Sustainability at SARIA: Current Practice and Future Challenge
| CONTENTS |
|----------------|--|
| **EDITORIAL**  | 3 |
| Editorial       |   |
| **A NEW GENERATION** | 4 |
| Facing Challenges with an Entrepreneurial Mindset | |
| **INTRODUCTION** | 6 |
| Doing Everything the "Eco" Way? | |
| **COMMENTARY**  | 9 |
| What is a Carbon Footprint? | |
| **ENVIRONMENTAL ISSUES** | 10 |
| Sustainable Biofuels Require Sustainable Policies | |
| **TECHNOLOGY**  | 12 |
| Advanced Technology Helps the Environment | |
| **INTERVIEW**   | 14 |
| Biogas – A European Challenge for the SARIA Group | |
| **IMPRESSIONS** | 18 |
| | |
| **SUSTAINABLE PRODUCTS** | |
| Putting Millions of Bacteria to Work | 20 |
| Sustainable Fuel Saves 400,000 Tonnes of CO₂ | 22 |
| DynAgro and DynaTer – Sustainable Alternatives to Mineral Fertilisers | 24 |
| Sustainable Production of Fishmeal and Fish Oil | 26 |
| Sustainable Fuels Help Conserve Fossil Resources | 28 |
| **VEHICLE MANAGEMENT** | 31 |
| Sophisticated Route Management | |
| **NEWS** | 32 |
| Expansion: ReFood UK | |
| Officially on Stream | 33 |
| Technical Conference in Cracow | 34 |
| Reiner Heck retires from business | 34 |
| Fishmeal Conference in Cuxhaven | 35 |
| VFC Opens New Administration Building | 35 |
The issue of sustainability has become increasingly important in recent years, impacting the political agenda on all sides. Trade associations and many social groups are becoming equally vocal in this area and advocating sustainable practices. Companies are also being more transparent about the sustainability of their commercial activities, although this is mainly focused on the environmental aspects of sustainability.

Due to the frequency with which the term is used and the variety of scenarios in which it occurs, we need to ensure that “sustainability” doesn’t just become a buzzword. It will also suffer if politicians encourage sustainability but then permit a legislative and regulatory framework that conveys precisely the opposite message. For example – and this directly affects our Group – it does not make sense for the EU Commission to hail biofuels from animal by-products as a second-generation, sustainable fuel of the future when this fuel cannot be used in a major EU member state, namely Germany. Care must also be taken to ensure that the debate about “sustainability” does not degenerate into a discussion about the best form of emissions certification or become a topic where external consultants are essential.

In the SARIA Group, there is a tradition of acting responsibly and thus sustainably. In particular, economics and ecology are not regarded as mutually exclusive. Conserving the environment by using by-products in the most efficient manner and adopting sustainable business management have formed key planks of various corporate activities for years. However, we also know that there is greater public awareness than ever of sustainability, especially with regard to the general issue of resource consumption together with the use of fossil fuels and associated emissions of harmful greenhouse gases. This is a challenge to which we must respond.

Producing biogas and quality fertilisers from organic waste, manufacturing high-quality biodiesel from waste material, optimising truck routes to reduce transport costs while at the same time cutting emissions and using animal by-products to generate energy as an alternative to fossil fuels are just some examples of SARIA’s wide range of activities in this area. We continually strive to improve the methods we deploy and seek new process technologies and possible uses for our products.

This issue of SARIAnews is entitled “Sustainability at SARIA: Current Practice and Future Challenge.” We hope the title encourages you to consider our Group’s many activities in this light, as well as the conditions under which we operate – which are not always easy.

We trust you will find our articles interesting.

Best wishes,

Dr. Kurt Stoffel
At the ordinary meeting of the Supervisory Board of the RETHMANN Group on 21 September 2009, Norbert Rethmann passed the position of Chairman of the Supervisory Board to his son, Dr. Martin Rethmann, marking a change of generation. At the same time as Norbert Rethmann – and with the special thanks of the family shareholders, the Supervisory Board members and the Management Board – Dr. Wolf-Albrecht Prautzsch and Heinrich Zölzer also stepped down from the Supervisory Board. The new Supervisory Board will be comprised of Dr. Martin Rethmann (Chairman), Dr. Peter Nölke (Deputy Chairman) and Georg Rethmann. All three joined the Supervisory Board in 1999 and this step fulfills the completion of a leadership transition at the family-owned company, simultaneously reducing the number of Supervisory Board members from six to three.

The Management Board of the RETHMANN Group remains unchanged, with Reinhard Lohmann continuing to serve as Chairman and CEO supported by Klemens and Ludger Rethmann.

The shareholders, Management Board and Supervisory Board of RETHMANN AG & Co. KG would like to thank Norbert Rethmann, Dr. Wolf-Albrecht Prautzsch and Heinrich Zölzer visiting a Polish plant in 2003.

Hand over to a new generation now complete within the Supervisory Board of the RETHMANN Group

At the Supervisory Board meeting of the RETHMANN AG & Co. KG on 21 September 2009, Norbert Rethmann passed on the position of Chairman of the Supervisory Board to his son, Dr. Martin Rethmann, marking a change in generation for the family owned company.

The current management team of the RETHMANN Group: (from left to right) Dr. Martin Rethmann (Chairman of the Supervisory Board) with Management Board members Ludger Rethmann, Reinhard Lohmann (Chairman) and Klemens Rethmann.

Facing Challenges with an Entrepreneurial Mindset

The Management Board and Supervisory Board in 1989: (from left to right, standing) Reinhard Lohmann, Norbert Rethmann and Dr. Hermann Niehues; (seated) Bernhard Heinemann, Dr. Ludwig Trippen and Heinrich Zölzer.
Zölzer for their longstanding dedication to the business. Heinrich Zölzer joined the Supervisory Board in 1989, while Dr. Prautzsch has been a member since 1993. By contributing their considerable experience and invaluable advice, both men have helped to nurture and shape the company.

Norbert Rethmann took the opportunity presented by the Supervisory Board meeting to once again stress that it has always been important to him to view the family-owned company as a whole. This includes amicably transferring ownership to the next generation, as well as handing over responsibility within the Supervisory Board and Management Board. He personally thanked departing Supervisory Board members Wolf-Albrecht Prautzsch and Heinrich Zölzer for their commitment over the years. “Both of them have played a major part in the company’s evolution for many years, demonstrating a very fair but not unthinking loyalty to the family shareholders and Management Board, which has ultimately formed the basis of the RETHMANN Group’s growth,” said the now Honorary Chairman of the Supervisory Board.

Norbert Rethmann and the entire Supervisory Board wish the company – and particularly the new Supervisory Board and members of the Management Board – continued success and sustainable growth, informed by the special responsibility owed to the many employees and to shareholders.

Representing the interests of the company and the industry: Norbert Rethmann taking part in a discussion session with former Foreign Minister of the Federal Republic of Germany Hans-Dietrich Genscher.

An important milestone in the company’s history: the Supervisory Board of the RETHMANN Group and guests at the meeting on 21 September 2009 (from right to left): Back row: Dr. Wolf-Albrecht Prautzsch, Georg Rethmann, Dr. Martin Rethmann, Ludger Rethmann, Dagmar Fouquet and Michael Rohkämper (both from auditing firm PWC). Front row: Heinrich Zölzer, Norbert Rethmann, Helmut Grimm as legal adviser, Reinhard Lohmann and Dr. Peter Nölke.
Doing Everything the "Eco" Way?

Sustainability is not just a trend at SARIA – it is a key element of our corporate philosophy.
Sustainability is the aim of and generic term for the entire discussion. But what is “sustainability”? The World Commission on Environment and Development (WCED) established by the United Nations defined the term “sustainable development” in its 1987 report entitled Our Common Future: “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” It was recognised that policy change would be required around the globe, with sustainability providing a model for the future development of society.

The basic idea is that you wouldn’t cut down more wood than the amount that it has to grow to replace it, because otherwise one day there will be no more wood. This is not a new concept, foresters in the early 18th century recognised this and were compelled to act on behalf of future generations. What was new, however, was applying this concept to other products, such as a shoe or a refrigerator, or to processes like administrative structures or logistics chains.

The definition of sustainability extends far beyond the environment and covers aspects such as:

a) Employees, e.g. their health, safety and vocational training
b) Responsible financial management
c) Impact on customers, associations, politics and neighbours
d) Resource management, e.g. maintaining machinery and buildings

Norbert Rethmann, along with the entire RETHMANN Group, identified, addressed and pursued these objectives from an early stage. The company’s successful development is testament to the soundness of this approach.

SARIA has been combining ecology and economics for many years and sustainability is a key plank of corporate activities. There have been reports on many such projects in previous issues of SARIAnews.

For sustainability to describe what impact a process has on the environment, factors such as water consumption, logistics costs, land use, emissions, etc. need to be calculated.

"There is a tradition of acting responsibly at SARIA. We have been committed to sustainability for many years, basing our actions on both ecological and economic principles."

Dr. Kurt Stoffel, Chairman of the Management Board of the SARIA Group
not just straightforward energy costs (heat and electricity). The result of this life cycle analysis is a kind of ecological balance sheet. A systematic analysis of the environmental impact of products from the start to finish of their life cycle ("from cradle to grave"), including such factors as a product’s contribution to the greenhouse effect, acid rain or the hole in the ozone layer.

In terms of environmental impact. They do not cover social issues such as monocultures in agriculture, child labour or fair trade. Equally, they are not health indicators. For example, soft drinks made from sugar and water will certainly have a smaller carbon footprint than milk!

Another term often now encountered in this context is emissions trading. This is based on the Kyoto Protocol of 1997, which obliged the majority of industrialised nations, including all EU member states, to control their climate-damaging emissions. The EU has committed to reducing emissions by 8% by 2012. At present, only the energy sector is affected, which accounts for approximately 40% of CO₂ emissions. From 2012, this regime will also be extended to the aviation sector in the EU. In addition to CO₂, emissions trading includes five other gases which are detrimental to climate, such as methane, nitrous oxide and CFCs (which were previously used in refrigerators and hairsprays). With emissions trading, every year fewer emissions certificates permitting CO₂ emissions will be issued in order to achieve a gradual reduction. Emissions trading is thus an instrument which has already forced one of the biggest emitters of greenhouse gases, the energy sector, to cut its CO₂ emissions.

SARIA is dedicating this issue of its newspaper to sustainability in relation to different factors that impact the environment. The aim is to show that protecting the environment and sustainable business management are key pillars of our corporate activities.

• dr. martin alm
The carbon footprint that arises from collecting and processing animal by-products can be calculated and is a known quantity. It varies depending on the catchment area, processing systems, utilisation of capacity, etc. Upstream activity, that is the actual production of animal by-products, is not relevant here because such products are not created for this specific purpose. As by-products, they are similar to waste and no carbon emissions need to be assigned to them.

Based on this approach, it is possible to calculate the carbon footprint of SARIA products.

American processors of animal by-products have also performed this calculation, at the same time asking "What if we didn’t exist?" If that were the case, animal by-products would be dumped or buried. Although apparently natural, oddly enough this way of recirculating biological products in the biosphere is even more detrimental to the environment than incineration because the organic matter decomposes in the absence of oxygen. This not only releases CO\textsubscript{2} but also approximately twice the amount of methane. Methane has 21 times more global warming potential than CO\textsubscript{2}. Then there are gaseous nitrogen compounds (ammonia and nitrous oxide): nitrous oxide is 298 times more potent as a greenhouse gas than CO\textsubscript{2}.

The natural rotting process is thus 13 times more climate-damaging than controlled incineration. If the incineration process is not controlled, if the fire is open for example, then large quantities of soot are released. Apart from the fact that this soot is toxic, it absorbs the sun’s radiation and releases it back into the atmosphere. This subsequently contributes to indirect global warming.

As the above remarks show, although the collection and processing of animal by-products consumes energy, not collecting and not processing this material would be even more harmful to the environment. Avoiding unregulated disposal is therefore one of the best ways to take action on climate change. Processors of animal by-products are thus making a positive contribution in the battle against global warming.

**dc martin alm**
Sustainable Biofuels Require Sustainable Policies

The time is now: European politicians need to act

A critical commentary on the sustainability of environmental legislation in one EU member state
Biofuels should only be used if they have been produced in a sustainable way – this was the intention of the German parliament when it enacted an Ordinance on Requirements Pertaining to Sustainable Production of Biofuels (Biokraft-NachV). Parliament is right: only sustainable action will be successful in the long term.

Biofuels reduce our dependence on imported mineral oil and helps to decrease harmful emissions, making it a key tool in the fight against climate change. At the same time, expanding biofuel production presents a major opportunity to create jobs, use waste materials efficiently and open up new markets for the agricultural sector.

This was the explicit view taken by the German government when it brought in legislation in 2002 to make biofuels completely tax-exempt until 31 December 2009. At that time, the government announced that greater production capacity for biofuels was desirable, with tax-exempt status providing the impetus that would make this objective a reality.

Businesses heeded the message and invested, including SARIA. The Group’s existing biodiesel activities, launched on a small scale in 2001, were considerably expanded. Planning on the basis of government policy, production capacity was increased from 12,000 to 212,000 tonnes per year, involving an investment of some €60 million. The Group invested in highly innovative technology that is also suitable for processing animal fat and waste cooking oils.

The biodiesel project was driven forward with huge dedication and optimism, enabling two planned biodiesel facilities to commence operation in 2006. By 1 August 2006, however, the politicians decided to revoke tax exemption, which had originally been scheduled to run until at least the end of 2009, hardly a sign of sustainable policy. As a result, sales have suffered and there were decisions made which are unfavourable to the biofuel industry on issues that politicians had previously been so keen to promote. The consequences have been financial difficulties, short-time working and bankruptcies.

As if that were not enough to contend with, while scientists and EU politicians deemed the use of animal fats to produce biofuels particularly worthy of support as “second-generation biofuels”, the law in Germany will completely exclude biodiesel derived from animal fat from pro-biofuel measures as of 1 January 2012. Against this backdrop, the subsequent action taken by policymakers seems only too logical, with the biofuel quota scheme introduced in 2007 to compensate for loss of tax exemption being retroactively reduced in summer 2009.

This represents another breach of trust and a bitter setback in the battle against climate change. The latest policy change means that in 2009 alone more than one million additional tonnes of harmful fossil oil products will have found their way onto the German market than originally envisaged.

The damage done is far more wide-reaching. In the future, the government will find it more difficult to successfully put measures into place that influence business activity. The experience of recent years has shown that companies need to be very wary about political promises. New projects can only be tackled – if at all – subject to major caveats. Such a policy is far from sustainable.

What remains is the hope that policymakers in Germany and Europe will realise they must provide certainty and can only promote a policy if they are prepared to see it through – which would be fully in keeping with the principle of sustainability.

"Discussions about biofuels clearly demonstrate that policymakers talk the talk when it comes to sustainability, but don't walk the walk." Dr. Robert Figgener, Managing Director of ecoMotion
Sophisticated technology and environmental safeguards go hand in hand at SARIA. Technical innovation combined with modifications to production processes translates into fewer emissions and lower energy consumption.

Today, advanced technology is used at the various stages of processing animal by-products and organic waste. Typical steps include thermal treatment, sterilisation and drying, all of which are associated with high energy consumption. When you consider that some 75% of the required energy is used just to dry the raw materials, future energy prices could have a massive impact.

As well as manufacturing high-quality end products and intermediates, it is vitally necessary to increase energy efficiency by minimising the amount of primary energy consumed. This can be done by making greater use of derived energy and improving thermal efficiency of steam generation. The technical process of using energy derived from water vapour obtained during drying offers the most potential for saving energy.
By deploying advanced evaporation technology it is technically possible to save approximately 30% of the primary energy used in the drying process. The water vapour that results from drying is used in an evaporation facility to evaporate some of the water contained in the raw material in a vacuum. It is simultaneously possible to boost the drying facility’s output by around 25%. This technology is already being applied in two-stage evaporation facilities in Marl and Tulln, as well as in Mützel with a combination of disc dryers and evaporation technology. This arrangement of disc dryers and evaporation facilities is also being used at fishmeal plants and fat melting plants within the SARIA Group.

Another main focus of development work is enhancing the efficiency of the boiler plants used to generate steam. Process analytical testing carried out on boiler plants shows that there is significant potential to make energy savings by lowering the temperature of flue gas in the chimneys by approximately 50–70 degrees.

The approach implemented at the REMONDIS Lippewerk plant in Lünen, which integrates SecAnim and the power plant, is a unique, site-specific solution. In terms of energy, it is very economical to run the SecAnim processing facility because the crushed and sterilised raw material is used in the incineration process at the REMONDIS Lippewerk plant.

The following factors contribute to a favourable energy footprint:
- Co-incineration of heavily polluted exhaust air in the power plant
- Avoiding specific process steps:
  > Drying and defatting facility
  > Loading and unloading meal
  > Effluent treatment plant because no waste water arises
- Using the electricity and process steam generated at the REMONDIS Lippewerk plant in the SecAnim production process

Using derived energy minimises primary energy consumption and is one of many ways in which the SARIA Group is helping to reduce global CO₂ emissions.

**SecAnim’s integrated approach**

- **Lippewerk plant with SecAnim (left) and FBC power plant (centre)**

  - **Incoming raw materials**
  - **Crushing**
  - **Sterilisation**
  - **Defatting Meat waste**
  - **Energy production**
  - **Tank farm**
  - **Exhaust air**

  - **Lünen**
    - Acceptance/pre-treatment of animal waste, category 1 abattoir waste in accordance with EC regulation 1774/2002
    - Production of fuel from meat waste and animal fat

  - **Lippewerk power plant**
    - Using meat waste to generate energy
    - Production of steam energy and electricity

  - **Fluidised bed combustion facility**
  - **Turbine**
  - **Steam (6.5 bar)**
  - **Steam (4.5 bar)**
  - **Process steam (6.5 bar)**
  - **Electricity**

  - **Fluidised bed combustion**

*Remote emissions sensing by state environmental office in Lippspringe*
In 2005, the EU Commission asked EU member states to draw up national action plans on using biomass to generate energy. What developments have there been in relation to biogas in Germany?

**Thier:** The German federal government agreed on an integrated energy and climate change programme in August 2007, as well as a national biomass action plan (energy) in April 2009, thereby supporting the EU Commission’s goal. This biomass action plan is designed to expand bioenergy use in Germany in an efficient, sustainable manner.

Bioenergy already supplies just under 5% of primary energy needs in Germany. There is a corresponding reduction in the use of fossil fuels, plus a significant contribution to climate protection and the creation of considerable business value and jobs. The percentage is set to increase substantially by 2020.

When assessing future changes in the biogas market in Germany, it is important to make a distinction between biogas originating from the following:

- Organic waste not covered by the German Renewable Energy Sources Act (EEG), e.g. sludge
- Organic waste which is biomass as defined by the EEG, e.g. food and kitchen waste
- Renewable energy sources (RES), e.g. silo corn

I think that biogas not produced from EEG biomass or RES will continue to be an interesting “by-prod-
uct" of the actual disposal process, e.g. when arising in digestion tanks. However, there will be very few new capacities specially built which will result in an insignificant rise in the production of biogas in these areas.

Developments relating to biogas within the meaning of the EEG mainly depend on market conditions and in particular on alternative methods of disposing of or using biomass, e.g. incineration or composting. Prices for these alternative processes are currently falling, making it harder to create new capacity or to divert additional volumes from existing disposal channels or uses.

The future situation for RES biogas essentially depends on the price of alternatives and the feed-in tariff for supplying electricity or (in future) gas to the national grid. In Germany, biogas from renewable energy sources is currently being encouraged more strongly and, from an international perspective, production levels are above average. Therefore, a further rise in RES biogas production can be expected, at least in the medium term.

What is the situation in France with regard to biogas use?

Hurel: Unlike Germany, or even other European countries, biogas has hardly got off the ground yet in France. Energy policy is very different – in Germany, alternative energy sources emerged much sooner. In France there are less than 20 biogas facilities at present, whereas in Germany the official figure is approaching 4,500. The numbers speak for themselves.
France has a lot of catching up to do on many ecological issues. Following the Grenelle Environment Forum, the Sarkozy government is paving the way for lasting changes.” Jean-Louis Hurel

There is now obviously some catching up to do, given the previously sluggish pace of French environmental policy. Since the environment summit in Grenelle, the government under President Nicolas Sarkozy is advocating a radical shift in France’s eco-mentality, with the Grenelle 2 project promising substantial state support for recycling waste materials and especially organic waste.

In France, around 30% of household waste is organic matter but only 6% undergoes organic processing. There is therefore tremendous potential for growth in a situation where the following factors favour a significant increase in the processing of organic waste:

- The obligation arising from French legislation on waste and the Kyoto Protocol to reduce the amount of household waste that ends up in landfill and thus cut methane emissions
- Boosting the efficiency of soil recovery using organic substances to compensate for humus depletion on agricultural land, a widespread problem in some areas
- Increasing the proportion of renewable energy, which involves processing organic waste via methanation

Furthermore, a significant amount of communal waste (green waste, sludge, etc.) is made up of organic material. Algae deposits on the coast also fall into this category.

The governmental measures defined at Grenelle have created a legal framework for future developments in the biogas sector and kick-started numerous methanation projects in France.

The current situation in France, however, is that there are no incentives relating to food waste from restaurants and the catering trade, even though this is also organic waste material. I am convinced, though, that we will shortly see a fundamental change in this area.

What is your assessment of the way the biogas market is developing in Europe?

Hurel: It is obvious that biogas will progressively grow in importance both in Europe and worldwide for the following reasons:

1. The technology deployed is fully proven. There is now a considerable knowledge base and businesses active in this area are becoming increasingly professional and have more capacity for constructing plants.
2. In Europe, the European legal framework makes it clear that there will be stricter limits on sending organic waste to landfill and that in future other uses or incineration of such materials to generate energy will take precedence. Individual European nations are obviously approaching this mandatory requirement at different speeds and with different visions. As long as countries stipulate that these waste materials should be collected and processed separately, there is a good basis for growth in the biogas sector.
3. The debate about climate change and avoiding CO₂ emissions logically leads to a discussion of alternative energy sources. Natural biogas, particularly from organic waste, meets the needs of this kind of environmental policy in two ways: methane...
"For the SARIA Group, biogas generation is the best option for using organic waste while at the same time producing high-quality organic fertiliser."  

Franz-Bernhard Thier

is locked in, which protects the environment, and a fossil fuel is replaced by a renewable resource.

Thier: The extent to which the use of biomass takes off depends very much on economic conditions, such as movements in energy prices and the state of the markets for food and animal feed, as well as technological progress and levels of innovation among European businesses. Ultimately, individual governments can only set out a basic framework using the instruments available to them and provide incentives.

Which alternative uses do you see?

Thier: Now that converting biogas into electricity is state-of-the-art at decentralised combined heat and power plants, there is a new focus on using natural biogas and feeding it into the national gas supply. The first pilot projects have been implemented. The economic viability of this new use primarily depends on the level of the remuneration that operators receive. It is also crucial whether there are efficient options for using heat energy where biogas facilities are situated and what form policy will take in the future. At present there are calls to subsidise not just electricity generated from biogas but also biogas itself. It remains to be seen how this discussion pans out.

Hurel: In addition, ideas are being debated that involve liquefying biogas and using it to drive engines. Currently there is no legislation or fiscal policy in place to support this in terms of subsidies or tax exemption.

Is biogas production of interest to other countries in Europe?

Hurel: Biogas production is certainly an interesting proposition in other countries where the SARIA Group is active. Whether projects come to fruition hinges on criteria like subsidies/tax exemption and the availability of organic material in the relevant countries. The latter factor includes the cost of collecting and processing such waste.

Which organisational changes will be made if biogas continues to gain in importance?

Thier: For the SARIA Group, biogas generation remains the best option for using organic waste (not RES) while at the same time producing high-quality organic fertiliser. In conjunction with field trials, we have succeeded in creating and launching a premium NPK fertiliser under the DynAgro brand name which is proving increasingly popular in the agricultural sector.

Hurel: We are confident that using the organic waste available within the Group to produce biogas is right for SARIA, and we plan to continue down this path. Accordingly, we will be looking to adapt structures where necessary, rather than implementing wider organisational change.
State-of-the-art technology – the pump room at the biogas facility in Malchin, Germany

Disinfecting vehicles at the Artabra site in Spain

Aerial view of the SARIA site in Tulln, Austria

Building a new biogas facility at Benet in France

Bacteria at work – producing biogas
(Left) Patrick Coelenbier, sales director of SARIA France and President of SIFCO (EFPRA’s French member association), at a press conference.

Interested visitors at an open day in Malchin, Germany.

At this year’s conference of the European Fat Processors and Renderers Association (EFPRA), Dr. Martin Alm was elected as EFPRA’s new technical director.

The new administration building at VFC in Cuxhaven, Germany.

Production manager Dariusz Ziębliński in the control room in Gocza.
A start has been made: after a three-year ban on using certain materials in animal feed, a routine is gradually being established at our four German biogas facilities in Genthin, Schwallungen, Kogel and Malchin. Managers at the four ReFood biogas plants regularly share experiences, making it possible to increase gas and electricity production at all the facilities year-on-year. This year approximately 24 million cubic metres of biogas, 54,000 MW of electricity and 62,000 MW of heat will be generated. Other biogas projects in other countries where the SARIA Group is active are at the planning stage or are close to being implemented.

In the early years, the focus was on mastering the technology and ensuring the biological process was stable. This is directly related to technical and chemical conditions such as specific ranges for temperature and pH values, optimum nourishment and volumetric loading, as well as adhering to inhibitor thresholds.

At present less than 1% of the micro-organisms involved in the anaerobic digestion process are known. It is important when supplying the raw materials to ensure that the fermented substrate is as homogenous as possible, because the various strains of bacteria take considerable time to adapt to different conditions.
Since the quantities of substrate available for processing vary, small mono batches (e.g. fat separator content) can be accepted. Tailored trace element mixtures, which have a positive effect on the rate at which bacteria grow, optimise cell activity and increase methane concentration, have made it possible to achieve a considerable level of process stability.

Current objectives are to:
- Develop custom district heating arrangements for each site in order to boost added value
- Achieve cost savings by optimising the energy and heating needs of biogas and processing plants
- Ensure a stable supply of raw materials
- Optimise the quality of fermented residue by improving secondary fermentation and sieving techniques

Feeding the processed biogas into the national gas supply or selling crude biogas to gas distributors is currently being considered and discussed for the biogas facilities planned by ReFood, as well as for existing biogas facilities where no suitable district heating concept can be implemented.

"The ability to obtain sustainable energy from waste materials opens up massive potential for taking action against climate change in Europe."
Dr. Annelie Reiter, manager of the Schwallungen plant

In future, an increasing number of decentralised biogas plants will safeguard the supply of energy in Europe.
Sustainable Fuel Saves 400,000 Tonnes of CO₂

Biodiesel as an aid to future mobility

Filling up organically: ecological fuel for a cleaner future
Security of supply and combating climate change are the main drivers of energy policy. In the mobility sector, biofuels are the key to responding to these challenges.

Especially since Mexico’s tortilla crisis in early 2007, when the price of maize rocketed due to market scarcity, sustainability has become an important part of the biofuel debate. This includes the potential conflict of utilisation between food and fuel, the impact of growing more plants for energy purposes on ecosystems like the rainforest, safeguarding basic social standards when cultivating biomass in developing and emerging nations, as well as the potential of biofuels to reduce greenhouse gas emissions.

From mid-2007, efforts began at national and international levels to draw up a global certification system for sustainable biofuels. EU regulations promoting the use of energy from renewable sources became effective in May 2009. One of the objectives here is to increase the proportion of biofuels in the transport sector to 10% by 2020. The directive also introduces sustainability criteria for biofuels and confirms that biodiesel from plant oils or animal fat obtained from waste materials offers the best potential for cutting greenhouse gases.

Individual EU member states are implementing this directive via various national regulations. While the EU directive is clearly geared towards making the widest possible use of available biomass potential, legislation in Germany severely restricts the use of animal fat in biofuel production. Opinions differ, in some cases sharply, when it comes to the debate about the sustainability of biomass. However, one fact is recognised by all political camps and scientific bodies: utilising biogenic waste and by-products is highly sustainable and has deservedly been described as second-generation biomass use.

The SARIA Group has been producing second-generation biodiesel from animal by-products in Malchin, Germany, since 2001. SARIA subsidiary ecoMotion now has three biodiesel facilities with total annual capacity of 212,000 tonnes. If this capacity were to be fully utilised – which is not possible in the current climate – the biodiesel produced each year would replace fossil fuels and save nearly 400,000 tonnes of CO₂. This equates to the annual energy-related CO₂ emissions of 170,000 households or the annual CO₂ emissions produced by roughly the same number of cars.

The material required to produce biodiesel based on animal fats is readily available as by-products from the food processing industry. There is absolutely no question of any conflict between food and fuel when using this waste to generate energy. Biodiesel from ecoMotion contributes significantly to combating climate change and protecting resources, thereby fulfilling the key principles behind a truly sustainable energy policy.

Michael Weber
Agriculture turns its attention to organic fertilisers

Sustainability in general and sustainable crop production in particular involve both ecological and economic factors. The aim of sustainable activities is to ensure that future generations have the same opportunities as we do today. Use of fertilisers is unavoidable in the modern world for efficient agriculture and to feed the population. Until now fertilisers have been predominately mineral-based, whereas in the future, use of sustainable fertilisers for agricultural purposes will be virtually essential.

Sustainability is playing an increasingly important role in agriculture. Consumers and retailers are also questioning how the products they buy are produced. Sustainability assessments often focus on the fertilisers used. Clearly, forgoing the use of fertilisers entirely would not be sustainable because constant crop production depletes nutrients in the soil. This causes yields to decline, which in turn could lead to food shortages and malnutrition.

It is therefore vital to ensure that crops receive adequate nutrients. Having said that, fertilisers differ in terms of how sustainable they are.

All types of plants absorb nutrients from the soil and air via their roots and leaves. Phosphate and nitrogen play a fundamental role as they are an element of every plant cell. Mineral-based fertilisers and organic fertilisers both work by putting nutrients into the soil and thus making them available to plants to ensure healthy plant growth and optimum yields.

However, mineral fertilisers are manufactured synthetically, which involves complex processes and often high consumption of very limited resources. In agricultural applications, the processed plant nutrients are introduced into an existing ecological system from outside with the result that, over the long term, an excess arises in the system which is largely lost through air, water and the soil. The remaining nutrients stay in circulation, increasing nutrient pollution – even in ecosystems with low nutrient densities (moorland and bodies of water).

Organic fertilisers provide a genuinely ecological alternative and offer tremendous potential. In France, for example, more than ten million tonnes of mineral-based fertilisers were applied in 2008 but only 0.5 million tonnes of organic fertilisers.

DynAgro
DynAgro, an organic fertiliser produced during biogas generation, adds no nutrients to the environment because it is part of a closed loop system. This fertiliser only returns nutrients to the ecosystem that were previously extracted via harvested produce. No resources are consumed – in fact, producing...
DynAgro in biogas facilities actually generates resources in the form of energy. Both manufacturing and using DynAgro therefore makes an active contribution to countering global climate change.

**DynaTer**

DynaTer – an organic fertiliser based on meals obtained from processing animal by-products – is now being manufactured at several SARIA sites in France. It can be used either in granule form or as meal for general agricultural purposes (growing cereals or vegetables, in viticulture or for oleiferous plants). The organic farming sector, where mineral-based fertilisers are strictly avoided, has also recognised that DynaTer is a high-quality fertiliser.

**More eco-friendly than mineral fertilisers**

Production of DynaTer involves using animal by-products which as a rule derive from local sources, whereas the manufacture and transportation of mineral-based fertilisers consumes large quantities of fossil fuels (mineral oil and natural gas) and natural resources, especially phosphate. By contrast, biofuels are used to produce DynaTer. Erwan Oges, sales manager for the fertiliser segment in France, is passionate about his product: “an attractive alternative to mineral fertilisers, DynaTer is an organic fertiliser that meets the requirements of today’s partially industrialised agricultural sector and is also eminently suitable for farmers looking for a more eco-friendly fertiliser.” The concentration of nitrogen and phosphate elements in DynaTer facilitates its distribution across growing areas, thereby reducing tractor travel. What’s more, DynaTer does not affect the balance of the soil. This is particularly critical in organic farming, which is expected to treble in France between now and 2012. This increase in organic farming is one objective of the environment forum in Grenelle, where key policies were agreed to address environmental issues and sustainable development in France. There are similar legislative plans in other EU countries, meaning there will be a greater focus on sustainable fertilisers as an alternative to mineral-based fertilisers.

* dr. thomas leppin and jean-marie falhun

Farmers discussing DynAgro field tests; sustainable agriculture is the way forward
Sustainable Production of Fishmeal and Fish Oil

Overfishing of the seas calls for a rethink

Twenty years ago, responsible companies in the fish processing industry were already starting to think about fish as a resource. The size and age of the fish being caught was falling and continues to do so. Often the catch has not even reached sexual maturity. The fish population is endangered and there is urgent need for action.

To ensure that fish stocks do not fall below the biological minimum, fishing must operate along sustainable lines.

International fishing fleets take 120 million tonnes of fish from the water each year and research scientists around the world agree that this volume is much too high. Many researchers fear that overfishing the seas will deprive the fishing industry of its future. It is safe to assume that more than one-third of fish caught worldwide are processed into pet food, with aquaculture by far the biggest market.

These factors bring home how sustainable the production of fishmeal and fish oil are within the SARIA Group. The sites in Artabra, Concarneau and Cuxhaven produce high-quality fish oil and fishmeal by using fresh fish trimmings and scraps from the fish processing industry in an ecologically responsible manner. This ensures that no industrially caught fish are used specifically to produce fishmeal.

By processing fish by-products, the three SARIA sites exemplify a sustainable fisheries policy. Conserving resources by turning fish waste into sustainable products...
fishmeal and fish oil reflects the natural cycle and is therefore a responsible activity that makes environmental sense. Within the context of sustainability it is also helpful that associations and organisations specialising in marine research and fishing record fish stocks in the various oceans every year, and then define total annual quotas for individual species. These catch volumes are binding and strictly monitored.

Products are collected and processed separately, working closely with MSC certified plants within the fish processing industry. VFC is also a supplier to organic businesses because it meets the strict regulations and standards required for organic products in full. Poultry and pig fattening farms and partners in aquaculture benefit from high-quality feed sourced purely from organic by-products. Compliance can be guaranteed.

The Marine Stewardship Council (MSC) recognises and rewards sustainable fishing practices. Based on its standards, it is possible to trace a seafood catch back to a specific ship and a precise position and date.

As a processor of fish by-products, VFC in Cuxhaven is committed to enhancing the quality and sustainability of the seafood business and is a certified producer and distributor of MSC fishmeal and oil. MSC fish by-products are collected and processed separately, working closely with MSC certified plants within the fish processing industry. VFC is also a supplier to organic businesses because it meets the strict regulations and standards required for organic products in full. Poultry and pig fattening farms and partners in aquaculture benefit from high-quality feed sourced purely from organic by-products. Compliance can be guaranteed.

Due to the freshness of the fish waste collected, the quality products from VFC in Cuxhaven are exceptionally varied and suitable for a range of different applications:

- Fish oil
  For adding energy to feed in the pet food industry, aquaculture and as feed for pigs (especially for feeding sows and rearing piglets). Certain grades of oil are also used in technical applications in refineries and in the leather industry (tanneries, leather care).

- Fishmeal
  Popular as a source of protein in the pet food industry, in ornamental fish food, for organic feed in aquaculture and in pig feed. *bodo von holten*

"Bioceval produces fish oil and fishmeal exclusively by processing fish by-products and thus conserves natural resources."

Philippe Barreau, manager of the Concarneau facility

Aerial view of the Artabra site, which is located directly on Spain’s Atlantic coast
Many SARIA plants use animal fats as an alternative to fossil fuels such as fuel oil and natural gas. Meal which cannot be utilised for any other purpose is incinerated to provide a substitute fuel for power plants and the cement industry.

Burning animal fat and animal protein, especially from plants that process category 1 risk material, plays an essential role in animal waste disposal in line with the European Parliament’s Regulation 1774/2001. Incinerating animal material generates energy, which in turn reduces the use of fossil fuels like natural gas and fuel oil.

This conserves fossil fuel resources while at the same time cutting the cost of disposing of risk material, something that is currently a major financial factor for abattoirs, butchers and farmers.

Making use of animal fat at processing facilities plays a much bigger part in this respect than processing or incinerating protein at our own facilities.

Incineration of animal fat
A standard procedure for using animal fats within processing facilities was developed back in 2002.

Using animal fat internally significantly cuts the cost of handling, transporting and procuring external fuels (natural gas and fuel oil), while at the same time reducing traffic volumes.

When the animal fats are prepared, components that can lead to the emission of harmful pollutants are removed as far as possible. The relevant authorities have set thresholds for the various components of animal fat below which emissions are expected to be no different, or lower, than when using fuel oil. In some cases these thresholds vary from region to region, meaning that differ-
Different incineration methods are applied or used.

At present around two-thirds of the fat produced at category 1 plants are incinerated on-site. The remaining volume is used at other processing plants within the SARIA Group. SARIA deploys two different types of incineration. For flexibility, these are typically multifuel burners capable of using other fuels such as gas and fuel oil.

Burners featuring pressure atomisation which were originally used at 30 bar can now be operated at 10 bar. The key advantage here is that with the addition of steam, smaller drops enter the boiler and are incinerated more effectively.

In burners with rotary atomisation, the fat enters the boiler at 3–5 bar. The advantage of this system is the option of using fat with a slightly higher proportion of contamination because the technology is less sensitive. Deposits form in the boiler, which is a disadvantage that increases maintenance costs.

It is safe to say that over the past few years the efficiency of animal fat incineration has been significantly improved. In particular, the fact that average calorific values of different types of waste and fossil fuels

"Using animal by-products conserves fossil fuels while at the same time boosting the efficiency of processing plants."

Alfred Nettebrock, RTR Recyclat Tierischer Rohstoffe GmbH

![Average calorific values of different types of waste and fossil fuels](chart)
modern techniques enable the proportion of contamination in fat to be reduced to 0.15% helps boost incineration efficiency.

Today, 100% of the fats produced by the SARIA Group are used at our own facilities.

Incineration of animal meal
Incinerating animal protein, especially category 1 meal, is an efficient way of destroying potential risk material. Animal meal is delivered to power plants and cement works for use as a substitute material for generating primary energy. At power plants in particular, animal meal replaces lignite and coal. In the cement industry, category 1 meal primarily takes the place of lignite dust.

In contrast to the situation some years ago, burning animal meal no longer represents a technical challenge. Plants have been converted or equipped so that co-firing animal meal is not a problem. Previously, the suction system meant that animal meal was often regarded as a tricky substance because pipework would become clogged due to the high fat content. This is no longer an issue.

It is important to note that animal meal is obviously not produced specially to serve as fuel – it arises when processing risk material of animal origin and must be disposed of in compliance with legal regulations. Due to its energy content and attractive price compared to fossil fuels, cement works value the use of animal meal. Incineration temperatures of up to 2000°C guarantee total incineration and natural resources of gas and oil are not used as primary energy.

“Over the years, technology for incinerating animal meal has made great strides. Animal meal is now no longer a problematic substance, but one that offers greater energy security.” Alfred Nettebrock, RTR Recyclat Tierischer Rohstoffe GmbH
Sophisticated Route Management

Cost efficiency and sustainability in logistics

Transparent, flexible route management makes it possible to optimise vehicle deployment in terms of capacity and stops. Using advanced systems from the field of telematics and vehicle communications is also a way of reducing CO₂ emissions over the coming years.

Using IT systems, it is possible to plan individual truck routes effectively, taking into account factors like the truck’s capacity, driving hours, set-up time, customer restrictions (opening hours, agreed collection slots) and the road network (pedestrian zones, one-way streets).

Planning can either be dynamic or static. For both types, there are preset plans that take account of benefits such as the driver knowing the customer, the customer knowing the driver and the driver being familiar with the locality, etc. The controller at the local site is able to view the route geographically on the screen, making it easy to make changes. New customers can be integrated into existing routes more quickly and seasonal variations accounted for more effectively. The controller can also track the route live onscreen to monitor progress.

Transparent route planning helps avoid under-capacity journeys and unnecessary mileage, thereby lowering energy consumption and emissions.

It is not just optimising routes that achieve this – other projects and activities are also important. Using handheld devices enables jobs to be completed more quickly, which keeps vehicles moving. Orders received after the truck has left can be forwarded to the driver, who can also report back if the truck has no spare capacity, allowing the job to be passed to another truck in the vicinity.

Training drivers to be environmentally aware, in conjunction with vehicle manufacturers, enables them to adopt an energy-saving driving style which also saves on wear and tear. Driver induction programmes which show how to load trucks correctly also help to ensure the effectiveness of new drivers.

This kind of route management and driver training shows how efficiency and sustainability are closely related, even from a short-term perspective.

• gabi krüter
Expansion: ReFood UK

First ReFood project in Britain takes shape

Building on years of success in Germany, SARIA subsidiary ReFood is currently extending its concept of collecting and processing food waste to the UK market. A joint venture called ReFood UK has been formed with Prosper De Mulder (PDM). As the UK market leader in processing by-products from food production, PDM is the ideal partner for ReFood. Its market knowledge and existing production sites make it easier to tap into a new market.

Through their joint venture, the two companies are aiming to optimise the processing of food and kitchen waste in Britain in a sustainable way. The first major project for ReFood UK is to build a biogas facility in Doncaster at PDM’s headquarters. This plant will be one of the first facilities in the UK to process food waste on an industrial scale and convert it into bioenergy and fertiliser. In future, 45,000 tonnes of food waste will be used each year to generate up to 17.5 million kWh of electricity. In addition to supplying this energy to the national grid, the electricity and heat from the biogas facility can be used in PDM’s production process. This will conserve natural resources by using sustainably produced energy instead.

ReFood UK faces a mammoth task: statistical surveys point to approximately 20 million tonnes of organic waste! Much of this is currently disposed of in landfills via household waste. However, dumping organic substances in this way means a number of greenhouse gases are released into the atmosphere, not to mention the fact that a valuable source of energy is simply left to rot instead of being used. The UK is committed to taking action on climate change, and sending organic waste material to landfill sites is set to fall considerably in future, partly due to regulatory changes. In order to achieve these objectives, limits have been set on the volumes sent to landfill and a tax that increases each year has been introduced to discourage the disposal of organic material in landfill sites. By operating biogas facilities, ReFood UK can have a positive impact in two ways: by reducing the volume of organic waste pointlessly rotting in landfill and by generating bioenergy. The objectives for ReFood in the UK are clear: to offer as many customers as possible a high-quality service, to produce a large amount of bioenergy from waste and to help protect the environment. • Lorenz Boden
SARIA Subsidiaries ReFood and GERLICHER Expand Malchin Site

On 20 June 2009, the new buildings that ReFood have been constructing at the Malchin site over the past two years were put into service. In addition to the biogas plant, which commenced operation at the end of 2007, a staff welfare facility and admin block were built in 2008. The site was rounded off in 2009 with a new interim treatment plant for food waste and a shipment facility for oils and fats as part of GERLICHER, a ReFood subsidiary.

Every seat was taken in the festively decorated GERLICHER hall as Norbert Reithmann welcomed some 400 guests from Malchin along with Economics Minister for the state of Mecklenburg-Western Pomerania Jürgen Seidel, head of the district authority Siegfried Koniec and mayor of Malchin Jörg Lange.

After the welcome addresses, the opening tour began, starting with the new interim treatment plant where trucks are unloaded, containers are emptied and cleaned automatically and food waste is crushed by a hammer mill. Interested visitors were then shown the biogas facility and were amazed by its capacity. The electricity generated here is enough to supply 3,500 four-person households. Electricity is not just supplied to the local grid – it is also used to power production processes at the site.

Another product of the fermentation process is a residue that is in demand among neighbouring farmers in the form of DynAgro liquid fertiliser, which features a high nutrient content. Visitors were also able to find out about the environmentally friendly technique for applying this fermented residue. The tour included a presentation of various GERLICHER products.

GERLICHER has been part of the SARIA Group for just under two years and supplies the restaurant and catering trade and the food industry across Germany with high-quality frying oils and fats. Used oils are disposed of and then turned into a raw material for biodiesel production.

The 23 ReFood employees in Malchin are delighted to see their site being improved and appreciate the positive working conditions provided by the new plants. Their commitment will help to make these investments successful.

"Open day at ReFood in Malchin. That means environmental services that really deserve the name. Responsible use of resources combined with energy production and job creation." Jürgen Seidel, Economics Minister of the state of Mecklenburg-Western Pomerania, speaking at the official opening ceremony

The biogas plant in Malchin

- Processing capacity: 50,000 tonnes p.a.
- Fermenter volume: 2 x 3,500 m³
- Installed electricity output: 2 MW
- Installed heat output: 2 MW
- Annual production:
  - Electricity: 17,000,000 kWh
  - Heat: 17,000,000 kWh
  - DynAgro liquid fertiliser: 46,000 m³
Technical Conference in Cracow

International exchange of information

Chaired by Dr. Eberhard Schmidt of the SARIA Management Board, the technical directors of all plants in the SARIA Group met up at the end of October.

The aim of this conference, which is held once a year at different locations, is to discuss key current topics and thus improve the sharing of information at the international level. This year’s technical conference took place in Cracow on 22 and 23 October and was attended by 40 participants from Poland, Germany, France, Spain, Austria, the Czech Republic and Belarus.

Dr. Eberhard Schmidt reported on technical steps to save energy while Dr. Heinrich Linder spoke about the option of recycling phosphate from animal meal and ash. Other topics covered by speakers were improving fire safety measures and current guidelines for implementing projects to SARIA standards, followed by a presentation by Romain Guyon on reconfiguring the SIFDDA Plouvara site following fire damage. In addition, Bartoß Lange updated attendees on the status of ongoing projects in the host country Poland at the Gołcza and Przewrotne sites and at the planned biogas facility in Długi Borek.

Reiner Heck retires from business

The business relationship between Oskar Heck GmbH and RETHMANN TBA GMBH & Co. KG (as the predecessor of today’s SARIA Group) dates back more than 20 years.

Reiner Heck, son of company founder Oskar Heck, travelled regularly to various plants in Germany and France to collect skins and hides that had been removed before the animals were processed. The skins were preserved using salt and prepared for the leather industry in Alzenau, Germany, where Heck is based. One of the company’s main areas of focus was calfskin. High-quality shoes and bags are typical products made from such hides.

The relationship between Heck and SARIA evolved into a closer partnership, with the SARIA Group taking a stake in Oskar Heck GmbH. In 2008, the company Geb. Schnittger was added to SARIA’s skins and hides division and Heck in Alzenau became one of three Schnittger sites. As of 31 December 2009, Reiner Heck is retiring from business.

He will, however, continue to advise the SARIA Group in a consulting capacity.
Fishmeal Conference in Cuxhaven
Sharing information at a European industry event

There is a long tradition of producing fishmeal and fish oil in Cuxhaven – the first fishmeal factory here commenced production in 1912. Reason enough to host the European fishmeal conference in Cuxhaven this year.

In addition to presentations on various specialist topics, practical aspects in the form of two tours of facilities formed the focus of this year’s European fishmeal conference, which took place in Cuxhaven, Germany, on 21 and 22 September. A total of around 60 participants attended from Germany, Denmark, Iceland and the Faroe Islands to hear five speakers talk about new developments in the industry.

Attendees were particularly impressed by their visit to Köster Marine Proteins, a company that operates the biggest (230 metres long) and most advanced fishmeal terminal in Europe in Bremen.

The European fishmeal conference is held every two years in a different location and provides a good overview of highly specialised issues relating to the production of fishmeal and fish oil.

VFC Opens New Administration Building
13 offices and staff welfare facilities

VFC’s newly built administration and welfare building in Cuxhaven was opened at a ceremony attended by specially invited guests.

After just eight months of construction, the new administration building was officially opened on 24 September. The handsome brick building officially entered service in the presence of Cuxhaven’s mayor, representatives of the fisheries association and business development agency, suppliers and employees of the construction companies involved in the project. “This investment demonstrates our Group’s commitment to Cuxhaven. We intend to make further investments here over the next few years,” said VFC Managing Director Bodo von Holten and SARIA Management Board member Manfred Gellner, referring to their plans for future expansion.

“The existing administration building dates from the 1960s but operational procedures have changed considerably since that time. We are delighted to have a new, state-of-the-art working environment,” says Andreas Mrochen, who is responsible for sales at VFC.