

# PRELIMINARY RESULTS PRESENTATION

For the year to 31 July 2016



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*The financial information referenced in this presentation does not contain sufficient detail to allow a full understanding of Nanoco's results. For more detailed information, the entire text of the preliminary results announcement for the full year ended 31 July 2016, can be found on the Investor Relations section of the Nanoco website ([www.nanocogroup.com](http://www.nanocogroup.com)).*

# PRELIMINARY RESULTS HIGHLIGHTS

- Transformed business model which should accelerate the commercialisation of our technology
- Sample requests have increased over the past few months for Dow's TREVISTA™ cadmium-free quantum dots and are being fulfilled exclusively from Dow's dedicated Cheonan plant
- Merck licence agreement signed in July 2016
- Well advanced in transferring our technology to Merck and we expect them to be running initial manufacturing trials in the near future
- Wah Hong licence agreement signed in July 2016; sampling to customers is under way
- Significant increase in manufacturing capacity following process improvements and efficiencies developed during the year, together with moving to shift work post year end
- IP portfolio has grown to 467 patents and patents pending at year end
- Future opportunities if life science continues to emerge
- Revenue for the year was £0.47 million (2015: £2.03 million) and the loss after tax was £10.61 million (2015: £8.97 million). Billings in July 2016 which are deferred into future years amounted to £1.18 million.
- Cash and cash on deposit at 31 July 2016 was £14.51 million (2015: £24.31 million)



We continue to make substantial progress in the commercialisation of our technology

# OVERVIEW





- A pioneer in the development and production of CFQD® cadmium-free quantum dots
- Scalable "platform technology" with multiple markets and product applications
- Key target markets are display, lighting, bio-imaging and solar
- Supply and licensing agreements in place with Dow, Merck and Wah Hong to supply the display industry
- LCD TV market starting to ramp usage of cadmium-free quantum dots with market leader Samsung leading the way with its SUHD TV range
- Extensive and growing patent portfolio (467 as of 31 July 2016)
- 129 employees with the majority located at the Manchester HQ and Runcorn manufacturing facility
- Listed on the main market of the London Stock Exchange
- Founded in 2001

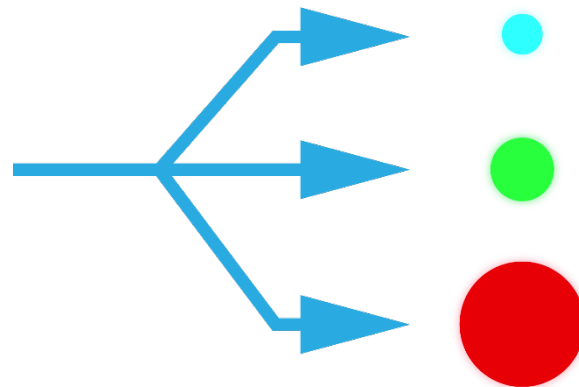


Samsung trailblazing the way with its SUHD TV range

## OVERVIEW

### WHAT IS A QUANTUM DOT?

- Tiny particles of a fluorescent semiconductor material
- 1 to 10 nanometers in diameter
- Size of the quantum dot determines the spectrum of light emitted
- Smaller = blue; larger = red
- Quantum dots can also be tuned to light beyond visible light into the Infra-red or ultra-violet parts of the spectrum

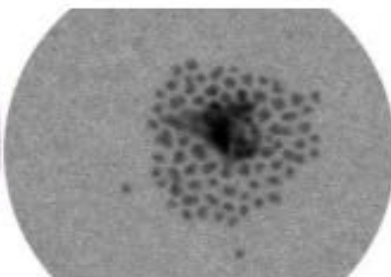


Established technology with commercial applications

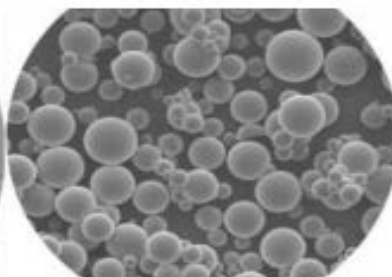
- World leader in heavy metal free quantum dots
- Unique “seeding process” enables mass production
- Bright and energy efficient
- Highly tunable to emit a specific colour on the spectrum
- Quantum dot surface can be chemically modified for different end use applications, creating a “platform technology”
- Extensive & growing patent portfolio (467 patents and patent applications) covering five key areas:



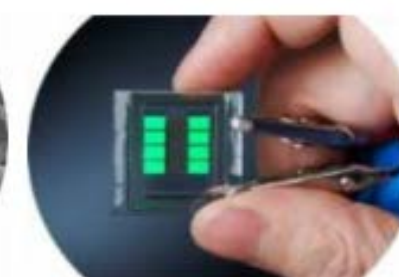
**Process**



**Materials**



**Surface chemistry**



**Devices**



**Solar**

# OVERVIEW

## KEY MARKETS ARE LARGE

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NANOCO GROUP PLC  
RESULTS TO 31 JULY 2016



Display



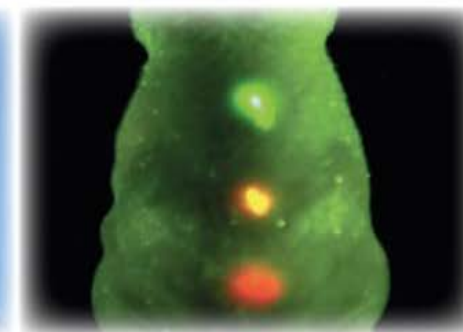
Lighting



Solar



Biomedical



Application	LCD backlighting	High CRI LED lighting	Thin film solar	Biological imaging In-vivo & in-vitro diagnostic
Technology	CFQD <sup>®</sup> quantum dots CFQD <sup>®</sup> quantum dots resin	CFQD <sup>®</sup> quantum dots film	CIGS nanomaterials	Water soluble CFQD <sup>®</sup> quantum dots Functionalized CFQD <sup>®</sup> quantum dots
Business Model / Timing	License & materials sales	Film sales / Near term niche potential with ability to expand usage	Partner license & Material sales (toll)	Partner license with upfront fees / Longer term
Anticipated addressable market size	\$7.5B in 2022 <sup>2</sup>	c.\$150M near term c.\$700M with further R&D	Expected to enhance the rapidly growing thin film solar market	QDs in healthcare = c.\$1B in 2022 <sup>2</sup>

(1) Market&Markets – Quantum Dots Market by Product, Application, Material & Geography – Forecast & Analysis (2013 – 2022)

(2) MarketsandMarkets report, 2012

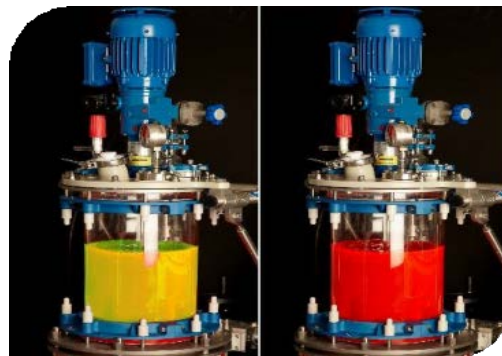




1) CFQD<sup>®</sup> quantum dots

### CORE BUSINESS

Developing & manufacturing heavy-metal free quantum dots fit for purpose



2) CFQD<sup>®</sup> quantum dots + Resin

### CORE BUSINESS

Ensuring Nanoco's CFQD<sup>®</sup> quantum dots work in customers' resin systems



3) CFQD<sup>®</sup> quantum dots/Resin in device

CFQD<sup>®</sup> quantum dots are incorporated into film, lens, capillary, LED, etc. Nanoco partners with end user customer or device producer such as a film manufacturer



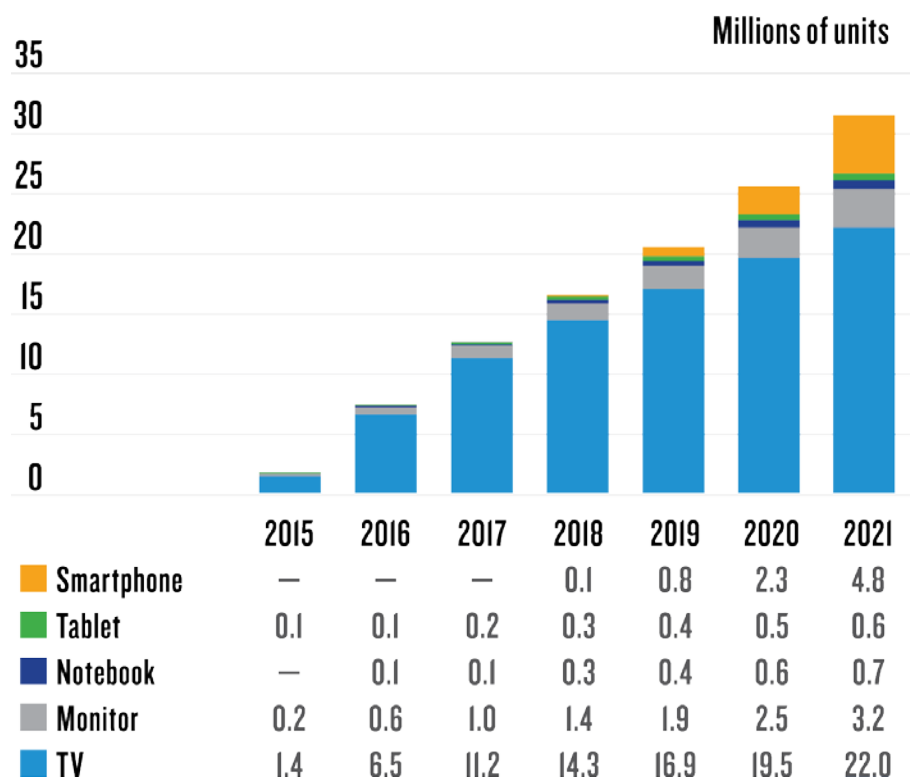
4) CFQD<sup>®</sup> quantum dots product

Nanoco's near term focus for CFQD<sup>®</sup> quantum dots is on backlighting for LCD display and LED lighting. Nanoco partners with end user customer

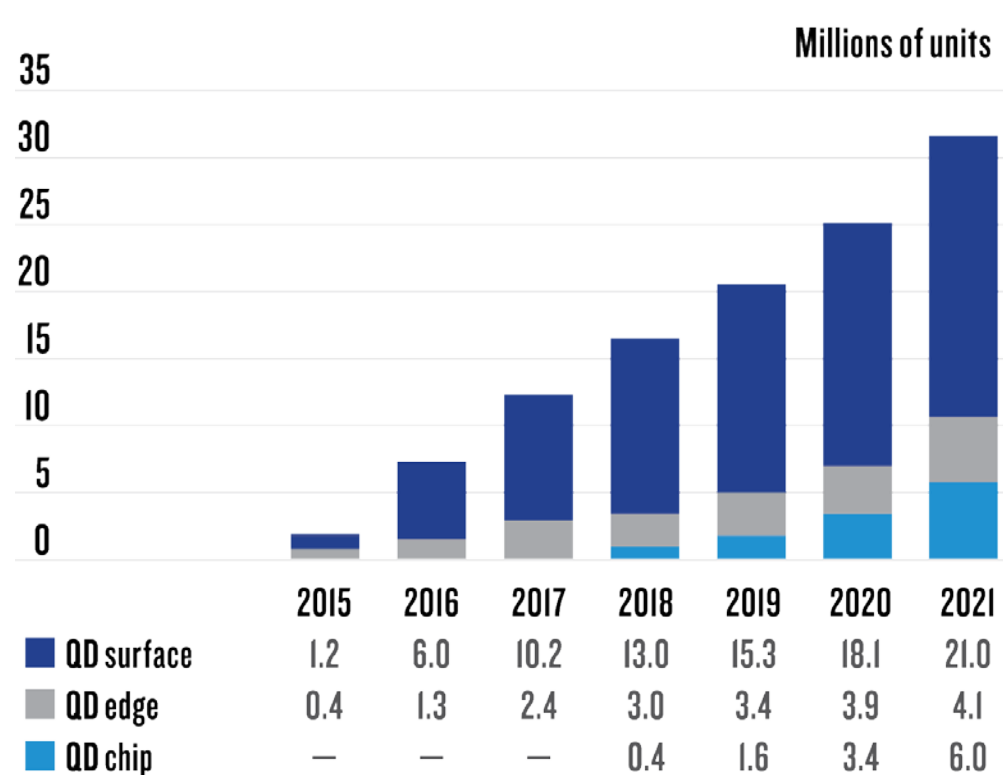
# DISPLAY BUSINESS



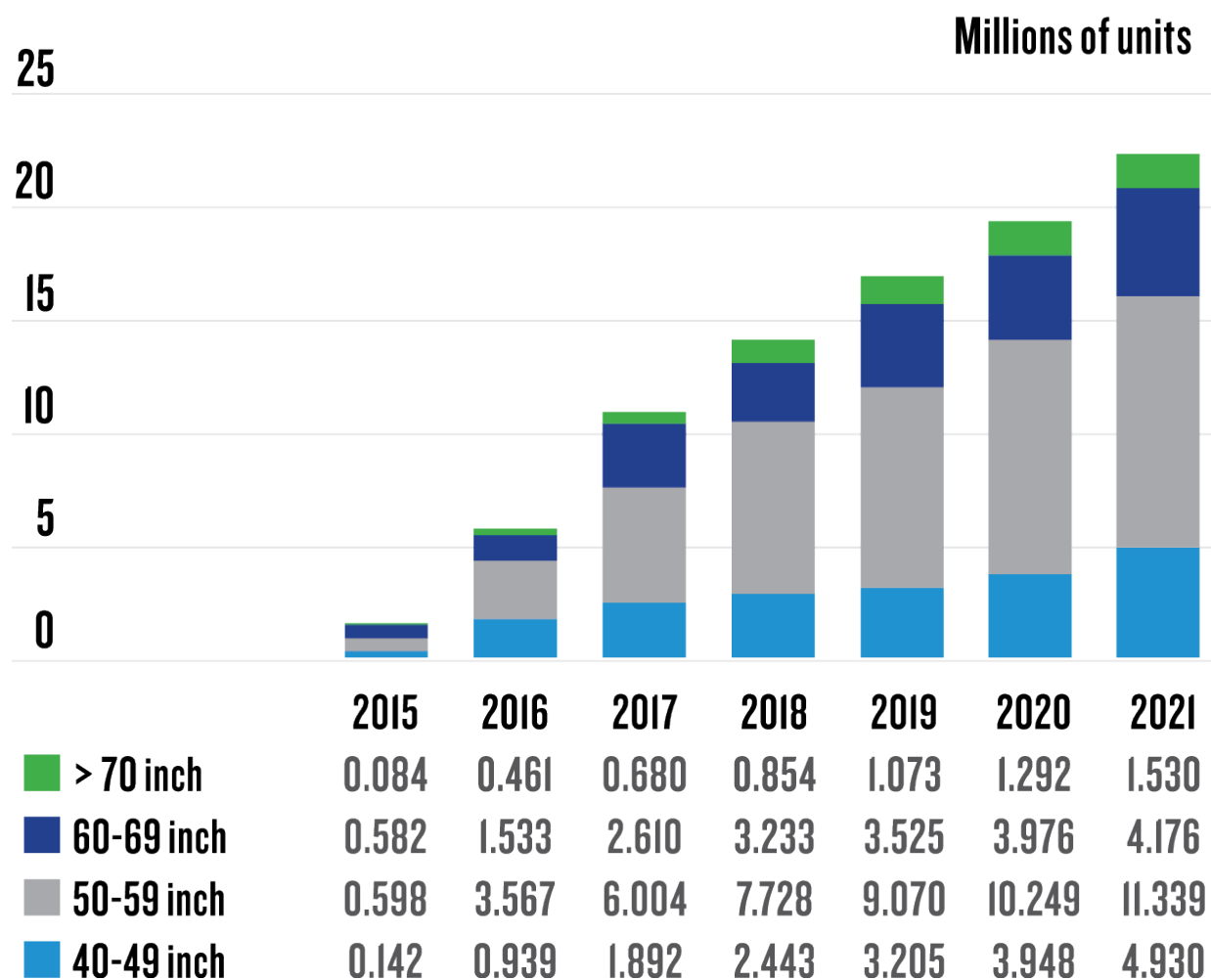
### QD display market forecast by application (volume)



### QD display market forecast by type (volume)



### QD TV display market forecast by size (volume)

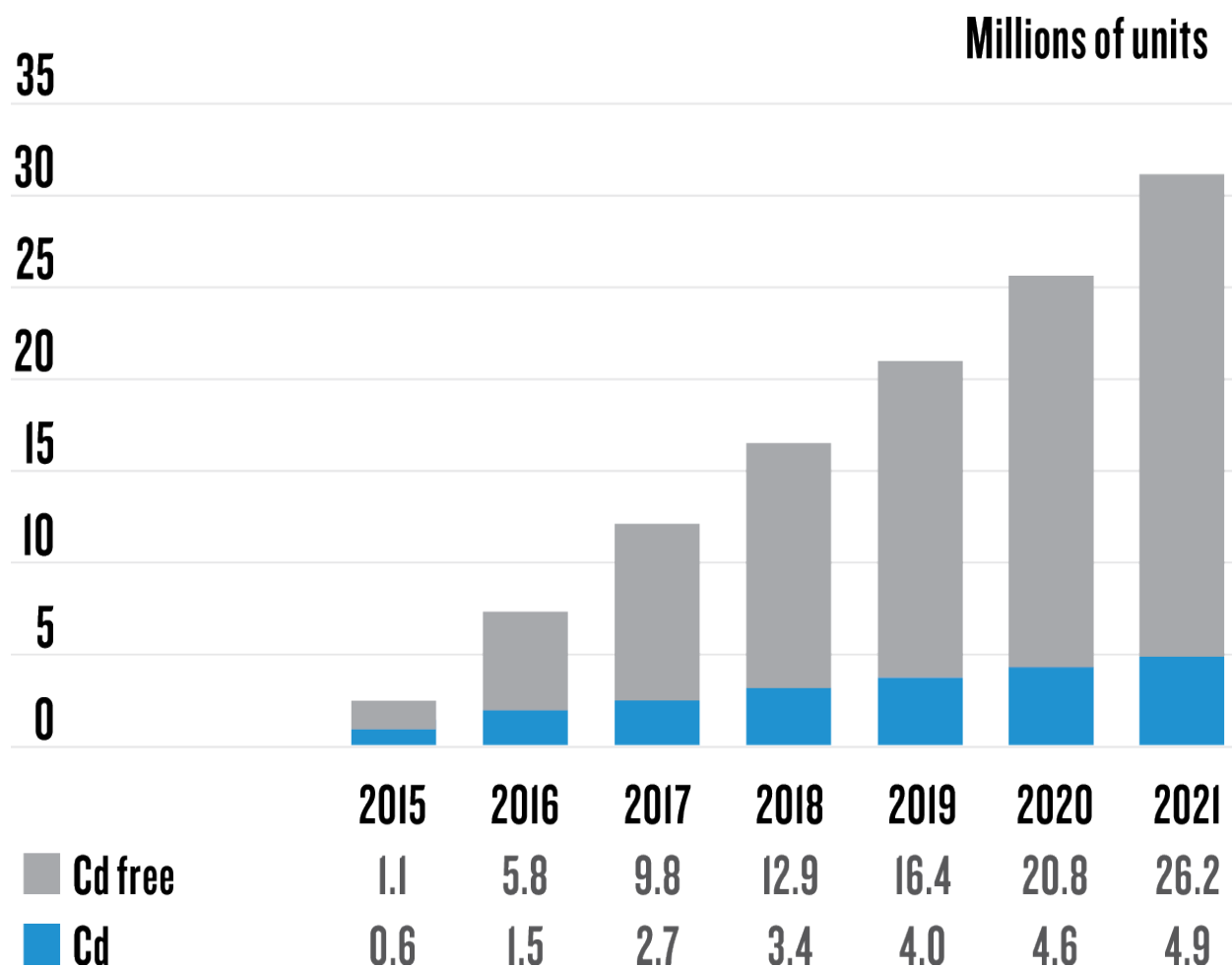




## DISPLAY

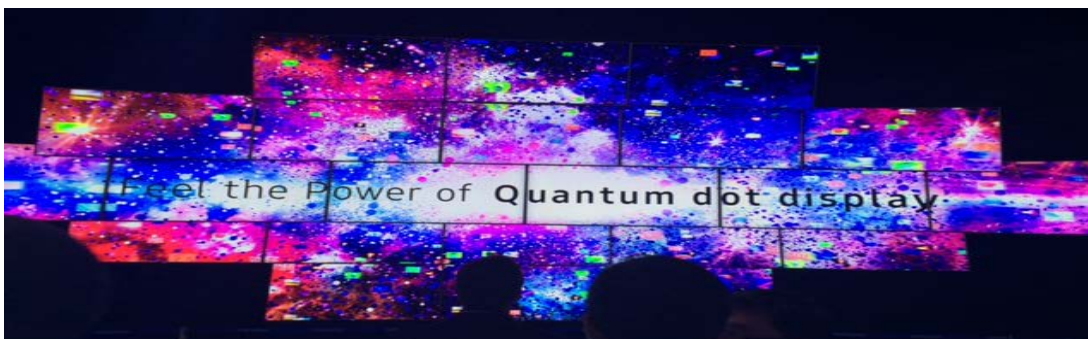
### CADMIUM-FREE QDS WILL DOMINATE

#### QD display market forecast by Cd and Cd-free (volume)

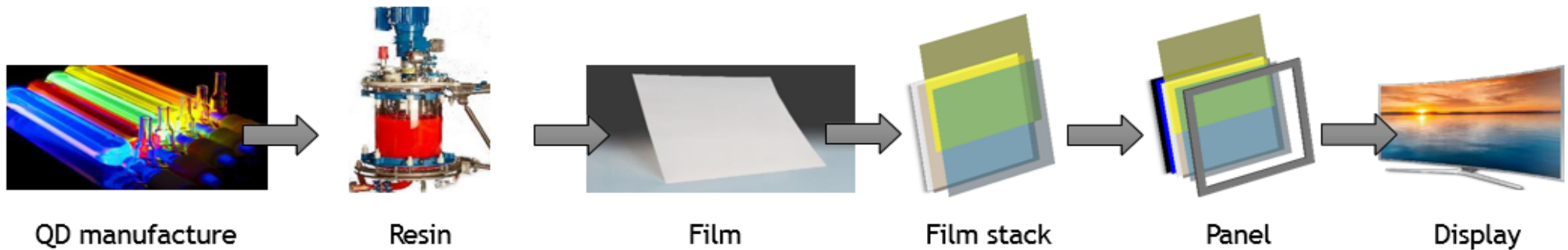


Source: IHS

- Samsung begins to aggressively promote QD TVs from launch at CES 2015 with further promotion at CES 2016
- Samsung QD TVs all contain cadmium-free quantum dots
- Sales of cadmium-free QD TVs in 2015 of c.1.1m units from a standing start in May; 5.8m units forecast for 2016
- Environmental legislation in Europe and China moving in favour of cadmium-free quantum dots
- QD TVs are gaining ground in the rapidly growing high end 4K TV sector
- OLED TVs are still costly due to poor manufacturing yields and on average cost 30% more than the equivalent QD TV
- The colour gamut on cadmium free QD TVs is better than on OLED TVs

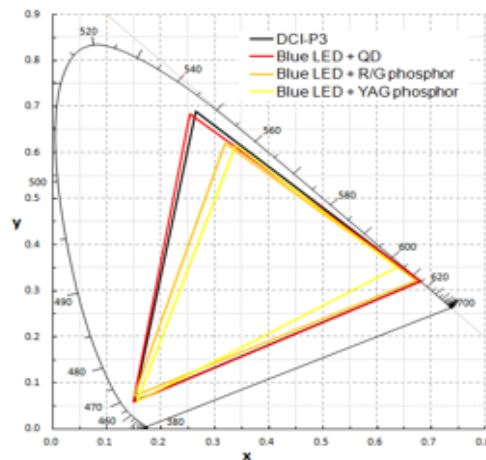


John Lewis flagship store in Oxford Street promoting the colour and brightness properties of quantum dot TVs



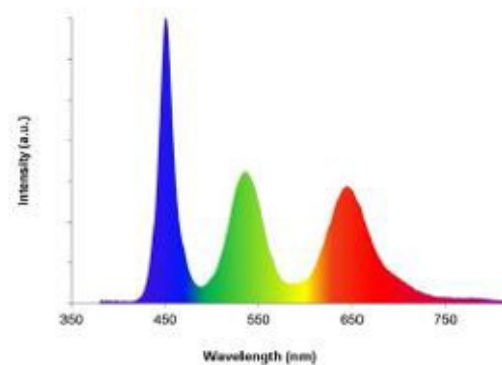
### Better Color Gamut

- Much improved color saturation
- Improved color enhancement over LCD → similar to OLED



### Energy Efficient

- Narrow bandwidth = more light extraction through color filters
- Enables use of blue LED instead of less efficient white LED



### Minimal Process Change

- Uses existing LCD manufacturing infrastructure
- Uses existing LCD supply chain



#### DOW CHEMICAL

- Announced January 2013; modified March 2016
- Changed from exclusive to non-exclusive in March 2016
- Non-exclusive worldwide technology licensing agreement with royalty payments



#### WAH HONG

- Announced July 2016
- Non-exclusive material supply and licence agreement with upfront licence fee, payment for delivery of QD resin and royalties on sales



#### MERCK KGaA

- Announced August 2016
- Non-exclusive material supply and licence
- Agreement with upfront licence fee, royalties on sales of Merck produced product
- Ability for Merck to purchase Nanoco manufactured product to accelerate their market entry

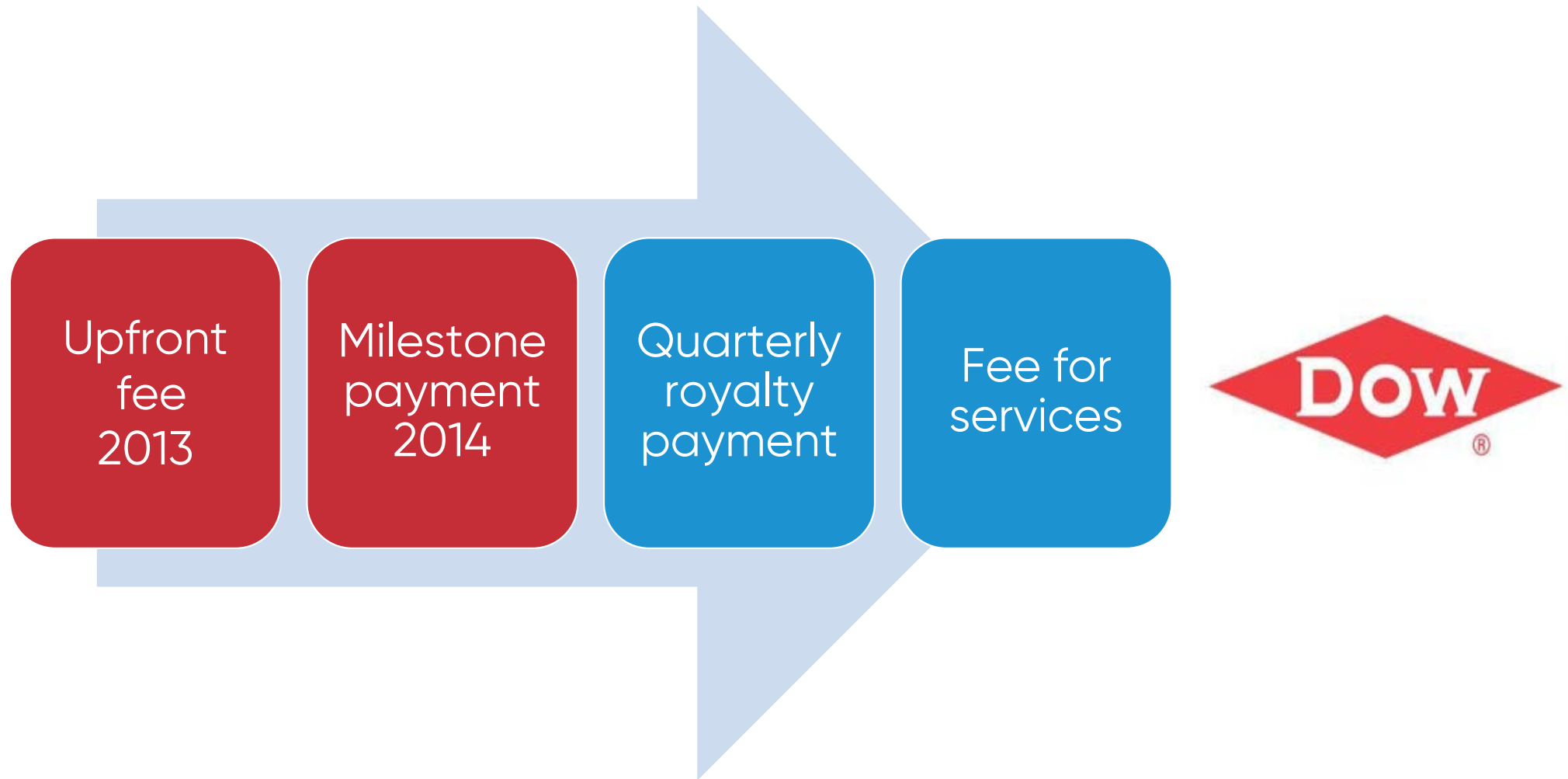




## BUSINESS MODEL

### COMPONENTS OF DOW AGREEMENT

- The Dow Chemical Company has a major international electronic materials business and has a non-exclusive licence to manufacture and market CFQD<sup>®</sup> quantum dots



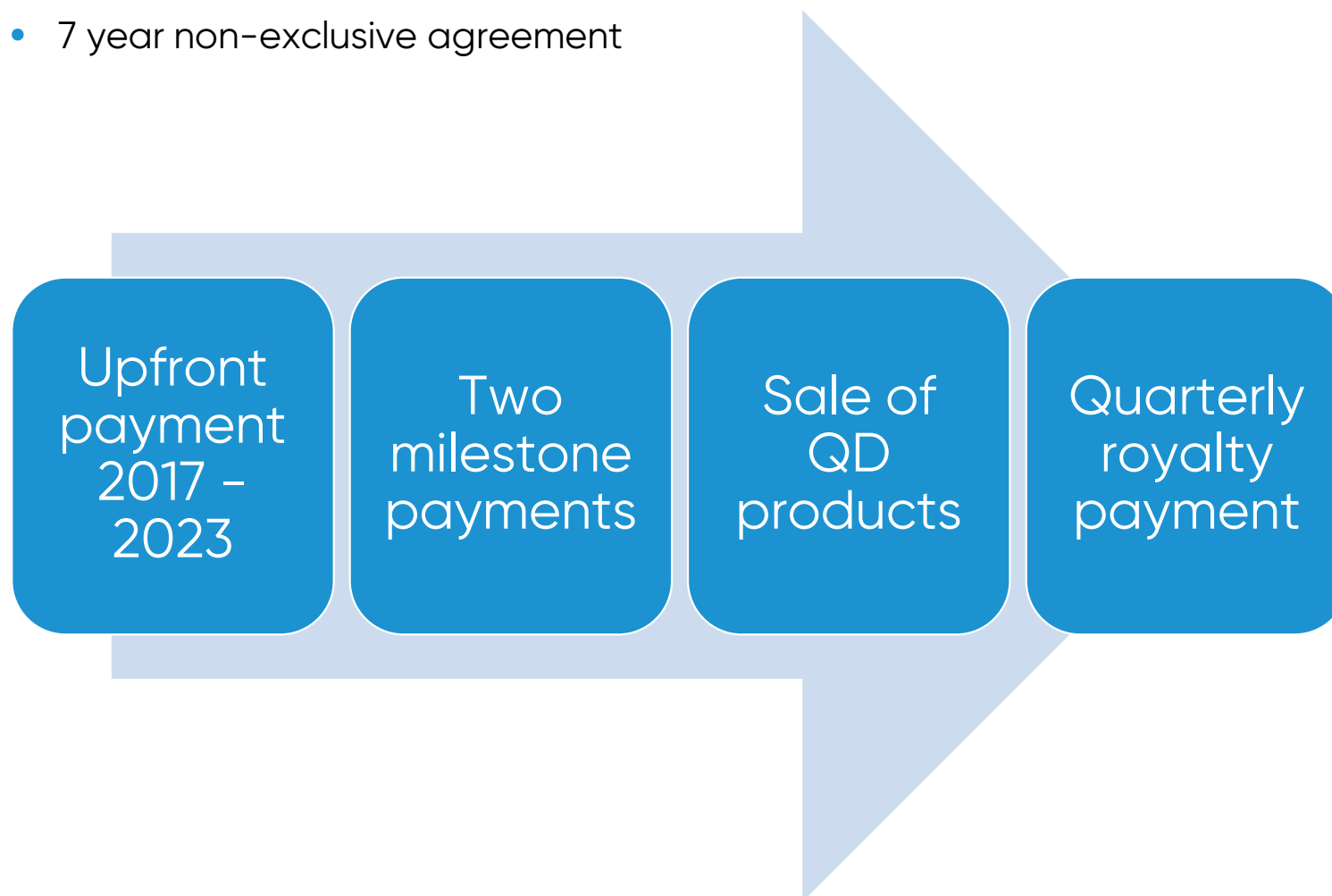


- The new Dow CFQD<sup>®</sup> quantum dot facility will enable mass production of cadmium-free quantum dots under Dow's TREVISTA<sup>™</sup> brand
- Facility is operational and has the capacity to support millions of large screen TVs
- Sample requests have increased over the past few months for Dow's TREVISTA<sup>™</sup> cadmium-free quantum dots and are being fulfilled exclusively from the Cheonan facility
- The transfer of Nanoco's improved manufacturing is being implemented

## BUSINESS MODEL

### COMPONENTS OF WAH HONG AGREEMENT

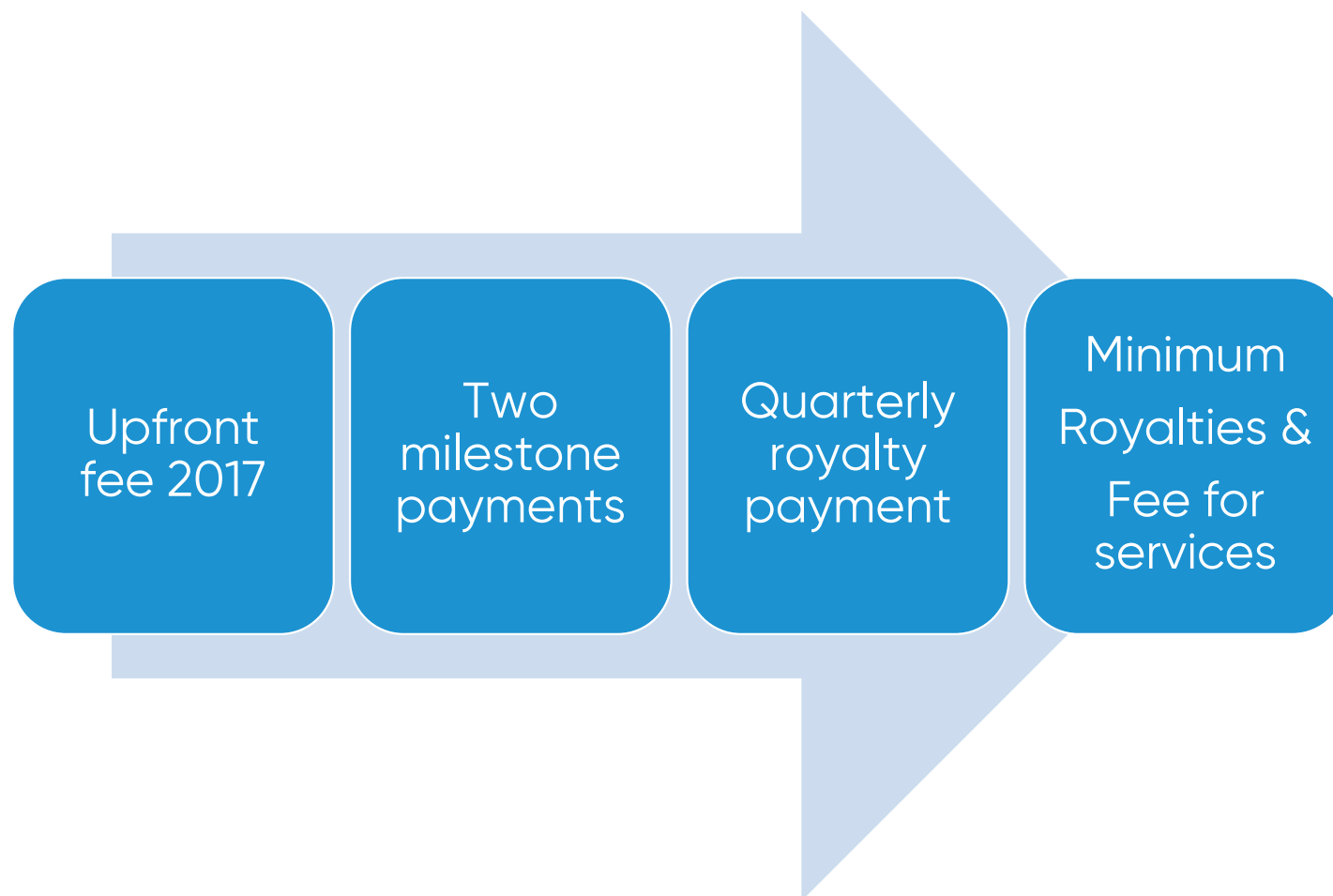
- Wah Hong is a leading optical film manufacturer and supplier to the Taiwanese and Chinese display industry
- Wah Hong is headquartered in Taiwan
- 7 year non-exclusive agreement



## BUSINESS MODEL

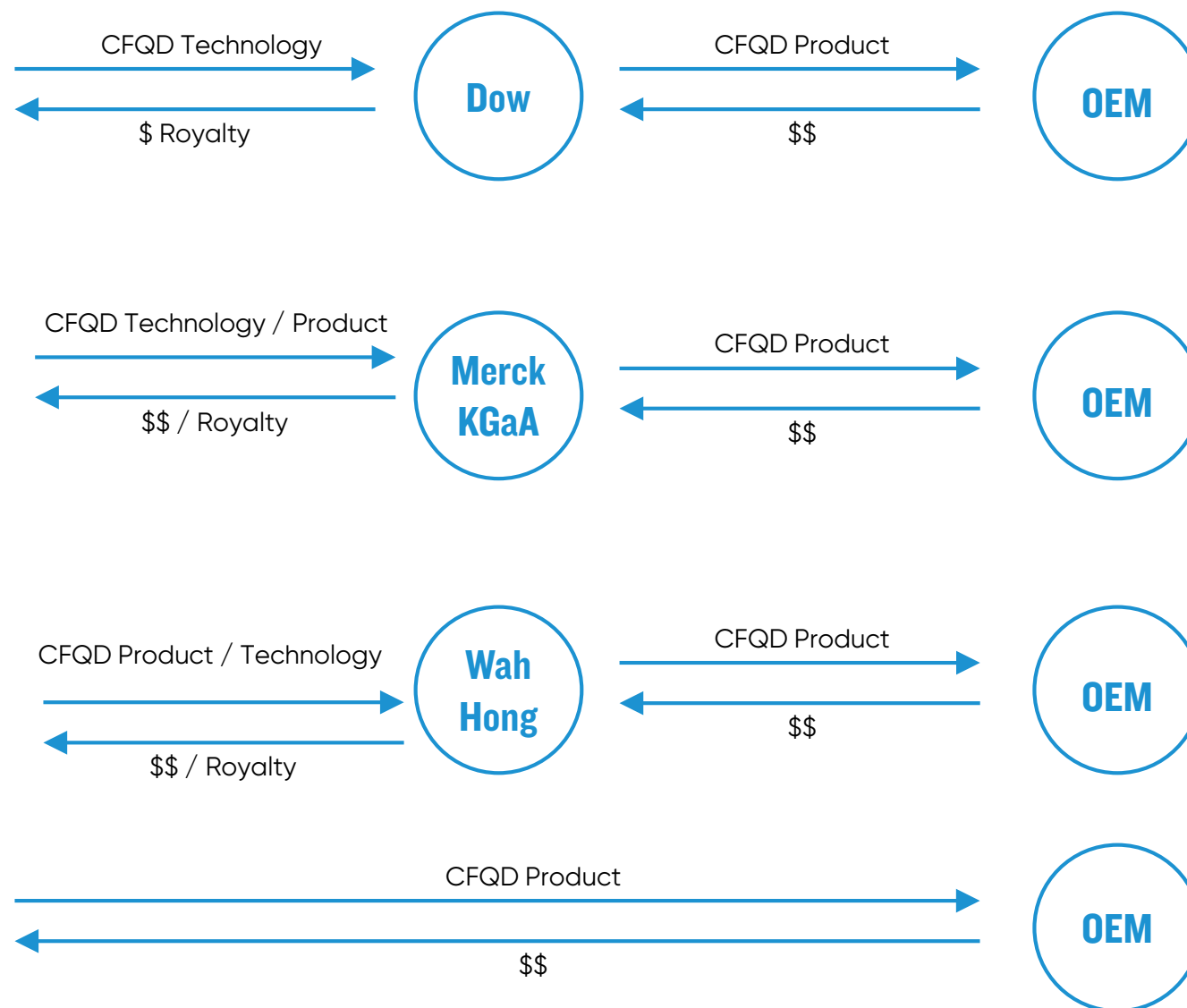
### COMPONENTS OF MERCK AGREEMENT

- Merck is headquartered in Germany and has c. 70% market share of liquid crystal polymer market
- Non-exclusive licence to manufacture, market and sell CFQD<sup>®</sup> quantum dots



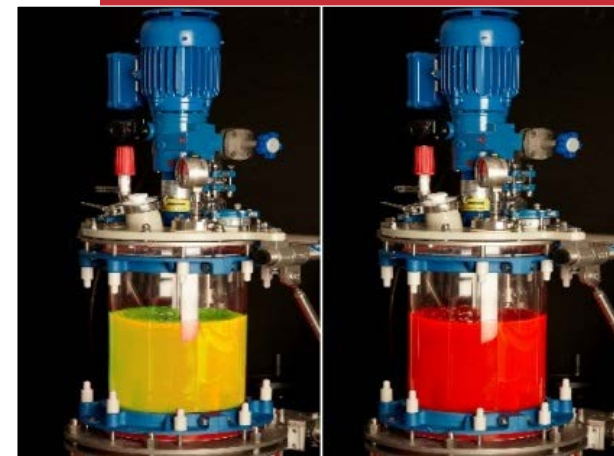
MERCK





## DISPLAY RUNCORN PRODUCTION FACILITY

- Nanoco's existing production facility in Runcorn is being enhanced to meet expected demand from Wah Hong and Merck
- 24 hour shift work was introduced in August
- Scaling will require little additional capital expenditure due to recent manufacturing process improvements
- Capacity of the plant expected to be c. 500 Kgs per annum
- Additional capacity will be brought on as demand dictates



# OTHER MARKETS



- Nanoco's cadmium-free quantum dots have the ability to tune the colour of light emitted by LEDs such that any particular shade of light can be produced by tailoring the wavelengths
- Potential applications for our technology are broad from improved white LED light in homes and offices to niche applications such as horticultural and architectural lighting
- Our commercial strategy is to work with licensing and marketing partners and also develop products ourselves
- Today's focus is in two niche areas: horticultural lighting and cosmetic skin treatment

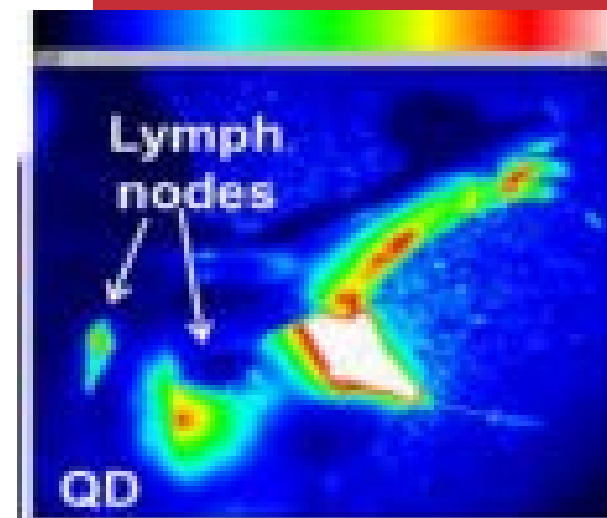


Horticultural lighting to  
enhance seed germination  
and seedling growth





- Life Science Division established to address the substantial opportunity for our CFQD® quantum dot technology in the healthcare sector
- The team is lead by Dr Imad Nassani, who is one of the pioneers of the use of quantum dots in life sciences
- Focus on in-vivo cancer diagnostics and surgical imaging
- Business plan established which will initially focus on illumination of cancerous tumours and then with further development, cancer diagnostics
- Long standing work continued with University College London on the in vivo imaging of sentinel lymph nodes and breast cancer



The florescenece of Nanoco's cadmium-free quantum dots is being used to pinpoint malignant lymph nodes to guide surgeons in the removal of cancerous tissue

- Our solar ink has been designed to maximise the absorption of energy and can be printed by low cost methods and annealed into a PV film
- The technology is based on copper, indium, gallium, selenium ("CIGS") materials
- Current performance is 17%
- We continue to work with Loughborough University on the scale up of our technology under a grant-funded project
- The priority in Solar is to identify a suitable partner to assist in the commercial scale-up



Development work to scale up the CIGS PV technology from small lab-sized cells to larger cells is on-going

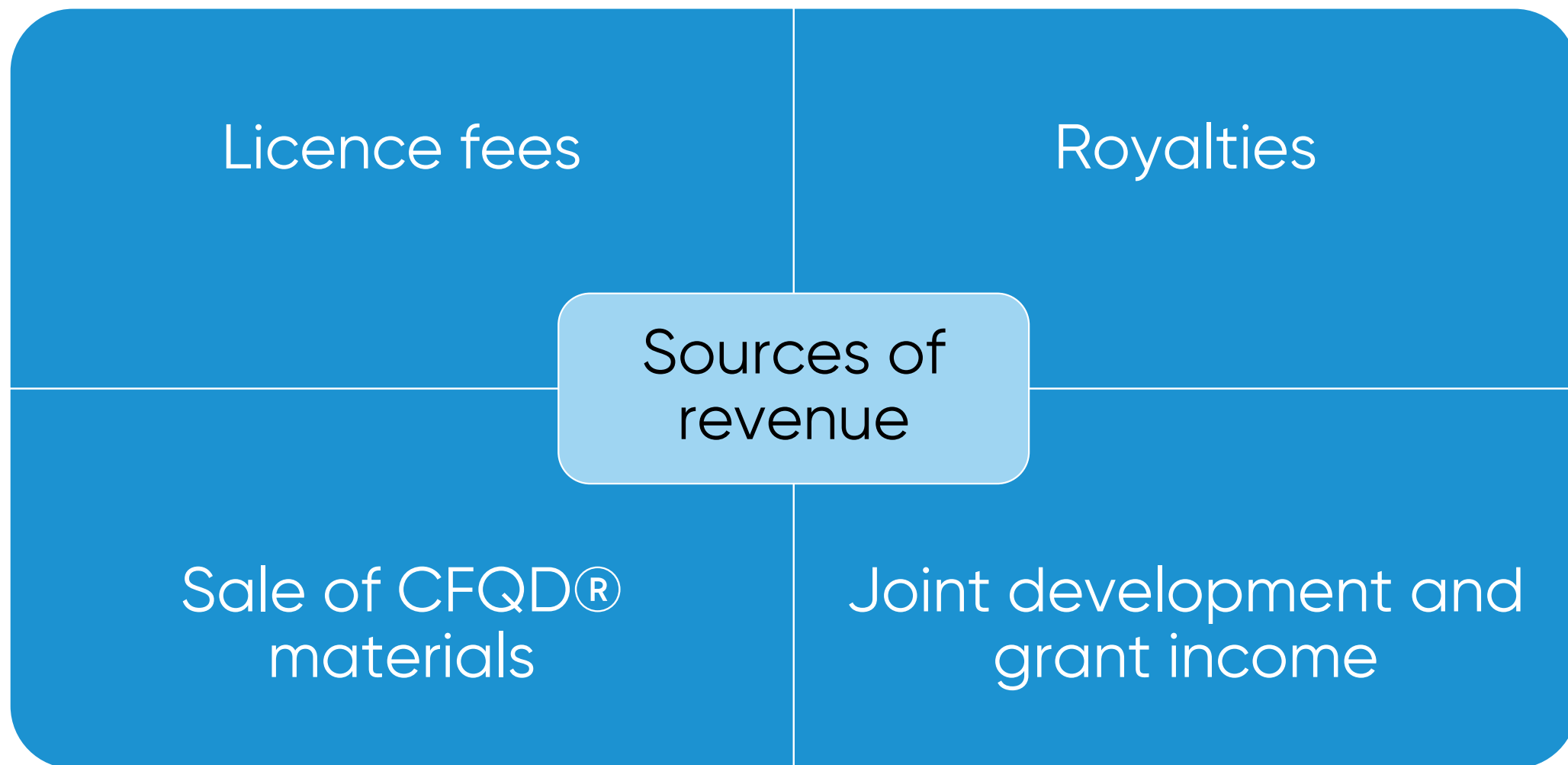
- The European Commission has been conducting a lengthy and on-going review of the future of cadmium-based quantum dots
- In spite of Members of the European Parliament voting overwhelmingly in 2015 to ban cadmium-containing quantum dots, the Commission decided to mandate a second report by the Oeko-Institute which was published in June 2016
- The new report recommended that cadmium-containing dots should be banned in lighting applications but allowed in display for a 3 year period
- The recommendation is not legally binding but forms part of an on going review by the Commission, Member States and the European Parliament
- In spite of this uncertainty and as deliberations continue in Europe, display makers worldwide, led by the market leader, Samsung, are choosing cadmium-free quantum dots in their products
- Cadmium's future is limited. It is just a matter of time



Market leader Samsung promote their cadmium free quantum dots TV range

# FINANCIAL REVIEW







# BUSINESS PERFORMANCE

## FINANCIAL HIGHLIGHTS

	2016 £m	2015 £m	Movement £m
Revenue and other income	0.8	2.0	(1.2)
R & D investment	(6.0)	(5.6)	(0.4)
LBITDA	(11.1)	(9.0)	(2.1)
Loss after tax	(10.6)	(9.0)	(1.6)
Cash and short term deposits	14.5	24.3	(8.8)
Deferred revenue	(1.2)	–	(1.2)
Net assets	18.8	29.1	(10.3)
Employees	129	109	20

### Liquidity

- Strength of balance sheet
- Key to fund R & D

### Revenue

- Excludes lumpy payments
- Key measure of growth

### Billings

- Sum of all invoices raised and grant income
- Key cash generator

### R&D spend

- Core skill
- Competitive advantage

### IP portfolio

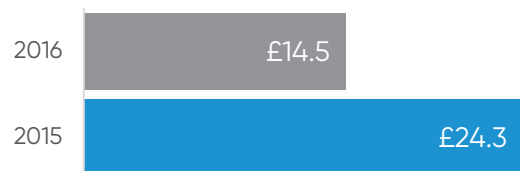
- Number of patents granted and pending
-

# BUSINESS PERFORMANCE

## KEY PERFORMANCE INDICATORS

Liquidity £'m

**£14.5m** -40.3%



Revenues and grant income £'m

**£0.76m**



Billings £'m

**£1.9m** -5.0%



R & D investment £'m

**£6.0m** +7.1%



Number of patents

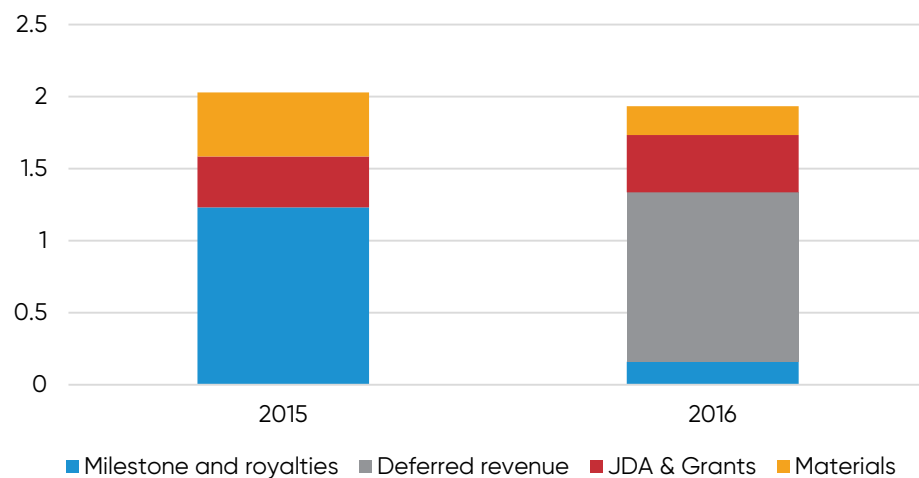
**467** +29.7%



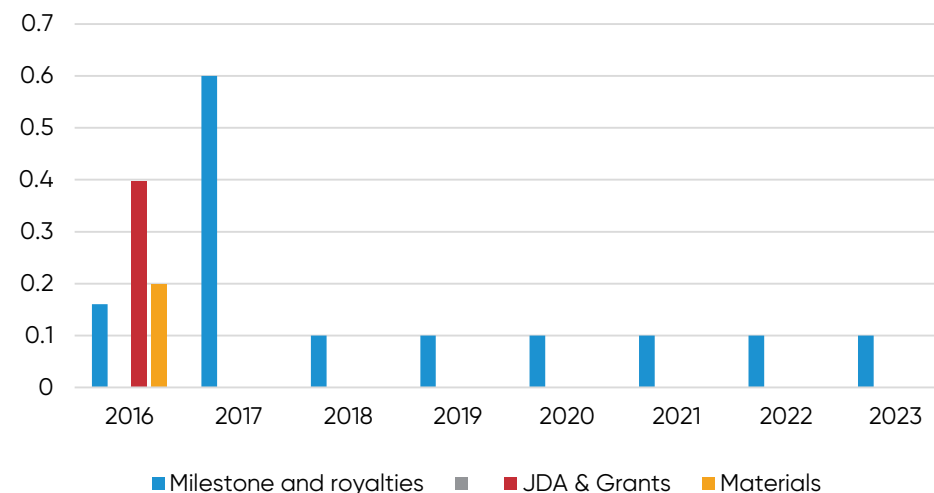
# BUSINESS PERFORMANCE

## KEY PERFORMANCE INDICATORS

Analysis of Billings £'m



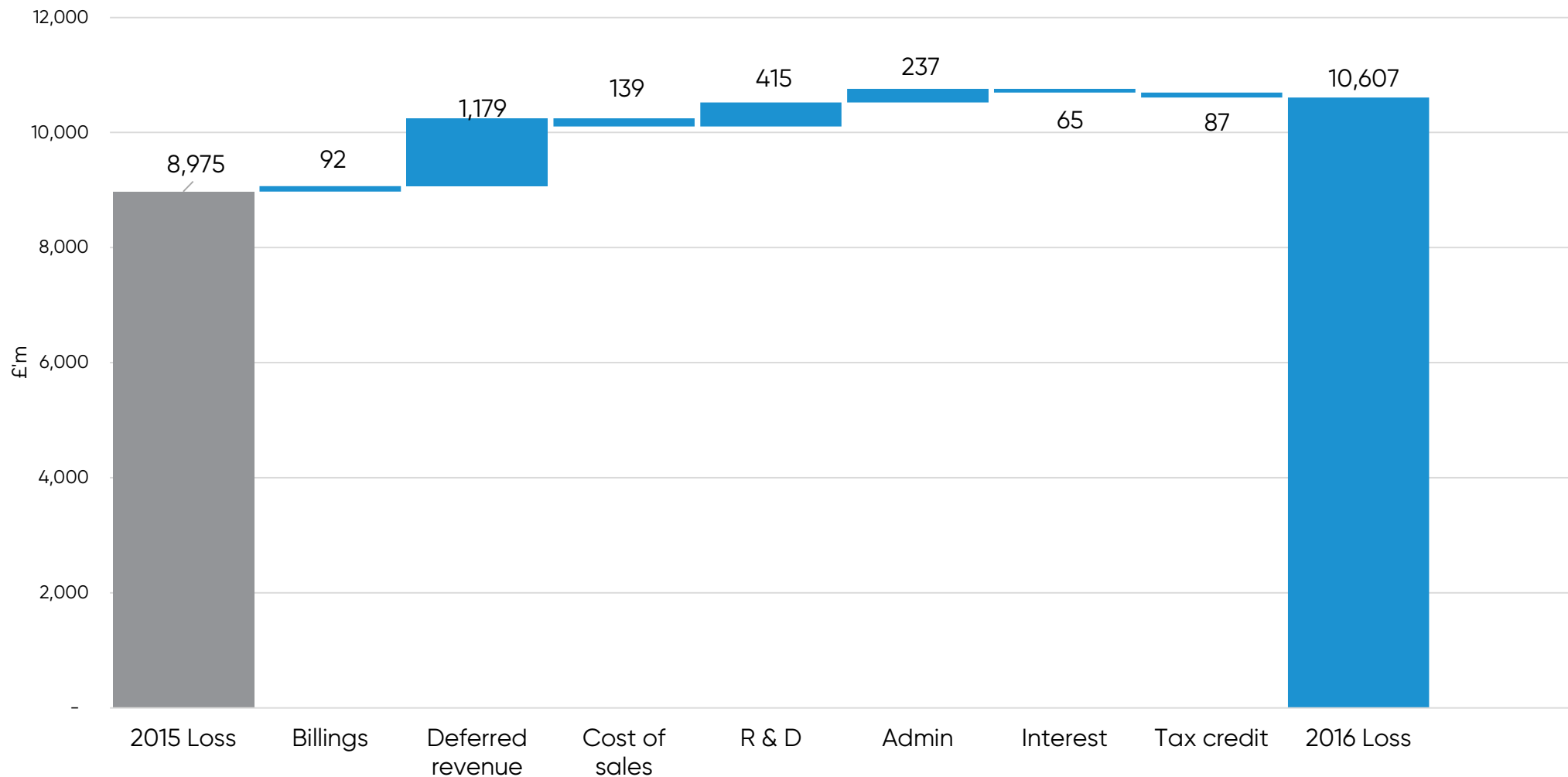
Revenue Recognition of 2016 Billings £'m



Statement	Title	2016 £'m	2015 £'m
Statement of comprehensive income	Revenue	0.5	2.0
Statement of comprehensive income	Other income	0.3	0.0
Statement of financial position	Deferred income	1.1	0.0
<b>Total</b>		<b>1.9</b>	<b>2.0</b>

## FINANCIAL HIGHLIGHTS

### MOVEMENT IN NET LOSS DURING 2016

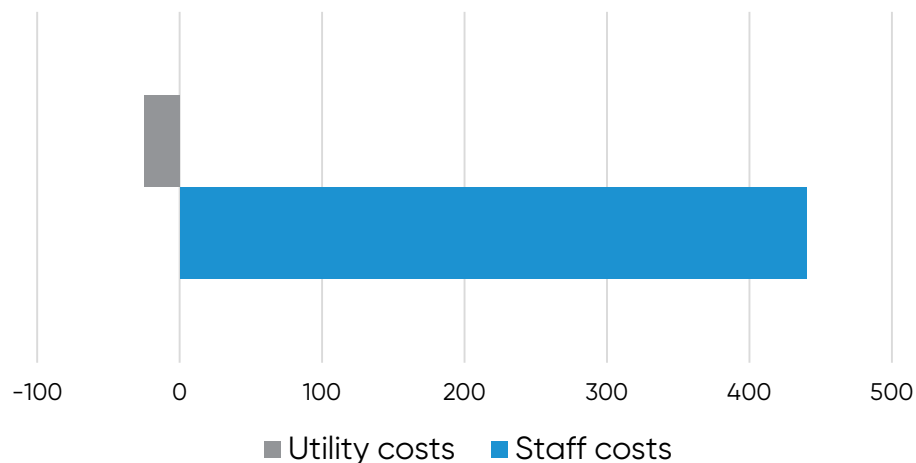




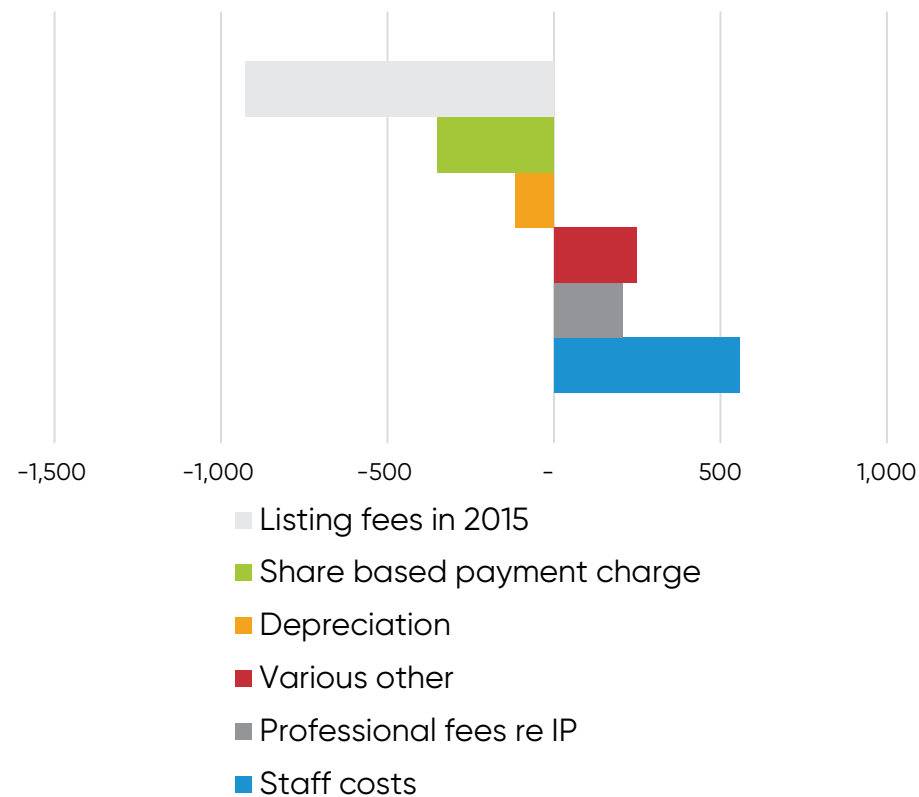
# FINANCIAL HIGHLIGHTS

## R&D AND ADMINISTRATIVE COSTS

Movement in R&D costs vs 2015 £'000

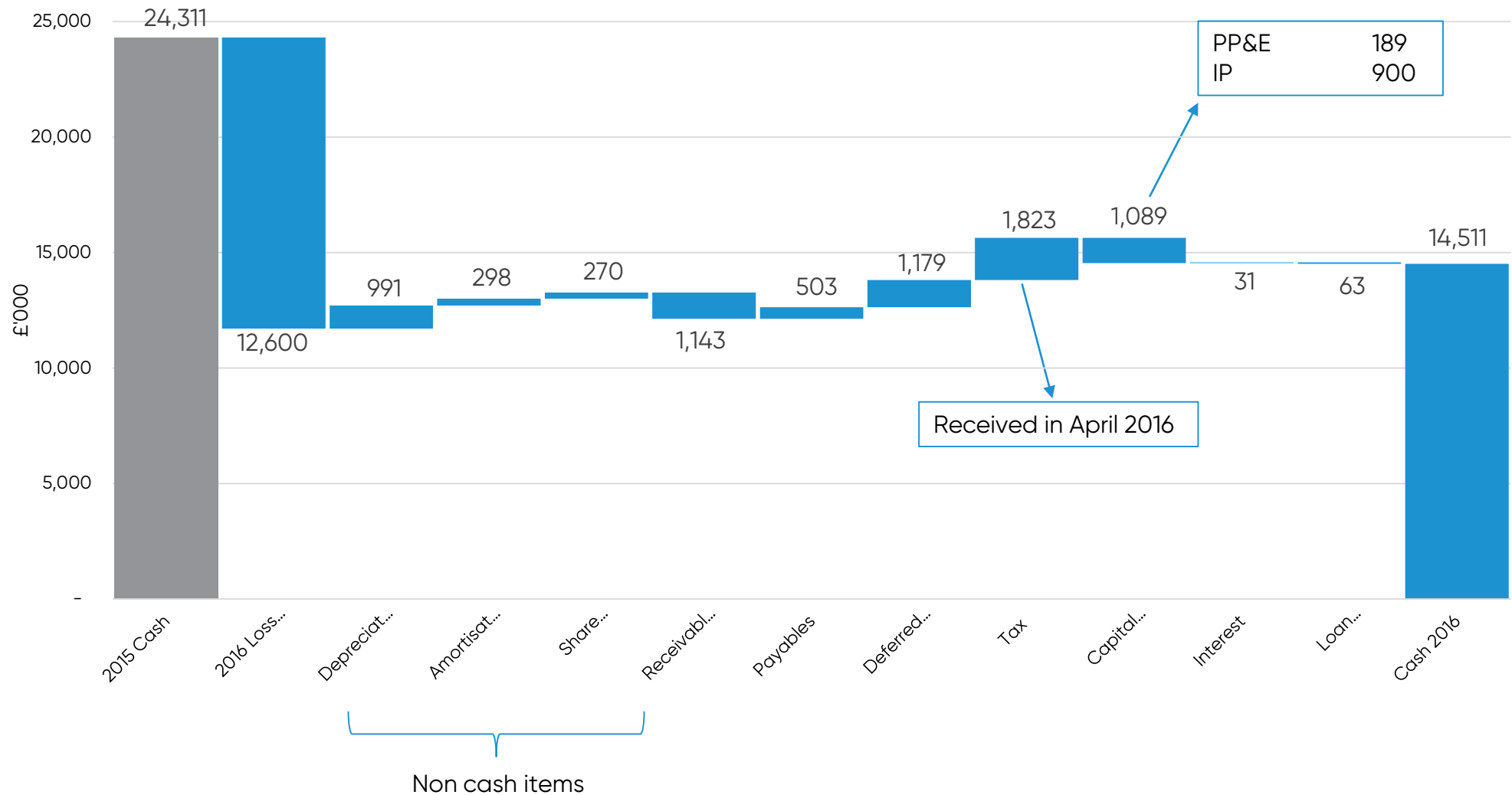


Movement in costs vs 2015 £'000



# FINANCIAL HIGHLIGHTS

## MOVEMENT IN CASH 2016





# SUMMARY

- Transformational year with the decision to adopt a non-exclusive licensing strategy in display, enabling us to increase the pace of commercialisation of our technology
- New relationships established with Merck and Wah Hong
- Future direction of the Company back in our control giving us the ability to manufacture and commercially sell our own product
- Improvements to our production processes have dramatically increased the quality and the yield of our cadmium-free quantum dots
- This in turn has substantially increased production capacity at our Runcorn facility without significant capital expenditure or the building of new production lines
- The market for cadmium-free quantum dots in display is developing rapidly
- Board and key employees strengthened in anticipation of commercialising our technology
- Robust balance sheet





# APPENDICES





**Dr Christopher Richards**  
Non Executive Chairman

- CEO, Non-Executive chairman, Arysta LifeSciences
- 20 years of increasing management roles at Syngenta
- Executive chairman of Plant Health Care
- Non-executive director of Dechra Pharmaceuticals plc and of Origin Enterprises plc

**Dr Michael Edelman**  
CEO

- Led spin-out of Nanoco from University of Manchester
- GE/Bayer JV, founded www.yet2.com Europe, commercial director Colloids Ltd, Brunner Mond, ICI

**Dr. Nigel Picket**  
Co-founder & CTO

- Inventor of Nanoco's key patented scale-up technology
- Leading expert on semi-conducting nano-crystals
- Japanese Government, St. Andrews University, Georgia Tech

**David Blain**  
CFO

- Experienced Quoted Company CFO, Renovo, Drew Scientific, Price Waterhouse

**Keith Wiggins**  
COO

- 30 years senior executive experience, 23 years with The Dow Chemical Company

**Brendan Cummins**  
Senior Non Executive

- 40 years of industry experience mostly with Ciba Geigy, last role was
- CEO of Ciba and was responsible for selling Ciba to BASF
- NED of US Headquartered, Ashland Inc.

**Gordon Hall**  
Non Executive

- Led IPO of Axis-Shield, subsequently acquired by Alere Inc. for £235m

**Robin Williams**  
Non Executive

- Experienced NED and Executive, Investment banking, Xaar, Manufacturing background.

# APPENDICES

## STATEMENT OF COMPREHENSIVE INCOME

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NANOCO GROUP PLC  
RESULTS TO 31 JULY 2016

	2016 £'000	2015 £'000
Revenue	474	2,029
Cost of sales	(177)	(316)
Gross profit	297	1,713
Other operating income	284	—
Operating expenses		
Research and development expenses	(5,995)	(5,580)
Administrative expenses	(7,367)	(7,130)
Operating loss	(12,781)	(10,997)
- before share-based payments and the costs of the move to the Main Market	(12,511)	(9,452)
- cost of admission to the Main Market	—	(926)
- share-based payments	(270)	(619)
Finance income	193	119
Finance expense	(12)	(3)
Loss on ordinary activities before taxation	(12,600)	(10,881)
Taxation	1,993	1,906
Loss on ordinary activities after taxation for the year and total comprehensive loss for the year	(10,607)	(8,975)
Loss per share		
Basic and diluted loss for the year	(4.47)p	(4.05)p

# APPENDICES

## STATEMENT OF FINANCIAL POSITION

	31 July 2016 Group £'000	31 July 2016 Company £'000	31 July 2015 Group £'000	31 July 2015 Company £'000
<b>Assets</b>				
<b>Non-current assets</b>				
Tangible fixed assets	1,260	—	2,062	—
Intangible assets	2,423	—	1,821	—
Investment in subsidiaries	—	66,322	—	66,052
	3,683	66,322	3,883	66,052
<b>Current assets</b>				
Inventories	208	—	208	—
Trade and other receivables	2,045	42,988	902	31,866
Income tax asset	1,970	—	1,800	—
Short-term investments and cash on deposit	5,000	5,000	20,000	20,000
Cash and cash equivalents	9,511	4,057	4,311	12
	18,734	52,045	27,221	51,878
<b>Total assets</b>	22,417	118,367	31,104	117,930
<b>Liabilities</b>				
<b>Current liabilities</b>				
Trade and other payables	2,443	—	1,909	—
Financial liabilities	32	—	63	—
Deferred revenue	531	—	—	—
	3,006	—	1,972	—

	31 July 2016 Group £'000	31 July 2016 Company £'000	31 July 2015 Group £'000	31 July 2015 Company £'000
<b>Non-current liabilities</b>				
Financial liabilities	—	—	32	—
Other payables	—	450	—	450
Deferred revenue	648	—	—	—
	648	450	32	450
<b>Total liabilities</b>	3,654	450	2,004	450
<b>Net assets</b>	18,763	117,917	29,100	117,480
<b>Capital and reserves</b>				
Issued equity capital	58,057	135,925	58,057	135,925
Share-based payment reserve	2,715	2,715	2,445	2,445
Merger reserve	(1,242)	—	(1,242)	—
Capital redemption reserve	—	4,402	—	4,402
Retained earnings	(40,767)	(25,125)	(30,160)	(25,292)
<b>Total equity</b>	18,763	117,917	29,100	117,480

	31 July 2016 Group £'000	31 July 2016 Company £'000	31 July 2015 Group £'000	31 July 2015 Company £'000
(Loss)/profit before tax	(12,600)	167	(10,881)	82
Adjustments for:				
Net finance income	(181)	(167)	(116)	(58)
Depreciation of tangible fixed assets	991	—	1,106	—
Amortisation of intangible assets	298	—	269	—
Share-based payments	270	—	619	—
Changes in working capital:				
Increase in inventories	—	—	(74)	—
(Increase)/decrease in trade and other receivables	(1,143)	—	(250)	(24)
Increase in trade and other payables	503	—	580	—
Increase/(decrease) in deferred revenue	1,179	—	(119)	—
<b>Cash outflow from operating activities</b>	<b>(10,683)</b>	<b>—</b>	<b>(8,866)</b>	<b>—</b>
Research and development tax credit received	1,830	—	1,323	—
Overseas corporation tax paid	(7)	—	(7)	—
<b>Net cash outflow from operating activities</b>	<b>(8,860)</b>	<b>—</b>	<b>(7,550)</b>	<b>—</b>



	31 July 2016 Group £'000	31 July 2016 Company £'000	31 July 2015 Group £'000	31 July 2015 Company £'000
<b>Cash flow from investing activities</b>				
Purchases of tangible fixed assets	(189)	—	(385)	—
Purchases of intangible fixed assets	(900)	—	(533)	—
Cash advance to subsidiary	—	(11,153)	—	(4,323)
Increase in cash placed on deposit	—	—	(20,000)	(20,000)
Decrease in cash placed on deposit	15,000	15,000	5,791	—
Interest received	224	198	100	39
<b>Net cash inflow/(outflow) from investing activities</b>	<b>14,135</b>	<b>4,045</b>	<b>(15,027)</b>	<b>(24,284)</b>
<b>Cash flow from financing activities</b>				
Proceeds from issues of ordinary share capital	—	—	21,123	21,123
Expenses on issue of shares	—	—	(560)	(560)
Interest paid	(12)	—	(3)	—
Loan repayment	(63)	—	(63)	—
<b>Net cash (outflow)/inflow from financing activities</b>	<b>(75)</b>	<b>—</b>	<b>20,497</b>	<b>20,563</b>
<b>Increase/(decrease) in cash and cash equivalents</b>	<b>5,200</b>	<b>4,045</b>	<b>(2,080)</b>	<b>(3,721)</b>
Cash and cash equivalents at the start of the year	4,311	12	6,391	3,733
<b>Cash and cash equivalents at the end of the year</b>	<b>9,511</b>	<b>4,057</b>	<b>4,311</b>	<b>12</b>
Monies placed on deposit at the end of the year	5,000	5,000	20,000	20,000
<b>Cash, cash equivalents and deposits at the end of the year</b>	<b>14,511</b>	<b>9,057</b>	<b>24,311</b>	<b>20,012</b>



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