

Hold EUR 19.00 (EUR 18.00) Price EUR 20.10 Downside -5.5 %	Value Indicators: EUR DCF: 19.00 FCF-Value Potential 18e: 16.10	Share data: Bloomberg: SIS GR Reuters: SISG ISIN: DE0007201907	Description: Sensor solutions throughout the value chain, from sensor chips to complete systems.
	Market Snapshot: EUR m Market cap: 205.2 No. of shares (m): 10.2 EV: 227.0 Freefloat MC: 131.3 Ø Trad. Vol. (30d): 1.29 m	Shareholders: Freefloat 64.0 % FS Technology Holding 36.0 % <i>Teslin Capital Management BV</i> 5.0 % <i>Rolly van Rappard</i> 2.8 %	Risk Profile (WRe): 2017e Beta: 1.3 Price / Book: 2.5 x Equity Ratio: 52 % Net Fin. Debt / EBITDA: 1.2 x Net Debt / EBITDA: 1.2 x

Benefiting from megatrends

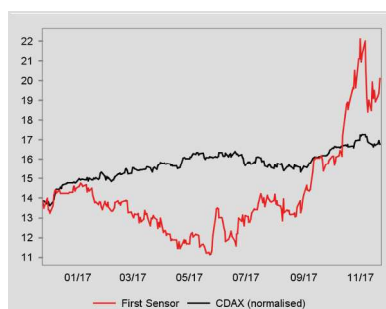
First Sensor is a manufacturer of customer-specific sensor solutions for applications in the mobility, medical and industrial sectors (approx. 80% of revenues). It also offers standard products and acts as a distributor of third party components (which jointly account for approx. 20% of revenues). As the company covers the entire value chain from the sensor chip to packaging to sensor systems, it is able to design and manufacture sensor solutions specifically tailored to customers' needs.

Focus on customised solutions leads to comparatively little competition. Owing to First Sensor's focus on customer-specific applications (approx. 80% of revenues), production is generally carried out in flexible lot sizes. Production volumes, particularly in the case of automotive applications, can easily reach several million per year. However for a large number of applications, the quantities are too small to be economical for large-scale manufacturers, which rely on high volume production to generate economies of scale. This generally limits competition from high-volume chip manufacturers and means that First Sensor is a **single source** for many of its customers as, for such lot sizes, it is not economical for customers to establish relationships with additional suppliers.

Dynamic top-line growth is supported by structural trends. Megatrends such as **Industry 4.0** or **autonomous driving** lead to structurally growing demand for sensors and sensor solutions as an ever greater volume of data needs to be collected and analysed and operative processes interlinked. First Sensor clearly benefits from this development and is aiming for annual top-line growth of 10% in the mid term.

Strategic realignment offers potential for substantial margin improvement. Historically, First Sensor has suffered from notoriously low operating profitability as a result of a) insufficient capacity utilisation, b) many customers that were too small to make the provision of tailored solutions economically viable and c) operating inefficiencies. To raise efficiency and improve profitability, management will a) streamline the portfolio, b) expand the portfolio of *key products*, i.e. products that are widely standardised and suitable for a variety of applications based on a modular product and technology platform to serve smaller customers, and c) offer customised solutions primarily to *key customers*, i.e. to customers with sufficiently high production volumes. Most recent Q3/17 results were very encouraging with regard to profitability potential and we expect the EBIT margin to rise from c. 6% in FY 2017 to 8% in FY 2019. In the medium term, First Sensor is aiming for EBIT margins of around 10%.

Valuation. We derive a DCF-based target price of EUR 19 for the First Sensor share. Following a substantial share price rally that started in early October, the stock is trading close to our price target. As this level adequately reflects the prospects of top-line growth and margin expansion, our recommendation for the First Sensor share is **Hold**.

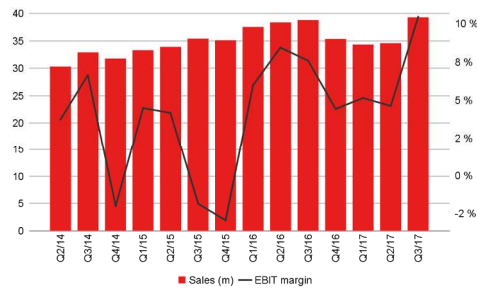


Rel. Performance vs CDAX:	
1 month:	2.6 %
6 months:	76.3 %
Year to date:	25.4 %
Trailing 12 months:	23.5 %

Company events:	

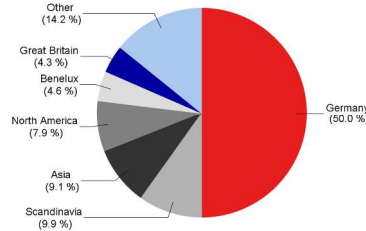
FY End: 31.12. in EUR m	CAGR (16-19e)	2013	2014	2015	2016	2017e	2018e	2019e
Sales	4.1 %	108.5	124.0	137.7	150.1	145.0	156.6	169.1
Change Sales yoy		-3.0 %	14.2 %	11.1 %	9.0 %	-3.4 %	8.0 %	8.0 %
Gross profit margin		54.1 %	51.9 %	49.6 %	51.9 %	52.1 %	52.0 %	52.0 %
EBITDA	5.4 %	11.6	13.5	11.4	19.4	17.5	20.2	22.7
Margin		10.7 %	10.9 %	8.3 %	12.9 %	12.1 %	12.9 %	13.4 %
EBIT	10.6 %	2.7	4.1	1.2	10.0	8.7	11.2	13.5
Margin		2.5 %	3.3 %	0.9 %	6.7 %	6.0 %	7.2 %	8.0 %
EBIT adj.		7.3	4.1	1.2	12.2	11.0	13.5	15.8
Net income	15.1 %	-0.5	0.2	-1.7	5.8	4.4	7.2	8.8
EPS	14.7 %	-0.05	0.02	-0.17	0.57	0.44	0.70	0.86
DPS	-	0.00	0.00	0.00	0.00	0.00	0.10	0.00
Dividend Yield		n.a.	n.a.	n.a.	n.a.	n.a.	0.5 %	n.a.
FCFPS		1.00	0.73	-0.21	0.97	0.38	0.38	0.53
FCF / Market cap		12.6 %	7.3 %	-1.9 %	8.5 %	1.9 %	1.9 %	2.6 %
EV / Sales		1.1 x	1.1 x	1.1 x	0.9 x	1.6 x	1.4 x	1.3 x
EV / EBITDA		10.0 x	9.7 x	12.7 x	7.3 x	13.0 x	11.0 x	9.6 x
EV / EBIT		42.3 x	32.4 x	119.2 x	14.2 x	26.1 x	19.9 x	16.2 x
EV / EBIT adj.		15.9 x	32.4 x	119.2 x	11.6 x	20.6 x	16.5 x	13.8 x
P / E adj.		19.4 x	143.4 x	49.6 x	15.9 x	34.1 x	23.4 x	19.7 x
FCF Potential Yield		7.8 %	5.6 %	4.0 %	8.0 %	4.3 %	5.0 %	5.9 %
Net Debt		36.1	30.0	33.3	24.7	20.8	17.0	12.6
ROCE (NOPAT)		1.1 %	0.9 %	1.5 %	6.8 %	5.9 %	7.5 %	8.7 %
Guidance:		2017: revenue EUR 140-145m; EBIT margin 5-6%						

Sales development in EUR m



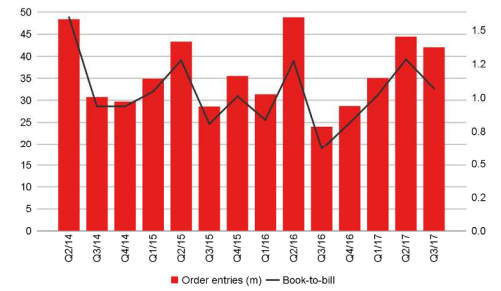
Source: Warburg Research

Sales by regions 2016; in %



Source: Warburg Research

Order entries in EUR m



Source: Company

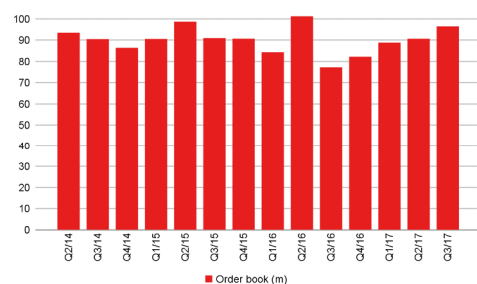
Company Background

- First Sensor develops and manufactures customer-specific high precision sensor solutions.
- The company develops sensor solutions along the entire value chain from sensor chips right up to sensor systems.
- The products are manufactured in small and large series. In the area of customised solutions, First Sensor is among the leading suppliers worldwide.
- Sensors (e.g. for acceleration, pressure, flow, light and radiation) and sensor systems form the functionally necessary, and therefore critical, elements of diverse end products.
- Of the sectors addressed by First Sensor, medical, industrial and mobility are most important.

Competitive Quality

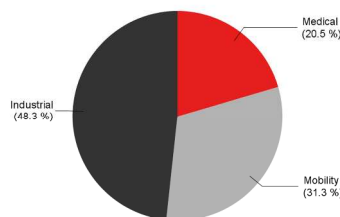
- Sensors and sensor systems, developed and produced by First Sensor in response to particular problems, allow customers to access new areas of application that would not have been possible with standard sensors.
- As large sensor producers focus on standard products and the achievement of economies of scale, First Sensor's market is often outside their realm, while smaller players do not have access to the market.
- The sensor costs form only a negligible part of the cost of an end product, which strengthens First Sensor's negotiating position.
- Customers are highly dependent on sensor suppliers; which explains the customer demand for a financially solid supplier.
- The ability to meet individual customer requirements at every step of the value chain, the expertise built up over many years and established relationships with key customers raise the barriers to market entry.

Order book in EUR m



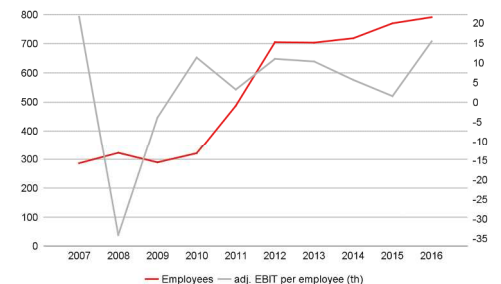
Source: Warburg Research

Sales by segments 2016; in %



Source: Warburg Research

Employees



Source: Warburg Research

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Summary of Investment Case

Investment triggers

- Sustained revenue growth, fuelled by an increasing use of sensors in various devices and improving profitability, should drive valuation in the future.

Valuation

- Our DCF-based price target of EUR 19 suggests that the First Sensor share is adequately valued
- We derive peer group based fair value indications close to the current share price

Growth

- Historical growth: Revenues CAGR of 7.6% (excl. M&A) over the period 2012-2016
- Top-line growth is driven by the increasing penetration of sensors and sensor systems in various applications and megatrends such as Industry 4.0 or autonomous drive cars
- Top-line growth in conjunction with margin improvement to drive net profit: Net profit CAGR 2016-2019e: 15.1%

Competitive quality

- Owing to its focus on customised sensor solutions, First Sensor operates in a market segment that is outside the realm of large-volume chip and sensor manufacturers, which rely on economies of scale to gain a competitive advantage. This effectively limits price pressure on First Sensor.
- First Sensor covers the entire production chain from chip manufacturing to the packaging of sensors to the development of entire sensor systems.
- Since sensors and sensor systems are integrated into the customers' products (design-in), there is rarely a change in supplier during the product lifecycle, which leads to comparatively high sales visibility and customer loyalty.

Warburg versus consensus

No consensus data available.

Company Overview

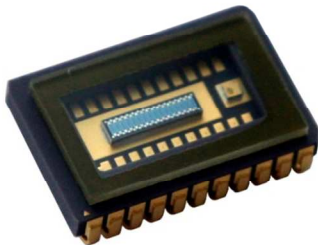
Customer market	Industrial	Medical	Mobility
Sales in EUR m	72.5	30.7	46.9
in % of total	48.3%	20.5%	31.3%

Optical sensors

Pressure sensors

Cameras

Product examples

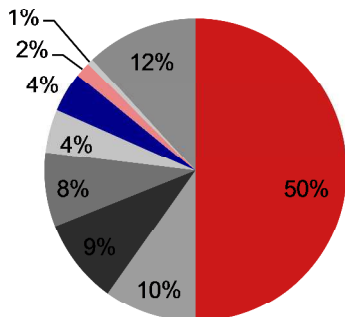


Competitors

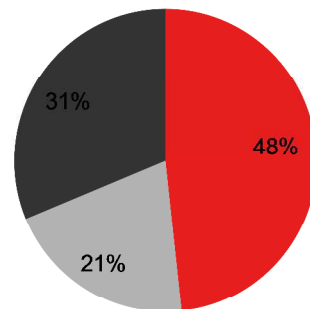
Hamamatsu, OSI Systems, Detection Technology, Amphenol Advanced Sensors, Sensirion, Honweyell, SMI, All Sensors, Magna, Sensata

Sales split by region and customer market

Sales split by region



Sales split by customer market



- Germany
- Scandinavia
- Asia
- North America
- Benelux
- Industrial
- Medical
- Mobility
- Great Britain
- France
- Italy
- Others

* All numbers relate to FY 2016

Competitive Quality

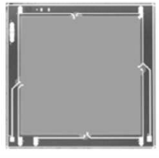



- Focus on customised sensor solutions effectively limits competition from large-scale sensor manufacturers
- High level of expertise along the entire value chain from sensor chips to packaging to entire sensor modules
- High customer loyalty as the sensor is fully integrated into the customers' products, making the costs of switching supplier relatively high.

Company overview

First Sensor's focus is the development and production of customer-specific sensors and sensor solutions (approx. 80% of group revenues). It offers standard products to smaller customers and also acts as a distributor for third-party products.

The product and service portfolio encompasses the entire value chain from wafer production and development of single sensor chips to the packaging of the chip to the manufacturing of complex sensor systems.

Value chain integration

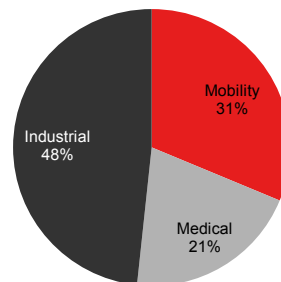
	Sensor chip	Packaging	Sensor	Sensor system
Product stage				
Customization capabilities	Chip design Geometry Capacitance Electronic signal	Design Components Connection technology Environmental protection Coating	Filter Calibration Responsivity Bandwidth Capacitance	Signal processing Data evaluation Communication Smart functionality

Source: First Sensor, Warburg Research

First Sensor only serves the B2B segment

First Sensor's products are used in a variety of industrial applications as well as in the medical and automotive (mobility) sector. However, the product portfolio does not include solutions for consumer electronics.

Revenue split by customer market – based on FY 2016 figures



Source: First Sensor, Warburg Research

Product examples include sensors for respiratory equipment (medical), laser alignment systems (industrial) or speed control in passenger vehicles (mobility).

Examples of areas of application

Medical	Industrial	Mobility
<p>Diagnostics:</p> <ul style="list-style-type: none"> - Blood sugar measuring devices - Pulse oximeters - Computer tomographs - Gamma probes - Endoscopy 	<p>Industrial process control:</p> <ul style="list-style-type: none"> - Liquid level measurement - Laser alignment systems - Filter control - Leak detection - Pressure detection 	<p>Passenger cars:</p> <ul style="list-style-type: none"> - Speed control - Tank leak detection - Measurement of tank pressure - Measurement of temperature - Fuel delivery modules - Sun and rain detection - Automatic start-stop systems
<p>Respiration and pneumology:</p> <ul style="list-style-type: none"> - Respiratory equipment - Anaesthesia devices - Sleep diagnostic devices - Sleep apnea therapy devices - Spirometers - Oxygen concentrators 	<p>Radiation and security:</p> <ul style="list-style-type: none"> - Container scanners - Baggage scanners - Radiation detectors 	<p>Smart Cars:</p> <ul style="list-style-type: none"> - Adaptive cruise control (ACC) - Parking sensors - Lane departure warning - Pedestrian recognition - Traffic sign recognition - Collision avoidance systems - Blind spot detection
<p>Dialysis and infusion:</p> <ul style="list-style-type: none"> - Dialysis machines - Infusion pumps 	<p>Smart Building:</p> <ul style="list-style-type: none"> - Filter monitoring - Room pressure - Condition monitoring - Volumetric flow controllers 	<p>Utility and special vehicles:</p> <ul style="list-style-type: none"> - Pressure sensors - Distance detection - Tank leak detection - Advanced driver assistance systems
	<p>Length measurement:</p> <ul style="list-style-type: none"> - Laser range finders - Laser scanners/ LIDAR - Laser alignment systems - Encoders 	
	<p>Aerospace:</p> <ul style="list-style-type: none"> - Laser alignment systems - Cabin air pressure - Navigation 	

Source: First Sensor

The focus is on tailor-made applications

Focus on customised applications effectively limits competition

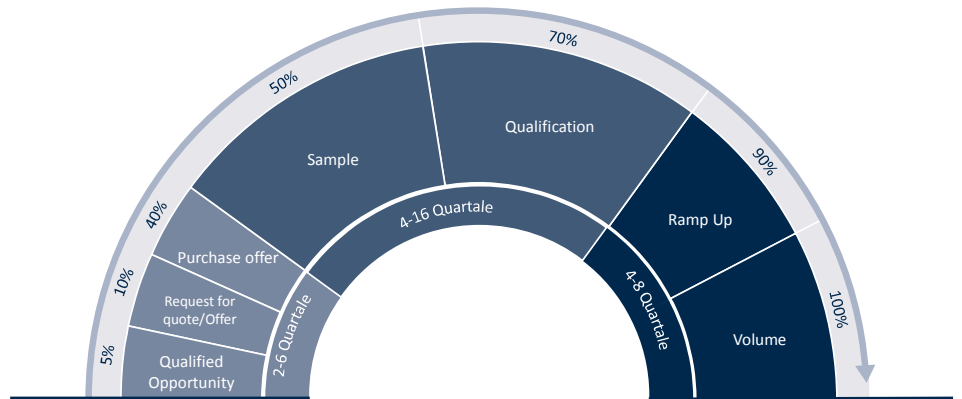
Owing to First Sensor's focus on customer-specific applications (approx. 80% of revenues), production is generally carried out in flexible lot sizes. Production volumes for certain products can easily reach several million per year but, for a large number of applications, quantities are too small to be economical for large-scale manufacturers, such as Infineon, which rely on high volume production to generate economies of scale. This also leads to a situation where First Sensor is **single source** for many of its customers since building up relationships with additional suppliers is not economical for such lot sizes.

Under these circumstances, First Sensor faces comparatively little price pressure.

Design-in leads to long-term customer relationships and high customer loyalty

The development of a sensor system, from a qualified opportunity until volume production, normally takes an average of 2.5 to 7.5 years. Typical product life-cycles for customised sensor solutions range from five to nine years. Taking the lead times and up-front investment into account, customers make a strong commitment to their supplier. Long lead times and high up-front investment result in a high degree of customer loyalty and relatively predictable revenue streams over the product lifecycle.

Long lead times and design-in leads to high customer loyalty



Source: First Sensor

In summary, First Sensor is in a comfortable competitive position as its activities focus on high-growth market segments in which price competition is often limited and technical complexity and necessary up-front investment lead to long-term customer relationships.

Analysis of Return on Capital

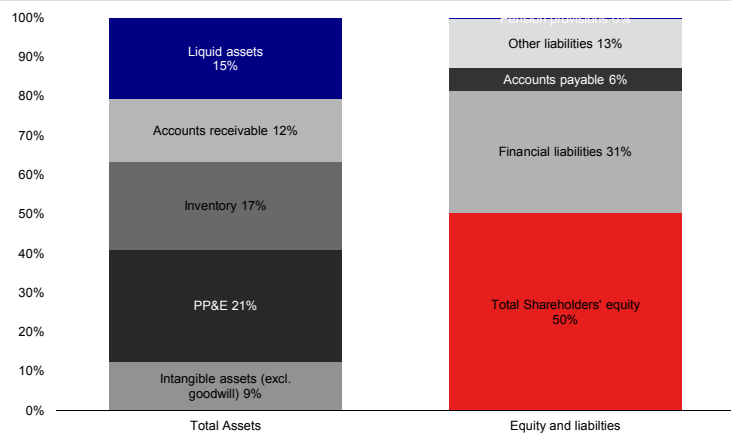
- Moderate capital intensity since typical production volumes do not require use of the latest production technology
- Operating profitability should improve as revenues continue to grow and efficiency measures kick in
- ROCE should continue to rise as capital efficiency and margins improve: We expect First Sensor to earn its cost of capital by the year 2018

Capital employed

Moderate capital intensity owing to focus on customised sensor solutions

Typically, the production of sensors and sensor systems is a highly capital-intensive business, which requires huge upfront investment and is only profitable once sufficient scale is achieved. Accounting for 21% of total assets, property, plant and equipment (PP&E) represented the largest position on First Sensor’s balance sheet as of the end of FY 2016. This primarily reflects the production machinery in First Sensor’s nine different production locations (two in Berlin, two in Dresden, Oberdisingen, Puchheim (all GER), Dwingeloo (NLD), Westlake Village (USA) and Montreal (CAN)).

Property, plant & equipment dominates the balance sheet - 2016



Source: First Sensor, Warburg Research

First Sensor is not a high-scale manufacturer...

...which reduces investment requirements

First Sensor achieves higher PP&E turnover than many large-scale chip manufacturers, like Infineon Technologies and Intel Corporation. While this might appear counterintuitive at first sight, it is the consequence of comparatively small investment requirements due to First Sensor’s focus on customer-specific sensor solutions (c. 80% of group revenues). Even though production quantities for certain products reach several million per year, and therefore do not qualify as classic low-volume niche applications, they are still small enough not to necessitate the very latest technology. This has advantages for investment as First Sensor can acquire production facilities that are no longer being used by chip and sensor companies focusing on mass production and economies of scale. Compared to the most modern technology, this reduces the investment volume by up to 80%.

Comparatively high asset turnover due to low capex - 2016

PP&E turnover	2013	2014	2015	2016	2017e	2018e	2019e
First Sensor	2.8x	3.4x	3.9x	4.4x	4.3x	4.4x	4.6x
Infineon Technologies	2.3x	2.6x	3.1x	3.1x	-	-	-
Intel Corporation	1.8x	1.7x	1.7x	1.7x	-	-	-

Note: PP&E turnover calculated as revenues/avg. PP&E; data for Infineon Technologies and Intel retrieved from FactSet

Source: FactSet, First Sensor, Warburg Research

In the last few years, depreciation exceeded investment, which is a reflection of slight underinvestment in the past. Going forward, we expect capital expenditure as a percentage of sales to rise to more sustainable levels above or equal to the level of depreciation.

Capital expenditure to rise in % of sales

	2013	2014	2015	2016	2017e	2018e	2019e
Capital expenditures	3.2	4.8	7.1	6.7	9.5	9.5	9.5
Capital expenditure in % of sales	2.9%	3.9%	5.1%	4.4%	6.6%	6.1%	5.6%
Depreciation & amortisation in % of sales	8.1%	7.6%	7.4%	6.3%	6.1%	5.7%	5.4%

Source: First Sensor, Warburg Research

Working capital utilisation to remain stable

Net working capital, which is dominated by inventories, represented 23.8% of total assets in FY 2016 and was thus the second-largest position on First Sensor's balance sheet. In recent years, net working capital as a percentage of sales fluctuated in a range of about 23% to 27%. Going forward, we expect net working capital to stabilise at a level of about 24.5% of sales.

Working capital management

First Sensor- Working Capital Management	2013	2014	2015	2016	2017e	2018e	2019e
Inventory turnover	3.6x	4.2x	4.8x	5.7x	5.6x	5.8x	5.8x
Days Inventory on Hand (DOH)	102.4	87.8	75.5	64.4	65.1	62.8	62.8
Days Sales Outstanding (DSO)	32.6	22.4	33.9	43.1	45.7	43.4	43.4
Days Payable Outstanding (DPO)	25.9	23.4	21.0	19.7	21.3	20.2	20.2
Cash-Conversion-Cycle	109.2	86.7	88.5	87.8	89.6	86.0	86.0

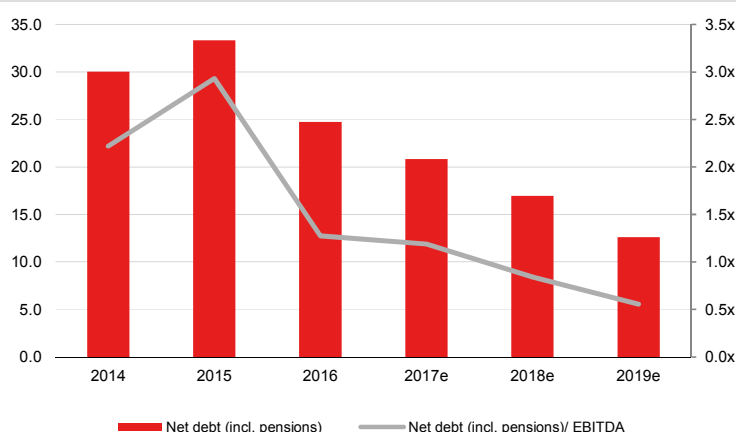
Note: Computed metrics are based on average balance sheet values.

Source: First Sensor, Warburg Research

Sound financial position

First Sensor is solidly financed and has sufficient financial leeway to pursue its growth strategy in the future. As of the end of FY 2016, financial liabilities amounted to EUR 48.2m and the company carried pension liabilities of EUR 0.3m on its balance sheet. The undiscounted value of minimum lease payments related to operating lease contracts amounted to EUR 2m as of the end of FY 2016.

Leverage to decline quickly as profitability improves



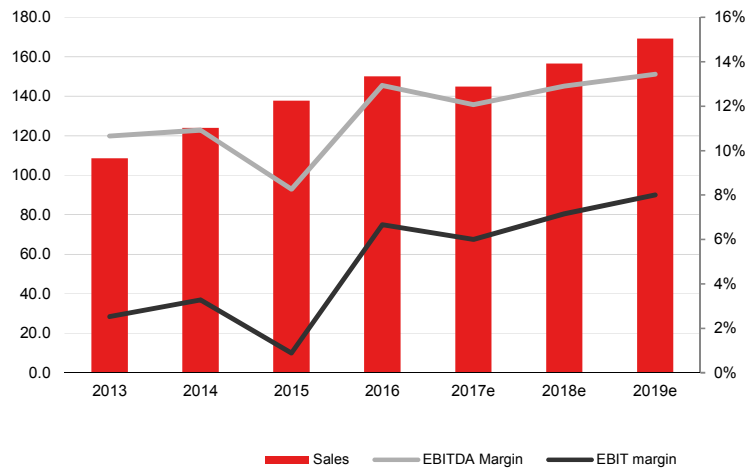
Source: First Sensor, Warburg Research

Net debt (incl. pension provisions)/EBITDA amounted to 1.3x as of the end of FY 2016. We expect the leverage ratio to decline further as margins and cash generation improve.

Operating profitability

A comparison with industry peers (see below) reveals that First Sensor’s profitability, measured in terms of EBITDA margin, has fallen short of its potential in recent years. We attribute this, to a large extent, to insufficient capacity utilisation (in Berlin Oberschöneweide, current capacity utilisation is only 30-40%) and inefficiencies in procurement and production processes. The impact of scale on profitability is also evident from the development in FY 2016 when EBITDA margin rose to 12.9% from only 8.3% in FY 2015, which was mainly driven by the higher sales volume.

Expected margin development

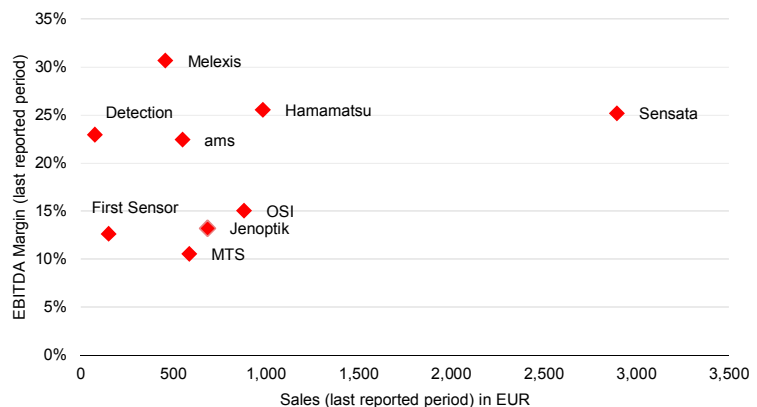


Source: First Sensor, Warburg Research

For FY 2017, we expect profitability to decline yoy owing to the lower sales volume, which is the result of the scheduled phase-out of a large order in the Mobility segment (see the section on top-line development). In the years thereafter, profitability should recover and improve to levels of >13% EBITDA margin owing to

- a) **higher revenues and accordingly, better capacity utilisation**, which will lead to improved fixed-cost absorption. The general importance of production volume is also evident in the chart below, which shows that higher sales have a positive correlation with operating profitability in the industry.

Higher sales correlate positively with higher margins



Source: Bloomberg, Warburg Research

- b) **ongoing transition from 4-inch to 6-inch wafer production** in Berlin Oberschöneweide which will reduce the silicon waste from the wafer cutting

process and allow for more efficient use of material input.

- c) **A focus on key products and customers:** According to the new strategy outlined by CEO Dr. Dirk Rothweiler, First Sensor will focus on *key products* and *key customers* in the future.

Key customers and *key products* are customers or products with whom the company can potentially, or is already, generating revenues of at least EUR 1m p.a. As part of the new strategy, First Sensor will put greater emphasis on business with larger accounts. Customised solutions will preferably be offered to such *key customers* while standardised sensor solutions are to be provided to smaller customers. This should result in more efficient procurement, engineering and production as larger orders lead to higher revenues per head and per step of a procedure.

To serve smaller customers more efficiently, the company will increase its portfolio of *key products*, i.e. products that are widely standardised and suitable for a variety of applications based on a modular product and technology platform. In this context, **First Sensor will also streamline its existing portfolio** by consolidating products and product variants with only minor technological differences to increase production volumes and generate economies of scale.

The introduction of *key products* and the concentration on *key customers* will reduce complexity and allow for higher productivity in the supply chain and production by generating benefits of scale.

- d) **Forward integration:** While First Sensor's product and service portfolio is currently mostly limited to data collection, the company intends to integrate routines for data analysis into its sensor systems. This will increase the added value for First Sensor's customers and promises potentially higher margins.

Management is aiming for mid-term EBIT margins of about 10% (6.7% in FY 2016), which even exceeds our medium and long-term margin assumption of 9%.

Return on capital employed

In the past, First Sensor did not earn its cost of capital, owing to a combination of low operating profitability and insufficient capital turnover.

Going forward, we expect Return on Capital Employed to steadily improve driven by better profitability (see above) and more efficient use of capital as revenues continue to increase and economies of scale start to kick in. We project First Sensor will earn its cost of capital by the year 2018.

ROCE should improve going forward

	2013	2014	2015	2016	2017e	2018e	2019e
Average Capital Employed	107.7	104.1	103.3	103.4	102.5	104.4	107.7
thereof							
Equity	70.0	71.0	71.6	74.4	79.7	85.5	92.9
Net financial debt incl. pension provisions	37.7	33.1	31.7	29.0	22.8	18.9	14.8
Capital Employed Turnover	1.01x	1.19x	1.33x	1.45x	1.41x	1.5x	1.57x
NOPAT	1.2	1.0	1.6	7.0	6.0	7.8	9.4
EBIT Margin	2.5%	3.3%	0.9%	6.7%	6.0%	7.2%	8.0%
ROCE	1.1%	0.9%	1.5%	6.8%	5.9%	7.5%	8.7%
WACC	7.2%	7.2%	7.2%	7.2%	7.2%	7.2%	7.2%

Source: First Sensor, Warburg Research

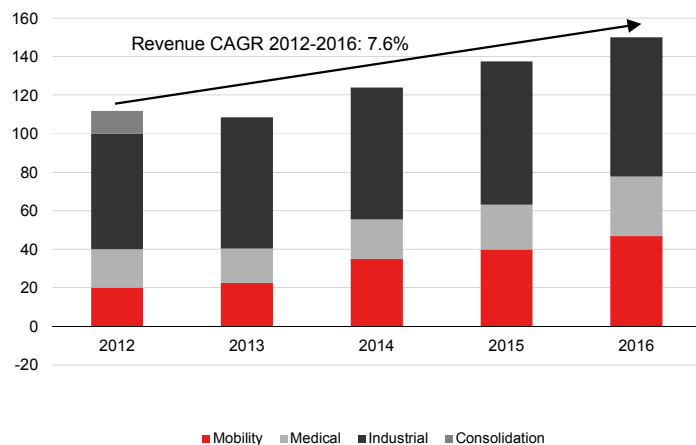
Growth / Financials

- Dynamic historical growth: revenues CAGR 2012-2016 of 7.6% (excl. M&A)
- Structural growth is driven by the exponential increase in the use of sensors in various fields and megatrends such as autonomous driving and Industry 4.0
- Sales decline expected in FY 2017 due to scheduled phase-out of large order in the Mobility unit
- Dynamic earnings growth expected: earnings CAGR 2016-2019e: 15.1%

Historical growth

First Sensor has shown decent revenue growth in the past. Between 2012 and 2016, revenues grew at a CAGR of 7.6% p.a. (ex. M&A). In recent years, growth was heavily driven by demand from the mobility and medical sector even though industrial customers remain the most important contributor to group revenues (represented about 48% of group revenues in FY 2016).

Revenues growth driven by Mobility and Medical



Source: First Sensor, Warburg Research

Growth drivers

Structural growth

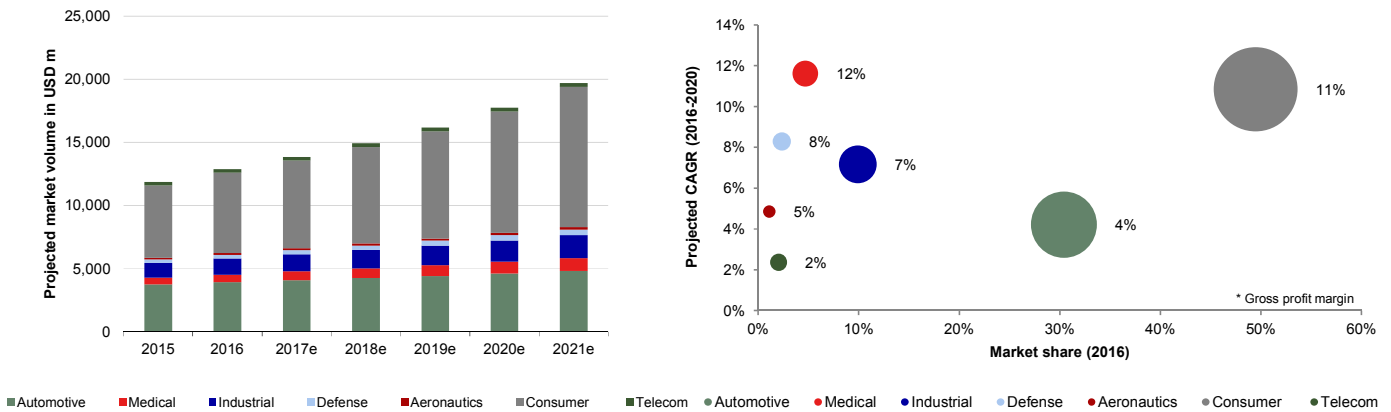
In ever more areas of daily life, new and data intensive applications are being used, which call for more complex sensor solutions as well as for a higher number of sensors per application. This development lays the foundation for further structural growth in the sensor market from which First Sensor can benefit.

The global sensor market consists of several market segments, each driven by particular trends. The overall market is expected to grow at a compound annual growth rate of about 11.3%. By 2022, the market volume will have passed the USD 240 billion-mark. Trends, such as Internet of Things (IoT), Industry 4.0 and autonomous driving are key drivers of future market growth.

Smart sensors, which are expected to account for roughly USD 60 billion by 2022 and generate an above-average CAGR of 19.2%, are among First Sensor's declared target markets. As well as the elementary measurement function, smart sensors also simultaneously process signals and communicate the data.

Coming from 15 billion MEMS units (micro-electro-mechanical systems), the **MEMS unit volume is expected to double** to 30 billion by 2020 (13% CAGR), while the market volume in USD is expected to grow at a CAGR of c. 9% between 2016 and 2021.

MEMS market projection (in USD Mio.)



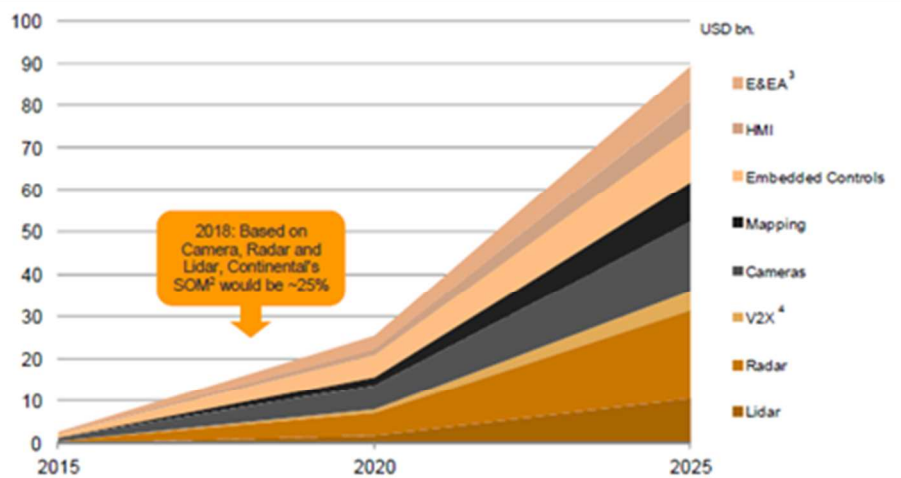
Source: Yolé, Warburg Research

ADAS and autonomous driving

First Sensor is the **global market leader for avalanche photodiodes**, which are an important component of LiDAR (light detection and ranging) systems. While LiDAR related products currently represent only about 10% of group revenues and are primarily used in industrial applications, we believe First Sensor will benefit from the transition from manually-driven cars to autonomous-drive passenger vehicles as this development will strengthen the demand for and application of LiDAR and other sensor systems in cars.

Sensor solutions are already key elements of advanced driver assistance systems (ADAS) and will become even more important in the context of autonomous cars. Driving assistance features such as reversing aid, adaptive cruise control (ACC), traffic sign recognition, blind spot detection, blind spot assist, lane departure warning or 360° all-round view are based on the input provided by optical sensors and LiDAR (light detection and ranging) systems such as those customised and manufactured by First Sensor. According to Continental, a major Tier 1-supplier to the automotive sector, the demand for important assistance systems such as LiDAR will increase substantially in the coming years.

Penetration of driving assistance systems to increase



Source: Continental

Growth initiatives

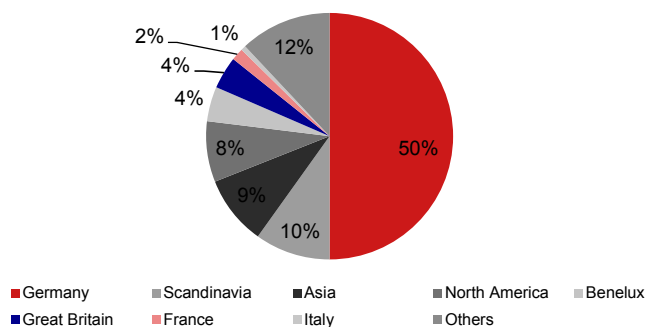
Apart from market-related growth, top-line growth will also be supported by First Sensor’s own initiatives:

Forward integration: The functionality of First Sensor’s sensor solutions has so far been limited to data collection in most cases while data analysis was left to the customer. In the future, the company will increasingly integrate routines for data analysis into its sensor solutions. This should not only support profitability (see section on operating profitability) but also help to increase the average price/value per sensor unit and therefore promote top-line development.

Internationalisation: The geographic focus of First Sensor’s business activities is still Germany where about 50% of group revenues are generated, while regions such as North America and Asia each represent less than 10% of group revenues. First Sensor aims to improve its footprint in these regions by gaining larger companies as key customers with whom the company can grow.

Germany is the most important market for First Sensor

Sales split by region - based on 2016 figures



Source: First Sensor, Warburg Research

Revenue and earnings estimates

For FY 2017, we forecast a revenue decline of about 3.4% yoy to EUR 145m owing to the scheduled phase-out of a large order in the Mobility segment that contributed about EUR 10m in revenues in the year before. For the years thereafter, we forecast revenue growth of 8% p.a. Based on our revenue, cost and margin assumptions, we derive the following projections for the P&L:

P&L projections							
	2013	2014	2015	2016	2017e	2018e	2019e
Sales	108.5	124.0	137.7	150.1	145.0	156.6	169.1
<i>in % yoy</i>	-	14.2%	11.1%	9.0%	-3.4%	8.0%	8.0%
Increase/decrease in inventory	-0.8	0.8	-1.2	-1.3	0.7	0.8	0.8
Own work capitalised	1.3	0.8	1.0	1.4	1.0	1.0	1.0
Total sales	109.0	125.6	137.6	150.3	146.7	158.4	170.9
Material expense	-50.3	-61.2	-69.3	-72.4	-71.1	-77.0	-83.0
<i>in % of sales</i>	-46.3%	-49.3%	-50.3%	-48.2%	-49.0%	-49.2%	-49.1%
Gross profit	58.7	64.4	68.3	77.9	75.6	81.4	87.9
<i>Gross profit margin</i>	54.1%	51.9%	49.6%	51.9%	52.1%	52.0%	52.0%
Personnel expense	-36.6	-39.4	-41.9	-44.1	-45.3	-47.0	-49.5
<i>in % of sales</i>	-33.7%	-31.8%	-30.4%	-29.4%	-31.2%	-30.0%	-29.3%
Other operating income	3.4	3.5	2.8	2.9	3.2	3.3	3.3
<i>in % of sales</i>	3.2%	2.9%	2.1%	1.9%	2.2%	2.1%	2.0%
Other operating expenses	-14.0	-15.0	-17.8	-17.3	-16.0	-17.5	-19.0
<i>in % of sales</i>	-12.9%	-12.1%	-13.0%	-11.5%	-11.0%	-11.2%	-11.2%
EBITDA	11.6	13.5	11.4	19.4	17.5	20.2	22.7
<i>EBITDA Margin</i>	10.7%	10.9%	8.3%	12.9%	12.1%	12.9%	13.4%
Depreciation & Amortisation	-8.8	-9.5	-10.2	-9.4	-8.8	-9.0	-9.2
<i>in % of sales</i>	-8.1%	-7.6%	-7.4%	-6.3%	-6.1%	-5.7%	-5.4%
EBIT	2.7	4.1	1.2	10.0	8.7	11.2	13.5
<i>EBIT Margin</i>	2.5%	3.3%	0.9%	6.7%	6.0%	7.2%	8.0%
Financial result	-3.8	-2.4	-2.4	-1.3	-2.3	-0.9	-0.9
EBT	-1.1	1.7	-1.2	8.7	6.4	10.3	12.6
Taxes	0.6	-1.3	-0.4	-2.6	-2.0	-3.1	-3.9
Net income	-0.5	0.4	-1.5	6.1	4.4	7.2	8.8
EPS in €	-0.05	0.02	-0.17	0.57	0.44	0.70	0.86

Source: First Sensor, Warburg Research

Q3 provides encouraging outlook for profitability

First Sensor released results for Q3/17 on November 9, and fully delivered on its target to accelerate revenue growth with significantly improved profitability. While revenues were still showing a decline yoy in H1, the top line grew by 1.3% yoy in Q3/17. Revenues in the Mobility unit of EUR 12.3m almost matched last year's level (EUR 12.4m) despite the phase-out of a large order in this unit with an annual volume of about EUR 10m. Driven by favourable product mix, good capacity utilisation and efficiency gains, profitability also increased markedly to 10.4% EBIT margin (vs. 7.6% in Q3/16) and reached the highest level ever. The company is thus on track to achieve the upper end of its guidance corridor of 5-6% EBIT margin. At projected FY 2017 revenues of EUR 145m, the upper end of that corridor implies Q4/17 EBIT margin of only about 3.3%. In our view, however, the company has adopted a conservative stance in light of uncertainties, especially regarding the introduction of SAP in Q4/17 which might temporarily interfere with usual business.

Even though we believe the company is not yet in a situation that enables the sustainable achievement of such high margins, Q3/17 results are very encouraging with regard to the profitability potential of First Sensor's business and management's ability to raise operational efficiency.

Valuation

- DCF model indicates a fair value of EUR 19 per share
- Peer group valuation suggests moderate upside potential. However, taking First Sensor's lower market capitalization and liquidity into account, the stock appears to be fairly valued
- Price target is based on our DCF model

DCF model suggests fair valuation

We derive a price target of EUR 19 per share. This value is based on a detailed planning horizon until 2019, a transition period until 2029 and in perpetuity.

Sales: Following our detailed planning period until 2019, we assume sales growth will approach a sustainable growth rate of 2% p.a. in perpetuity.

Profitability: We assume EBITDA margin expansion towards 13.4% by 2019, which we then assume will gradually decline towards a sustainable margin level of 13% in perpetuity. The rising EBIT margins in the transition period shown in our model are a result of the assumed decline in D&A expenses relative to sales as revenues continue to grow.

Other core assumptions of the model include:

- Mid-to long-term net working capital intensity of c. 24%, which is in line with historical values.
- Capital expenditure relative to sales as well as depreciation and amortisation relative to sales are assumed to narrow down to sustainable levels of 4.0% and 3.9%, respectively.
- A beta of 1.29 reflects the company's financial strength, the liquidity of its shares, and the cyclical nature of its business.
- WACC of c. 7%.

DCF model

Figures in EUR m	Detailed forecast period			Transitional period										Term. Value
	2017e	2018e	2019e	2020e	2021e	2022e	2023e	2024e	2025e	2026e	2027e	2028e	2029e	
Sales	145.0	156.6	169.1	181.0	193.6	206.2	219.6	232.8	244.4	254.2	264.4	275.0	286.0	
Sales change	-3.4 %	8.0 %	8.0 %	7.0 %	7.0 %	6.5 %	6.5 %	6.0 %	5.0 %	4.0 %	4.0 %	4.0 %	4.0 %	2.0 %
EBIT	8.7	11.2	13.5	15.4	16.6	17.9	19.2	20.5	21.6	22.6	23.7	24.7	25.8	
EBIT-margin	6.0 %	7.2 %	8.0 %	8.5 %	8.6 %	8.7 %	8.7 %	8.8 %	8.8 %	8.9 %	8.9 %	9.0 %	9.0 %	
Tax rate (EBT)	30.5 %	30.5 %	30.5 %	30.0 %	30.0 %	30.0 %	30.0 %	30.0 %	30.0 %	30.0 %	30.0 %	30.0 %	30.0 %	
NOPAT	6.0	7.8	9.4	10.8	11.6	12.5	13.4	14.3	15.1	15.8	16.6	17.3	18.1	
Depreciation	8.8	9.0	9.2	9.6	9.9	10.3	10.6	10.9	11.1	11.2	11.3	11.4	11.6	
in % of Sales	6.1 %	5.7 %	5.4 %	5.3 %	5.1 %	5.0 %	4.8 %	4.7 %	4.6 %	4.4 %	4.3 %	4.2 %	4.0 %	
Changes in provisions	0.0	0.0	0.0	0.0	1.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
Change in Liquidity from														
- Working Capital	-0.2	2.8	3.1	2.8	3.0	3.0	3.2	3.2	2.8	2.3	2.4	2.5	2.6	
- Capex	9.5	9.5	9.5	9.9	10.2	10.6	10.9	11.2	11.4	11.5	11.6	11.7	11.8	
Capex in % of Sales	6.6 %	6.1 %	5.6 %	5.4 %	5.3 %	5.1 %	5.0 %	4.8 %	4.7 %	4.5 %	4.4 %	4.3 %	4.1 %	
Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Free Cash Flow (WACC Model)	5.5	4.5	6.0	7.7	9.3	9.3	10.0	11.0	12.1	13.3	13.9	14.6	15.3	17
PV of FCF	5.5	4.2	5.2	6.2	7.1	6.5	6.6	6.7	6.9	7.1	6.9	6.8	6.6	141
share of PVs	6.69 %			30.26 %										63.05 %

Model parameter

Derivation of WACC:		Derivation of Beta:	
Debt ratio	20.02 %	Financial Strength	1.20
Cost of debt (after tax)	1.7 %	Liquidity (share)	1.30
Market return	7.00 %	Cyclicality	1.30
Risk free rate	1.50 %	Transparency	1.35
		Others	1.30
WACC	7.22 %	Beta	1.29

Valuation (m)

Present values 2029e	82		
Terminal Value	141		
Financial liabilities	48		
Pension liabilities	0		
Hybrid capital	0		
Minority interest	1		
Market val. of investments	0		
Liquidity	24	No. of shares (m)	10.2
Equity Value	197	Value per share (EUR)	19.34

Sensitivity Value per Share (EUR)

Beta	WACC	Terminal Growth							Beta	WACC	Delta EBIT-margin						
		1.25 %	1.50 %	1.75 %	2.00 %	2.25 %	2.50 %	2.75 %			-1.5 pp	-1.0 pp	-0.5 pp	+0.0 pp	+0.5 pp	+1.0 pp	+1.5 pp
1.52	8.2 %	14.34	14.68	15.05	15.45	15.89	16.36	16.87	1.52	8.2 %	11.81	13.02	14.24	15.45	16.67	17.88	19.09
1.40	7.7 %	15.85	16.27	16.73	17.22	17.77	18.36	19.02	1.40	7.7 %	13.26	14.58	15.90	17.22	18.55	19.87	21.19
1.35	7.5 %	16.69	17.16	17.68	18.23	18.85	19.52	20.26	1.35	7.5 %	14.08	15.46	16.85	18.23	19.62	21.00	22.39
1.29	7.2 %	17.61	18.14	18.71	19.34	20.04	20.80	21.65	1.29	7.2 %	14.99	16.44	17.89	19.34	20.80	22.25	23.70
1.23	7.0 %	18.62	19.21	19.86	20.57	21.36	22.23	23.21	1.23	7.0 %	15.99	17.51	19.04	20.57	22.10	23.62	25.15
1.18	6.7 %	19.72	20.38	21.12	21.93	22.83	23.84	24.97	1.18	6.7 %	17.09	18.71	20.32	21.93	23.54	25.15	26.76
1.06	6.2 %	22.26	23.12	24.07	25.14	26.34	27.70	29.25	1.06	6.2 %	19.72	21.52	23.33	25.14	26.94	28.75	30.55

- Economies of scale and synergies should contribute to margin improvements in the medium term.
- PPA-related amortisations are having a negative bottom line impact

Free Cash Flow Value Potential

Warburg Research's valuation tool "FCF Value Potential" reflects the ability of the company to generate sustainable free cash flows. It is based on the "FCF potential" - a FCF "ex growth" figure - which assumes unchanged working capital and pure maintenance capex. A value indication is derived via the perpetuity of a given year's "FCF potential" with consideration of the weighted costs of capital. The fluctuating value indications over time add a timing element to the DCF model (our preferred valuation tool).

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in EUR m	2013	2014	2015	2016	2017e	2018e	2019e	
Net Income before minorities	-0.5	0.4	-1.5	6.1	4.4	7.2	8.8	
+ Depreciation + Amortisation	8.8	9.5	10.2	9.4	8.8	9.0	9.2	
- Net Interest Income	-3.8	-2.4	-2.4	-1.3	-2.3	-0.9	-0.9	
- Maintenance Capex	3.2	4.8	5.2	5.5	5.8	6.0	6.0	
+ Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
= Free Cash Flow Potential	9.0	7.4	5.8	11.3	9.7	11.1	12.9	
FCF Potential Yield (on market EV)	7.8 %	5.6 %	4.0 %	8.0 %	4.3 %	5.0 %	5.9 %	
WACC	7.22 %	7.22 %	7.22 %	7.22 %	7.22 %	7.22 %	7.22 %	
= Enterprise Value (EV)	116.0	131.8	145.0	141.9	227.0	223.2	218.8	
= Fair Enterprise Value	125.0	103.0	80.5	156.2	134.9	153.1	178.2	
- Net Debt (Cash)	24.4	24.4	24.4	24.4	20.5	16.7	12.3	
- Pension Liabilities	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
- Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
- Market value of minorities	0.9	0.9	0.9	0.9	0.9	0.9	0.9	
+ Market value of investments	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
= Fair Market Capitalisation	99.3	77.3	54.8	130.5	113.2	135.2	164.7	
Aktienanzahl (Mio.)	9.9	10.0	10.2	10.2	10.2	10.2	10.2	
= Fair value per share (EUR)	9.99	7.70	5.40	12.84	11.09	13.24	16.13	
premium (-) / discount (+) in %					-44.8 %	-34.1 %	-19.7 %	
Sensitivity Fair value per Share (EUR)								
	10.22 %	6.14	4.61	3.06	8.30	7.21	8.84	11.01
	9.22 %	7.07	5.39	3.66	9.47	8.22	9.99	12.35
	8.22 %	8.24	6.35	4.41	10.92	9.48	11.42	14.01
WACC	7.22 %	9.73	7.57	5.37	12.78	11.09	13.24	16.13
	6.22 %	11.70	9.20	6.64	15.24	13.21	15.65	18.94
	5.22 %	14.42	11.44	8.39	18.64	16.15	18.98	22.82
	4.22 %	18.43	14.74	10.97	23.65	20.47	23.89	28.53

■ The FCF value of recent years is distorted by the capital increases.

Peer Group valuation

Apart from our DCF-based absolute valuation approach, we also conduct a peer group analysis for First Sensor based on a set of publicly traded peers:

ams (A)

ams manufactures analogue integrated switching circuits and application-specific switching circuits. Consumer & Communication account for 65% of total sales. Industrial, Medical and Automotive account for 35% of total sales. With the acquisition of CMOSIS, the area of picture sensors was strengthened. ams was founded in 1981 and is listed on the Swiss Stock Exchange.

Detection Technology (FI)

This company produces X-ray sensors for applications in medicine, safety technology and industrial applications. Detection Technology is thus a competitor of First Sensor's Medical and Industrial business units and aims to grow at 15% CAGR.

Elmos (D)

Elmos develops and produces semiconductors and Microsystems. The focus is on customer-specific system solutions (75%) for automobile applications. Major customers are Tier-1 and Tier-2 automotive suppliers. As well as its own production sites in Dortmund and Duisburg, MagnaChip is an outsourcing partner. Subsidiary SMI develops and produces microsystems in the USA.

Hamamatsu Photonics (J)

Hamamatsu Photonics manufactures optical sensors, electrical light sources and other optical components. The company was founded in 1948 and sells its products globally. Hamamatsu Photonics is a competitor in the area of customer-specific sensors.

Jenoptik (D)

Jenoptik focuses on photonic and covers significant parts of the value chain with products to produce (laser) and control light (lenses). It also produces sensors and complete sensor systems. Jenoptik holds a leading market position in precision optics, traffic monitoring, laser technologies and production measurement technology and applications in the military and civil aircraft equipment.

Melexis (B)

Melexis was established in 1988 and develops sensor switches and programmable semiconductor switches. The focus is on the automotive industry.

MTS Systems (USA)

MTS Systems offers test- and simulation systems as well as measurement- and sensor technology. The company was founded in 1966. The production portfolio includes sensors, hydraulic systems, test equipment, valves and system solutions including software.

OSI Systems (USA)

OSI Systems operates in the business fields of security, healthcare and optoelectronics. The company offers products for luggage search and medical devices for patient monitoring.

Sensata (USA)

This company offers control elements and sensor solutions. The range of products includes air pressure-, air flow-, temperature-, positioning- and speed sensors. Target industries are automotive and industrial. The sensor segment accounts for two-thirds of total sales. Sensata was a spin-off of Texas Instruments and is listed on the NYSE.

Based on the set of traded peers and median EV/EBITDA, EV/EBIT and P/E multiples,

we derive fair value indications for the First Sensor share roughly in a range of EUR 16 to EUR 24 per share. Considering that First Sensor's market capitalization and liquidity are significantly lower than those of the average peer, a valuation discount appears to be justified and we regard the First Sensor share as fairly valued.

Peer Group Valuation																
Company	LC	Price in LC	MC in LC m	EV in LC m	P/E			EV/Sales			EV / EBITDA			EV / EBIT		
					17e	18e	19e	17e	18e	19e	17e	18e	19e	17e	18e	19e
ams AG	CHF	100.00	6,604.5	9,554.1	53.8 x	22.9 x	16.9 x	7.6 x	5.4 x	4.6 x	33.8 x	16.1 x	12.1 x	50.6 x	23.5 x	16.1 x
Detection Technology Oy	EUR	19.94	254.3	244.6	19.3 x	18.2 x	17.1 x	2.7 x	2.4 x	2.1 x	114 x	10.9 x	10.7 x	13.4 x	12.7 x	118 x
Hamamatsu Photonics K.K.	JPY	3970.00	624,545.4	550,368.1	35.2 x	34.8 x	316 x	4.5 x	4.4 x	4.1 x	17.9 x	16.7 x	15.6 x	25.8 x	25.3 x	22.6 x
JENOPTIK AG	EUR	28.36	1623.3	1606.1	25.8 x	23.8 x	217 x	2.2 x	2.0 x	18 x	15.3 x	13.8 x	12.5 x	210 x	18.6 x	16.6 x
Melexis NV	EUR	82.86	3,318.9	3,224.8	30.0 x	27.7 x	25.3 x	6.4 x	5.9 x	5.4 x	20.7 x	18.9 x	17.1 x	25.6 x	23.3 x	21.3 x
MTS Systems Corporation	USD	52.40	888.5	1361.1	24.5 x	20.0 x	15.1 x	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
OSI Systems, Inc.	USD	89.99	1706.9	2,030.7	30.1 x	25.7 x	23.3 x	2.0 x	18 x	16 x	110 x	10.4 x	9.4 x	56.6 x	19.6 x	17.1 x
Sensata Technologies Holding NV	USD	48.48	8,301.3	10,994.2	15.3 x	14.0 x	13.0 x	3.3 x	3.0 x	2.8 x	12.6 x	11.3 x	10.3 x	14.5 x	12.9 x	11.6 x
Median					27.9 x	23.4 x	19.4 x	3.3 x	3.0 x	2.8 x	15.3 x	13.8 x	12.1 x	25.6 x	19.6 x	16.6 x
First Sensor AG	EUR	19.20	196.1	224.4	32.5 x	22.3 x	18.8 x	1.5 x	1.4 x	1.3 x	12.8 x	11.1 x	9.9 x	20.4 x	16.6 x	14.2 x
Potential to median in %					-14%	5%	3%	12%	12%	11%	19%	24%	23%	26%	18%	17%
Fair value per share based on median					16.45	20.10	19.79	43.90	43.84	43.49	23.46	24.51	24.15	24.84	23.10	22.96

Source: FactSet, Warburg Research

Note that we refrain from using EV/Sales multiples since EV/Sales multiples reflect structural differences in profitability and First Sensor's lower level of profitability compared to the average peer.

EV/Sales multiples reflect differences in profitability











Source: FactSet, Warburg Research

Company & Products

Company overview

First Sensor develops, produces and markets customised sensor solutions and standard products and also acts as a distributor for third-party products. With this, it covers the entire value chain from sensor components right up to complete sensor systems. Product examples include the following:

Examples of products

	Product	Description	Application Example		Product	Description	Application Example
	Optical Sensors / Detectors	Silicon PIN and avalanche photodiodes for the detection of ultraviolet, visible and infrared light	LiDAR for autonomous driving and transportation Laser distance meter Laser scanners Shape recognition Collision warning High speed optical communication Laser alignment Photometry Fluorescence detection camera technology, automotive electronics Instrumentation		Radiation Sensors	Photodiodes for the detection of ionizing radiation such as alpha, beta, gamma and X-ray radiation	Radiation detectors Container scanners Baggage scanners Scintillator luminescence detection Dosimeter X-ray fluorescence spectrometers
	Pressure Sensors	Pressure sensor elements, pressure sensors and pressure transmitters for air, gas and liquids	HVAC Industrial measurement and control Analytical instruments Respiratory devices Anesthetic devices Spirometers Dialysis machines		Flow Sensors	Mass flow sensors for air and gases with a highly sensitive thermal measuring principle to detect even smallest flows	HVAC Leak detection Analytical instruments Laboratory devices Fuel cells Gas meters
	Level Sensors	Hydrostatic liquid level sensors and optical liquid level switches to monitor the liquid level in tanks or containers	Tanks Liquid supplies Reservoirs Waste water Wells		Integrated Manufacturing Services	Packaging of customer-specific sensors, modules and complex systems	Various applications for the Industrial, Medical, Mobility target markets
	Camera	HDR CMOS cameras for automotive requirements	360° embedded area view Front camera Rear camera Mirror replacement		Inertial sensors	High-precision inertial sensors for the measurement of inclination and acceleration	Geoengineering, Condition monitoring Navigation Robotics Alignment and leveling Security systems condition monitoring, navigation applications

Sources: First Sensor; Warburg Research

With internal development and production activities, First Sensor covers the following stages of the sensor technology value creation chain in the narrower sense.

- **Assembly and packaging technology.** This is a sub-discipline of microsystem technology. Packaging technology allows for the connection of micro-electronic and non-electronic micro-components to a complete system.
- **Customer-specific hybrid circuits.** These are circuits, in which various electronic component parts are combined to form a unit, making it easier to build it into the end product.

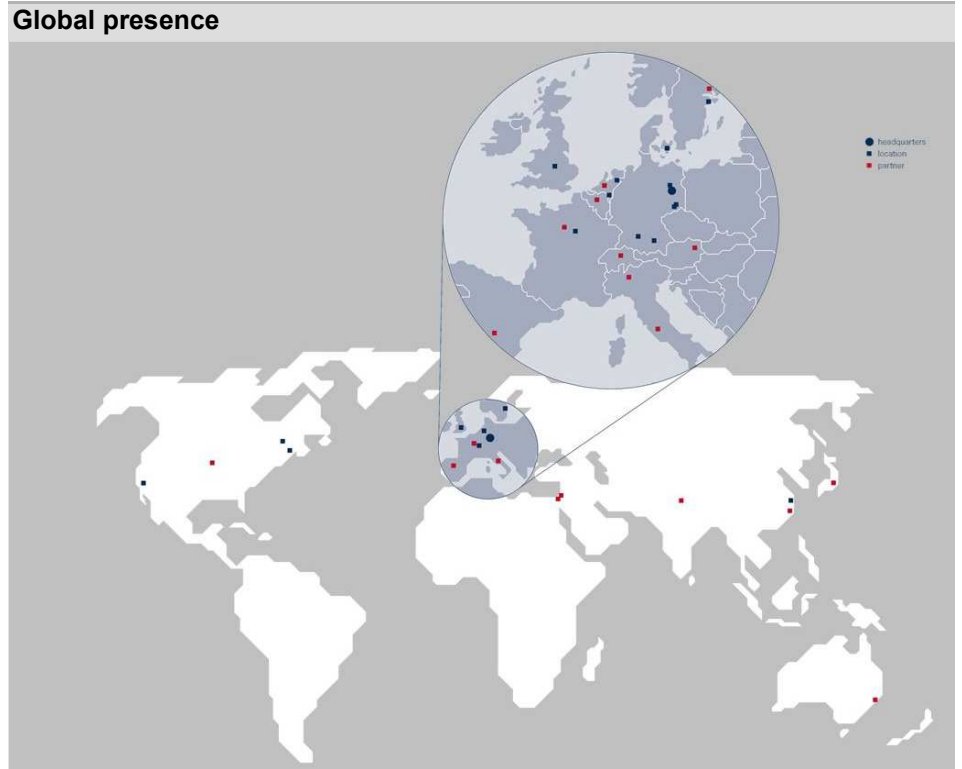
Examples of areas of application

Medical	Industrial	Mobility
Diagnostics: <ul style="list-style-type: none"> - Blood sugar measuring devices - Pulse oximeters - Computer tomographs - Gamma probes - Endoscopy 	Industrial process control: <ul style="list-style-type: none"> - Liquid level measurement - Laser alignment systems - Filter control - Leak detection - Pressure detection 	Passenger cars: <ul style="list-style-type: none"> - Speed control - Tank leak detection - Measurement of tank pressure - Measurement of temperature - Fuel delivery modules - Sun and rain detection - Automatic start-stop systems
Respiration and pneumology: <ul style="list-style-type: none"> - Respiratory equipment - Anaesthesia devices - Sleep diagnostic devices - Sleep apnea therapy devices - Spirometers - Oxygen concentrators 	Radiation and security: <ul style="list-style-type: none"> - Container scanners - Baggage scanners - Radiation detectors 	Smart Cars: <ul style="list-style-type: none"> - Adaptive cruise control (ACC) - Parking sensors - Lane departure warning - Pedestrian recognition - Traffic sign recognition - Collision avoidance systems - Blind spot detection
Dialysis and infusion: <ul style="list-style-type: none"> - Dialysis machines - Infusion pumps 	Smart Building: <ul style="list-style-type: none"> - Filter monitoring - Room pressure - Condition monitoring - Volumetric flow controllers 	Utility and special vehicles: <ul style="list-style-type: none"> - Pressure sensors - Distance detection - Tank leak detection - Advanced driver assistance systems
	Length measurement: <ul style="list-style-type: none"> - Laser range finders - Laser scanners/ LIDAR - Laser alignment systems - Encoders 	
	Aerospace: <ul style="list-style-type: none"> - Laser alignment systems - Cabin air pressure - Navigation 	

Source: First Sensor

Production: high level of vertical integration

First Sensor's German production sites are located in Berlin, Dresden, Oberdischingen (near Ulm) and Puchheim (near Munich). International production sites are located in the US (Westlake Village, CA), the Netherlands and Canada (Montreal). The production locations differ in terms of technology (e.g. optical electronics vs. MEMS), position in the value chain and the lot sizes produced.



Source First Sensor

- **Sensorchips** are developed and manufactured at the headquarters in Berlin-Oberschöneweide.
- A **sensor module or a finished sensor** occupies the next step of the value chain. The components are connected with other electronic components and circuits to a controlling device using integrated circuit packaging technology or hybrid technology, also known as microsystem technology. These steps of the process are carried out mainly in Berlin-Weißensee, at the two sites in Dresden as well as in Oberdischingen.
- In a **sensor system**, sensors in combination with actuators or other sensors, take over controlling tasks. The system processes complex data, filters and interprets this and enters a bidirectional communicative connection with its surroundings. In future, these sensor systems will be produced across all sites.

There are no significant dependencies on individual suppliers considering the company's comprehensive value creation process. The extent of First Sensor's production often goes **right back to the fundamental processes**.

Sales and customers

With sales branches and cooperation agreements, First Sensor ensures proximity to its customers. First Sensor's sales team normally deals directly with the OEMs using First Sensor's solutions and services in their own products. These products can be interim products or end products. First Sensor's customer base includes **Tier 1 suppliers**. Cooperation agreements have also been reached with local distribution partners. **Sales cooperation agreements** contribute to the internationalisation of business activities and the expansion of the product range.

Company history

The origins of First Sensor go back to Silicon Sensor GmbH, which was founded in 1991. The company evolved from the former East German “Werk für Fernsehelektronik” (factory for television electronics).

- 1999 marked First Sensor’s IPO, while Pacific Silicon Sensor was founded in the USA.
- In 2000, Lewicki microelectronic GmbH was acquired. This expanded the company’s offering in the area of customer-specific packaging solutions (with series sizes of up to 50k units) and enhanced the level of value creation.
- In 2005 First Sensor increased the packaging capacities (to series sizes of up to five million units) with the acquisition of Microelectronic Packaging Dresden GmbH.
- In 2006, Silicon Micro Sensors GmbH was founded with its headquarters in Dresden.
- In 2009, there were two capital increases to finance growth. Both were subscribed to a considerable extent by Daniel Hopp, who is no longer involved with the company.
- In 2010, First Sensor expanded its competence to the area of MEMS technology with the acquisition of First Sensor Technology GmbH, Berlin.
- In 2011, the company’s expertise in the area of positioning and acceleration sensors was strengthened with the acquisition of MEMSfab GmbH.
- In mid-2011, the company changed its name to First Sensor AG (previously: Silicon Sensor International AG), to highlight its positioning as a supplier of sensor solutions from sensor component right up to the complete system.
- In October 2011, the Sensortechnics Group was taken over. This came along with a doubling of revenues. The seller was AUGUSTA Technologie AG.
- Since 2014/2015 the company has been focusing on the three target markets, Medical, Industrial and Mobility, and is advancing the integration of past acquisitions. In the context of its buy-and-build strategy, the company regularly examines opportunities to acquire complementary technologies.

Management

Management board



Dr. Dirk Rothweiler, CEO



Dr. Mathias Gollwitzer, CFO

2017	CEO, First Sensor AG
2008	Executive Vice President Optical Systems, Jenoptik AG
2005	Vice President Sales and Service, TCZ
2000	Managing Director Asia-Pacific, Süss Microtec Co. Ltd.
1999	Director Sales & Marketing, Süss Microtec AG
1995	Project Manager Semiconductor Technology Division, Carl Zeiss
1995	Doctorate from the Department of Engineering, RWTH Aachen

2015	CFO, First Sensor AG
2012	Vice President Group Controlling, EnBW Energie Baden- Württemberg AG
2008	CFO, Mercedes-Benz France SAS
2006	Director Corporate Controlling, DaimlerChrysler AG
2005	CFO, DaimlerChrysler Belgium/Luxembourg NV/SA
2002	Director Research & Technology, Daimler AG
1999	CEO, Temic Sprachverarbeitung GmbH
1995	Director Division Controlling, Telefunken Systemtechnik GmbH
1992	Expert Adviser Finance/Controlling, Deutsche Aerospace AG

Source: Warburg Research

Supervisory board

Prof. Dr. Alfred Gossner is Chairman of the Supervisory Board. Since 2002, he has also been the CFO of the Fraunhofer-Gesellschaft in Munich. Previously, he was a member of the board of Allianz Versicherung AG. He completed his studies in economics, econometrics and politics at the Ludwig-Maximilians-University Munich and the University of Lancaster.

Further members of the supervisory board are deputy chairman **Götz Gollan**, Chairman of equinet Bank AG, **Marc de Jong**, CEO of the LM Group Golding A/S and **Prof. Dr. Christoph Kutter**, Director Fraunhofer EMFT, Munich.

DCF model

Figures in EUR m	Detailed forecast period			Transitional period										Term. Value
	2017e	2018e	2019e	2020e	2021e	2022e	2023e	2024e	2025e	2026e	2027e	2028e	2029e	
Sales	145.0	156.6	169.1	181.0	193.6	206.2	219.6	232.8	244.4	254.2	264.4	275.0	286.0	
Sales change	-3.4 %	8.0 %	8.0 %	7.0 %	7.0 %	6.5 %	6.5 %	6.0 %	5.0 %	4.0 %	4.0 %	4.0 %	4.0 %	2.0 %
EBIT	8.7	11.2	13.5	15.4	16.6	17.9	19.2	20.5	21.6	22.6	23.7	24.7	25.8	
EBIT-margin	6.0 %	7.2 %	8.0 %	8.5 %	8.6 %	8.7 %	8.7 %	8.8 %	8.8 %	8.9 %	8.9 %	9.0 %	9.0 %	
Tax rate (EBT)	30.5 %	30.5 %	30.5 %	30.0 %	30.0 %	30.0 %	30.0 %	30.0 %	30.0 %	30.0 %	30.0 %	30.0 %	30.0 %	
NOPAT	6.0	7.8	9.4	10.8	11.6	12.5	13.4	14.3	15.1	15.8	16.6	17.3	18.1	
Depreciation	8.8	9.0	9.2	9.6	9.9	10.3	10.6	10.9	11.1	11.2	11.3	11.4	11.6	
in % of Sales	6.1 %	5.7 %	5.4 %	5.3 %	5.1 %	5.0 %	4.8 %	4.7 %	4.6 %	4.4 %	4.3 %	4.2 %	4.0 %	
Changes in provisions	0.0	0.0	0.0	0.0	1.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
Change in Liquidity from														
- Working Capital	-0.2	2.8	3.1	2.8	3.0	3.0	3.2	3.2	2.8	2.3	2.4	2.5	2.6	
- Capex	9.5	9.5	9.5	9.9	10.2	10.6	10.9	11.2	11.4	11.5	11.6	11.7	11.8	
Capex in % of Sales	6.6 %	6.1 %	5.6 %	5.4 %	5.3 %	5.1 %	5.0 %	4.8 %	4.7 %	4.5 %	4.4 %	4.3 %	4.1 %	
Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Free Cash Flow (WACC Model)	5.5	4.5	6.0	7.7	9.3	9.3	10.0	11.0	12.1	13.3	13.9	14.6	15.3	17
PV of FCF	5.5	4.2	5.2	6.2	7.1	6.5	6.6	6.7	6.9	7.1	6.9	6.8	6.6	141
share of PVs	6.69 %			30.26 %										63.05 %

Model parameter

Derivation of WACC:		Derivation of Beta:	
Debt ratio	20.02 %	Financial Strength	1.20
Cost of debt (after tax)	1.7 %	Liquidity (share)	1.30
Market return	7.00 %	Cyclicality	1.30
Risk free rate	1.50 %	Transparency	1.35
		Others	1.30
WACC	7.22 %	Beta	1.29

Valuation (m)

Present values 2029e	82		
Terminal Value	141		
Financial liabilities	48		
Pension liabilities	0		
Hybrid capital	0		
Minority interest	1		
Market val. of investments	0		
Liquidity	24	No. of shares (m)	10.2
Equity Value	197	Value per share (EUR)	19.34

Sensitivity Value per Share (EUR)

Beta	WACC	Terminal Growth							Beta	WACC	Delta EBIT-margin						
		1.25 %	1.50 %	1.75 %	2.00 %	2.25 %	2.50 %	2.75 %			-1.5 pp	-1.0 pp	-0.5 pp	+0.0 pp	+0.5 pp	+1.0 pp	+1.5 pp
1.52	8.2 %	14.34	14.68	15.05	15.45	15.89	16.36	16.87	1.52	8.2 %	11.81	13.02	14.24	15.45	16.67	17.88	19.09
1.40	7.7 %	15.85	16.27	16.73	17.22	17.77	18.36	19.02	1.40	7.7 %	13.26	14.58	15.90	17.22	18.55	19.87	21.19
1.35	7.5 %	16.69	17.16	17.68	18.23	18.85	19.52	20.26	1.35	7.5 %	14.08	15.46	16.85	18.23	19.62	21.00	22.39
1.29	7.2 %	17.61	18.14	18.71	19.34	20.04	20.80	21.65	1.29	7.2 %	14.99	16.44	17.89	19.34	20.80	22.25	23.70
1.23	7.0 %	18.62	19.21	19.86	20.57	21.36	22.23	23.21	1.23	7.0 %	15.99	17.51	19.04	20.57	22.10	23.62	25.15
1.18	6.7 %	19.72	20.38	21.12	21.93	22.83	23.84	24.97	1.18	6.7 %	17.09	18.71	20.32	21.93	23.54	25.15	26.76
1.06	6.2 %	22.26	23.12	24.07	25.14	26.34	27.70	29.25	1.06	6.2 %	19.72	21.52	23.33	25.14	26.94	28.75	30.55

- Economies of scale and synergies should contribute to margin improvements in the medium term.
- PPA-related amortisations are having a negative bottom line impact

Free Cash Flow Value Potential

Warburg Research's valuation tool "FCF Value Potential" reflects the ability of the company to generate sustainable free cash flows. It is based on the "FCF potential" - a FCF "ex growth" figure - which assumes unchanged working capital and pure maintenance capex. A value indication is derived via the perpetuity of a given year's "FCF potential" with consideration of the weighted costs of capital. The fluctuating value indications over time add a timing element to the DCF model (our preferred valuation tool).

in EUR m	2013	2014	2015	2016	2017e	2018e	2019e	
Net Income before minorities	-0.5	0.4	-1.5	6.1	4.4	7.2	8.8	
+ Depreciation + Amortisation	8.8	9.5	10.2	9.4	8.8	9.0	9.2	
- Net Interest Income	-3.8	-2.4	-2.4	-1.3	-2.3	-0.9	-0.9	
- Maintenance Capex	3.2	4.8	5.2	5.5	5.8	6.0	6.0	
+ Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
= Free Cash Flow Potential	9.0	7.4	5.8	11.3	9.7	11.1	12.9	
FCF Potential Yield (on market EV)	7.8 %	5.6 %	4.0 %	8.0 %	4.3 %	5.0 %	5.9 %	
WACC	7.22 %	7.22 %	7.22 %	7.22 %	7.22 %	7.22 %	7.22 %	
= Enterprise Value (EV)	116.0	131.8	145.0	141.9	227.0	223.2	218.8	
= Fair Enterprise Value	125.0	103.0	80.5	156.2	134.9	153.1	178.2	
- Net Debt (Cash)	24.4	24.4	24.4	24.4	20.5	16.7	12.3	
- Pension Liabilities	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
- Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
- Market value of minorities	0.9	0.9	0.9	0.9	0.9	0.9	0.9	
+ Market value of investments	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
= Fair Market Capitalisation	99.3	77.3	54.8	130.5	113.2	135.2	164.7	
Aktienanzahl (Mio.)	9.9	10.0	10.2	10.2	10.2	10.2	10.2	
= Fair value per share (EUR)	9.99	7.70	5.40	12.84	11.09	13.24	16.13	
premium (-) / discount (+) in %					-44.8 %	-34.1 %	-19.7 %	
Sensitivity Fair value per Share (EUR)								
	10.22 %	6.14	4.61	3.06	8.30	7.21	8.84	11.01
	9.22 %	7.07	5.39	3.66	9.47	8.22	9.99	12.35
	8.22 %	8.24	6.35	4.41	10.92	9.48	11.42	14.01
WACC	7.22 %	9.73	7.57	5.37	12.78	11.09	13.24	16.13
	6.22 %	11.70	9.20	6.64	15.24	13.21	15.65	18.94
	5.22 %	14.42	11.44	8.39	18.64	16.15	18.98	22.82
	4.22 %	18.43	14.74	10.97	23.65	20.47	23.89	28.53

▪ The FCF value of recent years is distorted by the capital increases.

Valuation	2013	2014	2015	2016	2017e	2018e	2019e
Price / Book	1.1 x	1.4 x	1.6 x	1.5 x	2.5 x	2.3 x	2.1 x
Book value per share ex intangibles	1.42	1.90	2.03	2.68	3.21	4.02	4.88
EV / Sales	1.1 x	1.1 x	1.1 x	0.9 x	1.6 x	1.4 x	1.3 x
EV / EBITDA	10.0 x	9.7 x	12.7 x	7.3 x	13.0 x	11.0 x	9.6 x
EV / EBIT	42.3 x	32.4 x	119.2 x	14.2 x	26.1 x	19.9 x	16.2 x
EV / EBIT adj.*	15.9 x	32.4 x	119.2 x	11.6 x	20.6 x	16.5 x	13.8 x
P / FCF	8.0 x	13.7 x	n.a.	11.8 x	52.4 x	53.2 x	38.2 x
P / E	n.a.	501.9 x	n.a.	20.1 x	45.7 x	28.7 x	23.4 x
P / E adj.*	19.4 x	143.4 x	49.6 x	15.9 x	34.1 x	23.4 x	19.7 x
Dividend Yield	n.a.	n.a.	n.a.	n.a.	n.a.	0.5 %	n.a.
FCF Potential Yield (on market EV)	7.8 %	5.6 %	4.0 %	8.0 %	4.3 %	5.0 %	5.9 %

*Adjustments made for: PPA amortisations

Consolidated profit & loss

In EUR m	2013	2014	2015	2016	2017e	2018e	2019e
Sales	108.5	124.0	137.7	150.1	145.0	156.6	169.1
Change Sales yoy	-3.0 %	14.2 %	11.1 %	9.0 %	-3.4 %	8.0 %	8.0 %
Increase / decrease in inventory	-0.8	0.8	-1.2	-1.3	0.7	0.8	0.8
Own work capitalised	1.3	0.8	1.0	1.4	1.0	1.0	1.0
Total Sales	109.0	125.6	137.6	150.3	146.7	158.4	170.9
Material expenses	50.3	61.2	69.3	72.4	71.1	77.0	83.0
Gross profit	58.7	64.4	68.3	77.9	75.6	81.4	87.9
<i>Gross profit margin</i>	<i>54.1 %</i>	<i>51.9 %</i>	<i>49.6 %</i>	<i>51.9 %</i>	<i>52.1 %</i>	<i>52.0 %</i>	<i>52.0 %</i>
Personnel expenses	36.6	39.4	41.9	44.1	45.3	47.0	49.5
Other operating income	3.4	3.5	2.8	2.9	3.2	3.3	3.3
Other operating expenses	14.0	15.0	17.8	17.3	16.0	17.5	19.0
Unfrequent items	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EBITDA	11.6	13.5	11.4	19.4	17.5	20.2	22.7
<i>Margin</i>	<i>10.7 %</i>	<i>10.9 %</i>	<i>8.3 %</i>	<i>12.9 %</i>	<i>12.1 %</i>	<i>12.9 %</i>	<i>13.4 %</i>
Depreciation of fixed assets	5.6	5.5	5.8	5.8	5.8	5.9	6.2
EBITA	6.0	8.1	5.6	13.6	11.7	14.3	16.5
Amortisation of intangible assets	3.3	4.0	4.4	3.7	3.0	3.1	3.0
Goodwill amortisation	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EBIT	2.7	4.1	1.2	10.0	8.7	11.2	13.5
<i>Margin</i>	<i>2.5 %</i>	<i>3.3 %</i>	<i>0.9 %</i>	<i>6.7 %</i>	<i>6.0 %</i>	<i>7.2 %</i>	<i>8.0 %</i>
EBIT adj.	7.3	4.1	1.2	12.2	11.0	13.5	15.8
Interest income	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Interest expenses	3.9	2.4	2.2	1.8	2.9	1.5	1.5
Other financial income (loss)	0.0	0.0	-0.2	0.5	0.5	0.5	0.5
EBT	-1.1	1.7	-1.2	8.7	6.4	10.3	12.6
<i>Margin</i>	<i>-1.0 %</i>	<i>1.4 %</i>	<i>-0.9 %</i>	<i>5.8 %</i>	<i>4.4 %</i>	<i>6.6 %</i>	<i>7.5 %</i>
Total taxes	-0.6	1.3	0.4	2.6	2.0	3.1	3.9
Net income from continuing operations	-0.5	0.4	-1.5	6.1	4.4	7.2	8.8
Income from discontinued operations (net of tax)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net income before minorities	-0.5	0.4	-1.5	6.1	4.4	7.2	8.8
Minority interest	0.1	0.2	0.2	0.3	0.0	0.0	0.0
Net income	-0.5	0.2	-1.7	5.8	4.4	7.2	8.8
<i>Margin</i>	<i>-0.5 %</i>	<i>0.1 %</i>	<i>-1.2 %</i>	<i>3.8 %</i>	<i>3.1 %</i>	<i>4.6 %</i>	<i>5.2 %</i>
Number of shares, average	9.9	10.0	10.2	10.2	10.2	10.2	10.2
EPS	-0.05	0.02	-0.17	0.57	0.44	0.70	0.86
EPS adj.	0.41	0.07	0.22	0.72	0.59	0.86	1.02

*Adjustments made for: PPA amortisations

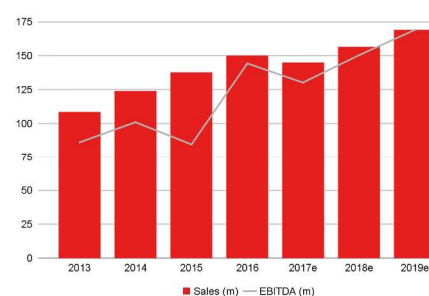
Guidance: 2017: revenue EUR 140-145m; EBIT margin 5-6%

Financial Ratios

	2013	2014	2015	2016	2017e	2018e	2019e
Total Operating Costs / Sales	89.8 %	90.4 %	91.6 %	87.2 %	89.1 %	88.3 %	87.6 %
Operating Leverage	7.5 x	3.4 x	-6.3 x	80.4 x	3.8 x	3.6 x	2.6 x
EBITDA / Interest expenses	3.0 x	5.6 x	5.2 x	10.6 x	6.0 x	13.5 x	15.2 x
Tax rate (EBT)	57.5 %	76.3 %	-30.3 %	30.1 %	30.5 %	30.5 %	30.5 %
Dividend Payout Ratio	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	14.3 %	0.0 %
Sales per Employee	154,179	172,459	178,886	189,774	n.a.	n.a.	n.a.

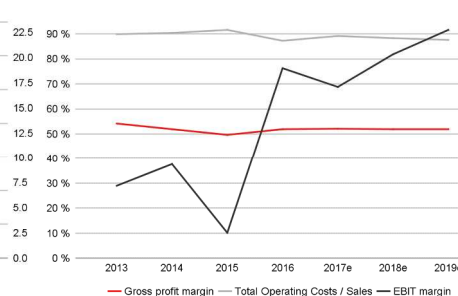
Sales, EBITDA

in EUR m

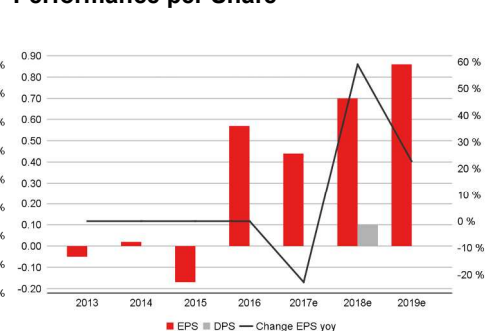


Operating Performance

in %



Performance per Share



Source: Warburg Research

Source: Warburg Research

Source: Warburg Research

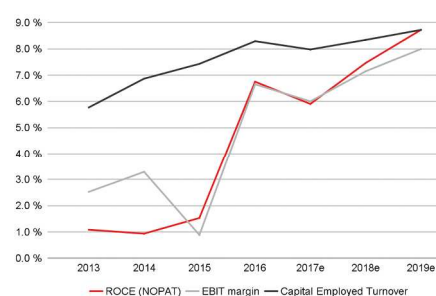
Consolidated balance sheet

In EUR m	2013	2014	2015	2016	2017e	2018e	2019e
Assets							
Goodwill and other intangible assets	55.6	52.4	50.0	49.2	48.2	47.1	46.1
thereof other intangible assets	21.9	19.1	16.2	14.4	13.4	12.3	11.3
thereof Goodwill	29.8	29.8	29.8	29.8	29.8	29.8	29.8
Property, plant and equipment	37.5	36.4	35.0	33.0	34.7	36.3	37.6
Financial assets	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other long-term assets	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fixed assets	93.2	88.8	85.1	82.1	82.8	83.3	83.6
Inventories	29.8	29.9	27.1	25.9	25.9	28.0	30.2
Accounts receivable	6.6	8.6	17.0	18.4	17.9	19.3	20.9
Liquid assets	11.4	14.5	21.5	23.8	27.7	31.5	35.9
Other short-term assets	4.1	3.1	2.8	3.9	3.9	3.9	3.9
Current assets	51.8	56.1	68.4	71.9	75.3	82.7	90.8
Total Assets	144.9	144.9	153.5	154.0	158.1	166.0	174.5
Liabilities and shareholders' equity							
Subscribed capital	49.9	50.7	50.8	51.0	51.0	51.0	51.0
Capital reserve	16.0	16.4	16.5	16.7	16.7	16.7	16.7
Retained earnings	1.0	1.0	1.0	1.0	5.5	12.6	20.4
Other equity components	3.0	3.6	2.3	7.8	7.8	7.8	7.8
Shareholders' equity	69.8	71.6	70.7	76.5	81.0	88.1	95.9
Minority interest	0.2	0.4	0.6	0.9	0.9	0.9	0.9
Total equity	70.0	72.0	71.3	77.5	81.9	89.1	96.8
Provisions	2.4	3.2	3.9	2.9	2.9	2.9	2.9
thereof provisions for pensions and similar obligations	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Financial liabilities (total)	47.1	44.3	54.5	48.2	48.2	48.2	48.2
thereof short-term financial liabilities	4.2	3.1	8.0	4.6	4.6	4.6	4.6
Accounts payable	7.7	8.2	7.6	8.6	8.3	9.0	9.7
Other liabilities	17.7	17.2	16.1	16.9	16.9	16.9	16.9
Liabilities	74.9	72.9	82.2	76.6	76.2	76.9	77.6
Total liabilities and shareholders' equity	144.9	144.9	153.5	154.0	158.1	166.0	174.5

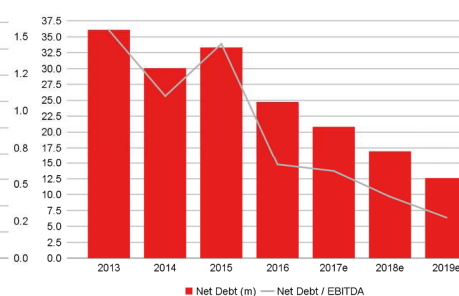
Financial Ratios

	2013	2014	2015	2016	2017e	2018e	2019e
Efficiency of Capital Employment							
Operating Assets Turnover	1.7 x	1.9 x	2.0 x	2.2 x	2.1 x	2.1 x	2.2 x
Capital Employed Turnover	1.0 x	1.2 x	1.3 x	1.5 x	1.4 x	1.5 x	1.5 x
ROA	-0.6 %	0.2 %	-2.0 %	7.0 %	5.4 %	8.6 %	10.5 %
Return on Capital							
ROCE (NOPAT)	1.1 %	0.9 %	1.5 %	6.8 %	5.9 %	7.5 %	8.7 %
ROE	-0.7 %	0.2 %	-2.4 %	7.8 %	5.6 %	8.5 %	9.5 %
Adj. ROE	5.8 %	1.1 %	3.1 %	9.9 %	7.7 %	10.4 %	11.3 %
Balance sheet quality							
Net Debt	36.1	30.0	33.3	24.7	20.8	17.0	12.6
Net Financial Debt	35.8	29.7	33.0	24.4	20.5	16.7	12.3
Net Gearing	51.6 %	41.7 %	46.7 %	31.9 %	25.4 %	19.1 %	13.0 %
Net Fin. Debt / EBITDA	309.4 %	219.4 %	290.2 %	125.9 %	117.3 %	82.5 %	54.2 %
Book Value / Share	7.0	7.1	7.0	7.5	7.9	8.6	9.4
Book value per share ex intangibles	1.4	1.9	2.0	2.7	3.2	4.0	4.9

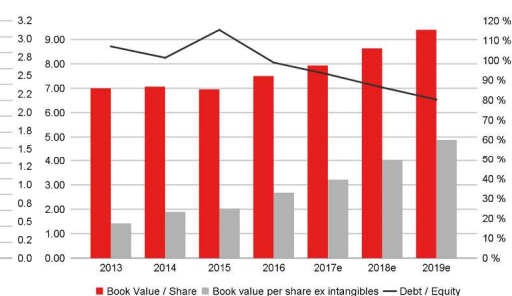
ROCE Development



Net debt in EUR m



Book Value per Share in EUR



Source: Warburg Research

Source: Warburg Research

Source: Warburg Research

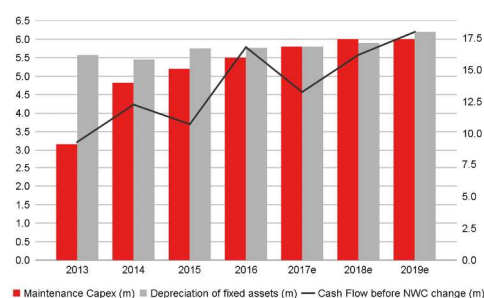
Consolidated cash flow statement

In EUR m	2013	2014	2015	2016	2017e	2018e	2019e
Net income	-0.5	0.4	-1.5	6.1	4.4	7.2	8.8
Depreciation of fixed assets	5.6	5.5	5.8	5.8	5.8	5.9	6.2
Amortisation of goodwill	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Amortisation of intangible assets	3.3	4.0	4.4	3.7	3.0	3.1	3.0
Increase/decrease in long-term provisions	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other non-cash income and expenses	1.0	2.4	2.1	1.3	0.0	0.0	0.0
Cash Flow before NWC change	9.3	12.3	10.7	16.8	13.2	16.2	18.0
Increase / decrease in inventory	0.0	0.0	0.0	0.0	0.0	-2.1	-2.2
Increase / decrease in accounts receivable	7.4	-1.6	-6.3	0.9	0.5	-1.4	-1.6
Increase / decrease in accounts payable	-3.7	1.6	0.5	-1.1	-0.3	0.7	0.7
Increase / decrease in other working capital positions	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Increase / decrease in working capital (total)	3.8	-0.1	-5.8	-0.2	0.2	-2.8	-3.1
Net cash provided by operating activities [1]	13.1	12.2	5.0	16.6	13.4	13.4	14.9
Investments in intangible assets	-1.4	-1.1	-2.0	-2.9	-2.0	-2.0	-2.0
Investments in property, plant and equipment	-1.7	-3.7	-5.1	-3.8	-7.5	-7.5	-7.5
Payments for acquisitions	-4.8	0.0	0.0	0.0	0.0	0.0	0.0
Financial investments	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Income from asset disposals	0.8	0.2	0.3	0.1	0.0	0.0	0.0
Net cash provided by investing activities [2]	-7.1	-4.6	-6.7	-6.5	-9.5	-9.5	-9.5
Change in financial liabilities	-4.1	-2.9	10.3	-6.3	0.0	0.0	0.0
Dividends paid	0.0	0.0	0.0	0.0	0.0	0.0	-1.0
Purchase of own shares	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Capital measures	0.2	0.9	0.2	0.3	0.0	0.0	0.0
Other	-2.9	-2.4	-1.8	-1.8	0.0	0.0	0.0
Net cash provided by financing activities [3]	-6.7	-4.4	8.7	-7.8	0.0	0.0	-1.0
Change in liquid funds [1]+[2]+[3]	-0.8	3.1	7.0	2.3	3.9	3.9	4.4
Effects of exchange-rate changes on cash	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cash and cash equivalent at end of period	11.4	14.5	21.5	23.8	27.7	31.5	35.9

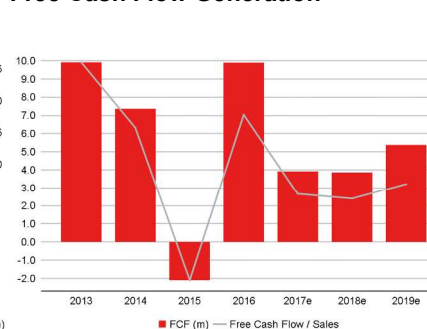
Financial Ratios

	2013	2014	2015	2016	2017e	2018e	2019e
Cash Flow							
FCF	9.9	7.4	-2.1	9.9	3.9	3.9	5.4
Free Cash Flow / Sales	9.1 %	5.9 %	-1.5 %	6.6 %	2.7 %	2.5 %	3.2 %
Free Cash Flow Potential	9.0	7.4	5.8	11.3	9.7	11.1	12.9
Free Cash Flow / Net Profit	-1910.2 %	4205.7 %	122.4 %	171.9 %	88.1 %	53.9 %	61.3 %
Interest Received / Avg. Cash	0.3 %	0.2 %	0.1 %	0.2 %	0.4 %	0.3 %	0.3 %
Interest Paid / Avg. Debt	7.9 %	5.3 %	4.5 %	3.6 %	6.0 %	3.1 %	3.1 %
Management of Funds							
Investment ratio	2.9 %	3.9 %	5.1 %	4.4 %	6.6 %	6.1 %	5.6 %
Maint. Capex / Sales	2.9 %	3.9 %	3.8 %	3.7 %	4.0 %	3.8 %	3.5 %
Capex / Dep	35.8 %	50.9 %	69.7 %	70.9 %	108.0 %	105.6 %	103.3 %
Avg. Working Capital / Sales	29.0 %	23.2 %	23.6 %	23.4 %	23.9 %	23.0 %	23.0 %
Trade Debtors / Trade Creditors	85.3 %	104.9 %	223.4 %	214.0 %	215.7 %	214.4 %	215.5 %
Inventory Turnover	1.7 x	2.0 x	2.6 x	2.8 x	2.7 x	2.8 x	2.7 x
Receivables collection period (days)	22	25	45	45	45	45	45
Payables payment period (days)	56	49	40	43	43	43	43
Cash conversion cycle (Days)	167	138	114	98	102	102	103

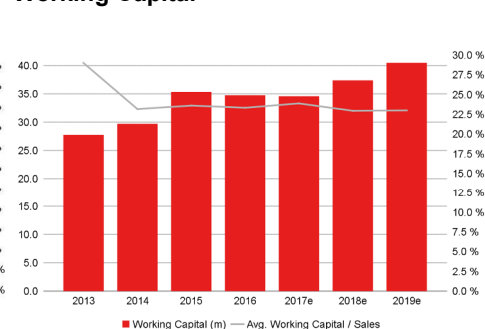
CAPEX and Cash Flow
in EUR m



Free Cash Flow Generation



Working Capital



Source: Warburg Research

Source: Warburg Research

Source: Warburg Research

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Investment recommendation: expected direction of the share price development of the financial instrument up to the given price target in the opinion of the analyst who covers this financial instrument.

-B-	Buy:	The price of the analysed financial instrument is expected to rise over the next 12 months.
-H-	Hold:	The price of the analysed financial instrument is expected to remain mostly flat over the next 12 months.
-S-	Sell:	The price of the analysed financial instrument is expected to fall over the next 12 months.
“-“	Rating suspended:	The available information currently does not permit an evaluation of the company.

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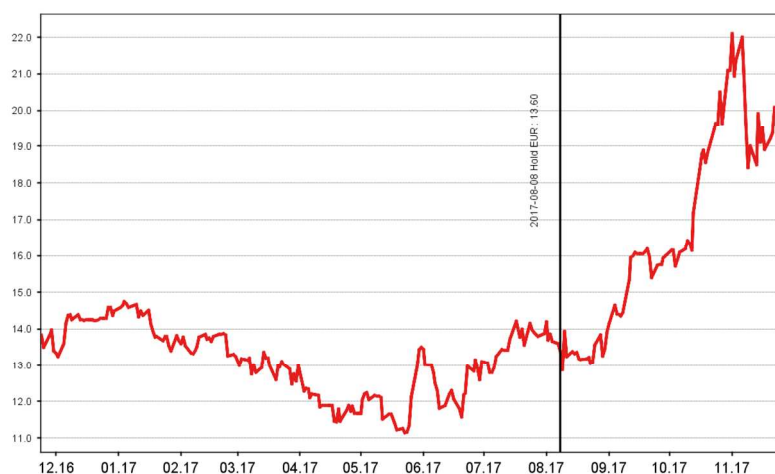
Rating	Number of stocks	% of Universe
Buy	105	52
Hold	90	44
Sell	8	4
Rating suspended	0	0
Total	203	100

WARBURG RESEARCH GMBH – ANALYSED RESEARCH UNIVERSE BY RATING ...

... taking into account only those companies which were provided with major investment services in the last twelve months.

Rating	Number of stocks	% of Universe
Buy	31	76
Hold	9	22
Sell	1	2
Rating suspended	0	0
Total	41	100

PRICE AND RATING HISTORY FIRST SENSOR AS OF 23.11.2017



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