3.1 Publishable summary

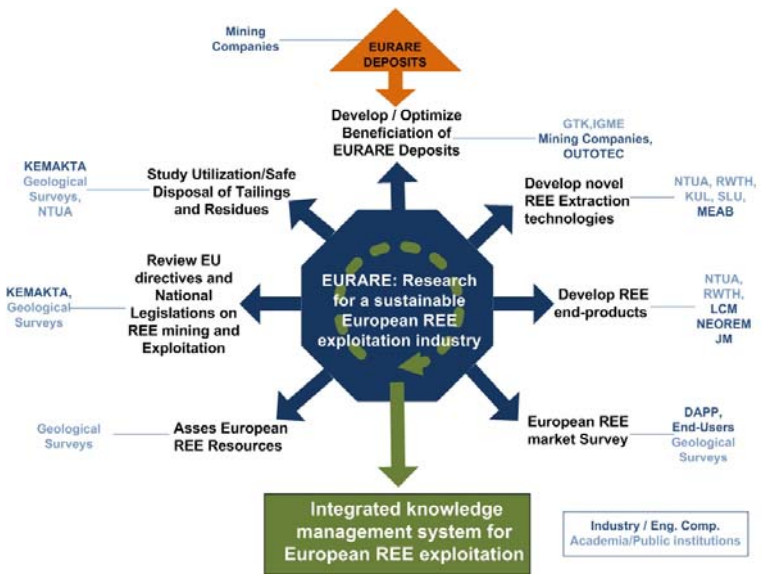
1. About the EURARE project

www.eurare.eu

The main goal of the EURARE project is to set the basis for the development of a European REE industry that will safeguard the uninterrupted supply of REE raw materials and products crucial for the EU economy industrial sectors, such as automotive, electronics, machinery and chemicals, in a sustainable, economically viable and environmentally friendly way. This goal will be achieved through:

- The **mapping**, characterization and technological and economic evaluation of the **REE resources in Europe**
- The development, optimization and demonstration of innovative technologies for the efficient exploitation of European REE resources with minimal impact on the environment. This will be done in compliance with the EU environmental legislation and in a manner acceptable to European citizens
- The establishment of the **critical mass** of scientists and engineers to support the REE exploitation, processing and manufacturing industry
- The development of an **Integrated Knowledge Management System** (IKMS) for EU REE resources, which will provide information on REE and build up the knowledge to be developed within the frame of the project.

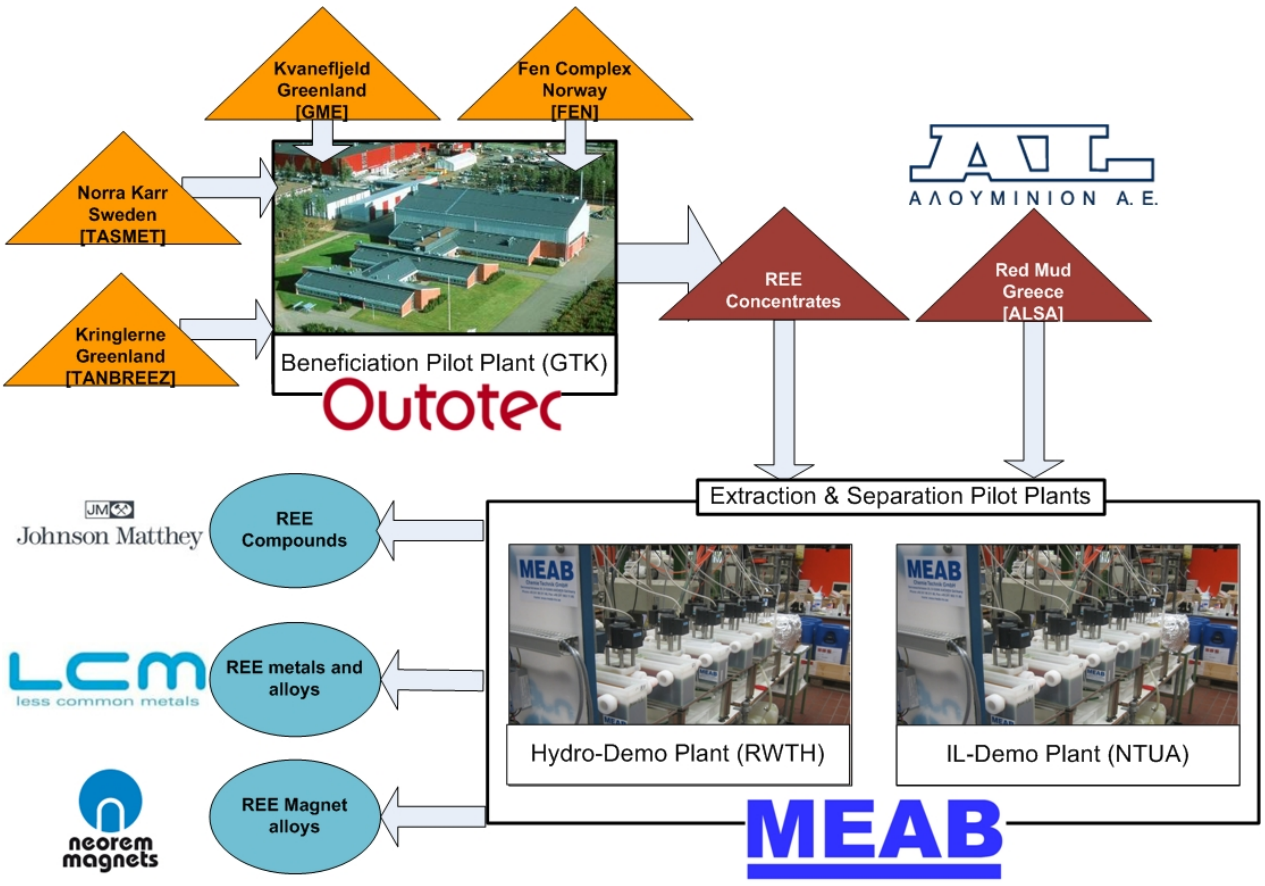
Thus the EURARE project sets about to achieve the following scientific and technical objectives



1. Definition and assessment of exploitable **REE mineral resources** and REE demand in Europe.
2. Development of sustainable and efficient **REE Ore Beneficiation Technologies**, that will lead to the production of high grade REE concentrates and minimization of produced tailings
3. Development of sustainable **REE Extraction and Refining Technologies**, to produce pure REE oxides, REE metals and REE alloys suitable for use in downstream industries
4. The development of a **strategy for safe REE mining and processing**
5. **Field Demonstration** of the novel EURARE REE exploitation technologies.
6. Identification of novel sustainable exploitation schema for Europe's REE deposits.

Within the EURARE project REE mineral deposits from 4 different European regions will be mined and beneficiated with novel sustainable technologies at GTK's EURARE beneficiation pilot plants. The concentrates produced along with the Red Mud by-product from primary aluminum production will be

used in two Processing pilot plant set up in RWTH (Aachen) and NTUA (Athens) respectively. The final products, REE compounds, REE metals and REE magnets will be evaluated by appropriate European End-Users.



The EURARE project, through the achievement of the abovementioned objectives and the realization of its ambitious workplan is expected to help in:

- Promoting sustainable / holistic mining and ore beneficiation technologies in Europe
- Fostering the development of new mining and extractive industries in Europe / Jump starting a European REE industry
- Strengthening the leadership of European technology developers and providers in extractive metallurgy
- Securing critical raw material supply in Europe, as
  - The Kvanefjeld project (examined in EURARE) could potentially supply >20% of global REE demand (Europe currently imports 14% of the global REE production)
  - The Norra Karr project examined in EURARE) could potentially supply 14% of the projected 2014 world demand in Dy oxide, 7% in Tb oxide and 2.2% of Nd oxide.
- Creating and sustaining jobs in critical industrial sectors (automotive, renewable energy, electronics and others) for Europe

The EURARE project is co-funded by the European Commission (EC) under the 2012 Cooperation Work Programme for Nanotechnologies, Materials and new Production Technologies and specifically the raw materials topic NMP.2012.4.1-1 "New environmentally friendly approaches in minerals processing". The project began on the 1st of January 2013, and will run for five years. It has a 13,845,950 EUR total budget of which up to 9,000,000 EUR may be funded by the EC.

2.First Year of the project

During the first year of the project the following achievements have been made:

- The geological surveys of the consortium have compiled a list of European REE occurrences, which currently contains 81 occurrences in 20 countries and details the mineralogical characteristics of each case. This list will be transferred to an on-line system (interactive map) within the next year.
- The consortium members dealing in ore beneficiation collected and analysed chemically and mineralogical samples from 4 EURARE deposits, mentioned in section above, as well as samples from 2 new European REE deposits explorations. Following the evaluation of these results, beneficiation testwork began on Kvanefjeld (Greenland), Norra Karr (Sweden), Olserum (Sweden) and Nea Peramos (Greece) deposits. First flowsheets were determined and medium grade REE mineral concentrates with high REE recoveries were obtained.
- The consortium members dealing in REE extraction technologies, started their work on available low grade ore concentrates and within the first year have already produced two novel process for achieving efficient REE recovery utilizing either aqueous or ionic liquid solutions
- The consortium members dealing in REE separation have already produced first positive result in two innovative process for separating REE, utilizing either immiscible Ionic Liquids or surface-modified nanomaterials.
- The consortium members dealing in the Environmental Health and Safety issues involved with REE mining and processing have delivered a first internal EHS guidance report and have produced their first survey of European legislation and identification of need for new legislation for REE mining and processing.
- The consortium has announced the first conference on European Rare Resources which will be held in 4-7 September 2014 in Milos Island, Greece.