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IDNES a CEA projet dedicated to SMR concept for decarbonization beyond pure power generation

Launched in 2020 within the French Alternatives energies and Atomic Energy Commission (CEA), the IDNES (Innovative Decarbonized Nuclear Energy Systems) project aims to take a new approach to the use of civil nuclear power generation, expanding its role beyond power production to provide other energy carriers by developing energy system concepts that include Small Modula Reactor (SMR) technology. After a first phase of the project, the development and study status are presented in this paper.
The work program was initially designed with a 15-year vision aligned with the carbon-neutrality objective by 2050. It has focused primarily on energy markets where decarbonization is a major challenge. This work has identified two markets to be potentially addressed by SMR technology: heat and hydrogen, that can be produced by cogeneration.
After an introduction of the methodology used to draw up technical specifications for new markets to be decarbonized, the main configuration of the different concepts developed in the project are explained:
- pure heating SMR ARCHEOS concept,
- coupled system between SMRs and High Temperature Steam Electrolyzers (HTSE) for hydrogen production and kerosene synthesis,
- SMR coupled with massive heat storage for industry supply.

Lastly, industrial prospects will be presented.

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Confirm that the work is original and has not been published anywhere else

YES

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