

**WELCOMING SPEECH
JUMPSTART SEMINAR SERIES: ENERGY & ENVIRONMENT**

BY

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**SEMINAR ROOM 2, TNB RESEARCH SDN BHD
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Thank you Master of Ceremony.

**YANG BERBAHAGIA PROF. EMERITUS DATO' IR. DR. MOHAMAD ZAWAWI
BIN ISMAIL**

Chairman.

NanoMalaysia Berhad

YANG BERUSAHA DR. IR. CHEONG KAM HOONG

Managing Director

TNBR Research Sdn. Bhd.

Honorary speakers,

Ladies and Gentlemen.

Salam sejahtera,

Salam 1Malaysia,

Salam 1MOSTI,

Salam 1Nano.

Ladies and gentlemen,

1. It is my pleasure to welcome you today to the NanoMalaysia Jumpstart Seminar: Energy and Environment, the last of the Jumpstart Seminar Series for the year 2015. NanoMalaysia have successfully conducted three Jumpstart Seminars this year with the support from Ministry of Science, Technology and Innovation (MOSTI), related agencies, stakeholders and all of our affiliates and partners. The other three series had started with the very first seminar on Food and Agriculture in March at MARDI, followed by Electronics, Devices and Systems in August and Wellness at MIMOS, Medical and Healthcare on last October in conjunction with Nano Kebangsaan 2015, which was organised at Shah Alam Convention Centre.
2. I would like to take this opportunity to convey my appreciation to TNBR Research for the kind hospitality and for their willingness to sponsor our event venue today. This augurs well for a potential fruitful collaboration with TNBR for nanotechnology infusion in Energy and Environment sector. I would also like to convey my gratitude to our speakers and all guests present today for being able to spare some time out of their busy schedule sharing inputs on commercial opportunities and advancement of nanotechnology in the area of energy and environment.
3. This jumpstart seminar is aimed at developing the true understanding on the commercial emergence of nanotechnology through focused development of demand driven applications. Malaysia has an abundance of natural energy sources in the form of solar, biomass, natural gas, petroleum, tidal wave and wind. The biggest challenge is to extract energy from those sources and deliver to consumers in the most cost-effective, safest and convenient manner.

Ladies and gentlemen,

4. Today, we have lined up four great topics which are **Advanced Environment Monitoring through Nanotechnology, How Nano Light Energy Panel (NLEP) Technology Can Impact the Energy Generation Industry in Malaysia?** and lastly, **Nanomaterial for Microalgae. A Synergy in the Making.**
5. Based on the topics which will be presented today, we know that technology advancement especially nanotechnology continually provides fresh impetus to re-energise economic growth and, in some cases, unleash disruptive changes in manufacturing and society. Economically disruptive technologies—like the semiconductor microchip, the Internet, or steam power in the Industrial Revolution—transform the way we live and work, enable new business models, and provide opportunities for new players to upset the established order.
6. Nanotechnology is disruptive because it enables so many other developments. By using nanotechnology combined with pre-existing technology, considerable change can be achieved. It is the belief of experts that nanotechnology provides the chance to drive exponential growth in the new knowledge based economy.

Ladies and gentlemen,

7. In this new knowledge based economy and with the disruptive nature of nanotechnology, our jumpstart sectors also include the energy sector as one of the focuses. The energy sector is expected to have the largest impact in the long run since all physical systems are essentially energy systems. As an example, electronic devices and systems, sensors, processors, telecommunication all the way to machinery and transportation require energy to run. Attention is made into high efficient generation and storage of energy for immediate and deferred use. Augmentation of materials at the atomic and

molecular level allows energy to be generated or harvested and stored with minimal losses

8. The second sector that we are focusing is the environment. Nanotechnology is being used in several applications to improve the environment. This includes cleaning up existing pollution, improving manufacturing methods to reduce the generation of new pollution, reducing energy consumption (for example lower friction) and making alternative energy sources more cost effective as well as provide cleaner water. In trying to help our ailing environment, nanotechnology researchers and developers are pursuing the following avenues; generating less pollution and wastages during the manufacture of materials, cleaning up oil spills and radioactive materials so on and so forth.

9. Malaysia's own synthetic Nano-Silica extracted from Rice Husk Ash for instance has become green corrosion inhibitor for carbon steel. Its derivatives such as zeolite improves water filtration at the nano-scale with lower energy consumption.

Ladies and gentlemen,

10. Investment in nanotechnology will require a collaborative approach because it is cross-cutting – touching all industrial sectors and improving current products and processes. In my point of view, when implementing nanotechnological innovations in the energy sector, the macroeconomic and social context must not be lost sight of. Thus, to enable the immediate practical implementation of nanotechnological innovations in such a broad field like the energy sector, an interbranch and interdisciplinary dialogue with all players involved are required. I believe today is the stage for that to be realised by stimulating the interest to find out more and to understand further.

11. NanoMalaysia has developed the iNanovation programme for our commercialisation efforts. iNanovation accommodates both market pull and technology push initiatives named iPull and iPush respectively joined with the correct business model for joint-ventures with the right industrial partners thus

providing business and employment opportunities for start-ups entrepreneurs and product innovators.

12. NanoMalaysia also leads Malaysia's National Graphene Action Plan 2020 (NGAP2020). This action plan is a commercialisation and industrialisation delivery framework connecting industry, research institutes and for demand driven graphene innovations focusing on five relevant applications namely rubber additives, plastic additives, nano-fluids, energy storage and conductive inks. Four of the five applications have direct positive impacts on energy and environment. Generating RM20 billions of gross national income and creating 9,000 jobs through start-ups, joint-ventures and technical collaborations by 2020 are the aims of this initiative.

13. Our NANO *Verify* Programme also complements each of the two programmes in term of awarding certification to product that claimed has nano-elements in it. This is the world's sixth verification programme and since launching on May 2015, we have certified four products all together. NANO *Verify* Programme is seen to help genuine products in the market, increase public trust in nanotechnology, facilitates trade and certifies the presence and quality of nanomaterial based products.

14. In the interest of time and the very purpose of this seminar, I hope that you all will be motivated to develop commercially viable nanotechnology applications in energy and environment collaboratively leveraging on each other's strengths. The commercialisation of the nanotechnology innovations will contribute to the wealth of the country targeting USD15-20,000 as income per capita under New Economic Model. Thus, NanoMalaysia is giving all sectors an importance. I am confident that we can achieve our goals by working and pulling our resources together, do it cohesively and ensure a progressive and sustainable Malaysia for many years to come.

Thank you.