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Co-Processing Magazine of Alternative Fuels & Raw Materials

Photo: InterCement

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VISDP: Dirk Lechtenberg | Editorial Director: Dirk Lechtenberg

Dear Readers,

While Europe has overcome the peak of Covid-19, it remains on the rise in the US, South America, India, and some other countries.

SARS-CoV-2, the newest Coronavirus, has demonstrated our vulnerability. It has also distracted us from another, less sudden but more severe catastrophe, that we will have to face in the near future: climate change. What it entails comes slowly, however not less drastic: Droughts, heatwaves (Siberia experienced a record 38°C in June) and floods are just some of the consequences.

Meanwhile, due to the lockdown during peak numbers of Covid-19 cases, we most likely experienced the largest ever annual fall in CO_2 emissions [1], more than during any previous economic crisis or period of war. But this is a temporary decrease, and "even this would not come close to bringing the 1.5C global temperature limit within reach", according to Carbon Brief [1].

We should therefore not rest on this decrease. Neither should we abandon climate goals when we prioritize economic stabilization.

The alternative fuels industry has been impacted by Covid-19 in several ways. The main factors that will determine the industry's development are:

- the availability of alternative fuels which has been impacted by decreased international trade,
- the development of fossil fuel prices which were plummeting and making alternative fuels prices less competitive,
- and cement demand, as an indicator for willingness to invest.

It remains to be seen whether the pandemic will drown concerns regarding climate change and CO_2 emission reduction efforts, or prompt us to tie up to and accelerate the emission reductions we have seen during the lockdown.

What Covid-19 has definitely pushed forward is the digitalization of various processes. While we cannot save ourselves from a flood of webinars, at MVW we have made the decision to call off the 7th Alternative Fuels Symposium. We look forward to discuss industry news when the situation is (hopefully) overcome in 2021. Meanwhile, you will read the project description of 2nd Alternative Fuel Award Winner in 2019, InterCement's Simuma plant, on page 9 in edition 02/20 of the Co-Processing Magazine.

MVW Lechtenberg is taking the next step to push forward alternative fuels use. In a cooperation with Nehlsen AG, one of the five biggest German waste management companies, we are proud to announce the first "Blue River Recycling" plant for the production of high-caloric alternative fuel pellets. Read more about the project on page 4.

Next to industry news on page 21, this edition furthermore includes an exclusive excerpt from the "Alternative Fuels and Raw Materials Handbook" on quality management for alternative fuels on page 15 and a report on waste management implementation in Beirut, Lebanon (page 8).

Enjoy reading this booklet,

Dirk Lechtenberg

References:

[1] Carbon Brief: "Analysis: Coronavirus set to cause largest ever annual fall in CO2 emissions". Retrieved 15 June from https://www.carbonbrief.org/analysis-coronavirus-set-to-cause-largest-ever-annual-fall-in-co2-emissions

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MACHINES AND PLANTS FOR THE PRODUCTION OF ALTERNATIVE FUELS

The production of high-quality alternative fuels from waste is a field that is becoming increasingly important. AMANDUS KAHL specializes in this field. The composition of the fuel pellets depends entirely on the requirements and wishes of the customer. For the major project “Blue River Papenburg Ems GmbH & Co. KG”, for example, pellets consisting of mixed plastics and paper and cardboard are desired. Four KAHL pelleting presses will soon produce pellets in this plant. AMANDUS KAHL has been setting standards in pelleting a wide variety of materials for various industries for about 100 years. For more information, please visit akahl.de

KAHL

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Figure 1: Bales of mixed plastics are loaded onto a vessel to be exported and later used as alternative fuel in a cement kiln. (Source: BERA GmbH & Co. KG).

Co-Processing Magazine of Alternative Fuels & Raw Materials

Blue River – Fuelling the Future

MVW Lechtenberg invests in the production of alternative fuels

The first "Blue River Recycling" plant is being built in the port of Papenburg, Germany, in cooperation with Nehlsen AG, one of the five leading waste management companies in Germany. The facility will produce pellets from high-caloric waste fractions to be used as alternative fuel in energy-intensive industries.

Next to its global consulting activities in the field of successful alternative fuels implementation, MVW Lechtenberg & Partner has also been involved in the development and implementation of supply chains for alternative fuels, especially high-caloric substitute fuels, since 2004. At the site of BERA port terminal in Papenburg, Germany, MVW Lechtenberg operates an intermediate storage and handling facility for substitute fuels, which are then shipped to cement plants and other clients in several European countries.

"We established supply chains for refuse derived fuels from, for example, the UK to German waste-to-energy plants already 10 years ago", says Managing Director Dirk Lechtenberg. "We see a drastic increase in the demand for high-caloric homogenous alternative fuels characterized by low chlorine and ash contents as well as low moisture levels."

In Germany, quality requirements for alternative fuels in the cement industry steadily increase along with substitution rates. For lower substitution rates, lower quality of fuels is acceptable, while requirements on composition and quality rise the higher the substitution rate.

In the following table, alternative fuel specifications from 2004 and 2020 in a German cement plant are displayed. In 2004, the plant achieved a substitution rate of 20% which increased to 75% by today.

While in 2004, when MVW started the project in the exemplary cement plant, fractions from household wastes were used, today exclusively specified high-caloric fractions from industrial wastes are co-incinerated.

Specification 2004			Specification 2020		
	composition			composition	
	component	max. value		component	max. value
mechanical properties max. grainsize <=20mm in one dimension (Film in two dimensions) Dustcontent <0.5 mm = max. 10%			**mechanical properties** max. grainsize <=20mm in one dimension (Film in two dimensions) Dustcontent <0.5 mm = max. 5%		
Moisture:	H2O	20%	Moisture:	H2O	15%
Calorific value, as received		20 - 40 MJ/kg	Calorific value, as received		20 - 40 MJ/kg
	H		22 - 40 MJ/kg	H	
	S	1%		S	1%
	O			O	
	N	5%		N	5%
	C			C	
	Cl^-	1%		Cl^-	0.5%
	F^-	0.05%		F^-	0.05%
	ash content	25%		ash content	15%

Table 1: Alternative fuel specifications in German cement plant.

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Parallel to these increased quality requirements in the cement industry, lime and steel plants begin to reduce their fossil CO_2 emissions through fuel substitution. Next to the composition of the respective alternative fuel, the requirements for the kiln type must be taken into consideration when co-processing a fuel mix.

In general, thermal substitution rates continue to increase on a global scale. In order to comply with the Paris Agreements and environmental legislations in the countries, industries turn to alternative fuel use.

In the German cement industry, 67.5% of the energy demand for clinker production were derived from alternative fuels (including tyres, waste oil, pieces of commercial and residential waste as well as scrap wood, solvents) in 2018 [1]. The average rate across Europe was 46% that year.

The percentage of alternative fuels in the global cement industry's fuel mix has increased almost ninefold from 1990 to 17.5 % in 2017 which equals around 25 million tonnes [2]. As many cement manufacturers set ambitious goals for their thermal substitution rates, the demand for alternative fuels is expected to increase to up to 150 million tonnes in 2030.

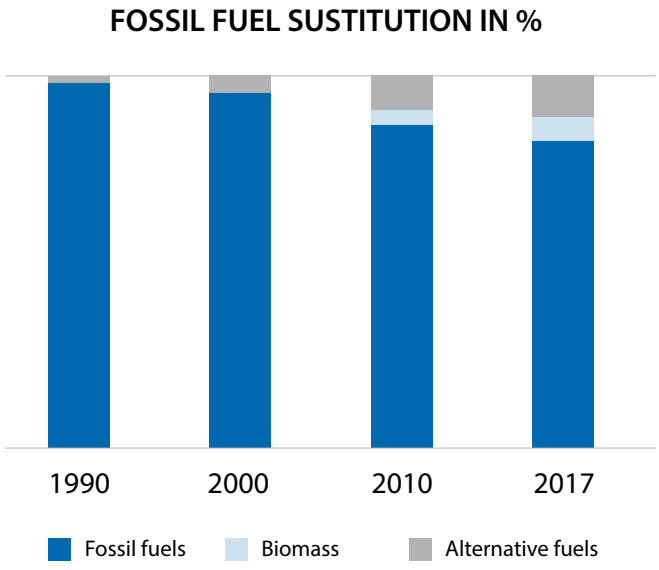

Figure 2: *Fossil fuels substitution in the global cement industry on %. (Source: GCCA).*

Figure 3: *Site of BERA GmbH & Co. KG terminal in the port of Papenburg, Germany, where the new Blue River Recycling Ems plant will be located. (Source: BERA GmbH & Co. KG). The white and black bales are part of the permitted feedstock with a capacity of currently 16,000 tonnes. In front: loading of a vessel.*

Since there is still no existing infrastructure for waste collection or recycling facilities in many countries, many plants rely on the import of alternative fuels.

On the basis of these developments and MVW Lechtenberg & Partner's 20 year-long experience in the field of consulting and project-implementation for alternative fuels use, Dirk Lechtenberg now founded the "Blue River Beteiligungsgesellschaft mbH".

Joint by local partners, the new company will establish several Blue River Recycling plants for the production of pellets to be used as alternative fuels in energy-intensive industries, worldwide.

The first project of this kind is realized at the site of BERA GmbH & Co. KG terminal in the port of Papenburg, Germany, in cooperation with Nehlsen AG, one of the five leading waste management companies in Germany.

The new plant with an investment value of around €7.5 million will be put into operation in January 2021. The new concept and future plant operation will create around 20 new jobs.

In this first Blue River Recycling plant, non-recyclable mixed plastics from the dual systems as well as industrial waste from waste disposal and industrial companies from Germany and abroad are processed into high-calorific pellets, which are used as high-quality alternative fuels

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Figure 4: *Pellets to be produced at Blue River Recycling Ems plant.*

in energy-intensive industrial plants, such as cement, lime or steel plants.

MVW Lechtenberg & Partner have been handling such high-calorific fractions primarily from Northwest Germany for around 15 years at BERA's terminal.

These are used, for example, in the Scandinavian cement industry as environmentally friendly alternative fuel.

The advantages of pelleting compared to previous substitute fuels are clear: "By pelleting the waste materials we can ensure a consistently

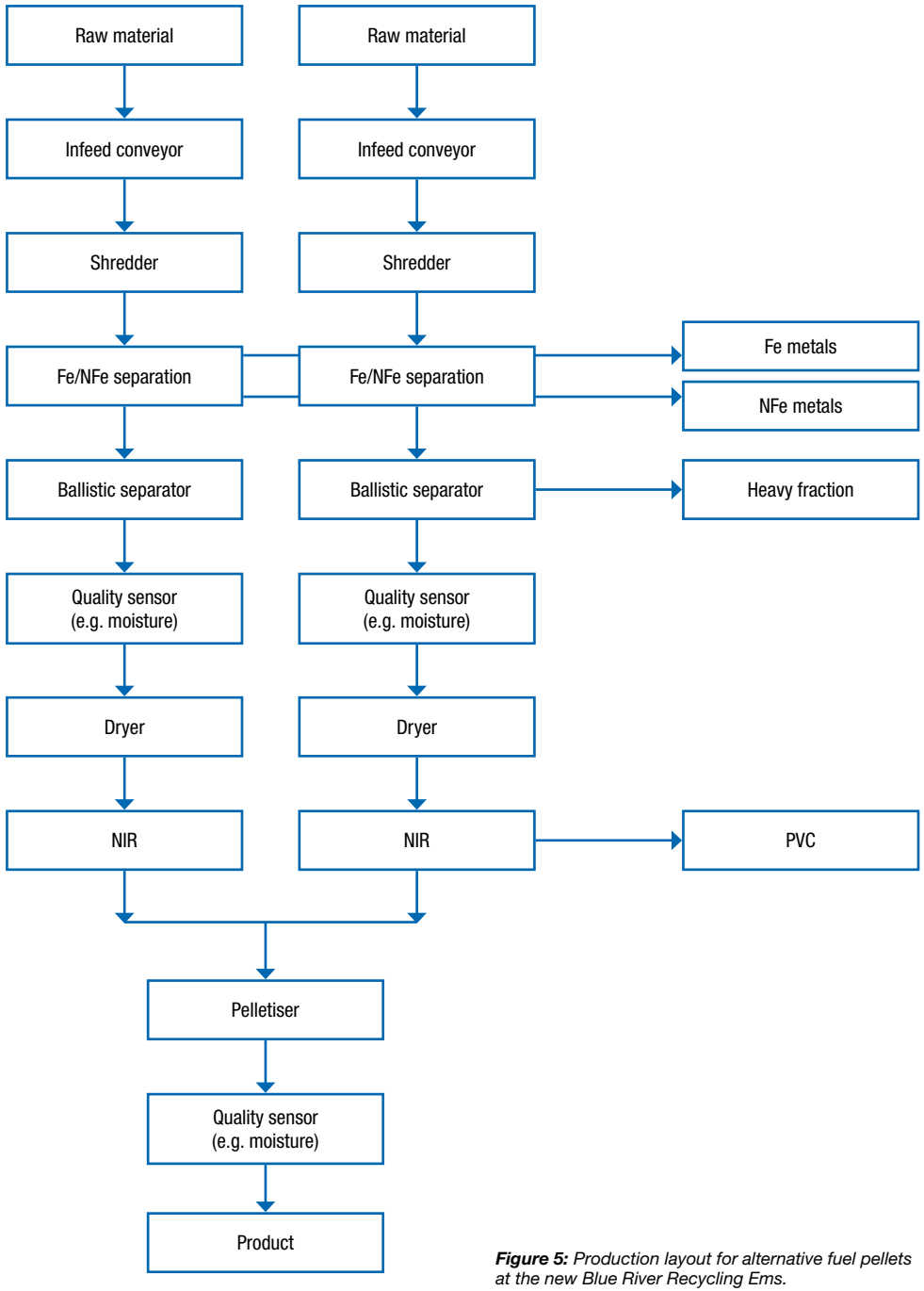

Figure 5: *Production layout for alternative fuel pellets at the new Blue River Recycling Ems.*

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high quality of the fuels. In addition, we save considerable amounts of CO_2 emissions for sea transport due to the higher bulk density. This also enables our customers to achieve their ambitious CO_2 savings goals," say Dirk Lechtenberg and Holger Wedemann, Managing Directors of the newly founded company.

At the new facility, the waste is processed into defined pellets with state-of-the-art and fully automated plant technology from well-known German and Austrian companies. The engineering is carried out by Eggersmann Anlagenbau (Bad Oeynhausen, Germany). With two Lindner shredders, fractions will be reduced in size to a unified <30mm at a capacity of 14 tonnes per hour. The screened material is thermally dried to a residual moisture of < 10 % by modern dryers of Andritz AG, Austria. Amandus Kahl (Hamburg, Germany) provides four KAHL flat die pelleting presses type 45-1250 with a joint capacity of 12 tonnes per hour.

Fully automated quality control to monitor the consistently high, homogeneous and high calorific value of the pellets as well as the environmentally friendly energy concept with its own combined heat and power unit for self-sufficient energy supply make the new plant the most innovative of its kind. The plant can also use biogas for further reduction of the carbon footprint. Additionally, a photovoltaic plant on the 12,000 m^2 production building is planned.

Its production capacity will achieve up to 100,000 tonnes of pellets annually. The production path is shown in figure 5.

Next to the "Blue River Recycling Ems" plant, more Blue River Recycling plants are planned both within Germany and abroad. The second project will be realized near the new company's offices in the port of Duisburg. In the largest inland port in Europe, transhipments with a volume of more than 65 million tonnes and 4.1 million TEU (Twenty-foot Equivalent Unit) are handled annually; making it the ideal logistic location for the transnational export of alternative fuel pellets. Additionally, Duisburg is located in the hotspot for steel production in Germany, which ranks highest by production rates in Europe and 7th on a global scale.

Production at the second plant is scheduled to begin by 2022. As in the Blue River Recycling Ems plant, solar panels and a cogeneration unit will be installed to ensure sustainable power supply. In the coming 2 years a total of up to €25 million will be invested. Further projects in other countries are planned.

References:

[1] Verein Deutscher Zementwerke e.V. (VDZ): Environmental Data of the German Cement Industry 2018.

[2] GNR – GCCA in Numbers (2019). Retrieved 15 June from https://gccassociation.org/sustainability-innovation/gnr-gcca-in-numbers/

Take the chance to become a part of Blue River Recycling Ems: A share of the investment sum is raised through crowdfunding. For more information contact info@blueriver-recycling.com.

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Waste Treatment in Lebanon

Experience Report from JCC

By Hisham Karameh, Managing Director and Advisor to the Chairman at JCC-Soriko, Beirut, Lebanon.

Almost five years have passed since the outbreak of the waste crisis that hit Lebanon in July 2015, when refuse filled the streets following the closure of the Naameh Landfill, south of Beirut.

In 2016, the Council of Ministers, represented by the Council of Development and Reconstruction (CDR), issued a tender for the processing and treatment of municipal solid waste. This covered the service area of the City of Beirut and Mount Lebanon Mohafaza (excluding Jbeil Caza), with an overall capacity of 2,600 tonnes per day. After being awarded the contract, Al Jihad for Commerce & Contracting (JCC) commissioned MVW Lechtenberg & Partner to evaluate the conditions of the Karantina and Aamroussieh sorting plants and present a report to CDR on the findings.

Accordingly, CDR decided to upgrade the plants to improve their efficiency and increase their capacity to the level of 4,200 tonnes per day. This would accommodate an increase in the volume of incoming waste, which by now averaged 3,500 tonnes per day. CDR commissioned Laceco as consultants to develop the design and specifications for this upgrade and supervise the process.

JCC entered into a cooperation agreement with MVW, which would take the role of engineer for the design, construction, and supervision of the undertaking. This was to include the upgrade of seven existing sorting lines and the construction of four additional lines. Each line will have the nominal capacity to process 25 to 30 tonnes of municipal solid waste per hour.

JCC started to build and supply these lines. The first new line has been operational since September 2019, while the other new lines are 85% finished. The financial crisis gripping Lebanon, combined with the global coronavirus pandemic, has delayed the work, but JCC is in the process of finalizing the upgrade over the coming four months.

JCC has the vision, determination and drive to achieve the most sustainable solution for municipal solid waste in Lebanon. Accordingly, we are working in partnership with MVW for the production of refuse-derived fuel (RDF) in the sorting plants and for its use in the Lebanese cement industry. JCC has already put in place a provisional plan with MVW to add the appropriate equipment for the production of RDF to the sorting lines, as soon as the cement plants finish their preparations for the incorporation of RDF into their fuel requirements.

JCC's commitment to the protection of the environment, through recycling, composting and promoting the use of RDF, contributes to putting Lebanon back on track. Together with MVW, we are helping to build a solution for the country's waste problem.

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Alternative Fuel Award 2019
Co-Processing at Simuma Cement Plant

5-years evolution for a sustainable waste disposal

In 2010, InterCement decided to focus on the development of their co-processing activity in the two cement kilns of Simuma cement plant, with a clear objective of achieving high thermal and raw material substitution rates through investments made based on the market's availabilities (tyres, solids, liquids and sludge). In 2019, MVW Lechtenberg presented Simuma cement plant with the 2nd Alternative Fuel Award, for their innovative thinking and use of alternative fuels despite low fossil fuel coal prices in South Africa. In the following, you will read the updated awarded project description.

NPC, part of InterCement Group, has a 55-year-long history in developing technologies and partner-ships to improve cement manufacturing processes and increase sustainability. InterCement Group produces clinker, cement, concrete, dry mortar and aggregate materials.

The company's sustainability is achieved by the implementation of best practice in process technologies and a constant strive for innovation. Co-processing is one of the main vectors of the strategy used to overcome challenges and achieve the company's goals.

Co-processing includes the use of alternative fuels and alternative raw materials to replace fossil fuels and primary raw materials. The benefits for NPC include lower costs and a positive impact on both societal and environmental matters. CO_2 emissions are reduced, as fossil emissions associated to alternative fuels are lower than the ones caused from burning fossil fuels. Additionally, co-processing of alternative fuels represents an important strategy for waste treatment, which is a key topic worldwide.

The use of tyres and liquid waste in the cement industry brings a few challenges that can be solved through the use and development of tailored technologies which improve waste quality and guarantee process stability inside the plants.

Simuma cement plant invested 5 years of intensive work to achieve a co-processing rate of 38% on kiln 1 and 12% on kiln 2, on a combined mix between tyres and liquid waste. More than 24% of the energy used to produce clinker is derived from waste that would otherwise be landfilled, or, in the worst case, be dumped into the environment.

Simuma cement plant

NPC Simuma plant is located in the East of South Africa, starting its clinker production in 1983 with an annual clinker capacity of 450,000 tonnes, achieving 626,600 tonnes of cement production. Due to this progress, the company could stop importation of clinker, its major raw material. When the company's operation spread beyond Durban, Durban Cement changed its name to Natal Portland Cement (NPC).

In 2012, NPC joined InterCement Group. Currently, the plant has an annual clinker capacity of 1.2 million tonnes in two clinker kilns and a capacity of 1.6 million tonnes per year of cement.

Co-processing at Simuma plant

Co-processing activities at Simuma plant began in 2014. Providing a solution for the disposal of used tyres in dump areas has been the company's top priority. Until 2016, kiln 1 co-incinerated whole tyres, which led to a thermal substitution rate of 2.5%. A long-time partnership of 10 years has been established with the Waste Bureau to supply whole and shredded tyres for both kilns of Simuma.

In order to use alternative raw materials, Simuma invested in a storage and feeding system to use boiler ash from the paper industry. Since 2016, Simuma consumed 86,000 tonnes of boiler ashes.

After identifying a lack of solutions for the disposal of liquid hazardous wastes, Simuma decided to increase its capacity and invested in tanks to receive, mix, transport and feed these liquids into both kilns. The facility began to co-process liquids in 2017 and achieved a total thermal substitution rate of 10.1% for the whole year. In 2018, this rate increased to 13.9% and in 2019 Simuma cement plant achieved a thermal substitution rate of 21%. This represents a consumption of 145,000 tonnes of alternative fuels and a substitution of 82,000 tonnes of fossil fuels.

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Figure 2: *Simuma Cement Plant, NPC South Africa. (Source: InterCement)*

From 2016 to 2019, a total of 95 million SA Rands (around 6.6 million USD) was invested in Simuma plant in order to achieve these co-processing results.

South Africa's waste market

The South African Government has implemented specific legislations that aim to gradually reduce the use of industrial landfills for wastes with calorific power and foster the use of sustainable alternatives to the waste generation.

By implementing co-processing, NPC aims to provide a sustainable option for the final destination of those wastes that should no longer be sent to landfills.

In line with the "Building Sustainability Partnership" guidelines, NPC has therefore established partnerships with the main regional and national waste operators, including the South African government through the Waste Bureau.

The Waste Bureau is responsible for the disbursement implementation of incentives and funds derived from waste management charges; to identify and promote the best practices in the minimization, re-use, recycling or recovery of waste; progressively build capacity to support municipalities in the development and implementation of integrated waste management plans and capacity building programmes, support and advise on the development of industry waste management plans, integrated waste management plans and other tools, processes and systems, and others.

Environmental licensing for co-processing

In 2016, the Department of Environmental Affairs authorized the co-processing of solid and liquid wastes to replace fossil fuels and raw materials in both kilns of NPC Simuma plant.

This enabled NPC to offer the South African waste market a sustainable alternative destination for waste, thereby avoiding for the waste to be landfilled or dumped, which causes hazards for the environment.

Whole tyres

Whole tyres were the first alternative fuel to be used in Simuma Plant. Investments have been undertaken to receive and store waste tyres, and to equip the plant with a feeding system for tyres to the kiln. Specialized handling and dosing equipment, control systems and process cleaning methods optimized the tyre co-processing activities.

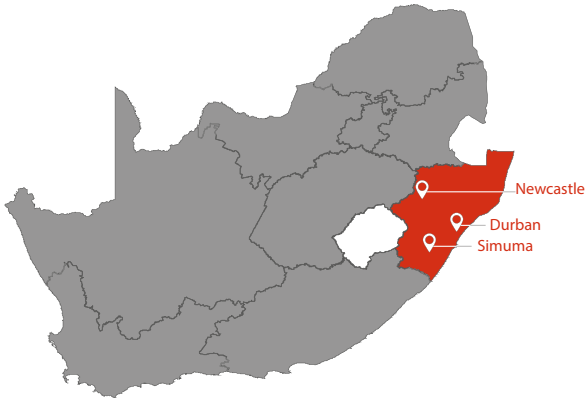

Figure 3: *NPC map, South Africa. (Source: InterCement)*

Boiler ash

Considering the composition of SIMUMA limestone in the quarry, InterCement needed to use some aluminum product in the clinker.

The co-processing department identified boiler ash waste to be suitable for this purpose. The ash is generated in two paper companies' facilities close to Port Shepstone, Durban, South Africa, and has previously been sent to industrial landfills.

Year	2015	2016	2017	2018	2019	*2020	**TOTAL
Tonnes of waste (Both Kilns and AF+ARM)	7 500	36 000	41 000	45 000	50 900	55 100	235 500
Tonnes of main fuel replaced	3 898	7 880	14 085	19 540	27 030	32 000	104 400

*Forecast 2020

**last 6 years

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Figure 4: *SIMUMA whole tyres facilities. (Source: InterCement)*

After a series of industrial tests and adjustments to the generators, InterCement invested in the raw material area, installed a storage area for alternative raw materials and one silo of 100 tonnes to receive "fine" boiler ash. Simuma Cement has been using the ash since 2016, avoiding the deposition of large quantities in industrial landfills as well as the use of aluminum ore.

Liquid Waste

As mentioned before, a modern system was installed in both kilns at Simuma to receive and pump liquid waste fuel with a high calorific value to the kiln. A storage tank and a heating system allowed the plant to receive a large quantity of high viscosity liquid waste.

Shredded Tyres

Following the co-processing business plan and in order to maximize the use of alternative fuels, Simuma introduced an installation for the co-processing of shredded tyres in kiln 2 in February 2019.

Considering the high arising of scrap tyres in the South African market, the project was designed to consume 17,000 tonnes per year of shredded tyres. Together with the 12,000 tonnes of whole tyres currently co-processed in kiln 1, this makes InterCement the largest consumer of and a final destination for waste tyres in South Africa.

Figure 5: *Co-processing capacity - InterCement South Africa. (Source: InterCement)*

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Figure 6: *Unload of trucks (2). (Source: InterCement)*

Figure 8: *Storage tank. (Source: InterCement)*

Alternative Fuel Award 2019 – 2nd Winner
Co-Processing at Simuma Cement Plant

Figure 7: *Pumping system for the tank. (Source: InterCement)*

Figure 9: *Storage tank (2). (Source: InterCement)*

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Figure 10: *Storage tank (3). (Source: InterCement)*

Conclusions

South Africa is one of the largest producers of coal in the world. For many years, co-processing in cement plants was ignored by local cement manufactures considering the high availability and low cost of this fossil fuel.

In 2010, InterCement decided to focus on the development of co-processing in the two cement kilns of Simuma plant, with a clear objective of achieving high thermal and raw material replacement rates through investments based on the current market's availabilities (tyres, solids, liquids and sludge).

Arriving in 2019, InterCement concluded that this was a correct decision. The high demand and low cost of coal are no longer an absolute reality in the country as they were in the past. Additionally, through the advances in environmental legislation and the growing concern of companies regarding their industrial waste generated, co-processing became one of the best alternatives for disposal of these materials. Co-processing brought a strong competitive advantage to InterCement South Africa.

Today, InterCement South Africa has flexible co-processing facilities at its disposal, allowing the company to receive different raw materials, all types of waste tyres (whole and shredded) and enabling it to provide the South African waste market with a definite and efficient environmental solution.

As the upcoming 7th Alternative Fuels Symposium will not take place in 2020, we thank all applicants for participating in this years' Alternative Fuel Award competition. We will take these projects into consideration for the Alternative Fuel Award 2020.

Co-Processing Magazine of Alternative Fuels & Raw Materials

7th Alternative Fuels Symposium 2020: Called Off

With regard to the spread of Covid-19 and after careful consideration of current developments, MVW Lechtenberg & Partner have decided to call off what would have been the 7th Alternative Fuels Symposium from 8 – 10 September 2020.

Currently, no reliable predictions regarding the future development of the situation and corresponding restrictions of public life or travel bans can be made. Therefore, hosting a conference of this dimension in September does not seem feasible.

For health and safety reasons for all delegates, exhibitors, and speakers, and in order to provide all participants with a reliable basis for planning, the cancellation of the event is seen as the most responsible decision.

Each year, the symposium brings together a limited number of up to 150 delegates from more than 30 countries to discuss current developments in the field of alternative fuels in the cement, steel, lime and related industries.

The dates for the 7th Alternative Fuels Symposium in 2021 are going to be announced by the end of 2020.

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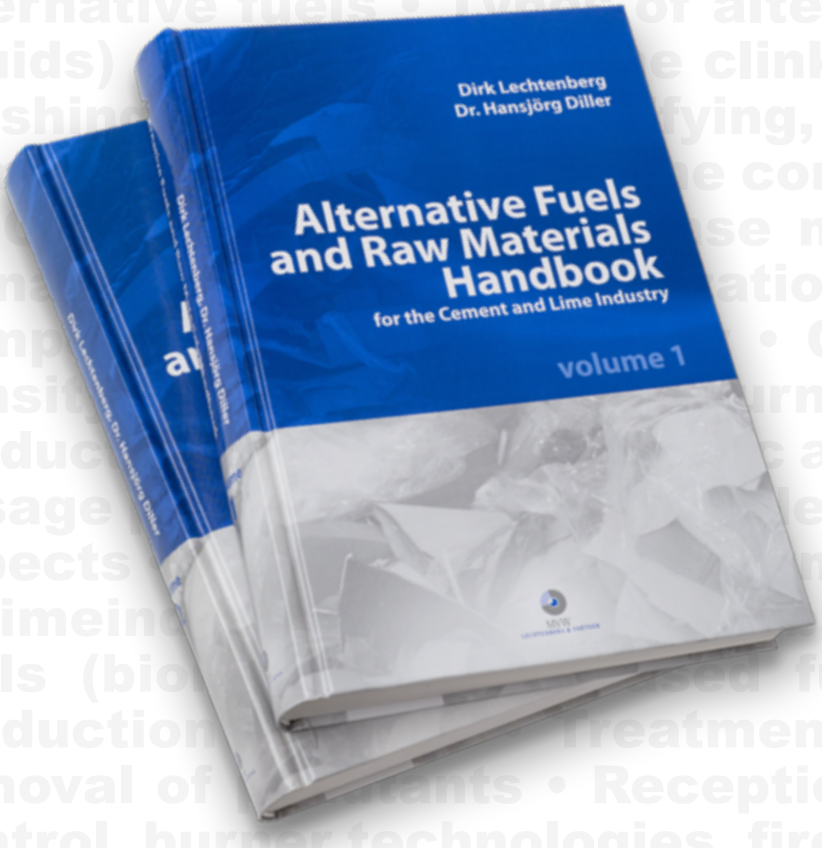

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VOLUME 2

Compilation of alternative fuels and raw materials fact sheets including among others:

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- Chemical and physical parameters
- Specific influences on the clinker production process
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Quality Management for Alternative Fuels

The following article is a revised excerpt from the "Alternative Fuels and Raw Materials Handbook for the Cement and Lime Industry." In this context, Dirk Lechtenberg and Dr. Hansjörg Diller emphasize the difficulties that the use of alternative fuels involves. To meet the increasingly stringent emission limits in the long run, the material composition of the fuels should vary only at a small scale. High quality of alternative fuels is thus the basis for a permanently successful substitution of fossil fuels. Therefore, the following article focuses on quality management and quality assurance.

Introduction

Quality assurance is the foundation for processing of suitable waste materials and biomass into environmentally compatible and cost-saving substitutes of fossil fuels. As is the case in the clinker production process, knowledge of the waste and raw materials at hand is the first step towards the production of an even quality product.

In general, ashes from alternative fuels are bound into the clinker. This is of particular importance since many waste products contain contaminants which can have a harmful influence on the cement/lime as well as a negative effect on emissions. Furthermore, alternative fuels frequently contain volatile elements (chloride, alkalis, sulphur) which increase the internal salt cycle and can lead to build-up problems in the kiln and heat-exchanger. In order to avoid negative impacts resulting from both, contaminants and volatile elements continuous sampling and knowledge of the wastes and raw materials are vital.

The quality management system for alternative fuels from waste is divided into two areas:

- Quality management in the RDF production plant
- Quality management (control) system in the cement or lime plant

Both quality assurance systems are ought to be matched to each other. It is furthermore necessary on the one hand to adhere to the legal parameters for employment of alternative fuels in cement/lime plants and on the other hand to follow the production-specific parameters.

Environmentally relevant elements

Belonging to the environmentally relevant elements are those listed in e.g. the Directive 2000/76/EC of the European Parliament and of the Council [1]. This list is not exhaustive, from time to time further elements can be requested by the authorities. In most cases these elements are heavy metals such as cadmium, thallium, mercury, lead, chrome, cobalt, copper, manganese, nickel and vanadium. In general, metals with a density of more than 5g/cm^3 are designated heavy metals [2]. These elements and their compounds naturally only occur in traces. A few of these heavy metals are vital for living beings, for example, copper, manganese, vanadium, iron, and zinc [3]. They are designated as biologically essential metals or trace elements. Further heavy metals, the non-essential trace elements, like mercury, thallium or lead are not needed by living organisms. In slightly increased concentrations essential as well as non-essential heavy metals can induce serious damage to health in humans and many other living organisms. The toxic effect of a particular heavy metal depends decisively on the respective chemical form. Trivalent chrome is valued at pH 7 as a non-soluble hydroxide and can only be absorbed by an organism in traces. Hexavalent chrome however is very soluble as chromate (CrO_4^{2-}) and can be very well absorbed by an organism. Special attention is ought to be paid since chromate is suspected of having a carcinogenic effect [3].

Also, arsenic and antimony, often even selenium and tellurium are among the environmentally relevant elements. The entire group of environmentally relevant elements is often designated as "heavy metals", which is not correct. Arsenic, antimony and tellurium are categorised as semi-metals – depending on the occurring modification these elements have metallic or non-metallic characteristics [2]. Selenium is even considered a non-metal [2].

Figure 1: *Fully automatic sampling at RDF unloading station. Left: Sampler. Right: Sample buckets.*

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Contaminant sources in alternative fuels

In order to minimise introduction of contaminants, especially environmentally relevant elements (mainly heavy metals) into alternative fuels, the persons in charge in the cement and lime industry need to be educated and trained on a continual basis. Fundamental knowledge of possible contaminant introduction through waste-sourced fuels or through biomass products must be conveyed.

Environmentally relevant elements reach waste via various old products. Metal content in household waste and in similar mixed wastes is a major cause though not the only one. Investigations illustrate [4, 5] that highest concentrations of certain heavy metals mainly occur in fractions of electronic scrap, fine fractions, batteries, metals, some plastic objects, composites and leather. The latter has high chrome contents which derive from leather tanning by chromate salts.

In the following, environmentally relevant elements are listed as examples with sample applications, general details on the physiognomic efficiency and their relevance in the biosphere. The full list including examples can be found in Volume 1 of the "Alternative Fuels and Raw Materials Handbook for the Cement and Lime Industry".

Antimony, Sb

- Fireproofing agent (antimony trioxide) in, e.g., plastics, electronic devices, or mattresses
- Additives for pigmentation in PET-plastics
- Alloy component in lead lettering in the printing industry (also zinc and copper)
- Sb oxides: Colour pigments for ceramics, glasses, plastic

Arsenic, As

- Alloy constituent of Cu, Sn and Pb in metals
- In electronic components (semi-conductors)
- As residual waste in treated wood (arsenic salts)

Arsenic oxide As_2O_3 is a strong poison and a carcinogen for humans even in very small amounts.

Cadmium, Cd

- Nickel-cadmium and silver-cadmium batteries
- Pigments and stabilisers (cadmium sulphide in yellow plastics, especially PVC)
- Electrolytic rust protection

Cadmium and its compounds are categorised as toxic.

Chrome, Cr

- Alloy component in stainless steel: min. 10.5% chrome
- In small metal items (fashion jewellery, jeans buttons)
- Chrome bearing pigments and tanning salts (leather)
- Green colouring of glasses and porcelain (with Cr_2O_3)

Chrome is frequently present in mixed building site waste caused through friction during processing/comminution of chrome metallic parts – especially in fine fractions. Above all, hexavalent chromate (CrO_4^{2-}) which can trigger carcinoma ("bricklayer's itch"/"mason's itch") needs to be mentioned here within the sphere of harm to human health.

Cobalt, Co

- Potassium cobalt silicate for colouring of glasses (cobalt blue, cobalt glass) and ceramics
- Component of "WiDia" (sinter material of tungsten carbide and 10% cobalt, employed in the production of cutting tools, e.g. drills)
- Additive in fertiliser and feed agents in cobalt-poor ground
- Production of paints (as colouring component, as drying agent)

Cobalt plays a significant role in biochemistry. In Vitamin B12 cobalt forms the central atom.

Copper, Cu

- Conducting material in electric technology
- Pipes and fittings for drinking water supply and heating installations
- Copper-zinc-alloys (= brass): Handles and door furniture, decorating material
- Copper salts as fungicide in plant protection and in wood protection agents

Copper is an essential trace element constituent of many enzymes.

Lead, Pb

- In batteries
- As alloy component in bottle capsules, tubes and tinsel
- Lead in glass (monitor tubes, lead crystal)
- As stabiliser (PVC-cable sheathing)
- Colour and corrosion protection pigments (Pb_3O_4)

Formerly, tetraethyl lead was in petrol as an anti-knocking agent component. Lead and lead compounds, in particular the organic lead compounds, are categorised as toxic.

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Manganese, Mn

- Alloy constituent for iron (manganese steel) and other metals
- In the production of ceramics
- Manganese oxide (MnO_2) to decolour green, iron containing glass

Manganese is an essential trace element constituent of many enzymes (e.g. peroxidases).

Mercury, Hg

- In the medical field
- Measuring instruments (barometer, hygrometer, thermometer)
- Fluorescent lamps (mercury vapour lamp)
- In agriculture as fungicide and bactericide
- Gold extraction (amalgam formation between gold and mercury)

Owing to its toxicity the use of mercury was generally in decline. However, through the use of energy-saving light bulbs this development has been reversed: The proportion of mercury in household waste as well as in mixed industrial and trade waste has increased significantly over the last few years. Thanks to the long lifespan of energy-saving lamps a further increase is anticipated in the coming years leading to significant changes in the composition of refuse-derived fuels for the cement industry due to the fact that sources originated from municipal solid wastes which may contain damaged light bulbs have to be exempted from the list of suitable wastes for co-processing.

Nickel, Ni

- In steel refining
- In fashion jewellery and coins
- Fine nickel parts serve as a technical hydrating accelerator, e.g. in the hardening of fat.

Nickel is a trigger for skin allergies. In the biosphere nickel plays a role as an essential trace element in various enzymes of bacteria and plants (e.g. urease).

Thallium, Tl

- In the production of special glasses (infra-red transmissive glasses, low melting-point glasses)
- In semi-conductor technology (e.g. thallium sulphide in photo cells)
- Thallium(I)sulphate as rat poison

Thallium and thallium bearing compounds are highly poisonous.

Vanadium, V

- Improve of steel wear resistance
- Vanadium pentoxide as catalyst in sulphuric acid production

In the biosphere vanadium occurs as a constituent of various enzymes in bacteria (e.g. nitrogenase).

Material Composition	Value	Unit
Moisture		Ma.-% ar
Ash		Ma.-% d
Biodegradable ingredients		Ma.-% d

Short Analysis		
Fixed carbon		Ma.-% d
Volatiles		Ma.-% d

Elemental Analysis		
C		Ma.-% d
H		Ma.-% d
O		Ma.-% d
N		Ma.-% d
S		Ma.-% d
Cl		Ma.-% d
F		Ma.-% d

Mechanical Characteristics		
Bulk density		kg/m³ ar
Grain-size distribution		Ma.-%

Caloric Characteristics		
Gross calorific value		MJ/kg ar
Net calorific value		MJ/kg ar

Reaction Engineering Characteristics		
Ignition and combustion behaviour		

Abbreviations:
ar = as received
d = dry

Trace Analysis	Value	Unit
As		mg/kg d
Be		mg/kg d
Cd		mg/kg d
Co		mg/kg d
Cr		mg/kg d
Cu		mg/kg d
Hg		mg/kg d
Mn		mg/kg d
Ni		mg/kg d
Pb		mg/kg d
Sb		mg/kg d
Se		mg/kg d
Sn		mg/kg d
Te		mg/kg d
Tl		mg/kg d
V		mg/kg d

Ash Composition/Ash Melting		
Al		mg/kg d
Ca		mg/kg d
Fe		mg/kg d
K		mg/kg d
Mg		mg/kg d
Na		mg/kg d
P		mg/kg d
Si		mg/kg d
Ti		mg/kg d
S or sulfate content		mg/kg d
Softening temperature		°C
Hemisphere temperature		°C
Flow temperature		°C

Table 1: *Proposal for the characterisation of alternative fuels.*

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Quality guidelines for suppliers of secondary fuels

Specication of combustibles from industry and trade wastes
Textile, paper, rubber, plastic and composite clastic fractions
Composition according to Waste Key Numbers, see form "Declaration Analysis"

Designation of the material	Composition		
	Components	Proportion wt. -% practice value	Maximum value
Mechanical characteristics : - Maximum particle size <15mm One dimensional (films two dimensional) - Hard plastic proportion ≤0% - Dust content <0.5mm, max. 10%			
Caloric value, as received:	NCV, ar	20 – 24 MJ/kg (min. 20,000 kJ /kg)	
Moisture:	H_2O	12	20
	H		
	S		1
	O		
	N		5
	C		
	Cl^-	0.5	
	F^-		0.05
Ash content:	Ash		25
		Practice value prop. in mg/kg	Max. value prop. in mg/kg
Trace elements related to DS :	Cd	3	5
	Tl	1	2
	Hg	0.6	1
	Sb	25 *	60 *
	As	9	20
	Pb	50	100
	Cr	40	120
	Co	8	15
	Cu	100	150
	Mn	50	150
	Ni	50	100
	V	10	20
	Sn	20	50
	Be	0.4	2
	Se	5	10
	Te	5	20
	Zn		2,000
	PCB	Sum acc.to DINx5	3

* independent of analysis process

Table 2: *Example of a specification for waste derived alternative fuels.*

Compliance Confirmation

Name, address of RDF producer/supplier:

Name:

Street:

ZIP/City:

Herewith we confirm that the delivered secondary fuel with the title

conforms to the composition of the declaration analysis number

_____ dated _____

Date:

Signature:

Figure 2: *Example of a "Compliance Confirmation".*

Zinc, Zn

- Galvanising of steel for corrosion protection
- As stabiliser for plastics
- Zinc sulphates in the textile and synthetic fibre industry
- Zinc oxide: Vulcanising accelerator in tyre production

Biologically zinc is one of the most important metals after iron. Zinc is a constituent of many enzymes (e.g. phosphatases, carboanhydrase) and is among the essential trace elements.

Investigation of alternative fuels – declaration analysis

Basically, quality management begins with the selection of the suitable waste materials according to the valid guidelines of the cement industry. How can the suitability of a waste material or an alternative fuel from waste be checked?

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Each waste material and alternative fuel must be analysed. Apart from the general material composition (water, ash, biologically degradable constituents), the following analyses have to be carried out:

- Elementary analysis: C, H, O, N, S, Cl, F
- Short analysis: Fixed carbon and volatile constituents
- Ash composition
- Mechanical characteristics: Bulk density, particle distribution
- Calorific and reaction kinetic characteristics.

A form as shown in table 1 can be used for the characterisation of alternative fuels

In individual cases further analysis parameters can be required in order to check the suitability of alternative fuels.

As a rule, the suppliers of waste derived alternative fuels have only modest knowledge of the necessary process-specific and pertinent emission protection guidelines for usage of such waste materials in cement or ime plants. Thus, corresponding guidelines need to be laid down and continuously monitored by the cement or lime plant operator within the quality management system. As an example, quality guidelines or a specification of combustibles of a cement plant are presented in table 2.

Most waste derived alternative fuels consist of material mixtures. The quantitative composition (percentage proportion of the various waste fractions) should therefore be exactly specified as part of a declaration analysis. This is necessary for process technological reasons in order to assess specifications. It is also partly required by the permitting authorities as often only certain volumes are permitted for each waste type per annum. Templates for such declaration analyses can be found in Volume 1 of the “Alternative Fuels and Raw Materials Handbook for the Cement and Lime Industry”.

In many European countries it has been proven that suppliers of alternative fuels, apart from providing analysis results of alternative fuels from certified laboratories, also draw up and confirm the above-mentioned declaration analysis. Declaration analyses have to be renewed at certain intervals, e.g. every 1,000 tonnes of fuel supplied.

Additionally, the suppliers should confirm the validity and compliance of analyses results on each delivery of alternative fuels. This can take the shape of a simple “Compliance Confirmation“ as in figure 2.

In this way the cement or lime plant receives an additional legal security in case contrary to contract deliveries occur (faulty loads, contaminated alternative fuels etc.).

Figure 3: *Example of a mercury analyser based on AAS. (Source: F. Wanzura, CEMEX Ostzement GmbH).*

Summary

A comprehensive quality management on the one hand involves the knowledge of the environmentally relevant elements that can occur in the alternative fuels or raw materials. On the other hand, samples must be taken regularly in order to make sure that the number of critical elements in the material does not exceed the limit values. Not only the cement plant itself, but also the producer or supplier of the RDF must be included in the quality control system. Only if the quality management system strictly adheres to this proceeding, the required high quality of alternative fuels and raw materials can be achieved permanently.

References

[1] The European Parliament and the Council of the European Union: “Directive 2000/76/EC of the European Parliament and of the Council of 4 December 2000 on the Incineration of Waste”. Official Journal of the European Communities, 2000.

[2] A. F. Hollemann, E. Wiberg: Lehrbuch der Anorganischen Chemie. 81.-90. Edition, Walter de Gruyter & Co., Berlin (Germany), New York (USA), 1976.

[3] W. Kaim, B. Schwederski: Bioanorganische Chemie – Zur Funktion chemischer Elemente in Lebensprozessen. B. G. Teubner, Stuttgart (Germany), 1991.

[4] Bayerisches Landesamt für Umwelt: Restmüllzusammensetzung, Einflussfaktoren, Abhängigkeit von lokalen abfallwirtschaftlichen Rahmenbedingungen (EFRE-Ziel-2-Gebiete in Bayern). Final report on the research project UmweltSpezial, November 2008.

[5] V. S. Rotter: Schwermetalle in Haushaltsabfällen – Potenzial, Verteilung und Steuerungsmöglichkeiten. Technical University of Dresden, Germany, 2002.

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Asia

Asian Cement Manufacturers Discover "Goldmines" Landfill Sites

Overflowing landfill sites in Asia may prove to be goldmines for local cement producers according to Norwegian research organization, SINTEF.

Countries in Asia increasingly turn to refuse as an energy source, although still to a much lesser extent than in Europe. To date, only 3% of coal consumption has been replaced by alternative fuels.

China, for example, is now investing heavily in the use of plastic waste as a fuel in the cement industry, supported by the Norwegian research team. The aim of the project OPTOCE (Ocean Plastic Turned into an Opportunity in Circular Economy) is to assist a number of Asian countries reduce their landfill sites and their coal consumption.

The utilization of refuse as fuel has become a key aspect of waste management policy in China, and the industry has recognized the economic benefit.

Pilot projects of the OPTOCE supported by the Norwegian research organization were all planned to have been implemented by now, but the cement factories have suspended operations due to the coronavirus outbreak.

According to SINTEF, some of the pilot projects are:

- One of the biggest cement manufacturers in Thailand is planning to utilize between 100,000 and 250,000 tonnes of plastic a year as a substitute for coal. Thailand has 2,500 landfill sites containing 190 million tonnes of plastic.
- The Yangtze river in China is overflowing with refuse that is causing problems for the turbines at the Three Gorges hydroelectric dam facility. The cement manufacturer in the city of Zigui, located upstream from the dam, is planning to look into the possibility of collecting and processing 100,000 tonnes of floating waste, including a large volume of plastic.
- Plastic refuse generated by paper manufacturing processes constitutes a major waste problem throughout Asia. Vietnam's largest paper factory, located on the Mekong river, is planning to test the use of plastic refuse as a fuel in a local cement factory.

Source: Phys.org: "Cement factories can put the brakes on global plastic pollution". Retrieved 22 April from https://phys.org/news/2020-04-cement-factories-global-plastic-pollution.html

Belgium

Co-Processing to Ease Challenge of Recycling Wind Turbines

In the recently published report "Accelerating Wind Turbine Blade Cirularity" by WindEurope, the European Chemical Industry Council and the European Composites Industry Association, recommended co-processing of decommissioned wind turbines to be scaled up.

According to the report, 85 – 90% of wind turbines' total mass is recyclable today, but wind turbine blades would present "specifiy challenges". Although the cement sector enables disposal of the turbines via co-processing, eliminating the need for landfill, composite recycling solutions are not currently widely available.

WindEurope estimates that 14,000 wind turbine blades will be decommissioned in Europe by 2023. In the report, co-processing is named the main technology for recycling composite waste.

Source: North American Wind Power: "Recycling of Wind Turbine Blades Presents Industry Challenge". Retrieved 15 June from https://nawindpower.com/recycling-of-wind-turbine-blades-poses-industry-challenge .

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Belgium

European Cement Industry Gears Up For 2050 Carbon Neutrality

Mid-May, CEMBUREAU, the European Cement Association, published its new Carbon Neutrality Roadmap, setting out its ambition to reach net zero emissions along the cement and concrete value chain by 2050.

"As Europe begins its green recovery, the significance of this moment for our sector is huge. This is our response to the EU Green Deal – we have a plan and are ready to make the leap." said Raoul de Parisot, President of CEMBUREAU.

CEMBUREAU's Carbon Neutrality Roadmap looks at how CO_2 emissions can be reduced by acting at each stage of the value chain – clinker, cement, concrete, construction and (re)carbonation – to achieve zero net emissions by 2050. It quantifies the role of each technology in providing CO_2 emissions savings, making concrete political and technical recommendations to support this objective.

To get there, the sector will need decisive political action from the EU in some key areas, including:

- The development of a pan-European CO_2 transportation and storage network;
- Decisive action on circular economy to support the use of non-recyclable waste and biomass waste in cement production;
- Ambitious policies to reduce European building's CO_2 footprint, based on a life-cycle approach, that incentivise the market uptake of low-carbon cements;
- A level playing field on carbon, regulatory certainty and an ambitious industrial transformation agenda.

By 2030, CEMBUREAU aspires to be in line with the Paris Agreement's two degrees scenario, reducing CO_2 emissions by 30% for cement and 40% down the value chain.

One of several key measures to achieve these goals will be the replacement of fossil fuels by non-recyclable and biomass waste, and the use of alternative raw materials, which will deliver 15% of the emissions reduction in the cement industry. According to CEMBUREAU, policies should support this circular approach by facilitating waste shipment between EU countries, and discouraging both landfill and exports of waste outside of the EU.

Source: CEMBUREAU: „2050 Carbon Neutrality Roadmap". Retrieved 12 May from https://cembureau.eu/news-views/publications/2050-carbon-neutrality-roadmap/

Cameroon

First Industrial-Scale Activated Clay-Based Cement Plant to be Built in Cameroon

thyssenkrupp is to fit the first cement plant with a system for the production of calcined clay for the Dutch-based company Cimpor Global Holdings. The technology developed by thyssenkrupp lowers CO_2 emissions in cement production by up to 40%. It involves replacing part of the cement clinker with calcined, i.e. thermally activated, clay. Cimpor Global Holdings will use the technology, known as "polysius activated clay", on an industrial scale at a new plant being built near the Cameroon sea port of Kribi. On completion in fall 2021, the plant will save more than 120,000 tons of CO_2 emissions every year.

Source: Thyssenkrupp: "Low-CO_2 cement production with activated clay: thyssenkrupp to build first industrial-scale plant in Cameroon". Retrieved 1 April 2020 from https://www.thyssenkrupp.com/en/newsroom/press-releases/low-co$_2$-cement-production-with-activated-clay--thyssenkrupp-to-build-first-industrial-scale-plant-in-cameroon-20160.html

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Canada

Biosolids Considered for Fuel at Lafarge Richmond Plant

Lafarge Canada announced a long-term contract with Victoria's Capital Regional District on Vancouver Island to provide supply of biosolids to use as fuel in cement manufacturing at the Richmond plant.

Supported by the government of British Columbia's CleanBC Industry Fund, Lafarge Canada's Western Canadian Geocycle team received US$753,000 in funding for the capital investment in a silo designed to co-process biosolids as low carbon fuel for the Richmond cement kiln.

The silo, and associated systems, will receive, store, and feed biosolids into the kiln. Biosolids, when replacing coal, will reduce greenhouse gases by approximately 5,000 tonnes per year of CO_2. The biosolids will also increase the thermal substitution rate by approximately 2.5%. Current estimates show between 5,000 to 7,000 tonnes per year of material to be co-processed at the facility.

Source: World Cement: "Lafarge Canada to use biosolids at Richmond plant". Retrieved 22 June from https://www.worldcement.com/the-americas/19062020/lafarge-canada-to-use-biosolids-at-richmond-plant/.

Germany

DNV GL Approval for Aker Solutions CSS Installation at Norcem Cement Plant

Aker Solutions' 400,000 t/yr carbon capture and storage system installation at HeidelbergCement subsidiary Norcem's 1.2 million t/yr integrated Brevik plant in Telemark has been certified as safe by private accredited registrar DNV GL. Per Brevik, Director of Sustainability and Alternative Fuels for HeidelbergCement Northern Europe said, "The promising results from pilot testing in Brevik give us confidence that realisation of the full-scale capture plant will be successful. We trust that the project risk related to novel technology elements is low." Following an 18-month test of the partial installation, the certification ensures that the full-scale project will receive government funding.

Source: Markets Insider: "Aker Solutions Norcem Cement Plant CSS Installation Receives DNVGL Approval". Retrieved 29 April from https://markets.businessinsider.com/news/stocks/aker-solutions-norcem-cement-plant-ccs-installation-receives-dnvgl-approval-8803033

Greece

Titan Group's Revenues Rise in First Quarter 2020

In May, Titan Group released its 1Q2020 business results which saw the group's revenues rise by 6.1% to €384.8 million, compared to 1Q19. Dimitris Papalexopoulos, chairman of the group, said: "The Group successfully navigated the first phase of the [COVID-19] crisis. Since the first emergence of the pandemic which appeared in our countries of operation in early to mid-March, our first focus has been to take measures to protect our employees, and our families along of course with our business partners' customers and our local communities."

The Greek market had a positive EBITDA of €1.4 million. Domestic cement consumption was supported by private investments, peripheral projects and tourism infrastructure spending. As well as seeing cement sales volumes improve, profitability accrued from the lower cost of petcoke and improved performance in alternative fuel use.

In Southeast Europe, revenues were slightly compared to 1Q19, despite of a positive price improvement and lower solid fuel costs, while alternative fuel use reached 40% in Bulgaria.

Source: CemNet: "Titan successfully navigates pandemic in first quarter". Retrieved 15 May from https://www.cemnet.com/News/story/168878/titan-successfully-navigates-pandemic-in-first-quarter.html

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Israel

Nesher Cement to Increase Hazardous Waste Use as Alternative Fuel

The factory, near the city of Ramle, produces around four million tonnes of clinker (calcium silicates ground up for use as a binder in many cement products) and around five million tonnes of cement each year. It operates two furnaces for clinker production and seven plants for cement production.

In 2014, Nesher Israel Cement Enterprises was given an emissions permit through 2021. Around 18 months ago, it submitted a request to the Environmental Protection Ministry for changes to the permit. The company seeks to replace some of its raw materials with waste that is similar in composition, and to use more waste as fuel for the furnaces to reduce dependence on petcoke (petroleum coke). Petcoke, derived from fossil fuels, has a higher energy content than coal, but emits 30 to 80% more carbon dioxide into the air when burned.

At a public hearing mid-June, opponents of the plan stated that the ministry's draft revised permit ran contrary to the 2008 Clean Air Act and its associated regulations.

During the first half of 2019, Nesher exceeded permitted mercury emissions 19 times.

In a statement to the Times of Israel, Nesher said, "As is customary in the global cement industry, the Nesher plant in Ramle uses raw materials and alternative fuels, thus minimizing the use of natural resources and reducing greenhouse gas emissions. The changes in the emissions permit will allow Nesher to continue promoting environmental solutions, without any increase in emissions to the air. It is sad to see the level of populist discourse on the issue, especially from those who should be promoting an environmental agenda."

Source: The Times of Israel: "Cement giant seeks permission to use more toxic waste, relax pollution rules". Retrieved 23 June from https://www.timesofisrael.com/cement-giant-seeks-permission-to-use-more-toxic-waste-relax-pollution-rules/

Mexico

Cemex to Continue Climate Action Strategy Despite Covid-19

In February 2020, CEMEX defined an ambitious new 2030 target of a 35% reduction of its net specific CO_2 emissions per tonne of cementitious product compared with its 1990 baseline. This decision was made in line with the IEA technology roadmap for the cement sector to fulfil the Paris Agreement's commitment under a 2-Degree Scenario. Additionally, the company established a new ambition to deliver net-zero CO_2 concrete globally to all of its customers by 2050.

"Climate change is one of the biggest challenges of our time, and we believe that we can continue to address it as a fundamental component of our efforts to recover from the COVID-19 pandemic," said Fernando A. Gonzalez, CEO of CEMEX. "We're capable of capturing this unique opportunity to build a better, more sustainable future, leveraging our robust experience in sustainability, health, and safety."

A CO_2 roadmap for each plant includes, amongst others, the reduction of CO_2 emissions in clinker through the production of novel clinkers with lower heat consumption, the use of alternative decarbonated raw materials, and the increased use of alternative fuels.

CEMEX currently consumes as either alternative fuel or alternative raw material 32 times more waste from other industries than the waste it generates and sends to landfill.

Source: World Cement: " CEMEX to move ahead with Climate Action Strategy." Retrieved 29 June from https://www.worldcement.com/europe-cis/29062020/cemex-to-move-ahead-with-climate-action-strategy/

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South Africa

Interwaste Supports Alternative Fuel Use as Solution to Country's Energy Crisis

South Africa remains in a dire energy crisis with utility costs having increased by 17% most recently. At the same time, the local providers need an additional 5,000 megawatts of generating capacity. Considering that 77% of South Africa's primary energy needs rely on coal, the country is heading towards not only an energy, but an environmental crisis too.

"It is here that waste plays a significant role. As the country moves towards a zero waste to landfill target and where hazardous waste to landfill is already prohibited, there is mounting pressure to find ways to repurpose waste and ironically such repurposing can, and already does, contribute significantly to energy inputs at various production facilities with the opportunity to increase this fundamentally," says Jason McNeil, CEO at Interwaste.

Beyond energy provision and finding alternatives, there is a carbon responsibility in South Africa, with carbon tax being implemented across industries. Alternative fuels such as RDF and TDF are considered sustainable fuels and so, businesses that use such fuels are given a 25% relief on carbon tax payable.

Interwaste received the 3rd Alternative Fuel Award 2018 for their efforts to employ hazardous wastes as alternative fuel in the South African cement industry.

Source: ESI Africa: "Repurposing waste as an alternative energy source". Retrieved 4 June 2020 from https://www.esi-africa.com/industry-sectors/future-energy/s-africa-repurposing-waste-as-an-alternative-energy-source/.

Spain

Cementos Cosmos to Use Waste Tyres as Alternative Fuel

After applying for the authorisation from the Ministry of Environment in February 2018 and following a two-year approval process, the cement manufacturer will be able to replace about 30% of its current petroleum coke fuel usage with non-hazardous waste tyres.

The TDF usage could significantly reduce the company's energy bill and CO_2 emissions while promoting a circular economy. In addition, with the incorporation of used tyres, Cementos Cosmos contributes to reducing the consumption of a finite fossil fuel such as petroleum coke.

Source: World Cement: "Cementos Cosmos to use waste tyres as alternative fuel". Retrieved 10 June 2020 from https://www.worldcement.com/europe-cis/10062020/cementos-cosmos-to-use-waste-tyres-as-alternative-fuel/ .

Geocycle Increases Co-Processing Activities

Geocycle has commissioned an XR3000C shredder supplied by Untha Iberica, for use at its Albox (Almeria) facility. The machine will now help transform 15,000 tonnes of hazardous solid waste per annum into pre-treated waste with the right granulometry for coprocessing in cement kilns.

The new shredding line allows the company to convert nationally-produced commercial and industrial waste which was previously landfilled – including oil/solvent contaminated textiles, plastics, paper and cardboard – into co-processing-ready materials for use at one of LafargeHolcim's five Spanish cement plants.

Outputs will range from 4-8 tonnes per hour, with a homogenous particle size of <45-80mm, depending on the specification of the final cement plant.

Source: Recycling Magazine: Untha shredder advances Geocycle's co-processing strategy. Retrieved 7 May from https://www.recycling-magazine.com/2020/05/07/untha-shredder-advances-geocycles-co-processing-strategy/ .

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