30 June 2016

Top End Minerals to acquire Bright LED and terminates proposed acquisition of Anyvision

Top End Minerals Limited [ASX:TND] (the Company or TND) has entered into a new agreement with the shareholders of Bright LED Ltd to acquire all of the issued shares of Bright LED; and advises that the proposed acquisition of Anyvision has been terminated by mutual agreement.

Bright LED

The Company has today signed a term sheet with the shareholders (vendors) of Bright LED Ltd (Bright LED) whereby the Company will acquire all the shares in Bright LED beneficially owned by the vendors.

About Bright LED

App store of the Outdoors

Bright LED’s products integrate unique and advanced processing and communications systems, which allow communications between numerous applications and users and cloud-based data transfer. Interactive applications and devices such as cameras, sensors and communication components can be easily integrated and installed on the street lighting infrastructure, and used for an unlimited range of operational and other applications in the urban environment.

The data transferred to servers is processed and utilized by the end-users for many applications, including navigation, available-parking location, municipal needs and more. Bright LED’s infrastructure elements become a key part of the Internet of Things (IoT) and Smart, Connected City vision, which is gaining ground every year. The possibility of integrating apps and services on the back of street infrastructure makes the platform developed by Bright LED into a connected street services app store, which Bright LED calls - App store of the Outdoors™.

Breakthrough Achievements

Bright LED was founded in 2009 by Rami Mirsky in Haifa’s HiCenter technological incubator. In 2011, Bright LED was nominated as one of the Israeli Chief Scientists most outstanding Incubator Program companies, and in the following year was cited in the international research company IDC’s report as “a company to watch” in the global LED lighting market. Together with development of Bright LED’s product line, Bright LED has raised capital from leading strategic investors including the Israel Electric Corp.

Bright LED was chosen to implement Israel’s first LED lighting project in a tender to install 1,000 advanced lighting systems in a green city in the Tel Aviv area. Bright LED cooperates with leading international companies and is involved in projects in Israel and abroad.

Bright LED is involved in technological collaborations with companies in areas such as camera and security systems management, advanced communications solutions, solar energy, and more, which allow it to apply comprehensive and complex solutions for the connected and smart city.

Bright LED implements registered and pending patents and its products meet the strictest technical requirements and standards in Israel, the USA, and European Union. It has 10 employees in its Research and Development and Operations Departments at its headquarters in Haifa, Israel.
Founder & CEO

Founder Rami Mirsky has over 15 years of experience in telecom, marketing, business development, founding and managing technology companies in Israel and abroad, mainly in Asia and North America.

Further Information on Bright LED

Attached is the following:

- Bright LED presentation
- Article on Bright LED that appeared in 2015 edition of High-Tech & Technologies – Globes DUN’s 100
- Paper prepared by Bright LED Ltd titled “The Time for Connected Street Light and the Connected City – Market Data and Analysis” dated February 2016.

Transaction Overview

TND and Bright LED have agreed a 60 day period to conduct due diligence and enter into a Share sale Agreement. The completion of the transaction is subject to a number of conditions precedent common to share sale agreements and ASX listings.

The Company will acquire all of the issued capital of Bright LED from the Bright LED equity holders for approximately USD$10 million, consideration comprised of:

- USD$25,000 payable to Bright LED for working capital within 7 working days from the execution of the Term Sheet;
- A further USD$25,000 payable to Bright LED for working capital within 25 working days from the execution of the Term Sheet;
- USD$50,000 per month during the course of the Transaction to Bright LED for working capital purposes (capped at 6 months);
- Shares in the Company to the value of USD$2.5 million (less any payments made above), to be issued at a price of $0.05 per share;
- A Class Performance Rights to a value of USD$2.5 million to be issued at a price of $0.05 per performance right, 6 months after completion. These performance rights will be subject to relevant hurdles;
- B Class Performance Rights to a value of USD$2.5 million to be issued at a price of $0.05 per performance right, 12 months after completion. These performance rights will be subject to relevant hurdles; and
- C Class Performance Rights to a value of USD$2.5 million to be issued at a price of $0.05 per performance right, 12 months after completion. These performance rights will be subject to relevant hurdles.

The Performance Rights will be subject to hurdles and vest when conditions are met. If the Performance Rights vest, they are convertible into fully paid ordinary shares on a one for one basis.

Post completion representatives of Bright LED will join TND Board and Top End will be renamed to reflect its new operating business.

The Company will seek to raise between of USD$4 million and USD$8 million to finance working capital for the expansion of Bright LED post completion of the Transaction.

Anyvision

The Company and Anyvision have mutually agreed to terminate the proposed acquisition of Anyvision by TND.

After a long and thorough mutual assessment, the Company concluded that although AnyVision and its technology is very innovative and has a big potential market share, as initially discussed and presented...
by Anyvision to TND, Anyvision still requires further development before it can become a suitable fit for a publicly traded company.

The parties have entered into a formal agreement to terminate the share sale agreement that had been signed between the parties. The parties have agreed that they may re-consider a possible transaction in the future, once AnyVision becomes a more mature and suitable fit.

For further information please contact:

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Director
Ph: +61 (3) 8532 2848
BRIGHT LED Ltd.

Illuminating the Future

June 2016
The Challenge - Major Trends Coming Together

**Surging Markets**
- Smart Lighting market – USD 8.1B by 2020
- USD 1.5T market opportunity for Smart City vendors
- USD 1.7T Internet of Things IoT market
- Largest recent financing rounds for companies in the field
Bright – Powering the connected street

True Broadband Connectivity

Energy savings for cities – up to > 80% in cost

New Business model – Lease POLE real estate: 1. To Operators 2. To 3rd party sensor vendors 3. Applications – App Store of the Outdoors™

Data and Mobility – On going Connectivity and data Handling to accommodate enhanced expected mobile traffic and generated data
Bright LED
It’s all about Data

- Collecting
  - 1. Sensors
  - 2. App Store of the Outdoors™
  - 1. Cameras

- Processing
  - 1. Computing near the data source
  - 2. Cloud processing

- Transmitting
  - 1. Wifi
  - 2. 4G/5G distributed NW
  - 3. Li-Fi
  - 4. Robust closed emergency NW

M / T Bps
TB / PB
Bright LED’s Vision – the Connected Street™

Harnessing the Light Pole

Streetlights are the ideal Smart City and Connectivity infrastructure – the “veins” flowing through the city
Bright LED – Coral Reef™

Reactive Street Lights In The Heart of the Smart City
Coral Reef - Smart City System

Not just light...

A game-changing system – powering the connected street of tomorrow -

Open big data Smart City platform, with fast broadband connectivity and distributed processing

Sensing & Understanding the City
## Bright LED Coral Reef Smart City System - Differentiators and Advantages

<table>
<thead>
<tr>
<th>System Capabilities</th>
<th>Bright LED “Coral Reef”</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connectivity options</td>
<td>Multiple connectivity options – People, cars, devices</td>
<td>None. Limited for specific devices only</td>
</tr>
<tr>
<td>Broadband data handling</td>
<td>True Broadband (WiFi, LTE, Li-Fi)</td>
<td>Narrowband, minimal information handling</td>
</tr>
<tr>
<td>Devices</td>
<td>Unlimited – “heavy users” (e.g. video), sensors, other devices</td>
<td>Mainly simple sensors, low info generation</td>
</tr>
<tr>
<td>System architecture</td>
<td>Open, scalable; platform for 3rd party applications</td>
<td>Closed, “tailored” solutions</td>
</tr>
<tr>
<td>End-point</td>
<td>Advanced node processing capability</td>
<td>Network-centric; relying on central processing of data</td>
</tr>
</tbody>
</table>
Example 3rd Party Peripherals

Sensors for:
- Air Quality
- Weather
- Traffic
- Microphone
- Garbage bins
- More...

Infrastructure to Vehicle (I2V) Gateway

Speakers

WiFi spot, Cellular 4G/5G Comm., Li-Fi, LCD Advertising screen, etc.

CCTV
App example:
Fog detection, weather conditions
App example: parking locator
- Cam & sensors locate a free parking space
- Location sent to driver
- Car is directed to available parking space
Communications Hub

- Drones
- Connected cars
- Pedestrians and mobiles
The Company

- A pioneer of Energy efficient, Connected, Smart-City Street lighting solutions
- Proprietary heat dissipation technology, Most efficient street lighting
- Bright LED implemented the first controlled energy saving street lighting projects in Israel
- Financing and coop with Israel Electric Corporation (IEC) and Israel Chief Scientist (ICS)
Customers and Partners
Tzfat City Project

- Replacing the city’s high-power street lights
- 70% Energy savings
- Wireless control system
Proven Experience
Over 1,500 Installed Units

Tens of thousands in planning
## Business Model

- Long-term installation and service agreements
- **Services:**

<table>
<thead>
<tr>
<th>Municipal Services</th>
<th>Commercial Services</th>
<th>Energy Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic management</td>
<td>Advertising Communications – to houses, mobiles Connected cars hub Apps (parking, pollution, navigation), Etc.</td>
<td>70-80% energy savings Dynamic, reactive dimming Solar power Energy management and control</td>
</tr>
<tr>
<td>Illumination management</td>
<td>Security devices</td>
<td>Security devices</td>
</tr>
<tr>
<td>Emergency communication and control network</td>
<td>Emergency communication and control network</td>
<td>Emergency communication and control network …</td>
</tr>
</tbody>
</table>

- Special “package” solutions -
  - for Gated communities and campuses - internet, security & lighting
  - for Cellular operators - cost-effective 4G rollout
Status

- China – Smart City in focus in following years
- Establishing a subsidiary in Changzhou
- Establishing JVs in China and LATAM
- Joint Israel-Jiangsu project application
- Cooperation with leading system integrators and technology partners
Thank You!

Bright LED
Illuminating & Connecting the Future

Rami Mirsky, CEO
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Bright LED develops, manufactures and sells LED smart lighting and communications solutions for municipal and road authorities. The company's products, also serve as a platform for IoT services and online street applications. The company leads the “Connected Street” vision – a street with a connected and shared environment for everything there. This is achieved by creating an environment that responds and adapts itself to residents and municipality’s needs.

The company’s solutions allow dynamic adjustment and reaction of lighting, signs and response to traffic volume and to users’ needs; directing drivers to available parking, response to accidents, automatic connection to security call centers, prevention of crime in real time, and more. As a pioneer in the field of power-saving, smart street lighting, Bright LED makes it possible to upgrade existing lighting infrastructure and transforming it into an ideal and flexible platform for connecting people, vehicles, infrastructure and objects in the urban space. These lighting infrastructures can be found and are deployed naturally everywhere worldwide. The company’s systems allow municipalities to implement a technological breakthrough and realize the “Connected Street” vision efficiently and flexibly, with particularly low setup and operations costs alongside dramatic savings in lighting costs, while improving the quality and reliability of street lighting.

The Company’s Products and Services
The company provides its customers with “Lighting as a Service” solution - a long-term holistic turnkey package that includes financing, infrastructure replacement, and day-to-day operations. The company’s solutions combine the growing need and tendency of local authorities to outsource their lighting services and urban energy management. Thus local authorities achieve energy and financial savings and improve services to their residents, while also obtaining the ideal base for smart city and safe city services.

Optimal Lighting and Communications Performance for Minimum Energy
By applying unique patents and integrating Bright LED’s advanced heat dissipation, optical and electronic technologies, the company’s LED lighting lets local authorities and interurban transportation authorities save over 70% of electricity consumption, while substantially improving illumination quality. The company’s control and monitoring system enables it to control each individual light and communicate with it separately, and thus control and understand the level and the quality of its functioning.

App store of the Outdoors™
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Company Founder & CEO
Company Founder Rami Mirsky has over 15 years of experience in telecom, marketing, business development, founding and managing technology companies in Israel and abroad, mainly in Asia and North America.
Executive Summery

Internet of Things (‘IoT’) and ‘Smart City’ concepts coincide to propose some of the biggest business opportunities on the immediate and long-term market place. Hardware and Software companies are working on solutions to pave the way for the means by which data will be collected from everything, everyone and everywhere – and then processed and serves as the basis for further decision making and actions.

Rather than spending imaginary amount of dollars to build dedicated independent networks to collect data for processing, Bright LED offers to capitalize on the existing utility in the city, the veins that runs throughout it – the street light infrastructure. With Bright LED’s Coral Reef solution not only will the city run a much more efficient street light infrastructure, but will be able to use the existing infrastructure to offer an open, vendor agnostic platform for services, sensors and devices to fit for the data required by so many emerging smart cities.

The surge in Energy consumption – one of the reasons cities are going Smart, is clearly visible with the ‘Electric Bill’ a municipality pays accounts to over 50% of its yearly expenses. With Bright LED’s Intelligent lighting solution based on IP protected ultra-efficient heat dissipation technology and remote control, that ‘Electric Bill’ can be cut by over 70%. Cities are looking for the most efficient way to transition their infrastructure to smart – interoperability is the name of the game, so many vendors offering a multitude of high cost and dedicated solutions, rather than providing a unified infrastructure to base their solutions on. Bright LED’s Coral Reef solution gives an open platform for delivery of multitude of services required, by the Smart City control center.
Bright LED’s solution performs as: 1. End-to-end Intelligent Street lighting; 2. A data collector from 3rd party devices, Apps and sensors; 3. Gateway between the collected data to data repositories where it will be analyzed. The solution offers the city the ability to enjoy a more efficient lighting infrastructure and capitalize on a share of the revenue from future services based on Data. Different Vendors can enjoy Bright LED’s solution as a Point of Service to which they can connect seamlessly and offer their services.

4G and emerging 5G High-speed data communications and security solutions are two fields that can benefit from a widespread deployment of Bright LED’s smart solution, and provide an additional growth path to the company.

The markets are surging – reality and market research mention that: -

- Smart Lighting market is growing at a very fast rate and predicted that the market is expected to grow to USD 8.14B by 2020, at a CAGR of 22.07% between 2015 and 2020, and connected outdoor lighting revenue is forecasted to grow on average 40% annually from 2014 to 2022.
- USD1.5T in market business opportunities by 2020 for Smart City vendors
- Internet of Things Market to Reach $1.7 Trillion by 2020

Bright LED (with investors such as the Israel Electric company), comes from the very core of LED street lighting industry, and provides the solutions that can make the interoperability between IoT solutions and vendors and the smart city needs easier, scalable and imminent.
The smart (connected) City

Backed up by the emerging IoT market place, smart cities are forming into shape and concept and we are witnessing a growing number of cities taking on the challenge of becoming ‘Smart’. The IoT is comprised of three main elements – Things, connectivity & business and computing infrastructure.

Frost & Sullivan predict a whopping figure of USD1.5T in market business opportunities by 2020 – hereunder;

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Gartner shows a direct correlation between growth in smart city and number of connected devices within
The symbiosis between the two are further showed in the following –
**Intelligent Lighting and the Smart City**

Market&Market research has shown that the Smart Lighting market is growing at a very fast rate and predicted that the market is expected to grow to USD 8.14B by 2020, at a CAGR of 22.07% between 2015 and 2020.

Strategies Unlimited forecasts connected outdoor lighting revenue to grow on average 40% annually from 2014 to 2022.

Up until not long ago, turning night into day and illuminating the dark has been the main task of street lighting. In the future, however, street lamps will fulfill many more functions. They will notify the garbage collection service whenever neighborhood waste bins must be emptied, or register a change in traffic volume and feed that data into an intelligent transport system (ITS). Street lighting will no longer be an isolated sphere but part of a networked urban infrastructure.

The basis of this is the emerging Internet of Things (IoT) and the associated concept of the smart city. Every conceivable object and location will be connected: cars, cargo containers, street lights, and car parks — even wristwatches, eyeglasses, and pens. They will each measure various parameters in their environment and digitize
everyday challenges such as finding a parking space. At the center of this change is machine-to-machine (M2M) communication, the automatic exchange of data between networked devices either with each other or with a control center.

The public sector already recognizes the opportunities inherent in a higher degree of cross-linking. Smart city solutions are regarded as key in reducing energy and maintenance costs, complying with the legal requirements of climate protection and providing better services to citizens. Intelligent street lighting plays a central role in this. In fact, in many cities, defective lamps account for roughly 20% of all citizen complaints, and intelligent systems can automate the repair process. In combination with LEDs, a programmable light management system reduces urban electricity costs up to 70%.

Intelligent lighting systems have already been on the market for a couple of years. However, it is through the repositioning of street lighting as the backbone of the networked city that the breakthrough could be imminent. Authorities, private sector companies, and supranational institutions such as the European Union (EU) are actively promoting the digitization of urban infrastructure.

When things around us become smart, their range of functions expands. Networked streetlights are more than mere appliances for artificial lighting. They become nodes in a multi-functional network. This is because networks established to control and manage LED lighting systems are also capable of doing much more. Joining the Internet of Things movement, networked street lights give cities the ability to capture data from the world around them through environmental and weather sensors, monitoring devices and video cameras. Following are a few examples:

1. Air quality sensors. Data collected from these sensors can provide insights on pollution levels, pollen counts and other public health matters.
2. Image or motion sensors. These types of sensors can, for example, count pedestrians or cyclists to monitor sidewalk congestion, or even to triangulate gunshots and alert authorities of other types of crimes
3. Irradiance sensors. Cities or utilities that rely on solar energy as part of their energy mix can plant sensors on street light networks to monitor solar intensity in various areas to assist with grid balancing.

IoT and the Smart City

The world’s large cities will pose our greatest challenge—and greatest opportunity—in the next century. Today there are 21 “megacities” with more than 10 million people, and more than 1 million people move to cities every day. By 2050, 70 percent of the world’s population will call a major city home. But today, cities waste an estimated $39 billion in water, gas and energy resources. As demands on resources and infrastructure grow, how will cities provide energy, water, transportation and other critical services for so many people?

The Internet of Things (IoT) is making it possible to make cities greener, safer and more efficient. By connecting devices, vehicles and infrastructure everywhere in a city, governments and their partners can reduce energy and water consumption, keep people moving efficiently, and improve safety and quality of life.

In smart cities, many different stakeholders must work together to provide the best technology solutions. Network operators, managed service providers, system integrators and technology providers all have a role to play in working with governments to enable smart city solutions. The key is building these solutions on an open, standards-based communications platform that can be continually re-used and re-imagined for new services, insights, and applications.

According to IDC research (led by Mr. Vernon Turner) the global Internet of Things market will grow to $1.7 trillion in 2020 from $655.8 billion in 2014, as more devices come online and a bevy of platforms and services grow up around them.

The firm predicts that the number of “IoT endpoints,” connected devices such as cars, refrigerators and everything in between, will grow from 10.3 billion in 2014 to more than 29.5 billion in 2020.
Devices, connectivity and IT services are expected to account for the majority of the global IoT market in 2020, with devices alone accounting for 31.8% of the total. Purpose-built platforms, storage, security, application software and “as a service” offerings are expected to capture a greater percentage of revenue as the market matures.

The Asia Pacific region captured around 58.3% of the revenue from IoT in 2015 and will shrink slightly to 51.2% in 2020. In China, a large and growing population using mobile devices alongside a push to make manufacturing practices more efficient may spur a significant number of new devices and IoT standards. Well networked countries like South Korea and Singapore may also ramp up smart city initiatives.

North America is expected to maintain revenue share of just more than 26% over the forecast period, while the share in Western Europe is expected to jump from 12% to about 19.5%.

As the Internet of Things ecosystem continues to grow, companies increasingly will look to platforms and services that help them manage and analyze the streams of data coming from connected cars, thermostats and smartwatches. That means a new world for the CIO as companies look for ways to process and analyze data from multiple sources in real time.

The growth in IoT-enabled devices has been fueled in part by the declining cost of sensors, connectivity and data processing power. The software needed to analyze this data has improved and companies are using it to boost operations and seek out new business models.

Embracing IoT may lead to increased use of open source software and standards, Mr. Turner said. Disparate devices will likely need to be managed by the same infrastructure, underscoring the need for common standards.

CIOs are contemplating how to secure and manage the multitude of new devices that could enter their companies, and how to deal with new types of data from different sources.