

Abstract InduFlexControl-2

Control algorithms for flexibility in power-to-X and industrial processes II, full cSBO with a proposed starting date on 1 January 2022 and a proposed duration of 48 months, with partners KU Leuven, UGent and VITO. Follow-up project of the currently running Moonshot sprint cSBO project InduFlexControl (<https://moonshotflanders.be/mot4-induflexcontrol/>).

The main goal of InduFlexControl is to control the flexibility (flex) of energy-intensive processes and power-to-X to optimally reduce CO₂ in a way that is suited to the overall industrial and energy eco-system.

The fundamental research challenge is the design of new control techniques, which integrate the constraints imposed by industrial processes, energy market design and the power/energy network configuration. To achieve this, we combine two fundamental methodologies: model predictive control (MPC) and deep learning (DL). Model-based approaches offer robustness, while model-free/data-driven techniques deal with the uncertainty and complex nature of energy-intensive processes.

The preceding sprint cSBO project focused on algorithms and methods for quantifying, valorising, and controlling the underlying energy flex in large industrial processes. In this continuation proposal, the consortium will investigate how and to what extent new sources of industrial flex, which are not evident yet, can be harvested. This implies looking into elements such as conversion between energy carriers, additional storage systems and an alternative (re-)design of selected components. In this way, processes can multiply their available flex towards its market valorisation potential and its CO₂ reduction capacity.

This unexploited flex will also add to the inherent capacity achieved by the control techniques developed in the sprint cSBO, while still considering the constraints imposed by industrial processes, energy market design and the power network configuration.

For substantive questions about this project proposal, please contact MOT4 representative Jeroen van Walsem (jvanwalsem@catalisti.be; +32 497 731 175).