

Trans-Sectoral Cooperation: Power-to-Gas Actor Constellations in Germany

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Introduction

Power-to-Gas (PtG), the production of hydrogen with renewable energy surplus, is seen by many as a viable technical option to decarbonise the energy and mobility sector (BMU, 2012; Fraunhofer ISI, 2016; Smolinka et al., 2011; Thielmann et al., 2015; Töpler and Lehmann, 2014). As the electrolysis of water into hydrogen and oxygen is known since 100 years, PtG seems less an innovation in a technological sense, but in its possible functions: As a combination of "low tech" and its application as a medium to transfer renewable energy supply to other sectors transcending organizational and institutional borders. Therefore, to fully exploit the benefits of PtG, changes in the organisational field become constitutive factors for the innovation.

Approach

In the Master thesis, the R&D consortia supporting Power-to-Gas innovation development were interpreted as the "focal level" of analysis (Sydow et al., 2012) from an interdisciplinary point of view. The research represents a new approach, as the methodology of Constellation Analysis is referred to the context of technological path research in sociological structuration theory. Findings are based on six expert interviews and participant observation in a conference and a stakeholder workshop. **The focus is on the question how the diverse technical functions of PtG are integrated into cooperation in the organizational field** (Powell and DiMaggio, 1991).

Power-to-Gas Pilot Plants in Germany

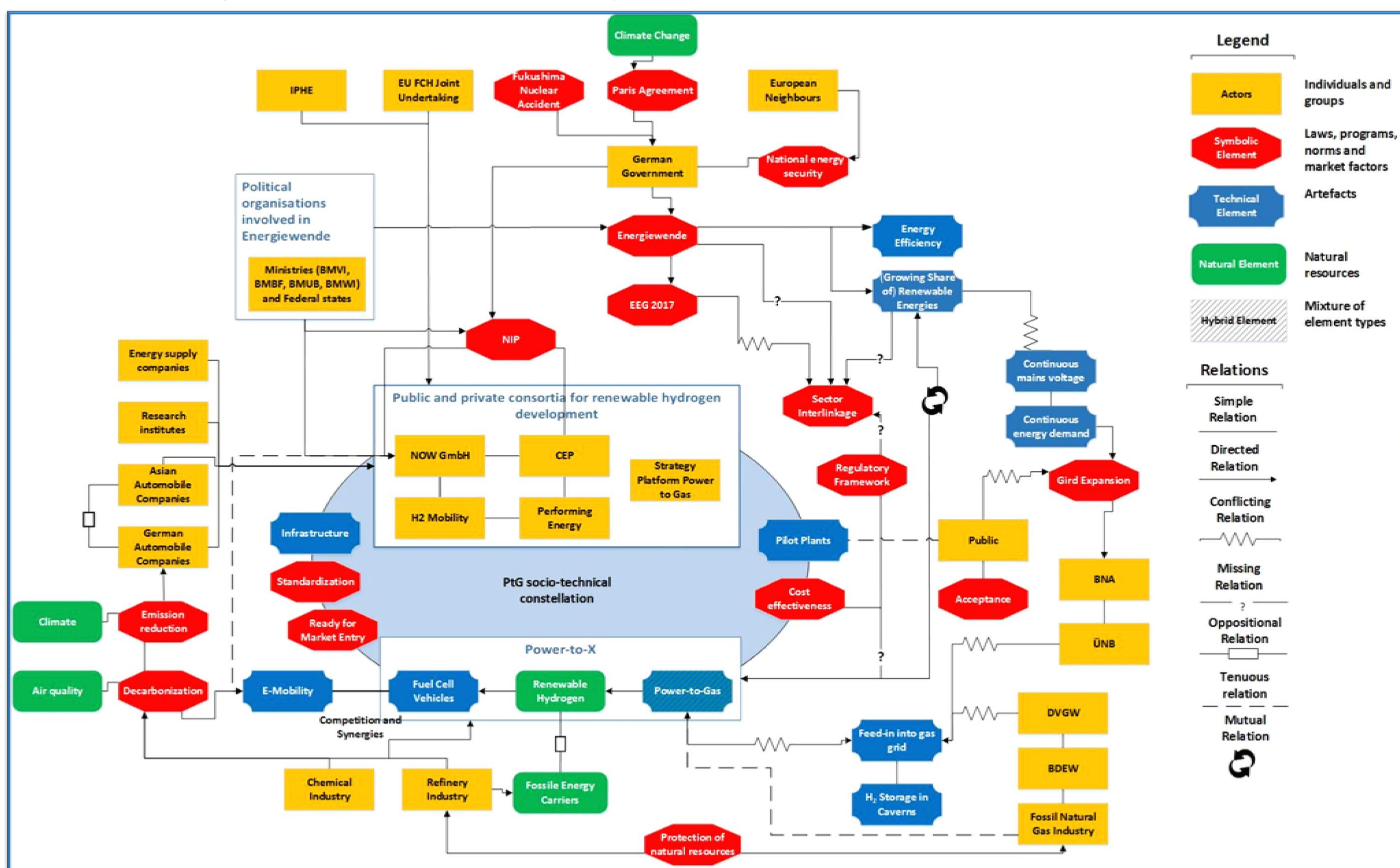


Source: http://www.powertogas.info/power-to-gas/pilotprojekte-im-ueberblick/?no_cache=1

Use of renewable hydrogen:

- hydrogen vehicles
- seasonal energy storage
- chemical industry
- heating

Constellation Diagramm: Power-to-Gas in Germany



Discussion:

Based on the findings, the heterogeneous character of cooperation in consortia for PtG in Germany, with different actors involved in self-reinforcing processes of cooperation of socio-technical infrastructures (Schubert et al., 2013), can be discussed on three levels:

1. Cooperation for PtG takes place in a "pre-competition" economical stage, builds on **informal communication structures** and is imbued with **both competition and trust**.
2. As PtG consortia are themselves **trans-sectoral** and work towards an interlinkage of energy sectors, they challenge a sector-explicit analysis of innovation research (Dolata, 2009; Geels, 2004) in favour of a social constructivism approach.
3. The different applications of PtG (mobility, heating, energy storage) build the **convergent element for the cooperation**, while at the same time **constituting the diverging interests** of the actors in the technology.

Conclusion:

German PtG consortia show features of **transformative agencies** and therefore support empirically the concept of active path creation by collective actors (Garud and Karnøe, 2001) as well as the observation of Schubert et al. (2013) that innovation processes become increasingly supervised by mindfully acting agents.

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