Converting XPS Foam Production from F-Gases to Climate-Friendly CO₂-Technology

**Background**

In China, the market for extruded polystyrene (XPS) foam used in building insulation increased the last years at double digit growth rates due to the fast rise of the economy and the associated construction boom. This growth in the market for insulation is brought about by new regulations on building insulation as part of the Chinese energy efficiency programme. Currently, Chinese XPS-producing companies are using fluorinated blowing agents such as the ozone-depleting HCFCs or their HFC-alternatives which are both significantly contributing to climate change due to their high global warming potential (GWP).

**Project Description**

Within the project activities, a new production line for XPS foam is installed at the site of the company Beijing Beipeng New Building Materials Co. Ltd., near Beijing. The plant demonstrates the use of environmentally friendly CO₂ as blowing agent instead of the currently used fluorinated gases. It has a capacity of producing 4,320 tonnes of insulation foam annually to be used by the Chinese construction industry.

The experiences gained within this pilot project are shared with other companies in the sector through a close cooperation with the China Plastics Processing Industry Association and with the help of two universities in Beijing. The two universities are equipped each with a laboratory extruder in order to study the optimisation of the production process technology and know-how including development of specific raw materials to enhance quality. They will also work on guidelines and training materials relevant for the production of XPS foam. Furthermore, a safety review is being done in order to verify the applicability of EU industrial standards to Chinese regulations.

On behalf of

**giz**

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

**Federal Ministry for the Environment, Nature Conservation and Nuclear Safety**

of the Federal Republic of Germany
Project Impact

The project proves that CO₂ technology can produce the required high-quality XPS foam with an attractive profit and thereby achieve a short pay-back period for the relatively high investment costs. Verification of the foams in Europe showed compliance with EU standards.

The project targets reduction of greenhouse gas emissions through the permanent replacement of the greenhouse gases HCFC-142b and HCFC-22 as blowing agents in the manufacturing of XPS foam. Calculations predict a direct emission avoidance of approx. 1.6 million tonnes CO₂ equivalent based on an annual production of 4,320 tonnes XPS (or 135,000 m³) which equals to 370 tonnes CO₂e/t XPS.

The experience gained from this demonstration project will be used in China’s HCFC phase-out plan under the Montreal Protocol. When successful, it will have a significant influence on the decisions taken at national level towards a nationwide conversion to natural blowing agents in XPS foam production.