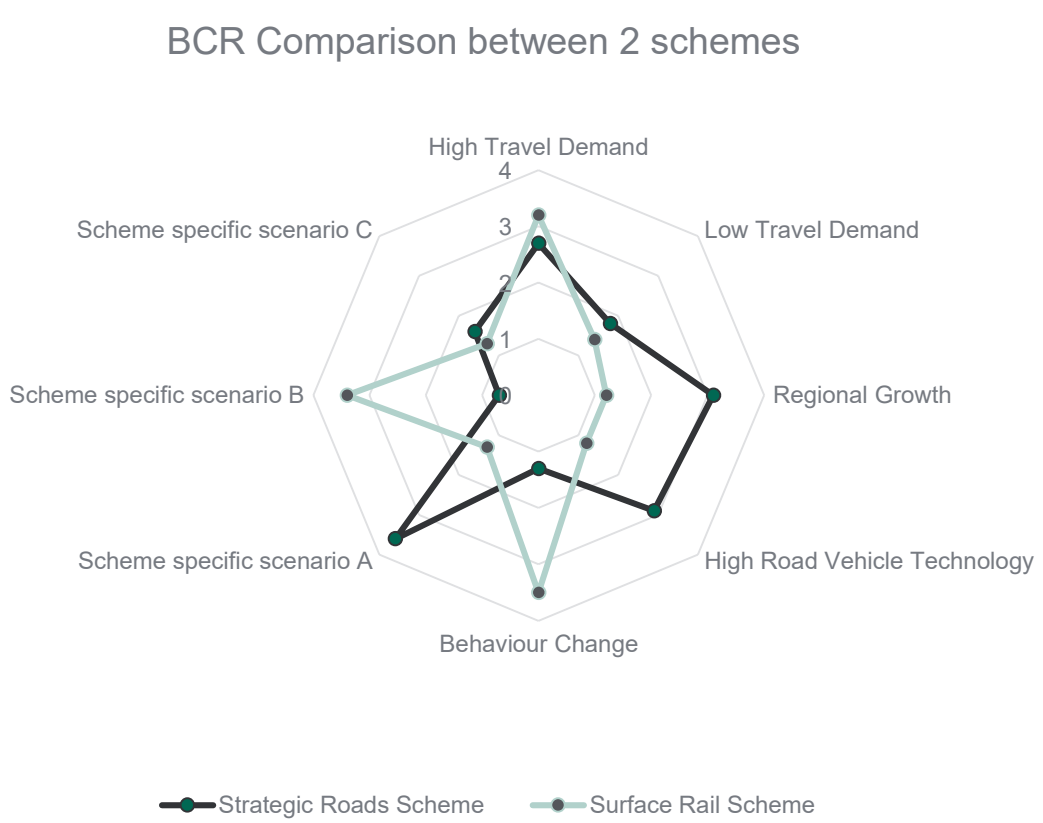
Options for presenting scenarios





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Appraisal periods

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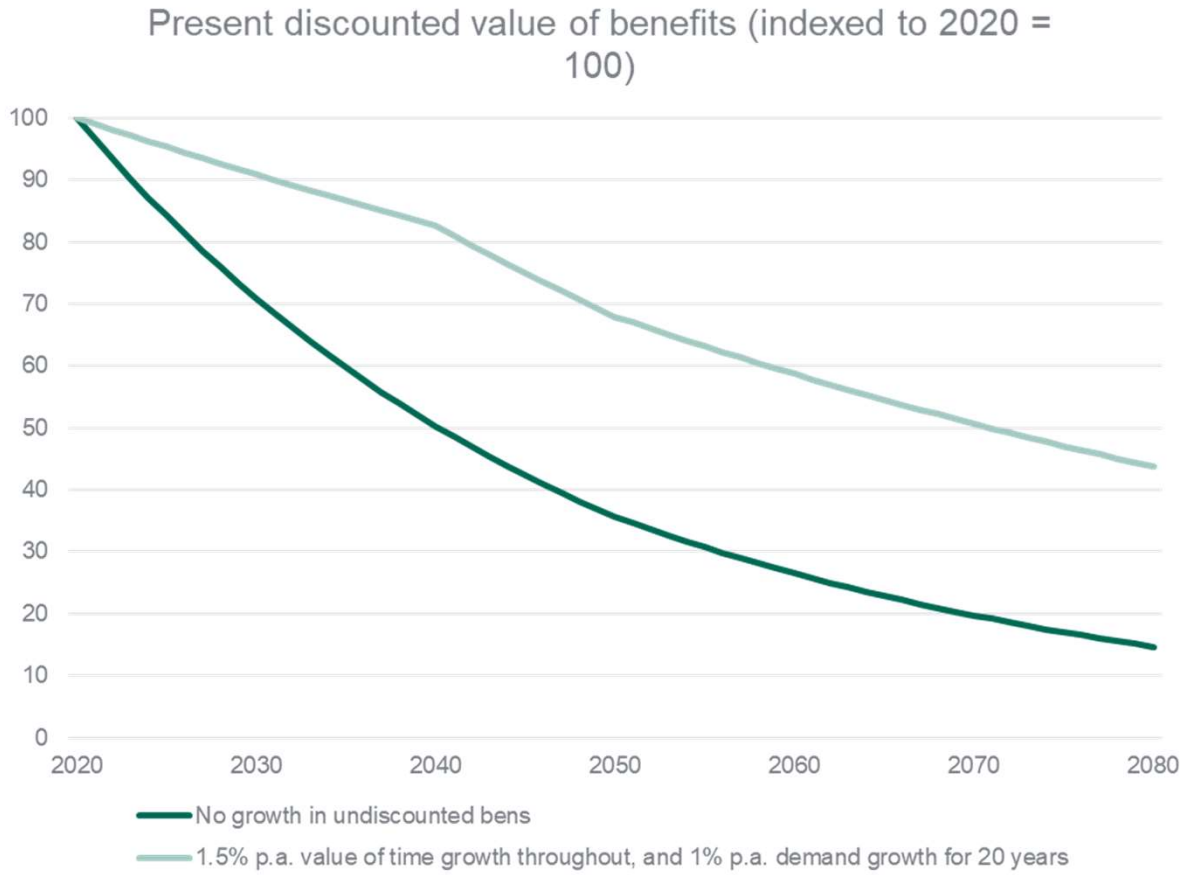
Appraisal Periods

- 60 years is standard appraisal period.
- Some assets, e.g. new rail lines or tunnelling work, have design life of 100 years or more

Project with long term benefits. Share of benefits remaining.



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Appraisal Periods

Possible Approaches

- **Longer appraisal period**
  - Full accounting of social costs and benefits
  - Wide forecast uncertainty.
- **Market based valuations**
  - Consider the market value of the asset to an operator, based on discounted flow analysis
  - Essentially financial value not full social
- **Scrap (residual) value**
  - The ‘scrap’ value of the asset at 60 years i.e. value of selling.
  - Also financial not full social value.

Key analytical challenges

Supply side uncertainty

- Changes to supply of transport services uncertain –include where ‘more than likely’.
- Can we forecast this in 100 years?

Demand side uncertainty

- Technology and behaviour change uncertainty
- Confidence in forecasts of fuel costs, population, GDP
- Technical parameters
  - Model assumptions
  - Values eg. forecast values of time, health impacts How these relate to ‘catastrophic risk’ in the Green Book of 1% p.a.

Other appraisal period related issues

- Relationship between value growth and discount rate.

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Environmental Impacts

Landscape

Greenhouse Gases

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Landscape impacts

- Existing guidance on landscape monetisation based on literature review from 2006, and values from studies carried out between 1984 and 2001.

- Following two recent reviews (Eftec/Temple 2019, Simetrica 2019), considering changes to bring them in line with the latest evidence. These include:
  - Moving from a perpetual to a 100-year appraisal period; with a sensitivity range of 60 and 250-year periods;
  - Moving from a fixed 3.5% discount rate to the Green Book schedule
  - Using an elasticity of 1 for the growth rate of landscape WTP values with respect to real income (for the central values).
  - Accounting for forecast population growth

- More fundamentally, moving towards **landscape-related ecosystem services**, starting with carbon sequestration and air pollutant removal by vegetation.

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Greenhouse gases

- Carbon values published in Green Book supplementary guidance. Cross-departmental review of carbon valuation underway, in light of net zero announcements..
- DfT interim guidance (July 2020) - use central value but analysts required to illustrate the impact of a higher value by using current published high carbon values as a sensitivity test, and note if the overall scheme value is sensitive to the carbon values applied.
- Projects consider embedded carbon and alternative fleet mix assumptions where relevant. DfT is considering this, in part through a review of the available software for calculating carbon impacts.

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Levelling up

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Current appraisal framework can support levelling up, and further work in hand

Raise visibility of analysis relating to levelling up

- Use rebalancing toolkit to support development of evidence-based strategic cases
- Understand local context for investment through collection of relevant data and metrics

Make use of existing flexibilities in guidance

- Highlight to scheme promoters the guidance and appraisal practices which support consideration of local economic impacts, for example:
  - presentation of local/regional impacts alongside national impacts;
  - use of supplementary economic models to support analysis;
  - distributional impacts analysis
- Develop case studies showing how guidance can be applied in practice

Accelerate research focused on filling evidence gaps and developing methodologies

- Historical case studies to understand conditions for transformational change
- Consideration of options for the use of distributional weights in appraisal

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Transport appraisal in the longer term

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Transport appraisal in the longer term

Appraisal here to stay: provides framework for decisions, extension of financial analysis

Modelling improvements can give us:

- Finer grained understanding of broader impacts
- Better understanding of programmatic impacts
- Better ways of handling uncertainty

Better understanding of valuation

- Stated revealed preferences, market values, damage costs
- Better values of utility through wellbeing analysis and distributional weights

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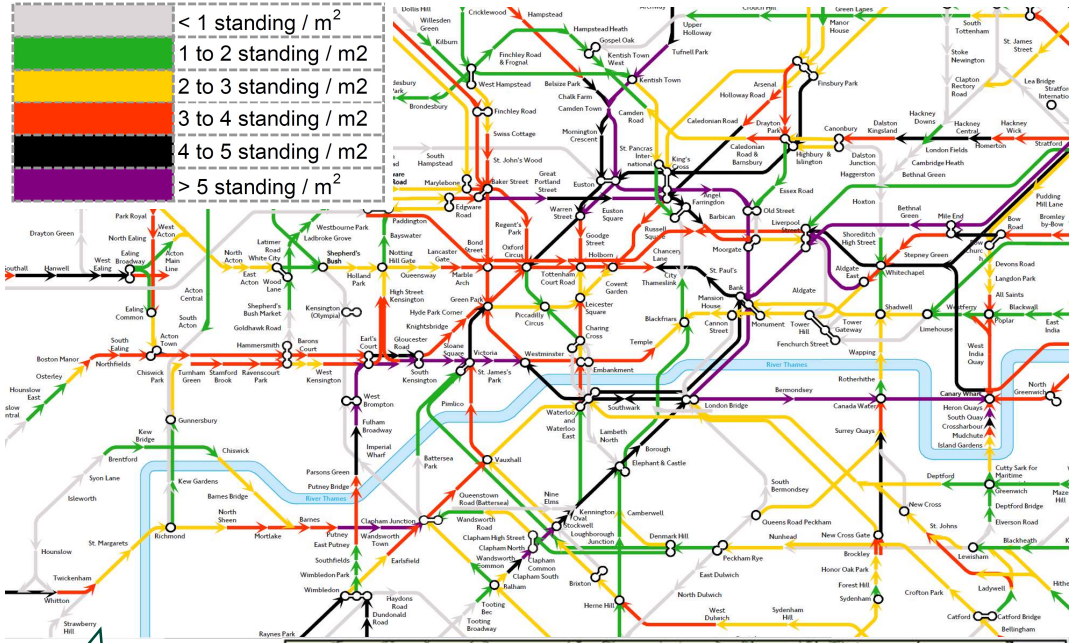
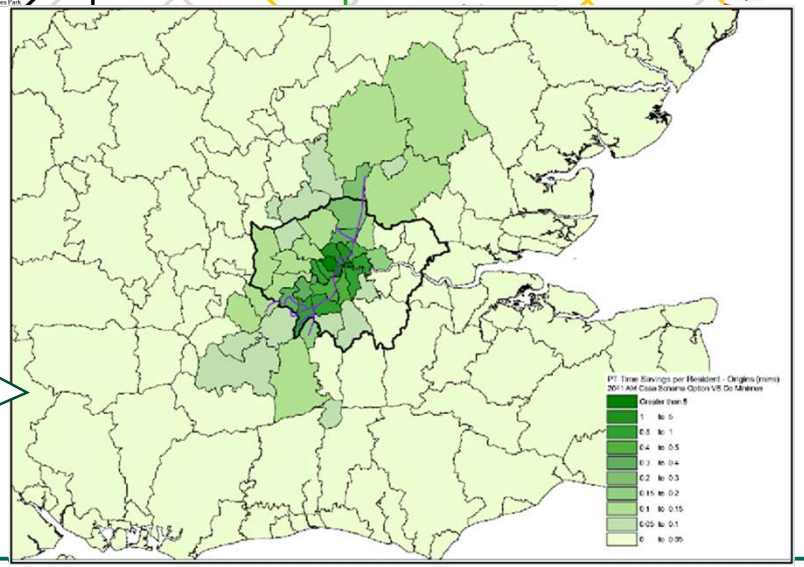
Using data to tell a broader story

Emphasising flexibilities

Ensuring people know what the guidance says!



Tube crowding in 2041, with Crossrail 2



Time saving benefits to Crossrail 2

Using data to tell a broader story

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Ensuring people know what the guidance says!