三大目标，五大战略！马来西亚发布氢经济技术路线图

马来西亚副首相拿督斯里法迪拉·尤索夫在马来西亚《2023国际绿色科技和生态产品展览会暨会议》上发布了马来西亚备受期待的**《氢经济技术路线图》**。

氢路线图旨在成为马来西亚《国家能源政策2022-2024》的支持文件，该政策设想在马来西亚发展氢经济。此前，马来西亚于2023年8月29日发布了《国家能源转型路线图》，其中将氢确定为推动该国到2050年成为净零排放国家的六大能源转型杠杆之一。

马来西亚的氢能现状

氢被广泛认为是未来的替代燃料。除了在减少温室气体排放方面发挥作用外，氢还可以利用其多用途的性质来解决能源安全问题。日本、韩国和新加坡等国正在积极采取措施发展氢经济。

沙捞越州是马来西亚氢能行业的先锋，正在开发两个主要的氢制造项目，预计将于2027年开始运营，以及一个利用氢动力智能电车的城市交通系统，该系统已开始在古钦进行测试。此外，还有一些项目正在筹备中，重点关注氢在电信、交通和生产等领域的利用。

尽管如此，在马来西亚，氢作为燃料的使用仍处于起步阶段。生产成本高，使得冒险开发氢气的经济可行性不那么有吸引力。此外，还必须考虑到氢的运输和储存方面的困难。此外，该国还缺乏明确的法律和监管框架，这对潜在投资者来说是一个阻碍因素。

马来西亚的氢能源目标

氢路线图认识到需要解决上述挑战，以使氢成为可行的燃料来源，并在马来西亚发展氢经济。为此，氢路线图设定了三个目标：

1、氢将成为马来西亚新能源经济的基石，该国在全球氢供应链方面建立了强大的影响力。

2、马来西亚将通过促进氢在能源储存和联合循环燃气轮机中的燃料使用，实现可持续的能源结构，并增加清洁能源在该国能源结构中的份额。

3、马来西亚将投资氢技术，以解决国内消费、能源安全、国际能源贸易的可持续性和脱碳问题。

实现这三个目标将以五个战略重点为前提，下文将加以展示。

氢能路线图下的五大战略重点

氢路线图下的每一项战略重点都提出了拟议的行动计划，摘要如下：

#1: GOVERNANCE SYSTEM, INSTITUTIONAL FRAMEWORK & REGULATORY	Upcoming
STRATEGY	**ACTION PLAN**
National Hydrogen Governance and Ecosystem	• Establish a National Hydrogen Economy and Technology Steering Committee to provide direction on, facilitate and oversee national hydrogen initiatives and hydrogen export. • Develop collaborative platforms and strategic partnerships on a government-to-government basis with countries such as Singapore, South Korea and Japan. • Implement a centralised database and impact tracking system for monitoring of the status of technology development across the hydrogen value chain in Malaysia.
Regulatory framework, and existing policies and legislation	• Review and identify measures for the hydrogen economy, including amendments to existing regulations under the Gas Supply Act 1993 as well as developing guidelines for a verifiable certification system and guarantees of origin scheme and safety aspects across the value chain. • Enhance mechanism to facilitate hydrogen production and consumption in the power sector, including conducting studies on special tariffs for generation, business models and blending of up to 20% hydrogen in combined cycle gas turbine power plants. • Adopt hydrogen taxonomy, technical codes and safety standards across the value chain to facilitate future trade of hydrogen.

#2: ENABLING ENVIRONMENT AND ECONOMIC INSTRUMENTS	
STRATEGY	**ACTION PLAN**
Accelerate adoption of hydrogen by local industries	• Introducing subsidies and incentives for generation and adoption, which will involve phasing out fossil fuel subsidies for diesel vehicles. • Establish dedicated funding and allocation to support hydrogen initiatives. • Establish a National Hydrogen Fund for hydrogen projects and technology. • Develop portfolio for feedstock availability and supply to support hydrogen production. • Study economic feasibility of production of blue hydrogen from natural gas together with / carbon capture, utilisation and storage facilities. • Source opportunities from energy-related mobility trends in the heavy vehicles segment and public transport, including tracking developments on future powertrains and determining fuel of the future. • Capture value pools from international marine bunkering fuel regulations. • Track developments in aviation that affect energy demand.
Accelerate transition to circular economy	• Study feasibility of adoption of hydrogen economy by industries through a circular economy approach.
Low-carbon hydrogen to mitigate greenhouse gas emissions	• Implement low-carbon hydrogen projects that contribute to Malaysia's long-term low emissions development strategies.

#3: COMMERCIALISATION OF TECHNOLOGY TO ENABLE EXPORT AND DOMESTIC UPTAKE	
STRATEGY	**ACTION PLAN**
Advancing research and development, innovation, commercialisation and economy with a build-some, buy-some strategy	• Increase renewable energy competitiveness for hydrogen production from renewable energy sector, including a demonstration project for hydrogen production through on-site, off-grid generation and an industrial-scale project by both local and international players to support domestic consumption and export. • Develop localised hydrogen infrastructure for domestic consumption and export, including the deployment of hydrogen fuel-cell trucks for transportation of hydrogen and large-scale hydrogen production plants. • Allow for technology penetration into the market with a build-some, buy-some approach. • Develop integrated low-carbon and hydrogen industrial clusters for captive production and demand.

#4: CAPACITY DEVELOPMENT AND CAPABILITY ENHANCEMENT	
STRATEGY	**ACTION PLAN**
Build competent and adaptive talent for the hydrogen economy	• Leverage hydrogen talent development to cater to job losses among low-skilled workers and increase awareness in hydrogen-related education and career pathway.
Strengthen knowledge for continuous enhancement of skills	• Develop a dedicated continuous development programme in hydrogen covering the value chain. • Implement an effective science, technology, engineering and mathematics education that incorporates a hydrogen component. • Enforce local content and transfer of knowledge and technology.

#5: COMMUNICATION, EDUCATION AND PUBLIC AWARENESS	
STRATEGY	**ACTION PLAN**
Enculturation and acculturation of hydrogen economy	• Create awareness to the consumers through the application of hydrogen as a fuel in public transport. This will include deployment of hydrogen fuel cell-powered public transport in the Federal Territory. • Nurture interest and awareness in hydrogen-related education and career pathway through strategic partnerships with local and foreign industries. • Develop understanding on the application of hydrogen through platforms with substantial public outreach.

氢作为马来西亚未来的燃料

实现氢路线图下的目标将是一个渐进的过程，实施各种行动计划的目标时间表从2024年到2050年不等。然而，这一路线图标志着马来西亚氢经济发展的开始，预计到2050年将产生890亿令吉(约189亿美元)的潜在收入。这也反映了马来西亚正在为解决和管理能源三难困境所做的努力。

（全球氢能网、新能源网综合）

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