COINCINERATION OF WASTE IN CEMENT KILNS IN SERBIA

Presentation

Branislav Despotov

GENERAL SITUATION WITH CEMENT COMPANIES IN SERBIA

1. There are three cement companies in Serbia

Lafarge in Beočin

Holcim in Novi Popovac

Titan Cementara in Kosjerić

2. Co-incineration of waste started in Holcim's cement kiln in Popovac in 2006. and in Lafarge's cement kiln in Beočin in 2008.

Titan Cementara still does not use waste as alternative fuel, although they do plan to start using it as soon as the legal framework is created.

TYPES OF WASTE THAT ARE INCINERATED IN OUR CEMENT KILNS

Holcim: Since 2006. waste tires, SRF, there are plans to co-process various types of industrial waste, sorted municipal and packaging waste.

Holcim owns a sister company called Ecorec (www.ecorec.co.rs – "ecological recovery") which prepares and processes the waste for incineration in cement kilns.

Lafarge: Since 2008. waste tires, biomass (waste of biological origin), sustainable solid waste (SSW) since 2010. They have the permission to use waste tires since 2007. Permission to use waste oils since 2010. and bone meal since 2012.

PUBLIC AWARENESS

1. General public (or at least most citizens of Serbia) were NOT aware of this issue and all the possible consequences. Public debates about coincineration of waste in cement kilns have been very limited in their scope and the number of people that participated.

2. The opinion of ordinary citizens in the local municipality of Kosjerić has been ignored. This opinion was expressed in the official letters from the NGO "Egrin" as well as by the local self-government. Namely, the municipal assembly of Kosjeric has unequivocally forbidden any incineration of waste in the Kosjeric area. Serbian Ministry did not take into account the opinion of the local self-government during the process of issuing the permit for waste coincineration.

CURRENT SITUATION IN CEMENT INDUSTRY IN SERBIA

Due to a decreased demand for cement in general, we suppose that cement kilns in Serbia currently produce less cement than what would be the usual amount.

However, this can and probably will change as soon as the demand for cement increases.

KOSJERIĆ

EGRIN (NGO)

ECOLOGICAL CITIZENS' INITIATIVE NGO EGRIN KOSJERIĆ

Kosjerić is a municipality in western Serbia with about 12,090 citizens.

The area is mountainous and its climate is especially suitable for growing high quality raspberries, but also plums, blackberries etc. The citizens of the Kosjerić area are also engaged in cattle breeding and rural tourism.

There are lime deposits and marl deposits (they stand opposite one another). These deposits are situated about 1,5 km away from the town center. This meant that there were ideal requirements for building a cement kiln in 1976 in Kosjerić.

TITAN CEMENT KILN IN KOSJERIĆ

NATURAL RESOURCES IN KOSJERIC

The cement kiln is situated in the valley next to river Skrapež, which flows downstream through the town of Kosjerić.

As of 2001 the cement kiln in Kosjeric is owned by Greek company TITAN.

An automatic measuring station that monitors air quality has been put here (as a part of the state network). According to the latest release from the Serbian agency for environmental protection, "agglomeration Kosjerić" is an area with excessively polluted air, due to the presence of suspended particles (PM 10). The impact of the cement kiln on this pollution is unknown.

NGO EGRIN & PROFESSOR CONNETT' S LECTURE IN 2012

EGRIN is a citizens initiative that was established in 2001 in Kosjerić. Its main goal is to improve the quality of people's life in this small area, and to raise citizens' ecological awareness. There has been a significant air contamination problem due to the cement kiln's operations, which was especially problematic at the time when EGRIN was established.

EGRIN has warned the public that the introduction of petroleum coke (instead of fuel oil) was only a transitional phase towards the ultimate goal – the introduction of the so-called alternative fuels, i.e. municipal waste, waste tires, sewage sludge and many other types of waste. It has been dubbed "Ecological genocide" for the citizens of Kosjeric.

NGO EGRIN organized a variety of local activities, lectures of specific activists in the media etc. In February 2012 EGRIN also organized the visit and lecture of professor Paul Connett. He was present at the panel discussion regarding the issue of incineration of waste in cement kilns, especially with regards to the Kosjeric's cement kiln.

PROFESSOR PAUL CONNETT'S LECTURE IN KOSJERIĆ IN 2012

Professor Paul Connett's lecture was very well received. It was the first time that the citizens of Kosjerić had the opportunity to hear the scientific facts about the dangers of waste incineration, especially in cement kilns.

He emphasized the fact that increased emissions of dioxins and furans (which will inevitably increase if waste is incinerated) pose a serious risk and represent a danger. The same can be said for emissions of heavy metals (such as mercury) into the environment and into the final cement product. Professor Connett also emphasized the fact that cement kilns are definitely experts in the business of production of cement, but that they are certainly NOT experts in the business of waste disposal.

He pointed out the huge advantages of the Zero Waste strategy (prevention of waste generation, recycling, reusing) when compared to incineration.

RECENT DEVELOPMENTS

TITAN cement company got a written consent from the Ministry for the Environment which gives them the permission to incinerate SRF in their cement kiln, despite the opposition of the local self-government. The Municipal Assembly fiercely opposes and forbids waste incineration on its territory.

NGO EGRIN expressed their opinion about this issue during the process of creating the *Assessment of Environmental Impact of coprocessing of municipal waste* in the Titan's cement kiln.

TITAN Cementara will have the obligation to measure dioxins, furans and mercury once a year (using an accredited institution), providing they acquire all the relevant permissions. We are not aware of the existence of any accredited laboratory for sampling and measuring dioxins and furans in Serbia. The price of a single sampling and measurement is estimated to be very high.

Public at large is not acquainted with the contents of Memorandum of Understanding which was signed between CIS (Association of the Cement Industry of Serbia) and the Serbian Ministry. This memorandum is the document for the initiation of all concrete activities regarding waste incineration in Serbia.

We don't have access to the data (if there is any) of any test co-incineration attempts (test burns) in any cement kiln in Serbia.

THE PROBLEMATIC STUDY

During the process of creating the Study that examines the Impact of Waste Coprocessing in TITAN's cement kiln in Kosjerić (2012-2013), the authors of the study used the modelling methods of dispersion of contaminant compounds instead of using the exact data from the other two cement kilns which had already burned waste since 2007.

The authors of the study emphasized positive impact of waste incineration on the environment from the point of view of "preserving the planet Earth", that is, they cite preservation of unrenewable energy sources, "mitigation of the greenhouse effect", decreasing the amount of waste that is taken to landfills etc. This is nothing short of mockery when it comes to the care for the environment and health of local citizens who will be directly affected due to the emissions of contaminants if this project becomes a reality.

EXPERT TEAM THAT WORKED ON THE STUDY OF ENVIRONMENTAL IMPACT

Another question that must be considered –

Will the proposed monitoring system be really satisfactory, considering the fact that partial substitution of virgin fuels with alternative fuels will be done using the existing facilities and equipment – without the introduction of any new filters, protection and fail-safe systems etc?

The team of experts that wrote the Study of Environmental Impact of Waste Coprocessing in TITAN's cement kiln consisted of:

1. Five mechanical engineers;

2. One hydrogeologist;

3. One engineer of organizational sciences.

THE TYPE OF EXPERTS THAT DID NOT TAKE PART IN THE STUDY

Among the authors of this study there were NO chemists, NO engineering technologists, NO engineers for the protection of the environment, nor any engineers for protection at work, physicians etc.

The measurements for dioxins and furans are performed only once a year, by an unknown laboratory. The same goes for mercury levels.

It is not known that any cement kiln in Serbia has ever been shut down due to the lack of compliance or excessive emissions!

LEGISLATIVE CONTEXT / NATIONAL STRATEGY OF WASTE MANAGEMENT

National Waste Management Strategy from 2003.

Waste Management Law from 2009. (changes added in 2010.)

Waste Co-Incineration started in 2006.

(before the legal framework permitted such practice!)

The Cement Companies Emphasize These Things as the Main Reasons why they Want to Use "Alternative Fuels"

- They care for our environment;

- They want to take up on themselves the difficult job of waste disposal as a way to help local communities;

- By using alternative fuels they decrease the use of unrenewable fossil fuels;

- By using alternative fuels they reuse the mineral components in the waste instead of using new raw materials;

- By using alternative fuels they decrease the CO2 emissions and thus contribute to mitigating the global warming problem.

- They create new jobs.

So, from the point of view of cement companies, it's a "win-win" situation both for them and the country in which they operate.

MARKETING VS REALITY

In reality, however, cement companies will accrue big profits, not only by saving on virgin fuels but also by receiving significant subsidies from the State for their waste disposal services.

The local community will get nothing from this practice, except for the potentially harmful contamination of the environment with miscellaneous toxins, including dioxins, furans, heavy metals such as mercury, volatile organic compounds etc. The environment will certainly not benefit from this practice. Also agriculture in general, growing raspberries, production of milk and other types of food can become negatively affected.

Apart from dioxins and furans (which are cancerogenic and mutagenic), heavy metals and toxic compounds that cannot or were not thermally destroyed will be mixed with clinker and incorporated into the final product – cement. Instead of disposing the fly and bottom ash in a toxic landfill, it will be put directly into the cement.

THE PROBLEM OF TOXIC CEMENT

Does this mean that buildings, houses, hospitals, kindergartens, schools and other constructions where cement is used will become **toxic landfills in disguise**? Can those buildings be really considered healthy?

Will the health of construction workers that come into contact with such cement (e.g. on construction sites) be negatively affected?

If fly and bottom ash from commercial incinerators is considered hazardous waste that must be disposed of in toxic landfills, how come that cement produced with coincineration of waste miraculously becomes healthy and non-toxic even though it will contain exactly the same toxic compounds (or worse)?

CEMENT AS HAZARDOUS WASTE IN DISGUISE

http://www.ejnet.org/rachel/rhwn243.htm
Environmental Research Foundation
P.O. Box 5036, Annapolis, MD 21403

Citizens are naturally concerned about this trend. Air emissions from cement kilns burning hazardous waste are substantially larger than those of cement kilns not burning hazardous waste. Toxic residues from a hazardous waste incinerator must legally be sent to a hazardous waste landfill where someone must watch them into the foreseeable future. On the other hand, toxic residues from hazardous wastes burned in a cement kiln can legally be mixed into the cement and thus distributed into the environment, liability-free.

A 1989 Greenpeace report estimated that cement kilns that year released 14 million pounds of unburned hazardous waste and two million pounds of toxic heavy metals into the environment via the smoke stack. The same report estimated that hazardous residues from hazardous waste combustion in cement kilns in 1989 totaled 6.7 billion pounds of ash, containing as much as 18.6 million pounds of toxic heavy metals.[1] These toxins went into the cement.

The newest tactic for opposing cement kiln incineration of hazardous waste has developed among a community of people who are asking, "What is this doing to the quality of the cement?"

The City Council of Fort Collins, Colorado May 7, 1991, passed a resolution opposing a plan by a major cement company (Holnam, Inc.) to burn hazardous waste in its Boettcher Plant. [Holnam was already burning hazardous waste in its cement kilns at Santee, SC, and Clarksville, MO.] The Council went on record opposing Holnam's proposal and directed the city staff to develop a plan for opposing Holnam. Most importantly, the Council formally outlawed the use of cement from cement kilns burning hazardous waste on any city funded projects in Fort Collins.

Two days later in Dayton, OH, Price Brothers, one of the nation's largest suppliers of cement water mains, announced it was suspending use of cement made at kilns burning hazardous waste until such cement was certified safe by the National Sanitary Foundation.

Clearly, this issue of "cement quality" could become the Achilles heel of cement kilns burning hazardous waste: if the public turns against their cement, they'll think twice about adulterating it with hazardous waste.

An interesting sidelight on the "cement quality" issue: Edward Kleppinger, an engineer, petitioned the American Society for Testing Materials (ASTM) November 19, 1990, to consider whether adulteration of cement with hazardous waste is a violation of ASTM regulation C-150, which states, "The cement covered by [regulation C-150] shall contain no addition except..." followed by a short list of materials that can be added to cement, such as water and calcium sulfate; the list does not include toxic metals or other hazardous waste constituents. Dr. Kleppinger asked the ASTM whether a new standard needs to be developed for waste-free cement vs. waste-containing cement. ASTM has charged a subcommittee of Committee C-1 with developing a response to Dr. Kleppinger.

Pergamon

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ORIGINAL CONTRIBUTION

CEMENT CLINKER: AN ENVIRONMENTAL SINK FOR RESIDUES FROM HAZARDOUS WASTE TREATMENT IN CEMENT KILNS

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ABSTRACT. About 70% of all of the liquid and solid hazardous wastes commercially incinerated in the United States is being burned in cement kilns. The process inevitably results in residues, primarily heavy metals, entering the clinker and waste dusts (cement kiln dust, CKD) produced by these kilns. The effects of this trend on the nature and chemical composition of cement, actual and future, are discussed. The wastes burned by cement kilns are expected to increasingly have higher levels of heavy metals per Btu. In general, the effects are very simple to describe but have as yet unknown consequences. The present American Society for Testing and Materials (ASTM) standard does not effectively control hazardous waste burning residues in Portland Cement.

The regulatory and economic pressures on CKD disposal suggest that much of it, and its heavy metal residues, will, in time, end up in the clinker and the resultant cement. The end point to the trend is the ability to make cement that passes the performance specifications while containing high levels of heavy metals. The only other alternative is to maximize the levels of heavy metals in the CKD, minimize the amount of CKD, and dispose of it as a hazardous waste.

It is recommended that an effort to correlate heavy metal levels in clinker with adverse effects be undertaken, a new standard for cement containing hazardous and other waste residuals be developed, and labeling be required.

for liquids is 11,820 ÷ 10,000, and for solids, 11,820 ÷ 5,000.

!!! In the few examples in Table 7, cement kilns burning, or proposing to burn, hazardous wastes at these permit levels can be seen to be depositing 14–155 times as much heavy metals into the environment as those burning coal. In this case environment is used in its larger sense. It needs to be pointed out that metals feed rates into cement kilns operating under BIF rules are controlled by the use of an hourly rolling average (HRA). To meet a particular HRA, the cement kiln must burn at below the maximum value. Thus, the values derived in Table 7 are relative, not absolute. For example, I was given average lead values for cement kiln blends of hazardous wastes produced by Cadence Chemical Resources for "liquid" and solid wastes. The values were 1219, 399, and 343 ppm lead in liquids and 3383, 23240, and 1477 ppm lead in solids for 1990–1992. These can be compared to the an average coal value of 35 ppm. No adjustment for efficiency Btu value has been made (60).

Pb

Kirchner gives a cadmium balance for a suspension and a grate preheater cement kiln (46). The raw meal feed to pulverized coal to clinker cadmium ratios are given as 0.302:0.024:0.299 and 1.090:0.229:0.400. The units are mg Cd/kg clinker. Coal Cd values are given as 0.1–1.3 ppm. Taking values of 19 and 153 from Table 7 for Cd waste fuel enrichment at 100% fuel substitution and using the German partitioning data, some idea of the impact of increasing Cd in hazardous wastes as compared to coal can be seen:

Suspension 0.302:0.024 → 0.302:0.456 and 0.302:3.67[14]

Grate 1.090:0.229 → 1.090:4.35 and 1.090:35.0.

Using fuel plus raw meal to clinker ratios yields an estimated effect on clinker composition if partitioning remains constant:

Suspension 0.326:0.299 → 0.758:0.695 and 3.97:3.64

Grate 1.32:0.400 → 5.44:1.65 and 36.1:10.9.

In the above example, with all of its limitations, the use of hazardous waste derived fuels can be seen to increase Cd levels in the clinker from the 0.3–0.4 ppm range to the 0.7–11 ppm range.[15]

Cd

More information about the levels of heavy metals seen by specific kiln systems will become available as the EPA BIF rules are implemented and test data reach the public sector.

G) Total Kiln Heavy Metal Loading

Cement kilns burning or wanting to burn hazardous wastes in the United States were required to file a "Precompliance Certification" by August 21, 1991. As part of that certification, information relating to stack emissions of heavy metals had to be calculated. One starting point estimated maximum feed rates of heavy metals by type of process stream: raw materials, HWDF (Hazardous Waste Derived Fuels), coal, etc. Table 8 has been derived from the data submitted by one cement kiln (43). Again, it must be noted that these are maximum data, not hourly rolling average, operational levels.

In my discussions with cement industry personnel about hazardous wastes and the heavy metals issue, it is common for them to state that most of the heavy metals in any particular kiln system come from the raw materials, not from the fuel or hazardous wastes. The information in Table 8 seems to

VII. SOME CONCLUSIONS AND RECOMMENDATIONS

A) Heavy metal levels in cement from cement kilns burning hazardous wastes have probably increased over the last 5 years. In response to marketplace and regulatory pressures, the levels will certainly increase in the future.

B) Organics may well be present in cement in a highly variable and generally rare basis. Given these factors and the solid matrix analytical problem, they may not be detectable even when present in concentrations affecting the use of the concrete.

C) The present ASTM standard does not effectively control hazardous waste burning residues in Portland Cement.

D) It is recommended that:

1. A major technical effort be undertaken to correlate heavy metal levels in clinker with adverse effects on the physical properties of cement and concrete.

2. A new standard for cement containing hazardous and other waste residuals be developed.

3. Pending the development of a new standard, and then incorporated into it, cement companies should label their cement as to origin if hazardous and other wastes are used in its production. Total heavy metal levels in the cement should be specified.

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The point is that the BIF regulations place a premium on the cement kiln demonstrating and operating in a mode wherein the maximum possible amount of the regulated heavy metals remain in the CKD or the clinker. The more heavy metals that remain in the CKD and clinker, the more that can be fed into the kiln under EPA regulations.

Since the cement company is almost always paid to treat hazardous wastes and since high ash, solids, and heavy metal wastes command a higher disposal fee in the market place, the cement kiln operator has a greater economic incentive to burn hazardous waste containing high levels of heavy metals. In permitting kilns under the BIF rules, the operator has an incentive to establish the highest possible metals feed rates, well above what is presently being fed into the kilns. Ultimately, this means increasingly higher levels of hazardous waste residuals in the cement in the market place. Indeed, the one cement company that has had to disclose its economic profits in sworn testimony stated that its only profits come from burning hazardous waste, not from making cement (7).

!!!

The recent Clean Air Act (CAA) revisions will eventually place major new restrictions on the atmospheric emissions from most sources of air contamination in the United States. Especially impacted are emissions of toxic air pollutants. There are only two ways to meet these standards; stop the process or use of the component, or remove the toxic air pollutant from the stack gas. This latter control technique often leads to additional waste streams of various toxic contaminants for off-site disposal. Thus, the implementation of the CAA will probably lead to more concentrated organic and heavy metal waste streams for disposal, in part by cement kiln incinerators.

C) The CKD Incentive

forts to minimize or eliminate CKD production. Technology is available to eliminate CKD[4] (8). The effect of decreasing CKD production will be increasing levels of heavy metals in cement clinker, especially that from wet process cement kilns burning hazardous waste. Wet process kilns burn the bulk of the hazardous wastes incinerated in cement kilns in the United States. The more energy efficient preheater and precalciner kilns are much more limited in their ability to reuse CKD.

Hazardous wastes are presently regulated under RCRA. The "derived from" rule is a part of the RCRA regulations. The rule is presently under review by EPA. The derived from rule simply states that residues from hazardous waste treatment processes are considered to be hazardous wastes until proven otherwise in a so-called "delisting" proceeding. Delisting is very difficult. Practically, this means that hazardous waste incinerator ash has to go to a hazardous waste landfill because it is derived from hazardous wastes. However, CKD from kilns burning hazardous wastes is exempted from having to go to special landfills by EPA's application of the Bevill Amendment. Curiously, total heavy metal levels in hazardous waste incinerator ash are generally less than those in CKD from all cement kilns, as show in Table 4. Published data are listed, but note that arsenic levels are higher in both CKD and cement than they are in hazardous waste incinerator ash. Chromium has an average of 41 ppm in CKD with a 293 ppm maximum, while hazardous waste incinerators ash (a limited number of samples) has an average of 127 ppm with an outlier of 660 ppm. The hazardous waste incinerator data are limited, but then there are very view commercial hazardous waste incinerators in the United States.[5]

The values in Table 4 are concentration based (9). The relative amounts of heavy metals can be approximated. An average commercial hazardous

NATIONAL STRATEGY OF WASTE MANAGEMENT – SERBIAN GOVERNMENT

THE CURRENT STATE OF RECYCLING IN SERBIA (NOT MUCH REASON FOR OPTIMISM)

3.4. Третман отпада

Општински отпад се без било каквог предтретмана одлаже на депонију. И поред тога што постоје одговарајући услови за компостирање (велики садржај органског отпада), компостирање се не врши. У Србији не постоји постројење за инсинерацију отпада, нити се отпад користи као алтернативно гориво у цементарама или железарама. Иако је примарна рециклажа (сепарација отпада на месту настајања) нормативно регулисана у Републици Србији, чиме је предвиђено раздвајање хартије, стакла и металне амбалаже у посебно обележене контејнере, наведени систем не функционише у пракси. Рециклажа из комуналног отпада се не обавља организовано. Постоји рециклажа индустријског отпада, која је претежно базирана на приватној иницијативи.

У садашњим условима капацитети за рециклажу отпада нису организовано заступљени. Наиме, постоје одређени производни капацитети уписани у организацијама које су почеле са рециклажом пре више година, и у међувремену престале или скоро престале са делатношћу. Такође, постоје приватне организације које су пронашле интерес да и у овако недефинисаној економској активности обављају делатност рециклаже. Према подацима Републичког завода за статистику у 2001. години постоји регистровано око 80 организација, са приватним капиталом које се баве пословима рециклаже.

CURRENT WAYS OF DISPOSING WASTE IN SERBIA (EXCERPTS TAKEN & TRANSLATED FROM NATIONAL STRATEGY FOR WASTE MANAGEMENT, PUBLISHED IN 2003)

"Although primary recycling (separation of waste at the place of its origin) has been normatively regulated in the Republic of Serbia, which implies that it should be separated according to its type (separation of paper, glass, metals, packaging) into separately marked containers, this system **does NOT** work in real life. Recycling of municipal waste is not performed in an organized fashion. There is some recycling of industrial waste, which primarily depends on private incentive."

"The installations for waste recycling are not currently present in any organized manner. Namely, there are some production facilities which are grouped into organizations and they started to operate several years ago, but in the meantime they entirely ceased their operations or they function to a very limited extent.

There are also private organizations which have seen their interest to do the business of recycling even in this economic activity which is so undefined. According to the data of the Republic Institute of Statistics in 2001. there are about 80 organizations with private capital that do work related to recycling.

CURRENT WAYS OF DISPOSING WASTE IN SERBIA (EXCERPTS TAKEN FROM NATIONAL STRATEGY FOR WASTE MANAGEMENT)

There are some smaller individual facilities for hazardous waste treatment, but they were designed primarily only for that particular generator of waste.

The largest portion of all municipal waste is taken to landfills. There are 180 official landfills in Serbia, not counting here many illegal landfills in rural areas.

Some landfills accept various types of waste, which is forbidden according to the national EU directives.

CURRENT WAYS OF DISPOSING WASTE IN SERBIA (EXCERPTS TAKEN FROM NATIONAL STRATEGY FOR WASTE MANAGEMENT)

Main conclusions regarding waste management in Serbia

According to the shown data, it can be concluded that

- Organized collection of municipal waste covers about 60-70 % of the population;
- Rural areas are not covered by organized collection of municipal waste;
- The only treatment option for waste is landfilling.
- The situation with hazardous waste in Serbia is very alarming and requires an integral approach from the point of generation of waste, to collection, transport, treatment and to its disposal.

REQUIRED MEASURES ACCORDING TO NATIONAL STRATEGY FOR WASTE MANAGEMENT

Превенција и смањење стварања отпада

- смањење количина комуналног отпада за одлагање у условима очекиваног пораста потрошње становништва;
- стабилизација количине индустријског и опасног отпада имајући у виду очекивани пораст производње;
- подстицање успостављања режима дозвола које се односе на управљање отпадом у великим индустријским компанијама, у вези са имплементацијом ЕУ Директиве ИППЦ.

Поновна употреба и рециклажа

- постепено увођење система раздвојеног сакупљања отпада;
- повећање типова отпада сакупљених у циљу рециклаже и поновне употребе;
- изградња нових постројења за рециклажу отпада;
- увођење система за означавање рециклабилних производа и амбалаже;
- унапређење система за сакупљање отпадних уља и њихову рециклажу;
- рециклажа грађевинског отпада;
- искоришћење отпада са органским материјама, биљних и животињских масти за прављење компоста, и других органских ђубрива (отпад из шећерана, прехрамбене индустрије);
- поновна употреба отпада са значајним садржајем минерала (металуршка шљака, пепео из термоелектрана, гипс генерисан у постројењима за пречишћавање гасова) у грађевинарству, за санацију подземних и надземних копова, у производњи гипса, цемента и сл.
- стимулација тржишта за рециклиране материјале;
- поновна употреба и рециклажа посебно сортираних и раздвојених металних отпада за производњу чистих метала;
- рециклажа и поновна употреба растварача за директно поновно коришћење или за даљу продају;
- рециклажа и поновна употреба термопластичних материјала у поновној производњи;

REQUIRED MEASURES ACCORDING TO NATIONAL STRATEGY FOR WASTE MANAGEMENT

Prevention and lowering the amount of waste creation.

- Lowering the quantity of municipal waste to be disposed of considering the expected increase in the consumption among citizens;
- Stabilization of the amount of industrial and hazardous waste, considering the expected increase in production;
- Encourage establishment of the permit regime regarding waste management in big industrial companies, in connection with the EU directive IPPC.

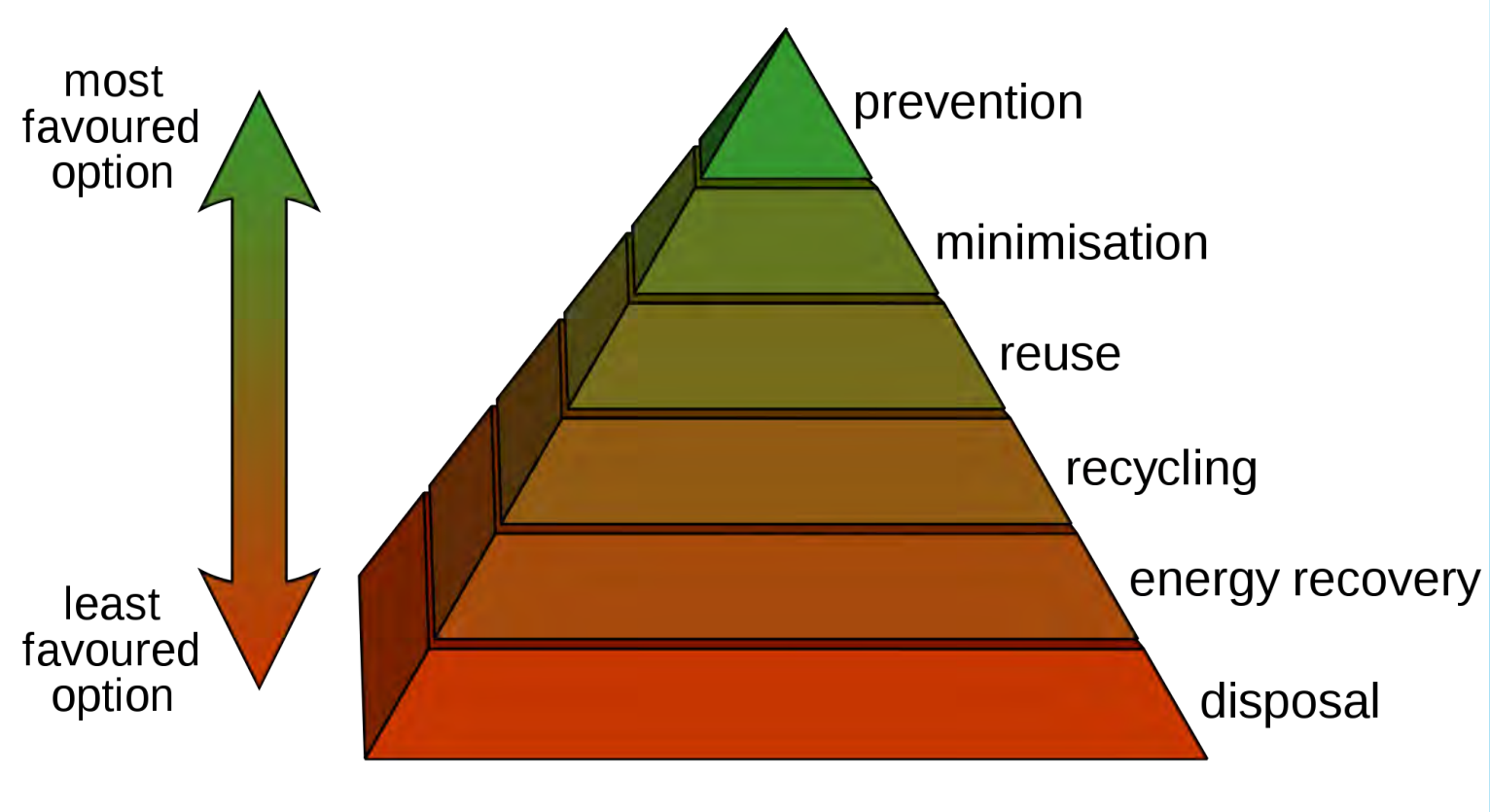
Reuse and recycling

- Gradual introduction of the system that would allow separation of waste during the collection phase;
- Increase the number of types of waste that is collected for recycling;
- Build new facilities for waste recycling;
- Introduction of system for labeling recyclable products and packaging;
- Recycling construction waste;
- Using waste with organic materials, vegetable and animal fats for making compost and other types of organic fertilizers (waste from sugar factories and food industry);
- Reuse of waste with significant mineral content (metallurgical slag, ash from thermal powerplants, gypsum generated in facilities for purification of gases) in construction, for repairing underground mines and above the ground mines, in the production of gypsum, cement etc.;
- Stimulate the market for recycled materials;

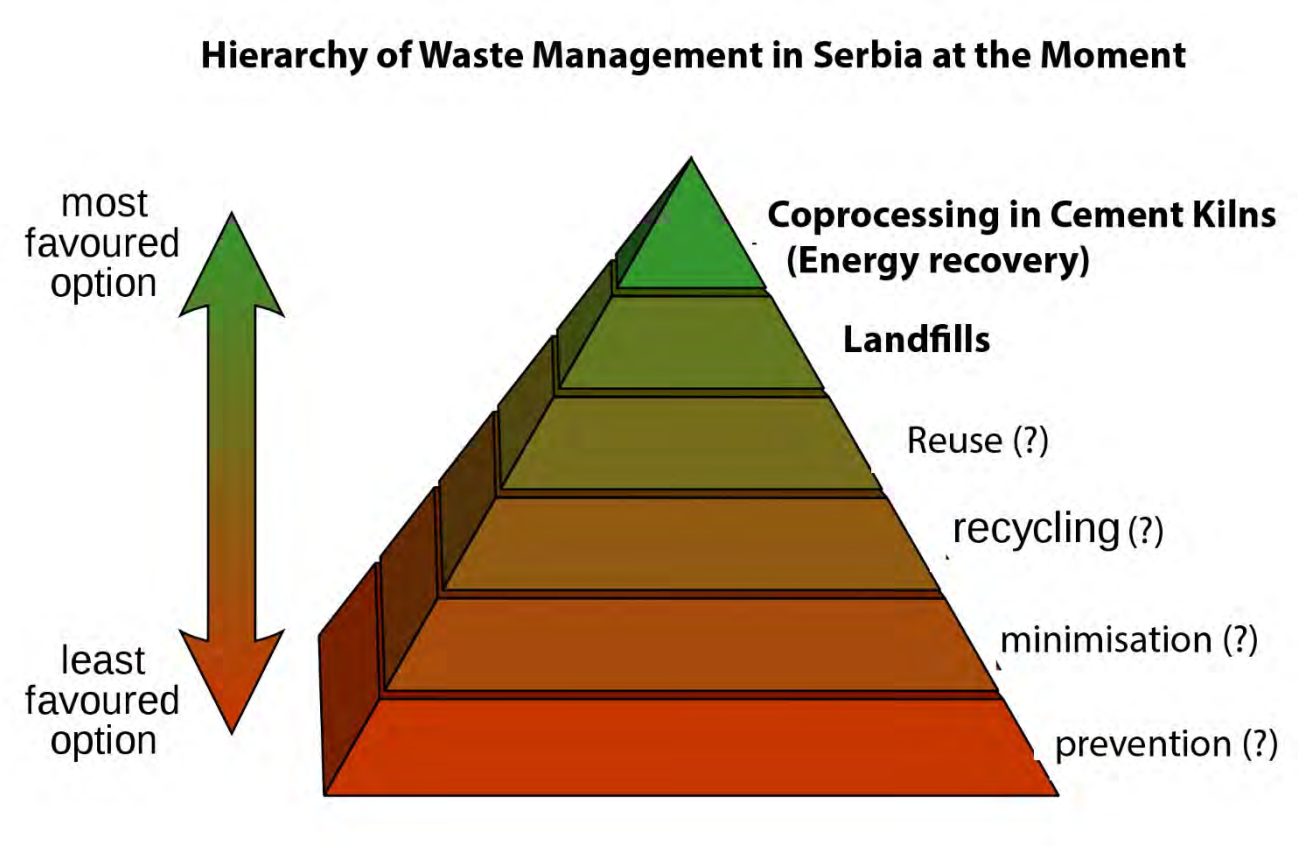
REQUIRED MEASURES ACCORDING TO NATIONAL STRATEGY FOR WASTE MANAGEMENT

- Reuse and recycling of separately sorted and separated metallic wastes for production of pure metals;
- Recycling and reuse of solvents for their immediate use or for selling them.
- Recycling and reuse of thermoplastic materials in new production cycle;
- Recycling and reuse of waste paper;
- **Recycling and reuse of waste tires;**

NORMAL HIERARCHY OF WASTE MANAGEMENT



EFFECTIVELY THE REAL HIERARCHY OF WASTE MANAGEMENT IN SERBIA TODAY



LEGISLATION VS REALITY

The current official Serbian legislation regarding waste management is **not bad**, and actually encourages minimization of waste production, recycling and reuse.

However, these recommendations and laws are NOT implemented or enforced in real life.

On the contrary, there is an increasing trend in the media to promote "coprocessing" of various types of waste in cement kilns as the best possible and most economically viable option for waste disposal.

Recycling and reuse is often seen as unrealistic and economically uninteresting.

CEMENT COMPANIES & THEIR MARKETING

“’ HOLCIM SERBIA’: THEY TURN WASTE INTO ENERGY”

вечерње НОВОСТИ online

“Holcim Srbija”: Otpad pretvaraju u energiju

Z. RAŠIĆ | 02. decembar 2010. 20:57 | Komentara: 4

Gustavo Navaro, generalni direktor cementare, za “Novosti” govori o planovima firme

PARAĆIN - Cementara “Holcim Srbija”, čija je proizvodnja locirana u Popovcu kod Paraćina, završila je izgradnju postrojenja za predtretman otpada i pripremu čvrstog obnovljivog goriva (SRF) za korišćenje u rotacionim pećima.

Komisija za tehnički prijem Ministarstva životne sredine i prostornog planiranja nije imala nijednu primedbu na izvršene pripreme, otkriva za “Novosti” Gustavo Navaro, generalni direktor “Holcima”.

SRODNE VESTI

Holcim i Lafarž prodaju imovinu, kupce traže i u Srbiji

- Čekamo samo upotrebnu dozvolu za rad platforme, posle čega postrojenje počinje da radi. U zavisnosti od brzine procedure, prve količine SRF cementari bi mogle biti isporučene do kraja decembra. Ovaj otpad će biti korišćen u rotacionim pećima fabrike cementa i iz njega će se na optimalan način dobijati energija. Sa stanovišta ekologije i naših proizvodnih troškova, to je vrlo efikasno rešavanje problema upravljanja otpadom.

Lafarž i Holcim u pregovorima o spajanju, vrednom 50 milijardi dolara

› Holcim: Cement se ne predaje

› Razbijaju "staklenu baštu"

› Poravnanja i mimo suda

*** Koje vrste otpada će biti korišćene i u kojoj količini?**

- Isključivo otpad koji nije pogodan za reciklažu. Na taj način klasična fosilna goriva, kao što je recimo ugalj, menjamo alternativnim. U pitanju je sortirani komunalni, industrijski i komercijalni otpad. To mogu biti trina, piljevina, drvni ostaci, papir, karton, plastika, tekstil i slično. Po svom karakteru taj otpad je sasvim neopasan. Prema sadašnjim planovima, u 2011. godini ćemo upotrebiti 4.500 tona takvog otpada.

*** Koja je vrednost investicije?**

- Samo u izgradnju i opremanje ovog postrojenja "Holcim" je uložio do sada oko dva miliona evra, a u uvođenje savremenih tehnologija koje doprinose racionalnom korišćenju prirodnih resusa i zaštiti životne sredine, ukupno smo uložili više od 10 miliona evra.

*** Ima li bilo kakve opasnosti da upotreba SRF izazove zagađenje okoline?**

- Ne samo da nema nikakvih opasnosti, već se na ovaj način pomaže očuvanju neobnovljivih prirodnih resursa i smanjuje se negativan uticaj otpada na životnu sredinu, koji se uglavnom nepravilno skladišti. Upotrebom SRF doprinosimo regionalnom rešavanju problema u upravljanju otpadom. To će doprineti smanjenju globalnog zagrevanja, odnosno efekta "staklene bašte". Sa druge strane, i naša ušteda će biti značajna. Teško je sada proceniti koliko je to, jer još nismo zvanično krenuli. Ali, sve što uštedimo investiraćemo u dalju modernizaciju proizvodnog procesa.

ČISTA TEHNOLOGIJA ?

- STANOVNICI Popovca i okruženja nemaju razloga da strahuju. Ne očekuje se nikakav negativan uticaj korišćenja SRF na životnu sredinu. Neće biti zagađenja neprijatnim mirisima, niti ikakvog značajnijeg povećanja emisija štetnih materija u vodu, vazduh ili zemljište. Sama platforma za predtretman otpada ima dva filtera za otprašivanje - kaže Navaro.

CEMENT COMPANIES' MARKETING (TRANSLATED)

What types of waste will be used, and in what quantity?

We use exclusively the types of waste **that are NOT suitable for recycling**. Thanks to this, we substitute classic fossil fuels, such as coal for example, with alternative fuels. By alternative fuels we mean **municipal, industrial and commercial waste**. That can include sawdust, wood scraps, paper, cardboard, plastic, textiles and similar materials. Those types of wastes are completely harmless. According to our plans we will use 4500 tones of these types of waste in 2011.

(Why do they think that municipal waste such as paper, cardboard, plastic and textiles are not suitable materials for recycling?)

Are there any dangers from using SRF for the environment?

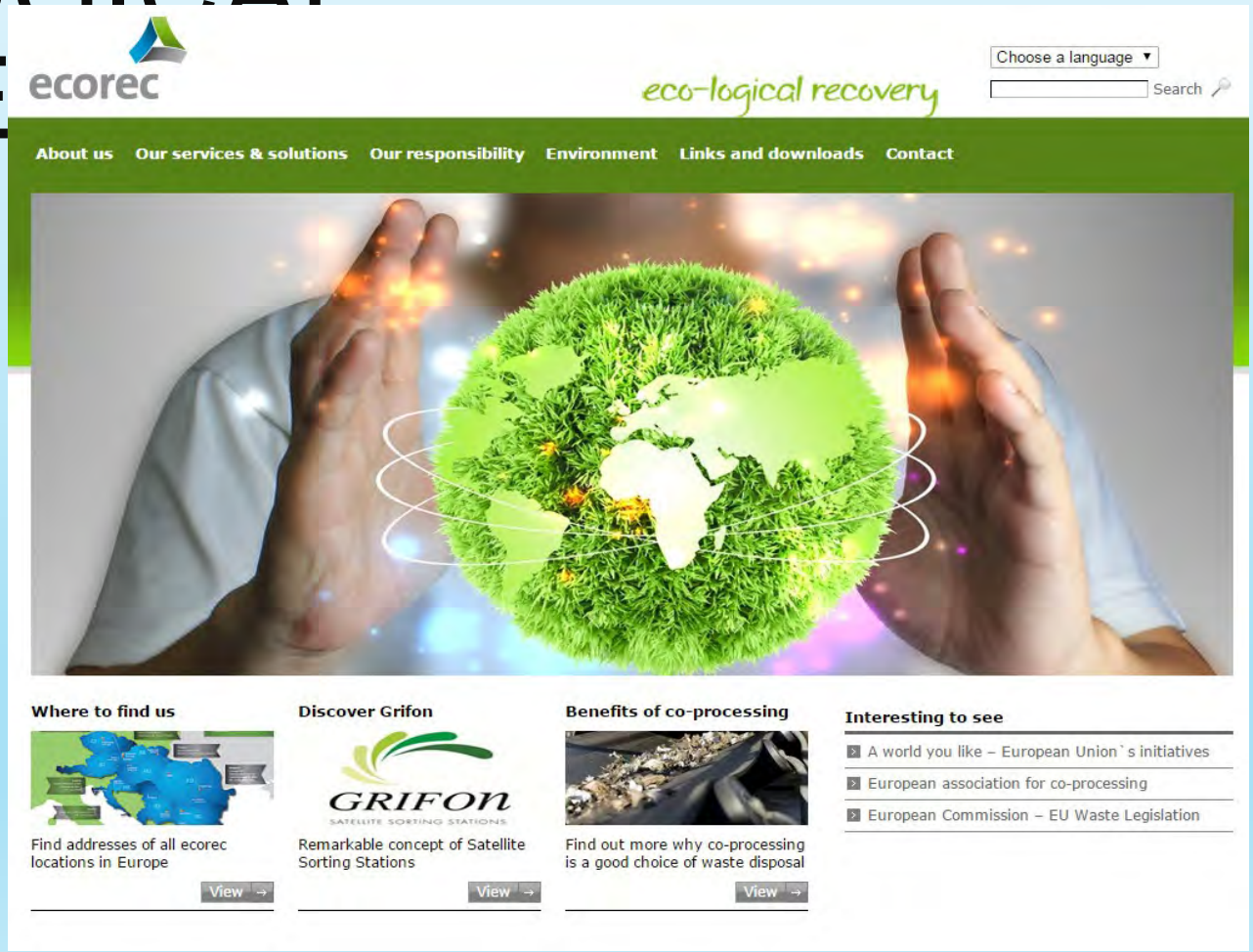
Not only there is no danger whatsoever, but we also contribute to the preservation of non-renewable natural resources and we decrease the negative impact of waste on the environment, which is usually disposed in an improper way.

Clean technology

Citizens of Popovac and the surrounding areas have no reason to be concerned. We don't expect any negative impact on the environment due to the use of SRF. There will be no contamination with unpleasant odors, nor any significant emission of harmful substances into watercourses, air or ground. The platform that we use for the pre-treatment of waste has two filters for dust removal, says Navaro.

CEMENT COMPANIES & THEIR MARKETING

ECOREC – “ECO-LOGICAL RE



ecorec

eco-logical recovery

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Ecorec Serbia / Environment / What is co-processing?

Environment

- What is what?
- What is co-processing?

What is co-processing?

Co-processing as a good choice

Co-processing is a secure form of waste management that fully recovers the energy and mineral content from waste for beneficial re-use as fuel for energy generation and product additives for manufacturing.

Many materials you may not expect to be viable for co-processing are excellent candidates. Items such as wood waste from construction sites, old mattresses, carpets, plastics and tires are engineered to precise specifications, generating a consistent fuel source manufacturers and energy generators can use in place of fossil fuels. Even liquids like paint sludge, pharmaceuticals, off-quality shampoo and detergent can be incorporated into the process.

ecorec is positioned to partner with you to manage your waste on a local, regional and national level. A rigorous on-site pre-screening by our co-processing experts helps ensure that your waste stream is maximized to benefit your company, your community and the environment. That means you can be confident that you are recycling and co-processing all possible waste streams, minimizing materials that end up in a landfill or incinerator while reducing your impact on the environment at the same time.

How co-processing works

Once your waste reaches our facilities, technicians conduct further analysis in our laboratories and pre-treat the waste if required. Solid wastes are shredded to uniform size to yield maximum energy creation. Solids are sometimes blended with liquid waste, creating a relatively dry material that stabilizes the liquids and allows them to be utilized more easily.

The waste is then safely and securely co-processed, often by using it as a fuel source in cement kilns and others manufacturers or energy generation facilities. Operating at temperatures in excess of 2500 degrees Fahrenheit (1370 degrees Celsius), the kilns provide complete thermal destruction, recovering the energy and mineral components within the waste. An added benefit is that no additional waste is produced during the process.

Why co-processing is safe

Co-processing is a safe and effective method of waste disposal for three unique reasons:

- The very high operating temperatures of the kiln break the long-chain hydrocarbons in the waste, reducing it back to its basic elements.
- The wastes experience long residence times inside the kiln, allowing adequate time to break down even the most complex chemical compounds.
- When co-processing in cement kilns, fine limestone dust captures heavy metals; those materials are kept out of the atmosphere and safely, fully incorporated into the product.

Why co-processing is better than landfills or incineration

- Landfills pose potential soil and groundwater contamination issues if they are not properly constructed and maintained, and they occupy valuable real estate that could be used for other purposes.
- Incinerators do dispose of solid wastes, but they do nothing to capture heavy metals such as mercury, lead and others than can be of risk to the human population, even in small concentrations. They also generate fly ash and bottom ash which must be disposed of, typically in a toxic waste landfill, which creates the potential for soil or water contamination.
- Co-processing achieves complete thermal destruction of waste, and when applied to the cement industry, can capture mineral components, which are then safely incorporated into the final product. It also reduces the need for on-site waste storage, reducing your liability and enhancing your regulatory compliance efforts.

Using cement instead of toxic waste landfill?

Where is scientific data and proof for these claims?
How safe is this incorporation of toxic materials into the final product (cement), really?

FROM NEIL CARMAN'S TALK: HEALTH EFFECTS OF REGULATED AIR POLLUTANTS FROM TOXIC WASTE BURNING CEMENT KILNS

and furans as well as other products of incomplete combustion, particulate matter, sulfur compounds, hydrochloric acid/hydrogen chloride gas, radioactive materials, and any other miscellaneous contaminants that may be cause for concern.

3). **Soil contamination** on and off-site from airborne fallout produced by cement kiln's stack and fugitive emissions involving metals, dioxins, furans and other products of incomplete combustion, particulate matter, sulfur compounds, radioactive materials, and any other miscellaneous contaminants that may be cause for concern.

4). **Drinking water pollution** in the nearby regional area and its lakes, ponds and rivers produced by cement kiln's toxic emissions, especially metals but also products of incomplete combustion such as dioxins and furans, radioactive materials, as well as any other miscellaneous contaminants that may be cause for concern.

5). **Surface water pollution** in the nearby regional area recreational waters produced by cement kiln's toxic emissions, especially metals but also products of incomplete combustion such as dioxins and furans, radioactive materials, as well as any other miscellaneous contaminants that may be cause for concern.

6). **Agricultural contamination** and damage in the nearby regions produced by the cement kiln's stack and fugitive emissions involving various contaminants such as metals, products of incomplete combustion such as dioxins and furans as well as other products of incomplete combustion, particulate matter, sulfur compounds, hydrochloric acid/hydrogen chloride gas, radioactive materials, and any other miscellaneous contaminants that may be cause for concern.

7. **Toxic cement product** made from cement kiln's hazardous waste firing in its cement kilns; such cement may contain metals, products of incomplete combustion, toxic particulate matter, sulfur compounds, radioactive materials, and miscellaneous contaminants.

8. **Hazardous waste transportation by truck** through the nearby regional area and large scale volume storage, handling and processing (blending) at cement kiln.

9. **Accidents**: Potential for fires, explosions and other accidents at cement kiln involving hazardous waste activities.

10. **Cumulative or aggregate pollution impacts** produced by combining cement kiln's emissions with other polluting manufacturing plants in the nearby regional area.

FROM EDWARD KLEPPINGER'S: CEMENT KILN INCINERATION OF HAZARDOUS WASTE: A CRITIQUE

authors believe that this is unfortunate since, as a result, currently no significant controls have been placed by EPA upon the practice of cement kiln incineration of hazardous wastes in the United States.

The specific points made by the Cement Kiln Recycling Coalition will be briefly discussed below. Detailed discussion of the differences between cement kiln incineration theory and practice will be found in the next section of this paper.

1. The cement kiln has been increasingly used as a waste disposal option. As will be discussed in a later section of this report, the cement kiln has not been proven to be environmentally beneficial as a hazardous waste disposal option. The beneficial use is that generators do not pay the rates for commercial incineration facilities that are under heavy regulatory pressure and the cement kiln operator has a additional source of income.

2. The recycling representation is incorrect as there is only the use of heat value from the waste. There is no recycling, there is only the incorporation of inorganic and organic constituents in the cement product, the cement kiln solid waste (the dust), and the stack gases. As the wastes used by cement kilns become "dirtier", that is contain less heat value and more solids, the degree of incorporation increases.

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Lowering costs of disposal for a generator and calling it recycling, not hazardous waste disposal, actually encourages industry to generate wastes and to not find ways to stop making it, or really reuse it or recycle it. In effect, cement kiln "recycle" encourages hazardous waste production.

FROM EDWARD KLEPPINGER'S: CEMENT KILN INCINERATION OF HAZARDOUS WASTE: A CRITIQUE

as a soil additive to agricultural land. All of the residuals from a cement kiln incinerating hazardous waste enter the environment rather than being subject to regulated long term storage in a secure landfill.

4. There is no assurance that complete destruction of organic hazardous waste is routinely accomplished in cement kilns as test results often show detectable amounts of targeted input materials appearing in stack gases. The maximum operational temperature is higher in cement kilns. However, it is the combination of time, temperature, turbulence, and oxygen level that define incinerator efficiency. Further, in a cement kiln, contrary to good hazardous waste incinerator design, the highest temperature is always at the "front end" of the kiln, not in the afterburner.

!!!

5. There is a saleable product produced as a result of incinerating hazardous waste in cement kilns. The product, cement, would be produced even if hazardous wastes were not used. The issue really is, produced at what envi ronmental and public health costs?

6. Cement kiln advocates claim that cement kilns have a natural dry scrubber, the alkaline atmosphere, to remove contaminants. Apparently if dry scrubbing is *"natural"*, wet scrubbing must be "unnatural". The real issue is whether the gas cleaning system used by the hazardous waste incinerator or by the cement kiln incinerator is effective at minimizing public health and environmental impacts. Dry scrubbing can be effective but it is limited in its capacity to absorb the acid products of combustion. Further, it increases particulate loading to the gas cleaning equipment. These authors further note that cement kilns have typically not utilized very effective gas cleaning systems. For example, Ash Grove Cement in Nebraska, as recently as 1989, had non-compliance with particulate related standards about 5% of the operating that time monitors were running.[10] Their kilns had no monitors for over 10% to 15% of the time. A hazardous waste incinerator would have been shut down during all of this time for non-compliance.

WE WELCOME YOUR SUGGESTIONS

We welcome all suggestions from GAIA and Zero Waste Europe regarding the future steps in our fight against incineration in cement kilns in Serbia, considering the current situation with the rather vague and apparently non-binding legislative framework on one hand, and on the other hand the eagerness of cement companies to promote incineration as the best available practice for waste management.

The Serbian government mostly accepts this opinion of the cement companies as the seemingly most practical option. We think that the government should encourage more public debates and discussions regarding this issue. We think there are far better options for waste management and it would be unwise to resort only to incineration.

How to promote Zero Waste principles considering the fact that most people do not really believe that it is a realistic option?

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Zorica Vuković (NGO EGRIN)
Branislav Despotov (mediator between NGO EGRIN and GAIA)

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