ZEPA
Zero Emission
Port Alliance

June 2024

Zero Emission Port Alliance

A Systemic Approach to Port Equipment Decarbonization

The numbers | 100,000 – 120,000 container handling equipment units need to be decarbonized

HORIZONTALLY MOVING EQUIPMENT

Terminal tractors

~52,000 units

Straddle carriers

~7,500 units

Reach stackers

~9,300 units

FIXED EQUIPMENT

Ship-to-shore

~7,800 units

Rubber tyred gantry[1]

~21,300 units

A tipping point in battery-electric container handling equipment can be reached within this decade – when action is taken

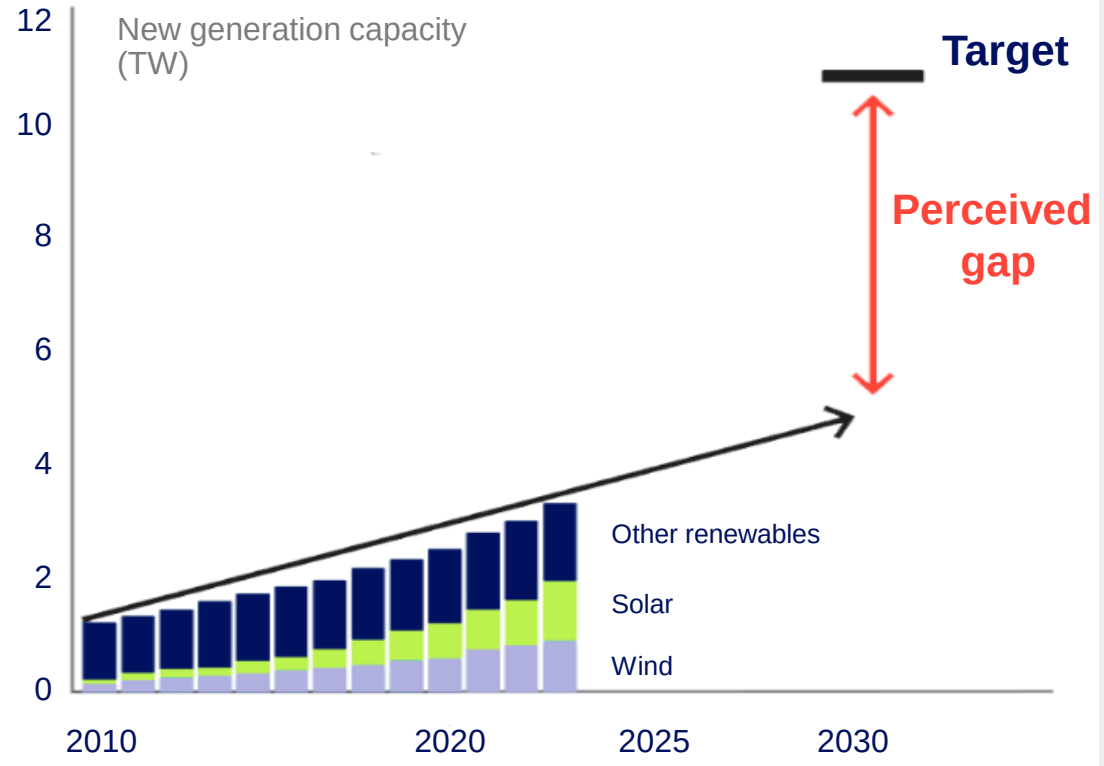
Source: Reaching a tipping point in Battery-Electric Container Handling Equipment, 2023 (link)
1. Rubber Tyred Gantry's (RTGs) can also make horizontal moves in select cases.

ZEPA
Zero Emission Port Alliance

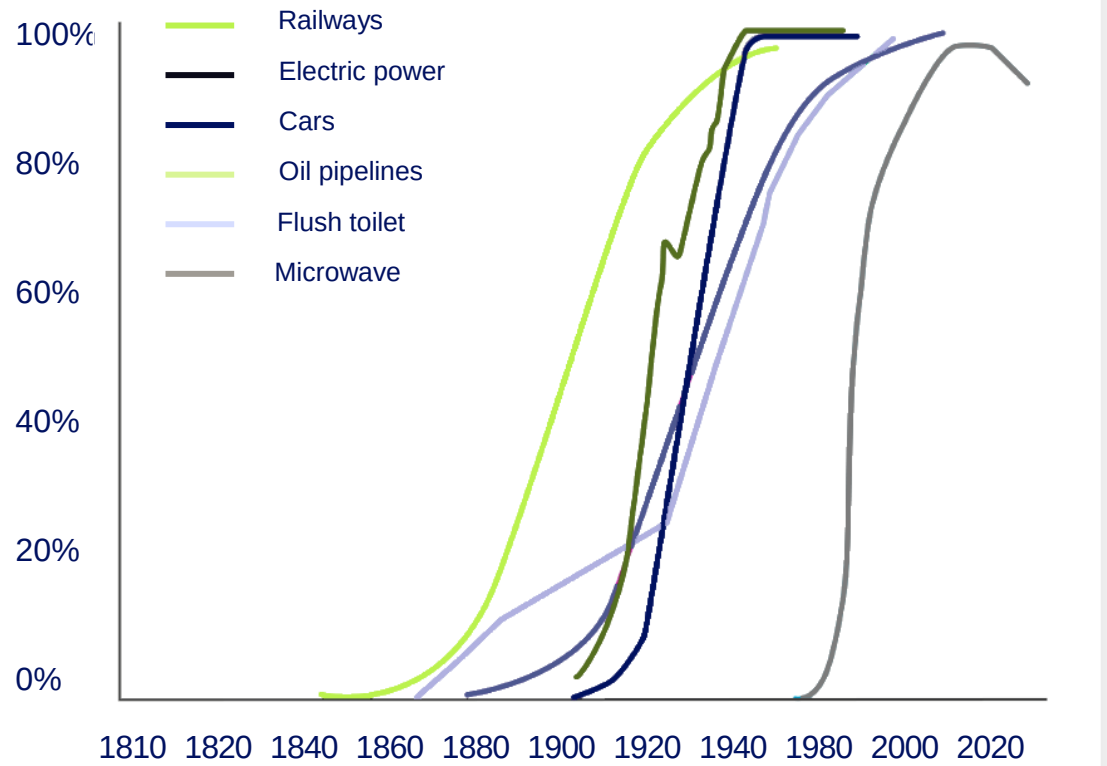
What is a tipping point ?

Moving from linear to exponential change

We expect change to continue at the same speed as in the past…



…but change happens exponentially and has done for centuries



Source: IRENA, ETC, developed by RMI, Systems change lab, MPP, Global Optimism, TED countdown

ZEPA
Zero Emission Port Alliance

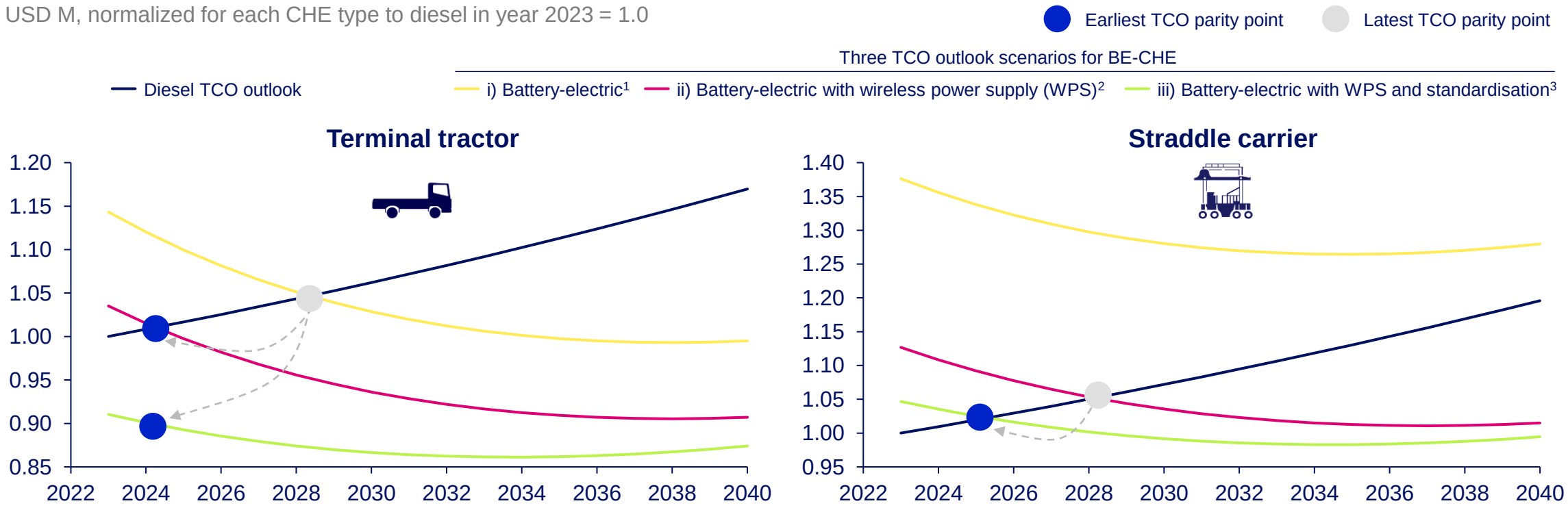
The challenge | Battery-electric container handling equipment is not yet competitive on affordability & accessibility with diesel – several levers can close the gap and accelerate adoption

Affordability	Accessibility	Attractiveness
Challenge: BE-CHE is currently more expensive than diesel CHE	**Challenge:** BE-CHE value chain does not have the scale required for a large roll-out, implementation is often complex	**Immediate benefits:** BE-CHE immediately eliminates tailpipe emissions
Levers to improve competitiveness (focus of ZEPA)		**Benefits**
Technology learning effects	Scaled production capacity	No scope 1 emissions
Reduced charging downtime	Standardisation & decoupling	Lower scope 2 emissions
Standardisation & decoupling	Power purchase agreements	No air pollutants
	Workforce training	Lower levels of vibration & noise

Source: Reaching a tipping point in Battery-Electric Container Handling Equipment, 2023 (link)

Affordability | Battery-electric CHE can become the cheapest option in the next 2-8 years, but only with collective action to close the TCO gap

Potential TCO pathways for terminal tractors and straddle carriers between 2023 and 2040 under three TCO outlook scenarios for BE-CHE: i) Reduced TCO ii) with reduced charging downtime and iii) with additional TCO reduction due to standards for key technology components



Source: Reaching a tipping point in Battery-Electric Container Handling Equipment, 2023 (link)
Note: (1) This scenario assumes the TCO of BE-CHE decreases as a result of a decrease in equipment prices and additional OPEX savings; (2) This scenario assumes the same decreases as the battery-electric scenario but includes the impact on TCO of eliminating downtime with wireless power supply (WPS); (3) This scenario adds to the WPS scenario the effect that the standardization of key technology components could have on TCO

ZEPA Zero Emission Port Alliance

ZEPA aims to accelerate port decarbonization by making battery-electric container handling equipment affordable and accessible this decade

MISSION

Make untethered battery-electric container handling equipment affordable and accessible by 2030

VISION

Accelerate port decarbonization

What ZEPA does | Collective action across 4 workstreams to accelerate the adoption of battery-electric CHE

1 Projected Demand

Encourage **scaled up production capacity** and shorter lead times & reduce product costs

Terminal Operators

2 Voluntary Design Standards

Bring down the TCO of battery-electric equipment and improve **interoperability** through standardization

Terminal Operators & OEMs

3 Power Infrastructure Roll-out

Facilitate **cost-efficient** roll-out of **power infrastructure** for BE-CHE, shore power and other cargo segments

Port Authorities, Terminal Operators, OEMs and Grid Companies

4 Adoption Incentives

Create better **market conditions** and help accelerate the adoption of untethered BE-CHE

Port Authorities, Terminal Operators, Governments and Financial Institutions

ZEPA
Zero Emission Port Alliance

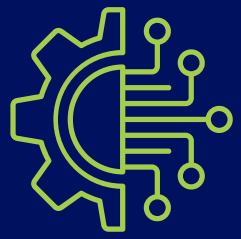
Membership | Joining ZEPA allows you to influence the design rules and provides you with a kick-start for implementation

Gain knowledge

Improve understanding of impact of BE-CHE on terminal operations

Improve BE-CHE technology assessment

Have a toolkit to develop your terminal electrification roadmaps



Lead technology development

Have a seat at the table when developing voluntary design standards

Capture and apply learnings for terminal planning and procurement

Support an industry-wide technology and demand outlook to scale BE-CHE production

Join like-minded frontrunners

Receive member-only analysis and have early access to final publications

Engage in joint piloting and data sharing (optional)

Be part of a constructive channel of communication

ZEPA

Zero Emission Port Alliance