

(Press release)

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Nippon Telegraph and Telephone Corporation
NTT Advanced Technology Corporation

Launch of "Pocket Energy" in May 2004
--A Prototype Versatile, Environmentally Friendly Solar-Powered
Mobile Power Source for Portable Devices such as Mobile Phones,
PDAs, and Digital Cameras--

Nippon Telegraph and Telephone Corporation (referred to as NTT hereafter; headquarters: Chiyoda-ku, Tokyo; president: Norio Wada) has just completed development of a prototype solar-powered mobile power source that provides a "clean" high-power output for supplying mobile devices by means of a single solar cell.

In commercialization this prototype product as a "clean"--i.e., environmentally friendly--mobile power source for the ubiquitous IT era, NTT Advanced Technology Corporation (hereafter NTT-AT; headquarters: Shinjuku-ku, Tokyo; president: Kimio Tazaki) will launch it under the name "Pocket Energy" onto the market from May this year.

Although commercialization of this technology was carried forward by NTT according to the "Comprehensive Producer Function" efforts introduced in July, 2003, from now on, it is planned to promote this business in collaboration with NTT-AT.

Pocket Energy (see [Fig.1](#)) is a mobile power source that includes both a solar cell and a battery for storage. It is suitable for use as a power supply for a wide range of portable devices like mobile phones, PDAs, and digital cameras. Although other companies have put solar-powered battery chargers onto the market, these chargers are only compatible with specific devices; in contrast, Pocket Energy is the first multi-purpose-type charger to be commercialized.

By very efficiently storing electrical energy generated from its solar cell (i.e., 1.5 times more energy than a conventional cell under sunny conditions), Pocket Energy provides a secure and simple power supply for charging or supplying mobile devices--in a lightweight, easy-to-carry package--even while on journeys or during emergency situations like commercial-power outages.

Development Background

Over recent years, accompanying the rapid popularization and improved performance of mobile devices, their energy consumption has severely increased. In line with this trend, the need has arisen for a power source for mobile devices that is handy to use anytime, anywhere and places a low burden on the environment.

In 2001, with the ubiquitous IT society in mind, NTT set about developing a mobile power source as a superior means of supplying energy conveniently and with low environmental impact. The first product resulting from this effort--a prototype named

"Solar Card Power"--was presented in November 2002 at the "NTT R&D Forum in Musashino" and received favorable reviews.

At NTT, as one part of the reform of R&D management aimed at overcoming the so-called "valley of death" phenomenon (namely, the challenging period between R&D and commercialization of promising technologies) the "Comprehensive Producer Function" plan was introduced in 2003. Under one of the first themes in this plan--namely, the field "environment and energy"--development of a mobile power source was planned and pushed forward. In addition to uncovering market needs, NTT focused on improving convenience in completing development of a prototype incorporating new features such as separation of the electrical-generation part and main body, automatic setting with a dedicated cable, use of two solar-cell panels to increase output power, and a shortened charging time. And it has been decided that NTT-AT will market and sell Pocket Energy.

Characteristics of "Pocket Energy"

Pocket Energy is a solar power source with high versatility; that is, one Pocket Energy unit can be used for charging a variety of devices. It is composed of two main parts: a generating unit, which produces electrical energy from sunlight; and the main body, which is separated from the generating unit. The main body consists of a storage part that accumulates the electrical energy generated from the generating unit and a converter for supplying that energy as various currents and voltages.

Electrical energy generated by the solar cells charges the main body, and by means of a simple connection via a specially adapted cable for particular devices, the output voltage is automatically set (3-8 V; max. output power: 10 W). Accordingly, other than notebook PCs (normal output power: 30-50 W), all major mobile devices are suitable for charging by Pocket Energy (see [Fig. 2](#)).

The storage battery built into the main body has a charging capacity of 5 Wh, which is enough energy to easily feed about two built-in mobile-phone batteries. The expected lifetime of the battery is over 500 recharging cycles, which represents "clean" energy utilization equivalent to the total lifetime of more than 1000 AA-type alkaline batteries. In addition, the battery can store energy even under the problematic conditions associated with conventional solar cells, such as indirect sunlight from north-facing windows on sunny days.

Key Technical Points

Pocket Energy features two world's-first technologies developed by NTT: (i) an electric-power generating module with a single solar cell and (ii) automatic setting of output power.

- Single-solar-cell electric-power generating module featuring ultra-low-voltage-input booster technology ([Fig. 3](#))

This booster technology increases the solar-cell output, about 0.4 V, to 5 V. In a conventional solar-cell module, several cells are connected in series to increase the output voltage. However, this set-up suffers the problem that if only one of the cells becomes shaded from the sunlight or broken, the electricity-generating system cannot function correctly. In contrast, the new single-cell set-up solves this problem because only the output of a single cell is boosted. In other words, compared to the conventional solar-cell set up, the new single-cell set up can store about 1.5 times more electrical power on a sunny day. (One built-in battery in a mobile phone can be

charged in two hours.) Moreover, since there is only a single cell, a solar panel of various shapes can be constructed. And since a strong point of the panel is that it can be charged in partially shaded places or on cloudy days, its surface can be painted freely.

- Software-controlled converter for automatic output setting

The suitable output current or voltage for a particular device (3.8-8.5 V) is automatically set according to data from the specialized cable. This means that the scalability of Pocket Energy is high and its adaptability to the latest products will be swift.

By drawing out the maximum capability from the battery, the high-efficiency, low-noise converter can produce a high electrical power supply of 10 W while maintaining safety.

Future Developments

Since the ultra-low-voltage-input booster technology utilized in Pocket Energy can be directly applied as a low-voltage energy source, various applications and combinations are possible. From now on, as part of our continuing "Comprehensive Producer Function" efforts, NTT is continuing to develop and apply Pocket Energy as a power source for applications, such as remote-monitoring equipment, in which commercial power sources are difficult to use, at the same time as investigating the commercialization of the booster-circuit module. Furthermore, while aiming towards realization of the ubiquitous IT society, from the perspective of the environment and energy consumption, we also have on eye the possible contribution of Pocket Energy in so-called "clean energy" applications like micro-fuel cells.

[Fig. 1: External view of "Pocket Energy" \(prototype version 2\).](#)

[Fig. 2: Application devices](#)

[Fig. 3: Key technical points: very-low-voltage input booster technology.](#)

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