COUNTRY REPORT:
CURRENT STATE OF NUCLEAR TECHNOLOGY APPLICATION IN MALAYSIA

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INTRODUCTION

CURRENT STATE OF COVID-19 & NUCLEAR ACTIVITIES

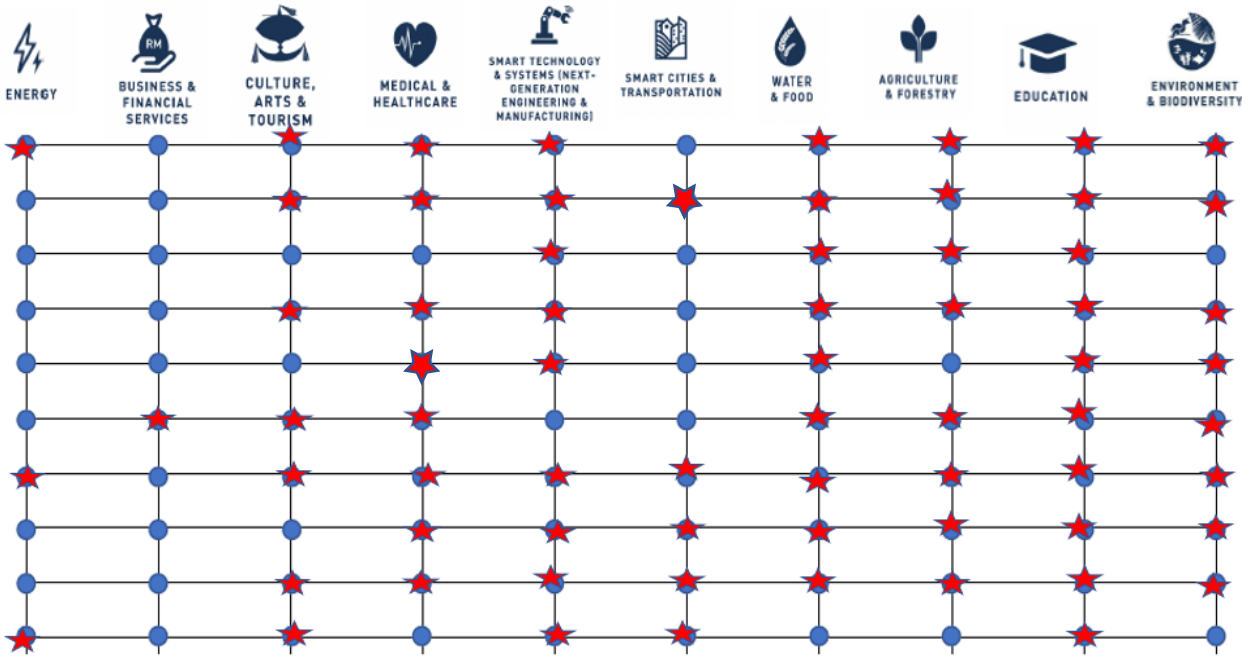
- The Covid-19 pandemic in Malaysia saw the important contribution of nuclear science and technology as follows:
  i. Gamma irradiation remains the main preferred sterilization method for medical devices including surgical gloves and PPE
  ii. Intensified studies on effect of UVC radiation on material integrity of face mask and protective suit
  iii. Development of ultraviolet C germicidal irradiation (UVCGI) box

- Presently, Malaysia is moving towards endemic phase with more than 90% adult population have been fully vaccinated

INTRODUCTION (CONT.)

CONTRIBUTION OF NUCLEAR TECHNOLOGY TO SOCIO-ECONOMIC SECTORS

1. Reactor & accelerator tech
2. Radiation processing/irradiation
3. Mutation breeding tech
4. Radioisotope /radiotracer
5. Radioactive waste management
6. Stable isotope, carbon dating, nuclear technique for forensic
7. Radiation safety
8. Dosimetry technique (calibration)
9. Radiology/Nuclear Imaging/ Diagnostic
10. Non-Destructive Testing



RESEARCH ACTIVITIES RELATED TO RESEARCH REACTOR

RESEARCH REACTOR UTILIZATION (RRU)

- Malaysia has a 1 MW (thermal) TRIGA Mark II reactor
- Currently, Malaysia conduct studies on radioisotopes production (^{177}Lu, ^{51}Cr, ^{165}Ho, ^{14}Cu & ^{153}Sm) due to the high interest for medical radioisotopes
- The reactor has also been used for neutron activation analysis, neutron beam research, and education & training

Visit by MOSTI Minister to TRIGA PUSPATI reactor, 8 November 2021

RESEARCH ACTIVITIES RELATED TO RESEARCH REACTOR

NEUTRON ACTIVATION ANALYSIS

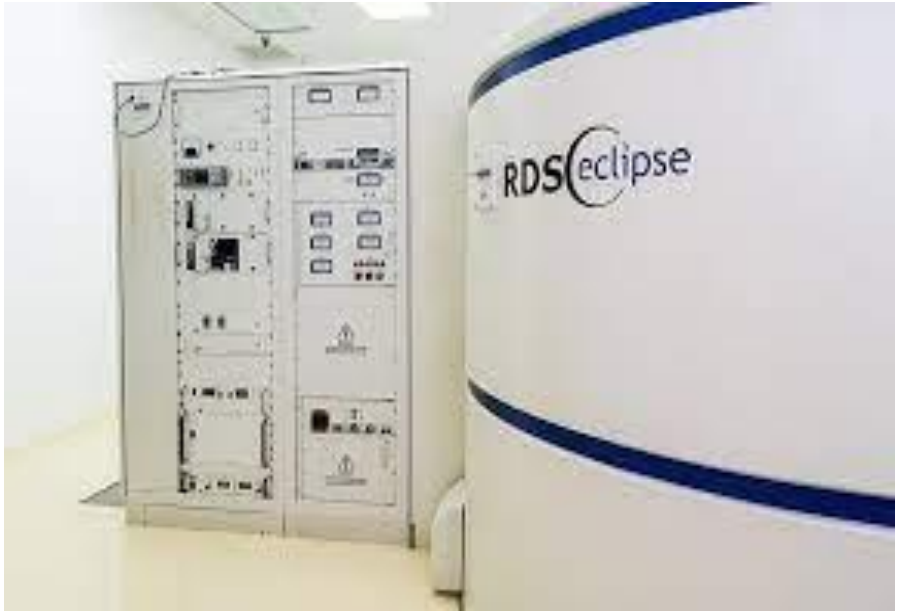
- Currently, Malaysia conducts a study on the determination of pollution sources of heavy, trace and rare earth elements (REEs) in soils samples from the vicinity area and industrial park to identify the sources of pollution

RESEARCH ACTIVITIES RELATED TO ACCELERATOR

AVAILABLE ACCELERATORS IN MALAYSIA

- Malaysia has 6 accelerators for industrial applications used for modification of material, sterilization of medical and food products whereby two of these accelerators are owned and operated by Nuklear Malaysia

- 5 accelerators for medical radioisotope production mainly operated by hospitals



Cyclotron at Beacon Hospital

RESEARCH ACTIVITIES RELATED TO ACCELERATOR (CONT.)

EB machine EPS-3000 from NHV, Japan

Electron irradiation of *silicon wafer semiconductor* (*sc*)

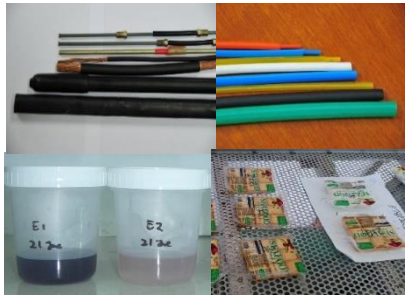
- Reduction of sc manufacturing costs (*fully integrated production line for IGBT*)
- Irradiating over 251,000 pieces of sc since 2014

Crosslinks of wire, cable and heat shrinkable tube

- Add value and quality that meets the needs of the automotive industry (vendor of Proton and Perodua)
- Irradiating over 7.3M meter since 2013

Simultaneous crosslinking and disinfection of sago sago hydrogel-based products

- IP products have been purchased by companies operating in China
- Irradiating 500,000 pieces of sago hydrogel since 2015



R&D

- Radiation processing to produce advanced materials and products
- Water and air pollution treatment applications
- Food security
- Expertise in DC accelerator technology

RESEARCH ACTIVITIES RELATED TO ACCELERATOR (CONT.)

Low Energy Electron Accelerator (LEEA)

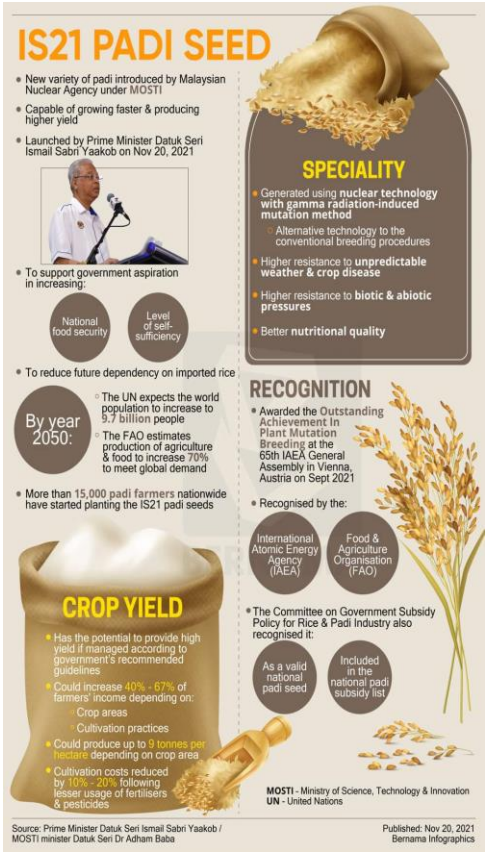
- Nuklear Malaysia has upgraded LEEA energy from 140 keV to 200 keV in 2017
- LEEA has been providing irradiation services internally since 2019 with more than 600 samples of various research materials have been irradiated using this facility.
- Nuklear Malaysia is verifying LEEA's dose mapping through qualitative and quantitative dose measurements for various parameters combinations. The parameters involved are energy parameters, conveyor speed, sample heights from irradiation windows. This will make LEEA as a trusted irradiation tool.

LEEA in Nuklear Malaysia

SOCIAL WELL-BEING CONTRIBUTION & ACHIEVEMENTS

FNCA Excellent Research Team Award 2020

IAEA/FAO Outstanding Achievement Awards in Mutation Breeding 2021



The launch of the IS21 Padi Seed by Prime Minister, Datuk Seri Ismail Sabri Yaakob, 19 November 2021

ISSUES AND WAY FORWARD

ISSUES

1. Aging facilities and infrastructure
2. Brain drain (many experts retired)
3. Limited local value chain suppliers
4. Inadequate resources

WAY FORWARD

1. Strengthen national human capital
2. Encourage private partnership to invest in local industrial accelerators infrastructure
3. Collaboration with local and international institutions
4. Feasibility study for new facilities

CONCLUSION

- The improved situation of Covid-19 has enabled more physical activities on nuclear science and technology to be conducted.
- Nuclear science and technology has contributed positively to socio-economic development of the country.
- FNCA is a good platform to confer and cooperate on tackling issues in nuclear science applications in the region.
- Malaysia will continue to actively participate in all activities conducted under the framework of the FNCA.

- Thank You -