



Johnson Matthey
Inspiring science, enhancing life

Capital Markets Day Sustained growth and value creation

September 2017

Cautionary statement

This presentation contains forward looking statements that are subject to risk factors associated with, amongst other things, the economic and business circumstances occurring from time to time in the countries and sectors in which Johnson Matthey operates. It is believed that the expectations reflected in these statements are reasonable but they may be affected by a wide range of variables which could cause actual results to differ materially from those currently anticipated.

Agenda

Start	Session	Presenters
9:30am	Sustained growth and value creation	Robert MacLeod
9:50am	Clean Air and Q&A	John Walker and Phil Blakeman
11:00am	Break	
11:30am	Battery Materials and Q&A	Alan Nelson
12:15pm	Lunch	
1:00pm	Efficient Natural Resources and Q&A	Jane Toogood
1:40pm	Health and Q&A	Robert MacLeod, Garrett Dilley and Paul Evans
2:30pm	Break	
3:00pm	Delivering shareholder value	Anna Manz
3:20pm	Concluding remarks and Q&A	Robert MacLeod

Restatement

Clean Air	Emission Control Technologies	Reallocation	Clean Air	% of Group
For year ended 31st March 2017				
Sales excluding precious metals (£m)	2,224		2,224	60%
Underlying operating profit (£m)	318.2		318.2	62%
ROS (%)	14.3		14.3	
ROIC (%)	30.7		30.7	

Efficient Natural Resources	Process Technologies	Precious Metal Products	Reallocation	Efficient Natural Resources	% of Group
For year ended 31st March 2017					
Sales excluding precious metals (£m)	587	403	(71) ⁽¹⁾	919	25%
Underlying operating profit (£m)	90.4	86.4	(13.8) ⁽²⁾	163.0	32%
ROS (%)	15.4	21.4		17.7	
ROIC (%)	11.4	19.8		13.5	

Restatement

Health	Fine Chemicals	Reallocation	Health	% of Group
For year ended 31st March 2017				
Sales excluding precious metals (£m)	284	(48) ⁽¹⁾	236	7%
Underlying operating profit (£m)	64.5	(12.8) ⁽¹⁾	51.7	10%
ROS (%)	22.8		21.9	
ROIC (%)	12.3		10.4	

1. Catalysis and Chiral Technologies

New Markets	New Businesses	Reallocation	New Markets	% of Group
For year ended 31st March 2017				
Sales excluding precious metals (£m)	191	117 ⁽¹⁾	308	8%
Underlying operating profit / (loss) (£m)	(14.4)	26.6 ⁽²⁾	12.2	2%
ROS (%)			4.0	
ROIC (%)			6.2	

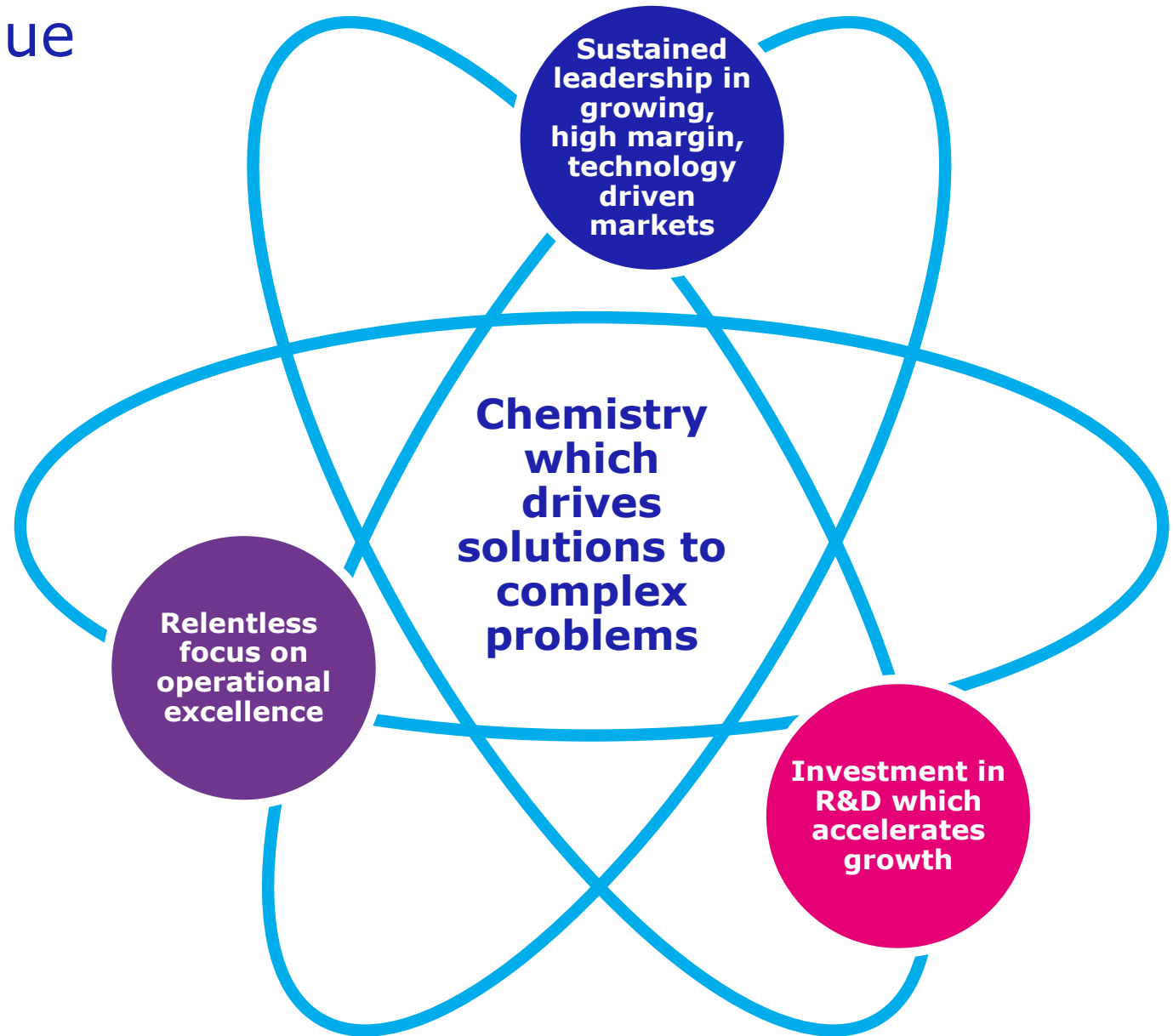


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Sustained growth and value creation

Robert MacLeod
Chief Executive

Sustained growth and value creation through:



Solving complex problems across the group with world class chemistry

Materials characterisation
and testing



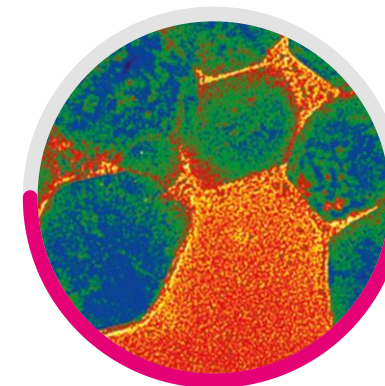
PGM chemistry
and metallurgy



Material design
and engineering



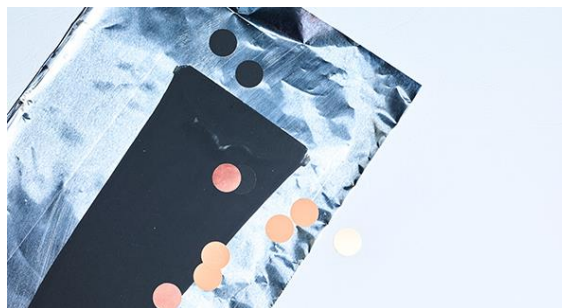
Surface
chemistry



and its application



Provision of
customised solutions



Development of new and
next-generation products



Scale-up of complex
manufacturing

We address three big global challenges



Increasing concern by consumers and governments on **Clean Air**

How to reduce powertrain emissions as efficiently as possible



Growing population and consumer aspiration is increasing demand for **Efficient use of Natural Resources**

How to achieve greater efficiency and optimal yields in the use of natural resources



Need for affordable **Health** care which is increasingly personalised

How to make complex, often highly potent APIs, efficiently and quickly

Technology leadership gives us #1 positions



#1 Diesel

Joint #1 Gasoline

Opportunity in
battery materials



#1 Methanol

#1 PGM recycling

#1 PGM products

#1 Oxo alcohols

#1 Formaldehyde

#1 SNG / #1 BDO

#1 NDA



#1 opiates


#1 ADHD

Opportunity to
expand

Sustained growth and value creation



**Chemistry which
drives solutions to
complex problems**



**Sustained leadership
in growing, high
margin, technology
driven markets**



**Investment
which accelerates
growth**




**Relentless focus
on operational
excellence**

Driving attractive returns:



**Expanding ROIC
to 20%**



**Mid to high single
digit EPS CAGR**



**Progressive
dividend policy**

Sustained growth and value creation through:



**Sustained
growth in
Clean Air**



**Breakout growth
in Health and
Battery Materials**



**Market leading
growth in Efficient
Natural Resources**



**Relentless focus
on driving
efficiency**

Clear visibility of sustained growth in Clean Air

Heightened air quality issues causing rapid change

In Europe Light Duty:

- In short term, we grow strongly from substantial share gains
 - ICE powertrain and legislation substantially reduces diesel/gasoline share sensitivity
-

Asia transforms in scale

North America grows steadily

Margins maintained through focus on efficiency



Breakout growth in Health from a deeper, broader API portfolio

We have established positions in attractive, growing market

Increasing API complexity/generic penetration play to JM strengths

Our growth will come from:

- Our existing portfolio will outperform
- Our new product pipeline in generics adds c.£100m OP in 2025
- Building on strong reputation for driving development and commercialisation
- Enhancing our growth by entering adjacent segments

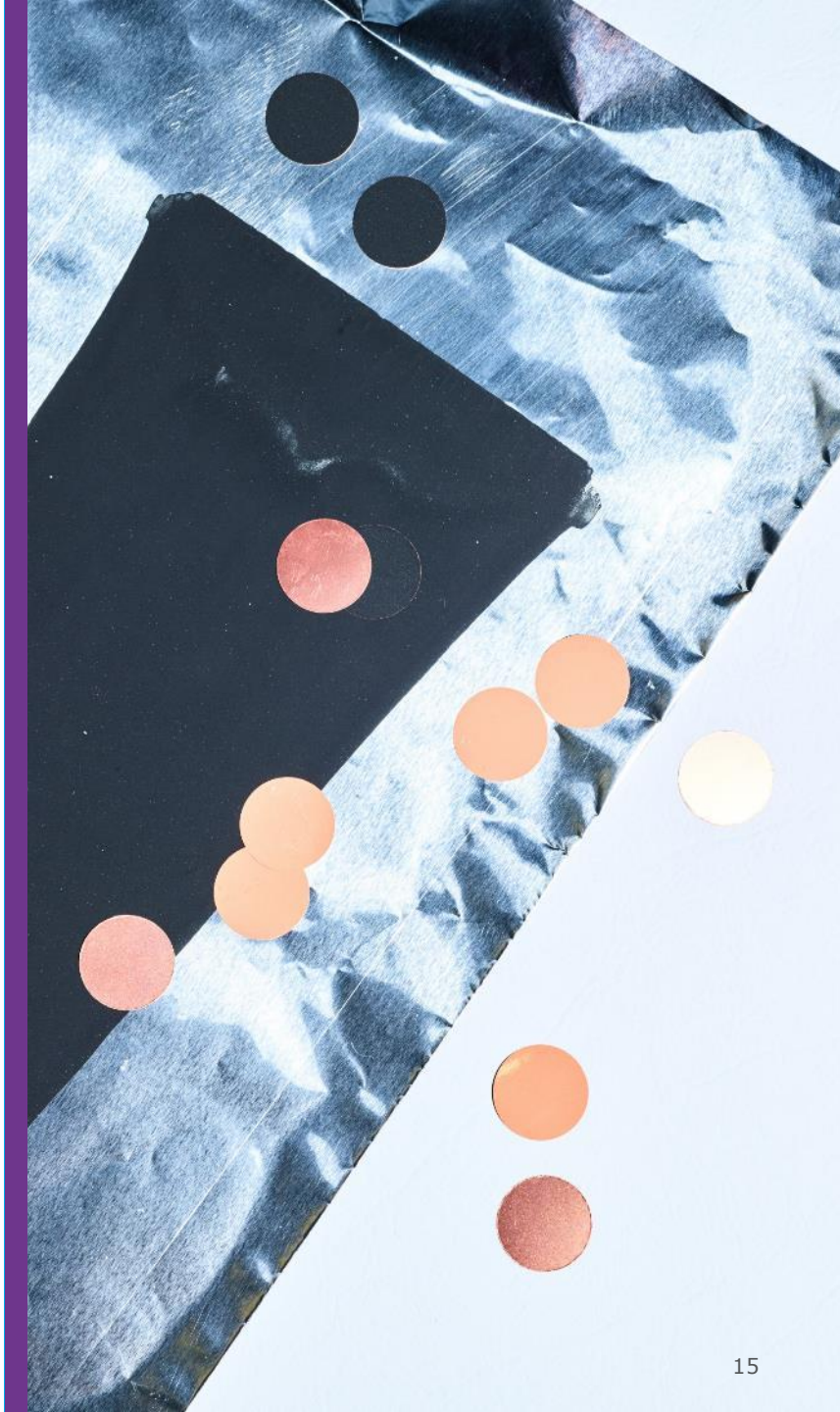


Breakout growth in Battery Materials through technical leadership

Market is still in its early stage but the opportunity is substantial

We have already developed materials with market leading performance characteristics

We will invest in high energy manufacturing capacity, starting in 2018/19



Outperformance in targeted, growth segments in Efficient Natural Resources

Market has changed significantly in recent years

We have leading positions in most markets

We will outperform in higher growth segments

Increased efficiency of operations will enhance performance



We create value by investing in our technology through three stages

Stage	 Clean Air	 Efficient Natural Resources	 Health
Selectively invest through New Markets sector	e.g. Battery Materials	e.g. Agrochemicals	e.g. Medical Devices
Scale-up	e.g. Emission Control in Asia	e.g. PGM Refining in China	e.g. API Manufacturing in both Innovators and Generics
Sustain and grow	e.g. Emission Control in Europe & NA	e.g. Hydrogen catalysts	-

Sustained growth and value creation through:

Improving performance through common standards and simplified processes

Accelerated by IT enablement

Creating a business that is more robust and more agile

Releasing £50m of cost over the next 3 years for reinvestment and margin expansion



**Relentless
focus on driving
efficiency**

Our vision is for a cleaner and healthier world

By 2025, we will:



Enhance technology leadership in our targeted markets

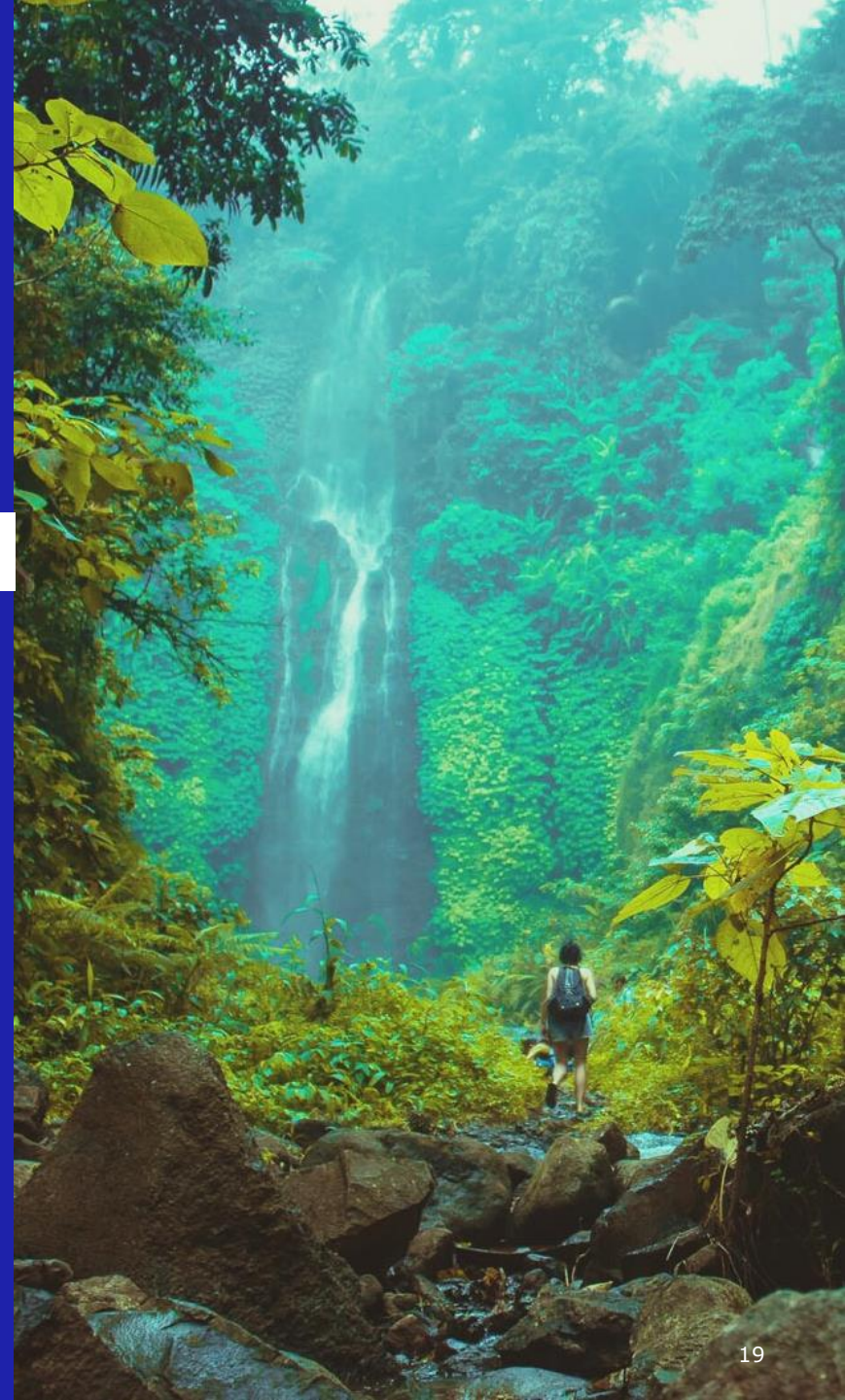


Have three substantial and growing sectors



Have excellence in everything we do

Be one of the best performing, most trusted and admired speciality chemicals companies in the world





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Clean Air: Sustained growth and value creation from a global leader

John Walker – Sector Chief Executive, Clean Air

Phil Blakeman, Ph.D. – Managing Director, Clean Air Sector, Asia

Sustained growth and value creation from a global leader

Europe Light Duty grows strongly in short term and broadly flat over 10 years

North America Light Duty delivers consistent growth

Asia transforms in scale

Operational efficiency supports margin and ROIC

Mid single digit sales CAGR over next decade

Our Sector strategy assumes:

Impact of legislation only included where quantifiable

Euro 7/VII is likely to drive increased value per vehicle but is not included

Diesel share declining to 25%* of Western Europe by 2025

Every 1ppt decline below 25% would impact gross profit by ~£4m

Increased penetration of hybrids

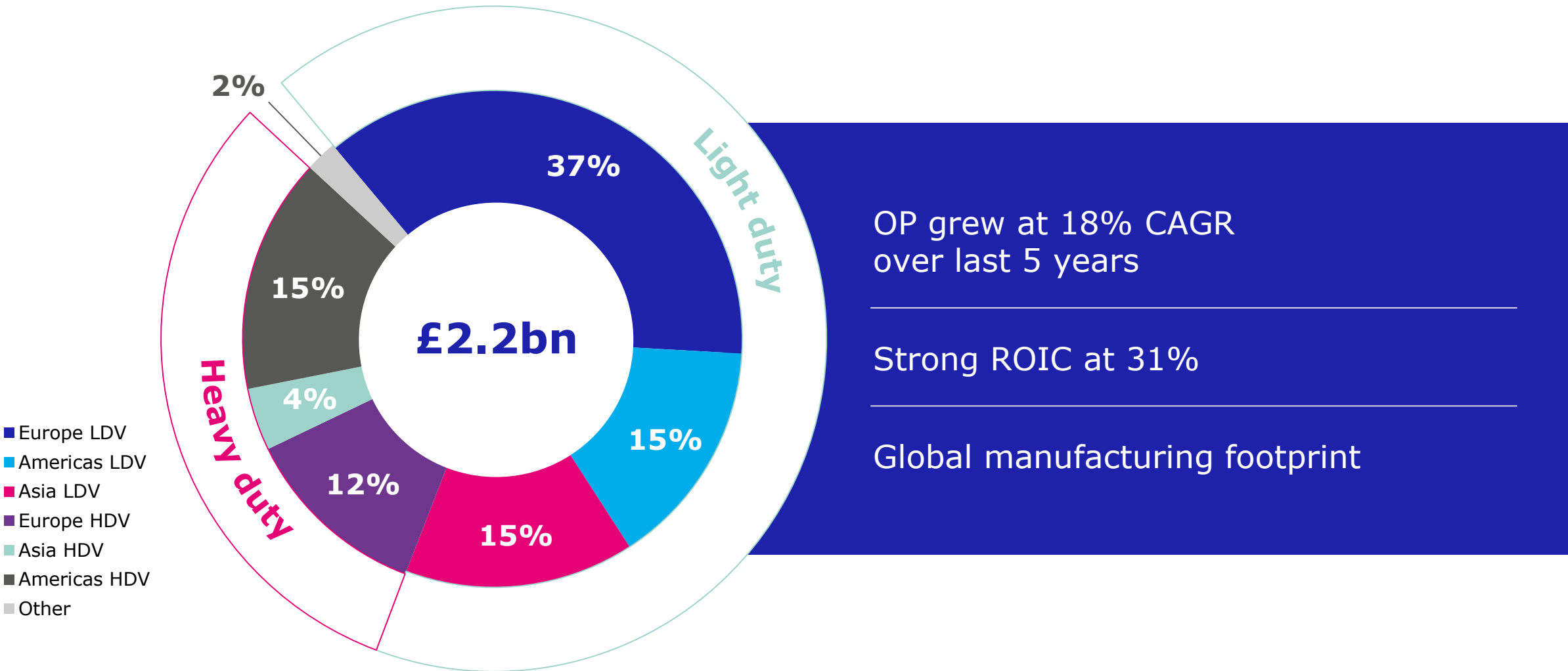
Neutral for gasoline to gasoline hybrid or diesel to diesel hybrid

Global BEV penetration increasing to 6% by 2025

Every 1ppt increase above 6% would impact gross profit by ~£7m

Sales grew at 11% CAGR over last 5 years

Sales 2016/17 by sub-business¹



1 Sub-businesses restated: South American businesses transferred from Europe to Americas, Americas LD truck business transferred from Heavy Duty to Light Duty, Heavy Duty includes non road

Share gains and tighter legislation gives visibility of mid single digit CAGR over 10 years

1-2 Years

Strong growth driven by:

- Additional ~20 ppts share secured in Europe Light Duty diesel
- Tightening legislation in Europe

3-6 Years

Good growth driven by:

- Tightening legislation in Asia and Europe

Partly offset by:

- Continued Europe diesel decline and early BEV penetration

7-10 Years

Growth driven by:

- Tightening legislation in US

Partly offset by:

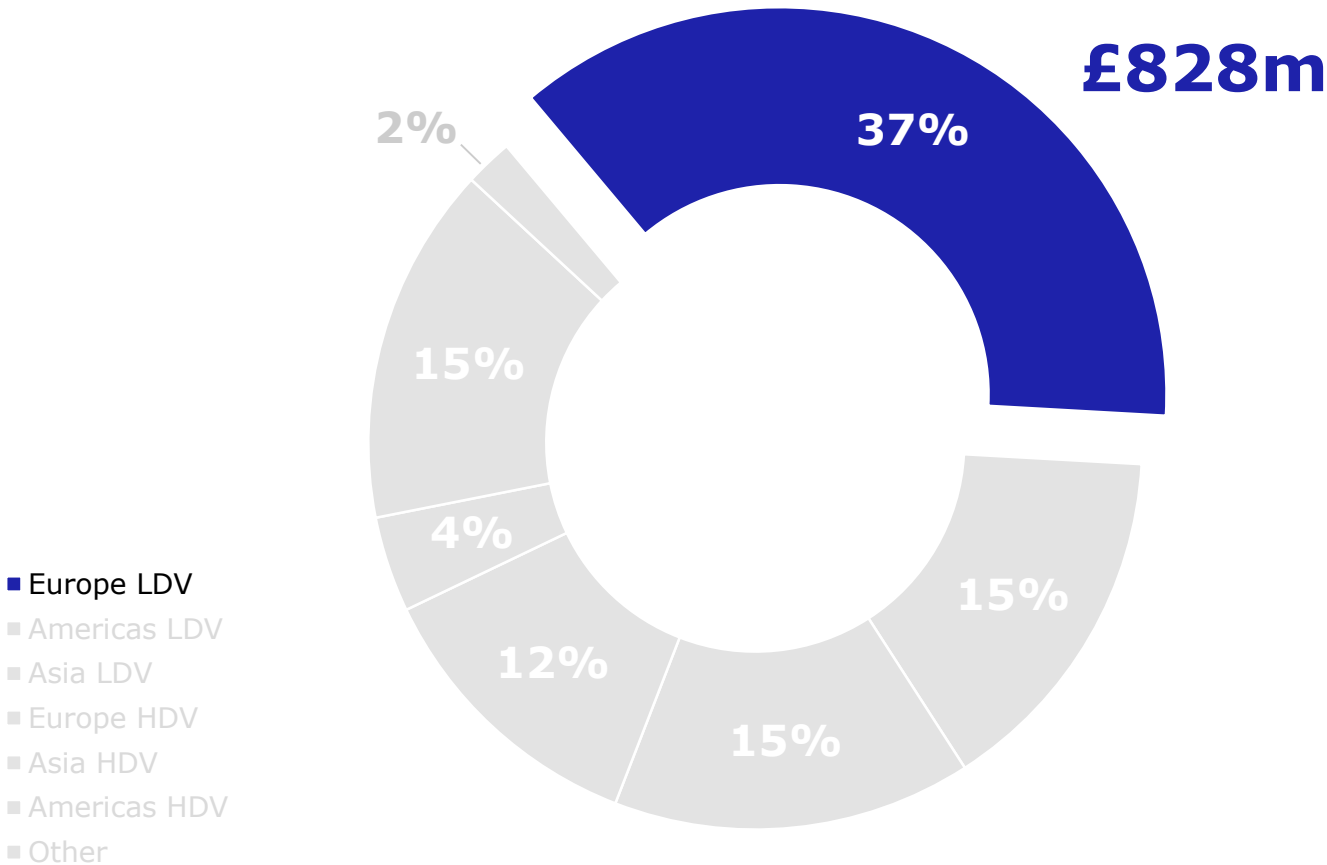
- Faster BEV penetration and further Europe diesel decline

Four key Clean Air segments to discuss



Europe Light Duty – Broadly flat over 10 years following strong short term growth

Sales 2016/17



01 Vehicle production

02 Air quality

03 JM share

04 Hybrid / diesel / gasoline

05 BEV

01. Vehicle production expected to grow but is not a material driver of growth

2% p.a. vehicle growth impacted by:

Population +

Increased wealth +

Better public transport -

Car sharing / ride hailing -



02. Air quality drives tighter legislation which adds value per vehicle

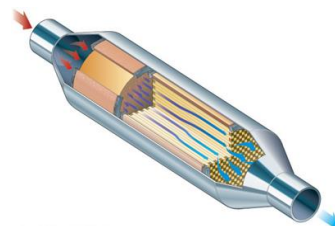
Gasoline : Sales per vehicle increases significantly

Euro 6b

Three way catalyst x2



Euro 6c/d



Three way catalyst +
gasoline particulate filter

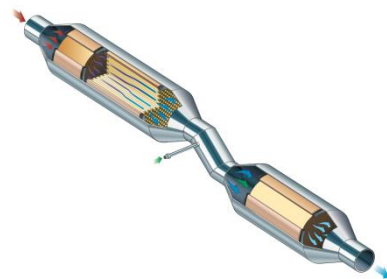
~2x value per vehicle

GPFs expected on >90% of GDI vehicles by 2025
GDI vehicles expected to be 80% of gasoline

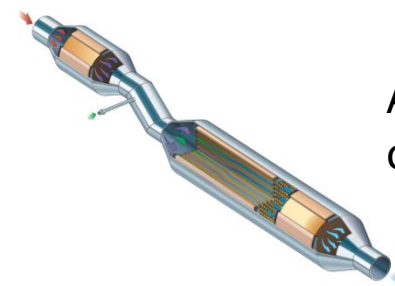
Diesel : Sales per vehicle increases

Euro 6b

Diesel oxidation
catalyst +
catalysed soot filter +
selective catalytic
reduction



Euro 6c/d



Advanced selective
catalytic reduction

Up to 1.5x value per vehicle

03. Fundamental change in emission control market led to significant increase in JM share

A blue-tinted background image showing several hands clapping together in a celebratory gesture.

Public confidence in emission control significantly hit

A cyan-tinted background image showing the rear of a white car parked in a lot, with other vehicles visible in the background.

NOx emissions in the public spotlight

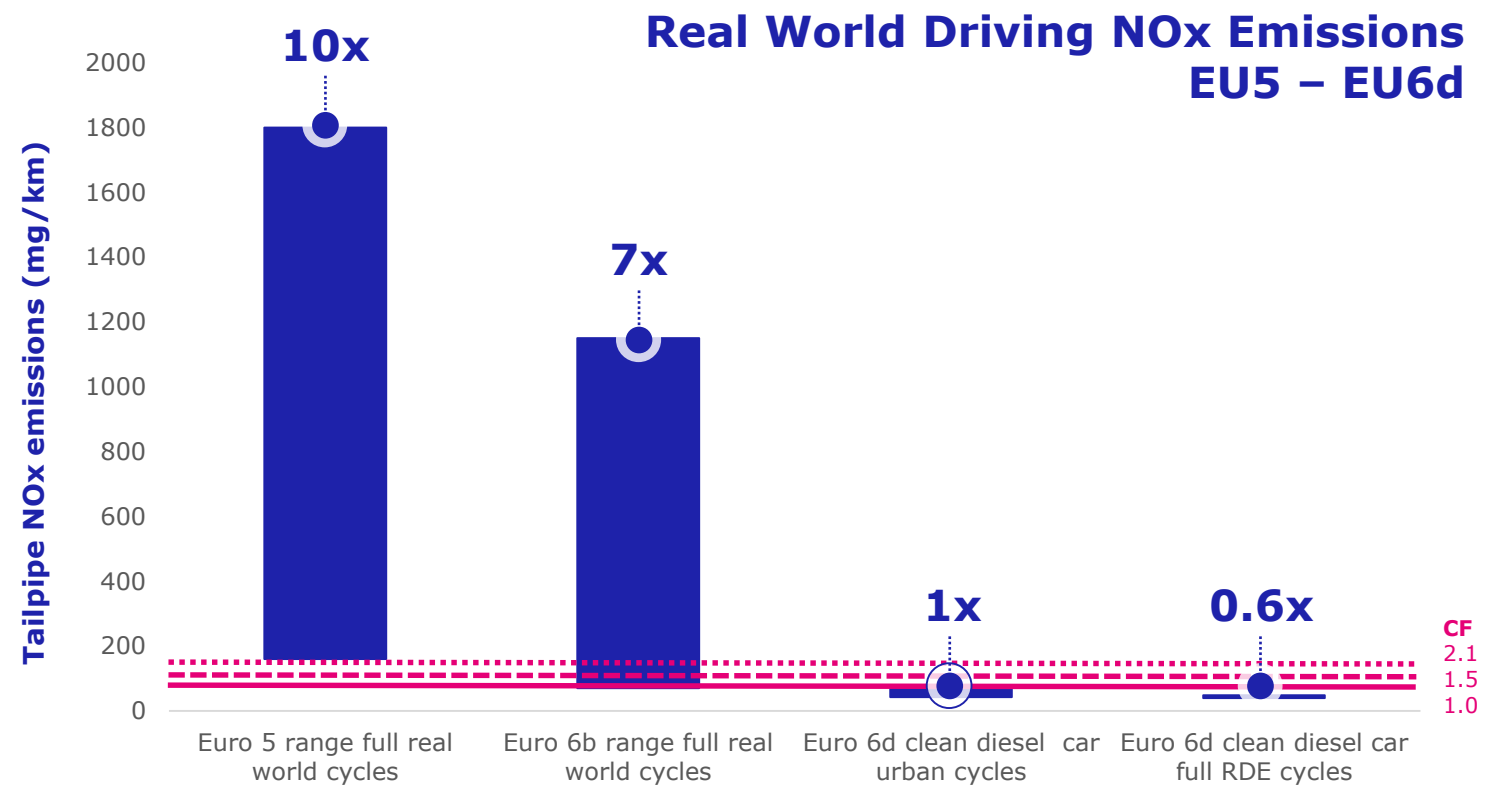
A purple-tinted background image showing a close-up of a car's engine and air intake system.

OEMs moved quickly to improve emissions ahead of legislation



03. Our leadership in diesel technology and fast response led to share gains

- Our technology delivers significant decrease in NOx emissions
- Excellent low temperature NOx conversion
- Outstanding thermal durability
- Strong customer relationships and manufacturing agility



JM diesel share increases by ~20 ppts in 2018/19

03. In addition our gasoline filter technology is driving material share gains

Particulate number emissions of JM GPF are below future regulation requirements



High performance

High filtration efficiency

Low backpressure

JM gasoline share will increase by ~5 ppts as Euro 6d phases in

04. Demand for diesel and gasoline ICEs increasingly impacted by consumer behaviour

Consumer awareness of vehicle emissions has increased



Consumer are moving through a spectrum:

- From: diesel to gasoline
 - From: ICE to hybrids
 - To: EV
- 



04. Hybrids will become a significant part of the market

Consumers



OEMs

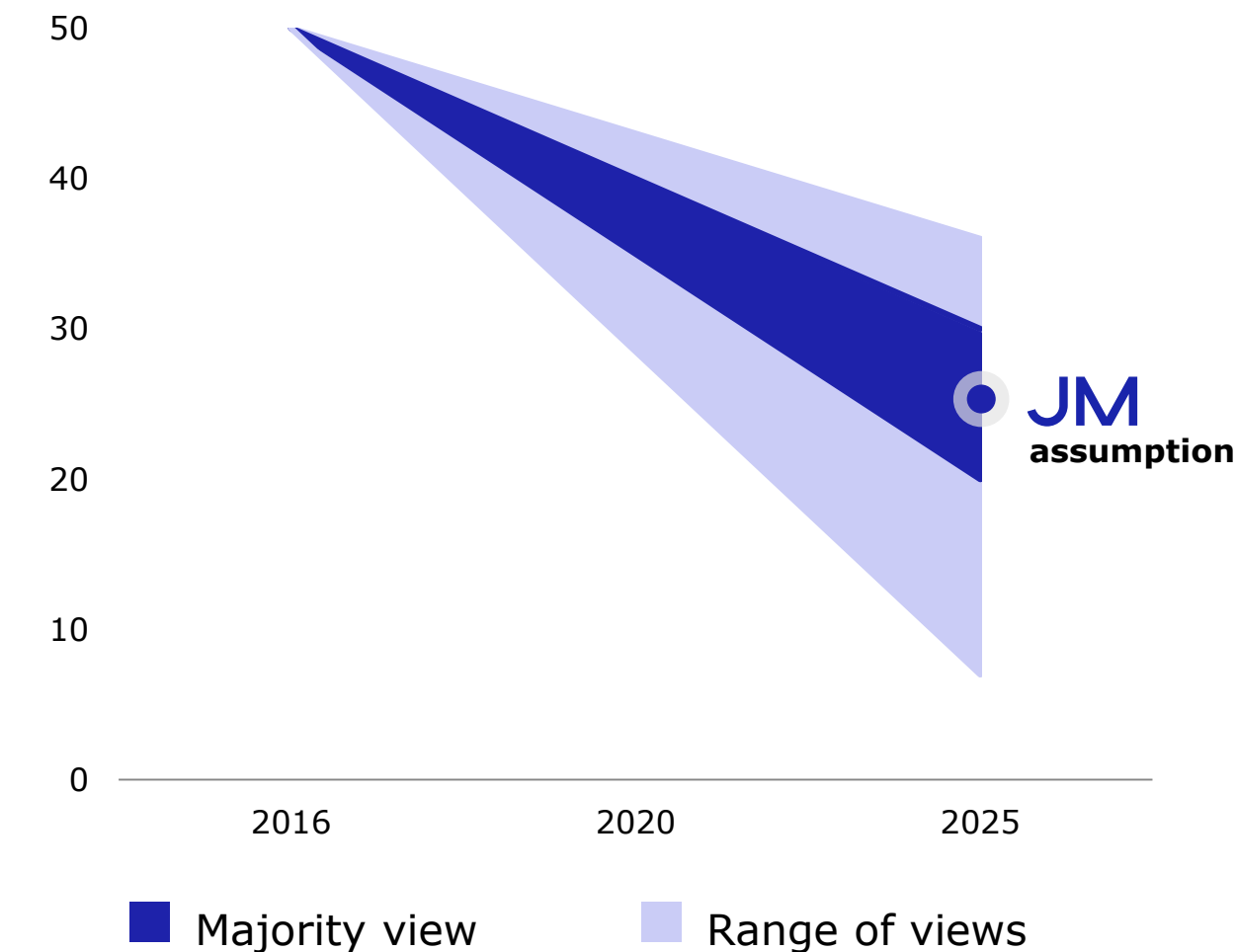


**Opportunity for more complex systems
to manage stop / start engines**

Neutral impact on Clean Air



04. Diesel / diesel hybrid share of light duty Western Europe is assumed to decline to 25%* by 2025



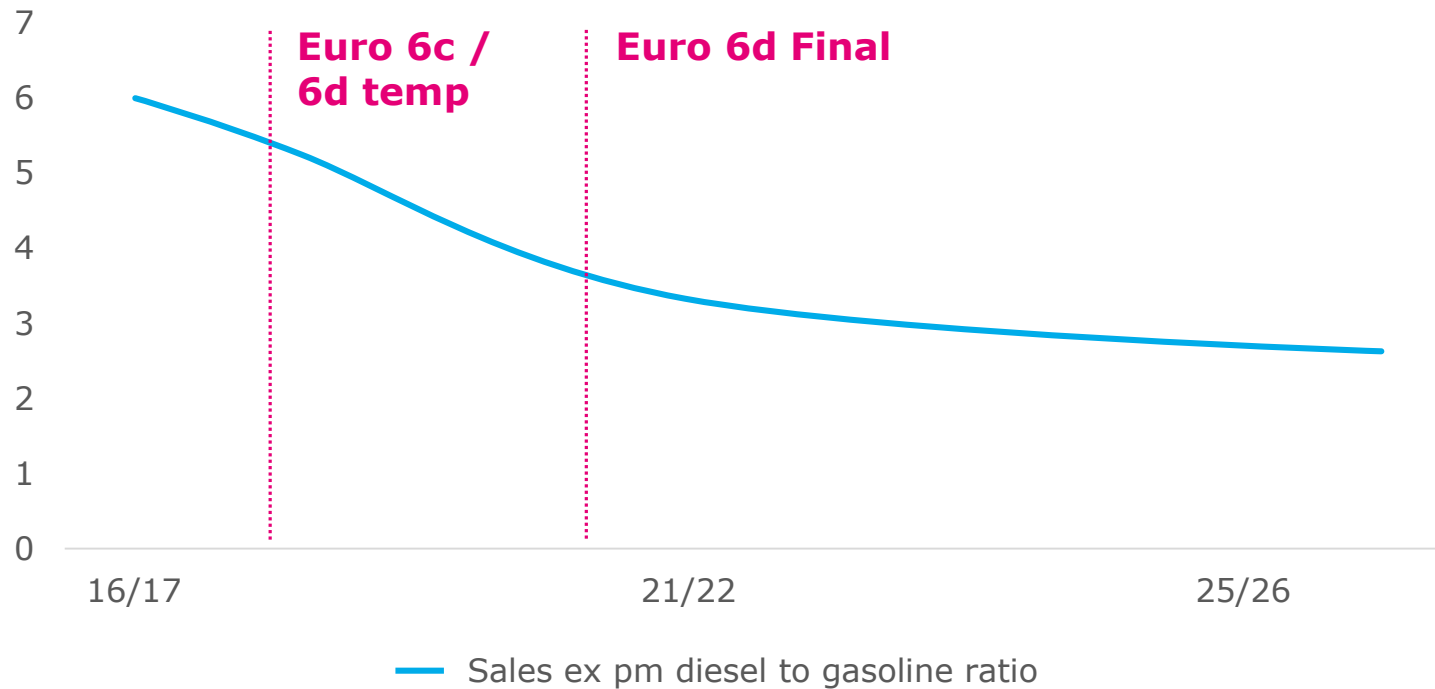
Mix of pure diesel ICE and diesel hybrids

Majority of cars assumed to be hybrids by 2025

*25% of Western Europe light duty vehicles (including commercial vehicles) by 2025, equivalent to ~20% of Western Europe passenger car sales

04. For JM, the sales gap between diesel and gasoline will halve

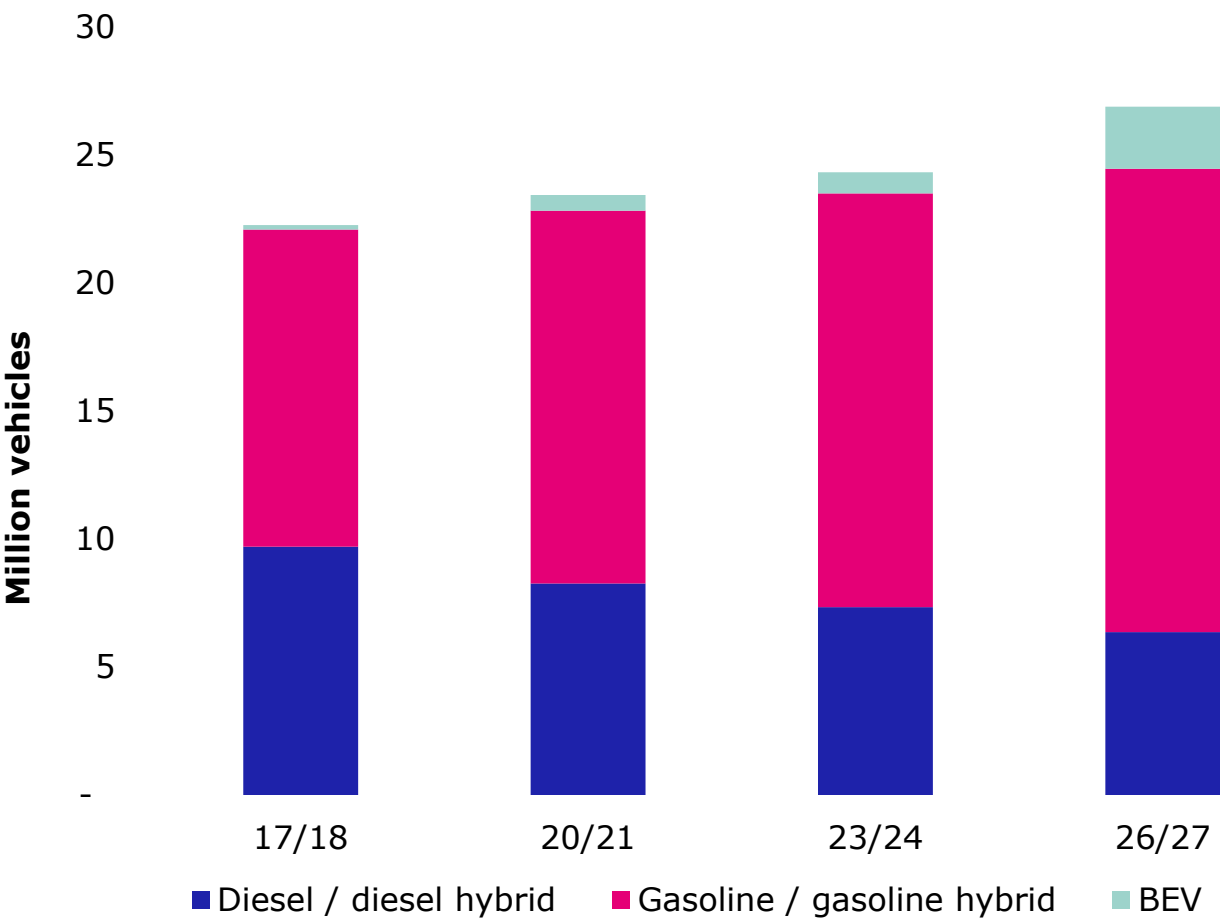
Ratio of diesel to gasoline value per vehicle



**A 1ppt shift from diesel to gasoline
(including gasoline hybrids) impacts gross profit by ~£4m**



04. Share gains in a growing gasoline market



Gasoline - including hybrid - vehicle production to increase 4% p.a.

Legislation approximately doubles sales value for some gasoline vehicles

JM share of gasoline market increases ~5 ppts by 2020/21

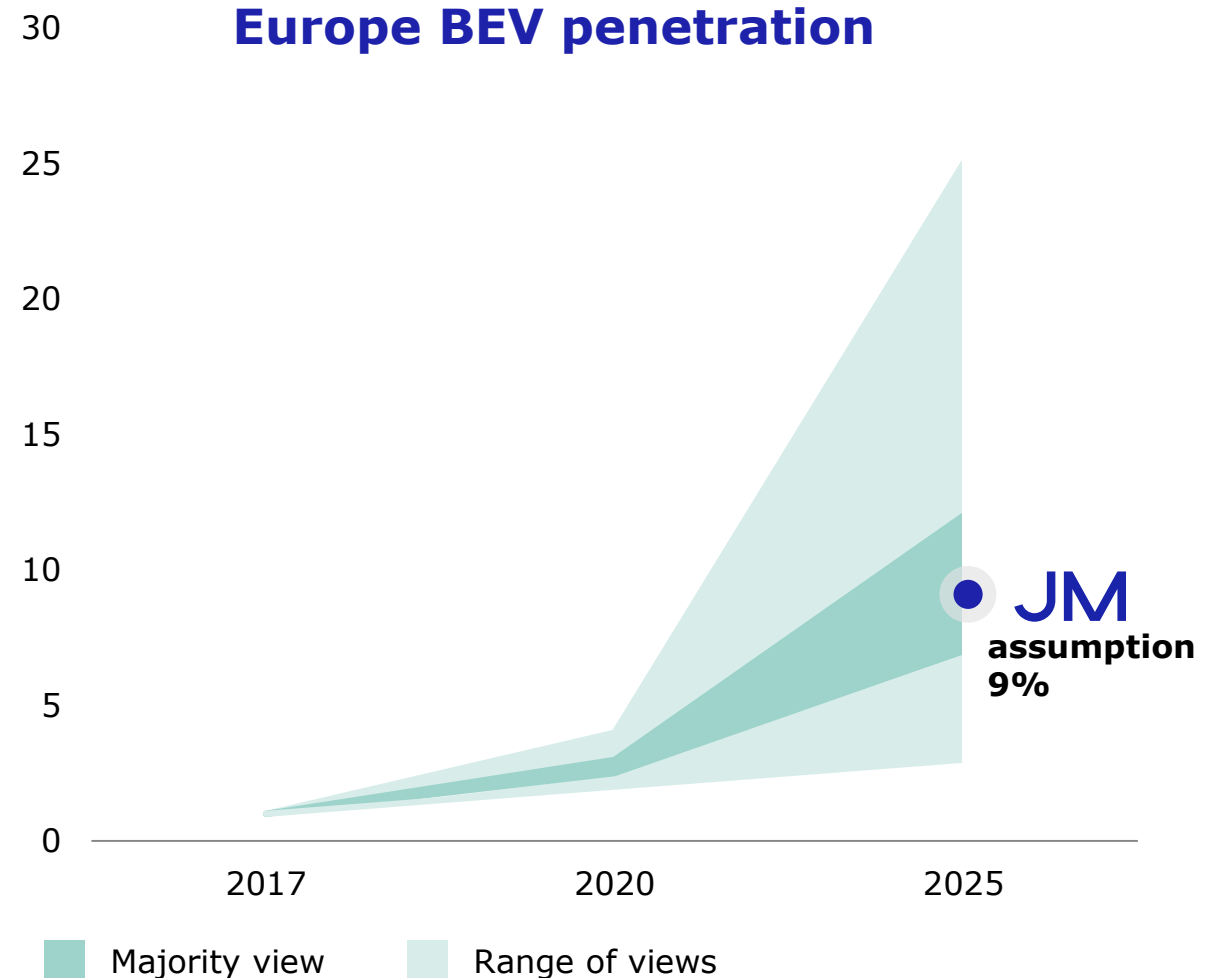
05. BEVs will take share from traditional powertrains

Consumer demand for BEVs is growing

OEMs increasing number of BEV models

Rate of uptake dependent on:

- Total cost of ownership
- Infrastructure



Europe Light Duty summary

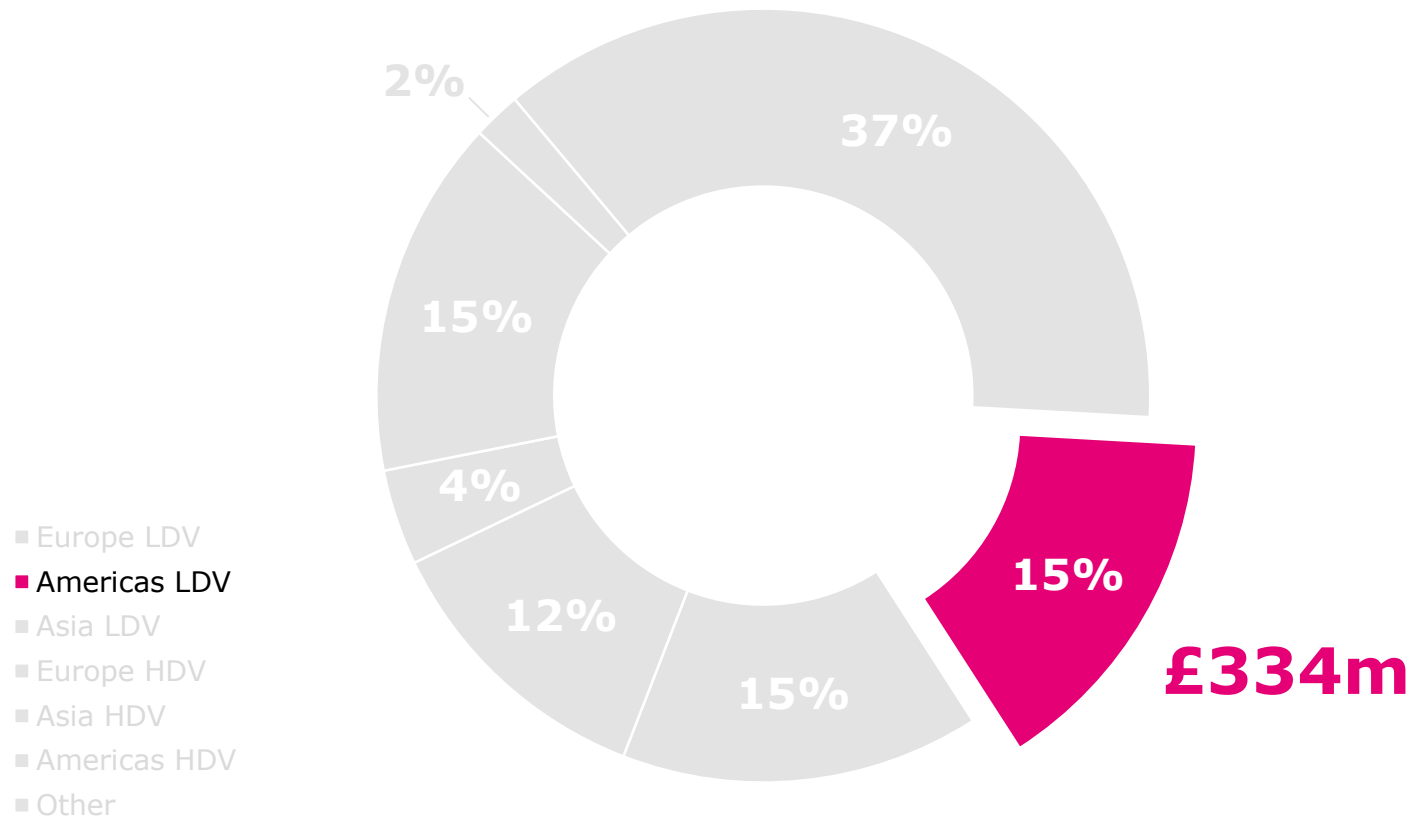
Key Driver

Vehicle production	2% CAGR supports growth in sales
Air quality - legislation	Euro 6c/d adds ~2x value for most gasoline vehicles
JM share	Technology leadership and agility drive share gains in diesel ~20ppt and gasoline ~5ppt
Diesel/gasoline share	Diesel market share declines to 25%* of Western Europe light duty by 2025
Hybrids	Penetration significantly increases to manage average fleet CO ₂ with neutral impact on Clean Air
BEV penetration	9% by 2025

Europe Light Duty broadly flat over 10 years following strong short term growth

Americas Light Duty – **Steady growth over the next decade**

Sales 2016/17



01 Vehicle production

02 Air quality

03 Diesel vehicles

04 BEV

01. Vehicle production will grow marginally

Vehicle growth impacted by:

Population +

Car sharing / ride hailing -

Diesel and BEV make gains



02. Legislation tightens adding sales value per vehicle

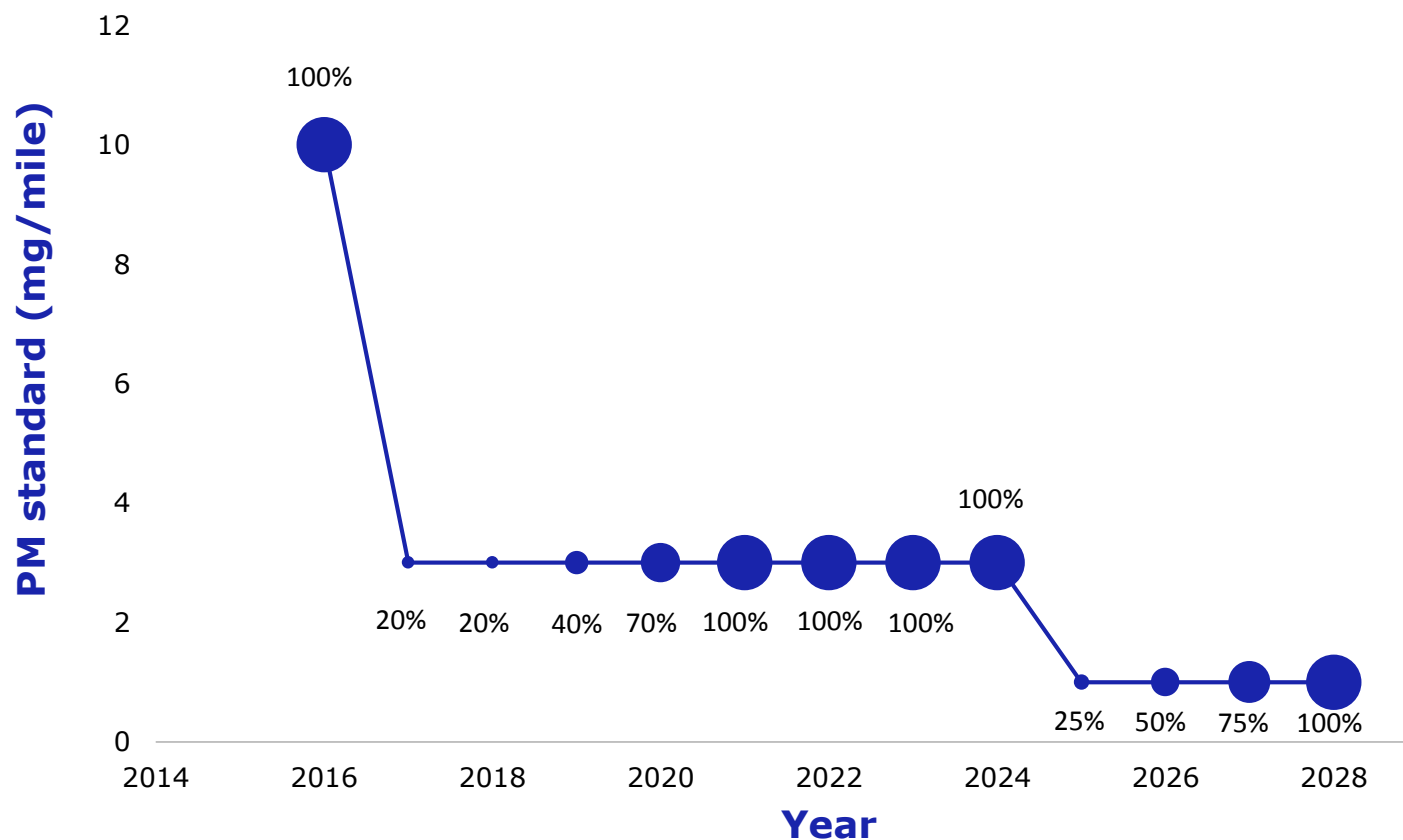
US legislation tightens for particulate matter

- % of fleet required to meet standard increases over time

Technology adds value further out

- Filters for some gasoline vehicles from ~2024 (assumed low fitment rate)

LEVIII particulate matter standards and fleet compliance rate



03. Expect to win share through technology in a growing diesel market

OEMs offering greater numbers of diesel variants

Increasing demand for diesel pick-ups, SUVs and crossovers

Diesel attractive option to meet tightening fuel economy standards

Strong technology provides scope for JM's diesel share to increase



04. BEV to have marginal impact in next 10 years

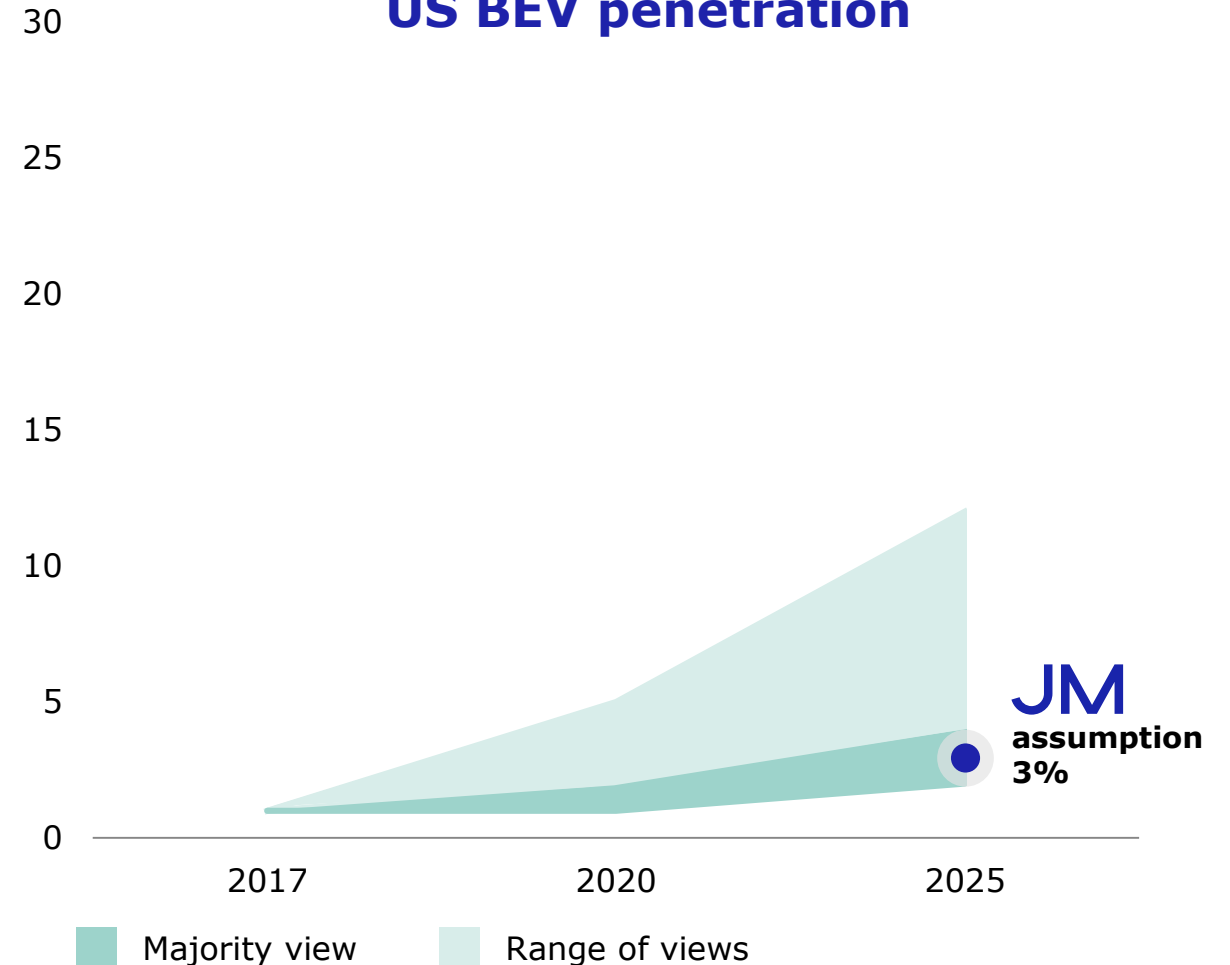
Consumer demand for BEVs is growing

OEMs increasing number of BEV models

Rate of uptake likely held back by:

- Low gasoline prices
- BEV infrastructure
- Consumer preference for large SUV's/pick-ups

US BEV penetration



Americas Light Duty summary

Key Driver

Vehicle production

Marginal growth supports growth in sales

Air quality - legislation

GPF adoption expected from 2024 from tighter particulate matter legislation

Diesel/gasoline share

JM technology leadership supports share gains in growing diesel market

BEV penetration

Low level BEV penetration supports growth in sales

Steady growth over the next decade

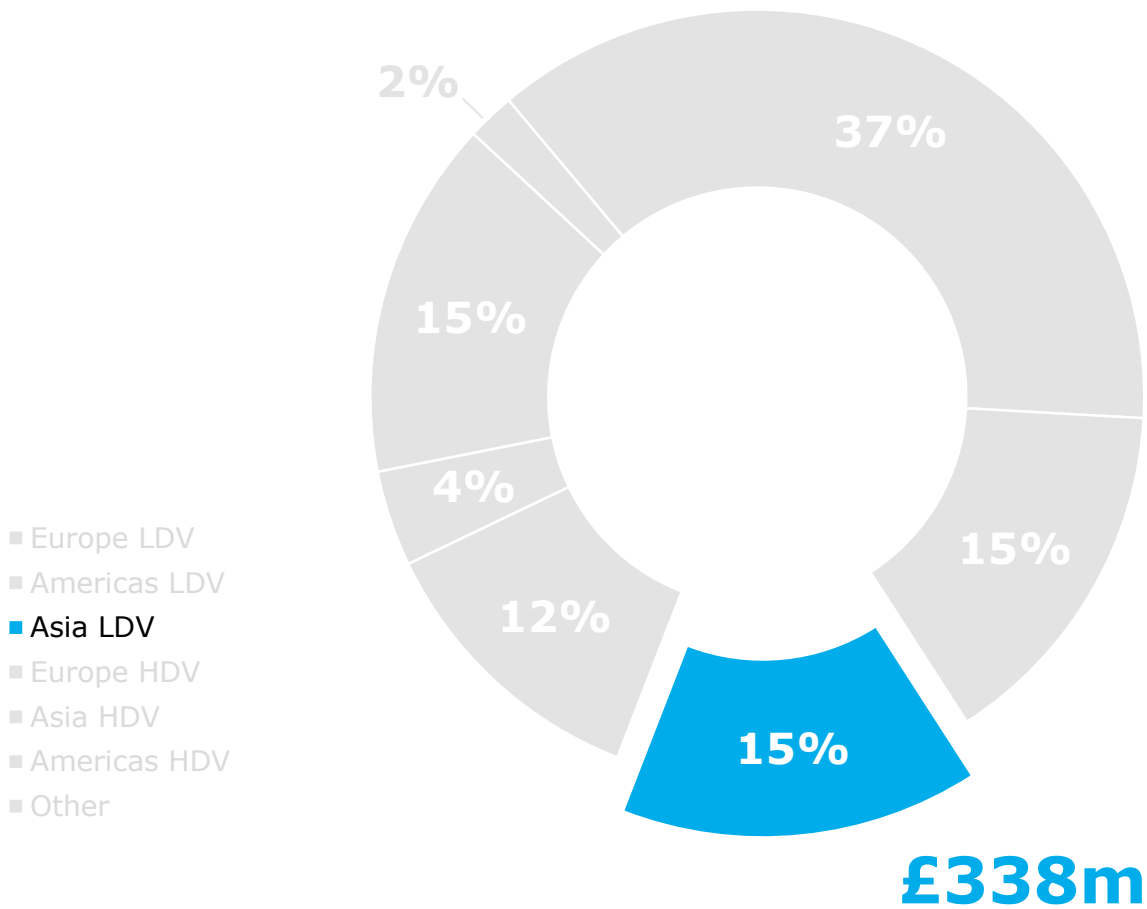


Clean Air – Asia Light Duty and Global Heavy Duty

Phil Blakeman, Ph.D. – Managing Director, Clean Air Sector, Asia

Asia Light Duty – Short to medium term growth from tighter legislation will almost double Asia Light Duty in 10 years

Sales 2016/17



- 01 China vehicle production
- 02 China air quality
- 03 China BEV
- 04 Other Asia

01. China vehicle production growth of 2% p.a. supports sales growth

Vehicle growth impacted by:

Relatively low vehicle ownership rate +

Increased wealth +

But will lag economic growth due to:

Increased urbanisation and improvements in public transport -

Usage barriers (esp. big cities) & ownership trends -

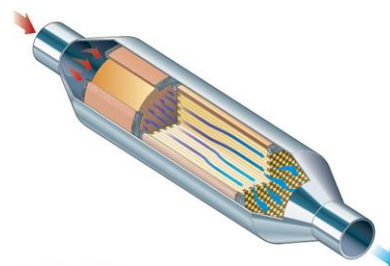


02. China air quality focus brings legislation which doubles sales value per vehicle



China 5 gasoline

Three way catalyst x2



China 6a gasoline from July 2020

Three way catalyst + gasoline
particulate filter (GPF)

~2x China 5

China 6b gasoline from July 2023

Three way catalyst + gasoline
particulate filter (GPF)

Real world driving

JM has the technology to deliver to these standards

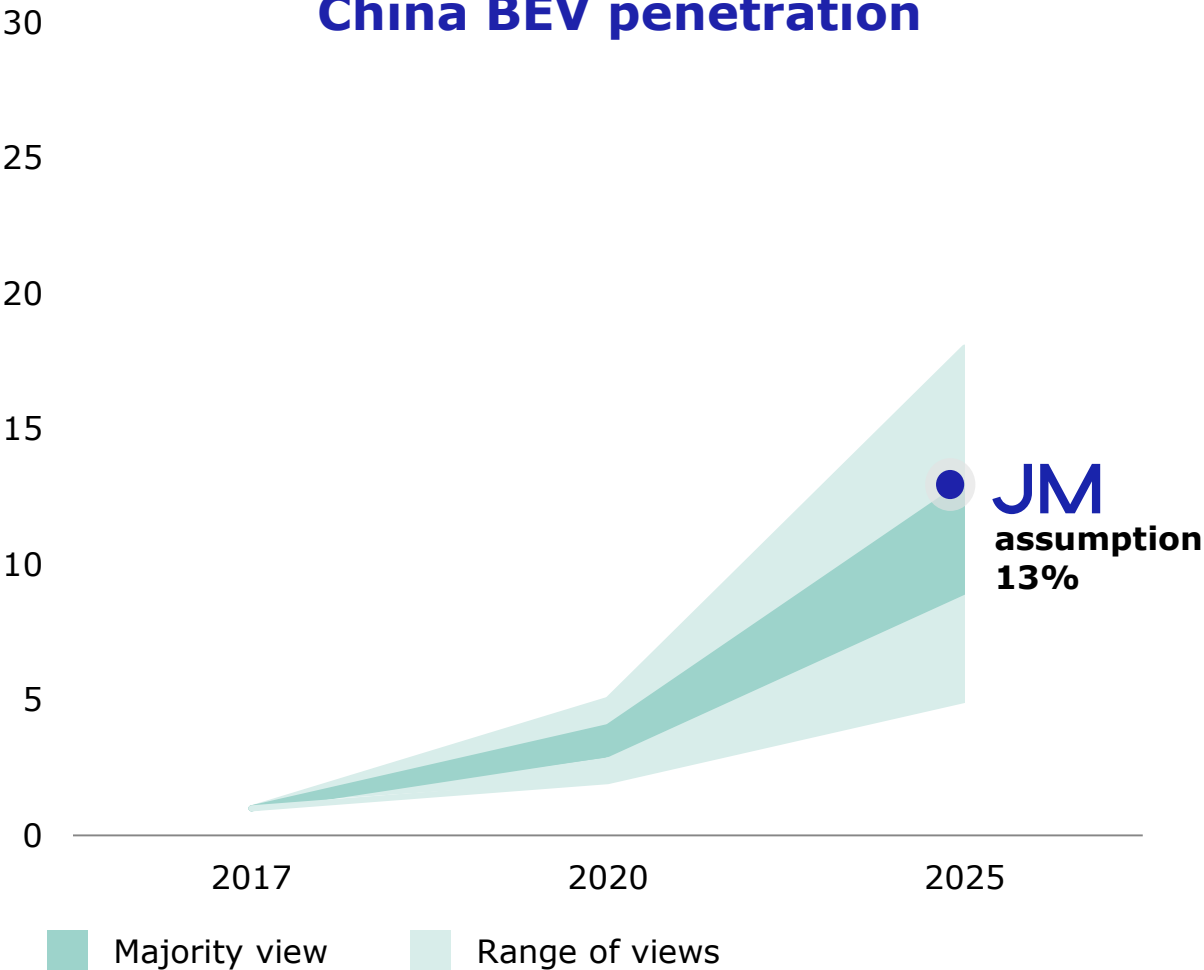
03. China BEV growing fast and impacts growth in later years

BEV expected to grow share quickly:

Strong government incentives for BEV

Tightening fuel consumption legislation continues to support BEV uptake

China BEV penetration



04. Other Asian countries provide additional growth

India grows strongly

- **Strong growth in vehicle production**
- **BS 6 legislation from April 2020:**
 - Gasoline remains with three way catalyst only
 - Increase in technology on diesel cars partly offset as diesel market share declines

Japan stable

- Steady car production
- Key for maintaining our relationships with Japanese OEMs

South East Asia growth

- Tightening vehicle regulations across the region provide opportunities for growth

Asia Light Duty summary

Key Driver

China vehicle production

2% CAGR supports growth in sales

China Air quality - legislation

China 6a and China 6b doubles sales value for some vehicles

China BEV penetration

13% by 2025

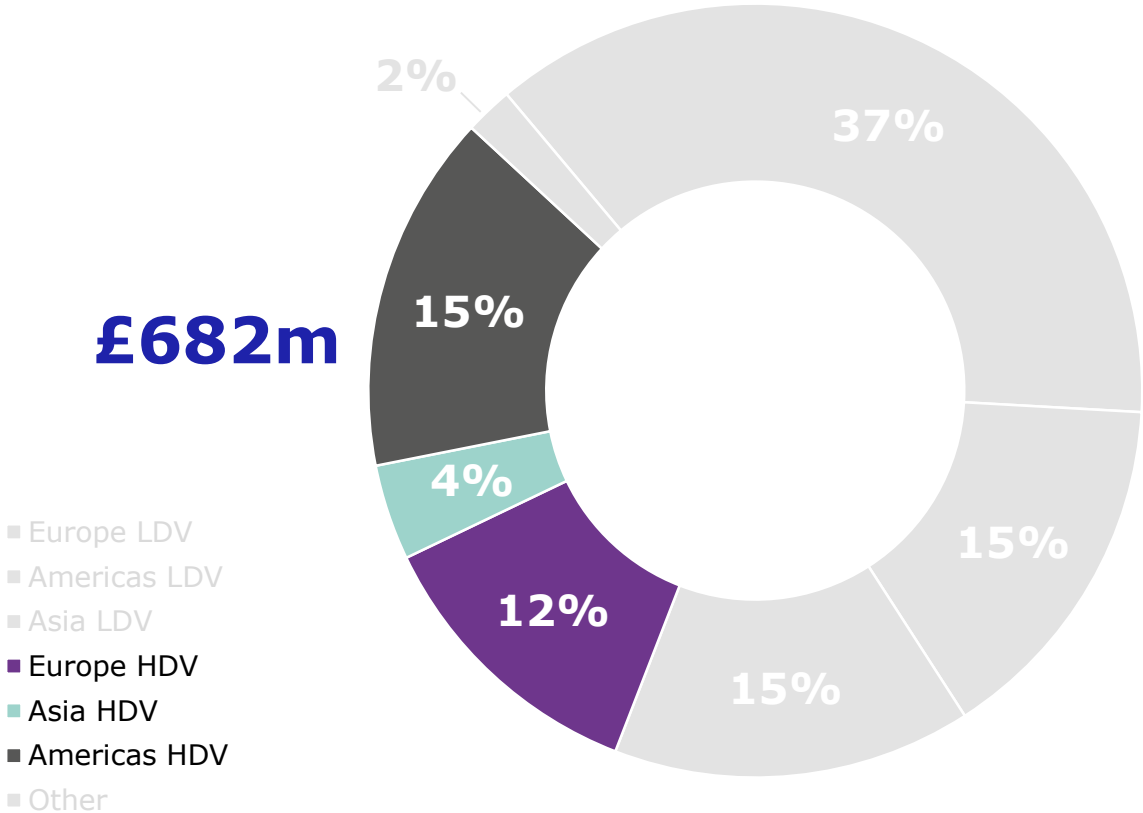
Other Asia

Growth from tightening legislation in India and South East Asia

Asia Light Duty to nearly double sales over the next 10 years

Global Heavy Duty– Legislation in China and India drives growth over the next 10 years

Sales 2016/17



01 Truck production

02 Air quality and JM share

03 BEV

01. Global truck production growth of 2% p.a. supports growth

US low single digit growth with cyclical class 8 trucks

Europe mid single digit growth

China marginal growth

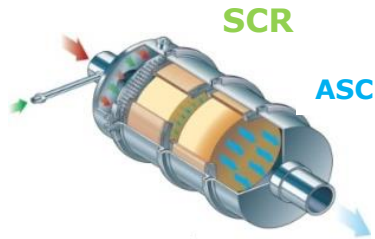
India grows in line with GDP



02. Asia legislation triples sales value per vehicle in China and India

China V

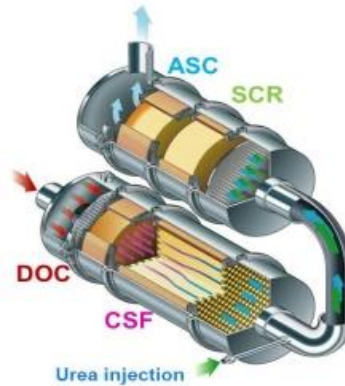
Selective catalytic reduction + ammonia slip catalyst



China VI

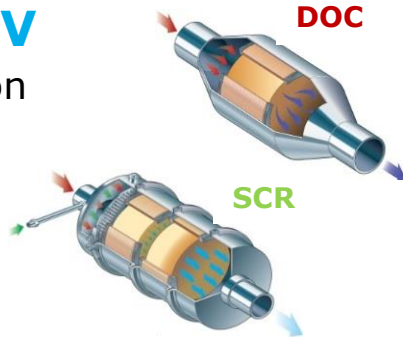
diesel oxidation catalyst + catalysed soot filter + selective catalytic reduction + ammonia slip catalyst
From January 2021 (expected)

~3x China V



India BS IV

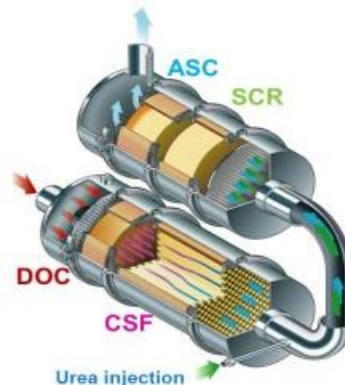
Diesel oxidation catalyst or selective catalytic reduction



India BS VI

Diesel oxidation catalyst + catalysed soot filter + selective catalytic reduction + ammonia slip catalyst
From April 2020

~3x India BS IV



Scope for share gains from our technology and focus on diversifying customer base to Asian OEMs

03. Expect BEV to have minimal impact over next 10 years

Interest in truck electrification but early technology solutions not suitable for majority of market

Limited by economic calculation of weight of freight carried versus total cost of ownership

Broad range of possible outcomes in the longer term



Global Heavy Duty summary

Key Driver

Truck production

2% CAGR supports growth in sales

Air quality - legislation

China VI / India VI drive significant increase in technology and triples sales value per vehicle

BEV penetration

Minimal impact on sales growth


Sustained growth in global Heavy Duty driven by legislation in China and India



Clean Air

John Walker – Sector Chief Executive, Clean Air

Opportunities to drive efficiency



**Efficient, flexible
manufacturing**



Procurement



Customer focus



Organisation

Consistent value creation from a global leader

**Europe Light Duty
broadly flat
absorbing decline
in diesel share of
market and BEV
penetration**

**Americas
Light Duty
grows steadily
with limited
BEV penetration**

**Good growth
in Asia Light
Duty despite
strong BEV
penetration**

**Sustained growth
in global Heavy
Duty driven by
legislation in Asia**

Improved operational efficiency supports margin

Mid single digit sales CAGR over the next 10 years in Clean Air



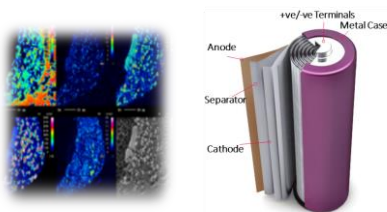
Johnson Matthey
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Battery Materials: Delivering breakout growth

Alan E Nelson, Ph.D., P.Eng.
Sector Chief Executive, New Markets and Group CTO

New Markets: three businesses at scale, focus on battery materials

Alternative Powertrain

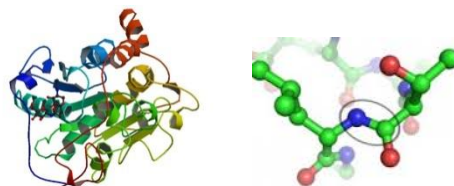


Become a leader using our chemistry advantage and JM capabilities

Flexibility across hybrid, BEV and fuel cell technologies

Battery materials the most developed opportunity

Life Science Technologies¹

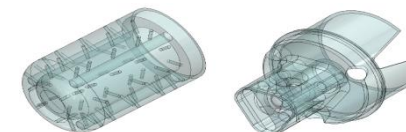


Become a leader in pharma and agrochem catalysts and processes

Cross-selling technologies with our Health sector

Expanding opportunities in new markets

Medical Device Components




Become a leader in the development of medical device components

Collaborate with customers to provide innovative solutions

Significant progress in development of high energy battery materials



**We have developed
best-in-class high energy
battery materials**

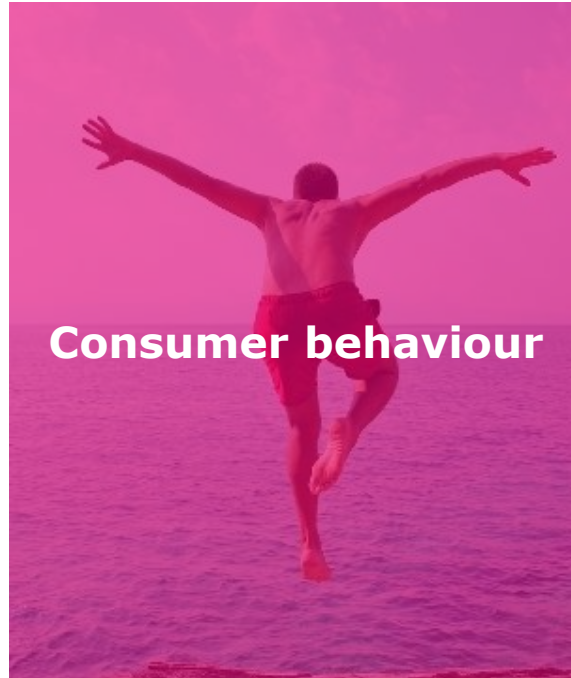
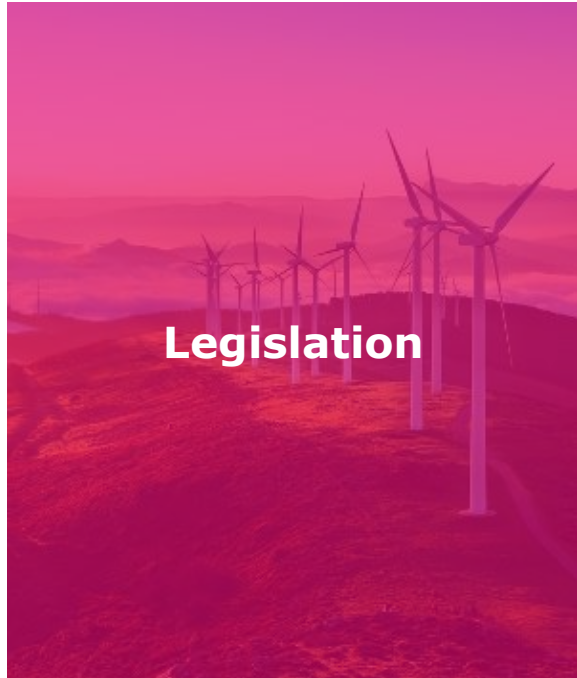


**Investment of c.£200m from
mid-2018 to manufacture up
to 10,000 metric tons from
FY21/22**



**We expect to be on
automotive platforms in
production from FY21/22**

The evolution of the automotive powertrain faces many challenges



OEMs focused on bringing affordable long range xEVs to market

"Ford is...adding 13 new electrified vehicles to its product portfolio by 2020; more than 40 percent of Ford's name plates globally will be electrified by the decade's end"

Press release, December 2015

"All models launched after 2019 will have a hybrid or fully electric propulsion"

*Håkan Samuelsson,
Volvo CEO*

H1 Results, July 2017

"We are now focusing on the electrification of our core portfolio and the introduction of BEV models through the 2019-2021 period"

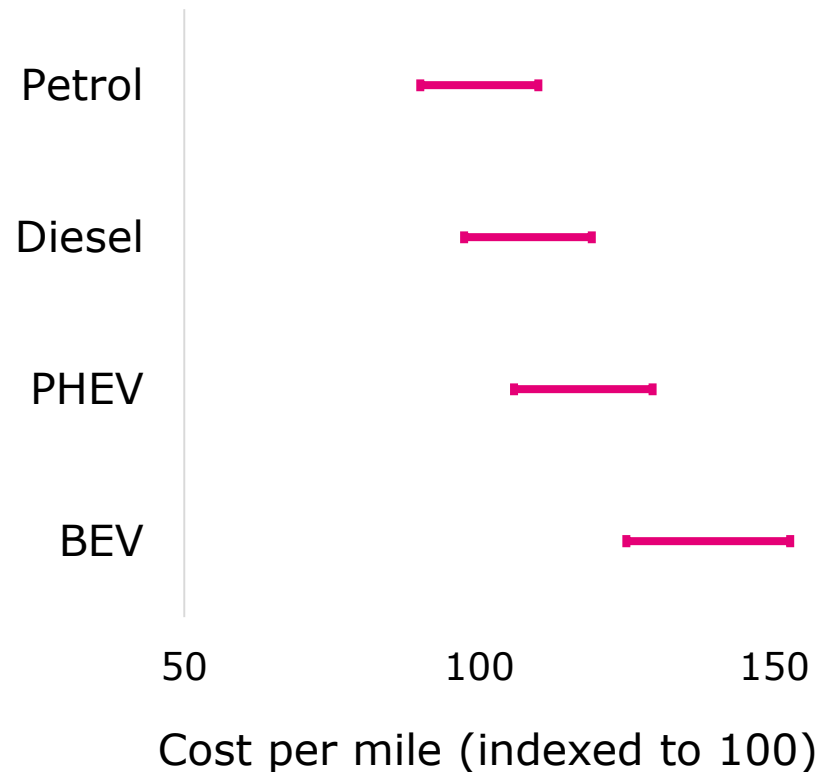
*BMW Group Investor
Presentation, August 2017*

"Volkswagen is...launching more than 30 purely battery-powered electric vehicles over the next ten years... BEV sales will be...equivalent to some 20 to 25 percent of the total unit sales expected at that time"

*Volkswagen,
Strategy 2025,
June 2016*

Today xEV adoption is limited by total cost of ownership

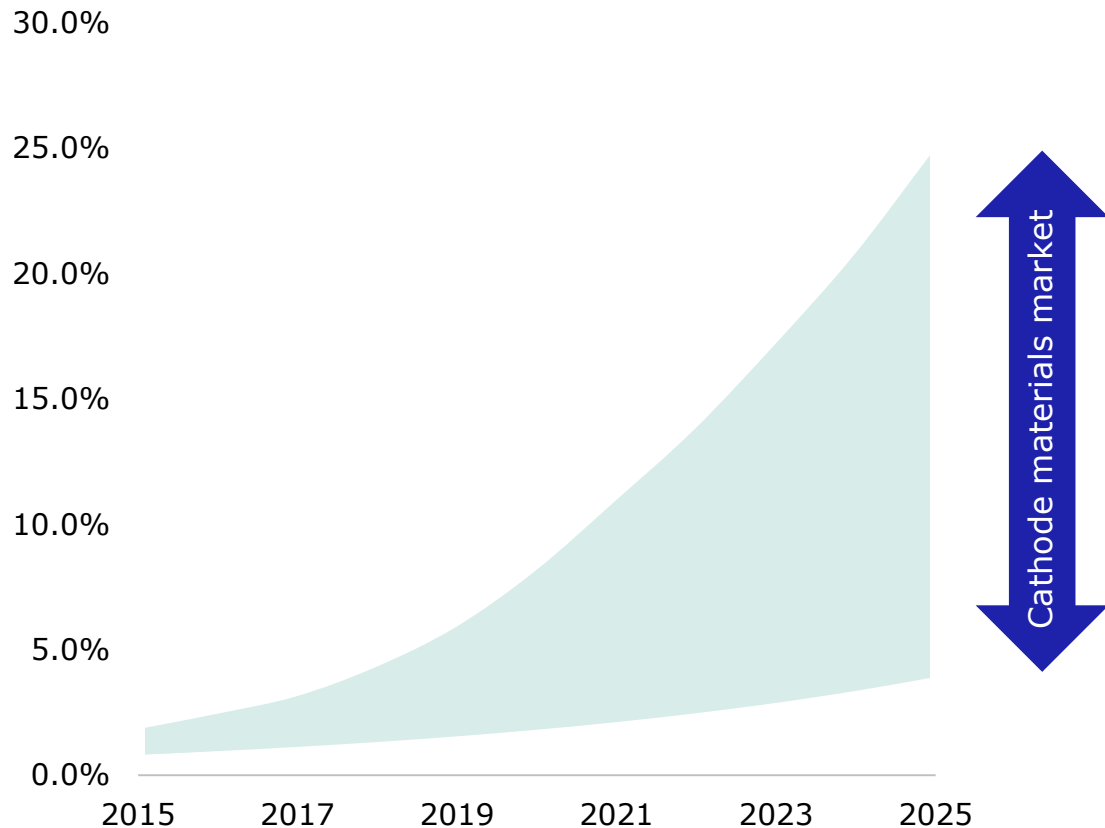
Total cost of ownership (TCO) for passenger cars, Europe 2017¹



- xEV penetration today driven by government subsidy
- xEVs are forecast to reach TCO parity in the mid 2020s, depending on vehicle segment
- Cost of lithium ion batteries has declined over the past decade
- Cathode materials over this time have not changed significantly

Demand for cathode materials between \$15bn and \$100bn by 2025








Projected xEV (BEV and PHEV) global light duty vehicle powertrain share 2015-2025,%¹



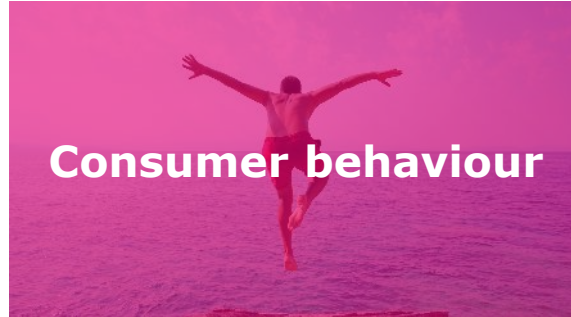
- Estimates of xEV (BEV and PHEV) penetration range from **4% - 25% by 2025**
- ICE and mild hybrids still expected to dominate market for the **medium term**
- Projected automotive cathode materials market by 2025:
 - **\$15bn-\$100bn** of sales
 - **500k to 3.3m metric tons** of capacity required, c. 150k today for automotive markets

A range of materials are required

Powertrain implications on cathode volumes and chemistries¹

								
		Micro HEV	HEV	PHEV	EV Medium	EV Long	PHEV-bus	E-Bus
Material demand ¹	Ave. Pack size (kWh)	0.6	1.0	10	30	70	70	250
	Cathode (kg), approx.	c.1	c.2	c.20	c.50	c.120	c.120	c.400
Materials positioning	LFP	High power					Safety and cost	
	NMC / NCA		High energy and range					
	JM eLNO		High energy, range, cost and safety					

JM is addressing the challenges for the adoption of xEVs



JM focus:

Technology investment

Broad portfolio of cathode materials

Sustained cathode materials innovation

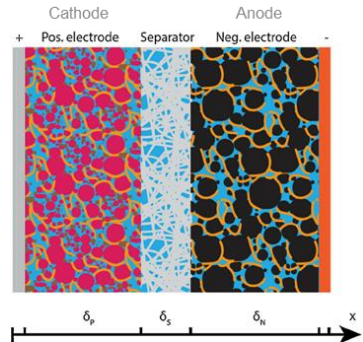
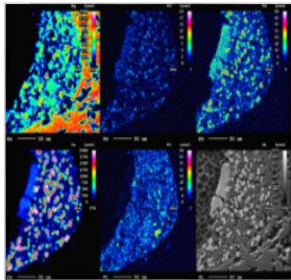
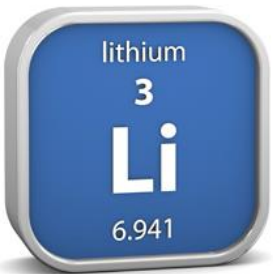
Building manufacturing capacity

Addressing cost (\$/kWh)

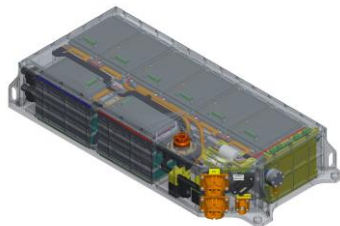
High energy material with low cobalt

Addressing barriers in the supply chain

JM has a strong position in the value chain



DOI: 10.1016/j.electacta.2015.06.015



Key challenges
to address:

Material cost
Energy density
Chemistry
Deactivation

Electrode cost
Press density
Structure
Degradation

Cell cost
Cell energy
Cell power
Cycle life

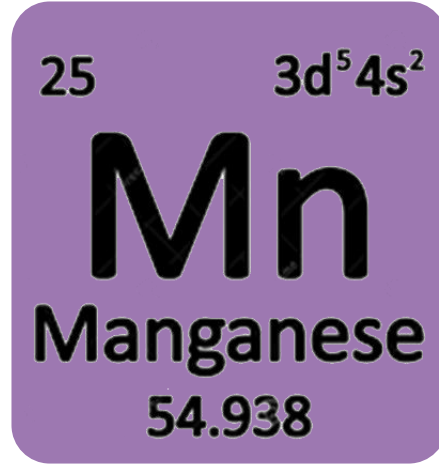
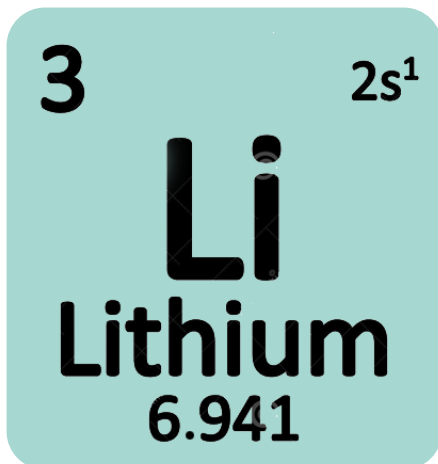
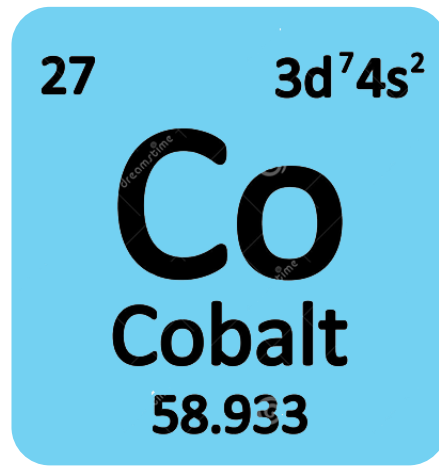
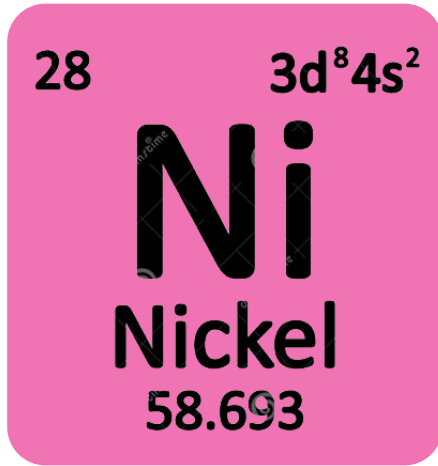
Total cost
Range
Power
Lifetime

JM focus



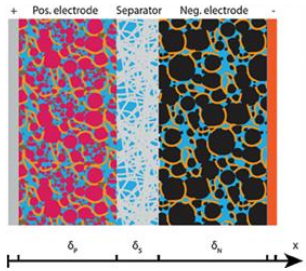
Insight to drive materials innovation

Raw materials: strategic sourcing of metals



- **JM-wide longstanding history** of metals procurement and management
- Leveraging nickel and cobalt contracts and buying power with **Efficient Natural Resources**
- Strategic partnership with **Nemaska Lithium** for the supply of lithium
- Developed **advanced precursors** to enable starting production from raw metals

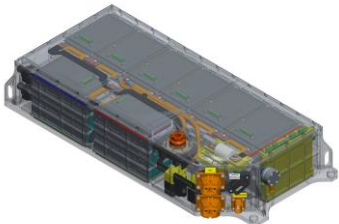
Electrodes, cells, and systems: insights to drive materials innovation



- Understanding electrode structures to design cathode material morphology to **improve energy density**

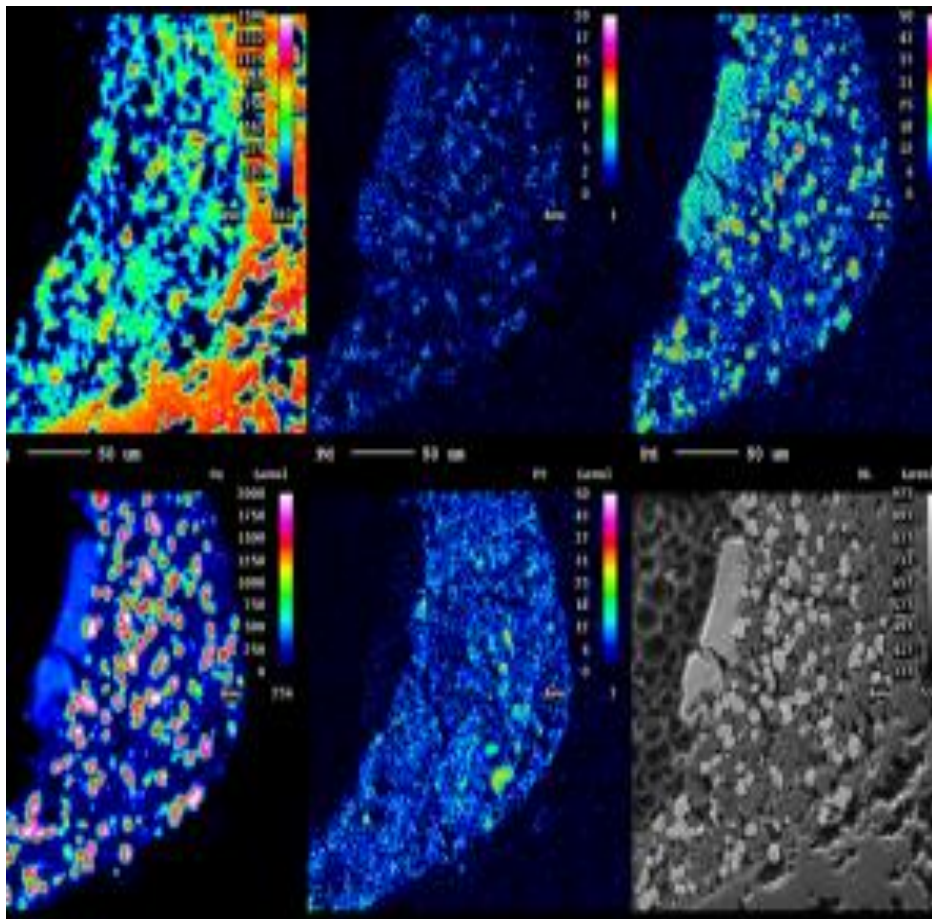


- Understanding cell performance to **match cathode performance** with anode, electrolyte, and separator



- Understanding pack-level performance to **improve cathode materials lifetime and safety**

Cathode materials: using our chemistry to develop leading materials



- **IP across a range of battery materials:** LNO, NMC, and LFP
- **Over 60 R&D scientists**
- Leveraging **nickel expertise** across JM
- Using **Clean Air expertise** in materials engineering and understanding automotive qualification cycles
- **Strategic partnerships** with cell manufacturers and automotive OEMs

Significant progress in high energy materials in the past year

2012

- Entered lithium ion battery market
-

May 2016

- Licensed key high nickel intellectual property
-

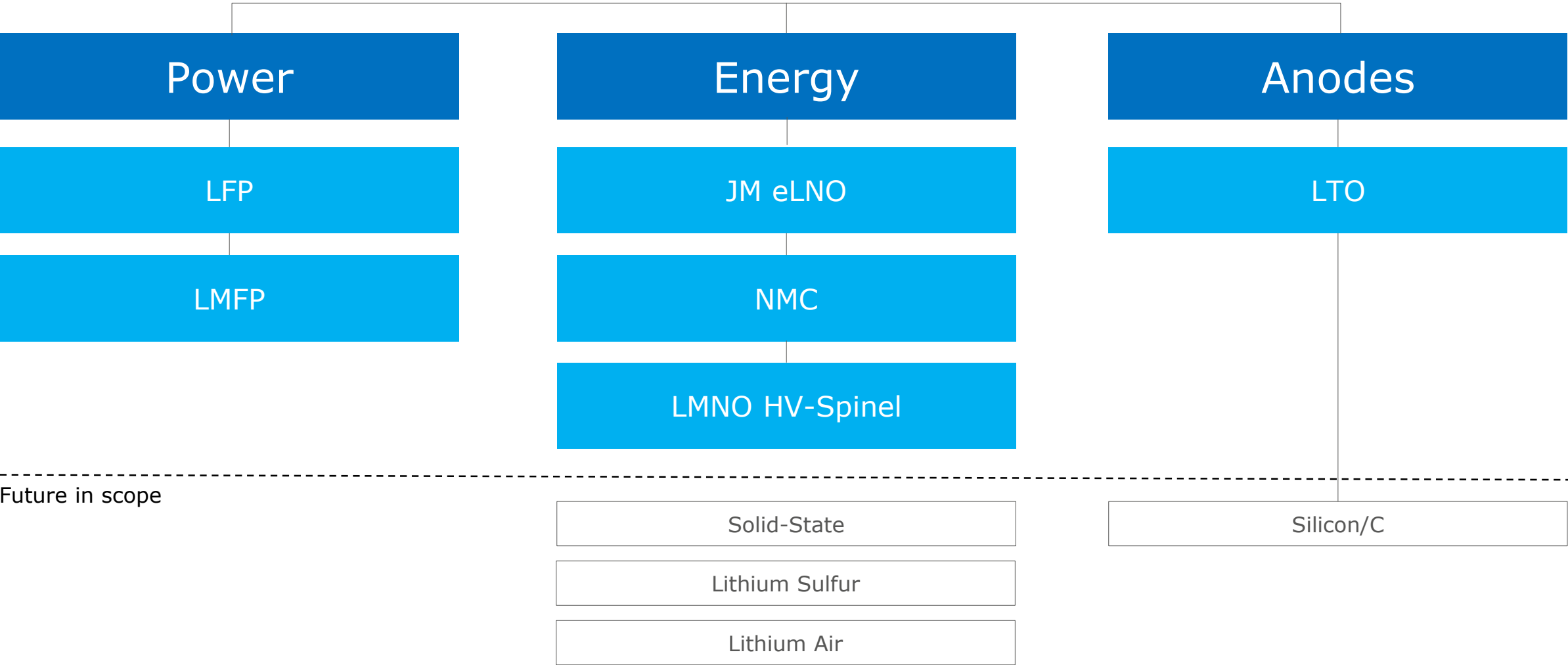
2017

- Developed high energy cathode materials and scaled-up to pilot scale
 - Validated benefits of materials with cell manufacturers and OEMs
 - Materials in qualification cycles with six customers
 - Identified manufacturing sites for our plants
 - Approved investment for demonstration scale manufacturing facility
-

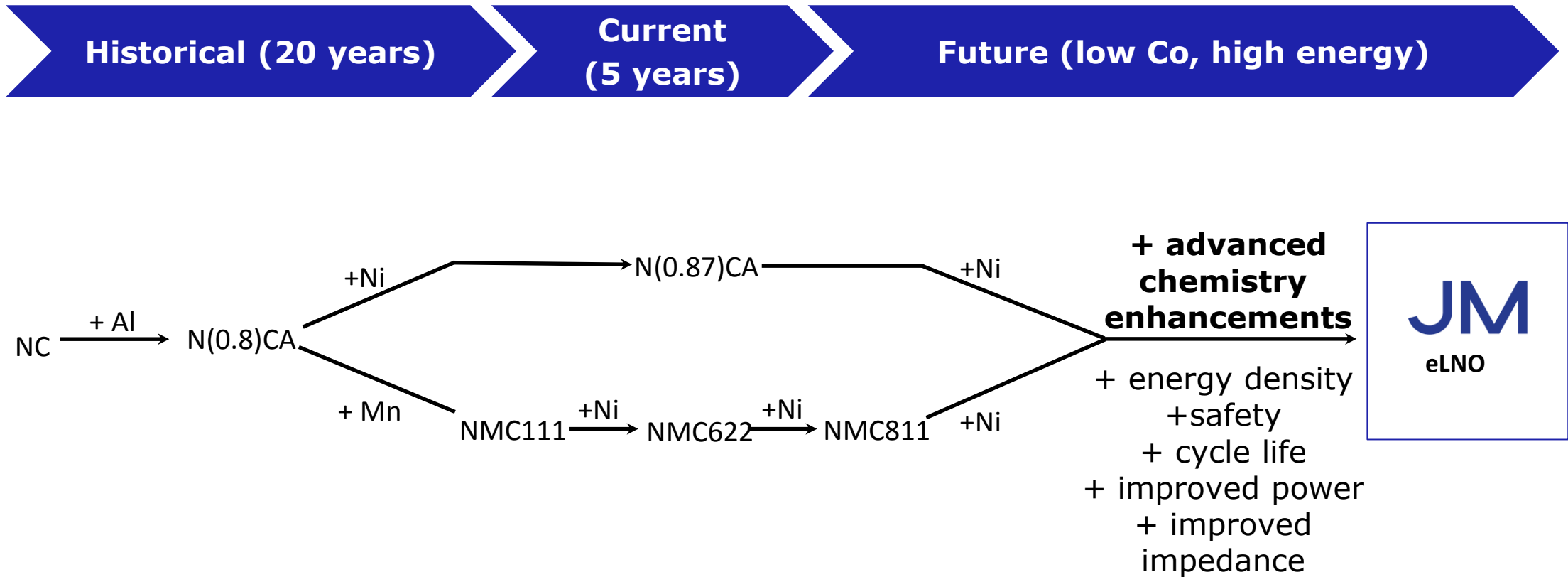
2018

- Investment on first plant of c.£200m from mid-2018

We have a wide portfolio of battery materials including JM eLNO



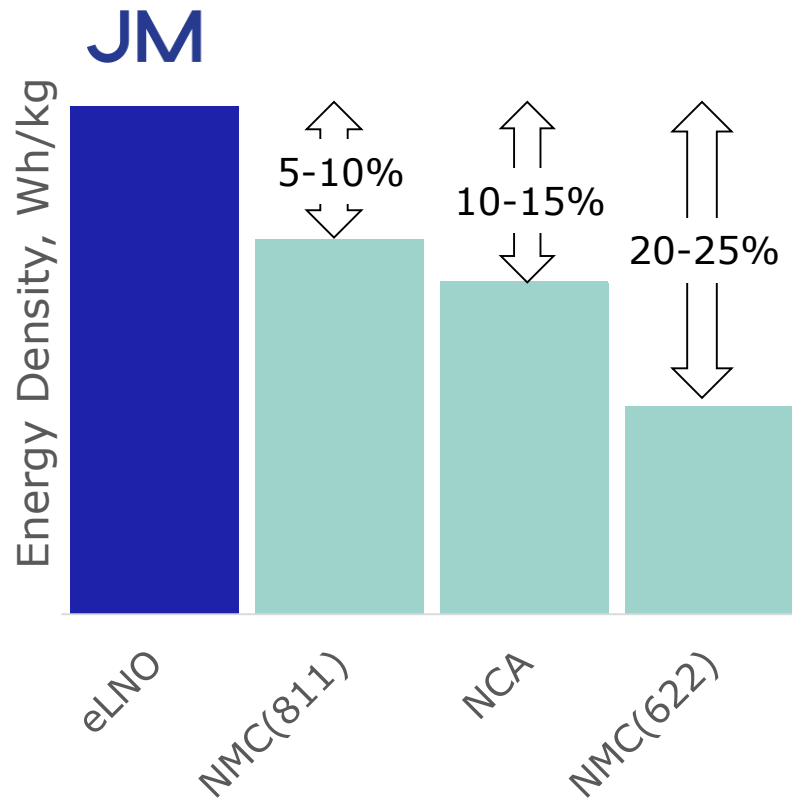
JM eLNO delivers a step-change in performance



JM Battery material development focussed on beyond NMC materials

JM eLNO a step-change increase in energy density

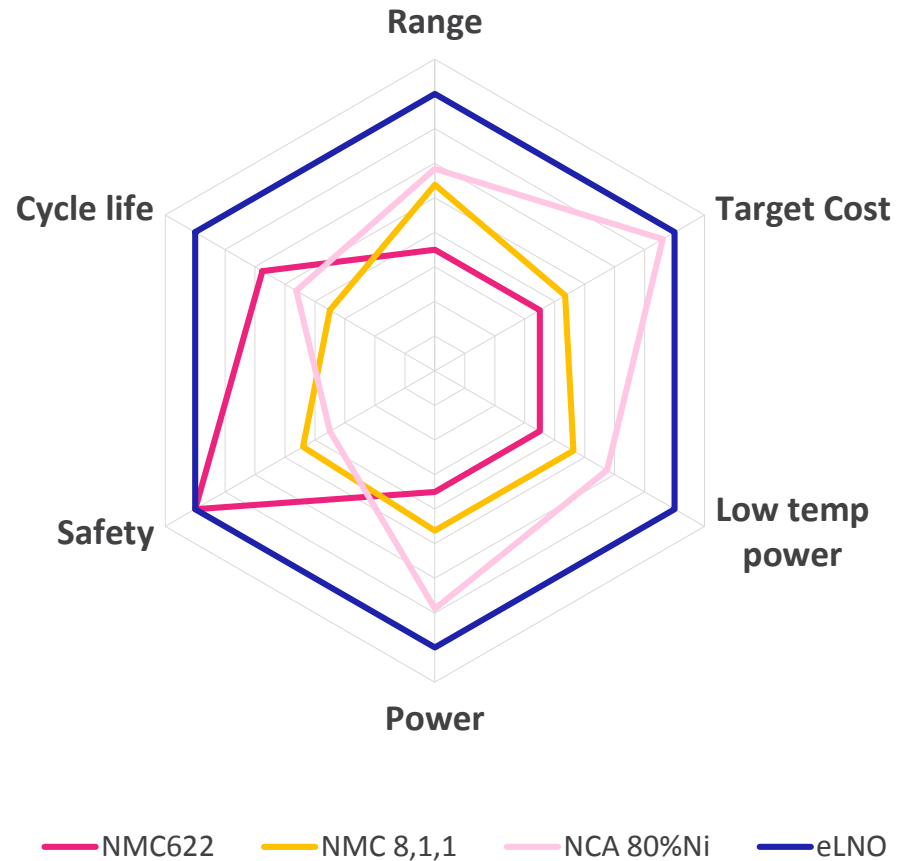
Energy density¹



- eLNO will enable longer range EVs with lower pack level cost
- Step-change increase in energy density compared to NMC(622), NMC(811) and NCA materials
- Material can be further optimised for any customer automotive application
- Technology is a key driver for market share gain and margin capture

JM eLNO delivers outperformance against all other key metrics

Relative performance across key areas¹



- On every key metric eLNO is the best material in the market
- eLNO delivers improvements across energy density, power, range, life cycle and safety
- Cost advantaged through the efficient thrifting of cobalt

Customers have validated the performance of JM eLNO

versus NMC

"...delivered higher energy density than NMC(811)"

"...delivered better rate capability than NMC(811)"

"...cycle life equivalent to or greater than NMC(111)"

versus NCA

"...shows improved power performance than NCA"

"...improved low temperature power performance than NCA"

"...shows higher capacity retention than NCA"

Feedback from leading cell manufacturers and OEMs

Market timeline for the commercialisation of battery materials

Qualification stage	Typical volume per stage	Milestones	Timeline
Initial testing	10 – 100 kg	Validation of cathode material performance	3 - 6 months
Cell performance	1 – 2 MT	Full range of materials testing under different conditions	Year 1
Selection and award	100 – 200 MT	Technical and commercial review and selection	Year 1 - 2
Scale-up	500 – 1000 MT	Preparation for full scale manufacturing for platform	Year 2 - 3
Commercial launch	> 2,500 MT	Commercial launch of vehicle platform	Year 3 - 5

JM manufacturing plans for high energy eLNO

Production volume	Investment start date	Start of production	Milestones
5 MT	2016	Today	Samples to multiple customers from JM asset
10 MT	2017	2018	Pilot plant qualification materials to customers
500 MT	2017	2019	Demo plant qualification materials to customers
10,000 MT	2018	2021	JM commercial plant production for materials
> 10,000 MT	Additional commercial production based on demand

Conclusion

- We have developed best-in-class high energy battery materials
- Investment of c.£200m from mid-2018 to manufacture up to 10,000 metric tons from FY21/22
- We expect to be on automotive platforms in production from FY21/22





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Efficient Natural Resources: Outperformance in targeted, growth segments

Jane Toogood

Sector Chief Executive, Efficient Natural Resources

Efficient Natural Resources:



Efficient Natural Resources : bringing together Process Technologies and Precious Metal Products

	Process Technologies	Precious Metal Products	Reallocation	Efficient Natural Resources	% of Group
For year ended 31st March 2017					
Sales excluding precious metals (£m)	587	403	(71) ⁽¹⁾	919	25%
Underlying operating profit (£m)	90.4	86.4	(13.8) ⁽²⁾	163.0	32%
ROS (%)	15.4	21.4		17.7	
ROIC (%)	11.4	19.8		13.5	

What you will hear today



**Overview of our
Efficient Natural
Resources business
and the markets
we operate in**



**How we serve our
customers and the
rest of the Johnson
Matthey group**



**Our strategy
and how we will
deliver it**

We create value from the efficient transformation and use of natural resources:

- Demand for the world's natural resources is increasing

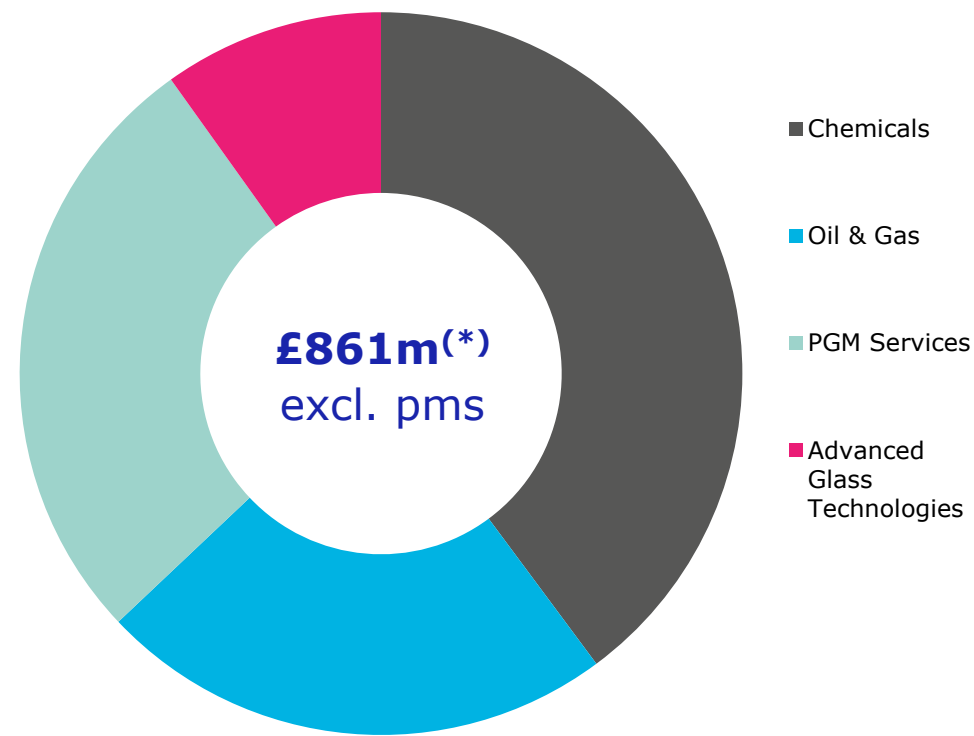
Efficient Natural Resources enables our customers to use natural resources more efficiently

Using JM's core chemistry and technology expertise to solve complex and variable problems through close collaboration with customers



We serve four market sectors
creating value through technology
and customer service

Efficient Natural Resources
2016/17 sales by sub-business



Catalyst Technologies

Chemicals

Chemical catalysts and process technology

40% of Sector sales

Oil & Gas

Refinery catalysts and gas purification

23% of Sector sales

PGM Services

Precious metal products, recycling and business solutions
Providing metal and metal products to the JM Group

27% of Sector sales

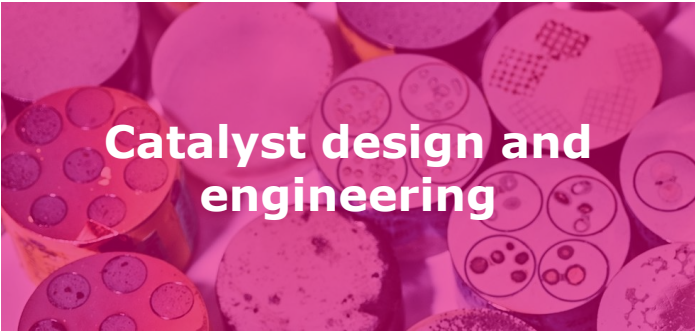
Advanced Glass Technologies

Advanced glass materials and conductive inks for use in automotive glass and other industries

10% of Sector sales

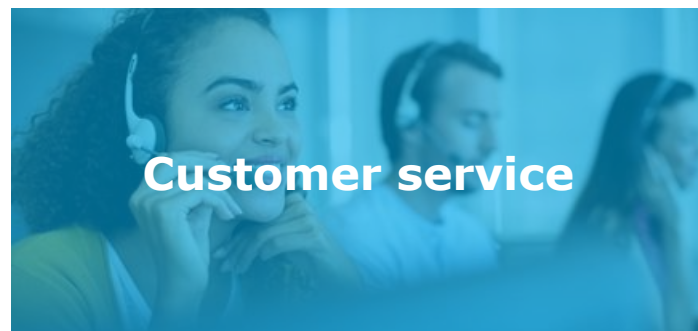
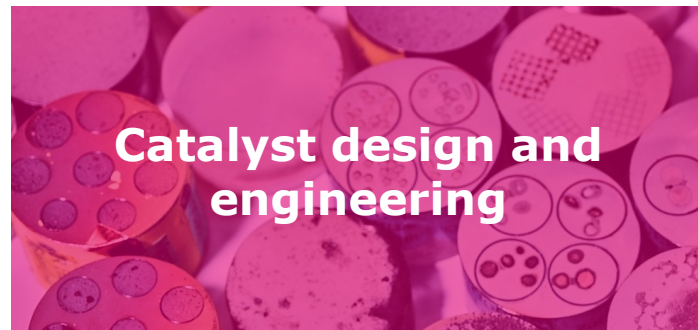
(*) Excludes £58m Diagnostics Services sales

We use our technology to lead the market

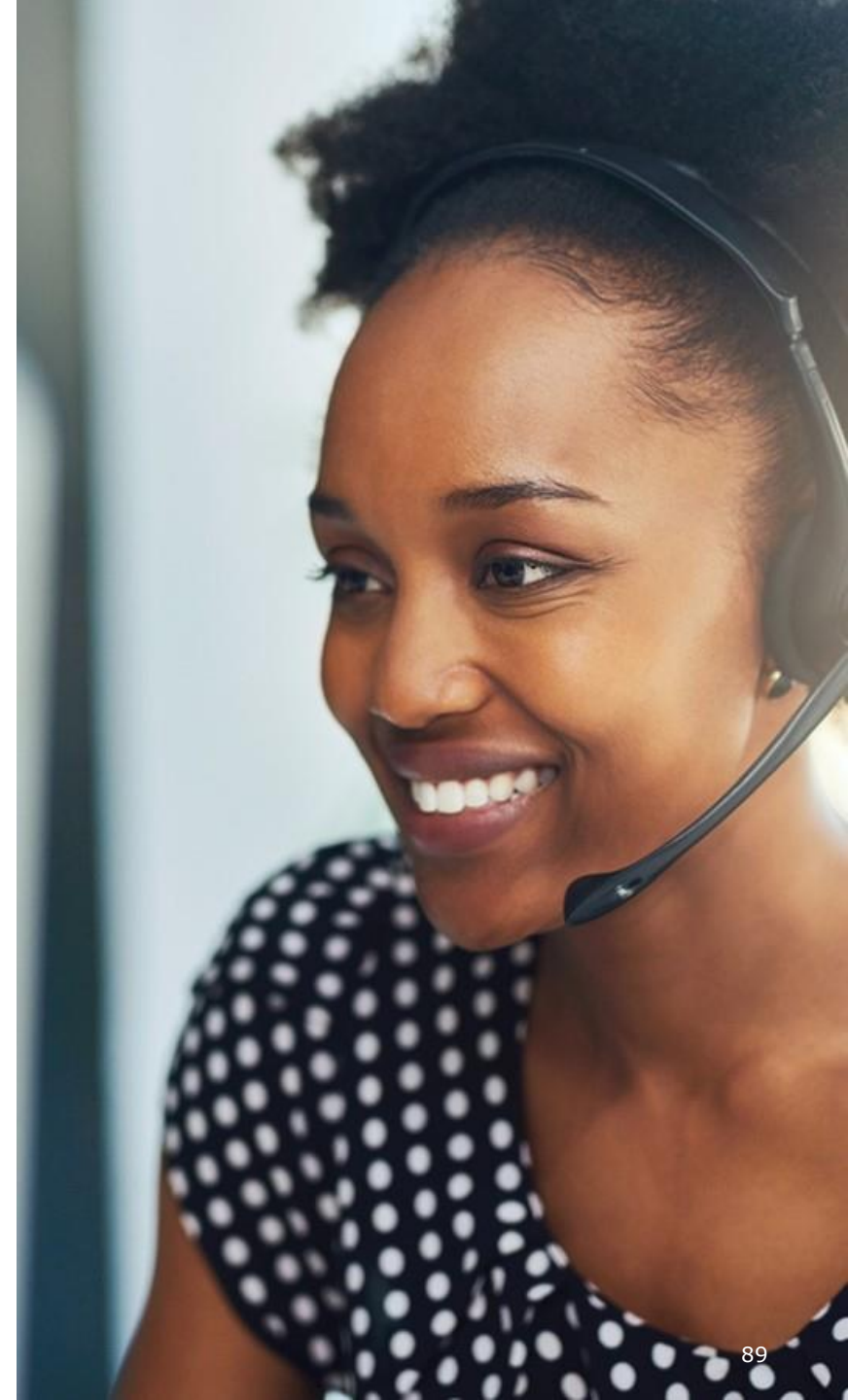


Technology Leadership Positions ⁽¹⁾	
Methanol	#1
Hydrogen	#1
Gas Processing	#1
Formaldehyde	#1
FCC additives	#1
PGM Services	#1
AGT	#1

We deliver outstanding customer service



Leveraging our competences to provide efficient transformation and use of natural resources



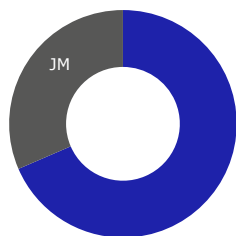
Our core strengths underpin #1 or #2 market positions in almost all our key segments

Catalyst Technologies

Chemicals - £343m

Chemical catalysts
\$5.4 billion⁽²⁾

(highly fragmented,
~ 40 segments)



- JM present in ~ 30% of overall market
- JM #1 or #2 in almost all key markets

Oil & Gas⁽¹⁾ – £199m

Refinery Catalysts
\$7.6 billion⁽²⁾

(mix of large and
small segments)



- JM present in ~ 37% of overall market
- JM has narrow position in \$2.7 billion⁽²⁾ FCC market
- JM #1 or #2 in all key markets

PGM Services - £234m

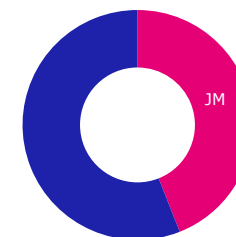
Largest single refiner of
pgms

JM #1 in all PGM
services markets

- JM has leading position in global refining capacity
- Focus on serving internal customers

Advanced Glass Technologies - £85m

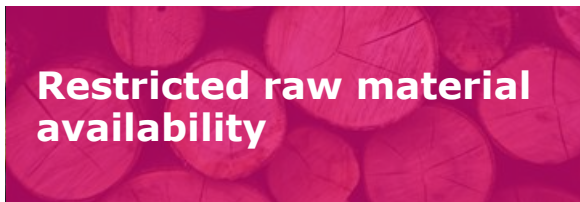
Advanced Glass
materials
£200m



- JM present in ~ 44% of overall market
- Automotive largest segment, smaller decorative, PV
- JM #1 or #2 in all markets

Increased demand for efficient use of natural resources

MegaTrends



Market Dynamics

Global growth 3%

Oil price lower for longer

Automotive production growth

Increasing PGM recycle & reuse

Over capacity in chemicals



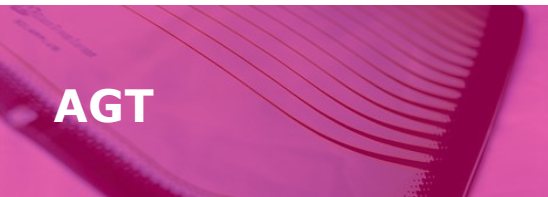
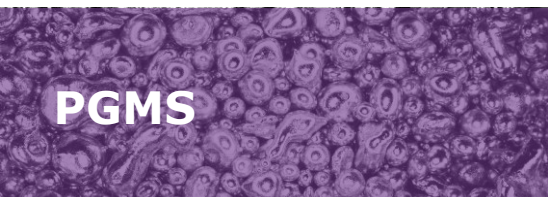
High growth regions

Shift to clean, cheap feeds

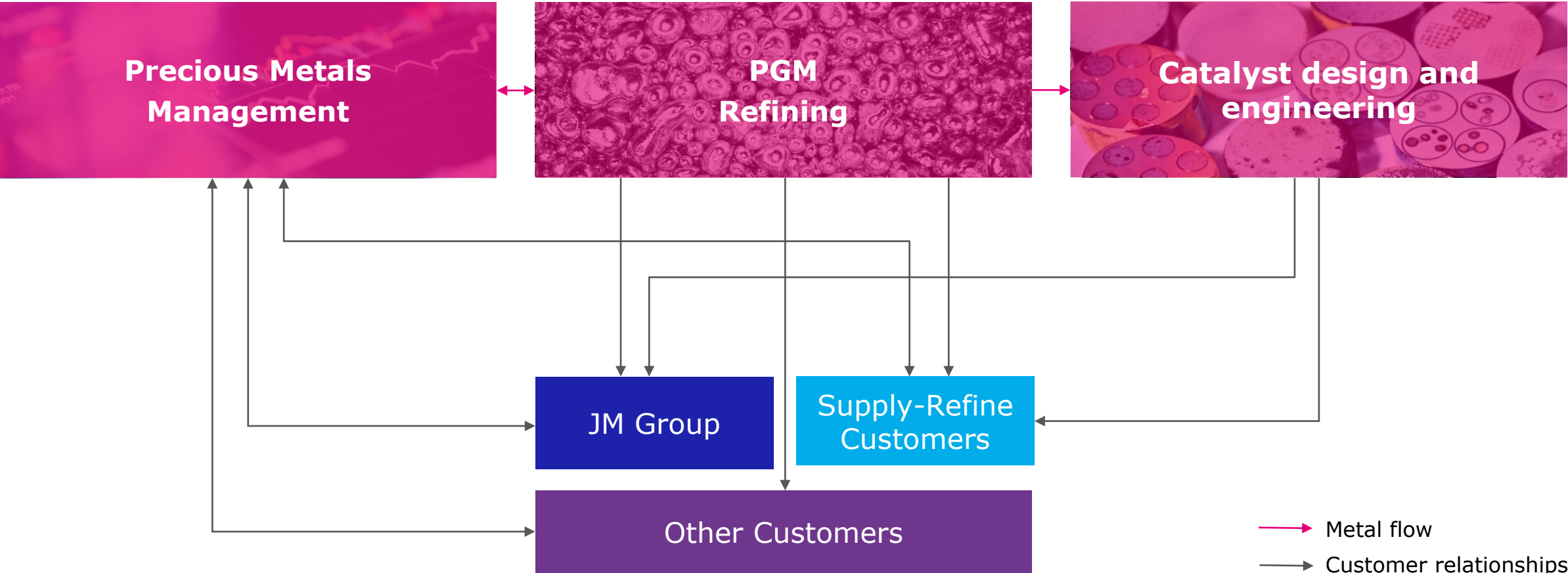
More environmental legislation

Plastics growth

Differentiated approach given range of growth in markets

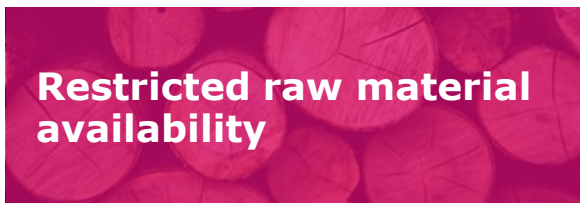
	Underlying medium term industry market growth	Average medium term growth rate in segments that JM operate in	Range of growth rates in segments that JM operate in
	↑ 2-3%	2.5%	2 - 4.5%
	↓	2%	0.5 - 3%
	2%	2.5%	2 - 3.5%
	Low single digit growth		

Platinum Group Metals: a secure & sustainable source of critical raw materials to JM Group and customers



JM strategy capitalises on current market trends

MegaTrends



Market Dynamics

Global growth 3%
Oil price lower for longer
Automotive production growth
Increasing PGM recycle & reuse
Overcapacity in chemicals

High growth regions
Shift to clean, cheap feeds
More environmental legislation
Plastics growth

Implications for strategy

Maintain

Drive efficiency
Increasing PGM recycle & reuse
Maintain in depth customer process insight

Change

Focus on high growth markets
Bigger footprint in high growth regions
Shift in PGM demand & mix
Fewer licenses, more catalysts
More gas and bio-based opportunities

Our strategy to deliver consistent market outperformance

Maximise growth through differentiated investment by segment and region and focus on margin retention in lower growth markets

01

Focused investment in R&D to maintain & extend technology leadership

02

Deliver additional value through focus on efficiency

03

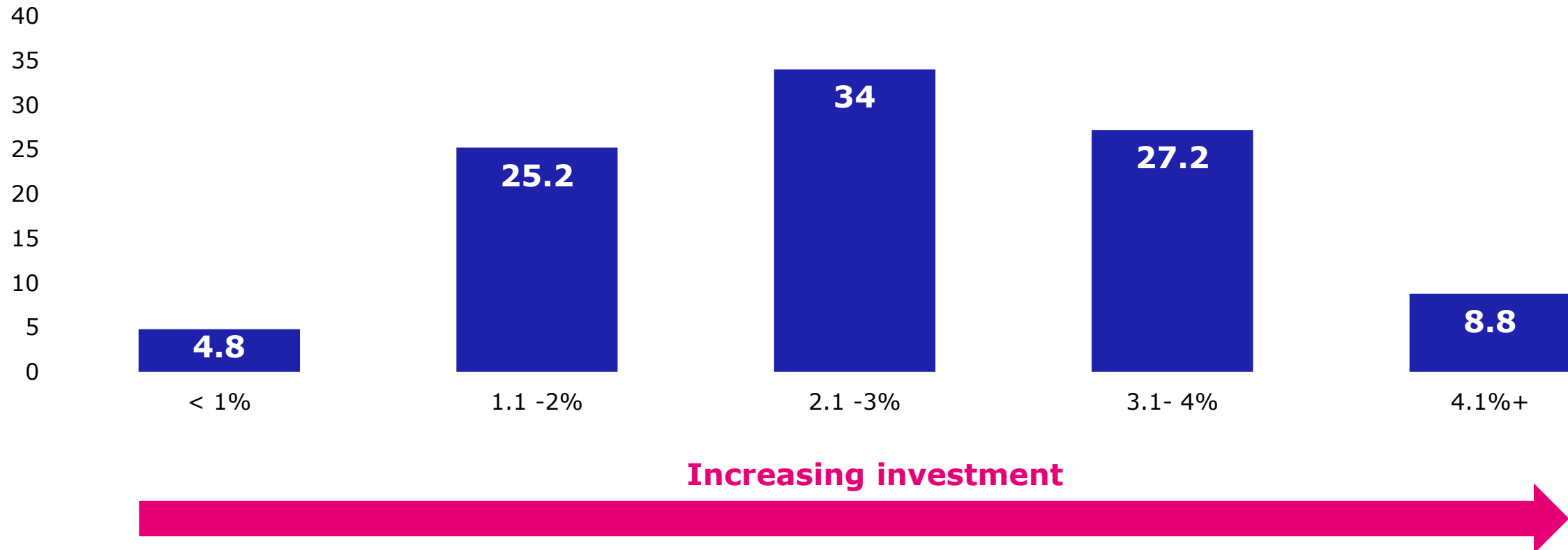
Explore long term growth opportunities by extending our capabilities into adjacent markets, geographies and technologies

04



1. Maximise growth through deep understanding by segment and region

% of sales⁽¹⁾ in each growth area⁽²⁾



2. Focused investment in R&D to maintain and extend technology leadership

Unique set of materials science and scale up capabilities

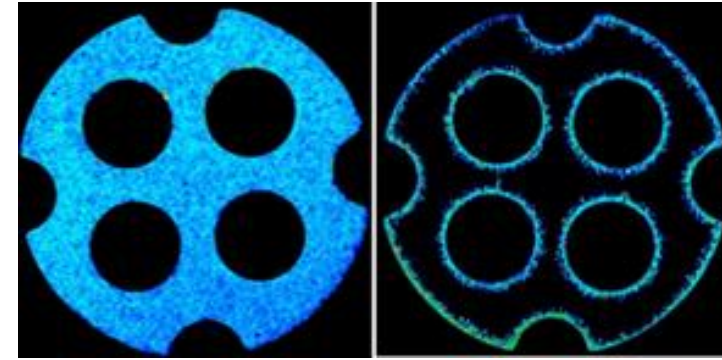
Maintain R&D spend at consistent level

R&D closely aligned to value creating sector positions and growth areas

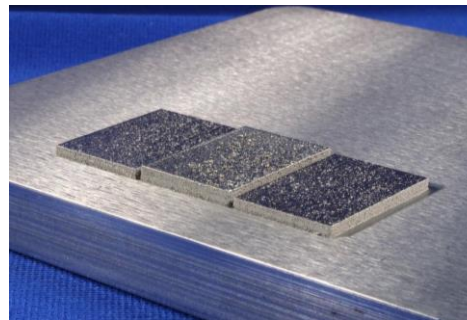
Working closely with leading edge partners and customers to deliver step change innovation

Add value to our customer's operations through new data driven insights

Core shell reformer catalyst
Optimised metal content, same performance



New methods of fabrication for PGMs
using additive layer manufacturing



3. Deliver additional value by focus on efficiency

Enablers for Efficient Natural Resources

Operational Improvements

Complexity reduction

Organisational efficiencies

Examples

PGM refinery
optimisation

Portfolio
Optimisation

Spans &
layers

**Deliver
Operational
Improvement**

- Operating profit 1% ahead
of sales growth

4. Explore long term growth opportunities by extending our capabilities into adjacent markets, geographies and technologies



New natural resource landscape

Exploring new market spaces



Alternative feedstocks

Gas to chemicals
Biorenewables



Customer and circular economies

Recycling
New customer solutions

Consortium to commercialise technology for low carbon chemicals and fuels



Strategic consortium

Develop and scale up of Virent BioForming® Technology

Aim to deliver a commercial facility to produce cost effective, bio-based fuels and bio-paraxylene

The future for Efficient Natural Resources means:

A wider scope building on JM core competencies and leadership in chemistry and technology

Performance improvement by focussed investment and efficiency

Sales growth at 1% above the market (excl. PGMS) and operating profit 1% above sales growth

Creating value for customers today and in the future by efficient transformation of critical natural resources





Johnson Matthey
Inspiring science, enhancing life

Health: Delivering breakout growth

Robert MacLeod, Garrett Dilley and Paul Evans

What you will hear today



**Overview of our
Health sector and
the market we
operate in**



**How we create
value with our
Innovator
customers**



**How we create
value with
our Generics
customers**



**Our strategy
and what this
will deliver**

Health sector to deliver breakout growth

We operate in a growing, \$40bn segment

We have expertise for both Innovator and Generics companies

We have a portfolio of successful products but that portfolio is not yet at scale

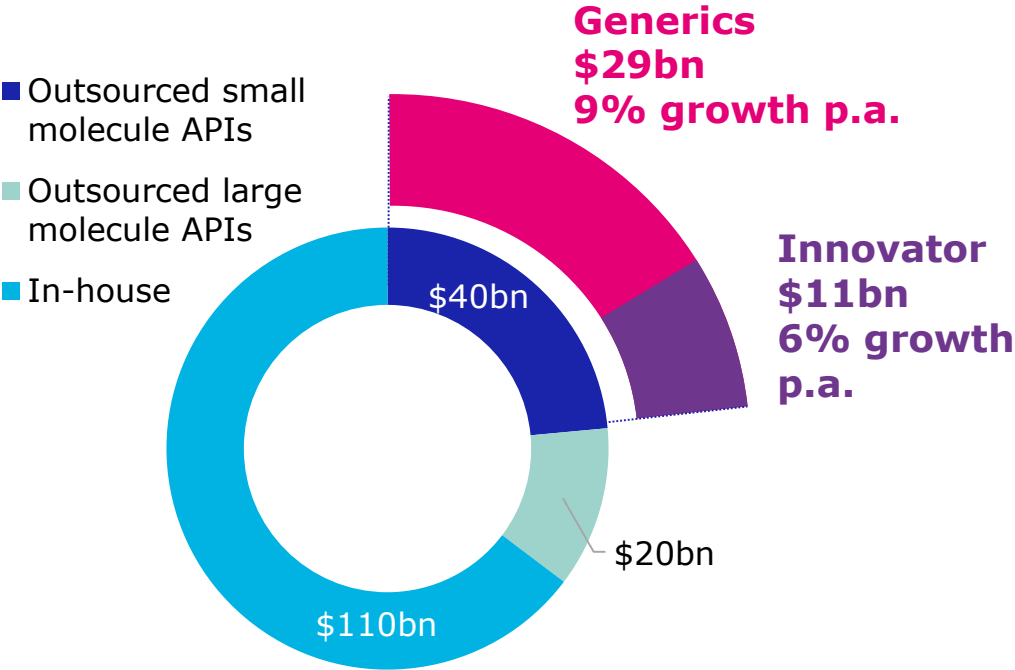
We ramped up our investment to broaden the pipeline from 2014

Therefore, sales growth from 2019/20 will be double-digit with margin reaching the high 20%s



Outsourced small molecule API is growing at 8% p.a.

Global sales in API \$170bn ¹



An attractive segment which plays to our strengths

Increasing focus on healthcare costs is driving:

- More targeted and potent APIs
- Greater competition by generic companies

This is leading to:

- Increasing complexity of APIs and their delivery mechanism
- Increasing trend to outsource API development and manufacture

We create value by solving our customers' complex challenges

Our core capabilities:

- Strong brand and position in controlled substances (e.g. opiates and ADHD)
- Proven track record in rapidly developing synthesis routes for APIs with high molecular complexity
- Solid form sciences capability
- Catalyst design and development

What we do:

- Overcome challenging problems in the development and manufacture of complex APIs
- Work with both:
 - Innovator customers for novel APIs
 - Generic customers on known APIs to navigate IP landscape
- Manufacture commercial scale volumes of controlled and non-controlled APIs

Examples of creating value by solving our customers' complex challenges

Example 1: capabilities in developing synthesis routes

Development of complex molecules used to treat a genetic muscular dystrophy disorder

Example 2: solid form science capability that improve bioavailability and saves money

Optimised crystal form of an antiemetic avoided lengthy milling process and improved bioavailability of the API

Our core capabilities:

- Strong brand and position in controlled substances (e.g. opiates and ADHD)
- Proven track record in rapidly developing synthesis routes for APIs with high molecular complexity
- Solid form sciences capability
- Catalyst design and development

We will continue to broaden our capabilities in strategically focussed areas

Our business is based on our core capabilities

2016/17 | Sales £243m

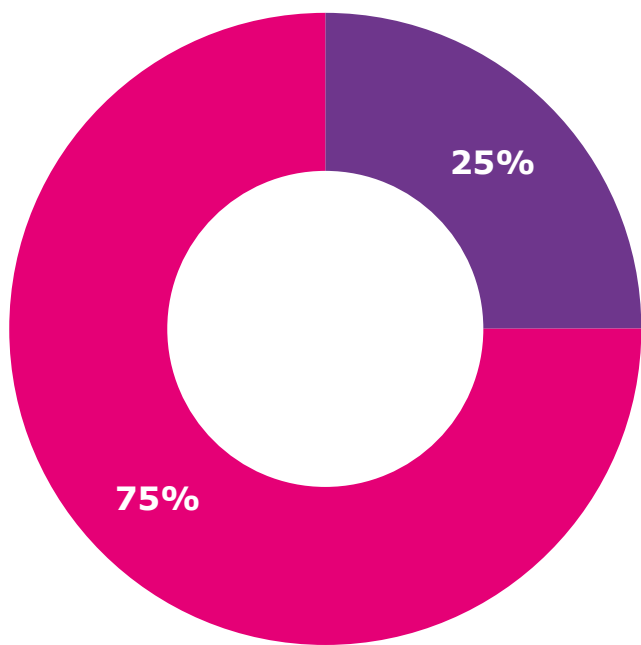
JM's existing facilities:

Full range of manufacturing assets in US and Europe

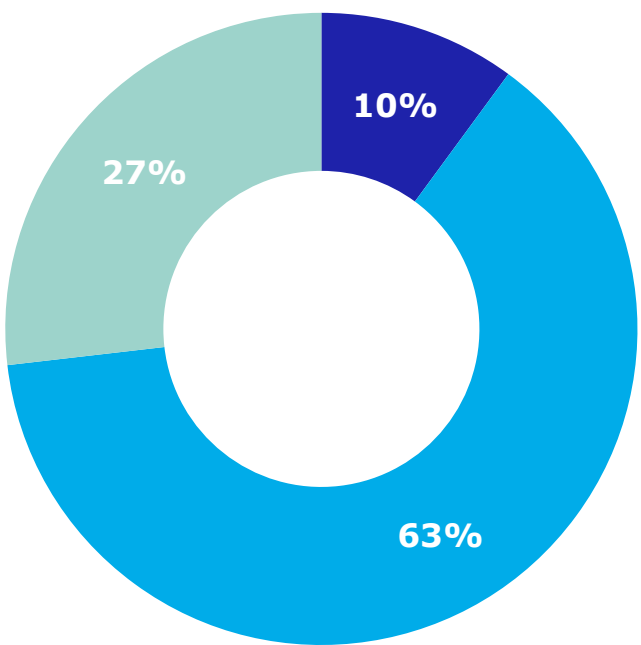
Key development sites in Boston (US) and Cambridge (UK)

Pilot and kilo lab capabilities in China

>1,000 employees



■ Innovator ■ Generic



■ Development
■ Controlled substance manufacture
■ Non-controlled substance manufacture

Ramped up investment since 2014 will drive breakout growth

The timelines in the pharma market are long:

Generics projects typically take 4-6 years

Opportunity to co-invest to enhance returns

Innovator projects take even longer

Development risk is taken by the customer

Projects are affected by clinical attrition and novel technology challenges

	2013/14	Today
Sector sales from new products (launched in last 5 years)	0%	19%
Size of pipeline (generic and innovator)	~20 products	~60 products
Annual R&D investment	£8m	£34m

Returns from this investment starts to come through from 2019/20

Our strategy: deliver breakout growth by providing solutions to the complex problems of innovator and generic companies

Trends

Increased demand for high potency drugs

Poor bioavailability profiles

Increased complexity of drugs

Focus

High barrier to entry segments

- Controlled substances
- High potency APIs

Using our high value-add capabilities of

- Developing synthesis routes for complex APIs
- Solid form sciences
- Catalysis enabled API manufacturing

JM strengths

Scale up of complex manufacturing

Materials design and engineering

Materials characteristics and testing

Double-digit sales growth beginning in 2019/20, with margins increasing to high 20%s



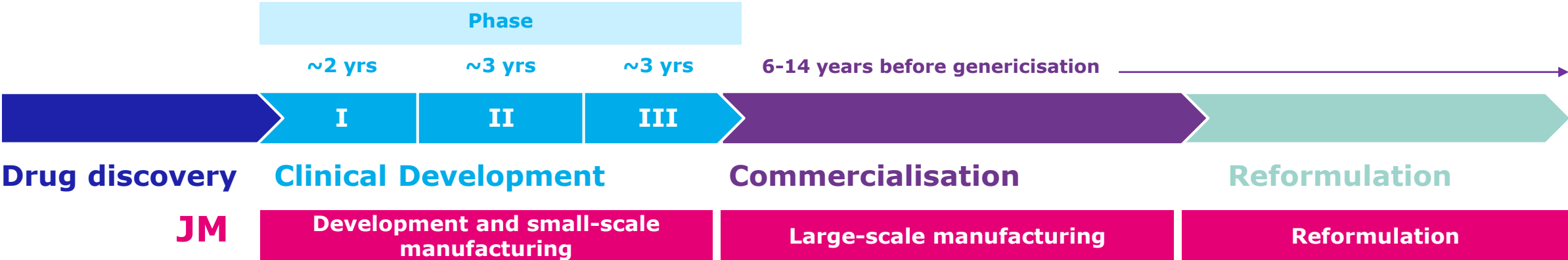
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Health - How we create value with our Innovator customers

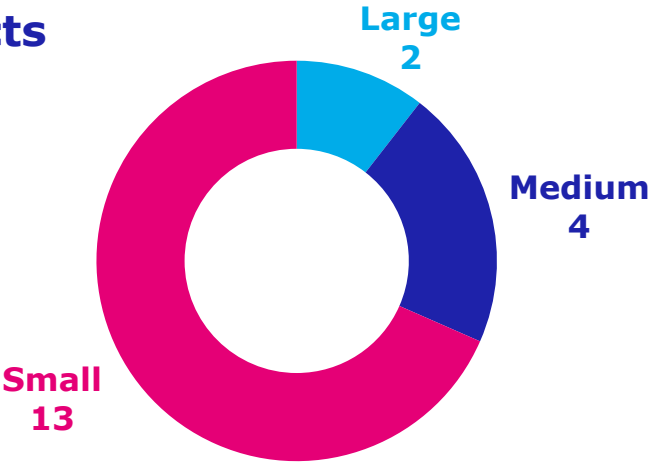
Garrett Dilley

We work with innovators on their API challenges

Innovators value chain



Development projects by customer type



Our core capabilities enable access to high-value clinical development projects

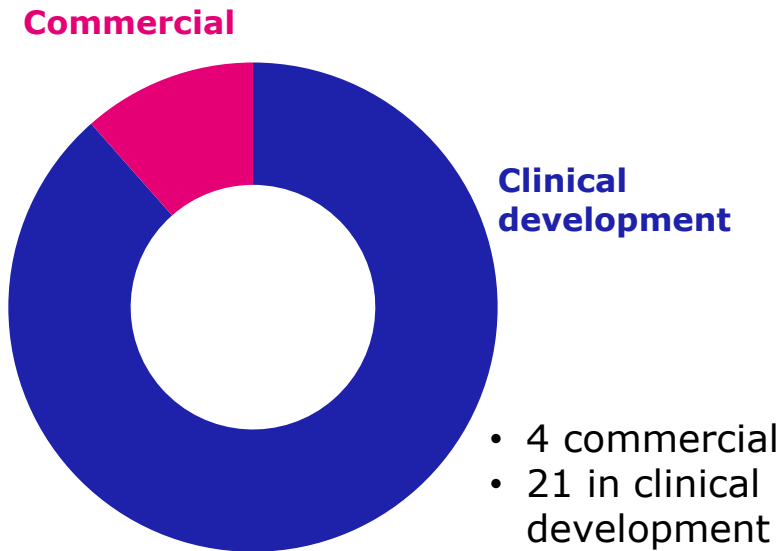
Supply of clinical development opens door to commercial manufacture opportunity

JM assists in filing for commercialisation and is listed as manufacturer on regulatory documents

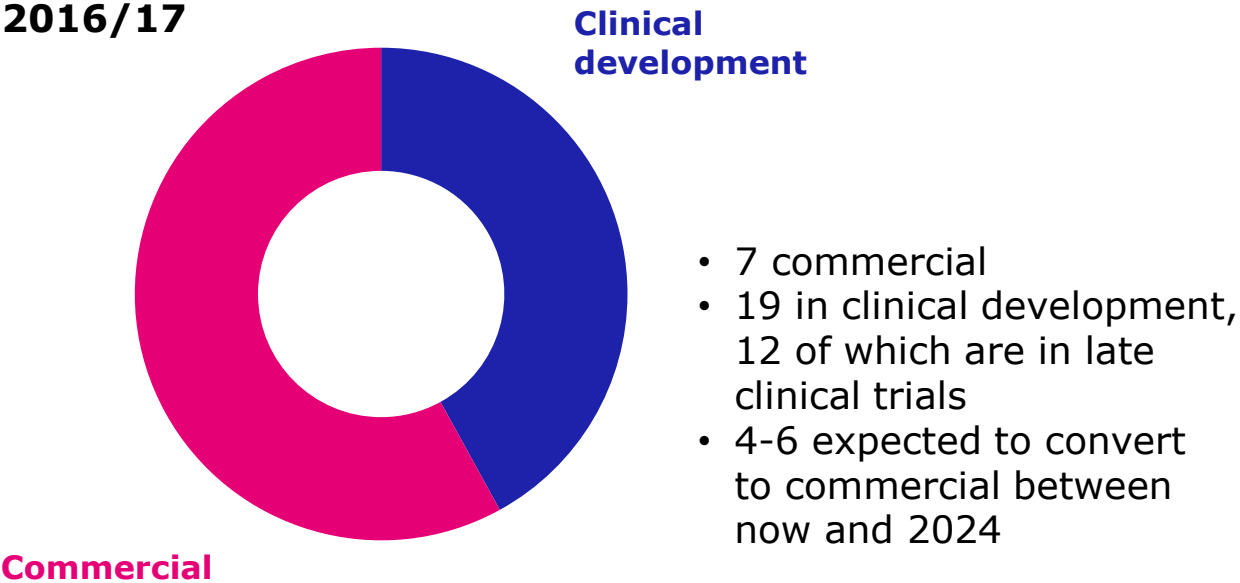
Driving growth through expertise across development to commercialisation

Innovators	% sales	Contractual terms	Sales ranges	Areas of focus
Clinical development – API development and manufacture	42%	6 months - 3 years	£250k - £5m per project	Number of clinical development projects
Commercialised API – development and manufacture	58%	3– 10 years	£1m - £25m p.a. per project	Number of commercialised APIs

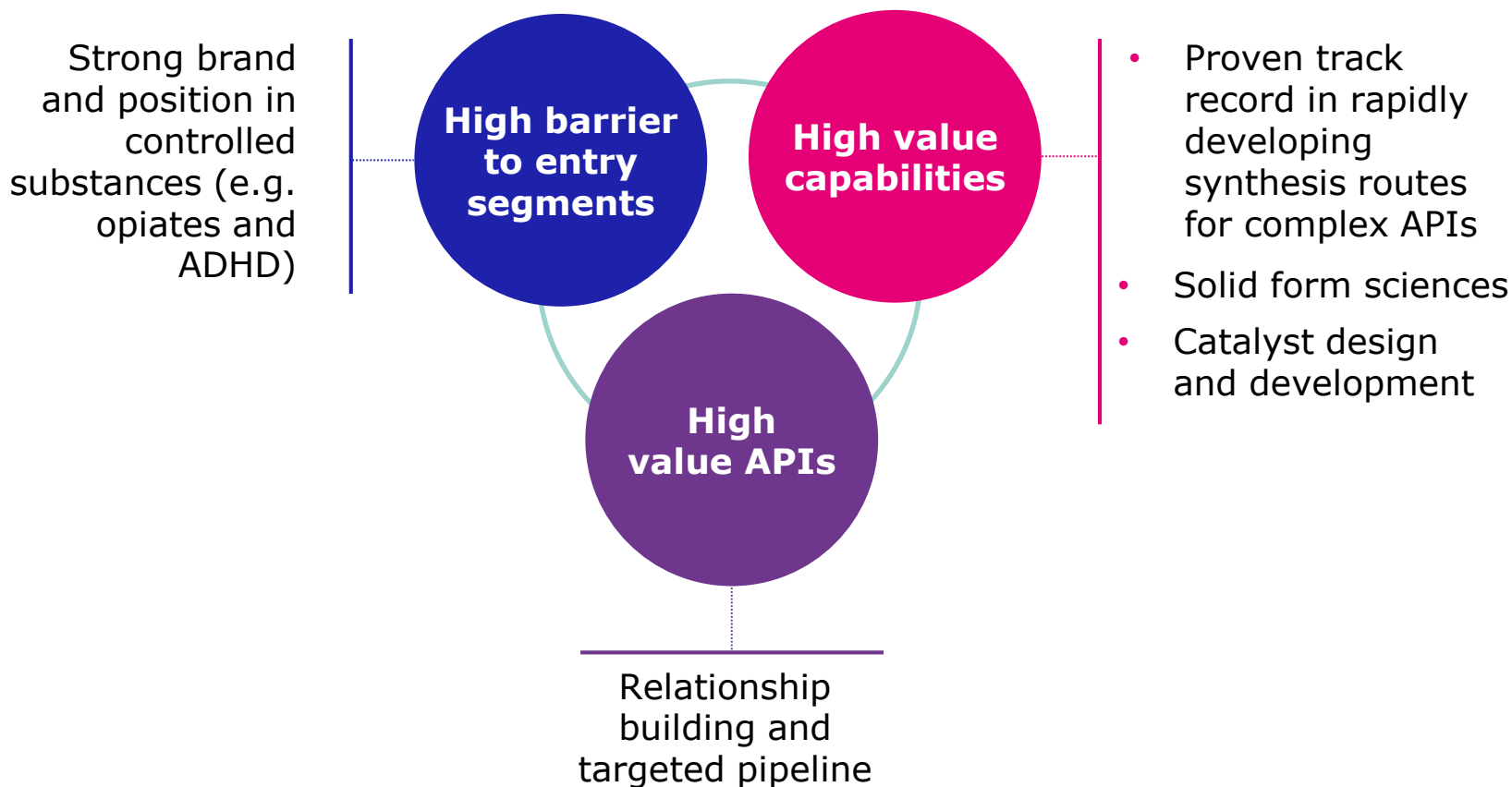
**Sales £22m
2013/14**



**Sales £59m
2016/17**



Core capabilities: why our customers come to us



World class development capabilities in Boston (US) and Cambridge (UK)

Crystal form expertise to rival large pharma – key in solving bioavailability challenges of novel APIs

Pipeline analysis

~60% with “high” molecular complexity or complex transformations/analyses

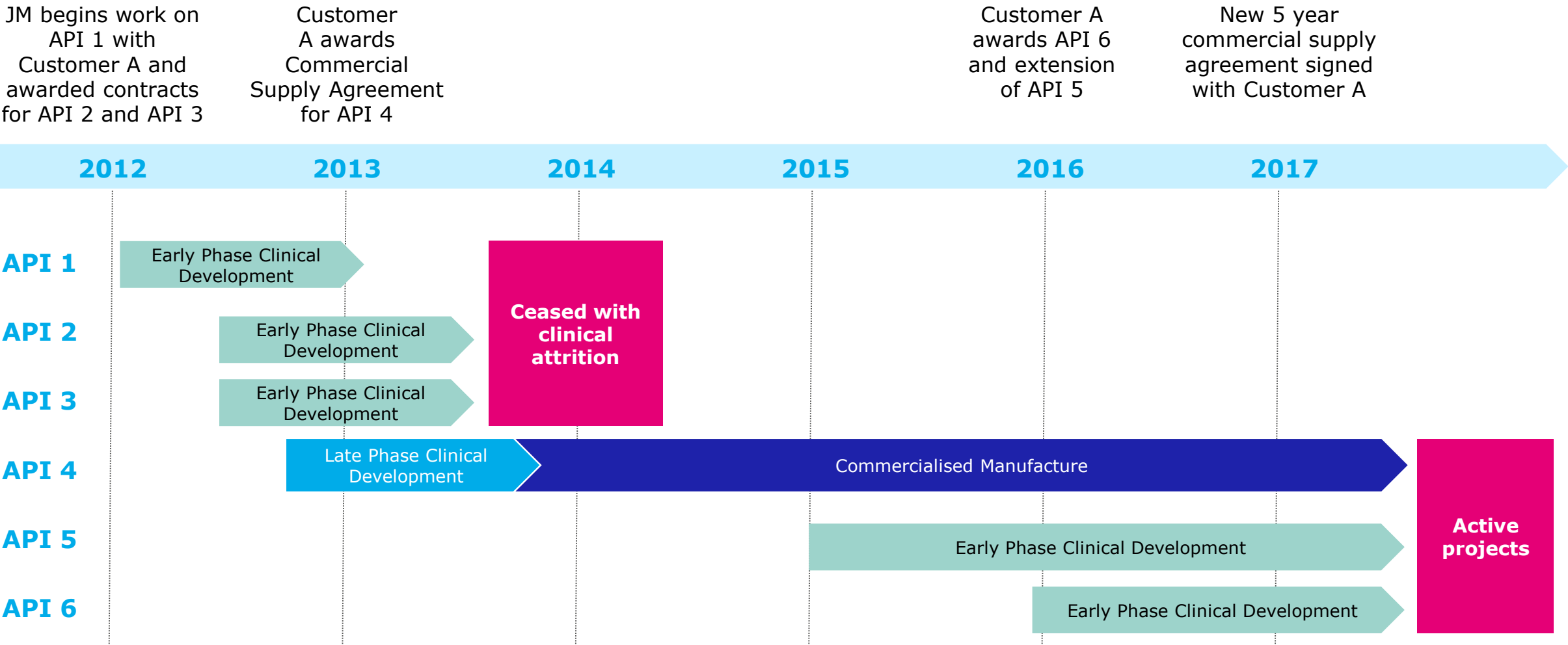
~50% highly potent or controlled molecules

~20% contain key catalysis steps

Customers include: Biogen, Nektar and Metacrine

Competitors include: Siegfried, Evonik, Cambrex, Alcamis, AMRI, Hovione

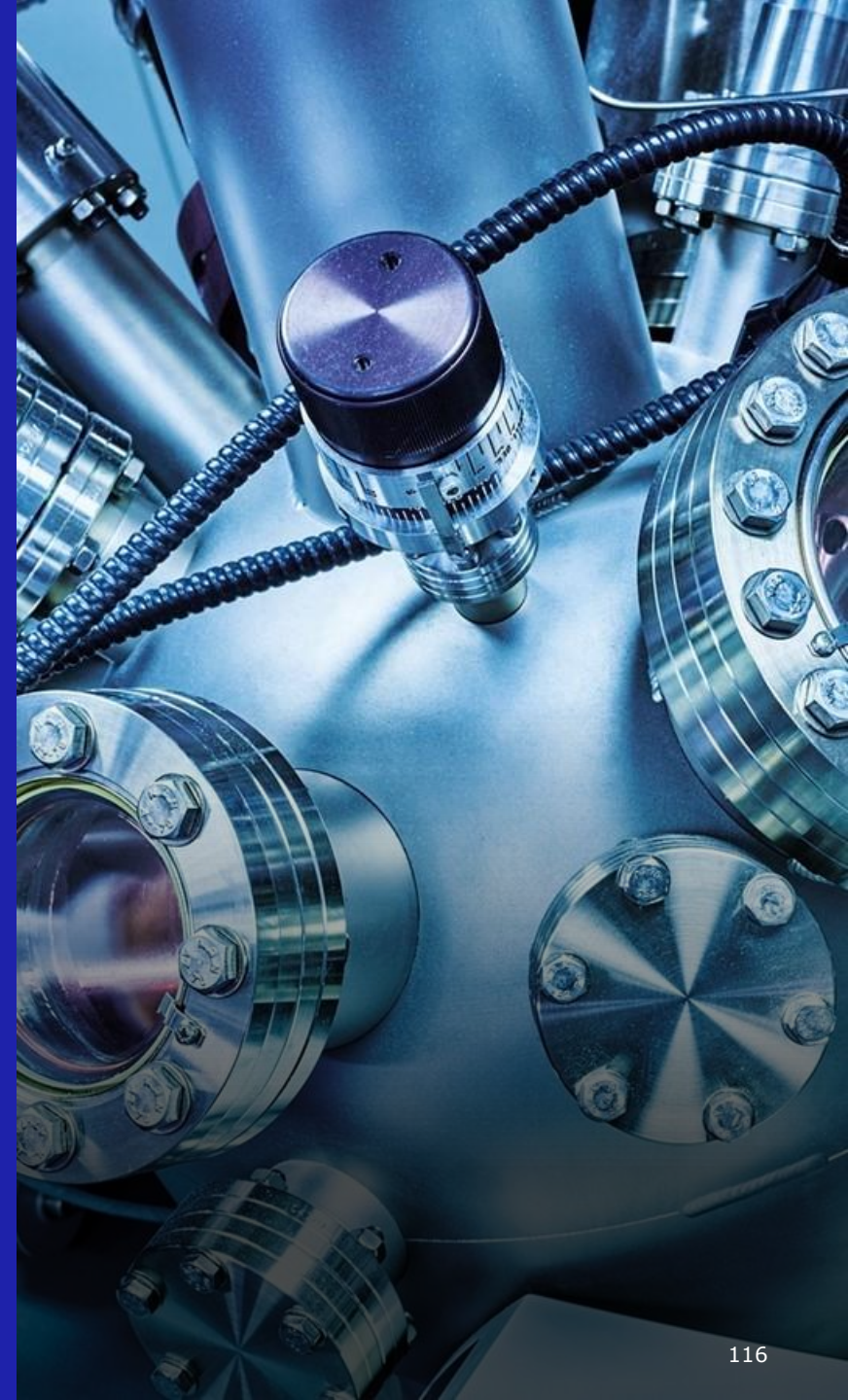
Customers come to JM for expertise: an example



Innovators: growth well ahead of the market

We have a strong foundation in the large and growing Innovator outsourced API market

- **With Innovator customers, we will:**
 - Continue to grow our product pipeline
 - Increasingly convert these to commercial-scale API manufacturing
- **We will add new skills and expand capacity**
- **This will deliver growth well ahead of the market**





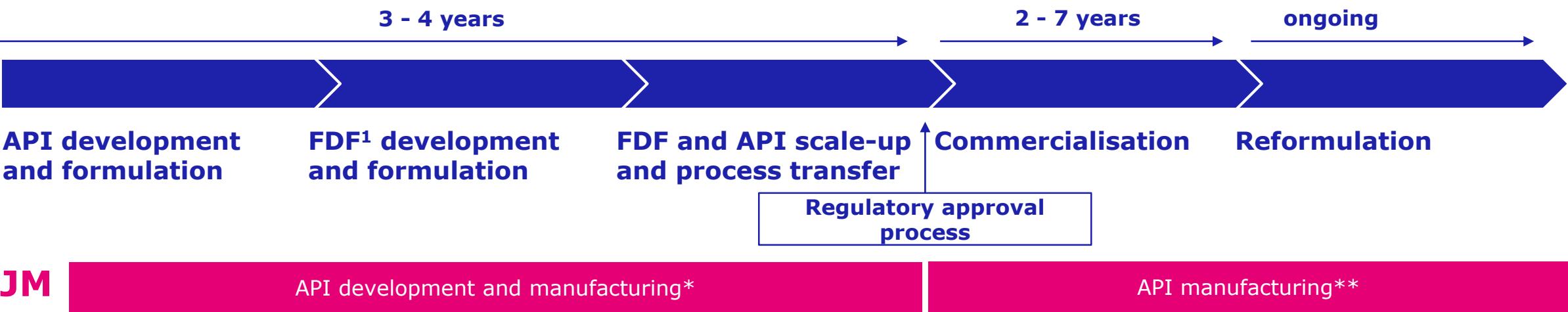
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Health - How we create value with our Generics customers

Paul Evans

We develop and manufacture complex, high value APIs

Generics value chain



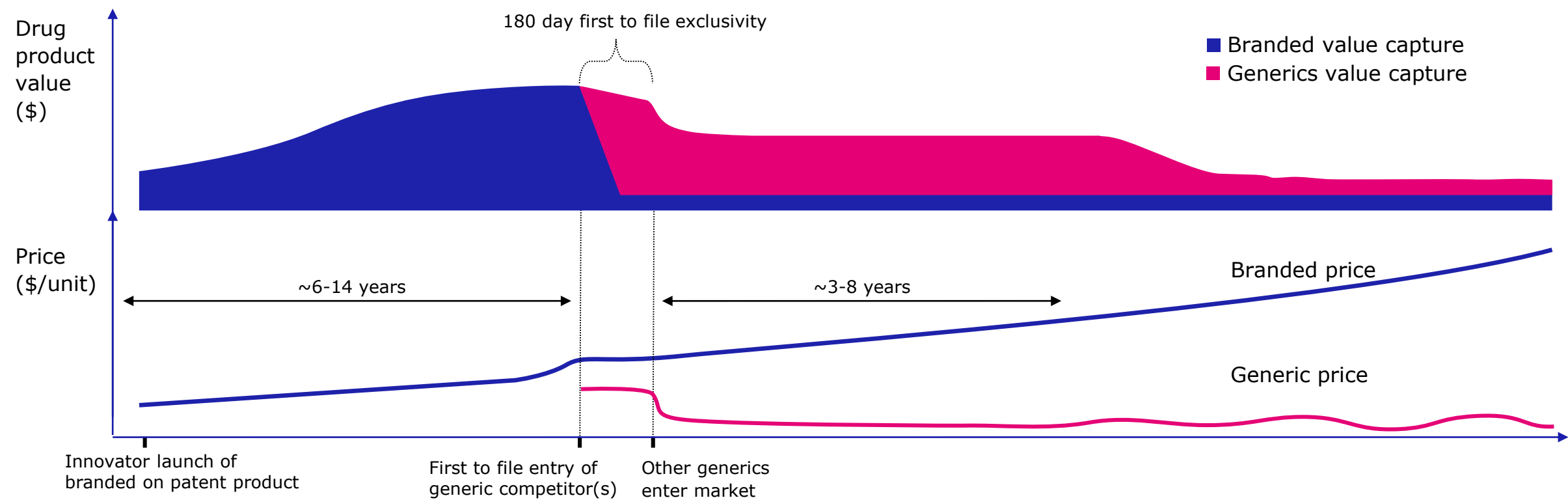
*small scale quantities **commercial scale quantities

\$29 billion global outsource API market	\$140 billion brand value coming off patent over next 5 years	Generics partners work with us to access the same strengths that innovators value	Generic companies include: Teva, Mylan, Sandoz, Par and Amneal
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JM competitors include: Alcam, AMRI, Cambrex, Hovione, Noramco, Mallinckrodt and Siegfried

US market characteristics

Indicative drug product lifecycle



Drug product prices change dramatically when generics enter the market

API price dynamics not correlated to drug product price dynamics

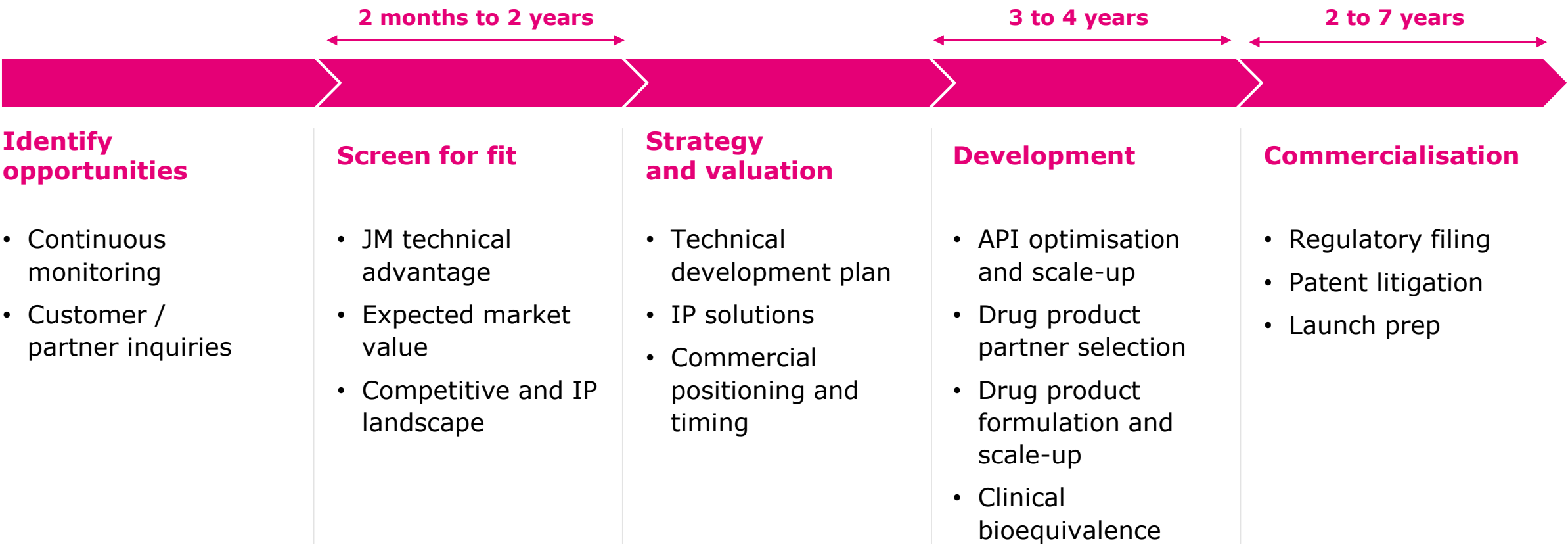
Relationships with customers vary from \$/unit API sales to profit sharing agreements

Our current portfolio will deliver low single-digit growth

Current product portfolio

	API area	% of sales	Characteristics	JM focus	JM medium-term growth
Controlled substances	Bulk opiates (principally pain relief)	18%	<ul style="list-style-type: none">• Lower margin	<ul style="list-style-type: none">• Improve efficiency• Annan site	Flat
	Specialist opiates (pain relief & addiction therapy)	31%	<ul style="list-style-type: none">• Higher margin• Positioned for new customer launches	<ul style="list-style-type: none">• Improve efficiency	Mid-single digits
	ADHD	24%	<ul style="list-style-type: none">• Higher margin• Declining past profit shares in near-term	<ul style="list-style-type: none">• Improve efficiency	Low to mid-single digits
Non-controlled	Diverse therapeutic areas	27%	<ul style="list-style-type: none">• Higher margin	<ul style="list-style-type: none">• Drive value	Low

Building our portfolio: our API product pipeline approach



Disciplined go/no-go decisions with risk-based financial analysis to support decisions and prioritisation

Our API product pipeline will deliver Health's breakout growth

Investment

Capitalised investment of **c.£25m** per year

Investment per product **£3m** to **£10m**

Progress

Over 40 API products in the pipeline:

- Around 15 in early stages
- Around 20 in formulation development
- Around 5 in regulatory approval stage

Over the next three to four years, we expect **14-22 of these to launch** and a further **20 to be pending regulatory approval**

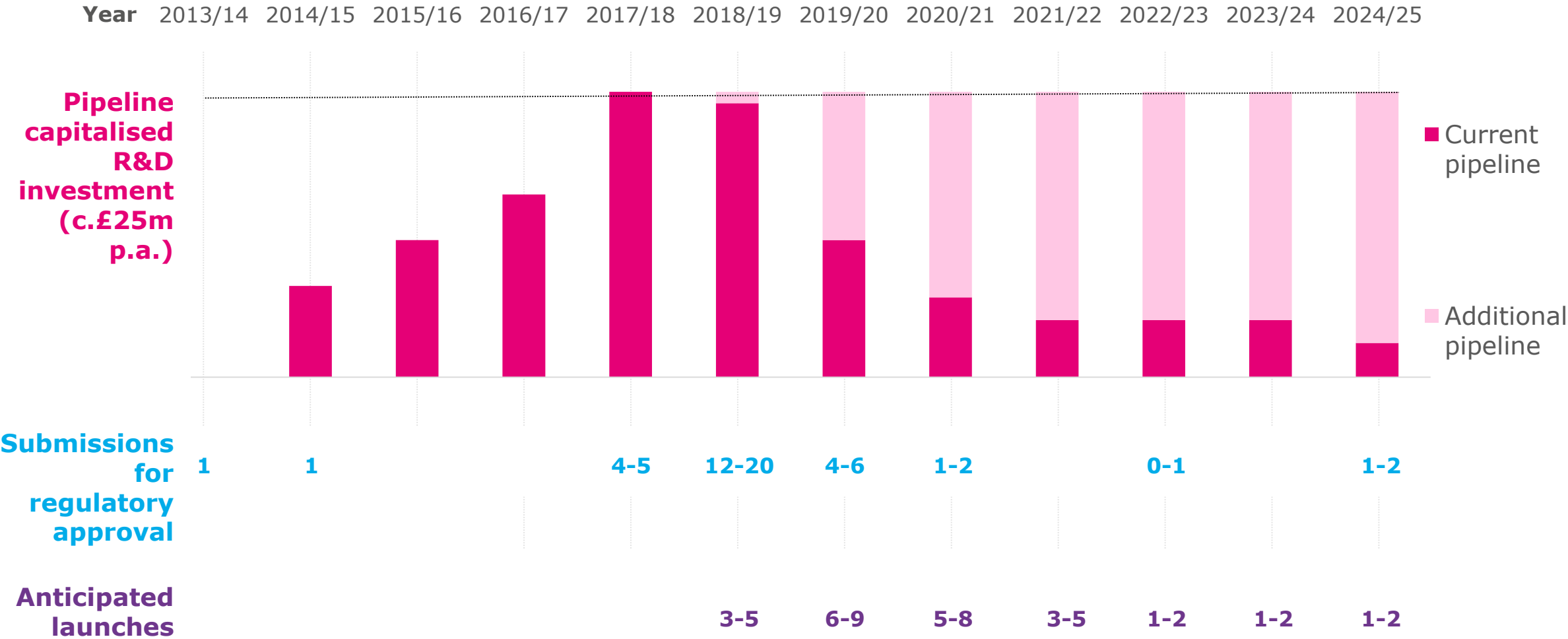
Returns

Not all projects will be successful

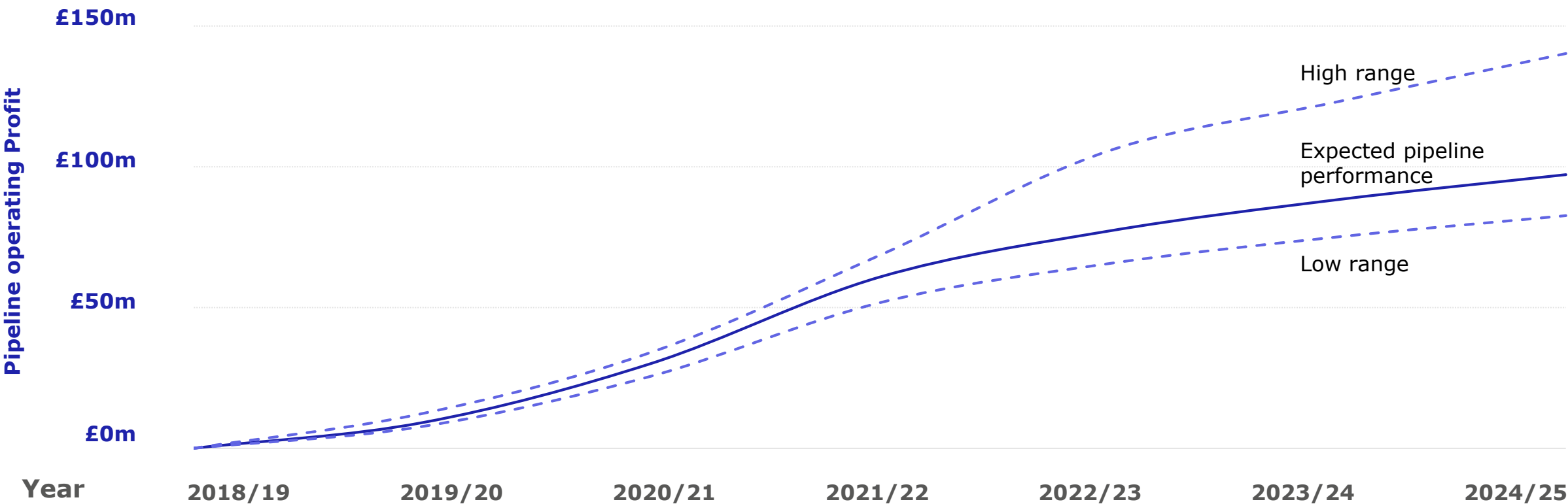
Wide range of product profitability

Building expanded and balanced portfolio

Ramped-up investment drives our pipeline

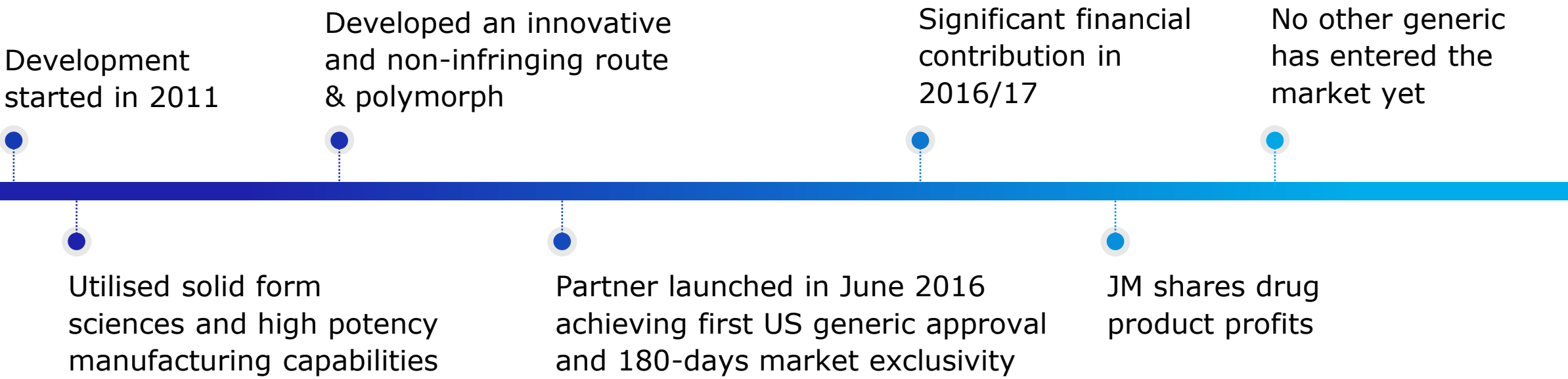


Generics pipeline delivers the break out growth in our Health sector



Current pipeline will deliver c.£100m operating profit by 2025, additional pipeline will add to this in outer years

Example: development of dofetilide



Partnered with



Generics summary

Strong position today in controlled substances

Ramped up investment to grow product portfolio since 2014

- **We will drive value from our existing product portfolio**
- **We will deliver growth from our strong product pipeline**
- **This will deliver substantial growth from 2019/20**





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Conclusion: Delivering breakout growth

Robert MacLeod

Our Innovator and Generics businesses deliver success together

Innovators

- Enhance our position as a technology partner-of-choice
> Delivering well above market growth

Generics

- Drive value from existing business
> Delivering low single-digit growth
- Deliver growth from strong API pipeline
> Delivering operating profit of c.£100m in 2024/25

Long-term investment commitment required

Maintain R&D at c.£25m p.a. to expand generic pipeline further

Continue to build our capabilities to meet critical technical challenges – e.g. high potency APIs

Further enhance our capacity as we convert pipeline

Overall capex investment (excl. R&D) c.£30-40m p.a.

Health sector to deliver breakout growth

We operate in a growing, \$40bn segment

We have expertise for both Innovator and Generics companies

We have a portfolio of successful products but that portfolio is not yet at scale

We ramped up our investment to broaden the pipeline from 2014

Therefore, sales growth from 2019/20 will be double-digit with margin reaching the high 20%s





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Delivering shareholder value

Anna Manz
Chief Financial Officer

Delivering long term shareholder value through:



**Sustained
growth
in Clean Air**



**Breakout
growth in
Health**



**Breakout growth
in Battery
Materials**



**Market leading
growth in Efficient
Natural Resources**

**Relentless focus on driving efficiency
Rigorous resource allocation**

Guidance for 2017/18:

Sales growth broadly in line with the 6% delivered in H2 2016/17

Improving operating performance offset by non cash items

Restructuring benefit of £10m in the year, with an annualised benefit of £25m

Capex £285m, 1.8x depreciation

Delivering sustained growth and value creation

Our strong market positions and legislation deliver sustained growth

Growth driven by Europe in next 2 years with share gains and increasing profitability of gasoline and gasoline hybrid

Subsequently, growth driven by legislation in Asia

Investment in capacity will transition from Europe to Asia

Margins maintained through efficiency

Sustained growth in Clean Air



Delivering sustained growth and value creation

Attractive high growth opportunities

Maintain investment to build a broader, deeper pipeline

In medium term growth accelerates to double digit as we start to benefit from the generic pipeline investment

Margin improves significantly as scale builds

**Breakout
growth in
Health**



Delivering sustained growth and value creation

Market opportunity is substantial and at an early stage

Our technology is market leading and customer feedback is strong

Continue to invest ahead with ~£200m investment in capacity beginning in 2018/19

Expect commercial sales from 2021/22

Breakout growth in Battery Materials



Delivering sustained growth and value creation

Highly selective investment choices allows us to out perform markets by 1ppt

Focus on operational efficiency improves margins, growing operating profit ahead of sales growth by 1ppt

2018/19 benefits from annualised restructuring savings

Maintaining current levels of investment



**Market leading
growth in Efficient
Natural Resources**

Delivering sustained growth and value creation

Driving sustained improvements in how we run our business

Improve performance through common standards and processes, enabled by IT

£50m, mainly procurement savings, over 3 years to invest and enhance margin

Improving working capital management



Relentless focus on driving efficiency

Common procurement standards reduce costs to invest and enhance margin

Our Procurement Opportunity

**Purchases of
£1.5bn* across
118 sites**

**Excluding direct
materials in
Clean Air,
buying has
been a site level
responsibility**

**A global
procurement
strategy coupled
with capability
build can unlock
significant
savings**

**Whilst also
mitigating
risks**

We create value by investing in our technology through three stages

Stage	 Clean Air	 Efficient Natural Resources	 Health
Selectively invest through New Markets sector	e.g. Battery Materials	e.g. Agrochemicals	e.g. Medical Devices
Scale-up	e.g. Emission Control in Asia	e.g. PGM Refining in China	e.g. API Manufacturing in both Innovators and Generics
Sustain and grow	e.g. Emission Control in Europe & NA	e.g. Hydrogen catalysts	-

Our rigorous resource allocation framework

	R&D as % sales	Capex: Depn	ROIC
Select	Meaningful early stage R&D investment	Investment Ahead	<0%
Scale-up	>5%	>1.5	>WACC
Sustain and grow	4-5%	1-1.5	>20%

Consistent investment weighted to near term

R&D remains ~6% of sales

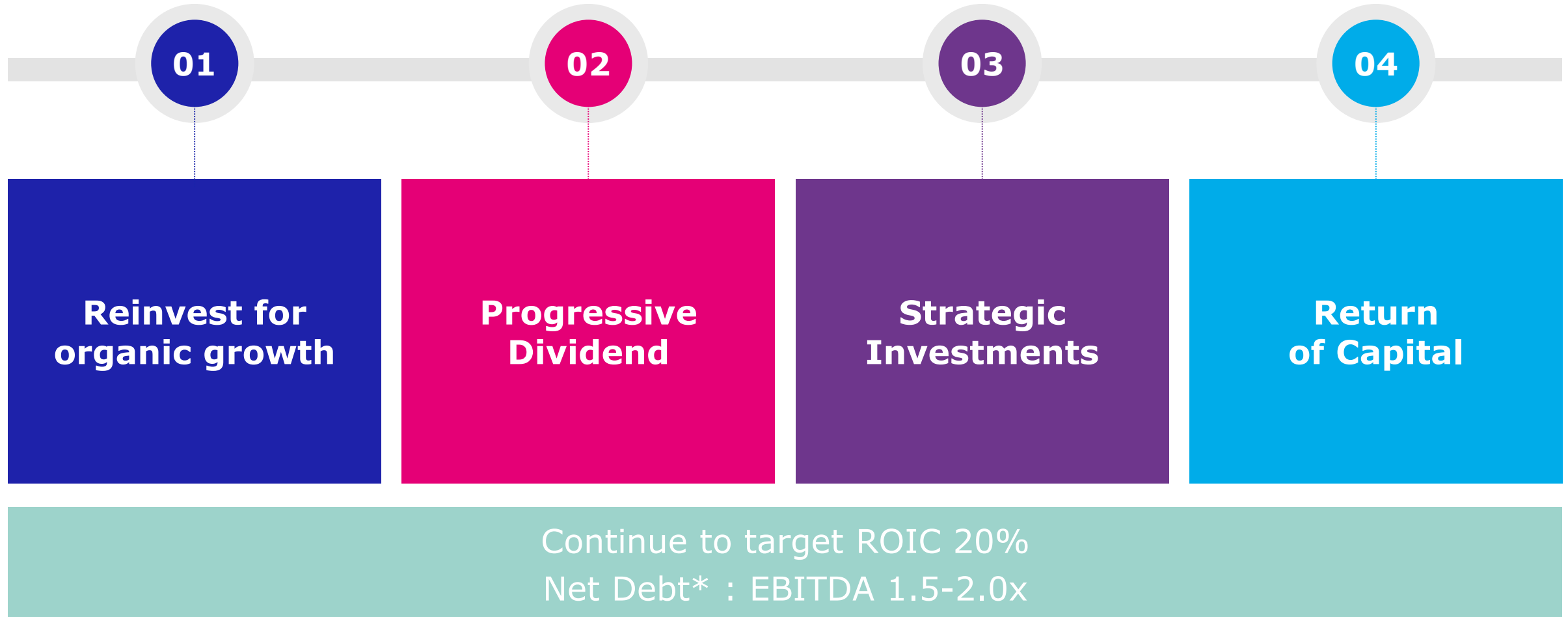
Capex Investment ~1.8x depreciation over the medium term

18/19 increase in capex with Battery Material capacity investment

Rigorous Resource Allocation



Capital allocation



Growth and value creation will deliver attractive returns

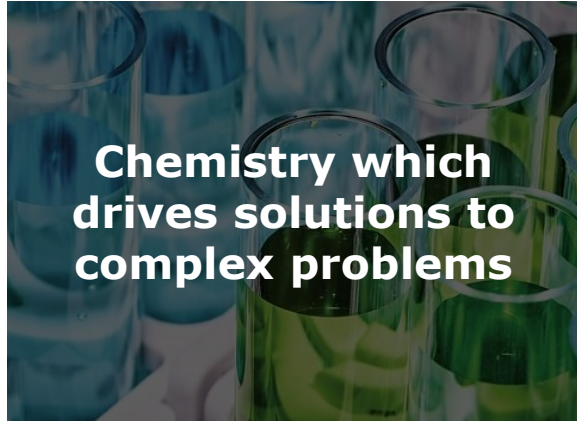
- Expanding group ROIC to 20%

- Delivering mid to high single digit EPS CAGR

- And continuing a progressive dividend policy



Sustained growth and value creation



**Be one of the best performing, most trusted and
admired speciality chemicals companies in the world**



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