

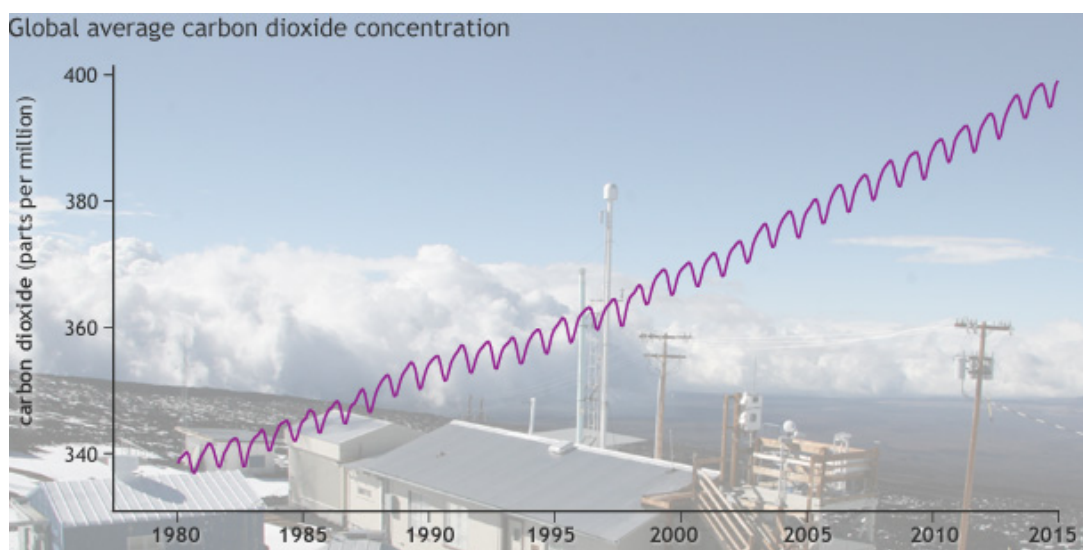


## The World is Transitioning to Renewables

July 24, 2015. **Investors could lose \$4.2tn due to impact of climate change, report warns** by Terry Macalister, The Guardian. “**Investments in fossil fuel companies face serious risk from global warming**, research by the Economist Intelligence Unit shows (...) “Investors currently face a stark choice. Either they will experience impairments to their holdings in fossil fuel companies should robust regulatory action on climate change take place, or they will face substantial losses across the entire portfolio of manageable assets should little mitigation be forthcoming,” said Brian Gardner, the editor of an EIU report, entitled **The cost of inaction: recognising the value at risk from climate change.**”

July 23, 2015. **Entrevista al Presidente Asociación Española de Biogás**, Francisco Repullo. Estado del biogás después de un año de la nueva norma gubernamental sobre tarifas energéticas en renovables. “**La rentabilidad de las plantas de biogás en España sólo es del 1%**”

July 22, 2015. **UN climate chief: Paris to set 50-year agenda** by Elaine Ganley, AP. “The December climate change conference in Paris is the last chance for a meaningful agreement that would offer hope for a planet at risk due to greenhouse gases, said U.N. climate chief Christiana Figueres. Figueres is deep into preparations to broker a landmark, legally binding climate deal with more than 190 nations to keep global warming from reaching dangerous levels (...) Whatever gets done over the next 10 to 15 years, whatever gets invested particularly in the energy system ... is going to determine the energy matrix that we will have for at least 50 years. It is going to determine the quality of life of this century and beyond,” Figueres said (...) “**With or without the science of climate change ... there is by now an unstoppable, irreversible technology and energy system trend**, said Figueres. To limit the Earth's temperature rise below 2 degrees Celsius requires a massive energy shift to renewable sources.”



NOAA Climate.gov: **[Global average carbon dioxide concentrations](#)** since 1980, with photo of Mauna Loa Observatory in background.

July 21, 2015. **Pope Francis Joins the Real Leaders in the Fight Against Climate Change** by Emily J. Gertz, TakePart. “**Nations are dithering while the environmental catastrophe unfolds, so cities are taking action to slow global warming.** Pope Francis and five dozen world leaders

signed a joint statement [[Modern Slavery and Climate Change](#)] pledging to take strong and speedy international action on climate disruption. But there were no presidents, prime ministers, premiers, or other national office holders in sight at the one-day conference in Rome where the signing took place. Instead, dozens of elected leaders of cities and other “sub-national” governments signed on, including California Gov. Jerry Brown, New York City Mayor Bill de Blasio, and the mayors of other cities in the United States, Canada, India, the European Union, South America, and Africa (...) With global action on climate change stalled for the past two decades, the emphasis of today's meeting on cities made perfect sense to Nils Moe, managing director of the Urban Sustainability Directors Network, a U.S. nonprofit that helped organize a delegation of mayors to the Vatican. **“Cities are essential to fighting climate change,”** Moe said, “because globally they are home to half of humanity and create three-quarters of greenhouse emissions.” Cities are also on the front lines of flooding, heat waves, and other effects of climate change. National and international efforts have failed to make enough of a dent in the escalating climate change crisis, said Moe, leaving a void that local leaders have moved to fill. “Working at the subnational level avoids gridlock,” he said, and has allowed cities to become “global R & D hubs for a lot of innovation” on energy, transportation, and waste reduction.”

July 21, 2015. **“5 megatrends” for a global energy transition** by Craig Morris, Energiewende Blog. “The WWF and German renewable power provider Lichtblick have joined forces to produce an overview of five ways in which the entire world is transitioning to renewables. There can be no doubt that **renewable energy is entering an era in which growth depends more on market forces and less on policy support.** Nonetheless, caution is warranted, lest we make a mountain out of a mole hill. The WWF’s five megatrends are a good place to start. (...) **1. The beginning of the end of the fossil era is here** In 2014, greenhouse gas emissions were stable for the first time in 40 years although the global economy grew. In China, coal consumption dropped. Since 2012, India has abandoned six times more coal plant projects than it has completed. The EU and the US have also closed more coal plants since 2000 than they have opened. Divestment is also affecting oil. The Rockefeller dynasty is selling its holdings in oil companies. 80 percent of the known fossil reserves need to be left in the ground to prevent the worst consequences of climate change (...) **2. Renewables are being built faster than coal, gas, and nuclear together** (...) **3. The cost of renewable energy is falling** The cost of a solar array fell by around 80 percent from 2005 to 2014, and costs will probably be cut in half again by 2025. By midcentury, solar power in the best locations (such as Dubai) may only cost two cents per kilowatt-hour. (...) **4. The energy future consists of a large number of distributed generators, not a small number of central-station plants** (...) **5. The energy future is digital** The merging of IT and energy will enable 100 percent renewable electricity, and we already have all of the technologies we need. French energy giant Engie (formerly GDF Suez) now speaks of the “miniaturization of the energy sector,” explaining that “the new era is distributed, carbon-free, and digital.” Many experts doubt that there is any role to play for conventional energy providers in this future. Critics have held that a breakthrough is needed for power storage, but prices are currently plummeting.”

July 20, 2015. **Summer Energy Package – the European Commission sees an important role for citizens in the energy transition.** “On Wednesday 15th July 2015 the European Commission published proposals on self-consumption and consumers that Cooperatives Europe and its renewable energy sector organisation REScoop.eu consider a good basis for **getting citizens and their energy cooperatives at the center of the energy transition.** In our view consumers (citizens, their cooperatives and other SME’s) need to play a more important role in delivering a fully functioning energy market to meet the 2030 EU climate and energy targets.”

July 16, 2015. **Climate change: 'We have to de-carbonise growth'** by Robert Parsons, France 24. “Rachel Kyte is vice-president of the World Bank and its special envoy on climate change. She is at the forefront of the fight to secure a global commitment to limit greenhouse gas emissions at the

Paris Conference on Climate Change later this year. **The aim is to cut emissions sufficiently to avoid more than two degrees centigrade of global warming.**”

July 16, 2015. **[International report confirms: 2014 was Earth’s warmest year on record.](#)**

“Climate markers continue to show global warming trend. In 2014, the most essential indicators of Earth’s changing climate continued to reflect trends of a warming planet, with several markers such as rising land and ocean temperature, sea levels and greenhouse gases — setting new records. These key findings and others can be found in the [State of the Climate in 2014](#) report released online today by the American Meteorological Society (AMS).”



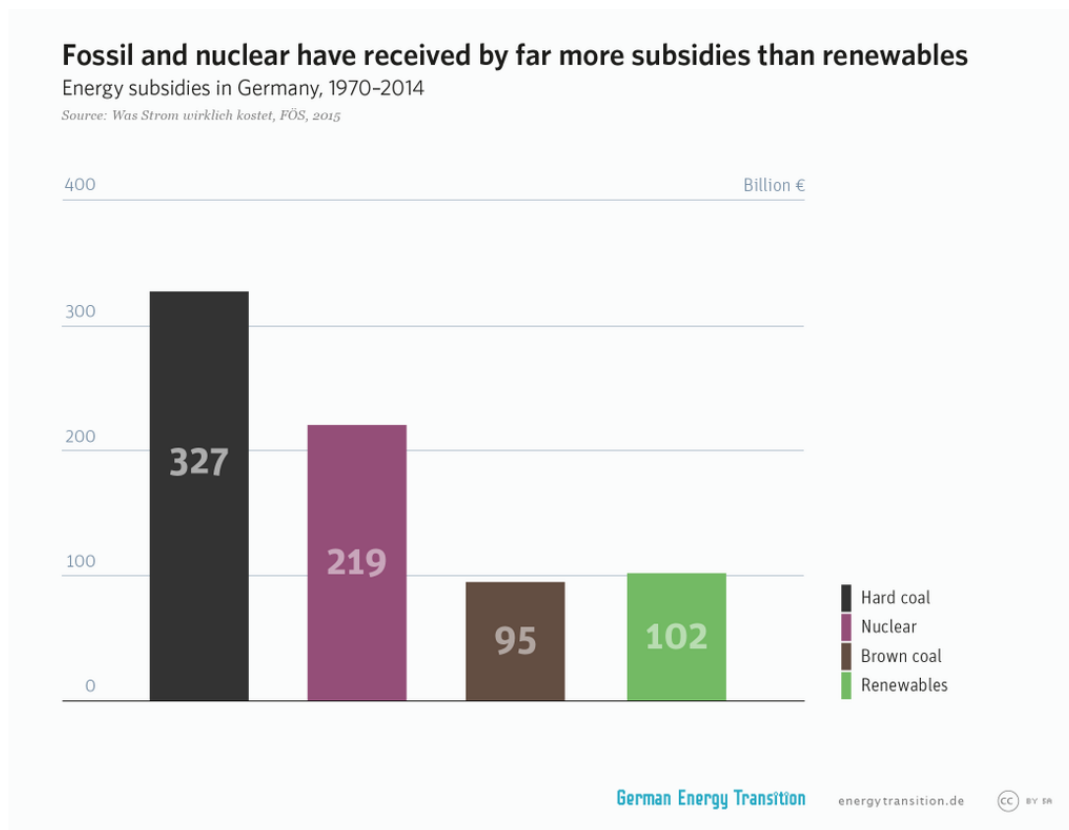
*Berlin Statue- Politicians discussing Global Warming.*

July 15, 2015. **[UK National Grid acknowledges AD 40 TWh potential figure.](#)** “In its Future Energy Scenarios planning document published today the National Grid uses AD&A’s figure of 40 TWh as the potential for biomethane. They say 4 billion cubic metres of biomethane could be produced. This equates to 40 TWh - the figure AD&A have been using for some time as to the potential for the industry using currently available technology. It is excellent news that a leading industry firm has recognised the potential for AD.”

July 15, 2015. **[Méthanisation agricole en France: les grands projets peinent à voir le jour.](#)** “La production d’énergie par fermentation des déchets agricoles, ou méthanisation, est résolument soutenue par le gouvernement, mais plus les projets sont ambitieux plus il est compliqué de concilier objectif écologique et rentabilité.”

July 15, 2015. **[La transition énergétique en France et en Allemagne.](#)** “Les académies nationales des sciences et des technologies françaises et allemandes - Nationale Akademie der Wissenschaften Leopoldina, acatech - Deutsche Akademie der Technikwissenschaften, Académie des sciences et Académie des technologies - ont rendu public le résultat de leur réflexion commune sur le thème de la transition énergétique (...) Pour relever les défis d’une transition efficace avec une réduction substantielle des émissions de gaz à effet de serre (GES), les quatre **Académies soulignent le rôle central de la recherche, de la technologie et des capacités industrielles** (...) Les Académies encouragent les programmes collaboratifs, au niveau de l’Union européenne toute entière, qui mettent **l’accent sur de nouvelles approches scientifiques et technologiques pour la production et l’utilisation de l’énergie.**”

July 15, 2015. [Fossil fuels are the ‘enemy’, OECD chief tells Addis finance meet](#) by Leo Barasi, RTCC. Question of how best to fund climate change action dominates UN financing for development summit. If we don’t stop climate change, we won’t be able to implement sustainable development or end poverty (...) **“Putting a big fat price on carbon dioxide and other emissions is imperative”**, told Ángel Gurría, Secretary-General of the OECD. **“We’re all over the place, we’re still subsidising the enemy... We need to face up to fossil fuel subsidies,”** he added.”



July 14, 2015. [10 Years of Results: Christiana Figueres, Executive Secretary of the UNFCCC, on how cities are accelerating sustainable development](#). “As home to more than half of the world’s 7 billion people and one of the largest sources of emissions, cities are well situated to reshape social and economic growth and usher in an era of climate-safe, sustainable development. [C40](#) was created one decade ago in this context. **Visionary leaders recognized that megacities are integral to meeting the challenge of our new century.** City action and collaboration has already proven powerful in reducing emissions and increasing resilience globally.”

July 13, 2015. [Fossil fuels are finished – the rest is just detail](#) By Paul Gilding, RenewEconomy. “It’s time to make the call – fossil fuels are finished. The rest is detail. The detail is interesting and important, as I expand on below. But unless we recognise the central proposition: that **the fossil fuel age is coming to an end, and within 15 to 30 years – not 50 to 100** – we risk making serious and damaging mistakes in climate and economic policy, in investment strategy and in geopolitics and defence.”

July 12, 2015. [NYC is looking to buy a whole lot of clean energy](#) by Ben Adler, Grist. “New York City Mayor Bill de Blasio (D) wants to power all city government operations with renewables within 10 years (...) De Blasio’s move has the potential to do more than just move the city government itself onto cleaner energy. **Injecting more than \$600 million per year into the renewable energy industry could help it expand and reach economies of scale that will bring costs down. And being the largest and most high-profile city in the U.S. means that New York’s actions reverberate nationally, even worldwide.**”



July 10, 2015. [BRICS bank's first project should be green – Modi](#). “A new development bank to be signed off by emerging economies this week should make its first ever investment in the clean energy sector, Indian prime minister Narendra Modi has said. Members Brazil, Russia, India, China and South Africa will “operationalise” the \$50 billion fund – a counterweight to Western lending institutions. The Shanghai-based bank dwarfs the UN signature Green Climate Fund, worth just \$10 billion so far (...) **The BRICS have skills and resources to make renewables and energy efficiency technology “affordable and accessible for all”** (...) The BRICS make up 20% of the world's GDP, almost equal to the United States, and are home to 3 billion people. Collectively, the five countries were responsible for nearly 40% of global greenhouse gas emissions in 2010, with China accounting for 22%. That makes them key actors in an international climate agreement.”

July 10, 2015. [Fossil fuel industry must 'implode' to avoid climate disaster, says top scientist](#) by Damian Carrington, The Guardian. ‘**The age of carbon is over’ and a transition to a greener economy is inevitable**, says [Hans Joachim Schellnhuber](#), adviser to the German government and Pope Francis.

July 6, 2015. [Energiewende: Biomethane helps to secure electricity supply](#). “**Biomethane-powered combined heat and power plants can help to replace fossil fuel power plants. For the future energy supply combined heat and power plants (CHP), the use of biomethane, is of central importance: can help to replace fossil fuel power plants in the security of electricity supply and complement the fluctuating power inputs from wind and solar power plants.** This is one of the results to the of the German Energy Agency (dena) Biogas coordinated partnership, a platform of about 60 companies in the biogas industry, has come in the wake of its recently completed dialogue process "future biomethane". **"The biomethane energy can be stored and controlled. Thus, the production of energy from bio-methane enables a reliable power supply around the clock.** The use of biomethane in CHP plants is therefore an important lever for the success of the energy revolution, "explains Oliver Frank, head of renewable energies and energy-efficient mobility at dena.”

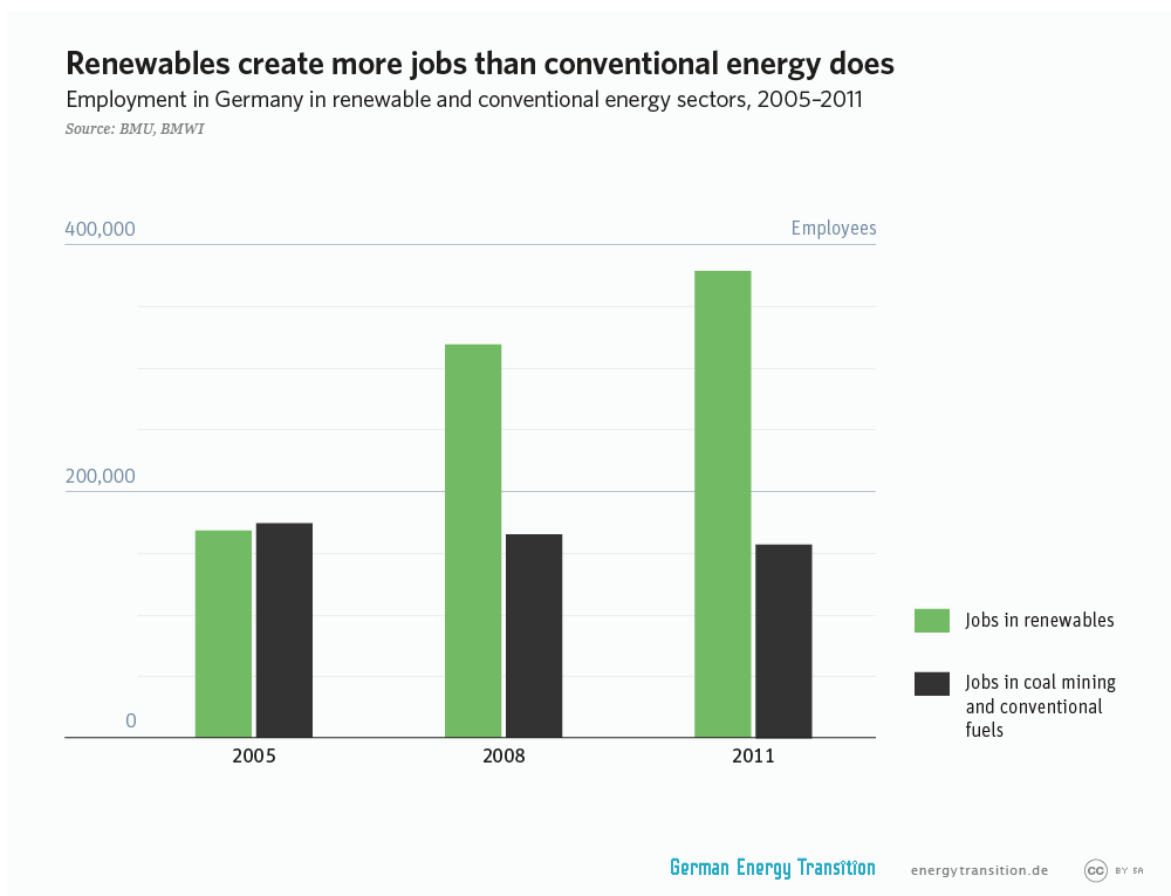
July 6, 2015. [The European cities moving faster on clean energy than their governments](#) by Terry Slavin, The Guardian. **More than 6,000 cities have signed up to go further than EU climate targets.** Copenhagen, Bristol and Växjö are leading the way. “When heads of state go to Paris at the end of the year to negotiate a deal to tackle climate change, global city mayors will also be there, arguing that **since cities are responsible for 70% of CO2 emissions, the battle should be waged, street by street, at a city level.** More than 6,000 European cities have signed up to the [Covenant of Mayors](#), a voluntary commitment to go faster and further than EU climate targets. Their climate action plans call for, on average, a 28% cut in CO2 emissions by 2020, 8% more than the EU's 2020 target.”

June 29, 2015. [« Ma propre énergie »: Le citoyen premier producteur d'énergie renouvelable?](#) par Frédéric Haas, Energystream. “Le sujet de la réappropriation citoyenne des enjeux énergétiques reste largement méconnu du grand public. En France, la tradition centralisatrice n'y est pas pour rien, mais plus largement à l'échelle européenne, la société civile n'est intégrée dans la production d'énergie que d'une manière marginale, et les récentes réformes politiques (par exemple le recours croissant à des procédures d'appels d'offres) privilégient de nouveau les grands acteurs de la production centralisée au détriment des acteurs du territoire. Sur la base de ce constat, le Conseil Économique et Social Européen (CESE) a mené en 2014 une étude qui interroge le « rôle de la société civile dans la mise en œuvre de la directive sur les énergies renouvelables »: doit-elle être simple observatrice ? contributrice ? ou principale actrice? **« Nous ne sommes pas simplement des partisans de la transition énergétique: nous sommes la transition énergétique. L'Energiewende n'a été enclenché ni par des hommes politiques, ni par les grandes entreprises énergétiques: c'est nous qui lui avons donné naissance.** Les pressions que nous avons exercées ont créé les conditions générales voulues pour que la transition soit possible ».- Témoignage d'un participant à une table-ronde en Allemagne, publié dans le rapport du CESE.”

## Energiewende and Biogas in Germany

**La transition énergétique allemande: une introduction.** La transition énergétique, «l'Energiewende» en allemand, est une expression qui fait flores depuis peu en politique, en Allemagne comme en France, et ailleurs. L'abandon du nucléaire en Allemagne, suite à l'incident de Fukushima, a provoqué beaucoup de réactions. Pour quelques-uns, cette décision politique va dans la bonne direction, mais elle est encore trop modeste et sa mise en application trop lente. Pour d'autres, cette décision semble populiste, voire trop radicale. Mais quoiqu'il en soit, **«l'Energiewende» allemande a certainement le mérite d'avoir (re-)lancé le débat aussi bien à l'échelon local que global sur le passage nécessaire aux renouvelables.** Même s'il existe actuellement un vif débat à ce sujet, on constate en effet un vaste consensus au sein de la population allemande qui estime qu'un tel pas, une telle « Energiewende » est indispensable. C'est la raison pour laquelle la Fondation Heinrich Böll a mis en place ce site internet sur la transition énergétique allemande.

**Key Findings:** 1. The German Energiewende is an ambitious, but feasible undertaking (...) 2. The German energy transition is driven by citizens and communities (...) 3. The Energiewende is Germany's largest post-war infrastructure project. It strengthens its economy and creates new jobs (...) 4. With the Energiewende, Germany aims to not only keep its industrial base, but make it fit for a greener future (...) 5. Regulation and open markets provide investment certainty and allow small business to compete with large corporations (...) 6. Germany demonstrates that fighting climate change and phasing out nuclear power can be two sides of the same coin (...) 7. The German Energiewende is broader than often discussed. It not only includes renewable electricity, but also changes to energy use in the transportation and housing sectors (...) 8. The German Energiewende is here to stay (...) 9. The energy transition is affordable for Germany, and it will likely be even more affordable for other countries (...)



**From Germany all over the World – Biogas is an Export Hit.** “In 2014, 7,944 plants in Germany with a total capacity of 3,859 MW generated more than 26 billion kWh of electricity, firmly establishing the country’s position at the top of the international rankings. There is no other country which will even approach Germany’s results. **The German biogas industry is in a correspondingly strong condition, with 41,000 people employed in the construction and operation of biogas plants in 2014 and an annual turnover of approximately 7.9 billion euros.** However, the domestic market is actually shrinking and the amendment to the German Renewable Energy Sources Act passed in August 2014 (EEG 2014) will exacerbate this. All the more reason for the industry to look towards the export markets. After all, the German biogas industry currently leads the way in terms of technology – not least because technological development here began much earlier than in many other countries.”

July 29, 2015. **Biogas: biorefinery technology ensures additional income.** “**The amendment to the EEG in 2014 resulted in the biogas sector to major changes.** The market for new plants has slumped to 41 MW, which is equivalent as compared to the industry's best in 2011, a decrease of 90 percent. **The operators of existing installations have partly economic problems. A new method could provide additional revenue.** Die Biofabrik, a company from the clean-tech industry, has completed the testing of its first bio-refinery. The innovative technology is intended to enable biogas plant operators additional revenues. The first bio-refinery was built in the Czech community Blíževedly and put the end of 2014 in operation. In the biorefinery of biofactories grass silage is utilized to produce various chemical raw materials for industry (...) ie Biofabrik sees the biorefinery a technique with great potential. **It produces sustainable chemical precursors that are used for the production of fertilizers, feed and plastic. Substances that have been produced mainly by the use of fossil fuels.** At the same time, rising commodity costs for biogas plants can be compensated because the grass silage can be used from the biorefinery in addition to the operation of biogas plants. At the same time, rising commodity costs for biogas plants can be compensated because the grass silage can be used from the biorefinery in addition to the operation of biogas plants.”

July 22, 2015. **AwSV (regulation on installations for handling water-polluting substances) threatens use of biogas from manure and waste.** “Fachverband Biogas eV fears existence threat for existing biogas plants.” (facilities for storing and treating liquid manure, leakage detections are required...)

July 20, 2015. **Germany: Schulungsverbund Biogas, uniform training for biogas operators.** “The goal is the uniform training of biogas operators and their staff in order to improve the safety standard of biogas plants. Ten educational institutions have been according to our principles in training and offers the Operator Qualification certificate.”

July 20, 2015. **Corn cultivation for biogas in Brandenburg, Germany.** “The Chorin Schorfheide biosphere reserve lies in the federal state of Brandenburg, in the Barnim district, around 45 minutes from the German capital Berlin. This reserve, founded in 1990, with its 129,161 hectares (ha) of lakes, swamps, forests and fields, is **one of the largest protected areas in Germany.** Biodiversity is high distinct species such as storks, cranes and field hares, find refuge here. **However, in the middle of the reserve farmers are shifting land use towards corn cultivation for biogas production.** While the area of corn fields has increased, that of uncultivated land and meadows has dramatically declined.”

July 16, 2015. **Organic farming in Germany decline: rents for land on which maize is grown increased due to subsidization of biogas.**

July 16, 2015. **Tighter control of biogas plants is intended to protect waters.**

July 14, 2015. [Biogas producers fighting for their existence](#). **“The biogas plant operators complain on serious losses after the amendment of the Renewable Energies Act (EEG). A biogas producer from the southwest will not longer accept passively: The KWA Bioenergy GmbH & Co. Kraftwerk Römerhügel KG (Bietigheim-Bissingen/Kreis Ludwigsburg) draws representative of Verein Nachhaltige Energien (the association of sustainable energy) with its 134 members before the Federal Constitutional Court. Why sue the operators in Karlsruhe? You will see the granted in Article 14 of the Basic Law protecting their property damaged by the 2014 entered into force EEG amendment. The restrictions on electricity from biogas would have to be canceled, especially among all renewable energy this is regardless of the weather conditions. "Gas can synchronize the concert of renewable," says Gerrit Müller-Rüster by the association. The guaranteed by the federal government grandfathering of 20 years for the investments of each operation should not have been lifted.”**

July 13, 2015. [Wild plants bloom for biogas](#). To promote ecological diversity, a **pilot project: “flowering plants for biogas.”** “Partly man high, wait camomile, wormwood, mallow and robin waiting to be processed in the near near future biogas plant. Jörg Düfelsiek is, according to climate protection manager Henning Korte from Gütersloh one of seven farmers who throughout the county to participate in the pilot project "flowering plants for biogas". On different soils - a total of twelve hectares - is also being tested in Borgholzhausen, Harsewinkel, Herzebrock-Clarholz, Rietberg and Werther except in Steinhagen, which mixture of perennial energy wild plants best suited for use in biogas plants - is suitable - as a complement to conventional maize (...) "On the field is really what's going on," says Jörg Düfelsiek and refers to an "enormous insect emergence". Bees, bumblebees, spiders, to farmland birds, bats and other animals - Conny Oberwelland of the Biological Station lists some beneficiaries of the 25 varieties of flowering plants on the 0.7 hectare site. Benefits sees Ulrich Bultmann also rabbits, partridge, pheasant and other animals, which in turn delighted the hunters.”

July 8, 2015. Fachverband Biogas e.V. (German Biogas Association) & Bundesverband WindEnergie e.V.: [Farmers face further losses](#) **A change in the Renewable Energy Act brings dramatic losses for the operators of biogas plants (...)** Energy from solar, wind and biogas account for the energy turnaround. In particular, the storage effect of the biogas plants is an important part of the energy revolution. Why does the wind association Schleswig-Holstein in this approach a worrying signal effect. "While nuclear power plants and coal-fired power plants will continue to receive government subsidies in the billions, are renewable energy plant will be wiped out. This can not be the right way, "said Nicole Knudsen, head of the country office in the wind association Schleswig-Holstein. "The annual loss for biogas operators amounts to more than five million euros, while a withdrawal of this regulation would not affect the price of electricity. None of renewable energy installation, there must be such a disproportionate interference in the grandfathering ". Meanwhile, **some operators of biogas plants have been filed against the maximum income threshold complaint before the Federal Constitutional Court.**”

July 6, 2015. [How Germany's Second-Biggest Utility Is Adapting to a Distributed Energy World](#) by Jeff St. John, The Energy Collective. “RWE is building distributed energy tech at home and looking to Silicon Valley for new ideas. German utility RWE is a **victim of the so-called “utility death spiral,” with its central-power-plant-reliant business losing billions of dollars in Germany’s renewables-rich energy market. But distributed energy technologies and business models could help turn its fortunes around** -- whether they’re homegrown, or out of Silicon Valley (...) The Essen-based utility is fielding about a dozen pilot projects across Europe that combine large-scale renewable energy, customer-sited energy resources and local control systems in order to find cheaper and more reliable ways to integrate green energy into its operations (...) to carry out a radical transformation of RWE’s business model. RWE plans to transform its business from dependence on large-scale power generation to a capital-light, distributed energy model.



“Based on funds sourced largely from third parties, we will position ourselves as a project enabler and operator, and [as a] system integrator of renewables.”

July 1, 2015. [Biogas accident: The floodplain in Bad Bodenteich has been contaminated by manure](#). “The town of Bad Bodenteich district Uelzen, has forbidden the use of the park lake until further notice. This means for visitors and residents: no fishing, no swimming and not even pedal boating. In the past week, several thousand liters of liquid manure had flowed into the water after it had been a leak in a biogas plant. Tests have now shown that the quality of water is severely affected by faecal bacteria. Bacteria can cause infections.”

February 2, 2015. [Biogas sustainability with side effects](#). Why still keep cows for a pittance? **More and more farmers prefer to feed a biogas plant instead of their animals**. This is lucrative, why cattle stable and pasture management biogas plants soft. But that has massive side effects.”

Context=

March, 2015. [Berlin Energy Transition Dialogue – towards a global Energiewende](#). BioGAS+ Newsletter. p. 5-6. “Biogas on the edge.”

November, 2014. [Effects of the Biogas Policy Changes in Germany: Adaptation to New Requirements](#). BioGAS+ Newsletter. p. 5-7. “Biogas on the edge.”

## AD Digestate: Waste or Resource?

July 23, 2015. Peoria, Illinois: [Potato Waste Digestate Outperforms Peat](#). “Sphagnum peat moss is one of the most commonly used substrates in commercial horticulture, along with pine bark, coconut fiber (coir), vermiculite, perlite, rock wool, rice hulls and various composts. But concerns about the **sustainability of harvesting peat moss from wetland bogs has prompted some to seek alternatives**. And a U.S. Department of Agriculture (USDA) researcher says he has **found one in anaerobically digested potato waste**. In controlled trials comparing air-dried potato peel digestate with peat, Steven Vaughan, a plant physiologist at the USDA’s Agricultural Research Service Utilization Research Center in Peoria, discovered that the digestate equaled or bested peat in promoting better growth in tomato plants and marigolds. Vaughn says that several years ago, a microbiologist was working with Cavendish Farms on Prince Edward Island, Canada, which had shifted from expensive off-island processing of its potato waste to being one of the first potato industry facilities to install an anaerobic digester. Cavendish Farms sent Vaughn ten 55-gallon drums of wet potato digestate, which he air-dried. “It had a slight ‘sour’ odor at first, but the dried digestate has a pleasant earthy odor with a physical appearance similar to sphagnum peat moss,” notes Vaughan, who began testing it as a peat moss replacement in both starter and transplant substrates. Vaughn explains that **the NPK (Nitrogen-Phosphorus-Potassium) values of the digestate are about 10 times higher than aerobic compost**. He was “a little worried” at first that the digestate’s level of dissolved solids in solutions might stress the plant, but it worked well. The control mix was 50 percent peat moss and 50 percent vermiculite, with a slow-release chemical fertilizer added. This was compared to a 50:50 mix of digestate and vermiculite, and 100 percent digestate. After four weeks, both tomato and marigold transplants in 100 percent digestate were as tall or taller, and heavier, than the transplants in the peat moss mixed with fertilizer, reports Vaughn. The 50:50 mix of digestate and vermiculite had pretty similar results as the 100 percent digestate, although the latter performed slightly better.”

July 15, 2015. [HRS helps Spanish grower become energy self-sufficient](#). “At the beginning of 2012 the Spanish government effectively withdrew subsidies for renewable energy, including

biogas production, following a moratorium on support as part of wider economic austerity measures. However, despite this there are still opportunities for businesses to utilise this technology. HRS Heat Exchangers is helping leading Spanish farming company Kernel Export **become more sustainable with its novel Digestate Concentration System (DCS)** which is being installed at a new 400 kW anaerobic digestion plant at the company's packing site in Murcia (...) Although the plant received match-funding from the European Union, as anaerobic digestion in Spain does not receive a Feed-in-Tariff, it is this use of the generated energy which makes the project financial feasible, as is a reduction in fertiliser costs by using the digestate (...) **Under local rules, unprocessed digestate cannot be applied in Murcia. However, the HRS DCS overcomes this obstacle and is also a key part of utilising the nutrient rich digestate effectively reducing storage requirements and transport costs for the 50 tonnes of material produced each day.** The concentrated digestate will be used as a biofertiliser while the water which is taken off will be cleaned and used to irrigate suitable crops such as salads and vegetables. Jose Antonio Cánovas Martínez, General Manager of Kernel Export, commented: "We had been looking for years for a system to optimise the use of the waste from salads and vegetables from our two production sites and we found the answer in a biogas plant to generate electricity and heat. This is then used to process the liquid and solid fraction after digestion to obtain a bio-compost that we can use in back on our production fields. The project has been a real challenge, as nothing similar has ever been built, with the focus on reusing and recycling salad and vegetable waste to return it back to the land for future production." Luis Puchades, Account Manager for Ludan Renewable Energy which constructed the plant added: "The three principles behind this project were waste reduction, the generation of electricity and the production of quality organic fertiliser for the farming business (...) The AD plant is already operating and the DCS will be commissioned in November 2015."

July 15, 2015. [Quality and function of anaerobic digestion residues](#) by Kajsa Risberg, Doctoral thesis Swedish University of Agricultural Sciences, Uppsala. "It can be concluded that the **digestate from biogas plants has great potential as a fertiliser in crop production** and does not seem to pose a greater risk of disturbing soil microorganisms than pig slurry and cow manure when spread on arable land"

July 14, 2015. [DC-Agri project \(digestate & compost in agriculture\)](#). "The DC-Agri project is a **four year research project looking at the use of quality anaerobic digestate (biofertiliser) and compost in agriculture**, integrated with an extensive knowledge exchange network. The project is funded jointly by Defra, WRAP, WRAP Cymru and Zero Waste Scotland. Using quality digestate and compost in agriculture can improve soil fertility and provides valuable plant nutrients. The DC-Agri project will gather data which will enable these materials to be used more efficiently by farmers, helping to control costs and improve production. Digestate is a valuable source of available plant nutrients, particularly nitrogen, but the rate at which nitrogen is released for uptake by crops is not well understood. This research will generate robust data on crop available nitrogen supply from digestate, enabling farmers to include digestate in nutrient management plans with confidence and maximise their potential to displace manufactured fertilisers. Utilising the nutrients in digestate and compost to grow crops will reconnect nutrient cycles and improve the efficient use of resources, particularly from the energy intensive manufacture of nitrogen fertilisers and the mining of phosphate from non-renewable resources. Composts are recognised as a valuable source of organic matter and the experiments will measure the impact of their use on soil organic carbon, soil health and soil physical properties, including water holding capacity, soil stability and soil strength. **The sustainability of UK agricultural production is dependent on the long-term maintenance of soil function and fertility which are key aspects of soil quality.**"

July 1, 2015. [Le ministère de l'Ecologie veut sortir le digestat du statut de déchet](#) par Vincent Gobert, La France Agricole. "L'accompagnement de la filière méthanisation est pour nous une priorité ». Voilà comment Olivier David a conclu son intervention à la table ronde organisée lors du Colloque national biomasse, ce mardi 30 juin à Paris. Représentant Ségolène Royal, le récent promu sous-directeur du système électrique et des énergies renouvelables assure d'un travail sur une

«ordonnance donnant un nouveau cadre pour la sortie de statut de déchet du digestat ». Il ajoute qu'un « décret d'application est en cours de finalisation ».

June 30, 2015. [\*\*New opportunities for agricultural digestate valorization: current situation and perspectives\*\*](#). “In the agricultural sector of many European countries, biogas production through anaerobic digestion (AD) is becoming a very fast-growing market. AD is a simple and robust process that biologically converts an organic matrix into biogas and digestate, the latter corresponding to the anaerobically non-degraded fraction. So far, digestate has been mostly used at farm-scales for improving soils. However, **its ever-increasing production induces problems related to transport costs, greenhouse-gas emissions during storage and high nitrogen content that constrains its use to land application only**. Consequently, research on alternative valorisation routes to reduce its environmental impact and to improve the economical profitability of AD plants should draw increasing interest in the future. This review therefore focuses on the different alternatives of digestate valorisation, apart from land applications: (I) the use of the digestate liquor for replacing freshwater and nutrients in algae cultivation; (II) the use of solid digestate for energy production through biological (i.e. AD, bioethanol) or thermal processes (i.e. combustion, hydrothermal carbonization and pyrolysis); (III) the conversion of solid digestate into added-value products (char or activated carbons) through a pyrolysis process.”

June 23, 2015. [\*\*Recovering nutrient content using anaerobic digestion\*\*](#) (video). “Aidan Cumiskey, Business Leader for Monsal Advanced Digestion Technologies, GE Water & Process Technologies **explains the global trend of using anaerobic digestion to recover nutrient content to apply to crops.**”

## **RRI: Anaerobic Digestion For Sanitation?**

July 27, 2015. [\*\*Consorzio Italiano Biogas: “Dal dott. Baldi tesi infondate”\*\*](#). “La grave infondatezza delle tesi espresse da Gian Piero Baldi nel suo intervento dal titolo “La morte dagli impianti a biogas” ci spinge, come Consorzio Italiano Biogas, a richiedere una doverosa replica. **A tutela dell’interesse dei cittadini a essere correttamente informati, premettiamo che quanto espresso dal CIB può trovare un riscontro scientifico attraverso gli uffici del CNRB, il Centro nazionale di riferimento per il botulismo presso l’Istituto Superiore di Sanità**. A riguardo è già utile premettere le conclusioni di una recente relazione pubblica dello stesso ISS nella quale si afferma che “in Italia non è mai stata dimostrata la correlazione fra casi di botulismo nei bovini e l’uso di digestati provenienti dalla digestione anaerobica”. Ulteriori doverosi riscontri possono arrivare dal Crpa e dal Consorzio del Parmigiano Reggiano, le cui posizioni in merito al biogas sono state erroneamente interpretate dall’autore dell’articolo.”

July 24, 2015. [\*\*La morte dagli impianti a biogas: il Botulismo\*\*](#) by Gian Piero Baldi, Presidente Associazione “Bio Ambiente cura e salvaguardia del territorio di Tarquinia e dell’ Alto Lazio” Medico ISDE (Associazione Internazionale Medici per l’ Ambiente – ISDE Italia). “Quale Presidente dell’Associazione “Bio Ambiente”, Vi scrivo in merito alla realizzazione dell’impianto a Biogas a Tarquinia, proposto dal Consorzio Pellicano ed attualmente in corso di Valutazione di Impatto Ambientale presso la Regione Lazio. Capita spesso, in casi come questo, che da una parte gli imprenditori tentino di difendere la loro aspettativa di un altissimo profitto economico e dall’altra **semplici cittadini ambientalisti lottino strenuamente per la difesa della salute della collettività e dell’ ambiente in cui vivono**. Noi facciamo parte di questa seconda categoria. Perciò sia da Presidente di “Bio Ambiente” ma ancor più in funzione della mia qualifica di Medico ISDE (Medici per l’Ambiente) trovo doveroso specificare che l’impegno che noi, in quanto medici, approfondiamo nella lotta civile in difesa dell’ambiente, deriva oltre che da un profondo senso di responsabilità, soprattutto da un obbligo morale e di coscienza che la preparazione scientifica, imprescindibile dal nostro ruolo, ci impone.”

July 20, 2015. **First study providing data on the reduction of Cl. botulinum during biogas processes:** [Fate of Clostridium botulinum and incidence of pathogenic clostridia in biogas processes](#). by Fröschle B, Messelhäuser U, Höller C, Lebuhn M, from the Bavarian State Research Center for Agriculture and the Bavarian Health and Food Safety Authority. “**This study aimed to assess the sanitary situation in agricultural biogas plants regarding pathogenic Clostridium spp.** Methods and Results: The incidence of Clostridium botulinum, Clostridium difficile, Clostridium novyi, Clostridium haemolyticum, Clostridium septicum and Clostridium chauvoei was investigated in 154 plant and animal substrates, digester sludges and digestates from full-scale biogas plants using a method combining microbial enrichment with Real-Time PCR. The investigated clostridia were absent in the samples, except for Cl. novyi that was barely present (3.9%) and Cl. difficile that was more frequently detected (44.8%). Cl. botulinum exposed to lab-scale digesters in sentinel chambers was reduced with D-values of  $34.6 \pm 11.2$  d at 38°C and  $1.0 \pm 0.2$  d at 55°C. Conclusions: These findings indicate minor relevance of clostridial pathogens in biogas plants and an improved sanitary quality of the digestion product compared to untreated substrates concerning Cl. botulinum. However, the frequent detection of Cl. difficile opens questions on the durability of this organism in manure digestion lines. Significance and Impact of Study: This is the first study providing data on the reduction of Cl. botulinum during biogas processes that **scientifically invalidate contrary claims by some media in the public.** Furthermore, the results improve the fragmentary knowledge on the prevalence of several clostridial pathogens in agricultural biogas production.”

July 13, 2015. **Biogas: potential health hazards for humans and animals?** by Deutschland Agrar und Veterinär Akademie (AVA). “There are quite strong concern that pathogens can be spread on fields and meadows through the biogas production and the subsequent deployment of biogas residual mass. A gene transfer, ie an exchange of information of the bacteria to each other, during the fermentation process can not be excluded (...) Why shrinks the biogas industry to publish critical and especially thought-provoking studies? You have something to hide? (...) In digestate of biogas plants prevail partially unknown or uncontrollable conditions, which have a significant impact on the microbiome (...) It is time to create clarity by research (...) **Ernst-Günther Hellwig, founder and director of the Academy, calls for an unprejudiced cooperation between all scientists concerned to control residual risks for the benefit of human and animal health. Until the major issues and theories are not scientifically clear and reproducible, no biogas residual mass on fields and meadows should be applied,** which are intended for the production of animal feed, or products for human nutrition.”

July 8, 2015. **Méthanisation et botulisme quels sont les risques pour le projet Athies-Méthanisation?** “Existe-t-il un risque de contamination au botulisme ? Le botulisme est une maladie rare et très dangereuse qui peut entraîner la mort. On trouve, en particulier sur internet, des articles accusant la méthanisation de contamination au botulisme. Ils affirment que le digestat (le résidu de méthanisation qui sert de fertilisant naturel dans les champs) pourrait être contaminé par du botulisme ce qui risque de contaminer les personnes et les animaux qui se nourriraient des plantes cultivées grâce à ce fertilisant naturel. Tout d'abord, aucune étude n'a prouvé la présence de botulisme dans du digestat issu de méthanisation. Ensuite, la rumeur sur la contamination au botulisme est lié à la méthanisation de déchets carnés (cadavres d'animaux, déchets de cuisine, déchets d'abattoir ou de boucherie) eux-mêmes contaminés. Notre projet, Athies-Méthanisation (Minimes d'Athies-sous-Laon, France), exclu catégoriquement les déchets carnés. Il n'y aura même pas de sous-produits animaux (lisier, fumier...). Il s'agira d'une **méthanisation exclusivement végétale issue de l'agriculture et de l'industrie agro-alimentaire locale.** Donc, le projet Athies-Méthanisation n'est pas concerné par cette rumeur qui ne s'appuie sur aucune étude.”

June 1, 2015. **Anaerobic digestion in sanitization of pig slurry and biomass in agricultural biogas plant** by Michal Grudzinski, Journal of Microbiology, Biotechnology and Food Sciences.



“Pig slurry is one of the production manure, which should be managed properly because of environmental threats it can cause. Pig slurry contains a wide range of microorganisms, most of which are opportunistic or obligatory pathogens for people and animals. Spreading it on fields without control can cause microbial contaminations of water and soil. **Use of pig slurry as substrate in anaerobic digestion can be an effective way of sanitization.** In this work role of methanogenic fermentation in pig slurry sanitization was laboratory examined. Study materials were biological samples: 1 sample of raw slurry and 3 samples of fermented biomass from different stages of fermentation. Total number of coliforms was determined by MPN (most probable number) method, and presence of enterococci was verified in each sample. Study have shown that anaerobic digestion reduced total number of coliforms from initial amount of  $7.0 \times 10^6$  [MPN/ml] in raw slurry to  $3.7 \times 10^4$  [MPN/ml]. Total reduction was 99.47%. Moreover, after first fermentation, enterococci in the sample were undetectable. **Results of this study proved anaerobic fermentation to be an affective way to neutralize microbial threat,** that is pig slurry.”

April 29, 2015. [No spread of pathogens \(especially C. botulinum\) through biogas plants!](#) (in german) “Several extensive studies in biogas plants have highlighted the following: - Should as C. botulinum arrive on animal carcasses in the manure in the biogas fermenter, this bacterium does not multiply there - Compared to the starting material it even comes to the reduction of pathogens during the biogas process - The hygienic status of the fermentation products is significantly improved by the fermentation so - Already the ensiling of the substrates leads to a reduction of pathogens - The ability to form spores is reduced by the biogas process (...) **The number of biogas plants has increased sharply since 2000. However, a parallel increase of poisoning caused by C. botulinum has not been proven.** This suggests that biogas plants pose no threat to the spread of C. botulinum.”

March 10, 2015. [Detection of Clostridium botulinum in liquid manure and biogas plant wastes](#) “**Biogas plants have been considered as a source for possible amplification and distribution of pathogenic bacteria capable of causing severe infections in humans and animals.** Manure and biogas wastes could be sources for spore-forming bacteria such as Clostridium botulinum. In the present study, 24 liquid manure and 84 biogas waste samples from dairies where the majority of the cows suffered from chronic botulism were investigated for the presence of botulinum neurotoxins (BoNT) and C. botulinum spores. The prevalence of BoNT/A, B, C, D, and E in biogas wastes was 16.6, 8.3, 10.7, 7.1, and 10.8 %, respectively, while in manure, the prevalence was 0.0, 0.0, 0.0, 8.3, and 4.1 %, respectively. After enrichment of samples in reinforced cultural medium, they were tested for C. botulinum BoNT/A, B, C, D, and E using ELISA (indirect C. botulinum detection). The prevalence of C. botulinum type A, B, C, D, and E samples in biogas wastes was 20.2, 15.5, 19, 10.7, and 34.8 %, respectively, while the prevalence in liquid manure was 0.0, 0.0, 0.0, 8.3, and 12.5 %, respectively. In conclusion, **the occurrence of BoNT and C. botulinum spores in biogas waste of diseased animals indicates an increased and underestimated hygienic risk.** Application of digestates from biogas fermentations as fertilizers could lead to an accumulation of long lifespan spores in the environment and could be a possible health hazard.”

November 11, 2014. [So far no indication of Botox bacteria in Lower Saxony biogas plants](#) (in german) “Recent results from a research project of the Federal Research Institute for Biodiversity (...) The Thünen research group headed by [Prof. Dr. Christoph Tebbe](#) employed novel molecular methods for their investigations (...) **Not a single outcome of the entire project suggests that toxin-producing C. botulinum bacteria or other problematic clostridia multiply in a biogas plant and so can pose a threat to the health of humans and animals.**”