



Technical talk on Biomass & Plasma Technologies for Sustainability
by Ir. Dr. Huzein Fahmi bin Hawari

Ir. Dr. Huzein Fahmi bin Hawari is the Honorary Secretary cum Treasurer of Electronic Engineering Technical Division (eETD).

Potential depletion of fossil fuel and climate change have globally accelerated the demand in renewable and alternative energy. One of the approaches is to look at the biomass where in Malaysia, there is an abundance of biomass sources for the energy sector due to their agriculture-based economy and enormous forest resources

In lieu of that, IEM eETD (Electronic Engineering Technical Division) together with IEM (Penang Branch) organized a technical talk entitled “Biomass & Plasma Technologies for Sustainability on 28th October 2021 from 6pm to 8pm. The talk was delivered by Ir. Dr. Lim Mooktzeng Principal Researcher, TNB Research Sdn Bhd. It was attended by 13 participants

The moderator, Ir. Dr. Huzein Fahmi bin Hawari, kick start the talk by providing a brief introduction about the talk, followed by the speaker’s introduction. In his introduction he mentioned about Ir. Dr. Lim Mooktzeng more than 10 years of experience in biomass & plasma technologies for sustainability. Apart from Ir. Dr. Lim Mooktzeng has also filed 8 intellectual properties related to the application of plasma technologies for the biomass industry.



Figure 1: Ir. Dr. Lim Mooktzeng background and experience

He then welcomed the speaker, Ir. Dr. Lim Mooktzeng to begin his sharing. Ir. Dr. Lim started off with the introduction of TNB Research Sdn. Bhd. Situated in Kajang, Selangor, TNB Research Sdn Bhd. research provides a centralised, one-stop centre for technical solutions and innovation. Since recently, there is shift emphasis from carbon-based power to low carbon society, TNB Research Sdn Bhd is now focusing on decarbonization, energy transition, smart grid, electrical mobility, renewal energy etc. One the item considered as well is the source of the renewal energy need to be used. Ir. Dr. Lim highlighted

biomass energy is considered as an important element in this transition since it generates least amount of CO₂ per kWh compared to other renewal energy source.

Ir. Dr. Lim Mooktzeng then further shared the latest biomass energy status in Malaysia. He elaborated that there are few biomass power plant operating in Malaysia (8-12 megawatt capacity) such as in Seri Ulu Langat (Selangor), Teluk Intan (Perak) and Jengka (Pahang). The rest are small in size and usually intended to only provide power to palm oil mills. He also mentioned that the utilization of biomass is quite low in Malaysia in comparison to other country such as in Thailand and Japan. Among the reason are the feeding tariff is not attractive, non-decentralize grid, unstable supply chain of biomass resources and high transportation cost.

In the next part of the presentation, Ir. Dr. Lim Mooktzeng then presented about plasma. He started by sharing that plasma is also called as the fourth state of matter after solid, liquid, and gas. He further elaborated that plasma is a state of matter in which an ionized substance becomes highly electrically conductive to the point that long-range electric and magnetic fields dominate its behaviour. He then continued about one of the innovations in plasma application is gasification of biomass where it is a process that converts biomass into gases. The gas is later can be used to generate heat or to produce liquid chemical biofuel.

Ir. Dr. Lim Mooktzeng finally shared some part of his research in TNB Research in relation to plasma biomass where for example, he is using plasma additional processing technology to modify and improve the biomass properties quality.



Figure 2: Application of Plasma Physics in Biomass Technologies



Figure 3: Group photo of the participants

Overall, the audience found the talk engaging both at a technical as well as a personal level.

IEM Penang Branch is the administrator of the above activity