Enabling the Planar Lighting Revolution

Optimizing Cost, Efficiency and Design
Oree – Facts sheet

- Established in late 2006, Raised $21M to-date
- Currently raising $10M for growth, 60% allocated
- High-volume manufacturing in Asia, UL certified
- WW distribution by Future Lighting Solutions
- Customers in Asia, Europe, US
- Strong IP: Patents in US, China, Europe & Japan

Board of Directors
- Peter van Strijp – Chairman of the Board
  - Former CEO, Solid State Lighting BU, Philips
- Eyal Harel – Board member
  - Former Co-President Orbotech (NASDAQ: ORBK)
- Alex Brabers, GIMV
- Yair Shoham, Genesis Partners

Investors

- Gimv
- Genesis Partners
- FGC
- Future Lighting Solutions
- EPISTAR corporation
About Oree

- **Oree’s LED LightCell™** leads the “Planar Lighting” revolution by becoming the technology of choice for surface and area illumination.

- **Oree’s LightCell™** fundamentally impacts the general lighting market with unmatched energy efficiency, cost effectiveness and ultra thin profile.

LightCell™ overcomes the tradeoffs between Energy Efficiency, Cost and Design
Oree’s White LightCell™

Planar Lighting: Efficient and cost effective lighting across a flat surface area

- Oree manufactures a 70 mm by 70 mm light module
- Module comprises of Planar Remote Phosphor, embedded LED chips in optical light guide and state-of-the-art thermal solution
- No direct line of sight between LED chips and emitted light
  - Remote Phosphor conversion efficiency of 78% (standard LED ~ 50%)
- Modular approach allows for the creation of larger surfaces by combining any number of LightCells
- Easily integrated into fixtures
Cost benefits

- Other cost benefits of using Oree LightCells are derived from the thin form factor and weight.
  - Less materials such as aluminum (where prices are expected to continue rising)
  - Reduced shipping costs due to the size and the weight (each LightCell is 10 gr.)
  - Construction of suspended or wall mounted low weight fixtures are less complicated
Early Users

- China
- US
- France
- Spain
- Germany
- Taiwan
Technology Comparison – Made by ADL

Oree compares favorably with side-lit, back-lit and especially OLED technology, but other remote phosphor products may offer higher energy- and cost-efficiency.

<table>
<thead>
<tr>
<th>Planar lighting technology features</th>
<th>Current specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Oree</strong></td>
<td><strong>OLED</strong></td>
</tr>
<tr>
<td><strong>Area</strong></td>
<td>7x7 cm</td>
</tr>
<tr>
<td><strong>Thickness</strong></td>
<td>Lightweight 5 mm thick</td>
</tr>
<tr>
<td><strong>Light intensity</strong></td>
<td>40 800 lm/m²</td>
</tr>
<tr>
<td><strong>Energy efficiency</strong></td>
<td>85 lm/W</td>
</tr>
<tr>
<td><strong>Module cost</strong></td>
<td>max. 33 lm/USD</td>
</tr>
<tr>
<td><strong>Total solution cost</strong></td>
<td>1</td>
</tr>
<tr>
<td><strong>Color quality</strong></td>
<td>CRI 95</td>
</tr>
<tr>
<td><strong>Durability</strong></td>
<td>Fragile glass sheets covering OLED substrate</td>
</tr>
<tr>
<td><strong>Lifetime</strong></td>
<td>50 000 h (white) 35 000 h (RGB)</td>
</tr>
<tr>
<td><strong>Color temperature</strong></td>
<td>5500K</td>
</tr>
<tr>
<td><strong>Product used in comparison</strong></td>
<td>Verbatim - OLED Module</td>
</tr>
</tbody>
</table>
Philips Power Balance

- Targeting office application and is considered to be one of the best products introduced in 2011/2.
- The fixture can be built with the trade-offs between efficiency and cost as described below.

### Parameter Comparison

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Power Balance</th>
<th>Oree 100 lm/W @ 2.5W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness</td>
<td>93mm</td>
<td>10mm</td>
</tr>
<tr>
<td>W</td>
<td>45W</td>
<td>44W (16 LightCell)</td>
</tr>
<tr>
<td>Lm</td>
<td>3400</td>
<td>3374</td>
</tr>
<tr>
<td>CCT</td>
<td>3000K 4000K</td>
<td>3000K 4000K</td>
</tr>
<tr>
<td>CRI</td>
<td>80</td>
<td>95</td>
</tr>
<tr>
<td>Optics</td>
<td>Secondary Optics</td>
<td>NA</td>
</tr>
<tr>
<td>COGS</td>
<td>$176</td>
<td>$152</td>
</tr>
<tr>
<td>Lm/W</td>
<td>75.5</td>
<td>76.7</td>
</tr>
<tr>
<td>Lm/$</td>
<td>19.3</td>
<td>22.2</td>
</tr>
</tbody>
</table>
GE Edge-lit panel (based on GLT/Rambus Technology)

- The most notable planar lighting competition
- The fixture can be built with the trade-offs between efficiency and cost:
  - From 86 lm/w and 12 lm/$ to 72 lm/w and 25 lm/$

<table>
<thead>
<tr>
<th>Parameter</th>
<th>GE Edge</th>
<th>Oree 100 lm/W @ 2W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness</td>
<td>63mm</td>
<td>10mm</td>
</tr>
<tr>
<td>W</td>
<td>40W</td>
<td>35.2W (16 LightCell)</td>
</tr>
<tr>
<td>Lm</td>
<td>2800</td>
<td>2842</td>
</tr>
<tr>
<td>CCT</td>
<td>4000K</td>
<td>3000K 4000K</td>
</tr>
<tr>
<td>CRI</td>
<td>80</td>
<td>95</td>
</tr>
<tr>
<td>Optics</td>
<td>Secondary Optics</td>
<td>NA</td>
</tr>
<tr>
<td>COGS</td>
<td>$160</td>
<td>$142</td>
</tr>
<tr>
<td>Lm/W</td>
<td>70</td>
<td>80.75</td>
</tr>
<tr>
<td>Lm/$</td>
<td>17.5</td>
<td>20.0</td>
</tr>
</tbody>
</table>
The Potential of Planar Lighting

Oree targeted segments of the LED lighting market are expected to generate attractive growth opportunities until 2017 and within planar lighting Oree could target about 70% of the market.

### Total global LED lighting market – by application

<table>
<thead>
<tr>
<th>Application</th>
<th>2010</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architectural</td>
<td>38%</td>
<td>11%</td>
</tr>
<tr>
<td>Public</td>
<td>5%</td>
<td>7%</td>
</tr>
<tr>
<td>Street lighting</td>
<td>11%</td>
<td>23%</td>
</tr>
<tr>
<td>Retail &amp; Hospitality</td>
<td>17%</td>
<td>22%</td>
</tr>
<tr>
<td>Commercial &amp; Industrial</td>
<td>16%</td>
<td></td>
</tr>
<tr>
<td>Residential</td>
<td>14%</td>
<td>20%</td>
</tr>
</tbody>
</table>

Source: Frost & Sullivan 2011; Arthur D. Little analysis

### Planar lighting global market (2017e)

Estimated market size 2017: 1,0-1,5 BUSD

- Residential: 14%
- Industrial: 3%
- Architectural: 7%
- Public: 3%
- Retail: 13%
- Office: 37%
- Hospitality: 22%

The potential planar lighting market segments that Oree can address represent ~70% of 2017 expected market size.
Target markets / applications and markets

- We focus on
  - **Functional and task lighting** in the **Office lighting** market
  - **Shelf and orientation lighting** in the **Shop lighting** market
- **Under cabinet** and **Orientation lighting** in the **Hospitality lighting** market are direct off-shoots
Market position

Oree has a strategic position in the LED-lighting value chain with a technology potentially attractive to both module and fixture manufacturers.

The LED lighting value chain:
- Raw materials
- Chip
- Package
- Module
- Fixture
- Light solution

Fixtures manufacturer
General illumination players
Led players

Rivalry

Price evolution

Op. Margins

Potential acquisitions
Potential Oree’s cell sales or technology licensing

Comments:

1. Oree sits in a strategic position and can sell its cells to both module and fixture manufacturers.

2. Oree will benefit from technological developments and price decrease of the LED chips it is sourcing — although this will also benefit competing LED modules.

3. Its technology can potentially be attractive to other LED players:
   - IP can be sold to other module manufacturers
   - Alternatively, IP could be licensed to module or fixture manufacturers

The trend for module manufacturers is to invest in market access rather than pure technology—proving Oree commercial viability is essential to make it an attractive acquisition target.
Technology highlights

- **Planar Remote Phosphor**
  - Drastically increases efficacy

- **Optical Packaging Technology**
  - Spreads light with minimal energy loss

- **Light guide**
  - Drives uniformity and optical efficiency

- **Thermal conductivity**
  - Enables efficient heat dissipation

- **Integrated solution**
  - Fixture ready module

- Significant reduction in Lm/$
- Impact on construction cost, shipping cost and fixtures BOM
- Overcomes the tradeoffs between energy efficient, cost, optics and slim design
Protecting: Freedom to operate

Enabling: Ensures participation in the evolving LED market

- Differentiated approach
- Competitive advantage in the current IP environment

Oree has patents dating back to 2002

- Broad IP portfolio with 38 patents in different stages of registration
  - 10 granted to date
  - Patents registered in the US, China, Europe and Japan
- Diversified patent portfolio relating to:
  - Unique optical design
  - Planar Remote Phosphor
  - Embedded LED chips
  - Driver in package
  - Scalable and modular fixtures
# Management

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Experience</th>
</tr>
</thead>
</table>
| Eran Fine       | President & CO-CEO     | - Serial entrepreneur with over 16 years experience leading startup companies  
|                 | (co-founder)           | - Co-founder and CEO of MobileSpear, a start up in the field of mobile operations,  
|                 |                        | - Founder and EVP of business & development at On-Eden Ltd, a software company purchased by Crystal Ltd. (NASDAQ:CRTL)                                                                              |
| Asher Brockmann | CO-CEO                 | - Over 35 years experience in the semiconductor industry  
|                 |                        | - Prior to Oree founded Advanced Dicing Technologies LTD (ADT)  
|                 |                        | - Served as Vishay's Executive VP for Business Development, responsible for Vishay's investments  
|                 |                        | - Worked at Kulicke & Soffa as Corporate VP and general manager in Israel                                                                                                                               |
| Itai Cohen      | CFO                    | - Served as VP Business Development & Marketing at Oree prior to CFO Position  
|                 |                        | - Formally a Principal at Genesis Partners, a leading venture capital fund in Israel  
|                 |                        | - 9 years experience at CIBC Israel as a Senior Equity Analyst, focusing on Israeli communications companies                                                                                           |
| Dr. Yosi Shani  | CTO                    | - Over 22 years experience in electro-optic industry  
|                 |                        | - Prior to Oree, established OMS Displays where he served as CEO and later as CTO  
|                 |                        | - Former VP of technologies at Lynx Photonics, VP of physics at Aelis Photonics, consultant to AT&T Bell Labs  
|                 |                        | - Holds numerous patents and has contributed to several technical publications, focusing on integrated optics                                                                                           |
| Avner Badihi    | VP, R&D                | - Investor and entrepreneur, with a record of startup activities and technological development, 30 years of experience  
|                 |                        | - Co-founder and former CEO of XLoom Comm. – wafer level integrative technologies for Electro Optical device production  
|                 |                        | - Founder and CEO of ShellCase Ltd a developer of novel Wafer Level Chip Size Packages (WL-CSP) using semiconductor thin film processes – sold to Tessara in 2005                                                                 |
| Ada Lotan       | VP, Operations         | - Over 13 years of experience in manufacturing processes  
|                 |                        | - Former VP manufacturing at both Magink, a display company, and Transchip, a CMOS image sensor company  
|                 |                        | - COO of Cinata Inc, a semiconductor company developing advanced solutions for the storage area network market  
|                 |                        | - VP operations at Tioga Technologies, growing the fabless semiconductor company to over 80 employees worldwide                                                                                     |