

Congratulatory Remarks  
Daesung Haegang Microbes Forum  
“From Waste to Energy”

Good afternoon.

Distinguished guests, participants, ladies and gentlemen.

It is indeed my great honor and privilege to deliver a congratulatory speech at this timely and important forum titled, “From Waste to Energy.”

Let me first express my deepest gratitude to Chairman Young-Hoon Kim for hosting this forum. He is my confidant whom I respect so much. He is not only a successful businessman but also a great leader in the global energy community.

Also, it is my great pleasure to be with my close friend, the honorable Congressman (from the Bareunmirae Party), Professor Se-Jung Oh who will make another congratulatory speech.

Back in 1947, Daesung started its briquette business as the first energy provider in Korea. The GDP barely stood at 50 US dollars. The founding Chairman Soo-Keun Kim had the humble vision of providing heating to every household in Korea.

The founding vision has made breakthroughs. Daesung has grown into a clean and sustainable energy solutions provider. The company now hopes to enrich society and warm the people’s hearts with expansion of its business portfolio by providing cultural contents and supporting scholarship projects.

This forum celebrates the 71<sup>st</sup> anniversary of Daesung Group. The theme of this forum, “From Waste to Energy,” reflects Daesung’s founding philosophy pursuing social value of the corporation by “Warming every household in the nation.”

The future of the globe will rely on energy. While the global industry is growing, wasted energy and solid waste also have exponentially increased to threaten the globe. It appears like a “Black Elephant in the Room.”

The World Bank forecasts that the volume of urban waste around the globe will increase from 1.3 billion tons in 2012 to 2.2 billion tons by 2025. The cost for processing that waste will also increase from 205 billion US dollars in 2012 to

about 377 billion US dollars in 2025.

Unfortunately, Korea produces a huge amount of waste. In Korea, the amount of waste accounted for 150 million tons in 2016. Its per capita amount of waste is estimated to be four times higher than the world average.

Recently in March, when China banned the import of waste materials, the world was in shock. We experienced a backwash in waste stockpiles.

So, for sustainable growth around the globe, it is critical to make innovations to transfer the waste into energy while protecting the environment.

One of the novel approaches to address environmental issues arising from the waste and solid waste is to capitalize on microbes. Being well aware of the urgency of the issues, Daesung has long been committed to R&D in the eco-friendly processing of waste using microbes.

Microbes have long played an important role in food industry. Now, converged into the field of engineering, it expands into its new paradigm.

A historical example is to invent acetone using anaerobes by the first Israeli President Chaim Weizmann, who was a biochemist. His acetone production method was applied to bomb manufacturing and eventually played an instrumental role in the UK winning the First World War.

As you are well aware, microbes are being widely used in the pharmaceutical and biotechnology industries. More than 70 percent of the bioactive substances of anticancer and antibiotic drugs are made up of microbes. When including microbe-producing medications like antibiotics, microbes make up 30 percent of the world's biotechnology market.

More than that, the development of innovative science and technologies combined with genetic engineering is under way for new energy solutions. For instance, it is also feasible to create a new type of fuel derived from microbe by providing only carbon dioxide and hydrogen to bacteria.

Such innovative technology will contribute to the growth of the 120-billion US dollar bio-ethanol market and the four-trillion US dollar Certified Emission Reduction market in 2020. In the very near future, synthetic biology will create highly efficient industrial microbes.

In this microbe research, many KAIST scholars are conducting the innovative research to be the best, the first, and the only one in the world.

For instance, distinguished Professor Sang Yup Lee, a world-leading pioneer in the metabolic engineering field, integrates system biology and synthetic biology with metabolic engineering to create novel materials. The bio-plastics and bio-chemicals are industrially efficient and valuable.

Professor Byung Kwan Cho conducts research on unraveling the genomes of microbes that fix C1 gas compounds, such as carbon dioxide and carbon monoxide. His research constructs a cellular factory with increased gas utilization efficiency capable of producing industrially value-added products.

Professor Suk Hwan Yoon studies ways to increase the fixation rate of greenhouse gases, such as nitrogen dioxide and methane. He is developing metabolic circuit systems capable of restricting and recycling greenhouse gas emissions and applying them to micro-organisms.

This forum is important for redefining the concept of waste and energy. I look forward to the distinguished participants' innovative solutions, practices, and experiences to create new resources in an eco-friendly manner, for a sustainable and clean environment across the globe.

I also hope for Daesung Groups' future success in pursuing its social value by contributing to the prosperous human lives and a clean environment.

Well, let me close my speech here by wishing a successful and valuable forum to all participants. Thank you very much.

Sung-Chul Shin  
President of KAIST