
Decarbonization perspective for construction machines

A3PS | Eco-Mobility 2023

DI (FH) Christoph Kiegerl

LIEBHERR

Liebherr-Werk Bischofshofen GmbH





Potential for
electrification.

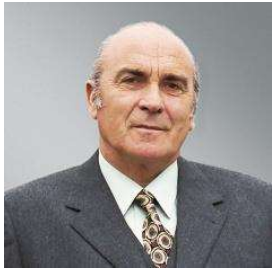


Hofburg, Vienna, 16.11.2023, 08:30

Agenda

- Company introduction
- Wheel loader product portfolio
- Decarbonization in the construction machinery business
- The role of battery-electric and hydrogen drives
- Current projects and outlook

Group overview



1949

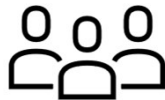
Founded by Hans Liebherr
in Kirchdorf an der Iller,
Germany



Parent company
Liebherr-International AG
based in **Bulle, Switzerland**

**Liebherr is a
family-run
technology
company**

13

 Product segments

51.321

Employees

40

Production sites



12.589

Turnover in € mio

>140

Companies

<https://www.liebherr.com/shared/media/annual-report/annual-report-2022/pdf/facts-and-figures-2022.pdf>

Earthmoving machinery production plants



Liebherr-Hydraulikbagger GmbH

Kirchdorf an der Iller (GER) | since 1949

R+D

Production

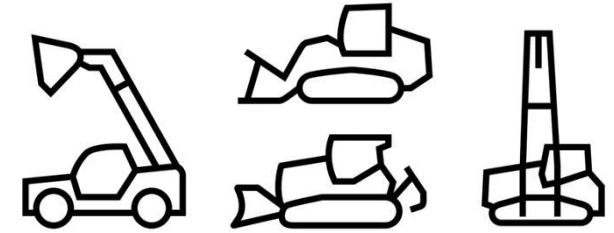


Liebherr-Werk Bischofshofen GmbH

Bischofshofen (AUT) | since 1960

R+D

Production



Liebherr-Werk Telfs GmbH

Telfs (AUT) | since 1976

R+D

Production

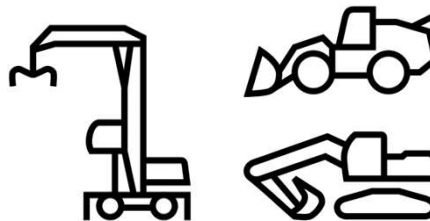


Liebherr-France SAS

Colmar (FRA) | since 1961

R+D

Production



Liebherr Machinery (Dalian) Co., Ltd.

Dalian (CHN) | since 2002

Production

Construction machines
for all divisions

Liebherr-Brasil Eireli

Guaratinguetá (BRA) | since 1974

Production

Liebherr in Bischofshofen, Austria

Facts & Figures

- The center of excellence for **wheel loaders**
- Founded in **1960**
- Approx. **170,000 m²** factory area
- Approx. **1,100** employees
- Production 2023: **6,700** wheel loaders
 - 2022: 5,200 | 2020: 4,298
 - 2030: **Strategic goal 10,000**



Product portfolio

Wheel Loader



		L 504 Compact	L 506 Compact	L 507 Stereo	L 508 Compact	L 509 Stereo	L 514 Stereo
Tipping load	kg	3,000	3,500	3,750	3,900	4,430	5,750
Bucket capacity	m ³	0.7	0.8	0.9	1.0	1.2	1.5
Operating weight	kg	4,600	4,970	5,550	5,700	6,390	8,860
Engine output	kW / HP	34 / 46	47,5 / 64	50 / 68	47,5 / 64	54 / 73	76 / 103

Small-size

Wheel Loader



		L 518 Stereo	L 526	L 538	L 546	L 550 XPower®
Tipping load	kg	6,550	8,730	9,650	11,010	12,500
Bucket capacity	m ³	1.7	2.2	2.6	3.0	3.4
Operating weight	kg	9,190	13,170	14,520	15,410	18,550
Engine output	kW / HP	76 / 103	116 / 158	129 / 175	138 / 188	163 / 222

Small-size

Mid-size

Large-size

Wheel Loader



		L 556 XPower®	L 566 XPower®	L 576 XPower®	L 580 XPower®	L 586 XPower®
Tipping load	kg	13,750	15,900	17,600	19,200	21,600
Bucket capacity	m ³	3.7	4.2	4.7	5.2	6.0
Operating weight	kg	19,600	23,900	25,700	27,650	32,600
Engine output	kW / HP	183 / 249	203 / 276	218 / 296	233 / 317	263 / 358

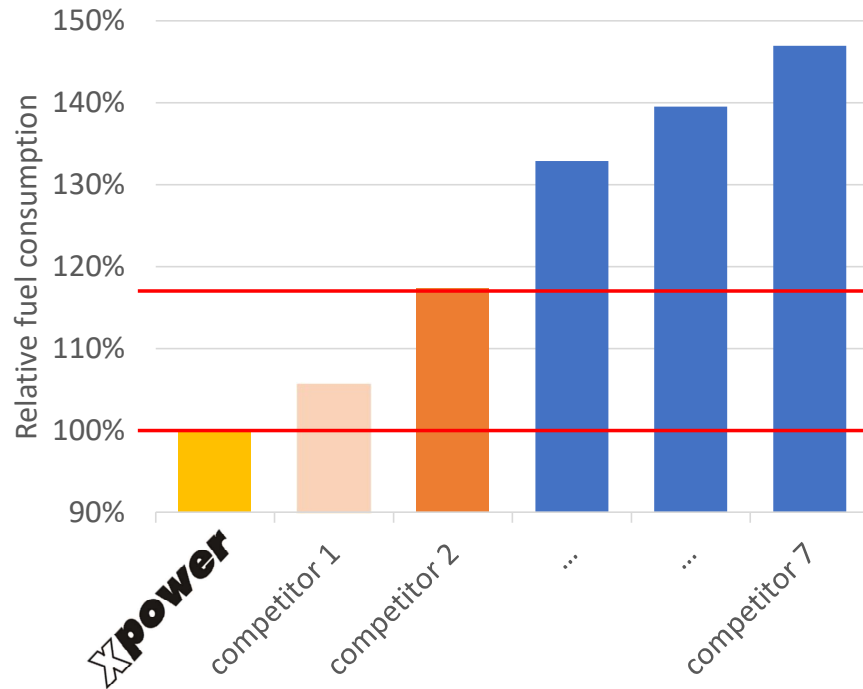
Large-size

xpower

Lowest fuel consumption = lowest CO₂ emissions in class

Highest energy efficiency provided by Liebherr's Xpower® large-size wheel loaders

Independent customer evaluation



Zero emission technologies

Battery-electric drives



Small
Mid
Large

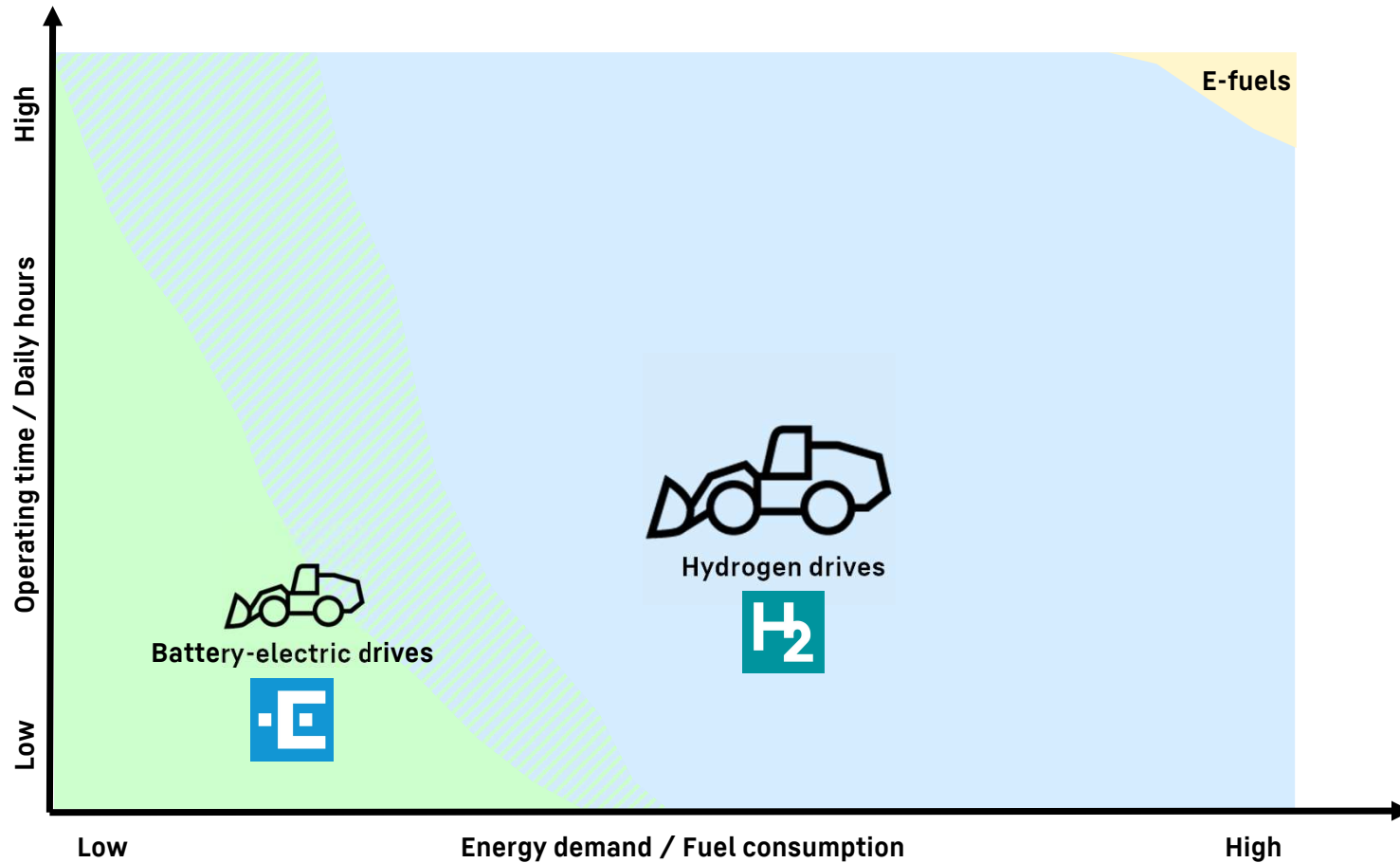
Battery-electric machines not applicable for high-energy demanding operations!

Hydrogen drives



Fast-refueling!

Drive technologies for different applications








Zero emission product scenario

Wheel Loader

							
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Small-size

Wheel Loader






						
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Large-size

Wheel Loader

						
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Large-size

10...80 kWh



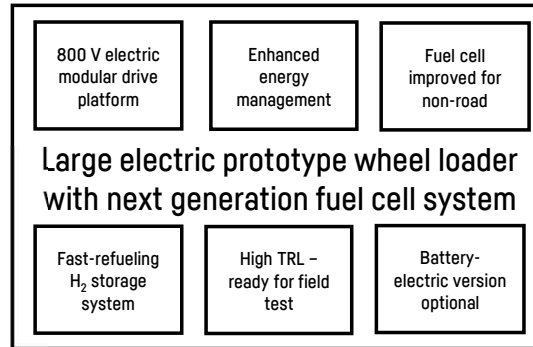
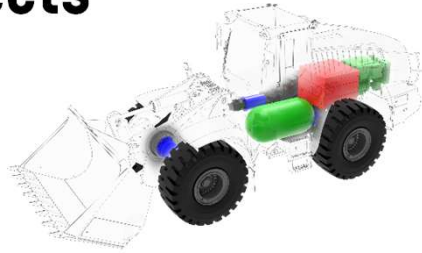
Battery-electric

500...1,000+ kWh

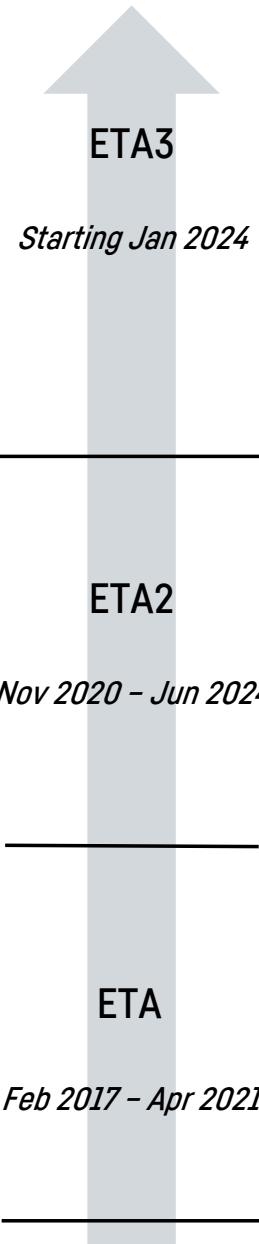
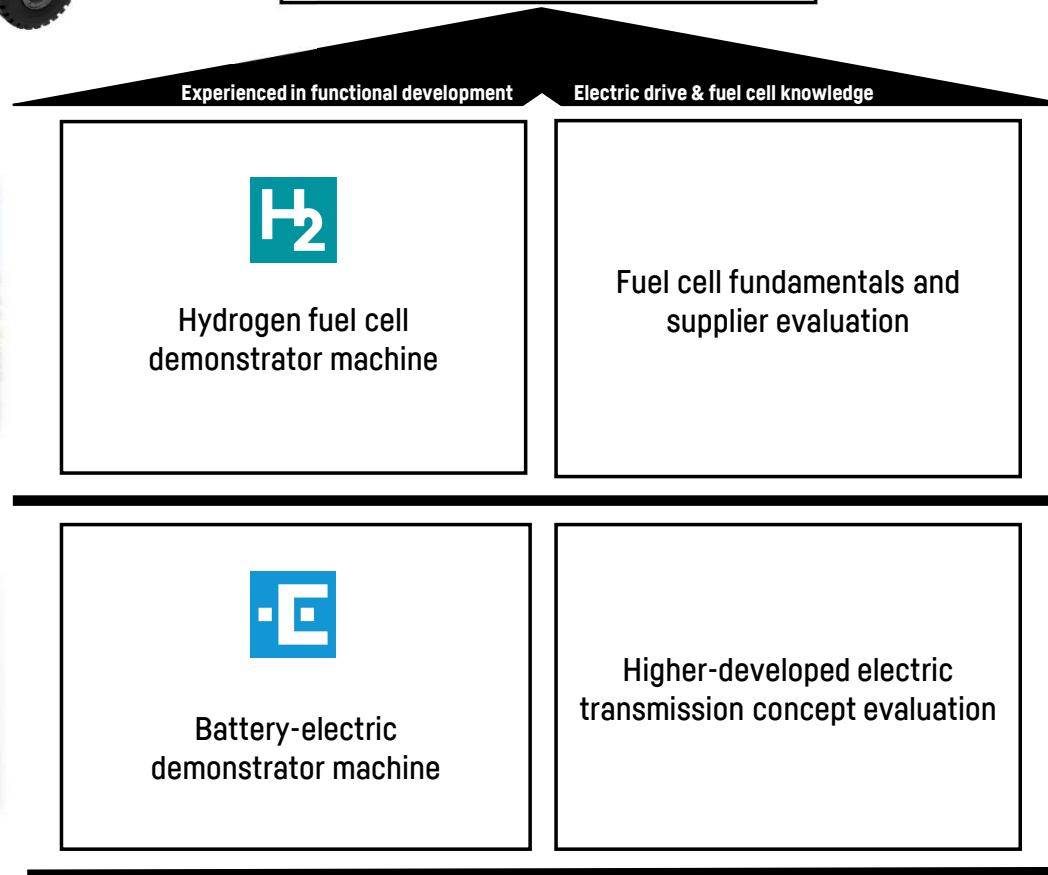


Hydrogen

R+D projects

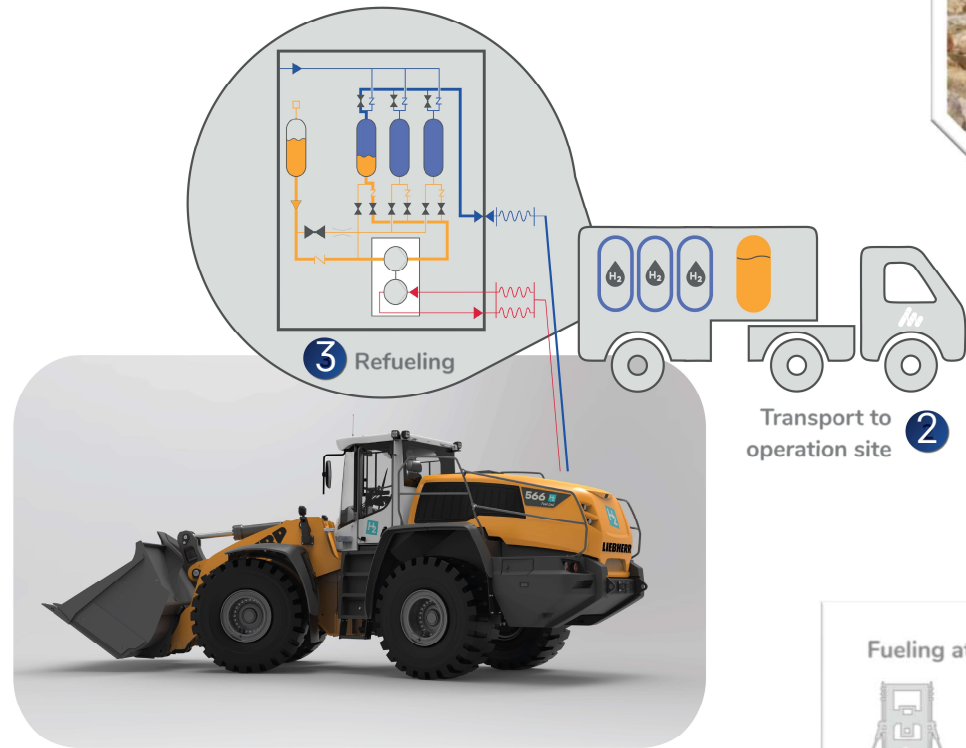


powered by **klima+ energie fonds**



Joint activities: Hydrogen fast refueling

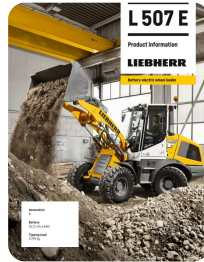
MAX Mobile Refueler



<https://www.maximator-hydrogen.de/newsroom/max-mobile-refueler>



Zero emission roadmap



▲ L507 E SOP

Series production development, testing & industrialisation

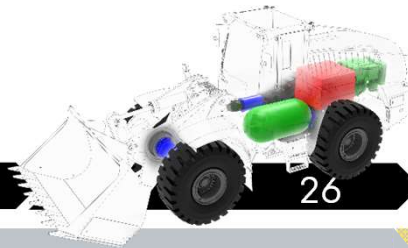
ETA - Electrification study



ETA2 - Fuel cell fundamental study



Fuel cell systems on the market are not yet ready for non-road machinery!



2017

20

21

22

23

24

26

27

2030

ETA3 - Fuel cell non-road improvement



Fuel cell intensive field testing fleet

Industrialisation ▲






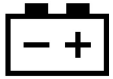











H2-ICE - Series production development, testing & industrialisation



▲ Large-size H2 machine SOP



Roadmap large German truck manufacturer

Zero emission technology	 Long haul transport	 Urban distribution	 Special applications, e.g. construction
	40 t	25 t	40 t
 Battery			
 Fuel cell			
 H2-ICE			

- Similar roadmap to construction machinery
- All zero emission technologies needed
- Promotion of investments necessary in the beginning

Source: 10th International Engine Congress 2023 | 28.02. – 01.03.2023 | Baden-Baden

Thank you
for attention.



Hydrogen refueling station at Liebherr Bischofshofen plant