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A comparison of bioenergy policies and institutional frameworks in the rural areas of Emilia Romagna and Norway

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HIGHLIGHTS

- We compare policies and institutional frameworks which regulate bioenergy systems.
- We use the SWOT analysis to evaluate the results of the case studies.
- Emilia Romagna has major systemic weaknesses.
- Norway has local elements for innovation but policy weaknesses.
- Policies and policy instruments should be decentralised.

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ABSTRACT

This paper explores the relationship between bioenergy, rural development and related innovation processes in two case studies (Emilia Romagna in Italy—and Norway), for a better understanding of the impacts of different policy regimes on bioenergy innovation. Regional innovation systems theory is used to explain the results emerging from the case studies and to identify the presence of potential elements for innovation. We used policy and relevant literature analysis and a grounded approach based on semi-structured interviews of relevant actors involved in the local bioenergy system. The main findings show that the case studies present consistent differences in terms of policy instruments and socio-political dynamics. Emilia Romagna has major weaknesses and threats that hinder innovation, but some positive potential elements for the future. Norway presents stronger local elements for innovation within local bioenergy systems, such as the employment of local resources and knowledge, but critical market and policy features that threaten further innovation developments. The conclusion draws on the comparative analysis to discuss policy implications of the study.

1. Introduction and objectives

Bioenergy and rural development are interconnected fields. As stressed by the OECD (2012) Linking Renewable Energy to Rural Development report, rural areas attract a large part of overall investment in RE deployment. Installations have to be located where renewable sources of energy are available and possibly abundant, and also where there is space to host them. For these reasons, low density areas are more likely to have these features and so they are the most suitable location for RE installations (OECD, 2012). Bioenergy is also conceived as an opportunity for farmers to diversify their income and for rural areas, generally marginalised, to foster their development. Nevertheless, the dominant policies on renewables are so far set by the EU's energy Directorate and National Ministries of Energy, often with little reference to district or regional development or to rural issues (OECD, 2012). As a result, there is often a problem at the level of local communities, left with negative externalities while most of the profits and land and policy rents accrue to 'outsiders' (Bryden, 2010). Thus, the question is investment in renewable energy a development opportunity for rural areas? (OECD, 2012) is one of central importance when it comes to study the relationship between bioenergy and sustainable rural development.

This paper[1] aims to contribute to a better understanding of the relationship between bioenergy development, related innovation processes and rural development, and the impacts of different policy regimes on these relationships. The research question investigates the

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[1] It builds on the work of Cavicchi's master's thesis "Emerging green innovation platform: a comparative study on bioenergy policies in Emilia-Romagna and Norway" which analysed the relationship between the bioenergy activities and rural development, and the ongoing work of the 'green innovation group' at NILF (see Bryden et al., 2013).

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capacity of the regional innovation system theory (Cooke, 1997, 2005, 2012; Foray et al., 2009; Etzkowitz, 2002; OECD, 2012) to explain the results emphasized by the case studies and the nature of the relationship between bioenergy and rural development.

2. Methodology

The study applies a qualitative research methodology to investigate on-going social, political and economic dynamics about which all facets remain to be displayed. We use the comparison of two case study regions—Emilia Romagna (an Italian region) and Norway—to reveal the conditions and the casual mechanisms underlying bioenergy development in two different systemic contexts.

The comparison of a region and a state has relevance and consistency in relation to the structure of their particular energy system and governance. However, since national and EU policies are usually dominant in bioenergy, we set the cases within their EU and national policy contexts. The Italian energy policy is a matter of concurrent competence between the State and the Regions, thus regions have major administrative and planning decision making power on this matter. Consequently, there is a great variety of policy instruments and energy systems in relation with the regional energy needs, the natural resources available and thus the energy technologies employed throughout the national territory. In particular, the choice of Emilia Romagna and Norway is founded on typology of available biomass resources, similar population and levels of public participation, as well as on their key differences in terms of policies and governance, and ownership structure of bioenergy plants. These similarities and differences allow us to test what impact the different policy and governance regimes and ownership have on the regional innovation systems in relation to bioenergy in the two cases (Table 1).

We used official public documents and database, policy analysis and semi-structured interviews. The core of the research is a field study of local bioenergy supply chains. The main data come from a variegated sample of actors including: institutional actors—such as local administrators and farmers unions' representatives, bioenergy businesses, local citizens, environmental organisations and sectorial experts. A total of 30 stakeholders were interviewed: 15 in each Country. The sample is selected through the 'snow-ball' method – which relies on suggestions and cooperation of the previous interviewees – integrated with official data-bases listing investors in bioenergy facilities. Through the interviews we obtained information about the local bioenergy businesses (ownership, economic data, and technical issues), local networks relationships, local impacts (social, economic and environmental), governance and bioenergy system structure. We do not claim statistical representativeness, as the populations of all actors in the supply chain are not readily identifiable from public databases. Rather we follow a chain opportunistically in a way that provides insights into the different ways in which their development is influenced by the two policy and governance regimes. A SWOT analysis is used to analyse and compare the case studies and to evaluate the capacity of the regional innovation system theory to explain the results and the nature of the relationship between bioenergy and rural development.

3. Theoretical framework

The theoretical framework is based on the regional innovation systems theory. Founded in the pioneering Innovation Systems work of Lundvall (1988), Freeman (1987), the regional dimension has been added by Cooke (1997, 2005, 2012), Edquist (2004), Etzkowitz (2002), Foray et al. (2009), and Lundvall (2005), among others. A regional innovation approach to the study of renewable energy, including bioenergy, has also been used by Buen (2006), Carrosio (2008), Ericsson et al. (2004), Forbord et al. (2012), Hillring (2002), Lindblom and Rasmussen (2008), Mangoyama and Smith (2011), McCormick and Kåberger (2005), Midtunn and Koefoed (2005), Mårtensson and Westerberg, 2007; OECD, 2012 report.

Bioenergy production is a complex system characterised by inter-sectoral, interdisciplinary, heterogeneous and location-specific dynamics. Most commonly, these dynamics occur in rural areas, where scattered settlements and abundance of natural resources make a suitable context for such activities. Local assets are thus very much involved in the process and it is clear from previous research that rural areas, while necessarily part of the biological process, can also be harmed by bioenergy activities (OECD, 2012). The theory of Regional Innovation Systems (RSI) – as territorially specific and centred on collaborative learning processes – rests on the idea that firms and other organisations systematically engage in interactive learning (Lundvall, 2005) through an institutional milieu characterised by embeddedness (Cooke et al., 1997). The RSI are characterised by interactive learning processes that are easier to emerge at a narrower level due to geographical proximity, but also to common resources, such as common knowledge, skills, values, trust, which are embedded in the local milieu. The embeddedness in the local milieu should facilitate processes of smart specialisation (Foray et al., 2009), namely a specialisation that fits with particular local conditions.

Table 1
Case study selection.
Source: Author's elaboration.

Study area	Emilia Romagna	Norway
Total population	4.459.246[a]	5.078.000[b]
Governance structure	Semi-regionalised	Semi-localised
Policy instruments/support schemes	Feed-in tariffs, green certificates, tax deductions, regional policy instruments	Green certificates, R&D, public grants, environmental taxes, R&D
Energy market	Semi-decentralised/vertical integration	Decentralised
Ownership structure	Individual	Collective
Available biomass resources	Agricultural dedicated crops, agricultural by-products, forestry by-products, solid waste	Forest by-products, straw, solid waste
Available/predominant technology	Combustion/district heating, farm-based biogas, solar panels	Combustion/District heating, large biogas plants
Civil society participation	Significant presence of social movements engaged in the energy debate	Officially recognized civil society participation through public hearings

[a] Population data Emilia Romagna region website: http://www.regione.emilia-romagna.it/notizie/2012/giugno/Cresce-la-popolazione-dellEmilia-Romagna, 2012.
[b] Population data Statistics Norway website: http://www.ssb.no/en/forside;jsessionid=8A5C59F354A93D2B95587C0C0FE2E076.kpld-as-prod03.