

Section Sciences et Ingénierie de l'environnement

Design Project 2018 (semestre de printemps)

Proposition n°17

Waste to energy in cement plant in the Balkans, feasibility analysis

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Descriptif du projet

In the Balkan area, they are still a lot of challenges in the waste treatment. Sanitary landfill or simple dumpsites are the most frequent used technologies. Incineration plants with sufficient air treatment level are generally out of the financial and technical local capacities.

Valorization of waste in cement plant can have a lot of advantages:

- Helping to reduce the use of primary energy sources in energy intensive industries
 - Reducing global CO₂ emissions
 - Reducing raw material use
 - Saving natural resources by reducing the area necessary for landfilling of MSW. Pro-long the lifetime of existing landfills
 - Creation of new jobs
 - Complying with European legislation and trends

Technically the good combustion (very high temperature and long burning time) of cement kilns is very good to destroy any incinerable pollutant. On another hand, the low pH of the clinker destroy the acid of the fumes and capture the heavy metals components. In Western Europe, Cement plants are using 40 % up to 100 % of alternatives fuels coming from waste. Holcim (ex-Swiss international company) is leader in such technologies.

The Balkans countries have different cement plant.

Albania: 4
Bosnia : 2

Kosovo:	1
Macedonia:	1
Serbia:	3

The capacity of these industries to contribute to the waste management is not known. It depends both from the technical conditions of the plant and of the waste management, legal and economic country and regional conditions.

Criteria on the side of the cement plant can be elements like: technical characteristics of the kiln and plant, age, capacity, fuel type and cost, raw material type and size, interest and concern of the operator/owner, etc.

Criteria on the side of waste management can be elements like: urban waste composition, other interesting waste sources (tires, oils, etc), local/regional waste production, distance, existing treatment /landfill alternatives, cost and challenges, organization (private, public) of waste collection, transport and treatment, legislation, etc.

In most of the cases, an intermediate pretreatment will be necessary, in order to separate and grind the most energetic part of the waste (plastic, papers, wood, etc.). An intermediate storage could also be necessary.

The aim of the Design Project is to evaluate these different elements, evaluate feasibility and propose priorities and next steps.

Objectives

The objectives of the project are the following:

- Identify the conditions of feasibility for waste to energy solution using waste alternative fuel in the Balkan countries, combined from technical/economical cement plant situation, from local waste management situation and air pollution concern.
- Assess the conditions of the cement plants in the 5 mentioned Balkan countries
- Assess feasibility and conditions, propose priorities and next steps.

Descriptif tâches

First phase is to

- Identify the information required in order to evaluate the feasibility of using waste as alternative fuel in the cement plants, with the help and validation of CSD experts checklist and other documentation (bibliography)
- Visit one cement plant using alternative fuel together with CSD expert (like Eclépens)
- Validation of the check list by CSD and SECO/SDC experts.
- Intermediate report

Second phase

- Collect information about the cement plants existing in the 5 Balkan countries mentioned. Introduction to the company will be provided by CSD expert, A. Flacher. Information will be collected through phone or skype call.
- Collect information (GIS, internet, bibliography, others) about the waste management conditions of the region.
- Analyze the information, propose a model for the evaluation
- Establish a simple comparison cost model for transport, intermediate treatment, storage etc. (adapting existing CSD cost models).
- Use the models, analyze feasibility and propose priorities

- Discuss the results, define main missing data and propose possible next steps.
- If the work and results are good enough, visit the (one or more) interesting plant(s) and local/national authorities in order to present the results, evaluate it with the industry and authorities and complete the evaluation and propositions.
- Final Report and EPFL presentation

Possible next phase

- *In a next step (probably out of the timetable of the DP) participation to a regional workshop in order to present and discuss the result with the industries, local and national authorities.*

Divers

Project will be followed by the following team :

- One cement plant and waste alternative fuel CSD expert , Alexander Flacher. Alexander has participated during 20 years to the development of alternative fuel projects for Holcim. He can provide all necessary knowledge about the cement plants technical and economic situation. He will also facilitate the contact with the cement plant.
- One waste management CSD expert, Emilie Gex
- Cliff Hammer, who is regional advisor for infrastructure and environment to the Swiss cooperation offices in the Western Balkans (SDC and SECO agencies).
- One EPFL teacher.

A monthly (skype) meeting, or more if necessary, will organized.

Students should develop knowledge and experience in the fields of

- Waste management
- Alternative fuel
- Cement production
- Economic and institutional conditions of development projects.

All written document and contact with Balkan partners have to be done in English.

F. Schmidt/E. Gex / 04.12.2017

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