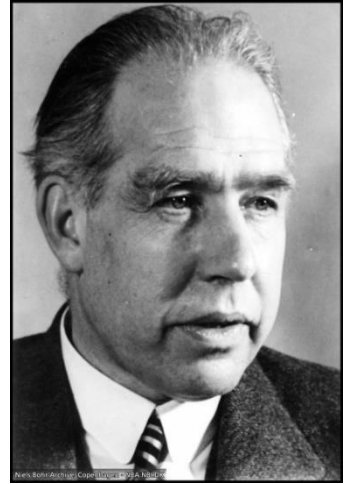

Famous quotes on energy systems modelling

Dr. Chris Dent (Turing Fellow / UoE)

Some famous quotes about energy system modelling

- *All models are wrong, but some are useful* (George Box)
- *Simple models for insight, complex models for quantification* (Ben Hobbs)
- *Prediction is very difficult, especially about the future* (Niels Bohr)
- *Don't be too proud of this technological terror you've constructed* (Darth Vader to Death Star commander, Star Wars Episode IV)



Further famous quotes...

- *Quis custodiet ipsos custodes* (Juvenal)
- *Democracy is the worst form of government apart from all the others* (Winston Churchill)
- *False confidence and true confidence* (Brian Clough)
- *Never flinch, never weary, never despair* (Churchill)



HM Treasury
The Aqua Book:

guidance on producing quality
analysis for government



The Aqua Book

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Box 5.A: The importance and implications of uncertainty – key points

Analysis is used to inform decision-makers about which option to choose, often in unique situations. For each option, a range of real outcomes may occur – the actual outcome is uncertain. Uncertainty will always exist and is inherent in any analysis and real-world decision.

Decision-makers aim to achieve their desired outcome by adopting strategies which increase the chances of better outcomes occurring while decreasing the chances of less favourable outcomes occurring. This requires good information on uncertainty, such as the range of outcomes that may occur together with the likelihoods for each option they can choose. “Best estimates” are not usually enough.

In the proposed responsibilities framework, commissioners should always expect information on uncertainty from analysts, and challenge them when it is absent, inadequate or ambiguous.

Analysts often describe uncertainty in qualitative terms, e.g. moderate uncertainty, high confidence, etc., that do not express the range or likelihood of alternative outcomes. Commissioners should request further information, however project constraints and practicalities may limit what can be achieved.

If the uncertainties are too complex for analysts to quantify, even approximately, the analysts should say so in order that the commissioner can take this into account.

When communicating with decision-makers and stakeholders, commissioners of analysis need to describe the extent to which outcomes are uncertain and the reasons for this.

Concluding thoughts

- ‘How do we do the Aqua Book?’
 - Basic statistical methodology largely exists (?)
 - Applied research
 - Tech transfer
 - Communicating beyond world of modellers
- How can Turing Institute / CESI / MUCM community / Newton Institute / etc help?

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Further reading (referenced by DOIs)

- Wilson, Dent and Goldstein, *Quantifying uncertainty in wholesale electricity price projections using Bayesian emulation of a generation investment model*, [10.1016/j.segan.2017.11.003](https://doi.org/10.1016/j.segan.2017.11.003) (with R code available for exemplar)
- Lawson, Goldstein and Dent, *Bayesian framework for power network planning under uncertainty*, [10.1016/j.segan.2016.05.003](https://doi.org/10.1016/j.segan.2016.05.003)
- Xu, Wilson and Dent, *Calibration and sensitivity analysis of long-term generation investment models using Bayesian emulation*, [10.1016/j.segan.2015.10.007](https://doi.org/10.1016/j.segan.2015.10.007)
- Blog version of this talk: <http://blogs.sps.ed.ac.uk/global-environment-society-academy/2017/05/22/energy-systems-modelling-models-and-the-real-world/>
- Dent, *What is an electricity blackout*, www.dur.ac.uk/dei/resources/briefings/blackouts/
- Managing Uncertainty in Complex Models (project and community), www.mucm.ac.uk
- Centre for Energy Systems Integration, www.cesi.ac.uk, see in particular McKinnon/Grothey (OR), Copeland/Mackerron (policy process), Du/Goldstein/Wilson (UQ)
- <http://www.newton.ac.uk/event/unq>, <http://www.newton.ac.uk/event/mes>
- <https://www.gov.uk/government/publications/the-aqua-book-guidance-on-producing-quality-analysis-for-government>