Mature oil shale processing technologies used in Estonia

Jaanus Purga, Viru Keemia Grupp AS, Estonia

In Estonia, Eastern Europe, oil shale has been successfully used for production of liquid fuels, gas, power, cement and chemicals for more than 80 years. Estonian oil shale is has high organic matter content up to 35%, a caloric value 8-12 MJ/kg, and a commercial oil yield of 120-170 l/mt. As mineral part of oil shale is mainly limestone, raw oil shale, spent shale from oil processing and shale ash from power stations are suitable feedstock for cement industry.

Viru Keemia Grupp AS (VKG) production facilities produce different grade shale fuel oils, high-grade coke and chemicals. VKG's power stations produce power and heat for the local community and industry from shale gas. Oil shale processing expansion is VKG's no.1 priority for coming years.

There are two types of commercial oil shale processing technologies currently used in Estonia – one (KIVITER) with gaseous heat-carrier for lump-size oil shale and other (GALOTER) with solid heat carrier for fine-size oil shale. With some adaptation, both processes are suitable for processing most shales of the world. Both processes have advantages and disadvantages that are compared in presentation. VKG is using KIVITER technology and currently designing modified GALOTER process for the next expansion project, scheduled to be constructed in 2008-2009.

Common understanding about oil shale processing is related to the liquid fuels production that should be direct alternatives for conventional oils. More simply – there should be additional common gasoline and diesel fuel available made from oil shale.

From the business standpoint, it may be much more profitable to use specific properties of shale (and shale oil) as an additional marketing argument instead of trying to make shale oil as close to the conventional oil as possible. Therefore, specific research of raw materials properties is highly recommended for developing optimum product slate. As properties of shale from various deposits differ from each other, it is likely that list of the profitable products will be specific for every location.