Capture growth in balancing solutions and services

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Capture growth in balancing solutions and services

Significant value creation opportunity as the transition to renewables accelerates

Leading position in thermal balancing, energy storage and power system optimisation

Set for performance through services growth and project excellence
Transform – The future is renewable
The energy future is renewable – balancing solutions are needed to achieve net zero by 2050

Share of renewables in global electricity generation

<table>
<thead>
<tr>
<th>Year</th>
<th>Renewables</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>28%</td>
<td>72%</td>
<td>100%</td>
</tr>
<tr>
<td>2030</td>
<td>61%</td>
<td>39%</td>
<td>100%</td>
</tr>
<tr>
<td>2040</td>
<td>84%</td>
<td>16%</td>
<td>100%</td>
</tr>
<tr>
<td>2050</td>
<td>88%</td>
<td>12%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Key steps to achieve net zero

1. Phase out fossil fuels
2. Convert to sustainable fuels
3. Phase out inflexible plants
4. Add thermal balancing and storage
5. Add renewables

Source: IEA World Energy Outlook 2021 (Net Zero Emissions Scenario)
Power system optimisation - Day

On sunny and windy days, renewables provide most of the electricity and excess energy can be stored.
Power system optimisation - Evening

Electricity demand is at its highest. When the sun goes down, quick ramp up of balancing power is needed.
Power system optimisation – Night

No wind and empty batteries, thermal balancing provides electricity.
Power system optimisation – Night

Wind starts blowing, engine can be switched off quickly compared to inflexible sources.
The 3 Cs - Our balancing solutions are complementary and provide:
Reduction in CO$_2$, Curtailment and Capex

Optimal system with thermal balancing

Inflexible system

Curtailment
Careful planning of future energy systems will save billions of euros and rapidly reduce CO₂ emissions – Wärtsilä is the go-to partner in power system modelling

Power system modelling

- Wärtsilä has carried out over 150 country and system studies worldwide
- A rapid worldwide shift towards net zero energy systems is feasible and affordable with technologies that already exist
- Significant potential in Germany & India

Download Front-loading net zero report
Perform – Capture growth in balancing solutions and services
Balancing market growing 10X – capturing the opportunity in thermal balancing, energy storage and services

1. Tap into thermal balancing & energy storage growth opportunities and maintain top 3 market position
2. Create value through our strong power system knowledge and experience by integrating different generation assets
3. Increase agreement coverage of the installed base through performance-based agreements
4. Tap into the 10 GW fuel conversion opportunity
Thermal balancing market will grow by 30% per year – driven by increase in renewables and coal-phase out

**Outlook**

- Increased **market activity**, thermal balancing included in capacity addition plans in Brazil, USA and South Africa

- 40 countries have pledged **coal-phase out**, 90 GW\(^3\) to be phased out in this decade

- **Gas** critical in this decade, after 2030 use of hydrogen and other low-carbon fuels will increase

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**Baseload – (Global #1-5\(^1\))**

<table>
<thead>
<tr>
<th>Year</th>
<th>Addressable annual market (GW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>12</td>
</tr>
<tr>
<td>2030</td>
<td>12</td>
</tr>
</tbody>
</table>

**Thermal balancing (Global #1-3\(^1\))**

<table>
<thead>
<tr>
<th>Year</th>
<th>Addressable annual market (GW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>2</td>
</tr>
<tr>
<td>2030</td>
<td>30(^2)</td>
</tr>
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</table>

++30% p.a.

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Source: Bloomberg New Energy Outlook 2020, Wärtsilä estimates
1) Market position
2) Key markets 10-15 GW
3) IEA Net zero scenario 2021
Our continued success in thermal balancing demonstrates the strength of our engine portfolio – installed base increasing to 8 GW

Recently awarded contracts for > 1 GW

- Brazil three contracts totalling 150 MW awarded for reserve auction
- Latin America two contracts totalling 600 MW and valued at 480MEUR awarded
- USA contract with Omaha Public Power District for 156 MW awarded
- Italy six projects with Meta Energia totalling 380 MW awarded
- Thermal balancing installed base increasing to 8 GW
Reciprocating internal combustion engine is the best technology for thermal balancing

1. Continuous ramp-up/down for renewables
2. Cycling several times per day with no cost impact
3. Modularity – multiple units with high efficiency
4. Catching price spikes 30+% better than competition
5. Avoiding negative prices 40+% more start/stops
6. Baseload when needed

The 211 MW Barker Inlet power plant in South Australia outperforms all other balancing and baseload plants with its flexibility features

1) Source: AEMO NEM data - Wärtsilä study
Our energy storage business is growing rapidly, by leveraging our power system competence and integration capabilities.

Order intake

Order intake (MWh)

<table>
<thead>
<tr>
<th>Year</th>
<th>LTM Q3/2021</th>
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<tbody>
<tr>
<td>2020</td>
<td>460</td>
</tr>
<tr>
<td>2030</td>
<td>2790</td>
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+500% p.a.

Energy storage (Global #1-3)

Addressable annual market (GWh) ¹)

<table>
<thead>
<tr>
<th>Year</th>
<th>2020</th>
<th>2030</th>
</tr>
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<tbody>
<tr>
<td>5</td>
<td>55</td>
<td></td>
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+30% p.a.

Outlook

- Maintain top 3 market position
- 2021 order intake for energy storage expected to be > EUR 700m
- 4 GWh delivered or awarded, with many of the largest energy majors
- Complexity drives demand for advanced energy management systems
- Business expected to be profitable within a few years

Source: Bloomberg New Energy Outlook 2020, Wärtsilä estimates ¹) Addressable market excluding certain geographical markets and residential and commercial storage
Deep know-how in power systems and integrating generation assets, plus strong project execution capabilities creates differentiation

Energy storage roadmap

Power system optimisation

- Combine our **deep understanding** of different technologies and software, integrating generation assets, and **maximising** the lifetime **revenue** potential for customers
- Continuously **invest** to maintain our **leading position** in power system optimisation, and explore different **revenue models** with **performance-based incentives**

Execution

- **Partnerships** with world leading **battery cell** providers
- Combine **strong customer base** with Wärtsilä’s **global network**
- Systematically scale the Energy storage organisation and leverage **strong project management capabilities**
Wärtsilä’s power system optimisation and asset integration creates value across multiple customer segments

**AGL 250 MWh - Australia**

“We are pleased to work with Wärtsilä on this project, who bring critical expertise and technology to bring this project to life.”
Markus Brokhof, AGL COO

**Able Grid 200 MW - USA**

“Able Grid selected Wärtsilä technology, among other considerations, for its critical safety and cyber-security features.”
Sharon Greenberg, Able Grid COO

**RWE Renewables 80 MWh - USA**

IntelliBidder auto-bidding solution maximises value to Georgia Power by value stacking solar firming through forecasting and asset optimisation

**B2Gold 15 MWh - Mali**

The thermal, solar & battery hybrid plant reduced gold processing cost by 7%

“GEMS is basically the quarterback of the team”
Dennis Stansbury, B2Gold Senior VP
Moving up the service value ladder with performance-based agreements – fuel conversions provide a notable growth opportunity

**Operating installed base**

<table>
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<th>Installed base (GW) &amp; agreement coverage (%)</th>
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<tr>
<td>2020</td>
</tr>
<tr>
<td>56</td>
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<tr>
<td>24%</td>
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+2% p.a.

| 2021                                        |
| 57                                          |
| 24%                                         |

**Net sales**

<table>
<thead>
<tr>
<th>MEUR</th>
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<tr>
<td>780</td>
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+11% p.a.

<table>
<thead>
<tr>
<th>LTM Q3/2021</th>
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<tbody>
<tr>
<td>865</td>
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**Outlook**

- Complexity of power systems drive need for **optimisation services and performance-based agreements**
- **Fuel conversion** opportunity of 10 GW
- Strategic focus on increasing **agreement coverage** and EUR/kW of installed base
- Expanding **digital offering** in remote and autonomous operations – 92% of support cases already solved remotely
Capture growth through increased agreement coverage, performance-based agreements and conversion projects

Increasing agreement coverage

- **Power system optimisation software** optimises all generation assets while ensuring **reliability** of the plant & grid
- Optimisation services **reduce customers’ CO₂ emissions** and **generation cost**. Potential to offset revenues from less running hours
- Performance-based partnerships with **shared benefits**
- Expertise Centres provide remote support with **predictive maintenance** & **anomaly detection**

Fuel conversions

- Fuel conversions from liquid fuels to gas represents a **10 GW**\(^1\) conversion opportunity during the this decade
- Wärtsilä has already converted or been awarded projects totalling **1.5 GW**
- **Sustainable fuel conversions** will provide opportunities on a longer term basis

1) Subject to fuel availability
Perform – Rigorous focus on project excellence
Rigorous actions taken to deliver project excellence and robust performance

- **Risk and requirement** management for capturing and executing projects
- **Project management** and **resource planning** for robust execution
- **Sales and operations** planning to improve productivity
- **Leadership** and **performance management** with continuous improvement mindset
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