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Greenhouse Economics: Value and Ethics by Clive Spash. London and New York; Routledge, 2002. Pp. xvi + 298; figures; tables, abbreviations; glossary; index. £75.00 (hardback); £14.99 (paperback). ISBN 0 4151 2718 1 and 2719 X

In *Greenhouse Economics*, Clive Spash presents an exhaustive account of the scientific, economic, political, ethical and policy issues relating to the enhanced greenhouse effect. Greenhouse economics seeks to identify the role of anthropogenic emissions regionally and across time in building up the stock of greenhouse gases, among which CO₂ has received the most attention. The author shows that although the

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science behind the greenhouse effect goes back to 1827, when Fourier established the atmosphere as a key determinant of global temperature, the importance of the role of human interactions with climate only developed in the second half of the twentieth century. By that time, global warming was seen as a positive phenomenon, which would delay the new glaciation and improve agricultural production. It was not until the late 1980s when the scientific and public concern for the adverse effects of gas emissions emerged.

A key tenet of greenhouse economics, Spash underlines, is that of acknowledging the broader sources of pollution integral to the modern industrial society. Hence a multiplicity of agents (industrialists, consumers) supplants the more narrow conception of polluter adopted in environmental economics – a stance still followed in various Intergovernmental Panel on Climate Change (IPCC) reports. Another discrepancy between mainstream and greenhouse economics arises in the attempt to establish a detailed cause-effect relationship between fossil fuel combustion and climate change. Spash articulates the concepts of weak vs. strong uncertainty, following the earlier Keynesian distinction between risk and uncertainty. Standard scientific modelling operates in the positivist realm of normal science and thus assumes weak uncertainty – that is, the belief that a satisfactory full understanding of climate behaviour is attainable with more intense research. This is the paradigm that guides the manner in which the scientific and economic communities inform policy-makers. Against this prevailing formula, Spash upholds that the non-linear character of natural phenomena, coupled with the inescapably value-laden interpretation of data, renders climate change an issue requiring a new ‘post-normal’ science. This new paradigm suggests that complexity entails strong uncertainty, that is, partial ignorance and indeterminacy. Accordingly, it calls for an extended peer community of decision-makers made up of both specialists and so-called lay people.

Spash alternates his academic narrative with ongoing critical remarks. An instance worth highlighting in the terrain of environmental politics is the apparently value-free IPCC reports. In *Greenhouse Economics*, we learn how statements over emissions reductions are politically negotiated behind closed doors. We thus learn how science is embedded in politics. Thus the book, while indisputably appealing to quarters of both environmental and

ecological economists, should also interest green political scientists, environmental ethicists and policy-makers. The author further points out that the amorality of neo-classical free-market economics, 'driven by the incentives to pass harm onto innocent others and benefit themselves' ought to be swiftly addressed with legal and institutional interventionism. This urge notwithstanding, the book concludes by taking stock of the bleak prospects towards the curtailing of the enhanced greenhouse effect: the 20–50 per cent reduction called for in the 1980s has been bargained down to an aggregate five per cent for a limited range of countries. The required fundamental changes seem strongly resisted by industrialists and the political elite who, in the face of a threatening climate change, paradoxically go on triumphing with their 'ideology of free choice in an unregulated market system of political economy'.

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