Acquisition of PeroxyChem

FUTURIZE PEROXIDE

8 November 2018
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Acquisition highlights

- Strengthening of Evonik’s growth segment Resource Efficiency
- Focus on environmentally-friendly specialty applications
- Attractive end-market growth with low cyclicality
- Excellent fit with Evonik’s peroxide portfolio – expansion of business in North America
- EBITDA margin of ~20% above Evonik’s average group margin
- Strong FCF generation with sustainable FCF conversion >60%
- Fair valuation with EV / adj. EBITDA multiple 7.8x (incl. synergies)
Strengthening growth segment Resource Efficiency
One of the most versatile and sustainable chemicals available

Hydrogen peroxide ($\text{H}_2\text{O}_2$) and Peracetic acid (PAA)

- **Diverse applications and high importance of application development**: to commercialize new and enhanced products, technologies and services
- **Sustainability**: stricter environmental regulations as growth driver for environmentally-friendly peroxide applications
- **Highly contract-based business**: longstanding customer relationships with high share of revenue under contracts of $>1$ year
- **Resilience**: attractive margin profile with minimal raw material volatility or seasonality in demand
- **Asset set-up and logistics**: customer proximity, supply security and logistics as decisive factors

Resilient and attractive business profile
PeroxyChem – Overview
A global manufacturer and supplier of peroxides

- PeroxyChem is a global manufacturer and supplier of hydrogen peroxide (H\textsubscript{2}O\textsubscript{2}), peracetic acid (PAA) and persulfates (PS)
- Headquarter in Philadelphia, Pennsylvania
- Ownership: Private equity (One Equity Partners)
- Founded: 1900s (Foret and Buffalo Electro-chemical Co.)
- Headcount: ~600 globally, thereof ~20% in application development, sales and marketing
- Locations: 8 manufacturing facilities (USA, Canada, Germany, Spain, Thailand), 2 distribution facilities, 5 regional offices, 3 R&D labs

Sales 2018E:
~$300 m

adj. EBITDA 2018E:
~$60 m

adj. EBITDA margin: ~20%
Acquisition of PeroxyChem
Excellent complementary fit with Evonik’s existing peroxide business

Evonik Business Line Active Oxygens

- Standard Business
- Specialties: H_2O_2, PAA
- HPPO

PeroxyChem’s peroxide portfolio

- Standard Business
- Specialties: H_2O_2, PAA
- HPPO

Market growth
- 3% p.a.
- 6% p.a.

Combined sales\(^1\): > €700 m

1. Sales of Evonik Business Line Active Oxygen and PeroxyChem
Attractive peroxide applications
Focus on specialty applications with strong secular growth drivers

### Specialties

<table>
<thead>
<tr>
<th>Industry</th>
<th>Environmental</th>
<th>Electronics</th>
<th>Food &amp; Beverage</th>
<th>Other specialties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application fields</td>
<td>▪ Solutions for waste water treatment, soil remediation and groundwater treatment</td>
<td>▪ Ultra-pure hydrogen peroxide as cleaning agent in semiconductor fabs</td>
<td>▪ PAA as disinfectant in poultry &amp; beef processing</td>
<td>▪ Medical, consumer and personal care applications such as sterilization of medical equipment and contact lens solutions</td>
</tr>
<tr>
<td></td>
<td>▪ H₂O₂ and PAA as alternative to chlorine</td>
<td>▪ H₂O₂ as disinfectant in poultry &amp; beef processing</td>
<td>▪ Aseptic packaging with H₂O₂ and PAA</td>
<td>▪ Energy: Persulfates and PAA in hydraulic fracturing</td>
</tr>
<tr>
<td>Growth driver</td>
<td>▪ Stricter environmental regulations</td>
<td>▪ Growth of mobile devices</td>
<td>▪ Stronger regulations for food safety</td>
<td>▪ Increased regulations on cosmetic and care products for high purity grades</td>
</tr>
<tr>
<td></td>
<td>▪ Redevelopments of former industrial or military sites</td>
<td>▪ Automatization and digitalization</td>
<td>▪ Increased demand for convenient packaged food</td>
<td>▪ Rising domestic oil and natural gas production</td>
</tr>
<tr>
<td>Growth</td>
<td>5-6% p.a.</td>
<td>&gt;7% p.a.</td>
<td>4-6% p.a.</td>
<td>3-5% p.a.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Process Chemicals</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Hydrogen peroxide for pulp and paper processing</td>
</tr>
<tr>
<td>▪ H₂O₂ and PAA in chemical synthesis</td>
</tr>
<tr>
<td>▪ Customer need for increased high product quality and supply security</td>
</tr>
<tr>
<td>3% p.a.</td>
</tr>
</tbody>
</table>
Evonik and PeroxyChem specialty exposure
Expansion of high-growth and -margin specialty applications

Combined peroxide portfolio with higher specialty exposure

Share of specialty business increasing from ~50% to ~65%
Impressive growth track record and attractive growth perspective
Earnings growth driven by portfolio shift to specialty business

Resilient and strongly growing business (adj. EBITDA)

- Portfolio optimization: successful strategic shift towards specialty applications
- Strong application development to commercialize new products

Future growth drivers

- **Sustainability** drives growing demand for environmentally-friendly specialty applications
  - e.g. new Memphis plant with long-term take-or-pay contract with City of Memphis for municipal wastewater treatment
- Increased exposure towards specialty applications
- **Optimization** in combined asset set-up and logistics
- Realization of synergies

<table>
<thead>
<tr>
<th>PeroxyChem</th>
<th>Evonik</th>
</tr>
</thead>
<tbody>
<tr>
<td>adj. EBITDA 2015</td>
<td>adj. EBITDA 2018E</td>
</tr>
<tr>
<td>adj. EBITDA 2015</td>
<td>adj. EBITDA 2018E</td>
</tr>
<tr>
<td>&gt;10% p.a.</td>
<td>&gt;10% p.a.</td>
</tr>
</tbody>
</table>
PeroxyChem – capital expenditures and free cash flow
Low capital intensity and attractive FCF conversion

<table>
<thead>
<tr>
<th>Year</th>
<th>Normalized capex</th>
<th>Free cash flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>Ø ~10% capex/sales</td>
<td>Sustainable FCF</td>
</tr>
<tr>
<td>2016</td>
<td>Ø ~6% capex/sales</td>
<td>Ø ~6% capex/sales</td>
</tr>
<tr>
<td>2017</td>
<td>Ø ~6% capex/sales</td>
<td>Ø ~6% capex/sales</td>
</tr>
<tr>
<td>2018E</td>
<td>Ø ~6% capex/sales</td>
<td>Ø ~6% capex/sales</td>
</tr>
<tr>
<td>2019E</td>
<td>Ø ~6% capex/sales</td>
<td>Ø ~6% capex/sales</td>
</tr>
<tr>
<td>2020E</td>
<td>Ø ~6% capex/sales</td>
<td>Ø ~6% capex/sales</td>
</tr>
<tr>
<td>2021E</td>
<td>Ø ~6% capex/sales</td>
<td>Ø ~6% capex/sales</td>
</tr>
<tr>
<td>2022E</td>
<td>Ø ~6% capex/sales</td>
<td>Ø ~6% capex/sales</td>
</tr>
</tbody>
</table>

>60% FCF conversion

- FCF in 2019 with integration costs and additional CAPEX for growth and production platform optimization
- Positive FCF in 1st full year after closing, further ramping up in following years

1. FCF conversion: FCF / adj. EBITDA

(e.g. new Saratoga (US) plant for electronic applications and new Memphis (US) plant for municipal wastewater treatment)
## Synergies and integration costs

**Tangible synergies driven by excellent strategic fit; low integration complexity**

<table>
<thead>
<tr>
<th>Synergies</th>
<th>Integration costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost Savings in Production, Logistic</td>
<td>Integration costs (e.g. IT integration, consultants)</td>
</tr>
<tr>
<td>Cross Selling</td>
<td></td>
</tr>
<tr>
<td>SG&amp;A</td>
<td></td>
</tr>
</tbody>
</table>

Total synergies: ~$20 m p.a.  
fully realized by 2022

Expected cash-out of ~$20 m  
in first 2 years

Integration costs excluding transaction costs
Attractive valuation

Enterprise Value

$625 m

EV / adj. EBITDA 2018E

7.8x
including synergies

EV / adj. EBITDA 2018E

10.4x
excluding synergies

EPS accretive
in 1st full year after closing
Transaction summary

- **Structure**
  - 100% acquisition of PeroxyChem
  - On a cash- and debt-free basis

- **Financing**
  - Financing secured via cash and committed credit facilities

- **Timing**
  - Approved by PeroxyChem Board and Evonik’s Supervisory Board
  - Aiming for closing by mid 2019, subject to approval by responsible authorities
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EVONIK
POWER TO CREATE
Evonik portfolio strategy
Healthy mix of growth & financing businesses

Strengthen leading positions in attractive markets
- Strong growth profile
- Above-average returns
- Focus of capital allocation (capex, R&D, acquisitions)
- Examples: High Performance Polymers, Comfort & Insulation

Generating financing power
- Attractive market growth
- Below average capex allocation
- Stable returns and high FCF contribution
- Examples: Perf. Intermediates (C4), Active Oxygens, Oil Additives

Growth businesses
Financing businesses
## PeroxyChem – Business overview

### PeroxyChem Business Overview

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Hydrogen Peroxide (H\textsubscript{2}O\textsubscript{2})** | - Environmentally-friendly oxidizer and disinfectant, replacing chlorine derivatives  
- Hydrogen and oxygen as primary raw materials  
- H\textsubscript{2}O\textsubscript{2} is purified and diluted to various concentrations depending on the end use application  
- Purity grades range from standard grade for numerous industrial applications to ultra-high purity grades for electronics and propulsion  
- Decomposes to yield only oxygen and water  |
| **Peracetic Acid (PAA)** | - PAA is an equilibrium mixture of hydrogen peroxide, acetic acid and water that is available in various grades  
- Broad-spectrum sanitizer, disinfectant and sterilant, primarily used as an antimicrobial  
- Easily dilutes in water and decomposes into non-toxic by-products  
- Purified and diluted to various concentrations, ranging from 5% to 35% PAA in equilibrium solution  
- Exceptional product stability, ensuring reliability and safety in production, transportation and usage  |
| **Persulfates (PS)**     | - Oxidizing agents manufactured as solid salts in an electrochemical process  
- Ammonium, sodium and potassium persulfates used in a wide number of applications  
- Key application for persulfates are in polymer initiation, soil and groundwater remediation and as a viscosity breaker in oil and gas fracking  |

### Applications

<table>
<thead>
<tr>
<th>Hydrogen Peroxide (H\textsubscript{2}O\textsubscript{2})</th>
<th>Food Safety, Environmental, Medical, Energy, Process Chemicals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peracetic Acid (PAA)</td>
<td>Food Safety, Environmental, Medical, Energy, Process Chemicals</td>
</tr>
<tr>
<td>Persulfates (PS)</td>
<td>Electronics, Environmental, Personal Care, Energy, Process Chemicals</td>
</tr>
</tbody>
</table>
Specialty Application Example (1): Wastewater disinfection
PAA is expected to enjoy robust growth in the near future

Industry Overview and Growth driver

- Chlorine, sodium hypochlorite (NaOCl) or UV are today’s most commonly used technologies to disinfect wastewater

- PAA as “green” alternative gaining more and more relevance, with the following advantages:
  - vs Chlorine: low-capital alternative, eliminating safety risks
  - vs NaOCl: lower operating costs and elimination of by-products
  - vs UV: performance improvement, lower maintenance and capex spending

- PAA introduced in U.S. municipal wastewater market by PeroxyChem in 2013, as of today already approved by 14 U.S. states

Long-term take-or-pay contract with City of Memphis for municipal wastewater treatment, start of product delivery late 2018

Technologies

<table>
<thead>
<tr>
<th>Water Treatment Technology</th>
<th>Water Treatment Technology Growth Rate (in %)¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAA</td>
<td>111</td>
</tr>
<tr>
<td>UV</td>
<td>5</td>
</tr>
<tr>
<td>Chlorine</td>
<td>-5</td>
</tr>
<tr>
<td>NaOCl</td>
<td>-2</td>
</tr>
</tbody>
</table>

Wastewater Disinfection Alternatives

<table>
<thead>
<tr>
<th>Safe transportation and storage</th>
<th>Chlorine</th>
<th>NaOCl</th>
<th>UV Light</th>
<th>PAA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low toxicity to aquatic life</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>No harmful disinfection by-products</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Effectiveness in low water quality</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Low complexity of operation</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Low operating costs</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Low capital costs</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
</tr>
</tbody>
</table>

Specialty Application Example (2): Electronics
Ultra-high purity H\(_2\)O\(_2\) essential in manufacturing of electronic devices

Industry Overview and Growth driver

- Growing trend towards smaller electronic device geometries results in increasing number of process steps
- This requires ultra-high purity cleaning agents in semiconductor manufacturing - driving more demand for ultra-high purity H\(_2\)O\(_2\)
- High-purity, electronics-grade H\(_2\)O\(_2\) is preferred because of their low cost, effectiveness and reduced waste disposal
- Electronic-grade H\(_2\)O\(_2\) difficult to transport, as maintaining high quality requires specialized transportation equipment
  - Geographic proximity is key to cost and reliability

Manufacturing Process Steps

<table>
<thead>
<tr>
<th>Geometric Size</th>
<th>PeroxyChem</th>
<th>Long-term Supply Contract</th>
</tr>
</thead>
<tbody>
<tr>
<td>28 nm</td>
<td>400</td>
<td>null</td>
</tr>
<tr>
<td>24 nm</td>
<td>410</td>
<td>null</td>
</tr>
<tr>
<td>10 nm</td>
<td>600</td>
<td>null</td>
</tr>
<tr>
<td>7 nm</td>
<td>1,000</td>
<td>null</td>
</tr>
<tr>
<td>5 nm</td>
<td>1,200</td>
<td>null</td>
</tr>
</tbody>
</table>

PeroxyChem with dedicated electronic-grade H\(_2\)O\(_2\) plant in Saratoga Springs close to end customer with long-term supply contract

1. Long-term 2017-2023E growth rate, according to Gartner, Mercury Research and Barclays Research | “nm” represents nanometers
Specialty Application Example (3): Food & Beverage
Stricter regulations in food & beverage processing offer further growth potential

### Industry Overview and Growth driver

- Increased demand for food safety as well as stricter regulations

- **Poultry and meat processing:**
  - PAA replacing chlorine as primary treatment method for poultry due to superior efficacy

- **Beverage industry:**
  - Rising hygienic requirements for dairy products, juices or nutritional natural drinks
  - Aseptic packaging utilizes H₂O₂ or PAA for the sterilization of packaging material and machines
  - Extends shelf life and preserves flavor and taste
  - Can work with both polyethylene bottles and paperboard containers

### Aseptic packaging – Spraying Technology

- [Diagram of aseptic packaging process]

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Combined production set-up
Strengthening of global position and stronger footprint in North America and Europe

Prince George, BC – Canada
- H₂O₂

Tonawanda, NY – USA
- PAA
- PS

Saratoga Spring, NY – USA
- Purification facility
- H₂O₂ Electronic Grade

Rheinfelden – Germany
- PS¹

Bayport, TX – USA
- H₂O₂

Memphis, TN – USA
- PAA
- Start delivery in late 2018

La Zaida - Spain
- H₂O₂
- PAA

Saraburi – Thailand (JV)
- Thai Peroxide Ltd.²
- H₂O₂
- PAA

PeroxyChem
- Headquarters
- Manufacturing facility
- Regional office

Evonik
Hydrogen peroxide is purified in a sequential process leading to different specialty grades for various applications.

Hydrogen (H₂) → Hydrogenation → Oxidation → Extraction

Oxygen (O₂) → Crude \( \text{H}_2\text{O}_2 \)

Water → Working Solution

Purification #1 → Purification residues

Purification #2

Standard grade \( \text{H}_2\text{O}_2 \)

Purification #3

Specialty grade I \( \text{H}_2\text{O}_2 \)

Specialty grade II \( \text{H}_2\text{O}_2 \)
**HPPO Technology**

**HPPO process as more favorable process to produce propylene oxide**

HPPO: Technology to manufacture propylene oxide (PO), a polyurethane (PU) precursor, on basis of $\text{H}_2\text{O}_2$

### Intermediates

- Propylene
- Hydrogen Peroxide

### Applications

- Polyols
- PU Foams
- Polyglycols
- Filler material
- Insulation of buildings
- Carpet underlay
- Seat cushion
- Elastomers
- Mattress

### Benefits from HPPO technology

- Substantial cost advantages versus alternative processes
- More environmentally friendly, only water as side stream
- Own technology licensed by Evonik; Evonik as only grantor of a licence for HPPO
- Evonik and Dow/BASF only players with proprietary technology
- Cost advantage of new $\text{H}_2\text{O}_2$ plants will also allow to capture growth in other $\text{H}_2\text{O}_2$ applications besides HPPO

*Hydrogen Peroxide to Propylene Oxide*