APPLIED NANOPARTICLES

Monthly Anaerobic Digestion Newsletter September 2015 Compilation & Overview

"This is the turning point"



THIS IS THE TURNING POINT

CONGRATULATIONS, WORLD LEADERS, on securing the Sustainable Development Goals. But we're not going to achieve them unless we take action on CLIMATE CHANGE. Organizations working with more than

6,000,000

COMPANIES AROUND THE WORLD want an ambitious climate deal at COP21 in Paris this December.

investors are taking climate action than ever before.

We are moving because taking action is scaling up clean energy, reducing greenhouse gas emissions in line with the climate science, creating jobs and unleashing low-

Simply put: climate action is good for business. And governments can help us all go further—and faster.

We ask governments to commit to securing an Paris which: an ambitious agreement in

- · Decarbonizes the global economy
- over the course of this century Regularly updates and improves government commitments
- transparency through clear rules
- Sends clear policy signals, such as carbon pricing mechanisms and incentives to shift trillions of dollars towards low-carbon, climate-resilient investment
- Reduces the vulnerability and strengthens the resilience of economies and communities to climate impacts

THE TRANSITION TO THE LOW-CARBON ECONOMY IS INEVITABLE, IRREVERSIBLE AND IRRESISTIBLE.

An ambitious global agreement at COP21 will catalyze business action to reduce emissions and build climate resilience. Together, we can forge a clean, predictable and transformative path towards a safe and prosperous future.























WE MEAN BUSINESS. DO YOU?

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WE ME N BUSINESS

September 26, 2015. Cutting greenhouse gas emissions won't slow **global economic growth** — report by Bruce Watson, The Guardian. "New report from green think tank Heinrich Boll shows **OECD** countries grew their economies 16% in last decade – and cut greenhouse gas emissions **6.4%** (...) The findings echo the results of an International Energy Association study earlier this year, which found that global emissions remained flat in 2014 while global GDP rose, marking a historical milestone (...) The biggest driver has been the reduced cost of renewable energy (...) "Renewables are the only source of energy that is continually getting cheaper (...) But the question of whether the world can continue to decouple economic growth and emissions depends largely on developing countries, which have taken on an increasing share of manufacturing. For the most part, developing countries' economies are more dependent on fossil fuels, and they are growing to make up an increasing proportion of the total world economy. Here, again, the Heinrich Böll study offers a glimmer of hope: it found that China, a major manufacturing economy, has also used renewables to begin decoupling its economy and emissions."

September 26, 2015. Goldman Sachs: "Peak Coal" Is Here by Charles

Kennedy, OilPrice.com. "Peak coal" is here. Goldman Sachs released a September 22 research note that predicted that coal will decline and never come back. "Peak coal is coming sooner than **expected,**" the investment bank concluded. "The industry does not require new investment given the ability of existing assets to satisfy flat demand, so prices will remain under pressure as the deflationary cycle continues." The conclusion is a stunning one, especially considering the years of predictions that coal would climb inexorably as developing countries expanded their grids and their economies grew quickly (...) The growing realization that China's coal demand may not continue is a remarkable development, and perhaps a fatal one for many coal producers"

September 24, 2015. Six Major US Banks Urge Global Leaders To Adopt Climate Change Agreement. "Over the next 15 years, an estimated \$90 trillion will need to be invested in urban infrastructure and energy. The right policy frameworks can help unlock the incremental public and private capital needed to ensure this infrastructure is sustainable and resilient."

In support of prosperity and growth: Financial sector statement on climate change

Scientific research finds that an increasing concentration of greenhouse gases in our atmosphere is warming the planet, posing significant risks to the prosperity and growth of the global economy. As major financial institutions, working with clients and customers around the globe, we have the business opportunity to build a more sustainable, low-carbon economy and the ability to help manage and mitigate these climate-related risks.

Our institutions are committing significant resources toward financing climate solutions. These actions alone, however, are not sufficient to meet global climate challenges. Expanded deployment of capital is critical, and clear, stable and long-term policy frameworks are needed to accelerate and further scale investments.

We call for leadership and cooperation among governments for commitments leading to a strong global climate agreement. Policy frameworks that recognize the costs of carbon are among many important instruments needed to provide greater market certainty, accelerate investment, drive innovation in low carbon energy, and create jobs. Over the next 15 years, an estimated \$90 trillion will need to be invested in urban infrastructure and energy. The right policy frameworks can help unlock the incremental public and private capital needed to ensure this infrastructure is sustainable and resilient.

While we may compete in the marketplace, we are aligned on the importance of policies to address the climate challenge. In partnership with our clients and customers, we will provide the financing required for value creation and the vision necessary for a strong and prosperous economy for generations to come.

Bank of America Citi Goldman Sachs

JPMorgan Chase Morgan Stanley Wells Fargo



September 22, 2015. CO2-Neutrality as a Business Model: Why Climate Protection Can Be Profitable by Siemens. "At the most recent United Nations Climate Change Conference, participating countries declared that they would aim to drastically reduce man-made emissions. Germany is already taking associated measures with its "energy transition" program, and even the pope has called on politicians to meet their obligations in his encyclica Laudato Si. Siemens supplies innovative technologies that help address this global challenge and save money in the process. Now the company itself is heading towards CO2 neutrality (...) However, emissions reductions are not only necessary from an ethical standpoint, but also because they affect a company's business results. Siemens expects its CO2-neutrality program to lead to substantial cost savings. Moreover, the associated technologies enable the company to help customers achieve their own sustainability targets and CO2 savings. For example, Siemens' environmental portfolio, which primarily encompasses sustainable products and solutions, has become a key factor in growth during recent years. In 2014 alone, this portfolio generated 46 percent of the company's income."

September 22, 2015. Fortune 500 listed companies pledge to use 100% renewable electricity. "Goldman Sachs, Johnson & Johnson, NIKE, Inc., Procter & Gamble, Salesforce, Starbucks, Steelcase, Voya Financial, and Walmart have today joined RE100, pledging to source 100% of their electricity from renewable energy to reduce CO2 emissions and seize the business benefits. RE100 is an ambitious global campaign led by The Climate Group in partnership with CDP, to engage, support and showcase influential businesses committed to 100% renewable electricity. The companies have chosen this year's Climate Week NYC to unveil their leadership move before senior figures from global business and governments. With December's COP21 UN climate talks fast approaching, this key milestone event sends a timely reminder to negotiators that leading businesses want strong climate action from governments, while increasing demand for renewables themselves. America's business drive to a low carbon economy has been picking up speed recently."



September 21, 2015. Energy Revolution 2015 by Greenpeace. "This is the year when the fight against climate change could take a dramatic turn. The conference in Paris in December presents political and business leaders with the opportunity to take the critical decisions needed if we are to keep average temperature rises to no more than 1.5 or 2 degrees Celsius. According to the IPCC, humankind cannot emit more than 1,000 giga-tonnes of CO2 from now, if we are to stay within this limit. At the current and projected rate of consumption, this entire carbon budget will be

used by 2040. Dynamic change is happening in energy supply, but the change needs to happen faster, this Energy [R]evolution scenario proposes a pathway to a 100% sustainable energy supply (achievable by 2050), ending CO2 emissions and phasing out nuclear energy, and making redundant new oil exploration in the arctic and deep sea waters such as off the coast of Brazil. It also demonstrates that this transformation increases employment in the energy sector. What is required is for the political will to be there. Greenpeace has been publishing its Energy [R]evolution scenarios since 2005, more recently in collaboration with the scientific community, in particular the German Aerospace Centre (DLr). While our predictions on the potential and market growth of renewable energy may once have seemed fanciful or unrealistic, they have proved to be accurate. The US-based Meister Consultants Group concluded earlier this year that "the world's biggest energy agencies, financial institutions and fossil fuel companies for the most part seriously under-estimated just how fast the clean power sector could and would grow". It wasn't the IEA. Goldman Sachs or the US Department of Energy who got it right. It was Greenpeace's market scenario which was the most accurate (...) The Energy [R]evolution proposes a phase-out of fossil fuels starting with lignite (the most carbon-intensive) by 2035, followed by coal (2045), then oil and then finally gas (2050)."

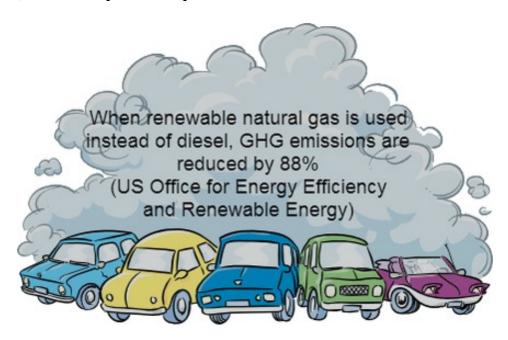
September 3, 2015. How are YOU dealing with the energy transition? by Hendrik Steringa, energypost. "It is still too early to tell whether the incumbent energy companies will survive. (...) In 2011 when I started my research it was clear to me that if I wanted to study the energy transition I had to focus on the electricity sector first. Although utility companies where still resisting the idea of a full blown transition, I felt this was the place where it was happening. I couldn't have made a better decision: in just a couple of years I saw major multi-billion euro companies plummet into a deep crisis because the spectacular growth of renewables took them by surprise. I also saw them go through the four classic transition stages familiar to me from academic transition literature. They are quite similar to the stages a person in grief goes through:

- First denial or ignoring the changes ("Solar is a hype")
- then changes were recognized but met with anger and resistance ("Subsidies are to blame ... and there will be black-outs")
- then acceptance ("We are in a deep crisis and we need to change")
- and now transformation ("It is a struggle to find new business models") In the last stage companies try to adapt to the new circumstances. If they fail, they will shrink or disappear altogether."



"Dieselgate" opens the door to a very different car industry

September 29, 2015. Per i ricercatori dell'IstitutoMotori di Napoli il metano è la vera alternativa di Sergio Troise, autologia.net. "Uno dei principali centri di ricerca europei sull'inquinamento atmosferico provocato da gas di scarico è l'Istituto Motori di Napoli. Emanazione del Consiglio Nazionale delle Ricerche, realizza campagne di prova, in laboratorio o su strada, rilevando emissioni e consumi per differenti classi di veicoli (autovetture, autobus, furgoni, motocicli) con il compito di valutare molteplici aspetti legati alla circolazione. I ricercatori sono coordinati dal professore Vittorio Rocco, docente alla facoltà d'Ingegneria di Roma Tor Vergata, considerato uno dei massimi esperti della materia a livello europeo. Per questo gli abbiamo rivolto alcune domande per Il Mattino su ciò che sta avvenendo, e ciò che potrebbe avvenire, in seguito allo scandalo Volkswagen (...) dai nostri studi emerge che l'ibrido, inteso come motorizzazione benzina/elettrico o diesel/elettrico, è interessante esclusivamente per i percorsi urbani, mentre in autostrada può far aumentare i consumi. E allora, su che cosa si dovrebbe puntare? «Sui carburanti alternativi». Quali? «Il metano innanzitutto. E' presente in natura in grande quantità, costa poco, viene già distribuito e apprezzato per usi domestici e seppure produce idrocarburi, non sono tossici. E' inspiegabile non sfruttarlo anche per i trasporti. Qualche anno fa l'amministrazione di Roma mi chiese di studiare un piano per la metanizzazione della circolazione della Capitale. Non se ne è fatto niente». Però è la strada che batte con ostinazione FCA. «Vero. Ma anche su questo fronte si fa meno di quanto si potrebbe. L'Istituto Motori è pronto a dimostrare, scientificamente, che per abbattere consumi ed emissioni si può puntare sull'ibrido metano/elettrico. La ricerca di sistemi alternativi, meno costosi e più utili per le aziende e la collettività, dovrebbe ripartire da qui."



When Renewable Natural Gas is used in vehicles in place of diesel, it reduces greenhouse gas emissions by 88 percent or more.

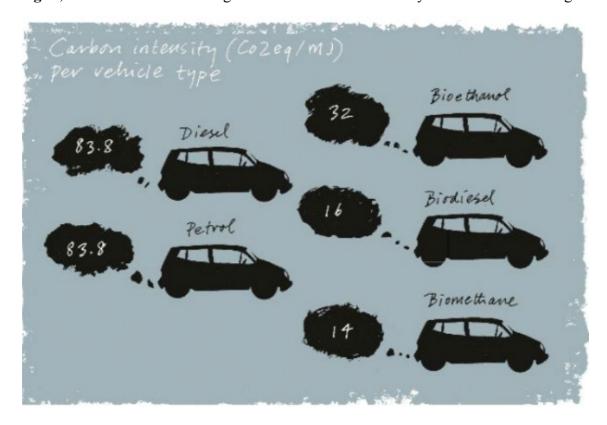
Image: <u>EBA</u>. Source: Energy.gov

September 28, 2015. Some Mercedes, BMW and Peugeot models consuming around 50% more fuel than official results, new study reveals. "Greg Archer, clean vehicles manager at T&E, said: "Like the air pollution test, the European system of testing cars to measure fuel economy and CO2 emissions is utterly discredited. The Volkswagen scandal was just the tip of the iceberg and what lies beneath is widespread abuse by carmakers of testing rules enabling cars to swallow more than 50% more fuel than is claimed." On average, two-thirds of the claimed gains in CO2

emissions and fuel consumption since 2008 have been delivered through manipulating tests with only 13.3 g/km of real progress on the roads set against 22.2 g/km of 'hot air', according to the report. This means that in the last three years there has been no improvement in fuel economy from new vehicles on the road (...) Cars are responsible for 15% of Europe's total CO2 emissions and are the single largest source of emissions in the transport sector. The EU's first obligatory rules on carbon emissions require car manufacturers to limit their average car to a maximum of 130 grams of CO2 per km by 2015, and 95g by 2021."

September 28, 2015. Beat Tesla: Germany Urges Automakers to Dazzle After VW Scandal by Rainer Buergin and Hans Nichols, Bloomberg. "Peter Altmaier, chief of staff to Chancellor Angela Merkel, challenged German carmakers to prove their country remains a leader in the auto industry by beating Tesla Motors Inc. in the electric-car market (...) Altmaier said automakers should use the challenge of reducing emissions to spur innovation (...) "The automobile industry has to adapt to the environmental challenge that we are facing all around the globe and I'm optimistic that this crisis, this issue, can help us to promote even more environmentally-friendly technologies," he said."

September 26, 2015. A scandal in the motor industry: Dirty secrets, The Economist. Volkswagen's falsification of pollution tests opens the door to a very different car industry. Emissions of nitrogen oxides (NOx) and other nasties from cars' and lorries' exhausts cause large numbers of early deaths—perhaps 58,000 a year in America alone, one study suggests. So the scandal that has engulfed Volkswagen this week is no minor misdemeanour or victimless crime. The German carmaker has admitted that it installed software on 11m of its diesel cars worldwide, which allowed them to pass America's stringent NOx-emissions tests. But once the cars were out of the laboratory the software deactivated their emission controls, and they began to spew out fumes at up to 40 times the permitted level. The damage to Volkswagen itself is immense. But the events of this week will affect other carmakers, other countries and the future of diesel itself. (...) Some fear that this may be the "death of diesel". So be it. There is still scope to improve the venerable petrol engine; and to switch to cleaner cars that run on methane, hydrogen and electricity, or are hybrids. A multi-billion-dollar race is already under way between these various technologies, with makers often betting on several of them as the way to meet emissions targets



September 25, 2015. <u>Elon Musk says VW scandal proves limits of fossil fuel cars</u> by Danny King, autoblog. "Asked if people might lose their faith in green technology, Musk said that what the scandal shows is that "we've reached the limit of what's possible with diesel and gasoline. And so, the time, I think, has come to move to a new generation of technology."

September 23, 2015. <u>Le dernier chant du diesel</u> par Philippe Escande, Le Monde. "Sale temps pour le diesel. Honnie par les écologistes, fustigée par les grandes municipalités, objet de soupçons des autorités de contrôle, cette technologie vieille comme l'automobile subit aujourd'hui son attaque la plus grave (...) Comme le dernier clou dans le cercueil d'une technologie dont les constructeurs français et allemands sont les spécialistes mondiaux et ardents promoteurs (...) Comme dans le cas du nucléaire, face à des coûts qui augmentent constamment et une réputation toujours plus écornée, les constructeurs, français en tête, vont, eux aussi, devoir changer de logiciel."

September 22, 2015. <u>Volkswagen scandal could kill off diesel cars</u> by Marion Dakers, The Telegraph. "Car giant's chief executive is under pressure following emissions furore that could spell the end of diesel cars (...) More than half of all new cars sold throughout Europe run on diesel engines, making the impact of the rigged nitrogen oxide readings in the US and possibly further afield over the past six years even more stark. "The move against VW is going to act as a catalyst to speed up the fall in diesel market share in Europe and halt it in the US," Bernstein said in a note to clients. "In fact, regulators will now be much more conservative about what they permit and much tougher real world tests may prove either too difficult – or too expensive – for diesel to meet."

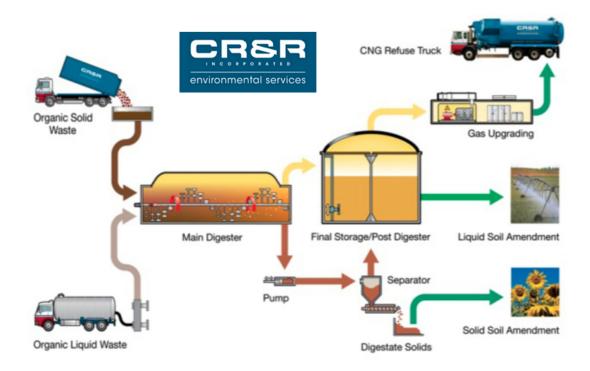
"Biogas can replace 51% of US fossil transportation fuel"

September 22, 2015. Le gaz, vecteur prometteur de la transition énergétique. "Concernant la production tout d'abord, le gaz vert ou « renouvelable » se développe progressivement et se décline désormais aussi bien pour le chauffage, la cuisson, la production d'électricité, et le carburant de nos véhicules. « Pour le moment, il n'en est qu'à ses débuts, moins de 1% du gaz consommé en France, mais il va monter en puissance, les objectifs sont d'ailleurs ambitieux, avec 10% de gaz renouvelable en 2030 et 70% en 2050 », explique Bernard Aulagne, président de Coénove, une association réunissant plusieurs industriels de la filière gazière (GRDF, Vaillant, Viessmann, Bosch, Atlantic...). "

September 21, 2015. <u>CR&R-Greenlane Truck Biomethane</u> by Rich Piellisch, Fleet&Fuels. "Greenlane Is Supporting a New Digester in Southern California With an Initial Production Target of One Million diesel gallon equivalents (DGEs) Per Year: State's First for 'Pipeline-Quality Renewable Natural Gas from Organics Recycling'. CR&R Waste & Recycling expects by this coming fourth quarter to be producing organic refuse-derived biomethane to fuel its natural gas truck fleet. UK-based Greenlane Biogas is providing engineering services to upgrade product from a new anaerobic digester in Perris, Calif., southeast of Los Angeles. Initial annual output is pegged at about a million diesel gallon equivalents. CR&R, based in Orange County, Calif., currently uses

Redeem brand biomethane from Clean Energy Fuels to fill compressed natural gas trucks at Garden Grove and Perris. The company has an LNG fueling facility in San Juan Capistrano. CR&R operates some 900 trucks, mostly Autocar and Peterbilt vehicles, and added 50 natural gas units this year, for a total of approximately 350. The 1,500-employee firm serves about 3 million customers through some 50 municipal contracts. The RNG/renewable natural gas facility initially will be able convert biogas produced from the anaerobic digestion of 80,000 tons annually of municipal organic waste into one million DGEs, Greenlane says. "We will be the first in California to produce and supply pipeline quality RNG from organics recycling," CR&R project manager Mike Silva says in a Greenlane release. Excess will go into the pipeline grid."

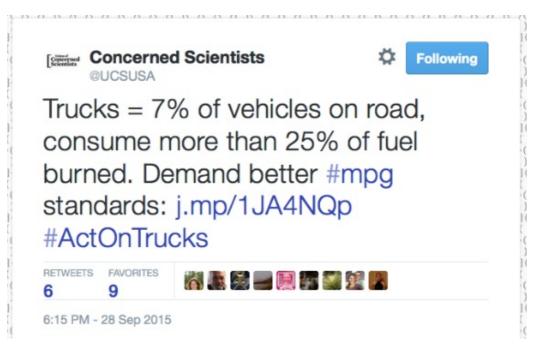
ANAEROBIC DIGESTION - FLOW CHART



September 16, 2015. El gas natural gana enteros en el transporte por Denisse Cepeda Minaya, Cinco Días. "España cuenta con una flota de 4.600 vehículos de gas natural, una cifra que se ha duplicado en cinco años. Los planes europeos y nacionales contra el cambio climático impulsan al sector gasista en la movilidad (...) Además, registra 42 estaciones de servicio públicas, concentradas en Madrid y Barcelona, de las que 18 son de GNL (gas natural licuado) y el resto, de GNC (gas natural comprimido); así como otras 50 privadas. La intención es que "España se convierta en el país de referencia tecnológica a nivel europeo en este sector", señala Industria. El proyecto calcula que el parque de vehículos a gas natural se elevará a 18.000 en 2020, para lo cual se requerirá un mínimo adicional de estaciones en torno a 50, entre urbanas y transeuropeas. Sin embargo, para Manuel Lage, secretario general de Gasnam (Asociación Ibérica de Gas Natural para la Movilidad), es "un plan pacato". Un estudio de Deloitte para dicha asociación estima, aunque en 30 años, una flota superior a 660.000 de ligeros a gas, más de 10.000 pesados y 140.000 pesados interurbanos, para un grado de penetración del 3%, 79% y 45%, respectivamente. Tampoco está de acuerdo con que se incluya el GLP por ser un derivado del petróleo. "Se necesitan más puntos de repostaje para cumplir con Bruselas y esto requiere apoyo de la Administración", considera Lage. El problema es el coste de las infraestructuras –que ronda los 800.000 euros–, no de oferta, añade."

September 9, 2015. Pour le Secrétaire d'Etat en charge des Transports, le GNV est le seul carburant alternatif aujourd'hui techniquement opérationnel pour le transport routier de marchandises. "Dans une interview accordée, en mars 2015, à la revue "Entreprendre", dans le cadre d'un dossier consacré au transport et la logistique, Alain Vidalies, Secrétaire d'État chargé des transports, de la mer et de la pêche, a développé les intérêts écologiques et économiques du carburant gaz naturel (...) "Le gaz naturel liquéfié (GNL), seul carburant techniquement opérationnel aujourd'hui pour le transport routier de marchandises, présente un fort intérêt écologique. Par rapport au diesel, il permet une diminution de 95 % des émissions de particules fines et d'environ 70 % de celles d'oxyde d'azote. L'intérêt du gaz naturel est aussi économique : son prix est plus compétitif que le gazole. Dans un cadre européen fortement concurrentiel, le bénéfice ne doit pas être négligé pour les transporteurs routiers, car le carburant représente en movenne plus de 30 % des coûts d'exploitation. Je souhaite établir un état des lieux partagé sur les avantages de l'utilisation du gaz naturel. Il est nécessaire d'associer à cette démarche tous les acteurs concernés. Dans ce contexte, avant la fin 2016, le Gouvernement présentera à l'Union Européenne le schéma national pour l'approvisionnement en carburants alternatifs, prévu par la directive d'octobre 2014."

September 9, 2015. <u>45000 voitures GNV immatriculées en Europe au premier semestre 2015</u>. "Selon l'association des constructeurs automobiles européens (ACEA), quelques 45.000 voitures GNV ont été immatriculées en Europe au cours premier semestre 2015 (...) Avec 35160 voitures GNV écoulées, l'Italie conserve sa place de leader et représente 78 % du marché européen. La Suède et l'Allemagne se place en seconde et troisième position avec environ 3000 exemplaires écoulés tandis que la République-Chèque se place quatrième avec environ 1500 immatriculations (...) La France reste en queue de peloton sur le segment de la voiture GNV. Il faut dire qu'entre l'absence de bonus gouvernemental, un réseau de ravitaillement largement insuffisant et la quasi-désertion des constructeurs, il n'y a pas beaucoup d'ingrédients pour que l'alchimie fonctionne…"



September 3, 2015. <u>The Biogas Rush by Jim Lane</u>, AltEnergyStocks.com. "51 percent? Could renewable natural gas get that big? The rationale behind the Eureka!, and some Caveats for all you Emptors. A few years back we lived in the era of the National Energy Solution Summed Up in One Word: it was gasoline, then diesel, then ethanol, or biodiesel. Then there was the Two-Word Era: in p[art because of an Inconvenient Truth, the craze was on for cellulosic ethanol, algae biofuels, aviation biofuels, and there was the Hydrogen Economy or the Glucose Economy, depending on who you were talking to. We seem to have reached the Three-Word Era. Seems like every day

we hear the drums beating for Renewable natural gas and low cost methane. And there's been a steady newsflow in new natural gas project and technology announcements, posted cellulosic RINs, a surge in investor enthusiasm, and increasing stakeholder acceptance."

September 2, 2015. The Gas Rush: The Digest's 2015 8-Slide Guide to Farmatic and the opportunity in renewable natural gas by Jim Lane, BiofuelsDigest. "In a remarkable presentation at the Infocast Methane Bioengineering Summit in San Diego this week (and earlier at the Advanced Bioeconomy Feedstocks Conference in New Orleans, in June), Farmatic Anlagenbau CEO Michael Schuppenhauer said that the US could replace up to 51% of its fossil transportation fuel through biogas, and that from crop residues and waste streams alone, 33 states could generate more than 10 percent of their transportation fuel. Building that low carbon fuel economy, Schuppenhauer said, would create 2.5 million jobs and create \$240 billion in investment in the communities that adopted this pathway."

August 31, 2015. <u>Transporte de mercancías: ¡Yo elijo Gas Natural!</u> "A día de hoy el Gas Natural Vehicular se presenta como la alternativa al combustible tradicional más creíble para el transporte de mercancías. Para saber más sobre qué ventajas e inconvenientes genera el uso diario de este tipo de vehículos, hemos hablado con varias empresas de transporte, de muy distinta naturaleza, que nos aportan una visión práctica del día a día del transporte con un vehículo GNL (...) Se calcula que hoy en día circulan más de 16 millones de vehículos GNV en el mundo, unos 5.000 en España... y de ellos cerca del 85% son vehículos pesados "

From Corporate Social Responsibility to to Responsible Research and Innovation?

September 27, 2015. Volkswagen And The Failure Of Corporate Social Responsibility by Enrique Dans, Forbes. "The Volkswagen case represents above all an absolute failure in terms of Corporate Social Responsibility (CSR). The company deliberately set out to design a means to circumvent emissions control—a stratagem known at the highest levels—with the aim of giving the company an unfair advantage over its competitors that made it the world's number one car maker, in large part on the basis of its supposedly environmentally friendly cars; meanwhile it was poisoning the planet (...) The conclusion can only be that for Volkswagen, CSR is a marketing exercise. But the sad truth is that this conclusion applies to the vast majority of companies: a head of CSR is appointed, given an air of respectability, and runs a department the job of which is to keep the company's image clean, despite the filth it is mired in, as is clearly the case with Volkswagen. Once again, we have allowed ourselves to be duped into believing that companies can and will regulate themselves, when of course the sordid reality is that as their actions show, beyond the occasional symbolic act, their sole objective is to maximize profit, and by any means (...) The problem with CSR pretty much comes down to this: we are asking companies to self-regulate."

Responsible Research and Innovation Related terms: Corporate Social Responsibility. "The main difference between Corporate social responsibility (CSR) and RRI is that the CSR approach tends to be industry-driven or rather "an expression of corporate strategy, corporate identity, market power". CSR decisions are driven by the values of stakeholders by asking "What do stakeholders care about?". In contrast to that RRI establishes procedures to better integrate societal needs in the process of research and innovation and its methodology is centered on the equal roles and responsibility of societal actors and innovators. Furthermore, CSR is mostly concerned with ethical acceptability (or legal responsibilities of human rights instruments) and sustainability (e.g. reducing pollution), not with societal desirability. "