ASGARD project's main objective is to provide a structured R&D framework bridging the research on fuel fabrication and reprocessing issues. The main focus will lie on future fuels for a sustainable nuclear fuels cycle. The main problem today is to tie the recycling of the nuclear fuel to the fabrication of new fuels.

Seen in this context the outline of the work on each of the fuel types will be:

DISSOLUTION of irradiated and unirradiated fuel | CONVERSION | FABRICATION

The sustainability circle for nuclear fuel where ASGARD project fills the gap between the main focus of FP7 ACSEPT and FP7 FAIRFUELS projects.

Objective

ASGARD project's main objective is to provide a structured R&D framework bridging the research on fuel fabrication and reprocessing issues.

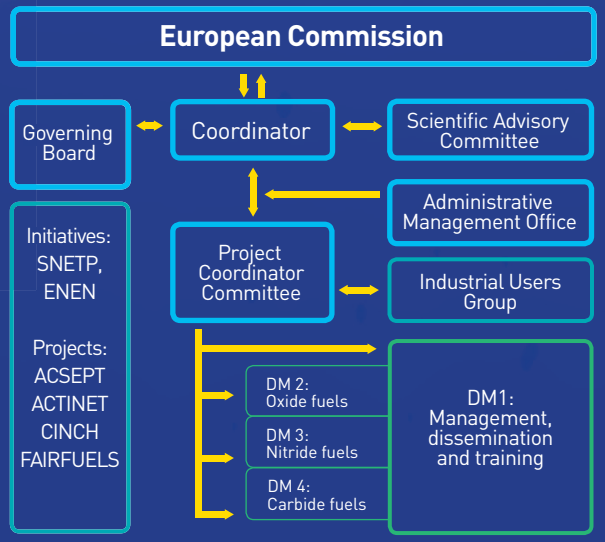
The main focus will lie on future fuels for a sustainable nuclear fuels cycle. The main problem today is to tie the recycling of used nuclear fuel to the fabrication of new fuels, which show efficient recycling (transmutation) behaviour in new reactor systems. ASGARD is coordinated by Chalmers University of Technology, Sweden.

Scope

In order to make nuclear power sustainable there is a clear need to close the fuel cycle and at the same time, if possible, find methods that shorten the storage time of the waste and increase energy utilization. New fast reactor systems together with a fully developed recycling strategy are needed to achieve this ambitious goal.

The scope of the project is to bridge existing knowledge in nuclear fuel manufacturing with existing knowledge in separation techniques used for waste treatment and recovery and to investigate the production and behaviour of new novel and improved nuclear fuels for the next generation of nuclear reactors. The targeted result of the project itself is to interconnect the recycling of the nuclear fuel to the fabrication of new nuclear fuel. Both oxide, nitride and carbide fuels are addressed with focus on dissolution, reprocessing and fabrication behaviour.

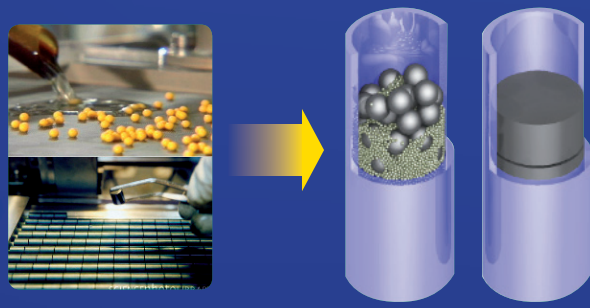
Organisation of the project



Expected results

Results from carbide fuel production and reprocessing will provide an insight into the safest and most economical carbide fuel design and establish the safest way to process carbide fuel whilst minimizing waste production.

Concerning nitride fuels, the impact of carbon and oxygen impurities on the dissolution rate in nitric acid will be clarified. As data from the literature are ambiguous, these results will be of particular importance for industrial application of nitride fuels in Gen-IV systems. From the industrial perspective, an even more important result will be the ability to enrich N-15 at a sufficiently low cost, as well as to recover N-15 during the dissolution process. The feasibility of reaching this goal will depend on the required N-15 enrichment, the corresponding cost of enrichment, losses of N-15 in the fabrication process and the efficiency of N-15 recovery during dissolution. The ASGARD project will provide industrial objectives for the combined performance of these aspects.



Societal impacts

Seen in this context, ASGARD contributes significantly to increasing the sustainability of nuclear energy by bridging the investigations of the fuel recycling research.

ASGARD will investigate the fabrication and dissolution behaviour of novel fuels for fast critical reactors. The knowledge advances of ASGARD will show to Governments, European Utilities and Technology providers that there are several options to the manufacturing and recycling of the novel fuels. It is of vital interest for the project that the outcome will be meaningful for the fuel manufacturing industry. To analyze the results of ASGARD with respect to their applicability in industry, an Industrial Users Group is involved in the project.