APPLIED NANOPARTICLES

Monthly Anaerobic Digestion Newsletter

January 2015 Compilation & Overview

Climate change is an inmediate risk

January 20, 2015. Remarks by the President in State of the Union Address. "**And no challenge -- no challenge -- poses a greater threat to future generations than climate change**. 2014 was the planet's warmest year on record. Now, one year doesn't make a trend, but this does: 14 of the 15 warmest years on record have all fallen in the first 15 years of this century. I've heard some folks try to dodge the evidence by saying they're not scientists; that we don't have enough information to act. Well, I'm not a scientist, either. But you know what, I know a lot of really good scientists at NASA, and at NOAA, and at our major universities. And **the best scientists in the world are all telling us that our activities are changing the climate**, and if we don't act forcefully, we'll continue to see rising oceans, longer, hotter heat waves, dangerous droughts and floods, and massive disruptions that can trigger greater migration and conflict and hunger around the globe. The Pentagon says that climate change poses immediate risks to our national security. We should act like it."

January 19, 2015. **It is only three minutes to midnight: Climate Change Inaction Pushes 'Doomsday Clock' Closest to Apocalypse in 30 years**. Founded in 1945 by University of Chicago scientists who had helped develop the first atomic weapons in the Manhattan Project, the Bulletin of the Atomic Scientists created the Doomsday Clock, using the imagery of apocalypse (midnight) and the contemporary idiom of nuclear explosion (countdown to zero) to convey threats to humanity and the planet. The decision to move (or to leave in place) the minute hand of the Doomsday Clock is made every year by the Bulletin's Science and Security Board in consultation with its Board of

Sponsors, which includes 17 Nobel laureates. The Clock has become **a universally recognized indicator of the world's vulnerability to catastrophe** from nuclear weapons, climate change, and new technologies emerging in other domains. "Efforts at reducing global emissions of heat-trapping gases have so far been entirely insufficient to prevent unacceptable climate disruption. Unless much greater emissions reductions occur very soon, the countries of the world will have emitted enough carbon dioxide and other greenhouse gases by the end of this century to profoundly transform the Earth's climate. The resulting climate change will harm millions of people and will threaten many key ecological systems on which civilization relies… We call upon world leaders to take coordinated and rapid action to drastically reduce global emissions of heat-trapping gases, especially carbon dioxide. We also urge the citizens of the world to demand action from their leaders. **This threat looms over all of humanity. We all need to respond now, while there is still time**."

Great Acceleration 2015 (slideshow) from International Geosphere-Biosphere Programme

January 16, 2015. **The New Global Context: The Great Acceleration**. New planetary dashboard shows increasing human impact. **Human activity, predominantly the global economic system, is now the prime driver of change in the Earth System** - the sum of our planet's interacting physical, chemical, biological and human processes. This is the conclusion made visible in a set of 24 global indicators, or a "planetary dashboard", published in the latest issue of Anthropocene Review. The research charts the "Great Acceleration" in human activity from the start of the industrial revolution in 1750 to 2010, and the subsequent changes in the Earth System – e.g. greenhouse gas levels, ocean acidification, deforestation and biodiversity deterioration. The original 24 indicators were published in 2004. "**It is difficult to overestimate the scale and speed of change. In a single lifetime humanity has become a geological force at the planetary-scale**."

January 16, 2015. **Four of nine planetary boundaries now crossed** as a result of human activity, says an international team in the journal Science. The four are: climate change, loss of biosphere integrity, land-system change, altered biogeochemical cycles. The scientists say that two of these, climate change and biosphere integrity, are "core boundaries" – significantly altering either of these would "drive the Earth System into a new state". The team will present their findings in seven seminars at the World Economic Forum in Davos (21-25 January).

January 15, 2015. **Planetary boundaries: Guiding human development on a changing planet**. The planetary boundaries framework defines a safe operating space for humanity based on the intrinsic biophysical processes that regulate the stability of the Earth System. Here, we revise and update the planetary boundaries framework, with a focus on the underpinning biophysical science, based on targeted input from expert research communities and on more general scientific advances over the past 5 years. Several of the boundaries now have a two-tier approach, reflecting the importance of cross-scale interactions and the regional-level heterogeneity of the processes that underpin the boundaries. Two core boundaries—climate change and biosphere integrity—have been identified, each of which has the potential on its own to drive the Earth System into a new state should they be substantially and persistently transgressed.

January 14, 2015. White House Targets Methane to Slow Climate Change by Haley Sweetland Edwards, Time. **It's 20 times more powerful than carbon dioxide**. The White House announced a new plan to cut methane emissions in the oil and gas sector by 40 to 45% in the next ten years. The reductions will come in part from fixing leaky equipment and the intentional "flaring" of gas at oil and gas production sites.

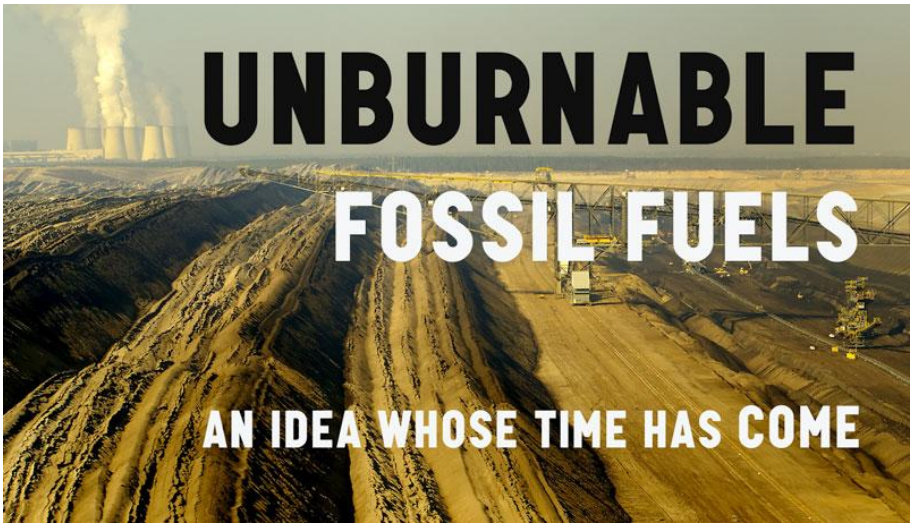
The Carbon Bubble

January 27, 2015. **China coal production falls for first time this century**. Coal production fell 2.1% in 2014 against 2013, with further decreases expected this year, BusinessGreen reports. The impact of China's clean air and renewable energy policies are beginning to have an impact on the country's coal industry, according to reports suggesting domestic coal production fell last year. **Much of the pressure on the coal industry is the result of demanding new environmental regulations from the Chinese government and increased investment in renewable energy, that has made China the world's largest investor in clean technologies**.

January 27, 2015. **Le biogaz bouscule le modèle de GrDF** par Guillaume Maincent, L'Express. La filiale distribution de GDF-Suez **se prépare à la transition énergétique : elle va devoir distribuer de plus en plus de gaz naturel d'origine renouvelable et locale**.

January 26, 2015. **Falling Demand for Oil Is the Biggest Concern for Saudis** by Isaac Arnsdorf, Bloomberg. **"Nobody should imagine the world will continue to demand oil as long as you have it in your fields,"** Mohammad Al Sabban, an adviser to Saudi Arabia's petroleum minister from 1988 to 2013, said in an interview. **"We need to prepare ourselves for that stage."**

January 22, 2015. **Historic moment: Saudi Arabia sees End of Oil Age coming and opens valves on the carbon bubble** by Elias Hinckley, Energy Post. In a world where a producer sees the end of its market on the horizon, every barrel sold at a profit is more valuable than a barrel that will never be sold. Saudi Arabia no longer needs OPEC. **Global action on carbon dioxide emissions is gaining global acceptance and technological advances are creating foreseeable and viable alternatives to the world's oil dependence**. The direct oil markets impact and the geopolitical fallout will likely be the defining headlines of 2015, but there is a much much bigger story unfolding: the carbon asset bubble is deflating. **The owner of the most valuable fossil fuel reserve on Earth just started discounting for a future without fossil fuels.** While they would never state this reasoning publicly, their actions speak on their behalf. **And that changes everything**.



January 17, 2015. **Seize the day. The fall in the price of oil and gas provides a once-in-a-generation opportunity to fix bad energy policies**. According to The Economist, **now the perfect time to abolish fossil fuels subsidies and boost green energy**.

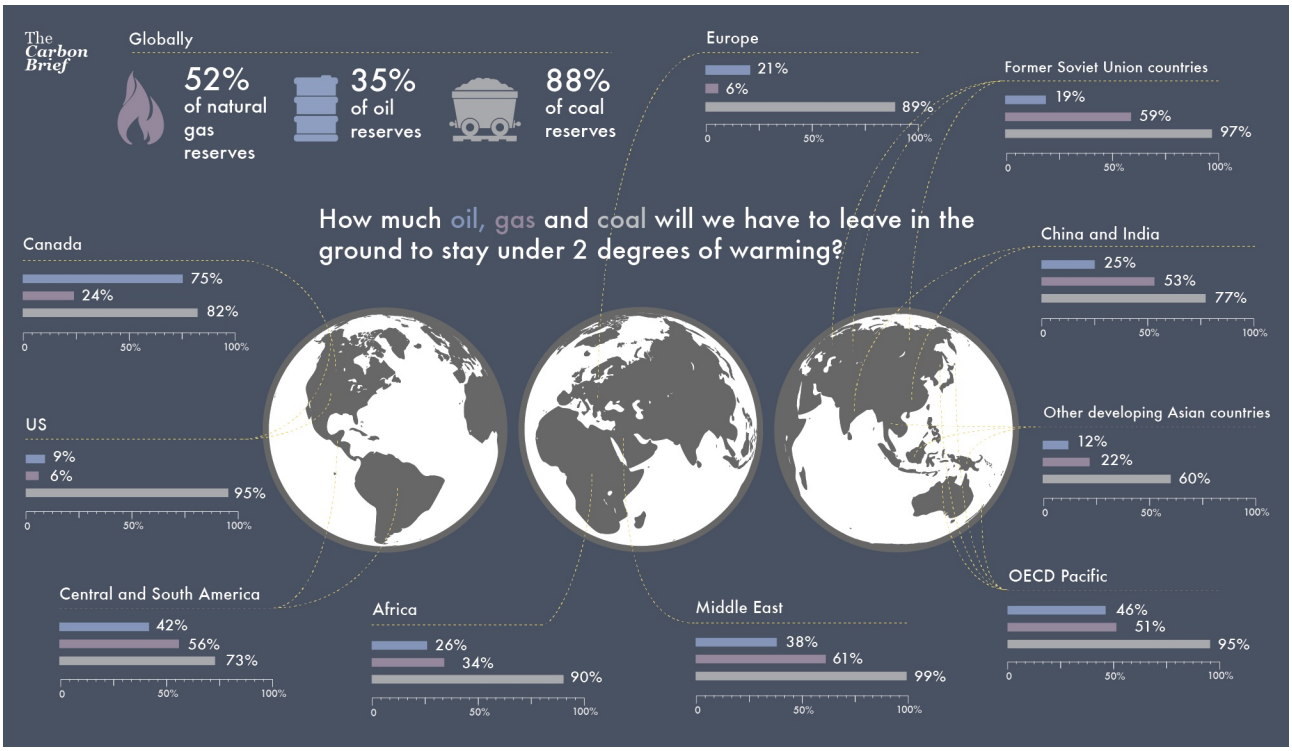
January 8, 2015. **The geographical distribution of fossil fuels unused when limiting global warming to 2 °C** by Christophe McGlade & Paul Ekins, Nature. **The unabated use of all current fossil fuel reserves is incompatible with a warming limit of 2 °C**.

January 7, 2015. **Fossil fuel warning: Climate scientists beg governments to leave buried natural resources in the ground** by Steve Connor, The Independent. Vast underground reserves of oil, gas and coal should be classified as off limits if the world stands any chance of averting dangerous climate change, a major study of global fossil-fuel deposits has found. Scientists calculated that a third of global oil reserves, half of gas reserves and more than 80 per cent of coal reserves should remain in the ground as "unburnable" to avoid exceeding the 2C "safe" threshold for global warming.

January 7, 2015. **World Bank urges leaders to use oil crash to slash subsidies**. As oil price hits 5-year low, chief economist warns emissions could rise without government leadership. **Governments should slash oil subsidies as the global price plummets or face a longer term rise in demand and global carbon emissions**. That is the stark warning from the World Bank in its Global Economic Prospects for 2015 publication.

December 1, 2014. **Bank of England investigating risk of 'carbon bubble'**. Enquiry to assess chances of an economic crash if climate change rules render coal, oil and gas assets worthless. The concept of a "carbon bubble" has gained rapid recognition since 2013, and is being taken increasingly seriously by some major financial companies including Citi bank, HSBC and Moody's,

but t**he Bank's enquiry is the most significant endorsement yet from a regulator**. The concern is that if the world's government's meet their agreed target of limiting global warming to 2C by cutting carbon emissions, then **about two-thirds of proven coal, oil and gas reserves cannot be burned**. **With fossil fuel companies being among the largest in the world, sharp losses in their value could prompt a new economic crisis**. News of the Bank's enquiry comes on the day that global negotiations on climate change action open in Lima, Peru, and as one of Europe's major energy companies E.ON announced it was to hive off its fossil fuel business to focus on renewables and networks. The UN's Intergovernmental Panel on Climate Change recently warned that **the limit of carbon emissions consistent with 2C of warming was approaching and that renewable energy must be at least tripled**.



How much oil, gas and coal will we have to leave in the ground to stay under 2 degrees of warming. Credit: Rosamund Pearce, Carbon Brief *derived from McGlade et al. (*2014*)*

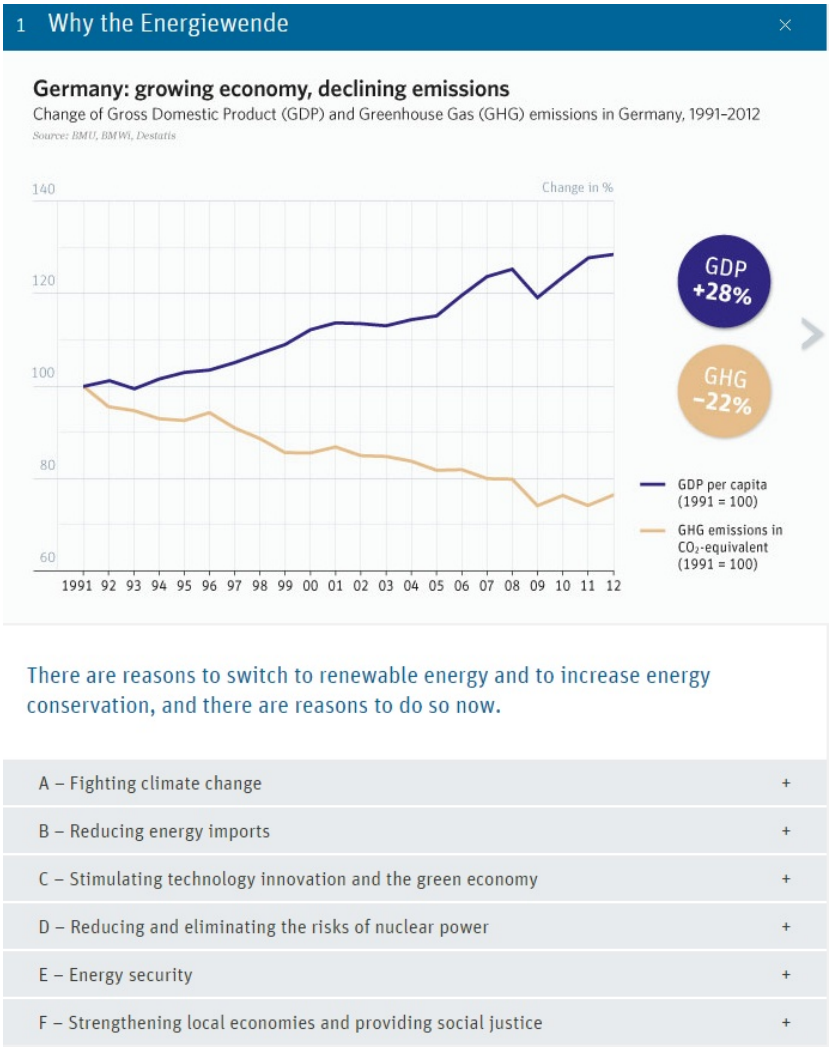
A Global Energy Transition has Started

January 28, 2015. **4 climate conclusions from Davos** by Christiana Figueres, Executive Secretary of the United Nations Framework Convention on Climate Change. **Davos 2015 accelerated the understanding of the economic desirability and the technical ability to meet the climate challenge**.

January 28, 2015. **Energie rinnovabili, nel futuro dell'Europa c'è il biogas**. **Ottime prospettive** per il biometano in particolare. AgroNotizie ha intervistato Jan Stambasky, presidente della European Biogas Association.

January 19, 2015. **Germany means business with EU #EnergyUnion** by Alice Stollmeyer. "Germany stresses the fact that Europe is facing a 'fundamental energy transition'. **We tend to think about the Energiewende as being uniquely German, but actually a global energy**

transition has started, and Europe had better make sure to keep up. Not just for reasons of competitiveness, but also because an urgent transition to energy efficiency, savings and renewables is needed to tackle the climate crisis. Europe has to do its fair share, if not more (...) All in all I much welcome the German position, and I hope EU decision-makers will take due note of it. As I said before: energy is a shared competence. And especially when working on a European Energy Union, we need stronger EU energy and climate governance, not weaker."



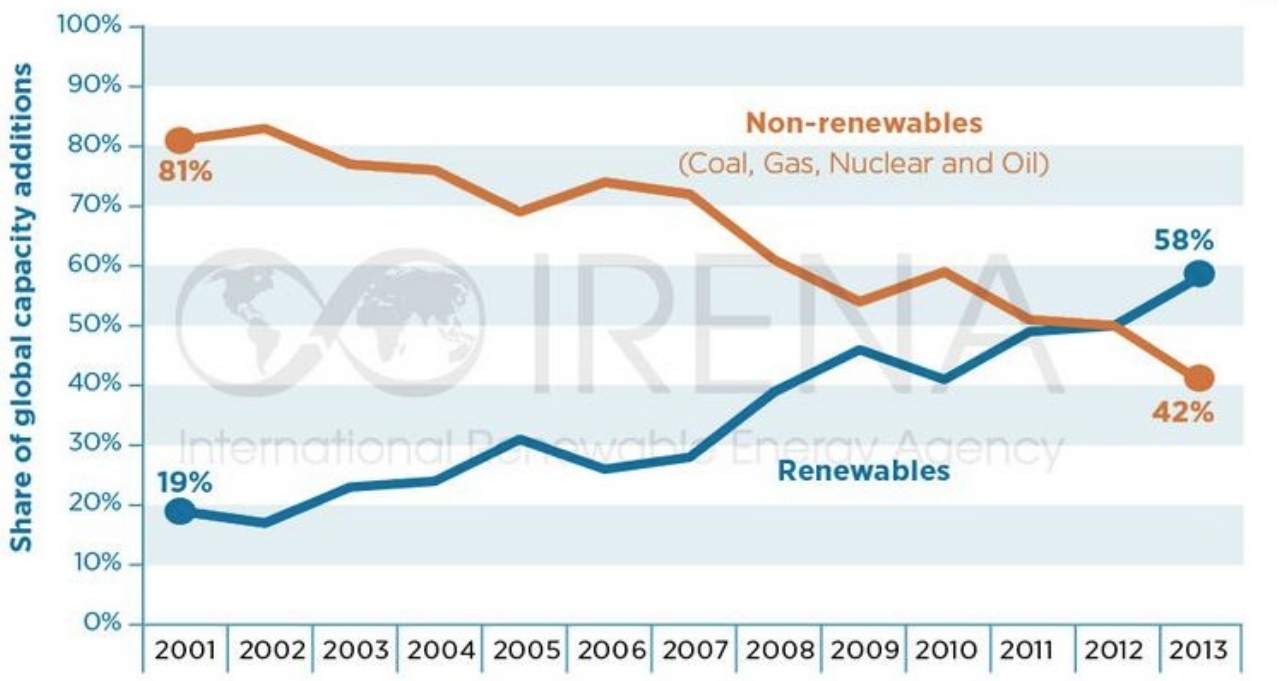
January 18, 2015. **Renewable power costs plummet: Many sources now cheaper than fossil fuels worldwide**. The cost of generating power from renewable energy sources has reached parity or dropped below the cost of fossil fuels for many technologies in many parts of the world, the International Renewable Energy Agency (IRENA) revealed in a new report. The landmark report, Renewable Power Generation Costs in 2014, concludes that **biomass, hydropower, geothermal and onshore wind are all competitive with or cheaper than coal, oil and gas-fired power stations, even without financial support and despite falling oil prices**.

January 14, 2015. **First time in 6 years: Chancellor Merkel tonight at BEE reception, Germany's renewable industry group**. On the New Year's reception of the German Renewable Energy Federation BEE (Bundesverband Erneuerbare Energie e.V.), Merkel praised the progress to a "sustainable and basic energy revolution" and emphasized the interaction of the different renewable technologies.

January 7, 2015. **Turnaround for the Energiewende**. The Energiewende is on solid footing: In 2014, there were positive developments in many key areas. **For the first time ever on an annual basis, renewables were the most important source of electrical energy in the power mix in Germany**, ousting lignite coal from first place with a 27.3 percent share of German energy usage. At the same time, electric power consumption fell by 3.8 percent - a sign that investments in energy efficient appliances and manufacturing systems are paying off, as the German economy grew fairly strongly at 1.4 percent. Owing to the favourable developments in renewable energy and electricity usage, the climate-adverse use of hard coal for power production sank to its second-lowest level since 1990. Together with a mild winter, this led to a considerable decrease in CO2 emissions from electricity, which now are at their lowest level since 1990.

January 5, 2015. **2015 decisive for Energiewende**. "2015 will be a decisive year for the energy transition's success (…) At the moment, we are still going down the right path. Whether we continue to do so depends on how the legislature paves the way further," Hermann Albers, President of the German Wind Energy Association (BWE), stated at the beginning of the year. "In the power market, there is a risk of completely misguided incentives being set. **The Energiewende is truly a technological revolution.** The new market design therefore cannot be built on the old foundations; it has to be reinvented from scratch. **The new energy world will include communications, analysis, smart grids, and virtual power plants, all of which require IT platforms.** At present, there is no point in talking about capacity markets because massive surplus fossil capacity is distorting wholesale prices and skewing the market. If we want to talk about a future power market design, we have to find out how the market can rid itself of surplus fossil capacity – and how binding plans can be adopted for the decommissioning of old, inefficient coal plants.

January 5, 2015. **Las renovables produjeron el 2014 el 42,8% de la electricidad de España**. **Las centrales de tecnología 'limpias' compensaron el 2014 la contaminación producida por las plantas que queman carbón**, según destaca el avance del informe El sistema eléctrico español 2014 publicado por Red Eléctrica de España (REE).



Renewables now competitive with non-renewables.
Source: IRENA (International Renewable Energy Agency).

Biogas in Mainstream Media

January 8, 2015. **Another source of natural gas** By Joanna D. Underwood, Times Union. “New Yorkers breathed a collective sigh of relief as they got the news the Cuomo administration would ban high-volume hydraulic fracturing, or fracking. But what will it mean for the state's energy sector? There are modest reserves of conventional natural gas in New York, though production has fallen by more than 50 percent since 2008. So does the state really need its own robust natural gas production, and if not from fracking, could it come from some other source? The answers are "yes" and "yes." In-state energy production would generate jobs and state tax revenue — both badly needed. As industry analysts and fracking boosters point out, a well-developed energy sector has important economic multiplier effects. Of 1,200 billion cubic feet of natural gas consumed in New York annually, barely 2 percent is produced in the state. **With limited conventional gas resources and huge shale gas deposits New York decided not to develop, there is another way to boost gas production: tap our enormous organic waste stream**.”

January 6, 2015. **These Hilarious Inflated Backpacks Are Actually Delivering Cheap Local Energy To The Rural Poor** by Ben Schiller, Fast Company. “Biogas produced from organic waste, such as cow dung and farm cuttings is a good alternative, because it's lightweight and clean burning. But it's not possible to have a bio-digester in every person's home. That's too expensive and impractical. You need upwards of five or six households invested in a digester to cover its costs. Katrin Puetz saw the potential of biogas for rural communities. **She wondered how to do the "last mile" of distribution from a central digester site to someone's home. She came up with the biogas "backpack"—a sturdy bag to transport the gas**.”

December 23, 2014. National Geographic Explorer Culhane Shows **Garbage-Energy Isn’t Science Fiction** by Marianne Lavelle of The Daily Climate. “When I set out to write a story about **the energy possibilities of garbage, portrayed as nothing but a sci-fi gag in the movie Back to the Future Part II**, I knew I had to check in with National Geographic Emerging Explorer T.H. Culhane. Year after year, Culhane has been one of the most riveting storytellers of the extended Explorer family. You’ll become a believer if you spend time listening to T.H. extol the little-known

virtues of in-sink garbage disposals, or show photos of renewable energy outposts he's catalogued in Nepal. Even if you spend most of your day reporting and writing on the stymied global effort to grapple with climate change, you'll be filled with hope after Culhane spills some crumpled cans and foil scrap and tangle of wires on your desk, and demonstrates how junk like this could light a village. One of Culhane's passions has been making methane fuel from garbage and other waste through the process of anaerobic digestion. **No, you don't need fusion as Doc Brown used in the Back to the Future movies**. All you need is the right set-up with well-understood technology, and the kind of ubiquitous micro-organisms that have been among the earliest living "bugs" on Earth."

Anaerobic Digestion R&D

January 28, 2015. **Converting olive mash into cash** by KTH Royal Institute of Technology. Researchers develop prototype **biogas-fueled fuel cell that currently runes on olive waste.** "An experimental system to create heat and power with waste from olive oil processing is up-and-running in Spain. "But for this project, the most important thing was finding a solution for all of the toxic waste left over from olive oil production," she says. **Converting the waste to heat and power is a three-part process**, beginning with a digester tank that breaks the material down and releases biogas, comprised of methane, carbon dioxide and sulfur compounds, to a reformer. The reformer converts the biogas into carbon dioxide and hydrogen, which can then be converted in the fuel cells. When oxygen is introduced in the cell, it mixes with the hydrogen and CO2 to create heat and electricity. The process depletes the toxicity of the waste and what's left can safely be transferred to landfill."

January 14, 2015. **Biogás Plus triplica la producción de energía a partir de residuos** por Carlos Corominas, MIT Technology Review. "Ahora, un equipo de investigadores de la empresa Applied Nanoparticles, una spin-off del Instituto Catalán de Nanociencia y Nanotecnologia y la Universidad Autónoma de Barcelona (España), ha conseguido aumentar un 200% la producción de biogás al introducir nanopartículas de hierro en los reactores, además de mejorar la calidad del fertilizante y hacer más eficiente energéticamente el proceso".

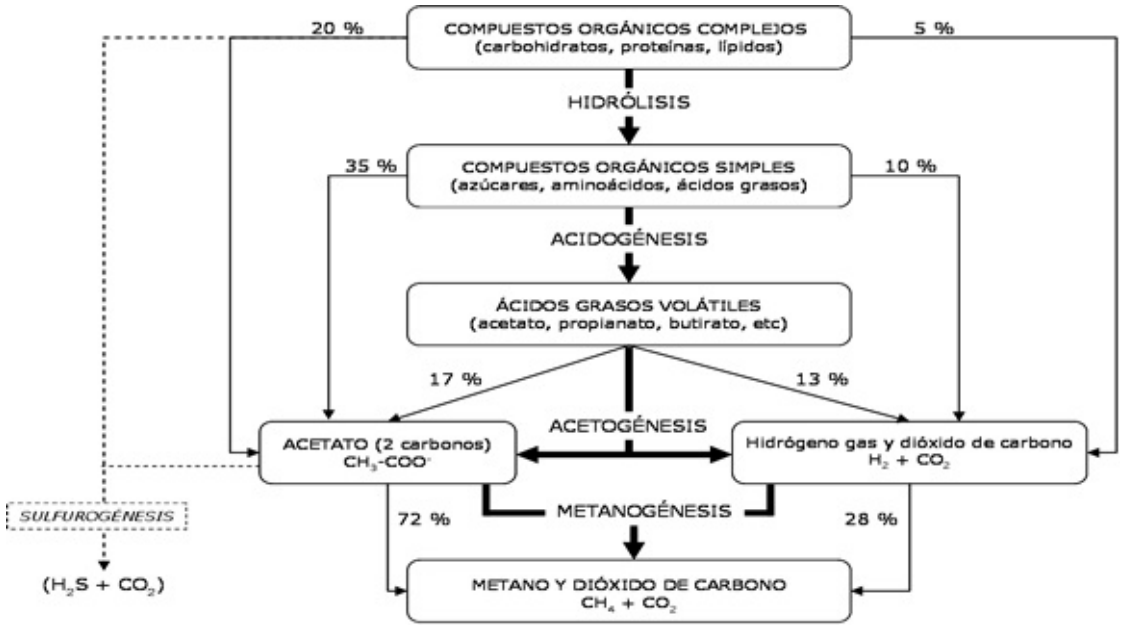
January 13, 2015. **CPI Project Aims to Transform Food Waste into BioGas for the Production of Renewable Hydrogen and Graphene**. "The Centre for Process Innovation (CPI) is leading a European collaborative project that aims to transform food waste into a sustainable source of significant economic added value, namely graphene and renewable hydrogen. The project titled '**PlasCarb**' will transform biogas generated by the anaerobic digestion of food waste **using an innovative low energy microwave plasma process to split biogas (methane and carbon dioxide) into high value graphitic carbon and renewable hydrogen**. "

January 12, 2015. **Chinese researchers use soil to speed wood-to-biogas anaerobic digestion processing**. A new open access article published in the journal Biotechnology for Biofuels details research at Lanzhou University, China in "Using the properties of soil to speed up the start-up process, enhance process stability, and improve the methane content and yield of solid-state anaerobic digestion of alkaline-pretreated poplar processing residues."

January 11, 2015. **World's first demonstration plant for large-scale production of biogas through gasification is operational**. GoBiGas - a project to be proud of by Henry Thurman, Chalmers University of Technology, responsible for the scientific evaluation of GoBiGas project. "In recent decades, EU countries have invested several billion on producing technology and demonstrate it on an industrial scale, without success. Now, therefore, Göteborg Energi with the backing of Gothenburg politicians had success with this. The biogas produced from wood pellets

(first year) and then forest residues, meets all current and future environmental criteria for biofuels, which makes the biogas to an exclusive product. The biogas is distributed via the European gas grid, making the whole Europe into a potential market. Right packaged, it can be sold at a high price."

January 8, 2015. Comienzo del proyecto Phaseplit impulsado por la Unión Europea. "A través del Proyecto PHASEPLIT (**Reactor anaeróbico bifásico ácido/gas para aguas residuales** provenientes de PYMEs agroalimentarias) número 602007, perteneciente al programa Instrumento para PYMEs del Séptimo Programa Marco, la Unión Europea está invirtiendo en el desarrollo de tecnología innovadora para mejorar la actual falta de competitividad medioambiental de las PYMES. El Proyecto PHASEPLIT servirá para desarrollar un reactor que ofrecerá a las PYMES agroalimentarias una alternativa económica y técnicamente viable para el tratamiento descentralizado de sus aguas residuales. PhasepliT se basa en la optimización del proceso anaerobio en dos fases (ácidogénesis/metanogénesis) que será aplicado por primera vez al tratamiento de aguas residuales".



January 8, 2015. **Influence of biogas digestate on density, biomass and community composition of earthworms**. In recent years, the increasing number of biogas plants in operation has also led to a considerable rise in fermentative substrates, which are now widely used as agricultural fertilizers. The impact on earthworm fauna of using biogas digestate as a fertilizer has yet to be sufficiently researched. After three years, earthworm biomass in the variants fertilized with conventional slurry and digestate tended to be higher than in the chemical fertilizer and untreated variants.

January 7, 2015. **An analysis of metal concentrations in food wastes for biogas production**. The analyzed wastes were characterized by varied content of Pb, Cd, Cu, Zn, Cr, Ni, Na, K, Mg and Ca. The results of this study can be used to optimize the composition of feedstock for biogas plants.

January 6, 2015. **The impact of Ni, Co and Mo supplementation on methane yield from anaerobic mono-digestion of maize silage**. The objective of this experimental study was to demonstrate the impact of trace metal supplementation, namely nickel (Ni), cobalt (Co) and molybdenum (Mo), on the methane yields obtained from batch mesophilic anaerobic digestion of maize silage as mono-substrate. The maize silage used in this experimental work initially lacked Ni and Co. Trace metal concentration selected was 0.1 and 0.5 mg/L for Ni and Co, respectively, while

it was 0.05 and 0.25 mg/L for Mo. The supplementation by Ni, Co and Mo, individually or in combination at different doses, seemed to improve the methane yields for mono-digestion of maize silage and particularly, the highest methane yield of 0.429 L CH4/g VSadded was obtained, when Ni, Co and Mo were supplemented together at concentrations of 0.5, 0.5 and 0.25 mg/L, respectively.

December 30, 2014. **¿Por qué la fermentación oscura puede ser una alternativa sostenible para valorizar residuos?** por Gracia Silvestre. “En AINIA, en el marco del proyecto DIANA, hemos obtenido los primeros resultados a escala laboratorio, sobre **producción simultánea de biohidrógeno y biogás mediante la digestión anaerobia en doble etapa**. La fermentación oscura es una tecnología basada en la recuperación del hidrógeno que se genera durante las primeras etapas de la digestión anaerobia, evitando que sea consumido para las bacterias metanogénicas. La digestión anaerobia en doble etapa, consiste en separar, de manera física, las etapas microbiológicas: en un primer digestor, el digestor hidrolítico, se llevarían a cabo las dos primeras etapas, la hidrólisis y la acidogénesis de la materia orgánica, y en el segundo digestor, digestor metanogénico, alimentado con el efluente del digestor hidrolítico, tendría lugar principalmente, las otras dos etapas, la acetogénesis y la metanogénesis”.

December 2014. **Phylogenetic forest of archaeal methanogens**.

November/December 2014. **Uso de nanopartículas de hierro en la digestión anaeróbica para multiplicar la producción de biogás** por Victor F. Puntes.

Milestones

January 29, 2015. **Oslo, la limpia. La ciudad que se quedó sin basura y la importa**. Por Rubén Guillemí, La Nación. “En muchos países, "basura" es sinónimo de "desperdicio". En Oslo, la capital de Noruega, ya no. La ciudad superó la capacidad de procesar los residuos que producen sus 1,4 millones de habitantes y ahora importa desechos de otros países para alimentar las plantas que generan calefacción y electricidad. Éste es el resultado de un compromiso que abarca a todos los noruegos, del más grande al más chico, en un país donde cuidar la naturaleza es prioridad nacional (…) Desde afuera, la planta de Klemetsrud para la conversión de basura en energía se puede confundir con un hotel cinco estrellas, con su imponente frente de paneles vidriados que semejan velas de un navío vikingo. No hay ningún rastro ni olores que indiquen que allí se procesan unas 300.000 toneladas de basura por año. Sólo la diferencia una chimenea de la que sale vapor, en un 99% de agua pura (...) **Oslo se fue quedando sin basura para sus plantas y desde 2009 comenzó a importarla de municipios de Inglaterra**. En realidad, lo de la importación es un buen negocio para esta agencia municipal. El tratamiento de los desechos es considerado un "servicio" y por eso los noruegos cobran a los ingleses entre 30 y 40 dólares por tonelada para recibir su basura hogareña lista para incinerar (sin plásticos, metales ni vidrios). Dicho de otra forma, los ingleses pagan a Oslo para darle el "combustible" que hace funcionar las plantas. Y de allí los noruegos obtienen electricidad y calefacción que venden a sus clientes. Lo que se dice un negocio redondo. Pero no todos en Noruega están contentos con la cuestión de la importación de residuos y la producción de energía a partir de los desperdicios. El grupo ambientalista más antiguo del país, Naturvernforbund, sostiene que **el planteo debe ser**

totalmente diferente. "Nuestra prioridad tiene que ser la reducción de la basura que producimos", dijo Lars Haltbrekken, director de la organización. Y brinda cifras. En 1992, cada noruego producía 237 kilos de basura por año, y veinte años más tarde el número subió a 430 kilos. **El especialista aplica el mismo criterio respecto de la importación de residuos. "Debemos tener una visión global del cuidado del planeta**, y no se puede alentar a que otros países se desentiendan de su basura porque saben que finalmente los noruegos y otros pueblos nórdicos tienen capacidad para procesarla", dijo".

January 20, 2015. La Saône-et-Loire s'apprête à injecter du biométhane dans le réseau de GRTgaz. A compter du 21 janvier 2015, l'unité de tri-méthanisation-compostage du Smet 71 traitera les déchets résiduels de 315 000 habitants du nord-est de la Saône-et-Loire. A partir de mai, **le biogaz issu de la fermentation des déchets sera injecté sur le réseau de GRTgaz et consommé par une usine voisine. Une première nationale**.

January 19, 2015. **Hong Kong hospital chooses methane power**.

January 17, 2015. **Zoológico en Puebla produce biogás con excremento de elefantes**.

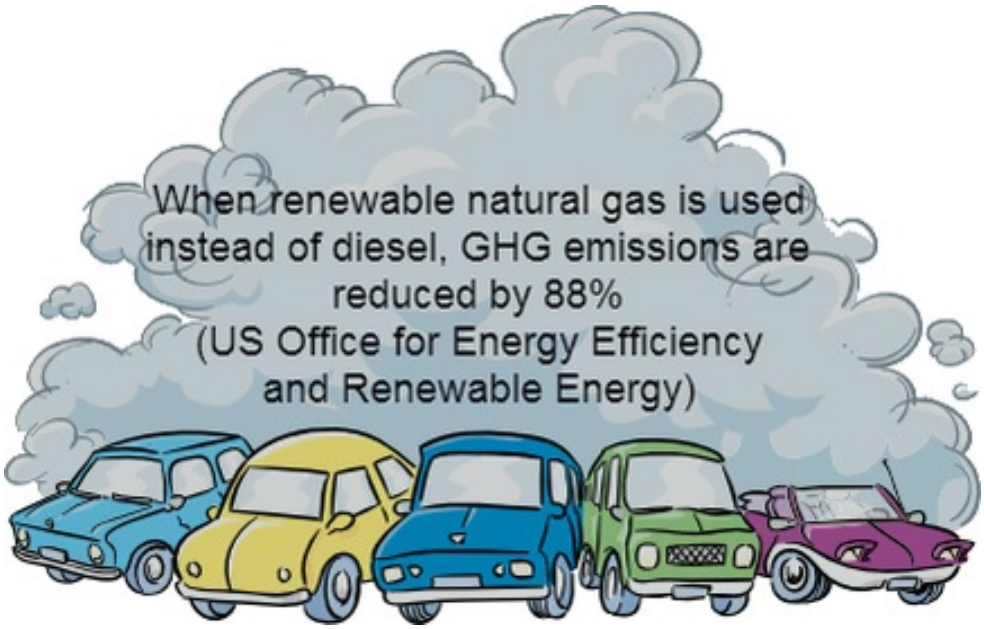
January 11, 2015. **Turning blood to power, Maasai pastoralists begin bottling biogas** by James Karuga, Thomson Reuters Foundation. "Maasai pastoralists have found an innovative way to generate biogas: using animal blood and waste from the Keekonyokie slaughterhouse."

January, 2015. Bioenergy initiatives continue to innovate. "**Mt. Everest Biogas Project: Biogas reactor for Everest Base Camp**" "The Mount Everest area is a destination for climbers and trekkers from all over the world. While visiting our world's highest mountain, climbers, trekkers, and walkers take away great memories, lots of photos and new friends, but leave behind their untreated waste. This needs to stop. At the Mount Everest Biogas Project our mission is to convert human waste from base camp into environmentally safe products for the people of Nepal, by designing a biogas system that can operate at high altitudes."

December 22, 2014. **Biomethane supplies the heat for manufacturing the rotor blades of the wind turbines**.

November, 2014. **México tiene el primer tren ligero impulsado por energía generada con basura**. 80% del sistema de metro de la ciudad de Monterrey funciona gracias a la energía producida por los desechos de los ciudadanos.

Paris: Renewable Natural Gas To Be a Major Contributor to Sustainable Transport



When Renewable Natural Gas is used in vehicles in place of diesel, it reduces greenhouse gas emissions by 88 percent or more. Image: EBA. Source:Energy.gov

January 28, 2015. **Paris: Les mesures anti-pollution inquiètent les chauffeurs-livreurs parisiens**. L'entreprise Ikea, elle, s'est tournée vers le biométhane. Le groupe qui avait prévu en amont le renouvellement de sa flotte, effectue depuis le début de l'année 2015 des livraisons avec 14 camions 100% biométhane, pour ses clients de Paris intra-muros. «Actuellement, il n'existe pas de poids lourd électrique qui aurait l'autonomie suffisante pour des livraisons», affirme Pierre Villeneuve, directeur de la relation client d'Ikea. «**En fait, le biométhane est la seule alternative**», ajoute-t-il. «15 à 20% des véhicules de professionnels concernés» La Fédération nationale des transports routiers (FNTR), qui s'«attendait à ces annonces», reste confiante sur le «peu d'impacts» de telles décisions. «La première mesure ne va concerner que 15 à 20% des véhicules professionnels», explique Elisabeth Charrier, secrétaire générale de la FNTR Ile-de-France. «Ensuite, **il faut que le calendrier soit supportable économiquement et que le Mairie développe des stations de ravitaillement GNV (gaz naturel pour les véhicules)**». Mais Elisabeth Charrier se dit confiante: «La Mairie ne laissera pas s'effondrer l'économie parisienne».

January 27, 2015. **Comment Anne Hidalgo veut réduire la pollution à Paris**. Propos recueillis par Laetitia Van Eeckhout, Le Monde. La maire de Paris, Anne Hidalgo, qui soumettra son plan antipollution début février, veut agir « dans l'urgence » pour bannir les véhicules polluants de la capitale. Les premières mesures d'interdiction s'appliqueront dès le 1er juillet 2015.

December 23, 2014. **Véhicules au GNV: un partenariat qui roule en Île-de-France! Face aux fréquents pics de pollution à Paris et en Ile-de-France, l'usage du gaz naturel véhicules (GNV) pour alimenter les moyens de transport urbains apparaît comme une solution évidente**. Conscient des atouts écologiques de ce gaz carburant, GrDF unit ses forces à la ville de Paris, le SIGEIF, La Poste et la Région Île-de-France pour rendre possible son développement à grande échelle.

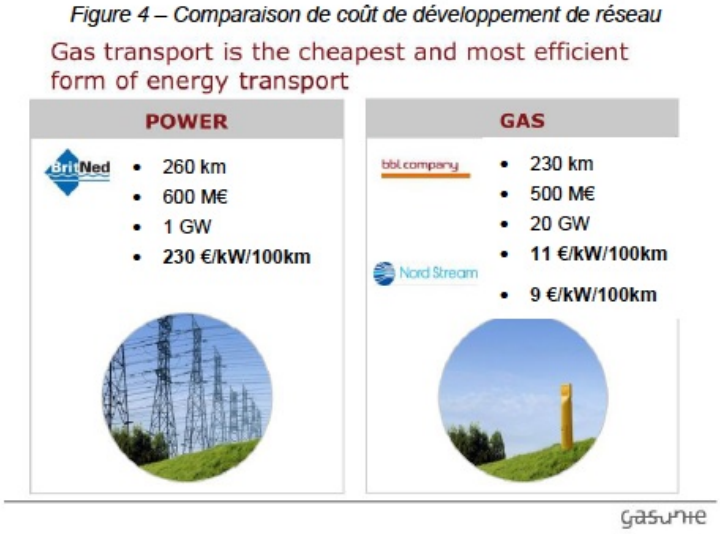
context=
September, 2014. **The Fuel of Tomorrow** p.6-9
July 14, 2014. **El automóvil a biogás ¿motor de la transición energética en Francia?**

“Everyone knows the future is decentralized, right?”

January 22, 2015. **Power to the people - Facing the global energy challenges**. Access to energy is perhaps the modern world's most fundamental challenge. It is a central part of our struggle to save the environment and create a more sustainable world. It is also the basis for political conflicts and wars. Unsustainable energy sources are running out or being phased out. Nuclear power is still very important to many societies, but often controversial. New and greener energy sources are gathering momentum, though not without their own problems and challenges. How can we meet the global need for power and energy efficiency in the future? What are the most interesting technologies, projects and policies? How will the quest for energy affect the political and economic landscape?

January 21, 2015. **Coénove lance son site Internet**. Gaz naturel, énergie de transition vers le biométhane. Le site de l’association Coénove, mobilisée **pour promouvoir une approche nouvelle dans la transition énergétique : la complémentarité des énergies et le rôle clé de l’énergie gaz dans cette complémentarité**. L’énergie gaz présente tous les atouts pour compenser l’intermittence des énergies renouvelables électriques et assurer l’équilibre entre offre et demande d’électricité. L’énergie gaz est en effet très adaptée aux usages intensifs et saisonniers, car stockable et transportable: elle permet de satisfaire rapidement des appels de puissance élevés, et ainsi d’accompagner efficacement le développement des énergies renouvelables. Inversement, en cas de surproduction des énergies renouvelables électriques par rapport aux besoins, le « Power to gas » est un vecteur prometteur de leur valorisation et de leur stockage. **Les réseaux existants de gaz peuvent alors accueillir l’hydrogène ou le méthane ainsi produit et rendent possible leur stockage, leur transport et leur valorisation par mélange avec le gaz, sans investissement supplémentaire dans les infrastructures**. Les perspectives offertes aujourd’hui par le biogaz, gaz 100% renouvelable issu de la dégradation de matières organiques, sont très prometteuses. **Energie multi usages et stockable, le biogaz possède de nombreux atouts environnementaux et occupe une place unique parmi les énergies renouvelables**. Le biométhane obtenu après épuration du biogaz est 100% miscible avec le gaz naturel et est utilisable dans le réseau de gaz existant sans investissement supplémentaire.

Figure 4 – Comparaison de coût de développement de réseau



Source : (Coenen, 2013)

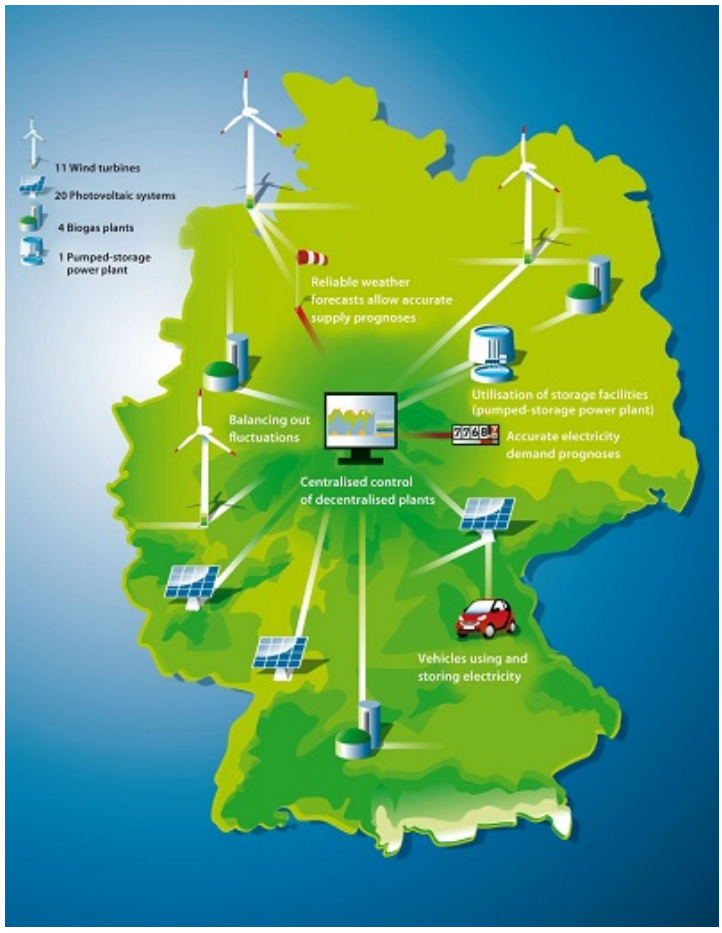
January 16, 2015. **Crowd funded startup EN3 first industrial-scale test of its equipment at biogas facility in Germany**. “The German tech start-up EN3, is **a crowdfunding start-up** on Companisto, that develops innovative systems for the **carbon-free generation of electricity from unused residual heat and waste heat**. By means of its environment- and resource-friendly energy systems, EN3 makes a valuable contribution to sustainable power generation. The internal

combustion engine is the most important technology for generating electricity or mechanical power around the globe. It is used in cars, ships, or decentralized power plants (CHP, biogas plants) to generate electricity. Even though this technology has been optimized continuously over time, as much as approx. 60% of energy stored in the fuel are still emitted to the environment unused through the coolant and through exhaust gas heat. This is precisely what our solution tries to change. Biogas plants are also perfectly suitable for demonstration purposes as a large number of plant operators are forced to further optimize their plants because of the new German Renewable Energies Act (EEG). This is certainly an advantage to us. We are glad that we will soon have the opportunity to demonstrate our expertise and to present our innovative systems for carbon-free power generation from unused residual heat and waste heat to a large audience."

January 12, 2015. **CHPA re-launches as Association for Decentralised Energy** by Diarmaid Williams, Cogeneration & On-Site Power Production. "The UK's Combined Heat and Power Association (CHPA) is to be renamed the Association for Decentralised Energy (ADE), **a move it says cements its role as the key advocate for the UK's decentralised energy transition** across the industrial, public, commercial and domestic sectors. ADE will be formally launched on 20 January, with the Association remaining the leading advocate for combined heat and power; district heating and cooling and demand-side energy services. The Association's director Dr Tim Rotheray said: "**The way we generate and use our energy is in the midst of a significant transition, away from a centralised system and towards a decentralised one that puts control in the hands of users**."

January 8, 2015. **"Decentralization. It happened in computing & telecoms. Now it's happening in energy"** Julia Pyper, Greentechmedia.

January 5, 2015. **Energiewende will succeed** by Roy L Hales, The ECOreport (Part 3 of the 7 Most Attractive Nations for Renewable Investments). "**Energiewende will succeed because it is embraced by the German people**. Most of the population endorses this policy. Despite all the criticisms from within Germany, as well as without, a 2013 poll showed the opposition had only grown to 14%. **One of her German critics recently described Merkel's genius as recognizing "where the train is going and jumping on it." She did not invent energiewende, she grasped hold of a movement whose roots go back to the anti-nuclear movement of the 1970's** (…) Germany is currently ranked #3, behind China and the US, on the Renewable Energy Country Attractiveness Index."

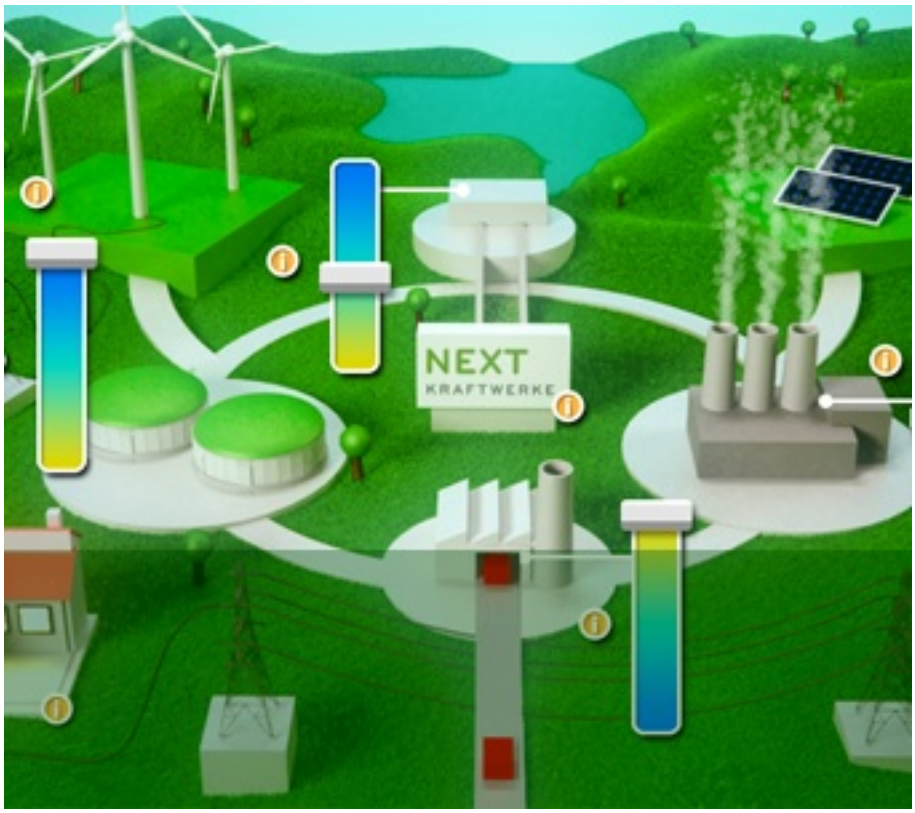


November / December, 2014. **Are virtual power plants the future of European utilities?** by Tim Probert, Intelligent Utility Magazine. "In Germany, where renewable energy accounts for around one-quarter of national power output, the big power generation utilities are certainly look to be an increasingly endangered

species. But grid companies? No, sir. **The enormous volumes of intermittent generation have made the role of grid balancing ever more crucial** and this has given rise to a new breed of utility, one which points to the future, perhaps, for Europe's behemoths. Next Kraftwerke is one of a growing number of companies which **aggregates decentralized generation capacity to form a virtual power plant** (...) Hendrik Saemisch, co-founder of Next Kraftwerke, expects increasing competition for its grid services, not just from similar virtual power plant outfits such as Clean Energy Sourcing and energy2market, but also from Germany's municipal Stadtwerke and even its Big Four utilities. "**The role of the utility will change over the next decade. Virtual power plants are a new kind of utility**, which perhaps shows the way to what utilities have to do other the next five to ten years. It's too early to say whether the likes of E.ON and RWE will become virtual power plants, but they will put a great deal effort in doing this. But we have a head start," he said."

December 1, 2014. La generación descentralizada es la inversión del futuro: **El autoconsumo es la meta de las directivas europeas** por Javier García Breva. "Las directivas europeas desarrollan el papel activo del **consumidor, como centro del sistema, a la vez generador y gestor de su demanda a través del autoconsumo y el acceso a su contador**. Las normas europeas plantean a los gobiernos la obligación de eliminar las barreras que obstaculizan el acceso de los consumidores a las renovables y la eficiencia energética. Su plena incorporación a las normas nacionales afecta al cumplimiento de los objetivos de energía y clima para 2020."

March, 2014. **Virtual Power Stations - A Boost for the Transition to Renewables? | Made in Germany** (video) by Holger Trzeczak, Deutsche Welle. Virtual power plants represent a big hope for Germany's long-term energy plans. **They connect clusters of small-scale generators such as solar-power plants, wind turbines and biogas facilities to form one big one**. The resulting power station has the capacity of a small nuclear power facility -- and with it more market power. **Whats is a virtual power plant?**



Access to a virtual power plant simulation game.
Source: Next Kraftwerke.

“We need to move from the food versus fuel debate to a food and fuel debate”

January 21, 2015. **We can’t separate biomass for energy, for food and for feed**. “**We have to look at the whole biomass production when it comes to bioenergy**. We can’t separate biomass for energy and for food and for feed. **It is all in one and we need all of those three**. At IEA (International Energy Agency) we try to think more integrated talking about bio refineries where you can use the same biomass several times.” says Arthur Wellinger, Technical Coordinator for the Bioenergy Agreement of the IEA and former President of the European Biogas Association (EBA).

January 16, 2015. The food systems of the future need to be smarter, more efficient Graziano da Silva: **Competition for resources and energy necessitates a "paradigm shift"** – Biofuels should be part of the mix. "Business as usual would mean a huge and simultaneous increase in the need for food, energy and water in the next decades: 6**0 percent more food, 50 percent more energy and 40 percent more water by 2050**," FAO Director-General Graziano da Silva said during his remarks. Climate change and increasing competition between food and non-food agricultural products such as bioenergy have made the challenges of feeding the future more complex, said da Silva. "But it is important not to forget that biofuel emerged with strength as an alternative energy source because of the need to mitigate fossil fuel production and greenhouse gases – and that need has not changed," he added. The FAO head argued for a more pragmatic approach to the issue. "**We need to move from the food versus fuel debate to a food and fuel debate**. **There is no question: food comes first,**" he said, adding: "**But biofuels should not be simply seen as a threat or as a magical solution. Like anything else, they can do good or bad**." Evidence shows that when developed responsibly, sustainable biofuel production systems can offer an additional source of income for poor farmers. The FAO Director-General noted that thanks to experience gained in recent years and new biofuel production technologies, countries today are better positioned to evaluate the opportunities and risks of biofuel production and to use it when it pays off socially, environmentally and economically. He also stressed that in order to avoid conflicts with food production, mandatory biofuel policies must be flexible and "need to be adjusted according to the reality, the ongoing balance of production, and stocks of the different products used."

January 16, 2015. **Synergy of agriculture and biofuels: Increased biofuel production without indirect effects possible**. The production of biofuels may indirectly cause land use changes such as deforestation of tropical rainforests, and lead to higher greenhouse gas emissions. Research by scientists from Utrecht University’s Copernicus Institute of Sustainable Development shows that this unwanted land use change can be prevented. Sustainably intensifying the entire agricultural sector, through yield increases, and using currently under-utilized land for extra production could considerably increase total production levels without the need for additional land expansion. “That way, crops won’t have to be relocated and there’ll be no need to convert nature areas into additional agricultural land. It’s essential, however, that Europe develop a strategy to maximise the synergies between agriculture and bioenergy.”

January 13, 2015. **Energy crops in Denmark: perennials won again! Energy crops are being restricted in Denmark for producing biogas and some new rules push producers to limit the share in their feedstock. However perennial grasses and legumes are allowed and promoted**. Germany, for example, has completely cut subsidies for energy crops have been removed, while France is also introducing legislation. Crops affected mainly include food varieties such as corn, beets and artichokes. Specifically, the rules apply to crops harvested as a whole for biogas use and therefore exclude waste from agricultural processes. Grass and clover is excluded as long as the land it is from has not been ploughed for a five year period or is farmed organically. **Soil and biodiversity are key issues behind but also food security.** The main reason to exclude o limite some crops is soil and rotations. Considering annual species like maize or others, is already clear to

diminish ecological services. That's why perennial grasses and legumes like clovers are being promoted and allowed. The number of years without ploughing is the main issue. The discussion about food security requires a different approach. We have land available we don't use in Europe and it is decreasing progessively. And our food security is not linked at all to the fact we produce food on those lands, but a decent salary and income to go to the store and get high quality products. If farmers get much more income with less subsidies when producing energy crops for biogas, Europe import of fossil energy decrease and local employment increase. The whole thing will be probably to grow highly value added products and reduce acreage dedicated to annual crops. But what we can do if we don't have the cattle? Should we grow just annual crops? Well, the truth is that we can have perennial grasses and legumes and biogas is very much linked to this fact.

January 13, 2015. **Justifying Maize Crop Production for Fuel Not Food**. UK - Last week at the Oxford Farming Conference in the UK, environmental campaigner and author, George Monbiot, launched an attack on several farming practices. Among his criticisms, he hit out at the current trend towards anaerobic digestion on farms for alternative fuels and the use us maize grown specifically for AD. Now, the CEO of the UK's Anaerobic Digestion and Bioresources Association (ADBA), Charlotte Morton has hit back at the criticisms. It is important to keep the use of bioenergy crops for AD in proper perspective. According to the latest Defra statistics released on 25 November 2014, the total maize area accounts for 0.5 per cent of England's total arable area and in turn just 17 per cent of this – **0.085 per cent of the total – is used for AD**. "**Rather than reducing the amount of agricultural land in production, AD crops can form a crucial component of a sustainable agricultural rotation**."

January 12, 2015. European Biogas Association: **New limitations on energy crops use for biogas in Denmark**. **Limits on the share of energy crops used in biogas plants receiving state aid are due to start in August this year**. A Danish plan to restrict the use of purpose-grown crops for producing biogas has moved a step closer with publication of rules requiring AD plants to report the share of energy crops in their feedstock. Rules restricting energy crops to 25% of a plant's feedstock are due to start in August this year. From August 2018 the limit will be further reduced to 12%. The reporting rules, revealed on 7 January, extend existing requirements regarding plants' output of digestate to include the share of energy crops they take in. Facilities not complying with the requirement risk losing subsidies. Denmark's energy agency and agrifish agency will jointly monitor the reports. The agencies expect to receive the first reports from September. A consultation on precisely how the system will work closes on 9 January and the results are expected in the early spring. **The decision to limit energy crops comes from a political drive mirrored across Europe, to move biogas production away from crops that can be used for food to processing waste**.

context=
December, 2014. **Biogas and Food Security Debate** p.5-6