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Investigating Operability Issues of Heat Integration for Implementation in the Oil Refining Industry

S. Marton, E. Svensson, S. Harvey

Department of Energy and Environment, Chalmers University of Technology, Gothenburg, Sweden

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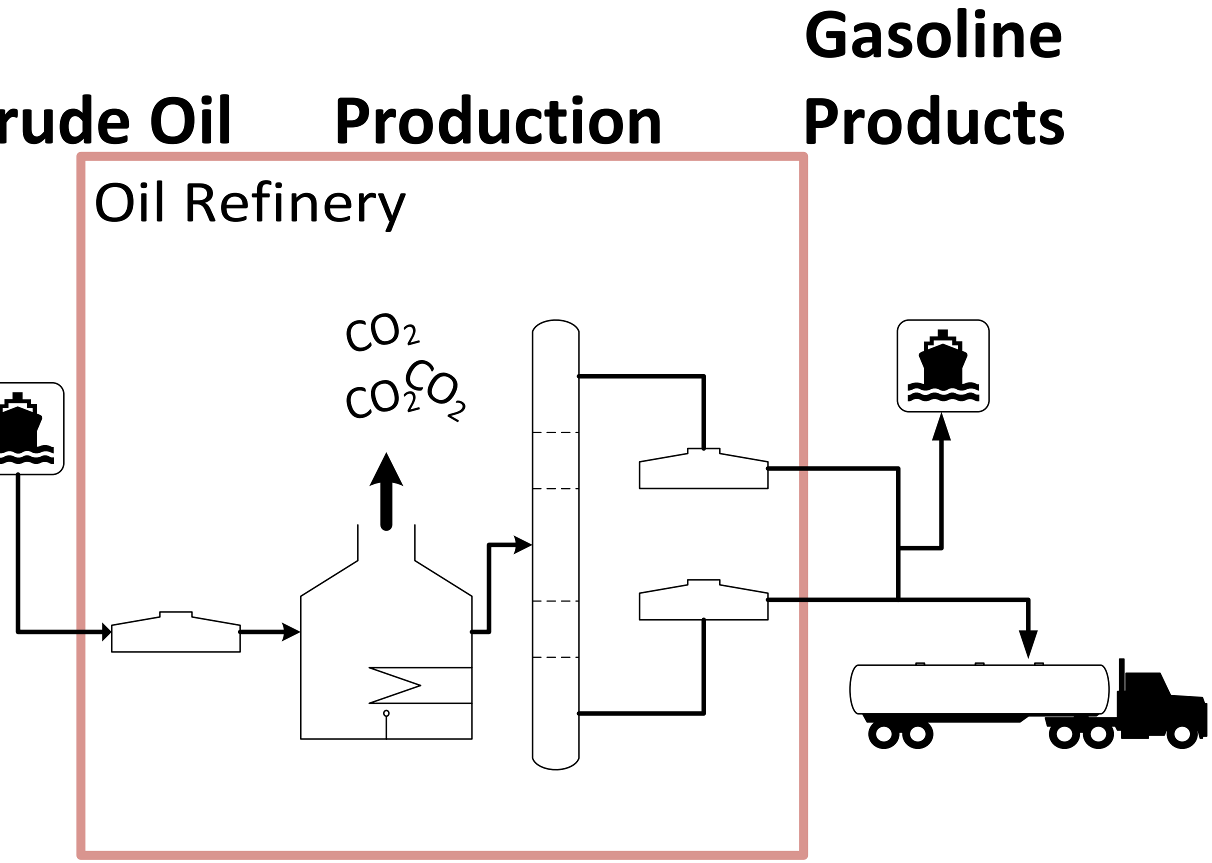
Oil refinery – case study



- **Crude oil:**
  11.4 Mton/year
- **CO_2 emissions:**
  1.6 Mton/year

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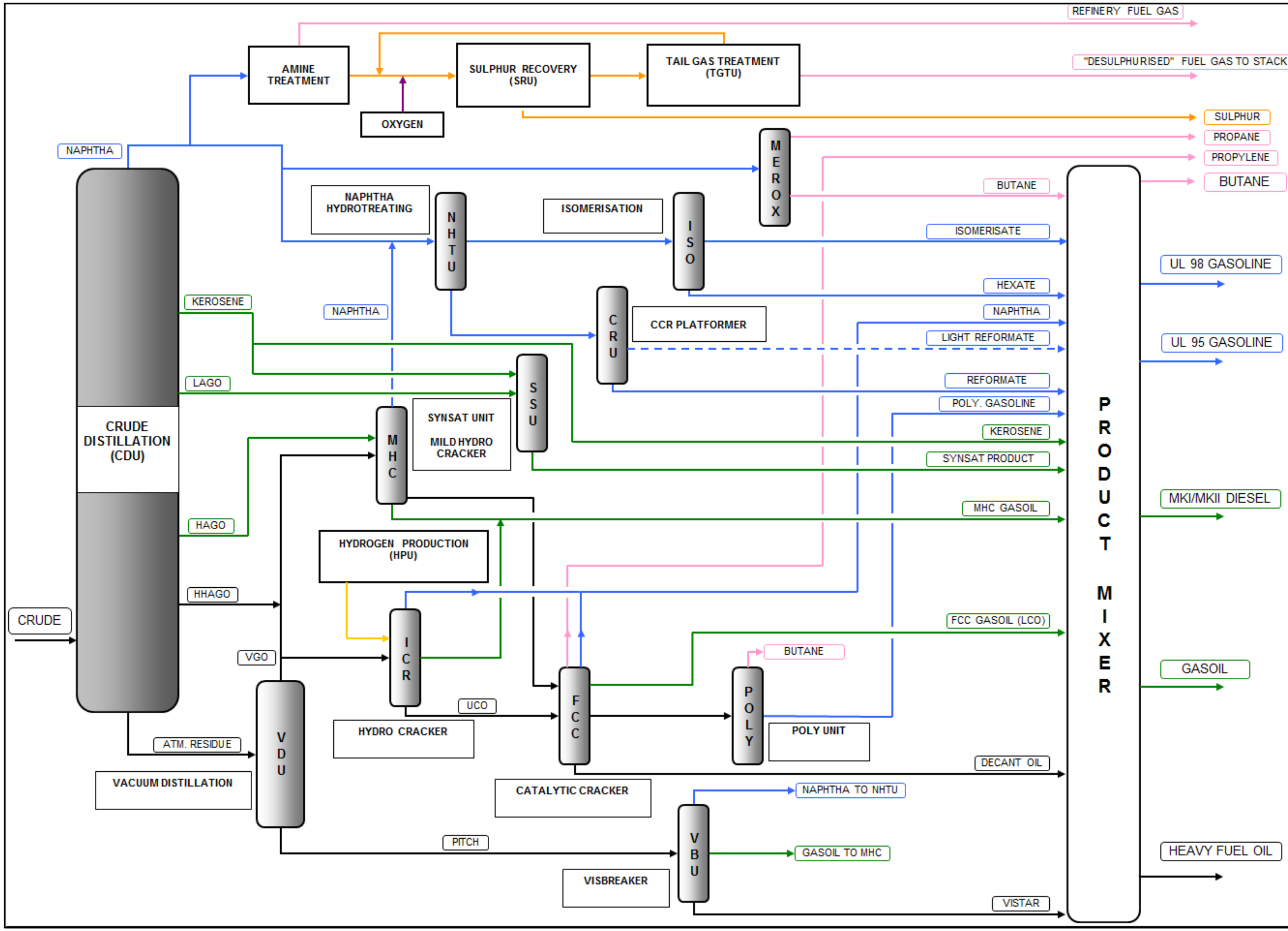
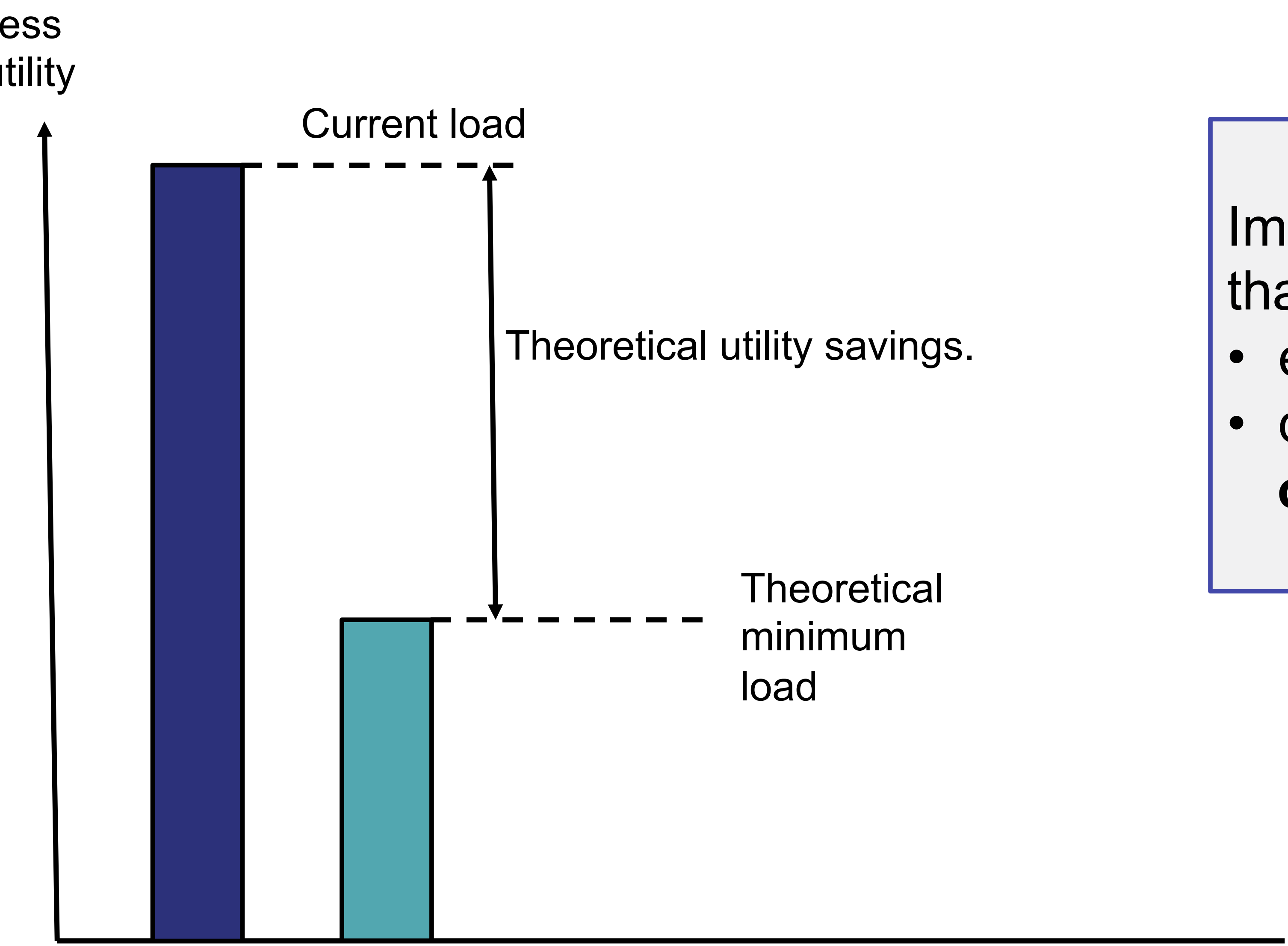


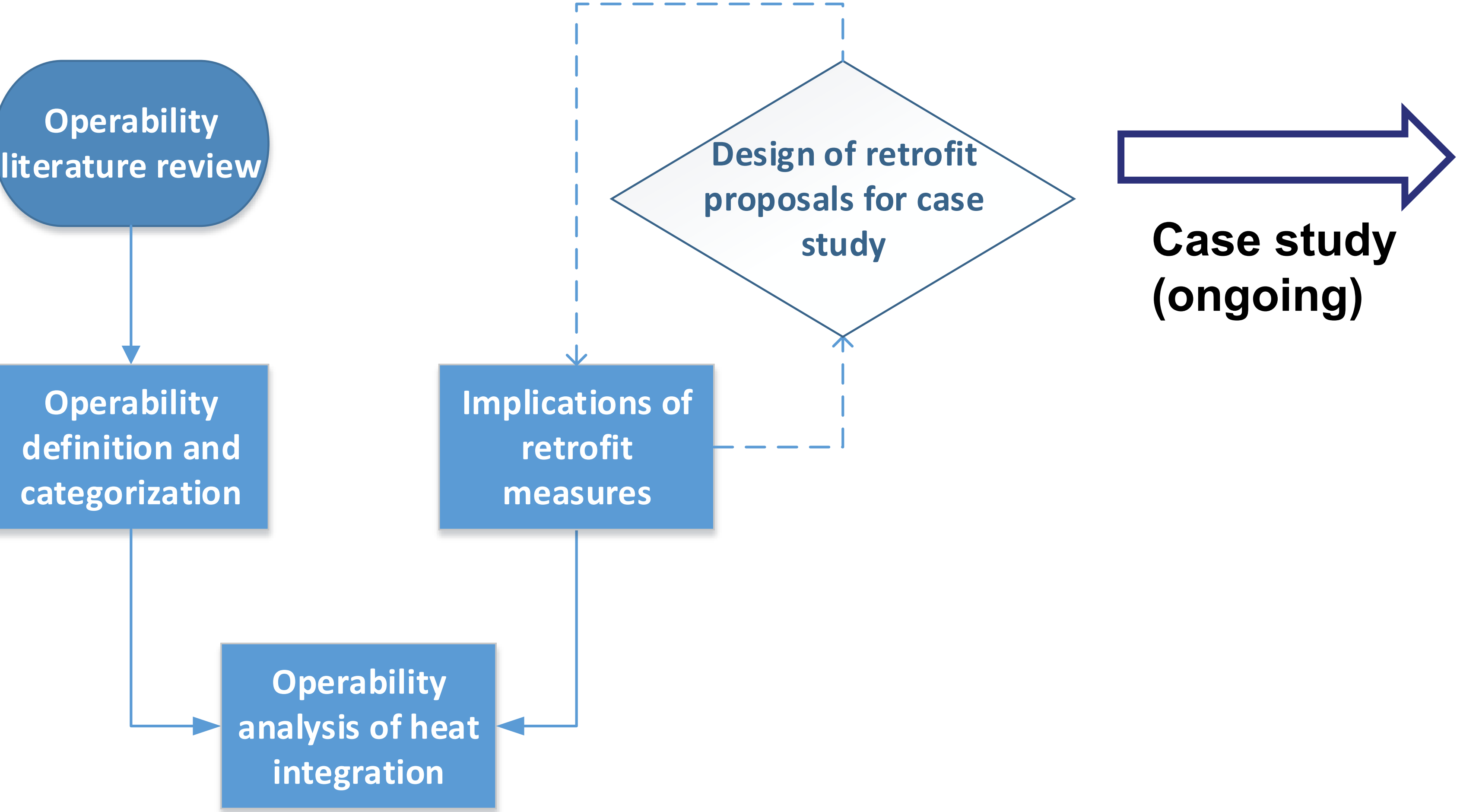
leat recovery potentials in industrial processes



Important to identify options that are:

- economically feasible
- do not affect process **operability** negatively

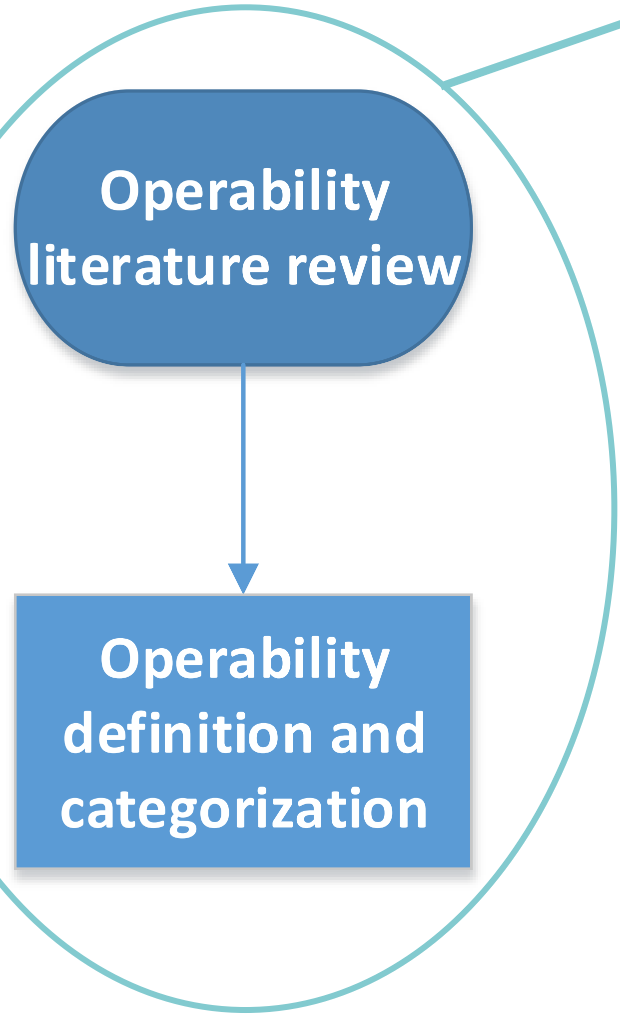
Context of work



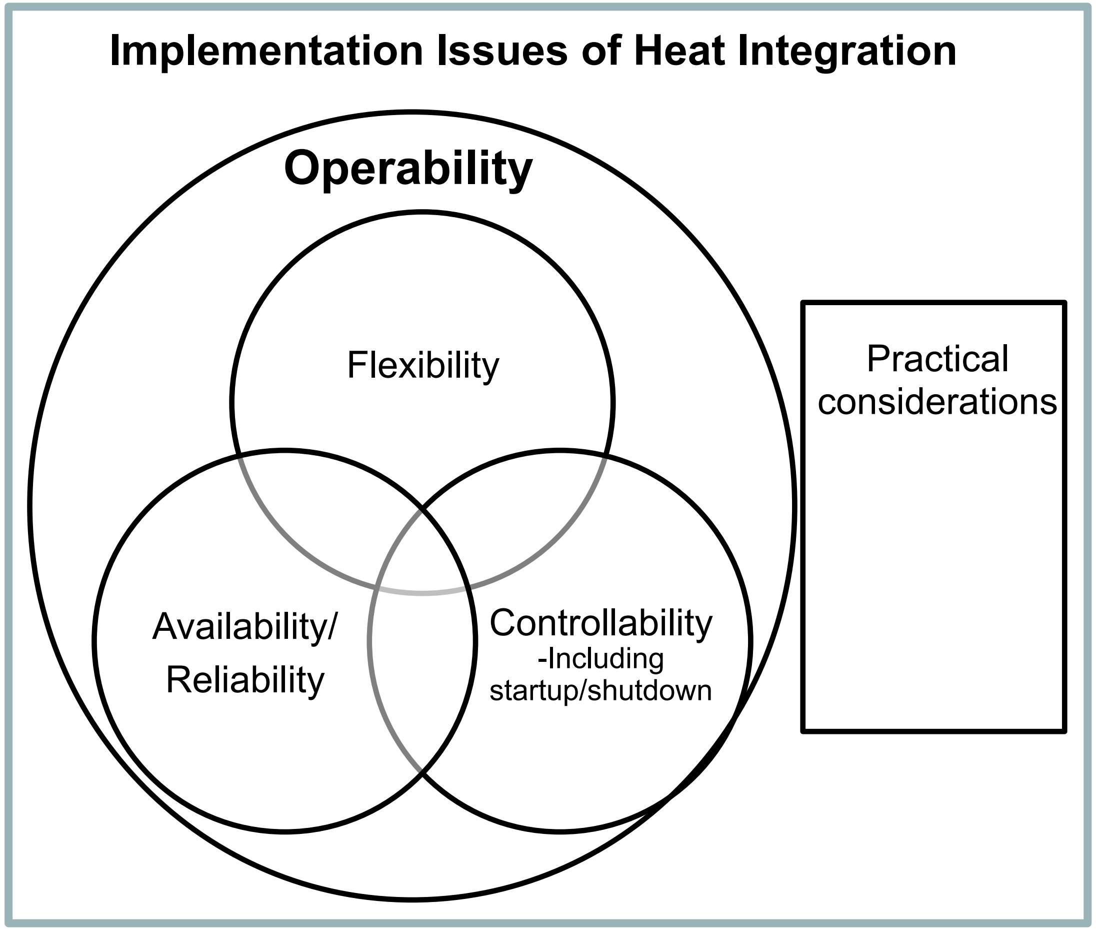
Interview survey with experts at the refinery. Discussions about retrofi proposals including various implications of heat integration.

- Process engineers
- Operation engineers
- Mechanical engineer
- Control engineers

erability



Operability is the ability to operate equipment, process units and total sites at different external conditions and operating conditions, without negatively affecting safety or product quality and quantity. This includes both steady-state and dynamic aspects of operation.



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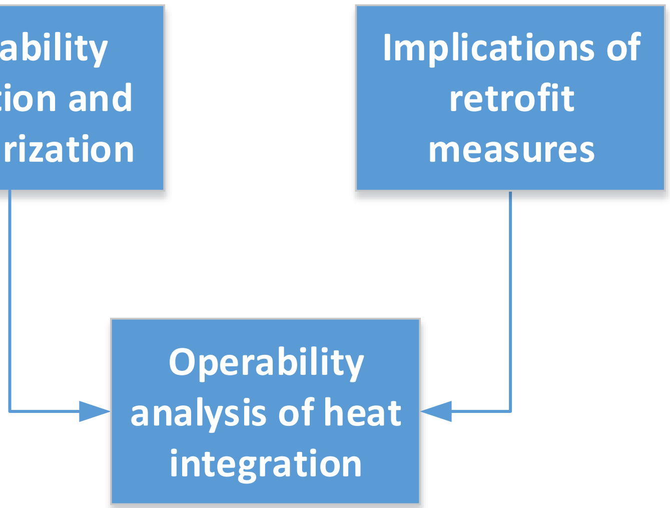
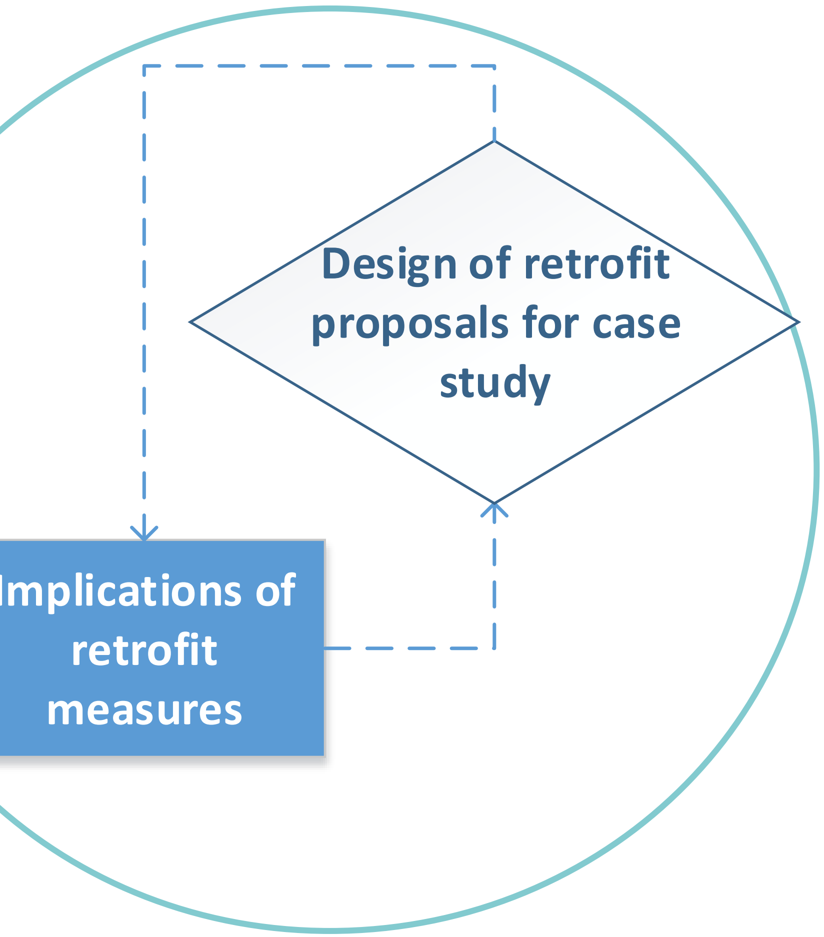
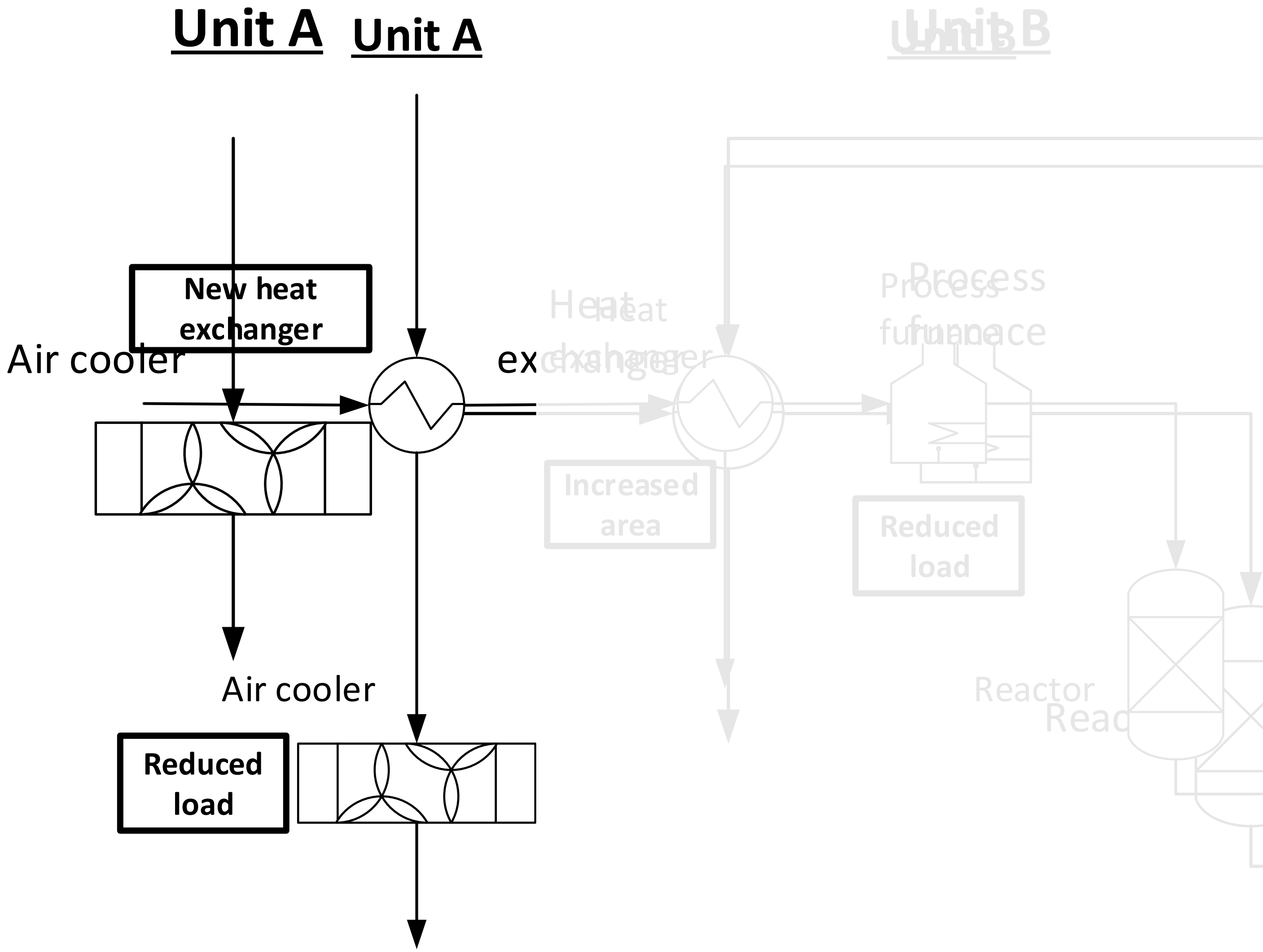


Implications of retrofit measures \ Operability factors and implementation issues	Flexibility	Controllability	Startup/ Shutdown	Reliability/Availability
1. De-bottlenecking	■			
2. Stream splitting		■		
3. Network complexity	■	■		
4. Reduced load on a furnace	■	■		
5. Reduced load on an air cooler	■	■		
6. Pressure drop	■	■		
7. Change in steam balance	■	■		
8. Shut down of furnace before reactor	■	■	■	
9. Heat exchange between process units	■	■	■	
10. New equipment installation				■
11. Rebuilding existing equipment				■
12. Pressure differences between streams or high pressures				■

xample - increased heat recovery





Operability factors and implementation issues / Implications of retrofit measures	Flexibility	Controllability	Startup/ Shutdown	Reliability/Availability	Practical considerations
1. De-bottlenecking					
2. Stream splitting					
3. Network complexity					
4. Reduced load on a furnace					
5. Reduced load on an air cooler					
6. Pressure drop					
7. Change in steam balance					
8. Shut down of furnace before reactor					
9. Heat exchange between process units					
10. New equipment installation					
11. Rebuilding existing equipment					
12. Pressure differences between streams or high pressures					

Concluding remarks

- Implementation of heat integration can involve many different process implications that can be connected to process operability.
- Considering operability for heat integration project can help to identify additional design constrains, multiple benefits and additional costs.
- Future work is needed to verify the relations between operability and heat integration and also to estimate the relative significance of the various relations.

Question for discussion

- What are the technical barriers for increased implementation of heat recovery projects?
  - Please share your knowledge and experiences.

Thank you for listening!

Sofie Marton
sofie.marton@chalmers.se