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Letter to Editor

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Need for cautious approach on alternative energy proposals in NETR

Sahabat Alam Malaysia (SAM) welcomes the launch by the Prime Minister of the National Energy Transition Roadmap (NETR) Phase 2 on 29 August 2023. We commend the government for being proactive in charting the roadmap in our energy transition that reduces our dependence on fossil fuels as we move towards a low carbon economy.

The setting up of the RM 2 billion seed fund for the National Energy Transition Facility is a step in the right direction in galvanising further finance for the energy transition.

However, as we navigate the challenges involved in the transition we have deep concerns over some of the proposals currently being touted in the NETR, such as hydrogen and carbon capture, utilisation and storage (CCUS) technologies, which we believe require more thorough assessments and debate before they are accepted as appropriate solutions.

The NETR is clear in its policy direction to rely on grey hydrogen until 2050 and to completely phase out the use of grey hydrogen as a feedstock by 2050. Grey hydrogen is produced from the fossil fuel industry, and because of its origin from fossil gas and the leakage along its life cycle, hydrogen contributes to climate change by emitting high levels of methane. Methane is a potent greenhouse gas, 86 times more powerful than carbon dioxide.

Currently, the warming effects of hydrogen could have been underestimated for two reasons: first is because the effects of hydrogen in the stratosphere have not been considered in the accounting¹; second, a study by Ocko and Hamburg (July 2022) pointed out that the standard methods for characterizing climate impacts of gases consider only the long-term effect from a one-time pulse of emissions, but for gases like hydrogen whose impacts are short-lived, this long-term framing masks a much stronger warming potency in the near to medium term.

This warrants further attention because hydrogen is a small molecule known to easily leak into the atmosphere, and the total amount of emissions from leakage, venting, and purging, etc in the existing hydrogen systems remains unknown. Therefore, the effectiveness of hydrogen as a decarbonization strategy, especially over timescales of several decades, remains unclear but what is clear is the high level of methane emissions.

Blue Hydrogen is fossil or grey hydrogen with an additional step of carbon capture and storage (CCS). A Cornell University study published in August 2021 finds that the fugitive methane emissions for blue hydrogen are higher than for grey hydrogen due to an increase of natural gas to power the carbon capture, even though the carbon dioxide emissions are lower. The study further reveals that the greenhouse gas footprint of blue hydrogen is more than 20% greater than burning natural gas or coal for heating and 60% greater than burning diesel oil for heating, with a conclusion that the use of blue hydrogen appears difficult to justify on climate grounds.²

Green hydrogen requires vast amounts of precious water resources and the process also demands huge amounts of cheap renewable electricity, which make green hydrogen highly inefficient. The proposed hydrogen economy will increase pressure on the sustainability and security of our existing water resources, exacerbated by the climate crisis.

The NETR has also proposed an initiative to explore hydrogen co-firing with coal and there is also a flagship catalyst project of co-firing of hydrogen and ammonia. Ammonia co-firing also has limited emissions reduction potential and will risk increasing lifecycle emissions.³ Nitrogen oxides are the by-product when burning ammonia⁴, which belong to a family of poisonous, highly reactive gases⁵; while hydrogen is highly flammable and can cause fires and explosions if not handled properly.

In relation to CCS technology, this is one of high risk, high cost and unproven at scale. A report by Institute for Energy Economics and Financial Analysis (IEEFA) (September 2022) which reviewed 13 operational large scale CCS projects concludes that failed/underperforming projects considerably outnumbered successful experiences and 73% of carbon dioxide captured annually is for enhanced oil recovery to extract more oil and gas.

The challenges in developing CCS are not just due to the technology's nascent status as stated in the NETR, but also present serious health, safety and environmental risks. CCS involves a massive network of pipelines connected to underground injection sites, each with its own set of dangers. Pipelines can leak or rupture; compressed carbon dioxide is highly hazardous upon release and can result in the asphyxiation of humans and animals.⁶ The pipeline rupture in Satartia, US saw mass poisoning from carbon dioxide and underscores growing concerns across communities that face the prospect of more carbon dioxide pipelines being built to address climate change.⁷

According to another report by IEEFA, the two CCS projects in Norway which are often cited as proof of the technology's viability, subsurface unknowns can arise at any point and present material ongoing risks that may ultimately negate some or all the benefits it seeks to create.

Further, while the NETR does not refer to reliance on nuclear energy, news that the government has not ruled this out is a matter of utmost concern. A Stanford-led research finds that the new small modular reactors (SMRs), which have been touted as the future of nuclear energy, will actually generate more radioactive waste than conventional nuclear power plants. This presents a massive challenge in relation to radioactive waste management.

Clearly, there is much need for holistic environmental, social and economic assessments into all these new technologies, before embracing and embarking on them. This includes the need for meaningful consultations with civil society and concerned members of the public.

The energy transition is indeed challenging but it does require carefully considered policies and solutions that help us solve the climate crisis, and not create new ones which we are unable to control, regulate and govern properly.

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¹<https://www.edf.org/blog/2022/03/07/hydrogen-climate-solution-leaks-must-be-tackled#>; here is the link to the new study <https://acp.copernicus.org/articles/22/9349/2022/>

²This study also featured in this article on The Guardian <https://www.theguardian.com/environment/2023/mar/07/hydrogen-clean-fuel-climate-crisis-explainer#:~:text=Production%20of%20both%20grey%20and,and%20steel%20among%20other%20industries>.

³<https://www.e3g.org/news/explained-why-ammonia-co-firing-in-coal-power-generation-is-a-flawed-approach/#:~:text=The%20%E2%80%9Cco%2Dfiring%20ratio%E2%80%9D,a%20fertiliser%20and%20chemical%20feedstock>.

⁴<https://www.cetjournal.it/cet/21/89/103.pdf>

⁵<https://www3.epa.gov/region1/airquality/nox.html>

⁶<https://www.ciel.org/issue/carbon-capture-and-storage/>

⁷<https://www.opb.org/article/2023/05/21/us-co2-pipelines-poisoned-town-wants-you-to-know-its-story/>