



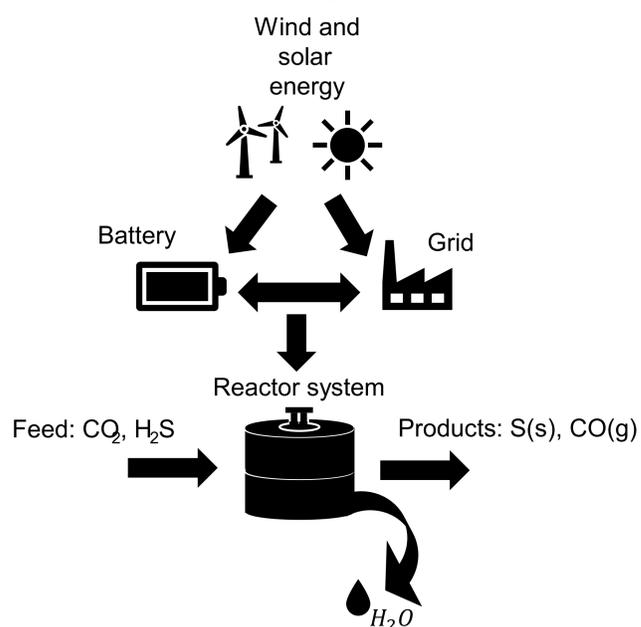
GOAL

In academia, we create models that can aid in solving many complex problems that arise in industry. However, it is not always straightforward to convince industrial users to use our models.

The goal of this research is to how we can present a production planning model in an appealing way to industrial users by making a dashboard that (1) visualizes the model in a way that is interpretable, and (2) permits flexibility by allowing manual adjustments to the output. Presenting complex models in this way can make it easier for a skeptical industrial user to implement them at their facility.

MOTIVATION

- A chemical reactor with a high electricity demand is powered by renewable energy, supplemented by energy from the grid via the spot market.
- Renewable energy generation and spot market prices are uncertain.
- A two-stage stochastic mixed-integer linear program optimizes the production plan, spot market utilization, and battery usage.



- However, for industrial users to apply the model, it must be packaged in a way that is interpretable and flexible.

FURTHER READING



For more information over the e-CODUCT project, see e-coduct.eu



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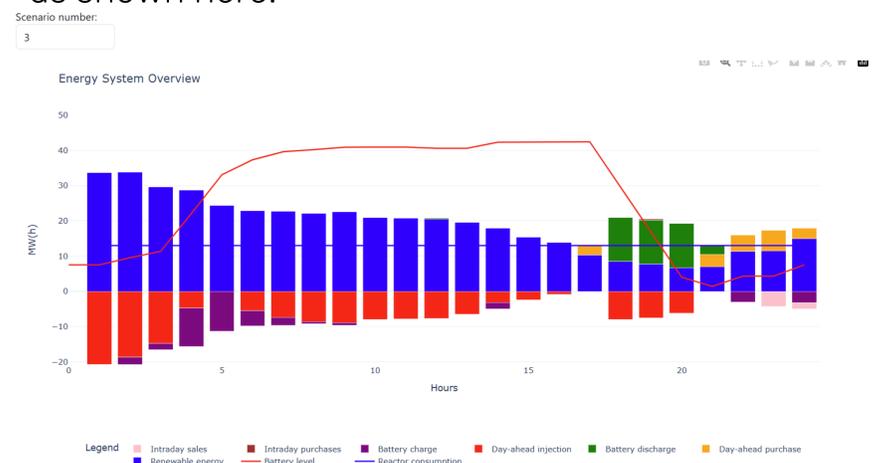
APPROACH

- This model is incorporated into an easy-to-use dashboard that:
 - Visualizes the result for each scenario (interpretable).
 - Allows system parameters and first-stage solutions to be manually changed (flexible).

Configuration	Day-ahead input	Day-ahead output \ intraday input	Intraday Output	Energy plan graph	VSS / EVPI
Configured for stage 2, after day-ahead prices are known. Model assumes values in table below have already been determined. User can input these manually or upload from an external file.					
<input type="button" value="Upload Day-ahead Decisions"/>					
<input type="button" value="Download as CSV"/>					
Hour	Reactor load (%)	Day-ahead purchases (MW)	Day-ahead Injection (%)		
1	100	0	20.74		
2	100	0	18.71		
3	100	0	14.8		

RESULTS

- A web application was developed and can be visited at reveal.ugent.be/dash2/
- User can adjust:
 - Infrastructure (i.e. Wind turbine and solar panel specifications)
 - Forecast uncertainty
 - Reactor throughput
 - Stage 1 decisions (reactor load and day-ahead bids)
 - More
- Output is given in downloadable tables and graphs as shown here:



The tool is live! Check it out here:

Note: application is best viewed on desktop screens.



KEY TAKE-AWAY

- Convincing industrial users to adopt complex models requires straightforward user interfaces, that focus on:
 - Interpretability
 - Flexibility

