



Legislative framework

Country:	Germany
Date start:	November 2016
Date finished:	March 2017

Substrate regulations

			Explain restrictions and/or exceptions	Source of information
Animal byproducts (ABP)	<i>Does the country apply ABP-legislation?</i>	YES/NO	<p>The use of this material is highly restricted due to the risk of spreading of pathogenes. The plant need to be separated from feed, litter and stalls where animals are kept.</p> <p>Binding legal regulations and technical measurements exist.</p> <p>Plant operators have to probe the digestate regularly. [1]</p> <p>Hygiene requirements for animal by-products not intended for human consumption [2]</p> <p>Concrete guidelines for the processing of various types of animal by-products and of manure in biogas plants [2]</p> <p>Monitoring and reporting requirements according to the Kreislaufwirtschaftsgesetz (KrWG) if animal byproduct considered as waste [2]</p>	<p>Nebenprodukte-Vo (EG) No. 1774/2002</p> <p>Definition of animal by-products that can be used in biogas plants: §2 No 2 KrWG and TierNebV Annex 4.</p> <p>Approval according to EG-VO 1069/2009 and EG-VO142/2011</p> <p>National regulations: Tierische Nebenproduk</p>



				te-Beseitigungsgesetz (TierNebG) Tierische Nebenprodukte-Beseitigungsverordnung (TierNebV) Kreislaufwirtschaftsgesetz (KrWG)
Waste water treatment plants	<i>Is this material allowed in biogas production?</i>	YES/NO		
	<i>If yes, are there any restrictions to spreading the digestate from that production?</i>	YES/NO	<p>The sewage sludge EU-directive 86/278/EEC from 1986 regulates the spreading of sewage sludge</p> <p>Regulation on sewage sludge recycling and requirements for soil-related sewage sludge recycling.</p> <p>The regulation AbfKlärV provides the comprehensive provisions for the recovery of phosphorus from sewage sludge.</p>	86/278/EEC sewage sludge regulation/ Klärschlammverordnung (AbfKlärV)
Agricultural materials (not included in ABP)	<i>Are there any restrictions for this material?</i>	YES/NO	<p>The regulation orders which substances are classified as: Biomass, which technical procedures and environmental requirements must be observed for the generation of electricity from biomass.</p>	Biomasseverordnung - BiomasseV



Bio-waste / organic waste material (not included in ABP)	<i>Are there any restrictions for this material?</i>	YES/NO	This Regulation applies to the treatment of biowaste and mixtures of organic waste for use as fertilizer in agriculture and forestry.	Bioabfallverordnung (BioAbfV)
Monitoring	<i>Who takes care of the monitoring of these regulations?</i>		The monitoring of requiring approval biowaste treatment plants is performed by the state office of immission control according to the recycling registration (KrwG).	Monitoring of waste treatment according to §§ 47-55 KrwG (Kreislaufwirtschaftsgesetz)

Alternative handling

				Explain restrictions and/or exceptions			Source of information
What alternative handling processes are allowed?	x	<i>Composting</i>	x	<i>Combustion</i>		<i>Landfilling</i>	
	<i>Another?</i>			Manure can be spread on the field as a fertilizer (to a maximum of 170 Kg nitrogen per hectare)			Düngemittelverordnung + Düngeverordnung (DüV)
Regulations	<i>Are there regulations to reduce the incentive of alternative handling? (ex. no organics allowed in landfills)</i>			YES/NO	Since 01.06.2005 it is not permitted anymore to put organics (of more than 5% organic dry matter content) to landfills		Abfallablagereverordnung (AbfAbIV)

Building regulations

		Explain restrictions and/or exceptions	Source of information
Guidelines	<i>Are there any documents of guidelines for construction of biogas plants?</i>	YES/NO Safety rules for biogas plants: Explain the safety rules for biogas plants specify the requirements for engineering and operation of	Safety rules for biogas plants



			<p>biogas plants</p> <p>The purpose of the Guide to biogas is to make a contribution to technical, organisational, legal and economic questions in relation to agricultural biogas generation and utilisation.</p>	<p>Leitfaden Biogas /German Guide to Biogas From production to use</p>
	<i>If yes, Are they widely used?</i>	YES/NO		
	<i>Are there any documents of guidelines for the construction of systems for the produced gas? (Security, upgrading, gas pipelines etc.)</i>	YES/NO	<p>The guideline "Biogas upgrading and feed in" describes the entire production process, from the supply of the substrate through the processing technologies to the exhaust gas aftertreatment and plant safety</p>	<p>Leitfaden Biogasaufbereitung und –Einspeisung /Biogas upgrading and feed in"</p>
Permission process	<i>Is the permission process for small and medium scale biogas plants easier/faster?</i>	YES/NO	<p>The construction and operation of a biogas plant require authorization. There are <u>two different approval procedures</u>:</p> <ul style="list-style-type: none"> • Building permit according to the Building Code and the respective building regulations • Approval according to the Federal Immission Control Act (BImSchG) <p>Applicable state building regulations,</p> <p>Which of the two approval procedures of the plant operator is to be chosen <u>depends on the capacity</u> and the <u>performance</u> of the planned plant and the <u>substrates</u> used in the biogas plant</p>	<p>Federal building code / Federal Immission control act</p>



	<i>Describe the process:</i>	<p>Every small and medium scale biogas plant is a "construction site" and therefore <u>needs at least the building permit according to the federal building code</u> in connection with the applicable state building regulations if the following criterias are existing [3]:</p> <ul style="list-style-type: none"> • Thermal heat input of the CHP < 1 MW • Biogas production capacity < 1.2 mil Nm³ per year • biogas plant as a secondary facility of an animal husbandry facility subject to authorization, e.g. < 2,000 pigs or < 600 cadles <p>Biogas plant for the biological treatment of:</p> <ul style="list-style-type: none"> • hazardous waste with a throughput capacity < 1 t / day • Non-hazardous wastes (except manure) with a throughput capacity < 10 t / day <p>Temporary storage of:</p> <ul style="list-style-type: none"> • Hazardous waste according to KrWG < 30 t / day • Non-hazardous wastes according to the KrWG < 100 t / day • Manure or digestate storage tank with a capacity < 6,500 m³ • Biogas storage tank < 3t 	Federal building code /4. Federal immision regulation/ KrWG- Circulation law
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Handling of products

			Explain restrictions and/or exceptions	Source of information
Digestate	<i>Are there any regulations for the spreading of digestate from biomethane production?</i>	YES/NO	The limitation is 20-30 t DM of organic waste within three years. When using digestate on grassland and vegetable gardening it has to be applied before plants are cultivated. [1]	§6 (1) bioAbfV §8 (1) Düngeverordnung §3 (1) No 1 Düngegesetz



	<i>Are there any regulations for transporting of digestate from biomethane production?</i>	YES/NO	In Germany, the Fertilizer regulation (Düngeverordnung) defines when digestate can be transported and applied to agricultural land.	Düngeverordnung
	<i>Is there a system for certification of digestate from biomethane production?</i>	YES/NO	There are limitations on toxics and pathogenes that has to be kept for all digestate that is being spread on farmland. The plant owner have to document the disposal of organic waste. [1]	§4 (3) BioAbfV §11 BioAbfV
Electricity	<i>Do you need permission to sell the electricity on the grid?</i>	YES/NO	Feed-in permit from the responsible local energy supplier is needed.	
Heat	<i>Are there regulations for selling heat?</i>	YES/NO	<i>For heat supply will be applicable the Regulation on General Conditions for the Supply of District Heating (AVBFernwärmeV)</i>	AVB FernwärmeV
Biomethane	<i>Is there a standard for using biomethane in vehicles?</i>	YES/NO	According to the BiokraftNachV, the cultivation of biomass on the one hand must not have been used to destroy areas which are particularly vulnerable under nature protection aspects, such as for example forest areas, and that sustainable cultivation of the farmland must take place. On the other hand, biofuels must have a greenhouse gas reduction potential of at least 50 percent as of January 1, 2017.	Biokraftstoff-Nachhaltigkeitsverordnung - Biokraft-NachV
	<i>Is there a standard for injecting biomethane into the grid?</i>	YES/NO	The grid connection method for biomethane plants is directed at according to gas network access regulation (GasNZV). The desired feed-in capacity, the specific network linking point and thus the location of the installation are defined in the grid connection method.	§ 33 Paragraph 4 to 10 GasNZV (DVGW-Arbeitsblatt G 262)



	<p><i>Is there a permission process for selling standardized biomethane?</i></p>	<p>YES/NO</p>	<p>The transport and sale of the injected biomethane can be carried out via a biomethan / gas trading company. The following contracts are to be concluded:</p> <p>Biogas-balancing group contract:</p> <p>In order to transport the injected biomethane in the gas network, the trading company (the transport customer) must conclude a balance sheet circle contract with the balancing group grid operator. The network operator assesses the quantities imported and extracted in a balancing group and calculates any excess or shortage quantities with the transport customer.</p> <p>Feed-in contract:</p> <p>In order to regulate the allocation of the quantities fed into a balancing group, the feeder closes a feed-in contract with the feed-in network operator. The quality requirements of the feed gas are regulated in the feed-in contract.</p> <p>Exit agreement:</p> <p>The final consumer shall conclude an exit contract with the exit network operator for the withdrawal of gas at the physical exit point.</p>	<p>http://www.biogaspartner.de/biomethan/wertschoepfungskette/verkauf-und-handel.html</p>
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Environmental goals



		Explain restrictions and/or exceptions		Source of information
Climate	<i>What are the overall goals for reducing greenhouse gas emissions?</i>	In 2007, the Federal Government committed itself to a 40% reduction in German greenhouse gas emissions by 2020 compared to 1990 with the "Integrated Energy and Climate Program". In the energy concept of 2010, this target will be supplemented by a reduction target of at least 55% by 2030, at least 70% by 2040 and 80-95% by 2050.		http://www.umweltbundesamt.de/daten/klimawandel/treibhausgas-emissionen-in-deutschland
	<i>Are there goals for reducing the use of fossil fuels in the transport sector?</i>	From 2015, the petroleum industry had to reduce its greenhouse gas emissions by 3.5 % (climate protection ratio). This figure will rise to 4 % from 2017, reaching 6% by 2020. To achieve this goal, the petroleum industry needs to use biofuels		http://www.biokraftstoffverband.de/tl_files/download/Daten_und_Fakten/14-12%20Erklaerung%20THG%20Quote%20fi_n%20(2).pdf
Eutrophication	<i>Are there goals for reducing eutrophication due to leakage of nutrients from digestate spreading?</i>	YES/NO	Effective measures to achieve the Federal Government's goal would have to lead to more efficient use of nitrogen. A more even distribution of manure/digestate from livestock /Biogas plants would be an essential prerequisite.	
	<i>If yes, how does this reflect in the legislation on spreading of digestate?</i>	The Fertilizer Ordinance (Düngeverordnung) defines "the good professional practice of fertilization" and specifies how the risks associated with fertilization are to be minimized. From 2018 onwards the maximum value of nitrogen input for the surplus of 60 kg per hectare and per year (kg / ha * a) should be reduced to 50 kg / ha * a. In parallel to the amendment of the Fertilizer Ordinance, the Fertilizer Act (Düngegesetz) is currently being revised. This creates the basis for a new legal regulation, which is intended to regulate the introduction of an operational material flow balance.		Düngeverordnung /Düngegesetz



Economic framework

			Explain restrictions and/or exceptions	Source of information
Investment	Are there subsidies that cover a part of the investment costs?	YES/NO		
	If yes, how big is it and where do you apply for it?			
	If yes, is the support larger for small and medium scale plants?	YES/NO		
	Are there other ways of financing the investment, special loans for this application?	YES/NO	<p>Low interest loans from “Kreditanstalt für Wiederaufbaue”, program “Erneuerbare Energien standard”, for construction, expansion and acquisition of equipment and grids. It covers up to 100 % of the eligible net investment costs. The subsidised credit will be issued according to the benefits for up to 20 years.</p> <p>Plants with electric capacity <70 kW can apply for a dept relief up to € 15 000.</p> <p>Loans from “the Landwirtschaftliche Rentenbank”, program “Energie vom land”, who finances investments in renewable energy. 100 % of the eligible cost can be financed by a loan that has a fixed interest period of 10 years. [1]</p>	
Electricity	Is there a feed-in tariff system for electricity produced of biomethane?	YES/NO	Guaranteed fixed price for 20 years. [1]	The Renewable Energy source act (EEG)



	<i>If yes, how is the price determined?</i>	<p>The price depends on which substrate that is used and how big the plant is. When using digestion of organic waste smaller plants (<500 kW) get a higher price. You only get this incentive if you have a capacity of maximum 20 MW.</p> <p>If using only manure as a substrate you get an even higher price, but the terms are that the plant must be smaller than 75 kW and have at least 80 % liquid manure. [1]</p>		
	<i>Is there any other support for producing electricity from biomethane?</i>	YES/NO	Operators receive a monthly market bonus from the grid operator. This is calculated by using the feed-in tariff minus the monthly market price from the electricity stock market. [1]	
Heat	<i>Is there a feed-in tariff system for heat produced of biomethane?</i>	YES/NO		
	<i>If yes, how is the price determined?</i>			
	<i>Is there any other support for producing heat from biomethane?</i>	YES/NO	<p>Promoting measures for the use of renewable energies in the thermal market - Market incentive program (MAP):</p> <p>The program covers two different ways of funding. On the one hand, an investment grant can be applied for at the Federal Office of Economics and Export Control (BAFA)</p> <p>Furthermore, large-scale heating solutions in the commercial or municipal sector can be supported by means of low-interest loans, where appropriate, with redemption payments, which are then issued by KfW Bankengruppe (KfW)</p>	<p>MAP/ EEWärmeG/ Richtlinien zur Förderung von Maßnahmen zur Nutzung erneuerbarer Energien im Wärmemark</p>
Biomethane	<i>Is there a feed-in- tariff system for injecting biomethane into the grid?</i>	YES/NO		



	<i>If yes, how is the price determined?</i>		
	<i>Is there any support for producing/selling/buying biomethane as a vehicle fuel?</i>	YES/NO	
	<i>Are there taxes on fossil fuels?</i>	YES/NO	
	<i>Are there demands or support for making biomethane available at filling stations?</i>	YES/NO	
	<i>Are there any other support systems for biomethane as a vehicle fuel, or biofuels in general?</i>	YES/NO	
SME's	<i>Is there support for small and medium enterprises?</i>	YES/NO	

Opinions

		Answer	Source of information
Regulations	<i>What are the opinions on the regulation framework?</i>	Political framework conditions determine the competitiveness of the biofuel industry. Like other renewable energies, biogas/biomethane is still dependent on state subsidies to become competitive and to establish itself on the market [4]. Although biogas/biomethane is already being promoted through various policy instruments, these have not been able to bring about the necessary market demand so that the considerable sales potentials remain unused. Without a quick adjustment of the legal framework, the Federal Government's ambitious targets are clearly missed[5].	
Economic framework	<i>What are the opinions on the economic framework?</i>	A consequent market penetration, largely due to a lack of general conditions, is still largely prevalent. A transnational biomethane market is still in its infancy.	https://www.ufz.de/index.php?de=35284/



		<p>Various strategies, investment programs, funding programs and utilization concepts have already been adopted. However, due to the complex supply chain, there are various ecological, economic, administrative and political hurdles for the market introduction of biomethane.</p>	<p>Studie: „Der Biomethanmarkt braucht klare Rahmenbedingungen für weiteres Wachstum.“</p>
Future	<i>What are the opinions on the role of biomethane in the future?</i>	<p>Biomethane can take over important functions in the future energy system: for example, providing control power in the power grid or used as a fuel alternative. Many energy scenarios are expected for the future of relevant amounts of biomethane. Processing procedures are able to work cost-effectively. Ultimately, however, the possibilities for revenue determine whether or not an investment concept can be represented economically.</p>	<p>https://www.ioew.de/no_casche/publikation/biomethan_in_energiesystem/?nr=1&Hash=855e84135137f38aa57470566771e0ea&sword_list%5B0%5D=bio</p>
	<i>What are the opinions on the future needs for the biomethane industry?</i>	<p>In the transport sector, where the share of biomass added to natural gas in the last two years was around 20 percent, biomethane companies see opportunities in heavy load and ship traffic. Biomethane and, in the future, increasingly liquefied biomethane LBG (Liquified Biogas) can counteract the rising CO2 emissions in heavy-load traffic as well as the fine dust problem. The cross-border trade of biomethane is also progressing: In the meantime, biomethane is fed into the natural gas grid in 15 European countries. This results in new opportunities for plant builders and projectors. In Great Britain and Denmark, for example, the conditions for feeding biomethane were improved</p>	<p>https://www.dena.de/newsroom/meldungen/biomethan-markt-waechst-trotz-schwieriger-rahmenbedingungen/</p>

References

[1] BIOGAS3 consortium, (2016) European legislative and financial framework for the implementation of small scale biogas plants in agro-food beverage companies.

[2] Leitfaden Biogas, (2016) FNR

[3] Leitfaden Biogasaufbereitung und –einspeisung, (2014) FNR



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[4] www.biokraftstoffverband.de

[5] www.biogasrat.de