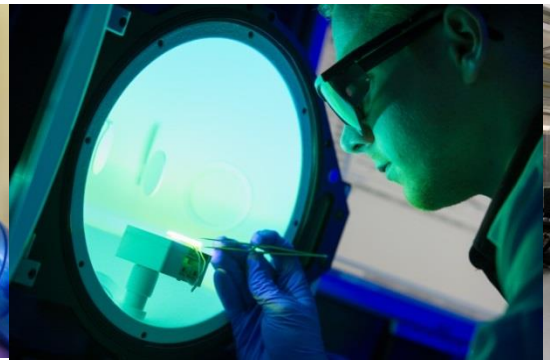
NANOCO GROUP PLC

# INTERIM RESULTS PRESENTATION


FOR THE SIX MONTHS ENDED 31 JANUARY 2016

12 April 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 interim results announcement for the half year ended 31 January 2016, can be found on the Investor Relations section of the Nanoco website (www.nanocogroup.com).*

# INTERIM RESULTS HIGHLIGHTS

- Decision to convert the Company's worldwide licensing agreement with The Dow Chemical Company ("Dow) to non-exclusive gives the Company greater control to pursue multiple routes to market in the display industry
- The capacity of Nanoco's plant in Runcorn continues to be enhanced by process improvements, allowing Nanoco to directly target OEM display makers, film converters and other display partners with its own products
- Dow's plant in Cheonan, South Korea, continues to supply sample material to meet potential customers' requirements
- Further Joint Development Agreement ("JDA") signed with Osram in general lighting and Nanoco's own Lighting Division launched four product lines
- Life Sciences Division formed to pursue potentially significant opportunities in the medical devices and medical diagnostics markets
- David Blain joined the Company as Chief Financial Officer in August 2015 and Chris Richards was appointed a Non-Executive Director in November 2015. Dr Peter Rowley is retiring from the Board after 10 years
- Loss for H1 2016 after exceptional items and taxation was £5.24 million (H1 2015: loss of £3.15 million)
- Balance sheet remains strong with cash, cash equivalents and deposits at 31 January 2016 of £18.3 million (31 January 2015: £9.4 million; 31 July 2015: £24.3 million). £1.9 million R&D tax credit is expected to be received in April 2016.

# DISPLAY STRATEGY

# OVERVIEW OF DOW CONTRACT CHANGES

## What's changed

- Non-exclusive licence
  - Nanoco can license technology or sell product to anyone, anywhere
- Royalty rate reduced
- Earn out eliminated
- Nanoco service resource requirement reduced

## What's not changed

- Dow's commitment to Nanoco's CFQD® technology
- Dow continuing to invest heavily in developing their CFQD® business
- Products sold likely to be CFQD® resin or CFQD® film
- Field of display only
- Territory is global
- Term remains long
- Payment terms remain unchanged

# STRATEGIC CONSIDERATIONS

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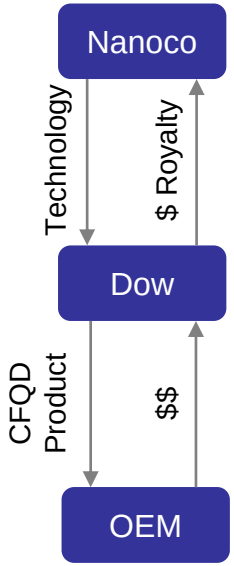
## Advantages of moving to non-exclusive

- ✓ Continued strong relationship with Dow who have built a world leading CFQD® manufacturing plant and are focused on supplying world leading display makers
- ✓ Regain control over roll out of Nanoco technology
- ✓ Multiple partners bringing Nanoco technology capacity online faster including Nanoco supplying product directly
- ✓ New Nanoco capacity will be significant with process enhancements being implemented without need for major CapEx
- ✓ Greater revenue from multiple royalty generating partners (including Dow) + Nanoco own sales
- ✓ Opens up display sales in areas that Dow are not focused on, e.g. high end monitors and all territories outside Korea
- ✓ Ability to respond quickly to the market demands
- ✓ Ability to drive business forward free from events outside Nanoco control

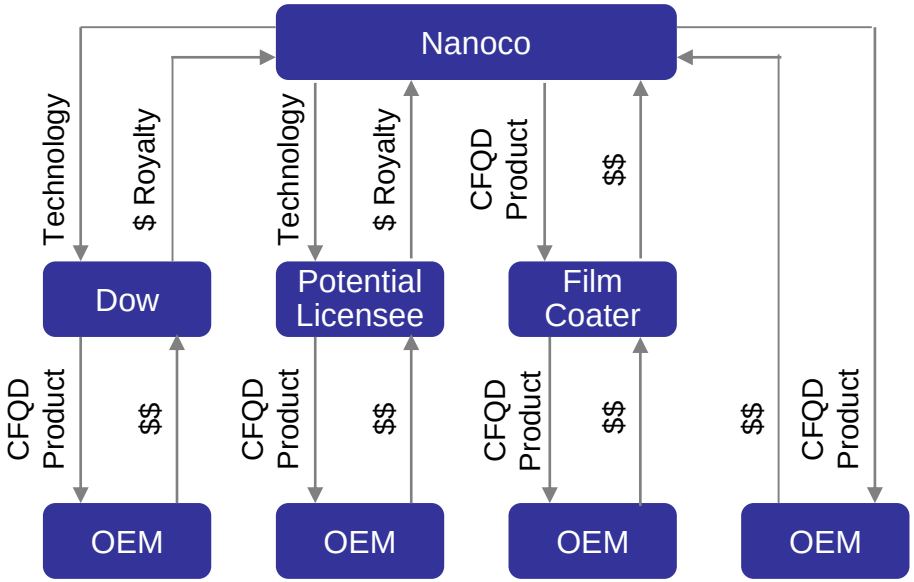
# DISPLAY STRATEGY

## Old




- High royalty from single licensee
- Reliant on Dow performance
- Less control

## New




- Multiple sales channels for Nanoco technology
- Increased revenue & income from multiple licensees and own product sales
- Increased control
- Improved pricing selling directly

# DISPLAY BUSINESS

# GLOBAL QD DISPLAY FORECAST

| (Millions of units) | | | | | | |
|---|---|---|---|---|---|---|
| | **2015** | **2016** | **2017** | **2018** | **2019** | **2020** |
| Quantum dot market forecast | 1.9 | 5.6 | 12.7 | 20.0 | 29.0 | 40.7 |
| Growth rate | | 201.70% | 124.80% | 57.40% | 45.00% | 40.50% |

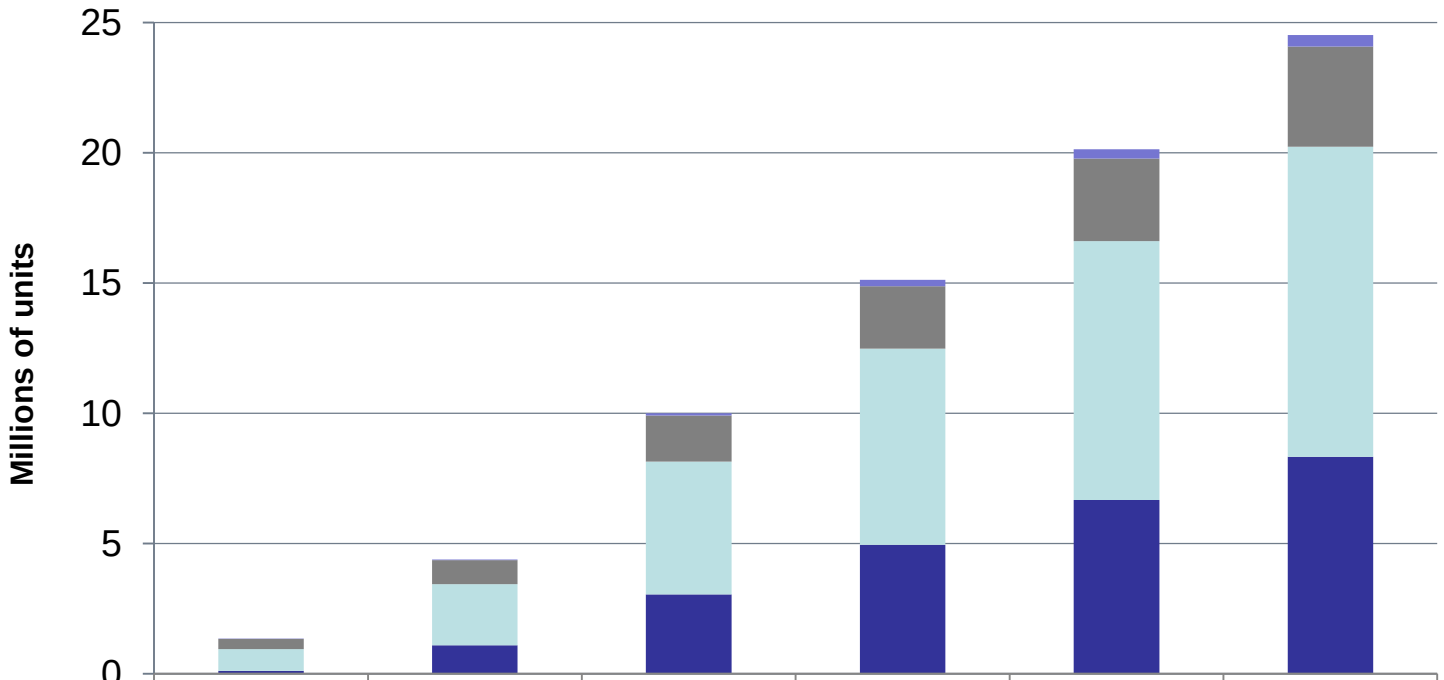
## By application (Volume)

| (Millions of units) | | | | | | |
|---|---|---|---|---|---|---|
| | **2015** | **2016** | **2017** | **2018** | **2019** | **2020** |
| TV | 1.4 | 4.4 | 10.0 | 15.1 | 20.1 | 24.5 |
| Monitor | 0.4 | 0.8 | 1.4 | 1.9 | 2.5 | 3.2 |
| Notebook | – | 0.1 | 0.2 | 0.3 | 0.5 | 0.8 |
| Tablet | 0.1 | 0.4 | 1.2 | 2.2 | 3.4 | 4.7 |
| Smartphone | – | – | – | 0.5 | 2.4 | 7.4 |
| **Grand Total** | **1.9** | **5.7** | **12.7** | **20.0** | **29.0** | **40.7** |

Source: IHS Quantum Dot Display Technology & Market Report – H2 2015

# GLOBAL QD DISPLAY FORECAST

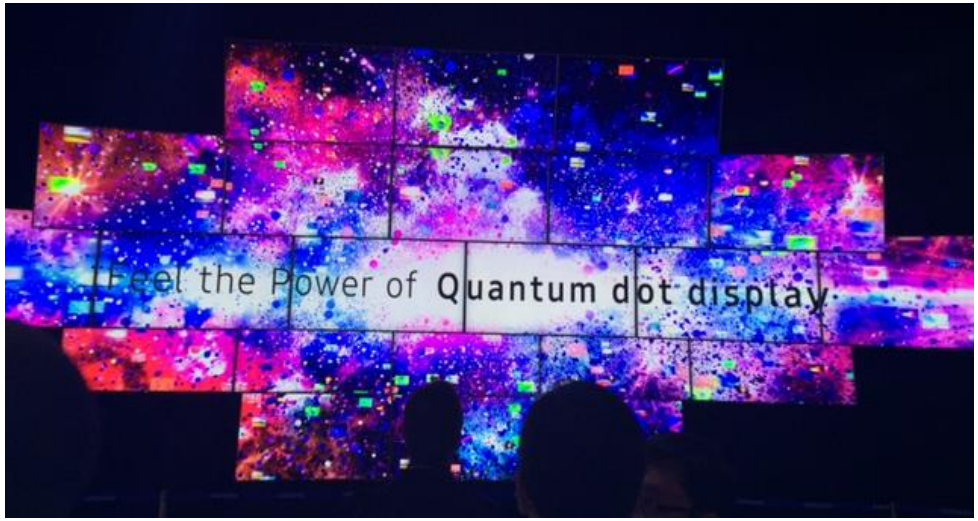
## QD TV display market forecast by size (Volume)




| | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|
| >70 inch | 0.0 | 0.0 | 0.1 | 0.3 | 0.4 | 0.4 |
| 60~69 inch | 0.4 | 0.9 | 1.8 | 2.4 | 3.2 | 3.9 |
| 50~59 inch | 0.8 | 2.3 | 5.1 | 7.5 | 9.9 | 11.9 |
| 40~49 inch | 0.1 | 1.1 | 3.0 | 5.0 | 6.7 | 8.3 |

Source: IHS Quantum Dot Display Technology & Market Report – H2 2015

# DISPLAY MARKET TRENDS FAVOUR CFQD®





- Samsung begins to aggressively promote Quantum Dot TVs from launch at CES 2015 and further promotion at CES 2016. 2015 sales of CFQD® TV estimated to be c. 1m QD TVs
- Samsung QD TVs all contain cadmium free quantum dots
- Environmental legislation in Europe and China moving in favour of cadmium free quantum dots
- QD TVs gain ground in rapidly growing high end 4K TV sector
- OLED TVs are still costly due to poor manufacturing yields

# CLEAR BENEFITS FOR OUR LCD CUSTOMERS

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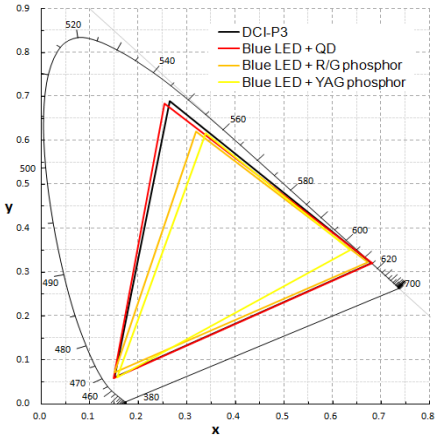
## Better Colour Gamut

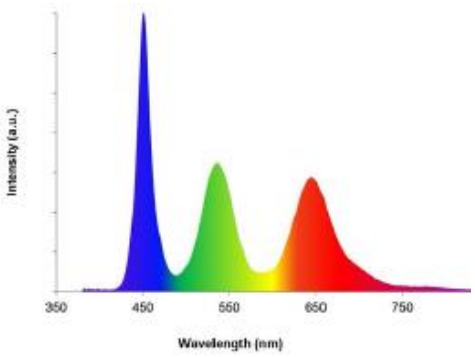
- Much improved colour saturation
- Improved colour enhancement over LCD → similar to OLED




Dramatically improved colour quality

## Energy Efficient

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




Light source cost saving Better TV experience

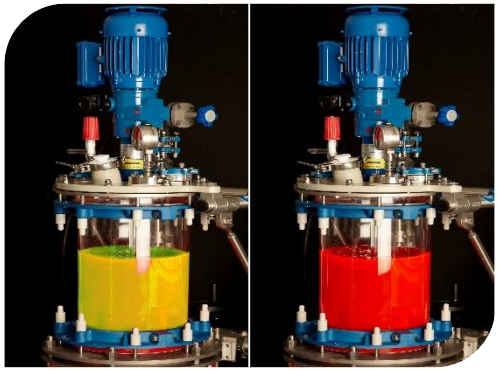
## Minimal Process Change

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

"Drop in system" for easy adoption

**Without the use of cadmium or heavy metals**

# CFQD® FILM ON BACK LIGHT UNIT



Red & Green CFQD® ready for processing into film

Finished 55 inch CFQD® films

CFQD® films assembled onto edge lit LCD backlight

# DOW PRODUCTION

**Dow's Cheonan 3 Facility in Korea – cadmium free quantum dot manufacturing site**


- The new Dow facility will enable mass production of cadmium free quantum dots to meet customers' requirements and product launch
- Capacity to support millions of large TVs
- Facility is operational and customers are currently sampling CFQD® products (resin & film) produced in Cheonan

# RoHS UPDATE

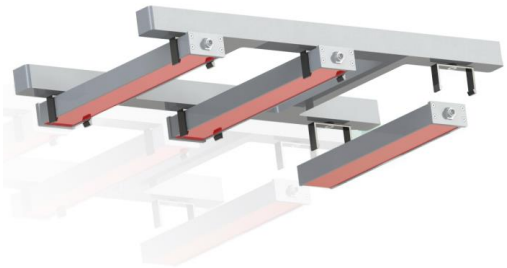
- On 20th May 2015, European Parliament voted 618 to 33 to reject the Commission proposal to extend the RoHS exemption for Cadmium QDs in display and lighting products
- The Commission response has been to repeat a full technical review
- The legality of Cadmium QD displays in the interim is still disputed by Nanoco and others
- The public consultation for the review was closed on 8th January 2016 and the final report is due by 24th April 2016, although the publication date has not yet been confirmed
- The Commission will then consult with Member States before taking a decision and presenting this in the form of a Delegated Act for approval by the Council and Parliament, which will then enter into law. The timetable for this has not been issued, but could take 6 to 12 months
- A run-out period of 12-18 months would be allowed after a Delegated Act to end the Exemption for Cadmium QDs, but responsible manufacturers may decide to take their Cadmium QD products off the market earlier
- The case for ending the Exemption is now even stronger than in May last year
  - Cd-Free QD display sales in EU are 20 times greater than Cadmium QD displays, and accelerating rapidly
  - 2nd generation Cadmium-Free QD displays meet the latest ULTRAHD™ Premium standard and have further improved energy efficiency
- The Exemption for Cadmium QDs will end – only the final timing is uncertain
- Other markets are following the EU lead on RoHS restrictions for Cadmium, including China's new RoHS regulations announced earlier this year
- Nanoco continues to be actively engaged with the EU

# LIGHTING BUSINESS

# LIGHTING BUSINESS

- Initial lighting sales have commenced
- Focusing on niche applications within lighting where CFQD® Quantum Dots can offer advantages
- Develop Technology Demonstrators to show the full potential of CFQD® Quantum Dots
- License design package to interested customers for them to manufacture as is or customise within design constraints
- Sell CFQD® Quantum Dot film to customers

# CFQD® LIGHTING APPLICATIONS

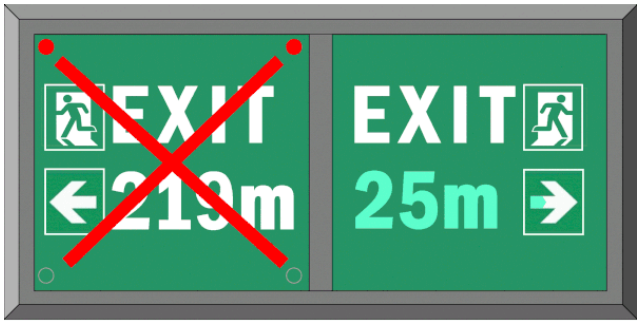


- Specific wavelengths for specific crops, even light distribution to ensure even growth
- Market Size: $1.9 billion by 2020
  [MarketsandMarkets 07/2015]

- High CRI, cool white panel light
- High quality light for office & retail purposes
- Addressable Market Size: c.$700m near term.
  [McKinsey&Company - Lighting the way: Perspectives on the global lighting market 08/2012]

# CFQD® LIGHTING APPLICATIONS

- Green colour emission according to British Standards. Red LED shining through Green Film indicating that Escape route is dangerous.
- Market Size: $500m
  [Strategies in Light (SIL) 02/2014]




- Specific wavelengths to suit skin types and treatment schedules, even light distribution for effective, even treatment
- Market Size: $800m
  [La Luminiere 2014]

# LIGHTING VALUE CHAIN





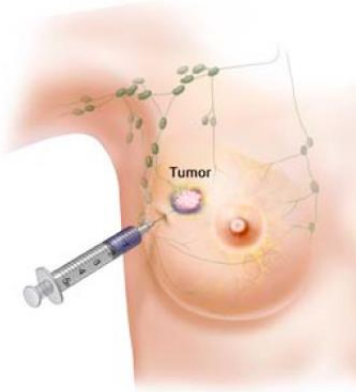
1. **CFQD® quantum dots**
2. **CFQD® quantum dots resin**
3. **CFQD® quantum dots film**
4. **CFQD® quantum dots Linear Lighting**

# OTHER APPLICATIONS

# LIFE SCIENCE APPLICATION

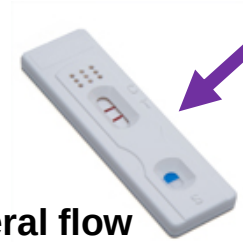
- Cancer imaging represents a significant opportunity for Nanoco
- Proof of principle studies in conjunction with University College London have been successful and the work is ongoing
- World leading team in the use of QDs in life science applications
- Following proof of principle we will seek suitable partners
- Target markets for clinical imaging first are:
  - Sentinel lymph node (breast, stomach, colon and uterine)
  - Intra operative tumour demarcation (colorectal, stomach, skin)
- Target diagnostic opportunities exist in early cancer detection for pancreatic, bladder and lung cancers
- Nanoco technology strengths are:  bio-compatibility of the formulated CFQD®s, non toxic, highly fluorescent for a longer period of time, single excitation source, photo-stable

# CFQD® LIFE SCIENCES

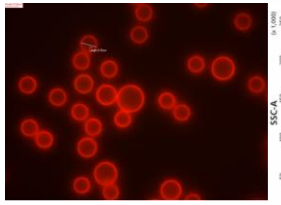

*Source:*
*University of Michigan Medical School*

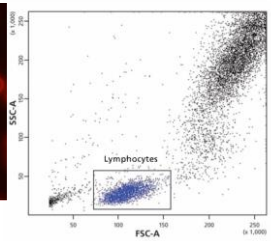
**Clinical imaging and therapy**



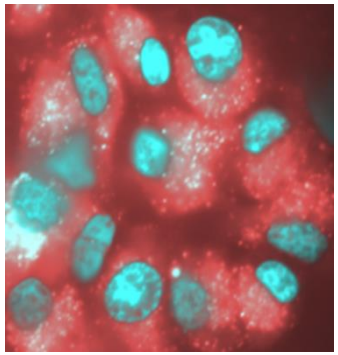
**Lateral flow**

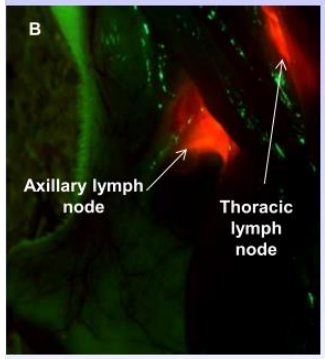
**Flowcytometry**

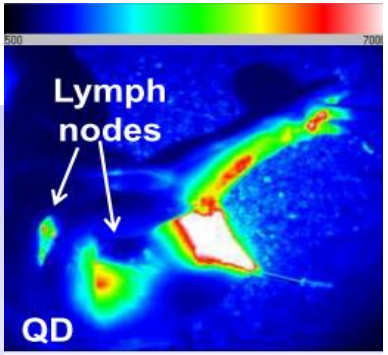





**Cellular Labelling**



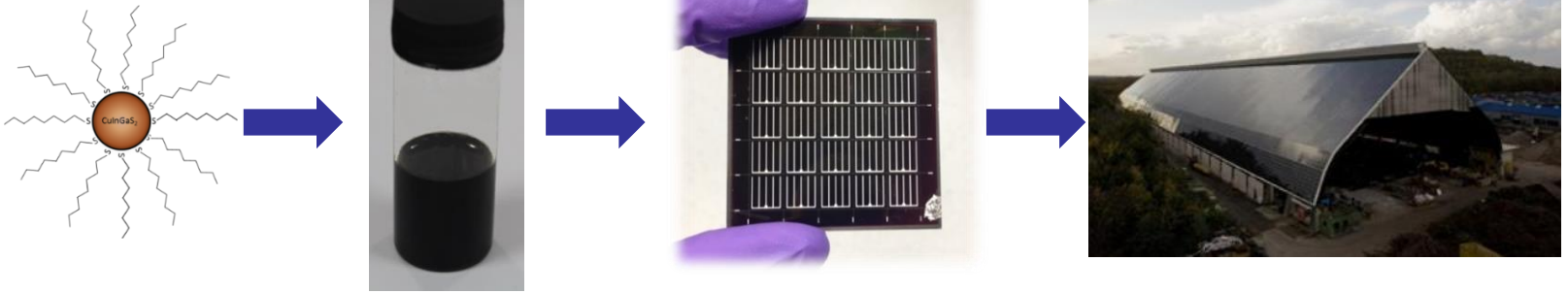



**QDs = brightness + photo stability + narrow emission + single light excitation**

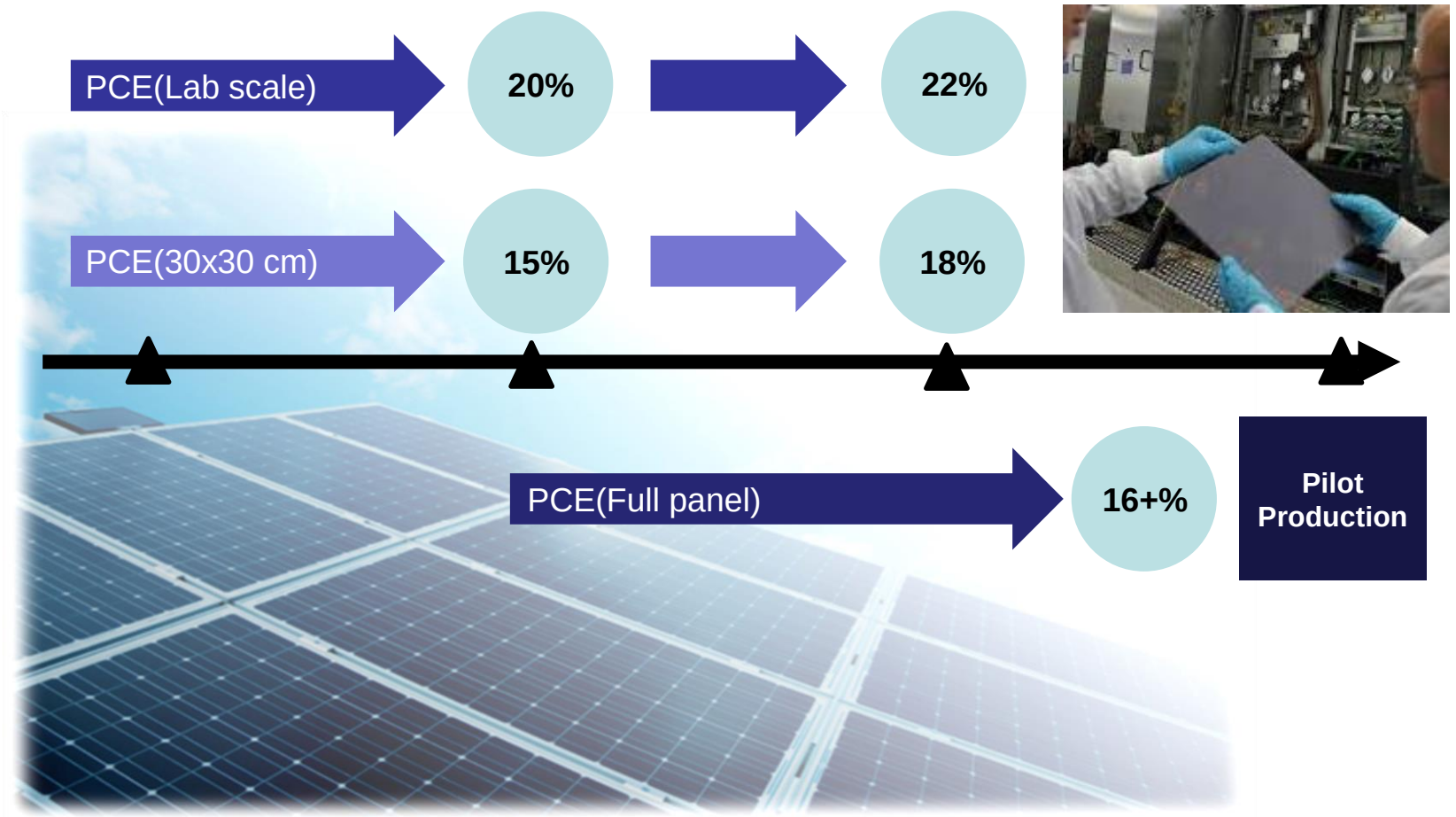
# SOLAR: CIGS THIN FILMS

- High performance printable Nanoparticle ink technology for CIGS thin film PV
- Low cost production technology enabling market penetration: <0.33 $/W for 16% CIGS module
- Current performance: 17% active area efficiency achieved in R&D – world leading for solution processed CIGS.
- Applications in expanding building integrated PV market (BIPV)
- Compatible with construction materials such as glass, steel, flexible substrates.



**CIGS Nano particle** **CIGS Solar Ink** **5x5 cm R&D substrate**

# SOLAR: ROADMAP




Scoping partners/collaborators for scale up phases

# INTERIM FINANCIALS

# FINANCIAL HIGHLIGHTS – OVERVIEW

| | 6 months to 31 January 2016 £'000 | Change £'000 | 6 months to 31 January 2015 £'000 | Year to 31 July 2015 £'000 |
|---|---|---|---|---|
| **Revenue** | **290** | **(1,322)** | **1,612** | **2,029** |
| R&D Spend | 2,939 | 216 | 2,723 | 5,580 |
| EBITDA | (5,601) | (2,340) | (3,261) | (8,077) |
| Loss after tax | (5,237) | (2,092) | (3,145) | (8,975) |
| Cash & short term deposits | 18,273 | 8,923 | 9,350 | 24,311 |
| **Net assets** | **23,976** | **9,212** | **14,764** | **29,100** |
| **Employees** | **133** | **27** | **106** | **113** |

# FINANCIAL HIGHLIGHTS – INCOME STATEMENT

| | 6 months to 31 January 2016 £'000 | Change £'000 | 6 months to 31 January 2015 £'000 | Year to 31 July 2015 £'000 |
|---|---|---|---|---|
| **Revenue** | **290** | **(1,322)** | **1,612** | **2,029** |
| Cost of sales | (151) | 46 | (105) | (316) |
| **Gross profit/(loss)** | **139** | **(1,368)** | **1,507** | **1,713** |
| R & D costs | (2,939) | (216) | (2,723) | (5,580) |
| Administrative expenses | (2,801) | (756) | (2,045) | (4,210) |
| **Adjusted EBITDA** | **(5,601)** | **(2,340)** | **(3,261)** | **(8,077)** |
| Depreciation and amortisation | (672) | 7 | (679) | (1,375) |
| **Adjusted operating loss** | **(6,273)** | **(2,333)** | **(3,940)** | **(9,452)** |
| Share-based payment charge | (113) | 120 | (233) | (619) |
| Costs of move to main market | — | — | — | (926) |
| Net interest income | 128 | 84 | 44 | 116 |
| **Loss before tax** | **(6,258)** | **(2,129)** | **(4,129)** | **(10,881)** |
| Tax credit | 1,021 | 37 | 984 | 1,906 |
| **Loss after tax** | **(5,237)** | **(2,092)** | **(3,145)** | **(8,975)** |

- Revenues were £0.29m in the period and were lower than the previous period as H1 2015 included a milestone payment from Dow of £1.3m
- R & D expenditure increased by 8% to support ongoing developments across all programmes
- Administrative expenses increased by 21% following increases in professional fees (including patent maintenance), recruitment costs, travel, marketing fees and costs associated with the EU cadmium review

# FINANCIAL HIGHLIGHTS – CASH FLOW

| | 6 months to 31 January 2016 £000 | Change £'000 | 6 months to 31 January 2015 £'000 | Year to 31 July 2015 £000 |
|---|---|---|---|---|
| **Loss for the period** | **(5,237)** | **(2,092)** | **(3,145)** | **(8,975)** |
| Adjustment for non-cash items | (364) | (248) | (116) | (28) |
| **Operating outflows before movements in working capital** | **(5,601)** | **(2,340)** | **(3,261)** | **(9,003)** |
| Changes in working capital | (53) | (124) | 71 | 1,453 |
| **Cash outflow from operations** | **(5,654)** | **(2,464)** | **(3,190)** | **(7,550)** |
| Investing activities | 9,650 | 5,384 | 4,266 | (15,027) |
| Financing activities | (34) | (783) | 749 | 20,497 |
| **Increase/(decrease) in cash** | **3,962** | **2,137** | **1,825** | **(2,080)** |
| Balance at start of period | 4,311 | (2,080) | 6,391 | 6,391 |
| **Balance at end of period** | **8,273** | **57** | **8,216** | **4,311** |
| Monies on short term deposits | 10,000 | 8,866 | 1,134 | 20,000 |
| **Balance at end of period (including short term deposits)** | **18,273** | **8,923** | **9,350** | **24,311** |

- **Investing activities** reflect net monies being put on short term deposit during the period

# FINANCIAL HIGHLIGHTS – BALANCE SHEET

| | At 31 January 2016 £000 | Change £'000 | At 31 January 2015 £'000 | At 31 July 2015 £000 |
|---|---|---|---|---|
| Tangible fixed assets | 1,668 | (746) | 2,414 | 2,062 |
| Intangibles (patents) | 2,068 | 365 | 1,703 | 1,821 |
| Cash & short term deposits | 18,273 | 8,923 | 9,350 | 24,311 |
| Other current assets | 1,087 | 277 | 810 | 1,110 |
| R&D tax debtor | 2,825 | 627 | 2,198 | 1,800 |
| Liabilities excluding loan | (1,882) | (297) | (1,585) | (1,909) |
| Loan | (63) | 63 | (126) | (95) |
| **Net assets** | **23,976** | **9,212** | **14,764** | **29,100** |

- Net assets increased to £24m at 31 January 2016 reflecting fundraising on moving to main market less losses incurred
- R&D tax debtor at 31 January 2016 related to the amounts due from last financial year plus H1 2016
- Net assets have increased to £23.97 reflecting the fundraise on move to the main market less losses incurred in the period
- £1.9 million R&D tax credit is expected to be received in April 2016.

# CONCLUSION

# CONCLUSION

- The move with Dow to non-exclusive will significantly de-risk the business and opens up new opportunities to monetise the Company's technology
- Dow facility producing CFQD® products and sampling customers
- Runcorn capacity enhanced through process improvements
- Lighting business strategy is in place and commercial sales have begun
- Company structure and people are in place to enable the successful transition from development to commercialisation
- Well funded for the foreseeable future

# NANOCO OVERVIEW

# COMPANY OVERVIEW

- A world leader in the development, manufacture and supply of fluorescent, heavy-metal-free semi-conducting materials called CFQD® quantum dots and other nano-particles (e.g. CIGS)
- Nanoco has developed partnerships with leading global electronics and chemical companies in order to incorporate Nanoco's technology into commercial products
- Key target markets are display, lighting, solar and bio-imaging
- Market for quantum dots forecast to be large and to grow quickly
- Signed major licensing deal in January 2013 with Dow to supply the display industry
- Dow's mass production manufacturing plant has been commissioned
- 133 employees with the majority located at the Manchester HQ & Runcorn manufacturing facility many of whom are recognised as leaders in the field[1]
- Listed on premium segment of the main market of the London Stock Exchange
- Founded in 2001

(1) As at 31 January 2016

# COMPANY OVERVIEW

## Business model

### Partnership

Nanoco works in close collaboration with companies developing quantum dot based products and applications, often under Joint Development Agreements

(>$25m JDA revenue received to date)

### Licence Revenue

Licence revenue from Nanoco's licensee, The Dow Chemical Company in the display market

Actively seeking other licensees

### Material Sales

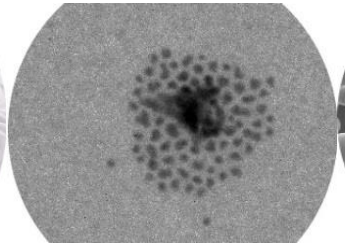
Nanoco supplies materials to customers in the, lighting, solar and life sciences markets

## Key territories and operations

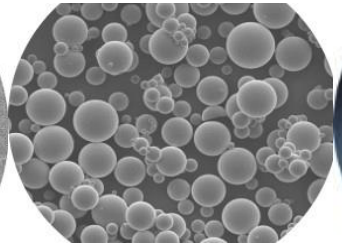
# NANOCO'S PATENTED TECHNOLOGY

- Quantum dots are a platform technology
- Unique "seeding process" developed enabling the **mass production** of quantum dots
- World leader in **heavy metal free** quantum dot technology (CFQD® quantum dots)
- Extensive & growing patent portfolio (ca. 400 patents and patent applications)
- Patents cover five key areas:

**Process**



**Materials**

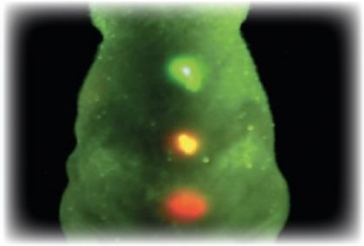


**Surface chemistry**

**Devices**

**Solar**

# KEY MARKETS ARE LARGE

| | Display | Lighting | Solar | Biomedical |
|---|---|---|---|---|
| |  |  |  |  |
| **Application** | LCD backlighting | High CRI<br>LED lighting | Thin film solar | Biological imaging<br>In-vivo & in-vitro diagnostic |
| **Technology** | CFQD® quantum dots<br>CFQD® quantum dots resin | CFQD® quantum dots film | CIGS nanomaterials | Water soluble CFQD® quantum dots<br>Functionalized CFQD®<br>quantum dots |
| **Business Model / Timing** | Licence & materials sales /<br>Near term<br>revenue stream | Film sales /<br>Niche near term potential<br>with ability to grow | Partner licence & Material sales (toll) /<br>Medium term NRE | Partner licence with upfront fees /<br>Longer term |
| **Potential market size[1]** | $120bn<br>(Global electronic display market - 2018)[1] | €110bn<br>(Global lighting market - 2020)[2] | $96bn<br>(Global spend on PV capacity in 2013)[3] | $169bn<br>(Global cancer diagnostics market - 2020)[2] |
| **Anticipated addressable market size** | Directors believe $7.5bn<br>(2022 QD display market) | c.$150m near term<br>c.$700m with further R&D | Expected to enhance the rapidly growing thin film solar market | QD's in healthcare<br>= c.$1bn in 2022[4] |

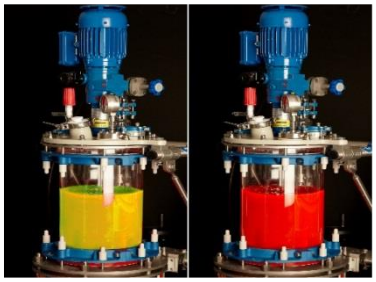
(1) MarketsandCompanies.com, published March 2014
(2) McKinsey & Company, Lighting the way: Perspectives on the Global Lighting Market, published 2011)
(3) International Energy Agency (IEA), Technology Roadmap: Solar Photovoltaic Energy: 2014 Edition, published 2014
(4) MarketsandMarkets report, 2012

# VALUE CREATION

## 1) CFQD® quantum dots

**CORE BUSINESS**

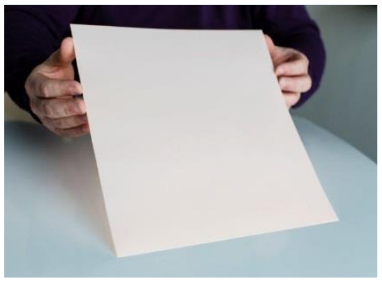
Developing & manufacturing heavy-metal free quantum dots fit for purpose



## 2) CFQD® quantum dots + Resin

**CORE BUSINESS**

Ensuring Nanoco's CFQD® quantum dots work in customers' resin systems



## 3) CFQD® quantum dots/Resin in device

CFQD® 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 ® quantum dots product

Nanoco's near term focus for CFQD® quantum dots is on backlighting for LCD display and LED lighting.

Nanoco partners with end user customer

# KEY PARTNERSHIPS / ROUTE TO MARKET

NANOCO GROUP PLC

| | Display | Lighting | Solar | Life Sciences |
|---|---|---|---|---|
| **Key partners** | DOW<br>LG<br>**11 display OEMs:**<br>• Korea: 2<br>• China: 4<br>• Taiwan: 2<br>• Japan: 2<br>• USA: 1 | OSRAM<br>MARL<br>**USA Photo-therapy Company** | Loughborough University<br>Innovate UK Technology Strategy Board | UCL<br>Innovate UK Technology Strategy Board |
| **Route to market** | • Licence with Dow for display industry only<br>• Seeking other licensees<br>• Direct sales | • Direct sales of CFQD materials and film to OEMs | • UK Grant funded<br>• Exploring partnerships | • UK Grant funded<br>• Exploring commercial partnerships |

# APPENDICES

# THE BOARD

**Anthony Clinch – Non Executive Chairman**

- 20 years private equity experience with CVC Capital Partners, Rolls Royce, experienced industrialist and financier

**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 Pickett - Co-founder & CTO**

- Inventor of Nanoco's key patented scale-up technology
- Leading expert on semi-conducting nano-crystals
- Japanese Government, US Office of Naval Research, Saint Andrews University

**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.

**Robin Williams – Non Executive**

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

**Gordon Hall – Non Executive**

- Led IPO of Axis-Shield, flotation at £20m, acquired by Alere Inc for £235m

**Brendan Cummins – Non Executive**

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

**Christopher Richards – Non Executive**

- Currently non executive director of: Plant Health Care PLC (chairman), Origin Enterprise PLC, Cibus Global Inc
- Former CEO of Arysta Lifesciences, 20 years exec with Syngenta and ICI

# RISK FACTORS

- **Technical milestones**: Customers' requirements are challenging and may take more time and resource to be achieved and may not be achieved at all
- **Costs**: Manufacturing costs could be higher than anticipated
- **Timing**: It may take longer for Nanoco's technology to be adopted
- **Intellectual property**: Nanoco's IP could be challenged or Nanoco may infringe others' IP
- **Pricing**: The company or Dow may not be able to charge as much for its materials as forecast
- **Other technologies**: Existing technologies that Nanoco is replacing may improve, new technologies may enter the market
- **Customers**: Nanoco and Dow rely on their customers to launch products containing its nano-materials. Large corporates with whom Nanoco deals may change strategic direction which could adversely affect Nanoco
- **Contracts**: Contracts are generally milestone based. If milestones are not achieved contracts can in certain circumstances be altered or terminated

(1) As at 31 January 2016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