

**TOC**  
EUROPE

# ENERGY TRANSITION AND **CLEAN POWER** TO PORTS

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**NIEK WILLEMS**

LEADER OF BUSINESS DEVELOPMENT,  
GLOBAL PORTS AND TERMINALS



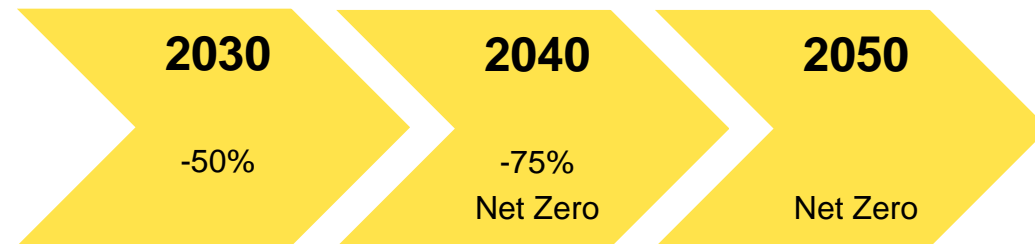
# THE WHY: DECARBONIZATION JOURNEY HAS STARTED...



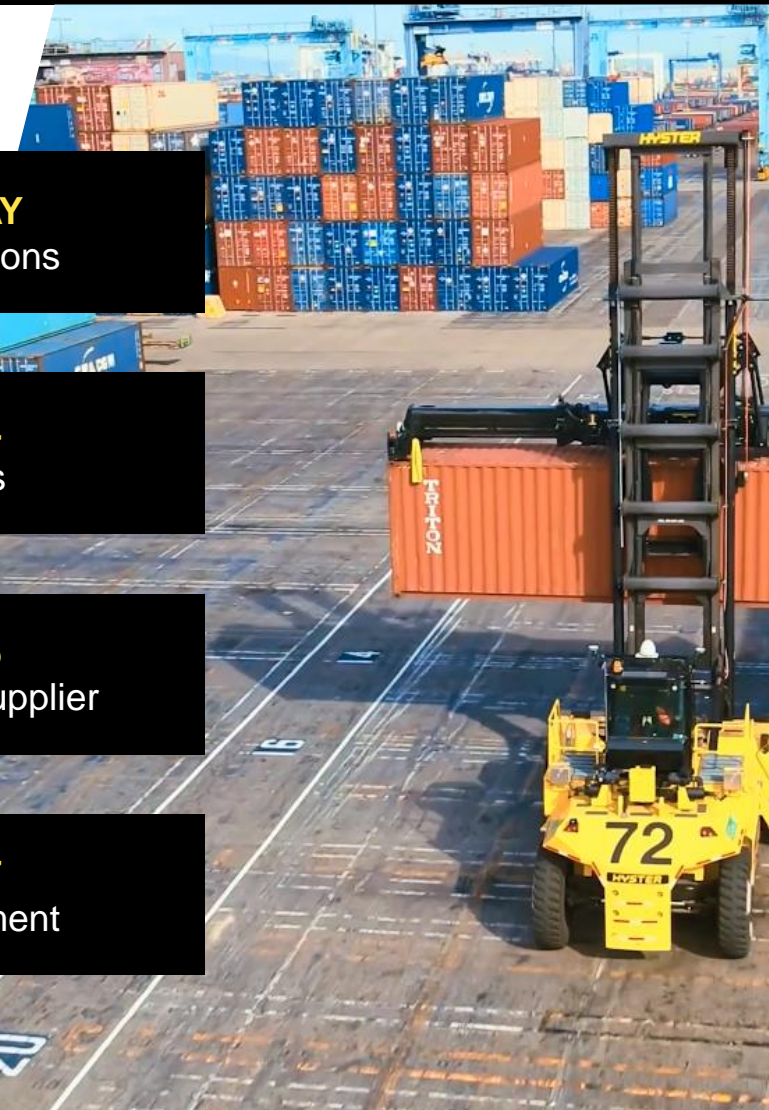
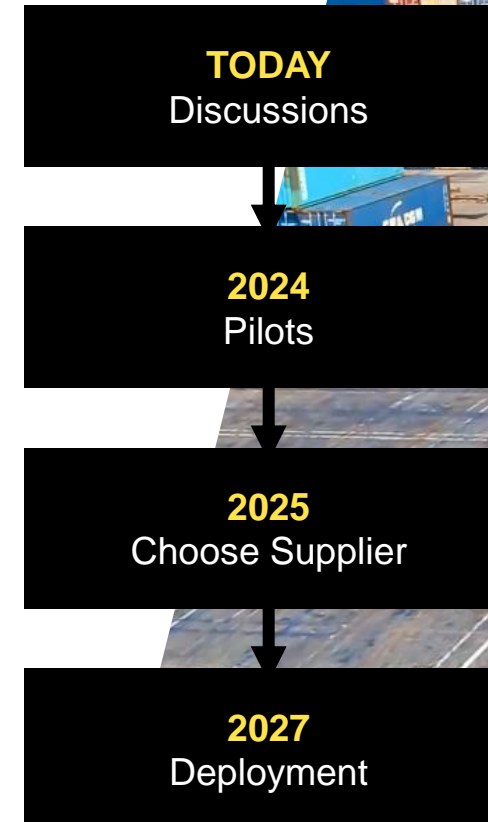
## GLOBAL PORT OPERATORS HAVE SET THEIR TARGETS

- Target equals massive equipment demand over the next years
- Port Equipment manufacturers to prepare for transition to zero emission maturity and related volume
- Efforts started already today

### CO2 Targets



### Timeline



# HYSTER® PORT EQUIPMENT

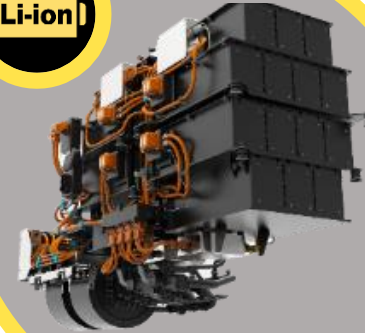
## HELPING PORTS AND TERMINALS ACHIEVE THEIR ENVIRONMENTAL TARGETS



### HYSTER® DEVELOPS FULL LINE ZERO EMISSION OFFERING FOR PORTS AND TERMINALS

- Battery Electric (Lithium-Ion)
- Fuel Cell hybrid (Hydrogen - Lithium-Ion)

Li-ion



H<sub>2</sub>





# IN-FIELD EXPERIENCE



## Hydrogen Fuel Cell Reachstacker

MSC Terminal Valencia  
Valencia, Spain



## Hydrogen Fuel Cell Toploader

CMA CGM Fenix Marine Services  
Los Angeles, USA



## Li-Ion 10-18T Forklifts

Various locations

# PORT EQUIPMENT ELECTRIFICATION

## BROADER PERSPECTIVE THAN JUST THE TRUCK



### ELECTRIFICATION CHALLENGES:



#### **Truck**

- Fuel costs
- Downtime/Idle time
- Purchase costs

#### **Fleet**

- Fuel / Energy Costs
- Productivity Fleet
- Cost per move

#### **Terminal**

- Infrastructure Changes & TCO
- Productivity Terminal
- Subsidies – to help transition

#### **Connections**

- Inside & Outside the Fence
- Truck Parking & Charging
- Ship to Shore Power



# TERMINAL RESPONSIBILITY?

## INSIDE & OUTSIDE THE FENCE



### GREEN POWER SUPPLY NEEDED FOR:

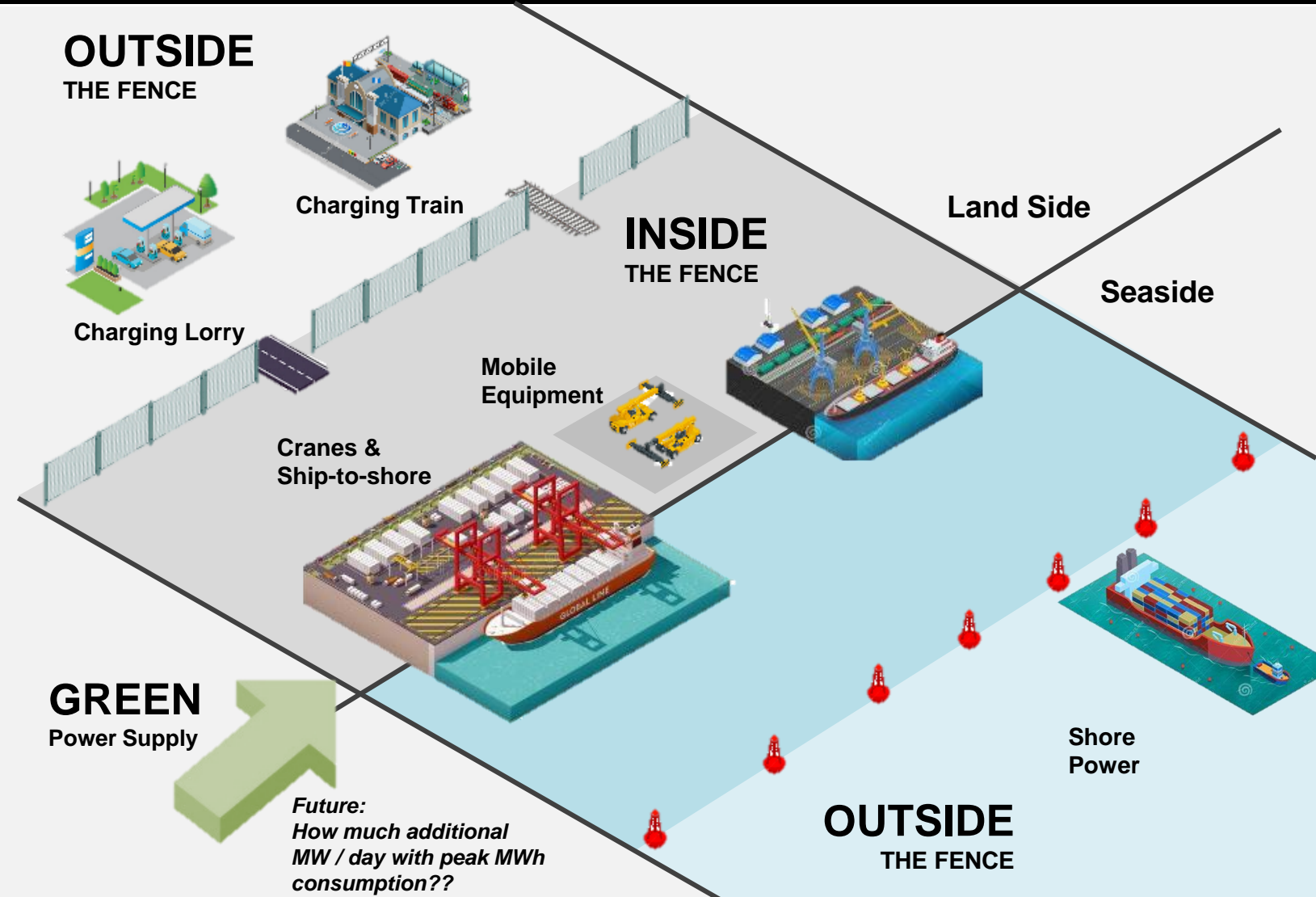
#### Inside the fence

(mobile) Equipment, Workshop area, offices, Lighting, etc

#### Outside the fence

External traffic, charging station, H2 station, local industry, Shore Power, etc

Consider all these aspects for your route to net zero



# OPERATIONAL IMPACT ON TECHNOLOGY CHOICE



## BATTERY ELECTRIC

TODAY's choice for most terminals  
TOMORROW's choice for most terminals

## OPERATIONAL CHARACTERISTICS



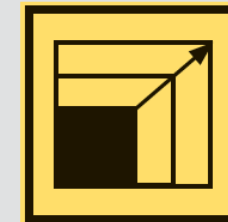
*Fleet size and  
characteristics*



*Number  
of shifts*



*Utility prices, grid  
stability, hydrogen  
availability*



*Space  
requirements*



*Deployment  
maturity*

## HYDROGEN

TODAY's choice for selection of terminals  
TOMORROW's choice for more terminals

# DECARBONISATION AT TERMINALS



## STRATEGIC ASPECTS

- Transparency on the **transition requirements**
  - 1000's of equipment to be swapped for Electric powered equipment in next years
  - Share long-term decarb roadmap for planning and on-time execution by manufacturers
  - Volume commitment?
- What type of **solution is right for you?**
  - Test technology solutions and evaluate if this is the right path
  - Full fleet vs single unit
- Understand the **local opportunities** and constraints on energy availability
  - Green electricity // Green Hydrogen
  - Incentives

## OPERATIONAL ASPECTS

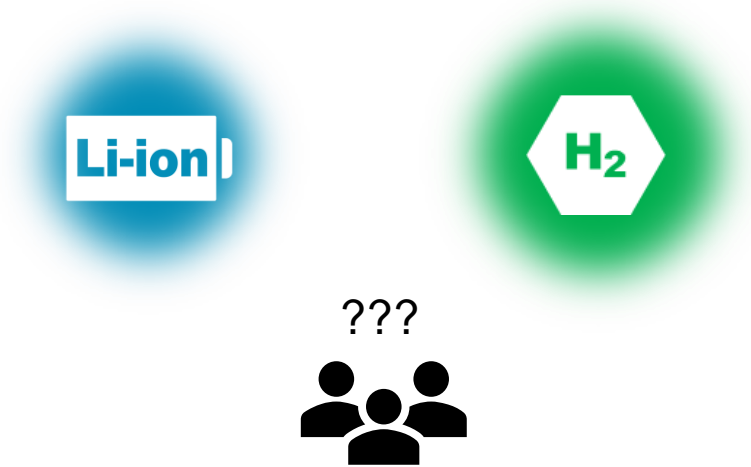
- Equipment run at **diesel-like performance**
- Operational availability vs. **Electrification Slowdown factor.**
  - More equipment required to achieve operational uptime
- **Ground m<sup>2</sup> requirements**
  - Parking lot to be created // HRS to be deployed
  - Overnight slow charge requires a lot of parking space
- **Fast Charge solutions** more difficult to integrate in existing terminals
  - Peak consumption is generating peak energy cost at different rates
- **Planning of charging** vs actual plugging
  - Back to base is taking time and energy (range)



# WHAT IS YOUR SOLUTION?



- There is no one-size-fits-all for the transition
- Today's solution might not be your ultimate solution
  - Current available solutions vs long term available solutions
  - One unit vs complete fleet
  - Regional aspects
  - Green Electricity vs Green Hydrogen
- To choose wisely, Hyster facilitates joint learning programs
  - **Hyster Learner Program** enables you to learn on the technology and deployment together with us.



# STAY UPDATED...



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