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# Dear Readers,

We have not only one, but two reasons to celebrate: Firstly, 2020 is finally coming to an end! Let's hope that 2021 will make up for its predecessor's mistakes. This editorial will not include an end-of-year-review, as I am certain that we will all see enough of those.

Secondly, I am proud to welcome you to the 10<sup>th</sup> edition of the Co-Processing Magazine of Alternative Fuels and Raw Materials!

When we first started this magazine, we wanted to create a journal dedicated to the global alternative fuels industry, to spark inspiration and become a main source of information for this specific network. In the last two years and now 10 editions, the magazine has accumulated more than 3,500 subscribers and been downloaded up to 6,000 times per edition. Your frequent feedback shows us that we have struck a nerve with our publication.

I would like to take this opportunity to thank you for your trust and interest in our Co-Processing

Magazine of Alternative Fuels and Raw Materials. We are looking forward to curating the next 10 editions for you!

As it has been our approach in this magazine to not only provide you with news from the industry, but also with experience reports, specialist and scientific articles, comments, and background information, our 10<sup>th</sup> edition will include a combination of these.

One good thing 2020 has brought for MVW Lechtenberg & Partner is our new colleague, Carlos Mendes, who will support us in Consulting and Business Development. Carlos comes from McKinsey & Co., Malaysia, where he advised clients globally in energy-intensive industries as Expert Associate Partner for 7 years.

Prior to that, he had been involved in the cement, pulp and paper and power industry for more than 15 years. In various positions at CIMPOR Cimentos group, he led projects and operations transformations across countries

– in, amongst others, Portugal, Egypt, South Africa and Mozambique.

Based on his invaluable expertise of the industry's processes, he wrote a report on how laggard companies can successfully deliver sustainability projects or even whole transformations. Find the article starting on page 6.

One example for a successful sustainability project is the erection of the first RDF plant in the Kingdom of Saudi Arabia. At MVW Lechtenberg & Partner, we are proud of having been accompanying the process. Read more about the project in an article on page 8.

While "climate change" has become a frequently used term in sustainability agendas, the underlying processes that cause global warming are not familiar to everyone. That greenhouse gasses play a significant role is common knowledge. However, on page 3, Dr. Hansjörg Diller will shed light on which gasses exactly cause the greenhouse effect, and

to what extent – as there is more to the story than just CO<sub>2</sub>.

Last but not least, the construction in our own "Blue River Recycling" venture in the port of Papenburg, Germany, is moving fast. Our new team members, Konstantin Schwabauer as Plant Manager, and Timo Ruhnke as Technical Project Manager, are in the process of finalizing the erection by the end of February 2021. Find some impressions from the ongoing process starting from page 15.

Enjoy reading these and more articles in our anniversary edition!

Meanwhile, the whole team of MVW Lechtenberg & Partner wishes you and your loved ones a prosperous, happy, and successful new year 2021.

Yours faithfully,  
Dirk Lechtenberg

# How Rice Grains, Sugar Lumps and Marshmallows Influence our Climate

By Dr. Hansjörg Diller, MVW Lechtenberg & Partner

To be honest, I was at odds with myself on finding an eye-catching headline for a quite common, and maybe sometimes boring topic like CO<sub>2</sub>, given the wealth of articles, blogs etc. which have been published so far. CO<sub>2</sub> – these are the magic three letters that everyone encounters in daily news. When entering only these three signs into Google, one obtains more than 378,000 hits in next to no time, the first dozens dealing with their effect on our climate, i.e. the greenhouse effect (the number of hits is definitely too much to go through all of them).

We all are aware of CO<sub>2</sub>, its harmful greenhouse effect and, consequently, it is blamed for rising global temperatures. No doubt about it. But hang on, why is that, and is CO<sub>2</sub> the sole influence on our climate?

Occasionally, I treat myself to some good reading matter from a local bookstore. On such an occasion, I have noticed two books from a German meteorologist which are really enthralling [1, 2], given the simple explanations of the greenhouse effect and related topics.

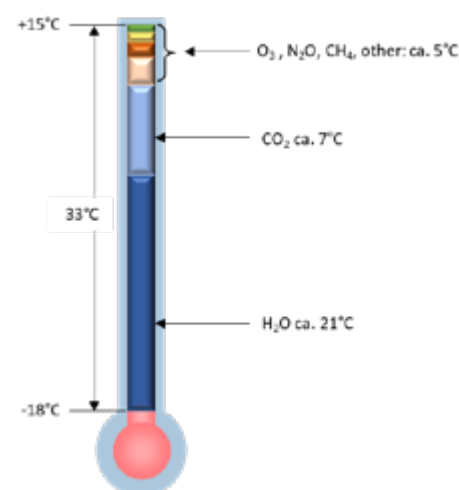
Since certainly most people know the interactions of CO<sub>2</sub> and global warming, I think it's worth to have a brief look on some of the other greenhouse gases and their stunning effects. And I will try to eventually unveil the connection to food like rice grains, sugar lumps and marshmallows.

## What is the Greenhouse Effect?

First of all, the natural greenhouse effect ensures that our earth retains an average surface temperature of around 15 °C, at which our flora and fauna can thrive. If this greenhouse effect did not exist, the temperature would be an inhospitable – 18 °C, despite the solar radiation. The difference of around 33 °C is caused by the phenomenon of the natural greenhouse effect. If you increase the proportion of greenhouse gases by burning fossil fuels, this effect increases and it becomes warmer on our planet. This additional share is called the anthropogenic greenhouse effect.

## Greenhouse Gases

Greenhouse gases are responsible for this effect, with water vapor being the most



**Figure 1:** Contribution of various gases to the natural greenhouse effect (Source).

important, followed by CO<sub>2</sub>. Other gases involved are ozone (O<sub>3</sub>), laughing gas or nitrous oxide (N<sub>2</sub>O), methane (CH<sub>4</sub>), and the fluorochlorohydrocarbons (FCHC) produced exclusively by us humans. All of these gases have the property of allowing short-wave solar radiation to pass through to the earth relatively unhindered. However, the long-wave thermal radiation reflected from the earth's surface is

absorbed by these gases, causing them to heat up. The heated gases in turn emit long-wave thermal radiation. This is how the 33 °C mentioned above come about. Water vapor is responsible for 21 °C out of these 33 °C. Another 7 °C are caused by the CO<sub>2</sub>, and for the remaining 5 degrees all the other gases mentioned above are to be held responsible. Only the natural greenhouse effect creates the conditions for life as we know it.

By the way, the main components of our air, oxygen (O<sub>2</sub>) and nitrogen (N<sub>2</sub>), are transparent for heat radiation from the earth. They are simply not greenhouse gases, just like the traces of monatomic noble gases.

Greenhouse gases are only molecules consisting of 3 or more atoms, such as CO<sub>2</sub>, CH<sub>4</sub>, etc. They have the property of vibrating in a certain way when excited by infrared radiation (i.e. heat radiation). Such molecules can bend, rock, wag, and twist, all the things smaller molecules like oxygen or nitrogen, and certainly not the monoatomic noble gases can do. For example, a carbon dioxide or water molecule is able to extract energy from the heat radiation and store it in the oscillations, and then release it again. Some of the gases are represented by their structural formulas in figure 2.

## The Anthropogenic Share of the Greenhouse Effect

Water vapour is by far the most important contributor to the greenhouse effect owing to its large concentration in the air and strong absorbing effect on long-wavelength radiation.

## How Rice Grains, Sugar Lumps and Marshmallows Influence our Climate

The mass fraction of water vapor in the mass of the atmosphere is only 0.25 %, which is, however, very irregularly distributed.

Let's make a handy comparison. If we take an empty 10 litre bucket as an example, which is naturally filled with air, the water vapor content

makes up the size of a common marshmallow in this bucket.

But because humankind hardly emits water vapor and because it remains in the atmosphere for about 9 days, meaning it is very short-lived, it does not play a big role in the discussions about the human share of climate change. But

an indirect one: Because the temperature rises due to greenhouse gases emitted by humans, and because warmer air can absorb more water vapor than cold air, a larger amount of water can now get into the atmosphere and accelerate the greenhouse effect.

Meanwhile, CO<sub>2</sub> might only be the second most important greenhouse gas, but it is very durable. CO<sub>2</sub> stays in the atmosphere for around 100 to 150 years.

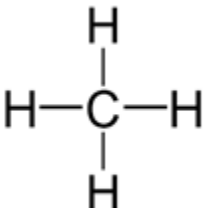

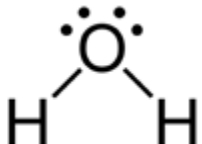
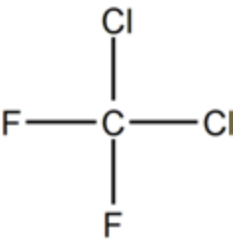
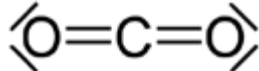
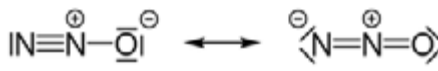
The impact of the individual gases on the greenhouse effect is very different. Methane has, for example, an around 20-35 times greater effect than CO<sub>2</sub>, and an FHCH is around 3400 times more effective than CO<sub>2</sub>.

Then why is everyone discussing the harmful climate killer gas CO<sub>2</sub>? First of all, CO<sub>2</sub> is not a "bad gas". Without CO<sub>2</sub> the plants would not be able to photosynthesize and thus produce oxygen. We would then have no oxygen to breathe and no ozone layer to protect us from the dangers of solar radiation.

But: There are two sides to the coin, as is the case here: If we look back to the time before industrialization, the CO<sub>2</sub> concentration was around 280 ppm in 1750. With industrialization, the CO<sub>2</sub> content in the air rose to around 415 ppm today, an increase of more than 48 %. If you look back further, the CO<sub>2</sub> concentration in the atmosphere fluctuated constantly, but there has never been such a steep increase as in the last 270 years.

Figure 3 shows concentrations of carbon dioxide in the atmosphere from hundreds of thousands of years ago through 2015, measured in parts per million (ppm). The data has been derived from a variety of historical ice core studies and recent air monitoring sites around the world.

It is interesting to look at shorter periods of time. Compared to 1970, global CO<sub>2</sub> emissions have risen by almost two and a half times in around 50 years. Since the beginning of the 1990s, when the Earth Summit took place in Rio de Janeiro, CO<sub>2</sub> emissions have increased by 67%.

Methane (5 atoms)	Ozone (3 atoms)	Water (3 atoms)
		
Dichlorodifluoromethane or "freon" (5 atoms, one of several FCHC)	Carbon dioxide (3 atoms)	Nitrous oxide (3 atoms)
		

**Figure 2:** Structural formulas (Lewis structure) of the most important greenhouse gases. Some of the molecules are mesomers, i.e. there are more than one Lewis structure possible.

# How Rice Grains, Sugar Lumps and Marshmallows Influence our Climate

At first glance, 415 ppm of CO<sub>2</sub> in the atmosphere do not sound like a lot. In terms of percentage, it is merely 0.04 %, a tiny portion of the air, actually. If we take a 10-litre bucket full of air, the 0.04% of CO<sub>2</sub> will represent a small cube having the size of a sugar lump. And such a small cube is to be blamed for global warming?

Moreover, approximately 93 % of the CO<sub>2</sub> in the atmosphere are of natural origin, and merely 7 % derived from human activities, in particular from combustion of fossil fuels. Actually, there are only about 7 % of the 0.04 % = 0.0028 % of CO<sub>2</sub> in the atmosphere, which are caused by human activities. Pretty little, to be honest.

However, it is like with medicine: It is not the amount, but the effect that matters. The best comparison to this is the ozone hole, which has been shown to be caused by FCHC. The concentration of FCHC in the atmosphere is around 0.5 million to 0.75 million times less than that of CO<sub>2</sub>!

In our 10-litre bucket example, FCHC will take the volume of merely two rice grains! Yet, the effect of FCHC is disastrous, as we all know. Ozone layer depletion causes increased UV radiation levels at the Earth's surface. Negative effects include increases in certain types of skin cancers, eye cataracts and immune deficiency disorders.

By the way, 90% of all ozone is in the stratosphere, i.e. at altitudes between 15 and 50 km. If this ozone was to be placed on the surface of our globe, this layer would only be 2.8 to 4.4 mm thick! The ozone is pretty thin-skinned, but extremely important to us. If this "layer" becomes even thinner due to the action of FCHC, it is called an ozone hole. The lowest measured values to date are translated to 1 mm thick, so that there is actually no real ozone hole, but an area with a protective layer that is far too thin.

But let's get back to CO<sub>2</sub>. Even with an anthropogenic portion of 0.0028% in the atmosphere, the influence of CO<sub>2</sub> from human activities on the rising temperatures can be appraised by a simple computation.

As explained above, the greenhouse effect of all atmospheric CO<sub>2</sub> is around 7 °C. Man-made CO<sub>2</sub> emissions account for around 7 %. 7 % of 7 °C is 0.49 °C. If one considers that temperatures have risen by 0.8 °C globally in the past 100 years, one can state – as a very rough approximation – that humanity is responsible for around half of the current temperature changes through CO<sub>2</sub> alone.

Such a simple linear estimate only provides an orientation. However, the values are suitable for determining whether the human impact should be categorized as insignificant or significant.

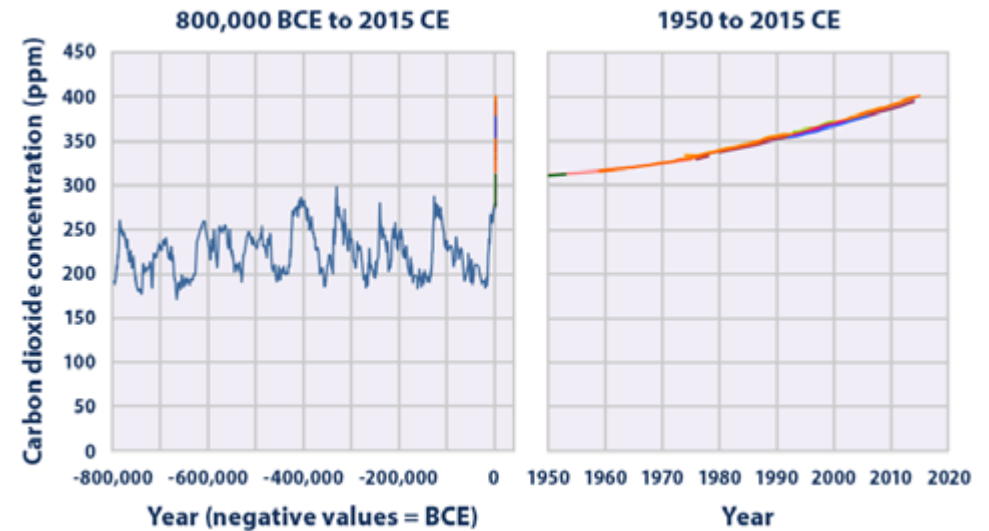


Figure 3: Global atmospheric concentrations of carbon dioxide over time. (Source:[3]).

## Outlook

The brief elucidations on greenhouse gases have impressively shown that minute amounts of gases have a tremendous impact on the climate, and on human beings, eventually. Moreover, the gases are invisible and scentless.

What is invisible to the eye, we unfortunately hardly notice. Imagine if CO<sub>2</sub> was black smoke and we could no longer see the sun. Or that CO<sub>2</sub> would have the same smell as stink bombs that often went off in teachers' rooms during school days. We'd all have to walk around with bulky gas masks to endure the disgusting stench.

THEN, we would feel the problem permanently, and surely would look for solutions very, very quickly.

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# The Phenomenon of Successful Sustainability Projects

By Carlos Mendes, MVW Lechtenberg & Partner

In this article, Carlos Mendes, Consultancy and Business Development at MVW Lechtenberg, will review how business can keep learning from physics, especially from counter intuitive phenomena – such as the “Mpemba effect”. He draws conclusions for laggard companies and their opportunities to successfully deliver sustainability projects or even whole transformations.

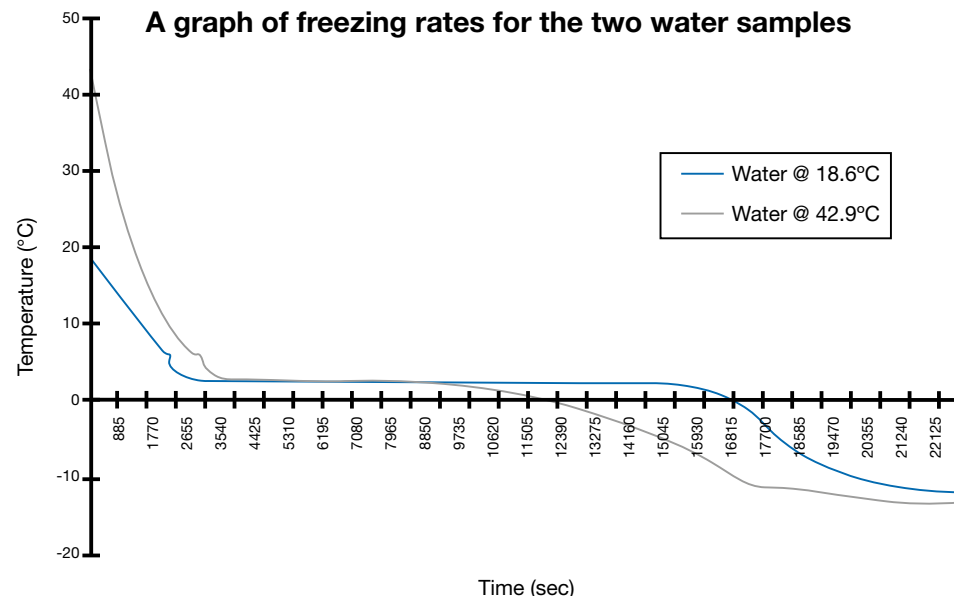
There are many articles written about how business follows some physics laws – from Newton’s to thermodynamics – and in this article I would like to focus on a very counterintuitive phenomenon, especially because often business leaders follow instinct or intuition. In this case, we can show how status quo business intuition is actually far from being an indicator for the desired success in sustainability projects.

Let’s start with physics and a short overview of the Mpemba effect, that, simply put, means: **hot water freezes faster than cold water**. The history behind the finding is very interesting as Erasto Mpemba, a Tanzanian secondary student, firstly observed the effect during cookery

classes in 1963 at secondary school. At first, he got ridiculed by his classmates and physics teacher. But already 6 years later, in 1969, he published the results of his experience together with professor Denis G. Osborne. Till current days, science is still debating on possible explanations for this effect – there are some

suggestions, mostly related to smaller and more intuitive phenomena related to heat transfer, crystallization and frost, among many!

It is for sure an amazing experiment to reproduce at home with your children!



**Figure 1:** The Mpemba Effect: freezing rates for differently water samples at different temperatures.

How does this relate to sustainability projects and transformations? Well, across the last couple of decades we have also been observing some fast paced and successful cases of companies and businesses that have leapfrogged their state from laggard to leader. Thus, in this article, I would like to share some of the facts and highlights that contributed to these cases – keeping in mind that there are no magic recipes, but these are some of the ingredients in the secret sauce.

This becomes even more relevant given the strategic nature of some of these projects, that many times have a negative net present value (NPV) and therefore become less of a priority when compared to others that are more attractive using only the financial metrics.

Let us begin by reviewing the context of some of these cases – it is unfortunately not unique that sustainability projects are disadvantaged, as these are often perceived as non-core to business.

The initial reason for why these cases are disadvantaged is the high awareness of one of two factors: threat or opportunity. What usually follows either of these is a corporate reaction, since something “has to be done”.

We see many SWOT analysis being done for diverse industries and plans. But only a few projects have the ingredients to be a game changer: purpose, quantification of impact, and one leader for each initiative with full ownership and accountability.

# The Phenomenon of Successful Sustainability Projects

When we are part of, or we visit a successful project, many times there is a very clear view on three dimensions:

1. Why the project is being done,
2. how it was delivered, and
3. what are the expected outcomes?

Investing the time to have these three questions outlined creates a great sense of responsibility within a team, and also makes the successful project implementation the core to each team's role – it's now something that the team “will do!” – not a part time job or some hobbies that get deprioritized in the first instance.

Secondly, let's also talk about scale – although there are major corporate programmes running the sustainability agenda, we have observed major success when these projects or initiatives are lead at plant level or even in smaller, autonomous circles within the organization.

It can be concluded that, the smaller the team, the more effectively they can create their own ecosystems, define a common purpose and act in conformity with the defined objectives. We could compare this to navy SEALs' teams: these groups are highly motivated to deliver and their purpose becomes the best incentive. For a major project or transformation, this is simultaneously like aviation fuel and a match combined, as these projects can become the leading light to inspire the rest of the organization. They become a role model for the whole

company to share within and externally, and can then, eventually, become a trailblazer for the rest of the industry.

Thirdly, we have technology, and we are not talking about all the bells and whistles of a shiny new toy – oversizing and over specifying is many times driven by teams as a safety factor for new facilities, given they are not so familiar with the new processes and equipment. This makes the whole project much more expensive, and thereby making it impossible to justify.

The best project teams start by focusing on what functionalities and equipment one really needs, like a basic technical solution. This also contributes to the improve of the overall NPV while ensuring a minimum viable project, for this it is essential to have a very good process technology knowledge during the solution development. This way, the plants will be leaner and one can start delivering value with less investment and therefore reduce the risks of these “pilot” facilities that in many cases are a proof of concept.

Another success factor is the setting of the right metrics for this project. Please keep in mind that we are still taking about a low margin, or even a negative NPV at the beginning. Therefore, is of utmost importance to define value for these projects: how to measure it and how to set the baseline for continuous improvement together with longer term aspirations. This gives successful teams the comfort to keep doing the

right thing and to focus on the objectives that have been set from the beginning.

Finally, and maybe the most important aspect which can ensure the success of a sustainability projects is, as usual, the culture in which these projects thrive: a mix of strong will fuelled by the purpose we have mentioned above combined with a shared vision on how to deliver the project. Also, the required skills need to be built along or brought to the project's lifecycle, to bring competence to every step, including pre-feasibility, approval, construction, commissioning and operations for one plant – and from there for the next one, and the next, and so on.

All the above includes all the very well know concepts of the art of project delivery, but only a few projects get to be successful. An example of this success is City Cement Company's Qassim plant in the Kingdom of Saudi Arabia, the first cement plant in the country to successfully implement a fully functional refuse derived fuel (RDF) production facility. Even though the plant seemed very far away from such an accomplishment at the project's beginning, the company managed to complete the works within only 14 months – against all odds.

Basically, in their recipe we can see all the markers for success:

- The connection of the project to a corporate aspiration of being pioneers in the industry for alternative fuel utilization.
- With the corporate sponsorship, the team that is driving the project is very small, but fully accountable to take decisions and drive the project until completion.

- This initial plant had a very lean design in terms of components and process flow with right sizing of components for the current production rates, and this in a modular way, allowing for expansion but not requiring current investments to prepare future phases.
- The metrics for this project include not only the construction typical KPIs, and operational ones for RDF production, but also broader sustainability indicators to complement the definition value for the project implementation and long-term success
- A deeply committed team, that had a good mix of technical hard skills, combined with soft skills that altogether contributed to a very effective project delivery leadership.

So, as much as hot water freezing faster than cold water seems counterintuitive, smaller companies or industries might complete sustainability projects in a successful manner faster sometimes, when compared to more “advanced” or sophisticated players or regions. Business does continue to follow physics.

In the last years, I have been a keen observer of many challenges in implementing sustainability and alternative fuels projects in the cement as well as other industries. It becomes apparent that a whole ecosystem contributes to the project for it to be a success, like the municipalities, the suppliers, contractors and so on. However, the determinant factor is still the owner's team. This team, in many cases, is confronted with the biggest challenges. At the same time, when it is committed and empowered, it becomes the driving force to successfully deliver a project.

# The Kingdom of Saudi Arabia Goes Green

By Dirk Lechtenberg, MVW Lechtenberg & Partner

Is the Kingdom of Saudi Arabia on the way to become a driver of innovation in the field of renewable energy? Which impact does the currently low and subsidised price for commodities have on the cement industry in the country? And what is the future of the Kingdom's waste management sector? In this article, Dirk Lechtenberg will review these and more questions regarding Saudi Arabia's "Vision 2030" to become a greener country through a spearheading sustainability agenda.

Covid-19 and its impact on the global economy was the main topic during the last G20 summit which was held virtually from 21 to 22 November 2020. However, the hosting country, the Kingdom of Saudi Arabia, has also put sustainability and the climate change as a priority on the agenda.

On the website of the summit, [Safeguarding the Planet \(g20.org\)](https://www.g20.org/), topics such as "Managing Emission for Sustainable Development" and "Clear Energy Systems for a New Era" are placed on top of the list.

The Kingdom furthermore surprised with press releases and the announcement of its endeavours for a sustainable future: the country plans, for example, to realise the to date biggest hydrogen project for its planned futuristic NEOM city. The 5-billion-dollar project includes the production of green hydrogen to fuel the growing bus and truck fleets of the region. Companies Air Products, ACWA Power and the tech-city NEOM joined forces for the successful implementation of the plan.

A 5-billion-dollar investment. For comparison: The German energy group RWE will invest 100 million euros in the "biggest electrolysis plant in the world" in Lingen, Germany. It is interesting to note that the Dutch manager Peter Terium, formerly CEO of RWE and RWE subsidiary Innogy, is now Managing Director for Energy, Water and Food at NEOM.

It remains to be seen whether such forward-looking energy projects are not just good intentions, but will actually be implemented.

## The Hydrocarbon-Based Economy

Saudi Arabia has the ideal preconditions to produce great amounts of solar or wind energy, with an annual average of 9.5 hours of sunshine per day. The United Arab Emirates, for example, have issued several tenders for low energy costs of most recently \$0.0135/kWh\*. Why has the Kingdom not done the same?

Let us take a closer look at the energy sector in Saudi Arabia. Saudi Aramco, officially the Saudi Arabian Oil Company, is one of the largest

companies in the world by revenue. Saudi Aramco has both the world's second-largest proven crude oil reserves, at more than 270 billion barrels and largest daily oil production of all oil producing companies. After becoming public on 11 December 2019, the company's shares commenced trading on the Tadawul stock exchange. The shares rose to 38.7 riyals, giving it a market capitalisation of about \$2.07 trillion.

Not only oil drilling, but also the enclosed refineries and petrochemical industries are part of the Kingdom's "hydrocarbon-based economy". Whereas Aramco has "only" 80,000 employees, the associated industries are the country's largest employer.

\* Abu Dhabi's 1.5 GW tender draws world record low solar bid of \$0.0135/kWh – pv magazine International (pv-magazine.com)

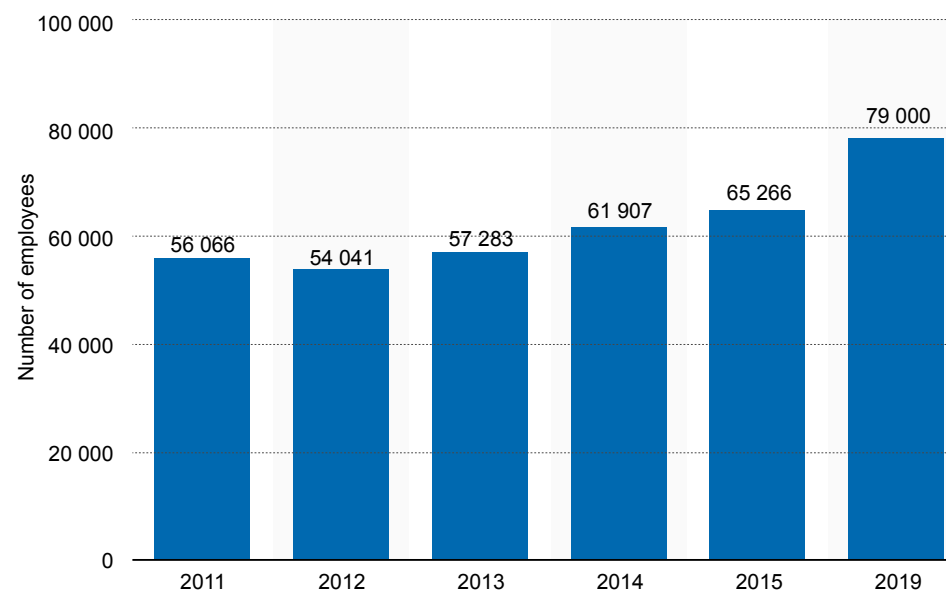


Figure 1: Number of employees at Saudi Aramco worldwide from 2011 to 2019. (Source: Statista.de)



# The Kingdom of Saudi Arabia Goes Green

As of today, oil production accounts for more than 90 % of the country's wealth. The local oil and gas industries are dominated by expat workers, with roughly 6 million foreign citizens being employed in the Kingdom. According to the UN factbook, Of the total population of 33 million, around 15 % are foreigners.

The Kingdom's consumption of its own oil production has steadily increased and it now consumes about one quarter of its oil production (approximately three million barrels per day). As of 2012, petrol in Saudi Arabia was sold at a price cheaper than bottled water—approximately US\$0.13 per litre.

This might be the root of an underlying problem: Saudi Arabia's whole economy is based on hydrocarbons. For decades, oil has been the guarantee for the country's wealth. At the same time, the commodities have not been used sustainably. As long as energy is cheap, it is unfortunately often being wasted. According to Jim Krane from Baker Institute, "Saudi Arabia now consumes more oil than Germany, an industrialized country with triple the population and an economy nearly five times as large."

According to a report by Citigroup's analyst Heidy Rehman, "As a result of its subsidies we calculate 'lost' oil and gas revenues to Saudi Arabia in 2011 to be over \$80 billion", adding that "at the domestic level, we believe the only real way to rationalize energy consumption would be to reduce subsidy levels."

## Change is Coming

Already in 2012, MVW Lechtenberg & Partner has been involved in a study for the "Mandatory Energy Efficiency Programme" under the patronage of HRH Prince Abdulaziz bin Salman Al Saud. The objective was to identify potential for energy savings within the Saudi Arabian cement industry. Our results showed that most plants were built according to modern standards and worked efficiently.

The country's cement industry has a combined clinker production capacity of more than 84 million tonnes, with more than half of it being installed in the last 15 years. Most of these plants are among the most modern and energy efficient in the world.

Also, energy costs in Saudi Arabia are the lowest globally. One tonne of fuel oil is currently delivered to the cement industry for \$27. Currently, fuel oils are heavily subsidized by the Government. This means that any other alternative fuel is much more expensive than subsidized fuels. These are not ideal conditions to promote the use of alternative fuels.

Nonetheless, the government has now made the first step towards

a sustainable future. Within the project "Vision 2030", the country is putting the use of alternative energies at the top of its priorities. In various reports that MVW Lechtenberg & Partner has edited for the Ministry of Environment, a significant potential for the use of, for example, refuse derived fuels (RDF) in the Kingdom of Saudi Arabia has been identified.

As a rich country, in Saudi Arabia there are arisings of approximately 20 million tonnes of municipal solid waste (MSW) which is characterized by a high calorific value. From the MSW

alone, alternative fuels with a heating value of 4,500 kcal/kg can be derived. This equals a third of the Kingdom's cement industry's energy demand.

Further energy sources can be found in the high arisings of wastes from the petrochemical industries or other industrial wastes, in biomass from the country's cattle and farming sector, as well as in the great amounts of waste tyres.

Old tyres are already being used as alternative fuel in a few cement plants in the Kingdom. Most of these plants cannot cover their

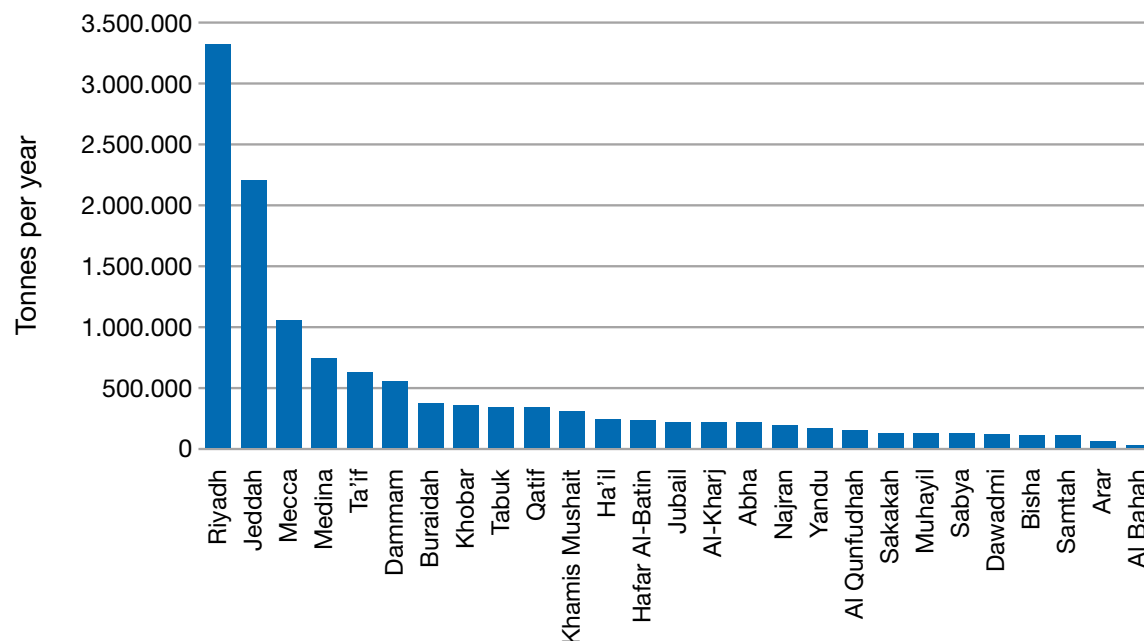


Figure 2: Annual arisings of MSW in 27 cities in the Kingdom of Saudi Arabia. (Source: MVW)

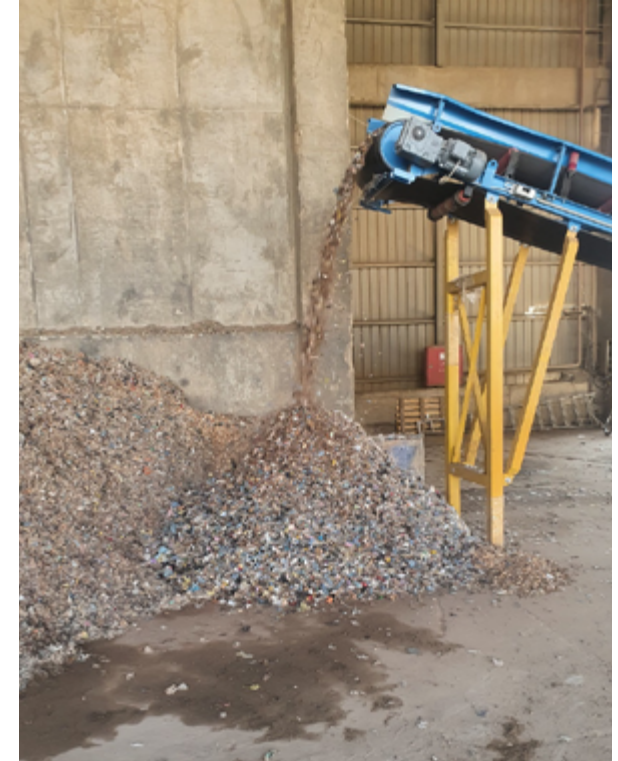
## The Kingdom of Saudi Arabia Goes Green



**Figure 3:** Date palm wastes in the Kingdom of Saudi Arabia. (Source: MVW)



**Figure 4:** Used and scrap tyres on a landfill in the Kingdom of Saudi Arabia. (Source: MVW).



**Figure 5:** The first RDF produced from MSW in the Kingdom of Saudi Arabia. (Source: MVW).

energy demand from subsidised oil alone and are therefore more or less forced to use other energy sources. However, these alternative sources of energy are easily 3 to 4-times more expensive than fossil fuels.

It is thus even more impressive that City Cement Company in Marat which relies on MVW Lechtenberg's consulting services for a while now, has not only implemented an own tyre shredding unit, but is now starting to use alternative fuels from pre-treated MSW.

At the beginning of our cooperation with City Cement, I have told former CEO Mr. Saleh Al Shabnan and current CEO Majed Al Osalain that no matter what we will do, any alternative

fuel will be more expensive than the subsidised oil. And I will never forget their reply: „We are convinced that the subsidies will cease at some point. By then, we want to have the required infrastructure and experience to use alternative fuels at place“. And as a reply to my concern that this moment might not come too soon, I have been told: “We are Arabs. As Arabs we know that a camel can survive a long time in the desert without water. Until then, we will continue to march in this direction.“

Since then, the company has undertaken great investments to install their own RDF production plant with the capacity to treat up to 600 tonnes of MSW per day. Besides the sorting of recyclables (such as paper, cardboard and plastics),

the treatment line enables the production of a high-quality alternative fuel which is successfully implemented in the cement plant. The erection can be seen as a flagship project for the whole industry which showcases that it is indeed possible to produce a high calorific and high-quality alternative fuel from Saudi Arabian MSW.

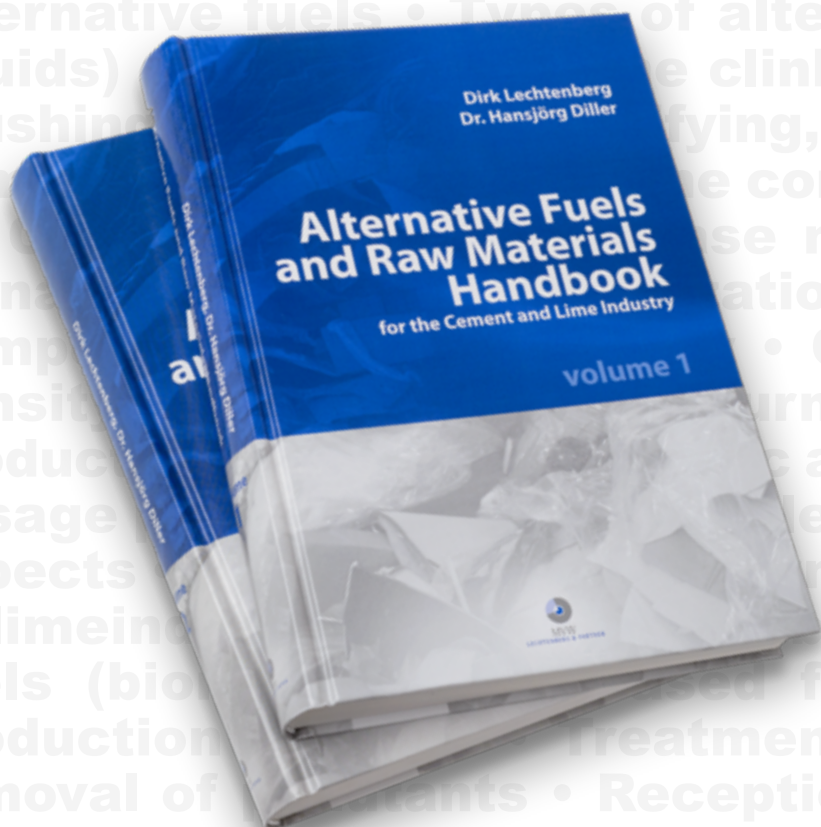
Every tonne of alternative fuels produced is an investment into the future, as oil is still much less expensive. However, it is a very future-oriented and innovative endeavor for City Cement Company to commit themselves to a sustainable energy supply and waste management.

We are optimistic that the camel will be able to walk a little longer without water.

I am also convinced that the government will stick to its plan to reduce the subsidies for oil, to even raise the oil price locally and to invest the newly gained funds into a new, job-creating and sustainable economy. Vision 2030 is more than just a vision!

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# A Production Site for Alternative Fuels is Built in Papenburg



*By Amandus Kahl GmbH & Co. KG*

**The Blue River Recycling Ems GmbH & Co. KG has opted for a pelleting plant for alternative fuels from the internationally renowned machine and plant manufacturer AMANDUS KAHL in order to save fossil resources by producing alternative fuels through recycling.**

The conservation of fossil fuels has been a main concern of politics and economy for several years. And yet in the past 50 years, more dead organic matter has been used for energy production than ever before. In recent years, energy-intensive industries, especially the cement industry, have shown an increasing interest in substituting fossil fuels by the systematic use of alternative fuels.

In order to boost their activities in the field of alternative fuels, the companies MVW Lechtenberg & Partner and Nehlsen AG have joined forces in a project company with the purpose of setting up a new pelleting plant for alternative fuels in Papenburg. Their aim: the production of hard pellets from different RDF fractions.

The German machine and plant construction company AMANDUS KAHL is up to the challenges in the planning, design and construction of such a plant. With its company history of more than 140 years, it can boast a vast experience in the field of recycling. With the flagship product of the company, the sturdy flat die pellet mill, high-quality pellets can be produced in the German plant. It is no coincidence that MVW Lechtenberg & Partner and Nehlsen AG have chosen a plant from AMANDUS KAHL.

## How the Plastic and Paper Mixture is Obtained

In the port of Papenburg, mixed plastics and paper waste from sorting plants destined to be used as alternative fuels have been handled for several years. So far, they have been loaded onto ships in bales and shipped to various customers. The joint project of building a production site directly at the port was prompted by the increased demand for pelletised fuels. The plant with four flat die pellet mills type 45-1250 is designed for a throughput capacity of about 12 t/h. An annual throughput capacity of 75,000 t of pellets with a bulk density of approx. 600 kg/m<sup>3</sup> is aimed at.

The plastic mixtures mainly consist of fractions, which include used and typical packaging plastics made of PP, PE, PS and PET including potential by-products such as caps or labels. The paper fraction comprises used papers, cardboard or cartons that are delivered completely empty.

## The Internationally Renowned AMANDUS KAHL GmbH & Co. KG. Provides the Pelleting Plant

The conditioning of the delivered waste fractions consists of shredding them to a particle size < 20 mm and of downstream screening and metal and impurity separation. Subsequently, the screened material is thermally dried to a residual moisture of < 10 %. The required heat is supplied by a combined heat and power plant that also supplies the entire plant with electrical energy.

After drying, the prepared input material is fed into the pelleting plant. By means of belt conveyors and a central trough chain conveyor, the dried material is transported to the pellet mills "in overflow". This ensures a sufficient product supply for all four pellet mills at any time. Excess input material is taken up by a proportioning bunker and returned into the feeding system.

The four KAHL flat die pellet mills type 45-1250 are fed by means of individual proportioning units, each consisting of a frequency-controlled proportioning wheel and a horizontal proportioning screw. The material is fed into the press in free fall and without deflectors or forced feeding, thus trouble-free product supply is ensured, especially in case of voluminous, inhomogeneous products.

## A Production Site for Alternative Fuels is Built in Papenburg



The flat die pellet mills have a die diameter of 1250 mm with a die perforation of 16 mm. The large pelleting chamber of the flat die pellet mill ensures an optimum feeding of the material to the rotating pan grinder rollers. Each pellet mill is equipped with an individual proportioning

system so that the optimum quantity of material is fed into the machine. Due to the low speed of the flat die pellet mill and the resulting low circumferential speed of the pan grinder rollers, the product can be optimally deaerated during the pelleting process and pressed into the holes

of the die. This also significantly increases the service life of the bearings, and the smooth, low-vibration press operation significantly reduces the noise emission of the press. The hydraulic system of the press with automatic roller gap monitoring and adjustment ensures

optimum process control and product quality by automatically adjusting the process pressure and the thickness of the material layer on the die to possible product fluctuations during operation. The automatic central lubricating system of the roller bearings adds to the reduced maintenance requirements of the machines and thus increases their availability. Thanks to their robust design, the pellet mills are insensitive to the effects of impurities, which often occur in inhomogeneous waste fractions. The design of the machine and the easy access to the pelleting elements ensure a quick replacement of rollers and dies, which also improves the availability of the plant.

After pelleting, the hot pellets are cooled and stabilized in a counter-current cooler using ambient air. Possible fines are separated via a downstream screening system before the pellets are conveyed to the storage facility for finished products upstream of the ship-loading unit.

### **The Company History of AMANDUS KAHL – High Performance Made in Germany Ensures Expert RDF Pelleting**

Alternative fuels derived from the recycling of waste and recyclable fractions are among the materials which are the most difficult to process. Depending on the season and the regions they originate from, fractions of municipal waste differ in terms of composition, size or initial moisture content. The plant planned by MVW



# A Production Site for Alternative Fuels is Built in Papenburg

Lechtenberg & Partner and Nehlsen AG provides ideal conditions for the pelleting of plastic waste and paper waste for the production of alternative fuels as these materials are cleaned and conditioned and fed into the KAHL flat die pellet mills at a defined ratio.

Unsorted plastics are, for example, plastic waste from domestic waste (DSD), plastic waste mixed with paper and aluminium (e.g. beverage cartons) or carpet waste with a mixture of plastics in combination with other substances. Industrial and packaging waste is also mixed waste. Compared to municipal waste, however, it is generally dry and much more homogeneous. In most cases, recycling of these high-volume material mixtures is problematic in terms of storage, transport and bulk density.

Pelleting offers the ideal solution for more economical storage and transport as well as a defined bulk density. As a specialist in the design and manufacture of machines and plants for pelleting municipal and industrial waste, AMANDUS KAHL looks back on decades of know-how:

Since the early 1980s, AMANDUS KAHL has been supplying flat die pellet mills for the processing of pre-sorted and pre-conditioned waste fractions with the aim of converting this waste into alternative fuels of different qualities. KAHL flat die pellet mills are used for the pelleting of

- light fraction of domestic waste with a high calorific value from mechanical-physical sorting plants
- sorted mixed construction waste
- paper and cardboard waste
- different mixed plastics
- waste of the German waste management system DSD (Duales System Deutschland)
- different fractions from the mechanical-biological treatment of waste fractions
- commercial and industrial waste
- rejects from the recycling of waste paper
- carpet waste and
- cellulose and plastic fractions from the recycling of nappy waste

Depending on the origin and, above all, the calorific value of the respective waste fraction, various applications for the different alternative fuels have developed over the years. In the cement and lime industry, the main demand is for blowable, i.e. only slightly compacted, homogeneously crushed alternative fuels which can be injected pneumatically through the burner lances of the rotary kilns and burn without residue when passing through the kiln. Higher compacted soft pellets are used, for example, in fluidised bed furnaces, where the specific compaction can prevent the fuel from being discharged from the fluidised bed. Highly compacted hard pellets are used in grate furnaces or gasification plants, where a certain degree of

thermal stability is required in the gasification reactors to enable stable reaction processes.

In 1999, for example, a KAHL pelleting plant with 8 pellet mills type 39-1000 for the production of 20 t/h hard pellets from different waste fractions was erected at the secondary raw materials recycling centre (Sekundärrohstoff-Verwertungs-Zentrum "SVZ") in Schwarze Pumpe. The pellets were used as input product for a reactor for methanol synthesis. Further plants for the production of hard pellets for methanol synthesis followed shortly afterwards – among others in Dresden with 4 pellet mills for the processing of dry stabilate (Trockenstabilat®) from municipal waste of the city, as well as in Berlin with 2 plants equipped with 6 pellet mills each. In the meantime, more than 100 AMANDUS KAHL flat die pellet mills are in operation worldwide in pelleting plants for the processing of various types of waste. Apart from Germany, they are also used in the Netherlands, Belgium, France, Spain, Portugal, Italy, Bulgaria, Poland, Canada, the USA, Israel and Japan.

Thanks to the high flexibility of the KAHL pellet mills, products of different degrees of compaction can be produced with little effort just by changing the flat dies. Larger pelleting plants with several parallel pelleting lines can be designed in such a way that e.g. slightly compacted fluff and hard pellets can be produced

simultaneously or in shifts in parallel operation of the lines to serve different customers.

## Technical Features You Can Rely On

AMANDUS KAHL supplies the latest technical know-how and finds the right solution together with customers from different industries. The owner-managed company, based in Reinbek, Northern Germany, looks back on more than 140 years of existence and has developed a unique selling point on the international economic market with its flat die presses. The machine range also includes pan grinder mills for energy-efficient crushing of wood, expanders, extruders, crushing roller mills, proportioning and mixing units and much more.

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# Blue River Recycling Ems: UPDATE



*Figure 1: Ceremonial laying of the foundation stone at the Blue River Recycling Ems plant.*

Three exciting months have passed at the new Blue River Recycling Ems plant. Our new team members, Konstantin Schwabauer as Plant Manager, and Timo Ruhnke as Technical Project Manager, are in the process of finalizing the erection by the end of February 2021.

## Groundbreaking Ceremony

On Monday, 23<sup>rd</sup> of October, the ceremonial laying of the foundation stone took place in Papenburg, in a small group and in compliance with Covid-19 guidelines.

In the photo above, you can see (left to right): Dirk Peter, Member of the Board at Nehlsen, Dirk Lechtenberg, Managing Director at MVW Lechtenberg & Partner and Blue River Recycling, Holger Wedemann, Managing Director of BERA port terminal and the new Blue River Recycling Ems plant, and shareholder Gerd Jans. The official ceremony marks the start of the “final sprint” - after years of planning, the plant is now in the final phase of its erection.

## Comet Impact

Shortly after the foundation works in most parts of the plant have been completed, the first machinery has been delivered in November. Amongst others, Lindner's Komet 2200 shredder arrived, which will ensure a high-quality and continuous output of a finely shredded basis for the pellet production.

Meanwhile, state of the art separation technologies were installed by Eggersmann Anlagenbau, who carry out the plant planning.

For more news and information about the projects, visit:

[www.blueriver-recycling.com](http://www.blueriver-recycling.com)



*Figure 2: Plant equipment arrives at the Blue River Recycling Ems plant.*

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## Lafarge orders A TEC RDF Flash Dryer for Mannersdorf Plant

Lafarge Zementwerke GmbH awarded A TEC the contract for the implementation of the Flash Dryer to be installed at its 1.1Mta Mannersdorf plant in Austria. The dryer will help the plant to reduce the moisture content of RDF for the kiln burner.

The A TEC Flash Dryer enables the use of various waste heat sources (including clinker cooler flue gas, bypass gas, preheater gas). The material is dosed to the hot gas flow in the flash dryer and transported with this gas flow, while the moisture is evaporated, to a cyclone and a subsequent filter where the fuel is separated from the gas flow and online fed to a kiln burner or a satellite burner. In addition to the drying the lifting effect of the gas can separate 3D impurities which contributes in a further increase of the fuel quality, according to A TEC.

A TEC was nominated earlier with the engineering and supply of key

equipment and has now added the supply of all structural steel, residual ductwork and mechanical erection works to this.

The project is scheduled for completion by the end of the 1Q21.

*Source: CemNet.com: "Lafarge Zementwerke orders A TEC Flash Dryer for Mannersdorf". Retrieved 24 November from <https://www.cemnet.com/News/story/169917/lafarge-zementwerke-orders-a-tec-flash-dryer-for-mannersdorf.html>*

## Votorantim Announces 2030 Sustainability Commitments

Votorantim Cimentos, an international building materials, mining and solutions company, announced its 2030 Sustainability Commitments. To meet the new needs of society, the commitments are aligned with the UN Sustainable Development Goals (SDGs), a global agenda with 17 goals and 169 targets to be achieved by 2030. Votorantim's 2030 sustainability commitments are divided into seven pillars: ethics and integrity; health, safety and well-being; diversity and inclusion; innovation; environmental footprint; circular economy; and shared value.

The companies' goal is to reduce its CO2 emissions per tonne of cement to 520kg by 2030. Between 1990 and 2019, the company reduced its CO2 emissions per tonne of cement by 23%, from 763 kg to 591 kg. In the long run, the company is committed to developing and implementing technologies that will enable it to deliver

carbon-neutral concrete to society by 2050. Additionally, the emission of particulate matter, SO<sub>x</sub>, and NO<sub>x</sub> per tonne of product is planned to be reduced to 30g, 490g and 1400g/tonne of clinker, respectively.

Among the key levers that will enable the company to achieve the goal of reducing CO<sub>2</sub> emissions is co-processing —the substitution of fossil fuels in cement production kilns, especially for biomass and solid urban waste. By 2030, Votorantim aims to achieve a thermal substitution rate of 53%.

*Source: Votorantim Cimentos: "Our 2030 Sustainability Commitments". Retrieved 12 November 2020 from <http://www.votorantimcimentos.com/en-US/media-center/news/Pages/Our-2030-Sustainability-Commitments.aspx>*



## Rio Tinto, Geocycle Canada and Lafarge Canada Partner for Circular Economy Project

Rio Tinto, Geocycle Canada and Lafarge Canada are working together to reuse waste from the aluminium smelting process to make cement. In this circular economy initiative, the trio will reduce the need to extract other raw materials and create value from waste.

Geocycle Canada and Rio Tinto have developed a new product called Alextra, made from used potlining, as part of the aluminium electrolysis process that would otherwise go to landfill. Alextra is the result of years of research and development, aimed at finding new ways to deliver sustainable outcomes and value from used potlining.

Lafarge Canada will produce on average one million tonnes of cement a year at its facilities in Bath, Ontario, using Alextra as an alternative to raw materials such as alumina and silica, which are commonly refined or mined for use in the manufacturing of cement.

The companies will explore options to further expand the supply of Alextra

from Rio Tinto's Potlining Treatment Plant in Saguenay-Lac-St Jean to Lafarge Canada's network of cement plants.

Rio Tinto Aluminium manager valorisation and marketing Stéphane Poirier said: "This partnership shows how Rio Tinto is innovating to find new ways to reuse waste, generating value from our operations and reducing their environmental footprint. We have worked closely with Lafarge Canada and Geocycle Canada over the past two years to develop a product that meets their needs and look forward to building on this partnership."

*Source: Lafarge Canada: "Rio Tinto, Geocycle Canada and Lafarge Canada partner for circular economy project". Retrieved 9 November 2020 from <https://www.lafarge.ca/en/block-rich-text-rio-tinto-geocycle-canada-and-lafarge-canada-partner-circular-economy-project>*

## Cemex and Carbon Upcycling Use Nanotechnology to Produce Low Carbon Concrete

Cemex has signed an agreement with Canada-based Carbon Upcycling Technologies to "improve the processing of residue or by-products of industrial processes to produce nanomaterials." Carbon Upcycling Technologies' equipment increases the cementitious properties of residues such as fly ash and steel slag by physical processing them into nanomaterials and adding captured CO<sub>2</sub>, enabling the partnership to produce concrete additives with "greater reactivity and a lower carbon footprint" than their raw materials.

Cemex Ventures Head Gonzalo Galindo said, "This agreement with Carbon Upcycling Technologies is yet another example of our determination to deliver net-zero CO<sub>2</sub> concrete products globally by 2050. Our roadmap to achieve this global ambition involves continuing to innovate our technology internally while continuing to seek complementary innovation outside of Cemex through investments in start-ups, consortia, and high-value collaboration agreements

such as the one reached with Carbon Upcycling Technologies."

*Source: Business Insider: "Cemex and Carbon Upcycling Technologies plan reduced-CO<sub>2</sub> concrete with nanotechnology". Retrieved 9 November 2020 from <https://markets.businessinsider.com/commodities/news/cemex-and-carbon-upcycling-technologies-plan-reduced-co2-concrete-with-nanotechnology-9469299>*

## Cemex Partners With Synhelion To Use Solar Energy

CEMEX and Synhelion SA announced today that they developed a technology designed to fully decarbonize the cement manufacturing process based on solar energy. This advancement is an important element of CEMEX's current Climate Action strategy. Synhelion, based in Switzerland, is a global pioneer in the field of sustainable solar fuels and process heat.

The radically new approach is based on replacing the use of fossil fuels in cement plants with high-temperature solar heat, and capturing 100 percent of the carbon emissions, which are then utilized as feedstock for fuel production, enabling cement manufacturing to achieve net-zero level. This is made possible by the unprecedented temperature levels of solar heat provided by Synhelion's technology and its pioneering process to turn CO<sub>2</sub> into synthetic drop-in fuels, such as kerosene, diesel, and gasoline.

Following the research collaboration completed in spring 2020, CEMEX and Synhelion plan to adopt

a staged approach towards implementing the technology. A pilot installation is expected to be incorporated into an existing CEMEX cement plant by the end of 2022 and gradually extended to a fully solar-driven plant.

"Our solar receiver demonstrably provides process heat at unparalleled temperatures beyond 1'500°C, and offers a clean alternative to burning fossil fuels," said Gianluca Ambrosetti, CEO of Synhelion. "The CO<sub>2</sub> emissions from the cement manufacturing mix with the heat transfer fluid for our solar receiver and are integrated into the process. As we are working in a closed-loop system, the CO<sub>2</sub> emissions can be easily extracted. We then close the carbon cycle by using CO<sub>2</sub> to produce fuels."

*Source: Synhelion: "CEMEX looks to use the sun to decarbonize cement". Retrieved 12 November 2020 from <https://synhelion.com/about/news/cemex-looks-to-use-the-sun-to-decarbonize-cement>*

## Lafarge Africa Plc is investing 7.3 million swiss francs

Lafarge Africa Plc is investing 7.3 million swiss francs to modernize production facilities at its Ewekoro plant. This is part of ongoing efforts to build on its current credential as an environmentally friendly and sustainable company while maintaining a drive for strong financial performance in a tough year.

Sales for the three months up to September 2020 was N59.3 billion, up from N56.9 billion in the second quarter, but still lower than the N63.3 billion recorded in the first quarter of 2020, before the Covid-19 pandemic affected the economy.

However, while striving to deliver a decent financial performance, the Country Chief Executive Officer, Khaled El Dokani, emphasized that the company will continue to set a main focus on environmental leadership in Nigeria.

The company sees an increasing use of alternative fuels, such as biomass, oil palm and rice husks.

El Dokani said that alternative fuels currently account for up to 40 % of fuel used to power its Ewekoro plant and the company's target is to have all plants operating on at least 35 % alternative fuels by 2023. This transition also offers significant financial benefits." Based on the current price of gas and coal, the upgrade of our plants (to use alternative fuel) could lead to a 30 % reduction in our fuel cost".

*Source: Nairametrics: "Lafarge Africa redoubles environmental commitment amid rebound sales". Retrieved 11 November 2020 from <https://nairametrics.com/2020/11/02/lafarge-africa-redoubles-environmental-commitment-amid-rebound-in-sales/>*

## Holcim and Human Nature Partner for Sustainable Management of Plastic Wastes

Leading building solutions provider Holcim Philippines, Inc. and natural personal care and home care social enterprise brand Human Nature have agreed to partner in sustainable waste management with the former using the latter's used plastic packaging as alternative fuel in cement manufacturing.

Under the partnership, customers may turn over their dry, empty, and clean Human Nature bottles to the company's select Metro Manila stores\* under its "Balik Bote" initiative. The used bottles will then be delivered to Holcim's plant in Norzagaray, Bulacan, where the materials will be shredded by Geocycle, the company's partner waste management unit. Afterwards, the pre-processed materials will be used as alternative fuels and raw materials for cement manufacturing using co-processing technology.

In 2019, Holcim Philippines pre-processed as alternative fuel the segregated wastes of several local governments near its plants in Luzon and Mindanao and expressed readiness to help more communities on this matter. The

company has also co-processed tens of thousand tons of non-recyclable plastics as it continues to provide waste management services to partners in various industries.

Geocycle Vice President Frederic Vallat: "We are proud to be a partner of Human Nature, a company that is serious in its commitment to have a positive social impact and be respectful of nature. We share the same commitments at Holcim Philippines and are glad to help in their efforts to address the waste management challenge in the country."

*Source: Holcim: "Holcim, Human Nature partner for sustainable management of plastic wastes". Retrieved 17 November from <https://www.holcim.ph/holcim-human-nature-partner-sustainable-management-plastic-wastes>*

## Republic Cement Celebrates Nestlé PH's 2nd Consecutive Month as Plastic Neutral

In August and September, Nestlé Philippines Inc. achieved plastic neutrality for two months in a row, in pursuit of greener and more sustainable operations.

The food and beverage manufacturer recovered 4,763 metric tonnes of plastic waste in those two months. This achievement comes less than a year after signing a landmark co-processing agreement with Republic Cement in December 2019.

Republic Cement has offered co-processing of waste since the early 2000s to both the private and the public sectors. Through co-processing, Republic Cement is able to use qualified plastics in the place of finite fossil fuels, among other alternative fuels such as rice husk, saw dust, and refuse-derived fuel.

"As long as it is deemed acceptable for co-processing and acceptable under the guidelines issued by the Department of Energy and Natural Resources (DENR) through DAO 2010-6, co-processing should be prioritized over other disposal methods that are more harmful to the environment in the long run," said Angela

Edralin-Valencia, Director of ecoloop, the alternative fuels and co-processing unit of Republic Cement.

Through co-processing, Nestlé has made a significant move toward ensuring that post-consumer plastic waste, such as sachets and other product packaging, do not end up in landfills or oceans. "We would like to sincerely thank Republic Cement for the big role that they have played in achieving this milestone. It is one of the many steps we are taking to reduce our plastic footprint. We are committed to stay the course toward a waste-free future. We look forward to the continuation of our partnership as Republic assists Nestlé Philippines in maintaining neutrality every month moving forward," said Nestlé Philippines Chairman and CEO, Kais Marzouki.

*Source: Page One Philippines: "Republic Cement Celebrates Nestlé PH's 2nd Consecutive Month As Plastic Neutral". Retrieved 3 November 2020 from <http://pageone.ph/republic-cement-celebrates-nestle-phs-2nd-consecutive-month-as-plastic-neutral/>*

## SMC to Increase Plastic Waste Co-Processing

San Miguel Corporation (SMC) is planning to buy bigger volumes of plastic wastes to fuel its cement manufacturing facilities as it ramps up efforts to help manage the country's solid wastes and create more livelihood opportunities during the pandemic.

This comes after a string of major sustainability efforts SMC has launched recently that include discontinuing its plastic bottled water business, building the country's first recycled plastics road, and spending 1 billion Philippine Pesos to rid major river systems of garbage.

Northern Cement Corporation (NCC), an affiliate of SMC, is capable of burning up to 1.5 million tonnes of plastic waste per year. It is targeting to reduce use of traditional fuel by up to 50 percent and substitute this with plastic wastes.

"Technology to safely convert plastic waste to energy has existed for a long time, in fact, Northern Cement has been using this on a smaller scale," SMC president and COO Ramon S. Ang said.

He added that, "Other major manufacturers, both locally and globally, have also been using this. It's a more environment-friendly and sustainable alternative to using traditional fuels."

The company's plan to expand and ramp up its use of plastic wastes for energy for NCC can now be implemented with the completion of its materials handling facility in Pangasinan.

*Source: Manila Times: "SMC buys up plastic waste to power cement facilities". Retrieved 2 November 2020 from <https://www.manilatimes.net/2020/11/01/public-square/smc-buys-up-plastic-waste-to-power-cement-facilities/789730/>*

## ThyssenKrupp to Modernize Secil Cement Plant

SECIL Group, a major Portuguese cement producer and provider of construction materials, has entrusted ThyssenKrupp Industrial Solutions S.A.S. (France) with the modernisation project of its Outão cement plant, one of the three cement plants operated by SECIL in Portugal.

The existing production line, established at the beginning of the 20th century, is located south of Lisbon on the peninsula of Setúbal. With an annual production capacity of around 2 million tonnes, it is one of the largest cement plants in Portugal. The Outão facility includes a private maritime quay that allows annual exports of almost 1.5 million t of cement and clinker by sea to more than 20 countries.

SECIL will implement the R&D Project 'CCL – Clean Cement Line' at its Outão cement works in Portugal. The CCL Project aims to bring the plant to the forefront of energy efficiency, low NOx and lowest CO2 emissions among the European cement producers. The CCL Project is partly funded by the Portugal 2020 Government incentives programme.

"This project marks a milestone for our Grey2Green initiative and is proof of the rising demand for green technologies in the cement industry", said Samir Abi

Ramia, CEO of thyssenkrupp Industrial Solutions France.

thyssenkrupp's scope consists of the modification of the existing rotary kiln and preheater tower, which includes several new developments to provide a highly customized solution to SECIL. The installation of a new AS-MSC calciner equipped with a prepol® SC-S calcining system will increase fuel flexibility and maximize the use of a wide range of alternative fuels, with a minimum substitution rate of 85%. A new polytrack® 7T/5-3R grate cooler, including a new cooler dedusting system, will replace the existing planetary cooler. These modifications will contribute to eliminate the dependence on fossil fuels and promote the development of low carbon clinker and cements.

SECIL expects that, with this investment, its plant will rank among the top 10% of the most efficient cement plants in Europe.

*Source: ThyssenKrupp: "thyssenkrupp to modernize SECIL cement plant in Portugal". Retrieved 14 October 2020 from <https://insights.thyssenkrupp-industrial-solutions.com/news/thyssenkrupp-to-modernize-secil-cement-plant-in-portugal/>*

## South Korea

### SungShin Cement to Employ Alternative Fuels in 2 Lines

SungShin Cement has ordered two FLSmidth HOTDISC combustion devices for its kiln lines 3 and 6. The first HOTDISC is expected to be commissioned in mid-2021 and the second at the end of 2021. After the recent installation at SsangYong's Yeongwool and Donghae plants this will be the third and fourth HOTDISC installations on the Korean peninsula.

The HOTDISC solution allows cement producers to substitute coal or other fossil fuels with a wide range of alternative fuels.

"With its degree of flexibility, the HOTDISC allows us to substitute coal, with a wide range of alternative fuels – refuse-derived fuel in our case," says Mr K R Cho, team manager of production technology at SungShin Cement. "As we turn waste into energy, the HOTDISC lowers our operating costs without compromising energy efficiency."

*Source: FLS Smidth: "Two FLSmidth HOTDISC's to replace coal at Sungshin Cement." Retrieved 10 November from <https://www.globenewswire.com/news-release/2020/11/10/2123467/0/en/Two-FLSmidth-HOTDISC-s-to-replace-coal-at-Sungshin-Cement.html>*

## United Arab Emirates

### Bee'ah to Supply Sharjah Cement Factory with Alternative Fuels

UAE waste recycling and sustainability giant, Bee'ah has signed a long-term contract with Sharjah Cement Factory for the supply of alternative fuel from Bee'ah's solid recovered fuel (SRF) plant, in line with the UAE's commitment to promote the use of cleaner fuels and protect the environment.

The agreement bolsters Bee'ah's efforts to achieve a zero waste-to-landfill target in Sharjah and will result in a reduction in the carbon footprint in the emirate. It involves the use of commercial and industrial waste as well as mixed household waste from Bee'ah's waste management complex to develop an even cleaner power source than refused derived fuel (RDF).

Bee'ah's supply of the fuel to Sharjah Cement Factory is powering the entity's cement factory and reducing the use of traditional fuels. At minimum, 73,000 tonnes will be provided each year. This is equivalent to 73,000 additional tonnes of waste being diverted from Sharjah landfills and being reused by the UAE's industries.

Sharjah Cement Factory's use of SRF from Bee'ah also complies with the UAE government's objectives to replace 10% of current fuel sources with alternative fuels produced by waste treatment to protect the environment and the health and well-being of the people in the UAE.

*Source: Construction Week: "Bee'ah and Sharjah Cement Factory sign alternative fuel contract". Retrieved 26 November 2020 from <https://www.constructionweekonline.com/business/269138-beeah-and-sharjah-cement-factory-sign-alternative-fuel-contract>*



## PCA Announces Carbon Neutrality Roadmap

The Portland Cement Association (PCA), the leading association representing cement manufacturers in the United States, recently announced an industry-wide ambition to reduce carbon emissions and further address the impacts of climate change. As PCA members continue to drive down the carbon intensity of their operations and products, PCA will develop a roadmap by the end of 2021 to facilitate its member companies achieving carbon neutrality across the concrete value chain by 2050.

According to the PCA, the roadmap will identify how to address the challenges that stand in the way of driving down emissions to achieve carbon neutrality, such as developing advanced technologies to

reduce energy consumption, and developing and adopting regulations to allow for such technologies.

Since 1990, the industry has reduced energy consumption by 35%, emissions intensity by 11% and company-led improvements have led to the increased use of alternative fuels, such as industrial by-products that otherwise would end up in landfills.

*Source: Portland Cement Association: "Portland Cement Association to Further Sustainability Goals by Creating Carbon Neutrality Roadmap for the Cement and Concrete Industry". Retrieved 17 November 2020 from <https://www.cement.org/newsroom/2020/11/17/>*

[portland-cement-association-to-further-sustainability-goals-by-creating-carbon-neutrality-roadmap-for-the-cement-and-concrete-industry](https://www.cement.org/newsroom/2020/11/17/portland-cement-association-to-further-sustainability-goals-by-creating-carbon-neutrality-roadmap-for-the-cement-and-concrete-industry)

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