Climate change and energy transition

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Chapter 1

A central component to climate change is carbon dioxide, which is highly related to our energy use. Transitioning to a climate friendly global lifestyle, we must keep in mind the wish to keep our energy budget stable. Energy availability is tightly correlated with both economic growth and Human Development Index, neither of which are generally desired to reduce.

When discussing climate problems, there is an intrinsic need for an interdisciplinary approach. There are for instance questions raised by science concerning whether we have entered a new geological epoch, how we might get to a stable and sustainable system regarding climate, and how we might bring justice to those who greatly damage the climate. However, each of these questions have normative-, psychological-, and sociological- dimensions.

1.1 The Anthropocene

The concept of the Anthropocene, the age of man, wherein humans have the greatest control over the earth, is highly present in the climate change debate. While the question: "Have we entered the Anthropocene?" is a matter of natural science, the attitude towards it is a philosophical matter.

There are those who fully embrace the Anthropocene, and wish therefore to take responsibility for the maintenance of the earth.

This approach stands in great contrast one wherein the Anthropocene is despised, but seen nevertheless as inevitable. This approach typically does not lead to taking responsibility.

Belatedly, but more responsible, are those who wish to limit the Anthropocene, mitigating and reducing the negative impact humans have.

There are also other terms proposed against the term "Anthropocene", for

instance Homogenocene or Eromocene. Respectively, the age of homogenisation and the age of loneliness (both referring to biodiversity loss).

1.2 Sustainability

Sustainable development is defined by the WCED as development that meets the needs of the present without comprising the ability of future generations to meet their own needs. This definition limits itself greatly to human ability, and does not properly define the needs current-, and future- generations have.

The assumption is that this "sustainability" is indeed possible, partly because the ethical and political implications of not meeting the needs to the present are too-repugnant to consider. This belief is not based in empirical evidence, but rather a matter of necessary hope.

Chapter 2

Values and Climate Models

There is a certain level of uncertainty regarding climate change. There are various details for which conflicting evidence exists. We do know however that we are not altogether wrong about anthropocentric climate change. Climate sceptics almost never pass even the lowest bar for counting as scientific, but then again, so do many historically-fringe opinions which we now count as fact.

While we know that climate change is largely-, if not primarily- caused by the emission of greenhouse gasses. The extent to which each affects the global rise in temperature, is not entirely known. Much like, local effects as opposed to global ones, various chemical reactions, threshold-theories, and various other facts.

One may claim that we are to simply adhere to those facts that are exposed to us through use of the scientific method. However, there are various scientific methods, whose exact parameters are not rigid. Among scientific models there are inductive-, deductive-, and abductive- ones, each with their own threshold for "truth".

2.1 Models

A large part of the scientific study of climate change is climate modeling. The aim of a model is to simplify a given environment (called "the target system") to predict the impact of various changes to said environment. Climate models in particular often combine various models, such as atmospheric-, tectonic-, and glacial- models, and various complex interactions between them.

We use our models to predict outcomes and inform action, though, due to the fact that models are – by definition – simplified, the modeled outcome rarely *entirely* conforms to reality.

An "ensemble model" is a model which combines the average output of various models which are calibrated for slightly different purposes. With an ensemble model, we can project how uncertain we are about a given outcome by analysing the divergence of each model to the ensemble model. Using an ensemble model however relies on certain assumptions, such as all models being equally good in measuring, and that each of them are scattered around the "true" value.

While there are good reasons not to use ensemble models (such a rejecting one of the assumptions made for using such models), they do show an important matter of philosophy of science, that being that no hypothesis is every entirely certain. Meaning that scientists, in accepting theories, make certain value judgements which lie outside the realm of hard-science.

There is for instance the matter of tolerating false negatives and false positives. In the case of the climate discussion, false negatives are often extremely catastrophic, whereas false positives are a matter of wasted funds. This might lead one to tolerate false positives but not false negatives (or rather a probability of a given negative being false), but this is a value judgement which ought to be made by a greater community than merely the scientific one.

Such a case is argued by Jeffrey, who states that scientists should only express their expert judgement, not their descriptive claims. Who then is left to make descriptive claims? This question is not answered to Jeffrey, though a compelling case can be made to not merely leave this up to the public, nor to a group working entirely separately from the scientists publishing the probabilistic facts.

Winsberg argues against Jeffrey and states that scientists can make value judgements *if* they are transparent about their values. To what extent we *can* be transparent though is not entirely clear. The value-leadenness of a model lies in the details, not all of which are obvious to the scientists themselves, let alone the public,