

# Hydrogen driven municipal vehicle

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Project vehicle Bucher Schörling CityCat H<sub>2</sub>

## Targets of the project

Development of a short term marketable hydrogen driven vehicle and real world testing in 3 Swiss pilot regions.

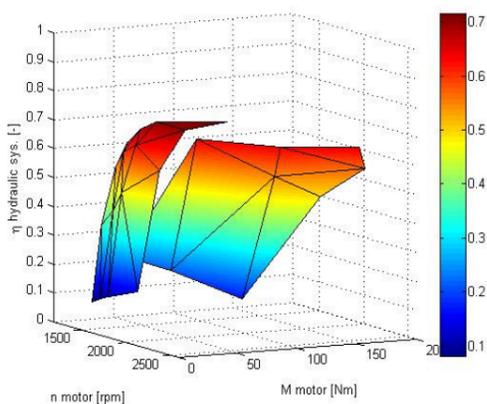
## Why a municipal vehicle?

Municipal vehicles are back-to-base-vehicles, which can be operated around one single hydrogen fueling station. Such vehicles are operated most of time in part load, where I.C. engines show a low, fuel cells a high energy efficiency.

The operation in public areas close to pedestrians offers a good platform for socio economic studies.

## Analysis of power train efficiency

The efficiency of the diesel-hydraulic power train was determined experimentally in the two operating modes (dislocation ride and cleaning mode).

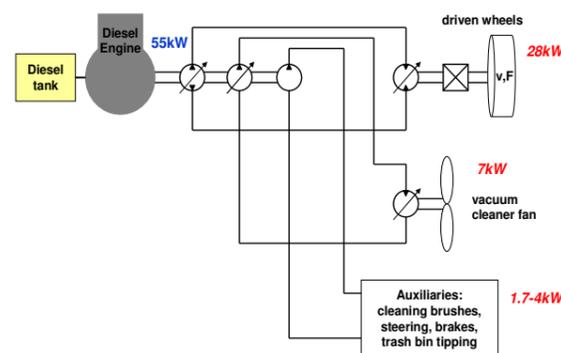


Efficiency map of hydraulic system

## Longitudinal dynamics model

The typical operation, consisting of dislocation and cleaning phases, was simulated using a longitudinal dynamics model. The model was used for the design and the specification of the power train components.

## From diesel-hydraulic to fuel cell/battery electric power train

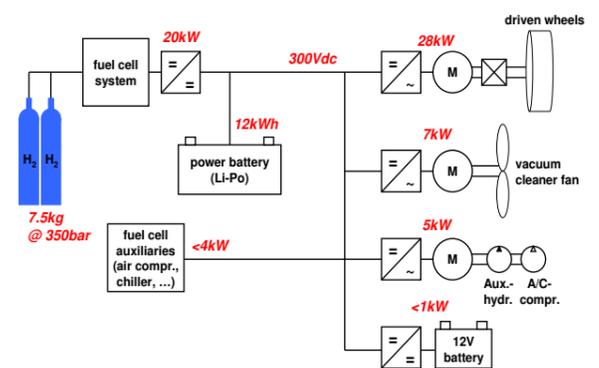


Diesel power train layout

Due to efficiency reasons, the 55 kW diesel engine and the hydraulic transmission have been replaced by a 20 kW fuel cell system combined with a 12 kWh LiPo battery, electric drives and a 7.5 kg hydrogen storage system.

## Hybrid mode

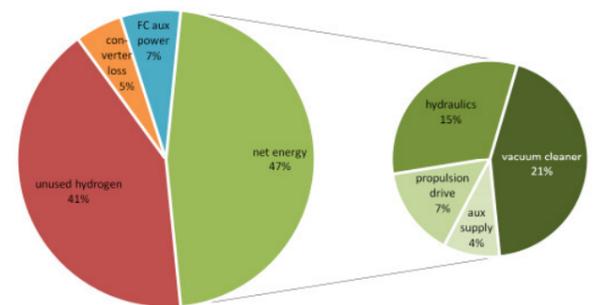
The fuel cell/battery hybrid mode allows a more stationary operation of the fuel cell than a fuel cell only concept, extending the fuel cell life time and enables energy recuperation.



hy.muve FC/battery hybrid power train concept

## Energetic consumption

The predicted hydrogen consumption of 0.5 kg/h could be verified during a real-world test.



Typical energy balance of hy.muve

Compared to the specified diesel consumption of 5 l/h, a reduction of more than 70% of tank-to-wheel energy could be achieved in that particular situation.