Yano Research Institute

October 20, 2011

RESEARCH SUMMARY

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Global Microwave Power Transmission Systems: Key Research Findings 2011

◆ Research Outline

Yano Research Institute has conducted a study on the global market of microwave power transmission system with the following conditions:

1. Research period: From June to September, 2011
2. Research target: Ten manufacturers, four universities, two R&D organizations, and a government agency that relate to microwave power transmission systems
3. Research methodologies: Face-to-face interviews by the specialized researchers, survey via telephone/email and literature research

What are a microwave power transmission system and a space-based solar power (SBSP)?

The microwave power transmission system is originally introduced in the "Science" magazine in 1968 as a technology that helps make the Space Solar Power System (SSPS) proposed by P.E.Glaser, who then worked at Arthur D. Little, come true, to collect solar power in the space for use it on the earth.

SSPS is a concept to launch a power generation satellite, equipped with a huge solar panel, to the space 36,000km distant from the earth, where it generate electricity for 7 x 24 hours so that 1GW (a million KW) of power can be used on the earth. The microwave power transmission system is considered as a method of transmitting the electricity from the orbit satellite to the earth. The system is expected to be able to apply from a very close range of several centimeters to a long distance like 36,000km of geostationary satellite orbit.

◆ Key Findings

■ **Global market size of microwave power transmission system is estimated to be 260 million yen in FY 2011, 3.5 billion yen in FY 2012, and 10.3 billion yen by FY 2015**

The microwave power transmission system market is predicted to launch in 2011, while all other wireless power transmission systems are expanding the market in consumer equipments (especially mobile phones aside from existing electric toothbrushes or electric shavers.) In the first stage of the market (estimated from 2011 to 2015) microwave power transmission systems are expected to be used as means of power transmission and energy harvesting (environmental power generation) for sensing devices in B-to-B equipments that need several meters of power transmitting distance.

■ **With construction fee estimated to be 4,359.8 billion yen, the first SSPS station is expected to start the operation in 2040**

In the roadmap created by MEIT for technological strategies in the space, the goal for

construction of a space-based solar power station is set around or later than 2030. However, the prospected schedule seems to be delayed for almost five years. Considering the transportation capability of the rocket and the delay, the estimated figures are based on the assumption that the construction of SSPS is to start in 2035, and its commercial operation around 2040.

◆ Report format

Published report: "Microwave Power Transmission System 2011"
Issued on: September 22, 2011
Language: Japanese
Format: 135 pages in A4 format
Price: 126,000 yen (6,000 yen of consumption tax shall be charged for the sales in Japan.)

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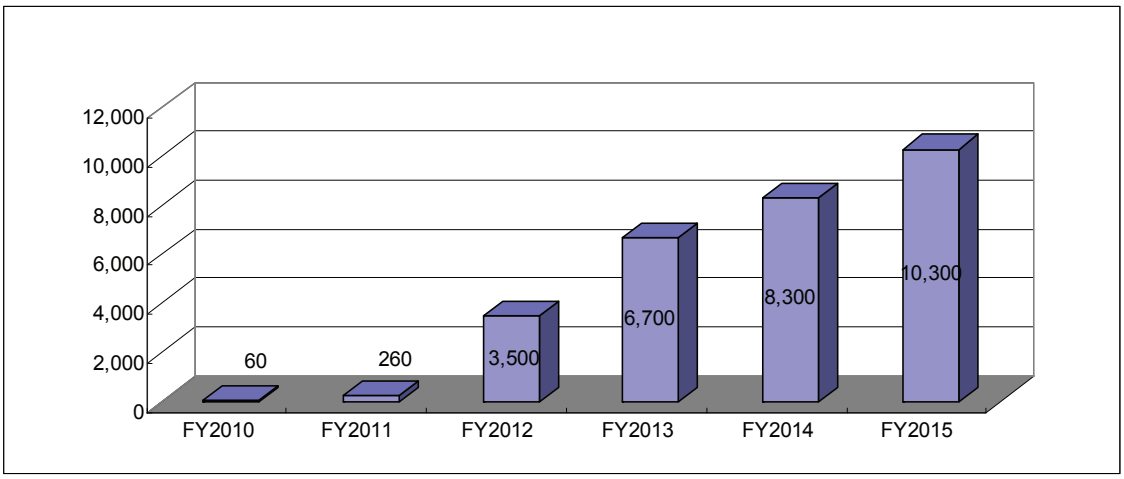
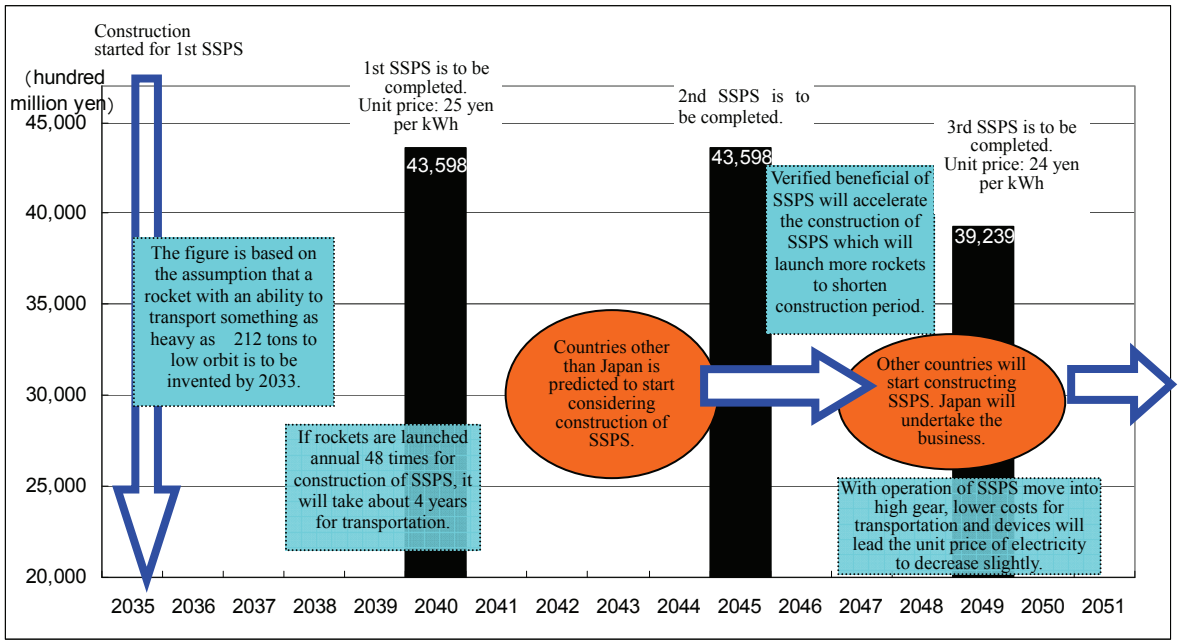
■ Forecast of global market size of microwave power transmission system



Notes:
1: Figures for FY2010 is an actual value, FY 2011 a prospect, and FY2012 a forecast.
2: Figures are based on sales as wireless power transmission system
3: Figures also include censors and IC and other devices of wireless gates.

■ **Forecast on the transition of SSPS market size later than 2035**



Notes:
4: Al the figures are forecast values.
5: Figures are based on the construction fee. Efficiency of solar cells exchanges in the space, their price reduction, and lower transportation cost to low orbit are also included in the calculation.
6: This market size includes transportation fee, device prices and land cost, but does not include manpower cost.