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Historical Transitions in Energy Services:

Lisbon from 1850 to the Present

Two thirds of humanity will be living in cities by 2050, a steep increase from 1950, when only one third of the world population was urban (UN, 2014). This phenomenon has been associated with increased prosperity, mobility and social transformation but also with strong environmental pressures due to the ever rising demand for energy services. To ensure that the environment is impacted in the least harmful way, a thorough understanding of how and why energy transitions happen is necessary. Historical research can provide important insights to urban planners about the drivers of these transitions, from which they can draw lessons for the future (Grübler, 2012).

The existing literature has limited usefulness for the study of energy transitions in urban areas. On the one hand, their reach is mainly national (eg. Gales et al., 2007, Henriques, 2011; Kander et al., 2013, Krausmann et al., 2008), with only a handful focusing specifically on cities (Eunhye and Barles, 2012; Krausmann, 2013). On the other hand, most studies focus only on primary energy consumption and not on the services provided by this energy, such as heating, lighting, transport or power. The focus on primary energy is useful for investigating broad historical patterns, but does not tell us a lot about the reasons for these transitions. Without changes in the demand for energy services there would be no changes in the primary energy supplied. Therefore, to better understand these transitions, we need to focus, not only on primary energy, but also on what energy is used for, i.e energy services (see Foquet, 2008 and Fouquet, 2010).

This paper addresses these two issues, by analyzing the way historical energy transitions were driven by energy services demand (heating, lighting, transport and power) in the capital city of Lisbon, Portugal, over the period 1850 to the present. First, I will reconstruct the final energy consumption of the city of Lisbon. This is made possible due to the abundant sources on Lisbon energy consumption, such as gas and electricity company reports, industrial, trade and transports statistics and city toll data

that cover the most important energy products (food, coke, wood, charcoal) (see Henriques, 2011). In this way I will be able to compare Lisbon energy transitions with country totals and with other cities for which this study has been made, such as Vienna and Copenhagen. Second, I will make estimates for energy service consumption at the sector level (industry, households). Third, I will analyze the drivers of selected transitions at the energy service level, using the framework employed by Fouquet (2010) which clusters these drivers in five categories: better service, efficiency, price, invention or discovery.

The article focus on energy services at city level will shed light on the differences in demand for energy at the national and urban level and lead to a richer understanding of the main drivers of energy transitions. Are the drivers of energy transitions similar or drastically different to the ones Fouquet found for the UK? I hope to find new relations which can provide lessons for contemporaneous energy transition research.

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