Agenda

1. Overview
2. Financials
3. SINGULUS TECHNOLOGIES Segments & New Business Areas
4. SINGULUS TECHNOLOGIES Key Takeaways
Ernst Leybold started his business in Cologne
Company building 1860

1851

LEYBOLD HERAEUS
Vacuum Technology, Metallurgy and Coating

1851

W.C. Heraeus took over business in 1851 and started with platinum

1851

LEYBOLD / BALZERS

1851

Foundation

1955

Merger

1966

LEYBOLD HERAEUS

1966

SINGULUS TECHNOLOGIES

1995

1995

1966

E. Leybold (Successor)

1966

Heraeus Hochvakuum

1966

founded

1967

1967

Heraeus Hochvakuum

1967

founded

1860

1860

SINGULUS TECHNOLOGIES

Ernst Leybold started his business in Cologne
Company building 1860

1851

1860

1966

1967

1995

1966

1995

SINGULUS TECHNOLOGIES

January 2017 - 3 -
Worldwide Connected, Close to the Markets, Close to the Customer Base

Corporate Profile - SINGULUS - Innovations for New Technologies

SINGULUS Technologies AG
Headquarter Kahl am Main, Germany

Singulus Inc.
Headquarter US, Hartford

Singulus Inc.
Sales and Service West Coast

Singulus Latin America
Sales and Service South America

SINGULUS Technologies AG
Branch FFB
Fürstenfeldbruck (near Munich), Germany

Singulus Asia
Sales and Service

Singulus Taiwan
Sales and Service

Optical Disc
over 8,550 systems sold *

Semiconductor
over 180 systems installed

Photovoltaic
over 4,000 MW production capacity installed

* including Metallizer
Innovations for New Cell Production Technologies

- Thin Film Vacuum Coating Applications (Sputtering and Co-Evaporation)
- Thin Film Thermal Treatment (Selenisation and Sulphurisation)
- Wet Process Applications for Crystalline- and Thin Film Cells
- Production solutions for PERC and HJT Cells
- Systems Business
Advanced Vacuum Coating applications for MRAM, Sensors and Thin-film Heads

• TIMARIS is market-ready machine for MRAM production
• Excellent prospects for further growth in applications like sensors
• Modular platform for new applications
• Ready for 450 mm technology
Mastering, Molding and Replication for all Disc Formats CD – DVD – Blu-ray:

• Total 8,530 systems sold worldwide
• Market share Blu-ray > 90 %, SINGULUS is Market Leader!
• Over 220 Blu-ray systems installed base
• Excellent equipment performance
• Ready for 100 GB UltraHD Blu-ray
SINGULUS TECHNOLOGIES is a mechanical engineering company offering machines for vacuum thin-film and plasma coating, wet-chemical processes as well as thermal technology.
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Financial Overview 9 Months 2016

<table>
<thead>
<tr>
<th></th>
<th>9 Months 2015</th>
<th>9 Months 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenues</td>
<td>57.7</td>
<td>36.7</td>
</tr>
<tr>
<td>Order Intake</td>
<td>84.4</td>
<td>144.1</td>
</tr>
<tr>
<td>Order Backlog (30.09.)</td>
<td>40.7</td>
<td>134.0</td>
</tr>
<tr>
<td>EBIT</td>
<td>-13.9</td>
<td>-14.7</td>
</tr>
<tr>
<td>EBIT (operating)</td>
<td>-12.4</td>
<td>-14.2</td>
</tr>
<tr>
<td>EBITDA</td>
<td>-10.5</td>
<td>-12.8</td>
</tr>
<tr>
<td>Result before Tax</td>
<td>-17.4</td>
<td>23.7</td>
</tr>
<tr>
<td>Result for the Period</td>
<td>-17.7</td>
<td>23.5</td>
</tr>
<tr>
<td>Operating Cash Flow</td>
<td>-8.7</td>
<td>11.6</td>
</tr>
</tbody>
</table>
## Cash Flow Development

<table>
<thead>
<tr>
<th>in million €</th>
<th>9 Months 2015</th>
<th>9 Months 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cash Flow from Operating Activities</strong></td>
<td>-8.7</td>
<td>11.6</td>
</tr>
<tr>
<td><strong>Cash Flow from Investing Activities</strong></td>
<td>-4.3</td>
<td>-0.7</td>
</tr>
<tr>
<td><strong>Cash Flow from Financing Activities</strong></td>
<td>-6.6</td>
<td>-2.4</td>
</tr>
<tr>
<td><strong>Total Cash Flow</strong></td>
<td>-19.6</td>
<td>8.5</td>
</tr>
<tr>
<td><strong>Cash and Cash Equivalents at the Beginning of the Period</strong></td>
<td>35.8</td>
<td>19.0</td>
</tr>
<tr>
<td><strong>Effect of Exchange Rate Changes</strong></td>
<td>0.4</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>Cash and Cash Equivalents at the End of the Period</strong></td>
<td>16.6</td>
<td>27.5</td>
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</tbody>
</table>
## Balance Sheet

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cash and Cash Equivalents</strong></td>
<td>19.0</td>
<td>27.5</td>
</tr>
<tr>
<td><strong>Total Current Receivables and other Assets</strong></td>
<td>23.2</td>
<td>17.8</td>
</tr>
<tr>
<td><strong>Total Inventories</strong></td>
<td>28.9</td>
<td>27.2</td>
</tr>
<tr>
<td><strong>Total Non-Current Assets</strong></td>
<td>21.0</td>
<td>18.7</td>
</tr>
<tr>
<td><strong>Total Assets</strong></td>
<td>92.1</td>
<td>91.2</td>
</tr>
<tr>
<td><strong>Total Current Liabilities</strong></td>
<td>36.3</td>
<td>50.2</td>
</tr>
<tr>
<td><strong>Total Non-Current Liabilities</strong></td>
<td>77.3</td>
<td>29.2</td>
</tr>
<tr>
<td><strong>Total Equity</strong></td>
<td>-21.5</td>
<td>11.8</td>
</tr>
<tr>
<td><strong>Equity and Liabilities</strong></td>
<td>92.1</td>
<td>91.2</td>
</tr>
</tbody>
</table>
Sales Split by Products & Region

### Products per 9 Month 2016
- Solar: 49.0%
- Optical Disc: 42.8%
- Semiconductor: 8.2%

### Region per 9 Month 2016
- Americas: 49.0%
- Europe: 27.6%
- Africa & Australia: 3.8%
- Asia: 19.6%
<table>
<thead>
<tr>
<th></th>
<th>Overview</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Financials</td>
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<td>SINGULUS TECHNOLOGIES Segments &amp; New Business Areas</td>
</tr>
<tr>
<td>4</td>
<td>SINGULUS TECHNOLOGIES Key Takeaways</td>
</tr>
</tbody>
</table>
Equipment Signing 3 GW CIGS Project

- Two sets of contracts with a total volume around € 110 million signed
- Two different factory sites
- For an output volume of around 150 MW each as a first expansion stage
- The planned final output capacity of each factory should amount to around 300 MW
Sun Belt Countries with a Strong Solar Irradiation

- Large parts of the world reaching grid parity
- Cost reduction of cells and modules will drive photovoltaic
- PV will be one of the most economic energy sources
Growing Global PV Market
60 GW in 2016 - 70 GW in 2017

Source: Global PV Market Report 2016-2020
SINGULUS TECHNOLOGIES Provides all Key Production Steps for a CIGS Fab

1. Automation
   - Glass Washing
     - Wet cleaning

2. Substrate Inspection
   - Si barrier layer & Mo Back Contact
     - Sputtering

3. Precursor
   - Sputtering
   - Laser

4. Selen Evaporation
   - thermal evaporation

5. Selenezation/ Sulphurization
   - CISARIS Oven

6. InS & iZnO
   - Evaporation & sputtering

7. CdS or alt. buffer Deposition
   - Chemical Bath Deposition (CBD)
     - or ILGAR (In2S3)

Front Contact
- Mechanical
- Laser

Scribing P2
- Mechanical
- Laser

CIS/CIGS Substrate
- Inspection

Interconnect and Encapsulation
- Lamination

Scribing P1
- Laser

Scribing P3
- Mechanical
- Laser

Precursor
- Sputtering
Projected CIGS Production Costs using Available Technology and Leveraging Cost Reduction Potential

<table>
<thead>
<tr>
<th></th>
<th>Present fab</th>
<th>Next gen fab</th>
<th>Upgrade &amp; scale next gen fab</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>150 MWp/a</td>
<td>250–500 MWp/a</td>
<td>500–1000 MWp/a</td>
</tr>
<tr>
<td>Average efficiency</td>
<td>14.3%</td>
<td>16%</td>
<td>18%</td>
</tr>
<tr>
<td>Reductions versus present fab</td>
<td>material -20% capex -20%</td>
<td>material -30% capex -30% f&amp;m -20%</td>
<td></td>
</tr>
</tbody>
</table>

Source: www.cigs-pv.net
Leveled Cost of Electricity of new Power Plants (€ct/kWh)

Source: Fraunhofer ISE/ IPA Dec. 2013 „Study for planning and construction of an xGW factory for the production of forward looking PV products in Germany“ (0.5 GWp/a, Sevilla - Note: in this study, PV costs are projected for products from a GWp fab, the costs for fossil driven power plants are today's)
Crystalline Cell Capacity by Technology

Source: IHS 2016
SILEX II Wet Processing System for Heterojunction Solar Cells
New Product Development:
LINEX Inline Wet Process Equipment

Applications
- Final Clean
- SDE & alkaline texturing
- Acidic texturing & polishing
- Single side etching & PSG removal

New Roller Concept
New Product Development: Sputtering and PECVD Equipment for Heterojunction

SINGULUS TECHNOLOGIES could offer key production steps for HJT cell production
Process Overview SINGULUS TECHNOLOGIES

THIN FILM DEPOSITION

- Thin Film Deposition
  - Sputter deposition (DC, RF, MF, Bipolar, pulsed)
  - Evaporation (thermal evaporation)
  - CVD
  - PECVD (ICP, μ-Wave)
  - AACVD (aerosol assisted CVD)

SURFACE ENGINEERING

- Embossing, imprint nano lithography
- Injection molding
- Functionalization
- Oxidation
- Plasma cleaning & etching
- Lacquering & bonding

THERMAL PROCESSING

- Thermal Processing
  - Rapid thermal processing
  - Conditioning
  - Annealing

WET CHEMICAL

- Wet Chemical
  - Cleaning/washing
  - Etching/polishing
  - Texturing
  - Conditioning
  - Chemical bath deposition
  - Developing
New Product Development 2016/2017

- Existing product portfolio
- currently in our product pipeline
Thin Film Deposition
SINGULUS - Innovations for New Technologies

Thin-film deposition systems are used in photovoltaics, new applications of battery technology or coating processes for the enhancement of surfaces and displays.

- Sputter Deposition (DC, RF, MF, Bipolar, pulsed)
- Evaporation (thermal evaporation)
- CVD (Chemical Vapor Deposition)
- PECVD (Plasma Enhanced Chemical Vapor Deposition)
- AACVD (aerosol assisted CVD)

SINGULUS TECHNOLOGIES has delivered far more than 8,000 vacuum coating machines since its foundation in 1995.
Surface engineering techniques can be used to archive a wide range of functional and optical properties on different substrates and materials.

- Coating of 3D Parts – Surface finishing
- Embossing
- Injection molding
- Lacquering & Bonding
- Antibacterial functional surface treatment

It includes processing, structuring and finishing of surfaces include the specific processing steps for the manufacturing of a Blu-ray Disc, such as the different lacquering steps or the embossing.
Thermal Processing techniques are used at photovoltaic and semiconductor applications, core focus on high temperature and diffusion processes.

- Rapid Temperature Processing (RTP)
- Selenization- and/or Sulphurization
- Heating and Diffusion
- Oxidation
- Molding

Selenization and sulfurization processes are important manufacturing steps for the production of thin-film solar modules and pre- and post- thermal processing at semiconductor wafer coating applications.
Wet Chemical Treatment techniques are used in a wide range at photovoltaic and semiconductor applications, for cleaning, etching and structuring processes.

- Washing, Cleaning and Etching
- Texturing and Conditioning
- Chemical Bath Deposition
- Developing
- Functionalization

Wet chemical processes are also used for cleaning and processing of special glasses for smartphones and tablets (Display) and for “intelligent” window glasses.
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Key Takeaways I

Finance

- Bond restructuring and capital increase for cash successfully completed
- Equity ratio positive at 13%
- High order intake and order backlog
- Restructuring income results in positive net profit

Objectives in Solar Market

- Strengthen the position of technical leadership in CIGS segment
- Realizing global opportunities for CIGS production lines
- Further develop the existing position in growing Heterojunction solar cells market
- Introduction of new products by cooperating with GCL as leading wafer supplier
- Delivering on crystalline silicon based PV in developing countries
Key Takeaways II

Strengths of SINGULUS TECHNOLOGIES

- Technological leader in CIGS PV market
- Innovator in Heterojunction PV market
- Know how & experience for new technologies
- Existing skills transferable to new applications
- Financially stable after completed restructuring

Markets

- Energy
- Entertainment
- Mobility
- Semiconductor
- Consumer Goods
Forward-Looking Statements

This presentation contains forward-looking statements based on current expectations, assumptions and forecasts of the executive board and on currently available information.

Various known and unknown risks, unpredictable developments, changes in the economic and political environment and other presently not yet identifiable effects could result in the fact that the actual future results, financial situation or the outlook for the company differ from the estimates given here.

We are not obligated to update the forward-looking statements made in this presentation unless there is a legal obligation.