

Growlight Value Proposition

Background:

LED grow light module markets at \$395 million in 2014 are forecast to reach \$1.8 billion by 2021. Rapid growth is anticipated as green house and plant factory growers find the LED grow lights improve agriculture (Wintergreen Research, 2015). Major contributors to this include megatrends such as global population growth and urbanisation. Furthermore people become more health conscious and try to avoid the deleterious effects of pesticides in their food grow lights are anticipated to find more and larger markets among greenhouse operators.

Market Place:

The horticultural lighting market is relatively fragmented with older incandescent, fluorescent and HID technology and well as the more recent LED solutions. The market is moving towards LEDs simply because of energy savings, better distinction between wavelengths and longer lifetime. There are also two different application areas within this sector, close vertical layers (Left) and the more traditional green house (right) as depicted below.



Technology:

Nanoco's CFQD® Quantum Dot film technology offers the greatest value for vertical farming systems. In fact, the closer the LED lights are to plants, the greater the benefit. CFQD® Quantum Dot film can be customized precisely to encourage chlorophyll absorption and promote healthy growing for specific varieties. Being close to the plant, the LEDs can afford to consume far less energy, and cast less heat thus offer and even greater energy savings in comparison to conventional LED systems. The biggest advantage at close distance comes from the uniformity of the light distribution that Nanoco's CFQD® Quantum Dot film technology offers. Conventional LED lights rely on different LEDs to obtain the desired spectrum of light and therefore have to increase the distance between the LED lights and the plant, wasting valuable space. See left picture below.



Growlight Value Proposition

Nanoco CFQD® Quantum Dot Film (above picture on right) offers perfect uniformity even at very close proximity. This enables growers to fit more shelves onto their racks, thus increasing their yields within existing space constraints. The film can be easily and cost-effectively incorporated into various LED lighting formats to assist in the propagation and vegetative stages of plant growth, as well as provide supplemental lighting in greenhouses to stimulate greater chlorophyll absorption, important for crops like basil and lettuce.

Key Value Propositions:

- Specific wavelengths for specific plants >>> increase in plant growth
- Uniform emission allows close proximity to plant >>> higher efficiency through more shelving in existing space
- Close proximity to plants and use of most efficient blue LED only >>> greater energy saving and longer lifetime