
KONECRANES®
Lifting Businesses™
BENEFIT FROM MOBILE HARBOR CRANES WITH EXTERNAL POWER SUPPLY
Gino Gherri
KONECRANES | GOTTWALD

EXTERNAL POWER SUPPLY – A KEY TOPIC

- No international standards impose onshore power supply (OPS)
- EU policy, e.g.
  - "Recommendation" of OPS to ports
  - OPS energy tax reduction
  - Directive: OPS mandatory in 2025
- US policy, e.g.
  - Reduction of onboard power generation
  - Fuel quality requirements
- National states set standards
  - Public pressure
  - (Low) distances to local communities require action
- Environmental responsibility is becoming a USP
- Ports emission statements
  - Use of OPS mandatory for operators
  - Incentives to shipping lines

EXTERNAL POWER SUPPLY – A KEY TOPIC

- Growing commitment to reduction of exhaust and noise emissions in terminals
- Trend towards electrification of handling equipment
- Many ports already have power main installations, others are working on it
- Various (voltage) solutions depending on terminal size and local conditions

STATUS QUO

Ships

- Environmental impact of moored vessels has been recognized
- More and more efforts on onshore power supply (“cold ironing”)

Stationary equipment (STS, yard cranes)

- Terminal mains supply of STS and RMG is common practice
- Electrification of RTG is ongoing (E-RTG)

Mobile equipment (lift trucks, straddle carriers, AGV)

- Other strategies are explored (e.g. battery drives)

THE MOBILE HARBOR CRANE – A SPECIAL CASE

Characteristics

- Self-contained (independent)
- Self-propelled (on-board power supply)
- Rubber-tired
- Multi-purpose

Key Advantages

- Flexible
- Any kind of cargo, any kind of port
- Mobile within the terminal
- Quays with and without infrastructure

ADVANTAGES COMBINED – FLEXIBILITY AND ECO-COMPATIBILITY

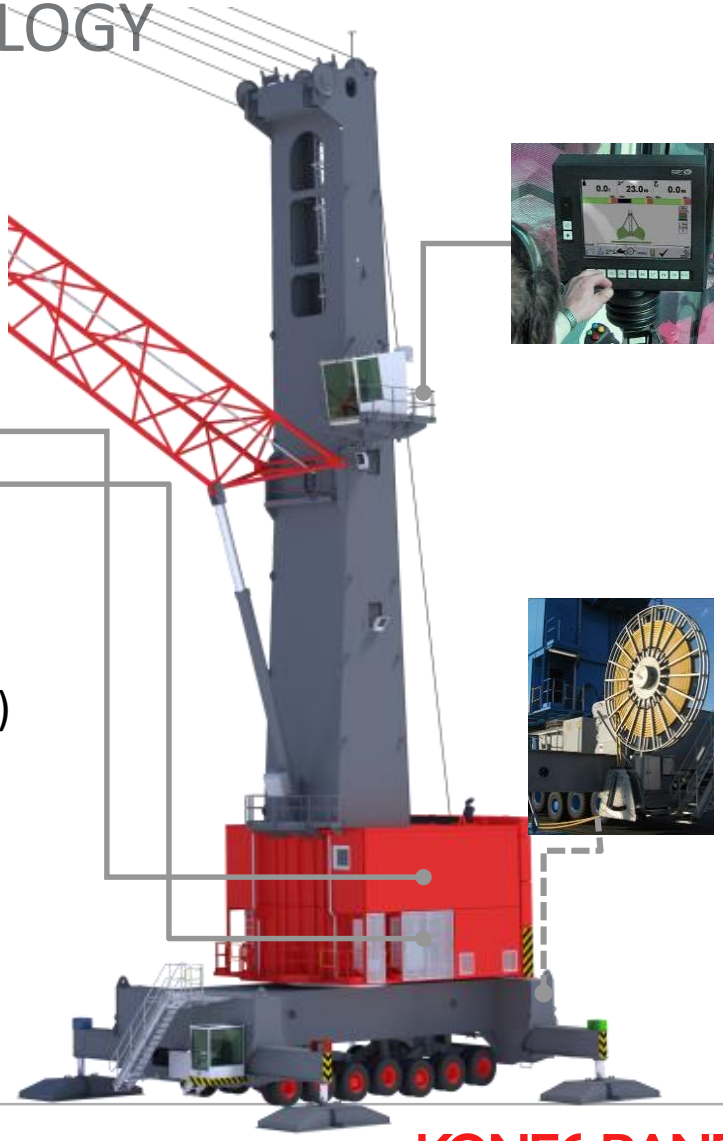
Konecranes Gottwald
Mobile Harbor Crane

On-shore power supply

KONECRANES GOTTWALD DIESEL-ELECTRIC DRIVE TECHNOLOGY







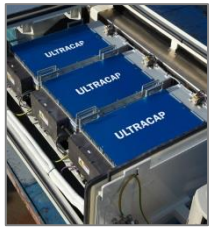
- Highly effective diesel-generator sets for on-board power supply
- Ultracaps for short time energy storage (hybrid)
- Recuperation of braking and lowering energy
- Ideal match for connection to harbor mains (diesel-generator bypassed)

KONECRANES GOTTWALD
DIESEL-ELECTRIC DRIVE TECHNOLOGY

Diesel generator

Ancillary consumers

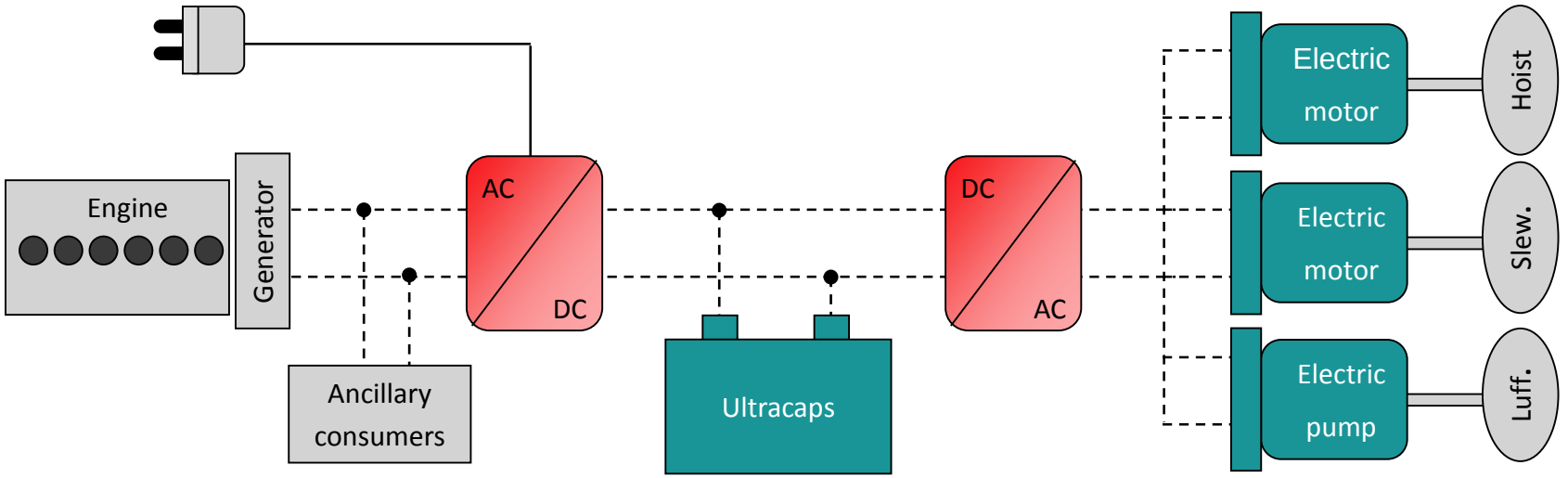
Energy storage



Hoist

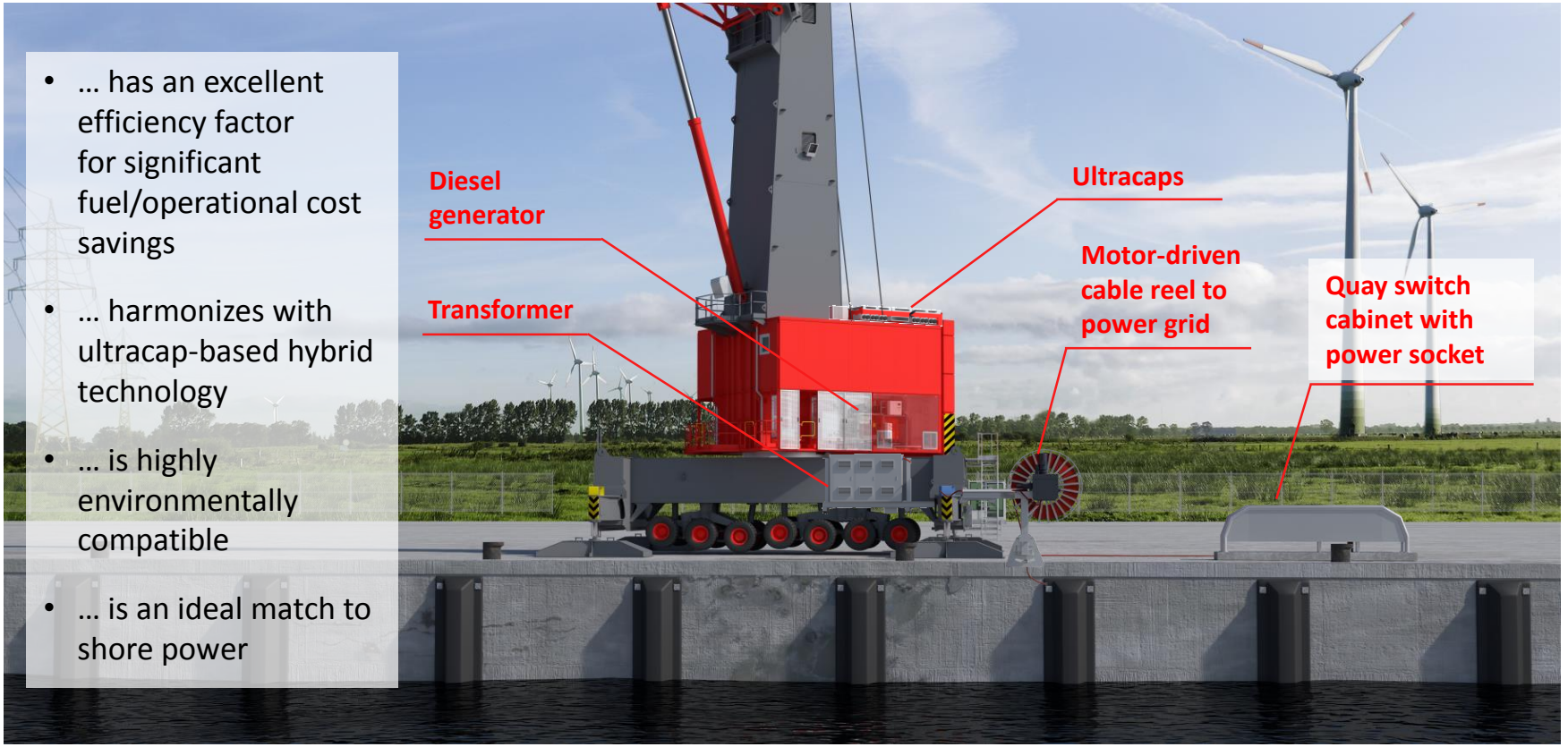
Slewing gear

Luffing gear



ELECTRIC DRIVE SOLUTION

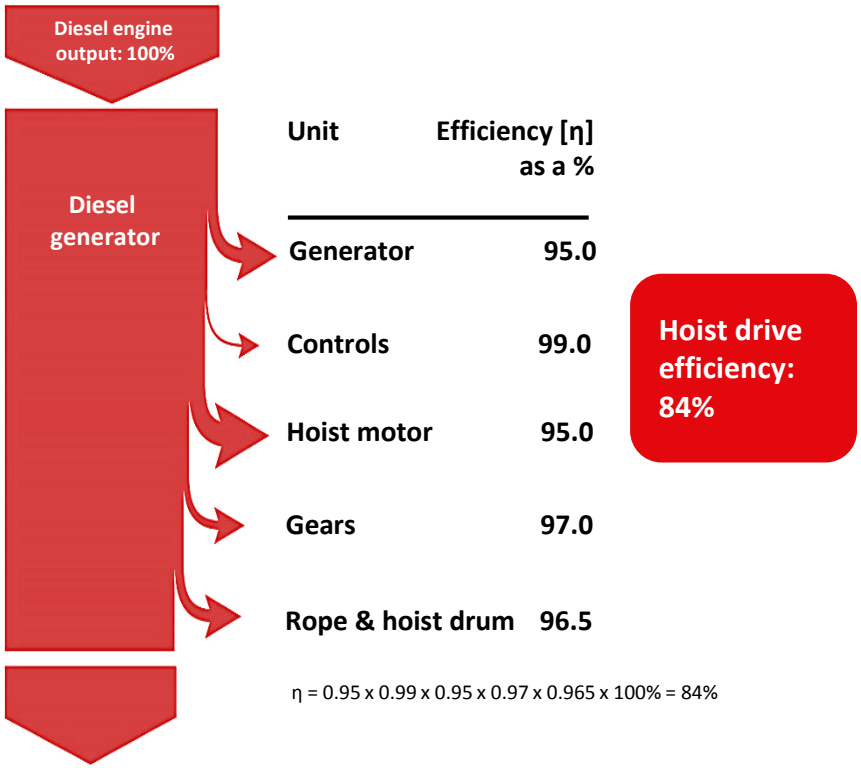
- … has an excellent efficiency factor for significant fuel/operational cost savings
- … harmonizes with ultracap-based hybrid technology
- … is highly environmentally compatible
- … is an ideal match to shore power

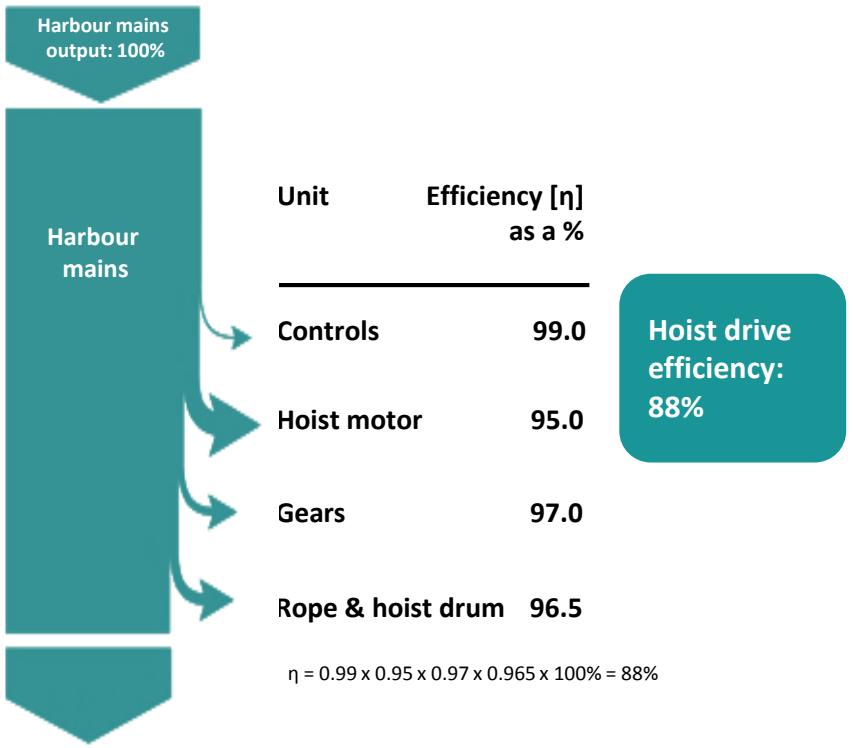


BENEFITS OF MHC WITH EXTERNAL POWER SUPPLY

- Increases efficiency
- Minimizes noise emissions
- No exhaust emissions in the port
- Lowers operating costs
- Reduces maintenance cost

DIESEL GENERATOR VS. HARBOR MAINS EXAMPLE: HOIST DRIVE EFFICIENCY





- Under harbor mains, generator η is of no consequence
- Efficiency η increases still further

ECO-EFFICIENT SOLUTION

Eco...nomical benefits

- Greater flexibility – free travel of the crane with on-board power and eco-efficient handling operation with external power
- Increased drive efficiency
- Electricity is recuperated and reused; feedback into terminal grid
- Lower energy consumption – lower operating costs
- Longer service intervals and lifetime – reduced maintenance costs

Eco…logical benefits

- No local exhaust emissions
- Reduced noise emissions
- Natural resource savings
- Significantly improved environmental footprint

MEDIUM VOLTAGE

Power cable duct

Underground quay switch cabinet

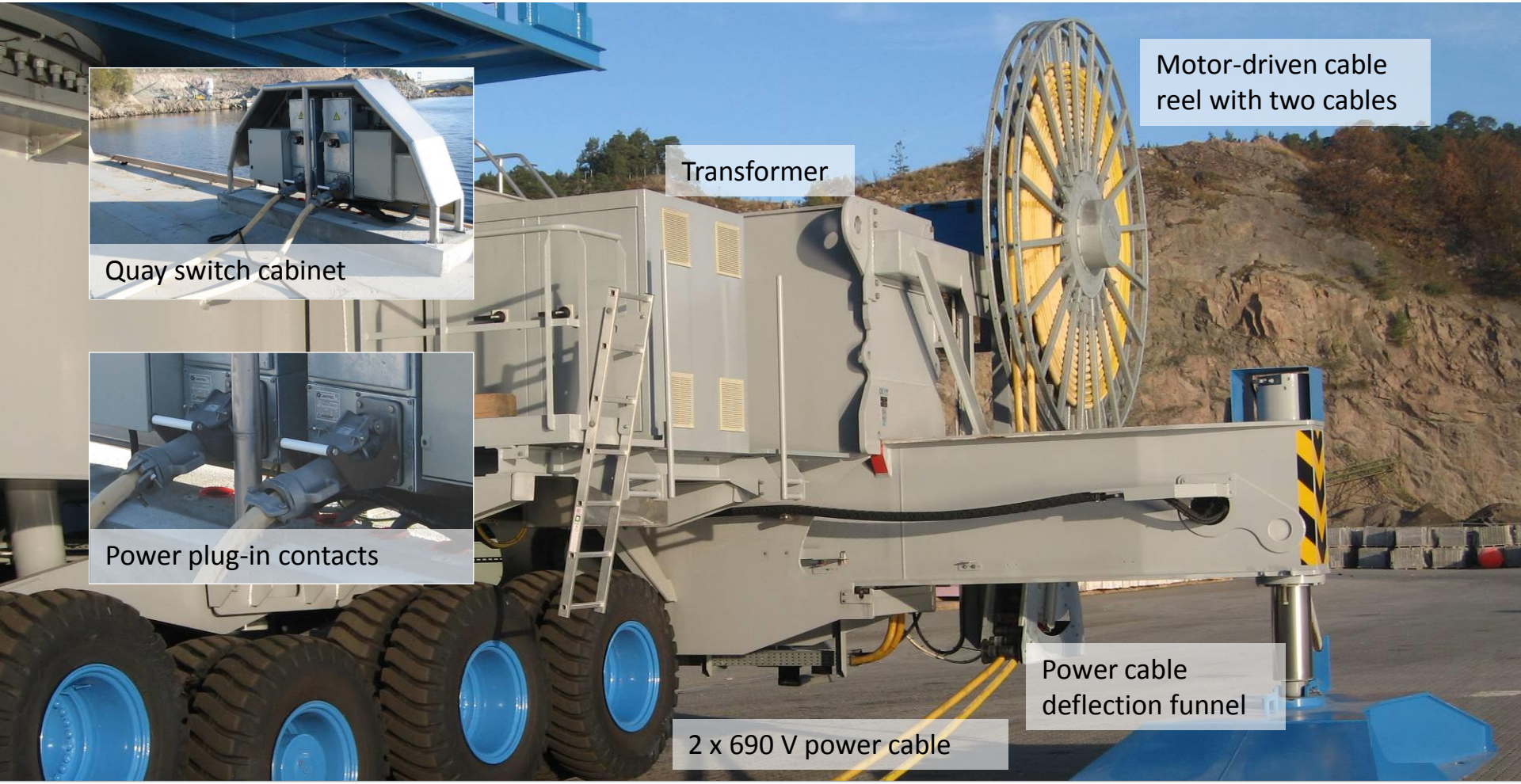
Alternative: quay power socket

Transformer

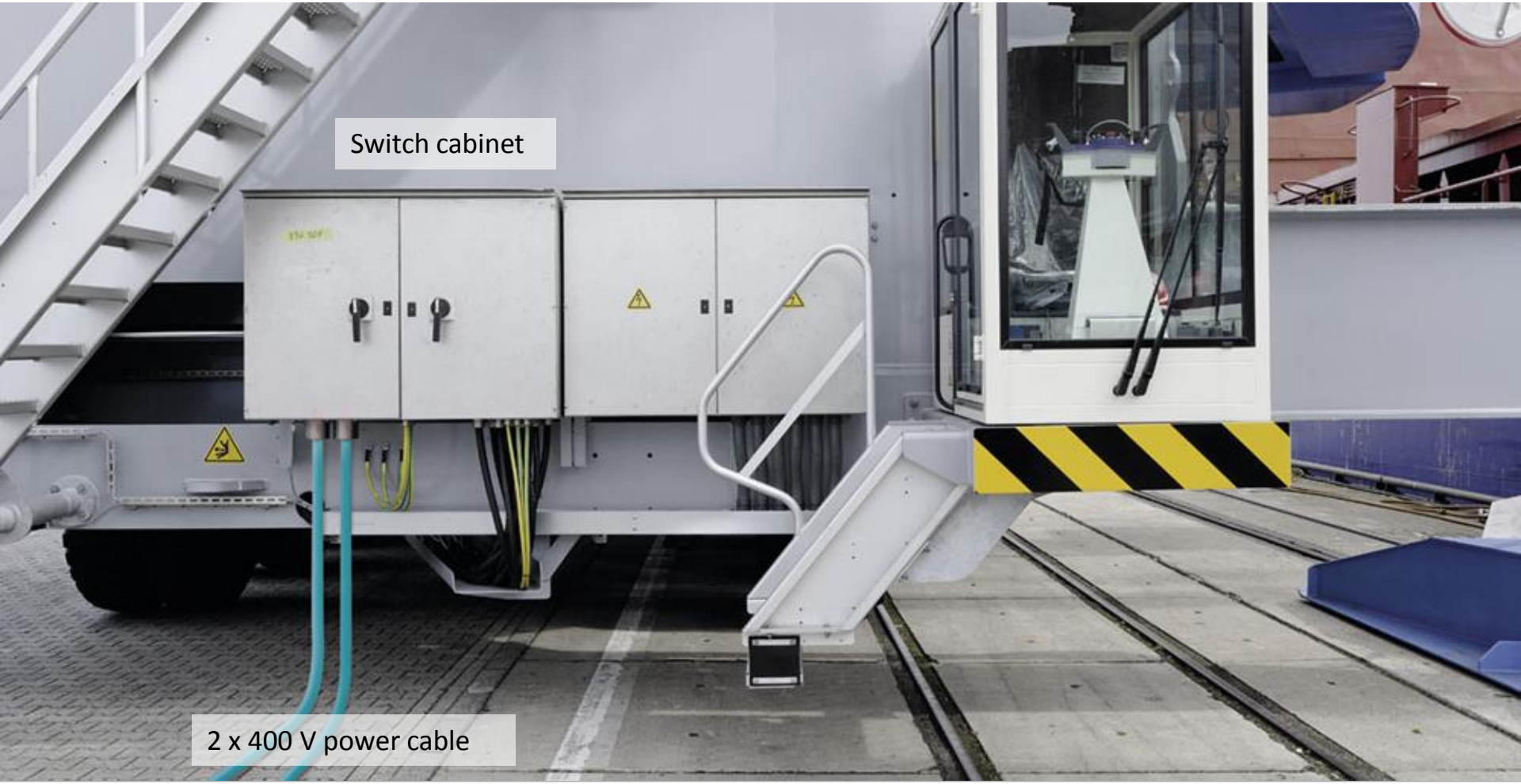
Motor-driven cable reel with one cable

Power cable deflection funnel

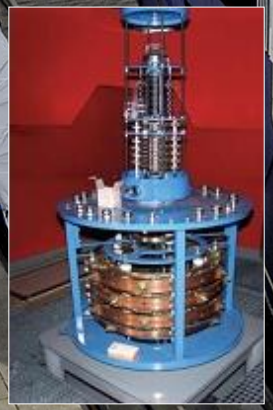
LOW VOLTAGE



DIRECT CONNECTION



PREPARED FOR RETROFIT OF EXTERNAL POWER SUPPLY

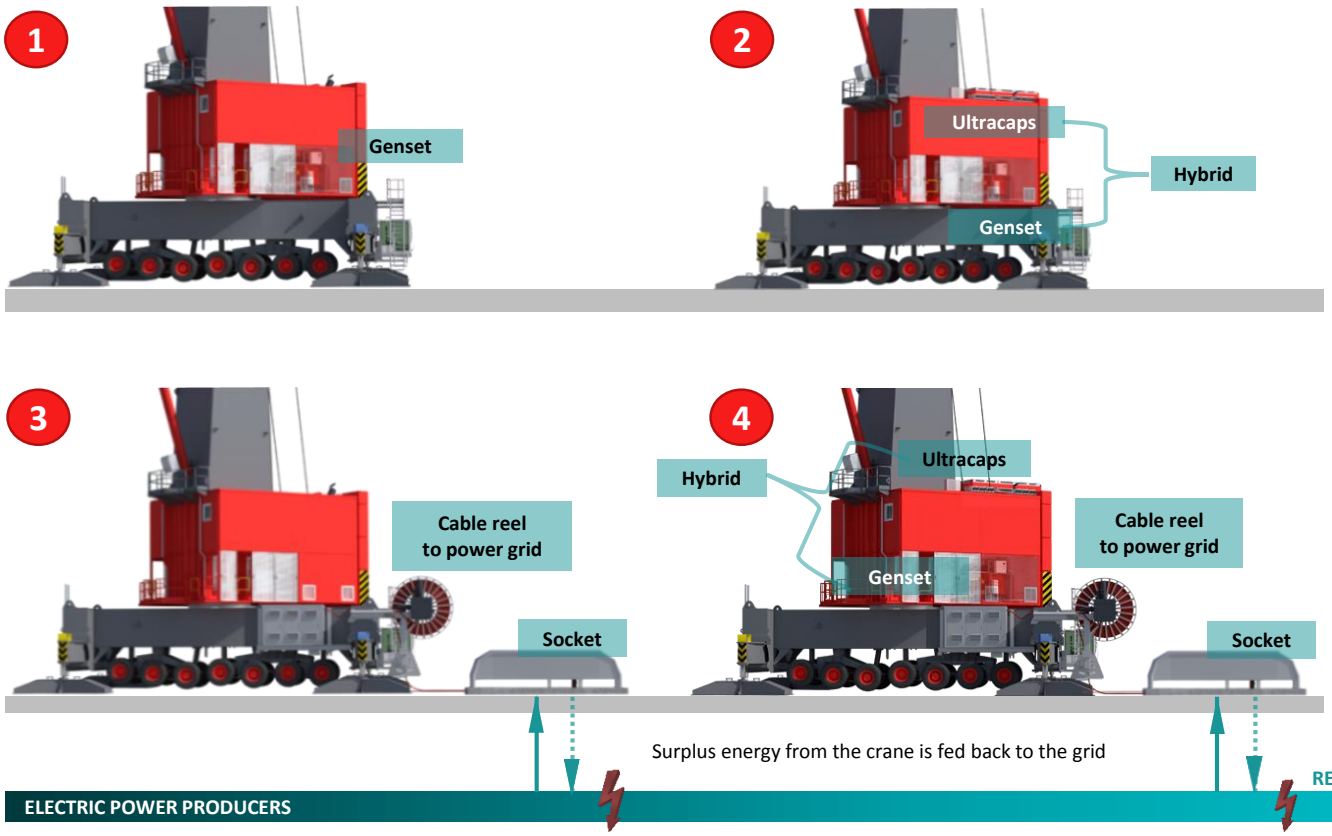


Preparation includes

- Mains/generator changeover switch
- Slip ring body with power set
- Switch cabinet at chassis

Power switch cabinet

KONECRANES ELECTRIC DRIVE SOLUTIONS



1. Optimized diesel genset on crane
2. Diesel genset + 2nd energy source => hybrid
3. Grid solution: shore power
4. All in one: genset, hybrid and shore power

Ultracaps:
electrostatic short-term energy storage media

CONCLUSION

- More and more ports take actions to reduce emissions
- Shore power supply for equipment and ships is a key topic in this context
- The mobile harbor crane is a special case on the equipment side
- Konecranes Mobile Harbor Cranes can combine flexibility of free travel with benefits of on-shore power supply in a particularly eco-efficient way
  thanks to their electric drive concept
- Shore power and electric drive system are an ideal match

NOT JUST LIFTING THINGS, BUT ENTIRE BUSINESSES