Sustainability of territorial transitions toward Decarbonated Hydrogen: a multidisciplinary, multi-actors and multi-criteria approach

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The energy transition is on its way in our territories. In this perspective, the decarbonization of industry is part of the national ambition to reach the 81% reduction of CO2 emissions by 2050. Decarbonized hydrogen is the result of a process that emits little CO2. This eco-responsible hydrogen is produced by electrolysis of water, using decarbonated or renewable electricity. The advantages of these hydrogen production methods are numerous. Projects based on the production of carbon-free hydrogen can also present risks. These projects can also be exposed to geopolitical risks, natural and technological hazards, as well as societal risks (e.g. intrusion, malicious acts, ...). In 2020, Barbara Pompili, Minister of Ecological Transition, Bruno Le Maire, Minister of Economy, Finance and Recovery, and Agnès Pannier-Runacher, Minister Delegate in charge of Industry, made public the map of the first 15 French projects selected in the framework of the Joint European Hydrogen Initiative (JEI). In addition to these projects, many projects are planned in France where a technological brick for the production of carbon-free hydrogen is inserted (e.g. the Horizeo project led by Engie, Neoen and RTE in the commune of Saucats, south of Bordeaux). These ambitious and innovative projects, which are inserted in territories with different configurations in terms of urban density, nature of the local social, environmental and economic fabric, will be subject to different administrative, economic and societal constraints. There is thus a need to develop new concepts and approaches in order to: (a) analyze, (b) evaluate hydrogen decarbonized production projects or projects with a hydrogen decarbonized production brick, and (c) characterize their potential in terms of societal responsibility and sustainability. These concepts and approaches must allow to account for the different dimensions and stakes of the projects (e.g. environmental, social, economic, governance, ...) on different time steps (short, medium and long term), at different territorial scales (local, regional, national, European, ...) and according to different purposes. The AIDHY project relies on a multi-disciplinary consortium combining humanities and social sciences, economics,natural sciences and engineering science to provide decision support for project owners, regulators, territories, third-party guarantors, and citizens

to better characterize and understand the issues, opportunities and risks around decarbonized hydrogen projects and to judge the level of sustainability and societal responsibility of the latter..