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CESPE National Council committee visits EMPA

On 10 September, the Swiss National Council Committee for the Environment, Spatial Planning and Energy (CESPE) was welcomed by EMPA representatives at the institute's Dübendorf site. The politicians' visit focused on environmental and energy issues. A key recommendation tabled by EMPA was for the promotion of gas-fuelled vehicles as a means of achieving significant long-term cuts in transport-related CO_2 emissions.

As a nationally and globally recognized authority on materials and system technology, the Swiss Federal Laboratories for Materials Testing and Research (EMPA) used the National Council visit to underline its environmental and energy-related credentials. CESPE were highly gratified that EMPA's recommendations on curbing air pollution square with our motion for a budget-neutral lowering of gas fuel prices to squeeze CO_2 emissions. EMPA appreciates that the ambitious targets specified in the Swiss CO_2 law – calling for an overall reduction in CO_2 emissions by 2010 to a level 10% below the 1990 mark – are scarcely attainable, even with the use of natural gas and biogas. It nonetheless advocates the promotion of natural gas and biogas as fuels underpinned by a corresponding gas fuel station infrastructure. In EMPA's view, the cut in CO_2 emissions is only one of several benefits: gas also compares favourably to diesel, for instance, in terms of the harmful pollutants emitted during the combustion process.

EMPA's interest in the use of natural gas and biogas as fuels forms part of a much wider environmental research programme. The institute is interested in a variety of issues centring on the interaction between technosphere (technical systems) and atmosphere (environmental systems) plus associated strategies for boosting efficiency in energy conversion and use. Partnering the Swiss Agency for the Environment, Forests and Landscape (SAEFL), EMPA operates the NABEL National Air Pollution Monitoring Network with its 16 stations. While providing EMPA with a valuable research platform, the NABEL network is also vital to SAEFL in permitting the success of air-quality programmes to be verified.

Swiss Federal Laboratories for Materials Testing and Research
8600 Dübendorf, 9014 St.Gallen, 3602 Thun Tel. +41-1-823 55 11, fax +41-1-823 40 31

The Committee members were fascinated to learn more about EMPA's other environmental activities, such as its contribution to combating air-traffic noise pollution. Its aircraft noise simulations and charts receive widespread attention from politicians and public alike. EMPA also investigates the sound insulation requirements for new-build schemes in the immediate vicinity of airports along with the options for upgrading existing facilities. A particularly interesting project focuses on the use of sensors in conjunction with an intelligent control system to offset incident sound waves from the external environment by inducing vibrations in the window panes.

A loud crack signalled the end of a failure test on a beam with zones of compression wood produced by wind action. Working in tandem with various partners, EMPA is conducting and co-ordinating several research projects on the subject of windblown timber as part of the "Lothar" basic research and assessment programme launched by SAEFL and the Swiss Forest Agency. Zones of crushed wood fibre represent local weaknesses in the structure of timber that severely restrict use. A special research project is seeking answers to a series of questions on the degree of compression caused by wind action, its development, consequences and the possibility of early detection. Another set of problems relates to the storage of round timber – a complex issue given that moist logs with bark, if unprotected, soon become vulnerable to insect and fungal attack and consequent degradation. It follows that appropriate storage methods are of paramount importance in preserving the timber's value.

Accounting for 60% of consumption, the building industry is the largest energy user in Switzerland. Sustainability in construction, i.e. reductions in the consumption of energy and other resources in the production and use of buildings, is consequently one of EMPA's key concerns. EMPA performs feasibility studies on the suitability of mixed demolition waste for use in mineral construction products and the eco-friendly recycling of tar-bearing paving materials, while championing the use of wood as the foremost renewable raw material in Switzerland. The National Council visitors were also introduced to various innovative high-performance thermal insulation materials capable of significantly reducing the environmental impact of buildings during the operation phase.

To quantify the environmental effects (mass and energy flows) of products, processes and systems, various research institutes have for years produced so-called life-cycle inventories (LCIs). These are currently being collated, revised and harmonized as part of the ETH (Swiss Federal Institute of Technology) domain "ecoinvent 2000" project co-ordinated by EMPA. The aim

is to provide consistent sets of data for use in the production of standardized life-cycle analyses (LCAs).

Editor: Robert Helmy, tel. 01/823 45 92; e-mail: robert.helmy@empa.ch