

THE GEOGRAPHICAL STUDY OF ENERGY: A HISTORICAL APPROACH TO THE STATE OF THE QUESTION

Daniel Herrero Luque
Eugenio Baraja Rodríguez

Departamento de Geografía. Universidad de Valladolid
danielherreroaluque@gmail.com, baraja@fyl.uva.es

Geographical studies on mining or on the use of energy resources do not consider landscape as an independent subject of analysis —let alone the potential of energy-related activities to generate new landscapes. The emergence of landscapes whose dominant feature derives from energy sourcing and development was not studied by Spanish geography until the turn of the present century. Prior to that, during the twentieth century, geographical studies were content with pointing at the destructive effects that energy development and/or mining had on rural landscapes, but ignored the fact that such activities encouraged the emergence of new landscapes. If, however, we focus on more recent studies or on the global understanding of energy itself, we become aware of other dimensions according to which energy is seen as (i) and economic activity, and therefore a source of wealth, (ii) a means of environmental transformation and “aggression”, and (iii) a key factor in boosting territorial discussion and raising social awareness of the value of landscape.

I. EXPLORATORY GEOGRAPHICAL STUDIES ON ENERGY RESOURCES

Energy and mining resources have played a key role in studies conducted within the framework of the geography of production, commerce and trade exchanges. Initially, the interest of geographers was focused first on the study of such geological and technical conditions as made resource exploitation possible and then on the availability of reserves and the economic conditions that rendered the exploitation of new sites feasible. Such is the pattern that underlies research work by geographers on the several mining and energy resources; coal, crude oil, natural gas and uranium (nuclear energy). The productive or economic dimension is closely linked to the early stages of exploratory research on any natural resource, as well as to regional studies of a general nature. We should be wary of setting up strict chronological thresholds in this regard, since in the last few decades

exploratory studies have been published on innovative techniques of energy production, with an emphasis on biofuels, cogeneration, solar thermal energy, etc.

Exploratory geographical studies result from the absence or limited availability of previous studies, so that fact-gathering and reporting on the resource's production and commercial exchanges, as well as on its location, are necessary tasks in this mode of inquiry. On the other hand, the range of traditional subjects of such geographical research, in the field of agricultural and industrial production, was soon expanded to incorporate energy production, its exchange and distribution. The main purpose of these contributions was to put the focus on the transformations experienced by the modern world and, above all, the economic changes that were taking place in those years —especially those impacting society and traditional ways of living. Since the 1970s the economic dimension evolved as a result of the first oil crisis, and energy became the key element under the threat of the short-term depletion of the main energy resources.

The approach taken by these studies is eminently descriptive, covering topics that range from the resource's origin and formation, location and characteristics to its exploitation history or potential in several countries. Conducted on a worldwide scale, these studies examined and evaluated the potential of the several producing areas without focusing on the landscapes resulting from the diversity of historical, technical and economic conditions associated with mineral extraction activities and/or energetic exploitation.

II. THE GEOGRAPHY OF ENERGY: INTEGRATIVE DISCOURSES WITHIN THE FRAMEWORK OF ECONOMIC AND SOCIAL GEOGRAPHY

Besides dealing independently with the several energy resources, geographers have invested considerable efforts on the study of energy as a category in the broadest sense of the term —what has come to be known as “the geography of energy”. Despite being widely used, the term has hardly been defined as such, even though attempts to demarcate its meaning have demanded a lot of attention from geographers. For Wilbanks (1985: 505–508), the specificity of the geographic dimension concerning energy is linked to its spatial sense and its closeness to three concepts: location, structure and movement. Indeed, a book like *Géographie de l'Énergie* (George, 1950) became a key reference source in understanding the development of the geography-based study of energy. Pierre George published this work as part of a four-volume series on economic and social geography. The book's contents transcended the scope of the then current geographical knowledge on energy, and highlighted the relevance of the means of production in spatial organization. George's was an early yet sound reflection that departed from the kind of physical and rural studies that were so prevalent in French geography in those days. *Géographie de l'Énergie* must be seen as a bibliographic landmark that marked the beginning of the study of energy from a strictly geographic —social and economic— perspective. The book started a rich debate: What is the geography of energy about? What issues does it tackle? Work published in the wake of George's *Géographie de l'Énergie* convincingly proved that geography and energy can interestingly combine within the same study. Each one of those monographs focused on a particular aspect like transport, logistics, supply, location, demand or the markets, including political issues.

From then on, there was a proliferation of published works on energy resulting from geographical scholarship. These were research studies conducted within the framework of economic geography —a discipline established on positivist and theoretical precepts and underpinned by quantitative techniques and methods of analysis. In fact, the design of those studies was typical of the latter discipline (which, incidentally, was particularly robust within French and Spanish geography) and revolved around the availability of resources, the mineable reserves and the production of energy. Such studies, which were packed with statistical tables, paid hardly any attention to human intervention on landscapes.

Examples of the strong economic dimension of energy within the discipline of geography are: *The Geography of Energy* by Gerald Manners (1964), *Energy in the Perspective of Geography* by Nathaniel Guyol (1971), *Géographie mondiale de l'énergie* by Donald W. Curran (1973) or *La nouvelle donne énergétique*, also published by the latter author (1981).

III. ENVIRONMENTAL AND SPATIAL DIMENSIONS OF GEOGRAPHICAL STUDIES ON ENERGY

In the late 1980s John Doneric Chapman (1989) succeeded in consolidating a new dimension of energy-related studies within geographical scholarship. By putting aside descriptive schemes and quantitative methods, he delved into the notion of the energy system —one first launched by physical geographers in the first half of the twentieth century in tune with the general theory of systems widely developed within the geographical disciplines. His book *Geography and Energy* is outstanding in its study of energy's complex commercial system and its proximity to radical geography. This work, which emphasises regional and local issues as well as global imbalances, discusses energy planning as a tool that enables geographers to participate in public policies. While acknowledging the high degree of specialisation of studies on energy within the several disciplines —basic sciences, applied sciences, environmental sciences or social and political sciences—, Chapman calls for an interdisciplinary approach. The turn of the decade, therefore, brought about a gradual yet relevant shift towards radical discourses encouraged by spatial and social considerations. Uneven growth, together with an environmental degradation recurrently mentioned by numerous radical authors, lie at the heart of a new dimension of geographical studies: one that was spatial and environmental.

At the start of the 1990s energy ceased to be present as the main topic of discussion, at least in scholarly publications and scientific events within the community of geographers. Indeed, it was rather historians who published a large number of works related to the geography of energy during the last decade of the past century. No doubt this goes to show the supremacy of other disciplines over geography during the 1990s, when energy issues ceased to be central to its main research output (Brücher, 1997; 2004). In the final years of the twentieth century, instead, energy was approached as part of generic studies on urbanism, transport and communications, climate, natural resource management and sustainable development. According to Mérenne-Schoumaker, such a variety of contexts for discussions on energy shows the importance of a subject that proves to be particularly interesting for the “understanding of spatial structures, dynamics, exchanges and, in short, the world we live in” (2011: 23) [*our translation*]. As regards the environmental dimension of geographical studies on energy, there is no clear chronological threshold, as is evidenced by *The Routledge*

Research Companion to Energy Geographies (Bouzarovski et al., 2016), where special emphasis is laid on the importance of energy as part of a larger context shaped by issues that range from climate change to quality of life in present-day society.

IV. RENEWABLE ENERGIES AND LANDSCAPE: THE NEW PARADIGM OF ENERGY GEOGRAPHY

Landscape changes resulting from the exploitation and processing of energy resources remained largely unexplored until two decades ago. Indeed both landscape and territorial logics were conspicuously absent from energy studies until the turn of the present century. The technical and commercial development of wind and photovoltaic power systems over the last couple of decades has aroused great interest. Consequently, a large number of studies concentrated on the landscape integration of renewable energies and the design of new territorial logics. The boom and expansion of renewables that has taken place in Europe and North America since the late 1990s (and in other areas like Latin America or Asia over the last ten years or so) has evidenced the existence of strong connections between energy, territory and landscape. An examination of scholarly contributions on this issue provides the key to understanding the relations among all three.

If landscape is defined as “an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors” (European Landscape Convention Art.1), it follows that citizen perception stands out as a key element with regard to the energy-landscape dyad¹: one that shapes a highly controversial relationship between both concepts. Initially, citizen perception became especially relevant in a series of studies that focused on the population (Walker, 1995) living near renewable energy power plants. A considerable amount of published research probed into hardly quantifiable factors including cultural and social ones, together with demographic and economic aspects, by resorting to case studies (Hammarlund et al., 2016; Baraja & Herrero, 2010; Frolova et al., 2015). The main aim of such work was to inquire into the local context that conditions opinion-shaping processes. In terms of results, the majority of these studies emphasise those factors that generate conflicts —and more specifically rejection— so as to identify those elements that must be taken into account in decision making processes.

The controversial relationship between renewables and landscape becomes evident as soon as they simultaneously elicit a positive response (insofar as they are perceived as clean, green, sustainable sources of energy, etc.) and a strong opposition. Scientific studies on the potential of renewable energies to generate conflict are indeed numerous. In fact, the decentralised character and the expansion of renewable energy power plants have made it possible to conduct profuse analyses of the impacts generated by such facilities. More particularly, we have been able to identify two distinct discourses that point at renewable energies as agents of conflict (Prados et al., 2012).

Energy-related activities have gone hand in hand with deep landscape and territorial transformations, but it was not until a little over a decade ago that they occupied a central

¹ Citizen participation and the social perception of landscape values have been two major factors in the development of wind power in Spain, as identified by Frolova (2010b) following her own research work and that of other scholars (Devine-Wright & Devine-Wright, 2006; Wolsink, 2007; Wüstenhagen, Wolsink & Bürer, 2007; Toke, Breukers & Wolsink, 2008).

position within the range of interests of the international scientific community. The publication titled *Renewable Energies and European Landscapes. Lessons from Southern European Cases* (Frolova, Prados & Nadaï, 2015) is a case in point, since it conducts an analysis of landscapes currently emerging as a result of the development of several technologies and their implementation in a number of different settings — mountain areas, flatlands and coastal regions. The authors prove that landscape is both an aesthetic issue in the spatial planning of renewable energies and an object that is deeply embedded in local practices.

V. CONCLUSION

We can certainly attest to a dynamic and constant evolution in research on energy from the point of view of geographical scholarship. We may draw a distinction between two types of studies: those that approach energy in a generic way, including its full range of resources, and those others that specifically target at a single resource or exploitation technique. The former are substantially indebted to the epistemological paradigm that frames their particular inquiry. By contrast, those studies that focus on specific resources or exploitation techniques rely on both their epistemological model and the stage of development of the resource under scrutiny. Thus, for example, for wind and photovoltaic power developments we have been able to trace research publications that range from exploratory works to specific studies on the landscape integration of such developments. Be it as it may, and regardless of the approach used, any study produced from a geographical perspective should start from a basic premise: the relevance of energy in the transformation and social production of space.

