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The Politics of a Circular and Carbon-Neutral Economy: The Challenge of Going Beyond Science-Industry-Driven Framings

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Before I start I would like to thank prof dr Weckhuyzen for the invitation and the opportunity to address you. I am a social scientist, so I'm not at all specialised in chemistry, chemical engineering or related fields. But over the last few years, I have been cooperating with people in engineering and in natural sciences in common research projects.

That's also how I came to know prof Weckhuyzen, because we were both involved in a European project, [Energy-X](#) (which is currently further developed as [Sunergy](#)), that aimed at developing breakthrough technologies for replacing fossil fuels in the European energy system and in the chemical industry: technologies for carbon capture and utilisation, production of green hydrogen, production of base chemicals or synthetic fuels.

When as a social scientist you are involved in such projects, and when you follow the ongoing discussions in the EU about the future directions for a carbon-neutral and circular economy, you cannot help but notice that most of it is framed in terms that fit strongly in the agendas of industry and of technologically-driven research. With the term "framing", I refer to how problems are defined, what are deemed to be suitable or acceptable solutions, which actors should take the lead, who is responsible for the problems or for initiating solutions, who should pay and who can reap the benefits, who has a voice in decisions about all of that.

So, as I said, my claim here is that much of that is currently formulated in such a way that to a large extent it echoes the agendas of industry and of technologically-oriented research. To be quite clear, I do not doubt of course that industry has an important role to play in the transition we are facing, and that we should be attentive to concerns that live there, nor do I doubt that technological innovation will be crucial. But that can never be the whole story in the immense changes we are going to witness in the next decades.

I will use the 10 minutes that I have to clarify that in two steps. First, I will very, very briefly say something about the dominant framing of the carbon-neutral, circular economy transition. And second, I will highlight some concerns that are surfacing in current social science research about this transition.

So, what is the dominant framing?

In general, you see a combination of typical arguments. One is simply that technological innovation will be the main element in a transition. Technological breakthroughs will ensure that carbon and material cycles are closed, and that we reduce emissions. Another argument is that the suited actors for realising that are on the one hand scientists for the invention of these technologies, and on the other hand industry for the implementation. The state has to provide substantial funding for these actors, has to create suited regulatory conditions, work preferably through voluntary agreements and no taxation, as well as invest in infrastructures. All of this will boost the competitiveness of industry, realise economic growth, while at the same time reducing environmental impact and creating jobs. And in the end, everybody will live happily ever after.

Except for that last sentence, I'm quite convinced that these storylines capture the essence of the current discourse about the low-carbon and circular transition.

Now, is there a problem with that? I will briefly highlight four points, **four concerns that over the last couple of years have been raised in social science research about this transition.**

One. It is a systems challenge. Developing a carbon-neutral and circular economy obviously goes beyond technology. Some of the key questions are social and political: how to alter institutions, how to change norms and attitudes, how to change business models, how to do all of this in an equitable, just way, ... **The questions we are facing are as much political, social and ethical as they are technological** (Kovacic, Strand and Völker, 2019; Calisto Friant, Vermeulen and Salomone, 2020). A carbon-neutral, circular transition will deeply influence the future social order. And it is important to realise that which technology we develop is not a neutral question. If we invest for example in large scale development of hydrogen or if, alternatively, we invest in energy demand reduction and renewables, these different choices lead us to different futures, with e.g. different distributional effects and different winners and losers.

This brings me to a **second point. Who bears the costs and who reaps the benefits?** This is sometimes translated as a "just" transition, which is essentially interpreted as a transition in which job creation and job security are central. However, there is much more to it than that. During the last years, we have seen that even small changes in the energy system, such as promoting solar panels on houses, have distributional effects, where some groups in society profit more than others. So, we should ask how costs will be distributed when investments are expected to go into billions of euros? How will vulnerable groups of society be protected? Is the state – so society – going to pay for the investments, and is the private sector going to reap the benefits? That is typical of the current model in innovation policy. But very recently we are seeing the start of exercises to rethink innovation policy, where the risks as well as the rewards of innovation are *shared* between public and private actors (Laplaine and Mazzucato, 2020).

This question of distribution is also relevant on a **global scale**. The effects of the exploitation of fossil fuels have caused enormous international tensions and conflicts over the years; it has been detrimental to the environment and the living conditions of whole populations. We

should thus think twice before proposing to simply duplicate this system with e.g. production of hydrogen in Africa or South-America. Geopolitical implications of renewable energy and hydrogen will also include new energy trade patterns and new relations and alliances between countries (Van de Graaf *et al.*, 2020).

Let's move to a **third** concern. **Who has a voice in this transition?** Given the huge consequences and the stakes of the transition we are facing, **we are in need of a broad societal debate, not one monopolised by voices of science and industry.** I have actively followed the climate debate since 1993, and industry has not exactly been a frontrunner in this period. Things can change of course, and will even have to if we want to have a chance at realising a circular, low carbon transition by 2050. But this will only happen when the interests of industry can be discussed and weighted against other, potentially conflicting, policy objectives. So, we need to bring in the institutions of democracy: the formal ones, so that policies can be decided transparently and can be legitimised; but also more informal forms where civil society is involved e.g. in the development of infrastructures and investments.

If I look at **science** for a moment: given the complex and wide-ranging nature of the challenges, we need to **include more disciplines** than engineering and natural scientists in searching for answers (so: social sciences, humanities). And we need to start working in transdisciplinary settings, with the **inclusion of non-academic actors from civil society.** To think together about the direction of the research (relevant research questions) and the process of the research (Jasanoff, 2018).

I go to my **fourth** point. In social science research, questions have also been raised about the **underlying assumptions and mechanisms that drive current developments.** To the best of my knowledge, in virtually all scenarios a further growth in energy and resource production and consumption is taken for granted. This will, without any doubt, render emission reductions or closing of carbon and resource cycles more difficult. Technological scenarios tend to rely on technological breakthroughs to deal with such questions, e.g. breakthroughs in catalysis, in reactor technology, in direct air capture. Technology should then be able to realise decoupling from growth. But what if these technologies don't deliver what we expect from them? We run the risk of carbon lock-in, with high investment costs and stranded assets in e.g. CCS or CCU. So, we should also **dare to think what is in some circles the unthinkable:** scenarios that *reduce* energy demand and production, and that *reduce* resource demand and production on a macro scale. The objective of realising a low carbon, circular economy will in the following years undoubtedly confront us with the question in **how far that is (not) compatible with a growth economy** (Hickel and Kallis, 2020).

So, what to conclude from all that? Let me reiterate what I said early on: of course technological innovation is important for a carbon-neutral and circular economy, and of course industry will have a key role. But is an illusion to think that the transition can only be delivered in the nexus science-industry. The questions we are facing are as much political, social and ethical as they are technological. This requires a broadening of knowledge inputs and of involved stakeholders, and a democratisation of the debate about the desired directions and strategies.

Thank you very much for your attention.

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