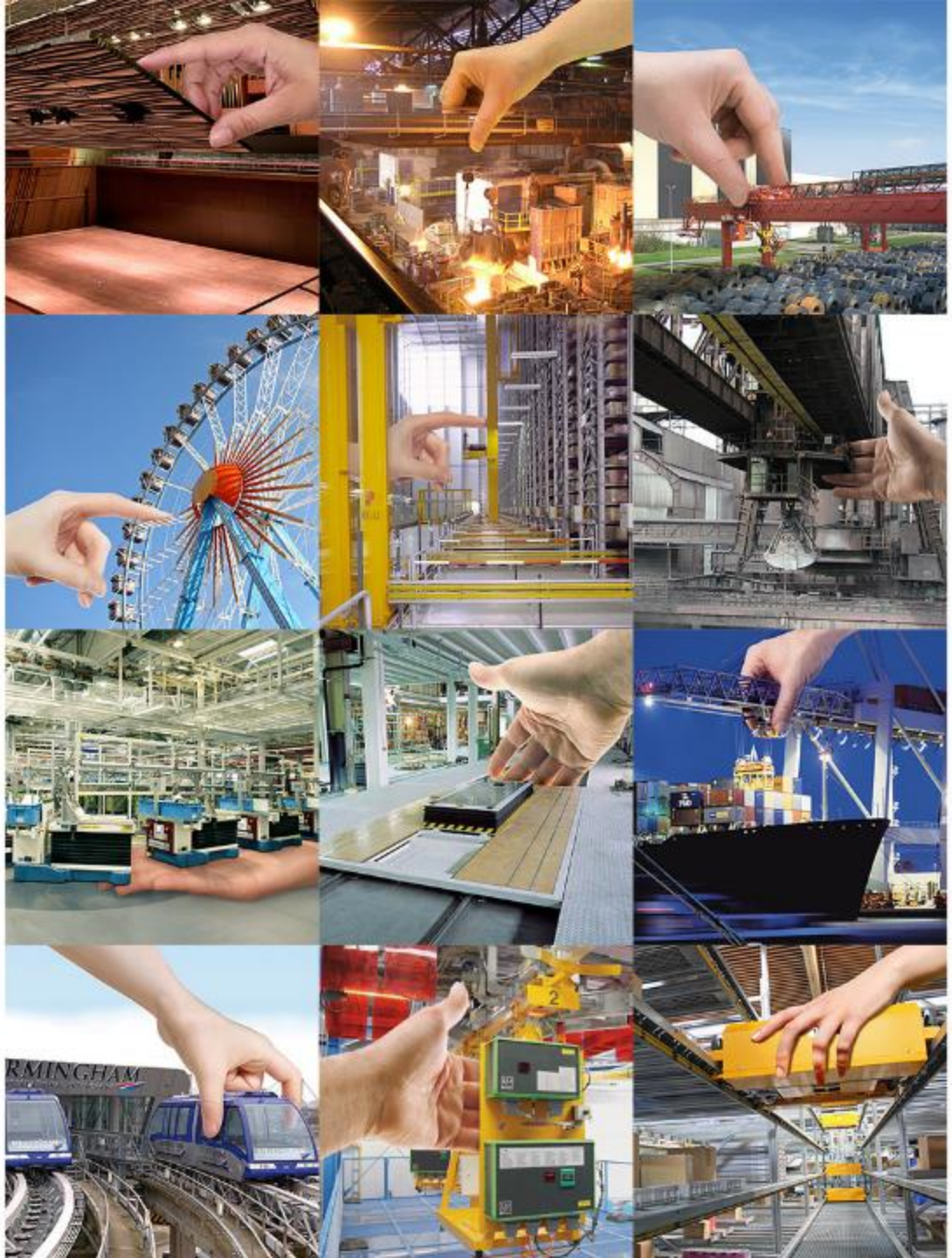
We move your business!

Energy and Data Management Systems

More Performance, less emissions with
ECO BatteryPack



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More Performance, less emissions with ECO BatteryPack

Today‘s challenges for ports

Source: rhinocarhire.com/World-Fuel-Prices/Asia.aspx

Source: World Bank Data

More Performance, less emissions with ECO BatteryPack

NetZero Decarbonisation commitment BIMP

Source: climatewatch.org

Tracker	Indonesia	Malaysia	Brunei	Philipines
Target Year after 2050	X	X		
No Document submitted			X	X
CO2 equivalent emission year 2019	1959,71 million t	396.11 million t	9,63 million t	236,79 million t
World's largest emitter ranking	#5 3.94%	#23 0.8%	#150 0.02%	#38 0.48%

Source: climatewatch.org

Indonesia's actual target (NDC) is to reach 540 million t by 2050

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What can we contribute…

Number of diesel operated RTGs in SEA is still very high

Our Mission: Retrofit existing RTGs and ensure further port electrification

Malaysia's government supports green technologies:

MYHijau "Green" mark for the Hybrid system was approved in Aug 2021. This enables customers to get funding from the Malaysian government (MIDA Department) for projects which reduce carbon emissions.

MALAYSIA MyHIJAU

TAX DEDUCTION

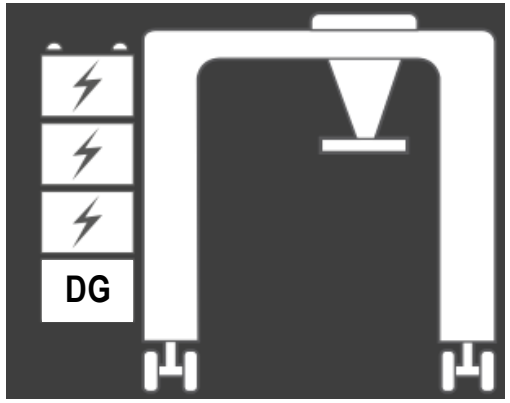
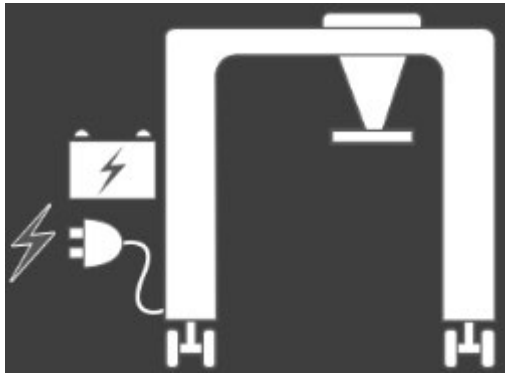
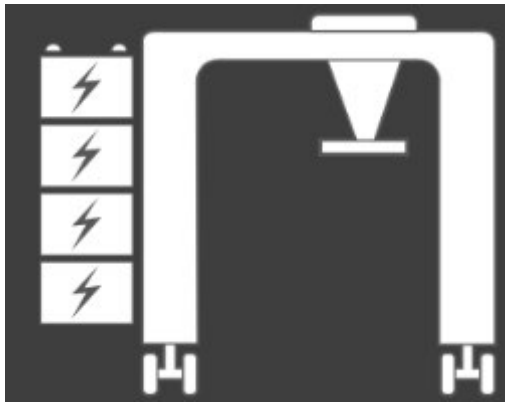
More Performance, less emissions with ECO BatteryPack

Market Leader in RTG Electrification worldwide

Motorized Cable Reels Solutions	Conductor Rails Solutions	Hybrid Solutions	Zero Emission Solutions
			
Manual or automatic cable connection to grid power ~ 500 cranes globally	Manual or automatic cable connection to grid power ~ 2900 cranes globally	Hybrid with a large battery pack and a small onboard genset ~ 160 cranes globally	BatteryPack BE BatteryPack FE ~ 88 cranes globally

ECO BatteryPack - Overview

Zero Emission Solutions

BatteryPack-Hybrid Medium Battery & DG or Cable Reel		**160x** 148kWh/111kWh… …	Energy Storage **24MWh**
BatteryPack-FE Small Battery & Conductor rail		**88x** 44kWh/32kWh… …	Energy Storage **3,8MWh**
BatteryPack-BE Large Battery		**1x** 222kWh… …	Energy Storage **0,2MWh**

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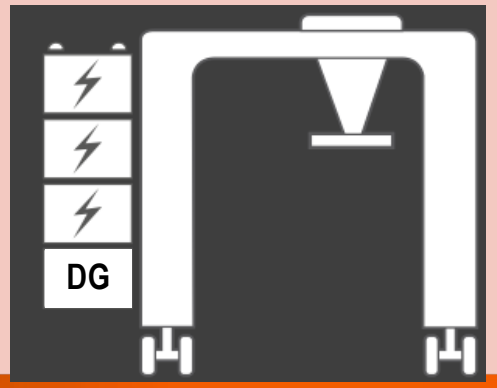
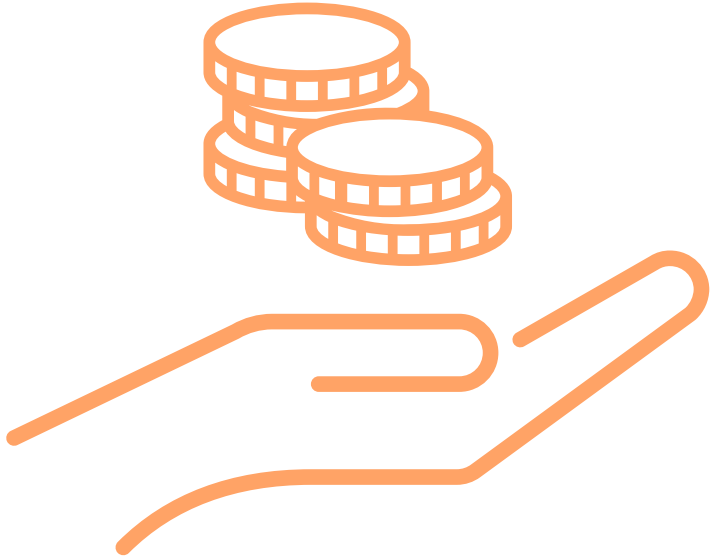
Key Features - BatteryPack-Hybrid



Lithium battery
Long lifetime 8 years
Battery Warranty 5 years
ESC 100 kWh
DC/DC converter 250 kW
Remote monitioring / diagnosis
DG downsize 100kW output

- **Up to 60% fuel savings**
- **Lower CO2 Emissions**
- **Reduced maintenance/service**



- **Green Port**
- **Improved TCO**
- **Increased Efficiency**

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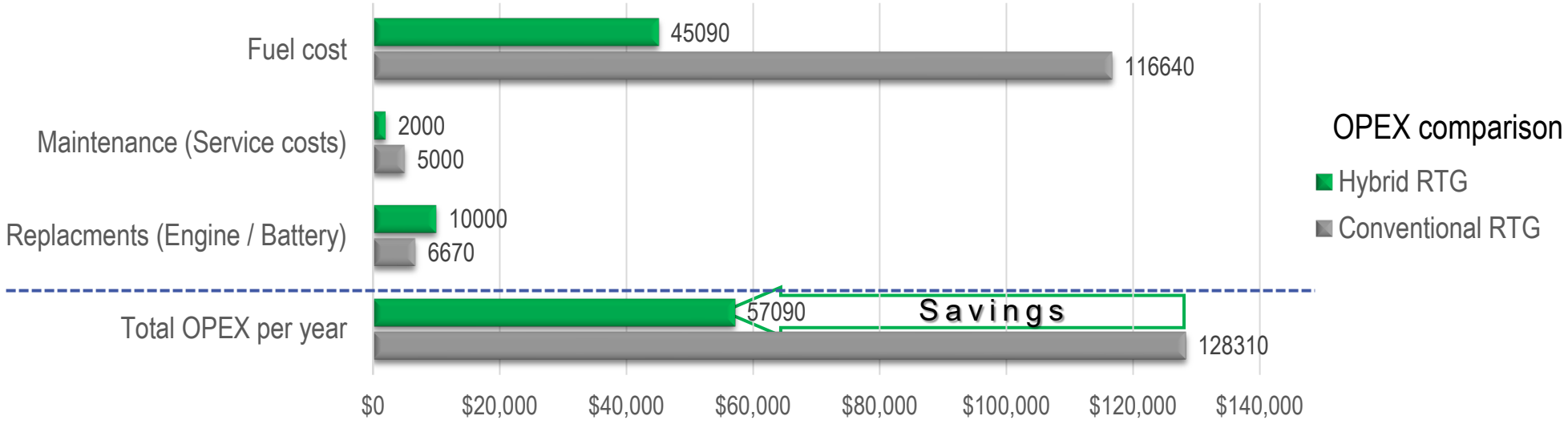
Operational Cost Savings – Real Case

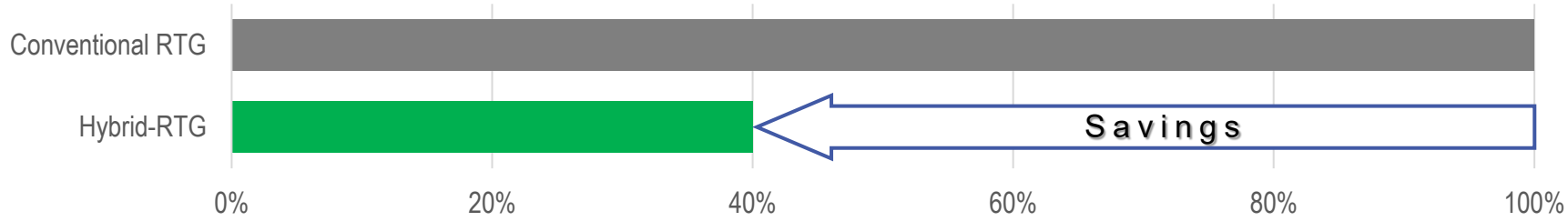


	Case	Conventional RTG	BatteryPack - Hybrid	Savings
		18l/h	7l/h	
Fuel saving per year	10 moves/h, 18 h/day, 300 days/year, 1,2 USD/l	116,640 USD/year	45,090 USD/year	**71,550 USD/year**
Maintenance service per year	100 USD/h	50h/year -> 5,000 USD/year	20h/year -> 2,000 USD/year	**3,000 USD/year**
Replacments (Engine / Battery)	15 years operation span -> yearly average	6,670 USD/year	10,000 USD/year	**-3,330 USD/year**
			Yearly saving per RTG	**71,220 USD/year**

More Performance, less emissions with ECO BatteryPack

Why BatteryPack Hybrid solution

- **Fuel savings up to 60% compared to a conventional RTG**

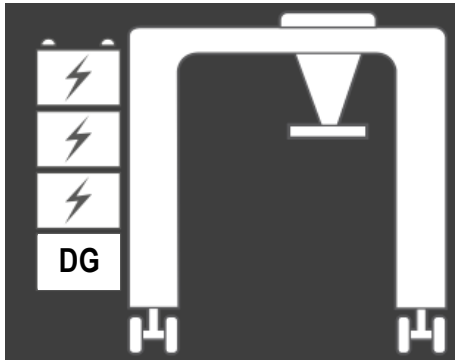


- **No energy switchover**
- **No operational change (full operational flexibility in- & outside the block)**
- **Reduction in maintenance cost**
- **Increased RTG uptime**
  - Less Diesel Generator maintenance
  - Less refueling operations
- **No Yard Investment**
- **Reduced CO2, SO2, NOX Emissions**
- **Reduced noise**

More Performance, less emissions with ECO BatteryPack

CO2 savings - Example

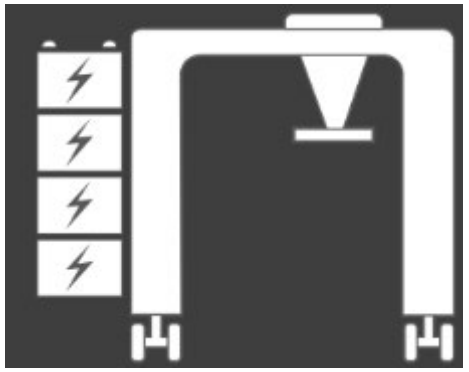
BatteryPack-Hybrid



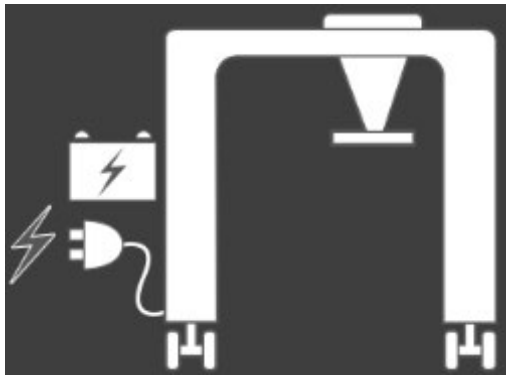
16 hrs / day
365 days / year
12 l / hr

= 124t CO2 savings

BatteryPack-BE



BatteryPack-FE



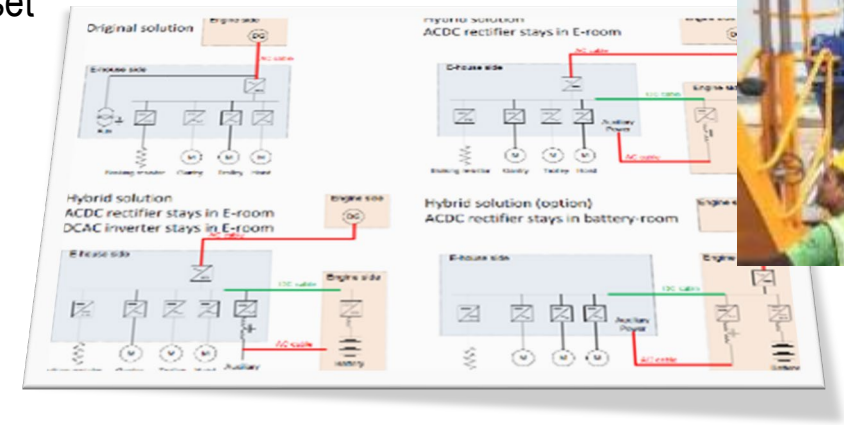
16 hrs / day
365 days / year
21 l / hr

= 325t CO2 savings

1 liter Diesel = ~ 2.65 Kg CO2

More Performance, less emissions with ECO BatteryPack
Retrofit

- **Engineering service of individual RTG retrofit modification**
- **Typical points to consider**
  - Location of Battery house
    - E-house or diesel side
    - Battery house can be located on top or underneath the sill beam
    - In narrow conditions the battery house and diesel genset may be mounted next to each other in between the RTG legs (project specific housing)
  - Location of AC/DC (with AFE) rectifier for genset
  - Location of DC/AC inverter for auxiliary power
  - Fuel tank



More Performance, less emissions with ECO BatteryPack

Ecological

- ✓Less CO2 emissions
- ✓Less Fuel burnt

Economical

- ✓Less/No Diesel costs
- ✓Less maintenance/service costs

Efficiency

- ✓More uptime
- ✓More Yard Flexibility

BatteryPack-FE

BatteryPack-BE

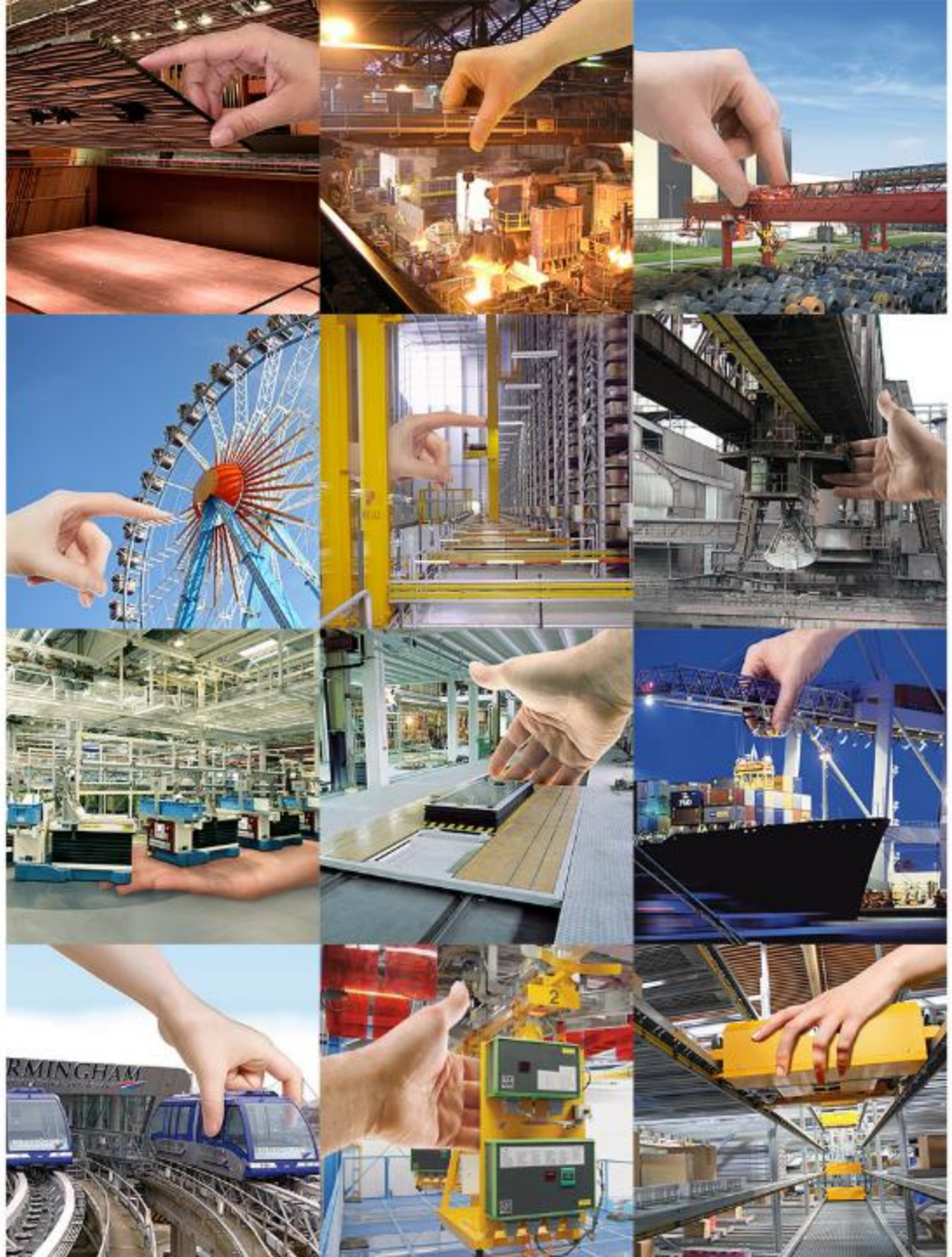
BatteryPack-Hybrid

We move your business!

thanks for your attention

BIMP-EAGA MARITIME 2023

Visit us:
February 21 to 23 at:
JW Marriott Jakarta
Indonesia
Booth 16



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