MVW
LECHTENBERG & PARTNER

lechtenberg & partner

Publication of
MVW Lechtenberg & Partner
Germany

01/2019

Co-Processing Magazine of Alternative Fuels & Raw Materials

Published by: MVW Lechtenberg Projektentwicklungs – und Beteiligungsgesellschaft mbH | Dammstrasse 11a, 47119 Duisburg Ruhrort, Germany
VISDP: Dirk Lechtenberg | Editorial Director: Dirk Lechtenberg

Dear Readers,

2018 was characterised by many turbulences. Climate change has become visible more than ever: a century of heat and drought across Europe, with surging storms and catastrophic weather around the world. Britain wants to leave the European Union. “America First” not only in America. Countries isolating themselves from refugees and applying import tariffs that provoke trade wars.

There are still wars and famines!

But there were also nice developments, even if it was on a small scale. We were able to implement some great projects, in which waste is used as an alternative fuel in cement plants and thus relieves the climate. As a result, our work has again created many new jobs, in Egypt for example. We were also able to bring people together from many countries and cultures in our 5th Alternative Fuels Syposium once again. We believe that new projects will emerge from the discussions held at the Symposium.

We have also had the chance to present some projects with the Alternative Fuels Award during the Symposium. Projects that demonstrate good examples of sustainable use and production of alternative fuels.

As promised during our last Symposium, in this edition of the Co-Processing Magazine you’ll be reading a short description of the first winning project “Reliance Group”. A company, which achieved a lot in a remarkable period of time and through a lot of circumstantial challenges.

In edition two of Co-Processing Magazine we’ve provided some news regarding fuel prices subsidies and the recent CO_2 reduction targets. Sequentially, you’ll be able to read in this edition about the carbon capture projects and technologies in addition to news about new alternative fuels projects in many different countries.

We also report on the use of agrofuels in the cement industry and their impacts on the industry itself, the food security and the climate change. In addition to the needed standards which consider the social, environmental, biodiversity and of course the economic impacts.

Among the various types of alternative fuels, we write an overview about coconut shells as an alternative fuel along with a description of its availability and common use in the cement industry.

I hope, that we will meet again in the next Alternative Fuel Symposium, which will be taking place in September 24-25, 2019 (save the date of the symposium’s field trip on the 23rd of September 2019 – further details will be announced soon).

I also hope you enjoy reading this booklet and I wish you a very happy and prosperous New Year on behalf of MVW Lechtenberg & Partner’s team and myself.

Yours sincerely,
Dirk Lechtenberg

Published by: MVW Lechtenberg Projektentwicklungs- und Beteiligungsgesellschaft mbH | Dammstrasse 11a, 47119 Duisburg Ruhrort, Germany
VISDP: Dirk Lechtenberg | Editorial Director: Dirk Lechtenberg

YOUR EXPERT
IN ALTERNATIVE FUELS

www.lechtenberg-partner.de

Alternative Fuels and Raw Materials Handbook, volumes 1 and 2

Get yours today

because 25 years of firsthand experience is always worth of browse!

MVW
LECHTENBERG & PARTNER

VOLUME 1

Contents include among others:

- Background and key issues for investments in RDF production technologies and RDF usage
- Production of RDF & quality control
- Logistics and storage of RDF
- Dosing and feeding of technologies
- Influences on clinker & lime production
- Emission limits

VOLUME 2

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

- Information about origin, composition and availability
- Chemical and physical parameters
- Specific influences on the clinker production process
- Environmental aspects

Dammstraße 11a, 47119 Duisburg, Germany
Tel: +49 (0) 203 34 65 16 – 25 Fax: +49 (0) 203 34 65 16 – 50 sales@lechtenberg-partner.de www.lechtenberg-partner.de

Co-Processing Magazine of Alternative Fuels & Raw Materials

Agrofuels for the Cement Industry

Agrofuels for the Cement Industry

By Dirk Lechtenberg, MVW Lechtenberg & Partner

As the world's reserves of fossil fuels fall and new concerns about the safety of nuclear power have arisen, the ability of the world to maintain the culture of a throw-away society is called into question. Over the past few years, agro fuels have increasingly been used in the transport sector as an alternative to fossil fuels, hoping that this will help achieve climate protection goals. In many industrialized countries and more advanced developing countries, governments introduced policies to promote agro fuels. In the US, for example, Renewable Fuel Standard (RFS) is promoted with the aim of 36 billion gallons of renewable fuels by 2022 [ref.1] and within the EU the aim of 10% bio fuels in overall EU transport petrol and Diesel consumption [2] shall be achieved by 2020.

But what will be the impact on the cement industry?

In 2013, the European cement industry has started to suffer from the new CO_2 reduction goals of the European Union (EU ETS). Currently, only minor quantities of such agrofuels are used in the European cement industry as sufficient other, local available biomass derived fuels or refuse derived fuels with a high biogenic content are available. It is foreseen, that with stricter CO_2 emission reduction goals more competition from the power generating industry will come up. Currently, the European energy producing industry already purchases agrofuels such as crops, rice husks, olive & palm kernel and wheat grain in order to reduce their fossil CO_2 emissions in large scale lignite or coal fired power plants.

Figure 1. *Rice husk feeding*

Meat and bone meal – a 100 % biogenic waste material from the rendering industry - banned from further use as animal food - is one example for the influence of the EU ETS on fuel prices. The European cement industry received gate fees of up to 150€ per tonnes of meat and bone meal for the environmental thermal utilization as service offered to the rendering companies around 18 years ago. Nowadays, meat and bone meal is mainly used as substitute fuel in coal and lignite fired power plants paying up to 50€ per tonnes for such alternative fuels- considering the 100% CO_2 neutral benefits.

Wood chips - originally only used in the cement industry and small scaled power plants is now

Published by: MVW Lechtenberg Projektentwicklungs- und Beteiligungsgesellschaft mbH | Dammstrasse 11a, 47119 Duisburg Ruhrort, Germany
VISDP: Dirk Lechtenberg | Editorial Director: Dirk Lechtenberg

Figure 2. *Wood chips*

also mainly used in bigger scaled dedicated power plants or as substitute fuel in coal fired power plants on a value of up to 40€ per tonnes - too high and therefore not feasible any more for the cement industry.

Can agrofuels be a solution for the CO_2 reduction in the cement industry? What is the impact on agrofuels produced under agro industrial schemes?

The questions surrounding agrofuels are coming to the fore, rating even a detailed New York Times story by Elisabeth Rosenthal, who begins by looking at the consequences of transforming one widely used food crop into fuel, the lowly cassava root [ref.3]. China turned to cassava after a disastrous experience with corn ethanol in the last decade, which triggered a rapid and disastrous inflation of food prices, leading the country to ban the use of corn for fuel in 2007. And because cassava grows best in tropical soils, Chinese corporations have been buying up land in Thailand, Cambodia, Laos and a few African countries to plant their crops, inflicting what economists like to call "externalities" on their neighbors to feed China's growing hunger for cars. Olivier Dubois, a Senior Natural Resources Officer and Coordinator of the Energy Program of FAO, said "it was hard to quantify the extent to which the diversions for biofuels had driven up food prices". "The problem is complex, so it is hard to come up with sweeping statements like biofuels are good or bad," he said. "But certainly, biofuels play a role. Is it 20 or 30 or 40 percent? That depends on your modeling". "While no one suggests that countries abandon biofuels, Mr. Dubois and other food experts suggest that they should revise their policies so that rigid fuel mandates can be suspended when food stocks get low or prices become too high." [ref.3]

"The policy really has to be food first," said Hans Timmer, Chief Economist for the Europe and Central Asia of the World Bank. "The problems occur when you set targets for biofuels despite the prices of other commodities." Rosenthal notes that about forty percent of the U.S. corn crop goes to ethanol refineries, helping to spark a 73 percent increase in corn prices over the second half of 2010. "We have to move away from the thinking that producing an energy crop doesn't compete with food," said Mr. Dubois of the Food and Agriculture Organization. "It almost inevitably does." [ref.3]

Even more than these political decisions, it has been the rise in oil prices that has boosted the demand for alternative fuels from biomass. As a result, the agricultural sector in developing countries increasingly concentrates on fuel production.

Resulting also in higher local fuel prices - as many cement plants already use available local biomass derived fuels purchased from small local enterprises or even directly from small farms which build a second income from such fuel

Figure 3. *Olive kernel storage*

Published by: MVW Lechtenberg Projektentwicklungs- und Beteiligungsgesellschaft mbH | Dammstrasse 11a, 47119 Duisburg Ruhrort, Germany
VISDP: Dirk Lechtenberg | Editorial Director: Dirk Lechtenberg

Figure 4. *Cassuarina processing into cement fuel Egypt*

business.

Thorough analyses and studies of the situation have prompted a re-examination of the opportunities and risks presented by agrofuels. [ref.4]:

- The growing demand for agro energy is in competition with world food security and is resulting in competition over limited natural resources. Developing countries, from which considerable amounts of fuel will need to be sourced if these blending targets are to be met, will also face considerable social and ecological risks, for example as a result of local people and smallholders' families being forced from good production locations, poor conditions for workers on plantations and the destruction of the environment and biodiversity.

- Local developed and sustainable markets for bio or agrofuels (such as rice husk, jatropha and cassia plantations such as in Egypt and other countries - which are sold and used in the local cement & lime industry) will be destroyed by the political driven prices for such fuels in the northern hemisphere

- So far, there is no international regulatory framework on agrofuels to mitigate these social and ecological risks.

- The greenhouse gas balance of agrofuels varies widely depending on the feedstock used. This is particularly true when both the entire life cycle, from production to processing, and the changes in land use are taken into account.

- For developing countries, it would appear that establishing appropriate decentralized supply and energy systems for the local population is more beneficial to development than exporting agrofuels.

A primary concern is the potential for agrofuels to accelerate climate change, rather than fight it. Production involves a considerable emission of greenhouse gases from soils, carbon sink destruction and fossil fuel inputs and it already causes significant deforestation and destruction of biodiversity. The clearance of Indonesia's peat forests to plant oil palm plantations has caused massive outputs of CO_2. Once forest removal reaches a certain 'tipping point', a process of self destruction may begin, particularly in the Amazon. Because so much remains unknown, a precautionary approach to developing agrofuels is necessary. The Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) of the Convention on Biological Diversity, has discussed and summarized the effects on using agrofuels as follows [ref.5]:

"The GM industry, having encountered widespread resistance to GM crops for food, has plans to gain acceptance for them as agro fuel crops. These crops would need to be planted as large-scale monocultures in order to be competitive. Yet, monocultures of GM crops (mainly soya and maize) as animal feed had negative impacts, e.g. in Argentina and Paraguay. Since animal feed and agrofuels can often be produced from the same biomass this could stimulate further expansion of GM crops. In addition, the GM industry looks for ways to engineer crops so they can be made to break down more easily into fuel.

Second generation agrofuels: Industry promises future technologies that will yield cheap abundant agrofuels from all plant material and plant waste. GM technologies are being promoted to streamline processes and to reduce costs. Research is carried out into GM microbes that could improve breakdown and fermentation processes and methods to streamline cellulose and reduce lignin or even

Published by: MVW Lechtenberg Projektentwicklungs- und Beteiligungsgesellschaft mbH | Dammstrasse 11a, 47119 Duisburg Ruhrort, Germany
VISDP: Dirk Lechtenberg | Editorial Director: Dirk Lechtenberg

Figure 5. Agrofuel production from biomass

Agrofuels for the Cement Industry

change its nature. Synthetic biology is a new approach that involves the use of genetic information to build completely new organisms with unknown impacts."

Agrofuels and biodiversity: According to [ref. 6], little biodiversity remains in Europe and many species are endangered. Extensive, low input farming is the most favorable system for wildlife. However, agrofuel production increases the pressure to convert such regions into intensive production of agrofuels, with crops such as oilseed rape and beet which are particularly unfavorable to wildlife. If set-aside land was brought into agrofuel production, the impacts on biodiversity would be severe, as would impacts on water reserves through increased irrigation. In the global south, critical ecosystems are destroyed to plant crops used for agrofuels. Examples include sugarcane and soya in Argentina, Paraguay, Bolivia, and Brazil.

[6] reads further: At the same time countries such as Indonesia, Malaysia, Cameroon, Colombia and Ecuador are experiencing accelerating biodiversity loss due to oil palm plantations, often preceded by logging. In India and Africa the planting of jatropha trees for agro diesel will threaten the remaining forests. Promoters of agrofuel expansion claim that yields must be increased by using more fertilizer and irrigation. Irrigation depletes lakes, rivers and aquifers while fertilizers cause an increased burden of nitrates in soil and water, with impacts such as eutrophication – a major threat to fish stocks. Herbicide tolerant GE crops facilitate the use of aerial spraying of herbicides with serious effects on biodiversity and small-scale farming. Indirect impacts of agrofuels are already becoming apparent as US farmers switch from soya cultivation to corn for ethanol. This provides an incentive for extending soya cultivation in Latin America, where the soya boom had been faltering. As with other intensive crops, agrofuel production displaces other activities to new areas, whether small-scale agriculture or large-scale cattle ranching.

Agrofuels and food security: According to [ref.6], agriculture already faces huge challenges. Food production could experience serious competition from energy crops. World food reserves are falling while the demand for grains and oilseeds has outstripped supply since 2001. Prices have risen sharply. In the case of maize, this is due to increasing amounts of US corn being used for ethanol rather than food. As ever, it is the poor and marginalized who suffer the worst impacts. The EU and the US are setting targets for agrofuel use in transport, but will not be able to produce the feedstock themselves. Producing soya for animal feed already causes serious problems in Latin America, while oil palm plantations have proved extremely destructive in both Latin America and Asia. Now these countries are gearing up to respond to the demand for agrofuels, further increasing the pressure on food production.

Manufacturers of inputs such as agro toxic chemicals (i.e. fertilizers and pesticides) expect an increased demand as a result of the attempt to increase yields. Small farmers will find it hard to compete with big producers. Some will turn from food to energy crop production and others will leave their land. This will result in a loss of local knowledge and local varieties, which in its turn will diminish agricultural biodiversity.

Agrofuels and jobs: A number of sources are asserting that agrofuels can regenerate rural economies and provide jobs. However, this depends on who controls the development. To benefit local communities, agrofuel production would need to be part of a diverse farming

Figure 6. *Biomass fuel processing small scale Philippines*

Published by: MVW Lechtenberg Projektentwicklungs- und Beteiligungsgesellschaft mbH | Dammstrasse 11a, 47119 Duisburg Ruhrort, Germany
VISDP: Dirk Lechtenberg | Editorial Director: Dirk Lechtenberg

system. But development is focused on large centralized monocultures for economies of scale and a consistent product. The impact of monocultures such as sugar cane in Brazil, is a clear example of the lack of benefit for the poor and marginalized. This is reinforced by experiences from other countries, including Paraguay and Argentina, Ecuador and Indonesia and South Africa, where communities have reacted to government agrofuel strategies. In Europe, the EC has claimed that agrofuels can provide opportunities for farmers as well as creating jobs and rural regeneration. However, EU sources are highly contradictory, especially regarding the number of jobs that will actually be created, not simply replaced or displaced. [ref.6]

Resistance to monocultures, including agrofuel production, is spreading. Groups in Africa, Asia and Latin America are mobilizing and demanding to be heard. Examples range from land occupations, through court cases, to national and regional campaigns. A number

Figure 7. Delivery of biomass by farmers

Agrofuels for the Cement Industry

of networks have produced statements of their positions directed at the EU and the UN. They insist that small farmers, local communities, the poor and the marginalized will continue to be the ones to suffer. [ref.6]

There is a tension between the increased demand for agro energy and efforts to ensure global food security and protect biodiversity, the environment and the climate. Forward-looking policies must be adopted at an early stage in order to resolve this tension as far as possible.

The following actions are to be recommended:

a) Giving priority to food

Non-governmental organizations and experts, including the UN Special Rapporteur on the Right to Food and the German Council of Environmental Advisers, have demanded that, when there is competition between the production of food and the production of fuel, priority be given to food. Policymakers should respond constructively to this demand. Efforts to meet statutory blending quotas in Germany or the EU should not result in pressure on production sites in developing countries. In view of both this findings on the various impacts and precise balance of agrofuels, any further increase in current blending targets should be carefully considered [ref.4].

Published by: MVW Lechtenberg Projektentwicklungs- und Beteiligungsgesellschaft mbH | Dammstrasse 11a, 47119 Duisburg Ruhrort, Germany
VISDP: Dirk Lechtenberg | Editorial Director: Dirk Lechtenberg

The following approach is recommended:

Focusing German and European legislation on minimizing the risks

Care must be taken in particular to ensure that this **legislation incorporates both ecological and social sustainability criteria**. This would mean, for example, that biomass is only eligible for inclusion in the blending quota if proof can be provided that its production in the country concerned will not have any of the negative impacts outlined above (particularly the displacement of food production and small farmers or non-observance of ILO core labor standards) [ref.4]. The current EU Fuel Directive 2009/30/EC [ref.7] considers biofuel and offers good opportunities for incorporating the demanded criteria. Strategic alliances should be formed with other countries advocating social sustainability criteria (e.g. the Netherlands and the UK).

Another important challenge is to introduce into the international debate new arguments on the WTO (World Trade Organization) compatibility of social standards.

b) Voluntary commitments and certification systems

Since it has not so far been possible to incorporate binding social standards into existing regulations, the focus for now should be on supporting voluntary sustainability initiatives in the following ways:

Testing and development of certification systems and sustainability criteria

A large number of international initiatives have already been launched to develop standards and certification systems. So far, however, no uniform international standards have emerged. The relevant international players should work together more closely on further elaborating these standards and achieving uniformity [ref.4]. The Cramer Commission's assessment [ref.8] framework is one important source that can be drawn on. It defines the following social and ecological criteria [ref. 4]:

- significant reduction in greenhouse gases across the entire chain from production to application; proof must be provided that there has been no direct or indirect interference in existing carbon sinks (forests and soils),
- conservation and, if possible, improvement of natural and agricultural biodiversity; no deterioration of nature reserves,
- environmental protection: preventing chemicals entering air, water, soil,
- no negative effect on food supply in region concerned as a result of the production of biomass for energy generation; priority must be given to measures to realize the human right to food,
- growth and prosperity: the production of agrofuels must have a positive impact on the economy, employment and income distribution,
- proven observation of economic and social rights; this includes ILO standards, land use rights and land title for small farmers.

One particularly important aspect when developing certification systems is that the process be participatory and non-discriminatory and those small farmers are included.

Figure 8. *Cassuarina plantation cement plant Egypt*

Published by: MVW Lechtenberg Projektentwicklungs- und Beteiligungsgesellschaft mbH | Dammstrasse 11a, 47119 Duisburg Ruhrort, Germany
VISDP: Dirk Lechtenberg | Editorial Director: Dirk Lechtenberg

Striving for international agreements

In order to ensure that agro energy is produced sustainably, agreements should be concluded between producing countries and importing countries. These should reflect their shared responsibility for creating a framework for regulation and monitoring. The countries concerned should also commit to measures to counteract any negative impacts that should emerge. In particular, the agreements should make reference to the relevant commitments under international law (such as, for example, the duty to observe, safeguard and provide the right to food, which also implies an international responsibility). Should it become necessary to take these corrective steps, consideration should also be given to revising existing blending targets. In this context, WTO rules (Agreement on Technical Barriers to Trade) on standard setting should provide the frame of reference [ref.4].

Research and development

Support of the developed countries should be also provided for research and development into the following topics in particular [ref.4]:

- appropriate agro energy sources for rural areas in developing countries, including increased research into the use of biogas,
- improved land use systems that also include energy crops,
- development of indicators on all relevant sustainability criteria (in particular food situation/right to food, biodiversity, preservation of small farming) as a basis for the application of certification systems, ordinances etc.

The cement industry - apparently affected by the CO_2 reduction goals and by more competition on renewable biomass derived fuels especially in developing countries should also reconsider and strengthening their position in a sustainable development:

Biomass – locally and sustainable produced by small and medium enterprises or entities and used as biomass fuel in the local cement industry developing new local markets has a visible advantage against multinational agro industries which export such biomass – converted into agrofuels - into the developed world. All the above-mentioned negative impacts, environmental, social and others can be avoided if sustainable local structures and networks are built between the cement plants within their regions.

Summary:

Giving a chance for sustainable development with fuel crop production for the agro industry as well as for developing countries- if clear standards such for the social, environmental, biodiversity and other impacts will be developed, taking a life cycle approach for climate effects into consideration. The cement industry can take a significant role for sustainable biomass use in many developing countries, which is already done e.g. in the Philippines, Africa and other countries.

References:

[1] Energy Independence and Security Act of 2007, Alternative Fuels Data Center, available at: https://afdc.energy.gov/laws/eisa.html.

[2] Council of the European Union: Brussels European Council, Presidency Conclusions, 8/9 March 2007.

[3] Elisabeth Rosenthal: Rush to Use Crops as Fuel Raises Food Prices and Hunger Fears. The New York Times, April 6, 2011, available at: https://www.nytimes.com/2011/04/07/science/earth/07cassava.html

[4] Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung (Federal Ministry for Economic Cooperation and Development): Development Policy Stance on Agrofuels. March 2008.

[5] Biofuelwatch, Carbon Trade Watch/TNI, Corporate Europe Observatory, Econexus, Ecoropa, Grupo de Reflexión Rural, Munlochy Vigil, NOAH (Friends of the Earth Denmark), Rettet den Regenwald, Watch Indonesia: Agrofuels – Towards a Reality Check in Nine Key Areas. June 2007.

[6] Corporate Europe Observatory: A Reality Check on Agrofuels. September 2nd, 2008, available at: https://corporateeurope.org/food-and-agriculture/2008/09/reality-check-agrofuels.

[7] Directive 2009/30/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 98/70/EC as regards the specification of petrol, diesel and gas-oil and introducing a mechanism to monitor and reduce greenhouse gas emissions and amending Council Directive 1999/32/EC as regards the specification of fuel used by inland waterway vessels and repealing Directive 93/12/EEC.

[8] Sustainable Production of Biomass (project group): Testing Framework for Sustainable Biomass. Commissioned by the Energy Transition's Interdepartmental Programme Management (IPM), Netherlands, March 2007.

Published by: MVW Lechtenberg Projektentwicklungs- und Beteiligungsgesellschaft mbH | Dammstrasse 11a, 47119 Duisburg Ruhrort, Germany
VISDP: Dirk Lechtenberg | Editorial Director: Dirk Lechtenberg

Coconut Shells

Coconut Shells

By Dirk Lechtenberg, MVW Lechtenberg & Partner

In this article Dirk Lechtenberg gives an overview of coconut shells as an alternative fuel source. This is an excerpt from the second volume of MVW Lechtenberg & Partner's Alternative Fuels & Raw Materials Handbook, which was published in 2012, the handbook gives an insight into over 80 different types of alternative fuels and raw materials with detailed descriptions of the availability, common use and practice in the cement industry. This includes processing considerations, the influence on the environment, clinker production and the economics of the various alternative fuels.

The global coconut production has been growing steadily for the last decades. The next figure shows the worldwide coconut production between 1995 and 2016. Table 5 shows that

	Central America	South America	Africa	Asia	Oceania
1995	1.36	1.01	1.92	42.34	1.97
2000	1.29	2.29	1.91	42.90	2.20
2005	1.35	3.49	2.02	48.19	2.09
2010	1.12	3.10	2.06	53.10	2.65
2016	1.29	3.16	2.10	49.02	2.67

Table 1: *Global coconut production (grey) and potential alternative fuel sourced from coconut production (blue) - million tonnes*

Indonesia is the world leader in coconut production, followed by the Philippines and India (in 2016). Table 1 shows regional variations. Asia is the world's main source of coconuts.

Taking into consideration, that approx. 15% of a coconut consist of the shell, the total quantity of coconut shells is app. 8.7 Mt/yr. with a calorific value of app. 4.500 kcal/kg (as received) this quantity can replace approx. 6.4 Mt/yr. of coal. It is therefore worth looking at as potential alternative fuel for the global cement and lime industries.

Additionally, coconuts are a permanent crop and available throughout the whole year. There is therefore a constant, year-round supply. Once coconuts are harvested, the main products are separated and processed; these are

Published by: MVW Lechtenberg Projektentwicklungs- und Beteiligungsgesellschaft mbH | Dammstrasse 11a, 47119 Duisburg Ruhrort, Germany
VISDP: Dirk Lechtenberg | Editorial Director: Dirk Lechtenberg

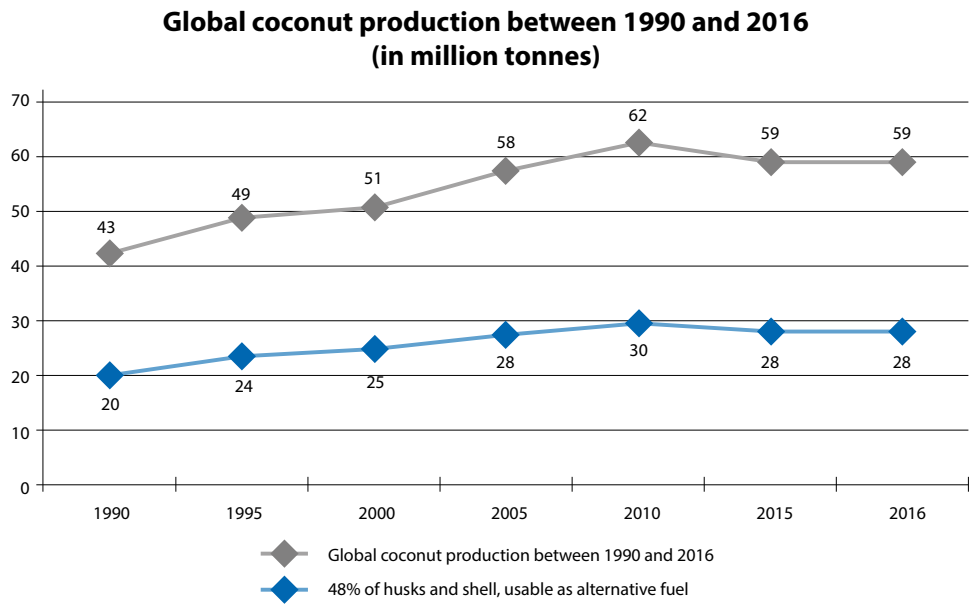


Figure 1: *Global coconut production (grey) and potential alternative fuel source from coconut production (blue) (Source: [1,2])*

the coconut fibres (coir), the milk and the meat. Usually everything except the shell is used. These are often just thrown away.

Coconut shells

15% of a de-husked coconut by weight is the shell. Coconut shells are used, for example, in southern India and Sri Lanka without pretreatment as fuel in villages and by local industries like laundries, bakeries and iron foundries. Coconut shells are one of the raw materials for charcoal production. Shell charcoal is manufactured with burning shells of wholly ripe nuts in a limited-oxygen atmosphere, which is suitable only for carbonisation and not suitable for complete destruction. Activated carbon is also manufactured from coconut shells. It is advised, to use only the coconut shells as fuel, as the other components can be recycled and reused. Large quantities of coconut shells are especially easy to collect in places where coconut meat is used traditionally in food processing. They can be collected in big bags or containers or directly in covered and wind-protected areas at the production site.

Transportation is commonly performed by truck. In cases where coconut fibers are not recycled or used for other products, they can be used as alternative fuels as well. If this is the intention, they must be protected from

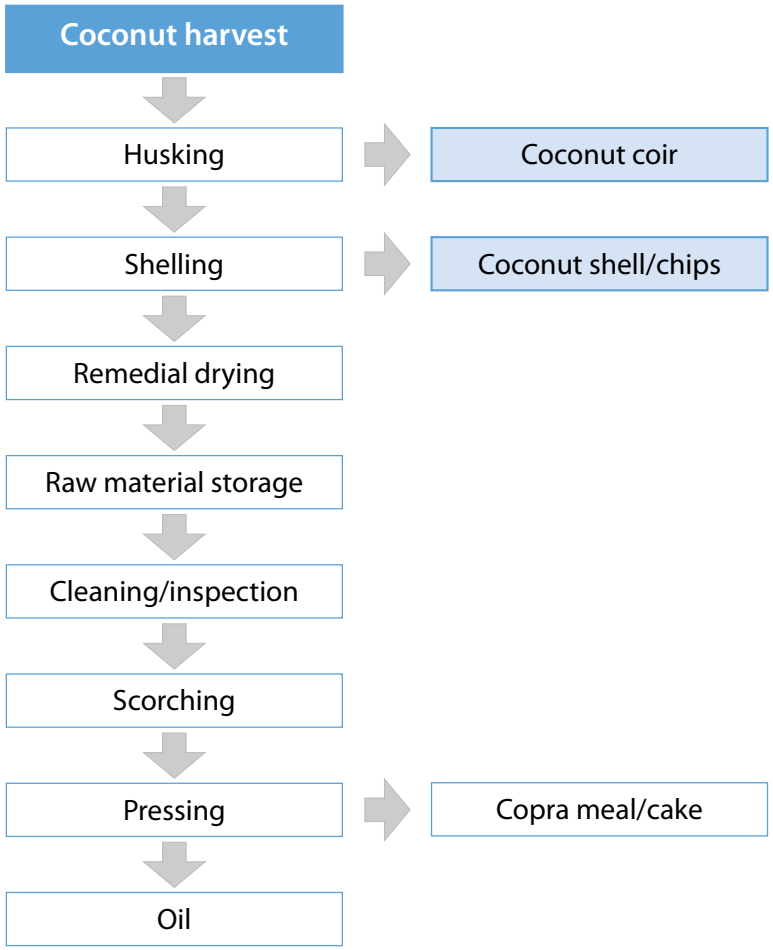


Figure 2: *Coconut production process, with alternative fuel sources highlighted in blue. (Source: [4])*

Published by: MVW Lechtenberg Projektentwicklungs- und Beteiligungsgesellschaft mbH | Dammstrasse 11a, 47119 Duisburg Ruhrort, Germany
VISDP: Dirk Lechtenberg | Editorial Director: Dirk Lechtenberg

Coconut Shells

Component	kg	kcal/kg	kcal	% of total energy
Coconut oil	0.12	9,000	1,080	27.7
Carbohydrates and proteins	0.06	4,000	225	5.7
Shell	0.18	5,500	990	25.4
Husk	0.4	4,000	1,600	41.1
Total	0.76		3,895	99.9

Table 2: *Typical energy characteristics of coconuts (Source: [2])*

Compound	%
Cellulose	33,61
Lignin	36,51
Pentosans	29,27
Ash	0,61

Table 3: *Coconut shell composition (dry matter) by percentage (Source: [3])*

Compound	%
K_2O	45,01
Na_2O	15,42
CaO	6,26
MgO	1,32
$Fe_2O_3 + Al_2O_3$	1,39
P_2O_5	4,64
SO_3	5,75
SiO_2	4,64

Table 4: *Composition of coconut shell ash by percentage (Source: [3])*

Published by: MVW Lechtenberg Projektentwicklungs- und Beteiligungsgesellschaft mbH | Dammstrasse 11a, 47119 Duisburg Ruhrort, Germany
VISDP: Dirk Lechtenberg | Editorial Director: Dirk Lechtenberg

Country	Coconut (Mt)	Shells (Mt)
Indonesia	17.7	2.66
Philippines	13.8	2.07
India	11.1	1.67
Brazil	2.65	0.40
Sri Lanka	2.52	0.38
Thailand	0.82	0.12
Vietnam	1.50	0.23
Mexico	1.16	0.17
Papua New Guinea	1.19	0.18
Tanzania	0.56	0.08

Table 5: *Worldwide production of coconuts and estimates of coconut shell arisings (based on 15% coconut mass) in 2016 (Source: [1])*

a literally 100% renewable energy source. Once combusted, the CO_2 released is considered as neutral with regard to greenhouse gas emissions. However, for the implementation of CDM projects, the complete supply chain, i.e. CO_2 emissions during coconut collection, baling, transportation, processing etc. has to be taken into consideration.

Summary:

With the use of coconut shells as alternative (and locally-available) "agrofuel" in the global cement and lime industries, these industries can develop a local and environmentally-friendly fuel source. By developing a supply chain from the small plantations to the cement plant, new jobs and additional income can be generated by local farmers. The use of fossil fuels with its negative impact on CO_2 emissions can be reduced and significant fuel costs savings can be made.

References

1. Food and Agriculture Organization of the United Nations (FAOSTAT) website, www.faostat.fao.org.

2. Banzon, J.A. 'The coconut as a renewable energy source.' Philippine Journal of Coconut Studies, June 1980.

3. Amu, O.O.; Owokade, O. S.; Shitan, O.I., 'Potentials of coconut shell and husk ash on the geotechnical properties of lateritic soil for road works.' International Journal of Engineering and Technology, Vol.3/No. 2, 2011, pp. 87 – 94.

4. 'ILO: Small-scale oil extraction from groundnuts and copra.' Technology and Employment Branch; UNIDO, Geneva (Switzerland), Vienna (Austria), 1983.

Coconut Shells

moisture as they are strongly hygroscopic and readily absorb moisture. Therefore, before transport, the loading area should be covered to avoid loss of material by wind or airstream and to avoid becoming wet during rainfall. The dry bulk density of coconut shells is around 404kg/m³ to 435kg/m³. It should be noted that copra expeller and coconut husk are classified under the HAZMAT flammable solids class 4.2 and therefore special attention should be paid during storage and transportation due to their combustible nature. Smoking and/or open flames should be prohibited throughout the loading and discharge processes and when accessing stores. Once delivered to the cement plant, coconut shells can be used either by direct feeding to the calciner or processed into finer grain sizes (of less than 10mm) for pneumatic feeding to the kiln burner. Coconut shells are 100% biomass, meaning that they afford

Published by: MVW Lechtenberg Projektentwicklungs- und Beteiligungsgesellschaft mbH | Dammstrasse 11a, 47119 Duisburg Ruhrort, Germany
VISDP: Dirk Lechtenberg | Editorial Director: Dirk Lechtenberg

www.lechtenberg-partner.de

YOUR EXPERT
IN ALTERNATIVE FUELS

Learn more about our fields of expertise:

Feasibility studies & audits

- Energy efficiency audits
- Waste assessment
- Technical due diligence
- Impact of RDF utilisation on clinker production
- RDF quality and substitution rates
- Environmental impact assessment
- Cement plant's and RDF plant's audits

RDF project development & implementation

- Technical concepts for the co-incineration of alternative fuels and biomass
- Waste processing technologies
- Dosing and feeding technologies
- Development of quality management systems
- Assistance in operation & quality monitoring

RDF supply & services

- Sourcing and contract management

In-house alternative fuels workshops

- Tailored to local plant's requirements and needs of internal audience

Alternative Fuels and Raw Materials Handbook

- The most comprehensive compendium of the alternative fuels and raw materials on the market

MVW
LECHTENBERG & PARTNER

Dammstraße 11a, 47119 Duisburg, Germany
Tel: +49 (0) 203 34 65 16 – 25 Fax: +49 (0) 203 34 65 16 – 50 sales@lechtenberg-partner.de www.lechtenberg-partner.de

Alternative Fuel Award competition 2019 – call for candidates

In 2018, MVW Lechtenberg & Partner has presented the (AFA Award) for the first time. The Alternative Fuel Award is established by MVW Lechtenberg & Partner to encourage the acceptance of the ecological responsibility on both social and individual levels, and to identify role models in the field of alternative fuels, a field which, aside from its contribution to the economic development, has the greatest contribution to the protection of our environment.

The award is to be presented to companies, cities, institutions and individuals promoting the idea of sustainable alternative fuel's production and use.

After the successful inauguration of the (Alternative Fuel Award 2018), we kindly invite you to participate in the Alternative Fuel Award competition 2019.

The awards ceremony will take place in the next Alternative Fuel Symposium of MVW Lechtenberg & Partner between 23-25 September, 2019 in Duisburg, Germany. The winners will be invited to the awards ceremony. The first winning project will get a 5000 € reward incl. travel costs and participation fee for one delegate to the symposium. The second and third winning projects will get the "Alternative Fuels and Raw Material Handbook for the cement & Lime Industry", a comprehensive standard compendium for the industry, in addition to free participation in the symposium for one delegate. The representatives of the three winning projects will present their projects at the Alternative Fuel Symposium.

MVW Lechtenberg & Partner calls companies, cities, institutions and individuals, which promote alternative fuels to participate in the Alternative Fuel Award competition by sending us a description of their projects and the experiences gained from promoting, producing or using alternative fuels.

Deadline for receiving the project descriptions is May 15, 2019

The prizewinning study will be selected by a board of expert reviewers and the judges' decision is final. Please send your project description to: office@lechtenberg-partner.de

Best of luck to all the participants!

Published by: MVW Lechtenberg Projektentwicklungs- und Beteiligungsgesellschaft mbH | Dammstrasse 11a, 47119 Duisburg Ruhrort, Germany
VISDP: Dirk Lechtenberg | Editorial Director: Dirk Lechtenberg

Alternative Fuel Award (AFA)

In the next editions of the Co-Processing Magazine, we will present a number of projects that were awarded the Alternative Fuel Award in 2018. We start with the project of Reliance, Egypt.

Reliance was founded in 1998 and headquartered in Cairo, it has extensive operations throughout Egypt with offices in Cairo, Dubai and Singapore. Reliance is a leading partner of the construction sector in Egypt, specifically of the cement industry, and its activities include the following:

- International trading in building agents and commodities
- Logistics services
- Ready mix concrete
- Mining and refining of minerals
- Quarrying of aggregates
- Waste management and production of alternative fuels

In 2014, after the Egyptian government began reducing fuel subsidies to the cement industry, Reliance began to focus on alternative fuels. Reliance team, notably Karim Elsabee and Sherif Shenouda, has held countless talks with communities in Egypt to identify the potentials and opportunities of waste management. MVW Lechtenberg & Partner was commissioned to carry out waste analyses as part of a feasibility study and to examine the possibilities of the extent to which alternative fuels can be produced from the available waste. Subsequent to the study, it was clear that Reliance would manufacture alternative fuels to provide an additional service to cement plants in Egypt, supplying just-in-time, specification-compliant and high-calorific alternative fuels. It took two years afterwards until they were able to draw corresponding contracts with municipalities to get the go ahead with the technical implementation. Reliance Investments is now operating 2 waste processing plants at Ismailia and Port Said handling solid waste that is generated by 1.6 million people.

As a result of Reliance's waste management activities, landfilling and waste dumping has decreased by 80%. Household waste in Egypt is characterised by a high proportion of organic waste. Around 50% of household waste consists of organic waste, another 10-15% of inert waste such as sand, etc.

Since the informal recycling sector is storgly developed, most of the recoverable recyclables, such as metal, plastics and paper/cardboard are picked up before the main collection from the street by the so-called "zabaleen" or waste pickers, such recyclables are hardly present when the household waste arrive at Reliance treatment plants.

Published by: MVW Lechtenberg Projektentwicklungs- und Beteiligungsgesellschaft mbH | Dammstrasse 11a, 47119 Duisburg Ruhrort, Germany
VISDP: Dirk Lechtenberg | Editorial Director: Dirk Lechtenberg

Pic. 1: *Locations of Reliance waste processing facilities in Ismailia and Port Said.*

The first waste treatment plant was installed in Port Said:

From 128,000 tonnes of household waste per year (about 350 tonnes/day), about 35,000 tonnes of RDF and 34,000 tonnes of compost/ year are produced. On a surface of approximately 23,000 square meters a sorting system consisting of drum screen, air classifier, manual sorting, ferrous and non-ferrous separation, takes place. Additionally, there is a secondary fuel processing plant consisting of pre-shredder, air classifier and final shredder as well as an open row composting and compost refining with screens.

Alternative Fuel Award (AFA)

Pic. 2: *Manual sorting*

Pic. 3: *RDF processing*

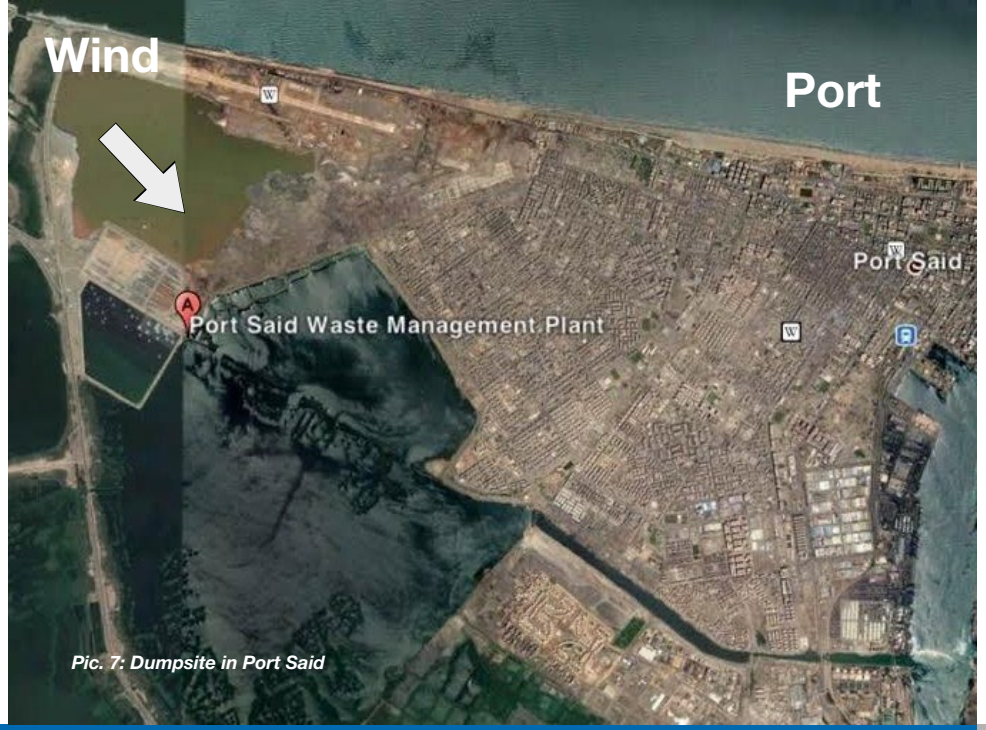
Pic. 4: *Composting and screening area*

Pic. 5: *Baling of recyclables*

Pic. 6: *Final RDF*

The second plant was erected in Ismailia on an area of 37,000 m², an annual quantity of 200,000 tonnes MSW (app. 550 tonnes/day) is processed into currently 55,000 tonnes RDF and app. 50,000 tonnes compost. The plant consists of 2 sorting lines, an RDF processing line and an open windrow composting and refining section.

Published by: MVW Lechtenberg Projektentwicklungs- und Beteiligungsgesellschaft mbH | Dammstrasse 11a, 47119 Duisburg Ruhrort, Germany
VISDP: Dirk Lechtenberg | Editorial Director: Dirk Lechtenberg



Pic. 7: Dumpsite in Port Said

Alternative Fuel Award (AFA)

Especially in Port Said and also in Ismalia the commissioning of the waste treatment plant has ensured a considerable environmental relief. Until the plant's installation, the waste was burnt in the landfill (or open dumpsite). As a result, heavily noxious clouds of smoke were distributed over the entire urban area, as location of the landfill causes the contamination of the lake water and the smoke is blown by the wind towards residential areas.

Situation of waste dump in Port Said before opening the waste processing facility:

- Waste self-ignition as a result of open dumping
- Exposure to biohazards
- Scavenging activity to collect recyclables on the streets and at dump sites
- MSW incineration - plastics specifically-:
  - Air Pollution
  - Emission of toxins causing health problems such as heart diseases, respiratory diseases, cancer, asthma and emphysema
- Leachate produced due to organic material mistreatment, which in its turn pollutes the soil, underground water and proximate rivers, seas and lakes
- Organic waste decomposition resulting in emission of methane and other greenhouse gases that contribute to climate changes.

The commitment and investment of Reliance has significantly improved this situation. 80% of the waste is now recycled and the stabilised remainder is properly dumped, so that no groundwater contamination or air pollution caused by burning waste and landfill gases would take place. New values have been created; alternative fuels for industries, compost for agricultural use and recyclable important resources, are recovered. An even more important goal was achieved by Reliance, which is the creation of more than 200 new and future-oriented jobs in total, especially in Egypt, where youth unemployment is high.

This project demonstrates a good example of how companies can engage in emerging new markets to create jobs and reduce environmental impacts.

Pic.8: *Situation of waste dump in Port Said before opening the waste processing facility*

Published by: MVW Lechtenberg Projektentwicklungs- und Beteiligungsgesellschaft mbH | Dammstrasse 11a, 47119 Duisburg Ruhrort, Germany
VISDP: Dirk Lechtenberg | Editorial Director: Dirk Lechtenberg

Get your business noticed!

1/2 page (138x210 mm)

1/4 page (138x97 mm)

1/1 page (297x210 mm)

Advertise with Co-Processing Magazine!

For further details please contact us:

Tel. +49 (0) 203-34 65 16-0
Fax. +49 (0) 203-34 65 16-50
e-mail: sales@lechtenberg-partner.de

Published by: MVW Lechtenberg Projektentwicklungs- und Beteiligungsgesellschaft mbH
Dammstrasse 11a, 47119 Duisburg Ruhrort, Germany | VISDP/Editorial Director: Dirk Lechtenberg

NEWS

Ireland

- Limerick mayor calls for oral hearing on Irish Cement incineration plan

Germany

- What to consider when taking a sample

Norway

- Could oil nation Norway help save the climate?

USA

- Global spending on clean energy solutions could be outpacing fossil fuels

Brazil

- SNIC forecasts 3% growth in 2019

USA

- Guiding the way to a more sustainable energy future

Turkey

- Saving energy across the board

India

- How the cement industry is helping India meet its climate goals

Japan

- Taiheiyo Cement starts carbon capture and storage test at Fujiwara plant

Namibia

- Cement maker burns tonnes of non-recyclable waste as alternative fuel to fire kiln

UAE

- UAE Climate Change Ministry awards alternative fuel facility contract

Published by: MVW Lechtenberg Projektentwicklungs- und Beteiligungsgesellschaft mbH | Dammstrasse 11a, 47119 Duisburg Ruhrort, Germany
VISDP: Dirk Lechtenberg | Editorial Director: Dirk Lechtenberg

Ireland

Limerick mayor calls for oral hearing on Irish Cement incineration plan

Mayor James Collins has called on the Environmental Protection Agency (EPA) to hold a public oral hearing on the health implications of Irish Cement's € 10 M plans to phase out fossil fuels in favor of burning used tyres and waste material at its Mungret plant.

The Fianna Fáil general election candidate made his call this week following the latest fine imposed on Irish Cement for a dust spillage at the Limerick facility.

"We are talking about houses and cars being covered in a 'glue-like' limestone dust which came from Irish Cement's plant. It doesn't take a genius to figure out that if cars and houses can be covered in this sticky glue, then thousands of people in one of Limerick's largest suburbs are breathing in the same toxic substance," he said.

About 21 complaints from neighboring housing estates were filed after 2.5 tonnes of waste splurged from the chimney stacks at Irish Cement, when a blockage in the kiln was cleared."

The €10 million development plan sees Irish Cement bidding to replace fossil fuel, used on site for cement clinker production, with alternative fuels to improve the sustainability of the Limerick operations, where 80 people are employed. The Limerick site is currently the only cement plant in Ireland not licensed to use alternative fuels.

Source: Limerick Post (2018, December 14). Limerick mayor calls for oral hearing on Irish Cement incineration plan

Germany

What to consider when taking a sample

Paper mills must document their greenhouse gas emissions in an annual emissions report. In addition, representative samples of the alternative fuels must be taken. A new guideline shows what has to be considered.

How much CO_2 emissions does the alternative fuel cause in a paper mill? And how should the samples and analyses be carried out so that they can then be documented in an annual emission report? Answers to these questions are provided by two new aids for the sampling and analysis of alternative fuels published by the Federal Environmental Agency.

In principle, all installations subject to emissions trading, including paper mills, must submit an emission report every year. Since alternative fuels are often used in the factories, operators also have to analyze the alternative fuels several times a year. The Monitoring and Reporting Regulation (MRR) sets how exactly often should the alternative fuels be analyzed annually: for untreated solid waste (pure fossil or mixed biomass fossil) every 5,000 tonnes and at least four times a year; for pretreated waste, every 10,000 tonnes and also at least four times a year.

For these analyses, the batch must then be "representative and free of systematic errors," write the experts of the consulting company MVW Lechtenberg & Partner, who have developed the guidelines on behalf of the UBA. Operators should insure that the analyses and sampling are carried out by applying methods based on corresponding EU standards. If there are no appropriate standards, the method of calculation must be based on best practice guidelines or other scientifically proven practices.

Most mistakes happen during sampling. In the first aid "Notes on Sampling of Solid Recovered Fuels in the Paper Industry", the authors list further requirements that the plant operator must observe in the analysis, they also recommend a number of measures to avoid sampling errors and listed the measures of correct sampling.

The second UBA guideline describes, among other things with the help of a spreadsheet template, how the data for CO_2 reporting can be calculated in a mathematical correct manner and recorded in the sense of the MRR requirements.

Furthermore, on the basis of DIN 19698-2, the user is provided with a calculation template in the form of an Excel file, which makes it possible to check the representativeness of the sampling of alternative fuels.

The guidelines can be downloaded from the webiste of the Umweltbundesamt (Federal German Environmental Agency) only in the German language https://www.dehst.de/SharedDocs/downloads/DE/stationaere_anlagen/Probenahme-Sekundaerbrennstoffe-Papierindustrie.pdf?__blob=publicationFile&v=3

Source: 320° (2018, December 14). Was bei einer Probenahme zu beachten ist

Published by: MVW Lechtenberg Projektentwicklungs- und Beteiligungsgesellschaft mbH | Dammstrasse 11a, 47119 Duisburg Ruhrort, Germany
VISDP: Dirk Lechtenberg | Editorial Director: Dirk Lechtenberg

Could oil nation Norway help save the climate?

The world may not be able to make necessary changes in time to limit rapid global temperature rise, the UN climate panel has warned. Existing emissions must also be captured and stored. Norway thinks it has the answer.

The world is facing a climate catastrophe, and urgent and unprecedented changes are needed. That includes carbon capture and storage (CCS), a technology that in the past has been fraught with problems.

“The climate challenge is so big that you have to use all the tools that you have in your toolbox,” said Trude Sundset, CEO of Gassnova, the Norwegian state company responsible for finding CCS solutions for the future.

While renewable energy production is growing quickly, many industries, like cement and steel, emit vast amounts of CO_2 in their production processes. This is where carbon capture technology is the only solution, apart from shutting down production altogether, Sundset argued.

With Norwegian government support, Gassnova is now entering the final stages of a pilot project that could see the first full-scale carbon capture plants installed at a cement factory and a waste incinerating facility. Each would capture 400,000 tonnes of CO_2 annually, that’s equivalent to the emissions from 171,000 cars.

“The process of making cement in itself emits a lot of CO_2, and the total cement production in the world represents 5 to 7 percent of the total CO_2 emissions every year,” said Per Brevik, Director of Sustainability and Alternative Fuels at Heidelberg Cement Northern Europe, part of Gassnova’s pilot project.

“We will take out the CO_2 from the flue gas, condition it and store it on the bottom of the North Sea,” Brevik explained.

The idea of removing CO_2 from the air to store it in porous rock under the seafloor is not a new one. Norway’s state energy company, Equinor, has run a CCS plant on one of its natural gas platforms in the North Sea since 1996, proving the technology works.

That particular project makes economic sense, thanks to Norway’s CO_2 emissions tax of € 52 ($ 60) per tonne on offshore oil and gas installations. Equinor would have had to fork out € 105,000 a day to release the CO_2 into the atmosphere, making CCS a cheaper alternative.

“The problem is, there is no business model for this [onshore],” said Sverre Overa, a Project Director at Equinor. The current European CO_2 tax is less than € 20 per tonne, although that price is set to increase in 2019.

“The quota prices that exist are not sufficient today to cover the cost both of capturing and storing the CO_2,” said Overa. “Over time we believe that gap will be closing. Deploying more and more of these facilities will bring the cost curve down, like it has for renewables.”

Captured CO_2 will be liquefied and transported on ships to a facility on Norway’s western coast. From there, it can be piped out to the North Sea and pumped some 3,000 meters (about 10,000 feet) down into porous rock formations.

Industry insiders have said there is already interest in the Norwegian CCS model from companies elsewhere in Europe.

“The next phase of Norway’s program, which is developing the infrastructure to enable capture from multiple industrial sources, is really exciting. And I think if this project is realized, there will be opportunities for other sources within Europe to access the infrastructure there,” said Luke Warren of the Zero Emission Platform.

Source: DW (2018, October 18). Could oil nation Norway help save the climate?

Published by: MVW Lechtenberg Projektentwicklungs- und Beteiligungsgesellschaft mbH | Dammstrasse 11a, 47119 Duisburg Ruhrort, Germany
VISDP: Dirk Lechtenberg | Editorial Director: Dirk Lechtenberg

USA

Global spending on clean energy solutions could be outpacing fossil fuels

Inc.BioHiTech Global, a technology and services company that provides cost-effective and sustainable waste management solutions, today announced it has entered into a definitive agreement to acquire an additional 26.8% ownership stake in the nation's first HEBioTtm renewable resource recovery facility located in Martinsburg, West Virginia (the "Martinsburg Facility").

The Company is acquiring the additional ownership stake in the Martinsburg Facility from Entsorga USA in exchange for the issuance of approximately $ 1,886,000 in BioHiTech preferred stock, convertible into BioHiTech common stock at a fixed price of $2.64 per share.

The Martinsburg Facility is expected to begin the commissioning process in December 2018 and to ramp production throughout the first quarter of 2019. The facility utilizes a patented high efficiency mechanical and biological treatment process ("HEBioT Process") for the disposal and recycling of mixed municipal solid waste (MSW) into an EPA approved solid recovered fuel ("SRF"). The HEBioT Process is expected to divert from landfills as much as 80% of the waste that enters the facility. The Martinsburg facility has secured ten-year agreements for both the supply of MSW from a regional hauler and the off-take of the SRF production by a multi-billion-dollar cement company with operations nearby.

The Martinsburg facility is the first of a series of facilities utilizing the patented HEBioT process that BioHiTech plans to build in the US in the coming years.

In additional developments for BioHiTech Global, a recent article published by Water & Wastes Digest that discussed how aerobic digester reduces global warming impact, it was reported The University of Delaware recently completed a Life Cycle Assessment of BioHiTech's aerobic digesters for food waste management. The study demonstrated how BioHiTech's technology can significantly reduce the global warming impact of food waste disposal.

BioHiTech launched its new subsidiary, Entsorga North America, which expands the company's value proposition to include organic and inorganic waste streams and provides enterprise solutions to the residential and municipal marketplaces. The Entsorga North America venture will expand the company's product offering towards providing disruptive, clean technology solutions that advance the global movement towards sustainability and zero waste initiatives.

Entsorga North America will manage Apple Valley Waste Conversions LLC, an Entsorga North America part-owned subsidiary, and the company that holds an exclusive license to deploy the Entstorga HEBioT Mechanical Biological Treatment (MBT) technology throughout the northeastern United States.

The HEBioT MBT system converts food waste, plastics and other carbon-based materials from the mixed municipal solid waste (MSW) stream into a U.S. Environmental Protection Agency (EPA)-recognized alternative fuel source. The waste received at a facility is converted to a clean burning alternative fuel (Solid Recovered Fuel or SRF), which will be used as an alternative or supplement to fossil fuels.

Source: Oil & Gas 360 (2018, November 11. Global Spending on Clean Energy Solutions Could Be Outpacing Fossil Fuels

Brazil

SNIC forecasts 3% growth in 2019

Paulo Camillo, the president of SNIC, forecasts that cement sales will rise by 3% in 2019. If he is correct then it will be the first rise in four years for the local industry. Total cement sales fell by 1.1% year-on-year to 52.8Mt in 2018 from 53.4Mt in 2017. Particular falls in sales were noted in the north and northeast of the country, although exports rose by 14.3% to 88,000 tonnes. A truck drivers' strike and general economic uncertainty reduced the effects of a positive first half to the year. The cement association also said that freight, fuels and electricity costs grew 'significantly' in 2018. However, it is optimistic that new legislation support co-processing of alternative fuels will partly help to alleviate this situation.

Source: Global Cement (2019, January 10). SNIC forecasts 3% growth in 2019

Published by: MVW Lechtenberg Projektentwicklungs- und Beteiligungsgesellschaft mbH | Dammstrasse 11a, 47119 Duisburg Ruhrort, Germany
VISDP: Dirk Lechtenberg | Editorial Director: Dirk Lechtenberg

USA

Guiding the way to a more sustainable energy future

The Intergovernmental Panel on Climate Change (IPCC) released an alarming report this October about what it would take to cap rising global temperatures at 1.5°C above pre-industrial levels. Hitting this target has motivated countries to start developing and executing plans for decarbonization of their power generation and energy matrix, as well as other options, such as removing CO_2 out of the atmosphere itself.

The consequences of society's response to this threat, needless to say, are dire.

"There's no question that the current proposition of fossil fuels as the world's primary energy sources needs to be transformed," says Dr. Carlos Romero of Lehigh University's Energy Research Center (ERC), "but doing so is a massive global undertaking that will not happen overnight".

In a three-year, $2.3 million project supported by the government of Mexico and the World Bank, Lehigh will partner with the Mexican Institute for Electricity and Clean Energies (INEEL, for its acronym in Spanish) to study the use of a renewable energy source—solar thermal energy—to improve the performance of CO_2 capture systems installed in natural gas combined cycle (NGCC) power plants. Mexico has a large number of NGCC's for power generation. Although NGCC power plants have a lower carbon intensity than coal plants, a portion of these plants will require CO_2 capture technologies to fulfill Mexico's greenhouse gas (GHG) emission targets set by the Climate Change Act. The country has committed to reducing its greenhouse emissions by 50 percent below 2,000 levels by 2050.

This project is part of large $90 million inter-institutional consortium designed to advance carbon capture, utilization, and storage (CCUS) in Mexico. According to the International Energy Agency, CCUS can potentially contribute to the mitigation of about 12 percent of the cumulative greenhouse emissions needed to reach the global goal of 1.5°C cap temperature by 2050. The consortium includes international participants from the research community, academia, and industry and will support the development of a group of projects, including a carbon capture pilot plant project and a CO_2-enhanced oil recovery project.

"One of the most promising technologies for capturing carbon dioxide from fossil-fired power plants is the use of chemical solvents or amines to capture the CO_2 in a solution," Romero says. "However, it is not practical to try to sequester the entire CO_2-laden stream. The CO_2 must be extracted back out, and optimally the solvent can be regenerated for future use."

In another new project closer to home, ERC researchers, including Dr. Alp Oztekin, Zheng Yao, Romero, and graduate students, are working with colleagues from Western Kentucky University, with support from the DOE Office of Fossil Energy, to analyze the impact of "cycling" on different power plants' wastewater treatment processes, including physical-chemical and biological technologies.

Titled "Coal-Fired Power Plant Configuration and Operation Impact on Plant Effluent Contaminant and Conditions," this $ 400,000 effort analyzes the impact upon the wastewater treatment process when coal-fired power plants engage in cycling operations.

Source: PHYS.ORG (2019, January 09). Guiding the way to a more sustainable energy future

Turkey

Saving energy across the board

To improve energy efficiency at its cement plant, OYAK Group-owned Denizli Çimento Sanayii TAŞin western Anatolia, Turkey, decided to introduce alternative fuels (AFs) to fire the preheater, the calciner and the main burner. To store, mix and convey AFs of different composition, the cement producer opted for a tailor-made AF system. At the core of this solution are two pipe conveyors. These completely-enclosed conveying systems ensure environmentally friendly, dust-free and low-energy transport of fuels as well as the required raw materials, using a minimum level of personnel. The new system has been running since January 2017 and has proven to be a particularly efficient and economical solution.

Source: CemNet (2018, October 18). Saving energy across the board

Published by: MVW Lechtenberg Projektentwicklungs- und Beteiligungsgesellschaft mbH | Dammstrasse 11a, 47119 Duisburg Ruhrort, Germany
VISDP: Dirk Lechtenberg | Editorial Director: Dirk Lechtenberg

India

How the cement industry is helping India meet its climate goals

Given the cement industry's achievements in energy efficiency and use of fly ash and steel industry slag, taking alternative fuel usage, including the existing commitment to use plastic waste, to the European level of 40% by 2025 should be worth attempting. This is an ambitious target though not unrealistic.

As India's thermal power plants mushroomed, fly ash from the burning of coal in these power plants kept growing and their disposal became an increasing problem. Thermal power plants and the cement industry made mutually satisfactory arrangements for the cement plants nearby to take fly ash and use it as raw material for making cement. The fly ash was given free, through a policy directive of the power ministry and the cement plants bore the transportation cost. The thermal plants had savings in the disposal cost of fly ash, especially in terms of land required for it. This arrangement was a win-win for both sides.

Enabling regulatory standards that specified the extent to which fly ash could be used helped. Within 20 years of the start of the process, as much as 25% of the total fly ash being generated in the country is now being used by the cement industry.

With slag from the steel industry, the success has been spectacular, with full 100% utilisation. This is a good example of real progress towards a circular economy.

The use of waste as an alternative fuel and raw material is the core of a circular economy. The Indian cement industry has already made remarkable progress in energy efficiency and now has five of the top 10 companies in the world, including the first, this year in the low-carbon transition league report.

On World Environment Day, the industry offered to use all the plastic waste of the country (up to 12 million tonnes) as an alternative fuel by 2025, provided it is made available to it in a segregated form.

In Europe, the cement industry uses alternative fuel from biomass, municipal and industrial waste to get as much as 40% of its energy needs. India should have the ambition to reach a similar percentage.

Given the cement industry's achievements in energy efficiency and use of fly ash and steel industry slag, taking alternative fuel usage, including the existing commitment to use plastic waste, to the European level of 40% by 2025 should be worth attempting. This is an ambitious, though not unrealistic, target.

Source: Hindustantimes (2018, November 16). How the cement industry is helping India meet its climate goals

Japan

Taiheiyo Cement starts carbon capture and storage test at Fujiwara plant

Taiheiyo Cement says it has started the country's first carbon capture and storage (CCS) test at its Fujiwara plant in Inabe, in conjunction with the Ministry of Environment. It is testing a chemical absorption method on kiln exhaust gases at the plant. Further installations on the project will continue during January 2019.

Source: Global Cement (2019, January 02). Taiheiyo Cement starts carbon capture and storage test at Fujiwara plant

Published by: MVW Lechtenberg Projektentwicklungs- und Beteiligungsgesellschaft mbH | Dammstrasse 11a, 47119 Duisburg Ruhrort, Germany
VISDP: Dirk Lechtenberg | Editorial Director: Dirk Lechtenberg

Namibia

Cement maker burns tonnes of non-recyclable waste as alternative fuel to fire kiln

Rent-A-Drum said tonnes of additional waste is generated during the festive season, but it has found a willing partner in Ohorongo Cement who generates as much as 40% of the energy for its kilns from alternative sources, including waste that is not fit for conventional recycling.

“If all waste is collected and taken to the Rent-A-Drum waste management centres in the Khomas, Erongo and Oshana regions, Ohorongo Cement will ensure that it is disposed of in a sustainable manner,” stated Louw.

This year, Ohorongo disposed of over 70 trucks of none-recyclable material as alternative fuel, alongside wood chips and charcoal dust in its kiln. For the past six months, Ohorongo’s kiln has been running on over 40% alternative fuels.

Source: Namibia Economist (2018, December 14). Cement maker burns tonnes of non-recyclable waste as alternative fuel to fire kiln

UAE

UAE Climate Change Ministry awards alternative fuel facility contract

The UAE’s Ministry of Climate Change has inked a shareholder agreement with Emirates RDF Company to build a refuse-derived fuel (RDF) facility in Umm Al Quwain.

According to a statement by Besix, the $40 M RDF facility will be developed under a public-private partnership (PPP) scheme and co-financed by the Ministry of Presidential Affairs. Upon completion, it will receive 907 tonnes per day of household waste from Ajman and Umm Al Quwain.

The refinery will convert the waste of 550,000 residents from both Emirates into an alternative energy source named RDF, which will be used in cement factories as a fuel.

In its statement, Besix added: “It will partially replace the traditional use of gas or coal. By implementing this project, approximately 90% of household waste will be derived from landfill.”

Construction on the new facility will start in December 2018 and is operational commencement is scheduled for April 2020, the Belgian construction giant added.

Emirates RDF Company is a joint venture consisting of Besix, Ajman-based Tech Group Eco Single Owner holding, and Finland-based Griffin Refineries.

Speaking on the news, Nico de Koning, Project Manager of Besix Concessions and Assets Middle East, said: “[The project] contributes to the UAE realising its ambitious sustainability goals and it helps cement plants decrease their use of fossil fuels”.

Source: Construction Week Online (2018, October 18). UAE Climate Change Ministry awards alternative fuel facility contract

Published by: MVW Lechtenberg Projektentwicklungs- und Beteiligungsgesellschaft mbH | Dammstrasse 11a, 47119 Duisburg Ruhrort, Germany
VISDP: Dirk Lechtenberg | Editorial Director: Dirk Lechtenberg

Published by:
MVW Lechtenberg Projektentwicklungs – und Beteiligungsgesellschaft mbH

Geschäftsführer Dirk Lechtenberg
Dammstr. 11a, D – 47119 Duisburg
VISDP: Dirk Lechtenberg
Editorial Director: Dirk Lechtenberg

Tel. +49 (0) 203-34 65 16-0
Fax. +49 (0) 203-34 65 16-50
e-mail: info@lechtenberg-partner.de

www.lechtenberg-partner.de

MVW
LECHTENBERG & PARTNER

Co-Processing Magazine of Alternative Fuels & Raw Materials

by MVW Lechtenberg & Partner, Germany

Published by: MVW Lechtenberg Projektentwicklungs – und Beteiligungsgesellschaft mbH
Dammstrasse 11a, D – 47119 Duisburg Ruhrort, Germany
VISDP: Dirk Lechtenberg | Editorial Director: Dirk Lechtenberg