A life cycle assessment approach is being used to determine the overall potential environmental benefits of applying DRAGON technology to future European tunnelling projects.

What proportion of excavated material can potentially be diverted from landfill?

The amount of excavated material that can be diverted from landfill depends on the balance of supply and demand. Relevant factors affecting supply include: quantity of excavated material, proportion of usable material of a given rock type, potential for use directly in tunnel (e.g. in concrete or shotcrete).

Relevant factors affecting demand include: distance of tunnel works from potential receiving industries, and the characteristics of the excavated material. We are using a combination of country-specific mineral consumption statistics and GIS-based population mapping to estimate demand near tunnel projects.

To assess variation between projects we are analysing the landfill diversion potential for 54 recent tunnelling projects.

What are the benefits of other industries using this excavated material?

Each project will be assessed using life cycle assessment (LCA) to determine the environmental benefits of using DRAGON technology compared to the default option of depositing all the excavated material on land.

The scope of these LCA studies include:
- impact of manufacturing and using DRAGON technology
- processing of excavated material
- transport of material to receiving industries
- avoided consumption of primary materials (giving a credit)
- landfill of non-usable fraction

What will be the future benefit of applying DRAGON technology in Europe?

Review of future tunnelling in Europe indicates that planned tunnelling projects will result in the generation of around 800 million tonnes of excavated material.

The environmental impacts assessed in the 54 tunnel LCAs will be averaged to give an indication of the potential reduction in environmental impacts, or environmental benefits, per tonne of excavated material.

The calculated benefits per tonne will be scaled up to evaluate the potential benefits of applying DRAGON technology to planned future tunnels in Europe.