

# PRELIMINARY RESULTS PRESENTATION

For the year ended 31 July 2017



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*It should be noted that past performance cannot be relied on as a guide to future performance. This presentation contains forward-looking statements with respect to Nanoco’s plans and objectives regarding its financial conditions, results of operations and businesses.*

*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 interim results announcement for the full year ended 31 July 2017, can be found on the Investor Relations section of the Nanoco website ([www.nanocogroup.com](http://www.nanocogroup.com)).*

# HIGHLIGHTS

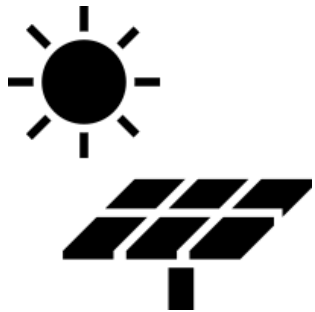
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- Hybrid commercial model in display established
- First display sales orders achieved
- Substantial pipeline of commercial opportunities
- 10x increase in manufacturing capacity at Runcorn, production costs reduced
- Agreement signed with Kyulux focused on next generation displays
- Life sciences – New grant for early detection of pancreatic cancer awarded
- Revenue and other operating income was £1.6m (2016: £0.8m); loss after tax was £9.1m (2016: £10.6m).
- Year end cash of £5.7m (2016: £14.5m)
- Cost base significantly reduced

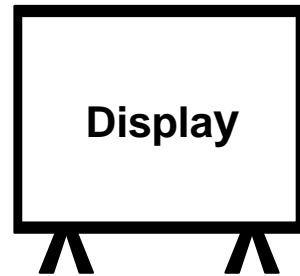
## Post balance sheet events

- Balance sheet strengthened, £8m net proceeds from placing
- Agreement with US Corporation for use of CFQD in medical devices
- AUO showed TV's and monitors equipped with Nanoco CFQD at Touch Taiwan

## COMPANY OVERVIEW



**Solar**



**Display**



**Lighting**



**Life sciences**



**Nano-materials**

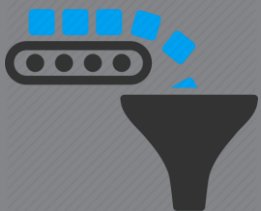
- Pioneer and world leader in the development and production of cadmium-free quantum dots (CFQDs)
- Scalable "platform technology" with multiple markets and product applications
- Extensive patent portfolio, c.600 patents granted/pending
- Large addressable markets
- Main focus to date is the display market; other markets now showing encouraging progress
- R&D in Manchester
- Manufacturing in Runcorn
- c.80 staff

# STRENGTHS



**Leader in heavy-metal-free  
CFQD® quantum dot & Nano-  
material products**

Leading R&D innovation  
Intellectual property



**Efficient mass production process**

Molecular seeding process  
Efficient scalable production



- Leading performance
- High quality
- Reliability
- Low risk
- High volume
- Low Cost





DISPLAY



# GROWING DISPLAY MARKET OPPORTUNITY

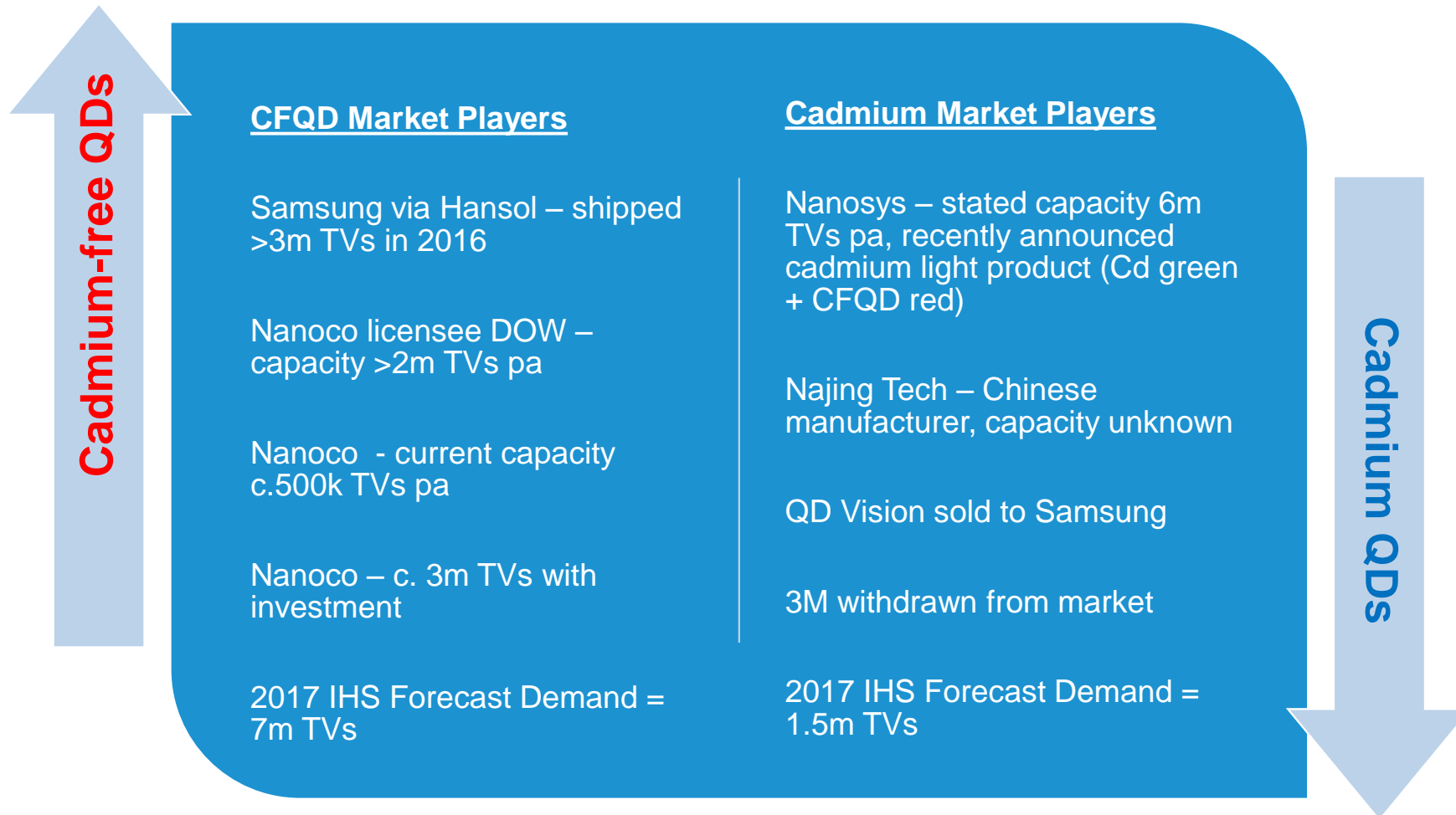
- Benefits of CFQDs
  - Enables Wide Color Gamut (WCG) displays for 4K, UHD, HDR, gaming, streaming, photos
  - Integrated into existing LCD technology
  - Consistent and accurate colours across product range
  - Improved peak brightness and contrast
  - Lightning fast response times and refresh rates
- Samsung leading the way; other OEMs are starting to following with the recent European Commission's decision to ban cadmium providing a catalyst
- Estimated 3.2m CFQD TVs sold in 2016
- IHS report that 26m displays will be QD equipped by 2021 and 90% (24m) will be cadmium-free
- 24m CFQD Displays would require c. 24 tonnes of CFQDs assuming 1g per m<sup>2</sup> of film; supply today limited to three manufacturers



**AUO demonstrating 65", 75" and 85" UHD HDR cadmium free QD TVs at Touch Taiwan in September 2017**

## COMPETITION AND SUPPLY

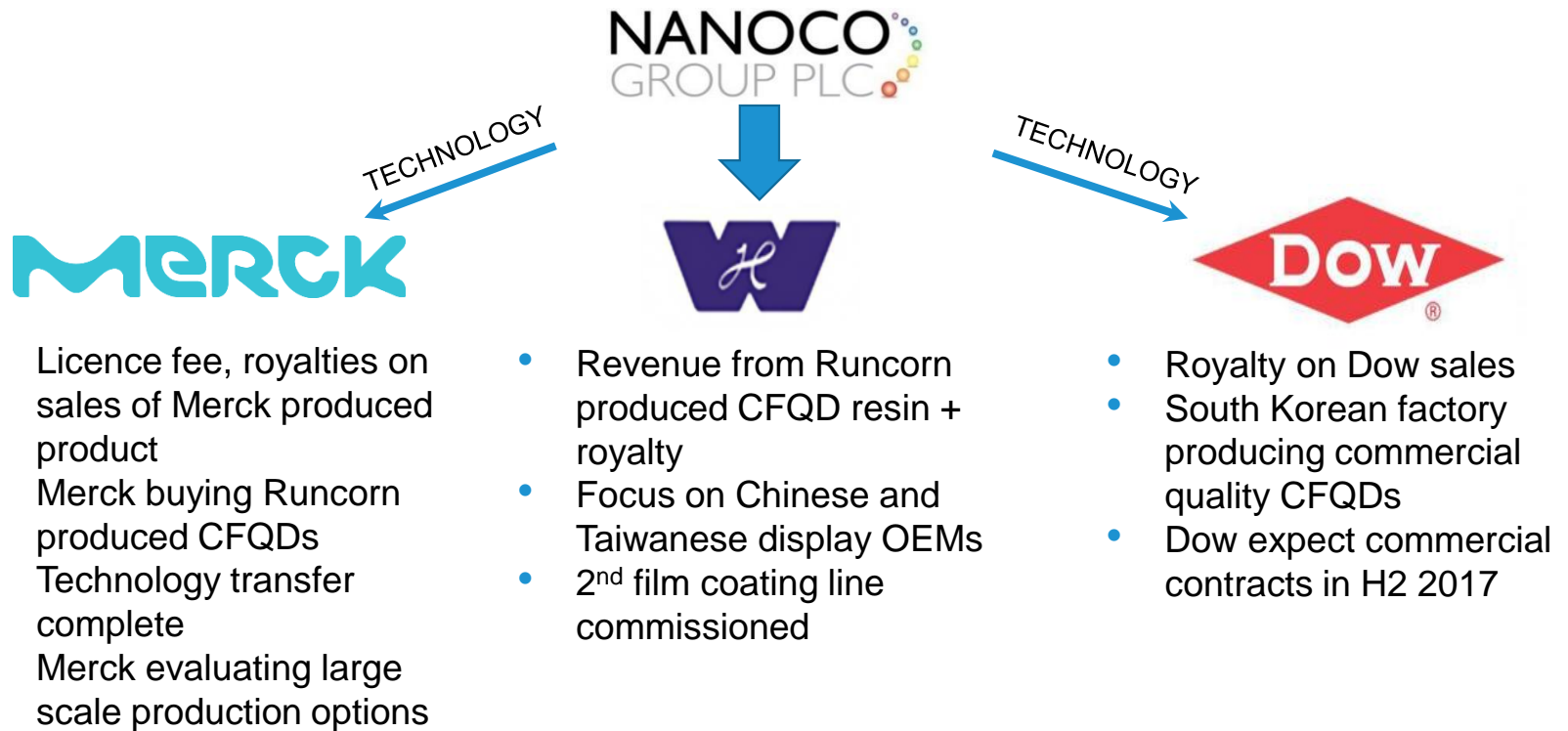
- Nanoco and its licensees, Dow and Merck, are the only commercial suppliers of CFQDs
- Competition chasing cadmium free hard





# MULTI-CHANNEL STRATEGY TO DISPLAY SUCCESS

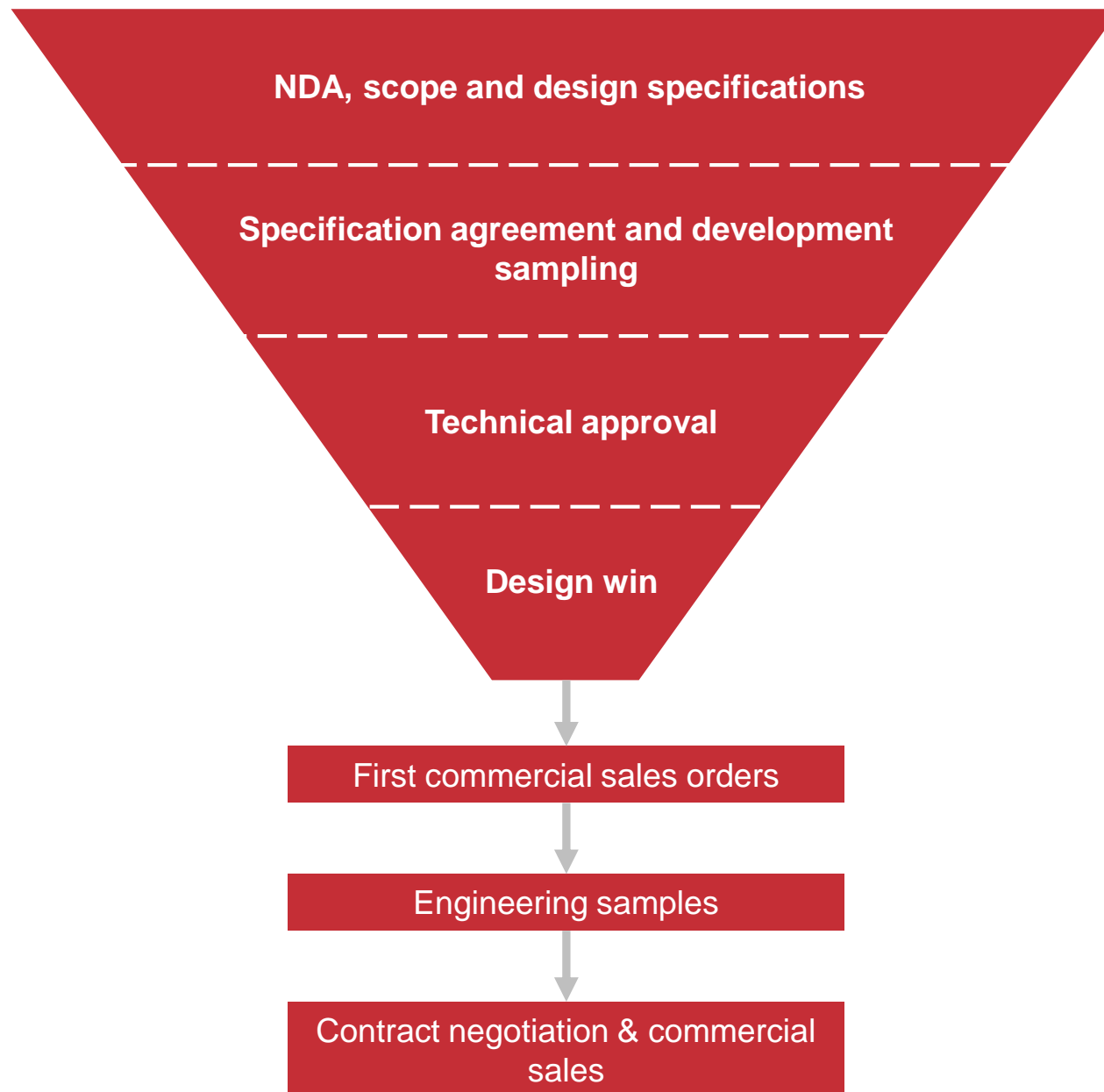
## Nanoco Non-exclusive Licensees



## Potential Display Customers



# GROWING & FOCUSED SALES PIPELINE



- Large pipeline of active programmes
- Focused on OEMs with near term potential
- Sales process longer than anticipated
  - Customisation required for each OEM
  - Achieving required specification can be iterative
  - Goalposts frequently changed
  - Use of cadmium lingering

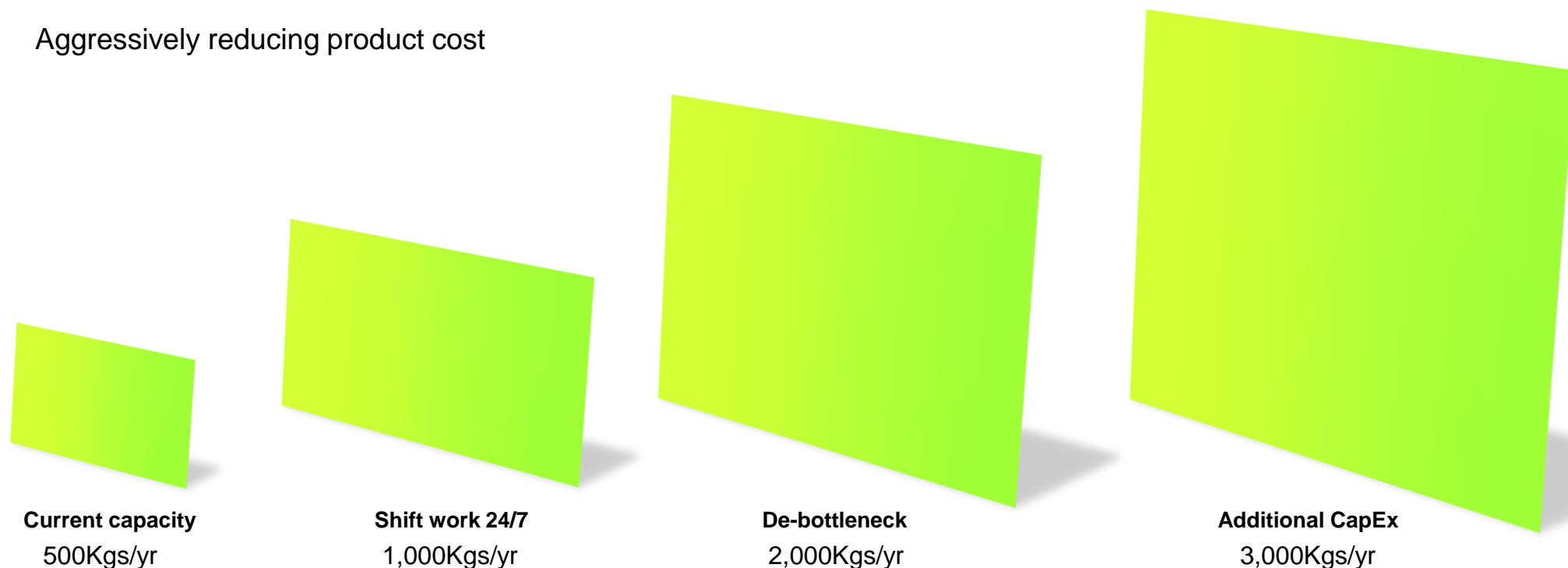
## SLOWER ADOPTION

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- Protracted RoHS ruling has allowed cadmium QDs to prevail, especially in China
  - October 2019 – cadmium exemption ends in Europe
- Initial adoption on high end TVs where volumes are low
- China currently using cadmium QD for local Chinese market, exploring CFQDs for export to Western markets in Europe and North America
- QD products have taken longer to design into new TV cycles
- QLED / OLED battle for high end TVs driven by Samsung and LG

# EXPANDING CAPACITY TO MEET FORECAST DEMAND

- Runcorn ready to fulfil commercial orders
- 10x increase in capacity through innovative technology improvements; cost reduced significantly
- Enables rapid transition for new materials from lab to production
- Awarded ISO 9001 certification in December 2016
- Capacity of 1000 Kgs/year with 24/7 operation
- Plan in place to ramp to c. 3000 Kgs/year on existing site with investment
- Aggressively reducing product cost



- AUO showed line of next generation 8k and 4k TVs equipped with Nanoco CFQD Fine Colour Film at Touch Taiwan
- Film produced from CFQD's produced by Nanoco in the UK and coated onto film by Wah Hong in Taiwan



65" CFQD 4K TV



85" CFQD 8K TV



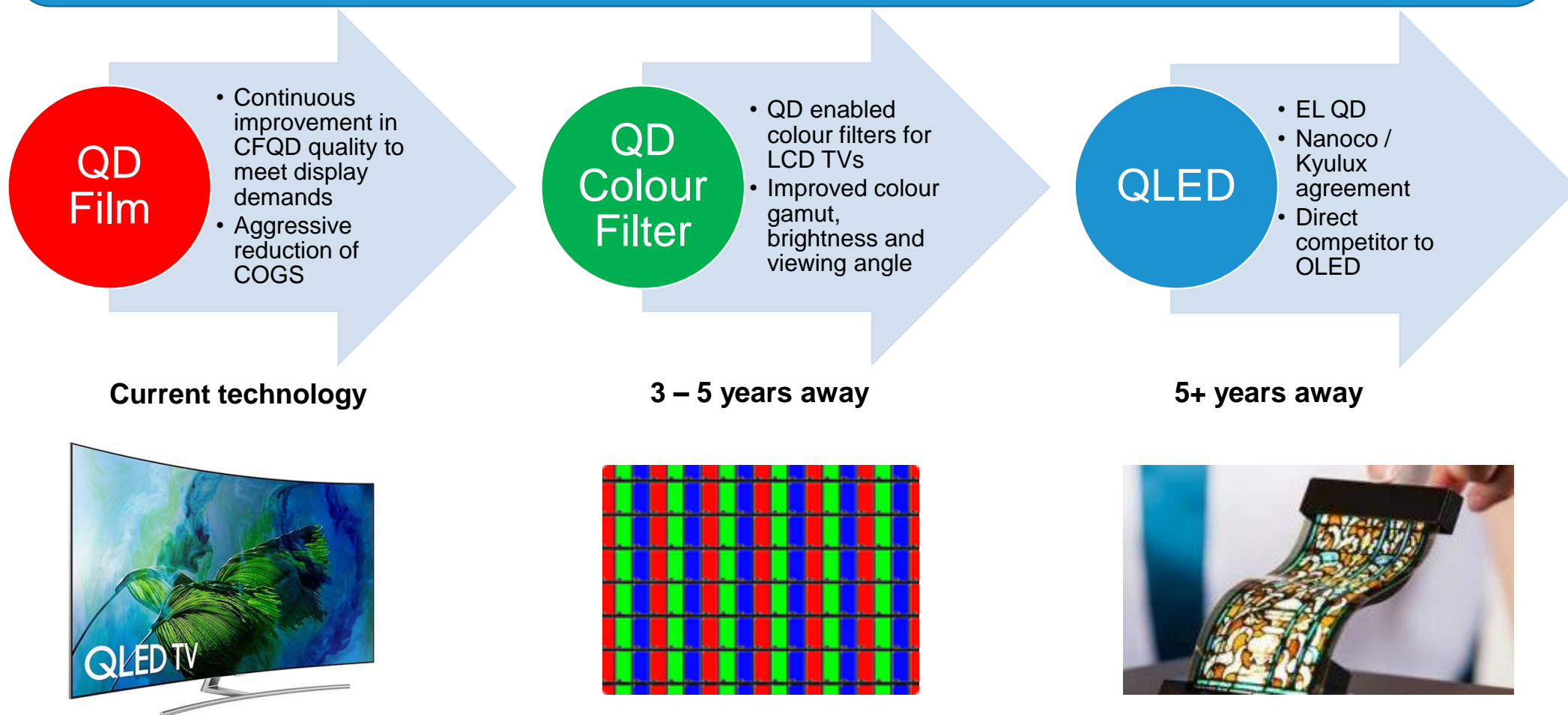
75" CFQD 4K TV



# CONTINUOUS INNOVATION CRITICAL TO SUCCESS

Nanoco has led the development of CFQD technology with rapid improvements in quality, performance and yield

Diminished R&D resource needs to be reinstated to keep up and stay ahead of competition and deliver improved technology

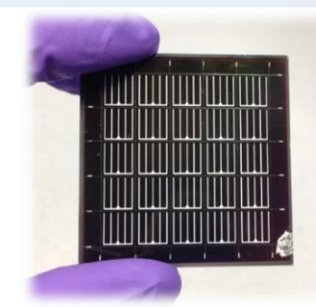
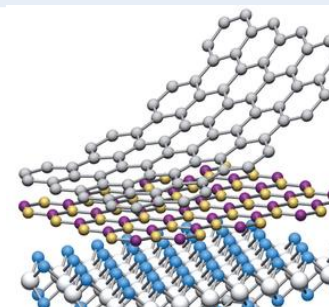
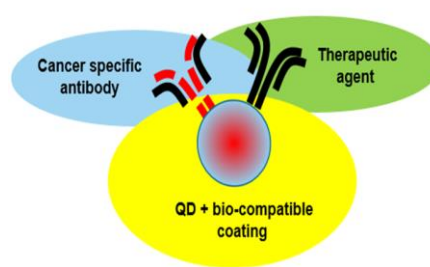




OTHER MARKETS

# OTHER MARKETS

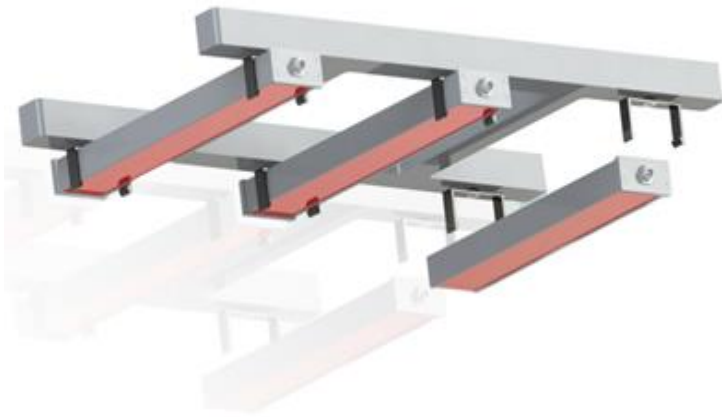
	LIGHTING	LIFE SCIENCES	NANO-MATERIALS	SOLAR
<b>Initial application</b>	Horticulture lighting Light therapy (crosses into life sciences)	Image guided surgery, cancer diagnostics & targeted therapy	Infra red, 2D other nano-materials	Printable thin film CIGS solar cells
<b>CFQD Advantage</b>	Enhanced plant growth, Photodynamic therapy for pain management and skin treatment	Enhanced tumour imaging and diagnosis	New materials; Wide range of applications: Display, sensor, catalysis	Low cost solar energy
<b>Key partnerships</b>	Commercial lighting and Medical device companies	University College London; Cancer Research UK	UoM , Graphene Institute (UoM) Prof Kostya Novoselov (Nobel Prize winner for Graphene)	Kinetic Corporate Finance
<b>Next milestone</b>	Sales ramp	Repeat toxicology study under GMP conditions and file IND with FDA	Commercial contracts, non dilutive funding	Successful sale or partnership of the business
<b>Strategy</b>	Grow business using existing supply chain	Spin out and fund as stand alone entity	Develop technology and build IP position	Divest business
<b>Status</b>	1 commercial contract signed	Positive proof of principal ; Positive toxicology, GMP	New materials being discovered and IP portfolio being built	Process to divest business has commenced





# HORTICULTURAL LIGHTING

- Focus on horticultural and photodynamic therapy
- Nanoco lights won CES 2017 Innovation Award
- Tune light to match the ideal growing conditions for plants
- Commercializing technology today



Horticultural lighting to enhance seed germination and seedling growth

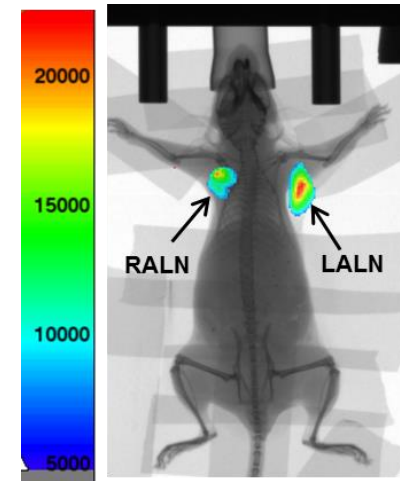




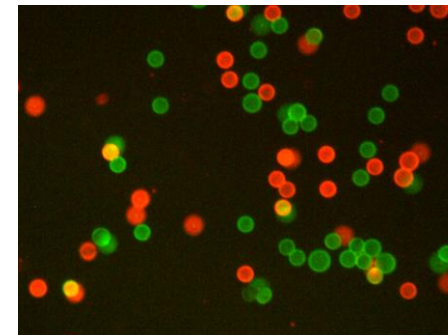


# NANOCO LIFE SCIENCES – RAPID PROGRESS

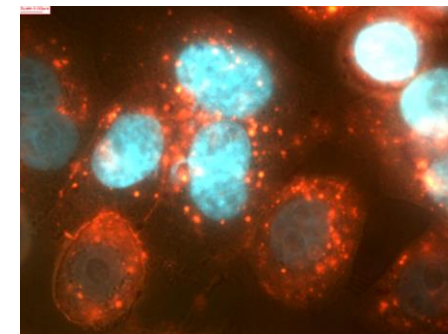
- Focus on in vivo imaging, diagnostic and targeted therapy of cancer
- Partnership in place with University College London, University of Manchester and University of Nottingham
- Positive results shown including:
  - Uptake in sentinel lymph nodes of mouse and rat models
  - No signs of toxicity were observed in rodents after high IV doses
  - Vastly improved tumour demarcation when compared to industry standard dyes (ICG)
  - Conjugation to monoclonal antibodies (i.e. breast cancer drug Herceptin)
  - Enhanced 5-ALA labelling and PDT
- Recent award of a Innovate UK Grant has ensured that the work is fully funded
- Strong IP portfolio on functionalization and novel applications
- Extensive QC system in place
- Commercial Supply and License Agreement signed with a US corporation in the field of medical devices for our film product



*In vivo photoluminescence images of the 650 emissive Vivodots™ nanoparticles following subcutaneous injection into the paws of female Balb/c mice.*



*Biotinylated spheres labelled with streptavidin-Vivodot™ conjugates*



*4T1 HER2 positive breast cancer cells labelled with Herceptin-Vivodots™ conjugate*

## 2D / NANO-MATERIALS

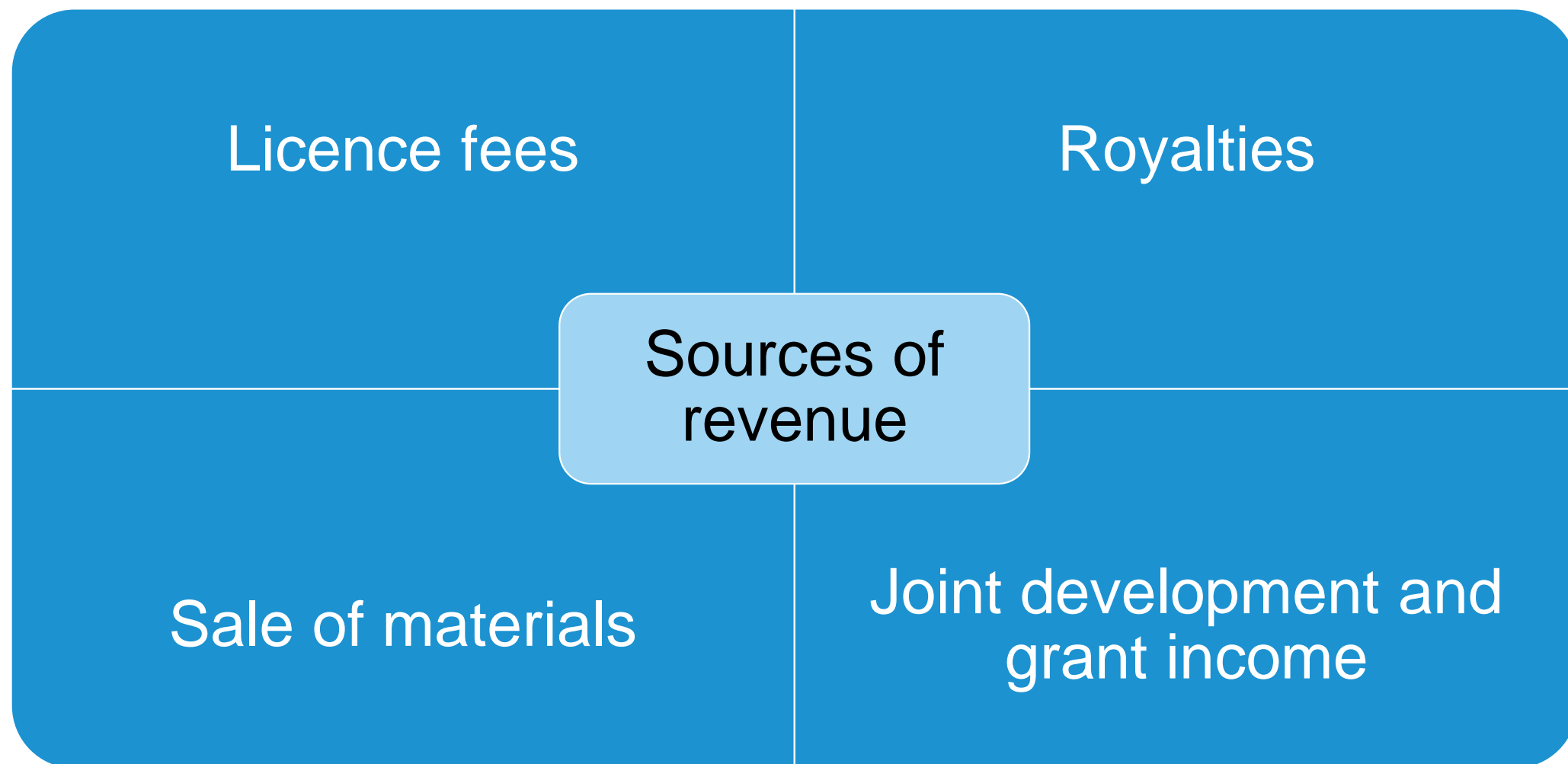
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- Nano material development is a core competency of Nanoco
  - Complex particle design and development
  - Scale up
  - Manufacturing
  
- 2D material development programme
  - Partnership between Nanoco and University of Manchester, National Graphene Institute
  - Collaboration between Nobel Laureate Prof. Kostya Novoselov and Nanoco
  - Develop and commercialise future generations of materials
  - Funded through collaboration agreement
  
- Infrared, electroluminescent and other materials
  - IR materials for range of near term applications
  - New generation of electroluminescent QDs which compete directly with OLED materials for new generations of display
  - Complex combination of materials in partnership with world leading technology companies, e.g. Kyulux

# FINANCIAL REVIEW



## BUSINESS MODEL



# FINANCIAL HIGHLIGHTS

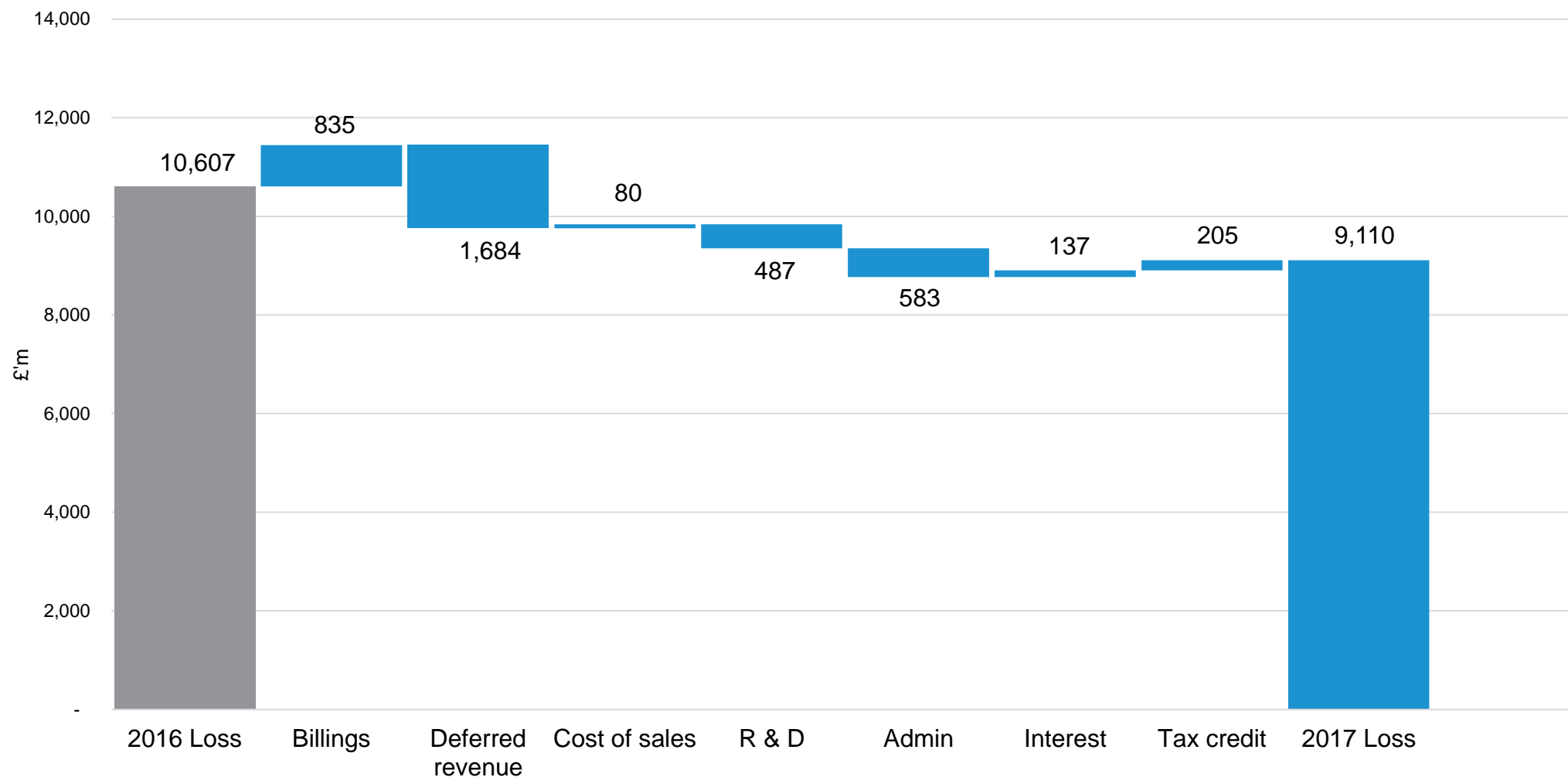
	<b>2017</b>	2016	Movement
	<b>£m</b>	£m	£m
Revenue and other income	<b>1.6</b>	0.8	0.8
Billings	<b>1.1</b>	1.9	(0.8)
R & D investment	<b>(5.5)</b>	(6.0)	0.5
LBITDA	<b>(9.7)</b>	(11.5)	1.8
Loss after tax	<b>(9.1)</b>	(10.6)	1.5
Cash and short term deposits	<b>5.7</b>	14.5	(8.8)
R &D tax credit	<b>1.8</b>	2.0	(0.2)
Deferred revenue	<b>(0.7)</b>	(1.2)	(0.5)
Net assets	<b>10.4</b>	18.8	(8.4)
	<b>No</b>	No	No
Average number of employees during the year	<b>110</b>	129	(19)
Patents granted/pending at year end	<b>600</b>	467	133

Post balance sheet event:

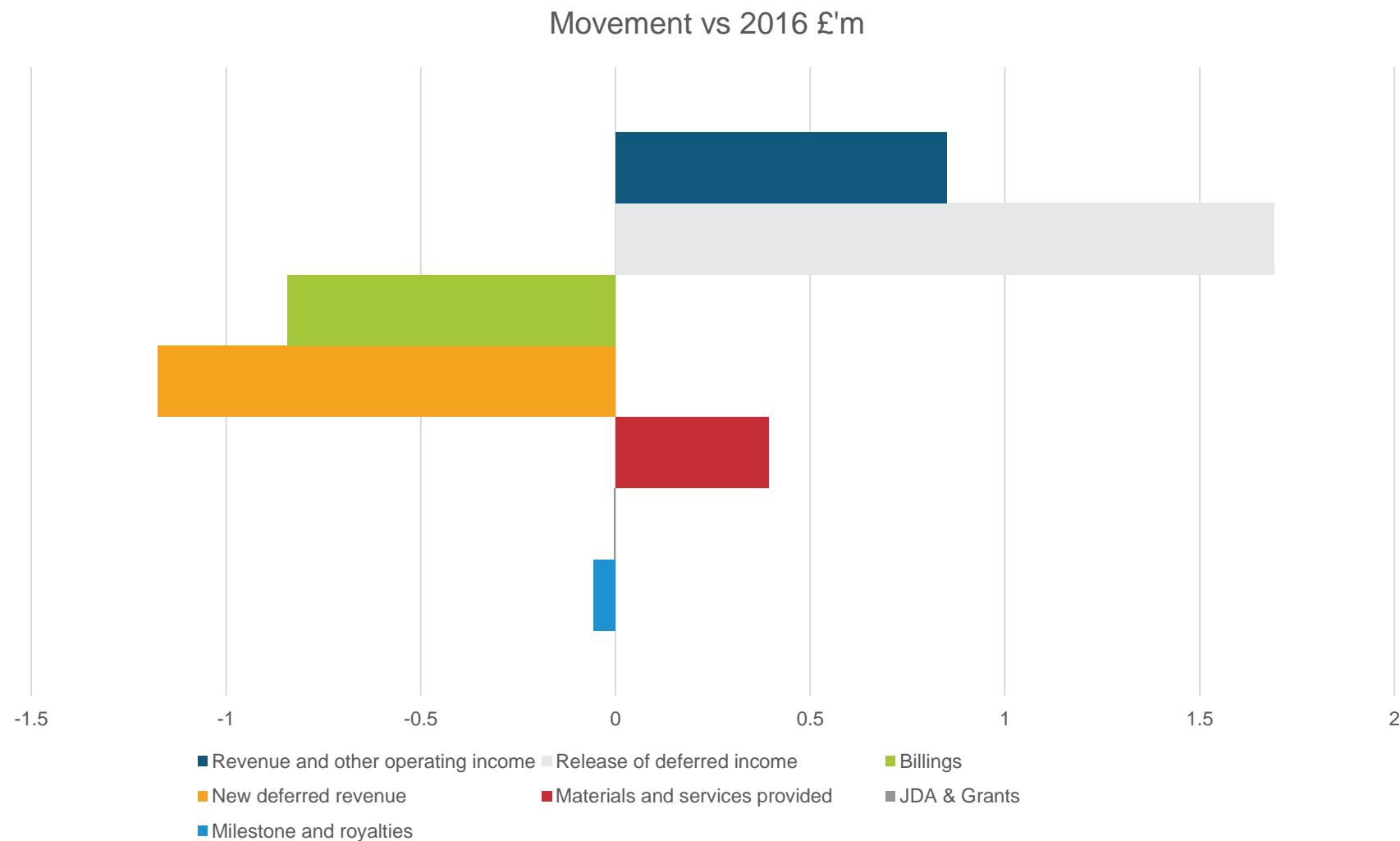
- Placing approved by shareholders on 14 November 2017
- New shares listed on 15 November 2017
- Net funds raised £8 million



# MOVEMENT IN NET LOSS DURING 2017

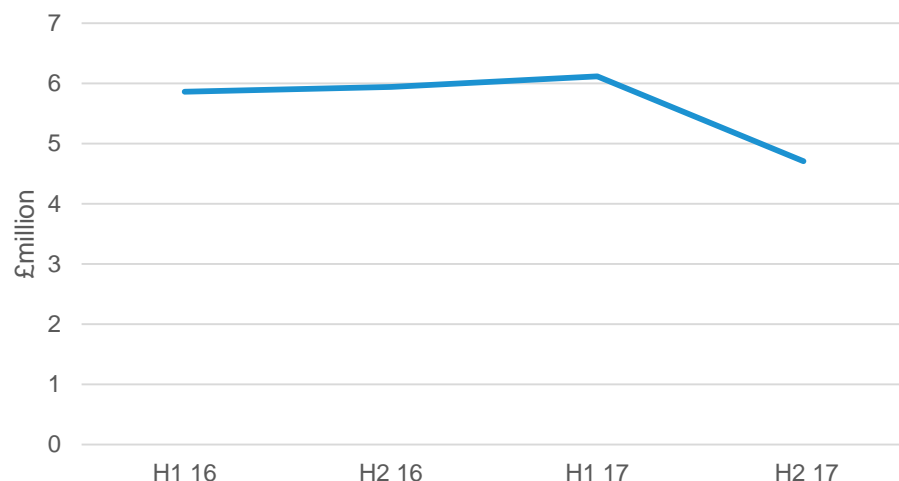


# REVENUE AND BILLINGS



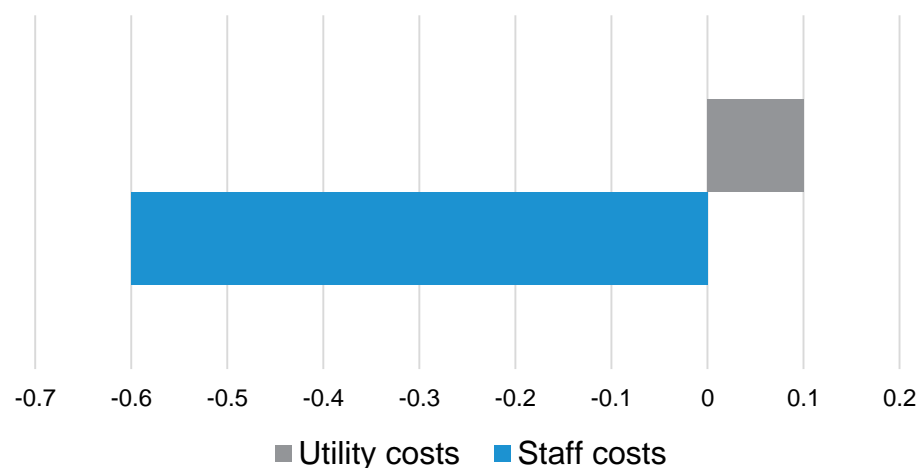
# R&D AND ADMINISTRATIVE COSTS

Total non-cash operating expenses

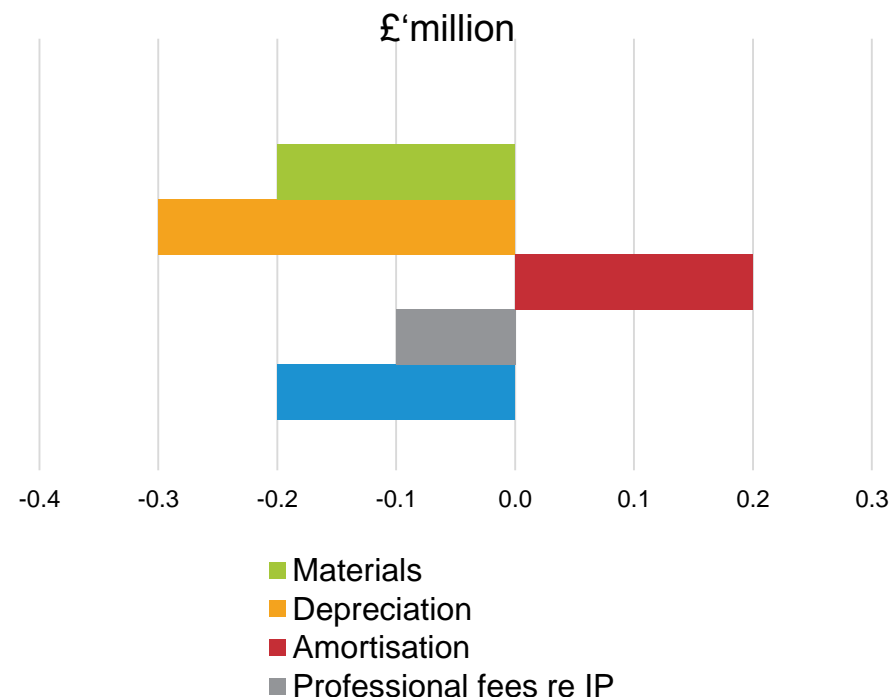


- Operating expenses are tightly controlled
- Cost savings achieved in H2 17
- Further reductions in staff costs have occurred post year end.

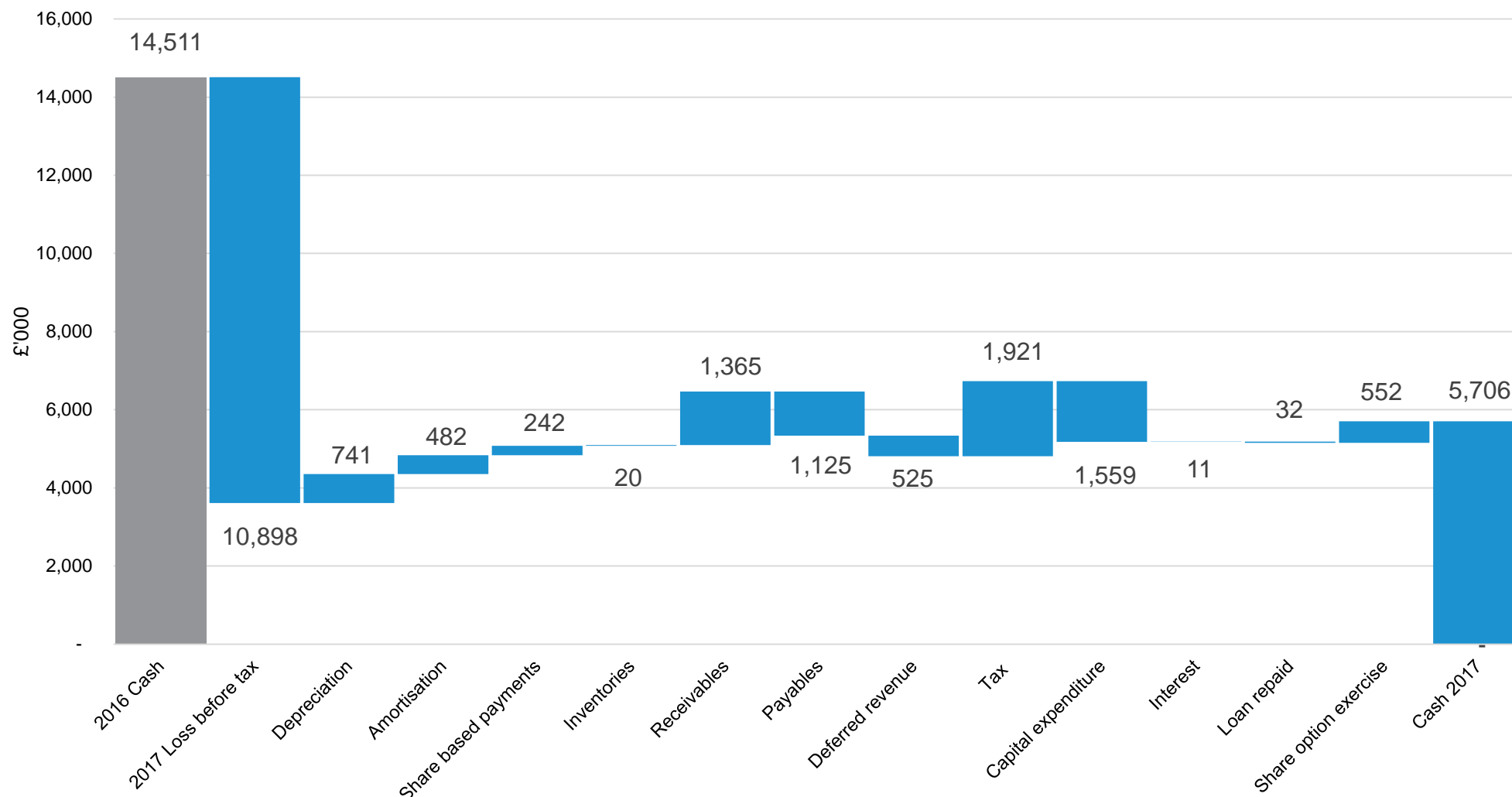
Movement in R&D costs vs 2016 £'million



Movement in Administrative costs vs 2016



# MOVEMENT IN CASH 2017





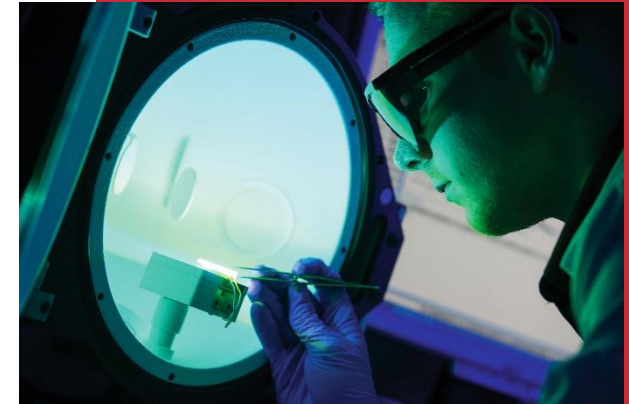
# SUMMARY





## SUMMARY – SOLID PROGRESS

- Achieved first commercial display sales orders
- Focus on target near term display programmes
- Dow royalty, although modest, is increasing
- Global supply chain established for display
- Recent European Commissions decision to ban cadmium stimulating interest in CFQDs
- Life Sciences wins grant
- Secured first medical device commercial supply contract
- Costs significantly reduced
- Funding allows us to deliver our business plan
- Progress made in divesting of the Solar business



## QUESTIONS

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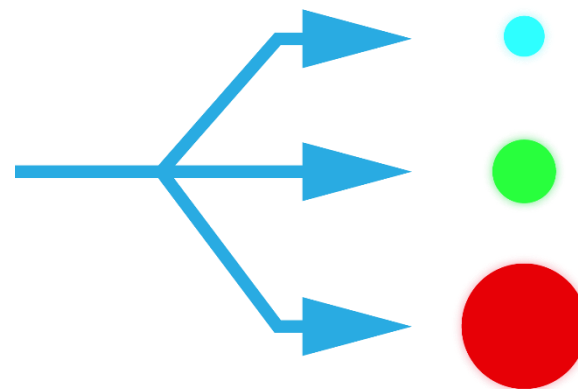
Q&A

# APPENDICES



# WHAT IS A QUANTUM DOT?

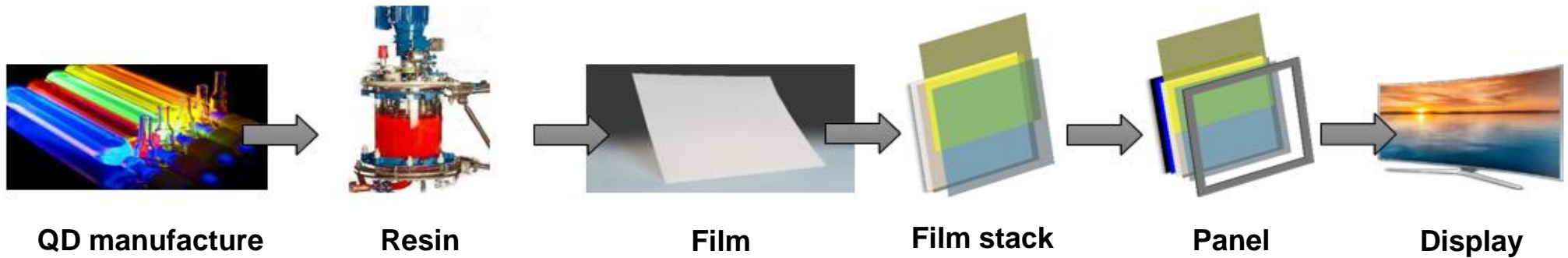
- Tiny particles of a fluorescent semiconductor material
- 1 to 10 nanometers in diameter
- Size of the quantum dot determines the spectrum of light emitted
- Smaller = blue; larger = red
- Can be tuned to light beyond visible light into the Infra-red or ultra-violet parts of the spectrum



**Established  
technology with  
a wide range of  
commercial  
applications**



# BENEFITS OF CFQD® QUANTUM DOT FILM



## Better Colour Gamut

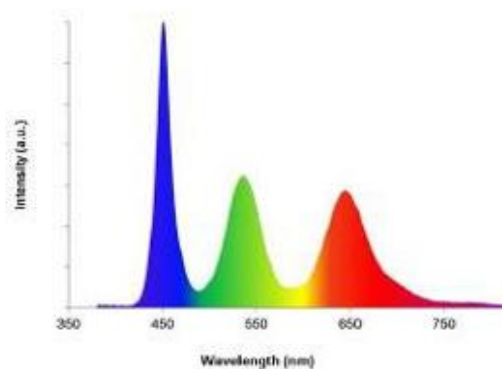
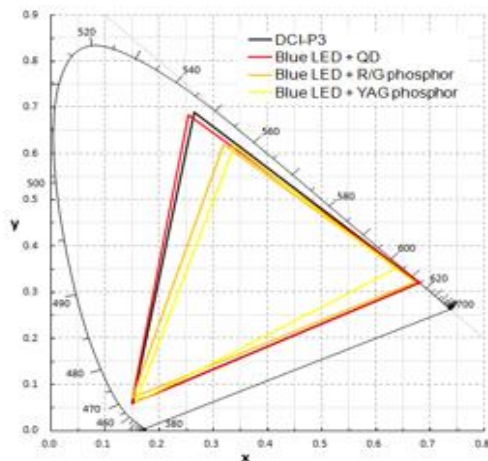
- Much improved colour saturation
- Improved colour enhancement over LCD → similar to OLED

## Energy Efficient

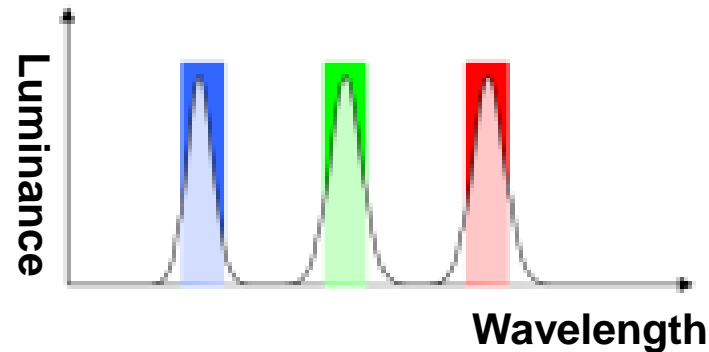
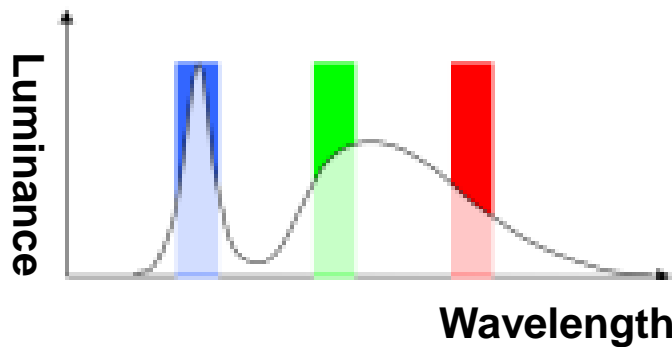
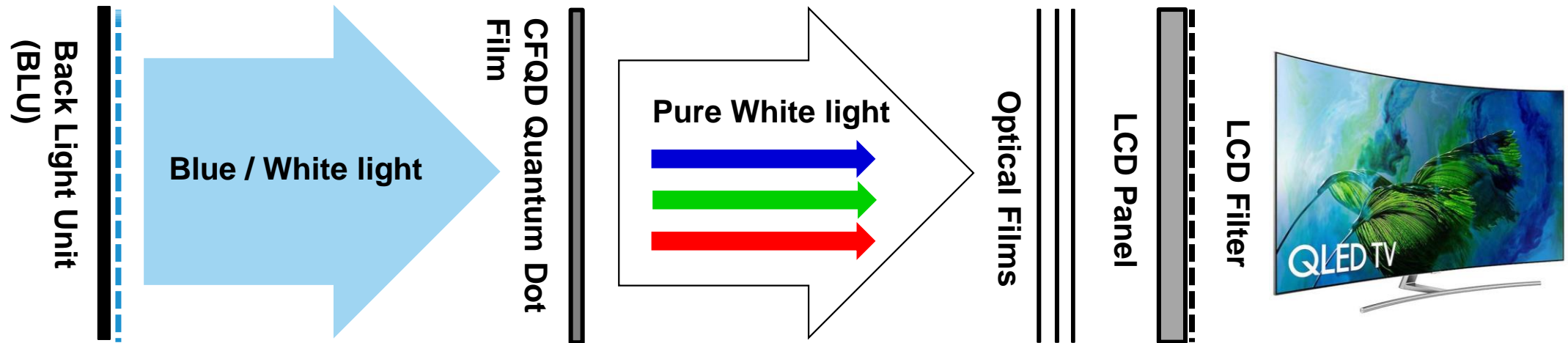
- Narrow bandwidth = more light extraction through colour filters
- Enables use of blue LED instead of less efficient white LED

## Minimal Process

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



# BREAKDOWN OF A QD LCD DISPLAY



Emits light – much more blue than green and red

Light energises the quantum dots in the film

Quantum dots emit precise green and red colours

LCD panel creates the image through polarised shuttering of pixels

Each pixel / shutter is paired with a coloured filter to remove all but the red, green or blue light. Filters may be replaced by QDs in the future.



## WHAT PEOPLE ARE SAYING ABOUT QD DISPLAYS

**“A TV screen that is jaw-droppingly good”**  
- *The Independent*



**“TVs are entering a new era in 2017”**  
- *Trusted Reviews*



**“May be the holy grail of gaming displays”**  
- *Forbes*



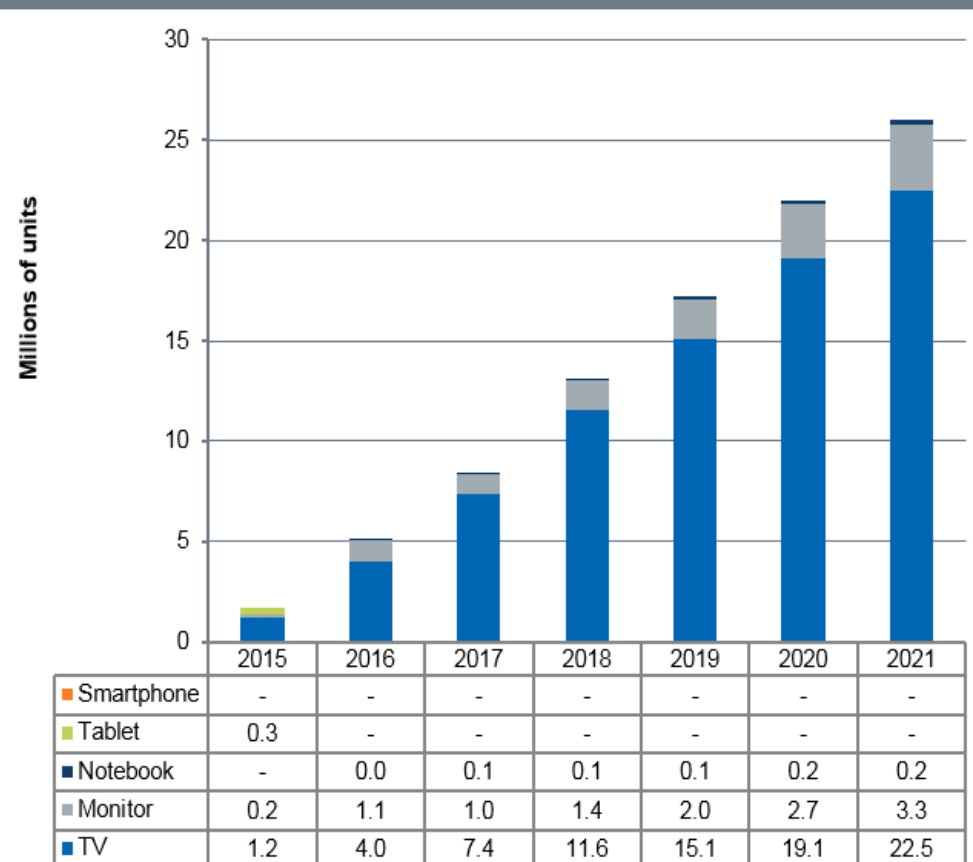
**“CF791’s pitch-perfect colors change the game for ultrawides”**  
- *Monitornerds.com*



**Digital Trend**  
4.9 out of 5

# CADMIUM-FREE TO DOMINATE RAPIDLY GROWING MARKET

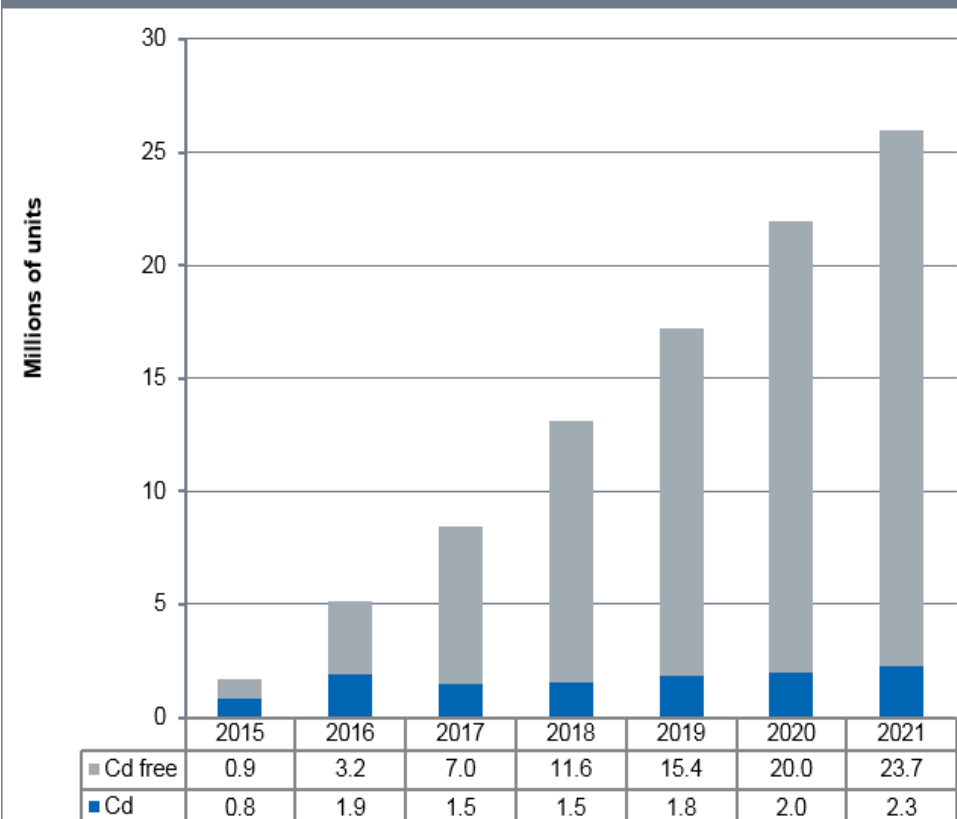
QD display market forecast by application (volume)



Source: IHS

© 2017 IHS

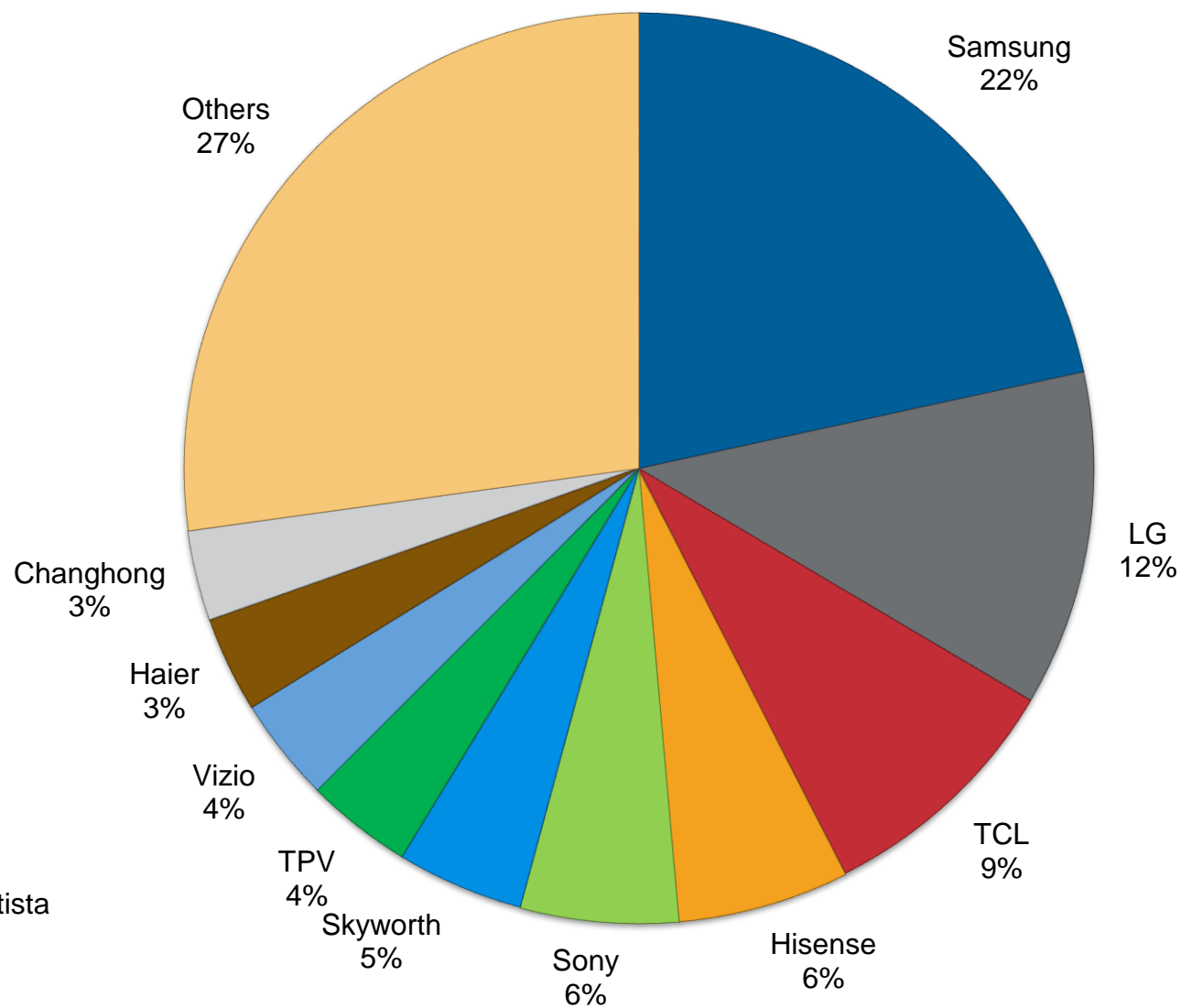
QD display market forecast by Cd and Cd-free (volume)



Source: IHS

© 2017 IHS

# LCD TV MARKET SHARE 2016



Source: Statista

## RoHS UPDATE

- The European Commission (EC) has completed a lengthy review of the use of cadmium-based quantum dots in displays and LED lighting, following the rejection by the European Parliament in 2015 of their previous proposal to extend their use
- The report from their consultants (Oeko-Institute) recommended a further 3 year extension, but after concern from Member States and environmental NGOs the EC decided to end their use in LED lighting and give the minimum period of 2 years only for use in displays
- The EC has put a Delegated Act before the European Council and Parliament to put this into force. Both have now accepted it and it was published in the EU Legal Journal on 31<sup>st</sup> October. It will pass into law on 20<sup>th</sup> November
- On this basis, cadmium-based quantum dots in displays will be effectively banned from 31<sup>st</sup> October 2019, since the normal RoHS limit of 100ppm will apply once the exemption ends
- Nanoco expects that regulations in other key markets, including China, will fall in line with RoHS
- Meanwhile, our contacts with display companies indicate that most already accept the need for new display products to be cadmium-free - especially the world leading brands in both television, computer monitor and laptop displays



**Market leader Samsung promotes their cadmium-free quantum dots QLED TV range at CES 2017**

# LEADERSHIP

## **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
- NED 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

- Increasing business & corporate leadership roles over years at Dow and ICI
- Business builder; former CEO of Haltermann, MD Dow Norther Europe, director roles speciality businesses located in USA, Germany, Switzerland, Hong Kong and United Kingdom

## **Brendan Cummins** Senior Non-Executive

- 40 years of industry experience mostly with Ciba Geigy, last role was CEO of Ciba and led the sale of Ciba to BASF
- Board of US Headquartered, Ashland Inc., Chair of Governance and Nominations Committees and member of Audit Committee
- Board of Perstorp AB, Sweden

## **Dr Alison Fielding** Non-Executive

- Director of Strategy and IP Impact at IP Group
- NED of Getech Group plc
- Astra Zeneca, followed McKinsey & Co, then co-founded Techtran Group Limited which was acquired by IP Group in 2005 and subsequently held the role of director and COO at IP Group
- Board member and advisor of several early stage and quoted IP Group backed technology companies



# STATEMENT OF COMPREHENSIVE INCOME

	2017 £'000	2016 £'000
Revenue	1,326	474
Cost of sales	(257)	(177)
Gross profit	1,069	297
Other operating income	281	284
Operating expenses		
Research and development expenses	(5,508)	(5,995)
Administrative expenses	(6,784)	(7,367)
Operating loss	(10,942)	(12,781)
- before share-based payments and the costs of the move to the Main Market	(10,700)	(12,511)
- share-based payments	(242)	(270)
Finance income	44	193
Finance expense	-	(12)
Loss on ordinary activities before taxation	(10,898)	(12,600)
Taxation	1,788	1,993
Loss on ordinary activities after taxation for the year and total comprehensive loss for the year	(9,110)	(10,607)
Loss per share		
Basic and diluted loss for the year	(3.82)p	(4.47)p

# STATEMENT OF FINANCIAL POSITION

	31 July 2017 Group £'000	31 July 2017 Company £'000	31 July 2016 Group £'000	31 July 2016 Company £'000
<b>Assets</b>				
<b>Non-current assets</b>				
Tangible fixed assets	865	-	1,260	—
Intangible assets	2,619	-	2,423	—
Investment in subsidiaries	-	66,564	—	66,322
	<b>3,484</b>	<b>66,564</b>	<b>3,683</b>	<b>66,322</b>
<b>Current assets</b>				
Inventories	188	-	208	—
Trade and other receivables	669	47,957	2,045	42,988
Income tax asset	1,837	-	1,970	—
Short-term investments and cash on deposit	-	-	5,000	5,000
Cash and cash equivalents	5,706	4,670	9,511	4,057
	<b>8,400</b>	<b>52,627</b>	<b>18,734</b>	<b>52,045</b>
<b>Assets held for resale</b>	<b>535</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Total assets</b>	<b>12,419</b>	<b>119,191</b>	<b>22,417</b>	<b>118,367</b>
<b>Liabilities</b>				
<b>Current liabilities</b>				
Trade and other payables	1,318	-	2,443	—
Financial liabilities	-	-	32	—
Deferred revenue	102	-	531	—
	<b>1,420</b>	<b>-</b>	<b>3,006</b>	<b>—</b>

# STATEMENT OF FINANCIAL POSITION

	31 July 2017 Group £'000	31 July 2017 Company £'000	31 July 2016 Group £'000	31 July 2016 Company £'000
<b>Non-current liabilities</b>				
Other payables	-	450	—	450
Deferred revenue	552	-	648	—
	552	450	648	450
<b>Total liabilities</b>	1,972	450	3,654	450
<b>Net assets</b>	10,447	118,741	18,763	117,917
<b>Capital and reserves</b>				
Issued equity capital	58,609	136,477	58,057	135,925
Share-based payment reserve	2,957	2,957	2,715	2,715
Merger reserve	(1,242)	-	(1,242)	—
Capital redemption reserve	-	4,402	—	4,402
Retained earnings	(49,877)	(25,095)	(40,767)	(25,125)
<b>Total equity</b>	10,447	118,741	18,763	117,917

# STATEMENT OF CASH FLOW

	31 July 2017 Group £'000	31 July 2017 Company £'000	31 July 2016 Group £'000	31 July 2016 Company £'000
(Loss)/profit before tax	(10,898)	30	(12,600)	167
Adjustments for:				
Net finance income	(44)	(30)	(181)	(167)
Depreciation of tangible fixed assets	741	-	991	—
Amortisation of intangible assets	482	-	298	—
Share-based payments	242	-	270	—
Changes in working capital:				
Decrease in inventories	20	-	—	—
Decrease/(increase) in trade and other receivables	1,365	-	(1,143)	—
(Decrease)/increase in trade and other payables	(1,125)	-	503	—
(Decrease)/increase in deferred revenue	(525)	-	1,179	—
<b>Cash outflow from operating activities</b>	<b>(9,742)</b>	<b>-</b>	<b>(10,683)</b>	<b>—</b>
Research and development tax credit received	2,000	-	1,830	—
Overseas corporation tax paid	(79)	-	(7)	—
<b>Net cash outflow from operating activities</b>	<b>(7,821)</b>	<b>-</b>	<b>(8,860)</b>	<b>—</b>

# STATEMENT OF CASH FLOW

	31 July 2017 Group £'000	31 July 2017 Company £'000	31 July 2016 Group £'000	31 July 2016 Company £'000
<b>Cash flow from investing activities</b>				
Purchases of tangible fixed assets	(374)	-	(189)	—
Purchases of intangible fixed assets	(1,185)	-	(900)	—
Cash advance to subsidiary	-	(4,980)	—	(11,153)
Decrease in cash placed on deposit	5,000	5,000	15,000	15,000
Interest received	55	41	224	198
<b>Net cash inflow from investing activities</b>	<b>3,496</b>	<b>61</b>	<b>14,135</b>	<b>4,045</b>
<b>Cash flow from financing activities</b>				
Proceeds from issues of ordinary share capital	552	552	—	—
Interest paid	-	-	(12)	—
Loan repayment	(32)	-	(63)	—
<b>Net cash inflow/(outflow) from financing activities</b>	<b>520</b>	<b>552</b>	<b>(75)</b>	<b>—</b>
<b>(Decrease)/increase in cash and cash equivalents</b>	<b>(3,805)</b>	<b>613</b>	<b>5,200</b>	<b>4,045</b>
Cash and cash equivalents at the start of the year	9,511	4,057	4,311	12
<b>Cash and cash equivalents at the end of the year</b>	<b>5,706</b>	<b>4,670</b>	<b>9,511</b>	<b>4,057</b>
Monies placed on deposit at the end of the year	-	-	5,000	5,000
<b>Cash, cash equivalents and deposits at the end of the year</b>	<b>5,706</b>	<b>4,670</b>	<b>14,511</b>	<b>9,057</b>

# SHAREHOLDER ANALYSIS (AS AT 31 OCTOBER 2017)

Name	Shareholding	Percentage
Lombard Odier	33,363,147	14.00
Hargreaves Lansdown Asset Management	23,143,241	9.71
Baillie Gifford & Co	18,051,750	7.58
COGEFI	17,101,951	7.18
Dr Nigel Pickett (CTO)	10,945,681	4.59
TD Direct Investing	8,170,676	3.43
Killik Asset Management	7,406,813	3.11
Dr Michael Edelman (CEO)	4,931,615	2.07

Notes: The total number of voting rights in the Company is 238,279,106





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