

21 June 2017

Thomas Schulz, Group CEO

Growth through productivity

Capital Market Day 2017



Growth through productivity

- Markets are entering **cyclical recovery**
- **Productivity is the driver** for the next cycle(s)
- **FLSmidth** has **managed the cycle** and is **prepared for sustainable profitable growth**
- We are **Productivity Provider #1** – a core competence rooted in our business model
- **Key productivity-based growth levers** are
 - Digitalisation
 - Innovation
 - Life cycle management
 - Key products

Capital Market Day 2017

Agenda

10.30-11.00	Arrival	
11.00-11.30	Key note from CEO – Growth through productivity	Thomas Schulz
11.30-11.50	Key note from CFO – Internal productivity	Lars Vestergaard
11.50-12.00	Short break	
12.00-12.20	Growth through digitalisation	Per Mejnert Kristensen
12.20-13.00	Growth through innovation	Manfred Schaffer
13.00-14.00	Lunch break	
14.00-14.30	Growth through life cycle management	Brian Day
14.30-15.10	Growth through key products <ul style="list-style-type: none">▪ Cyclones and pumps▪ Cement packaging	Pat Turner Francesco Ferrandico
15.10-16.00	Closing remarks + Q&A session	
16.00-17.00	Informal time with management	

About FLSmidth



Danish Company
founded in
1882



We are
~12,000
employees



Cement

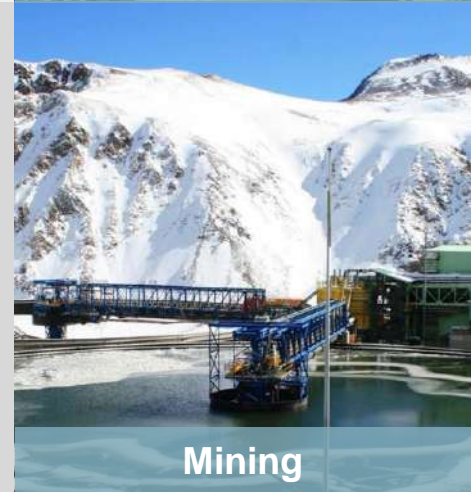
We are
a market-leading
supplier to the global
cement and mining
industries



OUR VISION
We drive success
through sustainable
productivity enhancement



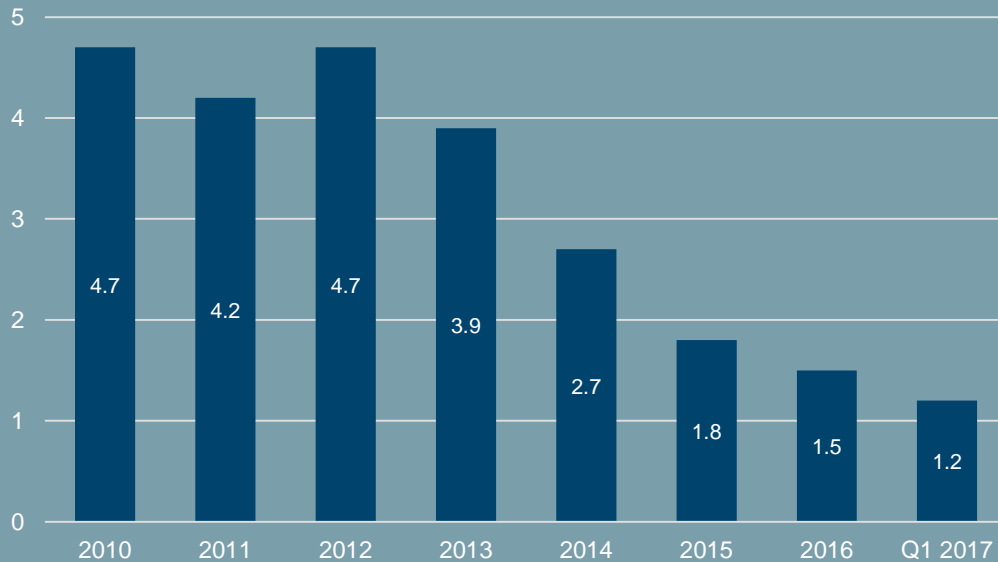
We operate in
+100
countries



Mining

Our “license to operate” is built on our continued focus on safety

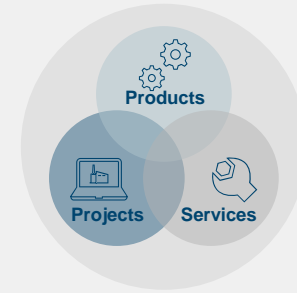
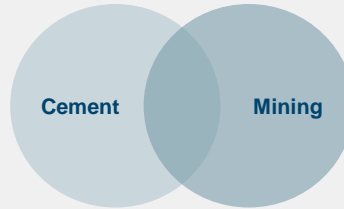
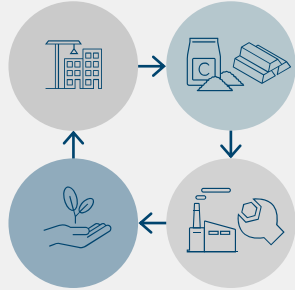
GROUP LTIFR



Winning teams of FLSmidth's President's Safety Award



Our business stands on a robust strategic foundation



Cement and mining are attractive markets to be in

Favorable **long-term demand drivers**

Increasing **complexity to operate**

Process-intensive, high wear & tear and demand for **premium equipment**

We leverage the advantages of targeting both industries

Scale benefits

Shared services

Shared know-how

Reduced cyclicality

Our unique business model positions us for growth

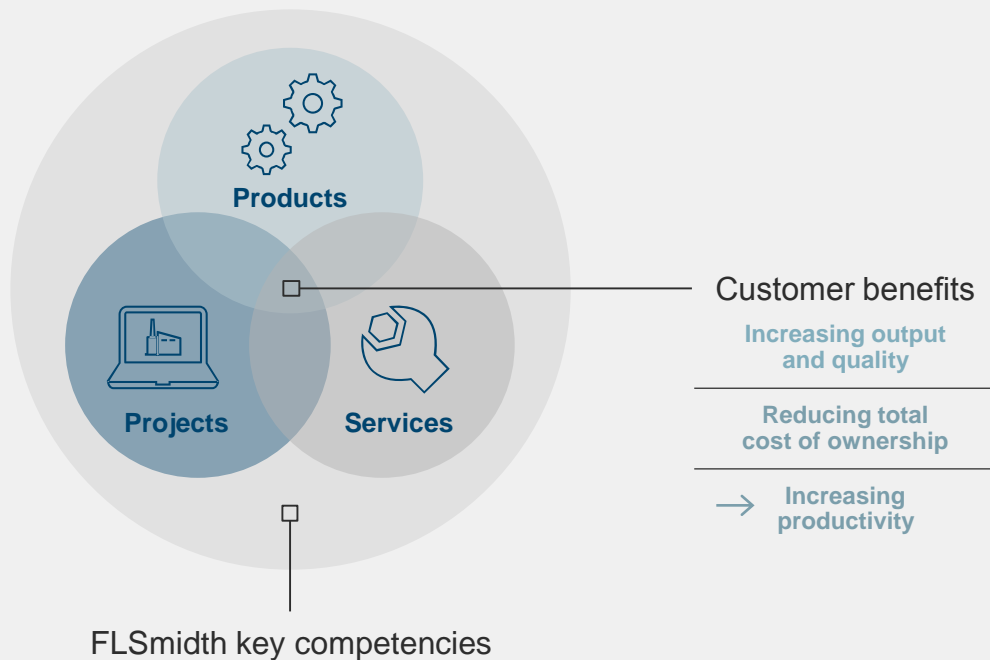


Our values

Our people

We are Productivity Provider #1

A unique
combination of
projects, products
and services



Process and product
knowledge to
optimise operations

Guaranteed
equipment uptime
and performance

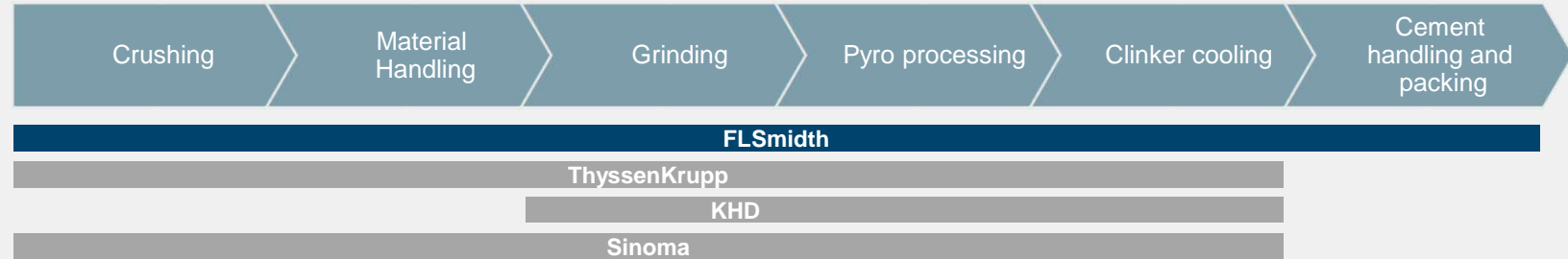
Proactive and
predictive
maintenance

Minimising
environmental
impact

Local service
and support
presence

Our offering to the cement and mining industries

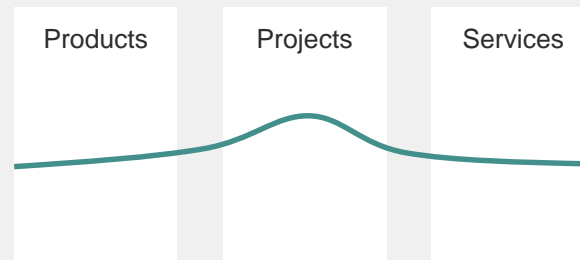
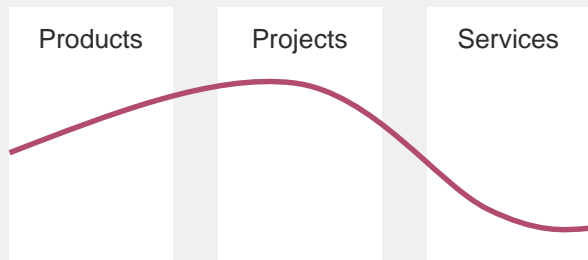
Cement



Mining



The next industry cycle(s) will be productivity-driven



Capacity cycle

Increase **production capacity**

Mostly **greenfield**

Fast delivery of proven technology

Customer requests

Project types

Required capabilities

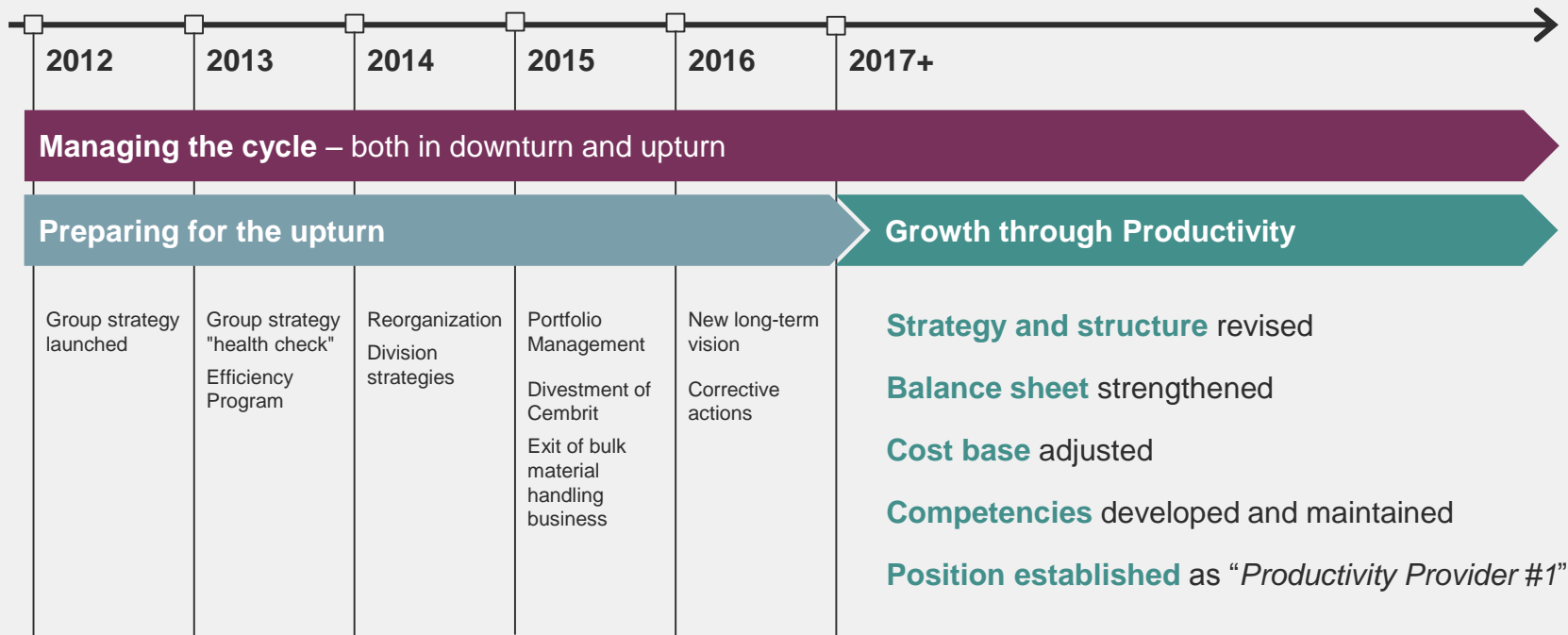
Productivity cycle

Optimize production and **reduce cost** of existing assets

Mostly **brownfield**

Holistic view on customer's operation – productivity improvements through innovation, digitalisation and high-tech service models

We have positioned ourselves to capture growth through productivity



Our long-term financial targets reflect cyclicality in our markets

Structural market growth



Cement
3-4%

Mining
4-5%

Growth rates in our industries
per annum over the cycle

Group long-term financial targets

Annual revenue growth	Above market average
EBITA margin	10-13%
ROCE*	>20%
Equity ratio	>30%
Financial gearing (NIBD/EBITDA)	<2
Pay-out ratio	30-50%

*) ROCE: Return on capital employed calculated on a before tax basis as EBITA divided by average Capital Employed incl. goodwill

Key growth levers strengthen our position as Productivity Provider #1

Cyclical recovery

Cement investments are already moving out of the trough with a *cautiously optimistic* outlook

Mining investments are at the trough and are expected to return to growth in 2018



Key productivity-based growth levers



Digitalization as the foundation for productivity

Innovation to address complexity of operations

Increased coverage of the **product life cycle**

Globalizing market-leading products

Combination of organic and M&A

Thank you



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flsmidth.com/instagram



flsmidth.com/youtube

21 June 2017

Lars Vestergaard, Group EVP and CFO

Internal productivity

Capital Market Day 2017

CFO Key note

Agenda

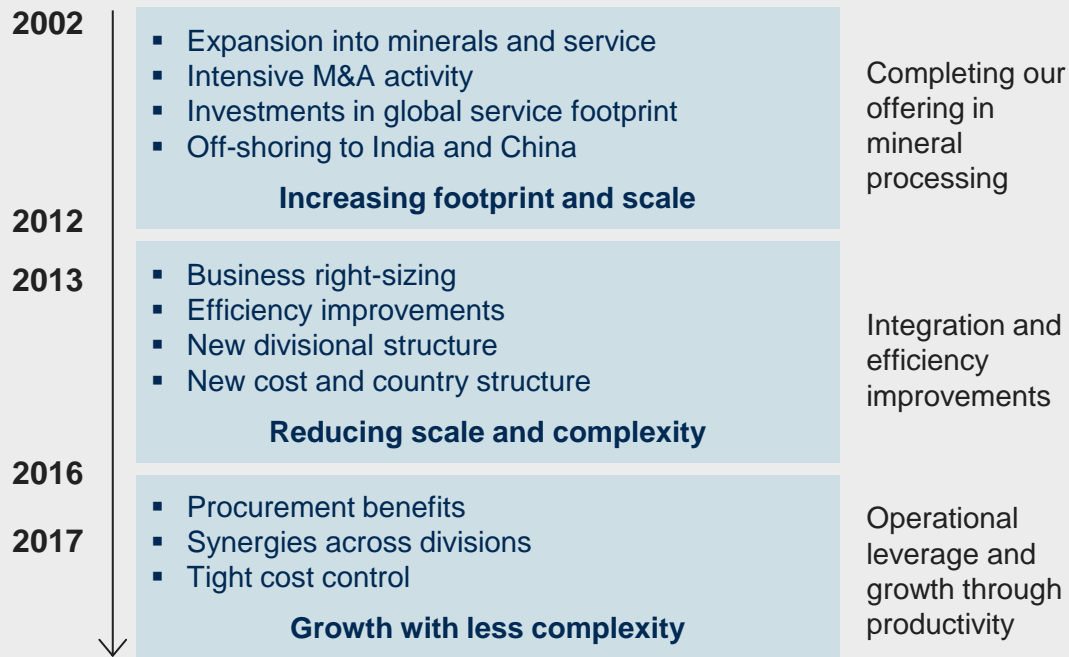
- Internal productivity
 - How we manage the company and drive internal productivity
- The CFO Agenda
 - How we invest and allocate capital
 - How we measure success and use financial KPIs

How we manage the company

How we work to improve internal productivity

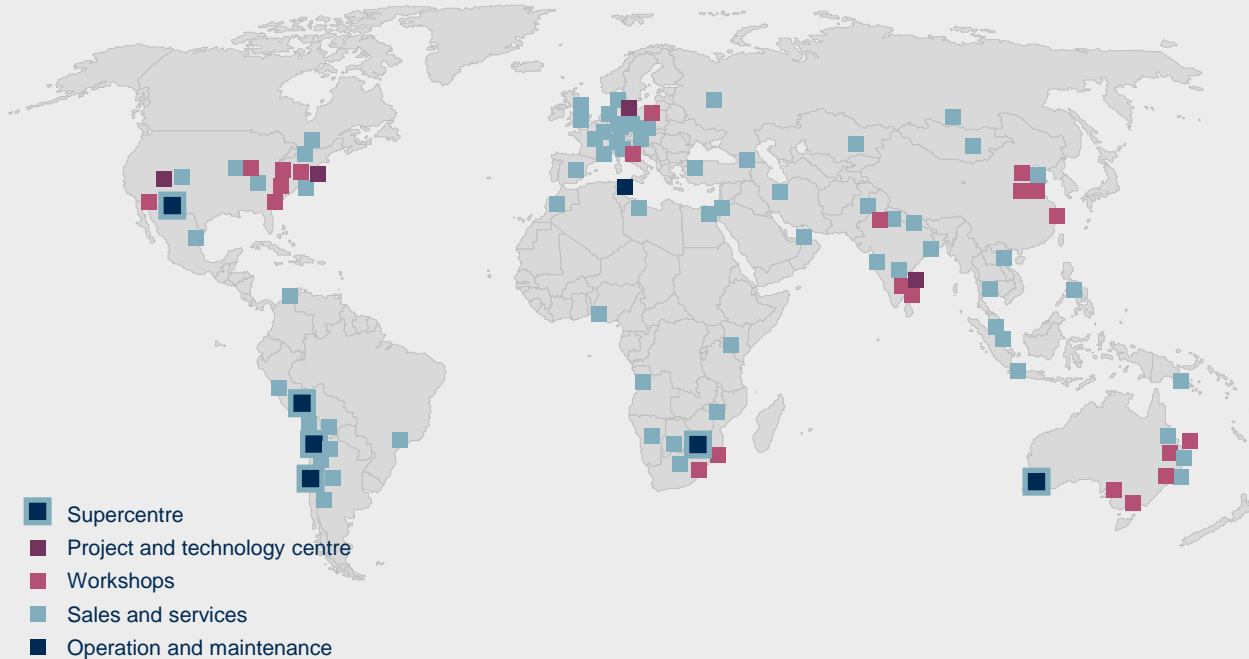
- Operating model
- Governance structure
- Synergies
- Procurement

Strategic priorities historically



Optimised global organisation and footprint

Global centres of excellence and service centres close to customers



Global Headquarters &
Group Functions, Denmark

Shared Service Center, India

Global Project &
Technology Centres
(Denmark, India, USA) 4

Local sales and service
offices 72

Service Super Centres in
mining clusters 6

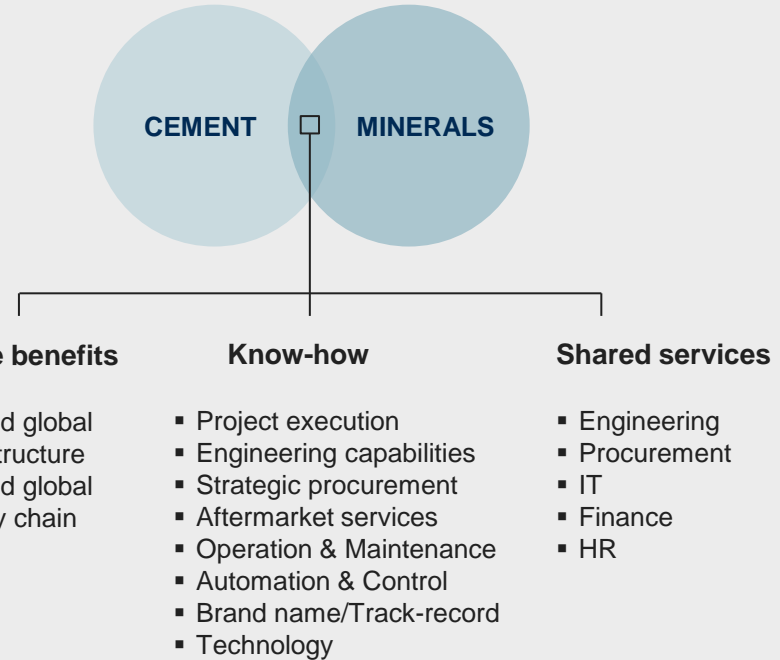
In-house workshops
(70-80% outsourced) 22

Formal country organization
(appointed country CEO) 25

Synergies extracted across the global organisation

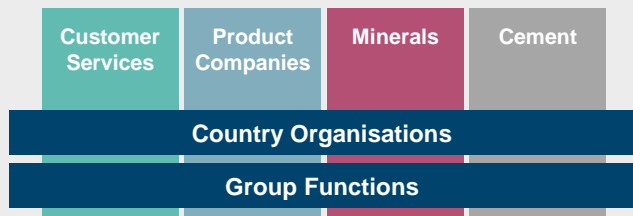
A continuous optimisation process

- Industry specific critical competencies
 - Product specialists
 - Process experts
 - Sales people
- Shared sources of competitive advantage:



New cost and governance structure

SG&A managed tightly throughout the organisation



Business Results

(managed by Business Units /Divisions)

- Order intake and Revenue
- Direct business unit costs

Shared Costs

- Shared R&D costs
- Local infrastructure costs (managed by Country CFOs)
- Group costs (managed by Group CFO)
- Shared depreciations

Breakdown of the Group by segments for 2016

DKKm	Customer Services	Product Companies	Minerals	Cement	Shared costs ⁱⁱ	
External revenue	6,461	4,281	3,172	4,278		
Internal revenue	94	734	13	8		
Total revenue	6,555	5,015	3,185	4,286		
Production costs	(4,485)	(3,407)	(2,655)	(3,696)	(228)	Shared R&D
Gross profit	2,070	1,608	530	590	(228)	
SG&A costs	(591)	(506)	(311)	(288)	(1,304)	Local and Group SG&A
EBITDA	1,479	1,102	219	302	(1,532)	
Special non-recurring items	(15)	(7)	(8)	0		
Depreciations of tangible assets	(89)	(68)	(16)	(6)	(67)	Shared depreciations
EBITA before allocation of shared costs	1,375	1,027	195	296	(1,619)	Business results
Allocation of shared costs	(559)	(467)	(330)	(268)	1,619	
EBITA	816	560	(135)	28	0	

Procurement benefits

From local to global procurement – leveraging local competencies

Global alignment

- Production costs ~75% of revenue of which 70-80% is outsourced
- Procurement strategy is key to mitigating headwind from pricing pressure and business mix (when equipment sales accelerates)



Category management

- Consolidated global spend
- Focus on long term strategic partnerships with preferred global suppliers
- Network of global specialists to support the local organisations



Value engineering

- Early involvement in R&D and Sales through value engineering and standardization
- Simplify and align product specification
- Same functionality at lower cost



Efficiency

- Transfer of transactional work to India
- Regional and global footprint optimization (10% headcount reduction through corrective actions)
- Consolidation of supplier base: From 15,000 to 7,500 suppliers – currently 11,000

How we measure success

Important Financial KPIs



A balancing act
ROCE



Cash is king
FCF



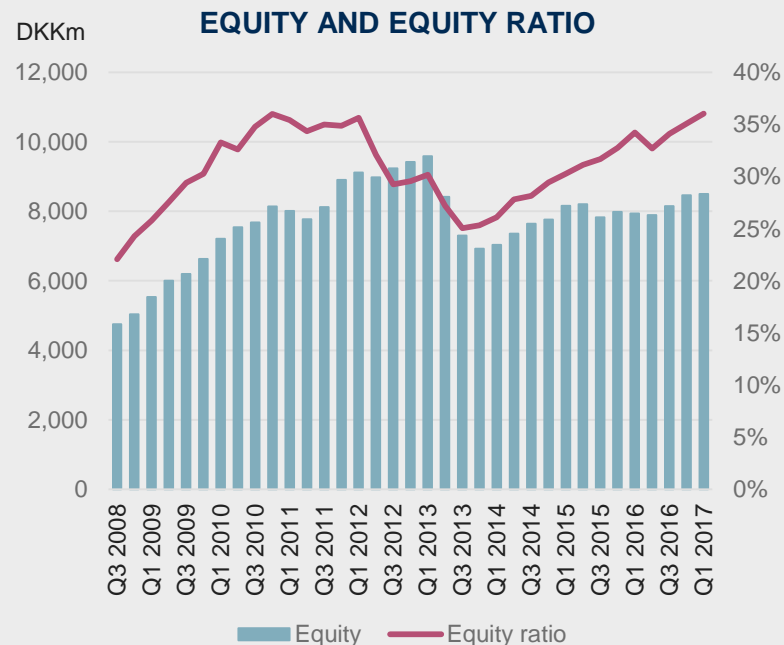
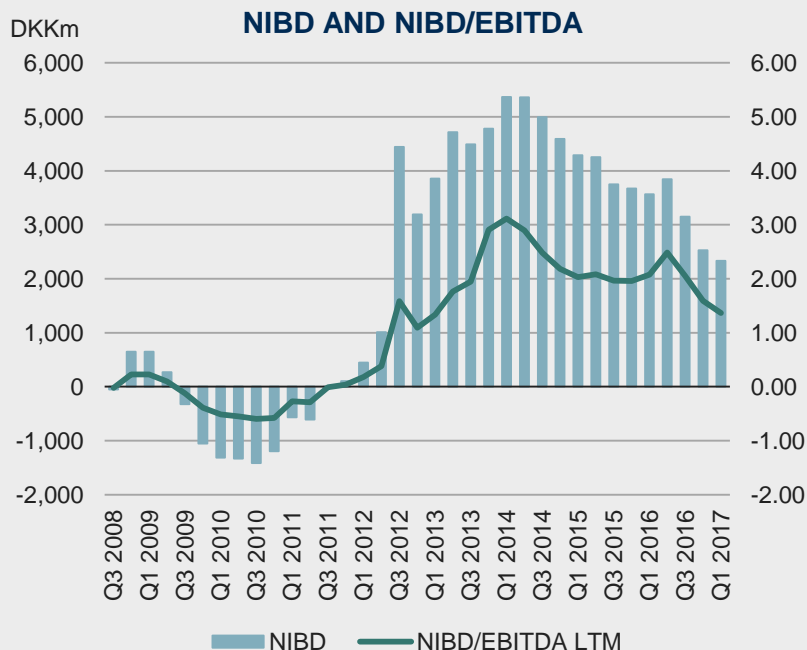
**Strong
balance sheet**
At any point in time



**Operational
leverage**
In the upturn

A strong balance sheet ensures maximum flexibility

Gradual improvement since efficiency programme in 2013



How we allocate capital

We maximise room to invest in growth and shareholder return

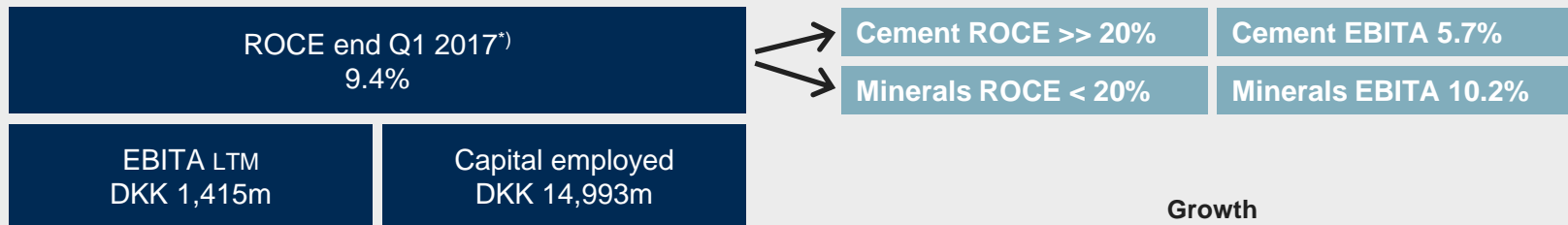
Investments and capital allocation

Priorities

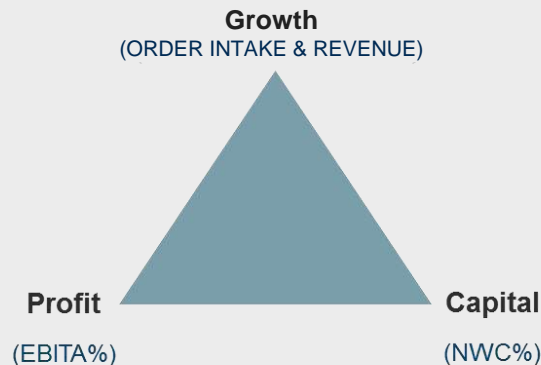
- To be **well-capitalised** (NIBD < 2x EBITDA)
- To pay stable **dividends** (30-50% pay-out ratio)
- Invest in **organic growth**
- **Mergers** and **acquisitions**
- **Share buy-back** or **special dividends**

Return on Capital Employed (ROCE)

We target a gradual and continuous increase towards 20%



Growth and operating leverage
to drive increase in ROCE

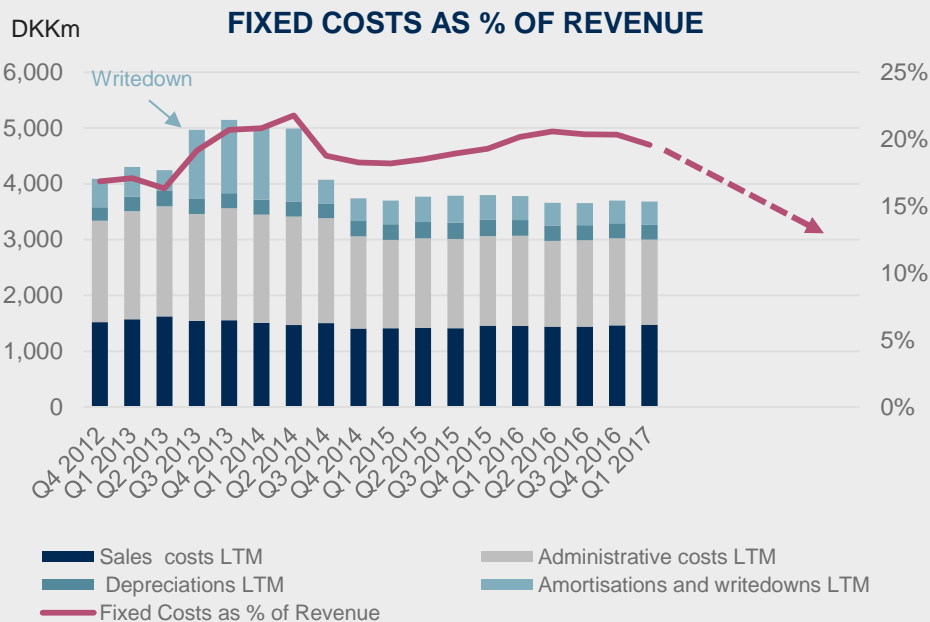


*) ROCE: Return on capital employed calculated on a **before tax** basis, **including goodwill** and based on last 12 months' **EBITA** and **average capital employed**

Ensure strong operating leverage as growth returns

Run business to optimise free cash flow generation

Tightly managed fixed cost base to generate operational leverage

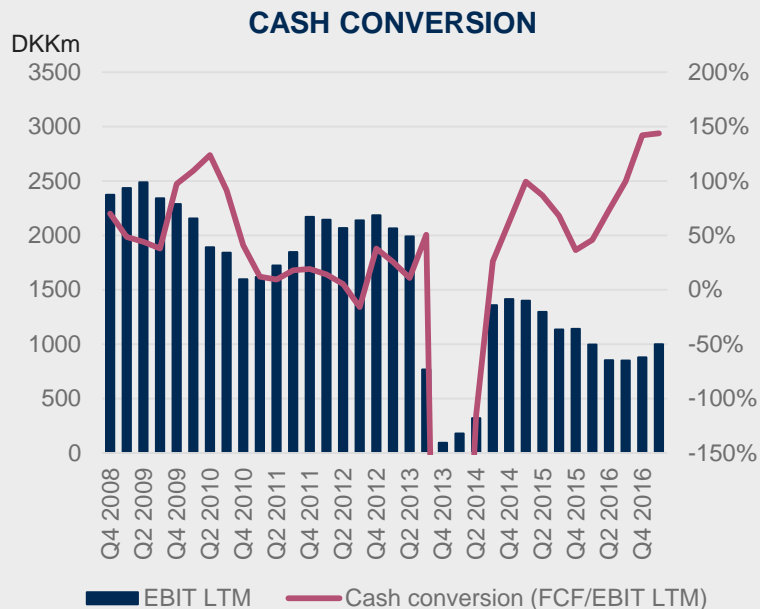


What if

we are able to increase revenue by DKK 1bn without adding more fixed costs?
(assuming a Gross Margin ≈25%)

Revenue	Δ DKK +1bn	+6%
Gross Profit	Δ DKK +250m	+6%
EBITA	Δ DKK +250m	+17%

High cash conversion and FCF to drive shareholder return



CFFO trends

- Net working capital to trend downwards (target <10% of revenue)
- Taxes rate trending downwards due to optimised global tax structure

CFFI trends

- We are already well-invested due to significant investments in the past

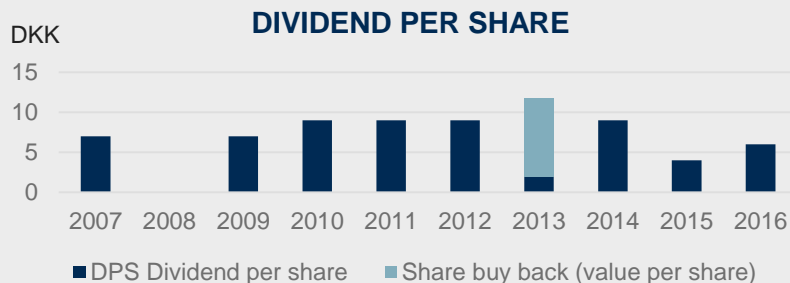
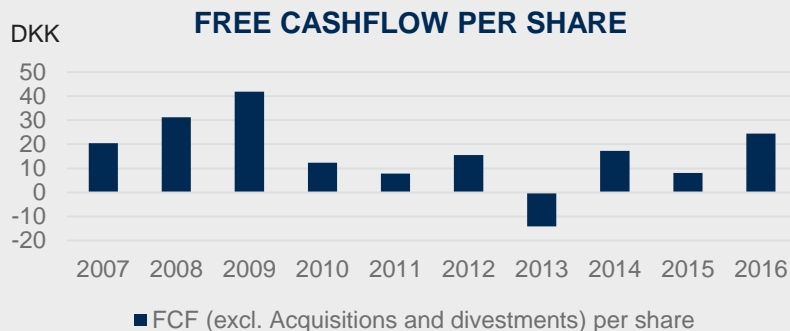
In pursuit of superior shareholder return

Internal productivity

- Optimised global **organisation**
- Optimised **cost** and **governance** structure
- Global **procurement** benefits

CFO agenda

- Maximum **flexibility** to invest in **growth**
- Managing costs to ensure **operating leverage**
- **Well-invested** => high **cash conversion**



21 June 2017

Per Mejnert Kristensen, Group EVP, Cement Division

Growth through digitalisation

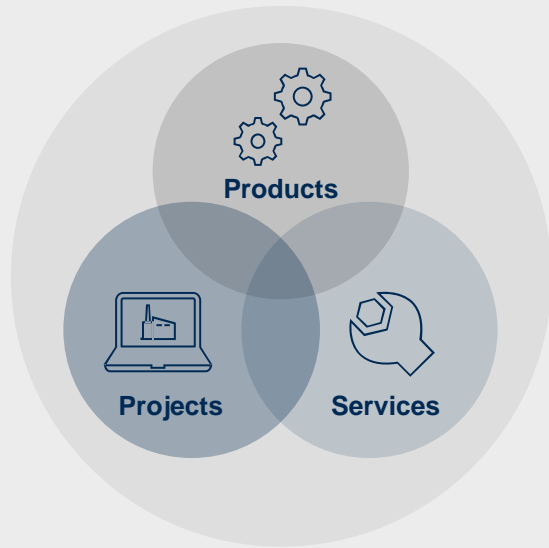


Capital Market Day 2017



Digitalisation is one of the key levers in FLSmidth for driving growth through productivity

Unique business model...



...combined with many levers for enhancing productivity

- Process and product knowledge to optimise operations
- Guaranteed equipment uptime and performance
- Minimised environmental impact
- Local service presence
- Operational excellence through expert competencies supported by **Digitalisation**

FLSmidth has been on the digitalisation journey for decades

FLSmidth possesses the key competencies needed to deliver on digitalisation

Plant/operations
optimisation

Mac-
hine
optimi-
sation

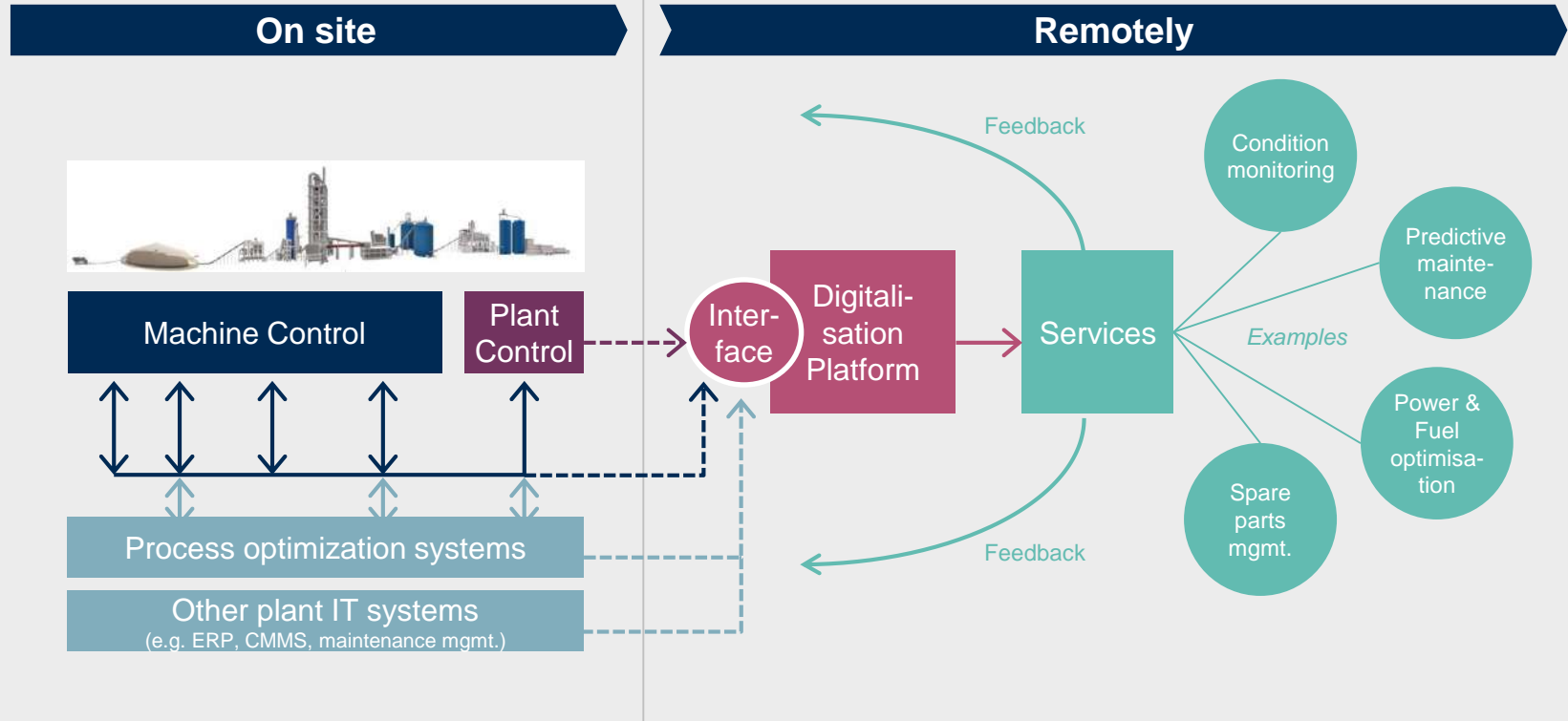
Process
optimisation

- FLSmidth is the **subject matter expert** in both machine control, process optimization and plant optimization
- **For several decades**, FLSmidth has sold numerous systems enabling automated operation
- **Increased focus** on digitalisation as a **critical enabler of productivity** in the future

What Digitalisation means in FLSmidth

Cement example

ILLUSTRATIVE



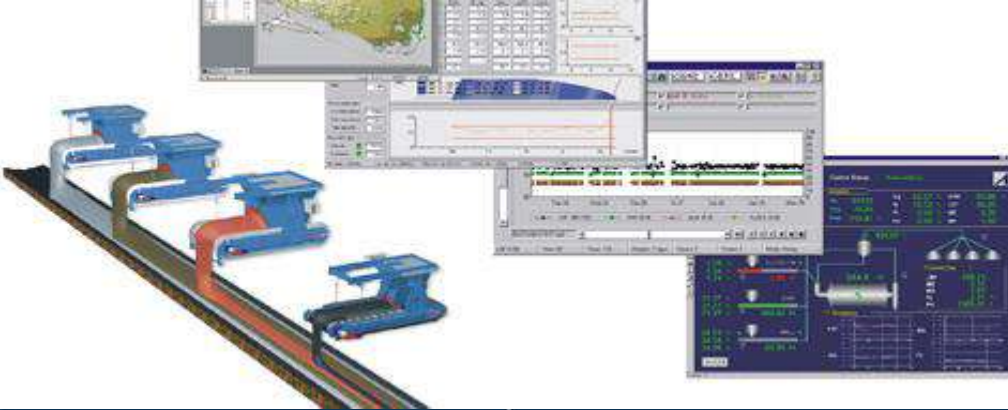


Already offering key technologies at the foundation of digitalisation

Example: Advanced Process Control systems

- FLSmidth's advanced process control solution used to stabilize and optimize key cement processes
 - Production increase of 3-5% in kiln applications and 3-6% in mill applications
 - Fuel savings of 2-4% in kiln applications and 3-6% in mill applications
 - Up to 30% reduction of process and quality variability
- Addressing key business challenges of our customers e.g. rising energy costs, fluctuating demand, scarcity of personnel

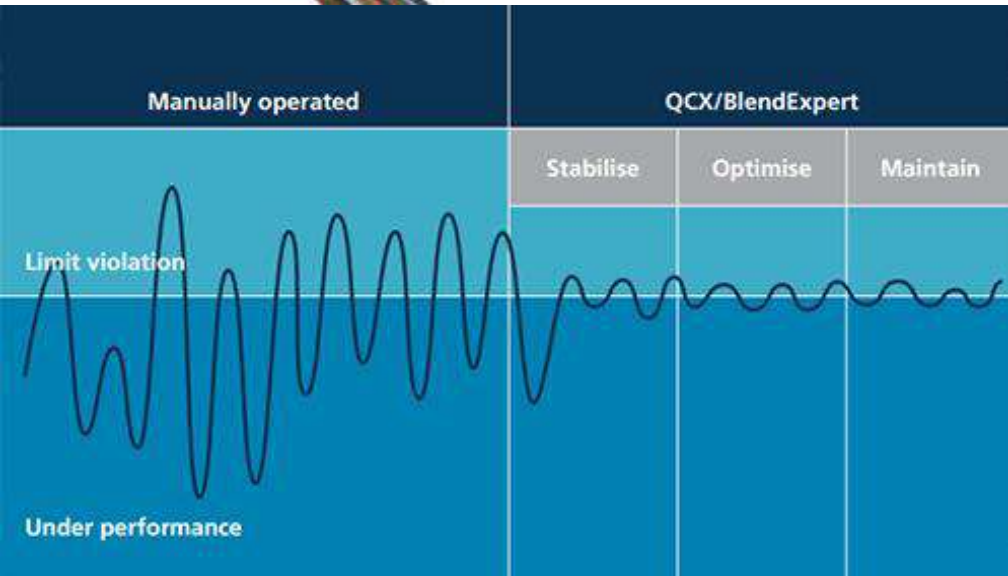




Enhanced productivity through automated material flow control

Example: FLSmidth BlendExpert Automation technology

- Applications supporting production optimization from quarry to cement
- Steady quality, lower fuel consumption and eliminated need for manual sampling/analysis
- Latest generation software based on experience from 700+ installations of quality control systems



FLSmidth's Operation & Maintenance (O&M) offering is a strong vehicle for Digitalisation



FLSmidth Operation & Maintenance

- FLSmidth has ongoing O&M operations in **10 production lines across 5 countries**
- We enjoy the possibility to **develop our Digitalisation offering in plants with O&M contracts**
- Data-driven productivity improvements are **already part of our O&M offering**

Data-driven productivity improvements are already part of FLSmidth's offering

Able to pull the right data from any business application...



Business applications

- FLSmidth-based business applications
- Other (external business applications)



Business Intelligence Platform

Data consolidation and reporting

- Preparation
- Analysis
- Visualisation / Dashboards
- Insight



Performance Management Platform

Preventive and Corrective actions

- Online support
- Improved performance

...FLSmidth's platforms can deliver easy access to key operational data and enable automated or remote action

FLSmidth Performance Management Platform enables automated and remote action

01

Preventive and Corrective actions from all plants



Knowledge sharing



Down time



Production & Quality



Predictive maintenance



HSE



Financials

02

Integrated process between sites, specialists, systems



Collaboration



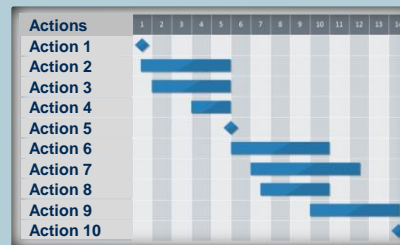
Task lists



Document centralization

03

Full management overview



Track progress on cases

FLSmidth is working on numerous potential technology applications for the future plant

Plant of the future



HoloLens

- Providing technicians with live video based support
- Augmented reality to support e.g. asset maintenance



Drones

- Automated stock pile measurement
- Site inspections
- Transportation of tools



Artificial Intelligence, AI

- Predictive maintenance without manual supervision
- Improved process control through machine learning



Mobile field service

- Create work orders on the fly via mobile devices



RFID/GPS tags

- Track location of employees in case of emergency
- Measure productivity on moving equipment e.g. trucks



IoT

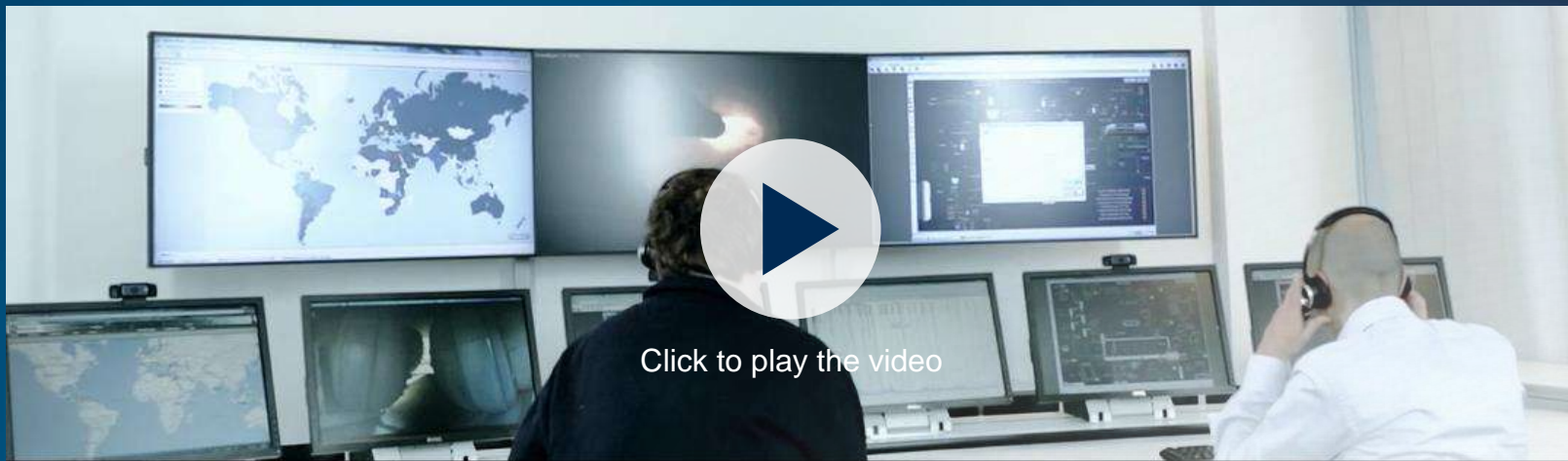
- Online equipment monitoring

Summary

- **Digitalisation is a key enabler of productivity enhancement**, which will grow FLSmidth's business
- FLSmidth is **fully engaged** on the digitalisation journey for a long time and **possesses the necessary competencies** to deliver it
- We are **already offering key automation technologies** that form the foundation of digitalisation and using our **O&M offering as a vehicle** to further develop it



FLSmidth Online Support Centre



Thank you



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flsmidth.com/youtube

21 June 2017

Manfred Schaffer, Group EVP, Minerals Division

Growth through innovation

Capital Market Day 2017



Innovation

Key element of productivity enhancements



Rapid Oxidative Leaching

Game-changer for copper and precious metal processing



Dry Stack Tailings

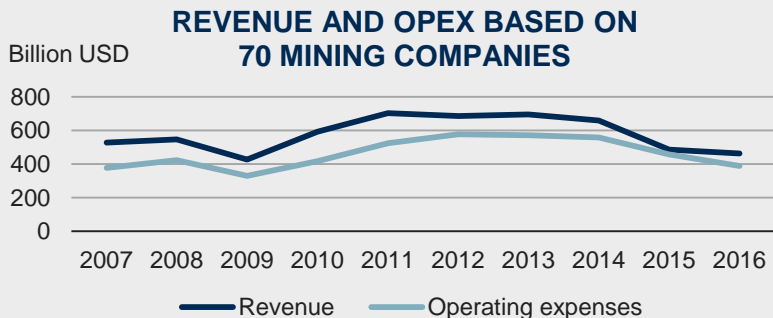
Future minerals processing with no tailings ponds/dams and recycled water



Summary & take-away

” We believe that even a small discovery can lead to a great deal more”

The need to improve productivity in mining and minerals processing



Charts source: Bloomberg

- With the mining industry's focus on maximising volume during the boom phase of the cycle, inefficiencies became embedded in operations
- When the cycle turned, the industry shifted its focus to cost-cutting and operational excellence
- The efforts of miners to cut costs in recent years have produced limited sustainable improvements as the majority of cost reductions are due to foreign exchange and the fall in energy prices
- Utilisation of mining equipment is still low compared to other industries
- With short-term gains already realised, the industry has to ask itself, where to go from here?
- Hurdle: When it comes to true innovation, everybody wants to be first to be second – could this change with productivity back on the agenda?

Innovation in FLSmidth



IN-HOUSE INNOVATION

- FLSmidth global technology centers
- Local product development
- Sophisticated laboratories and testing facilities in the USA, India and Denmark
- Fast commercialisation of new products and services
- Innovation in transformational technologies



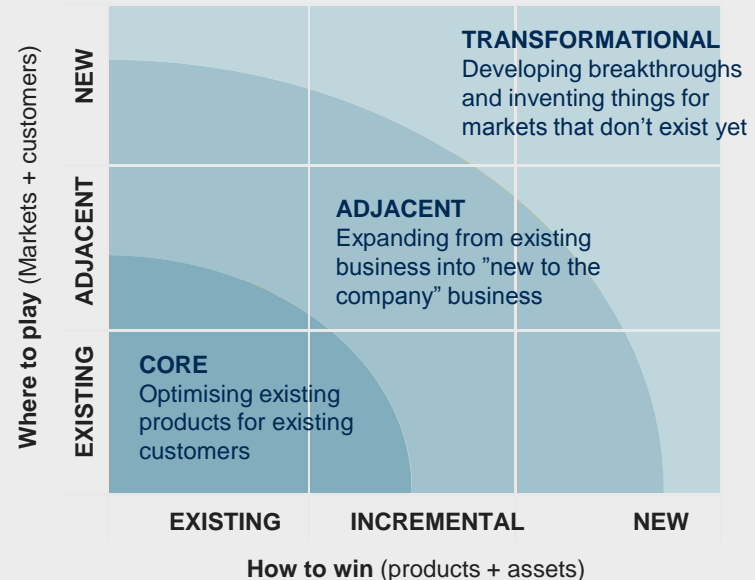
INNOVATION THROUGH PARTNERSHIP

- In-house focus on core business and partnering up if non-core technologies are needed
- Partnering in feasibility studies or pilot plant directly on site
- Strategic Partnerships:
 - Universities (DTU)
 - Technology Leaders: Haldor Topsøe, BASF, GE

Innovation – where to play

- FLSmidth is constantly pursuing innovation in the existing products, processes and markets
- But FLSmidth also looks for ways how our innovations can unleash the next wave of productivity
- We are now at a tipping point of making innovations in some areas that can deliver real, sustainable bottom-line value
- We are introducing transformative innovations that have the potential to significantly move the cost curve

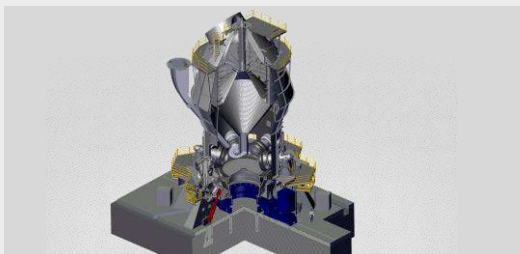
Innovation ambition levels



Source: Harvard Business Review

A glimpse at recent product developments

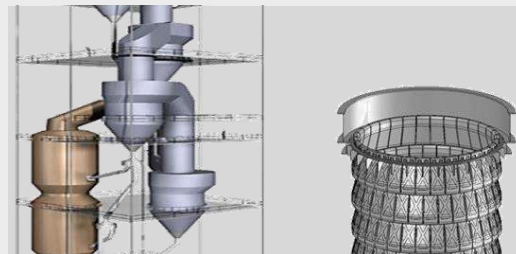
Optimising existing core products for higher efficiency, quality and performance



World's largest / most efficient cement mill



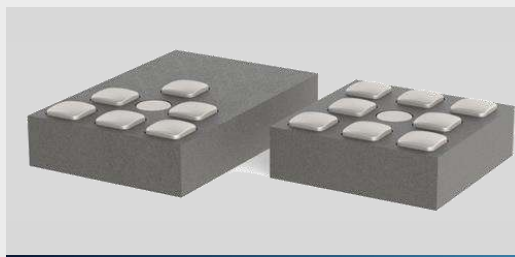
The SmartCyclone®



Superior dip tube material for preheater



millMAX-e™ high efficiency slurry pump



The FerroCer® Impact wear liner



FLSmidth® JETFLEX® burner



Transformational innovations

Dry Stack Tailings

- An end to tailings dams
- A step change in water management

Rapid Oxidative Leaching (ROL)

- A transformational solution to overcome the challenges of declining grades and impurities in ore bodies
- Winner in the global top 100 R&D awards

Dry stack Tailings

Saving costs and
improving safety

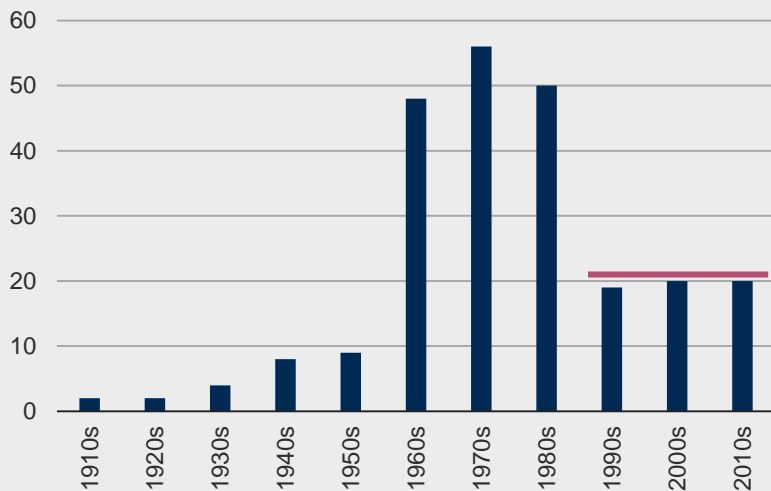


Tailings facilities

Risks and shortfalls

TAILINGS DAM FAILURES

Number of failures



Source: Waste CEO Technics, Tailings Dam Failures: A Review of the Last One Hundred Years



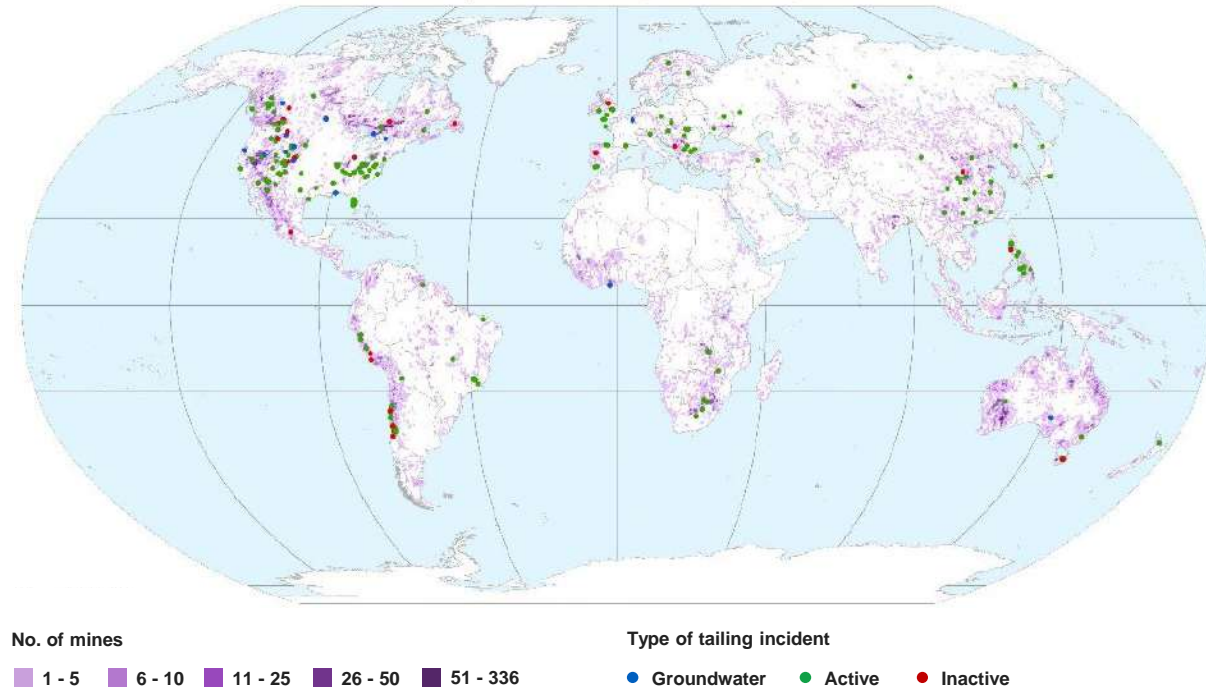
- On average 20 failures per decade over the last 30 years – no improvement
- 21 “very serious” failures of tailings ponds/dams in the past three decades
- Better technology will mitigate the risks, but not completely eliminate
- Large portion “force majeure” – type of events

Tailings accidents

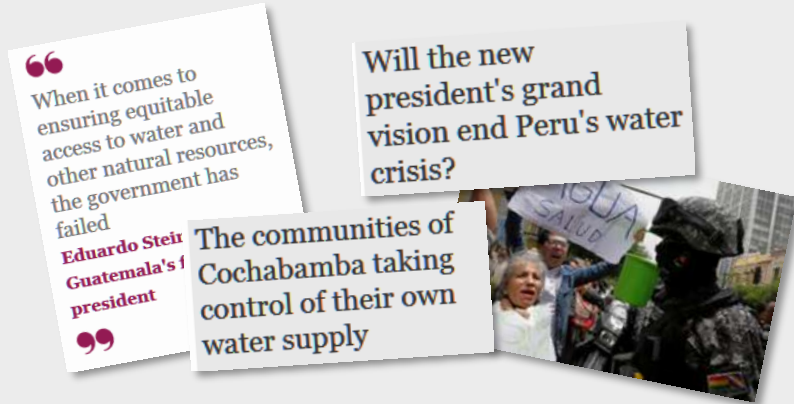
Tailings accidents are primarily caused by:

- Unusual weather (climate change)
- Management
- Foundation
- Slope instability
- Overtopping
- Seepage
- Etc...

Tailings incidents (1900-2016)



Water scarcity, access rights and costs



As water scarcity deepens, political instability grows (The Guardian-March 2017):

In Bolivia, Peru and Ecuador disputes over water shortages are part of a wider fight for equal access and shared responsibility

Average size concentrator with a capacity 100,000 tpd and a Water Ratio of 0.5-0.7 (Cyclone – High Rate Thickener) requires 50-70,000 m³ (50–70 million liter) of water per day

Many drivers toward filtered tailings

Land: Minimizing tailings management facility footprint – saving money

- Footprint is < 50% of a conventional TMF

Water reclamation => reduce dependency on external water supply and saving money

- Water can cost > USD 5/m³ (seawater desalination)

Reduction in closure costs at end of mine life – reduce liabilities (seepage)

- Progressive closure possible

Providing a “social license” to the mine

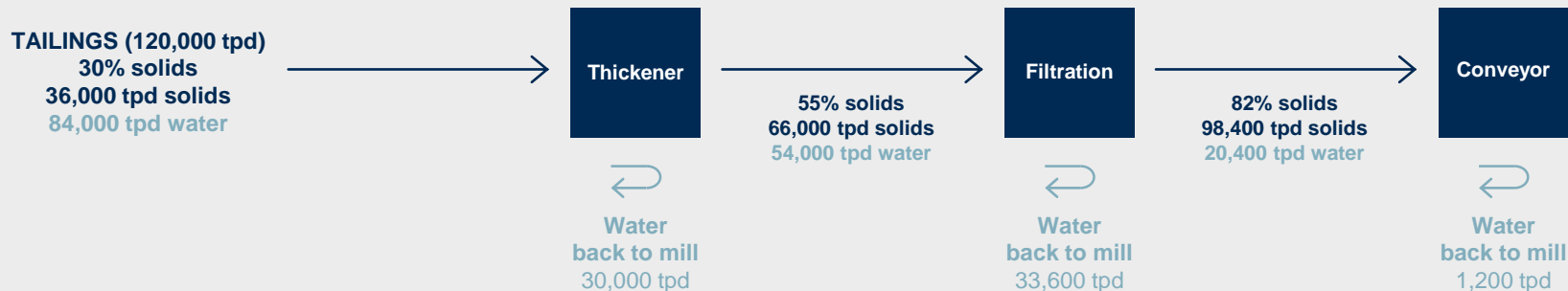
- Minimum environmental impact => quicker permitting possible

Reduced tailings risk – improving safety

- Avoid / remove water pool and dam prior to failure



Typical flotation tailings flow sheet



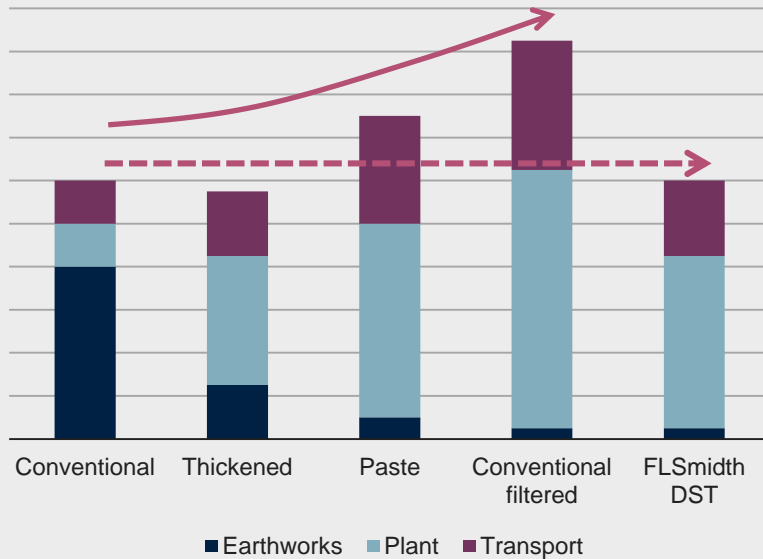
Size, tpd	Tailings dewatering description	Water ratio*	Makeup water (tpd)	Water cost per year (\$4/m3)
120,000	Cyclone sand dam	0.70	84,000	USD 107m
120,000	Filtered	0.17	20,400	USD 26m

Potential savings in water costs: USD 81m / year
Over 15 years mine life ~ USD 1.2 billion

*) Water ratio: required make-up water in m3 per ton of tailings

Competitiveness and addressable market potential

TAILINGS FACILITIES CAPEX



FLSmidth's filtered tailings solution will significantly reduce the CAPEX costs for the filter plant (size and filter media) and the transportation costs (mingling with overburden) and is cost competitive with conventional solutions

CAPEX

Assuming 1/3 of large tailings facilities (100,000 tpd class) converting to filtered solutions, the market potential is over **20 large scale filters (10-15% of total tailings market) with a CAPEX in excess of USD 1 billion over the next decade**

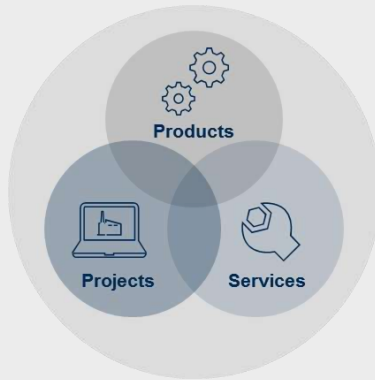
OPEX

The **consumables** from these filters have a market value of over **USD 100m per year**

FLSmidth is the one source for tailings solutions

Only OEM with complete equipment offering

- Thickeners - conventional to paste
- Filters - vacuum to high pressure filters
- Pumps, Hydro-cyclones
- Material handling - discharge and mobile stacking conveyors
- Flowsheet / processing competence
- R&D Strength & Partnering Culture



Dry Stack Tailings

Synchronizing market demand and solution development

Market interest for large scale DST

Early adaptors acceptance for large scale DST concepts

Market acceptance for large scale DST technology

Market demand for large scale DST solutions

2014–2015

Development of large filter solutions

2016–2017

Testing pilot plant and optimization

2018-2020

1st full-scale pilot & demo plant

2020-

Commercialisation and market penetration

- DST flowsheet studies
- Colossal filter plant development
- Prototype built
- Colossal™ trial operational
- R&D projects completed and commercialised
- Smaller traditional sized projects ready to start
- First Colossal™ large scale DST commercial operation
- Demonstration of new R&D projects / improvements in costs
- Continuous demand for large scale integrated DST project

FLSmidth Colossal™ automatic filter press demonstration plant

In final stages of process commissioning and trial operation

FLSmidth's goals

- Prove technology at scale
 - Prove large scale reliability
 - Obtain operational and performance data
 - Understand any material handling and stacking issues associated with large scale tailings filtration

Clients goals:

- Reduce risk
 - Complete a full-scale test program
 - Complete a cost/benefit analysis to compare the filtered tailings plant with alternatives



Partnership with Goldcorp for EcoTails solutions

TOWARDS ZERO WATER – ECO TAILS 15

Whole Tailings

Hi-Rate Thickener

Innovative Dewatering Device

Mine Waste Stream

CONVEYOR

GeoWaste

Water Recycled (65%)

Water Recycled (25%)

Water Recycled (1%)

>90% Water Recycled

- Low oxygen diffusion rates
- Reduced footprint
- Improved permitting timeline
- No wet tailings dam
- Early or progressive closure
- Reduced ARD potential
- Improved water recovery
- Improved geotech strength & permeability

What is EcoTails?

- An efficient, co-mingled filtered tailings and waste rock operation blended in transit
- The resulting co-mingled material is referred to as GeoWaste

How does it work?

- Tailings fill void space between rock particles to reduce opportunity for oxygen flow
- Reduced Acid Rock Drainage
- Coarse waste rock particles provide shear strength for physical stability

TOGETHER, CREATING SUSTAINABLE VALUE

GOLDCORP

The EcoTails concept developed in a partnership between Goldcorp and FLSmidth provides a fully integrated tailing solution by co-mingling waste rock and dry tailings

Slide from David Garofalo, CEO
GoldCorp, Keynote Mineral Exploration
Roundup January 2017

Dry Stack Tailings

Addresses main stakeholder concerns

Water usage / Management

Waste water management

Operational risks

Land reclamation

- ✓ Recirculation of >90% of the process water
- ✓ Elimination of the risks of catastrophic tailings flow when a dam (TSF) fails
- ✓ Safe stacking of tailings cakes even in areas of high seismic activity
- ✓ Retention of risk of groundwater contamination through seepage
- ✓ Reduction of storage footprint by 50% and enabling fast rehabilitation when approaching mine closure

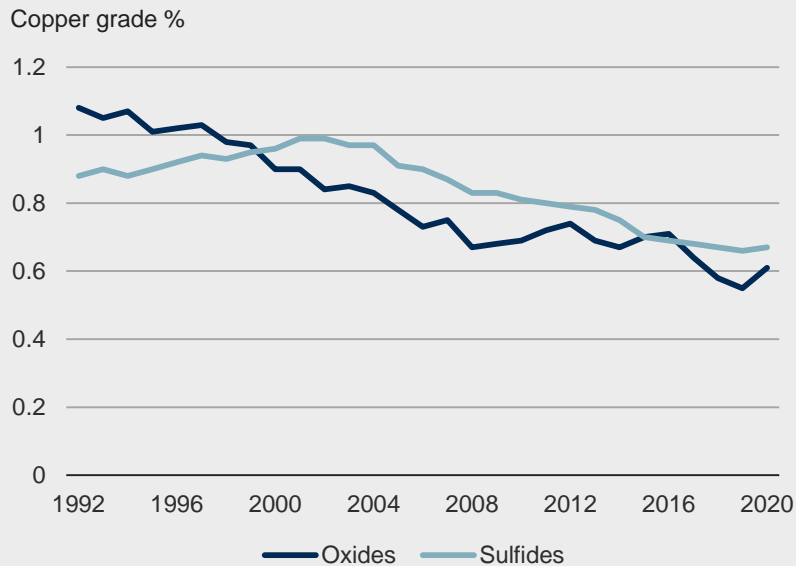


Rapid Oxidative Leaching – a game-changer for copper and precious metal processing

Customer challenge

Declining ore grades

COPPER GRADE

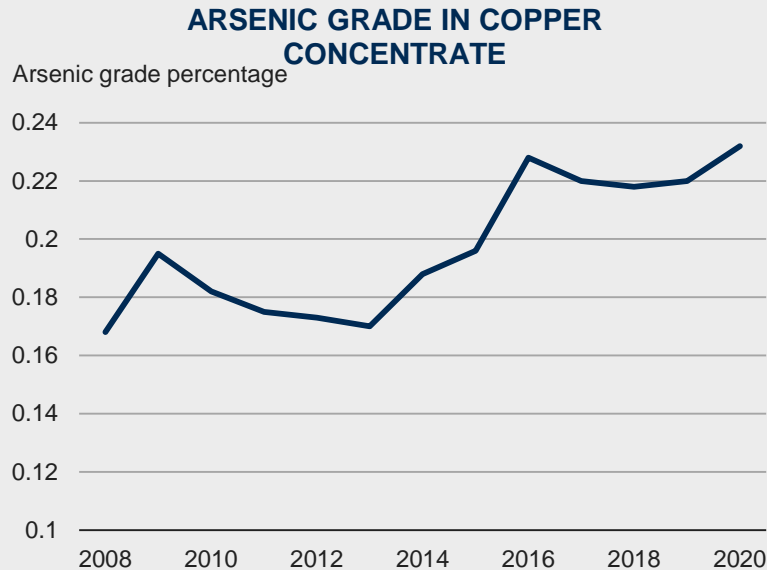


Source: EcoMetales/ICSG

- Existing ore bodies trending with lower grades
 - more complex ores to process
 - higher costs are diluting miners' revenue and the economic value of reserves
- Customers have to process lower grades/more complex/dirty ores => increasing OPEX over time

Customer challenge

Increasing impurities in concentrates



Source: EcoMetales/ICSG

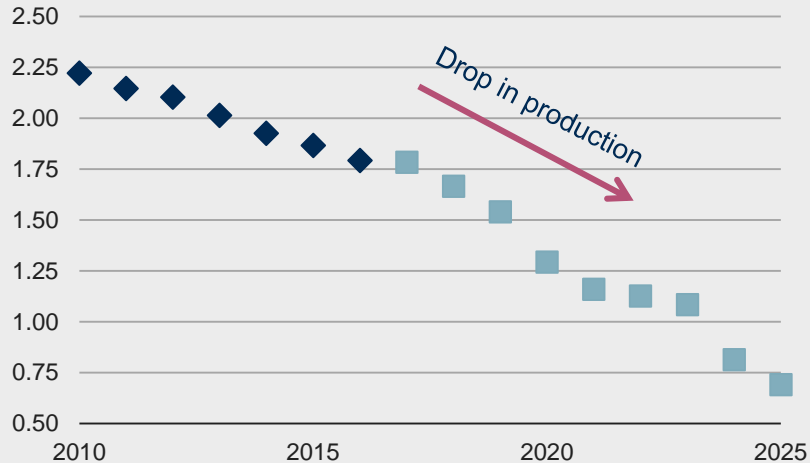
- Arsenic level in concentrates sent to smelters have increased from <0.15% to > 0.22% As
- Smelters' ability to take in materials with high arsenic levels is nearly at maximum
- Increasingly difficult to find new high quality ore bodies => new projects with higher grade ore bodies often contain arsenic
- License to operate will be challenged

Customer challenge

Economic stress in the transition from oxide to sulfide ore

SX-EW PRODUCTION - CHILE AND PERU

Cathode Production (mtpa)



Source: Wood Mackenzie Dec 2015

- Grade of oxide ore bodies dropping, with existing stockpiles depleted from years of operation
- Declining utilisation of fixed assets (Sx-EW) in transition period from oxide to sulfide ore (loss of production)
- Cash generation in transition period is critical to raise funding for concentrator to process sulfide ores

Existing (competing) hydromet technologies

Autoclaves

- Works at high temperatures and high pressures
- Heavy, complicated process machine due to extreme process conditions - High CAPEX and high OPEX

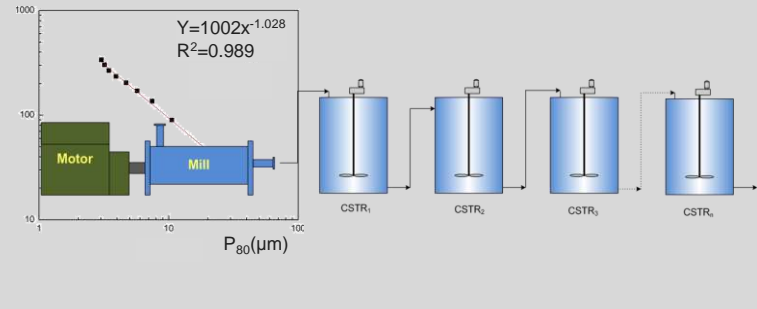
Ultra-fine grinding

- High energy input to pre-treat (<10 microns) prior to leach – and yet leach time remains long due to passivation

Catalytic leach systems

- Expensive catalysts (silver, activated carbon, etc), result in high OPEX, with complicated catalyst recovery
- Not yet commercialised (feasibility ?)

Specific milling energy input (kWh^t⁻¹)



FLSmidth Rapid Oxidative Leaching (ROL) technology

A Mechano-chemical approach mitigating passivation making it feasible to produce cathode copper on site:

1

Can process low grade concentrates without problems (7-20% copper content)

2

Leaches 97-99% copper in **6-8 hours**

3

No need for ultrafine grinding => **low OPEX**

4

Operates at atmospheric pressure and autogenously heated to 80°C => **low CAPEX/OPEX** compared to autoclaves.

5

Scalable from 5,000-100,000 tpa cathode copper

6

Integrates with existing SX-EW

7

Treats arsenic in Hydromet system – **no need for roasting or smelting**

8

Lower environmental impact

The uniqueness of ROL process

”Technology family“
patented and additional
patents pending

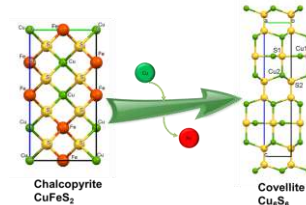
The challenge: During oxidative leach of chalcopyrite, a passivation layer is formed, which obstructs chemical reactions at the particle surface, inhibiting leach

The requirements: Overcome surface passivation reactions during oxidative dissolution - with low energy input

The key to success: Use of mechanical strain and mechanical energy to promote the chemical kinetics of the leach

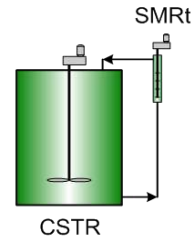
The two key steps:

- Step 1: A preconditioning activation step where the chalcopyrite concentrate is ‘doped’ with a small amount of copper in solution to destabilise the complex but stable structure, imparting **chemically induced mechanical strain** into the lattice structure
- Step 2: A gentle (low-energy) **mechanical abrasion** of the particle surfaces to remove the colloid films and allow unimpeded access of the oxidant to the mineral surfaces that are reacting



1

Preconditioning activation of
the chalcopyrite structure

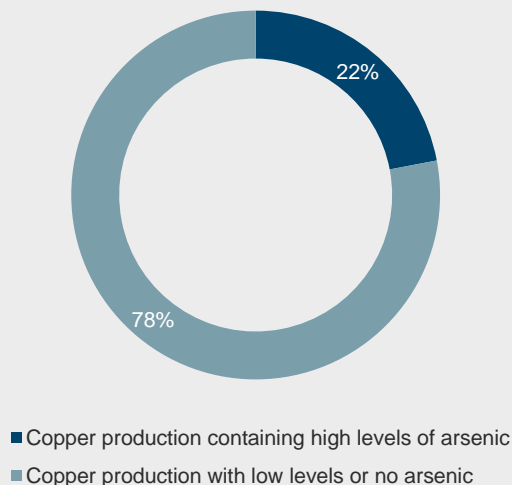


2

Mechano-chemical abrasion
of the particle surface

ROL market potential in copper

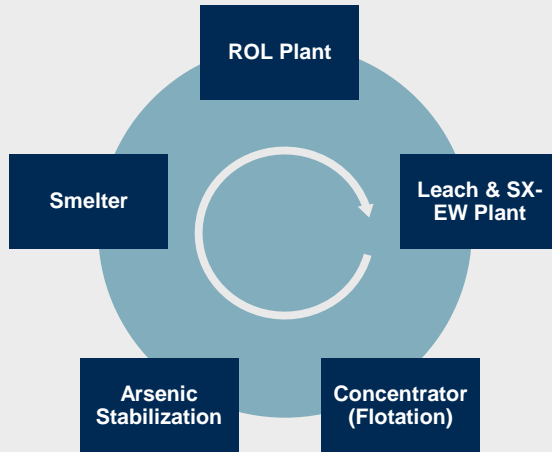
SHARE OF WORLD COPPER PRODUCTION CONTAINING ARSENIC



- ROL focuses on **chalcopyrite concentrates** which make up **~75% of the world copper supply**
- 1.5 million tpa copper from oxide to sulfide ore transition over next 10 years (*) corresponding to **7% of world copper production**
- Many ore bodies with **high arsenic not able to be processed** today, can be processed economically with ROL
- **Mines containing arsenic make up 4.5 million tpa copper (*)**
- With world copper mine production (in 2016) of 20.2 million tpa (ICSG), the **addressable market (CAPEX and OPEX) for ROL technology is > USD 20 billion**

*) Source: ICSG and Wood Mackenzie

Staged market penetration of ROL technology



ROL touches many processes of the copper production

Existing SX-EW plants (oxide)

Mines moving to more complex sulfide ores, continue SX-EW

Mines retrofitting concentrator operation to enable handling increase of low grade / complex ores

New mine development (two process streams)

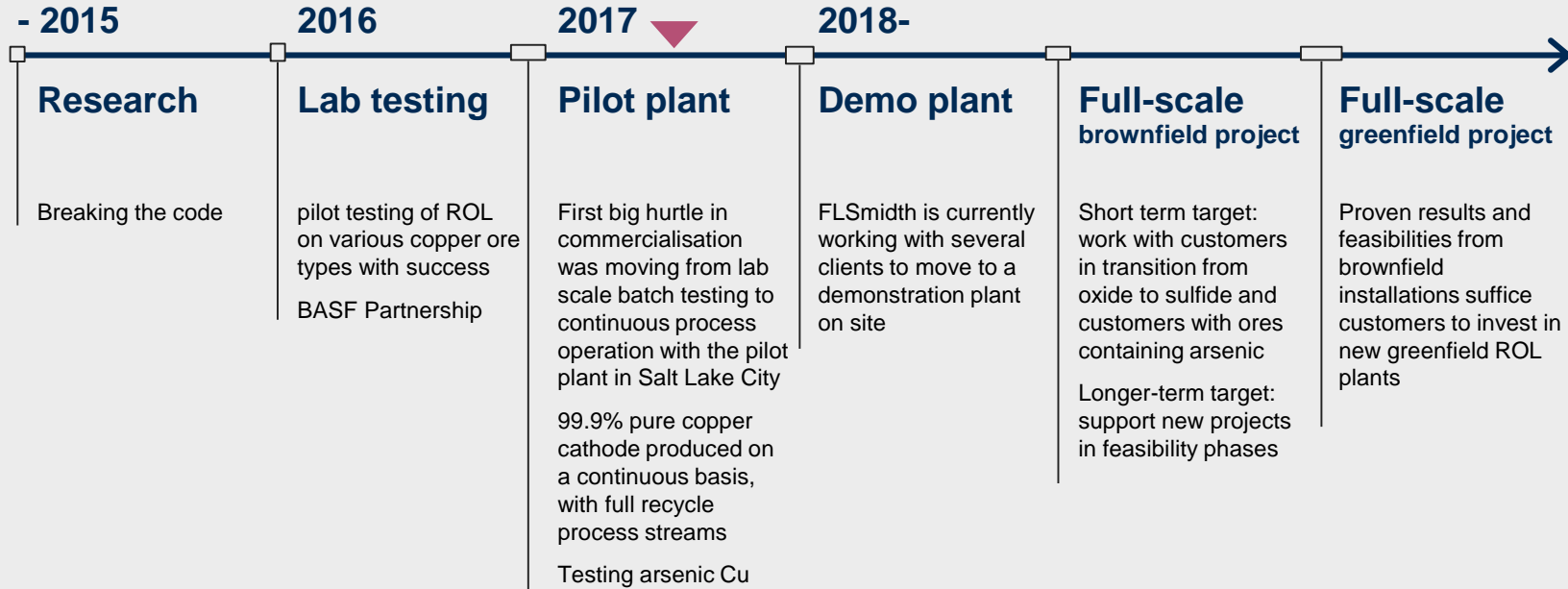
Retrofit ROL leach process to better utilise SX-EW assets at dropping ore grades

Retrofit ROL leach process to improve recovery and cleaner concentrates at dropping ore grades / increasing arsenic

Retrofit ROL in addition to existing concentrator process to better utilise assets at dropping ore grades

Install new ROL process for separate process stream handling lower grade and complex ores

Next steps in ROL commercialisation in copper



Opportunity: Refractory gold

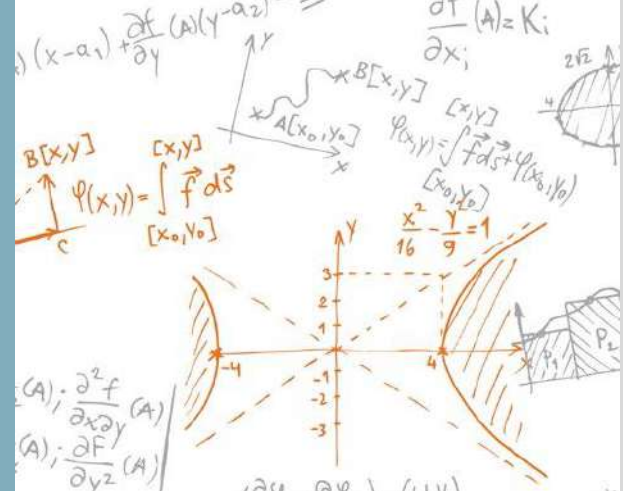
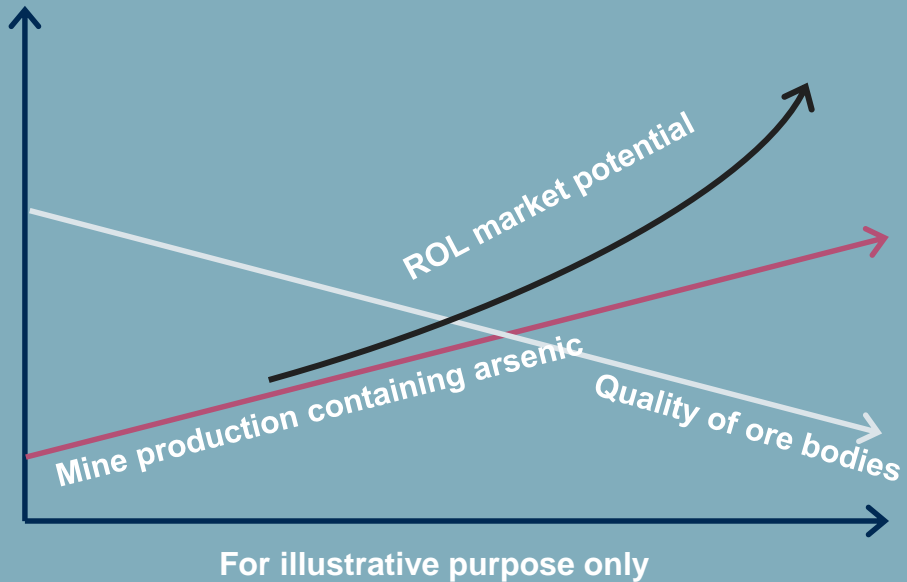
- ROL can represent a new low temperature, low pressure approach for the pretreatment of refractory gold ores and concentrates
- Potential to replace existing pre-treatment technologies (i.e. roasters, autoclaves, bioleaching).
- In early testing, the mechano-chemical pre-treatment approach shows great potential for processing refractory gold concentrates or whole ores.



Rapid Oxidative Leaching

The take-away

“Game-changer for copper and precious metal processing”





Summary and take-aways

- Environmentally and commercially attractive innovations
- Addresses declining economics of many mines
- Contribute to our vision of sustainable productivity enhancement

▪ Market Potential

Dry Stack Tailings

- Estimated addressable market of USD 200-300m per year (USD 100-200m CAPEX + USD 100m OPEX)

Rapid Oxidative Leaching (ROL)

- Addressable market is 20% of global copper market (CAPEX and OPEX USD 15-20bn per year) with estimated long-term potential for ROL in excess of USD 1bn per year

Thank you



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flsmidth.com/youtube

Backup slides

Translating the ROL technology highlights into customer benefits

1 Ability to process arsenic bearing concentrates on site

- Many new ore deposits have high arsenic levels
- Most smelters will not accept concentrates with >0.5% arsenic (ability for high AS is nearly at maximum)
- Options of blending good concentrates with high arsenic concentrates will be limited
- Smelter treatment costs and refining costs for concentrates with elevated AS is reducing profitability

2 Increase return on SX-EW assets

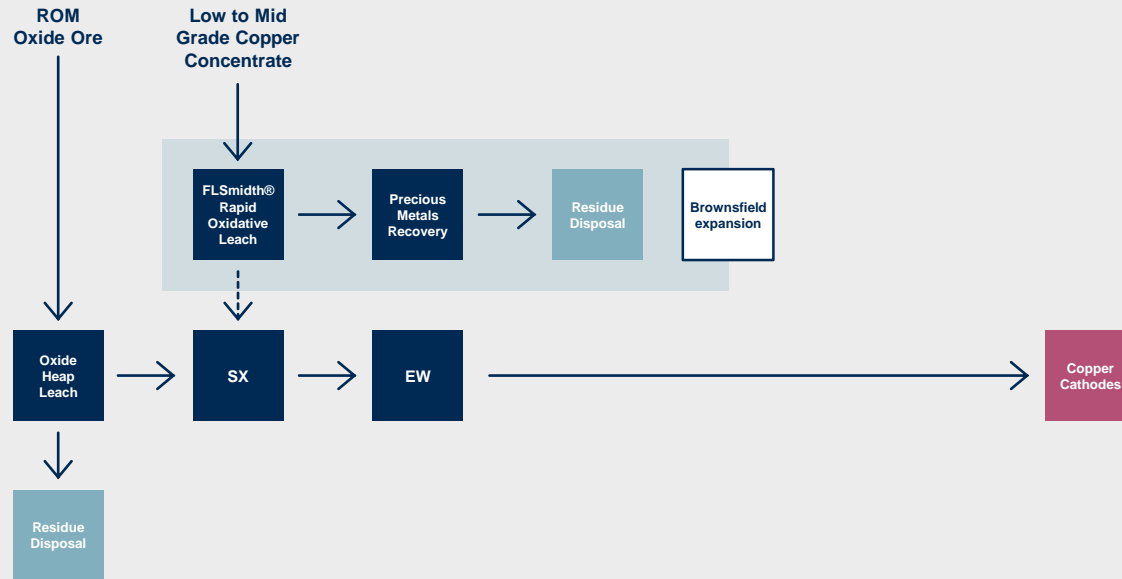
- SX-EW production is failing due to depletion of grade in existing heap leach operations
- Many mines are in transition from oxide to sulfide and transition can last several years
- Miners need to find a way to compensate for loss of production and utilise existing assets
- A brownfield retrofit solution will minimise disruption in operations

3 Process lower grade concentrates + recover other metals

- **ROL to maximise copper (or gold/silver) economic value of reserves** (ability to process lower grades)
- Obtaining 6-10% additional recovery by avoiding extra steps of flotation
- Recovery of other metals (zinc, lead etc.) that may be penalized by smelter can turn to revenue
- Ore reserves that were uneconomic to treat may be treated with ROL => increasing reserves

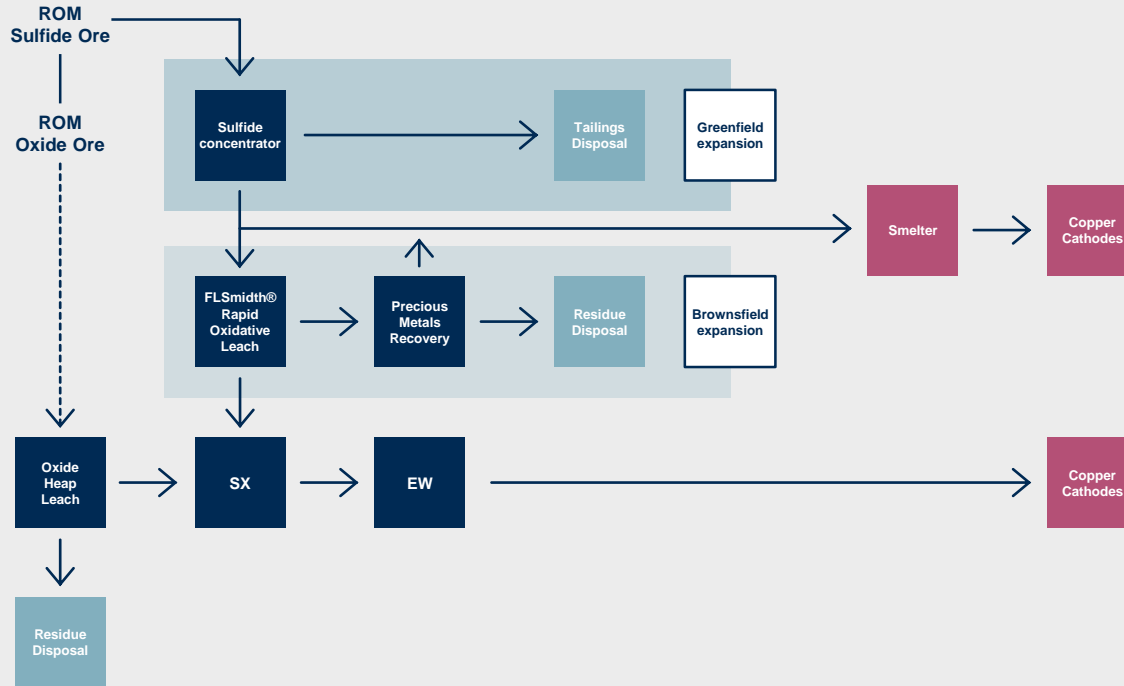
Existing Heal Leach with declining grade:

Maintaining Cathode production in existing Sx-Ew operations



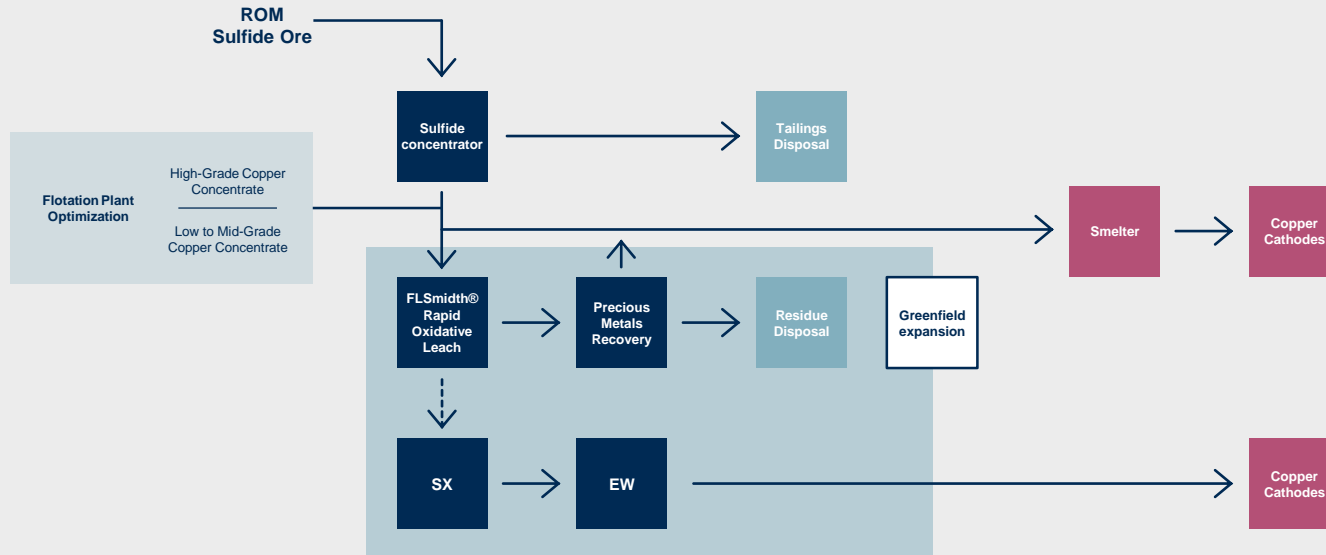
Transition from oxide to Sulfide Ore

Continue Sx-Ew Operation



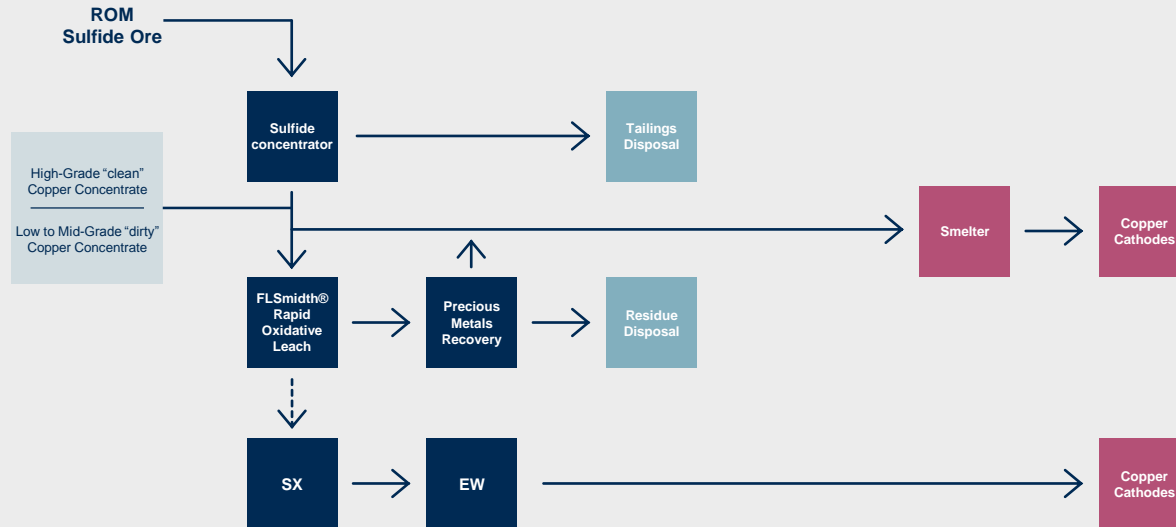
Existing Concentrator Lower Grade or Complex Ores

Concentrator operation for maximum revenue



New Project – Lower Grade or Complex Ores

Concentrator operation for maximum revenue



21 June 2017

Brian Day, Group EVP, Customer Services Division

Growth through life cycle management

Capital Market Day 2017



Life cycle management

Delivering the lowest total cost of ownership (TCO)



CAPEX

- Flow sheet optimisation
- Building and construction
- Key products

~25%

+



OPEX

- Maintenance/outages
- Parts and services
- Retrofits and upgrades

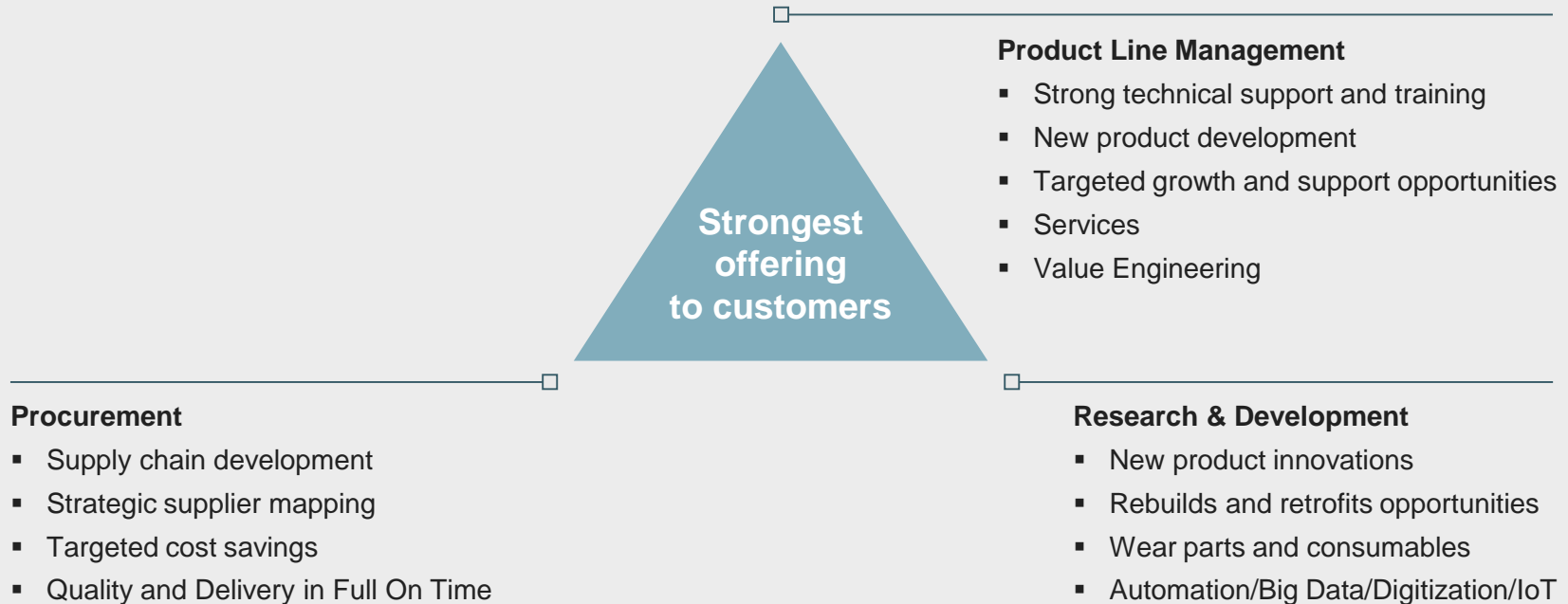
~75%

=

Total cost of ownership

Our product line management setup

ensures full product life cycle perspective across divisions/BUs





Growth through life cycle management

Strategic ambition

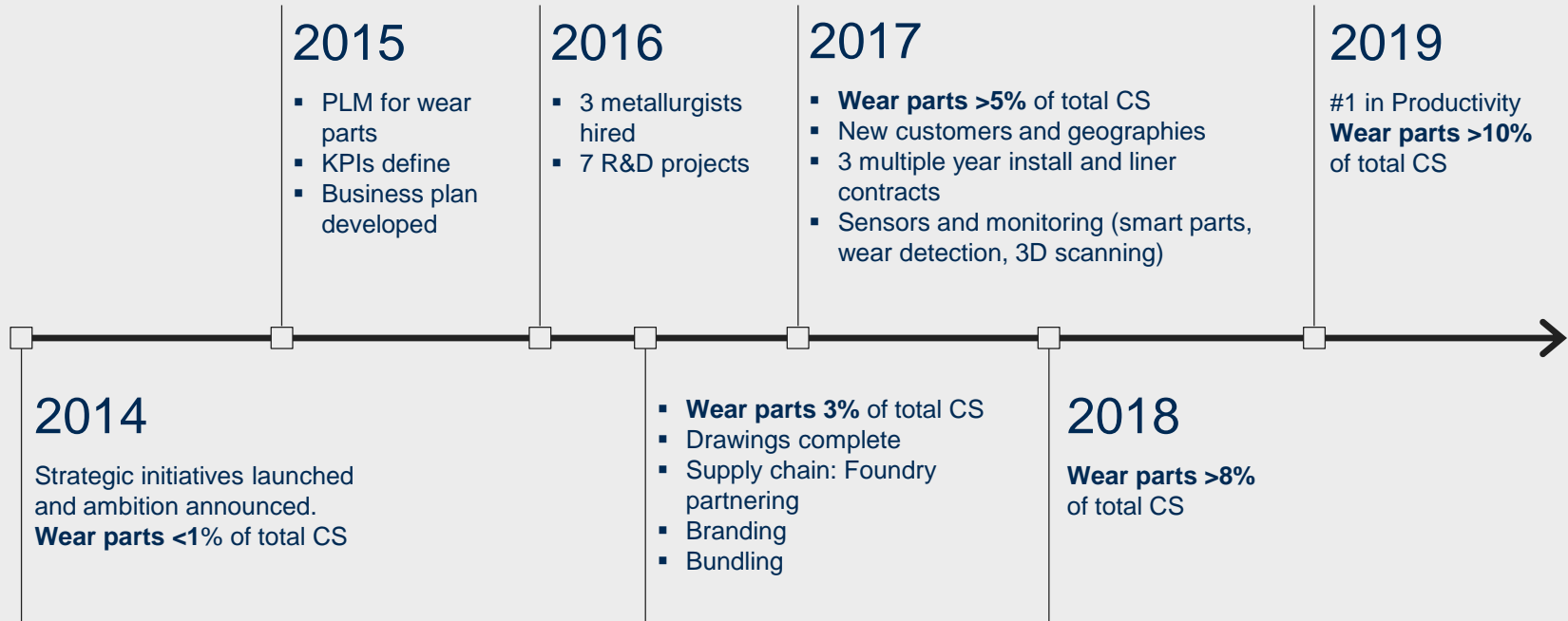
Productivity provider #1

- Best in class in maximizing customers' return on assets
- Strongest business partner for life cycle services
 - Support installed base
 - Product line management
 - Value adding spare & wear parts
 - Upgrades and retrofits
 - Maintenance contracts
 - *Grow wear parts to >10% of Customer Services*
- Leading edge in advanced technologies
 - Digitalisation
 - Smart parts

OPEX (aftermarket) related business opportunities in the cement and mining industries

	Spare parts	Wear parts	Maintenance	Services	Upgrades/ Rebuilds
Share of total service activities today	~55%	~5%	~10%	~20%	~10%
Examples of products /services	<ul style="list-style-type: none"> ▪ Mill shells ▪ Thickener drives ▪ Girth gears 	<ul style="list-style-type: none"> ▪ Mill liners ▪ Screen media ▪ Filter media 	<ul style="list-style-type: none"> ▪ Support to plant operations ▪ Predictive maintenance ▪ Scheduled outages 	<ul style="list-style-type: none"> ▪ Mechanical check-out ▪ Commissioning ▪ Plant audits ▪ Trouble-shooting 	<ul style="list-style-type: none"> ▪ Improved design / performance ▪ R&D projects in cooperation with customers
Other peers:		~50%			

Grow wear parts to >10% of Customer Services



Wear parts and consumable products

**Available
market**

(based on installed
base only)

> USD 5bn



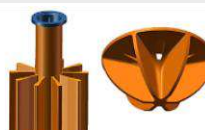
Crushing

Primary and
secondary liners



Grinding

Mill liners, trommel
frames, screen media,
tables and roller segments



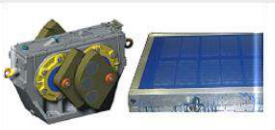
Flotation

Rotors, stators and
hood sectors



Centrifugation

Wedge wire baskets,
wet end wear part



Screening

Screen panels,
feed box liners



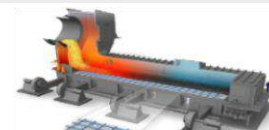
Filtration

Filter media,
plates & sectors



Gold Processing

Wedge wire intertank
screens, carbon
retention, cones

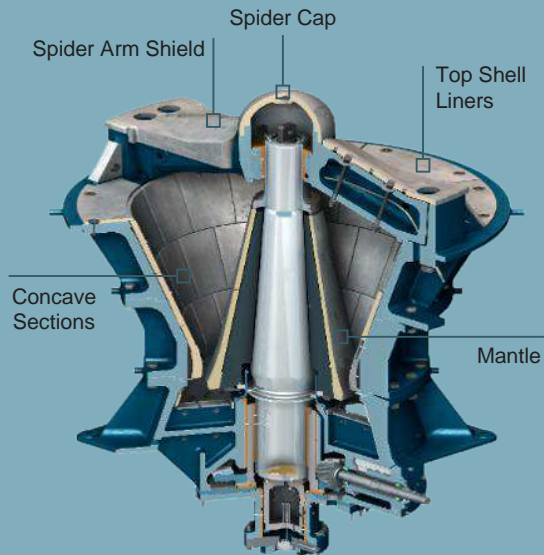


Coolers

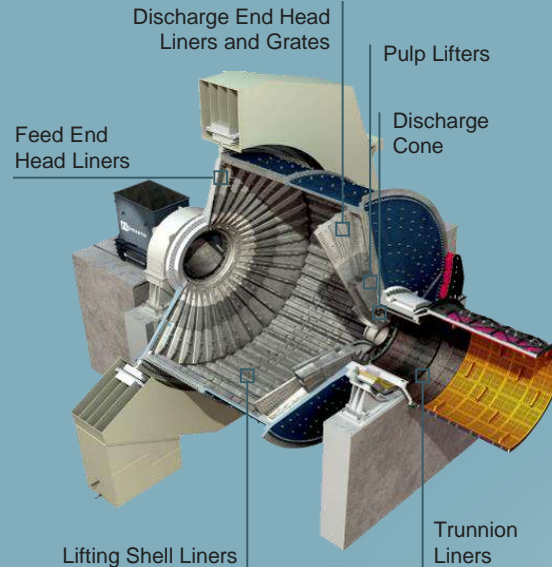
Grates

Crushing and Milling

Enhancing productivity through customised offering



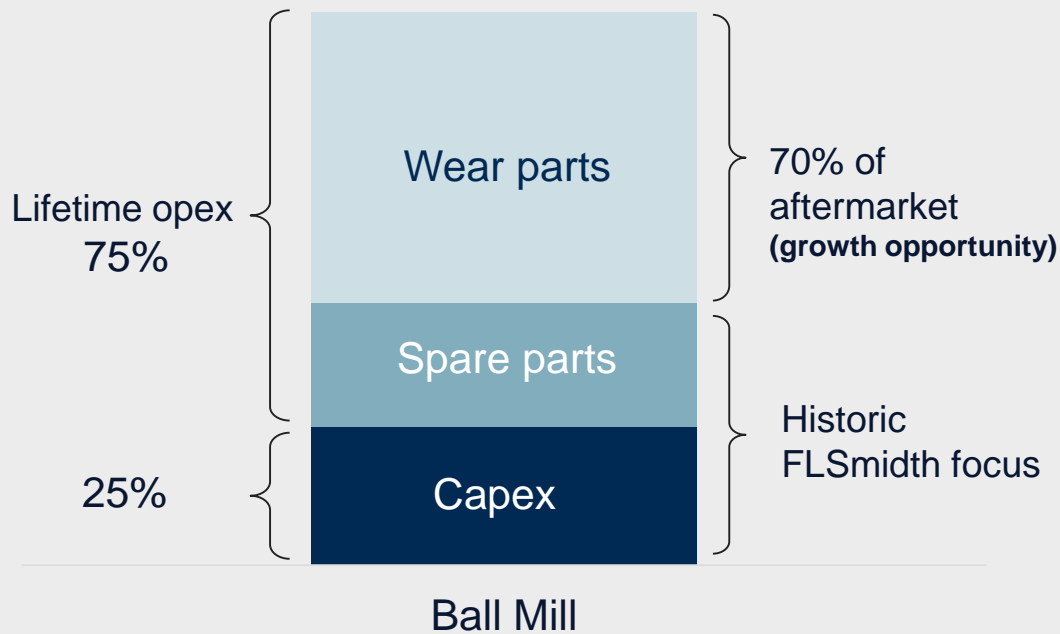
Gyrotory Crusher



Ball Mill

- Bundled offering
- Process optimization
 - Upstream and downstream
- Supply chain flexibility
- Increased throughput
- Customised liner geometry
- Composites
 - Reduced weight, transportation costs and increased safety
- Predictive maintenance
 - Monitoring and sensors

Wear parts potential in milling



Lifetime spend on Ball Mills for a typical copper concentrator
> DKK 300m

Different types of wear and applicable technologies

	Abrasive wear	Erosive wear	High pressure wear	Impact wear	Sliding wear	High temperature wear
Products impacted (examples)	Mills	Pumps	Crushers	Crushers/mills	Chutes/screens	Coolers/kilns
Available technologies (examples)	<ul style="list-style-type: none"> ▪ Hard-facing ▪ Sinter-cast ▪ Hi-Cr casting ▪ Studded surface ▪ Spin-casting 	<ul style="list-style-type: none"> ▪ Hard-facing ▪ Ceramics ▪ PTA welding ▪ Hybrid alloys 	<ul style="list-style-type: none"> ▪ Manganese & Cr-Moly steel ▪ Tungsten carbides ▪ Smart sensors ▪ Composite alloys 	<ul style="list-style-type: none"> ▪ Manganese & Cr-Moly steel ▪ Composite alloys ▪ FerroCer 	<ul style="list-style-type: none"> ▪ Polymers ▪ Tempered steel ▪ Hard-facing ▪ PTA welding ▪ FerroCer 	<ul style="list-style-type: none"> ▪ Spec. casting ▪ Mortars ▪ Hard-facing ▪ Cobalt PTA welding ▪ HVOF thermal spray

Wear part product development: FerroCer® impact panels

Delivering enhanced predictable productivity



Click to play the video

Previous liner wear life:
2-3 weeks

FerroCer® wear life:
>10 times longer



Life cycle management

Partnering with customers as a trusted advisor

Improved productivity

- Higher availability and throughput
- Predictive maintenance and planning
- Better parts and resource forecasting
- Lower total costs of ownership

Enhanced sustainability

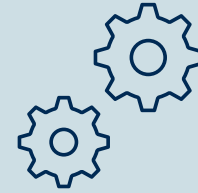
- Safety
- Water
- Energy
- Emissions

Wear parts

- A missing link in customer relation
- An untapped growth potential



Asset Mapping



Parts



Financial Modeling



Maintenance

21 June 2017

Capital Market Day 2017

Growth through key products

Market-leading products with unique growth potential

Growth levers:

- Geographical expansion
- Adjacent industries
- Extended service offerings



**FLSmidth
Feeders**



**FLSmidth
Pumps and
cyclones**



**FLSmidth
Gears**



**FLSmidth
Sizers**



**FLSmidth
Air pollution
control**



**FLSmidth
Automation**



**FLSmidth
Pneumatic
transport and
feeding**



**FLSmidth
Dosing**



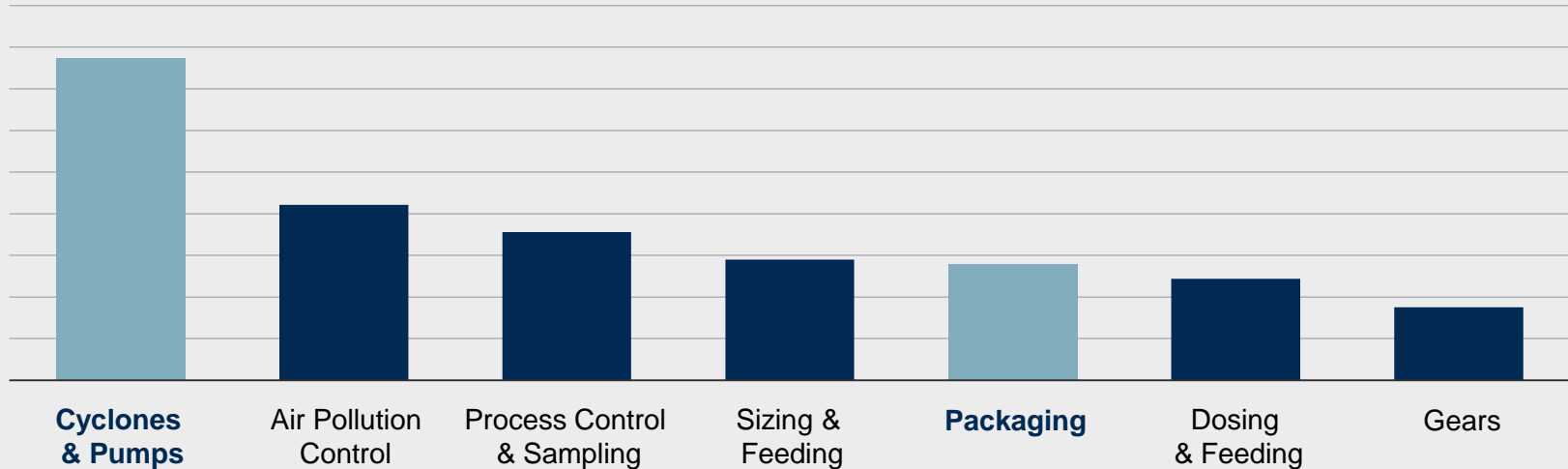
**FLSmidth
Packaging**

Products in focus today

Two strong business areas with interesting growth opportunities

REVENUE BY APPLICATION

Varying in size and profitability
Strong market position in niches (most are #1 or #2)



Thank you



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flsmidth.com/youtube

20 June 2017

Pat Turner, President FLSmidth Krebs

Pumps and Cyclones

Capital Market Day 2017

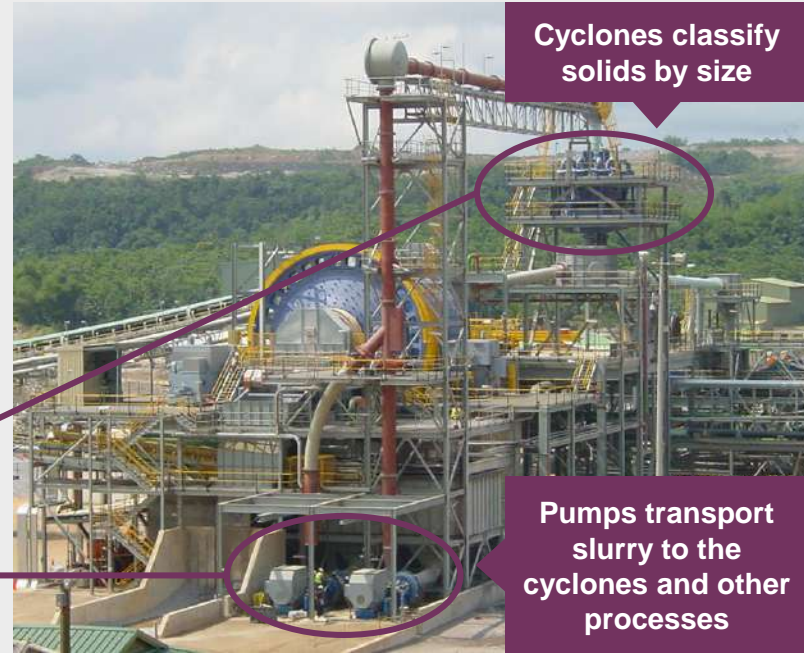
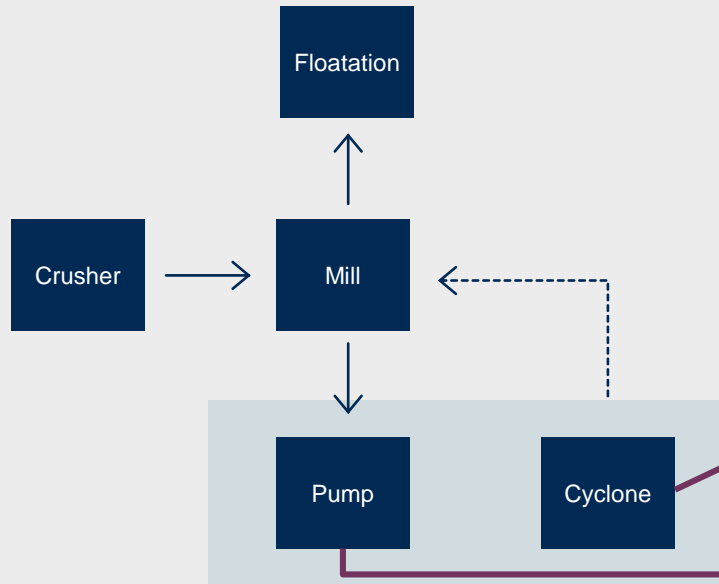


Pumps and Cyclones in a nutshell

- World leader in cyclones, strong player in slurry pumps
- Critical equipment for productivity in minerals and other industrial processes
- A large and profitable market, driven by service and aftermarket parts business
- Growth opportunities in
 - adjacent markets with cyclones
 - growing market share in pumps through improving productivity and geographical coverage



Pumps and Cyclones are critical equipment for mineral processing, coal, fertilizer, and other industry flowsheets





Pumps move high volumes of dense slurries with coarse solids – the “heart(s)” of a plant

- Pumps range in suction diameter (= pipe diameter) from 50 to 850 mm
- A pump costs between DKK 35,000 and 2.5m
- Our largest pump will **fill a 50-meter Olympic swimming pool in 15 minutes**, a garden hose would take 2-3 months
- Abrasive slurries create **high wear in the pump interior** – common for yearly **parts costs to equal 50% of original capital cost**
- Pump design to **increase wear life** of parts while maintaining **pumping efficiency**

Cyclones classify solids and help determine overall process efficiency and recovery



Cyclones



Mixing wear materials extends cyclone life

- Directly **affects recovery rates in mineral processing plants** by keeping coarse solids out of flotation / leach recovery step
- Cyclone sizes range from 12 to 2,200 mm and are bundled in manifolds with 4 to 20 cyclones typically in one manifold.
- **Optimizes mill power**, performance highly dependent upon patented gMAX geometry
- Yearly **spare parts can reach 25% of original capital** cost in primary applications
- **Long even wear life** important to our customers

Pumps and Cyclones are a large, profitable, and growing market segment



High Pressure Pump Train



Ball Mill, Pumps and Manifolds

- Lower grades and dropping commodity prices has driven a **focus on improving productivity**
- Pumps and Cyclones are purchased as part of each capital project but are **easily replaced in existing operations**
- A typical site will have
 - 15 – 50 pumps
 - 25 – 100 cyclones
- **High wear** – production levels drive aftermarket business
- Pump and Cyclone **replacement business is driven by productivity enhancements**



5 super centers,
35 service centers

Main competitors:

- Weir Minerals
- GIW
- Metso

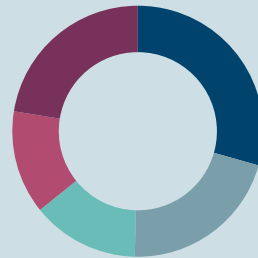


Market leader in Cyclones



Strong contender in Pumps

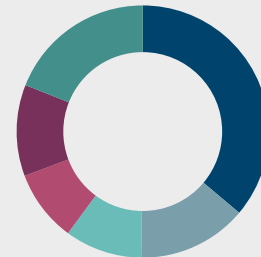
TOTAL REVENUE BY REGION



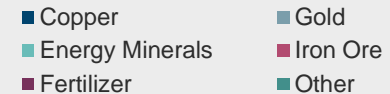
Even
worldwide
distribution

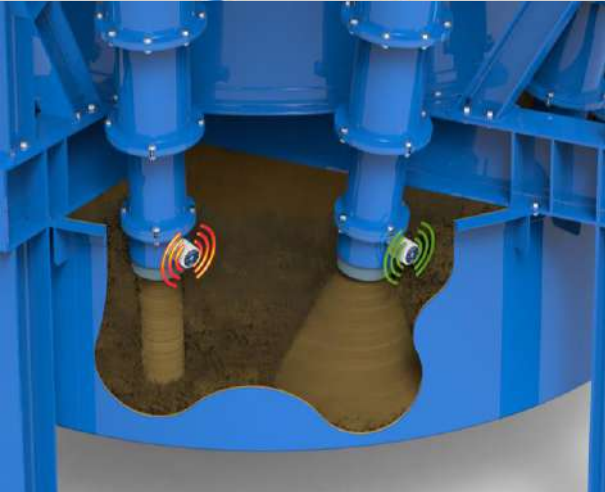


TOTAL REVENUE BY INDUSTRY



Strong
cyclone
adjacency
revenue





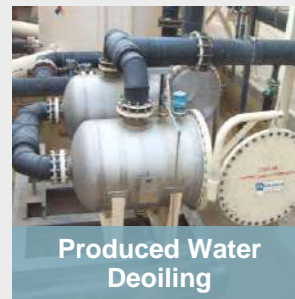
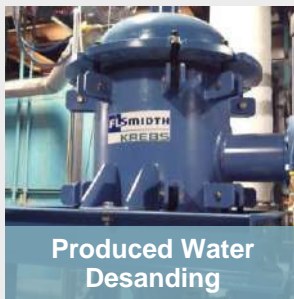
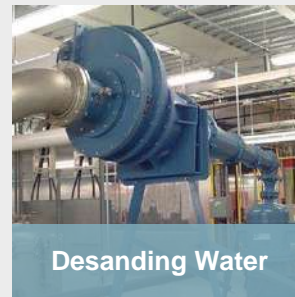
Growth through Productivity: SmartCyclone™

- Leader in **wireless smart condition monitoring**
- Proprietary SmartCyclone sensors measure acoustics to indicate proper cyclone operation and provide **real time wear indication**
- Combined with FLSmidth automation software, SmartCyclone **facilitates corrective action**
- **Increases mineral recovery and uptime** and process optimization
- One upset event can cost millions of DKK in potential downtime and maintenance

Further growth opportunities for Cyclones exist in adjacent markets

Strong capital opportunities

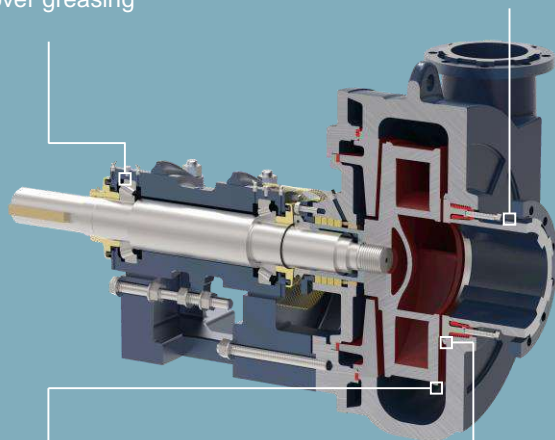
- Chemical Refineries
- Upstream Oil & Gas
- Power plants – FGD Process
- Pulp & Paper
- Automotive
- Water treatment
- Soil remediation
- Plastic recycling



Growth through Productivity: constant pump innovation

Self Purging Bearings
easy maintenance &
eliminates bearing failures due
to over greasing

Safe & Easy
suction side clearance adjustment
while pump is in operation



Wide Clearance between
impeller and suction side
eliminates mechanical
grinding of solids

Proprietary Wear Ring
– designed to eliminate suction
side recirculation

FLSmidth provides:

- **Long predictable wear life**
Predictable life means matching the pumps to the mill maintenance cycle and then extending the mill cycle
- **Energy efficiency**
Higher pumping efficiency reduces power consumption and/or allows pumping greater volumes with the same motor size
- **Safety**
Easy pump adjustments and maintenance
- **Quick reliable spare parts availability**
Provided through FLSmidth CS Super Centers and Service Centers



FLSmidth is well positioned to grow pump market share

Biggest opportunities in high tonnage plants

Copper

Gold

Iron Ore

Coal

- Leverage **near-term market growth** in Copper and Gold
- Increase **market coverage** together with **FLSmidth** organization

Opportunities where pumps are a major part of the process:

Oil Sands

Alumina

Phosphates

Industry Minerals

Pumps and Cyclones in a nutshell

- World leader in cyclones, strong player in slurry pumps
- Critical equipment for productivity in minerals and other industrial processes
- A large and profitable market, driven by service and aftermarket parts business
- Growth opportunities in
 - adjacent markets with cyclones
 - growing market share in pumps through improving productivity and geographical coverage
- Additional 5-6% growth above market reachable



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21 June 2017

Francesco Ferrandico, President FLSmidth Ventomatic

Cement packaging



Capital Market Day 2017

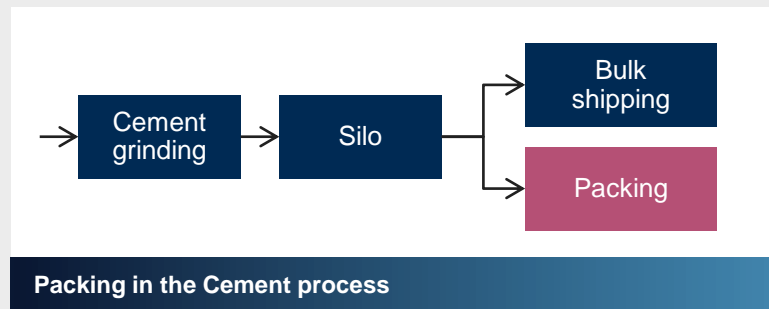
FLSMIDTH

FLSmidth Ventomatic in a nutshell

- **World leader in Cement packaging** – strong reputation in fully automatic packing and dispatching lines
- **Innovative product range** composed of equipment developed in the last 5 years
- Growth opportunities through
 - **Increasing productivity in our core market** – more automation, upgrades of existing facilities, and innovative service models
 - **Entering adjacent growth markets** based on our strengths, e.g. building materials, fertilizer and petrochemicals



Cement bags are a common way of distribution in the industry



- Bags are a **common way of distribution in developing countries**, where up to 45% of cement (up to 60% in India) is shipped in bags
- **Packing plants** are part of full cement production lines, but also grinding stations or cement terminals
- A **cement bag usually weighs 50kg**, a single packing line produces up to **15 million bags per year**
- The industry trends towards **increasing safety and productivity** trigger need for **upgrades**

Cement packing of the past **dangerous, hazardous and labor-intense**



Packing plants have evolved into complex, fully automated operations



Compact packing plant



Full-scale packing plant

- **Packing plants** consist of 2 – 8 packing lines (depending on level of automation)
- **Packing lines** cost DKK 3m – 11m and produce on average 2.800 50kg bags/hour or >15 million bags p.a.
- Full **automation reduces required manpower per shift from 12 to 2** when going from complete manual to automation packing – with the same output

FLSmidth Ventomatic provides the key product types and integrates them for fully automated packing plants



Electronic rotary and inline packers

Equipment for filling bulk cement from silos into bags with high weight accuracy and an output from 60 tons/h up to 250 tons/h



Empty bag applicators

Advanced machine for automatically placing various types of empty bags on packers with speed from 600 bags/h up to 6,000 bags/h



Palletizing systems

Receiving full bags (from 25 kg to 50 kg) from packer and forming bags into pallets of different layers. Pallet weight goes from 0,5 tons to 2 tons



Loaders for closed trucks/containers

First full automatic pallet loading system in the market for closed trucks and containers

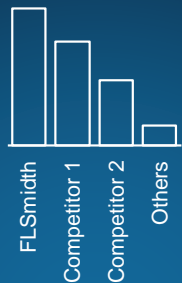
Significant increase of safety level and productivity (no fork lifts and relevant operators)



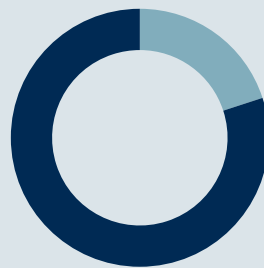
Loaders for open top trucks

Receiving full bags from packers and loading directly into open top trucks from the top

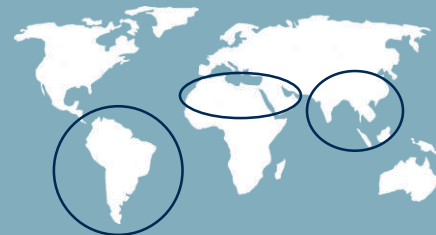
FLSmidth Ventomatic's product range composed of equipment developed in the last 5 years



SALES BY CUSTOMER GROUP



■ FLSmidth ■ Others



Core markets
with strong positioning

FLSmidth
Ventomatic is the
leading brand in
Cement packing



Significant share
of business with
Chinese Design Institutes
for international projects



Main growth levers
Productivity in Cement
Improve geographical coverage
Adjacent markets

Ventomatic is well-positioned to grow in the Cement market

Market trends and productivity requirements

Increase output of existing lines

Improve health and safety

Reduce manpower

Reduce power consumption

Reduce truck waiting time

Reduce inventory (bags on stock)

High capacity and flexibility

Full automation

Innovative logistic solutions

Service and aftermarket offering

Growth through Productivity: CARICATECH™ automatic truck loader

- Innovative development for loading **all type of bags on all kind of trucks**
- Bag layers are picked up by a fork with a special roller way (no vacuum system required) while maintaining the traditional loading from the top
- Addresses trend of **productivity improvements through automation** in developing markets
- CARICATECH™ replaces existing loading equipment without major process changes or rebuilds - targeting **upgrades of existing packing lines**



We are targeting several adjacent industries with significant growth potential



Building Materials

- Familiar packing process, different types of powders and mix
- Cleaning, bag accuracy and automation are key selling points

Market size:

0.3 x Cement



Petrochemical

- Different packing process
- Request for higher capacity and integrated solutions
- Strong market growth

1 x Cement

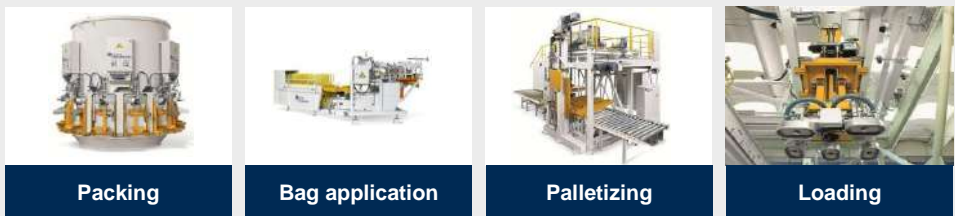


Fertilizers

- Different packing process
- Open for innovative solutions for truck and wagon loadings
- Focus on logistic: how to deliver bags in a better way
- Strong market growth

1.5 x Cement

We leverage our strengths to succeed in adjacent markets



	Packing	Bag application	Palletizing	Loading
Cement	+	+	+	+
Building Materials	+	+	+	+
Fertilizer	Different process requires development of product range		+	+
Petrochemical	Different process requires development of product range		+	+

Palletizing and loading are strongholds of FLSmidth Ventomatic – existing technology can be transferred



FLSMIDTH
VENTOMATIC
1957-2017



FLSmidth Ventomatic in a nutshell

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 - **Entering adjacent growth markets** based on our strengths, e.g. building materials, fertilizer and petrochemicals
- **Additional 3-5% growth** above market reachable

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21 June 2017

Thomas Schulz, Group CEO

Growth through Productivity

Capital Market Day 2017



Growth through Productivity

- Markets are entering **cyclical recovery**
- **Productivity is the driver** for the next cycle(s)
- **FLSmidth** has **managed the cycle** and is **prepared for sustainable profitable growth**
- We are **Productivity Provider #1** – a core competence rooted in our business model
- **Key productivity-based growth levers** are
 - Digitalization
 - Innovation
 - Life cycle management
 - Key products

Key productivity-based growth levers

Summary of today's presentations



An **enabler** to be
Productivity Provider #1



Dry stack tailings addressable market of USD 200-300m p.a.

ROL estimated long-term potential >USD 1bn p.a.



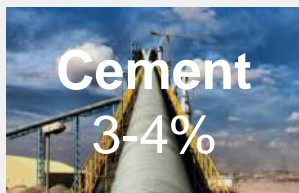
Addressable market for **wear parts** and **consumables**
> USD 5bn p.a.



Additional 3-6% growth by extending **geographical coverage** and entering **adjacent markets**

Growth and EBITA margin levers related to topics presented today

Structural growth
in our industries



Growth rates
per annum over
the cycle

Self-initiated growth opportunities
through key levers presented today

Cement
+2-3%

- **Digitalization** as the foundation for productivity
- **Innovation** to address complexity of operations
- Increased coverage of the **product life cycle**

Mining
+3-4%

- **Globalizing** market-leading **products**

EBITA margin improvement
through **operating leverage** and **procurement savings**

ROCE >20%
requires¹

EBITA > DKK 3bn

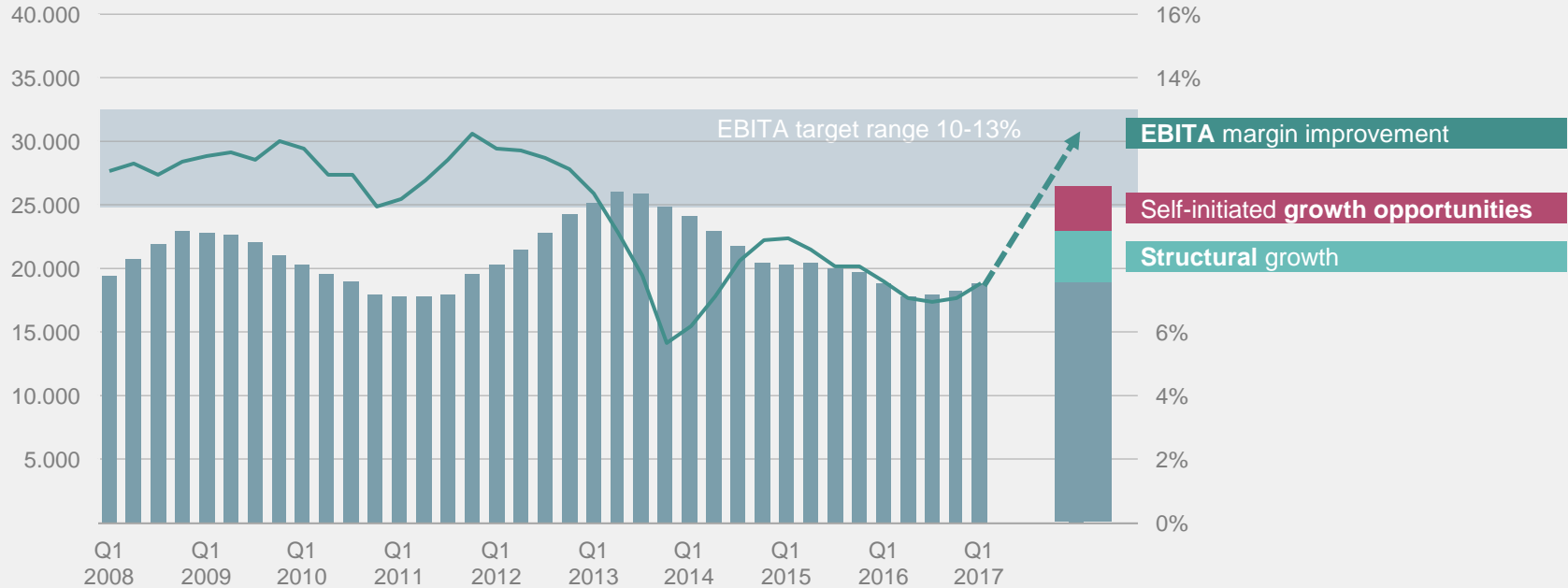
If EBITA margin
= 10%
revenue should be
> **DKK 30bn**

If EBITA margin
= 13%
revenue should be
> **DKK 23bn**

¹⁾ Based on Capital Employed of DKK 15bn

Roadmap to long term targets

Revenue and EBITA



Our long-term financial targets are reflecting our growth ambitions

Group long-term financial targets

Annual revenue growth	Above market average	✓	on track to deliver
EBITA margin	10-13%	✓	on track to deliver
ROCE*	>20%	✓	dependant on growth
Equity ratio	>30%	✓	already there
Financial gearing (NIBD/EBITDA)	<2	✓	already there
Pay-out ratio	30-50%	✓	already there

*) ROCE: Return on capital employed calculated on a before tax basis as EBITA divided by average Capital Employed incl. goodwill

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