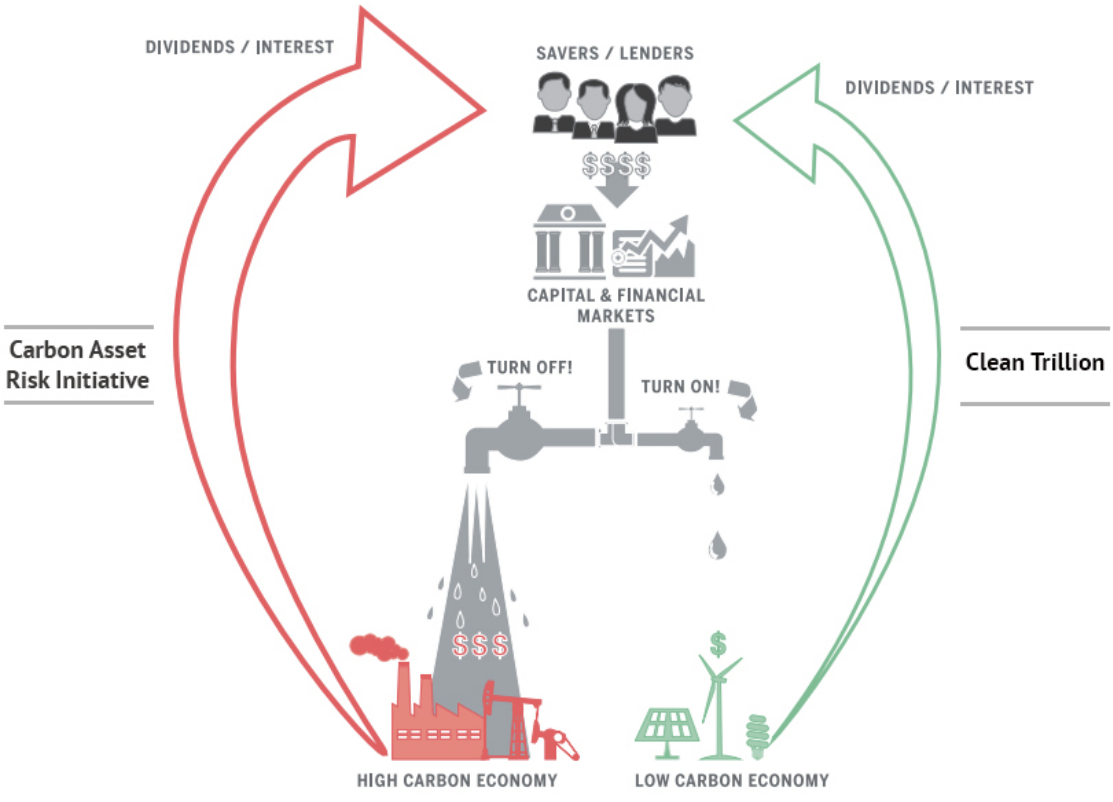
APPLIED NANOPARTICLES

Monthly Anaerobic Digestion Newsletter

January 2016 Compilation & Overview

Clean Trillion: World needs to invest $44 trillion in clean energy

January 27, 2016. 2016 **Investor Summit on Climate Risk: Advancing the Clean Trillion** at the United Nations in NYC. "World leaders recently reached a historic climate change agreement at the UN Conference on Climate Change (COP21) in Paris. It's the low-carbon policy signal we've all been waiting for – but what does it mean for investor funds and portfolios in the months and years ahead? The 2016 Investor Summit on Climate Risk at the United Nations in NYC is **the first major event on climate change for investors and businesses to discuss the far-reaching implications of COP21** (...) The Summit will explore the significant investment opportunities provided by the global climate deal involving 196 countries, with a focus on the types of capital flows necessary – involving many trillions of dollars – to achieve its ambitious global carbon-reducing goals." **Clean trillion**: "**In order to limit global warming to 2°C and avoid the worst effects of climate change, the world needs to invest an additional $44 trillion in clean energy—more than $1 trillion per year for the next 36 years**. Ceres is calling this clean energy investment goal the Clean Trillion. Meeting this goal will be a tremendous challenge, but it is possible if businesses, investors and policymakers join forces."



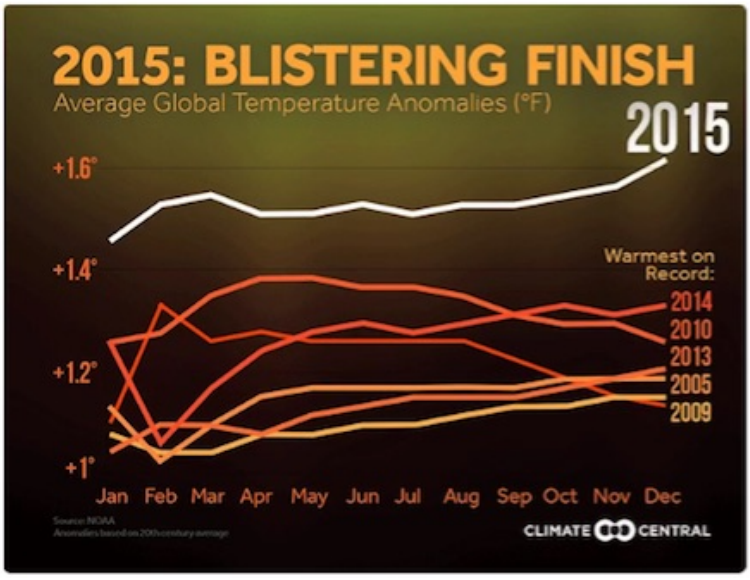
Adopted from UNEPFI Report: Financial Institutions Taking Action on Climate Change

January 25, 2016. **Saudi Arabia presents plan to move beyond oil** by Andrew Torchia and Katie Paul, Reuters.

January 22, 2016. **Cheap Oil Seen by EU as Good Time to Cut Fossil-Fuel Subsidies** by Javier Blas and Ewa Krukowska, Bloomberg. "A global collapse in crude oil prices is a window of opportunity for governments to cut subsidies for fossil fuels, the most polluting sources of energy, European Commission vice president Maros Sefcovic said (...) The International Energy Agency estimates that **annual subsidies on fossil-fuel consumption totaled $493 billion in 2014**, even after G-20 nations pledged in 2009 to phase out "inefficient" subsidies. **The assistance prolongs the use of polluting coal, oil and gas, whose carbon emissions contribute to global warming, and slow down the development of renewables**."

January 22, 2016. **It is still three minutes to midnight**. "Three minutes is too close. Far too close. We, the members of the Science and Security Board of the Bulletin of the Atomic Scientists, want to be clear about our decision not to move the hands of the Doomsday Clock in 2016: That decision is not good news, but an expression of dismay that world leaders continue to fail to focus their efforts and the world's attention on reducing the extreme danger posed by **nuclear weapons and climate change**. When we call these dangers existential, that is exactly what we mean: **They threaten the very existence of civilization** and therefore should be the first order of business for leaders who care about their constituents and their countries."

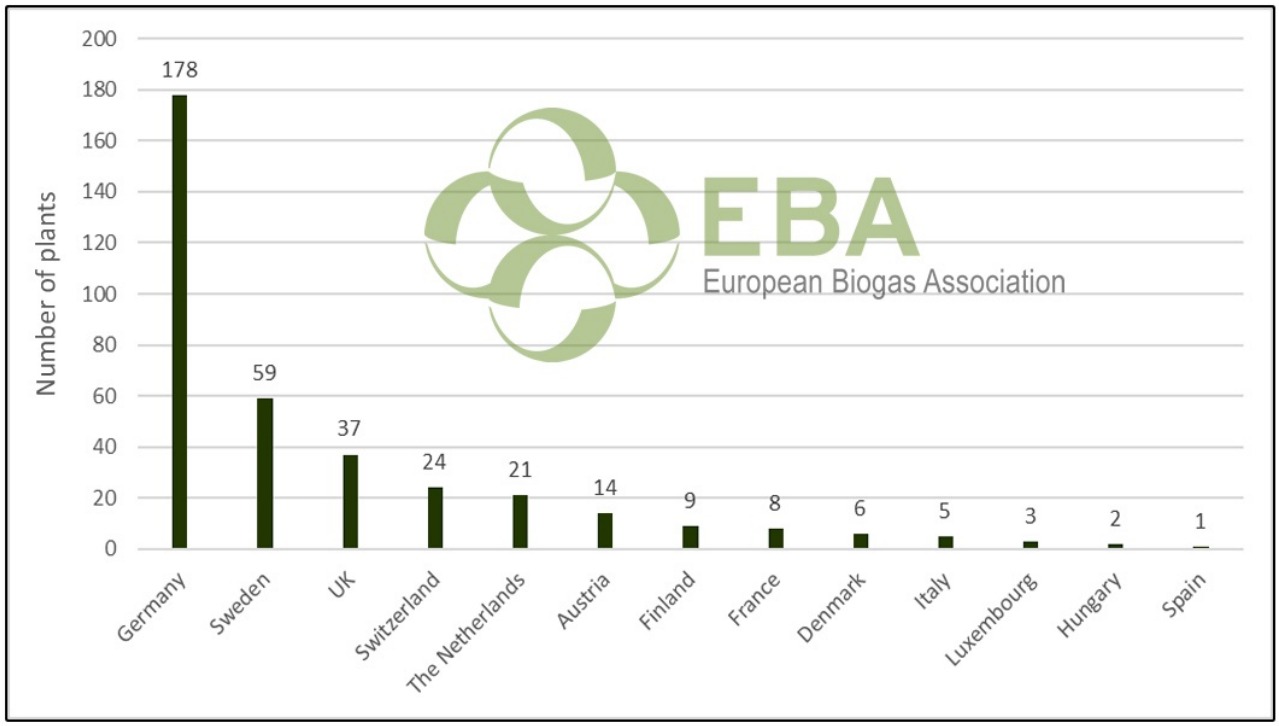
January 20, 2015. **NASA, NOAA Analyses Reveal Record-Shattering Global Warm Temperatures in 2015**. Earth's 2015 surface temperatures were the warmest since modern record keeping began in 1880, according to independent analyses by NASA and the National Oceanic and Atmospheric Administration (NOAA) (...) **The 2015 temperatures continue a long-term warming trend** (...) "Climate change is the challenge of our generation, and NASA's vital work on this important issue affects every person on Earth," said NASA Administrator Charles Bolden. "Today's announcement not only underscores how critical NASA's Earth observation program is, it is a key data point that should make policy makers stand up and take notice - now is the time to act on climate." **Most of the warming occurred in the past 35 years**, with 15 of the 16 warmest years on record occurring since 2001. Last year was the first time the global average temperatures were 1 degree Celsius or more above the 1880-1899 average."



January 14, 2016. **Surprise, surprise: Climate change is risky business** By Katie Herzog, grist. "Congratulations, climate change! You're officially the biggest threat to the most important thing in the world -the international Jenga game that we like to call "the global economy." According to a **recent survey** of 750 risk experts conducted by the World Economic Forum, t**he failure to mitigate and adapt to climate change tops the list of threats to the global economy**. The planet's number one enemy ranks above food and water shortages, infectious disease, cyberattacks, unemployment, terrorism, and involuntary mass migration. That's because - surprise!- climate change contributes to all of those things."

Biomethane is gaining in importance

January 25, 2016. **UK 'fastest growing market' for gas-to-grid plants** by James Brockett, WWT. "The new connections bring the **total number of installed gas-to-grid plants in the UK to 50**, almost doubling the figure at the end of 2014. BtG is the process whereby renewable gas is injected into the UK's gas grid, giving **a flexible and efficient source of sustainable energy** made from organic material including sewage sludge and food waste (...) CNG Services, the company which made the first commercial connection in 2012 and is responsible for 90% of BtG connections in the UK, welcomed the continued growth in the market."



367 biomethane AD plants in Europe (31/12/2014)
Total upgrading capacity 310 thousands m3/h of raw biogas

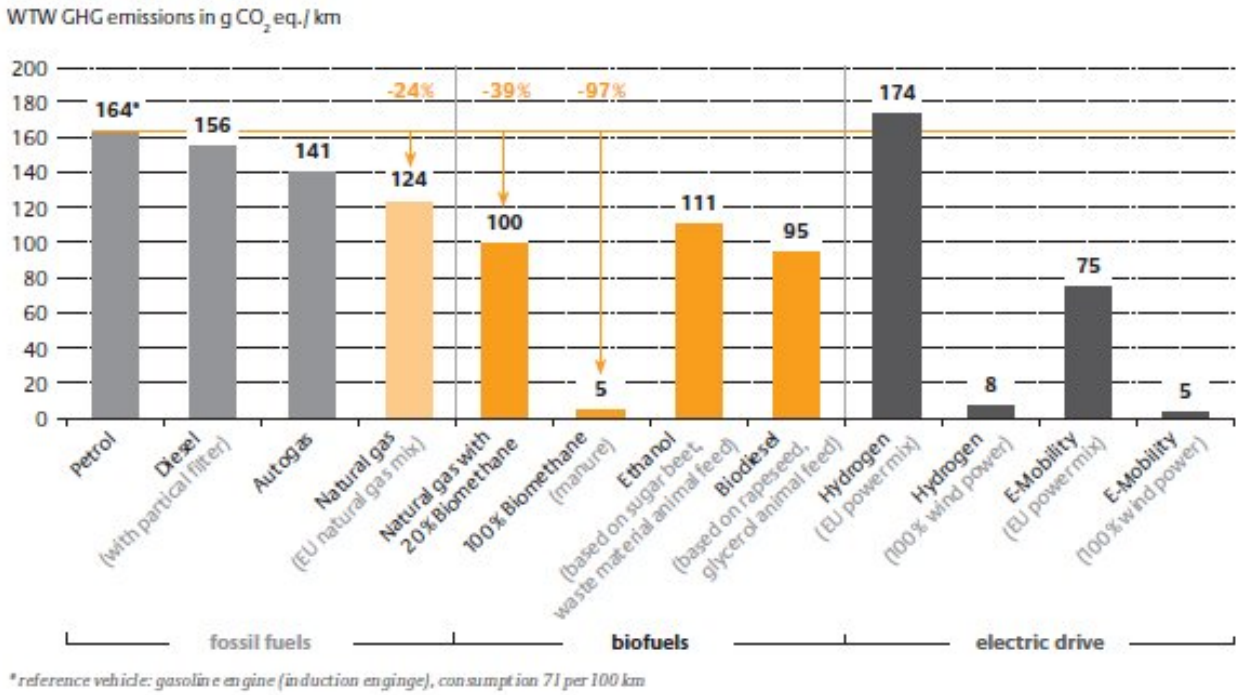
January 20, 2016. **How to perform a feasibility study on biomethane with 46 incentive schemes?** Interview with Claudio Fabbri, CRPA by Biogs Channel (video). "**Analyzing the economic sustainability of biomethane in Italy is a complex matter**. There are in fact around 46 incentive schemes, depending on the intended use, the size of the plant and the matrices that are used. The value of biomethane can range from 0.4 €/m³ to 1.4 €/m³ depending on the scenario"

January 19, 2016. **La filière du GNV auditionnée à l'Assemblée Nationale**. "Auditionnée à l'Assemblée Nationale **dans le cadre du dossier offre automobile**, la filière française du GNV a pu rencontrer les décideurs pour faire valoir les avantages et intérêts du gaz carburant en France. Des dispositifs d'aide à l'achat au levier du biométhane en passant par le développement des stations et du marché, gaz-mobilité dresse une synthèse des débats (...) Alors que nombreuses collectivités songent à se tourner vers la production locale de biométhane, ou biogaz, le GNV s'inscrit comme une suite logique de la démarche. « Tous les projets que nous avons pu avoir aboutissent **vers la valorisation du biogaz en carburant** » explique Catherine Foulonneau qui souligne l'intérêt des territoires pour la filière. « Nous avons aujourd'hui 94 territoires à énergie positive pour la croissance verte (TEP-CV) qui intègrent la problématique gaz dont 34 s'intéressent au GNV ». En parallèle, GRDF appelle le gouvernement à détaxer le biogaz carburant. «Aujourd'hui, les taxis qui roulent au diesel sont détaxés, ceux qui roulent au biométhane ne le sont

pas… Le bioGNV n'est pas reconnu comme biocarburant avancé afin qu'ils puissent intéresser les distributeurs de carburants ». Une remarque dont Denis Baupin, député d'Europe Écologie Les Verts et vice-président de l'Assemblée nationale, semble avoir pris bonne note..."

January 19, 2016. **Biomethane Half Century as UK sees highest level of BtG growth in the World**. CNG Services has worked on 90% of the UK's 50 biomethane to grid connections, with 23 new Biomethane plants connected in 2015. "John Baldwin, CNG Services founder and managing director said: "Growth of Biomethane-to-Grid (BtG) has been spectacular. In 2012 around 300,000 therms of biomethane were injected into the gas grid but by mid-2016, when all the completed projects are at full capacity there will be around 120 million therms/annum going into to grid. That will bring annual green gas production to 3.5 TWh per year. Put another way, that's around 240,000 tonnes of LNG that the UK won't have to be importing from the Middle East or four 60,000 tonne LNG tankers not needing to dock at our ports. (…) When you look at how fast this industry sector is developing, it's clear that BtG **is going to be the biggest renewable heat technology in the UK**" (...) Biomethane is also increasingly being used as a fuel for transport, known as Bio-CNG, where is offers big environmental benefits. Companies like Waitrose are introducing vehicles that are fuelled on Bio-CNG to reduce their carbon footprint and help improve the quality of the air that their customers breathe. On a full life cycle basis Bio-CNG provides a 72% reduction in CO2 emissions as well as being exceptionally clean."

January 5, 2016. **France: La loi de finances pour 2016 prévoit un dispositif en faveur de l'investissement dans les camions GNV/bioGNV**. "Un atout supplémentaire pour la transition énergétique : l'écart de la taxation entre GNV et gazole se creuse dès 2016 en faveur du GNV ! "



January 3, 2016. **Mahindra City gets bio-CNG plant** by Sangeetha Kandavel, The Hindu. "Pawan Goenka, Executive Director, Mahindra & Mahindra Ltd., said, "This may not be a large commercial venture, but it's a large venture in terms of sustainability. In MWC, the biogas will be used for generating power and fuelling CNG buses and tractors. Further, **the power generated will be used for street lighting, buses for free shuttle service and tractor for cultivation**."

January 2, 2016. India: **Mahindra Group inaugurates Bio-CNG Plant at Chennai.** "Plant, located at Mahindra World City (MWC), will convert food and kitchen waste into raw biogas, which can be further enriched to CNG grade fuel (...) Spread over an area of 1,000 square metres,

the Bio-CNG plant will convert 8 tonnes of food and kitchen waste generated daily at MWC, into 1000m3 of raw biogas. Further the raw bio gas can be enriched to yield 400kg/day of purified CNG grade fuel which is equivalent to a 200kW power plant. As a byproduct four tonnes of organic fertilizer will be produced per day. **The green energy (bio CNG) can be used to replace CNG as automotive fuel and LPG for cooking purposes as well as to power street lights at MWC**."

January 1, 2016. **Forget diesel and unleaded...take a look at the cars powered by poo** by Katie Butler, Manchester Evening News. "Manchester's first poo-powered cars are up and running - charged up entirely by gasses produced from sewerage. United Utilities have a fleet of vehicles running on fuel they produced at their Trafford wastewater treatment works (…) The biogas is used on the Davyhulme site in five combined heat and power engines to generate renewable electricity. In a year, this would power 25,000 homes. And **now it's powering five electric Polaris vehicles which are replacements for diesel vans** to help transport staff around the large site."

Biogas in Spain

January 26, 2016. **Biogás: Un gran ignorado en España, ¿Soluciones?** por Miguel Vallejo Fernández. "España es un país con una gran capacidad de generación de residuos, por lo cual es un lugar ideal para el biogás. Generamos residuos por encima de la media europea (...) ¿por qué siendo España un país con un potencial enorme para la producción de biogás, es tan pobre la implantación de esta tecnología? Para explicar esto cabe destacar el importante **daño que hizo el Real Decreto 1/2012**, por el cual quedaban suspendidas las primas a las nuevas instalaciones de origen renovable, lo que motivó que muchas plantas en construcción fueran frenadas. También la **falta de una legislación que defina los estándares de calidad del biogás, para permitir su aprovechamiento mediante la inyección a redes de gas natural**. Es importante mencionar que **es la renovable más gravada, ya que sufre la tasa impositiva del céntimo verde como el gas natural, además del impuesto a la generación eléctrica**. La consecuencia es que la viabilidad económica de estas plantas sea complicada. Actualmente contamos con 35 plantas de biogás instaladas, en contraposición a Alemania que cuenta con cerca de 8.000. Por tanto **los números del biogás están muy por debajo de los objetivos recogidos en el Plan de Energías Renovables (PER 2011-2020)** (...) Además debería proponerse una solución a uno de los principales problemas de estas plantas que es la **limitación de horas con derecho a retribución**, establecida en 4.235 horas anuales, casi un 50% de las horas operativas de una planta (...) Somos un país de mierda y debemos aprovecharlo"

January 26, 2016. **Nuevo premio para el biometano de la conservera Calvo** por Calvo Javier Rico, Energías renovables. "Tras recibir en 2011 el Premio Nacional Eneragen a la mejor actuación en materia de energías renovables, la planta de biometanización del grupo Calvo en su fábrica de Carballo ha ayudado a obtener nuevos galardones. Se trata del premio en el ámbito ambiental en la categoría de gran empresa y la mención especial en el ámbito económico en los Premios de Responsabilidad Social Empresarial de la Xunta de Galicia (...) Dentro de sus avances en I+D+i Calvo señala al proyecto de biometanización para la mejora de la eficiencia de su planta de Carballo mediante la reutilización de los residuos generados en sus instalaciones para producir biogás capaz de generar calor y electricidad. La alianza entre el grupo conservero y JB Ingenieros llevó en 2007 a la creación de Carballo Biometanización (Carbio) y **en 2009 a la puesta en marcha de la primera planta de producción de biometano de Galicia**. La planta de biogás, de 191 kW, es una de las pocas instalaciones que en España aprovechan residuos de industrias agroalimentarias para producir biometano mediante un proceso de purificación del biogás en el que se elimina el CO2."

Waste co-digestion plant (Carballo-A Coruña). Carballo Biometanización (Carbio)

January 26, 2016. **Un soci de la planta de purins de Juneda reobrirà també la del Pla** per r.r., Lleida.com. "La planta de purins Sava de Miralcamp, tancada des de fa gairebé dos anys, esquivarà el desmantellament després de la subhasta que es va adjudicar el grup Audax. Els propietaris, que participen també en el nou accionariat de la planta de Tracjusa (una de les dos clausurades a Juneda), esperen reobrir la instal·lació del Pla amb un projecte similar al de les Garrigues: reprendre la generació i la venda d'electricitat tractant altres residus a més de dejeccions ramaderes. **Per assolir la viabilitat després de la tisorada a les primes per generar electricitat, l'empresa planteja augmentar la producció de biogàs amb residus diferents als purins**. Mentre la de Juneda haurà de tractar escombraries urbanes del Pla i les Garrigues, **els impulsors de la de Miralcamp pretenen rebre en aquesta residus agrícoles i de la indústria agroalimentària, com els d'escorxadors**. El biogàs obtingut d'aquests residus es complementarà amb la crema de gas natural per generar electricitat i assecar purins mitjançant els motors de cogeneració. Audax va avançar que espera reobrir la planta de Miralcamp a mitjans d'any. Això suposarà una dotzena de llocs de treball directes i entre 10 i 15 d'indirectes, segons estimacions de l'empresa, que va indicar que preveuen assolir una producció elèctrica de 120.000 MWh anuals, l'equivalent al consum energètic de 70.000 persones. Així mateix, haurà de permetre una correcta gestió de 110.000 tones de residus orgànics a l'any". **Producirán hasta 10.000 toneladas anuales de fertilizante orgánico que se destinará principalmente a la exportación**.

January 25, 2016. El Ayuntamiento saca a concurso su planta, mientras la de biogás, propiedad de DGA, sigue parada. **Los ganaderos de Peñarroya pagarán la gestión del purín a un máximo de dos euros el metro cúbico** por Maribel S. Timoneda, Diario de Teruel. "Los ganaderos de Peñarroya de Tastavins pagarán como máximo dos euros (IVA incluido) por cada metro cúbico de purín que trasladen a la planta que el Ayuntamiento va a reactivar en los próximos meses, después de haya decidido sacar a licitación de nuevo la gestión de las instalaciones."

January 20, 2016. Seminario **El biogás en Galicia** de la Fundación Gas Natural Fenosa. "El biogás es un combustible obtenido a través de degradación de la materia orgánica de origen animal y

vegetal en condiciones anaerobias. En la primera parte, se describen los procesos de obtención y de concentración del biogás. La segunda parte de la jornada se centró en la práctica del aprovechamiento y tratamiento del biogás de explotaciones ganaderas, de plantas depuradoras de aguas residuales y de industrias en Galicia." **El potencial del biogás en Galicia. El aprovechamiento del biogás de explotaciones ganderas: el Proyecto Mouriscade** (Lalín) por D. Mario Iglesias, Responsable de Área Energías Alternativas, EnergyLab. **El aprovechamiento de biogás de depuradoras de aguas residuales en Galicia. Nuevas formas de upgrading del biogás** por D. José R. Vázquez, Jefe de Proyectos de I+D+i, Departamento de Innovación y Tecnología, FCC Aqualia, SA. **El aprovechamiento de biogás en la industria en Galicia. Ejemplos en mataderos y sector conservero** por D. Jacobo Bouzada, Gerente de CARBIO

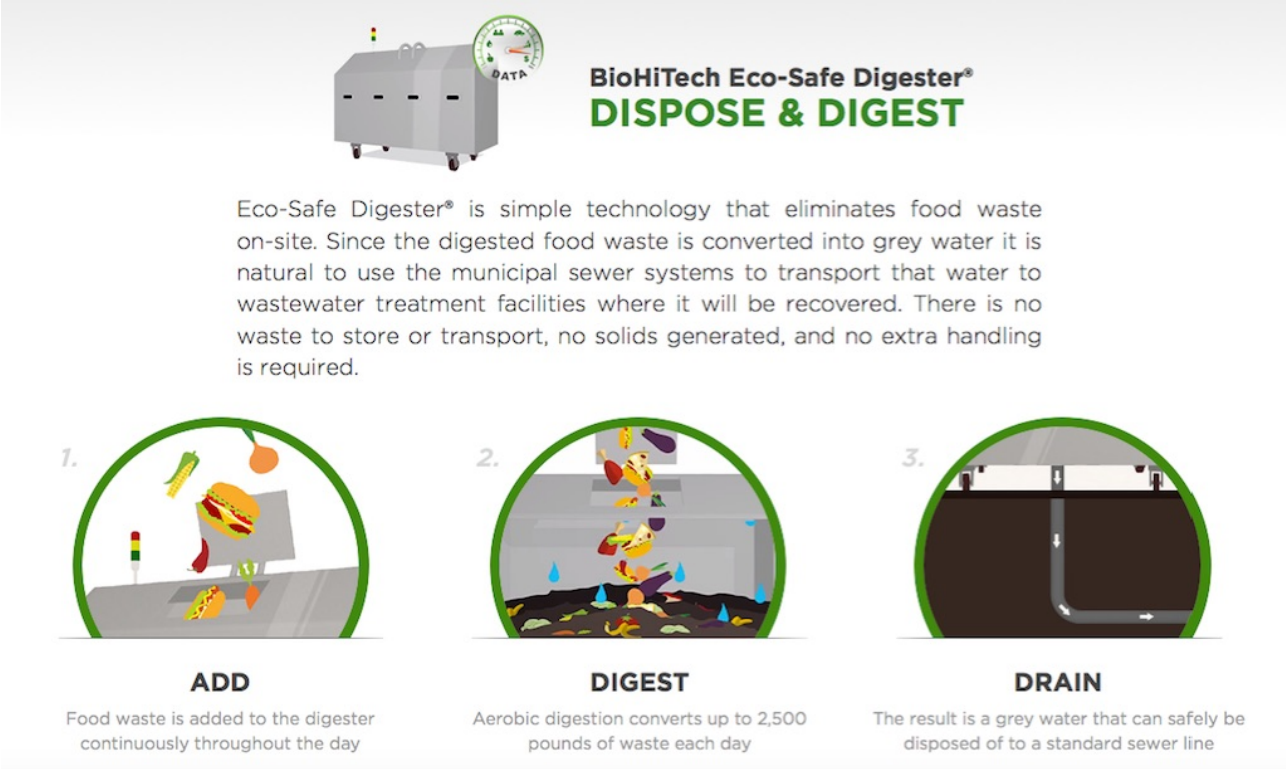
January 18, 2016. **Sale adelante el pliego de condiciones de la planta de purines de Peñarroya** por Javier de Luna, LaComarca.net. "Las empresas que quieran hacerse con la gestión de esta planta, dispondrán de un mes de plazo para presentar sus propuestas, encaminadas a la generación de biogas o a la producción de fertilizantes, propuesta esta última que parece agradar más a la Diputación General de Aragón. La intención es licitar la planta en este primer trimestre. Las plantas de purines de Peñarroya de Tastavins y Valderrobres costaron en 2009 más de 14 millones de euros procedentes de fondos europeos. Unos trabajos con un objetivo muy claro: resolver uno de los principales problemas que tiene la comarca del Matarraña y crear puestos de trabajo."

January 6, 2016. **La Planta de Tratamiento de RSU del Guadiel producirá energía eléctrica a partir del biogás el próximo mes**. "Bartolomé Cruz destaca que se están ultimando los trámites para que, tras una inversión de 250.000 euros, se genere electricidad para un municipio de más de 3.000 habitantes (...) En estos momentos "se están acometiendo los últimos pasos para la puesta en marcha del grupo motogenerador que producirá esta energía, entre ellos la evacuación a la red de la compañía distribuidora de la electricidad que genera este grupo motogenerador, que tiene una potencia de 405 kilowatios."

January 5, 2016. **L'Ajuntament de Sabadell instal·larà una central de cogeneració de biogàs procedent de l'EDAR - Riu Sec**. "La instal·lació d'una central de cogeneració de biogàs procedent de l'Estació Depuradora d'Aigües Residuals (EDAR) de Sabadell - Riu Sec ha estat **un dels projectes seleccionats en la convocatòria Projectes Clima 2015** del Ministeri d'Agricultura, Alimentació i Medi Ambient, que tenen com a objectiu fomentar activitats baixes en carboni mitjançant l'adquisició de les reduccions verificades d'emissions generades. El projecte de l'Ajuntament preveu reduir les emissions d'unes 5.500 tones anuals de CO2. Durant el proper mes de gener es signarà un contracte de compravenda de les reduccions verificades, que adquirirà el Ministeri d'Agricultura, Alimentació i Medi Ambient, per mitjà del Fons de Carboni per una Economia Sostenible. El contracte estableix un **preu unitari de 9,70 € per tona de CO2 que es deixi d'emetre a l'atmosfera durant 4 anys** i es començarà a comptar a partir del mes de juny de 2016. L'obtenció d'aquesta aportació econòmica del Ministeri, que es calcula en uns 50.000 € anuals, permetrà a l'Ajuntament de Sabadell cobrir els costos de manteniment de la instal•lació d'un grup de cogeneració de biogàs amb aprofitament tèrmic dels gasos d'escapament i recuperació del calor del circuit de refrigeració (...) **Actualment** l'EDAR de Sabadell - Riu Sec, explotada per la Companyia d'Aigües de Sabadell SA, consta d'un tractament biològic de les aigües residuals mitjançant fangs actius, que està en procés d'ampliació amb bioreactors de membranes i una digestió anaeròbia dels fangs produïts. En el procés de digestió anaeròbia dels fangs es genera biogàs que **es crema en una torxa, de manera que es desaprofita** una important font d'energia renovable. El biogàs és un gas combustible format fonamentalment per metà. **L'energia elèctrica generada servirà per a l'autoconsum de la mateixa depuradora**, ja que hi ha una demanda tèrmica anual en alguns processos, com és el cas de l'escalfament de l'aigua, assecatge de fang, consum de la caldera, entre d'altres."

Urban Methanization: “New York, London, Beijing and Cape Town already offer biodigesters to their residents”

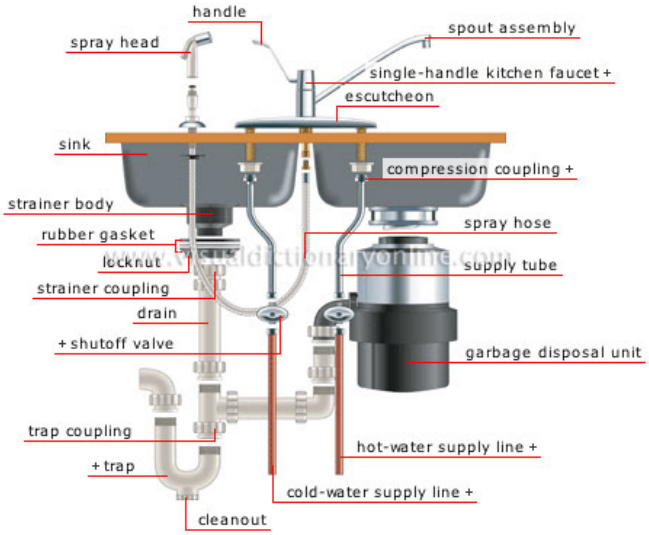
January 14, 2016. **BioHiTech America collaborates to convert food waste to energy**. “BioHiTech Global Inc., a green technology company that provides an innovative data-driven solution for food waste disposal, announced that its subsidiary, BioHiTech America, has partnered with Natural Systems Utilities, Ridgewood Green RME and the **village of Ridgewood, New Jersey, to test a process that will allow BioHiTech's Eco-Safe Digester to digest, tank, and deliver the effluent from its Eco-Safe Digesters to anaerobic digestion (AD) facilities anywhere in the world**. BioHiTech's Eco-Safe Digester utilizes an aerobic digestion process to convert food waste to grey water, also referred to as effluent. Typically the effluent is discharged safely into the sewage system and individual wastewater treatment facilities to treat it with other sanitary waste. This new process will tank the unit's effluent allowing for transportation to an anaerobic digestion plant where biogas can be captured and used to create renewable energy. The Eco-Safe Digester performs the hydrolysis stage of anaerobic digestion at the point of origin. Because the aerobic digestion process begins with the breakdown of solid organics to a liquid slurry, the effluent is able to be easily pumped and transported, arriving at the AD facility in a "predigested" condition allowing for efficient feedstock transfer and eliminating the need for costly processing at the AD facility. ”



BioHiTech Eco-Safe Digester convert food waste to effluent discharged into the sewage system

January 12, 2016. **Philadelphia Goes All In on Garbage Disposals. A trashy plan to create good gas** by Laura Bliss, CityLab. “**Between an in-sink garbage disposal and heaping food scraps into the trash, which is environmentally cleaner?** The answer isn’t simple. Though disposals divert waste from methane-seeping landfills, they can also cause harmful organic matter to sneak into local waterways. Done right, however, the pulverizing devices have one major ecological benefit: They can ensure food waste gets efficiently processed into biogas, a renewable energy that can be used for heat, electricity, and fuel. For years, Philadelphia—like other cities—has culled food scraps and other types of organic detritus from the waste stream for conversion into biogas,

which the city turns around to power its wastewater treatment facilities. **Now Philly is going all in on the biogas bet. As of January 1, the city's building code now requires all new residential construction to include in-sink disposals.** More disposals directing pulverized food waste into the city's processing plant means more biogas that the city can rely on. The requirement will also cut back significantly on how much the city spends on lugging solid food waste from homes to landfills —roughly $3 million a year, according to city recycling director Phil Bresee (...) Not all cities have that kind of space, and not all cities are necessarily in a position to benefit from a building code requirement like Philadelphia's. New York City, for example, is still building up robust biogas recovery infrastructure. That said, collecting food waste and processing it into gas still requires far more energy than collecting it for compost. And slashing food waste before it enters the sink or bin is really the best option; research shows that it reduces energy impacts more than biogas does."



In-sink garbage disposal

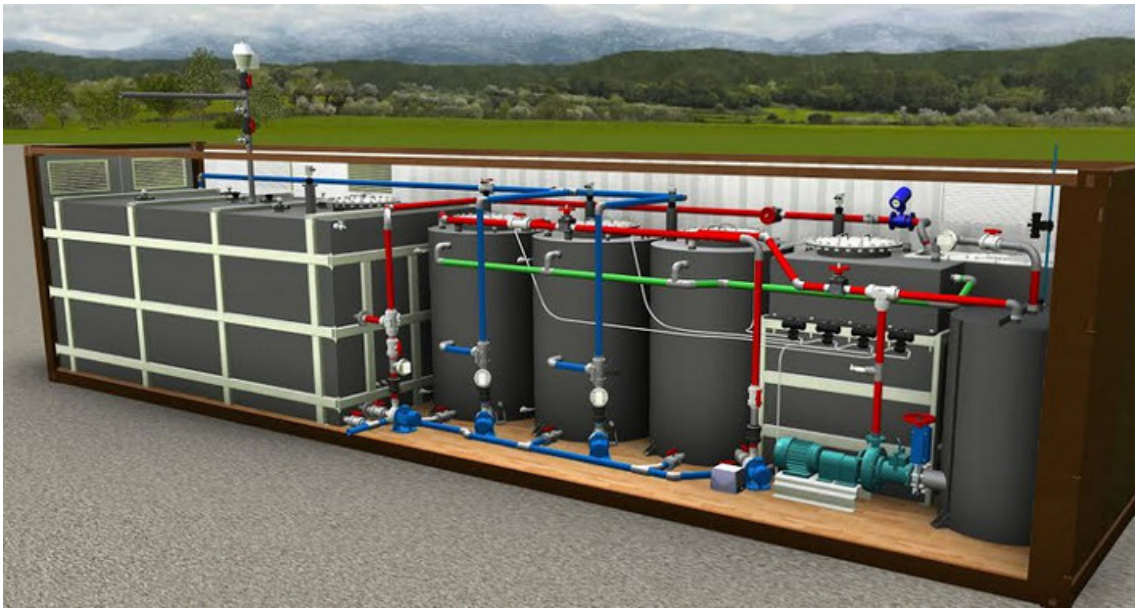
January 11, 2016. Chennai: **Big buildings will have to manage food waste** by Deepa H. Ramakrishn, The Hindu. "With large volumes of food and kitchen waste compounding the solid waste management programme in cities and expanding municipalities, the State Environment Impact Assessment Authority has finally decided to enforce a forgotten mandate for big builders to provide in-house systems to handle food waste. According to officials of the State Environment Impact Assessment Authority, from now on any builder who undertakes a project spread over 2.20 lakh square feet area will have to **mandatorily provide a decentralised system to convert food waste generated in the building complexes into biogas or compost** (...) Authority has also begun directing builders to include food waste from the local community and small eateries in the neighbourhood for generation of alternative energy or compost. "This will provide the required volume of waste for the biogas plants and keep the neighbourhood clean. Residents in apartment complexes will have to segregate waste," said a source in the Authority (...) The Bhabha Atomic Research Centre has proven technology for micro and macro biogas plants and there are several functioning in Chennai."

January 1, 2016. **From Poop To Power: Colorado Explores New Sources Of Renewable Energy** by Dan Boyce, NPR. "The wastewater treatment plant in Grand Junction, Colorado, takes in 8 million gallons of raw sewage — what's flushed down the toilet and sinks. Processing this sewage produces a lot of methane, which the plant used to just burn off into the air. The process was "not good for the environment and a waste of a wonderful resource," says Dan Tonello, manager of the Persigo Wastewater Treatment Plant. Now, using more infrastructure, the facility refines the methane further to produce natural gas chemically identical to what's drilled from underground.

Grand Junction has been replacing an aging fleet of garbage trucks and buses with natural gas vehicles, fueled mostly by the human-sourced gas from the treatment plant. Tonello says Grand Junction **is the first city in the nation to do that** (...) If all the organic waste in the country were gathered, current technologies could produce **enough natural gas to replace about half of the diesel fuel used in U.S. transportation**, says Energy Vision's Underwood."

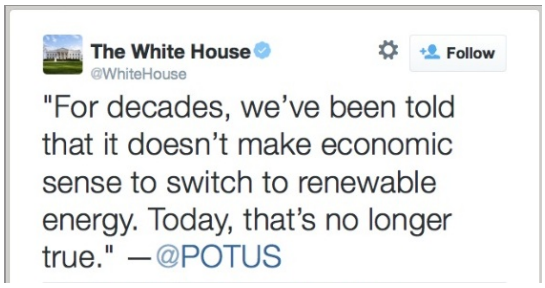
December 30, 2015. S**mart City : Chicago développe un réseau d'assainissement intelligent** Par Pauline Canteneur, L'Atelier. "**En intégrant une usine de méthanisation à son système de traitement des eaux usées, Chicago serait capable de compenser en grande partie sa consommation, et sa facture, énergétique**. Chicago souhaite créer de l'énergie à partir de ses eaux usées. Chaque jour, ce sont environ 4,5 milliards de litres qui circulent dans les tuyaux du réseau d'assainissement du district, **l'usine de traitement d'eau la plus vaste au monde**. Et l'énergie nécessaire au fonctionnement du système est plus que conséquente. Or, compenser complètement la consommation d'électricité de la municipalité fait partie des objectifs d'ici 2023."

December 22, 2015. **Bientôt des digesteurs en France pour produire notre propre gaz naturel ?** "Plusieurs pays dans le monde ont déjà mis en place un système aussi simple que performant pour produire du gaz naturel à l'échelle d'une ville ou d'un quartier. New-York, Londres, Pékin et le Cap proposent déjà des digesteurs à leurs habitants. Quand en sera-t-il de même en France? C'est un fait : l'usage et la production de gaz naturel va en grandissant, que cela soit pour des usages industriels, productifs, dans les transports et bien entendu pour la génération de chaleur à destination des particuliers. Sur ce dernier point, il existe en Chine des dispositifs certes rudimentaires mais qui permettent de créer du gaz à partir des déchets ménagers. Des cuves sont ainsi installées devant les maisons dans lesquelles épluchures diverses, déjections animales et autres matières organiques sont entreposées à l'image d'un composteur de jardin, à la différence que la cuve crée du gaz qui permet d'alimenter une chaudière en retour. S'inspirant de cette technique, une société anglaise, SEabEnergy, a mis au point le même principe mais à une échelle plus importante : **des containers -appelés digesteurs - sont à disposition des occupants d'un immeuble entier.** Les habitants y jettent ainsi tous les restes de repas et autres déchets verts; le digesteur prend alors le relai pour broyer et "digérer" la matière. Un ingénieux système permet de créer par la suite du gaz qui sera injecté dans la chaudière centrale de l'immeuble. Simple, performant et écologique."



SEaB Energy *installe des micro-méthaniseurs au plus près des consommateurs…et de leurs déchets. SEaB Energy a imaginé des containers mobiles de 6 mètres de long qui transforment les déchets organiques en énergie. Des containers qui peuvent être installés au bas des immeubles ou au cœur d'un petit village.*

2015 Summary



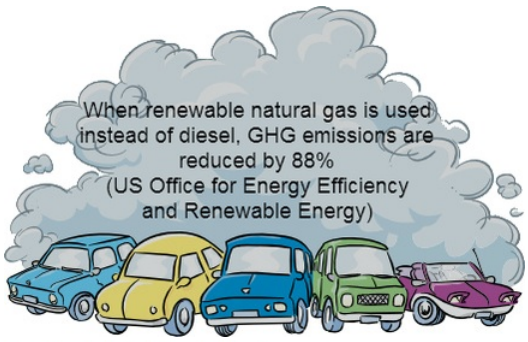
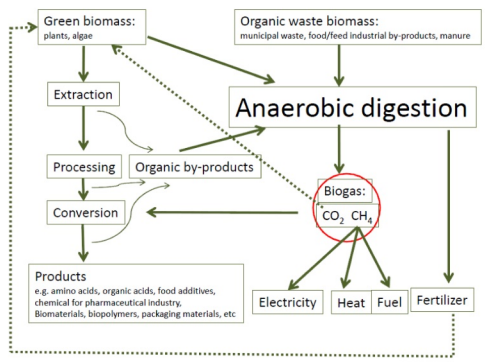


Figure 1: Anaerobic digestion in a key position in biorefinery concepts



December 2015: "The Paris Agreement at COP21 is a beginning, not an end" | "Great innovations are happening in the energy sector, and this biogas project is one of them" | Biogas Report 2014: Biogas & Biomethane Record Growth In Europe | USA Biogas: "We are currently 20 years behind Europe" | Biogas will continue to be promoted by the state in Germany | Re-commitment with biogas in key European Union countries | Sweden leads the world in biogas as a fuel: Biogas is pretty close to the ideal fuel

November 2015: "We're entering uncharted territory" | "We are finally starting to recognize that climate change leads to wars and economic ruin" | Biogas challenges and opportunities

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September 2015: "This is the turning point" | "Dieselgate" opens the door to a very different car industry | "Biogas can replace 51% of US fossil transportation fuel" | From Corporate Social Responsibility to Responsible Research and Innovation?

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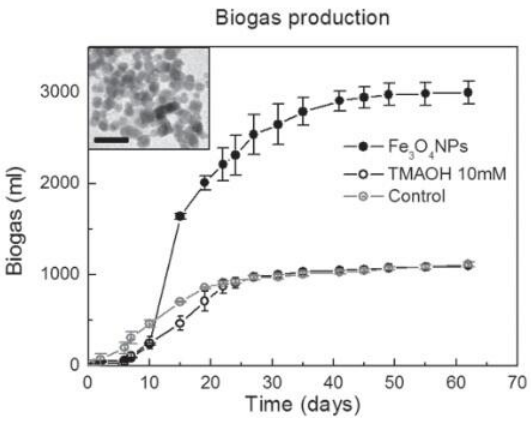
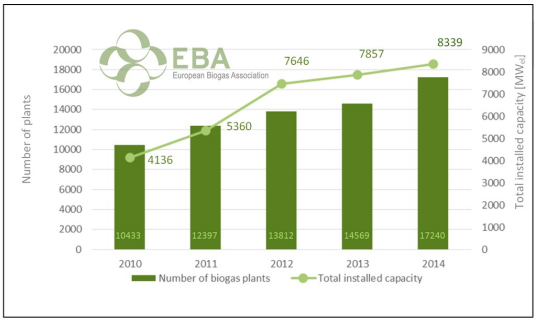
June 2015: Energy & Climate Change: The Start of Climate Litigation | Tipping Point for Renewables | Gas Role in the Global Energy Transition | Biomethane Fuels All Type of Vehicles! | "RRI is an unknown term among scientists & the general public"

May 2015: Climate Change: Clean-Energy Innovation is Essential | "If global food waste were a country, it would rank third in terms of greenhouse emissions" | Biomethane has to be a Pilar on European Sustainable Mobility | RRI Challenge





Number of biogas plants and total installed capacity in Europe 2010 -2014

April 2015: "Climate change will shape the way we do business" | European Biogas and Biomethane Devs | Greening the Gas Grid | Restricted Expansion of Food for Fuel: Waste-Biogas, Next Generation Biofuel | Path toward low-carbon, resilient cities

March 2015: "Energy transition only plan to address climate change" | Fossil fuels structural change | Berlin Energy Transition Dialogue – towards a global Energiewende | Eclipse was a glimpse into the future of our power systems | Citizens role: The energy transition to energy democracy | Waste-biogas or crop-biogas? | Outreach | Responsible Research and Innovation

February 2015: "Now Is The Time To End The Age Of Fossil Fuels" | The Responsible Research And Innovation In This Context | The Biogas Digesters Are Complex Biochemical Reactors | Digestate, Nutrients And Health | Biogas for Vehicles | "Biogas Italy"

January 2015: Climate change is an inmediate risk | The Carbon Bubble | A Global Energy Transition has Started | Biogas in Mainstream Media | Anaerobic Digestion R&D | Milestones | Paris: Renewable Natural Gas To Be a Major Contributor to Sustainable Transport | "Everyone knows the future is decentralized, right?" | "We need to move from the food versus fuel debate to a food and fuel debate"