

## DOTZ NANO FAQ

**Dotz Nano provides the following responses from CEO Dr Moti Gross to Frequently Asked Questions raised in connection with the Company's business and the market it operates in.**

**CEO of Dotz Moti Gross:** *Over recent months I have received many questions on Dotz Nano, and off the back of the ASX re-listing and release of our December Quarterly Report, we have now compiled a document with the most frequently asked questions by investors. I would now like to take the opportunity to provide some further discussion and answers to those questions.*

### **Q: What is a Graphene Quantum Dot (GQD)?**

In very simple terms, a GQD is a multi-functional material that has unique properties for use in optical, electronic, imaging, bio-med and optical brightener markets. A GQD nanoparticle works by absorbing ultra-violet light or energy and releases that energy as fluorescence in the visible light spectrum, across a range of colours and varying according to the size of the GQDs.

It is a very high-tech material at the leading edge of new advanced materials coming on the market that can be used in a variety of applications. Only small quantities of GQDs are needed to substantially improve those applications. For instance, approximately 1 gram of GQDs is enough to tag 10,000 casino chips as an anti-counterfeiting measure. For a more in-depth review of GQDs please refer to the Company's Supplementary Prospectus lodged with ASX on 1 September 2016.

### **Q: In what applications can it be used?**

GQDs have multi-functional properties that make them suitable for use in a variety of applications. In certain applications, GQDs can be used as an optical brightener, such as in laundry detergents, making clothes brighter after being laundered, or in paints and dyes allowing for a brighter coating. GQDs can also be used as a taggant for monitoring in liquids or for use as an anti-counterfeiting tool in packaging, currencies, plastics and more. Another common reference for GQDs use is the LED and display screen market. There are literally hundreds of applications that GQDs can be used for, and that's what makes the commercialisation of the material so interesting and exciting.

### **Q: Wait, don't those applications already have something like GQDs in them?**

Yes, most applications have some sort of optical brightener or some sort of UV tag, but GQDs bring significant added value to these applications, such as better efficiency and longer lasting, improved colour brightness. They are also non-toxic, environmentally friendly and in many cases less expensive. Furthermore, the material brings other added values such as anti-bacterial properties, is easily dispersed and has longer lasting stability.



**Q: Can they be used in new applications?**

Definitely yes! Over the last 18 months Dotz Nano has been busy researching the use of GQDs in new applications that had never been looked at before. These applications will take time, but that, and the applications we're penetrating now, is what will make the GQD market grow.

**Q: OK, so what markets are you contemplating penetrating?**

Well, that's the crux of it. There are literally hundreds of applications where GQDs can be used, so we have to be careful where we start. Our commercialisation strategy is based on a three-part plan.

First, in order to establish our base revenue, we began with direct sales, which are divided into two parts:

- a) signing distribution agreements with chemical distributors such as Strem Chemicals in the USA and Europe, Mainami in Japan, and others which are currently being negotiated; and
- b) negotiating with large first-tier users who will buy our GQDs in bulk. These are high volume markets that of course need a less expensive product.

Second, we are negotiating with application based users with a view to reaching licensing agreements, where it's intended they will receive an exclusive license to use our GQDs for a specific application.

Third, our objective is to go downstream with specific applications that Dotz Nano will either set up or partner with collaborators to commercialise technologies based on GQDs, such as sensors, photovoltaics, anti-counterfeiting and more.

**Q: So, what's the potential dollar value of the market?**

That's a very good but complicated question to answer. Simply put, the market for Graphene Quantum Dots has never been measured or forecast until now, due to the fact that GQDs have only been used in the research market. The Metal-Based Quantum Dot market, which is used mostly for displays, photovoltaics, energy and medical imaging applications, is forecast by major market research firms to reach \$11B in 2023. That's exciting for us, given our GQDs have the potential to be applied in the Metal-Based Quantum Dot market, in addition to other markets where Metal-Based Quantum Dots cannot be used such as laundry detergents, water monitoring and anti-bacterial uses.

**Q: What revenues are you forecasting for Dotz?**

Well, I'm sure everyone is aware about forward looking statements, especially in publicly traded companies, so I can't give a dollar figure here, but our goal is to be at our break-even point during 2017. It's also worth noting that Dotz is applying for a number of grant fundings. We have already received an AU\$1.2 million grant for establishing our manufacturing facility in the USA and we are continuing to apply for additional grants. These funds will go towards expanding our operations and increasing our value.



**Q: So how will you generate revenues?**

Our plans are for revenues to be generated from a number of sources including direct sales of GQDs to consumers, for use in research, development and production. Revenue may also be derived from license fees and royalty payments for exclusivity in certain applications as well as from downstream applications that may generate new revenue streams from technologies and applications Dotz Nano is developing.

**Q: Can Dotz dominate the market?**

Today, to the best of our knowledge, Dotz Nano is the only company globally that is commercialising GQDs on a large quantity basis. We are not aware of any other company that exists in this space. You can buy GQDs on websites, but not in large quantities. They are usually limited to 100 ml packages. We've already produced and scaled up our production process and can produce 100 kg of GQDs per annum at our Israel site, which can meet current world wide GQD consumption based on available data.

Our US facility will allow us to scale up production to support the large bulk of GQDs' consumers with whom we are negotiating. As you know, this is a new material, never contemplated for use in day-to-day applications. Just a few days ago, we shipped the first ever shipment of GQDs exceeding 100 ml packaging, which is the quantity being sold on various internet websites, mainly from Chinese laboratories. Any lab can produce milliliters of GQDs. However, producing GQDs on a serial manufacturing basis in large quantities, with quality assurance and logistics, calls for a scale up process that we have developed and are implementing.

**Q: Is the market ready for GQDs?**

The Quantum Dot (QD) market is here to stay. The most famous use of QDs today is for televisions, like Samsung's HDTV, which is based on QDs. To prove this point, Samsung recently purchased QD Vision, which was its main QD supplier, while 18 months ago Merck purchased Qlight Nano, another Israeli company producing QDs. These companies were purchased for tens of millions of dollars. Why? Because the TV manufacturers made the move to QDs from LEDs and were looking to safeguard their supply chain.

GQDs are an alternative to metallic based QDs, however conventional GQD production has some disadvantages, mainly being very expensive to produce, with production and quantum yields very low in comparison to our GQDs. Dotz Nano believes it has solved these problems, and is ready to penetrate all segments of the market, those that use metallic based QDs and those that can't. Our process can produce high quality GQDs with large production yields and high quantum yields, and of course at much less cost. That's what makes Dotz Nano's GQDs so interesting to the market and that's the reason why we're getting so many enquiries.



### **Q: Can you explain the Quantum Yield?**

It is a complex matter, but in layman's terms, Quantum Yield (QY) is the ratio of energy going into the GQD, versus the energy coming out of the GQD. It enters the GQD by the way of UV light and exits the GQD in the way of fluorescence. The higher the QY, the more efficient the GQD. Metallic based QDs usually have between 50-60% QY. GQDs historically had QY in the range of 6-10%. Dotz Nano was successful in developing a process that allows us to reach over 65% QY, not by doing this in a lab, like some scientific articles suggested, but in a serial production setup on a recurring basis. No other company can claim this and the users of QDs and other applications are now turning to Dotz Nano to supply the material. It will take some time, since they have to test our GQDs in their processes, but the market has responded and we are seeing the commercialisation happen right before our eyes.

### **Q: Competitors?**

To the best of our knowledge, we are the first company to offer GQDs produced in large quantities. There are some other offerors of GQDs but as far as we are aware these are laboratory- based production. The future could bring in other competitors, but it takes time to scale up to a production level. That's what Dotz Nano has been doing for the past 12 months - scaling up and solving production problems. That gives us a sizeable advantage in being the first to penetrate the GQD market.

### **Q: Can you explain the lower yield QD market?**

I like to divide the QD market into three: the high QY market, the low QY market and the no QY market. The high QY market is understood (TVs, optical brighteners, paints and dyes, etc.). The low QY market is comprised of applications that don't need to see the fluorescence, but need to know that it's there. They don't rely on eye-balling the colour from the GQD but usually use some sort of device to measure the spectrum, like a mass spectrometer. This market is a large one, usually in tagging and monitoring applications. Dotz Nano is also targeting these applications with our previous GQDs that have lower QYs.

The no QY market is the future. Many applications don't need the fluorescent properties of GQDs but other properties, those that are derived from graphene, namely electronic conductivity, thermal conductivity and much more. These are applications and technologies that Dotz Nano, and others, have invested research in, but now, with our less expensive product, these applications and technologies have the potential to become economically viable.

### **Q: So where do you see Dotz Nano going from here?**

Dotz Nano is here to stay! Our aim is to be a premier producer of GQDs. We've done the research, raised the funds needed and are now commercialising. We have invested in new Intellectual Property, are penetrating new applications and markets and are making waves for the future. We're Dotz Nano, the next BIG small thing!

*I want to take this opportunity to thank all the supporters of Dotz Nano. I'm confident in our success and look forward to further reporting on our progress.*



## **About Dotz Nano**

Dotz Nano Limited (ASX: DTZ) is a technology company focusing on the development, manufacture and commercialisation of GQDs. Its vision is to be the premier producer of GQDs by producing and supplying high quality GQDs for use in various applications including medical imaging, sensing, consumer electronics, energy storage, solar cells and computer storage.

To learn more about Dotz Nano please view the website and our corporate video via the following link: [www.dotznano.com](http://www.dotznano.com)

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