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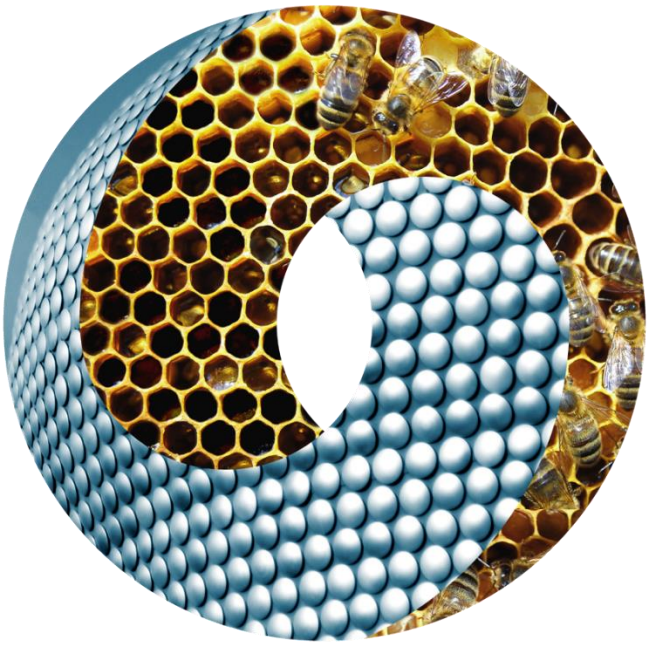
LECTURE N°1
2023 Series



Deloitte Climate & Sustainability Competency Lab

From science to business: providing companies with the knowledge to turn sustainability into action.

LECTURE N°1 | Climate change scenarios: narratives and business implications

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Interview with **Massimo Tavoni**

Massimo Tavoni is full professor of climate change economics at the School of Management of the Politecnico di Milano and director of the European Institute on Economic and the Environment (EIEE).

He received a starting grant from the European Research Council (ERC) in 2014 and has subsequently participated in more than 20 EU-funded research projects, 2 of them as scientific coordinator.

His research concerns climate change mitigation policies. He has been IPCC lead author (Fifth and Sixth Assessment reports) and serves as an advisor on mitigation issues for major international institutions, such as OECD and World Bank.

Q.1

How do climate scenarios work and how reliable are they?

Scenarios are made to depict future climate possibilities, depending on the choices we make and the policies we enact. We use them to **map the future landscape of climate outcomes** and especially to map the responsiveness to the kind of policies, technologies or other inputs we'll be given. In terms of reliability, of course when looking at the far distant future, they should not be taken as projections themselves, but actually as ways of thinking about **possible futures**. For that reason, scenarios are best used as instruments to think **about what could be done under specific circumstances**, assuming that these circumstances will change or will be different. As such, we explore a **vast range of scenarios** instead of a single one, and it's very important that we do so. One of the key objectives of climate scenarios is to explore future uncertainties, thinking about the future in a structured and analytical way, and that is why it's necessary that multiple scenarios are taken into consideration. One single scenario could never factor in all the uncertainties we'd like to explore.

C-TAKEAWAYS

Fast facts for the C-level

- Scenarios are not to be thought as predictions, but representations of future possibilities.
- Refer to as many scenarios as possible. The purposes of analysis are many, just like the uncertainties about the future: scenarios should be as many.
- Models work with a set of inputs that are scenario specific. They then elaborate the variables and generate different outcomes. They serve the purpose of understanding the possible consequences of policy and technological choices; it's up to you to decide what to do, given your business strategy.
- Make sure that you have at least one board member that understands the climate problem and is aware of the latest scientific developments.
- Incorporate climate education, transparency and accountability in your business strategy.

Q.2

What is modeling good for and what should modeling consider that it isn't?

I think the best use of modelling in the end is not projecting, but **thinking about different alternatives** and their implications. Solving the climate problem involves making big decisions and therefore it presents many **tradeoffs**. There are many ways in which we could do it, but however we decide to go about it, it will depend on things that we cannot predict with certainty. So in order to map the responses to different policy shocks or business enterprises or other kinds of strategies, **we should be using *ensembles* of models**. This is because what matters is of course what is inside the "black box" that is the model and what comes out of it, but also the set of assumptions that go in. As shown in the graphic here on the right, when it comes to climate change, key drivers like demographics, economics, technology, policy and so on are vital. But, for example, one variable that is often not included and yet is extremely important is the one related to justice. **The transition to climate neutrality has to be just**: not just efficient, but also equitable. To address that, we need to look at how the different parts of society, including the most disadvantaged ones at a business and household level, will respond. In order to do that, we also need the capacity to represent this diversity and consider the extent of the impact that climate transition will have on them. So ultimately the selection of variables depends on the question you're asking: in other words, **there isn't a model that is fit-for-all**, but only **fit-for-purpose models**.

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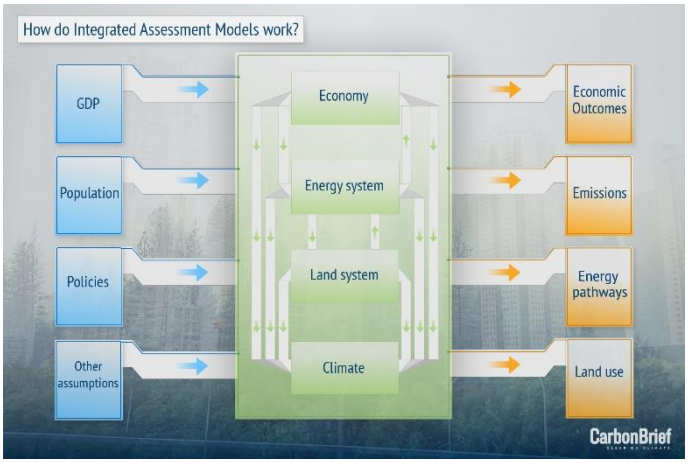


*Source: Carbon Brief, 2018. Reading from left to right, the process starts with model **inputs** (i.e. a long list of assumptions about how the world works and how populations and societies will change). In the centre is the **model** itself, and on the right are **outputs** from the model.*

Q.3

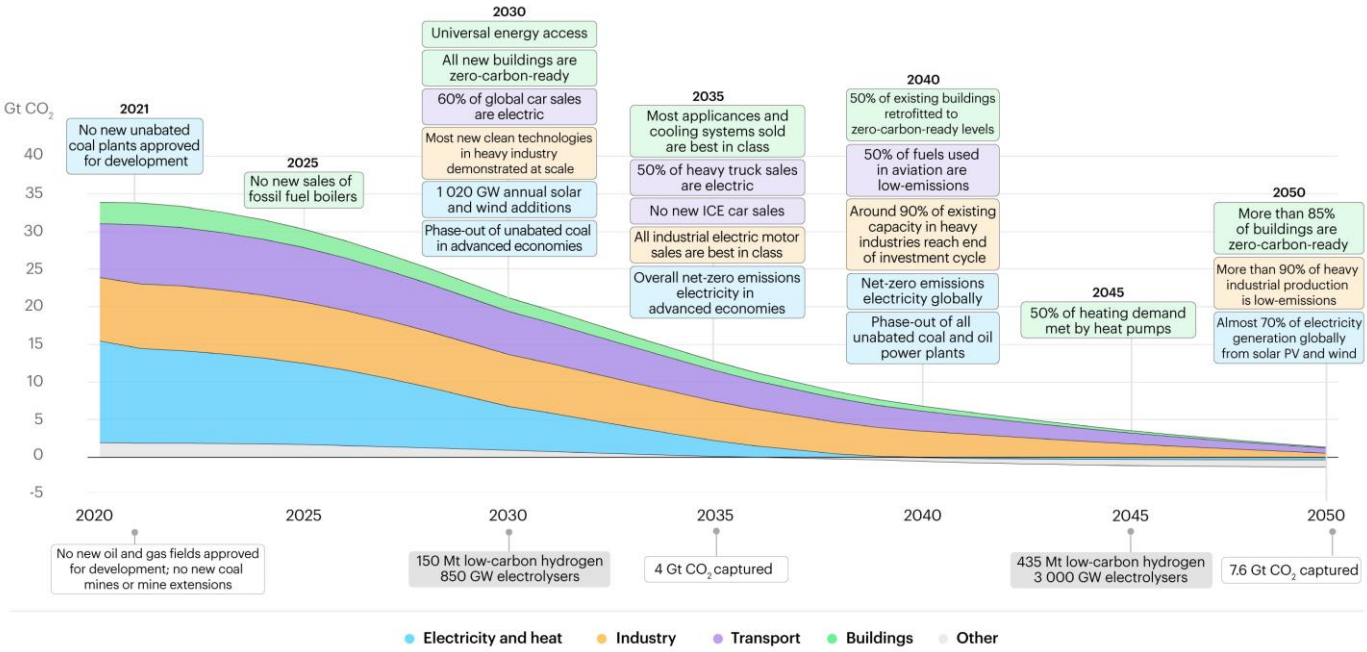
How do socio-political changes affect climate scenarios?

Tremendously. It's the purpose of the scenario exercise, to examine different social and political possibility arrangements, and to see the consequences of those arrangements. So, for example, if we want to tackle climate change we need to legislate important climate policies (think about carbon pricing, for example). Now, that would take the form of a constraint or a tax in a model, and in a scenario we'd be interested in understanding what are the economic and social repercussions; which economic sector will be advantaged, or disadvantaged, if any; what will happen to technology and innovation; what will happen to the social dimension, including issues related to justice, as we just mentioned; what are the institutional and governance requirements for an effective and inclusive transition. So the social and political parts are really key. In a way, **the modelling is an engine and you're fueling it with a variety of different policy arrangements,** while looking at how that engine is working. The idea is to present policy makers or business decision makers with all the different choices they can make and the possible outcomes, and let them choose the one that would work best, given their business strategy and based on analytical thinking through models.

Q.4

What are the most important technological changes we need to prepare for, if we want to achieve the objectives of the Paris agreement?

The technology roadmap is pretty clear. As it comes out of these scenarios, there's been a very strong push towards the **decarbonization of electricity** to begin with, which means renewables especially and other sources when feasible, and of course **reduction in fossil fuel extraction** and the **phase-out of coal** as fast as possible without carbon capture and storage. And that's the first enabling factor that technologically you need to have to get the transition starting. Once you have that, you can also move towards a much different intensity of electricity in end users: think of EVs or electric fueled house heating systems such as heat pumps. Then you can move towards even more difficult sectors, such as the industrial sectors, and address **how to abate energy-intense industries** that require further technological innovation. And then, ultimately, or simultaneously, you have to think about **how to remove CO2 from the atmosphere**. The roadmap I've just laid out has been made very clear in several of the scenarios we and the community have been producing, like the one you see below of the International Energy Agency. It offers a path forward - and a very clear one at that - for decision makers interested in how to best achieve transition from a technological point of view.



Source: "Net Zero by 2050", IEA, 2021. Selected global milestones for policies, infrastructure and technology deployment in the NZE (Net Zero Emissions scenario).

Q.5

Why is it important that this topic enters the corporate narrative and what benefits can companies get out of it?

The issue is that climate is such a complex problem that you need some analytical thinking and some boundaries to guide companies. Clearly each company is different, and it will have very specific decisions to make. Some decisions are common because are driven by what is really needed, e.g. achieve climate neutrality by mid-century, which doesn't have to happen in every sector and for every company, but generally speaking it has to be achieved. And models are very useful in telling you **how to get there**, for example at a technological level as we just saw in the roadmap above. But they're also good at telling you which sectors should be transformed and to what extent. The biggest benefit that companies can get out of modelling is **take their output, translate it and tailor it to their specific needs**, which are going to be very different from one another. Nonetheless, the major transition and pathways can be very well described and informed by models that are relatively complex. Not doing so would result in an uncoordinated effort between companies that wouldn't bring the emission reductions that are needed to stabilize the climate.

Source: Implementing the Recommendations of the TCFD, 2017. The Task Force's recommendations are structured around four thematic areas that are core elements of how organizations operate—governance, strategy, risk management, and metrics and targets

Q.6

What is the role companies need to play and what advice would you give to the C-level?

Again, the road is pretty clear on what companies should do. The transition to neutrality is set, so we already know the answers to questions like how to do it, when to do it and through which arrangements. Of course it's up to the companies to decide depending on their objectives, but the goal is set very clearly. What can management do to make it work? There are many ways. Obviously **education programs** starting from the bottom and information training. I think **awareness** is actually very important. It might be that ultimately what really matters is the **governance** level, where the actual decisions are being made. So we need to have people in the **boards,** at least one or two, that have a view of the management and economics but also understand the problem of climate change and the science. **Not just the physical science, but the economic and technological sciences as well**. A strong board of course is going to push the management towards the right direction. **Transparency** and **accountability** will surely help and ultimately management itself should be structured in a way that includes that as a key goal, as suggested by the Task Force on Climate-related Financial Disclosures, whose core elements you see in the graph on the left. Often these issues are relegated to decision-making levels that are not high or strategic, and I think that **requires a big U-turn** and **rethinking of management governance within companies**. We need people who understand the problems and are updated with the latest science developments, who can therefore facilitate induction processes to the board and help them act accordingly.

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