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Panel Discussion in Parallel

[Parallel 1] Creating Asia's alternative energy market: what is needed now?

Hideto Yamaji, Group Deputy General Manager, General Manager, Global Sales & Marketing & Operations, Solar Systems Group, Sharp Corporation

Toshiyuki Watanabe, Corporation President & CEO, Isman J Corporation

Yasuyo Yamazaki (moderator), President, The Sun-Based Economy Association

Mr. Yamazaki of the Sun-Based Economy Association has hit the alarm button in his assertion that the oil-dependent economy = carbon economy or the US style economy has reached its limit, not an economic limit but a human lifestyle limit. “What type of society or economy do we want to build in order to control carbon dioxide emissions?” This is a challenge for sustaining human existence. Mr. Yamazaki proposes that “a sun-based economy will change the world” and demonstrates how Japan can adopt initiatives that embrace “a society that thrives with the benefits of the sun.” While Japan is at the forefront of many individual technologies, it is not yet able to integrate these technologies in a manner that advances the direction of the country and society as a whole. The “Green New Deal” lacks depth in terms of its message and the direction we should take. That is why Mr. Yamazaki strongly asserts that “a sun-based economy” is a must for the future. Now is the time for Japan to utilize its technological prowess, its human resources and its economic capital strength and work together with Asian countries, which have resources and economic growth potential, to build a sun-based economic region that will create a societal foundation that can sustain economic growth and the survival of mankind. This, in turn, will help Japan improve domestic employment, reduce energy imports and better the balance of international payments.

In response to this proposal, what is the current situation of technology-oriented Japan? With the projection that there will be a huge market for alternative

energies in Asia (in particular, solar energy), we asked Mr. Yamaji of solar cell manufacturer Sharp and Mr. Watanabe of alternative material developer Isman J for their opinions on the challenges and possible solutions of this growing new market.

Sharp believes that the solar energy market in Asia, in particular India and China, will grow strongly. China, India and Japan together accounted for 32 percent of the world's total carbon dioxide emissions in 2006. This is because India and China use coal as the primary source of fuel for electricity (70% for India, 80% for China), and coal has a high negative environmental impact. In addition, if we chart out the relationship between economic development and carbon dioxide emissions by calculating its relationship to the country's population and GDP, we find that Japan and Europe, compared with the United States and Canada, have been able to maintain economic development with relatively little carbon dioxide emissions. Our goal at Sharp is to contribute to the spread of solar energy to create Scenario A = environmentally friendly economic development in Asia, in particular in China and India, with a combined population of 2.5 billion people, and in other rapidly developing countries.

One of the challenges Sharp faces in popularizing solar energy is the high cost of solar energy power generation. China and India have a high consumption rate of electricity and while there are no problems in regards to the amount of sunlight available, current electricity prices are low. The key to making solar energy popular in this type of market is lowering the cost of power generation. Sharp believes that solving this problem requires two simultaneous factors: 1) government incentives and subsidies, and 2) technological innovation on the manufacturing side. In terms of subsidies, he gave such examples as EU's FIT (Feed-in Tariff), a fixed electric prices buyback program, and the Triple 20 Deal (reducing greenhouse gas emissions by 20% by 2020 compared with 1990 levels, cutting energy consumption by 20% by the same deadline, and ensuring that 20% of the EU's energy mix comes

from renewables), as well as federal grants programs and tax breaks in the United States. In Japan, the “School New Deal Project” sets out to install solar systems in 12,000 elementary and middle schools and from November 2009, implementation of FIT will begin.

In terms of technological innovation, Sharp has two approaches in its effort to reduce power generation costs – “scale merit,” which strives to develop high-quality mass production technology, and “scope merit,” which aims to increase the number of products it provides. Sharp is responsible for 20% of the world’s cumulative solar energy generation. It uses two types of technologies – crystalline solar cells (mass production started in 1963) and thin-film silicon solar cells (mass production started in 1998) – and develops products that best utilize the characteristics of each technology. For example, the manufacturing efficiency of thin-film silicon is high, which enables low-cost manufacturing, so it is used for large-scale power generation sites to keep power generation costs low. The power generation plant being built in Sakai and due to begin operations in March 2010 is one example. We want the current 46 yen/kwh electricity costs to become 23 yen/kwh. In Abu Dhabi, we are building another thin-film silicon solar cell power generation site. In addition to on-grid, off-grid and hybrid systems, in places like Singapore, which is not a large country but is advanced in terms of environmental initiatives, we are promoting the implementation of BIPV (Building Integrated Photovoltaics). In China, we are building a new type of power generation plant that incorporates both thin-film silicon as well as crystalline cells.

Sharp produces more than just panels. It provides total solutions that incorporate system equipment and building and aims to expand its business in Asia as an integrator. Sharp is focused on developing solar energy for zero-emissions office buildings and direct current eco-houses to spread its eco-city concept and help Asia fulfil Scenario A. But doing so will require the support of government environmental initiatives and subsidies

Isman J Corporation strives to find the solution to reducing carbon dioxide emissions through “materials.” Mr. Watanabe gave an example of making silicon an alternative to steel, which enables a change in the production process of the steel industry, which accounts for 35% of Japan’s carbon dioxide emissions. Mr. Watanabe raised a puzzling question: “Why is it that we choose steel over silicon? Steel consumes a tremendous amount of energy and emits a tremendous amount of carbon dioxide to produce, while accounting for only 5% of the world’s resources. On the other hand, we have an abundance of silicon, which accounts for 26% of the Earth’s resources.” After six years of developing the technology to produce silicon alloy ceramics from silica stone mined from deserts, Isman J has finally achieved mass production capacity. Currently, it is working with an Egyptian state-owned enterprise to produce 1 million tons a year.

This ceramic material that can be used as an alternative to steel is called Meramix. Silicon particles of 0.5 microns are made into a clay and after casting, are heated at 1750 degrees. It is approximately twice the hardness of steel at 40% the weight, and when it oxidizes, it becomes sand, making it a very environmentally friendly product. When used for automobile parts, because it is lighter, fuel consumption will be lower. Of course, Meramix uses energy during the production process but at the Egypt plant, we get electricity produced by hydraulic power and with purer raw materials, we will be able to produce with even less energy. In addition, we are involved in tree planting as one of our carbon offset activities.

Making polysilicon (the raw material of solar battery cells) from silicon (silica stone) consumes more energy than making metallic silicon (the raw material used for Meramix). This is one of the reasons for the high cost of polysilicon, but Mr. Watanabe shared that they are required to introduce the technology to make polysilicon at the Egypt plant. There is a worldwide shortage of polysilicon but if metallic silicon production increases, polysilicon prices should come down. Mr.

Yamaji of Sharp proposed the use of thin-film silicon solar battery cells as one solution to combat the fluctuation in silicon prices. Thin-film silicon can be produced with just 1% of the silicon used to make crystalline cells. While conversion efficiency of thin-film silicon is slightly lower than crystalline, it can become part of a solution to lower electricity prices.

One of the biggest hurdles in the diffusion of new alternative energy technologies is price. The future of an Asian Solar Economic Region depends on whether or not Japan can overcome this hurdle, not just as a nation but as a society as a whole.

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