

## Toward a new ethics for energy modelling

"Visions before models: The ethos of energy modelling in an era of transition" is an article written by Sgouridis *et al.* published in June 2022 in the review *Energy Research & Social Science* *Reyes*. Building on recent works in economics, social and environmental science and on real-life examples, the author explains why it is necessary to first articulate a vision of the desired environmental model, and then tackle economic modelling specifics. The article underlines the limits of the current dominant energy models, described as too technocratic, and insists on the benefit of putting democracy at the heart of the environmental transition. Three key points in it have caught the attention of "La Fabrique Écologique":

**#1** For the author, energy systems and their transitions should be analysed from three point of views: technical, social and political. The Energy-Environment-Economy models (ThreeME/E3), which are crucial for assessing energy policies, are examples of this kind of modelling. They assess technological advances and infrastructures of energy systems, so as to forecast the evolutions of the energy price, notably taking into account climate change impact. To do that they rely on a series of equations based themselves on several hypothesis and a solving process in order to describe a real system, as well as its evolution. All in all, these highly complex physical, social, economic and technical models are trying to describe the cause-and-effect links between climate and human activity. The aim is to design climate-energy scenarios in order to provide insights on their choices to political decisions-makers.

**#2** The energy sector includes different fields (technology, biophysics, economics). Because of this complexity, it is hard to apprehend it exhaustively. Therefore, the axioms upon which the energy models are built are the result of compromises, of a selection, and this is why these models are always somehow partial. The author explains that modelling tools would tend to both underestimate the adoption rate of renewable energies, and overestimate the technological advances. The resulting scenarios are thus inherently biased, notably because technological advances depend on the evolution of social behaviour – a very hard parameter to predict. These models would thereby maintain dependence on fossil energies, slowing down the implementation of radical measures (such as a 100 % renewable target).

**#3** To tackle this issue, the author recommends to adopt a socio-economic and political perspective for modelling, a perspective that acknowledges the influence of social values on the energy transition. Here, vision should precede modelling: inviting first all stakeholders (citizens and NGOs) to formulate together a technological policy for the energy sector; and then, and only then, the modelling experts provide the information which are necessary to identify the steps toward the desired transition. Experts could thus enlighten the actions of political decision-makers, but starting from a vision that has been agreed upon before. This approach is illustrated/exemplified in part by the MEDEAS (2020) European model: in open access, and taking into account socio-economic parameters, it comes with free online courses to train all stakeholders so that they are able to give their opinion throughout the whole modelling process. The model adapts itself to the visions of the decision-makers, thus broadening the debate on the challenges of the energy transition instead of prescribing specific policies.

### France and techno-economic modelling

The OFCE and ADEME currently use a techno-economic Energy-Environment-Economy model to assess the consequences of energy and environmental policies (such as a carbon tax, for instance). Models with more social and economic parameters are used more and more, notably Integrated Assessment Models, or IAMs: like in the « TRANSITION(S) 2050, choosing now, acting for climate » prospective report from the ADEME, which gathered many scientists and representatives of stakeholders to build four "paths", coherent and distinct, based on socio-political choices. However, the 31 citizens panel was involved only afterwards, to contribute to complementary documents focused on ways of life.

### Pauline Bureau's opinion, vice-chair at LFE

*The article underlines the intrinsic difficulties linked to the anticipation of social parameters in the field of energy modelling. Instead of trying to predict these parameters, why not try to further explore ways to better include citizen participation in the co-construction of modelling scenarios ?*