Models vs Scenarios/Narratives

1. Models offer a consistent framework for analysis and comparison, impose discipline on modellers to articulate assumptions, and are transparent (or at least they should be).
2. However, most static optimisation models, of the kind used in NGFS scenarios, are **not suited to assessing system-wide change.**
   - They rule out 'endogenous' modelling of changes in key structural parameters such as technology use and cost, behavioural change, and evolving consumer preferences: despite these being where much of the interest lies, typically they are all set exogenously.
   - They lack learning curves, network effects, and reinforcing feedbacks that induce innovation and generate destabilising economies of scale.
   - Shocks are often treated as independent and fixed.
   - Data on which models are based on are often inadequate, and econometrically-estimated models perforce look backwards.
3. As a result, models have historically underestimated deployment rates for renewable energy technologies; and similarly they have overestimated their costs.
4. Current model analyses also fail to take seriously **three essential elements of the climate problem**:
   - The **convexity of damages**, whereby climate damages increase disproportionately relative to greenhouse gas concentrations.
   - Climate risk, whereby **low probability outcomes** can be catastrophic.
   - The **endogeneity of growth** (i.e. destroyed assets reduce future productive capacity, creating 'memory' in the system).
2. Climate models also tend to **focus only on chronic physical risks**. Acute climate risks, non-market damages such as loss of life, conflicts, biodiversity, and ecosystem damages are generally not included.
5. **New models** that go beyond present reductionist models will have to:
   - Abandon present proxying of policies through carbon prices.
   - Introduce substitution options.
   - Allow for non-marginal perturbations to a system that is intrinsically dynamic.
   - Introduce dynamic efficiency responses in place of static allocative efficiency.
   - Model disequilibrium rather than equilibrium (pathways to equilibrium are as important as the final equilibrium – which may never be reached).
6. In the face of deep uncertainties, **limitations of the modelling are becoming increasingly apparent.**
7. **Climate change scenarios and their associated narratives** can complement, and serve, various purposes:
   - **Pedagogical**. It being impossible ever to know towards exactly what temperature destination the world is heading, it is useful to consider what the predominant features of different paths might be.
   - **Stress tests.** It is important, both for the investor and the Regulator, to assess what the implications for investment portfolios might be were temperature and climate events more generally to evolve more in accordance with one or other of the scenarios.
   - **Policy**. The policymaking world needs to understand the implications of various possible developments so as to be able to devise appropriate policies for implementation if necessary.
8. Importantly, no *a priori* probability of a narrative is assessed – the emphasis is on **understanding the driving factors involved, and the probability** of those factors having substantial effects.
9. Narrative around scenarios needs in turn to be broadened, to take account of **important intangible, dynamic, system-wide processes** that, once initiated, can feed on themselves to change the path, sometimes dramatically (e.g. learning effects; economies of scale; combinatorial policies, and network and coordination effects; sector spill-overs; social and institutional feedbacks; business and trade union lobbies; consumer tastes, etc).■