

# The Social Science of Sustainability

JOHANNES URPELAINEN

## Abstract

The sustainability of socioeconomic systems is widely recognized as a key global challenge, and a social science of sustainable societies is now emerging. Social scientists have made commendable progress in quantifying the cost-effectiveness of different environmental policy instruments, explaining their diffusion across nations, and documenting the phenomenon of historical and ongoing sustainability transitions. However, social scientists should pay much more attention to the political economy of environmental policy formulation, the challenge of building coalitions that support more ambitious policies to promote sustainability, and the development of analytical models and testable hypotheses about sustainability transitions. Owing to the inherently problem-oriented nature of sustainability, the social science of sustainability must be strongly interdisciplinary, both among social sciences and with respect to the natural sciences. For the social science of sustainability to survive and thrive over time, academic researchers must both maintain the highest analytical standards and focus on research questions and answers that contribute to the solution of problems that practitioners face.

## INTRODUCTION

In spite of remarkable technological progress, our societies have not achieved a steady state of environmental sustainability. From the loss of biodiversity to climate change and the pending collapse of oceanic fisheries, humans are rapidly corroding the natural capital, which supports our well-being. In response to these developments, both natural and social scientists have sounded alarm and called for increased efforts to develop innovative approaches to promote the development of more sustainability societies (Rockström *et al.*, 2009). This essay briefly reviews the state-of-the-art, proposes a select set of central research questions for the future, and makes the case for more interdisciplinary, problem-oriented research.

Today, three fields of research stand out in regard to contributions to the study of the social science of sustainability. First, environmental economists have made major strides in evaluating the cost-effectiveness of different

types of policies. Second, the spread and diffusion of policies across countries is now understood much better than before. Finally, the emerging science of sustainability transitions—transformative positive changes in the way societies and economies use resources, mitigate pollution, and manage waste—has, in a short period of time, become one of the most dynamic fields of environmental policy.

Many open questions remain, however, as the social science of sustainability remains nascent and rudimentary. While scholarship on the logic of sustainability transitions has made significant progress, analytical modeling and systematic hypothesis testing still lag behind a growing body of individual, often descriptive, case studies. The political–economic approach to understanding the formulation of environmental and energy policies has become an increasingly sophisticated and rigorous field of inquiry, but this research agenda has yet to generate practical guidelines for how policymakers and activists should evaluate the political feasibility of different types of policy instruments without losing sight of their economic efficiency and environmental effectiveness. Little is known about the effectiveness of various strategies of mobilizing the public and politically influential constituencies to support better, more effective environmental policy. New research on these issues is important for the social science of sustainability to thrive.

To answer these questions in such a manner that contributes to progress toward increased sustainability, social scientists must strive to forge more interdisciplinary collaborations and accept the need for problem-oriented research. In the end, sustainable development is a quest for the creation of social institutions that allow all living beings to lead fulfilling lives without undermining the natural life-support systems that underpin our livelihoods. The emerging social science of sustainability must draw on scientific knowledge about the natural world and ecosystems, while generating a new body of knowledge that helps decision-makers identify threats to sustainability and respond effectively to them.

## RECENT ADVANCES IN THE STUDY OF SUSTAINABILITY

Since a short review of this kind cannot do justice to all the excellent research that scholars have conducted and published, I focus here on three areas that have made significant progress and are relevant to the core challenges of making our societies more sustainable. First, there is a lot of new evidence concerning the effectiveness of different types of environmental policies and regulations. Second, the process whereby environmental policies spread and diffuse across countries is now understood better than before. Finally, an emerging line of inquiry is looking at the challenge of societal transitions to sustainability.

By adopting quasi-experimental techniques, environmental economists have in recent years made major progress in quantifying the benefits and costs of different types of environmental regulations (Greenstone & Gayer, 2009). Advances in econometric techniques of causal inference have allowed scholars to draw more reliable inferences about the cost–benefit ratio of different types of policy instruments. In the United States, economic analysis shows that the use of emissions trading allowed a dramatic decrease in the cost of mitigating sulfur dioxide emissions (Stavins, 1998), with significant implications for cost-effective climate mitigation strategies (Fischer & Newell, 2008). Other studies have shown that traditional command-and-control regulations tend to be expensive, conforming to the predictions of standard economic theory (Greenstone, 2002; Ryan, 2012). Together, these studies are important because they provide compelling empirical evidence for the significance of the choice of a policy instrument in environmental protection.

While the above studies focus on the economic consequences of environmental policy, even more pressing is the need to understand how governments actually select their policies. One of the most important observations of the past decade is the importance of learning and diffusion effects. Almost two decades ago, Vogel (1995) proposed that environmental policies often spread across national borders through trade channels, as key import markets create environmental policies that other countries then mimic. Since then, the evidence for this hypothesis has grown rapidly. Saikawa (2013) showed that trade channels are critical to understanding the rapid spread of automobile emission standards, while Aklin and Urpelainen (2014) report that democratizing states tend to establish national environmental ministries under external pressure. Holzinger, Knill, and Sommerer (2008) documented the spread of environmental policies among 23 industrialized countries during the 1970–2000 period. Overall, these and many other studies suggest that learning, diffusion, and peer effects play an important role in the formulation of environmental policy. New information and reputational incentives push governments to enact new policies and create new institutions. These results are important because they illuminate the limits and possibilities of new policy innovations in an economically and culturally interdependent world.

The third field of inquiry that has grown rapidly, with excellent results, is the study of sustainability transitions. According to Aklin and Urpelainen (2013, p. 644), for example, sustainable energy transitions can be defined as “the extensive deployment of clean energy, such as wind and solar power, to reduce the environmental burden of the national economy.” While engineers and energy economists have described historical energy transitions from biomass to fossil fuels (Smil, 2010), the social dimension of

today's energy transitions remained understudied for a long period of time (Smith, Stirling, & Berkhout, 2005). Verbong and Geels (2007) noted that understanding societal transitions to a more sustainable system requires the adoption of a multi-level perspective that accounts for technological innovations, institutional structures, and structural factors. The study of such transitions has produced a rich variety of case studies, ranging from the Dutch electricity system (Verbong & Geels, 2007) to solar photovoltaics in the United Kingdom (Smith, Kern, Raven, & Verhees, 2014) and the development of modern biofuels in Finland and Sweden (Ulmanen, Verbong, & Raven, 2009). In a cross-national setting, Aklin and Urpelainen (2013) emphasized the importance of partisan politics, international energy prices, and path dependence for the growth of renewable energy. In my opinion, these studies are particularly important for the social science of sustainability, because they focus on the possibility of major transitions toward more sustainable socioeconomic systems.

#### RESEARCH QUESTIONS FOR THE FUTURE

In proposing research questions for the future, I adopt the premise that the goal of the interdisciplinary social science of sustainability is to offer an analytical foundation for solving the world's most pressing environmental problems. First, the political economy of the formulation of environmental policy instruments deserves more attention. Second, I propose that there is a clear need for new analytical models of transitions to sustainability. Finally, the most pressing research need is the development of practical strategies to build public and constituency support for better and more ambitious environmental policy.

On the theoretical level, both political scientists and economists have already made distinct contributions to the political economy of the choice of environmental policy instruments (Goulder & Parry, 2008; Keohane, Revesz, & Stavins, 1998; Urpelainen, 2012). This field is important because there is considerable variation in environmental and economic merits of the quality of different types of arguments. However, the study of policy instruments suffers from a lack of compelling empirical evidence and analytical guidelines into when and how more ambitious policies can be enacted. Some individual case studies (Harrison, 2013) and correlational analyses (Lyon & Yin, 2010) notwithstanding the political and economic conditions that allow ambitious policy formulation remain poorly understood. If a primary goal of the social science of sustainability is to identify opportunities for new policy formulation, this oversight should be corrected. For example, a body of rigorous theory on environmental policy formulation supported by empirical evidence could help us identify jurisdictions and moments

that would allow better policies if a specific constraint, such as the lack of grassroots mobilization, were removed.

This discussion brings me to the issue of sustainability transitions. As noted earlier, the progress in the study of sustainability transitions has been remarkable. However, the field is still young and unnecessarily narrow in its outlook. Most key studies in the field are individual case studies or comparisons of a small number of countries, and the hypotheses tested—if any—are not based on systematic, parsimonious social science. While some scholars have tried to develop and test analytical models of sustainability transitions (Aklin & Urpelainen, 2013; Safarzyńska & van den Bergh, 2010; Schilperoord, Rotmans, & Bergman, 2008), these models are not yet sufficiently informed by first principles of political economy and the empirical evidence supporting their relevance remains limited. Moreover, much of the recent case study research continues to ignore the political–economic side of sustainability transitions. Given how central political processes are to the decisions and behavior that determine the sustainability of the society, correcting this oversight is the most important next step for the study of sustainability transitions.

Finally, the social science of sustainability badly needs new research on the determinants of political support for better, more ambitious policies. While there is by now a lot of research on public opinion about environmental policy (Aklin, Bayer, Harish, & Urpelainen, 2013; Aldy, Kotchen, & Leiserowitz, 2012; Klick & Smith, 2010; Rabe & Borick, 2009), this research does little to identify when and how the public is mobilized to demand more ambitious policies with such intensity that governments and bureaucrats respond with real, nonsymbolic action. Studies of interest group influence (Cheon & Urpelainen, 2013; Kim & Urpelainen, 2013; Michaelowa, 2005) also focus on demonstrating the importance of economic interests, instead of characterizing the conditions under which it is possible to create a powerful “advocacy coalition” (Sabatier & Jenkins-Smith, 1993) to support ambitious policy formulation. This lack of attention to the challenges of coalition building is particularly important if the social science of sustainability is to have a genuine orientation toward solving problems. New knowledge about effective strategies to create public and interest group support for environmental policy is directly relevant to both advocacy by environmental groups and policy formulation by interested policymakers.

#### INTERDISCIPLINARY RESEARCH AND PROBLEM ORIENTATION

The need for interdisciplinary research on sustainability is indisputable. Since sustainability depends on creating policies that allow human beings to lead meaningful lives without undermining the environmental basis of life

on the planet, social scientists of all stripes must play a role in identifying effective and politically feasible solutions to the problem of sustainability. To harness clean technologies to promote sustainability, the contribution of the engineering sciences is equally valuable. And since sustainability requires the protection and maintenance of physical life-support systems, natural scientists must also play a central role.

Deeper interdisciplinary collaboration is also necessary among different social scientists. Whereas economists can shed light on the cost-effectiveness of different environmental policies, economic theory does not—with the partial exception of political economy and public choice (Buchanan & Tullock, 1975; Oye & Maxwell, 1994)—shed much light on the issue of political feasibility in a world of imperfect political institutions, powerful special interests, and uninformed publics. While economic theory provides an excellent foundation for the analysis of environmental policy, various other disciplines, ranging from sociology to political science and social psychology, have an equally important role to play.

For successful interdisciplinary research, a strong problem orientation is important for two reasons. First, interdisciplinary collaboration is difficult on the basis of the standard academic approach that emphasizes explanations at the expense of solutions. Different disciplines have their own theoretical traditions and conventions, and it is difficult for scholars from different disciplines to find a common ground. Even seemingly mundane practical considerations, such as locating appropriate journals for article submission, can prove insurmountable. Second, sustainability is itself a goal that cannot be achieved without solving problems. If social scientists and other scholars continue to focus on explaining our failures without offering constructive proposals for new solutions, progress toward sustainability is improbable.

In the light of these considerations, the interdisciplinary study of sustainability must be based on a practical outlook. Problem orientation requires that academic scholars reach out to practitioners at different levels to identify the most important barriers to progress toward sustainability. Collaboration between practitioners and academics combines the virtues of contextual knowledge, practical relevance, and the rigorous conduct of academic research.

On a final note, it is important for the social science of sustainability not to conflate practical relevance with consulting for the current political elite. From the perspective of a political scientist, today's crisis of sustainability largely reflects the neglect of environmental concerns among the powerful and influential. While academic research can support effective policy formulation with clear analytical logic and systematic empirical evidence, it is important to note that the people who need support and help the most are found in marginalized communities, such as the victims of climate change

in the least developed countries. I believe it is the moral responsibility of the academic community to support the efforts of the marginalized and powerless people to protect their natural life-support systems and deal with the severe consequences of environmental change. Equally important, academic researchers should not forget the need for a radical change in the outlook of the global elite to achieve a truly sustainable world.

## CONCLUSION

How can social scientists contribute to greater sustainability? This review has sought to answer this question by reviewing recent advances in the social science of sustainability, by identifying important research questions, and by making a plea for increased interdisciplinarity and problem orientation. These three components are intrinsically related. While much advance has been made, the practical significance of this social science remains limited. Also, the key research questions I have identified cannot be answered in a practically relevant manner without deeper collaboration with practitioners.

Without any attempt at representativeness or generality, I have proposed that the environmental economics of the cost-effectiveness of policy instruments, the study of policy diffusion across nations, and the literature on sustainability transitions are three important advances in the literature on environmental policy. However, much work remains to be done. The literature on sustainability transitions itself relies too heavily on case studies and lacks a firm analytical foundation for hypothesis testing. At the same time, the general question of how governments formulate environmental policies in a political-economic environment remains mostly unanswered. Perhaps, most importantly, new knowledge on effective strategies of coalition building for more ambitious environmental policy is needed. While answers to these questions will be provided by social scientists, the inherent problem orientation and normative emphasis of the social science of sustainability necessitate interdisciplinarity and deep engagement with practitioners.

For the social science of sustainability to sustain and thrive in the long run, it is important that currently active academics recognize the most important research questions and focus their attention on answering them. Similar to other social sciences, the social science of sustainability is prone to fads, such as the increasingly sophisticated mathematical modeling of complex global agreements that have no hope of being implemented. In choosing our research questions, we must acknowledge the need to focus on the central impediments to sustainability and emphasize the generation of knowledge that offers innovative solutions to overcoming them. This challenge requires

the rare combination of analytical rigor and a practical emphasis on the context in which practitioners operate. The social science of sustainability cannot afford to remain within the confines of the ivory tower, but it is also important not to throw the baby out with the bath water by compromising our analytical standards in the pursuit of relevance.

## REFERENCES

- Aklin, M., Bayer, P., Harish, S., & Urpelainen, J. (2013). Understanding environmental policy preferences: New evidence from Brazil. *Ecological Economics*, *96*, 28–36.
- Aklin, M., & Urpelainen, J. (2013). Political competition, path dependence, and the strategy of sustainable energy transitions. *American Journal of Political Science*, *57*, 643–658.
- Aklin, M., & Urpelainen, J. (2014). The global spread of environmental ministries: Domestic–international interactions. *International Studies Quarterly*. doi:10.1111/isqu.12119
- Aldy, J. E., Kotchen, M. J., & Leiserowitz, A. A. (2012). Willingness to pay and political support for a US National Clean Energy Standard. *Nature Climate Change*, *2*, 596–599.
- Buchanan, J. M., & Tullock, G. (1975). Polluters' profits and political response: Direct controls versus taxes. *American Economic Review*, *65*, 139–147.
- Cheon, A., & Urpelainen, J. (2013). How Do competing interest groups influence Environmental Policy? The Case of Renewable Electricity in Industrialized Democracies, 1989–2007. *Political Studies*. doi:10.1111/1467-9248.12006
- Fischer, C., & Newell, R. G. (2008). Environmental and technology policies for climate mitigation. *Journal of Environmental Economics and Management*, *55*, 142–162.
- Goulder, L. H., & Parry, I. W. (2008). Instrument choice in environmental policy. *Review of Environmental Economics and Policy*, *2*, 152–174.
- Greenstone, M. (2002). The impacts of environmental regulations on industrial activity: Evidence from the 1970 and 1977 clean air act amendments and the census of manufacture. *Journal of Political Economy*, *110*, 1175–1219.
- Greenstone, M., & Gayer, T. (2009). Quasi-experimental and experimental approaches to environmental economics. *Journal of Environmental Economics and Management*, *57*, 21–44.
- Harrison, K. (2013). The political economy of British Columbia's Carbon Tax. OECD Environment Working Paper 64.
- Holzinger, K., Knill, C., & Sommerer, T. (2008). Environmental policy convergence: The impact of international harmonization, transnational communication, and regulatory competition. *International Organization*, *62*, 553–587.
- Keohane, N. O., Revesz, R. L., & Stavins, R. N. (1998). The choice of regulatory instruments in environmental policy. *Harvard Environmental Law Review*, *22*, 313–367.
- Kim, S. E., & Urpelainen, J. (2013). When and how can advocacy groups promote new technologies? Conditions and strategies for effectiveness. *Journal of Public Policy*, *33*, 259–293.



- Klick, H., & Smith, E. R. (2010). Public understanding of and support for wind power in the United States. *Renewable Energy*, 35, 1585–1591.
- Lyon, T. P., & Yin, H. (2010). Why do states adopt renewable portfolio standards? An Empirical Investigation. *Energy Journal*, 31, 131–15.
- Michaelowa, A. (2005). The German wind energy lobby: How to promote costly technological change successfully. *European Environment*, 15, 192–199.
- Oye, K. A., & Maxwell, J. H. (1994). Self-interest and environmental management. *Journal of Theoretical Politics*, 6, 593–624.
- Rabe, B., & Borick, C. (2009). Public opinion and climate change: Analysis of the Virginia Climate Survey. *Virginia Environmental Law Journal*, 27, 177–203.
- Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin, F. S., Lambin, E. F., ... , Foley, J. A. (2009). A safe operating space for humanity. *Nature*, 461, 472–475.
- Ryan, S. P. (2012). The costs of environmental regulation in a concentrated industry. *Econometrica*, 80, 1019–1061.
- Sabatier, P. A., & Jenkins-Smith, H. C. (Eds.) (1993). *Policy change and learning: An advocacy coalition approach*. Boulder, CO: Westview Press.
- Safarzyńska, K., & van den Bergh, J. C. (2010). Demand–supply coevolution with multiple increasing returns: Policy analysis for unlocking and system transitions. *Technological Forecasting and Social Change*, 77, 297–317.
- Saikawa, E. (2013). Policy diffusion of emission standards: Is there a race to the top? *World Politics*, 65, 1–33.
- Schilperoord, M., Rotmans, J., & Bergman, N. (2008). Modelling societal transitions with agent transformation. *Computational and Mathematical Organization Theory*, 14, 283–301.
- Smil, V. (2010). *Energy transitions: History, requirements, prospects*. Praeger: Santa Barbara, CA.
- Smith, A., Kern, F., Raven, R., & Verhees, B. (2014). Spaces for sustainable innovation: Solar photovoltaic electricity in the UK. *Technological Forecasting and Social Change*, 81, 115–130.
- Smith, A., Stirling, A., & Berkhout, F. (2005). The governance of sustainable socio-technical transitions. *Research Policy*, 34, 1491–1510.
- Stavins, R. N. (1998). What can we learn from the grand policy experiment? Lessons from SO<sub>2</sub> allowance trading. *Journal of Economic Perspectives*, 12, 69–88.
- Ulmanen, J. H., Verbong, G. P. J., & Raven, R. P. (2009). Biofuel developments in Sweden and the Netherlands: Protection and socio-technical change in a long-term perspective. *Renewable and Sustainable Energy Reviews*, 13, 1406–1417.
- Urpelainen, J. (2012). How do electoral competition and special interests shape the stringency of renewable energy standards? *Environmental Economics and Policy Studies*, 14, 23–34.
- Verbong, G., & Geels, F. (2007). The ongoing energy transition: Lessons from a socio-technical, multi-level analysis of the Dutch electricity system (1960–2004). *Energy Policy*, 35, 1025–1037.
- Vogel, D. (1995). *Trading up: Consumer and environmental regulation in a global economy*. Cambridge, MA: Harvard University Press.

## JOHANNES URPELAINEN SHORT BIOGRAPHY

**Johannes Urpelainen** (PhD, University of Michigan, 2009) is an Associate Professor of Political Science at Columbia University. His research focuses on environmental policy, energy access, and international cooperation. The author of a hundred refereed articles and a book with Oxford University Press, Professor Urpelainen's research has, among other outlets, appeared in *The American Journal of Political Science*, *Global Environmental Change*, and *International Organization*. He has extensive experience with the study of energy access in India and is currently managing several major research projects on the spread and socioeconomic benefits of solar power in rural and urban India, with a particular emphasis on Uttar Pradesh and Bihar. He is also currently working on a book manuscript on the political history of renewable energy. Website:

<http://www.columbia.edu/~ju2178/>

## RELATED ESSAYS

Understanding American Political Conservatism (*Political Science*), Joel D. Aberbach

Rent, Rent-Seeking, and Social Inequality (*Sociology*), Beth Red Bird and David B. Grusky

To Flop Is Human: Inventing Better Scientific Approaches to Anticipating Failure (*Methods*), Robert Boruch and Alan Ruby

Sociological Theory After the End of Nature (*Sociology*), Robert J. Brulle

Political Ideologies (*Political Science*), Edward G. Carmines and Nicholas J. D'Amico

Lawmaking (*Political Science*), Jamie L. Carson and Mark E. Owens

Elites (*Sociology*), Johan S. G. Chu and Mark S. Mizruchi

The Inherence Heuristic: Generating Everyday Explanations (*Psychology*), Andrei Cimpian

Misinformation and How to Correct It (*Psychology*), John Cook *et al.*

Cities and Sustainable Development (*Sociology*), Christopher Cusack

Globalization: Consequences for Work and Employment in Advanced Capitalist Societies (*Sociology*), Tony Elger

Global Income Inequality (*Sociology*), Glenn Firebaugh

Architecture of Markets (*Sociology*), Neil Fligstein and Ryan Calder

Food Sharing (*Anthropology*), Michael Gurven and Adrian V. Jaeggi

Behavioral Economics (*Sociology*), Guy Hochman and Dan Ariely

Modeling Coal and Natural Gas Markets (*Economics*), Franziska Holz

The Development of Social Trust (*Psychology*), Vikram K. Jaswal and Marissa B. Drell

- Niche Construction: Implications for Human Sciences (*Anthropology*), Kevin N. Laland and Michael O'Brien
- Why Do States Sign Alliances? (*Political Science*), Brett Ashley Leeds
- Understanding Risk-Taking Behavior: Insights from Evolutionary Psychology (*Psychology*), Karin Machluf and David F. Bjorklund
- Transformation of the Employment Relationship (*Sociology*), Arne L. Kalleberg and Peter V. Marsden
- Domestic Political Institutions and Alliance Politics (*Political Science*), Michaela Mattes
- Built Environments and the Anthropology of Space (*Anthropology*), Gary W. McDonogh
- Rationing of Health Care (*Sociology*), David Mechanic
- Below-Replacement Fertility (*Sociology*), S. Philip Morgan
- Natural Resources and Development (*Political Science*), Kevin M. Morrison
- Economics of Renewable Energy Production (*Economics*), Gregory F. Nemet
- Organizations and the Production of Systemic Risk (*Sociology*), Charles Perrow
- Migration and Globalization (*Political Science*), Margaret E. Peters
- Limits to Human Longevity (*Sociology*), Samuel H. Preston and Hiram Beltrán-Sánchez
- The Politics of Disaster Relief (*Political Science*), Alexander J. Oliver and Andrew Reeves
- Economics and Culture (*Economics*), Gérard Roland
- Ethical Decision-Making: Contemporary Research on the Role of the Self (*Psychology*), Lisa L. Shu and Daniel A. Effron
- Sustainability (*Archaeology*), Joseph A. Tainter *et al.*
- The Institutional Logics Perspective (*Sociology*), Patricia H. Thornton *et al.*
- Recent Demographic Trends and the Family (*Sociology*), Lawrence L. Wu