energy decentral®

POWERING NEW IDEAS

including BIOGAS Convention

Innovation Magazine 2018

Innovation Award EnergyDecentral

- 2 Gold medals
- 4 Silver medals
- 22 Company innovations

Specials

- Renewable Energies
- Biogenic solid fuels

Tested by DLG experts

- Technology in Test
- Current Test Results

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MADE BY DLG

Content

Worldwide forum for innovative energy supply

As the leading trade fair for decentralized energy supply, EnergyDecentral 2018 will be presenting an international exhibition and technical programme dedicated to all aspects of the challenges faced by the industry.

From biogas, biogenic solid fuels and CHP systems up to and including wind power, solar energy and smart energy, EnergyDecentral offers in-depth insights into the energy mix of the future.

Modern complete systems are already able to cover a large part of the demand for electricity, not only in agricultural enterprises, fill storage tanks or refuel electric vehicles. As the energy revolution progresses, biogas is also taking on new, important tasks in sustainable power supply. Digitalisation in the energy industry is giving rise to numerous new opportunities for energy-intensive industries to manage resources efficiently.

The innovations presented in Hanover show how far decentralised energy supply has advanced and which challenges are associated with the implementation of visions. They also provide answers to changing legal and economic framework conditions.

The “Innovation Award EnergyDecentral” will again be presented for pioneering, innovative developments in the energy industry this year. The prizewinners that have been awarded the renowned innovation medals are representative of the creative will and innovativeness of the entire industry. They combine creative and entrepreneurial thinking with extensive technological know-how.

The development of decentralised energies requires scope for innovations.
The “Innovation Award EnergyDecentral2018” offers the appropriate platform for this. This year, two innovations will be awarded a gold medal and four innovations will be presented with a silver medal. Convincing proof of the pioneering importance of sustainable energy production.

I would like to congratulate all of the award winners on their success.

Hubertus Paetow
President of DLG e.V.

PUBLISHING DETAILS

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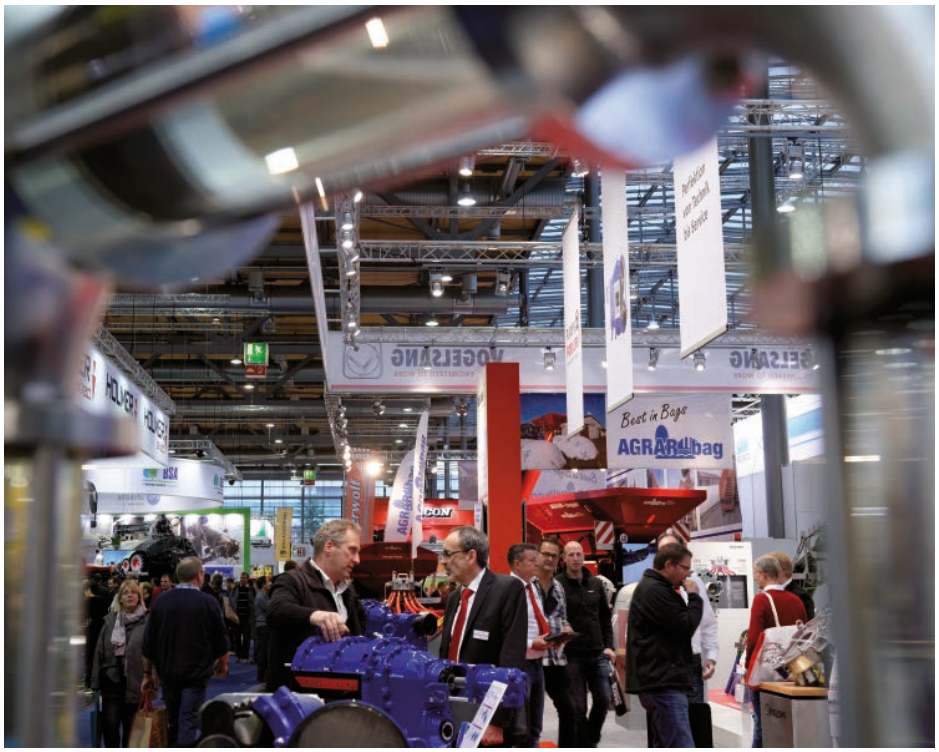


EnergyDecentral 2018

Trends and innovations for the regenerative energy source industry

EnergyDecentral is the specialist international trade fair for innovative energy supply. This year, around 310 exhibitors will be presenting their new and advanced developments at the trade fair grounds in Hanover over an area covering 26,000 m².

Everything at EnergyDecentral 2018 will be geared towards energy from regenerative energy sources such as biogas, biogenic solid fuels, engine systems (CHPs), wind power and solar energy. An extensive technical programme with Specials, specialist conferences and discussion forums will offer information on the latest trends in the industry as well as the opportunity to network with experts.

International specialist congresses

The specialist "BIOGAS Convention" conducted by the German Biogas Association on the topic of "Biogas - Flexible, secure, future-oriented" will be discussing perspectives of the biogas market. At the world's largest biogas industry meeting, biogas plant operators, in particular, but also visitors from abroad will be offered valuable information, cost-effectiveness analyses and technology trends in numerous national and international discussion events.

The BioenergyEurope (formerly AEBIOM) "European Bioenergy Future" (EBF) congress will be taking place for the first time at EnergyDecentral, thus highlighting biogenic solid fuels.

Top-class technical programme

The use of biogenic solid fuels will be demonstrated in the outdoor area to the north of Hall 26 in a Special "Biogenic Solid Fuels: Wood and Stalk-Type Biomass". Practical solutions for energy wood and straw, pelleting, logistics and transport as well as their low-emission and cost-efficient use will be presented here.

A further Special on the topic of "Clever Use of Renewable Energy" in Hall 25 will focus on energy generation and use of self-produced electricity once the German Renewable Energy Act (EEG) subsidy period comes to an end. Solutions for power stores, photovoltaics and electric mobility in agribusiness will also be presented.

EnergyDecentral Forum

Further highlights at EnergyDecentral 2018 will include specialist presentations from the field of innovative energy supply concerning topics such as "Fermentation in small liquid manure plants", "Hydrogen methanisation", "Straw fermentation" or "Biofuels in agriculture and forestry" in the EnergyDecentral Forum in Hall 25, Stand L13.

INFO

EnergyDecentral 2018

13 to 16 November 2018
Hanover Fairgrounds
Opening times:
daily from 9.00 am to 6.00 pm
www.energy-decentral.com
facebook.com/energy-decentral

Combined heat and power plants in agriculture

Modern lean motors and catalytic converters ensure low emissions

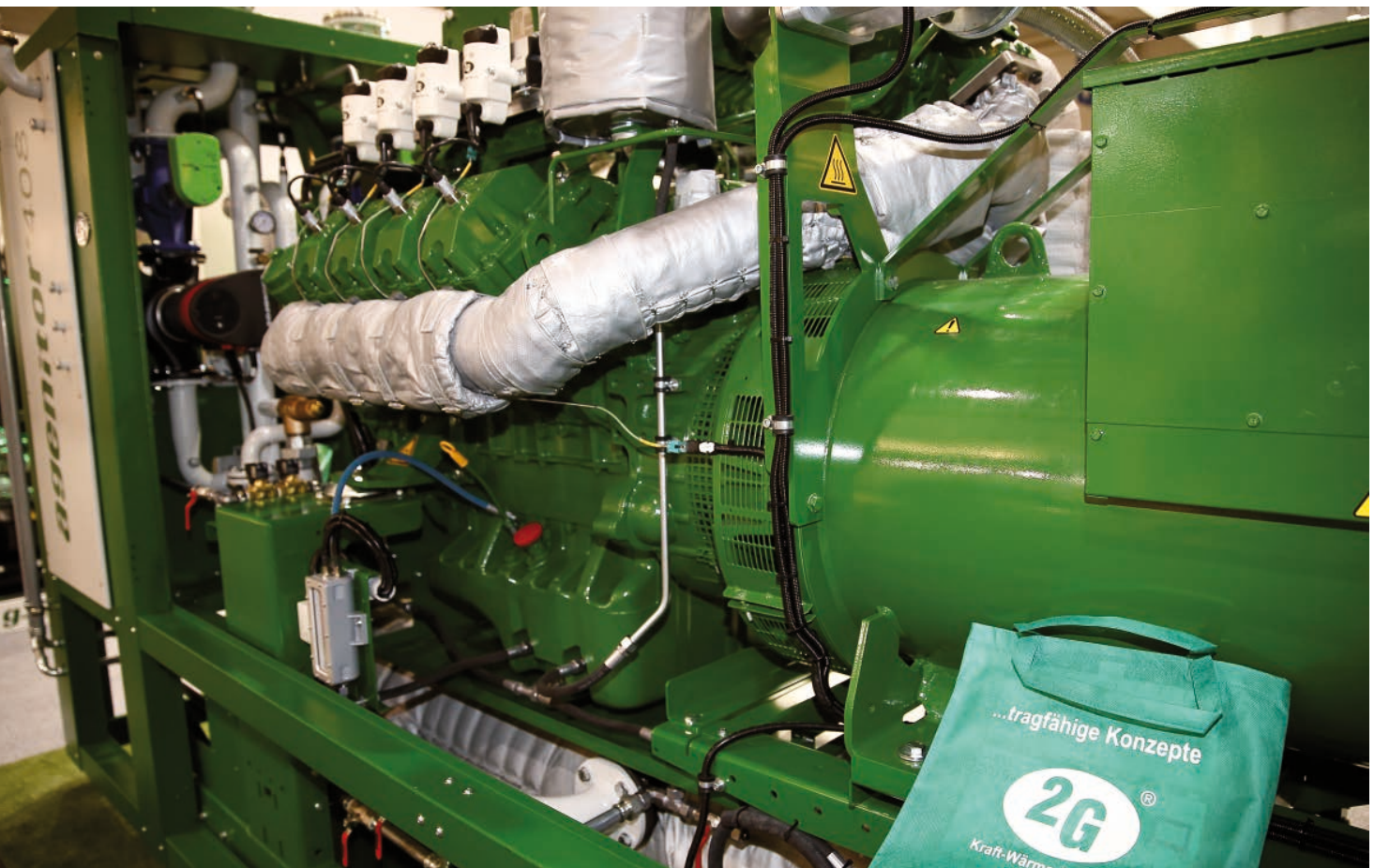
The international trade fair EnergyDecentral 2018 shows solutions for new and existing plants

Combined heat and power is a particularly rational form of energy production for farmers and enterprises in the field of food production pursuing the goal of achieving energy self-sufficiency in providing their buildings and animal housing with power and heat. Thanks to the most recent progress in drive engineering and after-treatment of exhaust gases, combined heat and power plants (CHP) can provide the energy necessary for running the farm or for food production and at the same time comply safely with future limitations on emissions. At the heart of EnergyDecentral, the international trade fair for innovative energy supply being held together with EuroTier in Hanover from 13 to 16 November 2018, the focus is therefore on motors/engines and catalytic converter systems for new and existing plants.

Combined heat and power plants are considered to be the backbone of the German energy transition – and it is not least for this reason that they are also an attractive energy-saving model for farmers aiming to reduce power and heating costs as well as converting biogas into electricity. Modern systems for combining heat and power today cover a large share of on-farm or on-site demand on farms or in food-producing plants. In addition to satisfying the requirement for process heat, they also supply, for example, the necessary heat for the farrowing shed or drive ventilation systems and feeding machines. However a CHP can do even more. With the aid of an installed absorption chiller, the heat produced can be converted into cooling energy via the evaporation principle and thus be used for milk refrigeration.

Your own on-farm power station

EnergyDecentral is presenting the necessary key technologies for this in Hanover. The programme offered by the exhibitors comprises efficient plants for producing electricity, heating and cooling, enabling farmers to become more independent of the utility companies. The combined heat and power plants from the many motor/engine manufacturers and packagers are examples of this. They can also be operated with biogas, such as is produced by fermenting raw and residual materials. The electricity obtained can be used locally or fed into the public grid in return for payment. At the same time the resulting heat can be used as process heat or to heat buildings. Lean motors/engines that minimise the occurrence of pollutants are in demand. Thanks to integrated lambda probes, they ensure low emission levels and steer the quantity of fuel injected so that the optimal composition is always guaranteed. The gas engines produced by the international operators in the sector represent examples of this. They are designed for decentralised energy supply in continuous operation and can be used in



applications with biogas, natural gas or gas from purification plants.

More stringent boundary levels drive investments

In view of the more stringent exhaust gas legislation, as set out in the amendment to 'TA Luft' (Technical Instructions on Air Quality Control), many of the exhibiting combined heat and power plant manufacturers are expecting a wave of investment. The focus at EnergyDecentral is likely to be above all on low-emission motors and technologies for emission reduction. The future specifications concerning motor-operated CHP plants with a rated thermal input of between 1,000 kilowatt and 50 megawatt relate to carbon-monoxide (CO), nitrogen oxides (NOx), formaldehyde (HCHO), hydrocarbons (HC) and ammonia (NH3). The NOx-boundary levels are to be lowered to 100 milligrams per cubic metre for natural gas motors and to 500 milligrams per cubic metre for biogas. There are still no generally valid regulations on emission limitation for combined heat and power plants with a rated thermal input of less than 1,000 kilowatt. Accordingly the combined heat and power plants from a rating of approx. 400 kW electrical power are not affected by the regulation.

Keep an eye on the environmental bonus for biogas plants

The great majority of farmers with plants not liable to approval under the law on emission protection will therefore probably not be directly affected by the new regulation. However, biogas plant operators should note the formaldehyde boundary levels of each combined heat and power plant that is part of the installed output in the Renewable Energy Act. The specifications for the environmental bonus for biogas plants up to an output of 500 kilowatt changed as of 1 July 2018. Farmers who want to continue receiving the state funding of one Cent per kilowatt hour must demonstrate the boundary level of 20 milligrams formaldehyde per cubic metre – often only after-treatment of the exhaust gas will help to reduce emissions in the case of existing plants.

Catalytic converters as an answer to the emission requirements

One important keyword at EnergyDecentral will probably be selective catalytic reduction (SCR). The new sulphur-resistant catalytic converter systems convert formaldehyde and – in combination with a retrofittable urea dosing unit – nitrogen oxides as well. The technology is used for instance in the Emission-Blue-Systems from Emission Partner. The catalytic converters are obtainable with a urea dosing system, tank and continuous nitrogen oxide monitoring. A pressurized-air-supported nozzle doses the precise amount of urea into the exhaust gas pipe that is needed to reduce the nitrogen oxides in the exhaust gas.

Focus on professional maintenance

From optimised motor technology to efficient exhaust gas after-treatment – at this year's EnergyDecentral in Hanover the focus will be not only on innovative technologies, but also on professional maintenance of existing plants. Most of the exhibitors offer extensive information and now also provide offers covering Maintenance & Service. As a supplement to the exhibitors' offerings, this subject will be considered in greater depth at Forum events – always with the goal of continuous and long-term compliance with CHP emission standards.

Use of biogas in agriculture

Straw fermentation and new technologies accelerate the turnaround in energy policy

Storable, flexibly usable and capable of covering base load demand – with an electrical output of over 4,200 megawatts, biogas plants have developed to become a key pillar of the energy turnaround. Visitors to EnergyDecentral can enter into intensive dialogue about the current situation and future prospects of the technology. Spotlight now on straw as an energy supplier.

Germany is still the world market leader and pioneer in the use of biogas. One thing is necessary above all to defend this leading position – technical innovations for more efficient bioenergy plants, as are highlighted at EnergyDecentral. Alongside the manufacturers of complete systems and combined heat and power plants, suppliers of components, mixing/stirring technology and gas treatment are also represented at the Fairgrounds. Not least on the basis of the most recent amendment to the EEG (German Renewable Energy Act), the industry is responding with relatively small and modular plants with an output below 75 kilowatts that convert waste and residual materials produced (such as slurry, solid manure, organic wastes and prunings) into energy. The core element of all such plants is the fermenter. This is where the processes of microbial degradation of the organic substance take place, from which biogas results. In the simplest case, the slurry flows from the animal housing facility into the pre-storage pit and from there directly into the fermenter. Solid substrates can be introduced with the aid of stationary feeders.

Straw as an alternative substrate

On the grounds of its high lignin, cellulose or hemi-cellulose components and its low contents of macro-nutrients and micro-nutrients, straw is not really an ideal raw material for fermentation. However it is becoming increasingly more interesting, as many exhibitors and market participants impressively demonstrate. The economic potential is promising. It is estimated that eight to 13 million tons of cereal straw that can be used as substrate in biogas plants are produced. Co-fermentation of straw is always a practicable solution when sufficient nutrient-rich liquids such as for instance liquid manure or slurry are available. As matters stand at present, fermentation of straw makes it possible to achieve a methane yield that corresponds to around 50 to 70 per cent of the yield from maize silage. In order to increase the gas output even further, the exhibitors at EnergyDecentral are presenting energy-saving methods of breaking down the raw material. Even before fermentation in the fermenter, the straw is subjected to mechanical and biochemical treatment in order to open up its lignocellulose structures.

Opening up via steam explosion

With its Economizer SE, the firm Biogas Systems will be presenting a solution for hydrolysing cellulose-rich biomass

in Hanover. The fibrous or viscous raw substrate is heated in two stages up to 180 degrees Centigrade and treated in a hydrolysis reactor at up to ten bar overpressure. After completion of the hydrolysis, optimal substrate disintegration is achieved by means of "Steam Explosion". In this process the material is broken down into fibres with pressurised saturated steam, followed by sudden release of tension. In this way the coarsely fractionated source material is turned into a homogenous, easily usable substrate pulp. For the subsequent fermentation this means constant reaction conditions, shorter dwelling periods and stable, trouble-free operation. Through the use of the patented technology it is possible to convert not only straw but also almost all agricultural residual materials such as farmyard manure, grass, right through to prunings into biogas.

Deep-sea microbes break down lignin

The BMT-method from MWK Bionik pursues a different approach. Via targeted interplay of biological, mechanical and thermo-catalytic processes, it promotes the fermentation of materials with a high lignin content, such as straw or wood residues. The BMT system is integrated into the substrate flow between the substrate store and the fermenter, so that existing plants can also be retrofitted. Up to 90 per cent of the organic dry matter is converted into biogas. This is made possible by a special mixture of enzymes and plant-based active ingredients as well as natural deep-sea microorganisms. They break down the robust and water-resistant lignin layers and release the enclosed and fermentable carbohydrates from the straw.

New tasks in the energy turnaround

With the increasing advance of the energy turnaround, important new tasks in the field of sustainable energy supply arise for biogas. Alongside the requirements of the German Renewable Energy Act, farmers and plant builders must also keep an eye on the regulations covering fertilising and plant safety. Many operators are following the path of flexibilisation and upgrading their existing plant with gas storage tanks and more efficient combined heat and power systems (CHP) – a trend that is reflected by the range and framework programme of this year's EnergyDecentral too. At the same time research facilities are working flat out to make alternative substrates available. Research scientists at the Fraunhofer IKTS in Dresden aim to develop new potentials for the biogas sector with straw pellets. These drop in the fermenter and are broken down within 60 minutes. The chemical-mechanical treatment leads to 40 per cent more gas yield by comparison with untreated straw – without any need to convert existing biogas plants.

Special

Renewable Energies – Chances of Decentralised, Intelligent Power Generation

Photovoltaic system models with pure electricity infeed are being phased out. Modern complete systems are already able to cover a large part of the demand for electricity, not only in agricultural enterprises, fill storage tanks or refuel electric vehicles. EnergyDecentral shows how far decentralised energy supply in agriculture has advanced and which challenges are associated with the implementation of visions.

Entitled "Renewable Energies – Chances of Decentralised, Intelligent Power Generation", this year's special is aimed primarily at the operators of systems for generating renewable energy from their agribusiness. In view of the end of German Renewable Energy Act (EEG) compensation, generating electricity for their own use is an obvious choice in the mid-term for this target group. At the Special, trade fair visitors will be able to obtain an extensive overview of the feasibility, requirements and cost effectiveness, and above all of existing and future technologies.

In the highlight special at EnergyDecentral, visitors can expect a moderated live show that looks at renewable energies embedded in the agribusiness and supplies all electrical consumers with intelligent green electricity based on PV, wind and biogas as required. Electric vehicles and tractors with electric charging station, ventilation and lighting as well as the necessary grid technology up to intelligent load management with storage and connection to the farm's power circuit will be shown.

For many years, agriculture was the driving force behind the expansion of renewable energies. From PV systems on roof surfaces to livestock farming and agricultural biogas plants to onshore wind parks subsidised by EEG feed-in compensation, the agribusiness sector currently has an enormous capacity for power generation.

Against the background of expiring EEG compensation for electricity generation for these existing systems and the currently valid framework conditions for new systems, characterised by complicated tendering procedures with occasionally unprofitable compensation rates, operators are being forced to search for alternatives. With regard to highly fluctuating electricity prices and market values averaging just a few cents, the sale of the generated energy on the electricity exchange tends to be unattractive.

In contrast, farmers' electricity bills are rising to unprecedented levels, while politicians are promoting the expansion of electric mobility at the same time. Manufacturers are launching new, smart, electrically operated future trends on the market and machines powered by conventional fossil fuels are being replaced with efficient, low-maintenance electric drives.

Central considerations here are the fact that farmers can charge up their electrically-powered wheel loaders with their own PV systems, ensure ventilation of the poultry house and the automatic milking robots from the farm's own biogas plant or separate liquid manure and fermentation products regardless of the time of day or night, therefore smoothing the load curve. Internationally, focus is also on supply reliability and independent energy supply.

OUTDOOR SPECIAL: BIOGENIC SOLID FUELS – WOOD AND STALK-TYPE BIOMASS

In the current energy mix, solid fuels are becoming increasingly significant as a climate-friendly alternative. Use existing resources and meet agribusiness energy requirements with logs, wood chips and pellets. Find out how unused potentials from straw can be used to generate energy and how the latest technologies offer farmers extensive scope for savings under consideration of increasing emission limit value requirements. For instance, the use of stalk biomass in heating plants can represent a cost-efficient alternative for local heat supply to farms, villages and towns. This is why the outdoor area of EnergyDecentral is focusing on the topic of "Energy from wood and stalk-type biomass" in an attractive live demonstration.

The market for biogenic solid fuels is hotly contested. Suppliers are relying on certification in order to stand out against the competition through consistently high qualities. EnergyDecentral provides an overview of the range of international certifications.

Innovations & trends

From new approach to modification

The sector aims to and will succeed in asserting its position in the market with innovations! This spirit is omnipresent in the "Innovation Award EnergyDecentral 2018" and at the trade fair – in products and in solutions with fundamentally new approaches that can open up new opportunities. But also in numerous smaller modifications that improve details of the operating reliability, flexible applications, ease of operation and maintenance, or energy efficiency.

In addition to the innovative character, once again this year the high technical maturity with which manufacturers always respond to customer wishes via extremely professional solutions is impressive.

Measured against the number of innovations reported, at this year's EnergyDecentral most innovative developments can be noted in the fields of biogas and biomethane. By way of example, it is an outstanding idea to bind a large part of the substrate-nitrogen in a marketable organic-mineral fertilizer suitable for transport already before the actual fermentation process. A tradable product thus emerges from the challenge presented by substrates containing nitrogen. Another particularly promising approach is, for example, the possibility of a spray-on silo cover which, after simple application, can apparently withstand all weather conditions and changes in the silo stock.

Despite this we should not fail to mention the many small improvements to agitators and mixers, biogas storage units, container systems, screw presses, cylinder heads, fermentation residue removal systems, rotary pumps, controls and much more besides.

These are the innovations and many small improvements that will be on show for you at the trade fair and allow you to experience the difference between good and very good solutions.

Martin Strobl
Chairman of the EnergyDecentral Innovations Commission,
Institute for Business Administration and Agricultural Structures,
Bavarian State Research Center for Agriculture in Munich

Leading in innovation

Innovation Award EnergyDecentral

The DLG Innovation Award that will be presented at EnergyDecentral is one of the leading innovation awards in the International energy industry. The new name "Innovation Award EnergyDecentral" emphasizes the status enjoyed by this award in modern energy technology.

The innovation commission which was used by the DLG, selected according to strict criteria from all submitted and approved applications, the winner of the gold and silver medals. This underscores the leading position held by EnergyDecentral as the world's largest showcase for energy industry innovations.
Gold Medals were awarded for two innovations, and a further 4 innovations were awarded a Silver Medal. The award-winning products have never before been shown or won awards at any other major trade fair or international show. To be admitted they must be operable at the time of the trade fair and be available on the market at the latest in the year 2019.

PROFILE OF THE INNOVATION AWARD

Applying for and receiving the award
All exhibiting companies at Energy Decentral can enter the awards competition and submit their innovations which will be examined and discussed in depth by an independent commission. The decision on whether a product is worthy of the EnergyDecentral Innovation Award is taken by simple majority vote. The prize will then be awarded at a ceremony on the eve of EnergyDecentral.

Innovations Commission
The EnergyDecentral Innovations Committee is a panel of independent scientists, researchers and consultants.The members on the committee guarantee that their decisions are unbiased and based on profound expert knowledge. All innovations submitted in time and before the closing date will be assessed to the same strict criteria for eligibility for the EnergyDecentral Innovation Award in gold or silver.

- Ing. agr. Carsten Brüggemann, Landwirtschaftskammer Niedersachsen, Hannover
- Arne Dahlhoff, Landwirtschaftskammer Nordrhein-Westfalen, Bad Sassendorf
- Prof. Dr. Eberhard Hartung, Christian-Albrechts-University, Kiel
- Dr. R. Günther Herdin, PGES Günther Herdin technisches Büro GmbH, Jenbach, Austria
- Thomas Hering, TLL, Dornburg-Camburg
- Dipl.-Ing. Willi Horenkamp, TU Dortmund
- Prof. Dr. Gerog Konrad, FH Kufstein Tirol, Kufstein, Austria
- Gerd Krieger, VDMA – Power Systems, Frankfurt am Main
- Julian Langstädtler, FGH GmbH, Hamburg
- Dr. Gerd Morscheck, University Rostock
- Dr. Edgar Remmele, TFZ, Straubing
- Prof. Dr.-Ing. Jörg Scheffler, Hochschule Merseburg
- Martin Strobl, Bayer. LfL, München
- Prof. Dr.-Ing. Jürgen Wiese, Hochschule Magdeburg-Stendal
- Prof. Dr.-Ing. habil. Tobias Zschunke, Hochschule Zittau/Görlitz

Assessment criteria
For the selection of the awarded innovations is their meaning for practical significance, the impact on operating affordability and efficiency, on the environment and on energy consumption. Its impact on labour saving and health and safety at work will also be considered.

„Innovation Award EnergyDecentral" in gold

A EnergyDecentral Innovation Gold Award is conferred on a product that presents a new concept and a changed functionality and the application of which gives rise to a new process or marks a substantial improvement to an existing process. The following criteria are critical for a product to earn a gold medal:

- Benefits in profitability and processes
- Benefits to environment and energy use
- Benefits for work load and safety

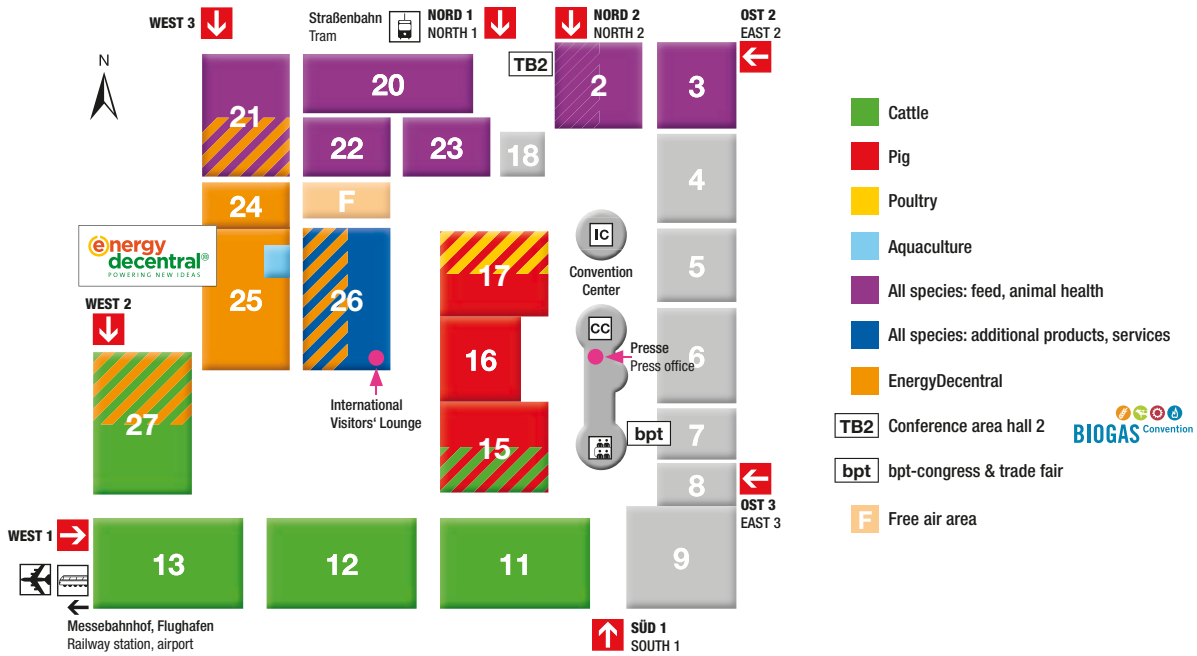
„Innovation Award EnergyDecentral" in silver

A EnergyDecentral innovation Silver Award is conferred on an innovation that has been enhanced to such an extent that a substantial improvement in its function and process can be expected from it. At the same time, it need not meet all the criteria applicable for a EnergyDecentral Innovation Gold Award. The following criteria apply for a Silver Medal:

- Importance for practical application
- Advantages in work performance
- The work quality and operational reliability

Where you can find Gold and Silver medals at the EnergyDecentral:

PRODUCT	EXHIBITOR	STAND
GOLD		
poultry profit ®	revis bioenergy GmbH	Hall 25, Stand F16
Spray-on silo cover	TFZ	Hall 26, Stand B22
SILVER		
Novatech removal system for slurry and fermentation residues	Novatech	Hall 25, Stand D24
EVE3 4 valve cylinder head	ECI-Distribution GmbH	Hall 24, Stand C08
WANGEN X-UNIT	PUMPENFABRIK WANGEN GmbH	Hall 25, Stand C07
Bioselect – Axially Adjustable Screw	BÖRGER GmbH Drehkolbenpumpen	Hall 27, Stand A25



Innovation Award Registrations

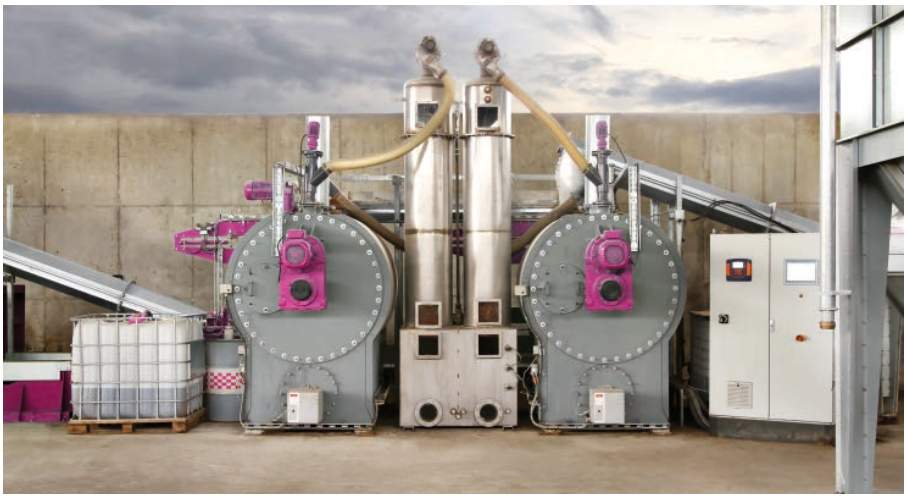
PRODUCT	EXHIBITOR
Biogas and biomethane – production and use	
GOLD: poultry profit®	revis bioenergy GmbH
GOLD: Spray-on silo cover	TFZ
SILVER: Novatech removal system for slurry and fermentation residues	Novatech
SILVER: WANGEN X-UNIT	PUMPENFABRIK WANGEN GmbH
SILVER: Bioselect	BÖRGER GmbH Drehkolbenpumpen
Pump separator KKS/P	Moosbauer-Separator GmbH & Co.KG
Combined gas storage	Wiefferink B.V.
Drive Biogas	EnviTec Biogas AG
Tlow process	AEV Energy GmbH
CarboFerm®	LUCRAT GmbH
System Methabox	PETERS Maschinenbau AG
REMEX SF	Schmack Biogas Service GmbH
Powerfeed twin	BÖRGER GmbH Drehkolbenpumpen
PlanET Valentin	PlanET
Complete cleaning of slurry and fermentation residues using high-performance biology	WEHRLE Umwelt GmbH
Submersible motor agitator 3M	Erich Stallkamp ESTA GmbH
Bellows pump for slurry and substrates with a high dry matter content	Green Energy Max Zintl GmbH
Solid biofuels – production and use	
Drying systems	I.T.B.- Installatie Techniek
Decentralized energy technology	
SILVER: EVE3 4 valve cylinder head	ECI-Distribution GmbH
Airing and ventilation, waste air and exhaust gas cleaning	
SCHNELL_upgrade_CATALYST	AIR SONIC GmbH
Energy distribution and storage	
Powerball PBRO and PBLIRO system storage for on-grid and off-grid application	Powerball Systems AG
Measuring, control and instrumentation technology	
BlueVCount	BlueSens gas sensor GmbH

Innovation Award EnergyDecentral 2018 in Gold

Biogas and biomethane – production and use

Poultry Profit®

revis bioenergy GmbH, Münster, Germany (Hall 25, Stand F16)



If substrates with high nitrogen loads, such as poultry manure, are used in biogas plants, this can lead to efficiency losses, as ammonia inhibits the fermentation processes and can even bring them to a halt. In order not to stress the entire biology in the fermentation tank by overloading it with nitrogen, either the share of poultry manure used in the substrate mix must be limited or fermentation excipients must be added. However, with a high percentage of nitrogen in the biomass used, the digestate also contains a large quantities of nitrogen. Agricultural land can only be fertilised inexpensively in the region close to the biogas plant. The maximum quantity to be spread is quickly reached due to the high nutrient contents. However, an alternative digestate transport or digestate processing is very expensive.

With Poultry Profit from revis bioenergy of Münster, it is possible for the first time to already remove a large share of the nitrogen content in the biogas plant before its use in the biomass and to generate an ammonium sulphate solution, i.e. a known, permissible fertiliser, from it. In addition to the specific fertilisation effect, it is also very worthy of transport.

As a result, it is now possible for the first time to also metabolise ammonium-rich substances and use them energetically on a large scale following corresponding processing, and no longer just as admixtures in biogas plants. In addition, valuable fertilisation components are also obtained.

Biogas and biomethane – production and use

Spray-On Silo Cover

TFZ, Straubing, Germany (Hall 26, Stand B22)

For an optimum ensiling process and low respiration losses during silo removal, the biomass must be stored well-compressed and air-sealed. Especially for air sealing, a structure of air-tight wrapping foil, silo tarpaulin, protective nets and fixation with weights must be produced within a narrow time frame after filling the silo at a high technical and personnel expense. As particularly for biogas plants, the silo heaps have especially large dimensions, in addition to the workload, occupational safety is also a relevant topic when covering the silo.

The Technologie und Förderzentrum im Kompetenzzentrum für Nachwachsende Rohstoffe Straubing (TFZ – Technology and Support Center in the Expertise Center for Renewable Raw Materials in Straubing) has now developed an innovative silo cover that can considerably reduce the workload and provide a major improvement in occupational safety. The process is based on a self-hardening material made of renewable resources that is mixed locally from two components and sprayed onto the silo. It then cures to form an air-tight protective layer that achieves values similar to a silo foil with regard to gas permeability and tensile strength.

When choosing the components of the spray-on silo cover, attention was paid to the nutritional harmlessness, enabling it to be introduced into the biogas plant as a substrate with the silage.

The spray-on silo cover based on renewable resources from TFZ Straubing represents a completely new process that can solve major problems when sealing off a bunker silo air-tight.

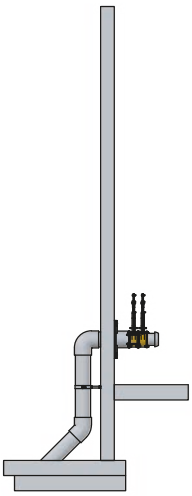
Innovation Award EnergyDecentral 2018 in Silver

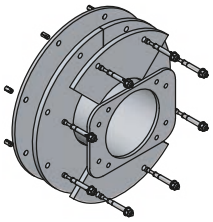
Biogas and biomethane – production and use

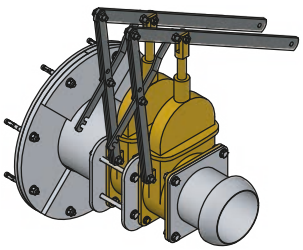
Manure/Fermentation Residue Removal System

Novatech, Wolpertshausen, Germany (Hall 25, Stand D24)

If errors occur, causing substrate to escape when operating a barrel pull-off unit, i.e. an outlet, for example in the fermentation tank of a biogas plant or of a manure storage tank, then this can lead to water-polluting substances being released – up to the entire tank being drained. Even if the substrate loss would just barely be financially tolerable, there is a risk of major damage to surface water if the organic material reaches it. This temporary "imbalance" will – apart from the unpleasant odour – be perceived as very negative in the public eye. Furthermore, the introduction of fermentation substrates in surface water can also result in substantial fines being incurred.







Novatech from Wolpertshausen has now developed its manure and fermentation residue removal system further such that accidental opening is virtually impossible. This is implemented technically by using the principle of multiple blocking familiar from other sectors for this application for the first time. To intentionally open the barrel pull-off unit, the user must therefore carry out several different actuating steps consecutively.

The system is securely screwed on to the tank wall by means of a positive connection. To remove manure or fermentation residues, a safety slider on the tank and an operating slider must be opened. If the driver forgets to disconnect the hose, and the hose connection is then torn off, a statically tested tear-off guard with a reverse tensioning protection device for the locking slider helps prevent larger substrate quantities from escaping.

This represents a practical further development of an existing product with regard to active environmental and water protection.

Decentralized energy technology

4-Valve Cylinder Head

ECI-Distribution GmbH, Schwaz, Austria (Hall 24, Stand C08)

If biogas expensively generated from biomass is converted to electricity, then for economic and ecological reasons this must take place with the highest possible efficiency. Each new and further development which can also sustainably increase the efficiency in practice strengthens the competitiveness of those generating electricity from biogas and further increases the environmental friendliness of this technology.

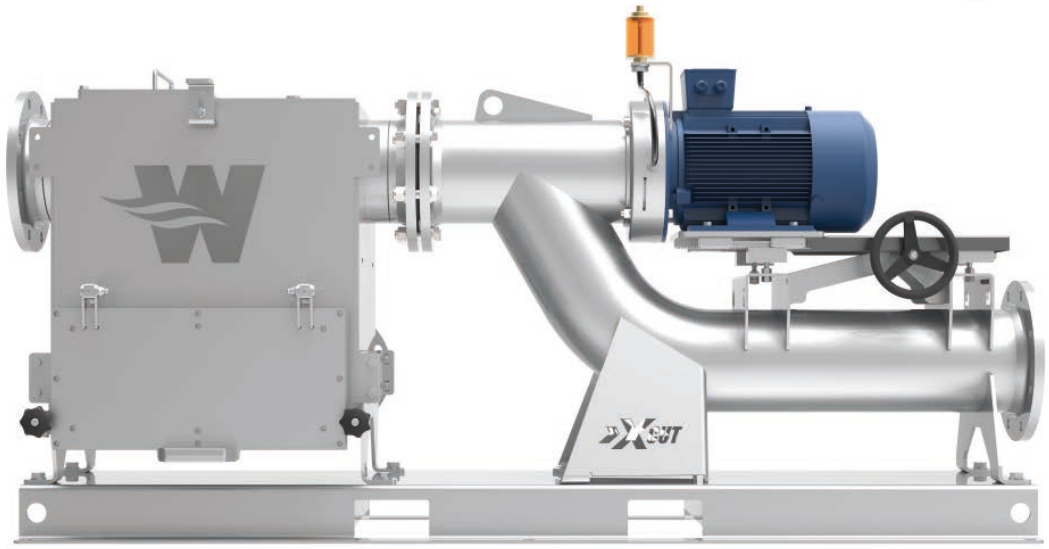
With the EVE3 Efficiency Upgrade Package, ECI-Distribution GmbH from Schwaz (Austria) now offers a four-valve cylinder head for gas engines. With its optimised inlet and exhaust duct geometry and a centrally positioned pre-chamber spark plug, it is possible on the one hand to achieve improvements for nitrogen oxide emissions. Another advantage is an increased efficiency and/or a reduction in gas consumption. The cylinder head can also be retrofitted on existing gas engines as part of maintenance or servicing.

The increased efficiency of a combined heat and power system by retrofitting four-valve cylinder heads from ECI-Distribution GmbH represents a practical further development and has a direct, positive effect on both the efficiency and the emissions of as biogas plant.

Biogas and biomethane – production and use

Wangen X-UNIT

Pumpenfabrik Wangen GmbH, Wangen, Austria (Hall 25, Stand C07)



Foreign bodies and impurities in the source material of pumping media such as fermentation substrate have always been a problem, as they put a particular load on and can even damage the technology for shredding the material often located downstream.

The Wangen X-UNIT, a modular system comprising a foreign body separator (X-TRACT) and a shredder (X-CUT), offers several innovative new features at once for tackling the impurities, and therefore for increasing both the operation and the work quality. An easily accessible foreign body removal unit and the axially adjustable shredding unit enable uncomplicated, fast revision and maintenance of the system. In addition, the rake can be easily changed, which also allows it to be adjusted to the material used.

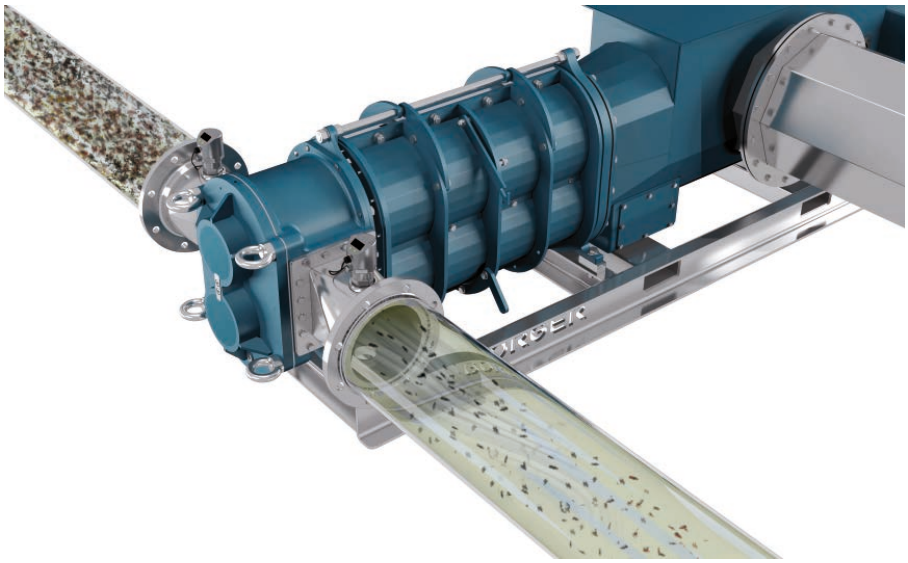
With the safe removal of foreign bodies and impurities that can damage the system and the optimum adjustment of the shredding unit to the medium, the Wangen X-UNIT provides for increased process reliability and lower maintenance costs in the downstream biogas plant technology.

Biogas and biomethane – production and use

Bioselect – Axially Adjustable Screw

Börger GmbH, Borken-Weseke, Germany (Hall 27, Stand A25)

It's not important whether it's a volume reduction with scarce storage capacities, increase efficiency through considerably higher worthiness of transport of the solid phase, use of thin manure on site or substrate improvement for a biogas plant. There are many good reasons for the separation of resulting manure and fermentation residues. Consequently, the use of manure separation systems is on the rise, whereby many are already used by several farms jointly to achieve maximum utilisation. However, especially in the multi-farm segment there are a large number of different source substances. As a result, the requirements for a separator for solid-liquid separation of pig manure differ quite clearly from those for the separation of fermentation residues from maize silage.



With the Börger Bioselect, now the degree of thickening is continuously adjusted with a pre-pressure spring. The further adjustment to the substrate used is carried out automatically. The solid material plug compressed in the axially adjustable screw presses against the multi disc, a rotating, secure thick-matter sealing disc. A scraping edge attached to it causes the loosened thick phase to fall out downward.

This represents a practical further development of manure separators in the direction of individual adjustment to the substrates used, which considerably improves and simplifies its operation. A higher performance with decreasing energy costs are to be expected without further adjustment of the device.

DLG-Test Center Technology and Farm Inputs

From Experts tested quality

The experts at the DLG Test Center Technology and Farm Inputs test several thousand agricultural machinery and equipment products and farm inputs every year. The rewards for passing these demanding tests, which are relevant for practical use, are certifications such as DLG APPROVED or the DLG quality labels.

Decisions to invest in new agricultural machinery or farm inputs should always be taken on the basis of robust data and facts. In the market the test labels issued by the DLG Test Center Technology and Farm Inputs stand for top product quality that has been confirmed neutrally and independently. The methods and test profiles are practice-related and independent of manufacturers. They are based on the latest modern measuring techniques and test facilities and take international standards and norms into account.

The DLG Test Commissions - consisting of leading practitioners, scientists, experts from federations and associations, consultants and administration - conduct reproducible technical tests together with the DLG test engineers in response to practice-oriented questions from animal husbandry and field operations. Whether on test rigs or in defined scenarios in practical use on farms, the products and innovations are scrutinised with the help of the latest modern measuring technology and assessments by experienced practitioners, right down to the smallest detail. The test method and the test design are developed in close consultation with the independent, test commissions, whose members work on an honorary basis. These specify the evaluation standards and decide on the award of the test labels.

DLG TEST REPORT 6898 – BAYERN BHKW GMBH

Biogas-BHKW MNW 75 BG Y
Electrical efficiency

The "electrical efficiency" test was performed as a field test according to the DLG testing framework. This test is intended to determine and evaluate the electrical efficiency of combined heat and power systems. An assessment of the thermal efficiency was also undertaken. No other criteria were checked.

Assessment – in brief: The CHP "MNW 75 BG Y" passed the DLG "electrical efficiency" test for an emission-optimised operating mode. Based on this result, it can be assumed that this CHP converts 34.2 % of its total energy turnover into electrical energy in practical operation. The current limit values of the German Technical Instructions on Air Quality Control for NO_x, CO and SO_x are adhered to with this CHP and this operating mode. The limit values for formaldehyde are partly exceeded if no suitable catalytic converter is used.

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With the aim of shaping, together with you, the future of agriculture, agribusiness and the food sector.

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