Poster Sessions

[P51] Why does the transition in the heating sector occur so slowly? - A TIS in Context-based comparative analysis between the German electricity and heating sector.

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Since the German energy transition started in the 1990s the electricity transition experienced a much higher development velocity than the heat transition. The share of renewables in the electricity sector has recently risen above 30 % while the share of renewable heat is unlikely to exceed 14 % by 2020 (German Government 2015). This overall situation is quite remarkable since the building stock, where heat is mostly consumed, is accountable for almost 40% of Germany's final energy consumption (German government 2014). This situation correlates with the scientific attention that both areas have obtained over the last decades in the policy and transition literature. Energy Policy published for instance since it was founded 1041 papers that contain "renewable electricity" in their abstract. Only 126 papers were published containing "renewable heat" in their abstract. The same can be observed in Environmental Innovations & Societal Transitions which is one of the main transition outlets. Here 27 papers were published that contained the term "renewable electricity" in their abstracts, while only 6 papers contained "renewable heat". Focusing on the German residential heat sector we see that a total of 45.9 % of the German households are heated with single heating systems that utilize natural gas and 26.2 % that utilize oil. 13.5 % of the households are supplied with district heating. 4.1 % use heat pumps or night storage heaters. 2 % rely on biogenous substances. The transition towards sustainable heat systems is needed in order to reach the nation CO2-emission targets. This transition requires the development and diffusion of novel technologies in ways that the continuous burning of gas and oil is drastically reduced. Currently the German Government sees the roll-out of advanced district heat grids as one major step which would accompany the widespread diffusion of energy efficiency measures (German Government – Climate action Plan 2050). In this paper we focus on advanced district heating grids. These are heating grids that do not only burn fossil fuels but operate in ways that are more sustainable. Currently there is a variety of these more sustainable grids being developed. Some use waste heat, others use heat pumps, bio energy or solar thermal energy sources. Others operate with lower or even fluctuating temperatures. No matter which specific type of grid construction is chosen it seems to be quite apparent that such a roll out of district heating grids would impose a change of the utilized heating system on large parts of society in all types of dwellings (rural and urban, single households and apartment buildings). In this paper we therefore analyse the dynamics of the transition in the German residential heating sector. We create insight in the specific characteristics of the heat transition and how this differs from the much more studied transition of the electricity sector. Hereby we will explore what can be learned from the diffusion of renewable electricity for the diffusion of renewable heat. The paper will follow a three step approach. First the characteristics of the current residential heat regime are analysed. Second, we analyse the dynamics of change by focusing on six advanced district heating projects in different geographical locations in Germany and using different core technologies. Twenty-six interviews were conducted with actors involved in projects for renewable district heating; six further interview partners are experts from associations and industry involved in the topic on a national level. Thirdly, we compare our insights on the dynamics of the German heat transition with existing insights on the dynamics of the electricity transition (e.g. Negro et al. 2011). First, we will show that local circumstances have a much greater impact on the dynamics (technological choice, local physical resources, institutional embedding and local capabilities) than in the electricity domain. This reduces learning effects as each project is different and makes wide spread on the ground knowledge a crucial prerequisite for a roll out of new heat grids. Second, we will show that competing technological trajectories, each supported by specific actor coalitions prevent a clear guidance of the search process to take place and lack of critical mass by any of these coalitions. Third, we show that dominant regime actors on the national level managed to keep the status quo longer than in the electricity sector due to the weak degree of joint coalition building of new actors.

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