OPERATIONAL IMPACT

of electric cargo handling equipment

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SUSTAINABLE
DEVELOPMENT
GOALS
COMMITTED
to making a difference
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BIGGEST CONCERNS

regarding zero emission equipment

- How much will battery powered equipment impact my operations if I need to charge several times per day?
- How will batteries perform during cold winter or hot summer time?
- How should the power supply be designed
- How will I know which battery and infrastructure to choose for my operations?
- What will battery cost and residual value be? And with that - how can I ensure a good total cost of ownership?

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CO2
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Annual CO2 reductions vs diesel Reachstackers
100 tons CO2 =
44
The Electric Reachstacker
Capacities and performances like a diesel Reachstacker
Energy-efficient design
Operational in all climates
Modular battery solution
Low operational noise
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Energy-efficiency optimizes productivity

- Minimized energy losses and optimized energy accumulation
- Ensures longer charger intervals
- Improves battery lifetime and performance
- Saves on battery size and cost
- Optimizes total cost of ownership

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Productive in extreme weather conditions

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THERMAL MANAGEMENT SYSTEM

External temperature	-30°C … 40°C
Battery core temperature	25-30°C

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One size does not fit all

- 4 different Li-Ion battery sizes
- Long battery lifetime and performance
- Opportunity charging is key
- 10-12 year first life (until 80% of initial capacity) at 2500 running hours/year

Optimizes return on investment

- Proven Technology

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Low operational noise

Diesel **107 dB**

Electric **100 dB**

80% noise reduction

Better working environment

- Lower stress
- Better concentration
- Higher productivity
- Easier to hear warnings
- Lower risk of accidents

Extended operational hours

- Noise restrictions close to residential areas

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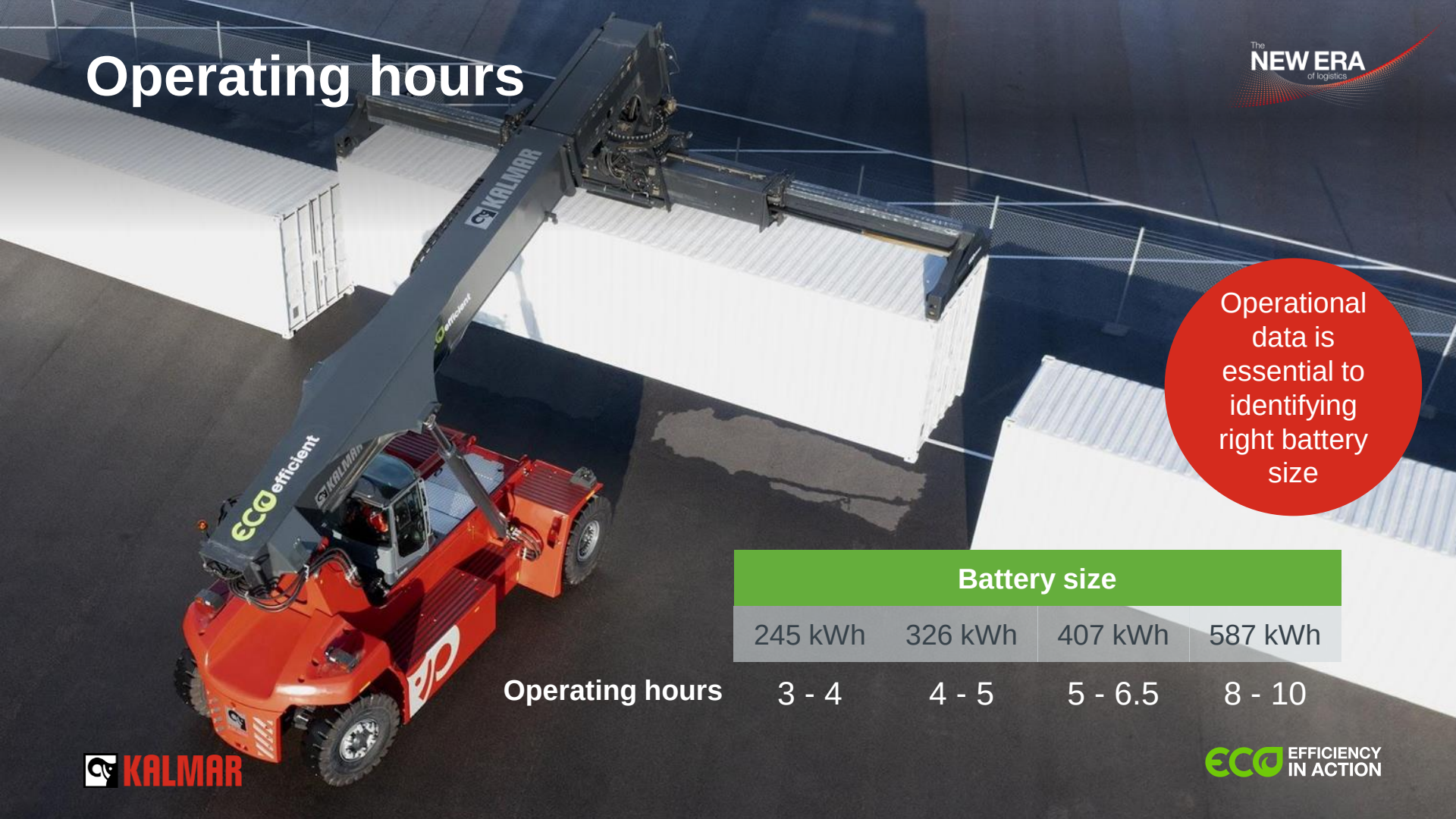
Operating hours



Operational data is essential to identifying right battery size

	Battery size			
	245 kWh	326 kWh	407 kWh	587 kWh
Operating hours	3 - 4	4 - 5	5 - 6.5	8 - 10

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From **80%** discharged to fully recharged

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Charging time from maximum discharge level

CHARGER SIZE	BATTERY SIZE			
	245 kWh	326 kWh	407 kWh	587 kWh
175 kW	75 min	100 min	120 min	175 min
350 kW	35 min	50 min	60 min	90 min

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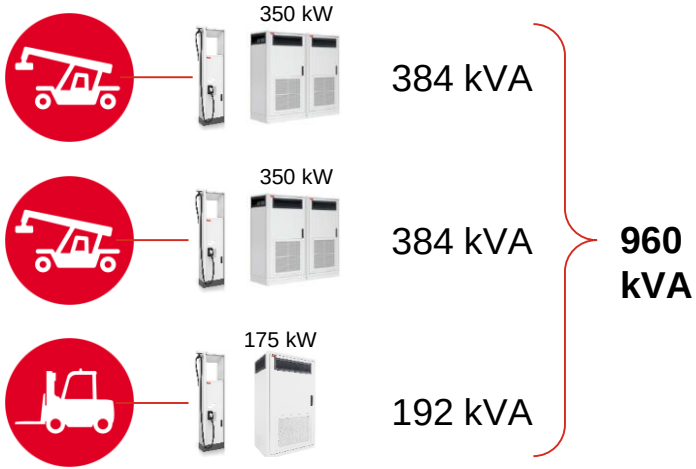
Infrastructure requirements: 2 scenarios

2 electric Reachstackers + 1 electric forklift

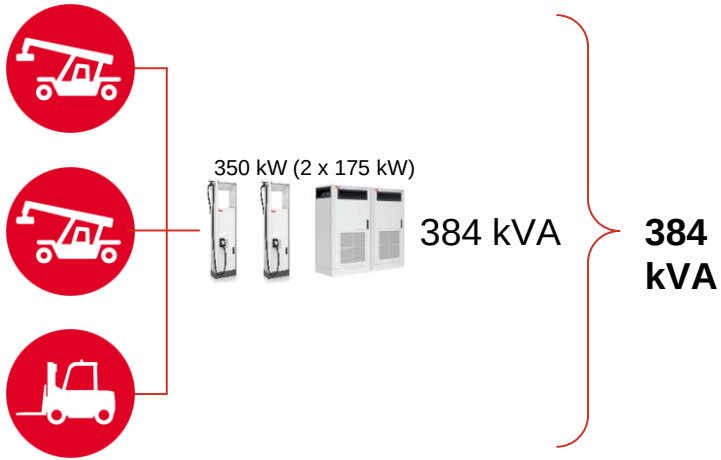
No charging management

1 charger per machine



With charging management

3 machines per charger



CHARGING MANAGEMENT

1. Manual = Separating breaks for the operators
2. System controlled = Based on battery state of charge, operational status, electricity price, grid capacity/availability (solution to be developed)

So how will electric cargo handling equipment impact operations?

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IMPROVEMENT

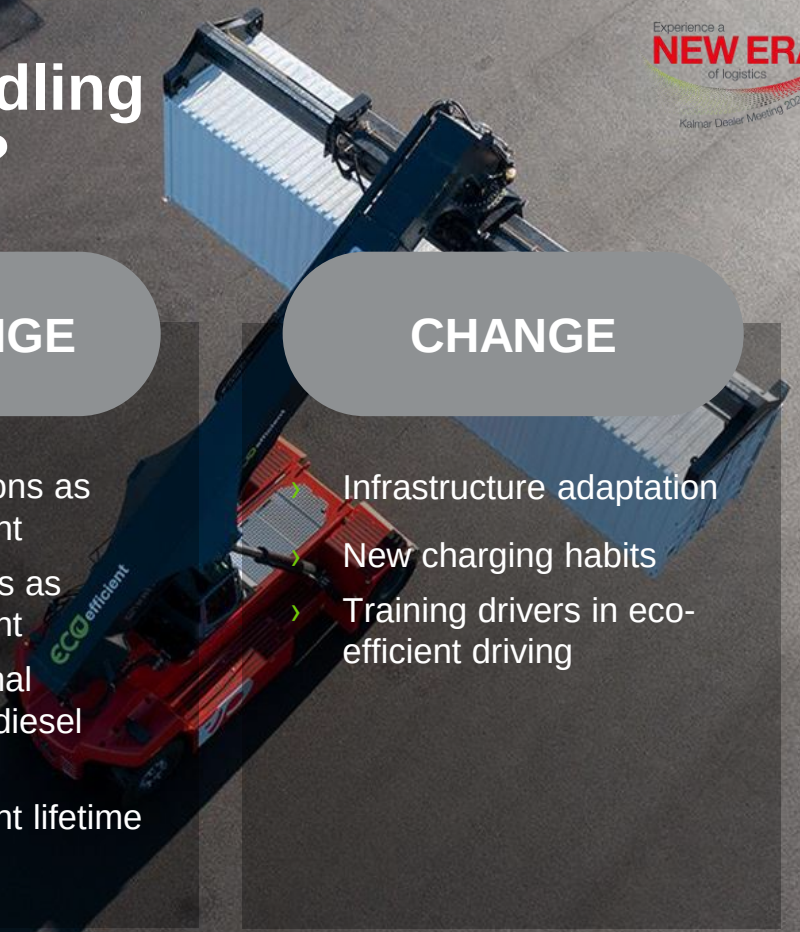
- Lower emissions
- Lower noise
- Possibility to extend working hours close to residential areas
- Better working environment
- Lower service cost

NO CHANGE

- Same applications as diesel equipment
- Same capacities as diesel equipment
- Same operational productivity as diesel equipment
- Same equipment lifetime

CHANGE

- Infrastructure adaptation
- New charging habits
- Training drivers in eco-efficient driving



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TOGETHER
we can put eco-efficiency into action, step by step
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