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Can Fusion Energy Contribute in Achieving Carbon Neutrality in Thailand?

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Fusion reactions fuse light nuclei to form a heavier nucleus and release a huge amount of energy. In tokamaks and stellarators, this starts by heating magnetically-confined plasma until the light nuclei could overcome a Coulomb barrier and reach fusion conditions. Neutrons, one of the two products of the fusion reactions, are then captured with its kinetic energy converted to electricity generation. This MeV-scale reaction energy produces essentially no greenhouse gases. International-wise, fusion reactors at 1000-MW scale are envisaged as an alternative and GHG-free energy source in 2040s to 2050s. With such a plan for commercialization of fusion energy technology in a global stage, is Thailand ready to incorporate this advanced energy source in its energy mix by the time? Thailand aims to reach carbon neutrality in 205x and net zero emissions by 206x. Can fusion energy then contribute to strengthen the electricity stability in this bold plan? Is our ecosystem in terms of infrastructure, frontier sciences, research and development and human resource development for fusion technology up and ready to meet this grand demand? This contribution aims to address this question, summarize the preparation and project the ways forward.

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