VOLTA CHEM

Electrification of the Chemical Industry

DELICI: Drivers for Electrification of the Chemical Industry

Powered by: TNO innovation for life ECN

Power-to-X
Current knowledge

- Electrification in the chemical industry is a development that is part of a successfull energy transition
- The need for flexibility in the energy system increases and a mix of flexibility options is needed to cope with the intermittency
- The different flexibility options are more or less known and documented
- Electrification of the industry (Power-to-X) is a feasible option with many different possibilities and processes (no one size fits all-flex option)
- Power-to-X business cases are explored: economic perspective for the period till 2030 seems small, but will be larger in the period after 2030

Power-to-X
Remaining issues

- What is the impact of electrification on the chemical industry?
- What is the market value for different flexibility services that chemical industry could deliver?
- What is the value of electrification in the chemical industry for society?
- How could alternative energy market design, structure & regulations improve the case for electrification in the chemical industry?

What are we going to do
Analysis of three scenarios…

1. Security of supply
   What is the possible role of Power-to-X in the chemical industry at external shocks in the energy market?

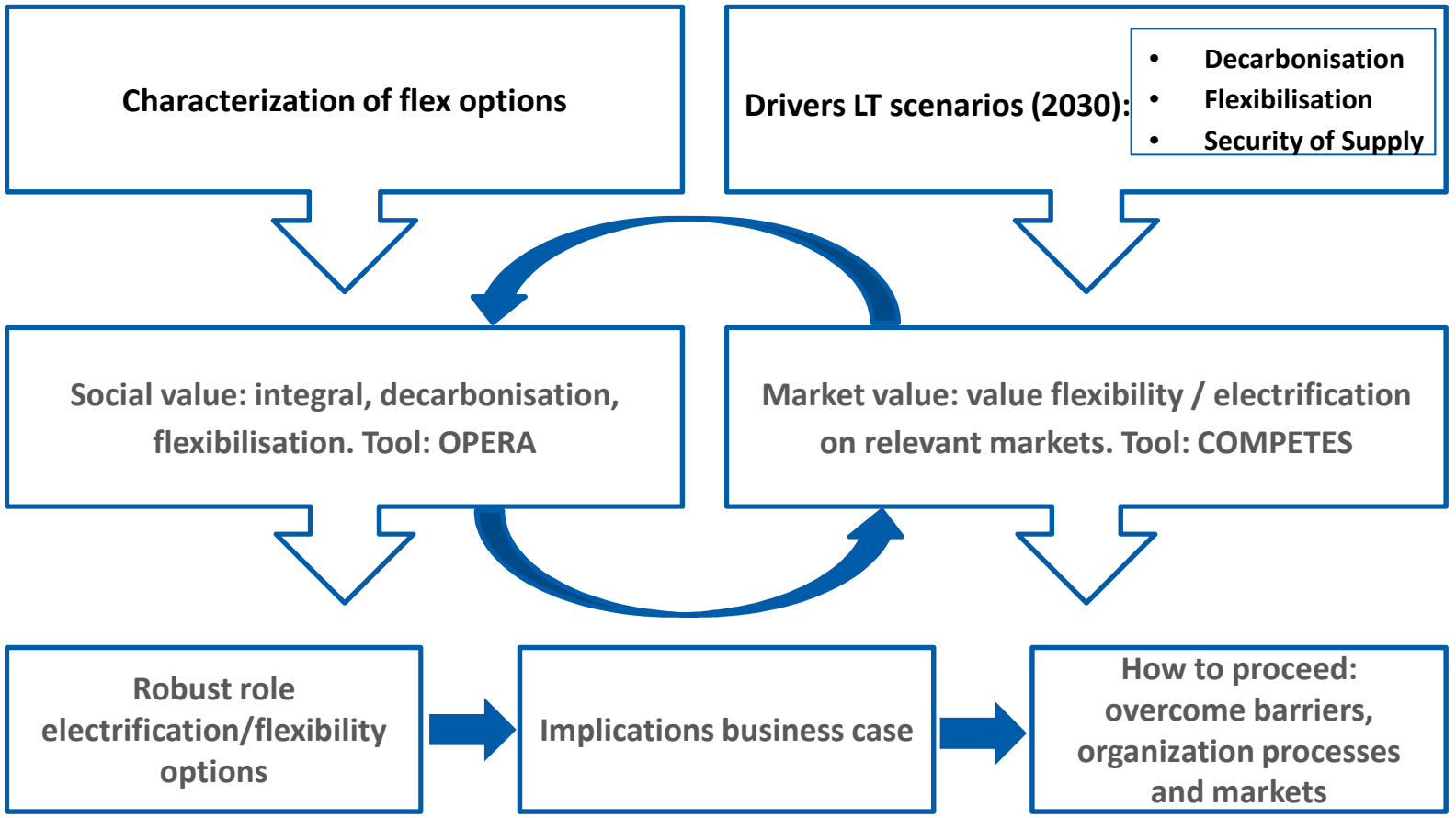
2. Decarbonisation
   What is the possible role of Power-to-X in the chemical industry at stringent climate policy/ high CO_2 prices?

3. Flexibilisation
   What is the possible role of Power-to-X in the chemical industry at high penetration of renewable energy?

Why a new study?

- Previous analyses were useful, but (only) exploratory, partial, and static
- What are we going to do:
  - Build on existing knowledge / surveys
  - From partial analysis to an **integral analysis**
  - A **dynamic analysis** instead of a static analysis
- With the right tools:
  - Integrated energy analysis with integral energy system model (OPERA)
  - Valuation of flexibility options on ***all*** the relevant markets (COMPETES)
- What does it deliver to you?
  - Merit order to electrification options that take into account other flexibility options
  - And so: (more) robust understanding of the potential business case for electrification options

What can we do
… and how do we perform the analysis?



Project description

Aim:
- Contributing to successful electrification in the chemical industry

Activities:
- Characterization of electrification technologies (efficiency, costs, technical potential)
- Scenario analysis based on most relevant drivers
- Business case assessments put forward by industry participants
- Industrial involvement and dissimination

Results:
- Public report describing the value of electrification in chemical industry
- Interactives sessions with project partners (discussions & mutual learning)
- Value creation by contributing to **YOUR business case**
- Dissemination of results

Invitation to work with us!

VOLTA CHEM

Shared Innovation Program
Electrification of the Chemical Industry

We are most interested in:

- Your opinion
- Your vision
- Your technology
- Your showcase
- Your participation

Martijn de Graaff
martijn.degraaff@tno.nl

Yvonne van Delft
vandelft@ecn.nl