Press Release

Nippon Chemi-Con Corporation
March 30, 2010

Nippon Chemi-Con, Stanley Electric and Tamura announce: Development of "Super CaLeCS", an environment-friendly EDLC-powered LED Street Lamp

Sets up the lamp at the Toki Koryu Kaikan in Sado City, Niigata Prefecture, Japan

Nippon Chemi-Con Corporation, Stanley Electric Co., Ltd. and Tamura Corporation jointly developed "Super CaLeCS Toki", a LED street lamp combining solar cells and electric double layer capacitors (EDLC).

The street lamp was developed in cooperation with Kyocera Corporation for solar cells and Enomoto Architects' Laboratory (*1) for total design of the street lamp which features toki (a Japanese crested ibis), realizing a design that harmonize with nature.

The first street lamp is set up at the Toki Koryu Kaikan (1101-1, Niibo Katagami, Sado City, Niigata Prefecture, Japan). The street lamp will be launched in the market as a product originating in Niigata.

Niigata Industrial Creation Organization played a major role in achieving this development by adopting the "LED street lamp with stand-alone power supply" developed by Chemi-Con Nagaoka Corporation (*2) who undertakes the EDLC business within the Nippon Chemi-Con Group, as the "New products development aid business of regional core firms" (*3).

Different to lead batteries and other secondary batteries, EDLC is an environment-friendly energy device that can be charged without chemical reactions.

The EDLC-powered "Super CaLeCS Toki" is an environmentally sound LED street lamp that has been developed on the basis of reducing CO2 emission to the minimum, and this is the first time for such lamp to be commercialized in the industry at a practical level.

*1: Hiroyuki Enomoto/ Completed his Ph.D. in architect at University of Tokyo, and established Enomoto Architects' Laboratory in Tokyo in 1995.
*2: 100% owned subsidiary of Nippon Chemi-Con who manufactures EDLC modules, located in Nagaoka City, Niigata Prefecture.
*3: An assistance system to support the creation of new markets and development of firm's new businesses by aiding firms that locate in Niigata Prefecture on the development of their new technologies and new products.

[Image－Super CaLeCS Toki]

◆Outline of “Super CaLeCS Toki”

This is a street lamp that lights up LED at night time with energy generated by solar cells and stored to EDLC.

It ensures high durability and stable performances under various climates, from areas that exceeds 40 degrees Celsius in summer to areas that plunge to sub-zero in winter. This lamp can also be set up without considering the construction work to lay commercial power supply as the lamp employs a stand-alone power supply that uses only solar power for its energy source.

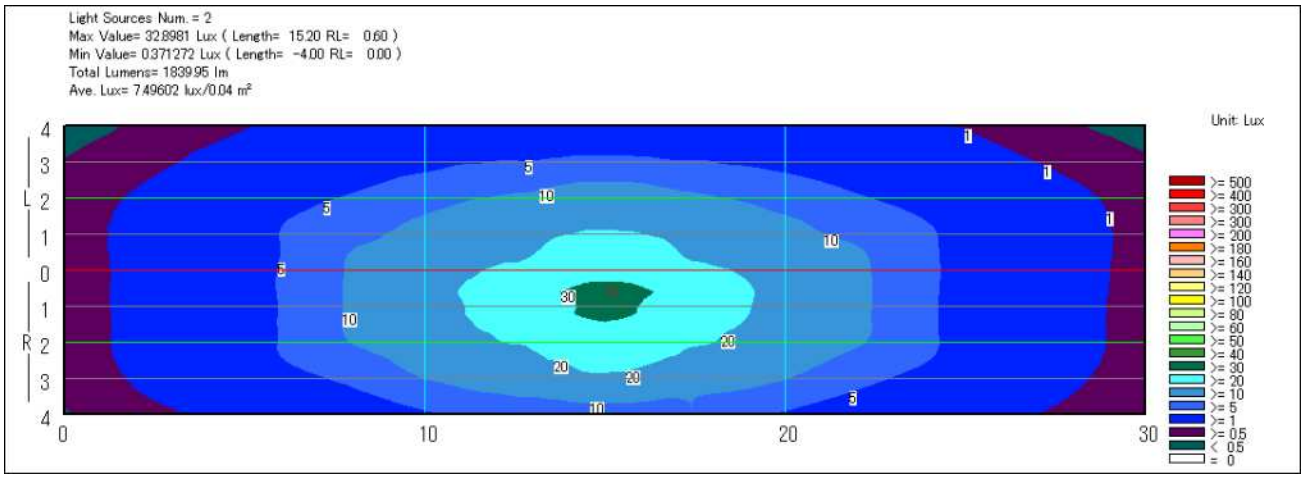
<LED Lighting>

Stanley Electric’s LED unit (including 2 LED lamps with 15W power consumption) is used for LED lighting.

This LED unit is a high-performance, weatherproof LED lighting which has applied technologies for automotive headlamp, marking the industry’s highest standard of reliability and light use efficiency.

By using a wide-field irradiation lens developed through their original optical technology, the company achieved in making lighting with ideal light distribution.

[Light distribution simulation]



[Durability of LED lighting]

	Durability	Average times for change within 10 years (for 43,800h or 12h/day)
Incandescent lamp	2,000h	22 times
Fluorescent lamp	12,000h	4 times
Mercury lamp	12,000h	4 times
Metal halide lamp	9,000h	5 times
Sodium	12,000h	4 times
LED	40,000h	No changes

<Power supply controller>

Tamura’s “TAM-2025” is used for power supply controller. Based on their existing solar controller, the company has developed and applied “maximum-efficiency tracking argorithm” to their controller to efficiently charge EDLC whose voltage fluctuates.

As a result, EDLC is able to be fully charged in about 2 hours under clear weather. Also in

under rainy and cloudy weather as well as under most of the other bad weather conditions, it is able to be charged in about 6 hours.

For LED lighting circuit, the company has adopted microcomputer controlled constant-current system to realize high efficiency, high definition and high reliability.

In addition, precise control of its microcomputer has made possible to achieve the major advantage of this system of "extending LED lighting hours at night time".

By calculating based on the measurement of voltage and capacitance of EDLC, it is able to acquire the amount of residual charge extremely accurately, and can set an optimal schedule for discharge current.

It will therefore enable long term lighting under bad weather conditions when it can charge very little, which results in considerably improving the light-out situation caused by weak charge.

<EDLC>

Nippon Chemi-Con's EDLC, "DLCAP™" is used for storage device.

EDLC is attracting attention as an environmentally friendly device as it has long life and does not use any heavy metal.

"Super CaLeCS Toki" is equipped with 240 cells of DLCAP™ at rated 2.5V and capacitance of 2,300F (product size is φ50×172mm), enabling the lamp to be lit for 14 hours.

In addition, DLCAP™'s storage ability under the temperature below zero has been demonstrated through the cold region evaluation test, investigated jointly by Graduate School of Engineering of Hokkaido University, Stanley Electric, Tamura and others.

[Photo-EDLC module]
(Module is placed under the bench in this system)

<Solar cell>

Kyocera's high efficient, polycrystalline silicon cell is used for solar cell.

Through the accumulation of their long years of R&D activities and integrated production, the company has achieved higher efficiency by improving the quality of wafer by reducing the impure substances of polycrystalline silicon, expanding the light receiving area of the element through thinning technology of electrodes, and using 3 bus bars.

<Features of the system>

(1) Environment design that minimizes CO2 emission

The system uses only solar power as its energy source to pursue environment-friendliness. Environment conscious components are used within the system including LED which consumes less energy and EDLC which uses no heavy metals for its materials.

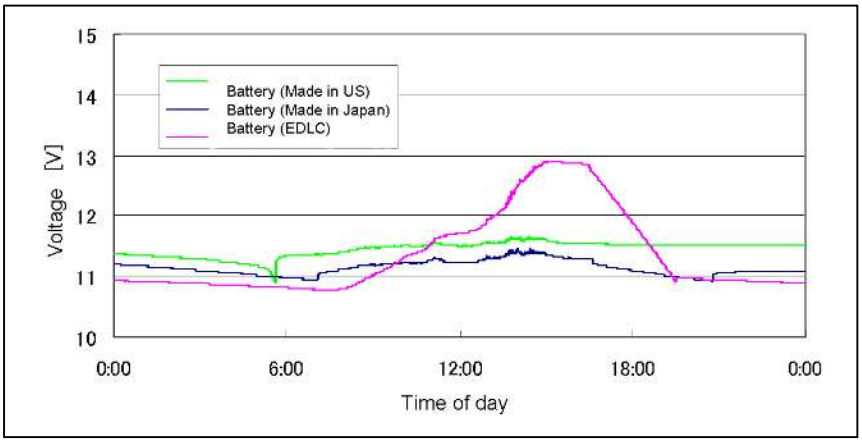
(2) Realizes high efficient operation under bad weather conditions

The MPPT (maximum power point tracker) type power supply controller specially designed for this system enables efficient storage of the generated energy.

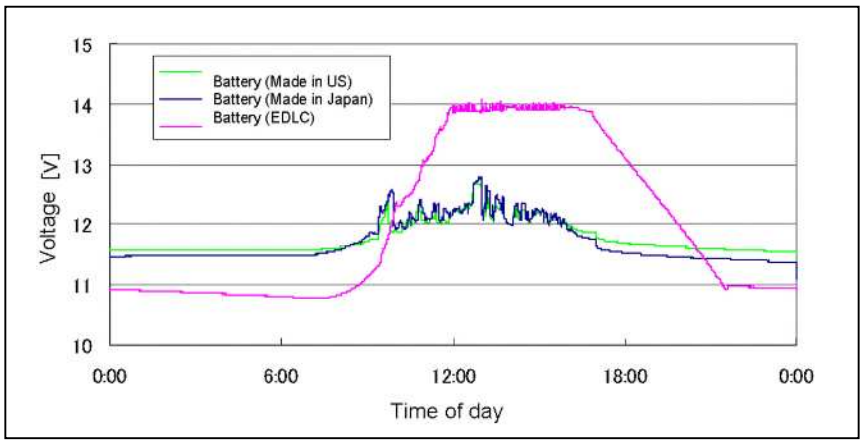
For storage device, a low resistant type EDLC is used to efficiently charge under rainy and cloudy weather when electric generating capacity becomes weak (see diagram below).

EDLC is also able to provide high performance in midwinter when the temperature drops to below zero. Compared with lead batteries, EDLC has excellent charge-discharge characteristics

under cold climates.



[Batteries' voltage fluctuation under cloudy weather]



[Batteries' voltage fluctuation under sunny weather]

(3) Requires no commercial power source

The system installs a stand-alone power supply which uses only solar power as its energy source. It will require no electricity expenses, no construction to lay power line, and is able to be easily set up at areas difficult to lay power line.

(4) Maintenance-free, which results in reducing total cost

By equipping long-life LED lighting and EDLC, the frequency to change components has been reduced (expected life=10 years), which results in reducing total cost through long-term usage (see diagram below).

Type of lighting	(1) Commercial power		(2) Commercial power Solar cell Lead battery		(3) Solar cell Lead battery		(4) LED Solar cell EDLC	
Energy consumption	Incandescent lamp	×	Fluorescent lamp	△	F luorescent lamp	△	LED (Low energy consumption)	○
Energy-conservation	No energy-saving function	×	Use of natural energy	△	Use of natural energy	○	Use of natural energy	○
Maintenance	Requires bulb change once in half years	×	Requires changes of lead battery and lamp every 2 to 3 years	△	Requires change of lead battery and lamp every 2 to 3 years	△	Requires no change of EDLC and LED in 10 years	○
Environment consciousness/ safeness	None	—	Lead battery (contains heavy metal)	×	Lead battery (contains heavy metal)	×	EDLC (contains no heavy metal)	○

◆Future Plan

Based on the model of “Super CaLeCS Toki” developed this time, “Super CaLeCS”, an EDLC-powered LED street lamp, is planned to be commercialized in various specifications to meet the requirements of customers’ locations and purposes.

[For reference]