

# biofuels

## international

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### **Future of biofuels**

**GIDARA Energy uses non-recyclable waste to fuel transportation**

### **Charting a course**

**Developing new high-performing biofuels**

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ENERGY

**Regional focus: Asia**



BDI outlines how its retrofitting expertise has proved a success in the biodiesel industry

# Eight steps to retrofit success

**A**s a customer-driven and market-focused technology provider in the field of biodiesel, Austrian company BDI has carried out more than 30 retrofit projects worldwide.

In terms of plant operation and installation, BDI understands retrofitting to be the improvement and optimisation of existing biodiesel installations, for example, with regard to feedstock flexibility, increase of production capacity and product quality, safety upgrades and other important needs of its customers.

## Retrofit projects

The first example dealt with a successful de-bottlenecking of an existing production plant. Although only a small project, this example revealed that sometimes simple new solutions can be found.

The design capacity of the plant had been exceeded on some occasions, but further increases were prevented by a single machine, thanks to the high level of expertise and experience of the plant staff. An upgrade to a bigger machine would have been too large an investment. During a plant inspection by BDI experts, the media streams leading to that machine were thoroughly evaluated.

It was discovered that by rerouting one particular media stream to another point of the process, the load on the machine could be reduced as a result.

This out-of-the-box idea was further developed and discussed together with the customer on site.

In the next phase, the customer executed some trials designed by BDI to figure out the influence of the intended rerouting on the performance of the machine and on the overall process. The results of the trials were checked and confirmed by analysis and recalculation of the mass balance.

Finally, the solution was implemented by installing new pipelines and additional process control changes. The retrofit resulted in more stable production over the design capacity, achieved with a significantly lower

investment compared to replacing a single machine.

## Plant modification

The second example concerns the modification of an existing biodiesel plant, which was running on waste-based oils, like used cooking oil.

The plant was increasingly struggling with long downtimes due to the degradation of equipment and blocked pipelines, valves and instruments.

This effect came gradually and at the time, had a big impact on the overall

production figures in terms of quantity and quality of the product and by-products.

With more than 25 years of experience in handling waste-based oils for the production of biodiesel and constant monitoring of different qualities of waste oils, BDI noticed that the quality of waste-based feedstock was declining. Therefore, the first approach was to focus on the feedstock quality, which the plant used for its operations.

With the help of laboratory tests developed by BDI, different raw materials from various feedstock suppliers were tested. In addition to these analyses, the settling behaviour was evaluated and the degree of solid impurities was determined.

The results confirmed that all raw materials used had excessive levels of impurities.

To make matters worse, due to the limitations of the feedstock market, it was not possible to change suppliers. For that reason, a solution had to be found to reduce the impurities upfront before entering the production line to avoid fouling and the loss of end-product quality.

Based on its extensive experience, BDI provided the concept of a fat pretreatment unit. Through this process, bad qualities of feedstock are treated by means of heating, washing with a washing agent, separation via centrifugation and final drying.

The customer decided to install this unit and the satisfying result of the retrofit was a robust and stable production mode, less down time and significantly better product quality.



Plant inspection being carried out. Credit: BDI-BioEnergy International

### Mixing systems

Retrofit inquiries can often arise at very short notice. The increasing uncertainty of the delivery of a central catalyst mix prompted one of BDI's customers to quickly opt for a mixing system for a potassium methylate catalyst mix system.

Due to the modular, skid mounted design, this retrofit was successfully implemented by BDI within a short time, thereby providing the customer with a safe plant design.

These examples show the wide range of retrofit tasks available in the biodiesel sector. Retrofitting always requires tailor-made solutions and BDI has developed an eight-step concept for retrofit projects that ensures that they are successful.

During the first contact with a potential customer, the special needs and requirements of the customer will be questioned and documented.

### Status evaluation

Once the customer's needs have been well understood, the first step in the retrofit programme is an on-site status evaluation of the current installation. This plant inspection usually lasts for two days and is executed by a senior process engineer to gain a good understanding of the current plant operation mode.

To develop possible improvements, it is important to ask the right questions and to use the experience and know-how of the operators working daily on the plant.

Based on the information provided during the plant inspection, the results are summarised in a report, including recommendations for short-term solutions and improvements.

Furthermore, the general approach for the proposed retrofit concept is described in detail, placing the focus

on interfaces, influence on existing production, and a rough cost estimation for the implementation of the concept. Sometimes several alternative solutions may be presented and discussed in detail with the customer.

### Preengineering

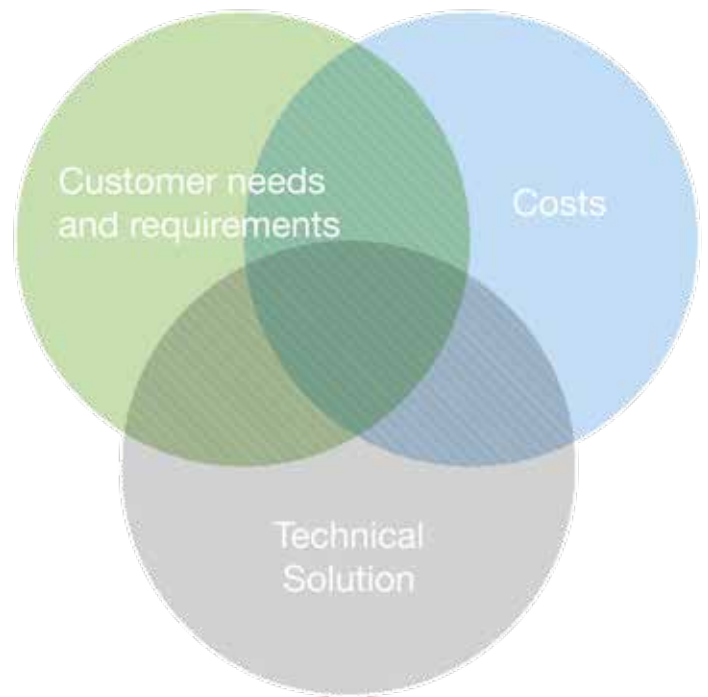
The next step is the pre-engineering execution for the most favourable concept that meets the customers' requirements. This involves a layout of the new units, the interface management and a mass and energy balance to identify open demands, for example, additional cooling capacity and to define the necessary measures to close the loop.

### Offer preparation

If the customer decides to advance further, the scope of supply will be defined in detail and an offer will be provided. This offer includes a detailed description of the customer's scope of supply to enable a precise planning of all necessary resources.



BDI's expertise lies in the biodiesel industry



The main driving factors for a successful retrofitting process

### Authorisation procedure

Additionally, during the pre-engineering and offer preparation stages, the customer will need technical data including a risk assessment study to be well prepared for the authority procedure; this will be provided during the fourth step of BDI's retrofit programme.

### Engineering and delivery, implementation and commissioning

In the course of the project execution, BDI carries out the full engineering and purchasing, which will be coordinated by a nominated project manager, keeping the timeline of the project brief and effective.

An efficient process planning for the installation time and a technical on-site support during the construction is necessary to keep the downtime of the regular operation to a minimum. After finishing the installation, the commissioning is initiated by carrying out the functional plant testing and start-up of the new process part, in combination with

the existing plant units.

This is followed by the optimisation of the plant parameters and stabilisation of the processes with the plant personnel and training them on the new units.

### Customer service

When the commissioning and the retrofit project is completed, the final step involves extending BDI's support to the entire life of the new process unit. There is a wide range of services like spare part delivery, 24 hour hotline or production support, which can be provided by BDI's customer services department.

For a successful retrofit project it is important to consider three main driving factors - customer's needs and requirements, the costs of the project and a suitable technical solution. A retrofit project will be a successful if the intersection of these three factors is as large as possible. ●

### For more information:

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