CAPTURE project proposes a new concept of central receiver system based on a Decoupled Solar Combined Cycle (DSCC). A non-pressurized volumetric receiver is employed to feed the solar turbine using a fixed bed regenerative heat exchanger system for connecting both, pressurized and non-pressurized air loops. The fixed bed regenerative heat exchangers are alternatively connected to the two different air loops through a group of two way on-off valves. Thus, the system allows the continuous operation of the receiver and the turbine through the charging and discharging of a certain number of fixed bed regenerators.

For the regenerative bed stacked metallic wire mesh screens with plain square weave are selected as porous media for the heat exchange, a commonly employed configuration in high performance Stirling engine regenerators.

For the modeling task, one-dimensional dynamic parametric model have been developed in Modelica® with these characteristics:

- Fluid flow is normal to wire screens
- Geometric parameters: wire diameter, aperture and thickness of the screen; number of stacked screens; diameter and length of the cylindrical bed
- Different matrix volumetric porosity expressions can be selected
- Thermal properties of the metallic material are temperature dependant (four different materials are already available in the model)
- DryAirNasa (Modelica Standard Library) selected as air model
- Different fluid friction and heat transfer correlations from available works on wire screens are implemented
- Regenerative bed can be divided into nodes representing radial sections of the matrix material
- Heat losses to the ambient are negligible

The model is part of a public deliverable of CAPTURE project that will be published on the website.