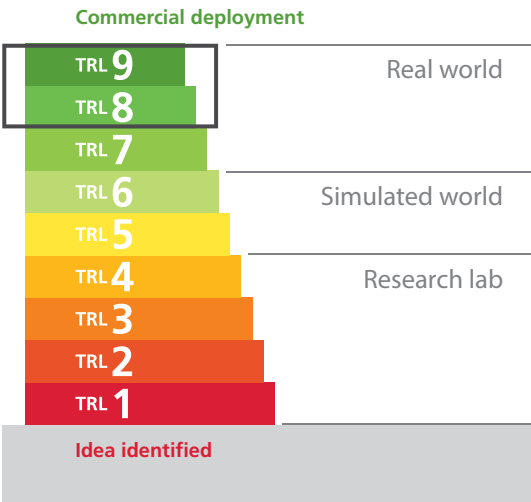


LIBS4FELS

Online analysis of the lime at the outlet of the kiln via Laser-induced breakdown spectroscopy

lyncis.lt

Type	Energy efficiency
Partners	Leader/Lime: Fels (DE) Partner: Lyncis UAB (LI) 
Funding	Funding: BAFA (DE) Total project: 0.6 Mill EUR National contribution: 0.15 Mill EUR
Duration	11.2022 – 10.2027
TRL	Technology Readiness Level: TRL 8-9



LIBS Spectrometer during Factory Acceptance Test.

avoidance); 3. Energy savings (up to 1%); 4. Expected process CO₂ emissions savings (up to 1%) have been observed.

Contribution to Process improvement – Laser-induced breakdown spectroscopy – Fuel reduction – CO₂ reduction.

Scope of work

The kiln technology in the lime sector is already very efficient, however in the frame of continuous improvement, EuLA members make use of measuring techniques that help to contribute to deliver multiple advantages. In the frame of this project, LIBS4FELS will measure the chemical composition of the freshly produced lime after leaving the kiln by exiting the lime to a plasma via Laser and analyzing the light emitted when the plasma cools down. The generated data will enable better operation of the furnaces and should lead to optimized fuel consumption and improved process stability. After successful system test in our plant Kaltes Tal (DE), the technology could be implemented in all Fels plants.

Status of the project

The project started in 2022. The following milestones were achieved:

- The analyzer and its auxiliary equipment such as belts and a crusher were installed at the Kaltes Tal plant and automated. The lime from six kilns can be analyzed via LIBS. The process begins at the outlet of the kilns, where a representative sample is taken. The material is transported to the crusher and crushed to a size of < 2 mm. After homogenization, the material is fed via belt below the analyzer. The height of the lime on the belt is measured and the Laser is focused on the surface of the sample. The light emitted from the sample is collected into two spectrometers and analyzed. The analyzer is connected to the process automation system of the kilns to allow training our A.I.-supported kiln control system in a future step of the project. The target accuracies for the main elements have been achieved. The accuracies for some trace elements are not yet within the target range. The calibration of the analyzer is currently ongoing. Other activities are the revamping of the sampling machine and the breeches chute after the sampling machine to better steer the flow of the lime after it has been analyzed. To date the following benefits: 1. Better lime product quality control to meet end users specifications; 2. Resource efficiency (waste