Konica Minolta, Inc.
Main Q&A from Growth Seeds Briefing:
"Barrier Film for Perovskite Solar Cells"

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Cautionary Statement

This material was prepared for those who were unable to attend the briefing and is intended only for reference purposes. Readers are asked to acknowledge in advance that the following text is not a verbatim account of everything that was said at the briefing but a basic summary whose content was determined by Konica Minolta.

Moreover, readers are asked to further acknowledge in advance that the contents concerning future results in this document is based upon information that the Company has at present and upon a rational evaluation based on certain assumptions and, additionally, that actual business performance can greatly vary due to number of factors.

In the following text, EneCoat Technologies Inc. is referred to as "EneCoat," and Konica Minolta, Inc. is referred to as "Konica Minolta."

<Application of Konica Minolta Products at EneCoat>

Q. EneCoat plans to begin mass production in 2027. At that stage, is it assumed that Konica Minolta's barrier film will be adopted? Also, as part of the partnership with Toyota, will Konica Minolta's barrier film be used in electric vehicles and other applications?

A. (EneCoat) Our applications range from low-light indoor use to high-illumination space applications. The required performance of the barrier film depends on the specific application. In particular, for outdoor applications used over long periods, we have high expectations for Konica Minolta's barrier film. Starting in 2027, production will first focus on indoor, low-light solar cells. Even for indoor applications, some require durability while others do not, so we will evaluate according to customer needs.
We are currently verifying the adoption of Konica Minolta's barrier film, and if cost and other conditions are met in 2027, there is a possibility that it will be used. There is also a possibility of adoption for low-light indoor products, depending on conditions. As for application to Toyota's electric vehicles, if the timing of installation and other conditions align, adoption is also possible.

Q. Has EneCoat established a prospect for cost reduction to enable the adoption of Konica Minolta's barrier film? How much cost reduction from the current level would be necessary for adoption?

A. (EneCoat) The price of barrier films varies depending on the application of the solar cells. Indoor applications in particular require significantly different performance levels, and the price changes accordingly. Outdoor applications

require both high barrier performance and low cost, and we expect this to take time. At this moment, no specific cost target has been set.
(Konica Minolta) Our barrier film is still under technological development, but we aim to provide highly water-resistant barrier films that meet the needs of customers such as EneCoat.

<EneCoat's Facilities>

Q. Where is EneCoat's mass-production facility, scheduled for completion in 2027, located, and what will its production scale be?

A. The plant is currently under construction in Uji City, Kyoto. While the production scale is still subject to change, the facility is expected to have an annual production capacity—combining both the sheet-to-sheet and roll-to-roll lines—equivalent to 10 megawatts of outdoor solar-power output.

<Konica Minolta's Business Model and Investment Scale>

Q. In the evolving supply chain and value chain, what are the advantages and disadvantages for Konica Minolta in specializing in barrier films?

A. (Konica Minolta) Konica Minolta is moving forward with development as a supplier of barrier films. We believe that our Industry-type materials-supply business model will be the key to future business expansion, and we are proceeding on that basis. Our initial focus is on the domestic market, but in the medium to long term, we see possibilities such as supplying to module manufacturers both in Japan and overseas.

Q. If the market size is estimated at 50–80 billion yen and we assume that Konica Minolta will hold roughly half of that share, what level of capital investment would be required?

A. (Konica Minolta) At this stage, we believe that we can meet demand using our existing facilities. We plan to make appropriate investments as the market grows, but we are not currently assuming any large-scale additional investment.

Q. Konica Minolta has announced inkjet printheads compatible with organic solvents. Will this technology be used in the manufacturing of barrier films for perovskite solar cells? Also, are you considering business development for inkjet printheads as well?

A. (Konica Minolta) As you pointed out, we are also exploring the use of inkjet technology for perovskite solar cells. Since today's briefing focuses mainly on barrier films, details regarding inkjet technology will be shared in a briefing we plan to hold in the future. We are considering our overall technology development strategy from a sustainability perspective as well, and we plan to hold the briefing in the fourth quarter.

<Performance and Technology Development>

Q. Regarding the issue of lead in perovskite solar cells, could you explain the potential obstacles it may pose for global deployment and the countermeasures being considered?

A. (EneCoat) For glass substrates, the lead content remains below the RoHS Directive threshold of 1,000 ppm. For film substrates, preliminary estimates

indicate that the lead content may exceed 1,000 ppm; however, we are actively implementing measures to reduce it. In Europe, lobbying activities are underway with the aim of having perovskite solar cells included in the exemptions under the RoHS Directive to support practical commercialization. The actual impact on human health is currently under analysis and evaluation.

Q. The barrier film has undergone a 3,500-hour durability test. To how many years of durability does this correspond?

A. (EneCoat) It is difficult at this stage to accurately convert the current accelerated test conditions (85 °C/85 %RH) into the actual outdoor degradation rate, so we cannot provide a precise year-equivalent figure. For reference, there are papers indicating that, for solar cells including crystalline silicon, 3,500 hours under the same accelerated-test conditions corresponds to roughly 30 years outdoors, but this should be considered only as a reference value for perovskite solar cells.

Q. What is the water vapor transmission rate of the barrier film?

A. (Konica Minolta) As it varies depending on the application and specific conditions, we do not disclose detailed figures. However, as explained today, customer evaluations of the material have confirmed that it meets the required performance levels for outdoor use.

Q. What enables the high barrier performance with a two-layer structure?

A. (Konica Minolta) In general, barrier films are composed of a planarization layer and a barrier layer stacked together. However, we possess technology that allows the planarization layer itself to have barrier functionality, enabling us to achieve high barrier performance while keeping the number of layers to a minimum.

Q. What technological developments are required for Konica Minolta to begin sample shipments in 2026?

A. (Konica Minolta) We are proceeding based on the technologies we already possess for OLED applications, and the fundamental technologies have been established. The details vary depending on each customer's specifications, so we are not disclosing them.

<Other>

Q. Prime Minister Takaichi has mentioned the procurement of domestically produced energy. How do you view the external environment?

A. (EneCoat) In Japan, expectations are growing for the promotion of film-type solar cells. Konica Minolta is the first company to announce its intention to manufacture and supply barrier films. With the progress of domestic production of such critical components, we believe that fully Japan-made solar cells are entirely achievable.
(Konica Minolta) We currently estimate the barrier film market to reach 50–80 billion yen by fiscal 2035, but we also believe there is a possibility that market expansion could accelerate rapidly going forward.

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