

OBJECTIVES

The programme proposes a detailed study of such combined manganese oxides, in combination with studies of fluidized bed reactor design, actual operation in small pilot plants and modelling to provide a basis for commercialization and scale-up of this new principle of combustion. Thus, the objectives include:

- 1) fundamental and applied research on a new class of oxygen carriers having three decisive key properties for the use of CLC with solid fuels, in combining i) low cost, ii) the capacity to release oxygen and iii) good fluidizing properties, and closely linking this work to the proposed use of these materials in chemical-looping combustors
- 2) basic research in fluid dynamics of fluidized reactor systems, with purpose to increase understanding of key elements specific for adopting known fluidized bed technology to special application of CLOU
- 3) detailed investigations in fluidized-bed reactors of fuel conversion behaviour in interaction with oxygen carriers having the capacity to release oxygen. This will involve the continuous operation in chemical-looping reactor systems of different sizes and design.
- 4) the formulation of an aggregated model, using results from 1) and 2) which will give submodels for fluidization, oxygen release, direct reaction of combustible gases with oxygen carrier materials, steam gasification of char and char oxidation by oxygen released. The model will be validated and improved by the results from 3) and used to assess the full-scale design.