



Biogas Landfill Gas **The Product: Innovation.**
Sewage Gas Weak Gases Plant Oils Biogas
Landfill Gas **The Principle: Service.** Weak Gases
Plant Oils Biogas Sewage Gas Weak Gases
The Name: Schnell. Landfill Gas Plant Oils





The Company Extensive experience Innovative technology Market leader Meeting requirements Promoting growth **The Expansion** Securing availability and quality **The Dual Fuel Engine** Proven diesel principle + innovative injection system = unbeatable technological performance **The Fuel Injection Technology** Electronic control systems optimise engine processes Increased yield Coordinated components **The Product** Most cost-effective solution Experience Expertise **The Services** and service: outstanding Satisfied customers **The References** A strong basis for further development **The Perspectives** Managing efficiency On course for future success!

The Company

Extensive experience. Innovative technology. Market leader!

Biogas is developing dynamically. We have been at the forefront of this development since the early 1990s. Back then, SCHNELL was already an established name in the biogas industry. Today, we are the market leader in producing dual fuel CHPs for biogas plants.

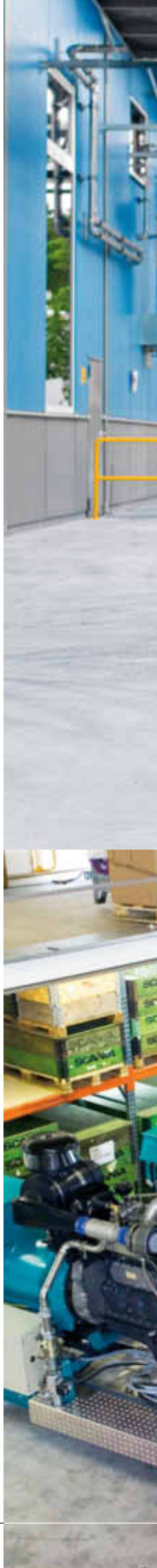
Our customers benefit from our many years of practical experience in the planning and construction of complete plants. We are uncompromising when it comes to the following:

- highest machine efficiency
- individual concepts for agricultural plants
- energy-optimised combined heat and power
- technological quality and development
- customer-orientated service "without ifs and buts"

Competence you can rely on

We are available seven days a week for our customers, both in our modern facilities in Amtzell (Allgäu) and also in our national and international service subsidiaries. Our workforce of over 280 employees is ready to help you with development, production and consulting. Their aim is to help you achieve your goals and meet your challenges, within a strong partnership.

The best proof of our reliability and technological competence is provided by over 2,500 units delivered to date. Their electrical power ranges from 40 kW to 1.6 MW. In whatever area, whether biogas, landfill or sewage gas, or another weak gas – together we'll find a solution!







The Expansion

Meeting requirements. Promoting growth. Securing availability and quality.

Meeting the requirements of our customers has always been our main focus. The demand for SCHNELL dual fuel engines has increased worldwide. To meet both of these needs, we have significantly expanded our production and service capacities at many of our sites. With storage, production and office space now totalling over 16,000 m², our state-of-the-art facilities ensure optimum conditions. This allows us to work to the highest standards in production and service! Eight SCHNELL aggregate test stands for production guarantee optimal final quality production controls for up to 40 modules per week. With over 10 % of the total workforce, high qualifications, state-of-the-art measuring technology and eight test stands operating under realistic conditions, our development department is ready to meet the future.

| Thinking ahead: further training

On-going training is also a key focus at SCHNELL. Our SCHNELL Academy specialises in further training, offering a wide range of courses targeted at our customers, sales and service partners and, of course, our own teams.



The Dual Fuel Engine Proven diesel principle + innovative injection system = unbeatable technological performance.

The dual fuel engine is based on the diesel principle. For more than a hundred years the diesel engine has established itself as the most efficient and economic engine. It shares many physical advantages with the dual fuel engine.

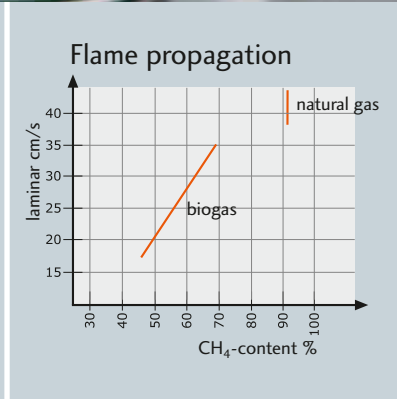
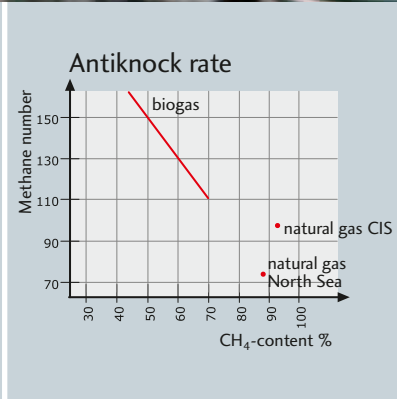
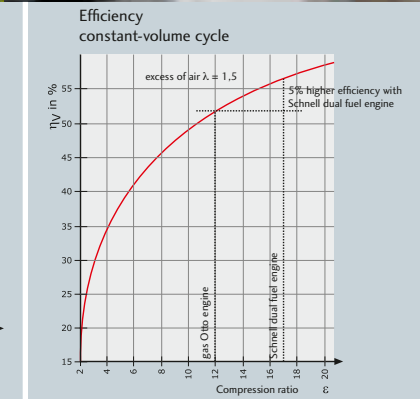
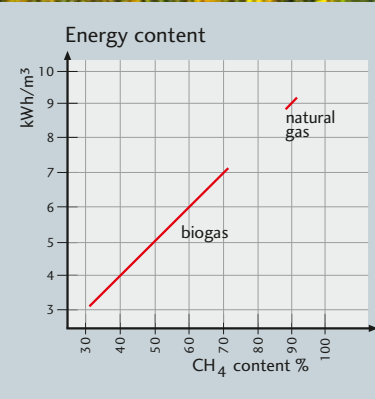
Yet the dual fuel engine is capable of more. A high compression ratio raises efficiency. Due to its high CO₂ content, weak gas (biogas, sewage and landfill gas) has a high antiknock rate, making it highly suitable for combustion in dual fuel engines. Biogas is admixed to the intake air. This weak gas-air mixture is compressed in the engine, and the injection of a small portion of fuel initiates the ignition in the combustion chamber.

| Innovative: effective

To use the thermodynamic advantages of the diesel principle for biogas combustion to full capacity, we modified the diesel engine to a dual fuel engine. For instance, an optimised camshaft makes sure that the flushing leakage of biogas can be minimised.

The major modification for achieving the best efficiency is without doubt the intelligent fuel injection system. Higher efficiency means higher energy yield. This ensures the efficient use of primary products and cost-effective operations.









The Fuel Injection Technology

Electronic control systems optimise engine processes.
Increased yield!

Biogas is a natural fuel that can vary greatly in its composition. Especially for agricultural plants, which use liquid manure and renewable primary products, this means that values such as the antiknock rate and flame propagation can double or halve in a matter of seconds.

What is the best way of controlling these varying conditions? SCHNELL dual fuel technology is based on an award-winning electronic injection system designed to precisely control the point of ignition – a milestone in the history of dual fuel injection technology.

| Intelligent controls

The electronic control system adjusts the ideal fuel injection time as well as the required portion of fuel, thus ensuring the ideal combustion temperature. It controls and optimises fuel injection. Compared to conventional dual fuel units, our electronic fuel injection technology offers decisive advantages:

- significantly higher efficiency
- proven reduction of emissions
- fewer downtimes, fewer failures
- increased engine durability
- cost-effective use of biodiesel and vegetable oil
- minimum portion of pilot fuel required
- longer nozzle service life

For operators this effectively means increased electricity production with a substantial reduction of costs.



The Product

Coordinated components. Most cost-effective solution.

The core component of our units is the dual fuel engine. It is based on field-proven diesel engine technology, used in millions of applications, from manufacturers such as SISU or SCANIA. The main advantages provided by SCHNELL's dual fuel engine include guaranteed high efficiency, reliable operation, long durability, economical consumption and low emissions. The sophisticated adjustment of the ignition system, turbocharger, engine and intake-air cooling as well as the control unit guarantees an economic and reliable CHP that ensures an efficient delivery of electric and heating energy.

All units are fitted with a plate heat exchanger made of stainless steel as standard to separate the engine cooling cycle from the heating cycle. Furthermore, an emergency cooling system ensures reliable heat dissipation even on hot summer days.

Our units are multi-supported on rubber bearings on a rigid steel frame to ensure high stability and vibration resistance. The generator is connected to the engine by a durable vibration-damping rubber clutch.

| **Controlled efficiency**

Our microprocessor control featuring a plain text display, is designed for user-friendly, simple operation. Here all functions relating to the CHP can be adjusted and monitored. The complete overview includes permanent engine management, generator and electricity network control as well as power conducting to external guidelines. In addition, there is monitoring on overload, underload, backward load and load fluctuation as well as a history function.







The Services

Experience, expertise and service: convincing.

Step one Project Planning. We will plan the engine room or container of your biogas plant in cooperation with your planning office and construction companies. Selecting the right location and adapting the device to your operating conditions ensures optimal operation for many years. We can also support you in obtaining installation licences and permission for power input at your electric utility.

Step two installation. SCHNELL Motoren AG has its own highly qualified service technician teams. The wellrehearsed professional teams ensure an economic and reliable integration of the CHP into the biogas plant right up to initial start-up.

We offer an engine room or engine container solution. Either the operator builds the engine room in cooperation with the planning office according to our specifications and we are responsible for the mounting and installation of the components on site. Or the CHP is delivered built into its steel container, extensively checked and ready for connection. In this case, all the necessary devices - ranging from the sliding block absorbers via the room ventilation fan and exhaust gas heat exchanger through to the emergency cooling system - are already pre-mounted. This solution offers minimum on-site mounting effort and thus accelerates operational readiness.

| Long-term top support

Step three Operation. Our CHP Service Department staff provide telephone support, remote maintenance and spare part services seven days a week. Additionally, we run an online troubleshooting service on our homepage, which is available to operators around the clock. Together with our area-wide network of authorised service partners we guarantee quick availability if maintenance or repairs are necessary.

Conclusion: A productive outlook from the planning stage through to long-term operation!





The References

Satisfied customers. A strong basis for further progress.

SCHNELL dual fuel engines range from 40 kW to 1.6 MW depending on their electric power rating. Our CHPs meet the requirements of small biogas plants operated by single farmers as well as big communal plants.

Since 1992 we have delivered and provided support for CHPs to well over 2,000 customers, both nationally and internationally. Today, over 2,500 SCHNELL dual fuel engines are in operation in over 20 countries on 4 continents. Besides units for biogas and other weak gases, SCHNELL also offers vegetable oil units with a specially developed injection system.

| Award-winning motivation

SCHNELL Motoren AG has already received a number of awards and innovation prizes. This not only acknowledged the outstanding development of the company headed by the company's founder, Mr. Hans-Jürgen Schnell, but also the company's outstanding technological achievements.

For us this is an incentive to continue our policy of focusing on innovation. Not to mention maintaining the excellent relationships to our customers! Information and references can be found on our website: www.schnellmotor.de.









The Perspectives

Managing efficiency. On course for future success!

“Long-term success depends on providing your customers with the best advantages.” This is the guiding principle by which we endeavour to meet our customers’ needs - every day.


SCHNELL dual fuel engines are characterised by extreme flexibility and robust operation with the most varied of gas qualities and process variations.

We are familiar with our customers’ requirements. Especially the operators of agricultural biogas plants appreciate the reliability of our units. SCHNELL dual fuel engines are in control all the time. They can cope with energy content variations associated with liquid manure as well as with interfering gases which are liable to occur unexpectedly with renewable primary products. They have proved themselves during start-up operation and during the switch from biogas to vegetable oil.

| Outstanding efficiency

For years we have been setting the benchmark in efficiency. Our customers benefit from the cost-effective, reliable operation of their CHPs. Not to mention the environment through the efficient use of natural energy sources. This makes SCHNELL dual fuel technology a successful example of how the combination of experience and innovation can drive success.

We will also continue to ensure this in the future. See for yourself. Let’s discuss your project together. We look forward to meeting you!



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