MultiComponentMultiPhase – a framework for thermodynamic properties in Modelica

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This paper describes the development and requirement specification of an open-source framework for multi-phase multi-component thermo properties in Modelica. The goal is to have a standardized interface to multi-component multi-phase fluids with access to external property packages in Modelica. This will make it easier to develop models for e.g. the process industry. The library uses a model based interface and implications of such a design are analyzed and compared with the traditional function based interface.

The availability of properties for steam and flue gases initiated the use of Modelica in the power industry, where it today is a well-established technology with several commercial and open source libraries available. High quality fluid properties are laborious to produce and their non-availability is therefore a typical blocking argument for the use of a certain tool or technology.

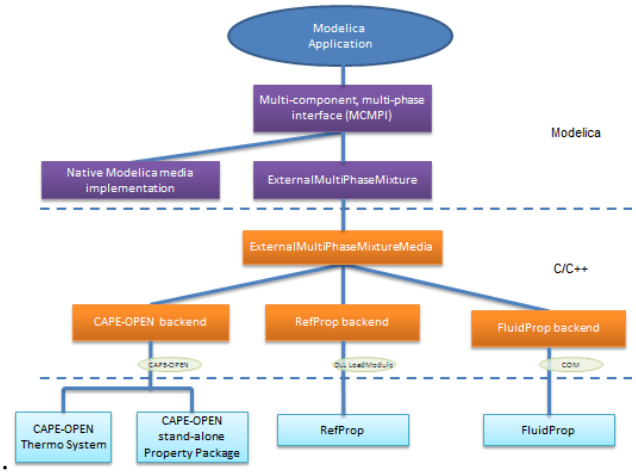

Figure 1. Overview of external framework structure.

In this project a Modelica library for multi-phase multi-component fluids has been developed together with an external C/C++ Modelica property interface with back ends to CAPE-OPEN, RefProp and FluidProp. The framework also contains a Modelica library for distillation processes for verification and testing of the media interface design.