

## **Towards an evidence base to support power-to-X (PtX) decision-making in South Africa: Applying systems thinking, knowledge co-production and spatial analysis**

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De-fossilisation is a priority, globally and in South Africa. Power-to-X (PtX) technologies could contribute greatly to achieving these ambitions. South Africa's renewable energy resources, land availability, platinum group metals resources, and port infrastructure, position it as a potential competitor in the global PtX economy. In addition to defossilisation, a domestic PtX economy could make substantial contributions to job creation, improve local livelihoods and facilitate a Just Energy Transition. Vast technologies and infrastructure are required to create the electricity and water inputs to deliver PtX products (for domestic use and export), which, if developed at a sufficient speed, scale, and intensity, could have cumulative, unforeseen consequences. We applied systems thinking, knowledge co-production and spatial analysis to develop a foundational evidence base for future planning, assessment and decision-making on PtX projects towards the sustainable and responsible establishment of a South African PtX economy.