Governing Low-Carbon Innovation – the Importance of Public Perceptions

China has set out an agenda for social and technological change that represents a significant transition towards low-carbon development. At the same time, several of the innovations that could potentially contribute to this transition are viewed with scepticism by some sections of society. This brief focusses on **the importance of public perceptions in the governance of low-carbon innovation**, and puts forward recommendations for how they can be addressed.

Public perceptions of different technological innovations have been studied for several decades in Western contexts. The associated literature stresses the importance of social trust, and suggests that government can improve innovation governance by:

- **investing in research to better understand public attitudes to new technologies, including the institutional contexts in which they are being introduced;**
- **proactively engaging publics in decision-making through increased transparency, consultations and partnership.**

These approaches have in many cases helped to reduce social conflict and lead to more politically robust decisions, but have not necessarily enabled the rapid uptake of controversial technologies.

The context in China is different and demands appropriate responses. Recent studies from Tsinghua University and the ESRC project 'Low-Carbon Innovation in China: Prospects, Politics and Practice' offer potentially useful insights. Both have studied technologies that claim to contribute to low-carbon development, but which are characterised by polarised debate and some social opposition.

Nuclear Power

Nuclear power will be an important low-carbon energy source under China's 13th Five Year Plan, with a target of 58GW installed capacity by the end of 2020, requiring 6-8 new nuclear stations being built each year. The 40GW target for installed nuclear capacity by the end of 2015, however, was narrowly missed. Public resistance through group petitions or public unrest have increased, and the Chinese government has cancelled or postponed several potential sites. Public perceptions and responses may therefore have an important impact on the future energy structure of the country. **New insights point towards the reasons behind this opposition and the importance of participation, transparency and trust in balancing nuclear energy demand and public perceptions.**

Recent Chinese literature mainly focuses on collecting data on public perception towards nuclear energy, rather than understanding the reasons behind objections to nuclear energy in China. Some supported a positive relationship between levels of knowledge (often self-reported and possibly unreliable) and positive perceptions, while others found that lower levels of knowledge might not lead to low acceptance.

Recent research from Tsinghua School of Public Policy and Management/ China Institute of Science and Technology Policy focused on two key questions: 1) Do the public care about nuclear projects, even if they don't live nearby? 2) Are there factors that influence nuclear public perception, other than knowledge? If so, how do these factors, especially public trust towards local government, influence perception formation?

This research used 1,700 face-to-face questionnaires with Beijing and Hangzhou residents to measure perceptions (positive/ negative) based on the question "if your city is going to build a nuclear power station, do you agree with this?" It investigated the relationship with levels of knowledge of nuclear power and personal information such as gender, age and education level. Higher levels of knowledge were found in most cases to correlate with positive perceptions. No personal characteristics were found to have any statistical correlation.

Secondly, the study measured two aspects of social trust. The first measurement asked to what degree citizens trust the authorities to deal with all possible risks associated with nuclear energy, and did not show any statistical correlation with positive perceptions towards nuclear power. The other measurement reflects the extent to which citizens believe they can influence the policy process and implementation in order to manage possible risks associated with the technology. This shows a significant correlation with more positive nuclear perceptions. In other words, **if the general public believe they have more impact over policymaking process, it is more likely that they would form a positive attitude towards nuclear technology.**

The Chinese government is using educational policy as its main policy instrument to raise positive public perceptions towards nuclear technology near planned sites, but this study indicates that this is only half of the possible response. Improving mechanisms for citizen participation is also essential to increase positive perceptions. **Setting up formal and effective public participation channels and increasing transparency are all methods to increase citizen's capacity to influence the policy process.** This has equal importance to enhancing knowledge through education.

Genetically modified food and crops

China's government sees agri-food biotechnologies as central to its goal of sustainable food security. Some studies indicate CO_2 emissions reductions due to genetically-modified crops, and Chinese innovations such as phytase maize have been referred to in media reports as 'environmentally-friendly'. The introduction of genetically modified food and crops to China has proceeded slowly against a background of public concern, despite government attempts to enhance public acceptance. New research from the project 'Low-Carbon Innovation in China: Prospects, Politics and Practice' used documentary and media analysis, semi-structured interviews and focus groups with experts, consumers and practitioners to understand the reasons behind support or resistance to genetically modified food and to explore the lessons for innovation governance.

By comparing perceptions of those with or without technical knowledge of genetic modification, the study suggested that, unlike the case of nuclear power, **understanding of GM technology does not enhance trust in its safety**, especially when there are clear difficulties in regulating GM seeds and supply chains. **Lack of public trust in regulatory systems around food and agriculture was found to link closely to suspicion of GM food, suggesting that building this trust should be a long-term government objective.** Perceptions of GM food by more informed publics or practitioners often linked to broader debates around China's changing agricultural systems, the relationship between urban and rural populations, intellectual property and foreign influences on China's food supply.

Reiterating the recommendations of earlier work, the research suggests that a focus on educating the public is unlikely to allay public concerns over GM food. Instead, a focus on participation, transparency and accountability could provide a stronger basis for building public trust. The experience of the 'GM Nation' public debate in the United Kingdom in 2003 provides a model for this kind of approach and offers lessons for innovation governance elsewhere.

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