Investor theme call: Engine Power Plants

Improved execution and profitability, continued strong position for growth, and decarbonisation tailwinds

11 December 2024

Engine Power Plants business performance has improved and is well positioned for future growth

In this event: Engine business

- Focus today will be on the Engine Power Plant Business end-to-end: both equipment and services
- The Energy Storage & Optimisation business is under strategic review and will not be discussed today

Key reflections

- A stronger and more resilient Engine Power Plant business
- An improved, future-proof product portfolio
- Strong long-term growth prospects in balancing power
- A culture of continuous improvement

The end-to-end Engine business is delivering on commitments from CMD 2023

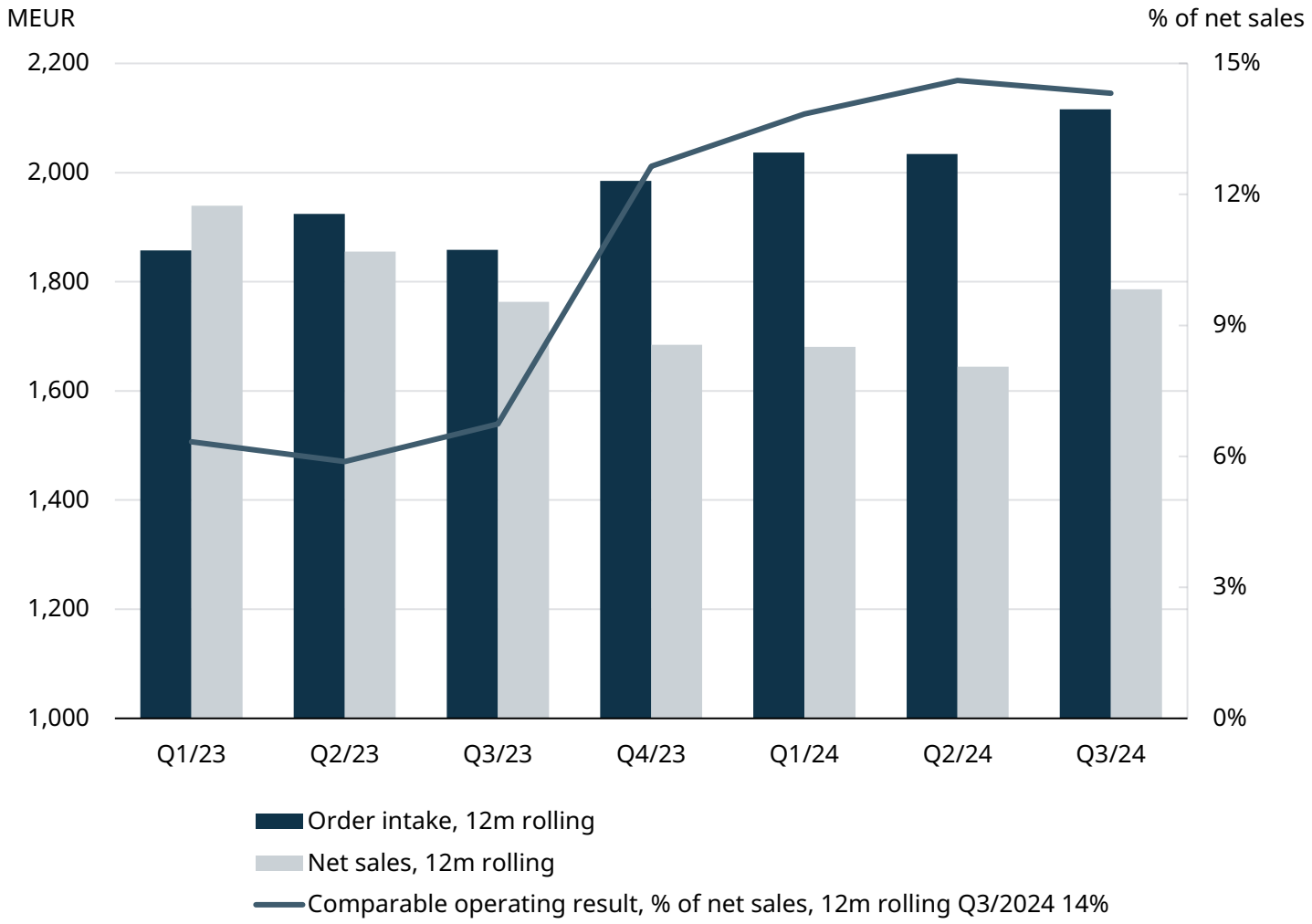
	Focus areas from CMD in 2023	→	Status as of 2024 [1]
Profitability Focus on profitability and project excellence	New organisation and governance	✓	Successfully implemented
	Stronger risk management	✓	Improved risk-reward balance with >80% EEQ[2] and <20% EPC[3]
	Operational leverage from growth	✓	+14% growth in order intake, +1% net sales
	Lean operations and flow efficiency	✓	Continuous improvement focus on products and services delivery
	Moving up the service value ladder	✓	+15% agreements with performance guarantees[4]
	Increasing agreement coverage	✓	+5pp agreement coverage[4], >90% renewal rate
Growth Capture growth in balancing solutions and services	Continued growth in Services	✓	+7% Services sales growth, book-to-bill ratio 1.1
	Strong thermal balancing growth	✓	+260% increase in balancer order intake
	Future-proof portfolio for sustainable fuels and optimisation	✓	100% hydrogen power plant launched, hydrogen engine development programme on track

1) Growth: LTM (last twelve months) Q3/24 compared to LTM Q3/23 2) Extended Equipment Supply, in MEUR 3) Engineering, Procurement, Construction, in MEUR 4) In MW, Q4/21 - Q3/24

All figures in MEUR unless otherwise indicated

Engine Power Plants shows end-to-end profitable growth

Growing order intake, higher comparable operating result margin



Higher order intake and improved profitability
2023–LTM Q3/2024

+13% total equipment sales
2023–LTM Q3/2024

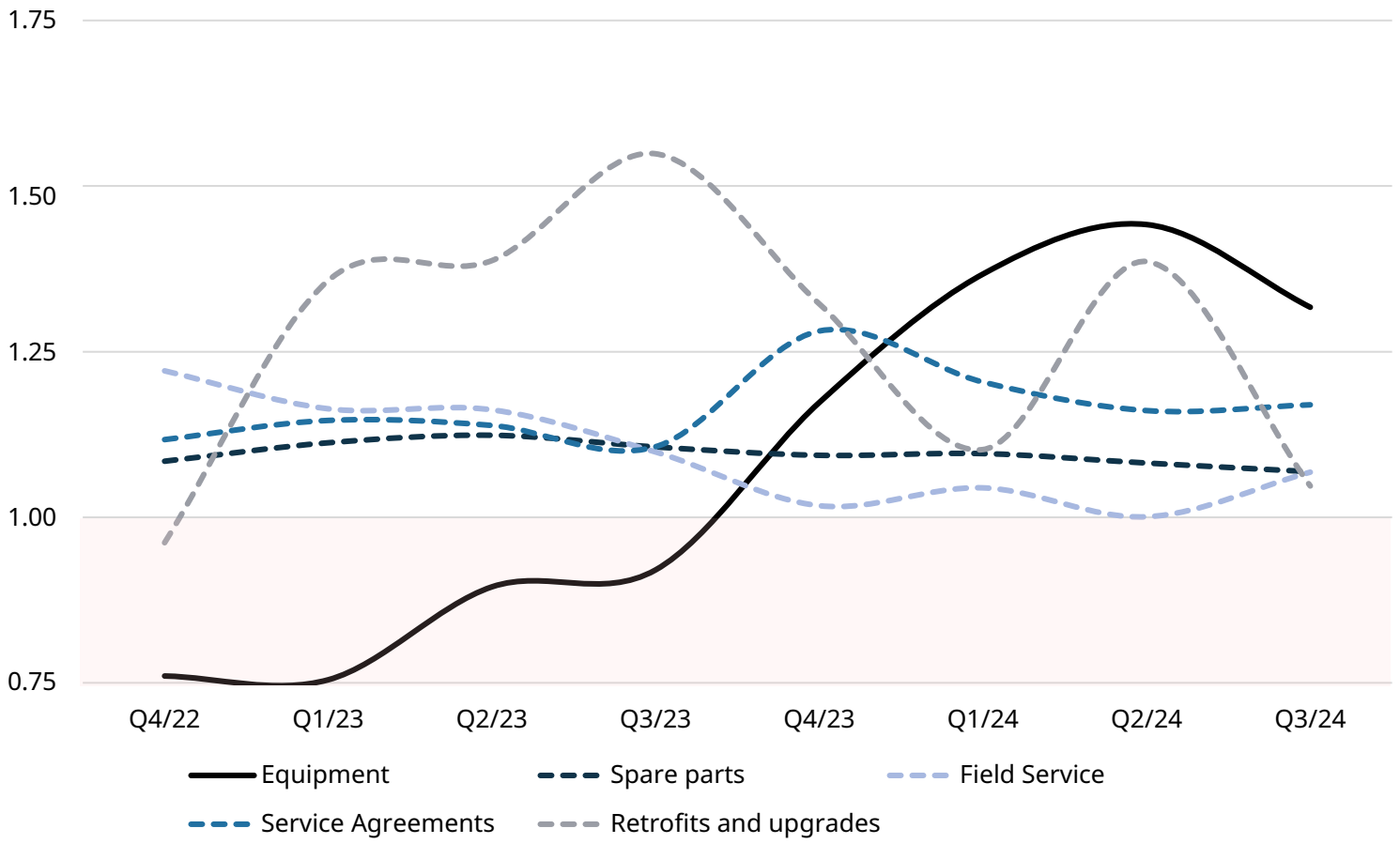
LTM profitability drivers

- Recovered profitability in equipment sales
  - Improved risk-reward balance and project selection criteria
  - Continuous improvement and higher operating leverage
- Growth in service sales

LTM: Last twelve months (Q4/2023 – Q3/2024)

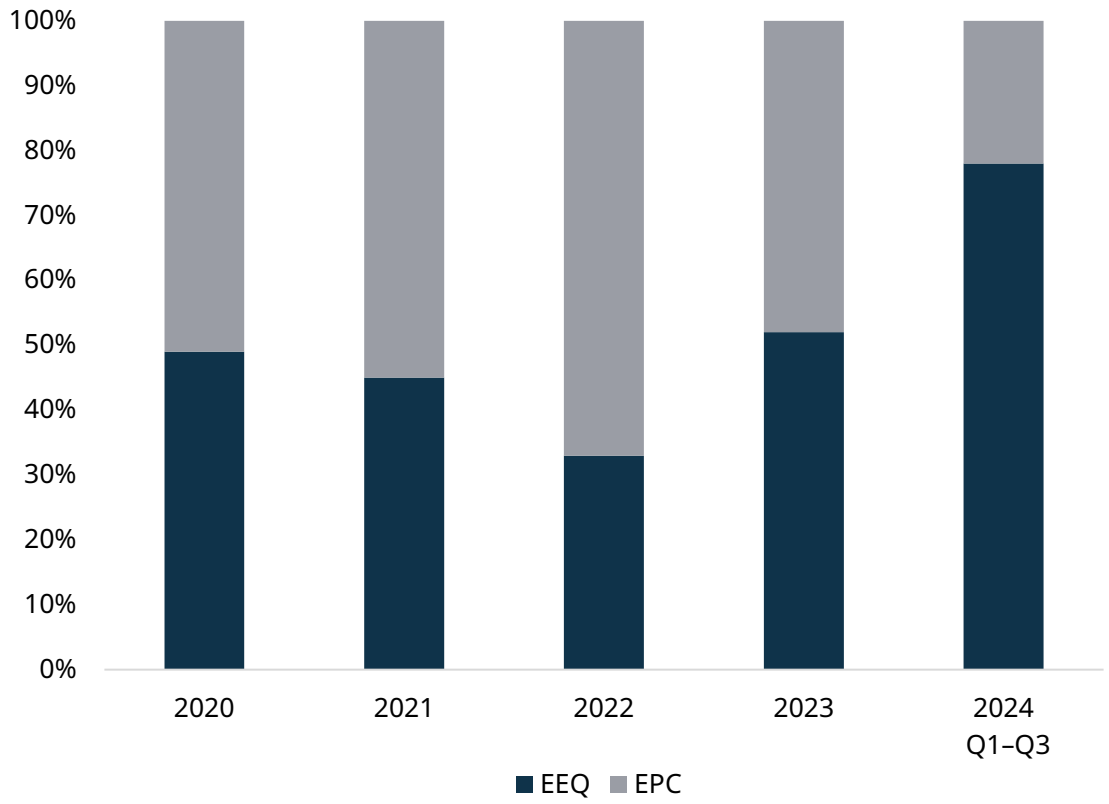
Book-to-bill shows growth for both equipment and services

12M rolling book-to-bill ratios, EPP and Services



The new balance between EEQ and EPC supported profitability

Rebalanced EEQ/EPC net sales[1]



Improving profitability through risk management

- **New organisation and governance** has improved risk management
- Energy has **EEQ** (extended equipment supply) as **the preferred offering**
- **EPC** (engineering, procurement, and construction) is considered in **selected markets** and with sufficient risk/reward premium and strong sales/project management
- **EPC** has **higher revenue potential** and potential to obtain **better end-to-end margins**
- Rebalance in risk appetite leads to **an improved order book risk/reward profile for 2024 and onwards**
- At the end of Q3 2024 **80% of the order book was EEQ orders**; this will vary from year to year

1) Share of Net Sales (MEUR) by year, EPP and Services

Market trends are generally positive, with some uncertainty remaining

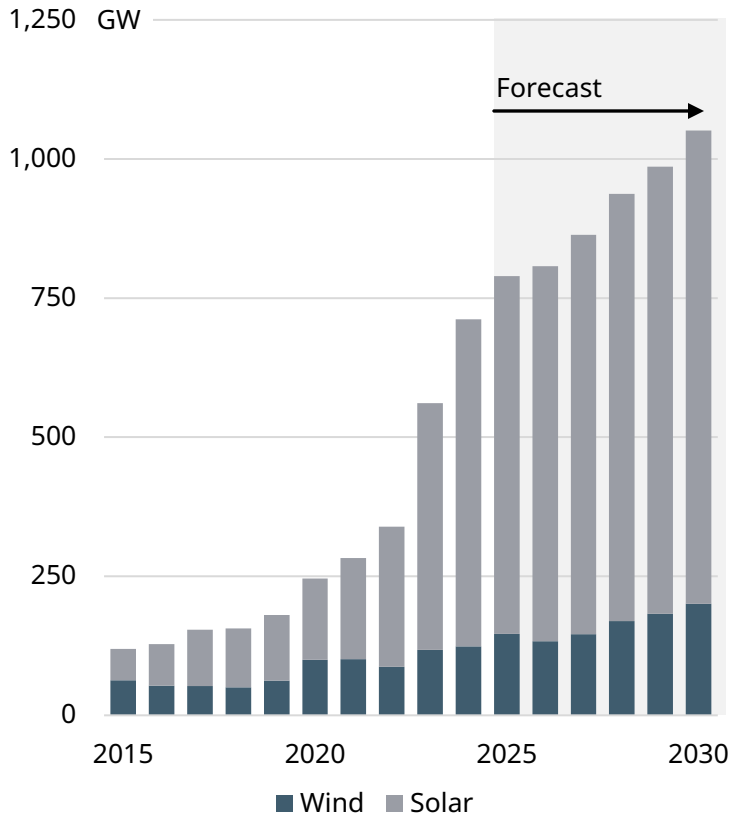
Opportunities and tailwinds

- The **energy transition is accelerating**, with renewables capacity forecasts at record levels
- **Renewables** remain the **least expensive** way to generate electricity, driving balancing demand
- **Natural gas prices have moderated**, improving competitiveness for gas
- **Regulatory changes** are largely **supportive of thermal balancing**

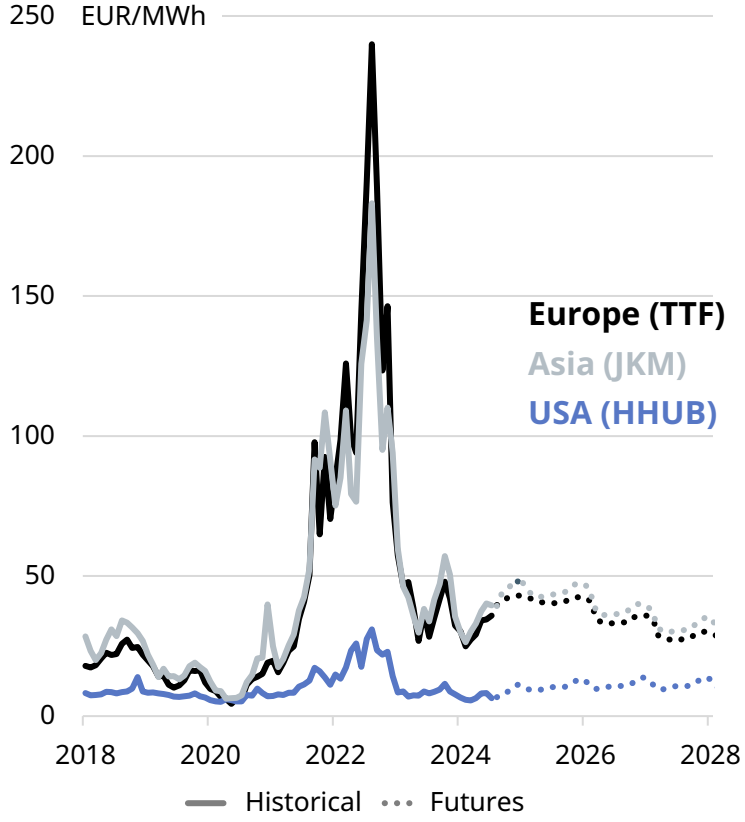
Uncertainties and headwinds

- **Rising protectionism** and increased use of industrial policy
- **US election result** has increased trade- and tariff-related uncertainty

Renewables capacity additions



Natural gas prices

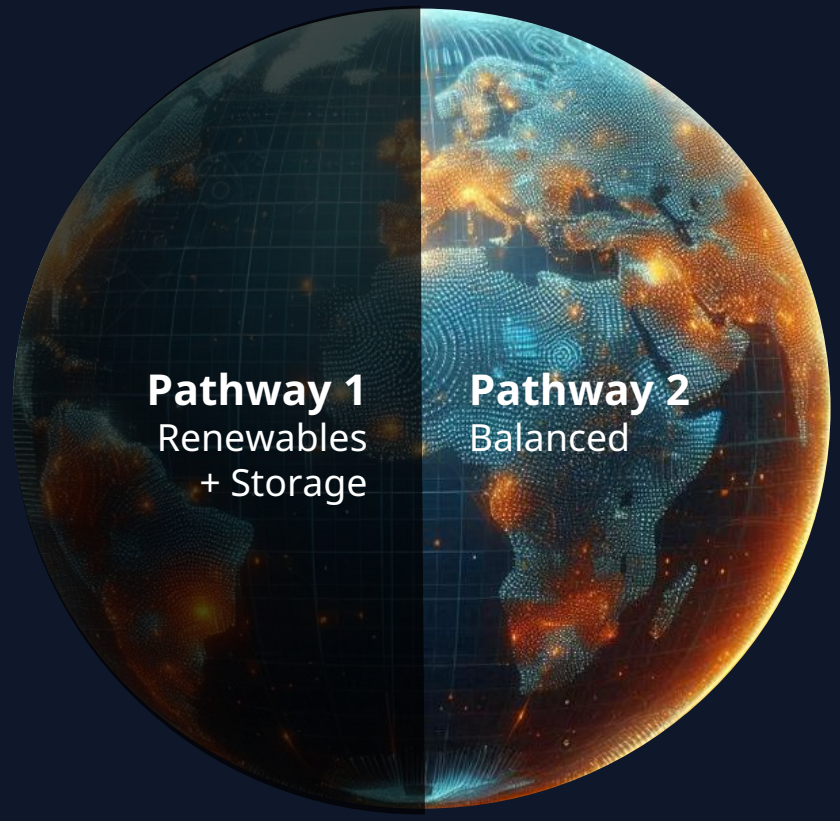


Forecasts from BNEF: 3Q 2024 Global PV Market Outlook and 1H 2024 Global Wind Market Outlook

Thermal balancing is needed for an optimal transition

We modelled the world as one power system and compared two Net Zero pathways between now and 2050. Pathway 1 allows only additions of renewable energy and energy storage, while Pathway 2 also includes additions of thermal balancing.

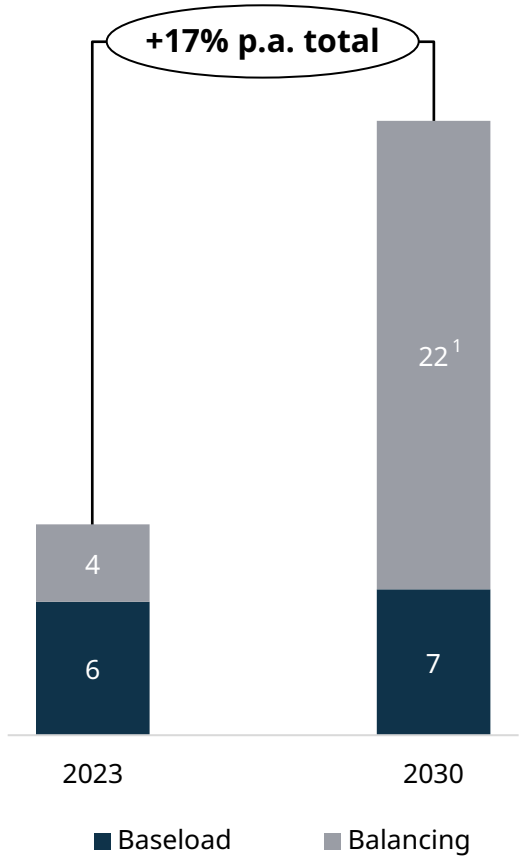
The modelling shows that a power system including flexible balancing power plants has significant advantages when it comes to both the cost and pace of the energy transition, compared to a renewables-only scenario.



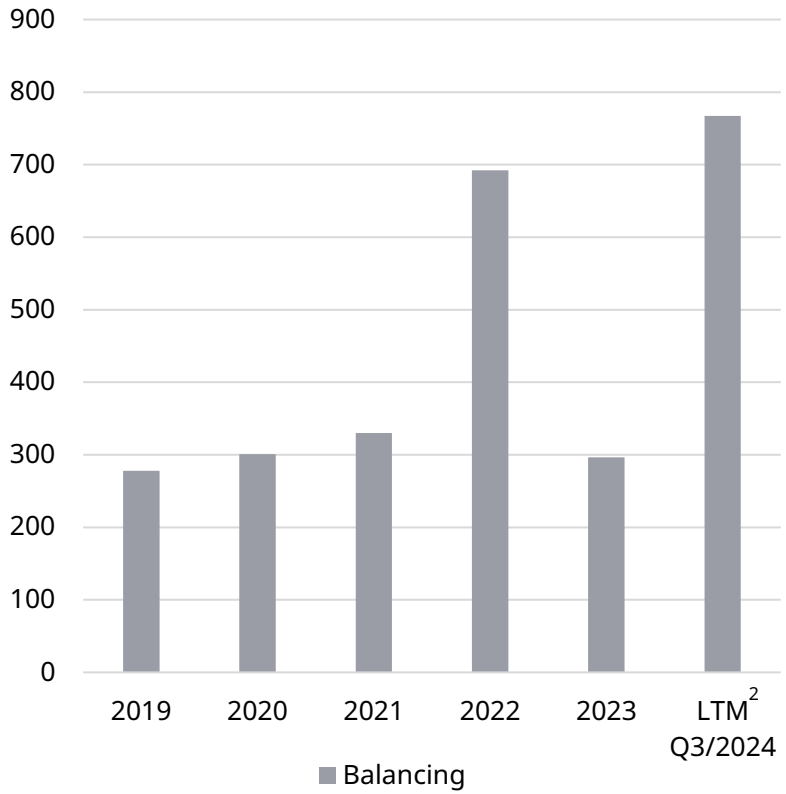
- 65 trillion EUR cost savings between 2025-2050
- Faster CO2 reductions
- 50% less renewables capacity and land needed in 2050
- 88% less wasted energy in renewable curtailment by 2050

The significant growth opportunity in balancing is materialising

Addressable market (annual, GW)



Realised balancing order intake (MW)



The case for thermal balancing

- **Record renewables installations** drive demand for thermal balancing
- **Favourable market reforms** to balancing are progressing
- **Gas is a crucial transition fuel**
- **Balancer order intake** on track for a **record year**
- **Good order pipeline**
- **North America and Europe** are high-potential balancing markets

1) Balancing forecast based on BloombergNEF forecast wind and solar capacity additions, estimated share of balancing capacity compared to renewables growth.

2) Q4/2023 – Q3/2024

The need for thermal balancing is driven by increased renewable penetration

Balancing and the energy transition

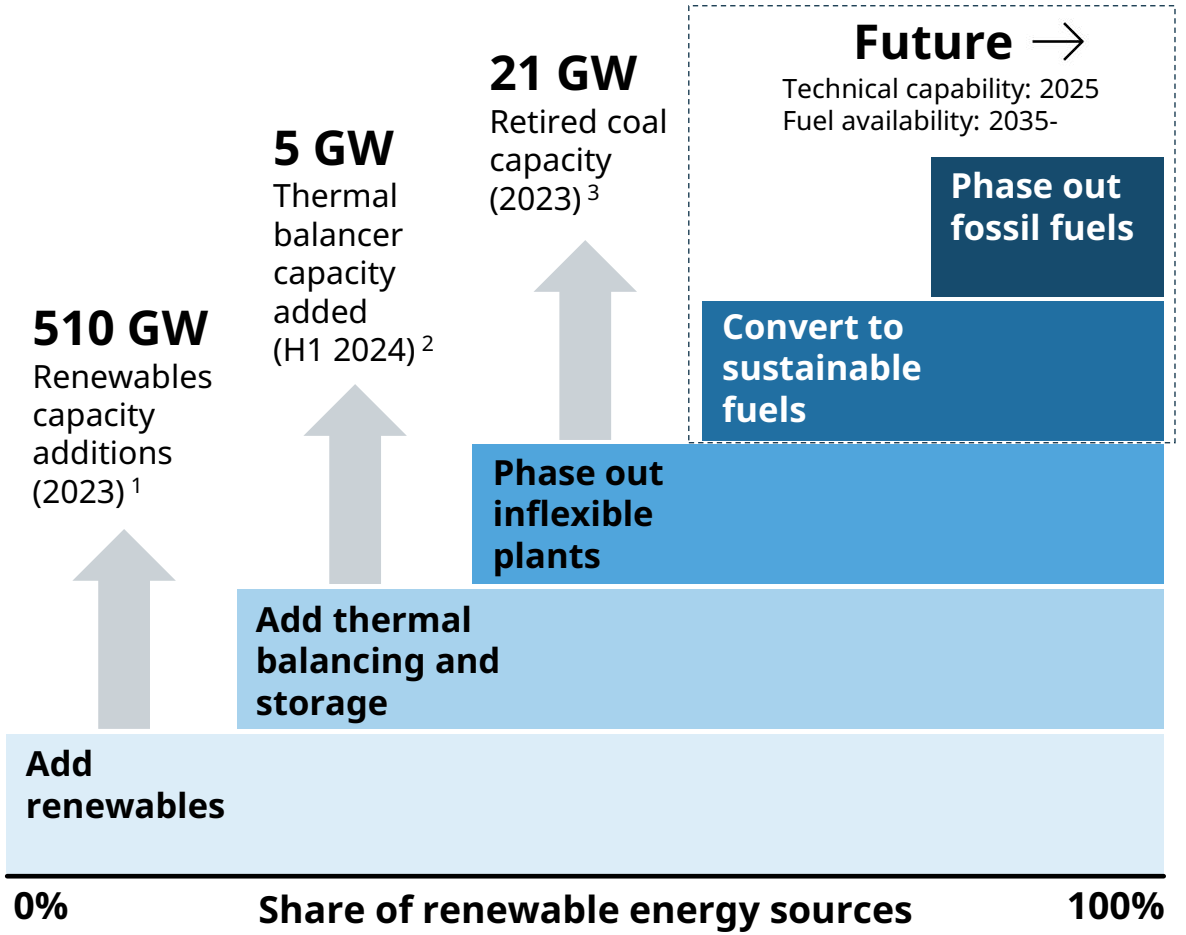
Creating the need for balancing

- Increasing penetration of intermittent renewables creates a need for thermal balancing, while switching off coal drives demand for dispatchable capacity
- Using inflexible power plants leads to curtailment – sufficient balancing power ensures maximum utilisation of renewables
- Engines support power grids on a minute, hourly, daily, and seasonal basis, and react quickly to changes

Revenue triggers and market examples

- Thermal balancing has high value for the power system, but power plants must also be profitable investments for owners
- Introducing 5-minute intervals for dispatch and price settlement in electricity markets improves power system ability to balance renewables
- The balancing and flexibility needed in power systems can also be incentivised through capacity mechanisms or payments for ancillary services and reserves

Optimal path to decarbonising the global energy industry



1) IEA Renewables 2023 2) Internal calculations based on McCoy Power Reports, collected data 3) Global Energy Monitor

South Australia: a power system showcasing the future of the energy transition

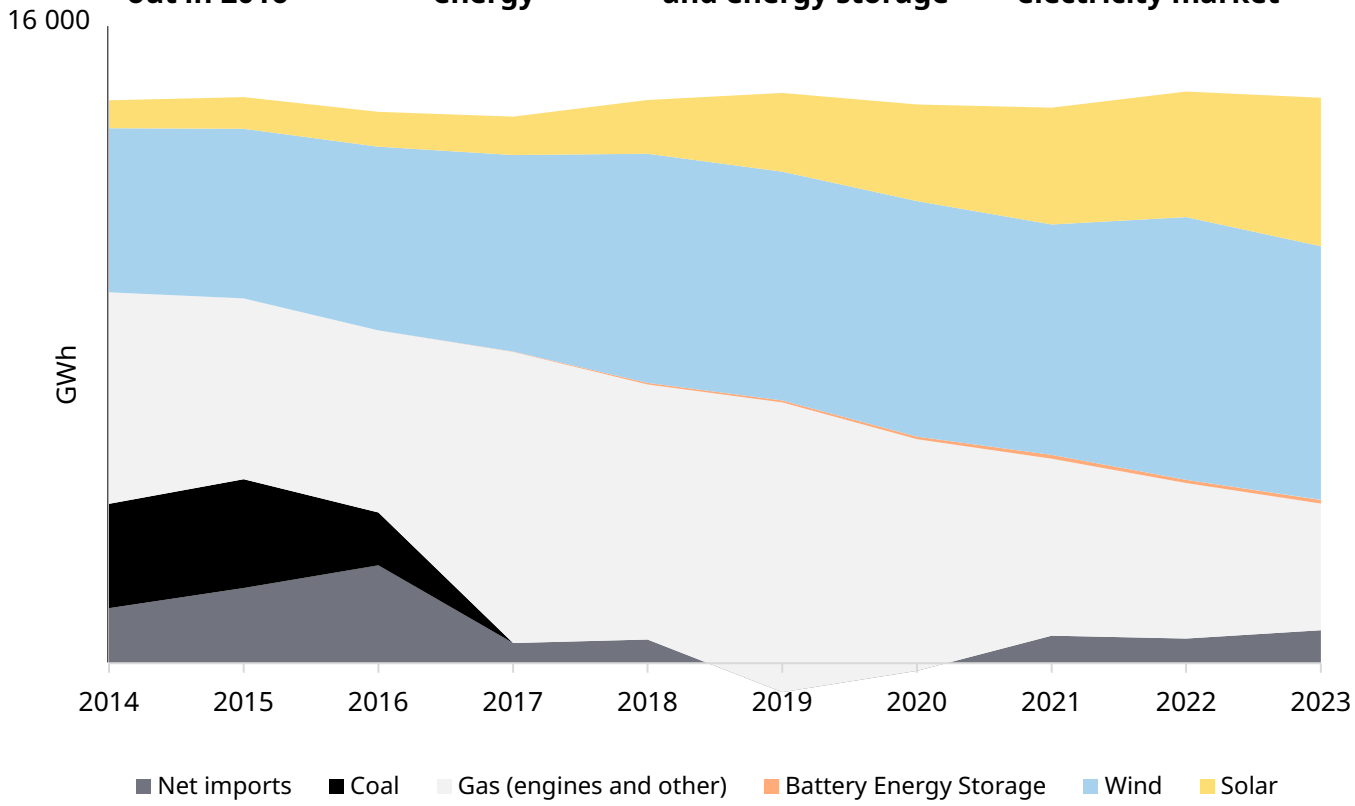
74% renewable energy balanced by gas and energy storage

Coal phased out in 2016

74% renewable energy

Balanced by gas and energy storage

5-minute electricity market



Balancers can tap into multiple value streams[1]

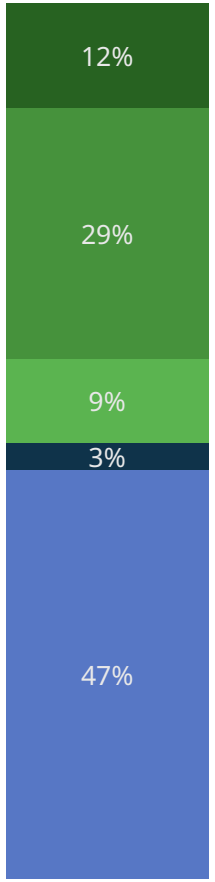
Merchant revenues
Capturing price spikes in the spot market

Energy revenues
Paid to serve electricity

Cost savings
Savings from lower fuel and O&M costs

Ancillary services
Paid to provide critical grid support

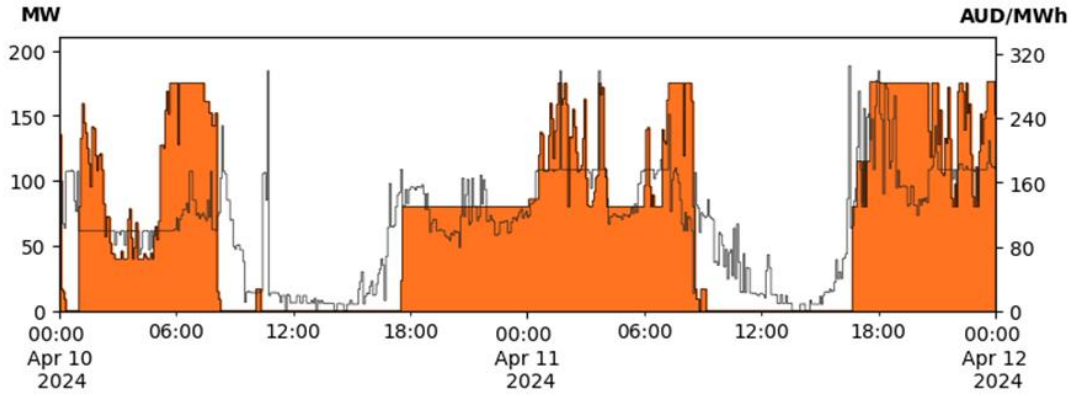
Capacity revenues
Paid to provide dependable capacity



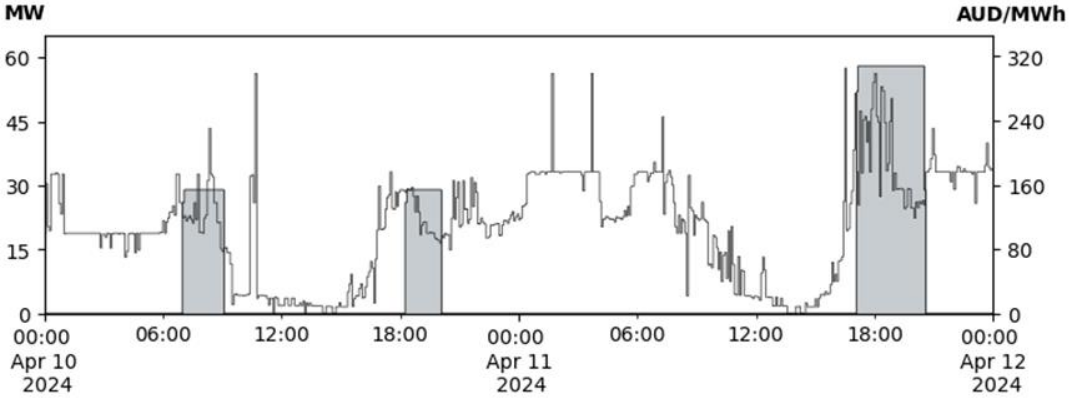
1) Wärtsilä study on how balancers can generate value (based on South Australia's power system)

Engines are unique, flexible market assets

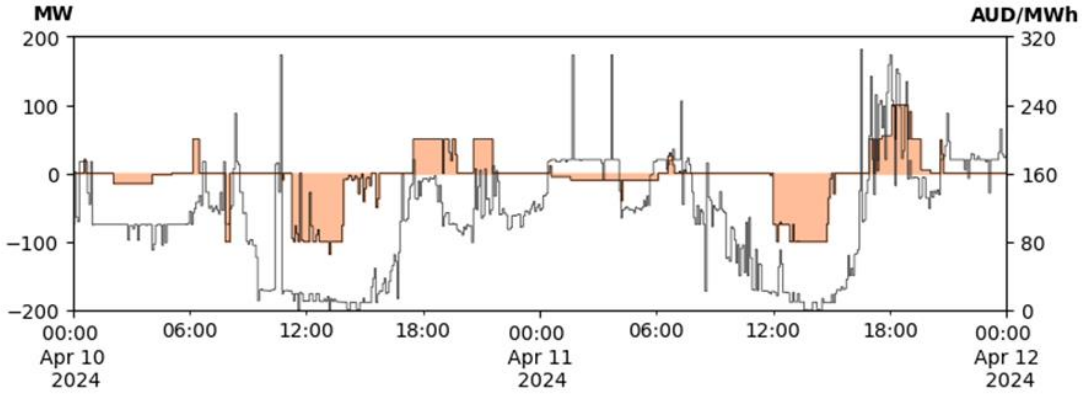
Internal combustion engines (ICE)
Rapid start-stops, part-loading, and load following



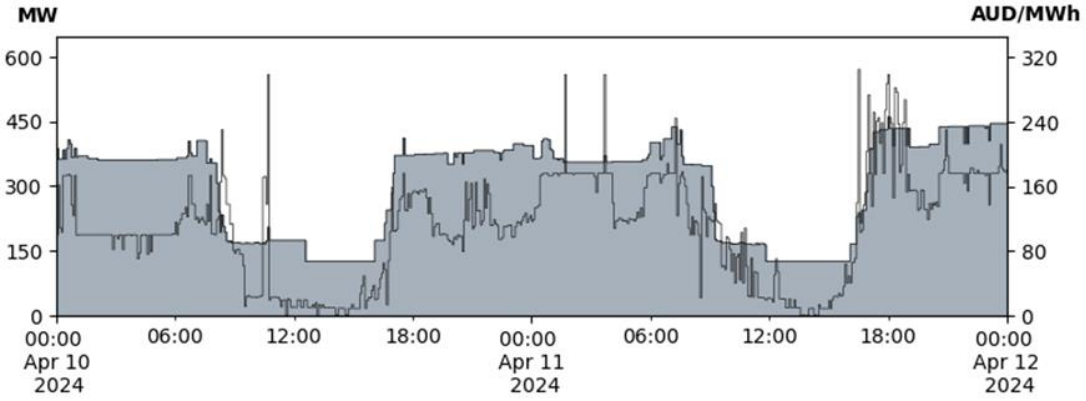
Aeroderivatives and other open-cycle gas turbines (OCGTs)
Operating in an on-off pattern



Battery energy storage systems (BESS)
Focus on energy shifting and frequency regulation



Combined-cycle gas turbines (CCGTs)
Continuous running, constrained by minimum load



Wärtsilä's sweet spot is in 50 - 400 MW plants

Engine technologies

High-speed engines

- Low capex and low efficiency
- Best suited for backup and low running hours applications

Wärtsilä medium-speed engines

- High efficiency due to multiple modular units
- Faster start-up; can cycle several times per day with no cost impact
- Transparent modelling shows the value of balancing with engines

Most competitive in applications with high numbers of starts/stops and markets with structures and incentives that reward flexibility

Gas turbine technologies

Aeroderivative gas turbines

- Lower capex than engines but less fuel-efficient
- More flexible than heavy-duty gas turbines (HDGTs)

Open-cycle gas turbines (OCGTs)

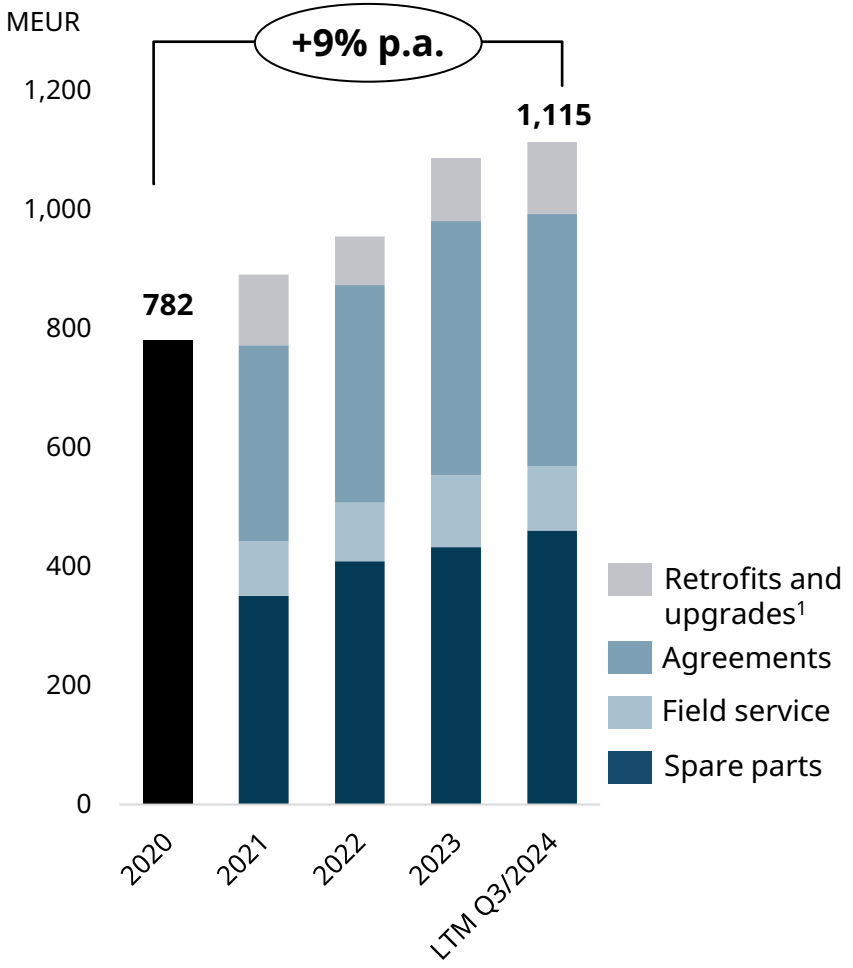
- Low efficiency; poorly suited for balancing
- Competitive mainly in peaking applications with low amount of starts/stops

Combined-cycle gas turbines (CCGTs)

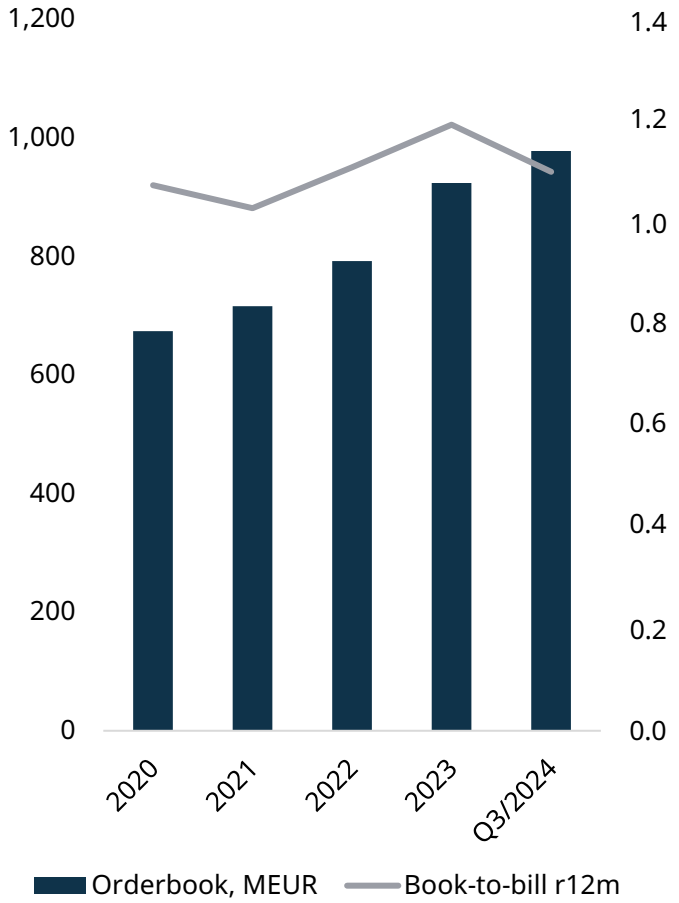
- High efficiency, but high capital costs (CAPEX)
- Best suited for large-scale baseload applications

Solid services performance continues

Growing Service Net sales



All time high orderbook & strong book-to-bill



1) Referred to as Service Projects in interim reports

+17% total Services sales
2022–LTM Q3/2024

+22% Service agreements sales
2022–LTM Q3/2024

+40% total orderbook
2020–2023

Energy services growth drivers remain solid

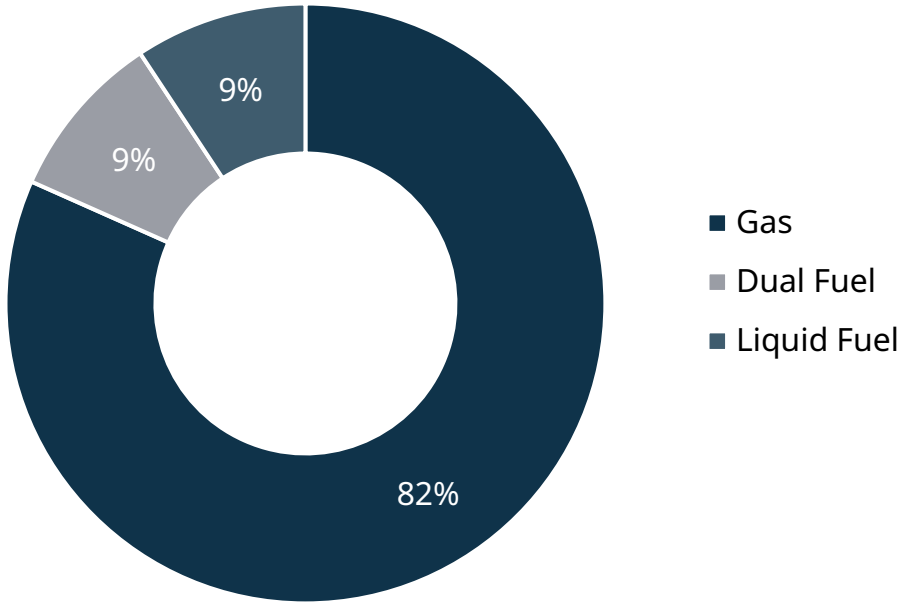
- Increasing agreement coverage
- Growing installed base
- Upgrades & sustainable fuel conversion demand
- Growth potential in outcome-based and decarbonisation agreements
- Stable total running hours

Wärtsilä Energy is well positioned to provide the fuel flexibility needed for the energy transition

Technology roadmap for engines

- Plant lifetimes stretching to 2050: **fuel flexibility future-proofs engines**
- There will be **no single global green fuel** for use in the energy sector
- We launched our **100% hydrogen** power plant in Q2 this year, expected to be released for sales in 2025
- 25% hydrogen blend already possible today
- Sustainable fuels come with high conversion losses and should be used **exclusively for balancing** and the decarbonisation of hard to abate sectors
- Using expensive sustainable fuels for inflexible baseload power does not make commercial or environmental sense – leading to a **future advantage for balancing**

Order intake by fuel, 2020-2024 (MW)



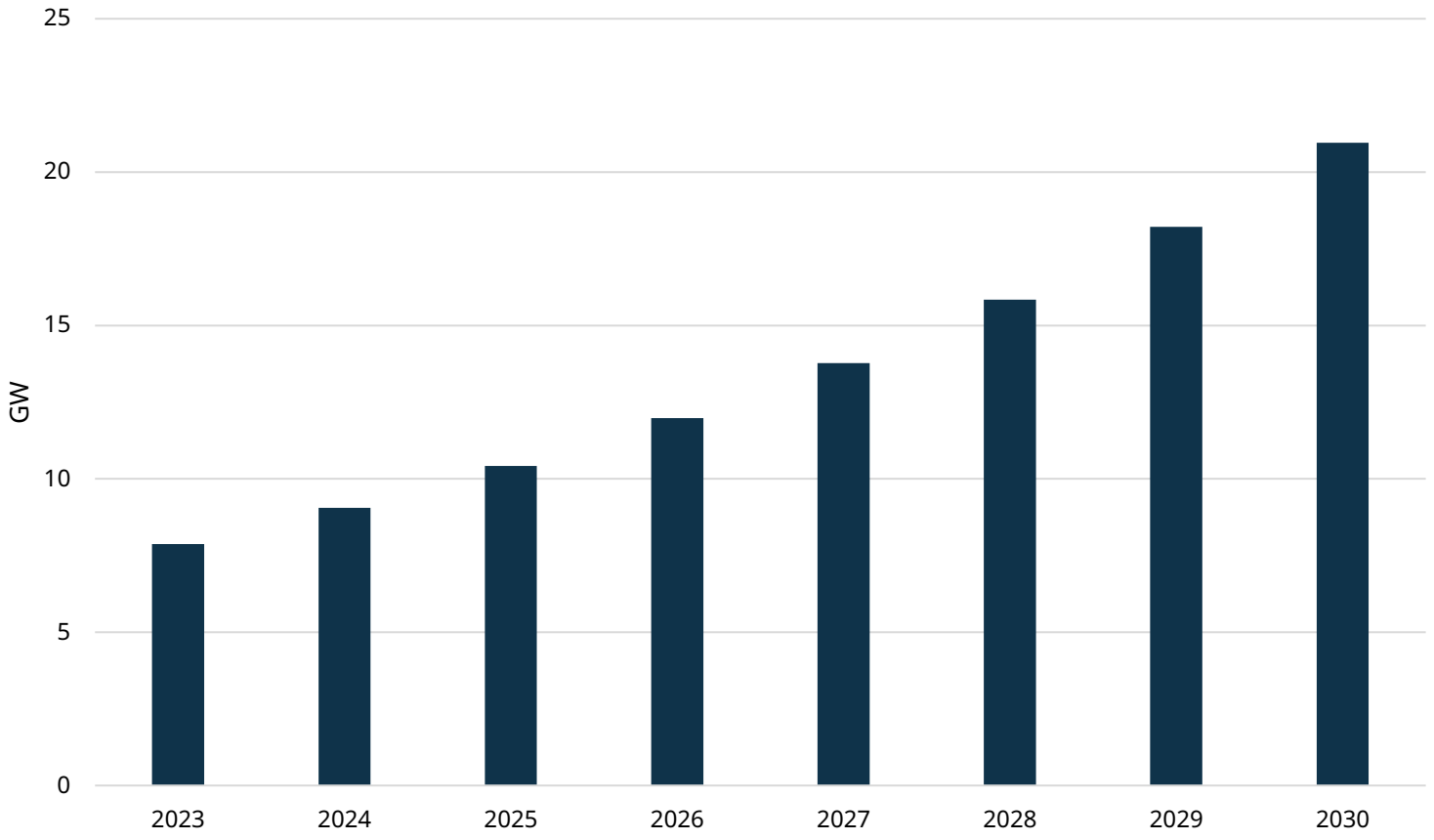
- **91%** of engine MW designed for natural gas operation
- Strong upgrade track record, with **140 liquid fuel engines converted to gas** in 18 countries

Service upgrades have a strong customer value proposition and can increase agreement coverage

Offering Upgrading customer installations with a broad portfolio of solutions	Fuel conversions, repowering, electrical and automation upgrades. Engine performance upgrades and waste-heat recovery
Value proposition Supporting customers through decarbonisation and ensuring maximum reliability and profitability	Decreased production cost, increased plant efficiency, output, and availability. Reduced emissions and preventing asset stranding
Revenue Extending installed base lifetime and increasing agreement coverage	Upgrades to enable climbing the services value ladder. Demonstrators and pilots for sustainable fuel conversions

We see growth opportunities for baseload engine power plants in Data Centres

Global data centre power demand growth[1]



New data centre power capacity expected to be added 2024-2027
~ 45 GW

Typical grid connection time currently
5 years

Wärtsilä's sweet spot
Baseload power for off-grid data centres[2]

1) Adapted from IEA Electricity 2024, 2) Waiting for grid interconnection due to grid constraints

The Data Centre power market is shifting, with new thermal baseload opportunities in specific markets

Historical: backup power

20-100 MW

typical power need

Grid interconnections immediately available

- Customer focus: CAPEX, availability
- Segment typically served by high-speed engines
- High risk in case of strict availability guarantees
- Limited lifecycle service opportunity

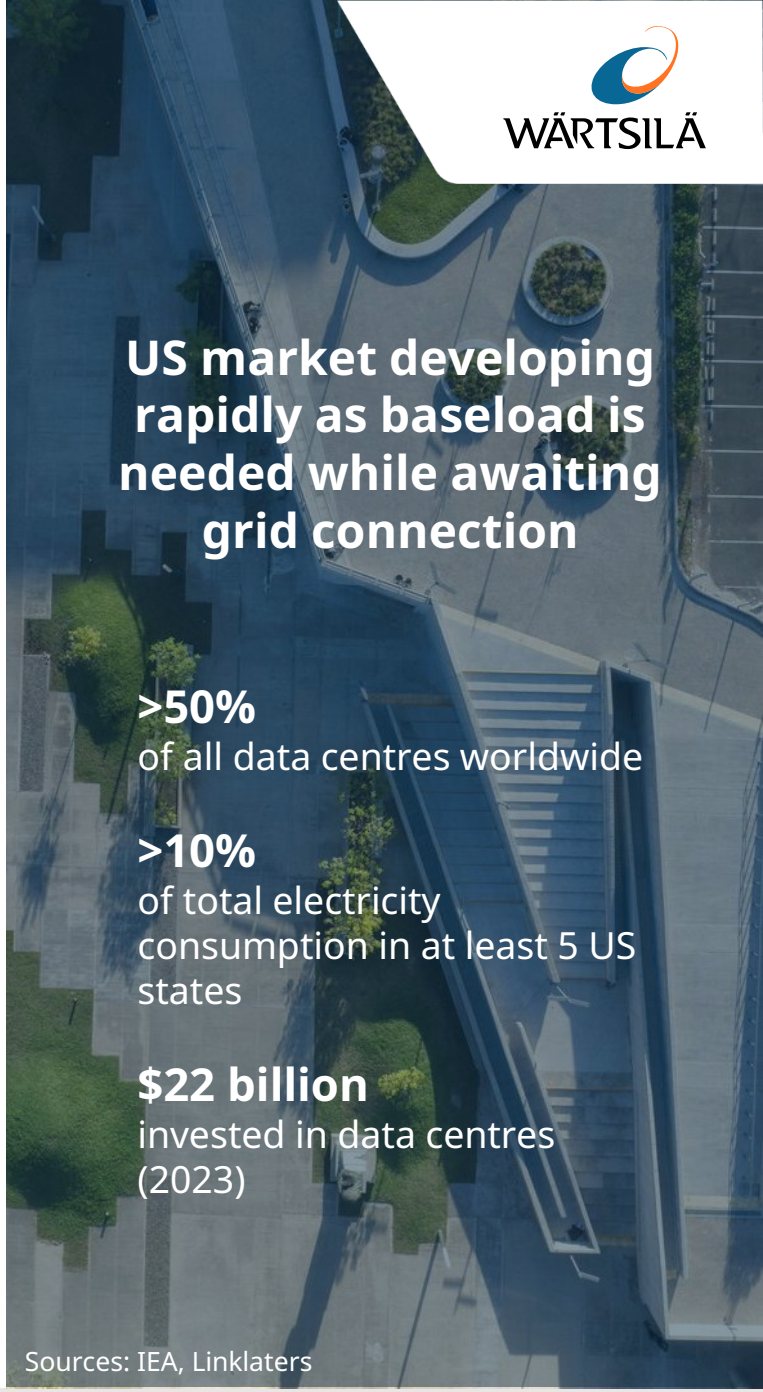
Emerging: off-grid baseload

50-300 MW

typical power need

Grid interconnection times up to 5-7 years in some markets

- Customer focus: delivery time, OPEX, emissions
- Typically requires medium-speed engines or gas turbines
- Wärtsilä competitiveness high due to shorter lead times, modularity, reliability
- High lifecycle sales potential



US market developing rapidly as baseload is needed while awaiting grid connection

>50%
of all data centres worldwide

>10%
of total electricity consumption in at least 5 US states

$22 billion
invested in data centres (2023)

Sources: IEA, Linklaters

Future performance driven by equipment sales growth, service volumes, and continuous improvement

Equipment margins ✓ Maintaining achieved balance in risk management ✓ Operational leverage from growth ✓ Total installed cost reduction	**Equipment sales** ✓ Strong thermal balancing growth ✓ Data centre power demand growth ✓ Future-proof portfolio for sustainable fuels and optimisation
Continuous improvement ✓ Lean operations and flow efficiency ✓ Predictive and autonomous operations ✓ Cost indexation & value-based pricing	**Service sales** ✓ Growing installed base ✓ Increasing agreement coverage ✓ Climbing the service value ladder

Profitability ← → **Growth**


WÄRTSILÄ