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New Approach to the Analysis of the Unresolved Controversy over Nuclear Power

A research team from ICTA-UAB has developed a new approach to study controversies over technology governance, applied to the case of nuclear power, which has been one of the most controversial and, at the same time, largely deployed man-made technology over the past 60 years. According to the researchers, the controversy over nuclear power can be understood as a series of mismatches between expectations and experience. These mismatches are the result of the challenge of dealing with the high levels of uncertainty inherent to this technology.

A research team from the Institute of Environmental Science and Technology (ICTA) of the UAB has developed a new approach to study controversies over the governance of technologies. They applied their approach to the case of nuclear power which has been one of the most controversial and, at the same time, largely deployed man-made technology over the past 60 years.

The paper, published in Global Environmental Change, a high-impact scientific journal,

investigates why nuclear energy is still deployed in spite of the negative feedbacks and experiences. The researchers, members of the Research Group in Integrated Assessment: Sociology, Technology and the Environment (IASTE) of ICTA-UAB, argue that one possible explanation for this controversy is that the scientific information and models used for the governance of this technology seem to be irresponsive to the systemic problems and accidents that arise from experience.

The study was carried out by a multi-disciplinary team formed of a former engineer of the nuclear industry in France and the U.S. now working as a Post-Doctoral Researcher on the energy supply issues and a development economist working as a Doctoral Researcher on the role of science for governance and epistemology.

In their study, the team focused on the case of the United States, which was the first country to deploy nuclear power commercially. They first identified the main actors and hegemonic narratives used over time. Then they revisited the history of nuclear power in the US through the lens of complexity theory. Complexity theory makes it possible to distinguish between the meaning and the realization of a system – in this case, the nuclear energy system. Meaning refers to the expectations associated with a technology, and is expressed by the narrative. Narratives are therefore a way to assign causality to the observed system. The realization refers to the experience, how the system is established, how nuclear power plants are built, how designs and regulations change over time.

According to the researchers, the controversy over nuclear power can be understood as a series of mismatches between expectations and experience. These mismatches are the result of the challenge of dealing with high levels of uncertainty, a situation in which the limits of scientific information to guide and inform governance become evident. The challenge of the scientific information used for governance in the case of nuclear power resides in the fact that decisions have to be made under high levels of uncertainty and have to deal with a plurality of non-equivalent perceptions of this technology.

Figure 1: Dominant narrative analysis of nuclear power in the U.S.

Because of the irreducible uncertainties and of the plurality of meanings and purposes given to nuclear power, the researchers insist that it is important to analyze how the descriptive and normative aspects interact and shape the debates and controversies over nuclear power. The analysis of narratives responds to this issue by making it possible to define the problems both from the normative and descriptive sides. In their view, the approach proposed is especially useful to identify the governance challenges under uncertainty and claim that it could also be useful to study other controversies.

The researchers conclude by recalling that the issues of energy-supply and energy security require a critical appraisal of the potential of alternative energy sources to power modern societies. However, since any model or quantitative information depends on an (arbitrary) pre-analytical choice of narrative about what is desirable, they urge scientists and decision-makers to give more attention to the quality of the narratives used in policy making.

The Research Group in Integrated Assessment: Sociology, Technology and the Environment (IASTE) is hosted by the Institute of Environmental Science and Technology (ICTA) of the UAB and supported by the SGR program of the Catalan Government. The IASTE research group delivers scientific output strongly needed for dealing with sustainability issues: an alternative narrative and quantitative representation of the interaction socio-economic systems/nature.

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References

Diaz-Maurin, F.; Kovacic, Z. The unresolved controversy over nuclear power: A new approach from complexity theory. *Global Environmental Change*. 2015, vol. 31, p. 207–216. doi: 10.1016/j.gloenvcha.2015.01.014.

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