As part of the TPP-RSU project sponsored by the Science Fund of the Republic of Serbia, a paper "Numerical investigations of steam accumulator dynamics: Assessment of computational models" was published in the prestigious international "Journal of Energy Storage" (doi.org/10.1016/j .est.2024.112633).

Steam accumulators are key components of thermal energy storage systems in various plants using fossil or renewable energy sources. The use of steam accumulators enables the maximum use of renewable energy sources of the sun and wind, providing energy in periods of low solar and wind yields, harmonizing the available electricity production capacity with consumer needs and stable operation of thermal energy and power systems. Accurate prediction of steam accumulator dynamics is a key factor for the design and reliable operation of energy storage systems.

The paper compares modern computer models of numerical calculations of steam accumulator dynamics. The focus is on the modelling of transient processes during accumulator charging and discharging, using the mass and energy balance of a two-phase vapour-liquid system and equilibrium and non-equilibrium models for predicting evaporation and condensation.

In this paper, an improved correlation was introduced for determining the concentration of the dividing surface of the phase transition, which takes into account the geometry and dimensions of the steam accumulator, i.e. the influence of the ratio of the wetted surface in the accumulator container to its volume. The validation of the results was performed on the basis of available data measured on industrial and laboratory accumulators and confirms the reliable prediction of transient processes in steam accumulators of different volumes.

The paper is available for reading and downloading until August 21, 2024 at the following link: https://authors.elsevier.com/a/1jMLs,rUrFtwIt