Contribution ID: **428** Type: **Oral**

The nuclear power plant with high temperature gas cooled reactor and chemical process equipment as an option for solving the problem of large scale production of low carbon hydrogen

Nuclear power is a reliable and stable source of energy in context of global reduction of carbon dioxide emissions. Nuclear power may be used for desalination of sea water, production of low-carbon hydrogen, district heating and other industrial applications.
The development of nuclear hydrogen energy in Russia involves both large-scale production of hydrogen and related products using thermochemical processes (for example, steam reforming of methane) at specialized nuclear power plants with high-temperature gas-cooled reactors, as well as local production of hydrogen by water electrolysis at electrolysis facilities powered by electricity from nuclear power plants.
This paper will describe the progress in development of an innovative project of Rosatom State Corporation, i.e. a nuclear power plant with the gas (helium)-cooled high-temperature reactor (HTGR) (with thermal capacity of 200 MW) integrated with chemical process equipment for hydrogen production.
The purpose of the HTGR is to generate high-temperature thermal power to be transferred to the chemical process equipment for large-scale, competitive hydrogen production.
The use of the HTGR as a source of thermal power will provide for significant reduction of carbon dioxide emissions that are inevitably produced in hydrogen production processes that use methane not only as a raw material for steam reforming of methane, but also as a fuel to provide heat necessary for process running.

Country OR International Organization

Russian Federation

Email address

pavlikhina@okbm.nnov.ru

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Author: PAVLIKHINA, V. (Afrikantov OKBM JSC)

Co-authors: LAZAREV, A. (Afrikantov OKBM JSC); SHMELEV, I. (Afrikantov OKBM JSC); KODOCHIGOV, N. (Afrikantov OKBM JSC); ISHCHENKO, T. (Afrikantov OKBM JSC); PETRUNIN, V. (Afrikantov OKBM JSC)

Presenter: PAVLIKHINA, V. (Afrikantov OKBM JSC)

Track Classification: Topical Group A: SMR Design, Technology and Fuel Cycle: Track 5: Non-Electric Applications for SMR