

## **Adaptation and scale-up of the Enefit technology**

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The Enefit technology has been developed over many years for surface processing of Estonian oil shale at an industrial scale. In 2009 Eesti Energia began working with Outotec to further develop and scale up the technology resulting in the construction of a new plant currently being commissioned in Narva, Estonia. During this time, the joint venture Enefit Outotec Technology (EOT) was formed to become the developer of the Enefit technology. The Enefit technology is now being considered for several shale oil extraction projects in other countries including USA and Jordan. However, oil shale deposits around the world vary significantly in both composition and site conditions. The Enefit technology will need to be adapted to suit the unique oil shale properties and site conditions for each project. Also there are economies of scale to be achieved by further scale-up of the technology. EOT is developing concepts to adapt the Enefit technology to suit oil shales of different organic yields, moisture content, carbonate decomposition, and fines generation and for locations with variable water or natural gas availability. Laboratory and bench-scale test work to characterize new oil shales are performed at EOT Research Centre in Frankfurt. Steady-state process modelling tools Aspen Plus and SolidSim are used to evaluate alternative flowsheet concepts. A 300 kg/h pilot plant to be commissioned in 2012 will be used to confirm expectations and to collect additional design data.