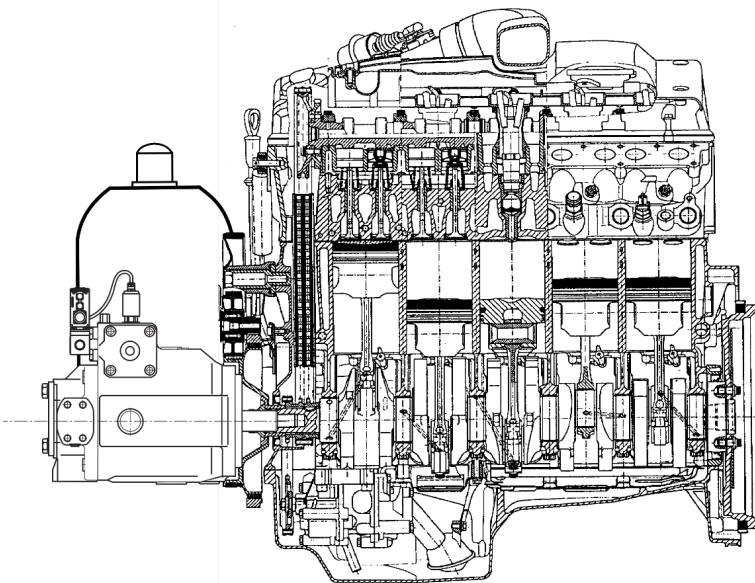




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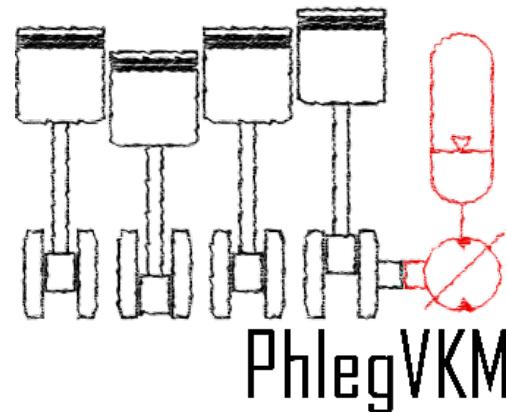
Phlegmatisation of a Combustion Engine for Reduction of Particle Transient Emissions

Prof. Danilo Engelmann | Felix Pult M. Sc

Cooperative Investigation



Project:



BFH| Abgasprüfstelle (AFHB) und Motorenlabor



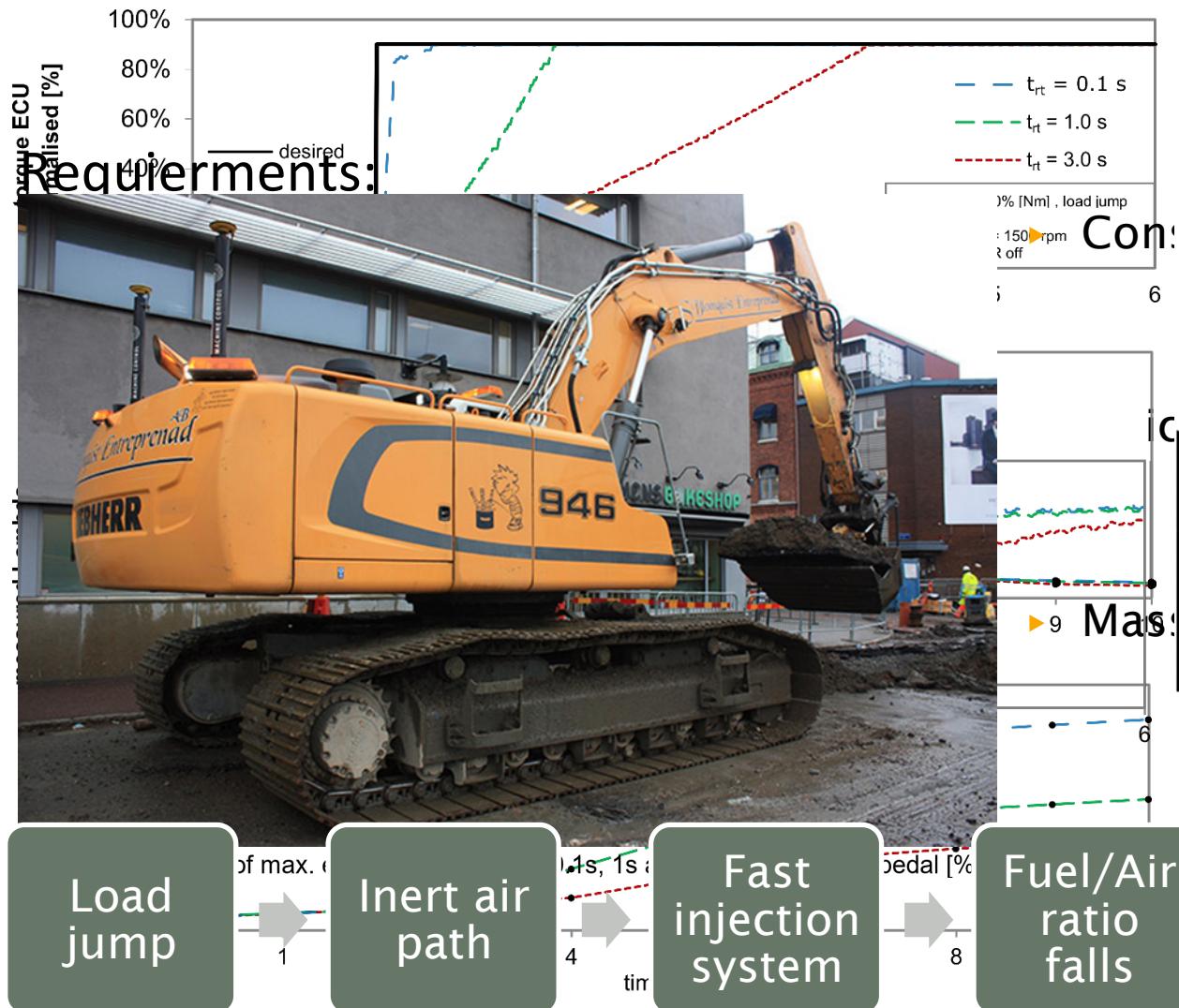
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Cooperation:

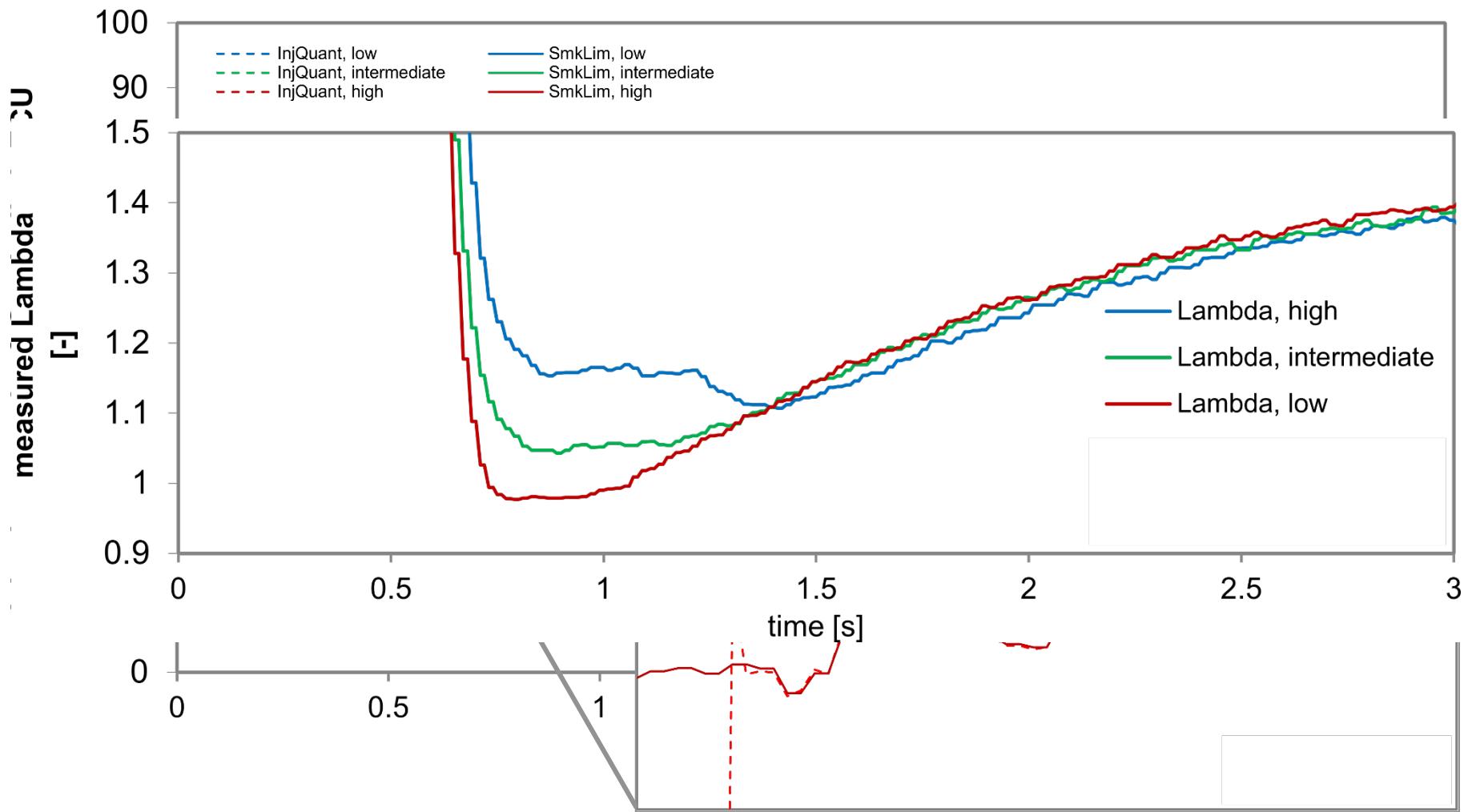
- ▶ Chair of mobile machines (KIT)
- ▶ AFHB (BFH)

testing together processed Ideas on
the testbench

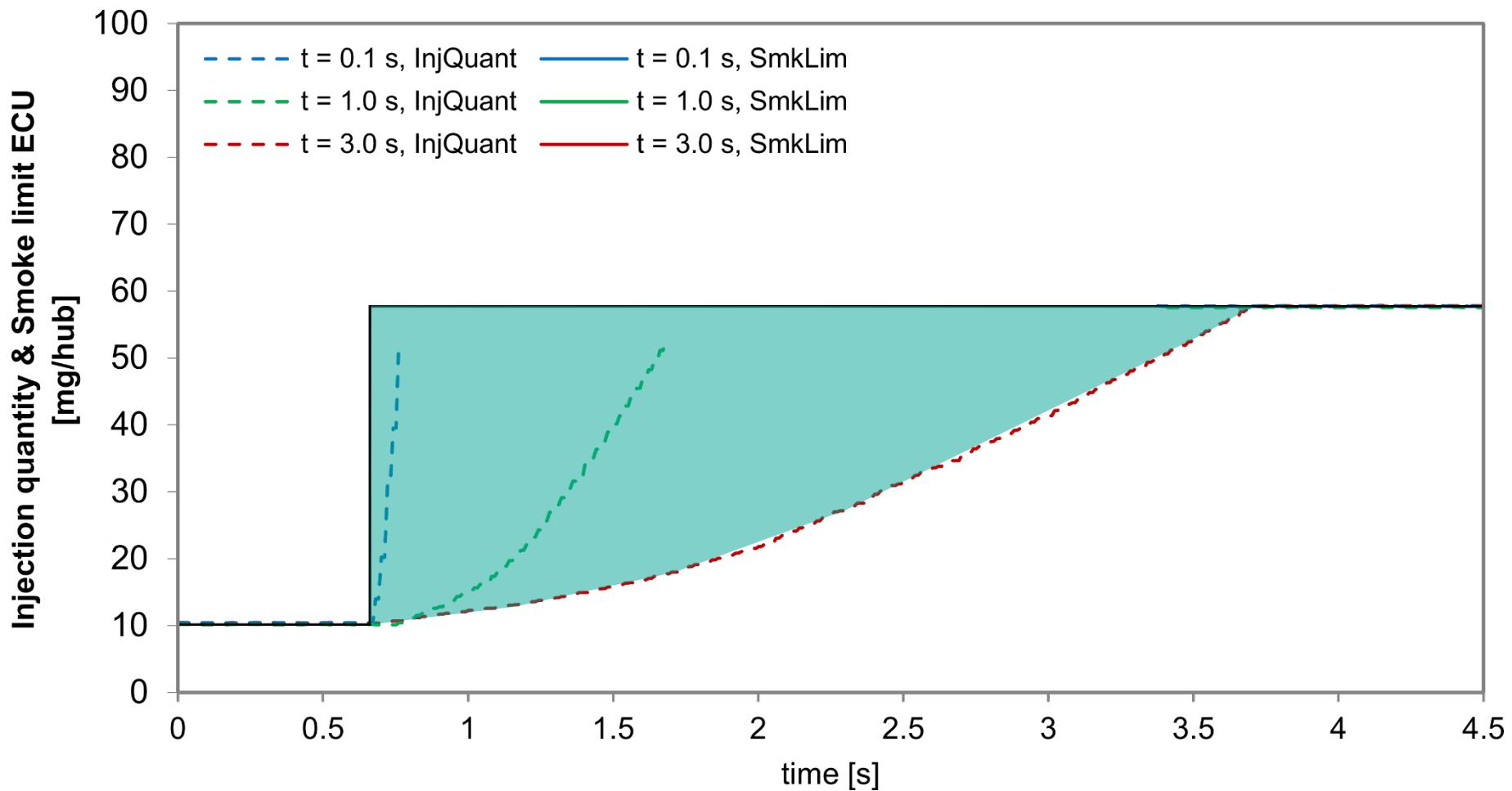
Motivation



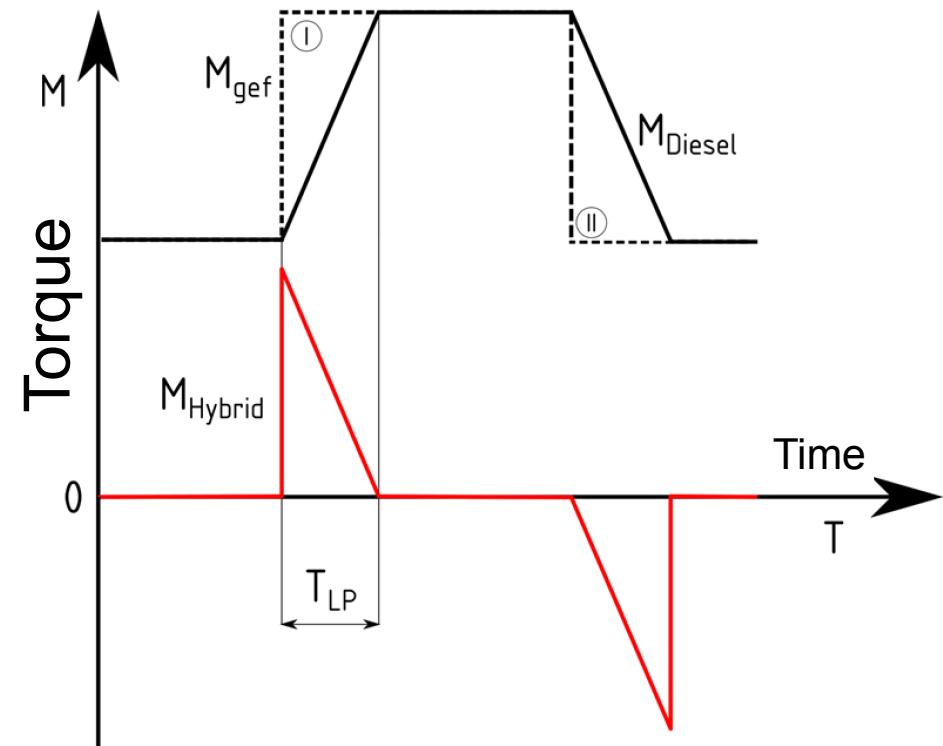
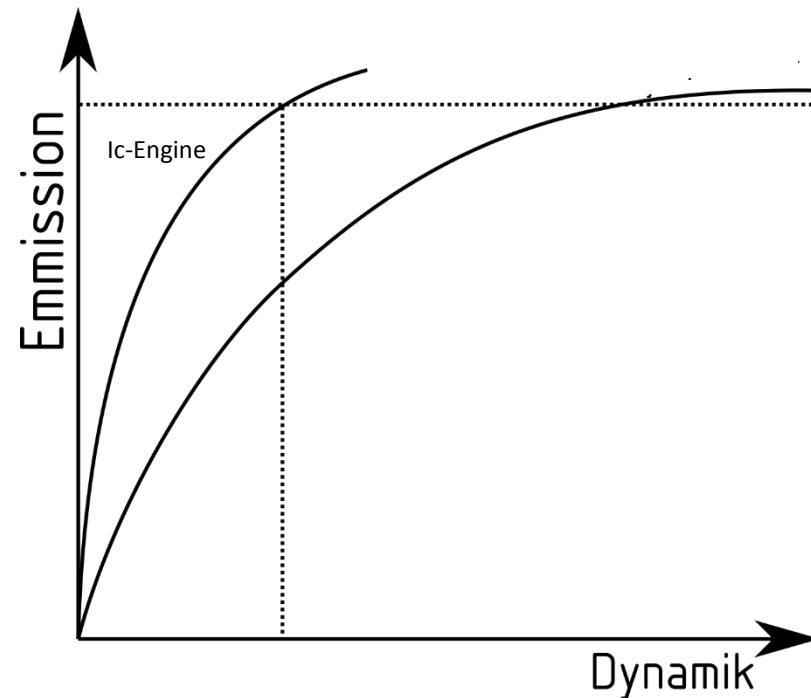
Trade-off: emissions vs. dynamics



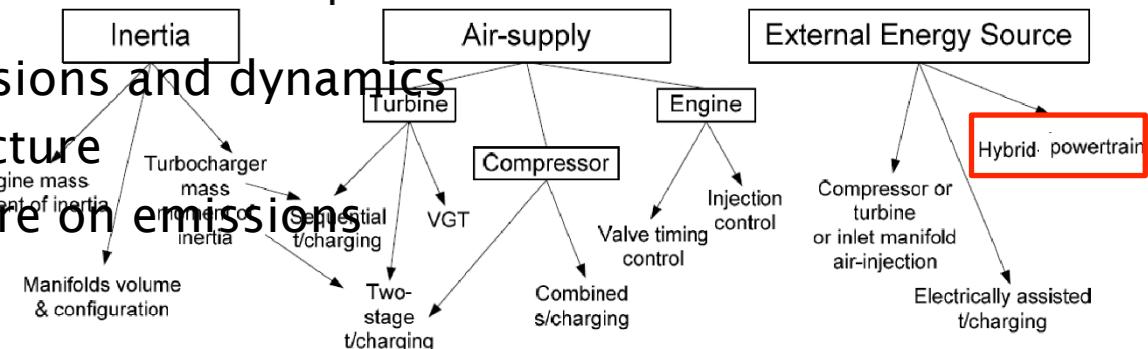
Trade-off: emissions vs. Dynamics II



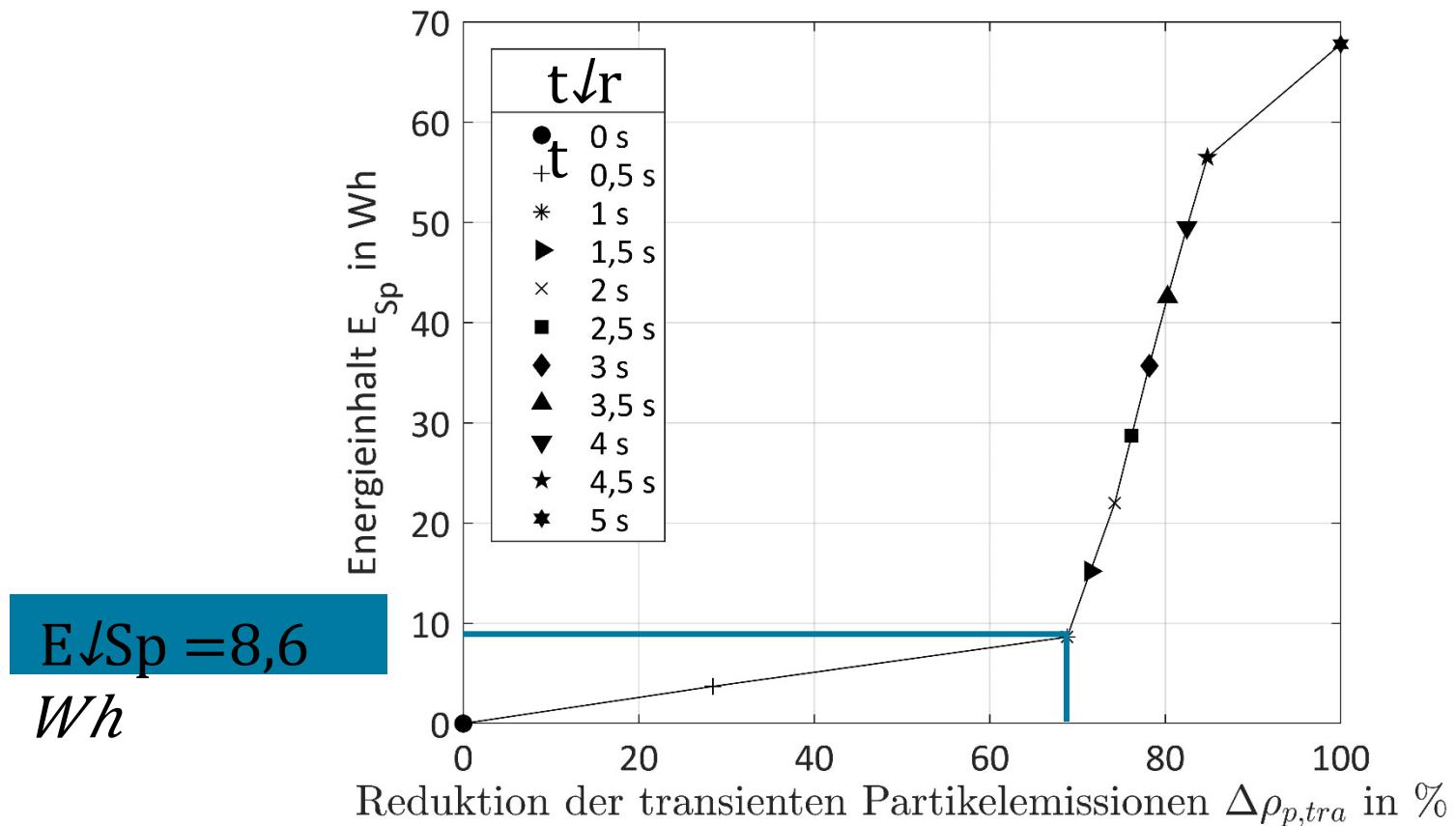
Hybrid Idea



- ▶ Tradeoff between emissions and dynamics
- ▶ Suitable P2 hybrid structure
- ▶ Focus of hybrid structure on emissions

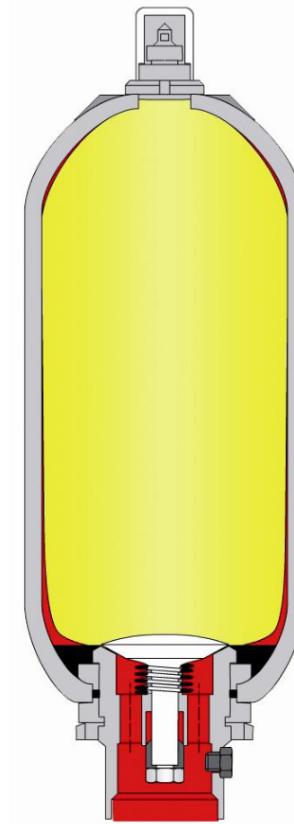
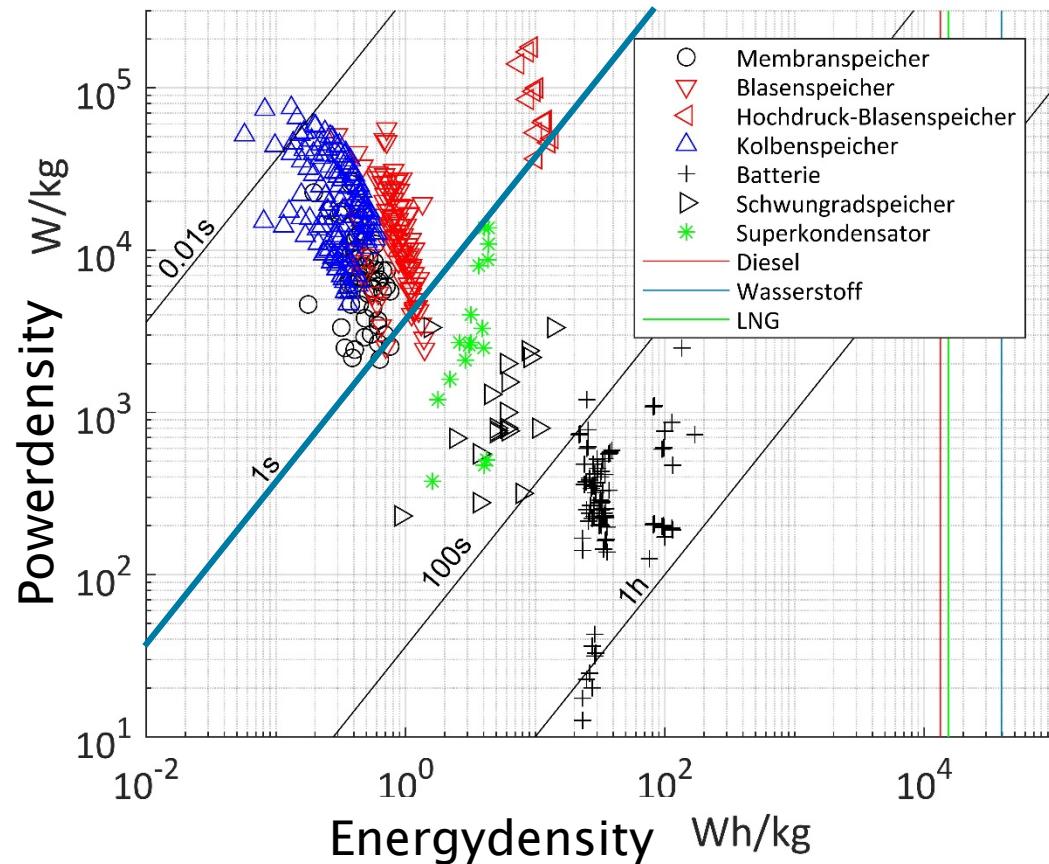


Energy content of the hybrid module



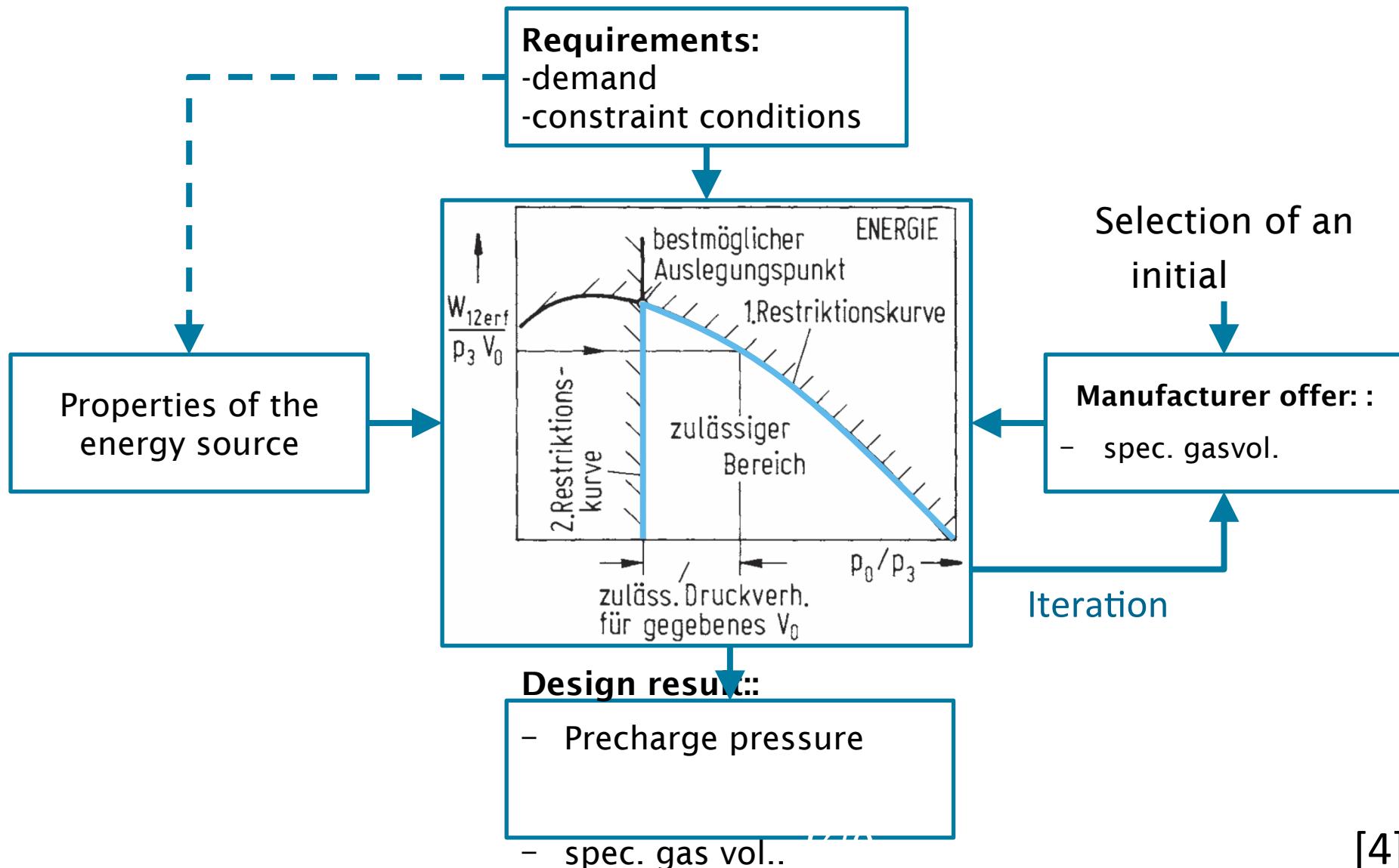
- Energy content using the example of a commercial vehicle diesel engine

Selection of the hybrid power source



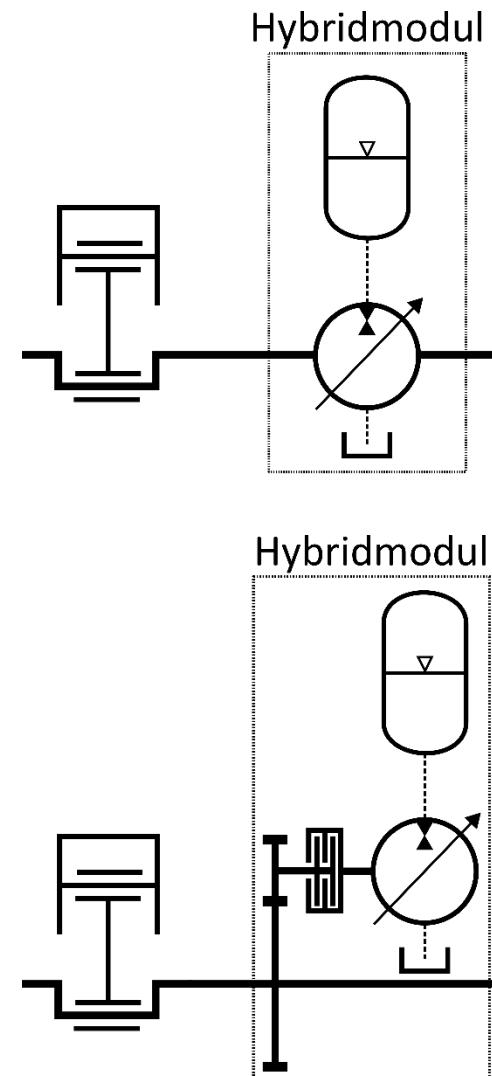
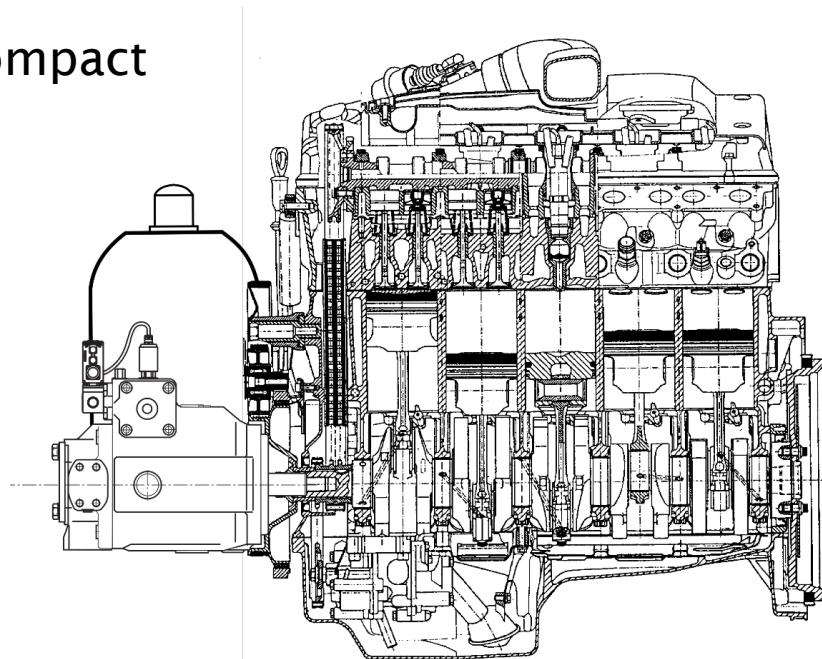
- Energy content $E_{\downarrow Sp} = 8,6 \text{ Wh}$ for VKM ramp-up time $t_{\downarrow rt} = 1 \text{ s}$

Design method for hydrostatic accumulator

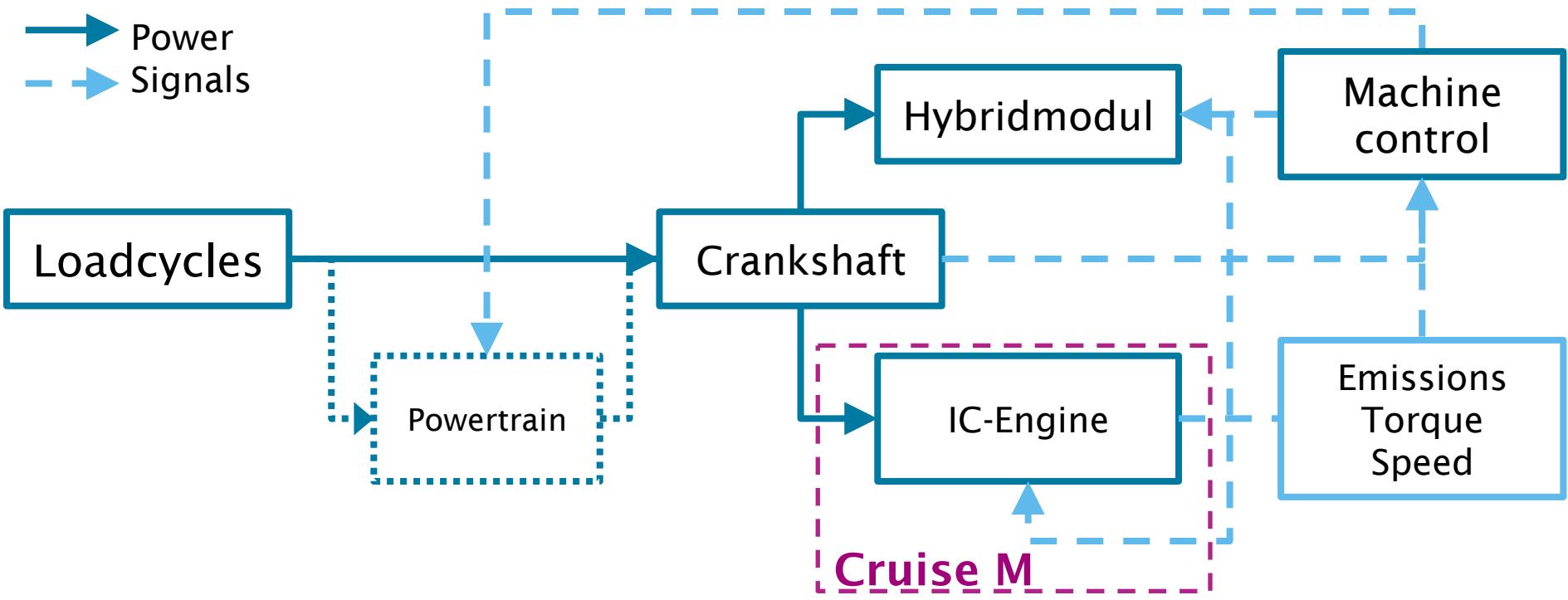


Selection of the hybrid module

- ▶ hydraulic hybrid P1 or P2
- ▶ close to the engine
- ▶ compact



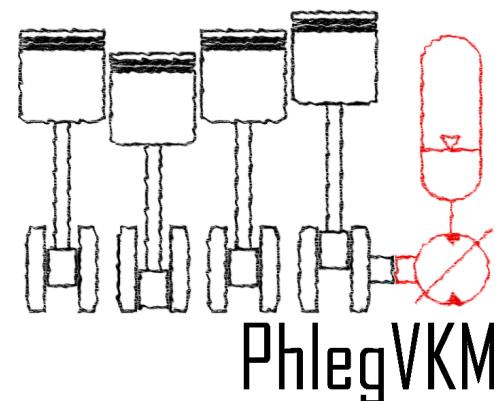
Simulation for Hybrid Selection



Summery and up comming

- ▶ Idea of a phlegmatised IC-Engine
- ▶ Development of a design method of a hydraulic hybrid
- ▶ Presentation of hybrid modules and simulation model
- ▶ Further development of the simulation model
- ▶ Validation of different operating strategies

→Obtain a general design tool



Thank you

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