



NUKLEAR
MALAYSIA

NUKLEAR MALAYSIA IN THE NEWS 2023

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Thank you notes

This is a compilation of newspaper clippings and online media to portray the successful story of Malaysian Nuclear Agency (Nuklear Malaysia) in 2023. We would like to thank to all media for the co-operation and continuous support. It

is hoped that the story ties between reporters and researchers will continue to enhance Malaysia's future development in nuclear science and technology.

Newspaper

Content : Newspaper

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9 July 2023

30 **Panorama** [Wawancara]

Kosmo! Ahad 9 JULAI 2023

Nuklear Malaysia aktif komersial produk R&D

DITUBUHKAN sejak 1972, Agensi Nuklear Malaysia (Nuklear Malaysia) merupakan badan yang menerajui bidang berkaitan teknologi nuklear di negara ini. Sepanjang lebih lima dekad penubuhannya, Nuklear Malaysia telah mencatatkan pelbagai pencapaian cemerlang dan agensi tersebut turut menerajui bidang berkaitan penyelidikan dan pembangunan (R&D) berteraskan teknologi nuklear.

Bukan itu sahaja, agensi tersebut turut mengkomersialkan produk-produk R&D bagi memberi manfaat kepada industri dan pengguna.

Bagi membincangkan lebih lanjut berkaitan hal tersebut, wartawan Kosmo! Ahad, FARID AHMAD TARMIZI, berpeluang bertemu bual **Pengarah Bahagian Pengkomersialan Teknologi (BKT) Nuklear Malaysia, Dr. Rasif Mohd. Zain** baru-baru ini.

RASIF telah berkhidmat dengan Nuklear Malaysia selama 21 tahun.

KOSMO!AHAD: Boleh ceritakan serba ringkas mengenai peranan Nuklear Malaysia?

RASIF: Secara keseluruhan Nuklear Malaysia adalah sebuah agensi yang menjalankan penyelidikan, pembangunan, pengkomersialan dan inovasi (R&D&C&D) yang berkaitan dengan bidang teknologi nuklear.

Bagi menjalankan fungsi ini, keupayaan tenaga kerja di Nuklear Malaysia adalah dalam sekitar 780 pekerja yang terlibat, di mana 330 pekerja adalah pegawai penyelidikan.

Tahap pendidikan pegawai penyelidikan kami terdiri daripada 97 ijazah sarjana muda, 172 ijazah sarjana dan 61 ijazah doktor falsafah.

Apabila mereka melakukan R&D, ini bermaksud produk-produk yang dihasilkan perlu sampai kepada masyarakat dan industri.

Ini bukan hanya sekadar di dalam makmal. Kebiasaannya, R&D yang dijalankan mendapat dana dari kerajaan dan pihak swasta. Ia tidak semestinya selesai di dalam makmal dan menerbitkan kertas-kertas ilmiah tentang penyelidikan.

Kini kami bukan sekadar menghasilkan ilmu baharu, tetapi bekerjasama dengan syarikat untuk mengkomersialkan penyelidikan supaya menjadi produk yang boleh digunakan.

Kami mempunyai beberapa bahagian yang merangkumi pertanian, teknologi industri, alam sekitar dan teknologi perubatan.

Di bahagian saya ini, kami menguruskan pengkomersialan produk, perkhidmatan dan latihan yang dihasilkan oleh Nuklear Malaysia.

Kami mempunyai 21 pusat khidmat yang membantu pihak industri dan agensi-agensi kerajaan serta universiti menjalankan pelbagai perkhidmatan.

Perkhidmatan yang kami sediakan ini tidak ditawarkan di tempat lain di Malaysia.

Apakah kemudahan-kemudahan utama yang

Loji sinagama adalah pusat kemudahan penyinaran bertaraf komersial yang menawarkan perkhidmatan penyelidikan berkaitan penyinaran gama terhadap produk perubatan, makanan, herba, makanan haiwan, bahan pembungkusan, dan sebagainya."

ditawarkan oleh Nuklear Malaysia dan perkhidmatan disediakan memandangkan Malaysia tidak memberi fokus kepada nuklear?

Kami ada 15 kemudahan utama yang merangkumi Pusat Kecemerlangan Nuklear (CoNE), Gamma Green House (GGH), Loji MINTEC Sinagama, makmal analisis radiokimia dan alam sekitar (RAS) serta lain-lain lagi. Bagi pusat kecemerlangan nuklear, R&D mereka adalah untuk menghasilkan penemuan baharu.

Ini bermakna, ada pengetahuan baharu berkaitan teknologi nuklear. Di sini juga, kami melatih pihak industri dan masyarakat berkaitan teknologi tersebut dari aspek keselamatan sinaran bagi mereka yang bekerja menggunakan punca radioaktif dan gama.

Di pusat CoNE, kami melatih purata lebih 2,500 pelatih setiap tahun dan 50,000 pelatih telah berjaya dilatih sehingga kini.

Selain itu, kami ada GGH untuk pembiakan tanaman.

Di sini, kami memberi peluang kepada para penyelidik dan pihak industri di Malaysia menggunakan teknik nuklear dalam menghasilkan varieti baharu tanaman.

Sebagai contoh, kami telah menghasilkan varieti benih padi baharu dengan menggunakan teknik nuklear.

Kini, ia telah dikomersialkan dan digunakan oleh para petani di negara ini. Sementara itu, bagi kemudahan Loji MINTEC Sinagama, kami membantu proses khidmat penyinaran dan pensterilan.

Mana-mana produk yang ingin dieksport ke luar negara seperti produk kesihatan, herba dan buah-buahan perlu menjalankan proses ini.



Kosmo! Ahad 9 JULAI 2023

[Wawancara] **Panorama** 31

Setelah proses ini dilaksanakan, baru produk mereka layak dieksport ke luar negara terutamanya Eropah.

Menyentuh mengenai pengkomersialan, apakah tujuan utama aktiviti ini dan bagaimana Nuklear Malaysia melaksanakannya?

Tujuan utama kami adalah untuk pastikan penyelidikan dan pembangunan yang dilaksanakan di Nuklear Malaysia sampai ke rakyat dan memberi manfaat kepada negara.

Dana untuk melakukan R&D ini adalah daripada kerajaan dan faedahnya perlu sampai kepada rakyat dan industri.

Oleh itu, kami akan mengenal pasti produk-produk yang menjalani R&D mesti melepasi *Technology Readiness Level (TRL)* peringkat enam ke atas.

Mana-mana produk yang melepasi tahap keenam, kami akan mengambil teknologi tersebut untuk dikomersialkan.

Kami akan mengenal pasti bahawa produk itu telah ada prototaip dan mendapat pengiktirafan daripada badan yang sepatutnya sebelum dikomersialkan.

Selain itu, kami akan membantu ketua-ketua projek mencari rakan industri untuk mengkomersialkan produk-produk mereka.

Kami akan membuat promosi bersasar dan menguar-uarkan kepada pihak industri mengenai produk baharu dan mana-mana syarikat yang minat boleh menjadi rakan kerjasama pengkomersialan.

Pihak kami juga terlibat secara langsung dalam penyediaan kontrak kerjasama antara pihak terlibat.

Blakah Nuklear Malaysia mula memberi perkhidmatan kepada para pelanggan di luar. Apakah perkhidmatan yang diberikan?

Berdasarkan rekod perkhidmatan secara signifikan telah bermula pada tahun 1990. Ia bermula dengan khidmat yang diberikan oleh Makmal Dosimeter Sekunder (SSDL).

Nuklear Malaysia telah ditubuhkan dan menjadi ahli kepada rangkaian SSDL di bawah Agensi Tenaga Atom Antarabangsa (IAEA) dan Pertubuhan Kesihatan Sedunia (WHO).

Ini secara tidak langsung menunjukkan bahawa kami telah mula memberi khidmat sebagai makmal bertaraf antarabangsa.

Ia diikuti dengan pembangunan kemudahan penyinaran gama di agensi ini apabila loji sinagama ditauliahkan pada 13 Januari 1989.

Loji sinagama adalah pusat kemudahan penyinaran bertaraf komersial yang menawarkan perkhidmatan dan penyelidikan berkaitan penyinaran gama terhadap produk perubatan makanan, herba, makanan haiwan, bahan pembungkusan dan sebagainya.

Perkhidmatan penyelidikan ini telah menjadikan sinagama sebagai pusat khidmat yang paling awal



RASIF menunjukkan beberapa produk yang dihasilkan daripada aktiviti R&D di Nuklear Malaysia.

menjana pendapatan kepada agensi.

Sebagai agensi kerajaan, bagaimana Nuklear Malaysia menguruskan aktiviti pengkomersialan ini?

Kami adalah sebuah agensi kerajaan di bawah Kementerian Sains, Teknologi dan Inovasi (MOSTI). Oleh itu, aktiviti pengkomersialan ini dilakukan dengan kerjasama pihak kementerian.

Kami juga melaksanakan promosi secara bersasar dan mengadakan sesi libat urus bersama pihak berkuasa tempatan (PBT). Bagi pengkomersialan ini, kami menggunakan pendekatan media massa dan media sosial.

Perkhidmatan yang diberikan merupakan *niche area* kerana tiada syarikat tempatan yang melaksanakannya.

Pihak industri kebiasaannya perlu menghantar produk mereka ke luar negara untuk mendapatkan perkhidmatan ini.

Dengan kemudahan yang ada, kami boleh bantu industri, sekali gus dapat menjimatkan kos mereka.

Sebagai contoh, salah satu makmal kita telah mendapat pentauliahkan daripada Kementerian Kesihatan Malaysia (KKM) untuk pengukuran keradioaktifan bagi air minuman.

Boleh ceritakan proses pengkomersialan produk R&D dari makmal ini?

Proses pengkomersialan sesuatu produk R&D biasanya mengambil masa agak panjang.

Biasanya, para penyelidik akan memohon mendapatkan geran untuk melaksanakan pelbagai penyelidikan, sama ada berbentuk *fundamental* atau *applied research*.

Setelah berjaya menghasilkan produk baharu, formula atau proses

itu akan dipatenkan.

Kemudian, penyelidik akan bekerjasama dengan syarikat-syarikat untuk peringkat seterusnya iaitu proses prapengkomersialan.

Apabila produk tersebut dikenal pasti mempunyai potensi besar di pasaran, barulah ia masuk ke peringkat pengkomersialan dan dijual di pasaran terbuka.

Sebagai agensi penyelidikan, bagaimana pula peranan Nuklear Malaysia kepada masyarakat di negara ini?

Kami di sini akan menjalankan R&D mengikut hala tuju negara berkaitan teknologi nuklear. Kami menerajui teknologi ini bagi memenuhi keperluan negara dalam menuju taraf negara maju dan membantu pihak industri tempatan.

Kami juga menjalankan projek R&D dalam menyelesaikan masalah-masalah yang dihadapi oleh pihak industri dalam penghasilan produk yang berkualiti dan mempunyai nilai tambah.

Dengan kepakaran yang sedia ada, kami membantu industri dalam menyelesaikan R&D yang mereka tidak mampu laksanakan.

Selain itu, kami menyediakan latihan kepada masyarakat yang memerlukan kursus-kursus berkaitan keselamatan sinaran di CoNE.

Sekiranya ada pihak yang ingin berkolaborasi atau mengkomersialkan hasil penyelidikan, bagaimana dan siapa yang perlu mereka hubungi?

Kami mengalu-alukan para pelanggan yang ingin mendapatkan khidmat nasihat, analisis, penyinaran daripada Nuklear Malaysia. Sila layari laman web, www.nuclearmalaysia.gov.my atau hubungi kami bagi mendapatkan maklumat lanjut.

Ekstra

DR. RASIF
MOHD. ZAIN

- Memiliki Ijazah Sarjana Muda Sains Fizik Industri dari Universiti Kebangsaan Malaysia
- Sarjana Kejuruteraan Elektrik dari Universiti Teknologi Malaysia
- Doktor Falsafah Fizik dan Astronomi dari Universiti Glasgow
- Berkhidmat di Agensi Nuklear Malaysia lebih 21 tahun

DTNN 2030 bantu tingkat penggunaan teknologi nuklear

Putrajaya: Pelaksanaan Dasar Teknologi Nuklear Negara 2030 (DTNN 2030) membolehkan Malaysia memaksimumkan manfaat penggunaan teknologi nuklear secara aman untuk pembangunan sosioekonomi, sekali gus setanding dengan negara maju.

Menteri Sains, Teknologi dan Inovasi, Chang Lih Kang, berkata kementerian berharap DTNN 2030 boleh membantu mencapai hasrat negara meningkatkan 40 peratus penggunaan teknologi nuklear dalam bidang khusus sains, teknologi, inovasi dan ekonomi (STIE) menjelang 2030.

Setakat ini, katanya, sebanyak 20 peratus teknologi itu sudah dipraktikkan dan ia juga menjadi satu dasar bagi mengarusperdanakan penggunaan teknologi ini di Malaysia.

Katanya, bagi tujuan itu, DTNN 2030 menetapkan empat teras strategik, 18 strategi dan 13 sasaran utama membabitkan pihak berkepentingan dalam pelbagai sektor ekonomi yang dikenal pasti bagi mencapai visi dan hala tuju ekosistem teknologi nuklear negara.

"Teknologi nuklear digunakan secara meluas dalam pelbagai sektor ekonomi utama di Malaysia dan dijangka semakin meningkat pada masa hadapan," katanya kepada pemberita pada Majlis Pelancaran DTNN 2030, di sini semalam.

Kenal pasti enam sektor

DTNN 2030 mengenal pasti enam sektor fokus utama sebagai sektor yang boleh dipertingkatkan keupayaannya melalui penggunaan teknologi nuklear, iaitu perubatan dan penjagaan kesihatan; makanan dan pertanian; pembuatan peranti dan peralatan.

Selain itu, pengurusan alam sekitar dan sumber asli, aplikasi perindustrian dan keselamatan serta sekuriti nuklear.

Lih Kang berkata, strategi dan inisiatif digariskan dalam dasar itu memberi penekanan untuk mewujudkan ekosistem teknologi nuklear negara yang mampan serta membentuk asas yang kukuh dalam mengarusperdanakan teknologi nuklear secara aman di Malaysia.

Katanya, bagi mempergiatkan ekosistem penyelidikan, pembangunan, pengkomersialan dan inovasi, kerajaan telah memperuntukkan tambahan RM100 juta dengan tumpuan kepada keperluan industri, tenaga boleh baharu, keterjaminan makanan serta aktiviti pertumbuhan baharu.



CHANG melancarkan Dasar Teknologi Nuklear Negara 2030, semalam.

Sasar guna 40% teknologi nuklear menjelang 2030

Putrajaya: Pelaksanaan Dasar Teknologi Nuklear Negara 2030 (DTNN2030) membolehkan negara memaksimumkan penggunaan teknologi nuklear secara aman untuk pembangunan sosio-ekonomi dan meletakkan negara setanding dengan negara maju.

Menteri Sains, Teknologi Dan Inovasi (MOSTI) Chang Li Kang berkata, kementerian berharap DTNN 2030 ini boleh membantu mencapai hasrat negara meningkatkan 40 peratus penggunaan teknologi nuklear dalam bidang khusus sains, teknologi, inovasi dan ekonomi (STIE) menjelang 2030.

Menurutnya, setakat ini sebanyak 20 peratus teknologi itu dipraktikkan dan ia juga menjadi satu dasar bagi mengurus peredaran penggunaan teknologi ini di Malaysia.

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"Teknologi nuklear digunakan secara meluas dalam pelbagai sektor ekonomi utama di Malaysia dan dijangka akan semakin meningkat pada masa hadapan"

teknologi nuklear negara.

"Teknologi nuklear digunakan secara meluas dalam pelbagai sektor ekonomi utama di Malaysia dan dijangka akan semakin meningkat pada masa hadapan," katanya kepada pemberita pada Majlis Pelancaran Dasar Teknologi Nuklear Negara 2030 di sini, semalam.

Turut hadir, Ketua Setiausaha MOSTI Datuk Dr Aminuddin Hassim.

DTNN 2030 ini mengenalpasti enam Sektor Fokus Utama sebagai sektor yang boleh dipertingkatkan keupayaannya melalui penggunaan teknologi nuklear iaitu perubatan dan penjagaan kesihatan, makanan dan pertanian, pembuatan peranti dan peralatan, pengurusan alam sekitar dan sumber asli, aplikasi perindustrian dan keselamatan dan sekuriti nuklear.

Lih Kang berkata, strategi dan inisiatif yang digariskan dalam dasar ini memberi penekanan untuk mewujudkan ekosistem teknologi nuklear negara yang mampan serta membentuk asas yang kukuh dalam mengurus peredaran teknologi nuklear secara aman di Malaysia.

Menurutnya, bagi mempergiatkan ekosistem penyelidikan, pembangunan, pengkomersialan dan inovasi kerajaan telah memperuntukkan tambahan RM100 juta dengan tumpuan kepada keperluan industri, tenaga boleh baharu, keterjaminan makanan serta aktiviti pertumbuhan baharu.

DTNN 2030 sasar 40 peratus kadar guna teknologi nuklear

PUTRAJAYA – Kerajaan menyoasarkan kadar penggunaan teknologi nuklear di Malaysia meningkat kepada tahap 40 peratus menjelang 2030 berbanding 20 peratus ketika ini.

Menteri Sains, Teknologi dan Inovasi, Chang Lih Kang berkata, sasaran itu yakin dapat dicapai menerusi Dasar Teknologi Nuklear Negara 2030 (DTNN 2030) yang dilancarkan semalam.

Beliau berkata, teknologi nuklear secara aman sudah digunakan secara meluas di negara ini sejak 40 tahun lalu dan sudah tiba masanya, penggunaannya diarusperdanakan.

"Kami juga menyoasarkan

nilai pelaburan dan hasil daripada industri nuklear ini dijangka mencecah RM2.4 bilion menjelang 2030 berbanding sekitar RM1 bilion ketika ini.

"DTNN 2030 adalah dasar jelas bagi memacu tahap penggunaan nuklear negara dan kita masih lagi agak kebelakang berbanding negara jiran," katanya pada sidang akhbar selepas melancarkan DTNN 2030 di sini semalam.

Katanya, setakat ini, teknologi nuklear di Malaysia digunakan secara meluas dalam bidang perubatan dan teknologi makanan khususnya dalam menghasilkan beras tahan penyakit serta lebih berkualiti.



LIH KANG pada Majlis Pelancaran Dasar Teknologi Nuklear Negara (DTNN) 2030 di Putrajaya semalam.

Sasar 40 peratus penggunaan teknologi nuklear

PUTRAJAYA: Kerajaan menyasarkan kadar penggunaan teknologi nuklear di Malaysia meningkat kepada 40 peratus menjelang 2030 berbanding 20 peratus ketika ini.

Menteri Sains, Teknologi dan Inovasi, Chang Lih Kang berkata, sasaran itu yakin dapat dicapai menerusi Dasar Teknologi Nuklear Negara 2030 (DTNN 2030) yang dilancarkan semalam.

Beliau berkata, teknologi nuklear secara aman sudah digunakan secara meluas di negara ini sejak 40 tahun lalu dan sudah tiba masanya, penggunaan teknologi itu diurusperdanakan.

"Kami juga menasaskan nilai pelaburan dan hasil daripada industri nuklear ini mencecah RM2.4 bilion menjelang 2030 berbanding sekitar RM1



MENTERI Sains, Teknologi dan Inovasi, Chang Lih Kang (tengah) pada Majlis Pelancaran Dasar Teknologi Nuklear Negara (DTNN) 2030 di Marriot Putrajaya, semalam. - UTUSAN/FAIZ ALIF ZUBIR

bilion ketika ini.

"DTNN 2030 adalah dasar jelas bagi memacu tahap penggu-

naan teknologi nuklear negara dan kita masih lagi agak kebelakang berbanding negara jiran,"

katanya dalam sidang akhbar selepas melancarkan DTNN 2030 di sini, semalam.

Katanya, setakat ini, teknologi nuklear di Malaysia digunakan secara meluas dalam bidang perubatan dan teknologi makanan khususnya dalam menghasilkan beras tahan penyakit serta lebih berkualiti.

Lih Kang berkata, DTNN 2030 adalah agenda negara bagi mengurusperdanakan penggunaan teknologi nuklear secara aman selain meningkatkan daya saing industri, memperkukuh kesejahteraan rakyat dan memulihara sumber asli.

Menurutnya, dasar itu akan merangka hala tuju strategik jangka panjang bagi memacu pembangunan teknologi nuklear negara sehingga tahun 2030.

"DTNN 2030 menggariskan enam sektor fokus utama iaitu perubatan dan penjagaan kesihatan; makanan dan pertanian; pembuatan peranti dan peralatan; pengurusan alam sekitar dan sumber asli; aplikasi perindustrian; dan keselamatan dan sekuriti nuklear.

"Agensi Nuklear Malaysia (Nuklear Malaysia) akan bertindak sebagai agensi penyelaras untuk platform kerjasama nasional termasuk projek strategik berkaitan teknologi nuklear.

"Nuklear Malaysia juga akan menerajui Jawatankuasa Teknikal Teknologi Nuklear Kebangsaan di mana ahlinya terdiri daripada pakar teknikal daripada agensi kerajaan yang berkaitan, institusi berasaskan negeri, pengawal selia, sektor swasta dan ahli akademik," katanya.

15 October 2023



An image from Canada's Nuclear Waste Management Organization of dry storage concrete containers for nuclear waste. Sahabat Alam Malaysia and Greenpeace Malaysia are concerned about how Malaysia would safely store waste produced by using nuclear technology to power the electricity grid.

No passion for fission

SAHABAT Alam Malaysia (SAM) and Greenpeace Malaysia remain adamant that nuclear power is inherently unsafe.

In a joint statement, both parties voiced concern over studies on the dangers of high radiation exposure.

"The studies show that residents surrounding the vicinity of nuclear power plants (NPPs) have higher chances of contracting cancer, leukaemia and generational DNA defects due to high radiation exposure."

"Nuclear waste remains radioactive for thousands of years and cannot be disposed

of safely. No proven solution exists for dealing with radioactive waste. NPPs are also vulnerable to natural disasters and accidents, human error as well as sabotage or terrorist attacks."

SAM and Greenpeace also say that the costs of procuring uranium, constructing and operating nuclear power plants, managing nuclear waste and eventually decommissioning the plants, are high.

"The public will ultimately have to foot the bill, with such knownt being translated into an increase in the electricity bill.

"Nuclear power has never been clean or green. Each step - from uranium ore mining, milling, processing, fuel fabrication, reactor construction, spent fuel reprocessing to eventual decommissioning and waste storage - releases greenhouse gases, radioactive particles and toxic materials that poison the air, water and land," the statement said.

Natural Resources, Environment and Climate Change Minister Nik Nazmi Nik Ahmad acknowledges the worries expressed by various parties about the use of nuclear power.

"In general, I think that Malaysians are concerned about the radioactive waste from the commissioning of a

nuclear power plant. Therefore, if the government can address this aspect of public perception, I believe that access to cheaper energy might silence many sceptics and critics," he says, referring to reduced costs over the long run.

"Radioactive waste is a serious matter and will not be taken lightly. Should we decide to pursue nuclear power, the radioactive waste management plans will be reviewed seriously to ensure public health, safety and well-being. We will cross the bridge when we get there," Nik Nazmi says in response to questions emailed to him by *Sandisy Star*.

He says the sensitivity of

nuclear technology requires expertise from countries that are allowed to develop nuclear energy.

"Malaysia will need to forge partnerships and sign treaties with international communities to explore nuclear technology. In addition, the nuclear-related Acts and Regulations in Malaysia will need to be revised, updated, and debated per international standards."

"Another challenge faced by Malaysia is human capabilities readiness. A long lead time is required to develop sufficient knowledge and skills, and thus any decision must be made early so that the required or critical human capability readiness could be achieved."

15 October 2023

The science of relief

SINCE Malaysia's research reactor Triga Puspati was established in 1982, nuclear technology has been used in diverse ways covering several industry sectors in the country.

According to Science, Technology and Innovation Minister Chang Lih Kang, this includes medicine and agriculture, where the technology plays an especially significant role.

For medicine and healthcare, Chang says the crucial role of nuclear technology is seen in three medical speciality areas: radiology, radiotherapy and oncology, and nuclear medicine, for the diagnosis and treatment of major non-communicable diseases, including cancer and cardiovascular diseases.

"For food and agriculture, the application of nuclear technology has offered solutions for improving food safety, food security, management of land, crops and livestock, productivity and overall quality," he says in an email interview.

At the same time, Chang says that in the fields of environmental and natural resources management, nuclear technology can provide sensitive and accurate methods to analyse trace amounts of atmospheric and marine pollutants.

"It can also be applied to reduce levels of certain pollutants in water and industrial emissions, as well as help to further improve the management of water resources, irrigation schemes and sedimentation studies.

In industrial applications, the technology is used in sectors such as oil and gas, conventional power generation, transportation, aerospace and manufacturing.

"It is widely applied to optimise industrial productivity and operations as well as to produce high-quality goods."

In advancing the use of nuclear technology, Chang says the decision to develop the National Nuclear Technology Policy 2030 is important to recognise the landscape of nuclear technology and its applications.

"Global trends have shown that nuclear technology is one of the key advanced technologies capable of providing solutions to major socio-economic issues.

"This policy envisions Malaysia as a leading nation in the peaceful use of nuclear science and technology, contributing to global sustainable development by 2030.

"In addition, as nuclear technology creates spillover impact on various sectors, the development of nuclear technology

needs a national-level strategic direction, and all stakeholders need to unite on a collaborative platform to leverage each other's strengths through the sharing of information and resources."

Chang says the policy aligns strategic nuclear technology priority areas with the national priority and niche areas under the 10-10 MySTIE Framework to drive socio-economic development and increase competitiveness.

According to the STIP Compass page at the Organisation for Economic Co-operation and Development's website, the 10-10 Malaysian Science, Technology, Innovation and Economic (MySTIE) Framework is "an integration of 10 key Malaysian socio-economic drivers with 10 global leading science and technology drivers aligned to our strengths and needs".

Chang continues, saying that "Nuclear technology will create a spillover impact on various sectors by empowering six focus sectors for enhanced capabilities through the use of nuclear technology, such as medicine and healthcare, food and agriculture, device manufacturing and equipment, environmental and natural resource management, industrial applications, and nuclear safety and security."

He says the policy will also ensure the progress of nuclear technology in Malaysia meets social and national economy needs including opening up economic opportunities and creating new jobs.

"The implementation of strategies and initiatives outlined in this policy is expected to bring several significant benefits to our society. These benefits include the creation of new businesses, the generation of high-tech, high-skilled and high-income jobs, improved product and service quality, and enhanced nuclear safety and security.

"In addition, the use of nuclear technology is expected to help increase the competitiveness of industry players and subsequently be able to increase the value chain.

Among the benefits expected to be obtained through the implementation of this policy are increasing the annual growth of the export value of related local nuclear technology products of RM2.403bil in 2030, 20% increase in public-private partnership and capacity development of research, development, commercialisation, innovation and economics per year; and a 10% increase in international cooperation for annual capacity development.



Malaysia's only nuclear reactor, Triga Puspati. It reached its 'criticality' (i.e. became operational) at 5pm on June 28, 1982, heralding Malaysia's entry into the nuclear era. — Filepic from Nuclear Malaysia

14 Focus

Stories by SYED UMAR ARIFF
sunday@thestar.com.my

DID you know that Malaysia has been operating a nuclear reactor since 1982?

Not many people might be aware that the research reactor Triga Puspati was set up then, and its use has been incorporated in advancing the fields of healthcare, agriculture and environmental management, among various other fields.

But Malaysia has yet to connect nuclear technology with the national power grid. That might change, though, with the pressing need to achieve net zero emissions of global warming gases to mitigate climate change.

In August, Economy Minister Rafizi Ramli, during an energy transition conference here, said Malaysia is not ruling out nuclear power generation but needs to take many factors into consideration before integrating it into the country's energy mix.

"Of course, we look at planning but usually any major pivot, especially on something like nuclear, we have to bring throughout all the government decision-making bodies and agencies."

"But I can say with clarity that I don't think we can be choosy. And I prefer to be agnostic, so long as it meets all our demands, all our requirements – and we have to be stringent with our requirements," Rafizi said.

There are, indeed, many considerations for the government to make, such as costs, expertise, and the lack of an applicable regulatory framework as well as public apprehension.

The last remains a crucial matter to look into due to public concerns about the disposal of radioactive waste, which can remain toxic for decades, leading many to consider that a nuclear power plant will bring more harm than good.

Nuclear accidents, such as Chernobyl in 1986 and Fukushima in 2011, have added to the generally negative perception the technology has developed over the decades. These tend to overshadow the development of safer and more reliable ways of using nuclear energy as a power supply.

Nevertheless, it looks like today, the government is opening its doors to the possibility of powering Malaysia with nuclear energy.

According to the Sustainable Energy Development Authority

Malaysia, in 2018, the three largest primary energy sources in Malaysia were natural gas (41%), crude oil (30%), and coal and coke (22%). Hydropower and renewables contributed only 7% of primary energy supply. In other words, our power grid is largely fossil fuel-based and emitting a lot of carbon.

Figuring out our approach

The government is, obviously, considering the pros and cons of using nuclear energy as it comes with its fair share of concerns that need to be addressed, says Natural Resources, Environment and Climate Change Minister Nik Nazmi Nik Ahmad.

Among these, he acknowledges the risk of accidents and managing radioactive waste.

"Firstly, the risk of nuclear accidents. Although rare, accidents like Chernobyl and Fukushima have demonstrated the potential for catastrophic events leading to the release of dangerous levels of radiation into the environment.

"The consequences of a nuclear accident in Malaysia could be severe, posing significant risks to public health. Secondly, the management of radioactive waste is a crucial aspect of nuclear technology, he says.

"Nuclear power generation produces transgenerational radioactive waste that remains hazardous for thousands of years. Ensuring proper disposal and long-term storage of this waste is essential to prevent environmental contamination and protect public safety.

"This will require the implementation of robust waste management practices and the development of suitable storage facilities," he tells *Sunday Star* in response to emailed questions.

On the pro side, nuclear energy provides some advantages compared with Malaysia's current power mix when it comes to balancing the energy trilemma: energy security, affordability and sustainability.

"In terms of energy security, nuclear power provides a stable

base load which complements well the use of intermittent solar energy.

"In terms of affordability, with rising geopolitical concerns that have resulted in volatile fuel prices, the use of nuclear power mitigates this risk as the required amount of nuclear fuel, such as uranium, is much smaller than that of the required fossil fuels in a conventional power station.

"Nuclear power does not emit greenhouse gases during electricity generation, providing the much-needed sustainability benefits towards our quest of achieving net zero [carbon emissions].

"It can provide a stable, non-intermittent source of energy that doesn't depend on weather conditions or time of day, unlike wind or solar. This can help diversify Malaysia's energy mix and reduce dependency on fossil fuels."

Nik Nazmi says that strict regulatory compliance will ensure the safe utilisation of nuclear energy.

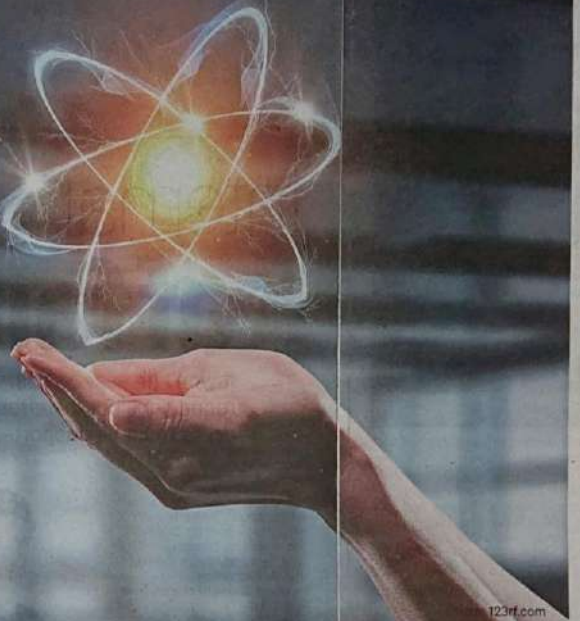
"Addressing public safety concerns would require a compre-

SUNDAY STAR, SUNDAY 15 OCTOBER 2023

SUNDAY STAR, SUNDAY 15 OCTOBER 2023

Taking a nuclear step

There hasn't been much mention of powering the country's energy grid with nuclear technology – until recently. What are the considerations we would have to take into account if we make a pivot towards fission?



Nik Nazmi says nuclear power provides numerous advantages to balance the energy trilemma. – Filepic/The Star



Azrudi says construction of a traditional nuclear reactor can be time consuming while it is more feasible to build an SMR in Malaysia. – Image provided

hensive approach that includes stringent safety measures, effective waste management strategies, enhanced security protocols, and transparent communication with the public."

Going small

If we do venture into generat-

ing energy with nuclear technology, it is not likely that Malaysians will see those typical monolithic nuclear power plant silos emerging on the landscape.

Rather, the government is keen on small modular reactors (SMRs), which the International Atomic Energy Agency says have

9 November 2023

Padi nuklear berjaya tingkat hasil

Pembangunan benih padi NMR152 atau lebih dikenali sebagai padi nuklear oleh Agensi Nuklear Malaysia, berjaya meningkatkan hasil padi.

Timbalan Menteri Sains, Teknologi dan Inovasi, Datuk Arthur Joseph Kurup, berkata peningkatan hasil padi itu bagaimanapun bergantung pada lokasi, pengelasan tanah dan kaedah pengurusan sawah yang baik.

Beliau berkata, padi nuklear dibangunkan menerusi teknik biak baka mutasi, yang mana varieti baka baharu tanaman itu berdaya tahan tinggi terhadap penyakit serta ancaman cuaca dan serangga.

“Varieti ini diperakukan oleh Jawatankuasa Bantuan Kerajaan Kepada Industri Padi dan Beras (JKBKKIPB), Kementerian Pertanian dan Keterjaminan Makanan, sebagai benih padi yang sah dan mula digunakan oleh petani di bawah skim subsidi kerajaan.

“Hasil kajian mendapati varieti padi ini yang ditanam di pelbagai lokasi Semenanjung menunjukkan purata hasil padi boleh ditingkatkan daripada 20 hingga 60 peratus, bergantung pada lokasi, pengelasan tanah dan kaedah pengurusan sawah yang baik,” katanya pada sesi soal jawab lisan di Dewan Rakyat, semalam.

9 November 2023

Malaysia berjaya hasilkan benih tahan penyakit, cuaca, serangga

Baka 'padi nuklear' lebih lasak

DEWAN
RAKYAT

Oleh ZULKIFLI MANZOR

KUALA LUMPUR – Agensi Nuklear Malaysia (Nuklear Malaysia) berjaya menghasilkan benih padi NMR152 atau lebih dikenali sebagai 'padi nuklear' menerusi teknik biak baka mutasi.

Timbalan Menteri Sains, Teknologi Dan Inovasi (MOSTI), Datuk Arthur Joseph Kurup berkata, baka baharu tanaman itu berdaya tahan tinggi terhadap penyakit serta ancaman cuaca dan serangga.

"Varieti ini telah diperakukan oleh Jawatankuasa Bantuan Kerajaan Kepada Industri Padi dan Beras (JKBKKIPB), Kementerian Pertanian dan Keterjaminan Makanan (KPKM) sebagai benih padi sah dan telah mula digunakan oleh petani di bawah skim subsidi kerajaan.

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GAMBAR fail bertarikh 21 September 2023 menunjukkan pekerja menanam padi menggunakan kaedah transplanter (calit) di Parit 2 Sungai Haji Dorani, Sungai Besar. – SADDAM YUSOFF

ah dan juga kaedah pengurusan sawah yang baik," katanya pada sidang Dewan Rakyat semalam.

Beliau menjawab soalan Riduan Rubin (**Bebas-Tenom**) sejauh manakah teknologi nuklear telah diaplikasikan secara optimum di dalam inovasi pertanian bagi menambah baik kualiti, mutu dan meningkatkan pengeluaran pertanian.

Terdahulu, beliau berkata, Nuklear Malaysia giat menjalankan penyelidikan, pembangunan dan inovasi berteraskan teknologi nuklear dalam bidang perta-

nian melibatkan penghasilan varieti baka baharu tanaman yang lebih berkualiti, penghasilan produk biobaja dan penggalak tumbuhan dan juga pembangunan sistem pengurusan agro-eko-sistem pintar.

Menurut beliau, bagi tujuan tersebut, mulai tahun 2016 sehingga 2023 MOSTI telah memperuntukkan sejumlah RM15.73 juta untuk pembangunan teknologi nuklear dalam bidang pertanian.

Kata beliau, menerusi penyelidikan, pembangunan dan

inovasi yang telah dilaksanakan, Nuklear Malaysia telah berjaya menghasilkan serta mengkomersialkan produk biobaja dan kitosan yang berupaya meningkatkan kecekapan penggunaan baja dalam keseluruhan rantaian tanaman pertanian.

"Teknologi nuklear ini turut diaplikasi dalam pembangunan kaedah pengurusan pertanian cekap melibatkan teknik penciriran kesuburan tanah, strategi pembajaan dan pengurusan air serta sistem pemantauan dan prediksi serangan penyakit tanaman," katanya.

Online Media

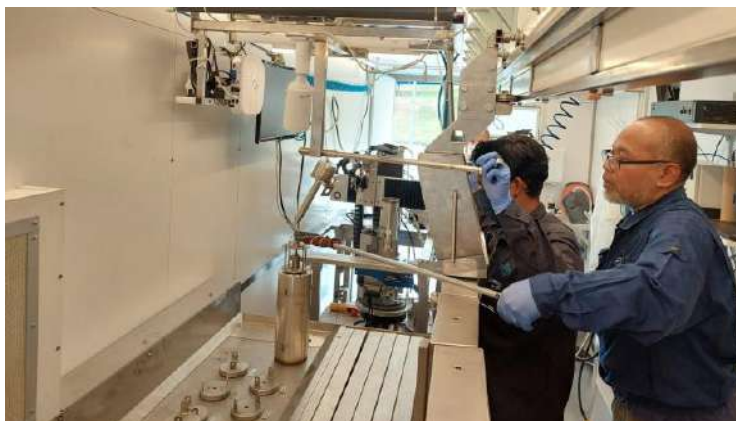
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The International Atomic Energy Agency (IAEA) is providing technological and engineering support for the first-of-a-kind construction and implementation of borehole disposal facilities for disused sealed radioactive sources, as part of a pilot project under way in Malaysia and Ghana, funded by Canada.



Malaysia Nuclear Agency experts practice operating the Mobile Tool Kit Facility for disused sealed radioactive sources conditioning (Image: Y El Abbary / IAEA)

Most radioactive waste arising from nuclear applications consists of disused sealed radioactive sources (DSRSs). Radioactive sources are used in different devices in medical, industrial and agricultural facilities.

According to the IAEA, for countries with limited amounts of radioactive waste, disposal could theoretically involve safe, secure and permanent placement inside boreholes, deep underground. The borehole disposal system is a detailed, engineering level system which enables the safe, secure and permanent disposal of all DSRs categories (1-5) in specially constructed boreholes tens of metres into the earth.

"The borehole disposal is a fit-for-purpose and cost-effective solution in general, because it is specifically designed for disposal of DSRs and is economically affordable in comparison with the other disposal pathways, such as geological disposal," said Nora Zakaria, Head of the IAEA Waste Technology Section.

In Malaysia, the preparatory work for the start of the borehole facility construction is now in its final stages and it is expected that the facility - which takes up to six weeks to build - will be operational soon. Following the country's request, the IAEA has been assisting the authorities and the national stakeholders, including the Malaysia Nuclear Agency (MNA) and the Atomic Energy Licensing Board (AELB), in developing guidance documents; designing and procuring borehole disposal equipment and tools; carrying out technical testing and facilitating capacity building, and more.

IAEA expert missions to Malaysia have focused on testing and providing guidance on the commissioning of the disposal operations and equipment, as well as on the oversight of the borehole facility construction. The IAEA is also providing technical assistance and advice throughout the facility construction and through capacity building to develop the expertise required for its operation.

6 January 2023

"The disposal of stored DSRs into boreholes reduces safety and security risks and enables their efficient management," said Mohd Zaidi Ibrahim, Manager at the Waste Technology Development Centre of MNA's Waste and Environment Technology Division. The implementation of the borehole disposal method allows Malaysia to dispose the majority of category 3-5 DSRs in its stockpile, especially the sources which were used prior to the establishment of appropriate regulatory requirements and are still in storage, that are usually associated with management concerns.

The IAEA systematically assists countries to identify and implement optimal solutions for the safe and secure use, storage, and now permanent disposal of their radioactive sources. We hope that Malaysia's success will encourage other countries to learn from the best practices in relation to borehole disposal of radioactive sources.

"The borehole system allows for a permanent disposition, rather than storage, solution," said Heather Looney, Head of the Nuclear Security of Materials and Facilities Section at the IAEA's Division of Nuclear Security. One of the most important benefits expected from this project is the overall enhancement of nuclear security and radiation safety at the national and regional level, as well as globally.

Ghanaian project

Ghana is also at an advanced stage of implementing its borehole project, with significant progress having been made in the regulatory authorisation processes. The borehole facility construction is expected to begin as soon as the licensing review process is completed.

"We are implementing the borehole disposal system as a final solution for disused sealed radioactive sources generated in the country," said Eric Tetteh Glover, Head of the Radioactive Waste Management Centre of the Radiation Protection Institute, Ghana Atomic Energy Commission. The successful implementation of the borehole disposal system will provide the country with a licensed disposal facility, and at the same time will further enhance the human and technical capabilities required for the country's nuclear power programme.

The IAEA said the completion of borehole disposal facilities in Ghana and Malaysia aims to significantly reduce the risks related to the disused radioactive sources. "The impact will go beyond the borders of these countries, as in the long-term this will be a model for other countries to follow. It is a major milestone for safety and security of disused sources," said Anna Clark, Head of the IAEA of the Waste and Environmental Safety Section.

In September last year, the IAEA launched a new peer review service in an effort to support countries faced with limited resources and capacities for the management of DSRs. The Disused Sealed Radioactive Sources Technical Centre (DSRS TeC) peer review aims to increase and enlarge the accessible pool of resources and support for sustainable management of DSRs.

<https://www.world-nuclear-news.org/Articles/Borehole-disposal-projects-under-way-in-Malaysia-a>



IPOH, 28 Ogos – Budaya keselamatan di semua organisasi memainkan peranan penting bagi memastikan penyampaian perkhidmatan berkesan dan mencapai standard prestasi tinggi.

Timbalan Ketua Pengarah (Program Pembangunan dan Penyelidikan Teknologi) Agensi Nuklear Malaysia, Dr Rosli Darmawan berkata dengan menitikberatkan budaya keselamatan yang tinggi, organisasi secara tidak langsung dapat mempengaruhi amalan, sikap dan tingkah laku pihak berkepentingan.

“Untuk mencapai matlamat ini, ia memerlukan komitmen berterusan semua pihak terhadap perlindungan kepada manusia dan alam sekitar bagi risiko radiasi dan keselamatan kemudahan,” katanya ketika berucap merasmikan Persidangan dan Bengkel Perlindungan Sinaran kali ke-24 bertemakan ‘Advancing Radiation Protection For Safety Culture’ di sini hari ini.

Beliau berkata kepentingan inovasi dan teknologi perlu diberi penekanan dalam memastikan Malaysia kekal berdaya saing dan menjadi peneraju teknologi nuklear di peringkat serantau. Persidangan anjuran Persatuan Perlindungan Sinaran Malaysia (MARPA) selaku pertubuhan bukan kerajaan mewakili kumpulan profesional serta berkemahiran dalam aspek perlindungan dan keselamatan sinaran, turut mendapat kerjasama daripada Agensi Nuklear Malaysia.

Ia bertujuan menyampaikan maklumat terkini berkenaan pembangunan aplikasi teknologi nuklear dalam pelbagai bidang dan memberi gambaran menyeluruh serta amalan terkini dalam perlindungan dan keselamatan sinaran di tempat kerja dan lapangan.

Persidangan selama empat hari itu membabitkan kira-kira 150 ahli terdiri daripada ahli akademik, universiti, jabatan kerajaan dan majoriti peserta dari pihak industri, yang menggunakan teknologi nuklear di negara ini dengan pembentangan kertas kerja dari pelbagai sektor.

<https://www.malaysiachinainsight.com/2023/08/28/budaya-keselamatan-di-organisasi-main-peranan-penyampaian-perkhidmatan-berkesan/?lang=ms>

8 September 2023



PUTRAJAYA: Dr Rosli Darmawan has been appointed as the new Malaysian Nuclear Agency (Nuklear Malaysia) Director-General, effective Sept 6.

He replaces Dr Abdul Rahim Harun, who retired on May 1.

In a statement on Friday (Sept 8), Nuklear Malaysia said the appointment of Rosli, who was the former Deputy Director-General (Research and Technology Development), was made based on his qualifications, experience and knowledge in nuclear engineering development and research.

Rosli, who has extensive experience in nuclear reactor safety systems, holds a degree in mechanical engineering from the University of the Pacific, United States, and in manufacturing systems engineering and mechanical engineering from Universiti Putra Malaysia.

Meanwhile, Dr Muhamma Rawi Zin was appointed as the Deputy Director-General (Research and Technology Development) and Dr Ishak Mansor as Deputy Director-General (Research and Technology Development).

Nuklear Malaysia, an agency of the Science, Technology and Innovation Ministry, is a leader in the field of research and development (R&D) in nuclear science and technology.

<https://www.thestar.com.my/news/nation/2023/09/08/rosli-darmawan-appointed-as-new-malaysian-nuclear-agency-dg>

8 September 2023

MOSTI umum Rosli Darmawan sebagai Ketua Pengarah Agensi Nuklear Malaysia baharu



Kementerian Sains, Teknologi dan Inovasi (MOSTI) hari ini mengumumkan, Dr Rosli Darmawan dilantik sebagai Ketua Pengarah Agensi Nuklear Malaysia yang baharu, berkuat kuasa kelmarin. - Foto FB MOSTI

KUALA LUMPUR: Kementerian Sains, Teknologi dan Inovasi (MOSTI) hari ini mengumumkan, Dr Rosli Darmawan dilantik sebagai Ketua Pengarah Agensi Nuklear Malaysia yang baharu, berkuat kuasa kelmarin.

Bekas Timbalan Ketua Pengarah (Program Penyelidikan & Pembangunan Teknologi) itu dilantik menggantikan Dr Abdul Rahim Harun, yang bersara pada 1 Mei lalu.

MOSTI juga mengumumkan pelantikan dua Timbalan Ketua Pengarah yang baharu iaitu Dr Muhammad Rawi Mohamed Zin yang mengetuai Program Penyelidikan dan Pembangunan Teknologi dan Dr Ishak Mansor, mengetuai Program Perkhidmatan Teknikal.

Unit Komunikasi Korporat Agensi Nuklear Malaysia, berkata pelantikan Dr Rosli berdasarkan kelayakan, pengalaman dan pengetahuan beliau khususnya dalam bidang pembangunan dan penyelidikan kejuruteraan berkaitan nuklear.

Beliau mendapat pendidikan Ijazah Pertama dalam bidang kejuruteraan mekanikal dari University of the Pacific, Amerika Syarikat (AS) pada 1990, Ijazah sarjana dalam bidang kejuruteraan sistem pembuatan pada 2005 dan mendapat ijazah kedoktoran dalam bidang kejuruteraan mekanikal dari Universiti Putra Malaysia (UPM) pada 2015.

8 September 2023

"Sebelum ini, beliau menjawat sebagai Timbalan Ketua Pengarah (Penyelidikan dan Pembangunan Teknologi) dan menjadi pakar nuklear dalam bidang kejuruteraan, kemudahan dan utiliti sokongan nuklear serta mempunyai kepakaran yang luas mengenai sistem keselamatan reaktor nuklear," katanya dalam satu kenyataan, di sini, hari ini.

Katanya, Dr Rosli juga mempunyai pengalaman profesional yang berkaliber sebagai Jurutera Kawalan Mutu (Evergreen Heavy Industry) dan Pengurus Unit Kejuruteraan, Pengarah Bahagian Sokongan Teknikal.

Sementara itu, Muhammad Rawi yang mendapat pendidikan Ijazah Pertama (Sains Gunaan) dalam bidang fizik gunaan dari Universiti Sains Malaysia, berpengalaman dalam teknologi radioisotop terkedap dalam industri serta pernah memegang tanggungjawab sebagai pengurus Reaktor TRIGA PUSPATI selama lima dan terbabit aktif dalam penyelidikan dalam teknologi alur neutron dari reaktor nuklear.

"Dr Ishak yang mendapat pendidikan ijazah pertama dalam bidang elektrik dan elektronik dari Universiti Kebangsaan Malaysia pada tahun 1989 ialah pakar dalam projek berimpak tinggi iaitu instrumen nuklear, pembangunan teknologi pemproses semikonduktor bagi penyelidikan sensor, tenaga dan pengesan radiasi," katanya.

<https://www.bharian.com.my/berita/nasional/2023/09/1149902/mosti-umum-rosli-darmawan-sebagai-ketua-pengarah-agensi-nuklear>



Dr. Rosli Darmawan dilantik sebagai Ketua Pengarah Agensi Nuklear Malaysia yang baharu berkuat kuasa 6 September lalu. - Edisi9/Agensi Nuklear Malaysia

Kementerian Sains, Teknologi dan Inovasi (MOSTI) mengumumkan pelantikan Dr. Rosli Darmawan sebagai Ketua Pengarah Agensi Nuklear Malaysia berkuat kuasa 6 September lalu. Menerusi kenyataan MOSTI berkata, Rosli dilantik bagi menggantikan Dr. Abdul Rahim Harun yang telah bersara pada 1 Mei. Pelantikan Rosli dibuat berdasarkan kelayakan, pengalaman dan pengetahuan beliau khususnya dalam bidang pembangunan dan penyelidikan kejuruteraan berkaitan nuklear.

“Ini bagi membolehkan beliau menerajui kepimpinan di Agensi Nuklear Malaysia dan seterusnya meneruskan kecemerlangan bagi mencapai matlamat kemajuan pembangunan dan penyelidikan,” katanya hari ini.

Menurut MOSTI, Rosli mendapat pendidikan ijazah pertama dalam bidang kejuruteraan mekanikal dari University of the Pacific, Amerika Syarikat pada 1990, Ijazah Sarjana Kejuruteraan Sistem Pembuatan (2005) dan mendapat Ijazah Kedoktoran Kejuruteraan Mekanikal dari Universiti Putra Malaysia (2015). Katanya, beliau sebelum ini menjawat sebagai Timbalan Ketua Pengarah (Penyelidikan dan Pembangunan Teknologi). Beliau merupakan pakar nuklear dalam bidang kejuruteraan, kemudahan dan utiliti sokongan nuklear serta mempunyai kepakaran yang luas mengenai sistem keselamatan reaktor nuklear.

Sepanjang perkhidmatan, beliau mempunyai pengalaman profesional yang berkaliber sebagai Jurutera Kawalan Mutu (Evergreen Heavy Industry), Pengurus Unit Kejuruteraan, Pengarah Bahagian Sokongan Teknikal. Sebelum ini beliau adalah Timbalan Ketua Pengarah (Program Perkhidmatan Teknikal) di Agensi Nuklear Malaysia.

MOSTI berkata, terdapat dua pelantikan baharu bagi jawatan Timbalan Ketua Pengarah berkuat kuasa 6 September. “Dr. Muhammad Rawi Mohamed Zin dilantik sebagai Timbalan Ketua Pengarah (Program Penyelidikan dan Pembangunan Teknologi) sementara Ts. Dr. Ishak Mansor pula dilantik sebagai Timbalan Ketua Pengarah (Program Perkhidmatan Teknikal),” katanya. – Edisi 9

<https://www.edisi9.com.my/2023/09/rosli-dilantik-ketua-pengarah-agensi-nuklear-malaysia-baharu/>

SEPTEMBER 18 — Nuclear technology plays an important role in various socioeconomic sectors of the country, particularly in the industrial, health, food and agriculture, water management, and environmental protection sectors. The safe use of nuclear science and technology through technology transfer and capacity development has a positive impact on the world.

Malaysia has gained many benefits from the safe use of nuclear technology since the introduction of the X-ray machine in Malaya in 1897. Since then, the use of nuclear technology has been expanding along with the rapid progress of the country's industry. At present, Malaysia has various facilities and laboratories based on nuclear science and technology, some of which have received international recognition, including as an International Collaborative Center (ICC) of the International Atomic Energy Agency (IAEA), a Regional Training Center (RTC), and a Regional Nuclear Security Support Center (NSSC) in Asia and the Pacific.

Malaysia has a research nuclear reactor, the TRIGA PUSPATI Reactor (RTP), which has been operating at the Malaysian Nuclear Agency (Nuclear Malaysia) since 1982. RTP is used for research and development purposes, including the production of medical, industrial, and agricultural radioisotopes, as well as education in the field of nuclear science and engineering. In addition to RTP, Malaysia also has various irradiation facilities that can enhance the stability and sustainability of food supply, medical care, and health care, among other related purposes.

In line with the development of nuclear technology, it's time for Malaysia to take steps forward to empower the safe use of nuclear technology based on the sustainable development goals outlined by the United Nations (UN). Below are some of the focus areas involving the use of nuclear technology in Malaysia.

Food and agriculture

Nuclear technology has been widely used and is capable of addressing issues related to the stability and sustainability of food supply through smart agricultural systems, land management, crops, and livestock. This contribution is evident through the production of more than 30 types of improved crop varieties and seeds that are disease-resistant and weather-tolerant. Among these is the production of the NMR152 rice seed, which has successfully increased farmers' income through yield improvements ranging from 35 to 50 percent. This rice seed has received the FAO/IAEA Outstanding Achievement Awards in 2014 and 2021 in the category of new rice plant mutation breeding and the Malaysia Commercialization Year 2021 Awards in two categories: Research Entrepreneur Award and Supreme Award.

Nuclear technology has also proven to be able to help verify the purity of food from natural sources, ensure it's safe to consume, and identify its locality. For example, for agro-products like rice, swiftlet bird nests, and honey, neutron activation techniques are used for characterizing the elemental profile of the original habitat and verifying the authenticity of products through geochemical markers. This process assists the Malaysian Ministry of Health and the Veterinary Services Department of Malaysia in enforcement and control over agro-food in Malaysia.

Nuclear technology can also be used to improve food quality and safety through irradiation techniques by eliminating harmful bacteria and pests, thereby extending the food's shelf life. Therefore, nuclear technology has the potential to assist local small and medium industries in meeting the food safety import standards set by international bodies and import markets.

Environmental, water, and natural resource management

Environmental, water, and natural resource management is crucial for universal life. As the population increases and the economy grows, access to clean and safe water becomes critical. Nuclear techniques can be extended to determine the age and quality of water, contributing to the development of integrated water resource management plans to preserve water-related ecosystems. Issues related to limited water resources can be tackled with more effective resource management through the study of underground water sources. Nuclear technology also helps address water pollution issues through the treatment of industrial wastewater, reducing pollutants, and improving water quality for safe reuse.

The use of nuclear technology for environmental and natural resource management can enhance monitoring strategies for effective environmental planning. This includes the development of air quality databases, identifying radioactive elements and compounds in the marine environment. These techniques also offer sensitive and accurate analysis methods for measuring the concentration of pollutant substances in the atmosphere and oceans, to manage and protect the vast marine ecosystems sustainably.

In 1984, Malaysia established the National Radioactive Waste Management Center for the safe management of radioactive waste in the country. This radioactive waste results from various nuclear activities, such as research reactors, medical institutions, industrial sectors, and from naturally occurring radioactive material (NORM) in mineral processing, as well as the oil and gas industry. Among these wastes, NORM and disused sealed radioactive sources (DSRS) are the types of radioactive waste most commonly produced in Malaysia. At present, borehole disposal technology facilities are being developed in collaboration with the IAEA in the country for the disposal of accumulated DSRS waste.

Nuclear safety and security

Malaysia's capabilities in leading the field of nuclear safety and security have the potential to make the country a regional hub for services and training in the future. This aligns with Malaysia's selection as an IAEA Regional Training Center in the field of radiation protection and safety, and as a Regional Nuclear Security Support Center (NSSC).

In terms of infrastructure, Malaysia has a system for detecting nuclear and radioactive materials through 82 Radiation Portal Monitors (RPM) at entry and exit points throughout the country. These facilities enable Malaysia to detect the movement of nuclear and radioactive materials in and out of the country. Additionally, there are eight Environmental Radiation Monitoring Stations (ERMS) that are used to monitor levels of environmental radiation.

Malaysia also has nuclear safety and security labs such as the Regional Loaner Pool for radiation detection equipment, Physical Protection Lab, Mobile Radiological Lab, Environmental and Radiochemistry Lab, and Analytical Chemistry Lab to ensure the safe use of nuclear technology.

Conclusion

As we all know, the world is currently facing challenges related to climate change and the need to transition to more sustainable and resilient energy sources. In this context, nuclear energy holds immense potential as an alternative energy source that can offer a stable supply with very low carbon emissions. Therefore, nuclear energy not only meets the country's increasing energy needs but can also become a new economic resource through various aspects such as infrastructure development, research and innovation, as well as education and training.

Nuclear energy is one of the most efficient and durable energy sources, with nuclear reactors capable of operating for several decades. This will help Malaysia ensure long-term energy supply stability while achieving sustainable development goals. In addition, the responsible and safe implementation of nuclear technology, complying with strict nuclear safety and security standards and protocols, will ensure that the risks to the environment and human health can be managed and controlled.

Beyond energy production, the nuclear industry also offers opportunities for generating new economic resources. The construction and operation of nuclear power stations will open up new employment opportunities and stimulate the development of supporting industries. The knowledge and expertise required in this sector will also drive education and training, creating opportunities for Malaysia to become a center of excellence and training in the nuclear field in this region. Indirectly, this will enrich the country's innovation and technology ecosystem, making Malaysia more competitive on the international stage.

Overall, nuclear energy holds significant potential to play a crucial role in creating a more sustainable and resilient future for Malaysia, both in terms of energy, the environment, and the economy. With a prudent and safe approach, nuclear energy can become one of the main pillars in the country's energy transformation and economic development.

*Chang Lih Kang is Minister of Science, Technology and Innovation.

<https://www.malaymail.com/news/what-you-think/2023/09/18/nuclear-energy-potential-as-a-nations-alternative-energy-chang-lih-kang/91454>



Teknologi nuklear memainkan peranan penting dalam pelbagai sektor sosioekonomi negara, terutamanya dalam sektor perindustrian, kesihatan, makanan dan pertanian, pengurusan air dan perlindungan alam sekitar. Penggunaan sains dan teknologi nuklear secara aman melalui pemindahan teknologi dan pembangunan kapasiti memberi impak yang positif kepada dunia.

Malaysia telah mendapat banyak manfaat daripada penggunaan teknologi nuklear secara aman sejak pengenalan mesin sinar-x di Tanah Melayu pada tahun 1897. Sejak itu, penggunaan teknologi nuklear semakin berkembang seiring dengan kemajuan pesat industri negara. Pada masa ini, Malaysia mempunyai pelbagai kemudahan dan makmal berteraskan sains dan teknologi nuklear yang sebahagiannya telah mendapat pengiktirafan di peringkat antarabangsa termasuk sebagai Pusat Kolaboratif Antarabangsa (ICC) Agensi Tenaga Atom Antarabangsa (IAEA), Pusat Latihan Serantau (RTC) dan Pusat Sokongan Sekuriti Nuklear Serantau (NSSC) di Asia dan Pasifik.

Malaysia mempunyai sebuah reaktor penyelidikan nuklear, iaitu Reaktor TRIGA PUSPATI (RTP) yang beroperasi di Agensi Nuklear Malaysia (Nuklear Malaysia) sejak tahun 1982. RTP digunakan untuk tujuan penyelidikan dan pembangunan, termasuk pengeluaran radioisotop perubatan, perindustrian, pertanian serta pendidikan dalam bidang sains dan kejuruteraan nuklear. Selain RTP, Malaysia juga mempunyai pelbagai kemudahan penyinaran yang dapat meningkatkan kestabilan dan kemampunan bekalan makanan, perubatan dan penjagaan kesihatan, serta pelbagai tujuan lain yang berkaitan dengannya.

Sejajar dengan perkembangan teknologi nuklear, sudah tiba masanya Malaysia mengorak langkah ke hadapan untuk memperkasa penggunaan teknologi nuklear secara aman berteraskan matlamat pembangunan mampan yang digariskan oleh Pertubuhan Bangsa-Bangsa Bersatu (PBB). Berikut adalah antara bidang fokus yang melibatkan penggunaan teknologi nuklear di Malaysia.

Makanan dan pertanian

Teknologi nuklear telah digunakan secara meluas dan mampu membantu menangani isu berkaitan kestabilan dan kemampunan bekalan makanan menerusi sistem pertanian pintar, pengurusan tanah, tanaman dan ternakan. Sumbangan ini dapat dilihat melalui penghasilan lebih daripada 30 jenis varieti tanaman dan benih baharu yang lebih baik, rintang penyakit dan cuaca. Antaranya adalah penghasilan benih padi NMR152 yang berjaya menambah pendapatan petani melalui peningkatan hasil tuaian diantara 35 hingga 50 peratus. Benih padi ini telah mendapat Anugerah Pencapaian Cemerlang FAO/IAEA 2014 dan 2021 bagi kategori pembiakan mutasi tumbuhan baka baharu padi dan Anugerah Tahun Pengkomersialan Malaysia 2021 untuk dua kategori iaitu Anugerah Usahawan Penyelidik dan Supreme Award.

Teknologi nuklear juga terbukti dapat membantu menentusahkan ketulenan makanan dari sumber semula jadi, selamat dimakan dan dikenalpasti lokalitinya. Sebagai contoh bagi produk-produk agro seperti padi, sarang burung walit dan madu, teknik pengaktifan neutron digunakan untuk pencirian profil elemen habitat asal dan mengesahkan keaslian produk melalui penanda geokimia. Proses ini membantu Kementerian Kesihatan Malaysia dan Jabatan Perkhidmatan Veterinar Malaysia dalam penguatkuasaan serta kawalan terhadap agromakanan di Malaysia.

Teknologi nuklear juga boleh digunakan untuk meningkatkan kualiti dan keselamatan makanan menerusi teknik penyinaran dengan menghapuskan bakteria berbahaya dan serangga perosak yang seterusnya dapat memanjangkan jangka hayat makanan tersebut. Oleh itu, teknologi nuklear berpotensi membantu industri kecil dan sederhana tempatan bagi memenuhi piawaian keselamatan import makanan yang ditetapkan oleh badan antarabangsa dan pasaran import.

Pengurusan alam sekitar, air dan sumber asli

Pengurusan alam sekitar, air dan sumber asli adalah penting untuk kehidupan sejagat. Apabila populasi bertambah dan ekonomi berkembang, akses kepada air bersih dan selamat adalah penting. Teknik nuklear boleh diperluaskan penggunaannya untuk penentuan umur dan kualiti air yang menyumbang kepada pembangunan rancangan pengurusan sumber air bersepadu bagi memelihara ekosistem berkaitan air. Isu berkaitan sumber air yang terhad dapat diatasi dengan pengurusan sumber yang lebih berkesan melalui kajian pencarian sumber air bawah tanah. Teknologi nuklear juga membantu mengatasi isu pencemaran air melalui rawatan air sisa industri, pengurangan bahan cemar dan peningkatan kualiti air agar selamat untuk diguna semula.

Penggunaan teknologi nuklear bagi pengurusan alam sekitar dan sumber asli berupaya meningkatkan strategi pemantauan untuk perancangan pengurusan alam sekitar yang berkesan. Ini termasuklah pembangunan pangkalan data kualiti udara, mengenal pasti unsur dan elemen radioaktif dalam persekitaran marin. Teknik ini juga menyediakan kaedah analisis yang sensitif dan tepat bagi menganalisis jumlah surihan bahan pencemar dalam atmosfera dan lautan, untuk mengurus dan melindungi ekosistem lautan yang sangat luas secara mampan.

Pada tahun 1984, Malaysia telah menubuhkan Pusat Pengurusan Sisa Radioaktif Kebangsaan bagi pengurusan sisa radioaktif yang selamat di negara ini. Sisa radioaktif ini terhasil daripada pelbagai aktiviti nuklear, seperti reaktor penyelidikan, institusi perubatan, sektor perindustrian dan amang daripada bahan radioaktif semula jadi (NORM) dalam pemprosesan mineral, dan industri minyak dan gas. Antara sisa ini, NORM dan sisa radioaktif punca terkedap (DSRS) adalah jenis sisa radioaktif yang paling banyak dihasilkan di Malaysia. Pada masa ini, kemudahan teknologi lubang gerek sedang dibangunkan dengan kerjasama IAEA di negara ini bagi melupuskan sisa DSRS terkumpul.

Keselamatan dan sekuriti nuklear

Keupayaan Malaysia dalam menerajui bidang keselamatan dan sekuriti nuklear berpotensi menjadikan negara sebagai hab perkhidmatan dan latihan serantau pada masa hadapan. Ini adalah selaras dengan pemilihan Malaysia sebagai Pusat Latihan Serantau IAEA dalam bidang perlindungan dan keselamatan sinaran dan Pusat Sokongan Sekuriti Nuklear Serantau (NSSC).

Dari segi infrastruktur, Malaysia mempunyai sistem pengesanan bahan nuklear dan radioaktif melalui 82 Portal Pemantauan Sinaran (RPM) di pintu masuk dan keluar seluruh negara. Kemudahan ini membolehkan Malaysia mengesan pergerakan keluar masuk bahan nuklear dan bahan radioaktif. Di samping itu, terdapat lapan Stesen Pemantauan Sinaran Alam Sekitar (ERMS) yang digunakan untuk memantau tahap sinaran alam sekitar.

Malaysia juga mempunyai makmal keselamatan dan sekuriti nuklear seperti Regional Loaner Pool untuk peralatan pengesanan sinaran, Makmal Perlindungan Fizikal, Makmal Radiologikal Bergerak, Makmal Radiokimia dan Alam Sekitar, dan Makmal Kimia Analisis bagi menjamin penggunaan selamat teknologi nuklear.

Penutup

Seperti yang kita ketahui, dunia kini sedang berhadapan dengan cabaran terhadap isu perubahan iklim dan keperluan untuk beralih ke sumber tenaga yang lebih mampan dan lestari. Dalam konteks ini, tenaga nuklear memiliki potensi yang sangat besar sebagai sumber tenaga alternatif yang dapat menawarkan bekalan tenaga yang stabil dengan pelepasan karbon yang sangat rendah. Oleh itu, tenaga nuklear tidak hanya memenuhi keperluan tenaga negara yang semakin meningkat tetapi juga dapat menjadi sumber ekonomi baru melalui pelbagai aspek seperti pembangunan infrastruktur, penyelidikan dan inovasi, serta pendidikan dan latihan.

Tenaga nuklear adalah salah satu sumber tenaga yang paling efisien dan tahan lama, dengan reaktor nuklear mampu beroperasi hingga beberapa dekad. Ini akan membantu Malaysia memastikan kestabilan bekalan tenaga untuk jangka masa panjang sambil mencapai objektif pembangunan mampan. Selain itu, pelaksanaan teknologi nuklear yang bertanggungjawab dan selamat, dengan mematuhi standard dan protokol keselamatan dan sekuriti nuklear yang ketat, akan memastikan bahawa risiko terhadap alam sekitar dan kesihatan manusia dapat dijaga dan dikawal.

Selain dari segi produksi tenaga, industri nuklear juga menawarkan peluang untuk penjanaan sumber ekonomi baharu. Pembinaan dan operasi stesen tenaga nuklear akan membuka peluang pekerjaan baru dan merangsang perkembangan industri pendukung. Pengetahuan dan keahlian yang diperlukan dalam sektor ini juga akan memacu pendidikan dan latihan, membuka peluang untuk Malaysia menjadi pusat kecemerlangan dan latihan dalam bidang nuklear di rantau ini. Secara tidak langsung, ini akan memperkaya ekosistem inovasi dan teknologi negara, menjadikan Malaysia lebih berdaya saing di peringkat antarabangsa.

Secara keseluruhannya, tenaga nuklear memegang potensi yang besar untuk memainkan peranan penting dalam mewujudkan masa depan yang lebih mampan dan lestari untuk Malaysia, baik dari segi tenaga, alam sekitar, mahupun ekonomi. Dengan pendekatan yang berhemah dan selamat, tenaga nuklear boleh menjadi salah satu tunjang utama dalam transformasi tenaga dan pembangunan ekonomi negara.

Disediakan oleh:
CHANG LIH KANG
Menteri Sains, Teknologi dan Inovasi

<https://my.lifenewsagency.com/2023/09/18/potensi-penggunaan-teknologi-nuklear-dalam-industri/>

19 September 2023



The Ministry of Science, Technology, and Innovation (MOSTI) is allocating RM5.3 million until 2025 to upgrade the nuclear technology application facilities and laboratories of the Malaysian Nuclear Agency (Nuklear Malaysia) in an effort to address the country's food security issues. Its minister Chang Lih Kang said the project, which started this year, seeks to improve food safety and security by increasing agro-food productivity through mutation breeding techniques. "In addition, the stable isotope technique is used to determine the authenticity of the food and verify the origin of the product," he said when winding up the debate for his ministry on the 12th Malaysia Plan Mid-Term Review at the Dewan Rakyat here today (September 19).

Chang said that MOSTI, as the leader of the science, technology, and innovation (STI) agenda, also played a role in helping to further strengthen the country's food security through the use of technology. The use of technology such as drones and robotics by local companies for the process of spraying fertiliser and planting trees can increase efficiency, thus reducing dependence on foreign labour. "In addition, the Malaysia Commercialisation Year (MCY) initiative has increased the commercialisation of local research and innovation from universities, institutions and local research agencies, where 474 local research and development (R&D) products or technologies have been commercialised and marketed, generating RM540 million in sales revenue," he said.

Chang said one of the outcomes of research on the agro-food sector done by agencies under MOSTI was the production of NMR 152 rice seeds by Nuklear Malaysia. He said the seeds can produce up to 10 tonnes of rice per hectare, compared to around six tonnes using normal seeds. "The production of NMR 152 seeds has also received various international recognitions, including the IAEA's (International Atomic Energy Agency) Outstanding Achievement Award, the Food and Agriculture Organisation of the United Nations (FAO) on Mutation Breeding in 2021 and 2014, and the Forum for Nuclear Cooperation in Asia (FNCA) Award 2020," he said. In the meantime, Chang said MOSTI was preparing guidelines for the feasibility study of space launch technology to ensure that the proposed launch site meets all the requirements set by the government.

He said that the industry interested in establishing a launch site should submit a feasibility report based on the guidelines for government evaluation purposes. "The government will hold engagement sessions with the local community if the study shows that the launch site is feasible," he said.

<https://www.businesstoday.com.my/2023/09/19/mosti-allocates-rm5-3-million-for-nuclear-technology-upgrades-to-enhance-food-security/>



MOSTI peruntuk RM5.3 juta naik taraf fasiliti, makmal depeni isu sekuriti makanan

Sep 19, 2023 #BuletinBernama

#BuletinBernama : Kementerian Sains, Teknologi dan Inovasi memperuntukkan RM5.3 juta sehingga 2025 untuk menaiktaraf fasiliti dan makmal aplikasi teknologi nuklear Agensi Nuklear Malaysia sebagai inisiatif mendepani isu sekuriti makanan negara. Menterinya, Chang Lih Kang berkata projek itu bermula tahun ini bertujuan meningkatkan keselamatan dan jaminan makanan menerusi peningkatan produktiviti agromakanan melalui teknik biak baka mutasi, termasuk penghasilan benih baru padi.

<https://www.youtube.com/watch?v=zWMyQKDOj3s>

20 September 2023



Chang Lih Kang (tengah) ketika merasmikan Dasar Teknologi Nuklear Negara 2030 pada Rabu - Gambar MOSTI

PUTRAJAYA: Malaysia menyasarkan peningkatan sebanyak 40 peratus penggunaan teknologi nuklear dalam bidang khusus sains, teknologi, inovasi dan ekonomi (STIE) daripada data asas bidang STIE semasa.

Menteri Sains, Teknologi dan Inovasi (MOSTI), Chang Lih Kang berkata, sasaran itu mampu dicapai menerusi kerangka Dasar Teknologi Nuklear Negara 2030 (DTNN 2030) beserta dokumen pelan tindakan yang telah disediakan. Jelas beliau, DTNN 2030 meletakkan strategi yang kukuh bagi menjayakan transformasi bidang teknologi nuklear. Ia bakal dipacu melalui kerjasama awam dan swasta bagi meningkatkan tahap penerimaan teknologi ini.

Melalui pelaksanaan DTNN 2030, bidang penyelidikan, pembangunan, pengkomersilan dan inovasi akan terus menjadi tonggak dalam pembangunan bidang sains, teknologi dan inovasi di bawah MOSTI. "Sejajar dengan ini, kerjasama dan penglibatan pelbagai pihak berkepentingan akan memacu kemajuan teknologi nuklear di Malaysia, yang akan membuahkan manfaat kepada rakyat," katanya ketika berucap merasmikan Dasar Teknologi Nuklear Negara 2030 di sini pada Rabu.

Mengulas lanjut, Lih Kang berkata, dengan memanfaatkan teknologi nuklear yang selamat dan berhemah, Malaysia dapat memenuhi keperluan sosioekonomi termasuk membuka peluang ekonomi dan pekerjaan baharu.

Pada masa yang sama, beliau berkata pelaksanaan DTNN 2030 akan membolehkan negara memaksimumkan manfaat penggunaan teknologi nuklear secara aman untuk pembangunan sosioekonomi negara dan meletakkan Malaysia setanding dengan negara-negara maju yang lain.

19 September 2023

Untuk tujuan ini, DTNN 2030 menetapkan empat Teras Strategik, 18 Strategi dan 13 sasaran utama melibatkan pihak berkepentingan dalam pelbagai sektor ekonomi yang telah dikenal pasti bagi mencapai visi dan hala tuju ekosistem teknologi nuklear negara.

Selain itu, dasar ini telah mengenal pasti enam Sektor Fokus Utama sebagai sektor yang boleh dipertingkatkan keupayaannya melalui penggunaan teknologi nuklear.

"Antaranya sektor perubatan dan penjagaan kesihatan, makanan dan pertanian, pembuatan peranti dan peralatan, pengurusan alam sekitar dan sumber asli, aplikasi perindustrian, serta keselamatan dan sekuriti nuklear," katanya.

Katanya lagi, Nuklear Malaysia akan bertindak sebagai agensi penyelaras untuk platform kerjasama nasional termasuk projek strategik berkaitan teknologi nuklear.

Nuklear Malaysia akan menerajui Jawatankuasa Teknikal Teknologi Nuklear Kebangsaan di mana ahlinya terdiri daripada pakar teknikal daripada agensi kerajaan yang berkaitan, institusi berasaskan negeri, pengawal selia, sektor swasta dan ahli akademik.

"Jawatankuasa ini akan berperanan untuk menyelaras, meneliti serta menasihati aspek teknikal berkaitan teknologi nuklear dalam pelaksanaan dasar ini," jelasnya.

<https://www.astroawani.com/berita-malaysia/malaysia-sasar-peningkatan-40-peratus-penggunaan-teknologi-nuklear-dalam-stie-438233>

Kerajaan Malaysia berhasrat untuk meningkatkan penggunaan teknologi nuklear sehingga mencapai 40 peratus menjelang tahun 2030. Ini adalah sebahagian daripada Dasar Teknologi Nuklear Negara 2030 (DTNN) yang baru dilancarkan oleh Menteri Sains, Teknologi dan Inovasi, Chang Lih Kang. Menerusi DTNN ini, kerajaan berharap dapat memacu pembangunan teknologi nuklear negara dan memberi tumpuan kepada penggunaan teknologi nuklear yang lebih meluas.

Chang Lih Kang menyatakan bahawa walaupun Malaysia telah menggunakan teknologi nuklear secara meluas lebih 40 tahun, penggunaannya masih rendah. Sebagai contoh, teknologi nuklear telah digunakan dalam sektor perubatan dan dalam pengeluaran makanan berkualiti. Oleh itu, dengan melancarkan DTNN, kerajaan berharap dapat mengarusperdanakan penggunaan teknologi nuklear di negara ini.

DTNN menetapkan empat teras strategik, 18 strategi dan 13 sasaran utama untuk memaksimumkan penggunaan teknologi nuklear secara aman dalam pembangunan sosioekonomi Malaysia. Ia juga mengenal pasti enam sektor fokus utama termasuklah perubatan, makanan, pembuatan peralatan, pengurusan alam sekitar, aplikasi perindustrian serta keselamatan nuklear.

Selain itu, kerajaan juga ingin melaksanakan projek perintis untuk melombong unsur nadir bumi di Gerik, Perak. Projek ini akan menguji teknologi dan teknik yang digunakan untuk mengelakkan pencemaran air serta isu alam sekitar yang lain. Projek perintis ini penting bagi memastikan teknik larut lesap in-situ selamat digunakan sebelum pembangunan industri mineral dijalankan.

Chang Lih Kang juga menyokong pendirian Perdana Menteri, Anwar Ibrahim, untuk mengharamkan eksport unsur nadir bumi. Beliau percaya bahawa larangan eksport tersebut akan membantu membangunkan industri nadir bumi di Malaysia dan memberikan pulangan maksimum.

Dalam majlis pelancaran DTNN, Chang Lih Kang juga menjelaskan bahawa kerajaan berhasrat untuk meningkatkan pelaburan dalam bidang teknologi nuklear. Malaysia pada masa ini hanya menggunakan kira-kira 20 peratus teknologi nuklear dengan nilai pelaburan kurang daripada RM1 bilion. Oleh itu, kerajaan berharap dapat memperluas penggunaan teknologi nuklear dengan nilai pelaburan industri sebanyak RM2.4 bilion menjelang tahun 2030.

Dengan memperluas penggunaan teknologi nuklear, kerajaan berharap Malaysia dapat setanding dengan negara maju lain dalam bidang teknologi nuklear. Ini akan membantu memacu pembangunan sosioekonomi negara dan memberikan manfaat kepada pelbagai sektor ekonomi.

<https://www.suara.my/news/headlines/msia-sasar-guna-teknologi-nuklear-40-peratus-menjelang-2030/>

20 September 2023



We are excited to announce the pivotal role of MSNT in the National Nuclear Technology Policy (DTNN) 2030, officially launched by YB Tuan Chang Lih Kang, Minister of Science, Technology and Innovation (MOSTI) today. This policy charts the path for the future of Malaysia's nuclear technology.

The primary objective of DTNN is to foster the development and consolidation of a sustainable national nuclear technology ecosystem, capitalizing on advancements in science, technology, and nuclear engineering to improve economic growth, knowledge generation, and societal well-being. As a crucial participant in this groundbreaking policy, MSNT will actively engage in the Advanced NDT Technology Development program flagship.

Through collaborations with key stakeholders, research institutes and universities, MSNT brings expertise and insights to drive the adoption of advanced NDT techniques. We aim to contribute to the country's economic advancement, foster the generation of knowledge and expertise, and ensure the well-being of society as a whole.

<https://www.msnt.org.my/dtnn2030/>

20 September 2023



郑立慷推介国家核技术政策，以实现国家核技术生态系统的愿景和大方向。

（布城20日马新社讯）科学、工艺及革新部长郑立慷指出，2030年国家核技术政策（DTNN 2030）将能够让马来西亚最大限度的和平使用核技术，以促进国家社会经济发展。

他今日推介国家核技术政策时说，该政策设定4大战略核心、18项策略和13项主要目标，以实现国家核技术生态系统的愿景和大方向。

“此政策所概述的策略和举措着重在创建永续的国家核技术生态系统，并奠定坚实的基础，以通过和平方式将大马的核技术主流化。”

郑立慷指出，国家核技术政策也鉴定6个可通过使用核技术提升能力的重点领域。

他说，这些领域分别是医药和保健、粮食和农业、器械和设备制造、环境和自然资源管理、工业应用，以及核安全和安保。

他说，通过国家核技术政策框架及已制定的行动计划文件，核技术在国家科学、技术、创新和经济（STIE）特定领域的使用率，将有望提高四成。

“通过国家核技术政策的落实，研究、开发、商业化和创新领域将继续成为科艺部底下科学、技术和创新发展的支柱。”

他提到，国家核技术政策是科艺部制定长期战略大方向的重要政策，以推动国家核技术发展至2030年，以及希望该政策能够作为大马实现昌明经济的战略指南。

他说，大马能够通过安全和谨慎的使用核技术，满足国家社会经济需求，包括开拓新的经济和就业机会。

郑立慷稍后对记者说，此政策有望在2030年达成24亿令吉的核技术投资目标。

他指出，科艺部将成立一个委员会，以确保国家核技术的使用率与发达国家一致，因为大马的这项技术在目前的使用率并不高。

<https://www.enanyang.my/>



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<https://www.chinapress.com.my/?p=3613476>

KOTA KINABALU: Kementerian Sains, Teknologi dan Inovasi (MOSTI) melalui Agensi Nuklear Malaysia (Nuklear Malaysia) menawarkan perkhidmatan penyelidikan dan pembangunan (R&D) berkaitan nadir bumi dalam sektor huluan.

Timbalan Menteri Sains, Teknologi dan Inovasi Datuk Arthur Joseph Kurup berkata antara khidmat yang ditawarkan itu melibatkan proses ekstraksi, pemisahan dan penulenan terutamanya berasaskan mineral seperti monazite dan xenotime. Nuklear Malaysia mempunyai pegawai penyelidik yang mempunyai kelayakan dalam bidang kimia, fizik, geologi, geofizik, keselamatan dan kesihatan, pengurusan sisa serta kejuruteraan dan pengendalian loji.

Pengalaman dan pengetahuan pegawai penyelidik Nuklear Malaysia di dalam aktiviti penyelidikan meliputi pengekstrakan unsur nadir bumi ringan (light rare earth element) iaitu cerium (Ce), lanthanum (La) dan neodymium (Nd).

Pengekstrakan unsur nadir bumi berat (heavy rare earth element) iaitu yttrium (Y) daripada sumber mineral xenotime dan juga Kajian Keberadaan dan Sumber Unsur Nadir Bumi di Malaysia.

Dalam menjalankan aktiviti R&D ini, Nuklear Malaysia turut bekerjasama dengan penyelidik tempatan daripada pelbagai institusi seperti Pusat Penyelidikan Mineral, Jabatan Mineral dan Geosains (JMG), Universiti Malaysia Pahang Al-Sultan Abdullah (UMPSA) dan beberapa universiti tempatan lain.

"Dengan wujudnya kerjasama antara agensi dan fasiliti penyelidikan di dalam bidang ini, lebih ramai kepakaran tempatan mampu diwujudkan dengan bilangan kepakaran mengkhusus dalam industri nadir bumi, seterusnya mengurangkan kebergantungan kepada pakar luar negara," katanya.

Beliau berkata demikian semasa menyampaikan ucapan penggulungan perbahasan ke atas Kajian Separuh Penggal Rancangan Malaysia Ke Dua Belas (KSP RMKe-12) di Dewan Negara. Empat Senator telah mengambil bahagian dalam usul perbahasan KSP RMKe-12 di Dewan Negara iaitu, Senator Jaziri Alkaf Abdillah Suffian, Senator Dr. Wan Wan Martina Wan Yusoff, Senator Dato' Ahmad Ibrahim dan Senator Norita Sual.

Mengenai kebimbangan terhadap pelepasan sisa air terawat daripada Loji Kuasa Nuklear Fukushima ke Lautan Pasifik, Kerajaan Malaysia telah membuat pemantauan aras sinaran berterusan dari masa ke semasa dengan menggunakan aset-aset di stesen-stesen pemantauan yang sedia ada sebagai langkah berjaga-jaga.

Berdasarkan rekod pemantauan termasuk data dari Stesen Pemantauan Air Gamma Spektrum (Gamma Spectrum Water Monitoring System – GSWMS) di Jeti UMS, Kota Kinabalu kata Arthur, tiada peningkatan aras sinaran yang ketara dikesan sejak dari pelepasan air terawat berkenaan.

Keputusan Kerajaan Jepun melepaskan sisa air terawat di perairan melalui Advanced Liquid Processing System (ALPS) setelah mendapat penilaian terperinci dan pemantauan ketat oleh pihak berkompeten iaitu Agensi Tenaga Atom Antarabangsa (IAEA).

IAEA dalam laporan yang telah dikeluarkan pada tahun 2023 bertajuk IAEA Comprehensive Report On the Safety Review of the ALPS Treated Water At the Fukushima Daiichi Nuclear Power Station menyatakan bahawa pelepasan sisa radioaktif ini ke Lautan Pasifik adalah mematuhi piawaian keselamatan antarabangsa serta menyebabkan impak radiologi yang boleh diabaikan (tidak signifikan) kepada manusia dan alam sekitar.

Walau bagaimanapun, Kerajaan Malaysia tetap mengambil langkah berjaga-jaga dalam memastikan keselamatan orang awam dan alam sekitar tidak tercemar melalui pemantauan aras sinaran berterusan.

"Bacaan purata kadar dos sinaran sepanjang September 2023 yang direkodkan oleh JTA hanya sebanyak 3 Nano Sievert/jam iaitu 500 kali lebih rendah daripada had kadar dos untuk orang awam," katanya.

<https://www.utusanborneo.com.my/2023/09/26/malaysia-ada-kepakaran-dalam-rd-industri-nadir-bumi>



Sesi Tetap Ke-67 Persidangan Agung International Atomic Energy Agency (IAEA), Vienna, 25-29 September 2023

26 Sept – Dr. Rosli Darmawan, Ketua Pengarah Agensi Nuklear Malaysia telah menyampaikan kenyataan negara semasa Perbahasan Umum Sesi Tetap Ke-67 Persidangan Agung IAEA. Beliau menekankan komitmen Malaysia dalam memajukan teknologi nuklear bagi tujuan aman melalui Dasar Teknologi Nuklear Kebangsaan 2030, menzahirkan kekusaran mengenai program nuklear dan peluru berpandu balistik Republik Rakyat Demokratik Korea (DPRK) dan menggesa supaya disambung semula dialog bagi penyahnuklearan di Semenanjung Korea, serta menyeru penerimaan skop perlindungan menyeluruh IAEA di Timur Tengah ke arah mewujudkan zon bebas senjata nuklear.

67th Regular Session of the General Conference of the International Atomic Energy Agency (IAEA), Vienna, 25-29 September 2023

26 Sept - Dr. Rosli Darmawan, Director General of Malaysian Nuclear Agency delivered a national statement during the General Debate of the 67th Regular Session of the IAEA General Conference highlighting Malaysia's commitment in advancing peaceful nuclear technology through its National Nuclear Technology Policy 2030, expressed concern over the Democratic People's Republic of Korea's (DPRK) nuclear and ballistic missile programme and urged for the resumption of dialogue for complete denuclearisation of the Korean Peninsula, and called for the acceptance of full-scope Agency safeguards in the Middle East as a confidence-building measure towards establishing a nuclear-weapon-free zone.

<https://www.facebook.com/MYembassyVienna>



Arthur said, with the existence of collaboration between agencies and research facilities in this field, more local expertise could be created with the number of expertise specialising in the rare earth industry, thereby reducing dependence on foreign experts.

KUALA LUMPUR: The Malaysian Nuclear Agency (Nuklear Malaysia) offers research & development (R&D) services related to rare earths in the upstream sector involving the study of the existence and exploration of resources and the intermediate sector involving the process of extraction, separation and purification mainly based on minerals such as monazite and xenotime.

Deputy Minister of Science, Technology and Innovation (Mosti) Datuk Arthur Joseph Kurup (pic) told the Senate that Nuclear Malaysia also has research officers with qualifications in chemistry, physics, geology, geophysics, safety & health, waste management as well as plant engineering and operation. He said the experience and knowledge of Malaysian Nuclear research officers in research activities include extraction of light rare earth elements, namely cerium (Ce), lanthanum (La) and neodymium (Nd); extraction of the heavy rare earth element that is yttrium (Y) from xenotime mineral resources; and Study of the Existence and Resources of Rare Earth Elements in Malaysia. "In carrying out this R&D activity, Nuklear Malaysia also collaborates with local researchers from various institutions such as the Mineral Research Centre, Department of Minerals and Geosciences (JMG), Universiti Malaysia Pahang Al-Sultan Abdullah (UMPSA) and several other local universities," he said in his winding-up speech in the debate on the Half-Term Review of the Twelfth Malaysia Plan (KSP 12th Malaysia Plan) of his Ministry at the Senate on Monday.

He was responding to Senator Dr. Hajah Wan Martina binti Wan Yusoff regarding sufficient experts in REE management so as not to depend on external experts. Arthur said, with the existence of collaboration between agencies and research facilities in this field, more local expertise could be created with the number of expertise specialising in the rare earth industry, thereby reducing dependence on foreign experts.

29 September 2023

Touching on Senator Norita Sual's concern regarding the release of treated water waste from the Fukushima Nuclear Power Plant into the Pacific Ocean, Arthur explained the Japanese Government's decision to release treated water waste into the waters through the Advanced Liquid Processing System (ALPS) after receiving detailed evaluation and strict monitoring by competent parties, namely the International Atomic Energy Agency (IAEA). The IAEA in a report issued in 2023 entitled IAEA Comprehensive Report on the Safety Review of the ALPS Treated Water at the Fukushima Daiichi Nuclear Power Station states that the release of this radioactive waste into the Pacific Ocean complies with international safety standards and causes radiological impacts that can negligible (not significant) to humans and the environment.

However, the Malaysian Government still takes precautionary measures to ensure the safety of the public and the environment is not contaminated through continuous monitoring of radiation levels from time to time by using assets at the station existing monitoring station. Based on monitoring records including data from the Gamma Spectrum Water Monitoring System (GSWMS) at UMS Jetty, Kota Kinabalu stated that no significant increase in radiation levels has been detected since the release of the treated water.

"The average radiation dose rate reading throughout September 2023 recorded by JTA was only 3 Nano Sievert/hour which is 500 times lower than the dose rate limit for the general public," he said. Responding the suggestions and views from Senator Dato' Ahmad Dato' Sri Haji Ibrahim on efforts to add value to Sarawak as a hydrogen and green technology hub, Arthur said Sarawak is a proactive state in the generation and implementation of green hydrogen initiatives.

The Sarawak Economic Development Corporation (SEDC) aims for Sarawak to start exporting green hydrogen on a large scale by 2027. He said under the short-term phase of HETR (2023 – 2030), the focus of implementation is to explore hydrogen initiatives through demonstration projects and further drive the domestic market as well as exports.

Arthur said this implementation would also be supported by a new policy that could provide incentives to interested parties for the use of the hydrogen ecosystem. This strategy will be gradually expanded with the concept of "Build Some, Buy Some." He said, Nano Malaysia (NMB), as an agency under Mosti, is now cooperating with SEDC Energy, Sarawak in various fields of hydrogen technology such as the development of Ground Power Units (GPU) as well as hydrogen-powered vehicles for the aerospace sector. These GPUs and hydrogen vehicles will be stationed at Kuching International Airport (KCH) to replace the existing diesel GPUs as well as the use of hydrogen-powered vehicles (Flight Pushback Tractor) for ground support services. "Mosti is always open to exploring opportunities to establish collaboration with the Sarawak Government and stakeholders in hydrogen-based renewable energy sources based on Sarawak's excellent performance in terms of hydrogen technology and economy," he said.

<https://www.dailyexpress.com.my/news/220746/nuclear-malaysia-has-qualified-research-officers-arthur/>



Idris (dua dari kiri) dan Pengerusi LKTN, Datuk Wan Abdul Rahim Wan Abdullah (tengah) menyampaikan sumbangan Tabung Kebajikan Industri Kenaf dan Tembakau (TKIKT) kepada pencarum di Ibu Pejabat LKTN, Kubang Kerian di Kota Bharu hari ini. Foto oleh ROSLIZA MOHAMED/KOSMO!

KOTA BHARU – Lembaga Kenaf dan Tembakau Negara (LKTN) bekerjasama dengan Agensi Nuklear Malaysia (ANM) untuk menghasilkan biji benih baharu untuk proses penanaman kenaf di Cuping, Perlis.

Ketua Pengarah LKTN, Idris Mohd. Salleh berkata, penggunaan biji benih baharu tanam kenaf yang masih dalam proses percubaan itu bermula pada September tahun lalu di kawasan seluas 200 hektar. Menurutnya, langkah percubaan menggunakan benih baharu itu dijalankan di Perlis kerana persekitaran dan cuaca panas di negeri terbabit sesuai untuk penanaman kenaf berbanding di tempat lain. Penanaman kenaf menggunakan benih baharu itu merupakan blok percubaan dengan kerjasama ANM untuk tujuan penyelidikan yang mengambil masa selama dua tahun.

“Penghasilan benih baharu itu menggunakan kaedah mutasi yang bertujuan untuk menghasilkan pengeluaran tanaman kenaf yang lebih tinggi dan keseragaman pokok yang sekata,” katanya pada sidang akhbar di Ibu Pejabat LKTN, Kubang Kerian di sini hari ini.

Mengulas lanjut, Idris memberitahu, penggunaan benih baharu yang masih dalam kajian itu juga akan diperluaskan ke negeri lain terutamanya melibatkan tananam kenaf. Katanya, sebaik proses penanaman percubaan berjaya, tananam secara lapangan akan dilakukan dengan segera. Perjanjian antara LKTN dan ANM dalam pembangunan benih mutasi kenaf sudah dilakukan pada tahun lalu. Kita menyambut baik langkah kerajaan yang bekerjasama dengan ANM.

“Selain penghasilan benih baharu, KTN turut memperluaskan tananam kenaf di Sabah dan Sarawak bermula awal tahun ini,” katanya. – KOSMO! ONLINE.

<https://www.kosmo.com.my/2023/10/25/lktn-agensi-nuklear-malaysia-cipta-benih-baharu-tanaman-kenaf/>

27 October 2023



Melaka Science, Technology, Innovation, and Digital Communication Exco Datuk Fairul Nizam Roslan (2nd left) and Malaysian Nuclear Agency director-general Rosli Darmawan (left) visit the exhibition space at the Targeted Promotion Programme (Technology Preview and Showcase) in Melaka October 27, 2023.
— Bernama pic

MELAKA, Oct 27 — The Nuclear for the People (N.U.R) programme is one of the initiatives by the Malaysian Nuclear Agency to introduce the usage and acceptance of nuclear technology across various fields to the public.

Malaysian Nuclear Agency Director-General Rosli Darmawan said the agency always promotes the technology in industries such as medicine, agriculture, environment, and manufacturing, improving the quality of life for the people. Through N.U.R, it is also hoped that it can change public perceptions of nuclear technology, focusing on its positive aspects rather than the negatives.

“Industries started acknowledging the contributions and integrating nuclear technology to enhance product quality and service improvements, ensuring maximum benefits in specific sectors,” he told reporters at the Targeted Promotion Programme (Technology Preview and Showcase) officiated by the state Science, Technology, Innovation, and Digital Communication Exco Datuk Fairul Nizam Roslan. Also present was the Malaysian Nuclear Agency Technology Commercialisation Division Director Rasif Mohd Zain.

Meanwhile, Rosli said the targeted promotion programme aims to facilitate connections between researchers and inventors from the Malaysian Nuclear Agency with industries and stakeholders, in introducing services and products developed through existing technologies and innovations. It also aims for a bigger impact by offering a comprehensive approach to the Malaysian Nuclear Agency’s products and services for specific industries and local customers, he added.

<https://www.malaymail.com/news/malaysia/2023/10/27/malaysian-nuclear-agency-d-g-nur-programme-initiative-to-introduce-nuclear-technology-to-the-public/98748>

MELAKA: The Malaysian Nuclear Agency is promoting the adoption of the NMR152 mutant rice variety among farmers to boost crop yields.

Malaysian Nuclear Agency Agrotechnology and Biosciences Division Director Dr Azhar Mohamad said the padi seeds of this variety have demonstrated high and stable yields in various environments. They are well-suited for cultivation in different soil series, especially in problematic soil areas.

Normally, these problematic soils yield less than one metric tonne. However, using NMR152 padi seeds and following proper planting techniques, crops can achieve yields between 40 and 60%.

"In the context of rice production in padi fields, employing high-quality seeds through nuclear technology, specifically using gamma ray-induced mutation breeding methods, can result in yields of nine to 11 metric tonnes, as opposed to the usual five to seven metric tonnes," he told reporters on Friday (Oct 27).

Earlier, Dr Azhar attended the Targeted Promotion Programme Series 3 officiated by the State Science, Technology, Innovation and Digital Communication Chairman, Datuk Fairul Nizam Roslan. Also present were Malaysian Nuclear Agency Director-General Dr Rosli Darmawan and the agency's Technology Commercialisation Division Director, Dr Rasif Mohd Zain.

Meanwhile, Fairul Nizam said he plans to discuss with the State Rural Development, Agriculture and Food Security Committee Chairman, Dr Muhamad Akmal Saleh, to leverage nuclear technology by expanding the NMR152 padi seed in Melaka.

"This helps control food prices long-term, giving significant advantages to people. I hope Melaka can become competitive in agricultural development, and agricultural commodities can achieve 100% self-sufficiency through market-driven agri-food approaches," he added.

<https://www.thestar.com.my/news/nation/2023/10/27/malaysian-nuclear-agency-promotes-wider-use-of-mnr-152-padi-seeds>

27 October 2023



Melaka: Agensi Nuklear Malaysia akan mempergiat promosi bagi memperluas penggunaan anak benih padi mutan NMR152 kepada pesawah, terutamanya di kawasan luar jelapang dalam usaha membantu mempertingkatkan hasil keluaran tanaman.

Pengarah Bahagian Agroteknologi dan BioSains Agensi Nuklear Malaysia Dr Azhar Mohamad berkata, benih padi varieti itu menunjukkan hasil tinggi dan stabil di pelbagai persekitaran dan sesuai ditanam di siri tanah berbeza terutamanya di kawasan tanah bermasalah.

Kebiasaannya, tanah bermasalah ini hanya mampu mengeluarkan hasil kurang daripada satu tan metrik tetapi dengan penggunaan benih padi NMR152 ini, tanaman mampu mengeluarkan hasil berganda antara 40 hingga 60 peratus dengan mengikut tatacara penanaman betul.

"Bagi hasil padi di kawasan jelapang pula, benih varieti berkualiti tinggi menggunakan teknologi nuklear kaedah biakbaka aruhan sinaran gama itu, ia mampu mengeluarkan hasil sembilan hingga 11 tan metrik berbanding hanya lima hingga tujuh tan metrik," katanya kepada media, di sini, hari ini.

Terdahulu, beliau hadir pada Program Promosi Bersasar Siri 3 yang disempurnakan oleh EXCO Sains, Teknologi, Inovasi dan Komunikasi Digital Negeri, Datuk Fairul Nizam Roslan dan turut dihadiri Ketua Pengarah Agensi Nuklear Malaysia Dr Rosli Darmawan serta Pengarah Bahagian Pengkomersilan Teknologi Agensi Nuklear Malaysia Dr Rasif Mohd Zain.

Mengulas lanjut, Azhar berkata, Agensi Nuklear Malaysia juga sedang dalam perbincangan membawa anak benih padi NMR152 ke Sabah untuk ditanam selain menjalankan kajian bagi membuat penilaian tahap kesesuaian dan jika berjaya pihaknya akan mengembangkan penggunaan varieti terbabit di negeri itu.

Katanya, padi itu mempunyai ciri-ciri berkualiti tinggi iaitu tahan pada perubahan cuaca tidak menentu seperti kemarau dan banjir iaitu mampu bertahan sekiranya terendam dalam air kira-kira 20 hari selain rintang terhadap penyakit karah.

Sementara itu, Fairul Nizam berkata, sektor pertanian juga memainkan peranan penting dalam pertumbuhan ekonomi Melaka dan pihaknya menyambut baik sokongan pihak kerajaan dan swasta yang menerokai peluang memodenisasikan sektor pertanian sebagai usaha membangunkan sektor itu secara lestari.

Katanya, pihaknya akan mengadakan perbincangan bersama EXCO Kemajuan Desa, Pertanian dan Keterjaminan Makanan Negeri, Dr Muhamad Akmal Saleh bagi memanfaatkan teknologi nuklear itu dengan memperluas penggunaan anak benih padi NMR152, sekali gus dapat mempertingkatkan hasil keluaran padi di Melaka.

Perkembangan ini memberi manfaat bagi jangka masa panjang khusus dalam aspek kawalan harga bekalan makanan yang memberikan manfaat besar kepada rakyat.

"Saya berharap, dalam masa beberapa tahun akan datang, Melaka dapat menjadi negeri yang kompeten dalam pembangunan sektor pertanian dan komoditi pertanian boleh mencapai 100 peratus tahap sara diri melalui pendekatan dan polisi agromakanan yang bersifat 'market-driven'," katanya.

<https://www.hmetro.com.my/mutakhir/2023/10/1024281/agensi-nuklear-malaysia-pergiat-promosi-luaskan-penggunaan-anak-benih-padi>

Mosti allocates RM15.73 million to boost research for use of nuclear tech in agriculture

8 November 2023



Datuk Arthur Joseph Kurup speaking during the Dewan Rakyat sitting today. - BERNAMA PIC

KUALA LUMPUR: The government, through the Malaysian Nuclear Agency (Nuklear Malaysia), has allocated RM15.73 million from 2016 to this year to intensify research, development, and innovation for the application of nuclear technology in agriculture.

Deputy Science, Technology and Innovation Minister, Datuk Arthur Joseph Kurup, said that nuclear technology was applied in the development of efficient agricultural management methods involving techniques for characterising soil fertility, fertilisation and water management strategies, and a system for monitoring and predicting the occurrence of plant diseases. "We have succeeded in producing and commercialising bio-fertiliser and chitosan products that can improve fertiliser efficiency across the agricultural produce chain," he said in reply to a question from Riduan Rubin (BEBAS-Tenom) on the extent to which nuclear technology has been optimally applied in agricultural innovation to improve quality and increase agricultural output.

According to Arthur, Nuklear Malaysia also developed a Gamma Greenhouse (GGH), which is recognised by the International Atomic Energy Agency as an 'IAEA Collaborating Centre' for providing irradiation services for plants and tissue culture materials for breeding and improving plant characteristics that can be used by the country's agricultural sector. He also said that the Science, Technology and Innovation Ministry (Mosti) has developed an alurtron plant at the Nuklear Malaysia facility to increase technical expertise in irradiation applications.

Arthur said the facility offers irradiation services for quality control of various products such as fruits, medical equipment, pharmaceutical products, food and cosmetics. The development of the Stable Isotope Analysis facility enables the classification of natural rice variety models using organic elements and isotope profiles to assist farmers in obtaining recognition for rice products such as the 'Geographical Indication' label and organic products. "Mosti is committed to advancing and strengthening agricultural research, development, and innovation in order to boost agricultural productivity and support the government's efforts to improve the quality and increase the country's agricultural produce," he said.

<https://www.nst.com.my/news/nation/2023/11/976274/mosti-allocates-rm1573-million-boost-research-use-nuclear-tech>



Arthur

KUALA LUMPUR - Kementerian Sains, Teknologi dan Inovasi (MOSTI) bercadang untuk menjalin kerjasama dengan Jabatan Pertanian Sabah (JPS) dalam penyelidikan varieti benih padi baharu sebagai usaha meningkatkan hasil tanaman padi tempatan.

Timbalan Menteri Sains, Teknologi dan Inovasi, Datuk Arthur Joseph Kurup berkata, cadangan tersebut sebagai alternatif untuk memberi pilihan kepada pesawah tempatan untuk mempelbagaikan jenis tanaman. Agensi Nuklear Malaysia sedang dalam usaha membawa dan mengkomersialkan varieti padi nuklear (NMR152) ke Sabah untuk mempelbagaikan benih padi sedia ada. "Cuma cabarannya ialah varieti ini belum diperakukan oleh JPS, maka kita tidak dibenarkan membawa masuk padi ini untuk digunakan di sana," katanya bagi menjawab soalan tambahan Riduan Rubin (BEBAS-Tenom) ketika sidang Dewan Rakyat pada Rabu.

Dalam pada itu Arthur berharap cadangan MOSTI tersebut disambut baik oleh JPS dengan memudahcara kelulusan penggunaan secara meluas padi NMR152 supaya hasil pembangunan dan penyelidikan (R&D) 'home grown' bernilai jutaan ringgit itu dapat dinikmati oleh semua rakyat termasuk di Sabah.

Sementara itu mengenai varieti NM152, Ahli Parlimen Pensiangan itu berkata, Agensi Nuklear Malaysia menghasilkan padi nuklear itu menggunakan teknik biak baka mutasi. Beliau menjelaskan, varieti itu berdaya tahan tinggi terhadap penyakit serta ancaman cuaca serta serangga. Hasil kajian mendapati varieti padi ini yang ditanam di pelbagai lokasi di Semenanjung Malaysia menunjukkan purata hasil padi boleh ditingkatkan dari 20 peratus hingga 60 peratus bergantung kepada lokasi, pengelasan tanah dan juga kaedah pengurusan sawah yang baik.

"NMR152 merupakan teknologi tempatan yang juga mampu mengurangkan kos input pertanian seperti baja antara 30 peratus hingga 50 peratus," jelasnya.

<https://www.sinarharian.com.my/ampArticle/633574>



Foto hiasan - NSTP/ASYRAF HAMZAH

KUALA LUMPUR: Pembangunan benih padi NMR152 atau lebih dikenali sebagai padi nuklear oleh Agensi Nuklear Malaysia, berjaya meningkatkan hasil padi.

Timbalan Menteri Sains, Teknologi dan Inovasi, Datuk Arthur Joseph Kurup, berkata peningkatan hasil padi itu bagaimanapun bergantung pada lokasi, pengelasan tanah dan kaedah pengurusan sawah yang baik.

Beliau berkata, padi nuklear dibangunkan menerusi teknik biak baka mutasi, yang mana varieti baka baharu tanaman itu berdaya tahan tinggi terhadap penyakit serta ancaman cuaca dan serangan

Varieti ini diperakukan oleh Jawatankuasa Bantuan Kerajaan Kepada Industri Padi dan Beras (JKBKKIPB), Kementerian Pertanian dan Keterjaminan Makanan, sebagai benih padi yang sah dan mula digunakan oleh petani bawah skim subsidi kerajaan.

"Hasil kajian mendapati varieti padi ini yang ditanam di pelbagai lokasi semenanjung menunjukkan purata hasil padi boleh ditingkatkan daripada 20 hingga 60 peratus, bergantung pada lokasi, pengelasan tanah dan kaedah pengurusan sawah yang baik," katanya pada sesi soal jawab lisan di Dewan Rakyat, hari ini.

Beliau menjawab soalan Riduan Rubin (BEBAS-Tenom) mengenai sejauh mana teknologi nuklear diaplikasikan secara optimum dalam inovasi pertanian bagi menambah baik kualiti, mutu dan meningkatkan hasil.

Dalam pada itu, Arthur berkata, Kementerian Sains, Teknologi dan Inovasi (MOSTI) memperuntukkan sebanyak RM15.73 juta bagi pembangunan teknologi nuklear dalam bidang pertanian sejak 2016 hingga tahun ini.

Katanya, penyelidikan, pembangunan dan inovasi dilaksanakan Nuklear Malaysia berjaya menghasilkan serta mengkomersialkan produk biobaja serta kitosan yang berupaya meningkatkan kecekapan penggunaan baja dalam rantai tanaman pertanian.

Beliau berkata, teknologi nuklear itu turut diaplikasikan dalam pembangunan kaedah pengurusan pertanian cekap membabitkan teknik pencirian kesuburan tanah, strategi pembajaan dan pengurusan air serta sistem pemantauan dan prediksi serangan penyakit tanaman.

Nuklear Malaysia juga membangunkan Loji Rumah Hijau Gamma (GGH) yang diiktiraf sebagai 'IAEA Collaborating Center' oleh Agensi Tenaga Atom Antarabangsa (IAEA) bagi menyediakan khidmat penyinaran tumbuhan dan bahan kultur tisu.

"Ia bagi tujuan pembiakbakaan dan peningkatan ciri tanaman yang boleh dimanfaatkan oleh sektor pertanian negara," katanya.

Beliau berkata, bagi meningkatkan kepakaran teknikal dalam aplikasi penyinaran pula, MOSTI membangunkan Loji ALURTRON dan Loji SINAGAMA di dalam fasiliti Nuklear Malaysia.

Katanya, ia menyediakan khidmat penyinaran bagi kawalan mutu pelbagai produk komoditi pertanian buah-buahan serta peralatan perubatan, produk farmasi, makanan dan kosmetik.

<https://www.bharian.com.my/berita/nasional/2023/11/1174727/pembangunan-padi-nuklear-berjaya-tingkatkan-hasil-padi>

9 November 2023



KUALA LUMPUR – Kementerian Sains, Teknologi dan Inovasi (MOSTI) mencadangkan untuk berkolaborasi dengan Jabatan Pertanian Sabah dalam penyelidikan varieti baharu di Sabah bagi meningkatkan hasil tanaman padi tempatan.

Timbalan Menteri Sains, Teknologi dan Inovasi, Datuk Arthur Joseph Kurup berkata ini disebabkan penggunaan benih padi NMR 152 yang dihasilkan Jabatan Nuklear Malaysia belum mendapat perakuan daripada Jabatan Pertanian Sabah untuk dibawa masuk ke negeri itu.

Selain itu katanya ini bagi meningkatkan kembali hasil padi sabah yang merosot sejak beberapa tahun kebelakangan ini.

Buat masa ini, Nuklear Malaysia dalam usaha untuk membawa dan mengkomersialkan benih padi NMR152 di bumi Sabah untuk mempelbagaikan benih padi sedia ada bagi memberi lebih pilihan kepada pesawah.

Cuma cabarannya ialah varieti ini perlu diperakukan oleh Jabatan Pertanian Sabah, maka kita tidak dibenarkan untuk membawa varieti tersebut untuk digunakan di bumi Sabah.

“Oleh itu, MOSTI mencadangkan untuk berkolaborasi dengan Jabatan Pertanian Sabah dalam penyelidikan varieti baharu diadakan di Sabah bagi meningkatkan hasil tanaman padi tempatan,” katanya.

Menurut beliau, penggunaan benih padi NMR 152 yang dihasilkan Jabatan Nuklear Malaysia menghasilkan sehingga 10 tan padi sehektar.

Arthur menambah, varieti padi NMR 152 mampu ditingkatkan dari 20% hingga 60% bergantung kepada lokasi, pengkelasan tanah dan juga kaedah pengurusan sawah yang baik.

Kajian juga mendapati penggunaan benih padi ini mampu mengurangkan input pertanian seperti baja diantara 30% hingga 50%. Justeru itu, perkara ini boleh mengurangkan kos pengurusan sawah oleh petani.

“Diharap melalui usaha bersepadu ini, Jabatan Pertanian Negeri Sabah akan bersedia memudahcara kelulusan penggunaan secara meluas benih padi NMR152 di Sabah supaya hasil R&D atau *home-grown technology* yang bernilai jutaan ringgit ini dapat dinikmati oleh rakyat Sabah,” katanya.

Beliau berkata demikian menjawab pertanyaan lisan Ahli Parlimen Tenom, Riduan Rubin mengenai sejauh mana pelaksanaan padi NMR152 dapat meningkatkan pengeluaran hasil padi di Sabah.

Riduan berkata ini bagi merealisasikan hasrat Kerajaan Negeri untuk menjadikan Sabah sebagai jelapang padi kedua menjelang tahun 2030.

<https://suara.tv/09/11/2023/mosti-cadang-kerjasama-dengan-jabatan-pertanian-sabah-tingkat-hasil-tanaman-padi/>

13 November 2023



Najat Mokhtar (IAEA Deputy Director General and Head of the Department of Nuclear Sciences and Applications), Ikram Mohd Ibrahim (Ambassador Extraordinary and Plenipotentiary of Malaysia to the Republic of Austria), Rosli Darmawan (Malaysian Nuclear Agency Director General) and Noraishah Pungut (Department of Atomic Energy Director General), Vienna, 27 September 2023. (Photo: D. Buerstedde/IAEA)

Malaysia has long been a regional leader in using nuclear applications to advance sustainable development both nationally and throughout Southeast Asia. Building on decades of cooperation, the IAEA has extended the designation of the Malaysia Nuclear Agency (MNA) as an IAEA Collaborating Centre in three research areas: plant breeding, non-destructive testing and radiation processing of polymers.

“Malaysia has taken great strides in applying nuclear technologies for development since the 1970s. Today, the MNA is widely recognised as a regional provider of expertise and capacity building in each of the three areas of the Collaborating Centre’s work,” said IAEA Deputy Director General and Head of the Department of Nuclear Sciences and Applications Najat Mokhtar at a signing ceremony held at IAEA headquarters on 27 September 2023 in the margins of the 67th General Conference.

“Malaysia is strongly committed to promoting peaceful applications of nuclear technology through the National Nuclear Technology Policy 2030, which was recently launched by the Minister of Science, Technology and Innovation. The redesignation of Malaysian Nuclear Agency as an IAEA Collaborating Centre marks a significant milestone in our nation’s journey towards harnessing advancements in nuclear technology,” said Malaysia Nuclear Agency Director General Rosli Darmawan.

13 November 2023

Plant breeding using nuclear techniques to speed up the natural selection process is a significant element in Malaysia's efforts to enhance the sustainability of its food and agriculture sector. This process, known as mutation breeding, produces stronger, more nutritious and higher-yielding crops. One successful example is the development of a new rice variety with improved ability to withstand both drought and flooding. The MNA's gamma greenhouse, a large-scale irradiation facility, allows researchers to expose plants to low-dose radiation over longer periods of time, offering enhanced possibilities to improve crops through natural selection. The Collaborating Centre will make extensive use of the gamma greenhouse facility, including by providing services to plant breeders across Southeast Asia.

Non-destructive testing (NDT), which is used to evaluate the properties of a material, component, structure or system for characteristic differences or welding defects and discontinuities without causing damage to the original part, has contributed to the competitiveness of Malaysia's manufacturing sector. For example, radiography is used to find cracks in welded joints in industrial piping. Malaysia has established a niche in Southeast Asia, offering non-destructive testing services to manufacturers in neighbouring countries. Several decades ago, the IAEA played an important role in establishing an accredited NDT training and certification scheme within the MNA. Today, the IAEA and the MNA are jointly pursuing research and training in advanced and novel non-destructive testing, making use of artificial intelligence, and developing prototypes of instruments and software. They are also working together to expand capacity building and training in the region.

Radiation processing of polymers has produced numerous new materials with desirable characteristics for the manufacture of medical devices, cables and other products, as well as biodegradable plastics. The IAEA's collaboration with the MNA focuses on strengthening the development of environmentally friendly polymers, including various forms of plastic and rubber in many common consumer products. Special attention will be given to recycling polymers and producing bio-composites, a blend of natural and synthetic materials. The MNA has played a major role in spreading this know-how throughout the region, increasing the availability and use of these products and helping to reduce plastic waste. MNA's expertise in radiation-based plastic recycling will also be put to good use in the IAEA's NUTEC Plastics Initiative, which aims to help reduce global plastic pollution by upgrading plastic recycling processes using nuclear techniques. Malaysia has recently been designated as a pilot country for this flagship IAEA initiative.

"The IAEA's partnership with the MNA in the Collaborating Centre will continue to be a driver of innovation for sustainable development in Malaysia and beyond," Mokhtar said.

<https://www.iaea.org/newscenter/news/iaea-collaborating-centre-in-malaysia-supports-sustainable-agriculture-and-industrial-development-in-southeast-asia>

15 November 2023



Datuk Arthur Joseph Kurup – Bernamapix

KUALA LUMPUR: The Ministry of Science, Technology and Innovation (MOSTI) has identified five primary perspectives for developing an ecosystem of advanced materials technology, which includes rare earth elements (REEs), the Dewan Rakyat was told today.

Its Deputy Minister Datuk Arthur Joseph Kurup said the perspectives include funding and financing as well as infrastructure development. For that purpose, he said MOSTI has implemented a number of initiatives for technology development, skill enhancement, and policy formulation. "The establishment of the National Advanced Materials Consortium (NAMC), which will serve as a communication hub for business development, will foster networking opportunities and engagements among stakeholders," he said during the question and answer session.

He was responding to a question from Datuk Ahmad Amzad Hashim (PN-Kuala Terengganu) about how the National Advanced Materials Technology Roadmap may assist the government in its plan to capitalise on REEs in the country.

In addition, Arthur said the Malaysian Nuclear Agency is responsible for providing technology and infrastructure for the development of REEs in the upstream and midstream ecosystems. He said that apart from graphene, nitinol, and microcrystalline cellulose polymers, REEs have been identified as one of the advanced materials that would bring market potential to industry players, with the worldwide REE market size reaching USD5.6 billion in 2021. Arthur added that the growing demand for electric vehicles has led to increased demand for REEs.

https://thesun.my/local_news/mosti-identifies-five-perspectives-for-developing-advanced-materials-technology-ecosystem-LC11751208

23 November 2023



The Lynas Advanced Materials Plant is seen in this general view taken in Gebeng, Pahang July 23, 2019. — Reuters pic

KUALA LUMPUR, Nov 23 — Three DAP MPs today asked the government to clarify a proposal for the extraction of thorium, which contains radioactive elements, from waste products produced by rare earths refiner Lynas at its plant in Gebeng, Pahang.

Kota Melaka MP Khoo Poay Tion, Bakri MP Tan Hong Pin and Raub MP Chow Yu Hui told a news conference at Parliament here that two conflicting statements from the government and Nuklear Malaysia regarding the extraction proposal had been made. The government had announced that this new proposal was by Lynas Malaysia and accepted by the Atomic Energy Licensing Board. However, Nuklear Malaysia Deputy Director-General Muhammad Rawi Mohamed Zin had said during a ‘Himpunan Hijau’ forum that the initiative came from Nuklear Malaysia and not from Lynas.

“It’s clear that there is a clash of statements between the government and Nuklear Malaysia. So we would like to ask, is this initiated by Lynas or Nuklear Malaysia?” Khoo asked. The ruling party MPs said the government needs to provide clarity due to public interest in the issue.

On October 24, Science, Technology and Innovation Minister Chang Lih Khang said the Atomic Energy Licensing Board (AELB) decided to amend Lynas Malaysia’s licence conditions after the company made a proposal to the licensing board about its thorium extraction technology. But on November 18, news portal Malaysiakini reported Muhammad Rawi who is in charge of Nuklear Malaysia’s research and technology development programme saying that his agency had made the proposal to extract thorium from Lynas’ waste as there is a “market” for the radioactive material.

“We would also like to ask, where is this said market for thorium? At the same time, thorium extraction is still in the testing phase globally, according to the Institute for Energy Economics and Financial Analysis, all nuclear reactors that use thorium fuel are still being studied or at the demonstration level. It has not been commercially launched.

27 October 2023

The International Atomic Energy Agency also said that extraction of thorium is very challenging and requires a huge budget.

“So, how far can thorium be extracted, used and marketed commercially? Has the water leach purification residue project research and development committee made periodic evaluation for instance, three or six months to ensure that the marketing process is done according to schedule and is in accordance with the safety standards?” Chow asked.

Chow, who is also a committee member of the environment, science and agriculture special select committee, also wanted assurance from the government that the Malaysian authorities are able to handle 1.2 metric tonne of radioactive waste that is currently collected at the Lynas plant in Gebeng. The three DAP MPs called on the government for another round of review of Lynas Malaysia's licence renewal and the proposal to extract thorium. They likened the situation to a factory found to be emitting pollutants and said in a normal situation, the polluting factory would be shut down and obliged to clean up its mess before it is allowed to resume operations. They questioned the “logic” in renewing Lynas Malaysia's licence when it has yet to address the 1.2 metric tonne radioactive waste issue.

This is not the first time DAP representatives have urged the government to rethink its decision concerning Lynas. In October, former Bentong MP Wong Tack told the government to prioritise safety first in handling Lynas' radioactive waste by making the company extract the radioactive thorium in Australia before shipping it to Pahang. He told the Science, Technology and Innovation Minister that since they had proven technology that the thorium can be extracted safely from feedstock and waste, then it should also be looked upon as an economic opportunity for Malaysians.

Wong had also said there is scepticism regarding Lynas' commitment to handling radioactive waste responsibly, as after 12 years of waste accumulation, the countless promises to remove or dispose of it have fallen on deaf ears.

On October 24, the AELB updated the licensing agreement of rare earths producer Lynas that allows its local chapter to import raw naturally occurring radioactive materials until March 2026 when its contract expires. Chang said his ministry is confident that the latest developments will protect public interest by keeping all operations above board.

<https://www.malaymail.com/news/malaysia/2023/11/23/who-proposed-to-extract-thorium-from-lynas-waste-backbenchers-ask-govt-citing-conflicting-info/103713>

11 December 2023

Seeking Sabah's nod for new paddy variety



Arthur said the study also found that the use of these paddy seeds can reduce agricultural inputs such as fertiliser between 30pc to 50pc. Therefore, this matter can reduce the cost of paddy field management by farmers.

KUALA LUMPUR: The Ministry of Science, Technology and Innovation (Mosti) told Parliament efforts are underway by, Nuclear Malaysia to introduce and commercialise NMR152 paddy seeds in Sabah so as to diversify and give more choices to farmers.

This variety needs to be certified by the Sabah Agriculture Department. So we are not allowed to bring that variety to be used in Sabah yet.

"Therefore, Mosti proposes to collaborate with the Department in the research for new varieties to increase yield," said its Deputy Minister, Datuk Arthur Joseph Kurup.

Arthur hoped the Department would facilitate the approval of the widespread use of NMR152 seeds in Sabah so the results of R&D or home-grown technology worth millions of ringgit can be enjoyed by the people of Sabah.

<https://www.dailyexpress.com.my/news/225122/seeking-sabah-s-nod-for-new-paddy-variety/>

Radio & Television

SUMMARY OF ELECTRONIC
(RADIO & TELEVISION) MEDIA COVERAGE 2023

BIL	MEDIA	MONTHLY COVERAGE												TOTAL
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	
1	RADIO					1	2		1		3			7
2	TELEVISION	1					1				1			3
	TOTAL	1				1	3		1		4			10

DATE	MEDIA	TITLE	GUEST
17 May 2023	Ai FM	"Teknologi Nuklear Untuk Manfaat Rakyat"	Mr. Raymond Yapp
8 June 2023	NASIONAL fm	"Teknologi Nuklear- Lahir Tenaga Pakar"	Ms. Nor Hadzalina Bt Sukarseh
16 June 2023	SELANGOR FM	"Bicara Khas-Manfaat Teknologi Nuklear Dalam Industri"	Mr. Md. Fakarudin Bin Ab. Rahman
23 August 2023	SABAH fm	"Jom Kenali Nuklear Malaysia"	YBrs. Ts. Dr. Ishak Bin Mansor
17 October 2023	JOHOR fm	"Cakna Nuklear Malaysia"	YBrs. Dr. Muhammad Rawi Bin Mohamed Zin
18 October 2023	Ai FM	"Hala Tuju Dasar Teknologi Nuklear Negara 2030"	Mr. Raymond Yap
19 October 2023	MELAKA FM	"Cakna Nuklear Malaysia"	YBrs. Ts. Dr. Husaini Bin Salleh

DATE	MEDIA	TITLE	GUEST
6 January 2023	tv1	“Teknologi GPR Kesan Jasad Manusia”	Dr. Rasif Bin Mohd Zain & YM Tengku Sarah Tengku Amran
12 June 2023	tv1	“Teknologi Nuklear – Pengkomersialan Untuk Masyarakat”	Dr Rasif Bin Mohd Zain
18 October 2023	tv1	“Hala Tuju Dasar Teknologi Nuklear Negara 2030”	YBrs. Dr. Faridah Binti Mohamad Idris

12 June 2023

NUKLEAR MALAYSIA

KEMENTERIAN SAINS, TEKNOLOGI DAN INOVASI

50

spm Nadi Seri Pagi Selamat Pagi Malaysia

rtm Teman Setia Anda

**" TEKNOLOGI NUKLEAR -
PENGKOMERSIALAN UNTUK
MASYARAKAT "**

12 Jun 2023 (Isnin) | 8.40 pagi

f LIVE selamatpagimalaysia

tv1 BERITA SALURAN 123 MYTV broadcasting RUM

MALAYSIA MADANI

Ber Samsa,
Dr. Rasif bin Mohd Zain
Pengarah Bahagian Pengkomersialan Teknologi
Agensi Nuklear Malaysia

f Nuklear Malaysia Agensi Nuklear Malaysia nukearmalaysia @NuklearM www.nuclearmalaysia.gov.my @nuklearmalaysiaofficial

TV1
SELAMAT PAGI MALAYSIA (SPM)



TEKNOLOGI NUKLEAR UNTUK MANFAAT RAKYAT

17 Mei 2023 (Rabu) | 9.00 pagi

 **LIVE** AiFM



Bersama
En. Raymond Yapp
Pegawai Penyelidik
Agensi Nuklear Malaysia



 Nuklear Malaysia  Agensi Nuklear Malaysia  nuklearmalaysia  @NuklearM  www.nuclearmalaysia.gov.my  @nuklearmalaysiaofficial

AI FM

The poster is for a radio program on NASIONAL fm. At the top, it features the NUKLEAR MALAYSIA logo, the Malaysian coat of arms, and a 50th anniversary emblem. The program is titled "TEKNOLOGI NUKLEAR-LAHIR TENAGA PAKAR" and is scheduled for 8 Jun 2023 (Khamis) at 10.30 pagi. It is a live broadcast on NASIONAL fm at 88.5 fm. The host, Puan Nor Hadzalina Bt Sukarseh, is shown on the right. The background has a blue and purple molecular theme. Social media and website links are at the bottom.

NUKLEAR MALAYSIA

KEMENTERIAN SAINS, TEKNOLOGI DAN INOVASI

50

NASIONAL fm
Bersempadan FM

ALFA
ANALISIS • LAPORAN • FAKTA • AGENDA

"TEKNOLOGI NUKLEAR-LAHIR TENAGA PAKAR"

8 Jun 2023 (Khamis) | 10.30 pagi

f LIVE NASIONAL fm
Frekuensi : 88.5 fm

MALAYSIA MADANI

Bersama
Puan Nor Hadzalina Bt Sukarseh
Pengurus Pusat Kecemerlangan Nuklear
Agensi Nuklear Malaysia

f Nuklear Malaysia • Agensi Nuklear Malaysia • nuklearmalaysia • @NuklearM • www.nuclearmalaysia.gov.my • @nuklearmalaysiaofficial

NASIONAL FM

NUKLEAR MALAYSIA

KEMENTERIAN SAINS, TEKNOLOGI DAN INOVASI

50

**"BICARA KHAS -
Manfaat Teknologi Nuklear
Dalam Industri"**

16 Jun 2023 (Jumaat) | 11.30 pagi

f LIVE SELANGORFM100.9 MHz

Bersama

Encik Md. Fakarudin bin Ab. Rahman
Pengurus Pusat Khidmat,
Kumpulan Teknologi Penilaian Loji,
Bahagian Teknologi Industri,
Agensi Nuklear Malaysia

SELANGOR fm
Pilihan Terbaik

MALAYSIA MADANI

[f Nuklear Malaysia](#) [Agensi Nuklear Malaysia](#) [nuklearmalaysia](#) [@NuklearM](#) www.nuclearmalaysia.gov.my [@nuklearmalaysiaofficial](#)

SELANGOR FM

The poster features a central image of a man in a dark suit and glasses. The background is dark blue with vibrant, glowing wavy lines in shades of blue, purple, and pink. At the top, there are three logos: 'NUKLEAR MALAYSIA' with a stylized atom symbol, the Malaysian coat of arms with the motto 'BERSEKUTUAN SAMA, TEKNOLOGI DAN INOVASI', and a '50' anniversary logo. The main title 'JOM KENALI NUKLEAR MALAYSIA' is written in large, bold, white capital letters with a black outline. Below the title, a yellow banner contains the date and time '23 Ogos 2023 (Rabu) | 11.30 pagi'. Underneath this, a Facebook 'LIVE' icon is followed by the text 'SABAHfm Bagus Bah'. The name 'YBrs. Ts. Dr. Ishak bin Mansor' is written in a mix of bold and cursive fonts, with 'Ber sama' in cursive above it. Below the name is his title: 'Pengarah Kanan, (Program Pengkomersilan dan Perancangan Teknologi) Agensi Nuklear Malaysia'. At the bottom left is the 'SABAH fm Bagus Bah' logo. At the bottom right is the 'MALAYSIA MADANI' logo. A footer bar at the very bottom contains social media and website links: Facebook (Nuklear Malaysia), YouTube (Agensi Nuklear Malaysia), Instagram (nuklearmalaysia), Twitter (@NuklearM), and the website (www.nuclearmalaysia.gov.my), along with the official Instagram handle (@nuklearmalaysiaofficial).

NUKLEAR MALAYSIA

BERSEKUTUAN SAMA, TEKNOLOGI DAN INOVASI

50

**JOM KENALI
NUKLEAR MALAYSIA**

23 Ogos 2023 (Rabu) | 11.30 pagi

f LIVE SABAHfm Bagus Bah

Ber sama
YBrs. Ts. Dr. Ishak bin Mansor
Pengarah Kanan,
(Program Pengkomersilan
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17 Oktober 2023 (Selasa) | 2.30 petang

 **JOHORfm - PERMATA SELATAN**

Bersama
YBrs. Dr. Muhammad Rawi bin Mohamed Zin
Timbalan Ketua Pengarah (Program Penyelidikan dan Pembangunan Teknologi)
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FM 101.9mhz

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**HALA TUJU DASAR TEKNOLOGI
NUKLEAR NEGARA 2030**

18 Oktober 2023 (Rabu) | 9.00 pagi

 **LIVE** **AI FM**

FM 100.9 MHz



Ber sama
Encik Raymond Yapp
Pegawai Penyelidik
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CAKNA NUKLEAR MALAYSIA

19 Oktober 2023 (Khamis) | 1.30 petang

f LIVE MELAKAfm

DIALOG 1.30

FM 102.3 mhz

MELAKA fm
Mempesankan

Bersama
YBrs. Ts. Dr. Husaini bin Salleh
Pengarah
(Bahagian Keselamatan dan Kesihatan Sinaran)
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MELAKA FM

6 January 2023

**ALAT PENGESAN GPR
BANTU KESAN JASAD MANUSIA**

6 Januari 2023 (Jumaat) | 8.30 pagi

f LIVE selamatpagimalaysia

tv1 **BERITA** **RTM**
SALURAN 123 SALURAN 123

YM Tengku Sarah Binti Tengku Amran
Pegawai Penyelidik,
Kumpulan Integriti Struktur & Bahan (MSI)
Bahagian Teknologi Industri

YBrs. Dr. Rasif Bin Mohd Zain
Pengurus
Pusat Pengurusan Penyelidikan
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**"HALA TUJU DASAR
TEKNOLOGI NUKLEAR
NEGARA 2030"**

18 Oktober 2023 (Rabu) | 8.25 pagi

f LIVE selamatpagimalaysia

spm Nadi Seri Pagi

tv1

Bersama
YBrs. Dr. Faridah binti Mohamad Idris
Pengarah Kanan
(Program Pengurusan)
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