

E-Mobility

# “Pure Play”

Investor/Analyst Presentation

June 2018

**V+LTABOX®**



# Executive Summary: Highlights Q1/2018

**↗ € 5.1 million** <sup>↗ 23 %</sup>

Revenues (previous year: € 4.1 m)

**↗ 108 employees** <sup>↗ 50 %</sup>

(previous year: 72)

**Successful Growth**

**↗ € -0.0 million** <sup>↗ 97 %</sup>

EBITDA (previous year: € -0.8 m)

**↗ € -0.8 million** <sup>↗ 33 %</sup>

EBIT (previous year: € -1.2 m)

# Agenda

- Introduction of Voltabox
- Business Overview
- Financials

# Corporate Development

1988

- Mother company paragon founded by Klaus Dieter Frers (as private ownership)

1994

- Certification as automotive Tier 1 for electronics

2000

- IPO of paragon AG at Frankfurt Stock Exchange (now: Prime Standard)

2011

- Market entry into Lithium-Ion Batteries: E-Mobility launched as a new business segment of paragon AG

2014

- Foundation of Voltabox as legal entities in Germany and the US (100% subsidiaries of paragon AG)

2017

- Voltabox IPO in Frankfurt after change of legal form into a stock corporation with Voltabox of Texas, Inc. as a 100% subsidiary

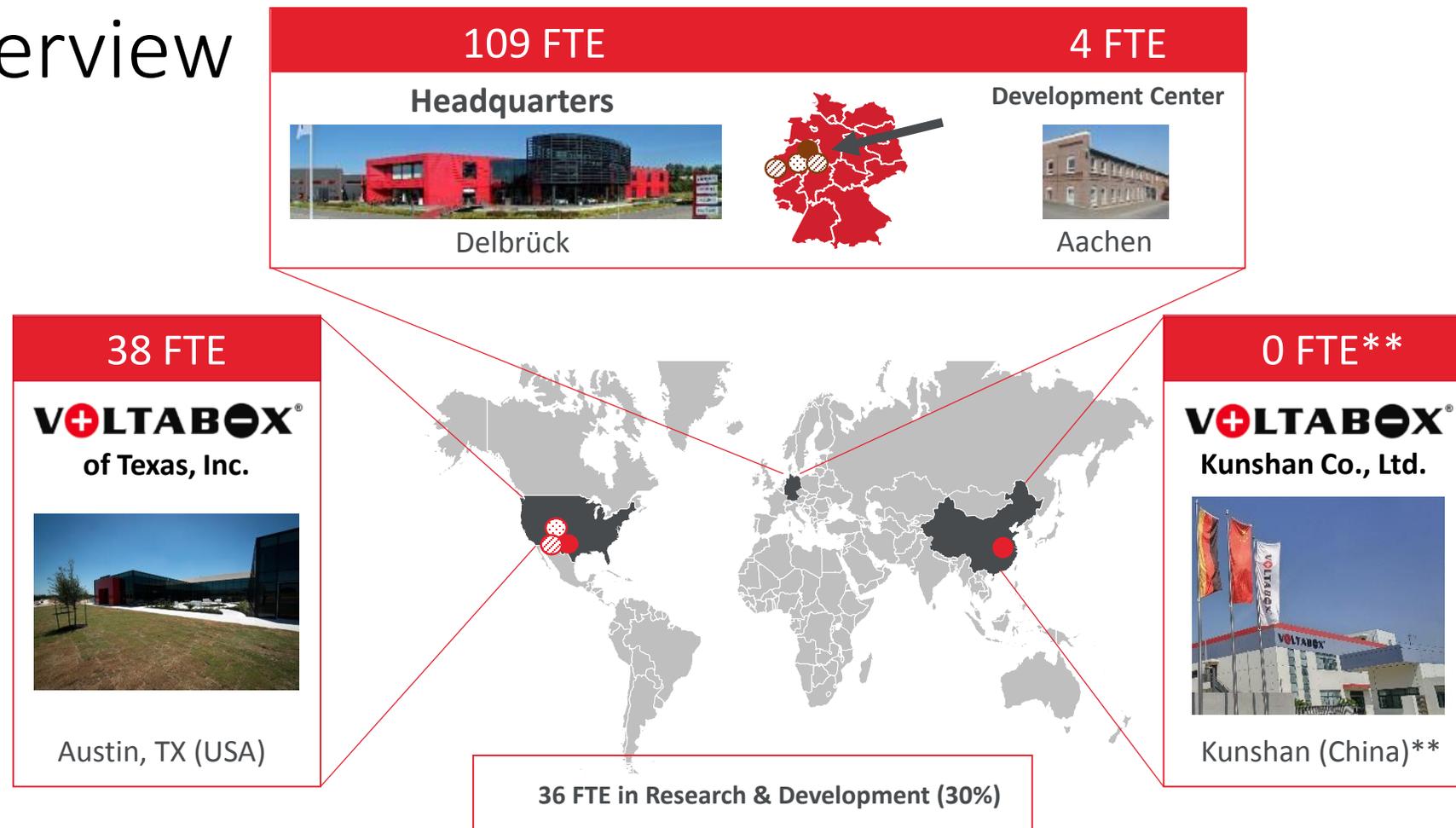
2018

- Acquisition of Concurrent Design, Inc. (engineering design services company) to accelerate growth



# Location Overview

- With 151 FTE\*, technology hubs and state-of-the-art production facilities, Voltabox is well positioned to grow its business on a global scale



\* Full time equivalents (FTE) incl. temporary employees in Delbrück, as of Apr. 30, 2018  
 \*\* In the course of formation

# Management Team

## Management Board



**Jürgen Pampel, CEO**

- Former Head of Electromobility business unit at paragon
- Various leadership positions at paragon since 2004
- Design Engineering graduate



**Andres Klasing, CFO**

- Joined Voltabox in 2017
- Former Head of Accounting & Controlling at paragon since 2016
- Various finance positions for Bertelsmann group
- Business administration (VWA) / Engineer (FH) graduate

## Supervisory Board



**Klaus D. Frers, Chairman**

- Founder / majority owner & CEO of Automotive Tier 1 paragon AG
- Former CEO of Voltabox
- Received numerous awards for entrepreneurial activities
- Leadership positions at AEG-Telefunken and Nixdorf Computer
- Mechanical Engineering graduate



**Prof. Dr. Martin Winter, (Deputy Chairman)**

- Professor at the Institute of Physical Chemistry at the University of Münster
- One of the most renowned German scientists in the energy-storage field with a focus on Lithium-Ion batteries



**Hermann Börnemeier**

- Shareholding director of Treu-Union Treuhandgesellschaft mbH, a tax consultancy
- Long-term advisor to the parent company paragon AG

# Agenda

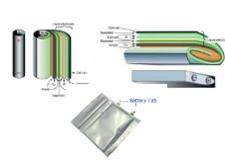
- Introduction of Voltabox
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# E-Mobility Pure Play

## Structural representation of a battery system



- Separator
- Anode
- Cathode
- Electrolyte
- Cell Housing
- Insulation Strips



- Cylindrical cells
  - Prismatical cells
  - Pouch cells
- in different Li-Ion chemistries
- LFP
  - NMC
  - LTO
  - (NCA)



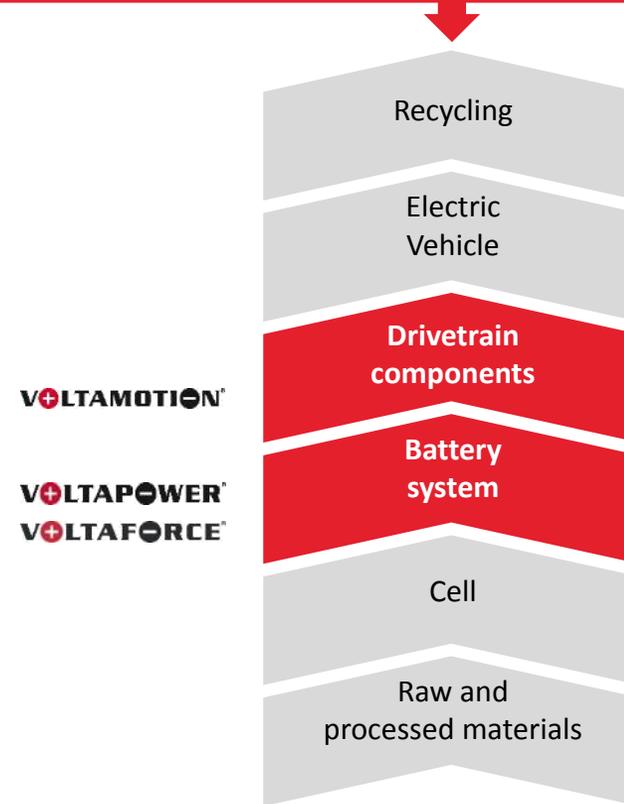
- Module cases with integrated
  - Cooling Devices
  - BMS Slave Circuit Board
  - Sensors
  - Wiring Loom
  - Lids
  - Sealings
  - Rupture Discs

in various low and high voltage versions



- Robust housing with integrated fixing points
- Master ECU
- Data interfaces
- Power switchers
- DC/DC converters
- Compensators
- Fuses / Resistors
- Climate systems
- (Chargers, cable rewinds)

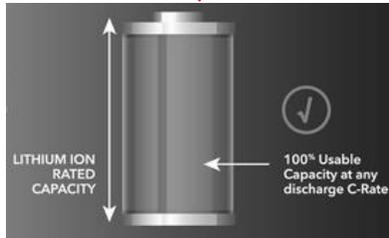
## E-Mobility Value Chain



The sweet spot of E-Mobility

# Li-Ion vs. Lead-Acid Technology

## Li-Ion Technology

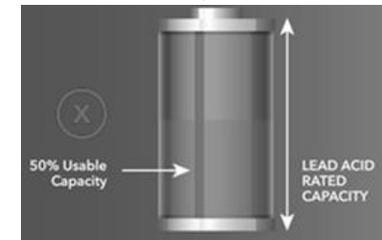


### Additional advantages:

- No memory effect (opportunity charging)
- Very low self-discharge
- No maintenance
- Full functionality at low temperatures
- Optimum control and (remote) monitoring

Up to 240 Wh/kg	<b>Energy density</b>	40 Wh/kg
Up to 95%	<b>Charging efficiency</b>	Up to 70%
Up to 30,000 cycles at 80% DOD	<b>Cycle life</b>	1,200
Up to 80% in 6 min (10C)	<b>Fast charging</b>	50% in 3 hrs.
Zero emissions	<b>Emissions</b>	Gassing & water loss

## Lead-Acid Technology



# Li-Ion-Battery Technology Overview

## Available Li-Ion Cell Chemistry

- Li-Ion chemistries are replacing the leading battery technologies of the past like Nickel-Metal Hydride, Nickel Cadmium and Lead-Acid
- Future technological developments are also carefully tracked and evaluated by Voltabox
- New lithium based technologies like Li-Air, Li-Sulfur and Lithium Solid State cells are expected to achieve market readiness around 2023

## Cell Supplier Base



## Li-Ion Cell Chemistry Types used by Voltabox

### Lithium Iron Phosphate (LFP)

- Nominal cell voltage: 3.2 V to 3.3 V
- No risk of thermal runaway (in case of an accident)
- High cycle stability of up to 4,000 cycles at 80% DoD
- Large operating temperature range -20/+ 55 °C
- High energy density (125 Wh/kg and 292 Wh/l)
- Using only a small portion of rare earths

### Nickel Manganese Cobalt (NMC)

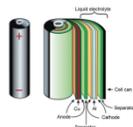
- Nominal cell voltage: 3.6 V to 3.7 V
- High cycle stability of at least 6,000 cycles at 80% DoD
- Great operating temperature range of -30/+ 60 °C
- High energy density (136 - 230 Wh/kg and at least 309 Wh/l)

### Lithium Titanium Oxide (LTO)

- Nominal cell voltage: 2.3 V
- Highest cycle stability of up to 30,000 cycles at 80% DoD
- High level of safety thanks to LTO anode
- Great operating temperature range of -30/+ 55 °C
- Energy density of 96 Wh/kg or 202 Wh/l
- Great SoC range useable with the highest performances

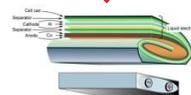
# Agnostic Approach to Cell Types

## Cylindrical



A spirally wound design (jelly-roll). Designated by size, e.g. 26650 cylindrical battery (Diameter: 26mm, length: 65.2 mm; code for cylindrical shape: 0)

## Prismatical



A prismatic design indicate a flat battery design. The stacks can be wound (as shown in the photo) or stacked (with alternating cathode/separator/anode structure). The stacks are usually inserted into rigid casing to form prismatic

## Pouch



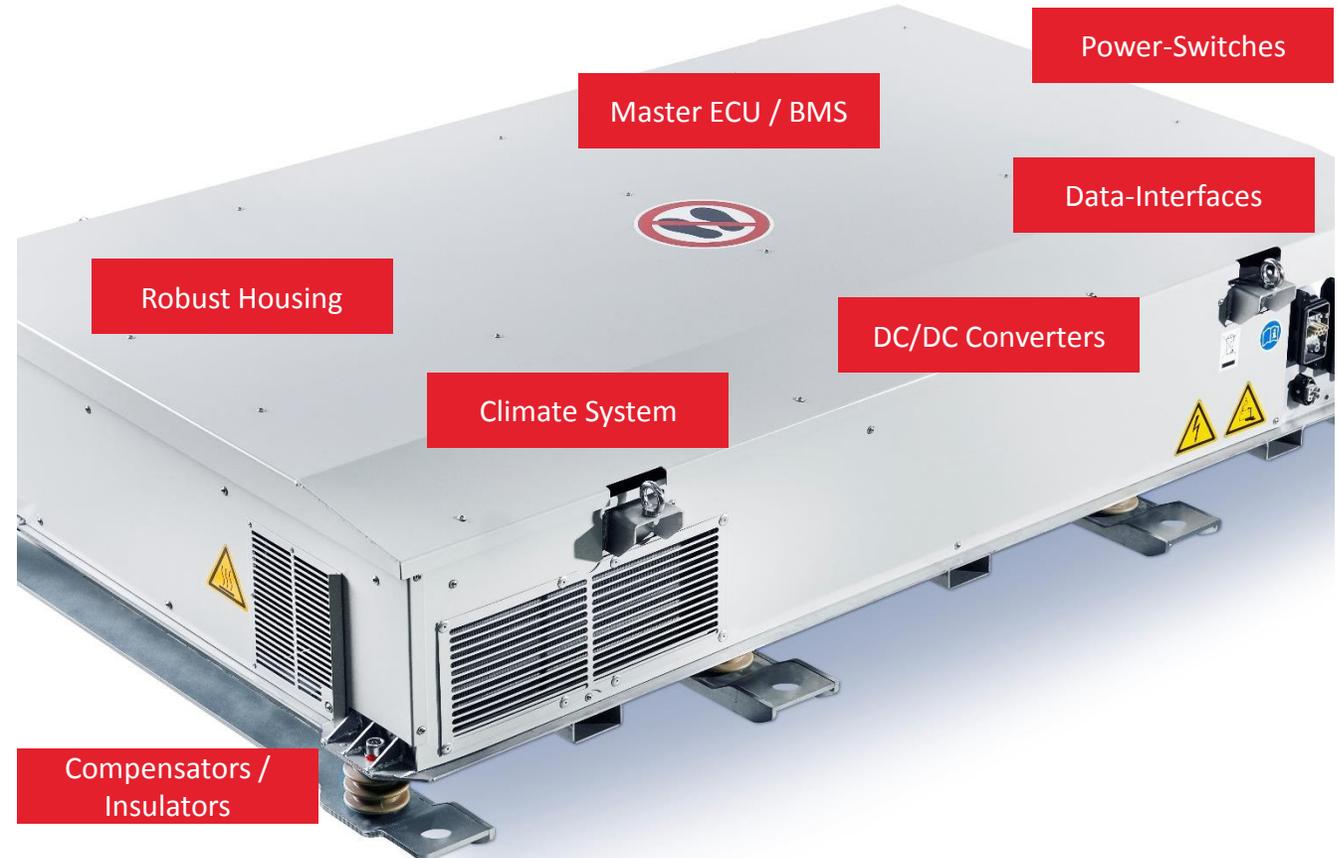
Rather than rigid metallic casing, conductive foil-tabs are welded to the electrodes and seal the battery fully. The tacks inside can be wound or stacked. Swelling and gassing could be a concern for pouch cells

Cell Package	Impedance	Thermal	Tabbing	Cell Cost	Battery Cost
Cylindrical	Poor	Poor	Minimal	Medium	High
Prismatical (Wound)	Poor	Poor	Minimal	Medium	Medium
Prismatical (Stacked)	Good	Poor	High	High	Medium
Pouch (Wound)	Poor	Good	Minimal	Medium	High
Pouch (Stacked)	Good	Good	High	High	High

Source: IDTechEx

# Li-Ion Battery System Supplier for Industrial Applications

- **Many years of experience in development and production of electronic components**  
(via parent company paragon AG)
  - **Exceptional integration power**  
(*experience in automotive interfaces*)
  - **Mindset focus on applications**  
(*authentic added value solutions*)
  - **Superior realization processes**  
(*short time-to-market with modular kit*)



# Market Penetration by Voltabox



- Q2 2014: First major US-contract for battery systems in trolleybuses
- Q1 2015: Strategic partnership to enter the fragmented forklift market (intralogistics)
- Q2 2016: Exclusive strategic partnership with leading mining equipment provider
- Q4 2016: Expansion of intralogistics market with batteries for Automated Guided Vehicles
- Q3 2017: First selected mass market entry with starter batteries for motorbikes
- Q4 2017: First strategic partnership in the area of agriculture and construction
- Q1 2018: Acquisition of the engineering services provider Concurrent Design

**Today:**

***Significant future growth prospects already backed by strong lifetime order backlog of € 1 billion\****

\* As of Mar. 31, 2018 (weighted acc. to probability of occurrence, thereof 77% signed framework contracts)

## Business Segments & End Markets

### V+LTAPOWER®



#### Trolleybuses

- Order backlog:\*  
€ 20 million



#### Intralogistics

- Order backlog:\*  
€ 460 million



#### Underground Mining

- Order backlog:\*  
€ 310 million



#### Agriculture & Construction

- Order backlog:\*  
€ 40 million

### V+LTAFORCE®



#### Starter Batteries

- Order backlog:\*  
€ 170 million

### V+LTAMOTION®



#### Power Electronics

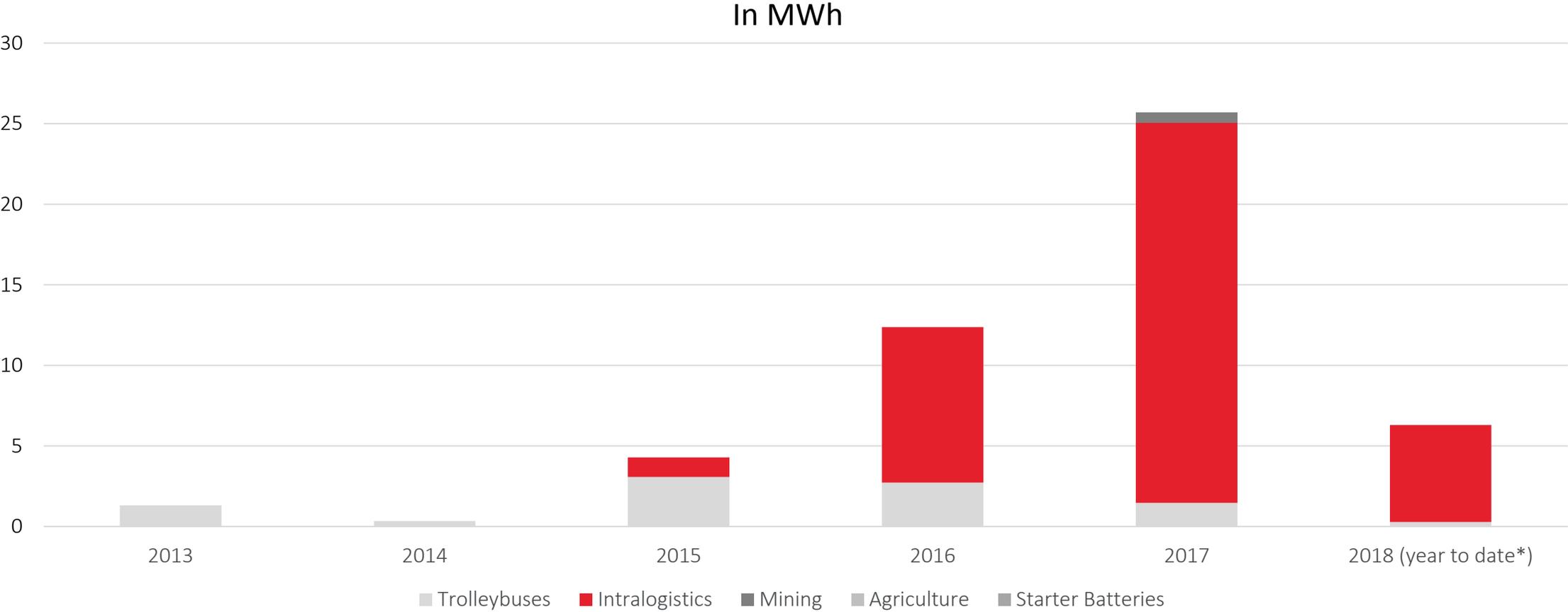
- Catalyst to  
VOLTAPOWER  
Segment



Full service provider for  
electrification of vehicles

\* As of Mar. 31, 2018

# Installation of Energy by End Markets



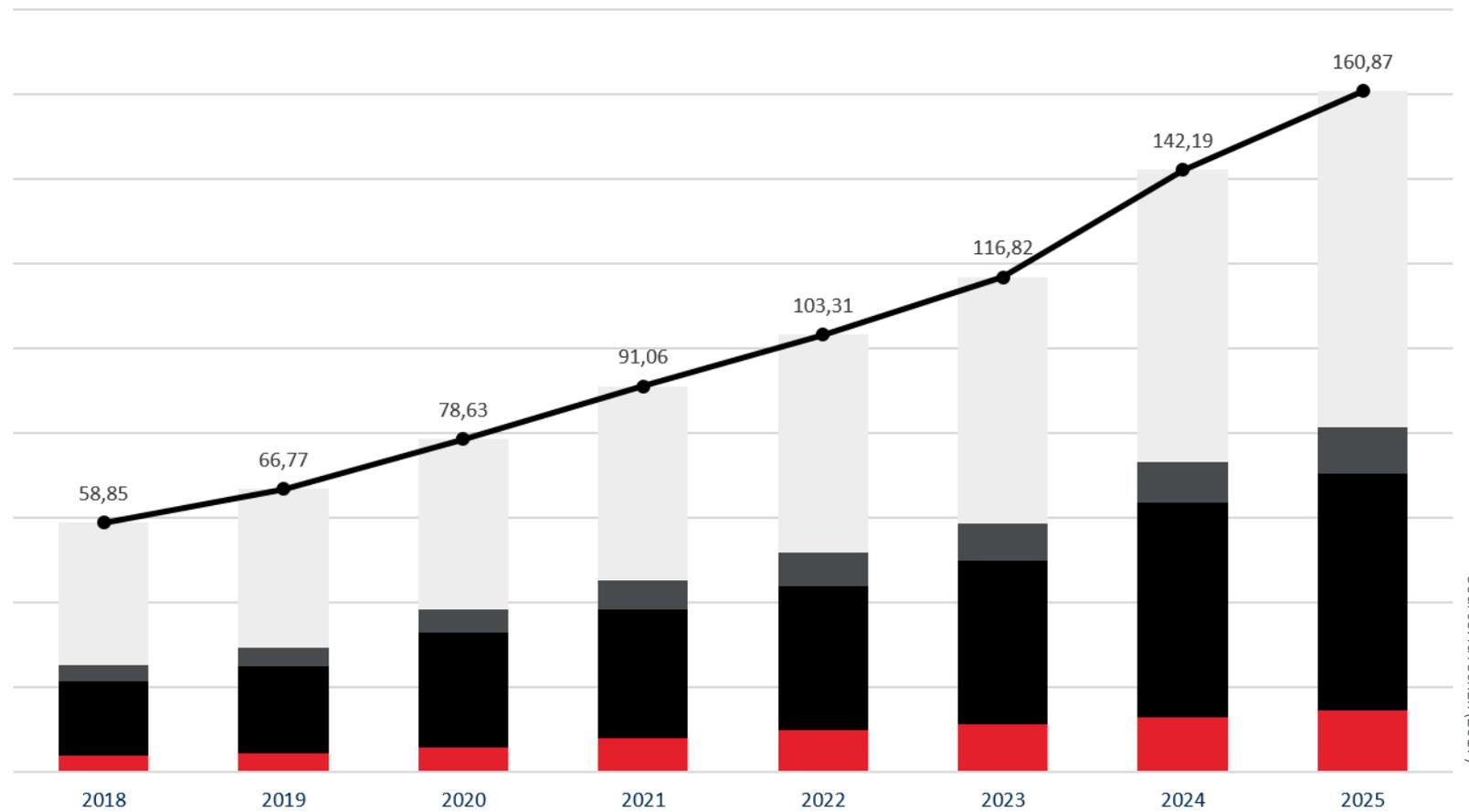
\* As of Mar. 31, 2018

# Market Potential for Voltabox

- Overall usage of batteries will increase due to e-mobility mega trend
- Ongoing substitution of lead acid batteries resp. diesel generators by lithium-ion batteries in occupied submarkets
- 11% global market growth expected for battery systems in current Voltabox end markets in 2018

<b>Current Voltabox end markets</b> HEV/PHEV buses over 5 meters, forklift/intralogistics, mining vehicles/equipment	<b>Further potential Voltabox end markets</b> Delivery trucks & other on-road excl. buses, indoor cranes/platform lifters, pedelecs/e-bike, motorbike, etc.
<b>Future Voltabox end markets</b> Construction & agriculture, Pure Electric Buses over 5 meters, Airport, Car (hybrid) – PHEV, microEV, etc.	<b>Others</b> Pure electric cars (premium & mainstream), microEV – 3 wheel & rickshaw, wearables, consumer, military, etc.

Battery market value by end markets (USD bn.)\*



\*Partly Lead Acid and Li Ion

Source: IdTechEx (2017)

# Voltabox Growing Into a New Dimension

## New facilities

- Space expansion for R&D / office & production
- Foundation of Voltabox Kunshan Co., Ltd., China (3,400m<sup>2</sup> space)

## Increase of resources

- R&D staff to increase to a total of 70 employees in FY 2018

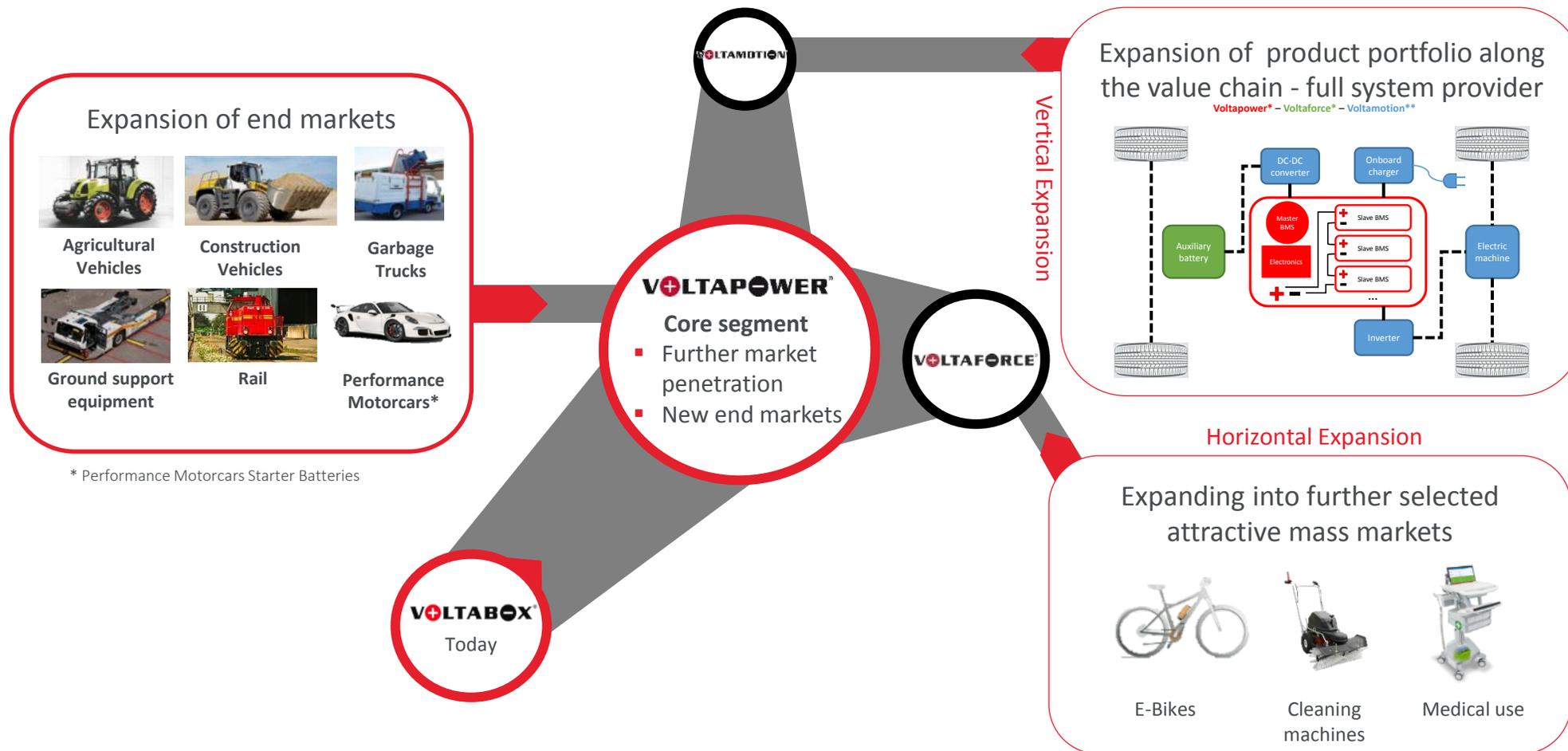
## New products

- Expanding product portfolio into selected mass markets
- Entering into new market segments (i.e. agriculture, rail)

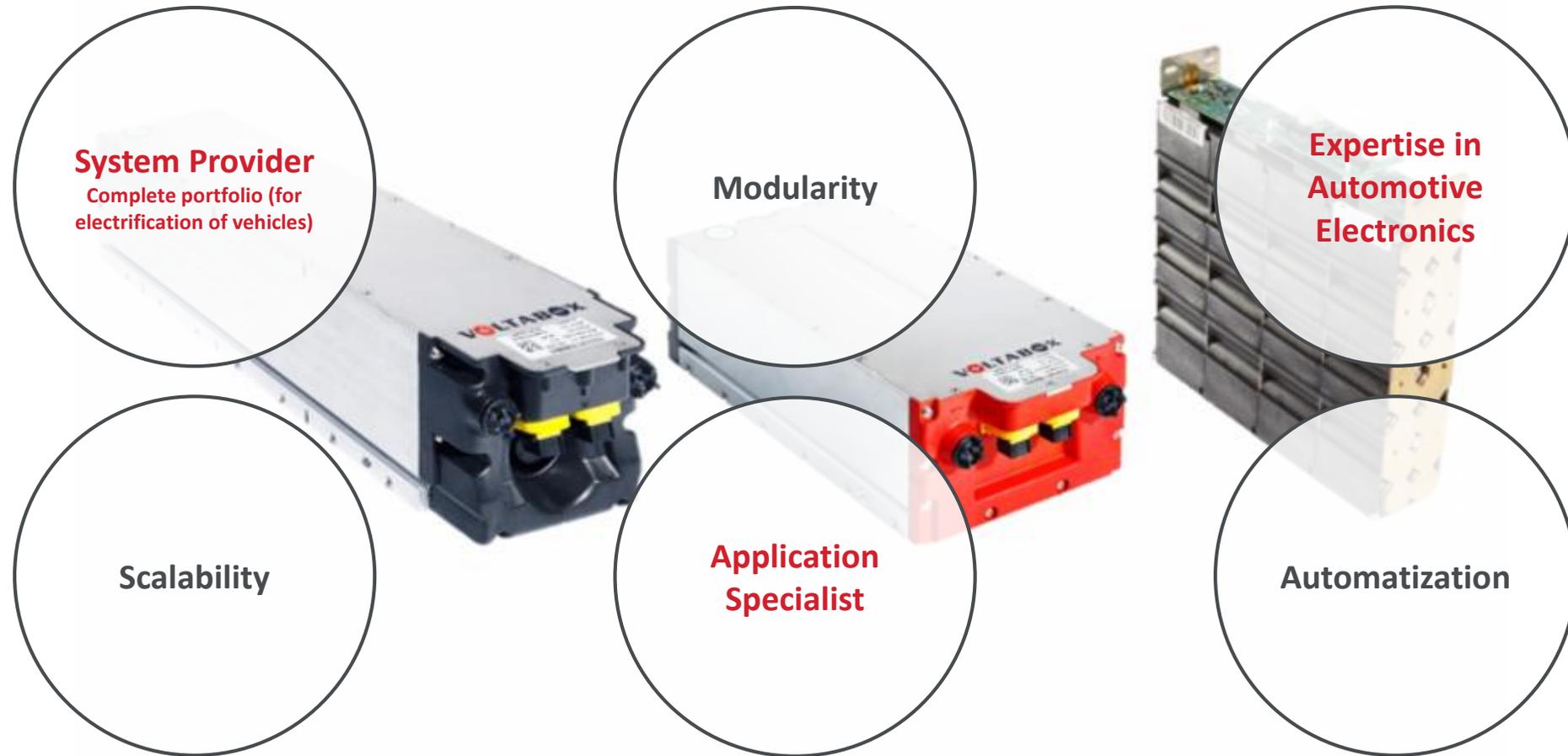
## Filled M&A pipeline

- Working on attractive M&A opportunities (short list)

# Multiple Growth Paths

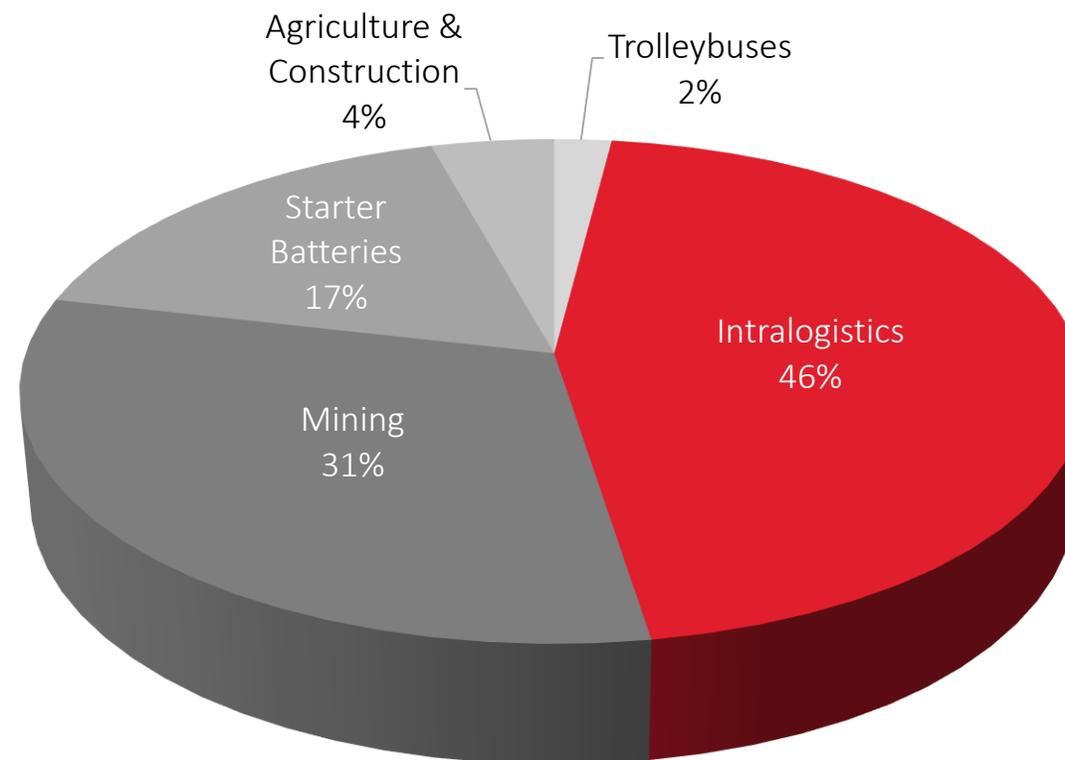


# USPs of Voltabox



# 5-Year Order Backlog\* (2018 – 2022)

- €1.007bn. (thereof +77% signed framework contracts)
- Estimated order backlog is weighted according to the expected lifetime and the probability of occurrence
- Consistent evaluation system in place since inception in 2011



\* As of Mar. 31, 2018

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# Highlights of the Financial Year 2017

## Strong Financial Position

- Equity ratio of 90.8 % (equity: € 154,990 million)
- Liquid funds of € 102.7 million

## Dynamic Top Line Growth

- Group revenue increased 88.2 % to € 27.3 million

## Increasing Profitability

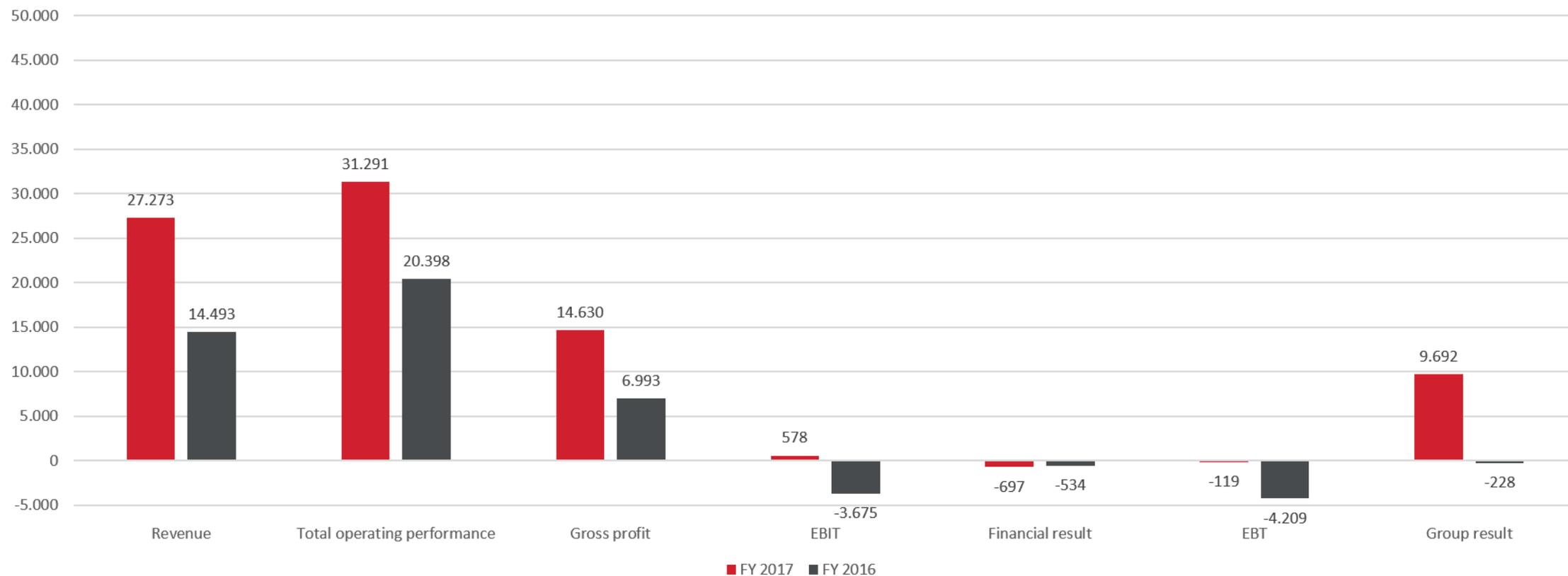
- EBITDA increased 240,9 % to € 3 million
- EBIT margin at 2.1 %

## Set for Future Growth

- Launch of a new R&D site in Aachen
- € 5.2 million internal R&D (R&D ratio 19.0 %)

# Top Line Growth with Increasing Profitability

Selected parameters from the consolidated income statement of Voltabox AG



# Well Balanced Net Assets and Financial Position

## Assets\*

- Noncurrent assets € 31.1m
- Current assets € 139.6m

## Equity and Liabilities\*

- Equity € 155.0m
- Noncurrent provisions and liabilities € 8.4m
- Current provisions and liabilities € 7.4m

- Voltabox invested in the further expansion of business activities
- Development work capitalized: € 5.2m
- Sufficient liquid funds of € 102.7m due to the IPO

### Balance Sheet Total

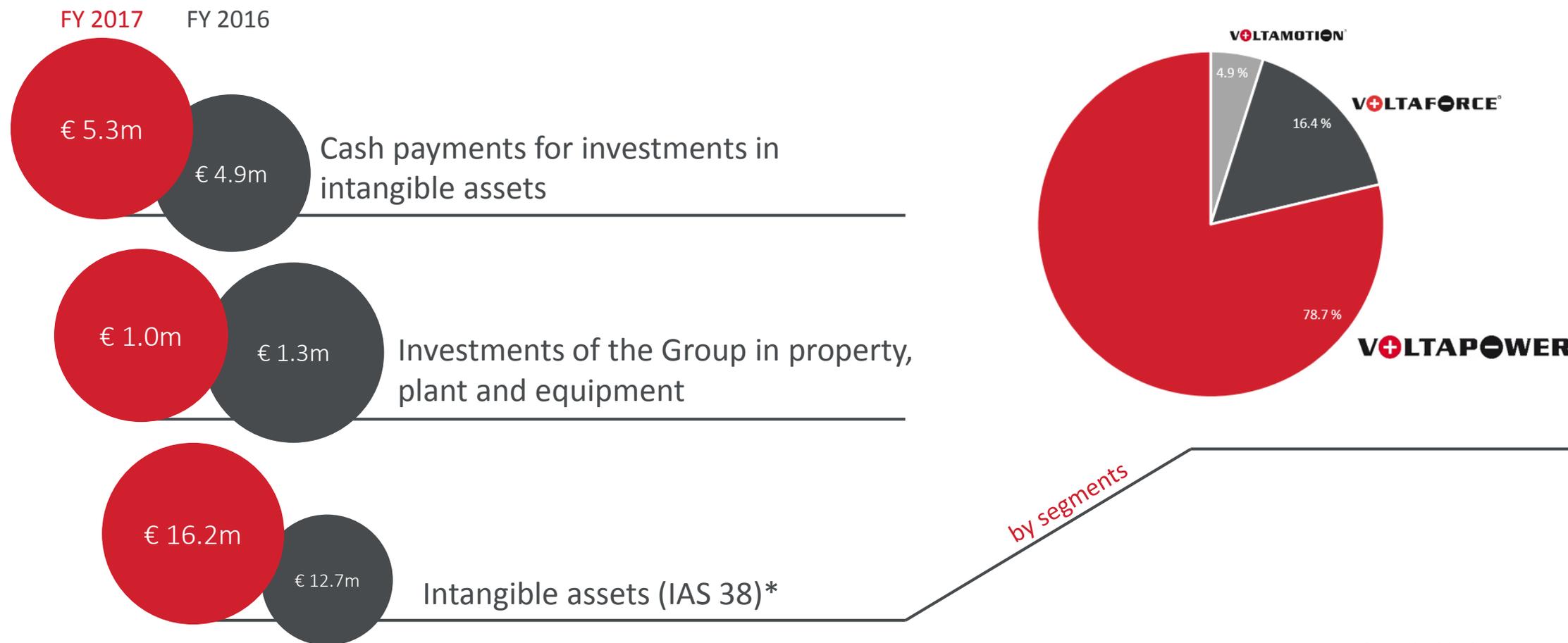
(Accounting date: Dec. 31, 2017)

- Assets + equity and liabilities € 170.8m  
(2016: € 39.0m)

- Capital reserve increased to € 126.4m
- Significant reduction of noncurrent provisions and liabilities

\* As of Dec.. 31, 2017

# Investments as a Key Factor for Expansion of the Business



\* Capitalized development expenses

# New R&D Capabilities: Takeover of Concurrent Design

Concurrent Design is an engineering services provider located in Austin, Texas with proven and long-standing expertise in R&D

More than **20** highly skilled  
**employees,**

mostly engineers, software developers &  
project managers

Expertise from more than **1,700**  
successfully completed **projects**

**Multiple** boost of  
**velocity** for **Voltabox**  
by additional resources



# Cash Flow

- Significant increase in trade receivables owing to strong revenue in Q4/17
- Reduction in trade payables as planned in consequence of the IPO
- Increase in payments for investments in intangible assets by 9.0% amounting to € 5.3 million (prior year: € 4.9 million)
- Increased amortization of noncurrent fixed assets
- Cash and cash equivalents increased to € 102.7 million as of the end of the reporting period (prior year: € 0.9 million)

Free  
Cashflow:  
€ -20.9m  
(2016: € 0.4m)

€ -15.0m

(2016: € 6.6m)

Cash flow from  
**operating activities\***

€ -6.0m

(2016: € -6.2m)

Cash flow from  
**investment activities\***

€ 122.7m

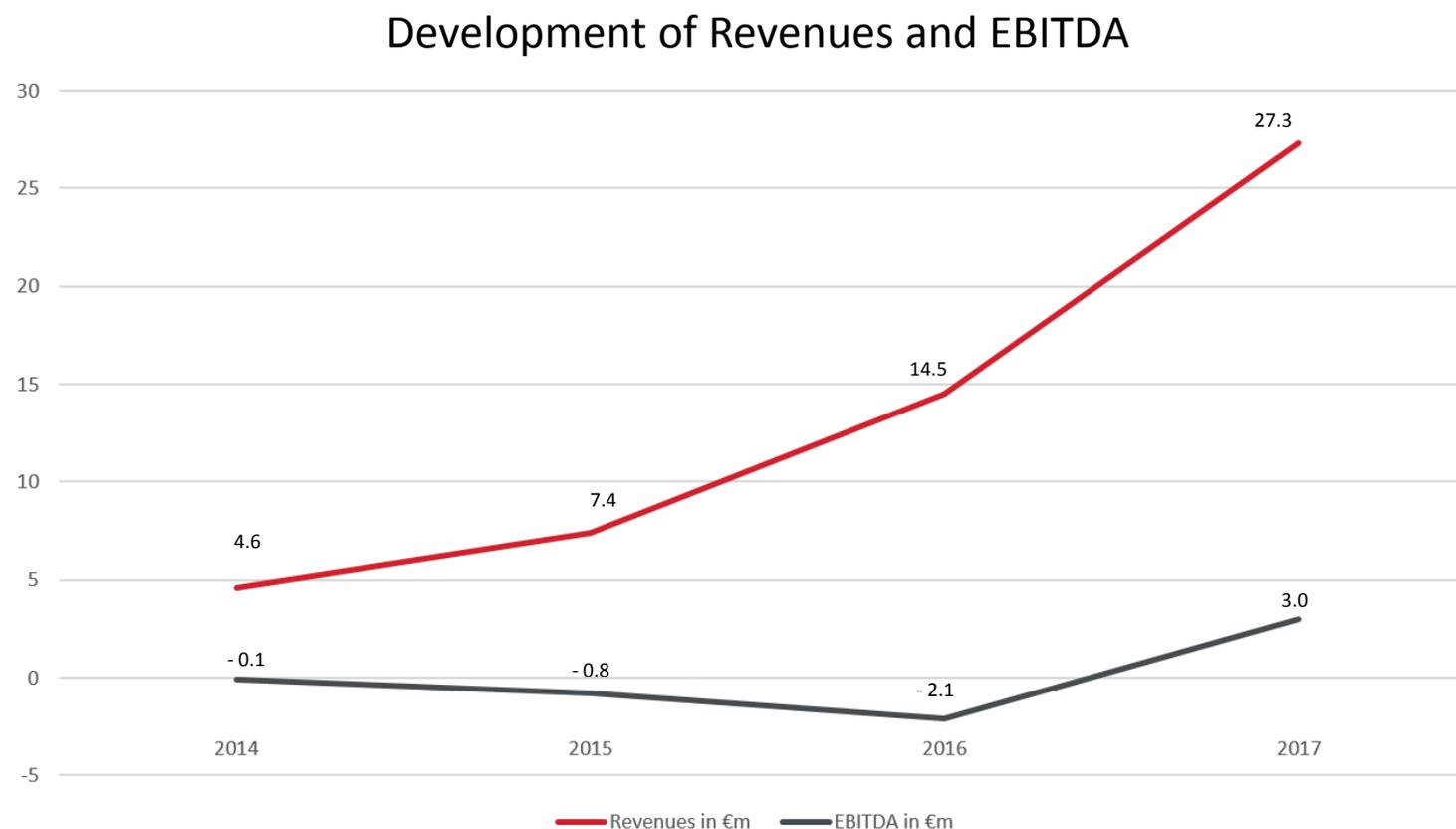
(2016: € -0.2m)

Cash flow from  
**financing activities\***

\* FY 2017

# Development of Revenues and EBITDA

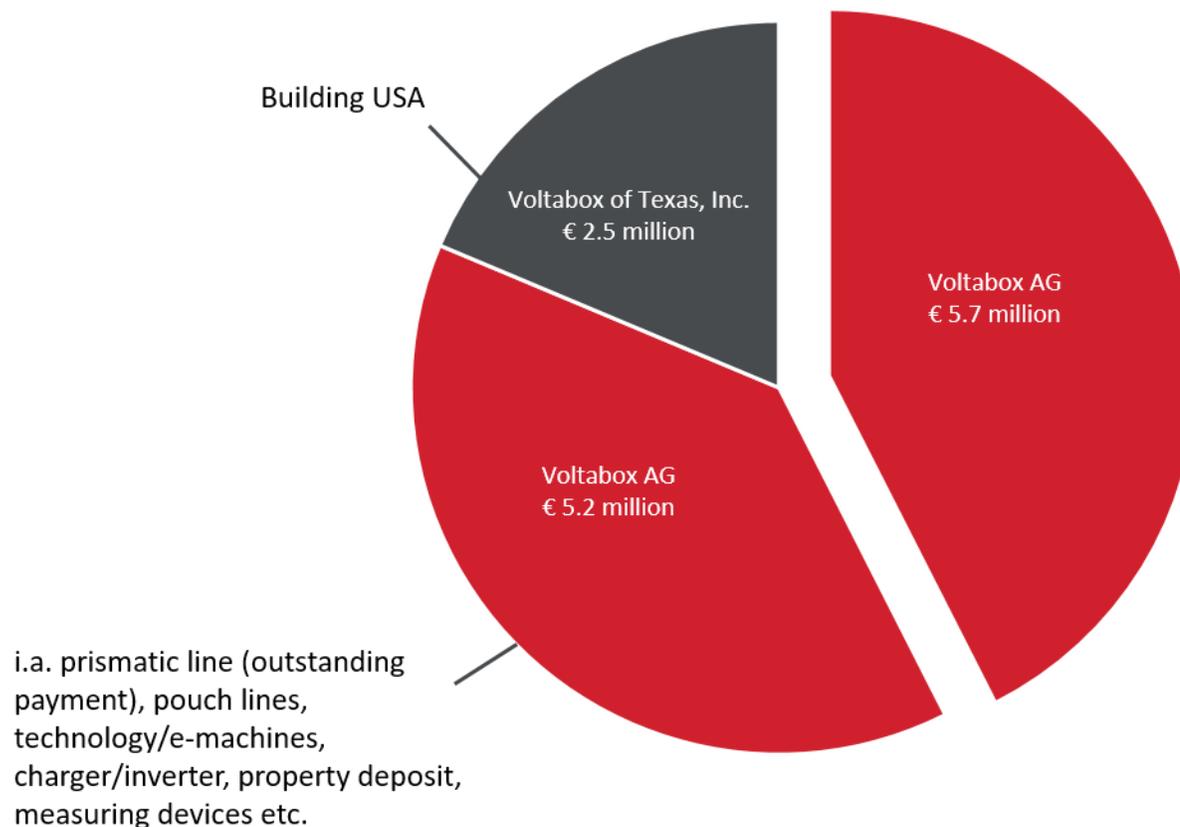
- Jump in revenue about 88.2 % to € 27.273 million in FY 2017
- EBITDA up 240.9 % to € 3.008 million
- EBITDA margin at 11.0 % (FY 2016: -14.7 %)



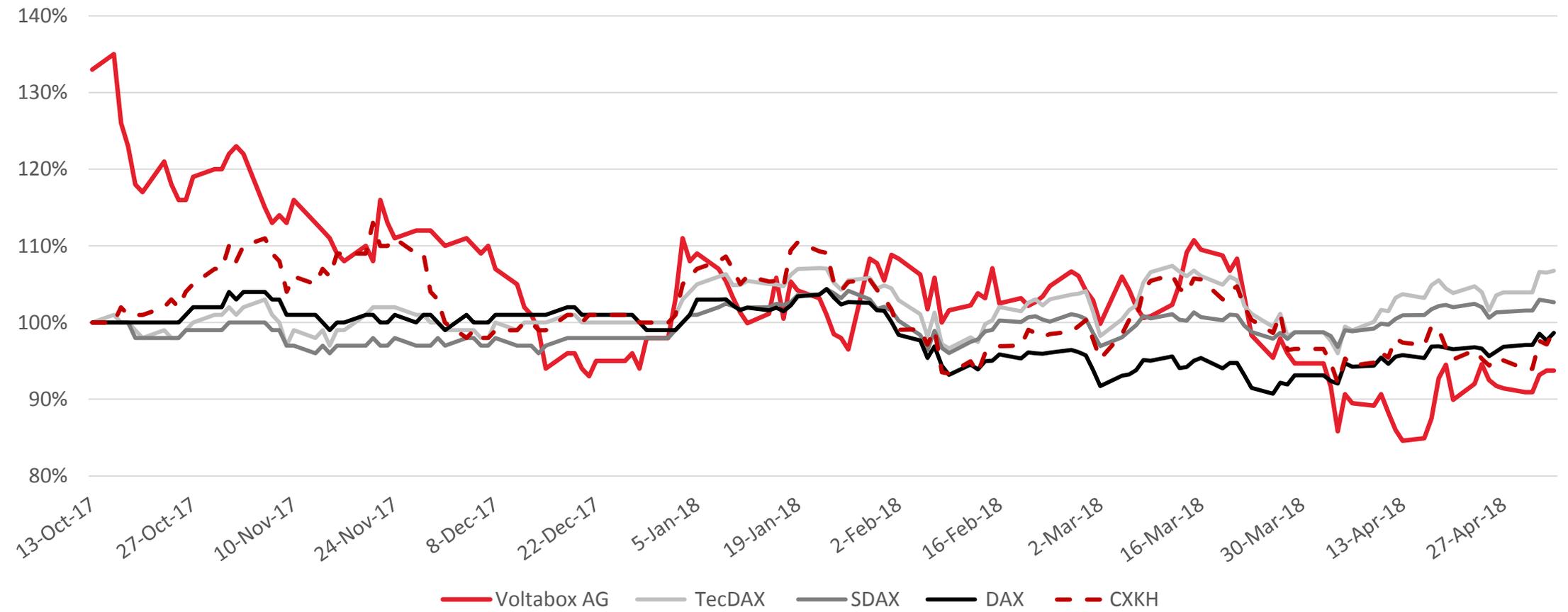
# Investment Plan 2018

- Total investment volume of € 13.4 million in 2018
- Thereof € 10.9 million in Germany and € 2.5 million in the US
- Capitalized development costs expected to increase by 6.6%

Property, plant and equipment      Intangible Assets



# Performance of Voltabox Share (VBX)



# Forecast 2018

**↗ € 60 m**

Revenues 2018 (e)

**↗ ca. 10 %**

EBIT margin 2018 (e)

# Forecast and Analyst Consensus

Financial performance indicators of Voltabox AG	2017		2018
[in € million / as indicated]	Forecast	Results	Forecast
Group revenue	25	27*	Approx. 60
EBIT margin	Slightly positive	2.1%	Approx. 10%
<i>Analyst estimates</i>	2017		2018
<i>Group revenue</i>	25.5		58.2
<i>EBIT margin</i>	0.8%		10.1%

\* Thereof around € 2 million with parent company paragon AG

# Financial Calendar

- Jan. 11/12, Oddo Forum, Lyon
- Feb. 1, Bankhaus Lampe German Corporate Conference, London
- Feb. 21/22, 12. Oddo-BHF German Corporate Conference, Frankfurt am Main
- Mar. 13, Annual report 2017
- Apr. 18-20, Bankhaus Lampe Deutschlandkonferenz, Baden-Baden
- May 8, Interim release as of March 31 – 3 months
- May 9, Annual general meeting, Delbrück
- May 16, Berenberg Investor Forum at The Battery Show, Hannover
- Jun. 7, quirin Champions 2018, Frankfurt am Main
- Jun 21/22, Berenberg Pan-European Discovery Conference
- Aug. 21, Interim release as of June 30 – 6 months
- Sep. 3/4, Equity Forum Herbstkonferenz, Frankfurt am Main
- Nov. 13, Interim release as of September 30 – 9 months
- Nov. 26-28, Deutsches Eigenkapitalforum 2018, Frankfurt am Main

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# Company Contact

Voltabox AG

Investor Relations

Dr. Kai Holtmann

Artegastraße 1

D-33129 Delbrück

Phone: +49 (0) 5250 9930-964

Email: [investor@voltabox.ag](mailto:investor@voltabox.ag)

