

An Interview with Mitsuru Izumo, President of euglena Co., Ltd.

# Euglena Can Save the World from an Energy Crisis

By Japan SPOTLIGHT Editorial Section

**Q: Your company, euglena Co., Ltd., was born at the University of Tokyo. This is one example of how academic research has been turned successfully into a business. Could you introduce our readers to the history of your business?**

**Izumo:** I was born in Tokyo and brought up there. When I was at university, having a strong curiosity about foreign countries, I visited Bangladesh for the first time in my life during the summer recess in my freshman's year. When I saw so many children suffering from malnutrition there, I thought to myself that I should start working on solving the malnutrition problem.

After coming back to Japan from Bangladesh and having looked into various possibilities for research projects on malnutrition, I found that a project organized by MITI and the Science and Technology Agency had been in progress since 1980 to resolve the problem of malnutrition by cultivating euglena. I was about to join this research project in 2000 while I was still a junior at university when the decision was taken to halt it, since it was proving difficult to cultivate euglena and they had not achieved any results from the research even after 20 years of work.

So I had to make numerous preparations to initiate a business for cultivating and utilizing euglena after having done research on it by myself, and I finally established euglena Co., Ltd. in 2005.

Then in 2007 we joined the Entrepreneur Plaza of the University of Tokyo which was founded by Dr. Hiroshi Komiyama, then president of the university. This was an attempt to support a venture business started at the university by providing a laboratory space. Dr. Komiyama understood our difficulty in starting a business without a laboratory, as this is a common problem for all such venture businesses engaged in biosciences and creating new medicines. This is a striking difference from the IT business, which really only needs PCs. We greatly appreciated Dr. Komiyama's initiative and became the first entrant at the Entrepreneur Plaza.

**Q: Could you tell us how your project, which started**



*Mitsuru Izumo, President of euglena Co., Ltd.*

**with your concern about malnutrition, became a project about power generation?**

**Izumo:** Euglena is a kind of seaweed and at the same time it contains nutrition from animals, and so it would be most appropriate for addressing the malnutrition problem. That was all I knew about it. When I founded the company, I was not aware that euglena could be useful in reducing CO2 emissions at a power station, let alone that biofuel made from euglena would be the best fuel for airplanes.

Our primary strength should be cultivation technology to produce large quantities of euglena. With technology other than ours, only a small quantity of euglena could be produced because most of it would be eaten by a variety of plankton. Ours is the only technology that

makes it possible to protect euglena from such insects. Energy companies, like power generation and petroleum refinery companies, have told us during our research collaboration that our technology could be instrumental in reducing CO2 emissions or producing biofuel.

**Q: It is certainly true that natural scientists need more research facilities and laboratories in Japan. In Silicon Valley, for example, there seem to be abundant support facilities. Why do you think such facilities are not sufficiently provided in Japan?**

**Izumo:** I think there are two things that make Silicon Valley more attractive than Japan for a venture. The first is the abundant venture capital available there, and the second is universities equipped with laboratories that a venture can use for its innovations.

Such laboratories exist at Stanford and MIT and Harvard Medical School that can be shared by ventures. US universities in general, not just in Silicon Valley, are equipped with such facilities for ventures in addition to their own laboratories for academic use. This is certainly an important merit of US universities, since there is space for the waste products from experiments. It would cost a lot of

money for a venture to create such a space for itself if it could not use the university laboratories.

In Japan, the Entrepreneur Plaza is the first attempt by a university to create an incubation facility to be shared with a venture business within the university's premises. Our company is a beneficiary of this facility, which has enabled us to continue our research at extremely low cost. I believe we need more such facilities in many other universities.

On the issue of availability of venture capital, I hope that a new tax system can be adopted to improve the availability of funds for entrepreneurs.

**Q: The Entrepreneur Plaza has been successful in attracting many academics as well as entrepreneurs from around the world, and it has now become a place of international collaboration among ventures. Are there other universities in Japan trying to attempt anything similar?**

**Izumo:** Yes. Tokyo Institute of Technology and Kyoto University followed the model of the University of Tokyo. In particular, the Kyoto Research Park is working very well. I hope this trend of ventures started at universities will be accelerated in the future.

**Q: I think cultural diversity is key to achieving business success for entrepreneurs. The internationalization of board members or employees and researchers would vitalize the business through the variety of ideas born from different cultures. In this regard, how do you assess the performance of the Entrepreneur Plaza?**

**Izumo:** I think the Entrepreneur Plaza will need more time for internationalization in earnest. But I believe that diversity means people with a wide range of backgrounds working closely in the same ecosystem. In the Entrepreneur Plaza, a venture firm working inside a research or educational organization can work closely with academics at the university and thus enjoy the benefits of their presence. This works well in our case, and so this could be more important than internationalization itself.

Furthermore, it is greatly expected that such facilities of incubation for venture firms will expand in trilateral collaboration between business, university and government agencies such as METI and the Ministry of Education and Science. If we are successful in facilitating this, we could naturally achieve international diversity as a result of globalization.

**Q: Changing the topic, what is your view on the development of renewable energy sources including**



**biomass? Given the continuing problems faced by the nuclear power industry following the Fukushima crisis, do you think such renewable energy sources can meet people's increasing expectations?**

**Izumo:** Euglena is in the category of biomass energy. We have enormous amounts of unused biomass energy, as enormous as solar and wind power. Therefore, we can say it would be possible to replace nuclear energy with biomass just in terms of its abundance. However, despite its abundance, its energy base is not stable all the time. That marks a striking difference from nuclear power. When typhoons come or cloudy days continue, production of biomass naturally declines. This is recognized as a common shortcoming of renewable energy sources and thus they cannot completely replace nuclear energy.

We should achieve a technological revolution in order to realize a stable base of supply of new energy sources such as solar power, wind power and biomass regardless of weather changes, assuming that they could replace nuclear power completely in terms of their abundance. For example, we should pursue the invention of storage batteries or technology to equalize peak and base demand for electricity, and promote the management of electricity consumption with smart meters that electricity fees appropriately reflect; that is to say, a fee system that is more expensive in daytime during the summer to encourage consumers to use electricity on other occasions such as at night.

These different efforts in parallel could lead to the appropriate use of new energies and their share of energy consumption would be raised eventually.

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**Q: What is your view of the development of storage technology for electricity? On the users' side, should we create a local energy supply system based on dispersed energy sources so as to take full advantage of renewable energy like biomass?**

**Izumo:** It is very difficult to store electricity. Therefore, more importantly, we should encourage incentives on the side of consumers to equalize electricity consumption between the peak and base periods by raising electricity fees at the peak of consumption and lowering them at midnight. What is crucially important to encourage the use of renewable energy sources is an Energy Management System (EMS) and smart meters that would play a core role in the pricing of electricity in EMS by measuring precisely the current energy consumption during a day or a year at each building or home in a given region. What kind of dispersed-type electricity supply system is appropriate for any local area or whether an existing storage battery is good enough to provide the necessary electricity supply will be key questions to be answered by such smart meters.

We are cultivating euglena on Ishigakijima Island and I believe our experiments there and the data they supply will enable us to expand gradually to an urban area like Tokyo, where we would see much more difficulty in the immediate introduction of an EMS based upon smart meters than in a small island like Ishigakijima.

**Q: It seems as if it will take a long time to implement incentives for electricity users. But once such reforms are achieved, can renewable energy sources such as biomass completely replace nuclear energy?**

**Izumo:** Without an infrastructure to accommodate such a dispersed electricity supply system, it would be difficult for renewable energy sources to replace nuclear power completely, since all the existing infrastructures such as the electricity distribution network have been devised mainly for nuclear power and it would be impossible to send electricity generated by wind power in Hokkaido to Honshu Island without a relevant distribution network.

However, renewable energy sources can replace nuclear power in terms of abundance, so it will be important to speed up the creation of an infrastructure to promote the use of new energies to realize the replacement of nuclear energy.

**Q: We should promote such reforms to expand the use of renewable energy to meet the needs of the global environment as well, namely to reduce CO2 emissions. We also need to maintain our current upward trend in the economy to get out of deflation. Given both these requirements, should we review our best energy mix of renewable sources and others, while bearing in mind that it will take a long time to introduce renewable energy on a full scale?**

**Izumo:** Yes. In order to get out of deflation completely and maintain Japanese industry's international competitiveness by taking advantage of the yen's depreciation, we should try to secure sufficient energy sources at the lowest cost. It would probably be necessary to maintain nuclear power supply from nuclear power stations whose safety has been clearly confirmed by the Nuclear Power Safety Commission, as well as try to achieve greater use of renewable energy sources.

**Q: The Japanese government is now pursuing a long-term strategy to pull the economy out of deflation permanently, known as "Abenomics". The growth strategy element of this includes a policy to create a new leading industrial sector. Environment-related sectors and the healthcare and medical industry sectors are often considered possible candidates for such a leading sector. Do you think a biomass electricity generation sector could have such potential?**

**Izumo:** Japanese environment-related industrial sectors and healthcare sectors have far more advanced technologies than the global standard and as such they are certainly highly competitive sectors. But there are many areas in these sectors where German or American technologies are more advanced.

I think the three sectors in which Japan is highly competitive compared with the rest of the world are animation, linear motor cars





and euglena. Japan produces high quality animation, software, contents and games, while its linear motor cars provide a highly sophisticated transportation infrastructure and at the same time run safely and efficiently, with tickets easily reserved by mobile phone or available at special ticket counters. I believe this combination of high technology and top-quality social infrastructure is only available in Japan. Euglena can be well cultivated in Japan because of its advanced fermentation technology that is also applied to *miso*, soy sauce, *sake*, and *natto*, etc.

Abenomics' growth strategy will work well if these three sectors were leading sectors in Japan and absorbed the workforce from industries exposed to severe price competition with China, India, South Korea and Taiwan. The 2% nominal GDP growth target could then be achieved and the business start-up ratio would be doubled by 2020.

**Q: We are now heading toward an aging society, but your company is mainly driven by the energy and competence of young people. What do you think of the power of young people today in Japan?**

**Some success stories suggest a team of young and aged people produces the best outcomes, but do you think a combination of young people's creativity and older people's experience can create the best ventures?**

**Izumo:** There are 45 people working in my company and our average age is 31. We may look like a company of young people, but we are working jointly with many large entities such as Hitachi Corporation, JX Nippon Oil & Energy, Shimizu Corporation, and Itochu. The people working for these large companies in collaboration with us have long and invaluable work experience, while we young people have the technology on euglena. So age does not matter. What is most important is that collaboration between ventures like ours with unique technology and large corporations with assets and experience through open innovation should be encouraged. Such collaboration could create more new ventures and new industries.

**Q: Since JEF is promoting international exchanges of ideas, I would like to ask you whether you see a business alliance with overseas corporations as part of your future plans. What other plans do you have at this moment?**

**Izumo:** I would like to achieve two things by 2020. We have just established our first overseas branch office in Dhaka, Bangladesh, on Oct. 1, 2013, and there are now two people working there. So firstly we would like to show people in Bangladesh that euglena could get rid of the malnutrition problem through the introduction of healthy



euglena in meals in cooperation with NGOs, food-processing companies, and doctors.

Secondly, in 2020, many people from all over the world will be coming to Japan by airplane (for the Olympics). We would like to show these people that their airplane is flying using new energy made out of euglena, since we do not produce any petroleum in this country. People would be surprised to see that Japan has finally been successful in inventing biofuel for jet aircraft out of euglena after numerous R&D attempts.

We would like to sell our newly developed biojet fuel to other nations that have no petroleum, and in order to realize this dream we need to complete our technology for creating biojet fuel.

Japan is not a country endowed with rich biomass energy. Indonesia, Brazil and Thailand are much more greatly endowed with biomass energy sources. But Japan is endowed with excellent potential for technological development. We should put our excellent and efficient technology into practical use and show it to people in countries with large biomass sources, so that they will be attracted by it and have a strong incentive to work with us in introducing this technology for more efficient use of their rich energy sources.

We will do our best to raise our quality of technology to realize such cooperation. We are eager to introduce our technology to these countries, but not interested in exporting fuel produced from euglena to other countries.