Brief description of the nanoelectronics industry in Malaysia.

Nano technology is at its infancy and is advancing as a very diverse technology. Nano electronics can be defined as Nano technology applied in the context of electronic circuits and systems. Nano technology advancement can be viewed at different level of generations over a period. Malaysia's aspiration to become a high-income nation by 2020 with improved jobs and better outputs is driving the country's shift away from "business as usual," and towards more innovative and high value add products. Malaysia is currently at the 2nd generation, which is on active Nano structures and moving towards the 3rd generation, which is on 3D Nano systems.

The Malaysia Nano technology roadmap has identified five industries to benefit from Nano technology development viz., Biotechnology, Energy, Environment, Agriculture and Medicine. The roadmap also spells out on ways to move forward. The roadmap emphasizes on participation of all the value chain players viz., universities, research institutes and industries in collaborating and mutually recognizing the roles and strengths of the participating parties. Formation of centers of excellences will be encouraged in specific research areas based on the strength of the research bodies. The roadmap envisions the participation of Malaysian entities in standards development initiatives on areas related to Nanotechnology and Nanoelectronics.

The downstream R&D efforts are to be driven by industry needs along the targeted application domains. Technology development will be tailored to applications and solutions identified to address the needs of the society according to the application domains. To allow innovation, the choice of technologies will be left open. The roadmap has chosen the following 6 products are chosen to bring impact to the 5 targeted industries mentioned above. They are viz., Biosensors, Biochips, Molecular Farming, Drug Delivery System, Solar and Lithium Ion.

Within this context, and in accordance with Malaysian national policies and guidelines, Graphene, an emerging, highly versatile carbon-based nanomaterial, presents a unique opportunity for Malaysia to develop a high value economic ecosystem within its industries. Currently, Graphene is still early in its development cycle, affording Malaysian companies time to develop their own applications instead of relying on international intellectual property and licenses

Agensi Inovasi Malaysia has successfully developed the National Graphene Action Plan 2020 in which the strategy clearly identified paths, opportunities and high potential applications for Malaysian companies to leverage. Moving forward, NanoMalaysia Berhad (NanoMalaysia) has been appointed as the Lead Agency to execute the National Graphene Action Plan 2020, aligned with their mandate to nurture nanotechnology development and its commercialization. At this juncture, timing is the key determinant in making sure Malaysian companies has the first mover advantage to enable them to move up the value chain and gaining access to the global market.

The opportunity for each of these applications in Malaysia is significant. Graphene-enhanced lithium-ion batteries can support the domestic production of electric and hybrid vehicles where battery performance is one of the main challenges in producing cost-effective and reliable vehicles. As a rubber additive, Graphene increases the strength, electrical/thermal conductivity and impermeability of rubber, offering Malaysia's rubber industry a significant advantage in manufacturing gloves, tyres or condoms, and to explore new rubber applications.