ELECTRO HYDRAULIC SYSTEMS FOR MOBILE APPLICATIONS

Leading with Purpose

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ENGINEERING YOUR SUCCESS.

Agenda

- WHY ELECTRIFICATION
- SYSTÉM DESIGN
- SOLUTION
- PARKER PRODUCTS
- MINI EXCAVATOR

WHY ELECTRIFICATION?

WHY ELECTRIFICATION?
Context

Global warming → CO_2 emissions, Paris agreement → Energy savings, energy availability energy costs, → Electrification → Flow on demand

WHY ELECTRIFICATION?
CHALLENGES

Efficiency | Cost

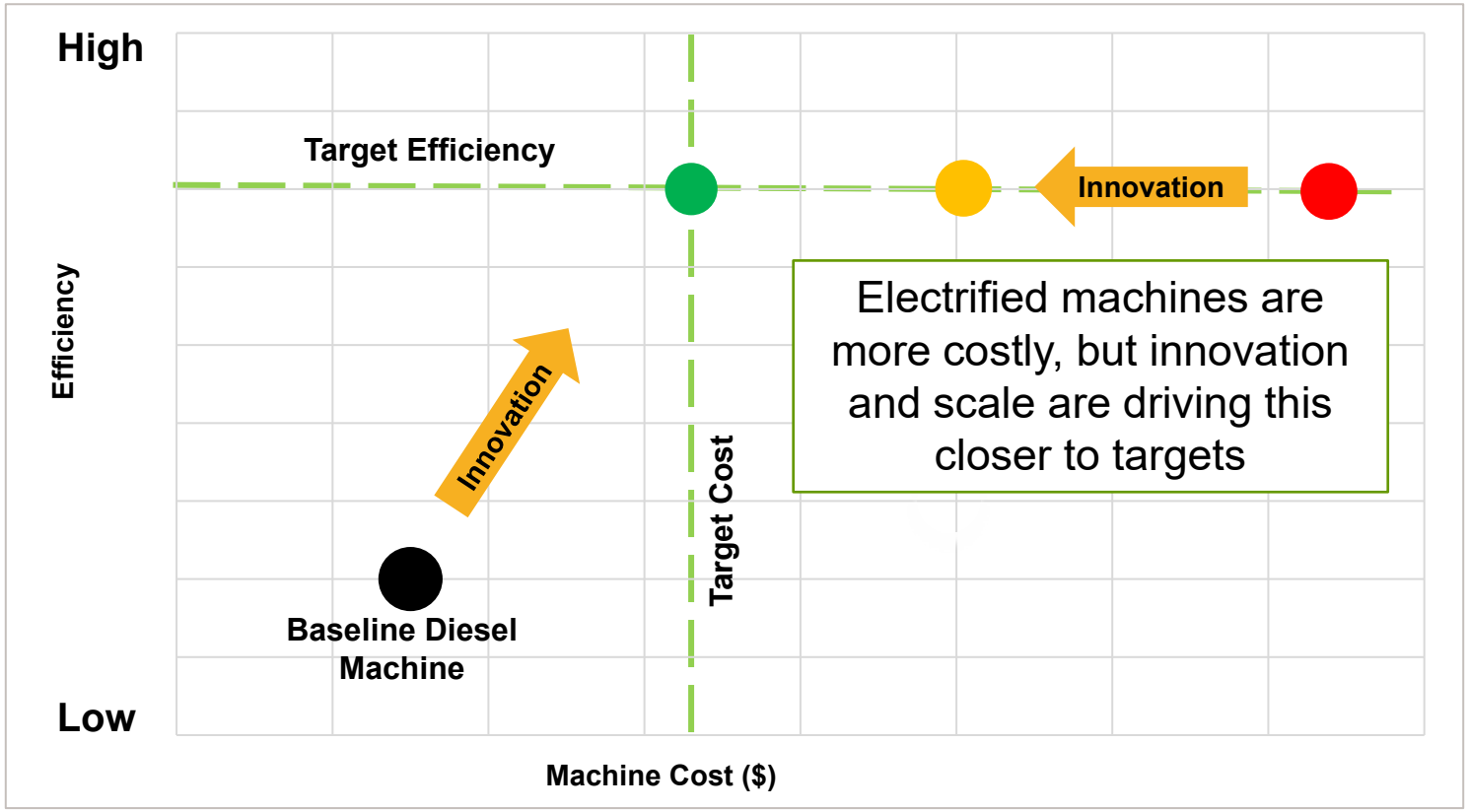
Performance | Energy Density

Diesel Tank

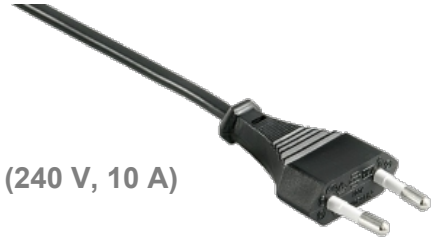
Size: 20 liter
Energy Storage: 200 kWh
Energy Density = 10 kWh/L
Weight: 17 kg

Battery Pack

Size: 30 liter
Energy Storage: 5 kWh
Energy Density = 0.16 kWh/L
Weight: 28 kg



POWER LIMITATION
Energy Transmission



(240 V, 10 A)

2.3 kW

(400 V, 64 A)

45 kW

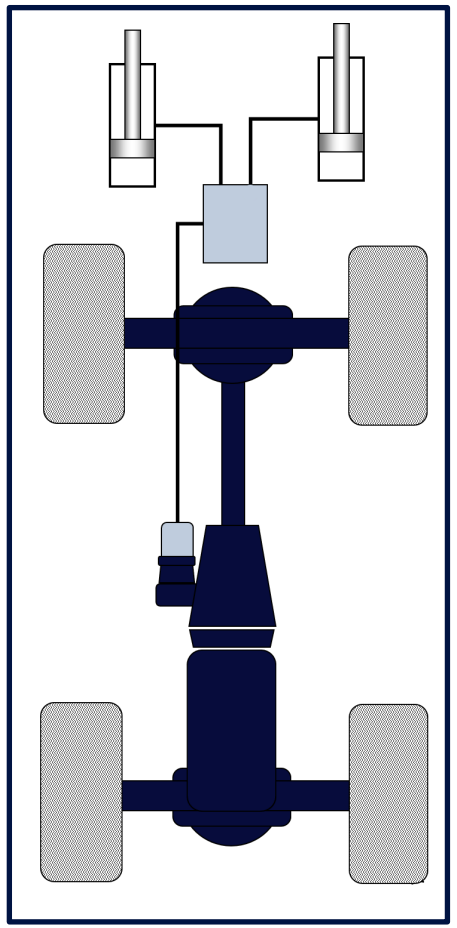
(30 l/min)

20 000 kW

SYSTEM DESIGN

Electrification - Flexible Machine Layout

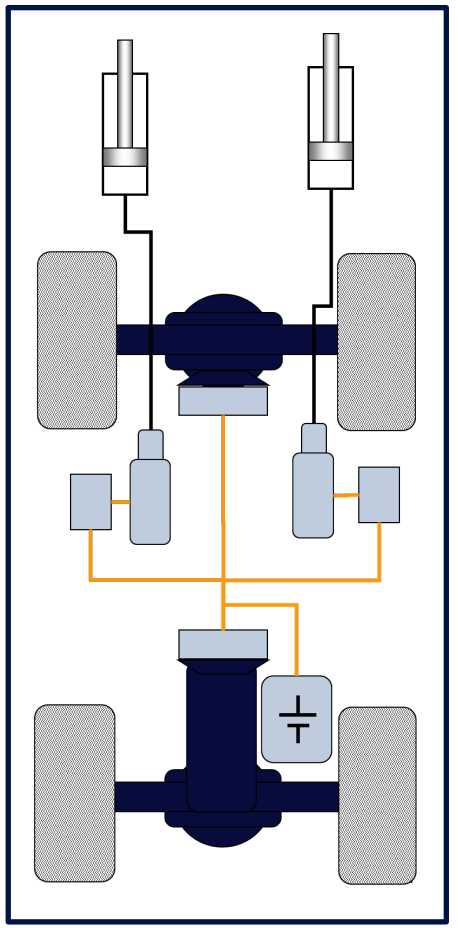
System Design



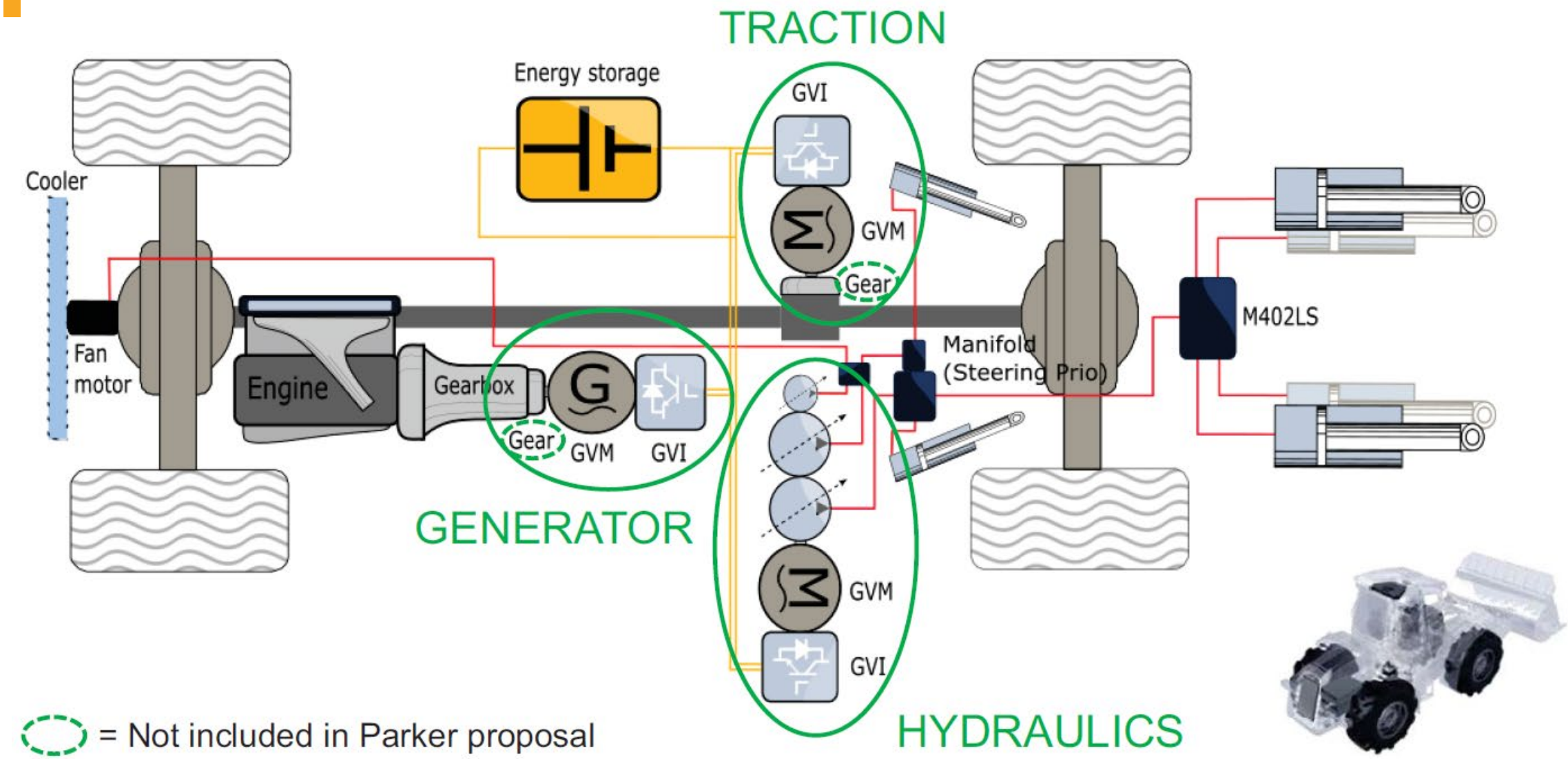
Design optimization - Components where they are needed.

More efficient to transport energy electrically than hydraulically.

Flexible installations.



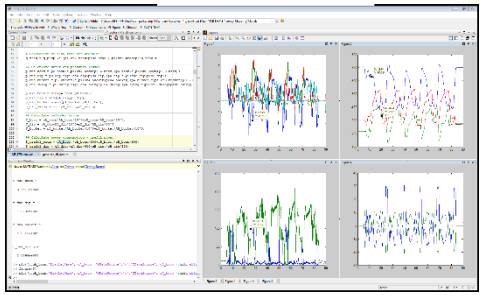
ELECTRIFICATION

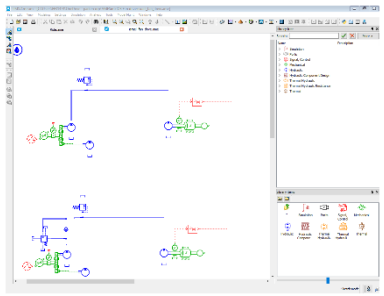


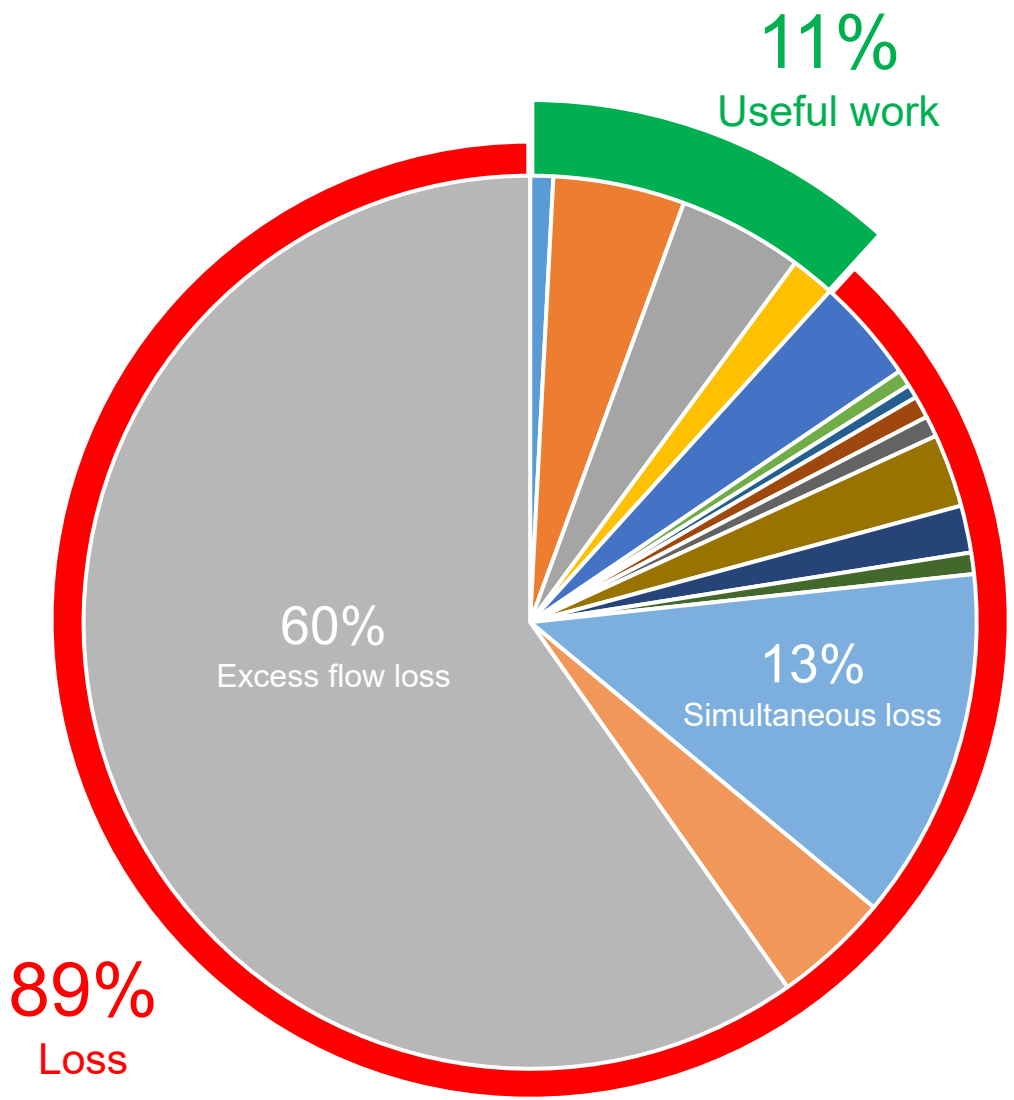
Energy losses analyze
System Design

Data acquisition
Parker SensoControl

Simulation/calculation model
In Matlab and/or AMESim







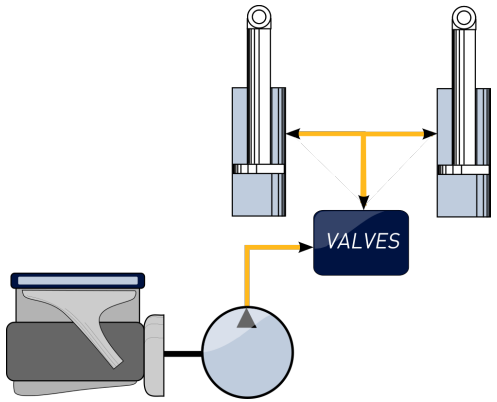

SOLUTION

ELECTRIFICATION
SYSTEM DEVELOPMENT

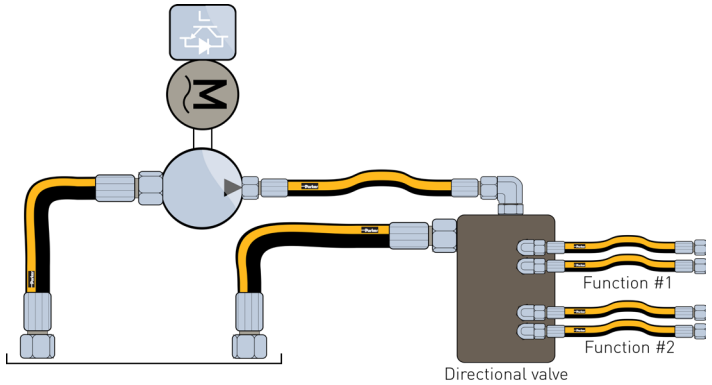
PERFORMANCE / EFFICIENCY

MACHINE EVOLUTION

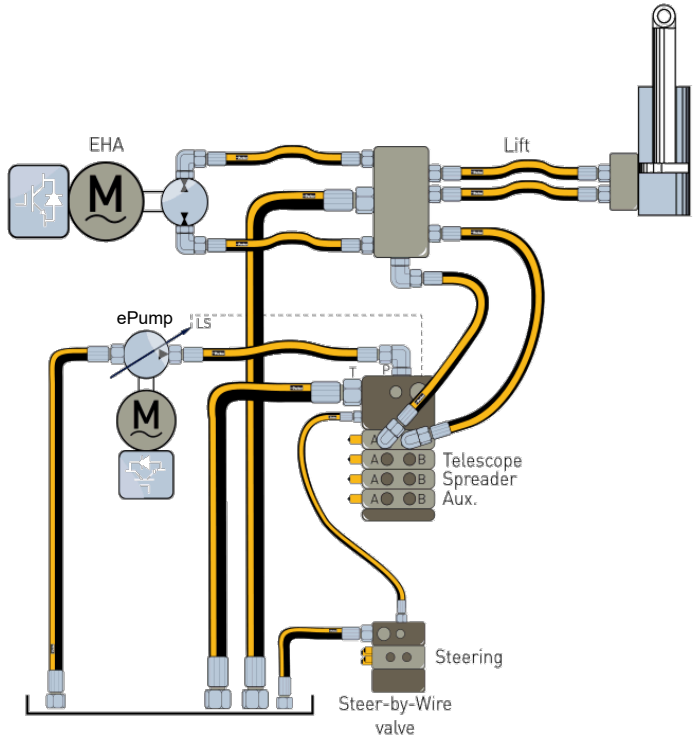
Traditional LS pump



ePump systems



Electro Hydrostatic Actuation & ePump systems



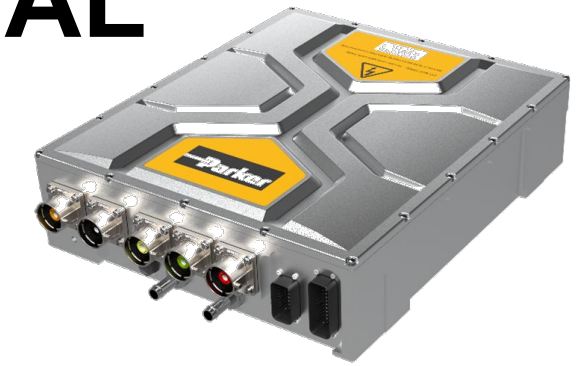
Solutions that meet customer expectations


PRODUCTS

ELECTRIFICATION
MOBILE ELECTROMECHANICAL

Mobile inverter for traction and work functions

- Rugged power electronics
- Safety standards compliant
- Integrated specialized functionality



GVI – 2nd generation

Mobile motor for traction and work functions

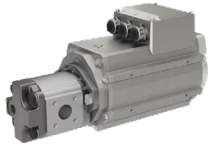
- High efficiency and dynamic response
- Enable hydraulic controls and diagnostics
- Improved performance with multiple pump technologies

GVM

ELECTRIFICATION PRODUCTS
CONFIGURED ePUMPS

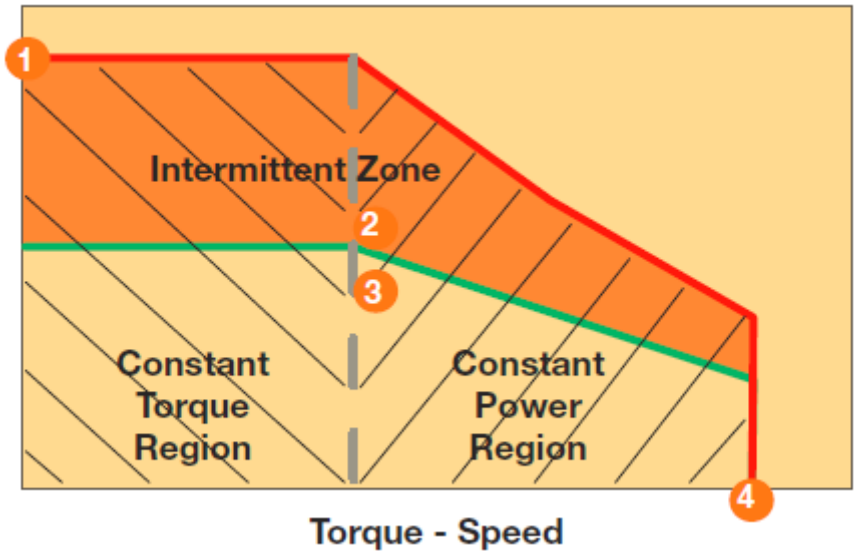
Standard motor-pump combinations combining GVM Series PMAC motors with Parker mobile hydraulic pumps

- Robust motor-pump interfaces
- Patent pending wet spline technology
- Tested and catalogued performance
- ePump ordering with single part number

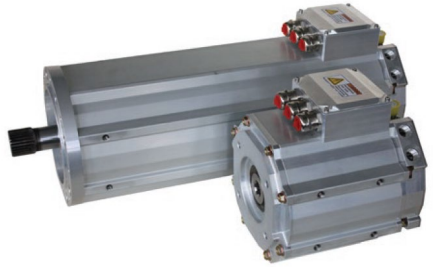
Pump Type		Attributes
Variable Piston		High efficiency Reduced motor size
Bent Axis		Highest efficiency
Vane		Lowest noise
Gear		Lowest cost

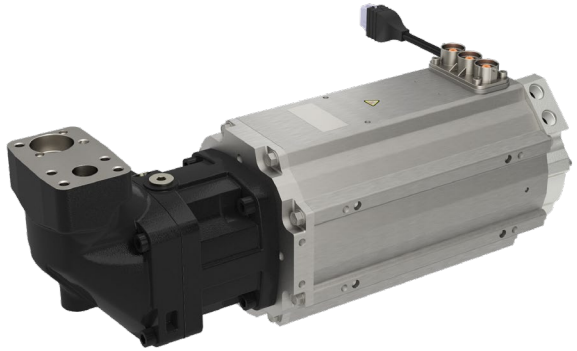
Hydraulic Pumps/Motors
Configured ePTO

- A highly efficient system combination including Inverter, Motor and Hydraulic Pump
- High dynamic response over the wide range of speed and torque control to achieve high hydraulic performance
- Optimized power density over the work cycle with high-efficient liquid cooling capability



Torque - Speed





Mobile Hydraulic
Valves solutions

Centralized Hydraulic solutions -

Directional valves

- Compact and cost-effective installation
- High controllability performance
- Solenoid & CAN - interface

P70

VA 300

Combo

Distributed Hydraulic solutions

- Manifold system solutions

Manifold solutions

Electronics
CONTROL SYSTEMS

Functional safety controllers:

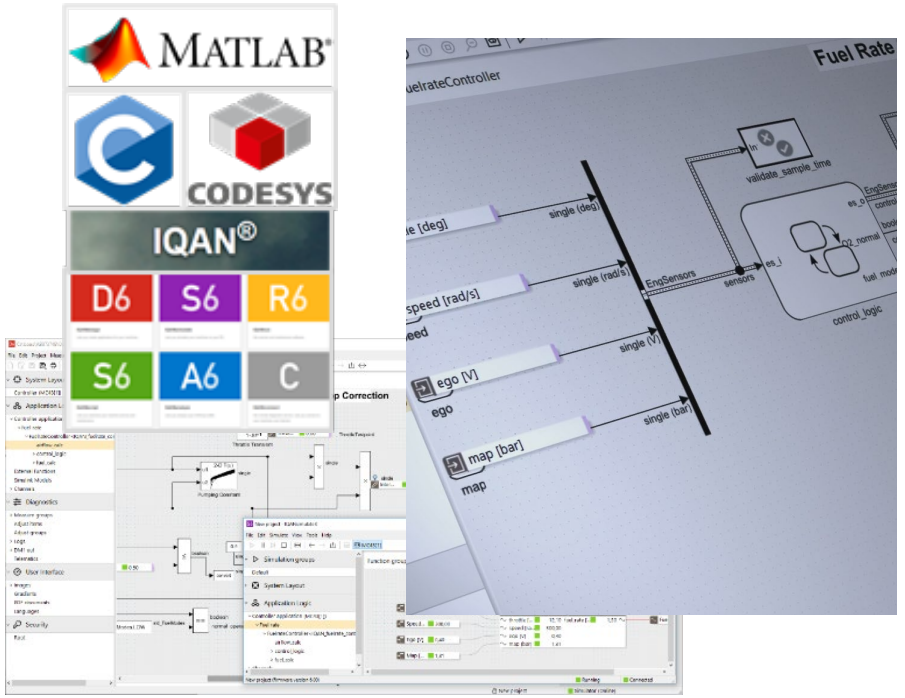
- IQAN for Functional safety applications

Model based function environment:

- System simulation including Matlab / Simulink models in Parker software tool chain

Sensors:

- Wide range of Mobile Sensors to optimize close loops machine control



Electromobility system

Components for System selection

Variable Pump

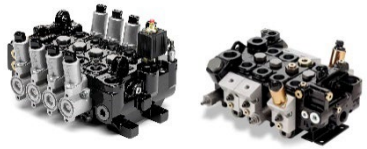
Fixed Pump-Piston

Fixed Pump-Vane

Fixed Pump-Gear

Custom Manifolds

Valve LS



Valve OC

Electric Motor

Inverter

ECU with SIL2

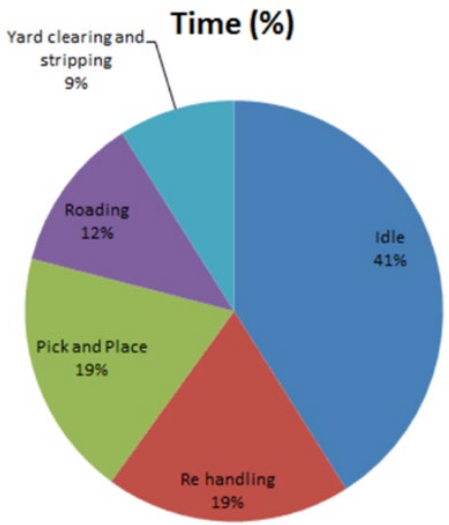
Electric Joysticks

Hydraulic Joysticks:

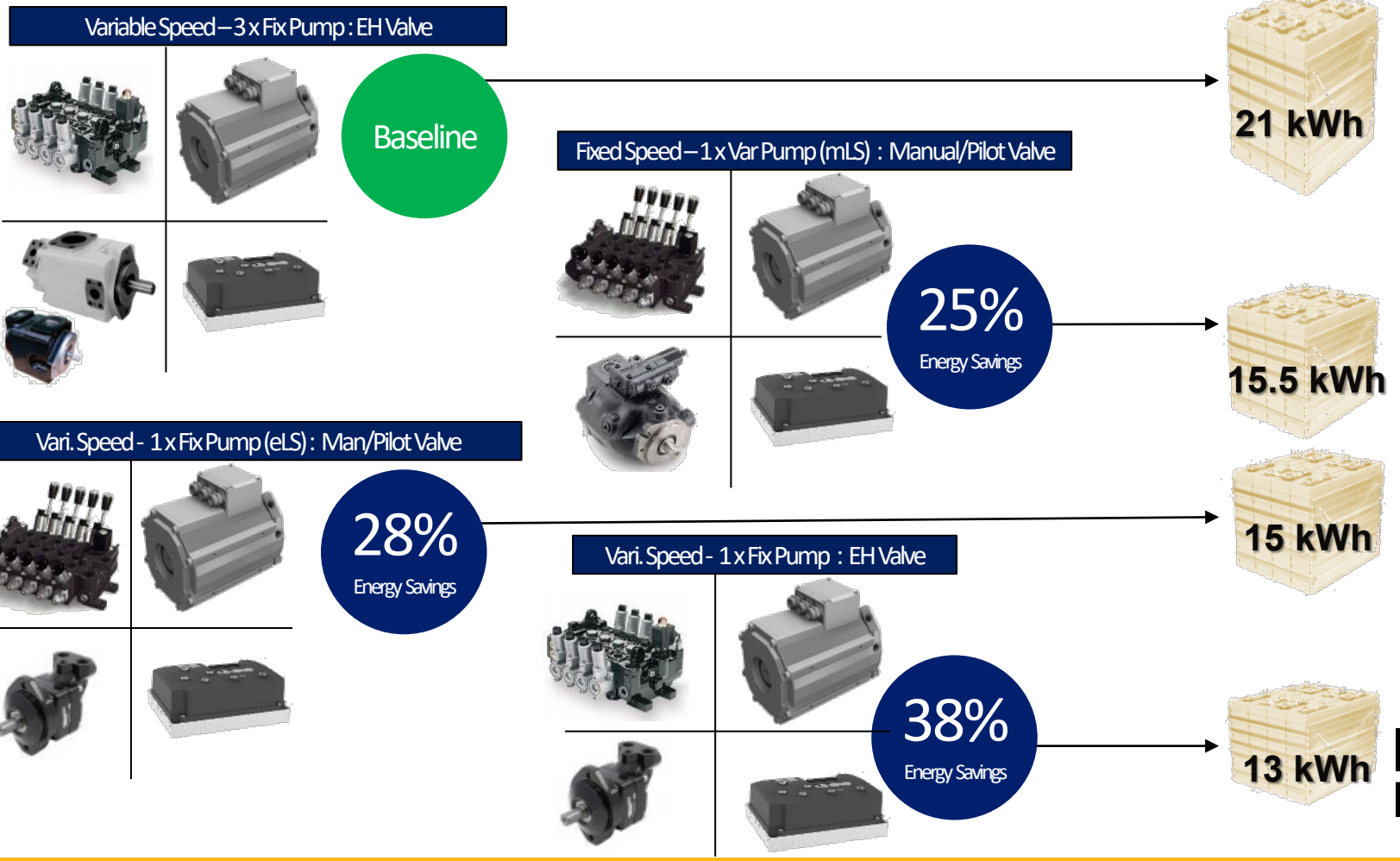
Coolers

Mini Excavator

Battery Sizing - APPLICATION: 4 HOURS OF CONTINUOUS 90 DEGREE DIGGING



Optimize system cost
or
Extended operation time




MINI
EXCAVATOR

Mini Excavator

Mini Excavator

Mini Excavator
System comparation

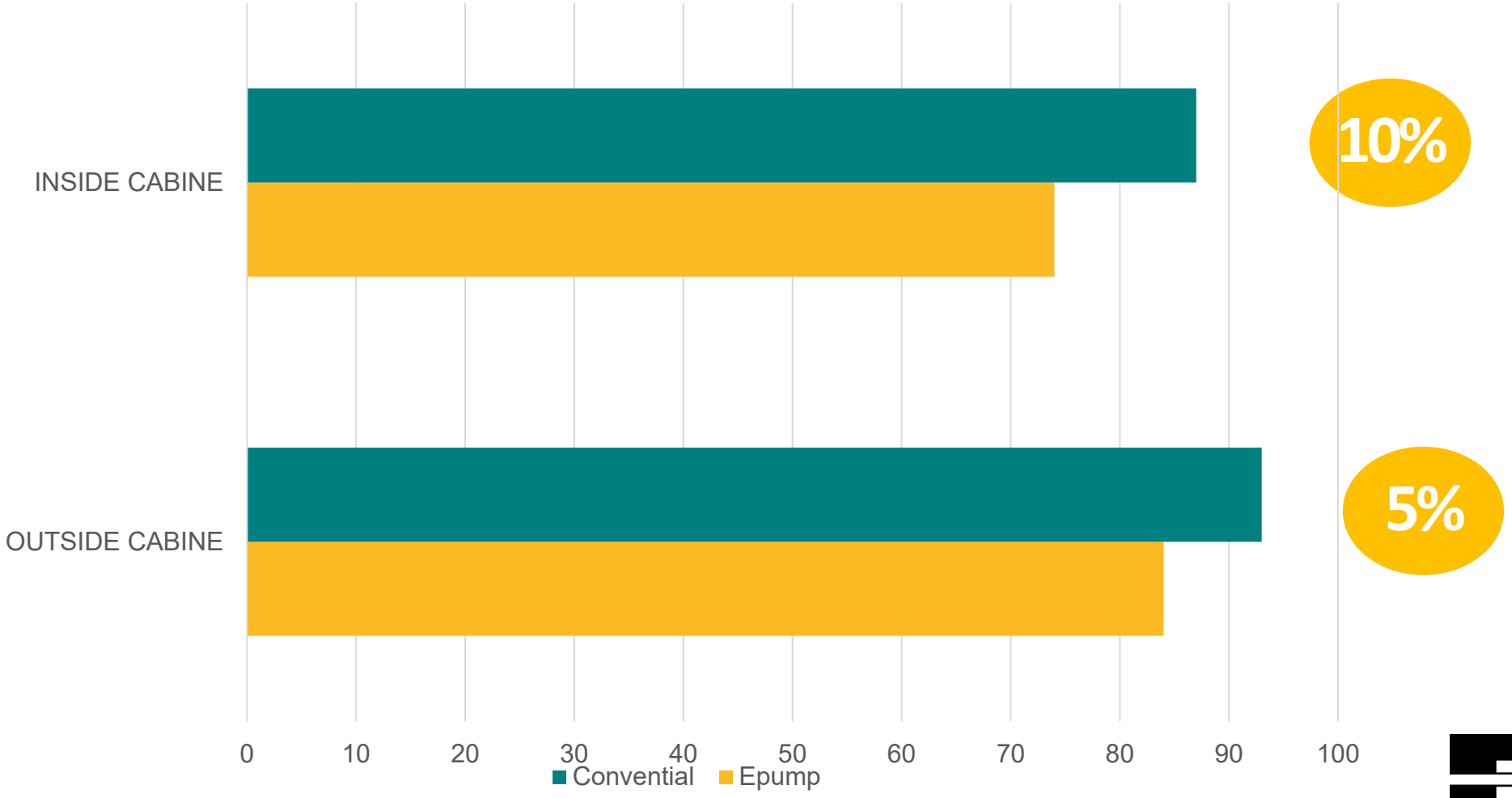
System 1

System 2

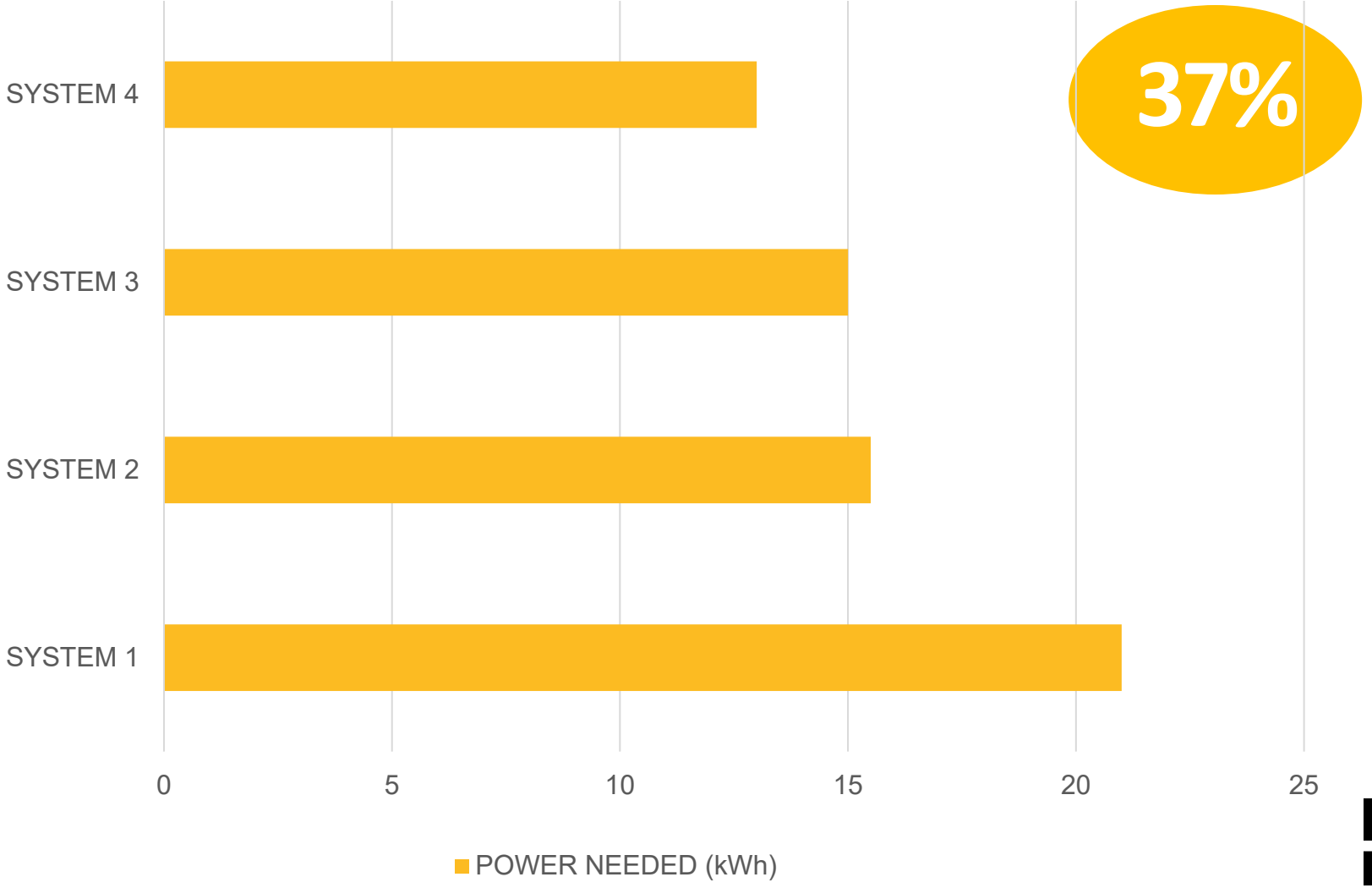
System 3

System 4

Mini Excavator
Noise reduce



Mini Excavator
Electrification gains



Thank You

PH
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NYSE