The challenge for the four-year ProMine Project, coordinated by GTK, was to find ways to reduce the EU’s overall dependence on metals and mineral imports. The net cost of such imports to the EU is around €11 billion a year.

ProMine launched in 2009 and was followed by intense research and development work until 2013. The project brought together 31 partner organizations, and gave over 400 "Prominers" from eleven European countries opportunities to participate in various project work packages.

The project covered a wide range of themes from 3D and 4D modeling for the mining industry and mapping of Europe’s strategic metal and mineral resources to creation of novel nano-products and sustainable mineral processing methods.

At the start of the project, research teams organized under six work packages representing the full spectrum of the minerals cycle operated quite independently. As the project evolved, however, work package themes were gradually weaved together and interaction among the research teams intensified. A great help in achieving this important target was also due to the novel knowledge management techniques employed. Shared findings helped bolter the work of other groups.

Remarks GTK’s Juha Kaija, ProMine’s project manager:
– There’s not a person on earth who could have managed all of the work packages single-handedly or the massive amounts of information they generated. Good cooperation was a must. Work package leaders were selected because they were leading experts in their particular fields.

While Kaija oversaw ProMine’s administrative challenges, the late Gabor Gaál, professor and senior GTK geologist, coordinated the intricate technical aspects of the work. He made sure the all teams hit their research targets on schedule. The cooperation with the EU Commission officers, also proved to be excellent.

WIDE-RANGING BENEFITS
When the EU granted ProMine funding, it insisted on results that benefit EU policymaking in the mining sphere, as well as actual commercial impacts. This has already happened.

Products with commercial potential have already been demonstrated by this EU project for nano-particle products from new mineral resources.
ProMine has created an excellent network of expertise that should deliver results long after the project’s completion.”

For example, the companies involved in the project can show 14 patents already granted or pending – and more patent filings are expected. Of the filed patents, five relate to the use of rhenium compounds in industry and one the use of schwertmannite as an adsorbent for wastewater treatment. The other eight have to do with uses of nanosilica in the construction and paper industries.

While the high level of patent activity suggests commercial potential of ProMine innovations, some project findings are not of a patentable nature. For example, one of the project’s biggest accomplishments, the online Pan-European Mineral Deposit Database, a searchable geographic information system (GIS) that comprises the European Mineral Deposit database and the Anthropogenic Concentration Database, (http://ptrarc.gtk.fi/ProMine/default.aspx).

NEW NETWORK EMERGES
– ProMine was an excellent experience. The teams melded together to create a whole greater than the sum of its parts. Credit goes largely to Gabor Gaál, whose vision unites us today for the benefit of all Europeans. Gabor’s illness and sudden passing just as ProMine was reaching the finishing line was a huge loss to all of us that will be felt for years, says Kaija.
– From a personal standpoint, the best achievements of this project have been the friendships gained and the network of expertise that has emerged. These new relations will continue to spawn new projects long after the conclusion of ProMine.

In September 2013, for example, we saw the launch of the Minerals4EU project, that is not solely legacy of ProMine. For example, the work of EuroGeoSurveys Mineral Expert Group and its members was crucial. The Minerals4EU project is made up of 32 partner organizations representing 22 EU countries and 4 partners from associate or ICP countries.

One goal of the project is to create a knowledge data platform with much of the substantial content coming from ProMine sources. Without ProMine, the GTK-coordinated Minerals4EU project would have been difficult to implement.

What has ProMine achieved so far?

The EU wanted to see tangible results in the areas of assessing EU resources and sustainability, as well as the creation of new products. The products had to be genuine European products, not simply proposals on paper. The processes had to truly benefit European industry. In these respects, the EU got what it paid for. ProMine successfully created new mineral products from European minerals. It identified new methods for handling mine wastes and byproducts, as well as exploiting the nano-materials from them. Lifecycle analyses were performed on the developed products.

NANOSILICA FOR CONCRETE AND THE PAPER INDUSTRY
Nanosilica from the olivine byproduct generated at magnesite mines was demonstrated to be a good substitute for cement in concrete. The new concrete is not only more durable but also lighter, which translates into transportation savings in the case of concrete building elements. Nanosilica’s utility as a paper coating for binding abrasives to sandpaper and as a replacement for organic binders in ink-jet printing was shown.

SCHWERTMANNITE FOR WASTEWATER TREATMENT
A team working with Schwertmannite, an iron-rich orange precipitation sometimes associated with acid mine drainage, devised a way to convert the mineral into high-quality pigments for the paint and ceramic industries. Schwertmannite was also demonstrated to be an excellent adsorbent for wastewater treatment that performs as well as commercial treatments in such areas as arsenic removal.

RHENIUM FOR AEROSPACE
The rhenium group developed processes for spherical rhenium and several new rhenium compounds. The work has attracted the interest of jet turbine makers, who see the possibility of using rhenium compounds on turbine blades and engines to increase their high-temperature durability.

3D/4D MODELING FOR THE MINING INDUSTRY
3D and 4D models were developed for four major European ore belts located in Scandinavia, Germany, Poland, Greece and the Iberian Peninsula. Ore deposits were modeled to depths as great as five kilometers. 4D, which adds the time dimension to the model, was shown to help in understanding how ore deposits evolved at a specific site. Such modeling should help our understanding of geological processes and suggest new areas with ore potential for study.