APPLIED NANOPARTICLES

Monthly Anaerobic Digestion Newsletter

September 2014 Compilation & Overview

The Road to Paris: Climate back on the agenda

September 23, 2014. **Historic Climate Summit Opens New Chapter in Global Efforts to Tackle Climate Change**. **World leaders reaffirmed the need to take urgent action to limit global temperature rise to less than two degrees Celsius**. Acknowledging that the world was not on a pathway to reach that goal, they also committed to significantly ramp up climate action. Many speakers made it clear that taking action to reduce emissions could be achieved without damaging prospects for economic development and efforts to fight poverty. Closing the Summit, the Secretary-General said, "I asked for bold announcements from Governments, business, finance and civil society in five key areas. The Summit delivered. This Summit was not about talk. History is made by action. And now we have seen that the world is ready to act." At the Summit, heads of government, business and civil society announced actions in areas that would have the greatest impact on reducing emissions, including climate finance, energy, transport, industry, agriculture, cities, forests, and building resilience.

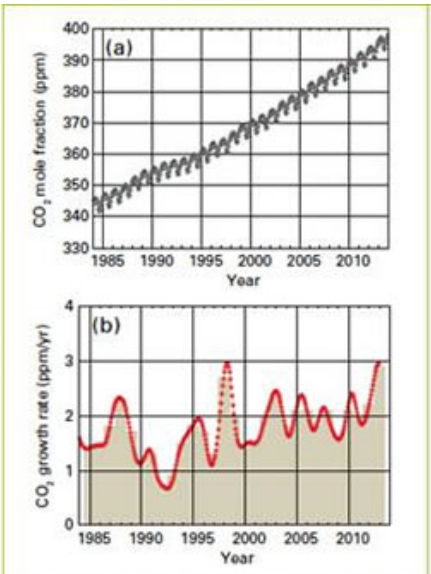


Figure 3. Globally averaged CO_2 mole fraction (a) and its growth rate (b) from 1984 to 2013. Differences in successive annual means are shown as shaded columns in (b).

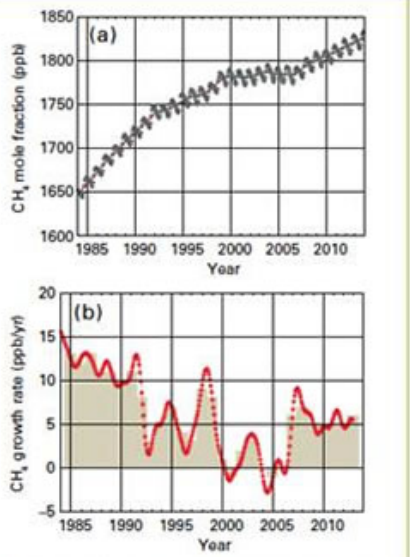


Figure 4. Globally averaged CH_4 mole fraction (a) and its growth rate (b) from 1984 to 2013. Differences in successive annual means are shown as shaded columns in (b).

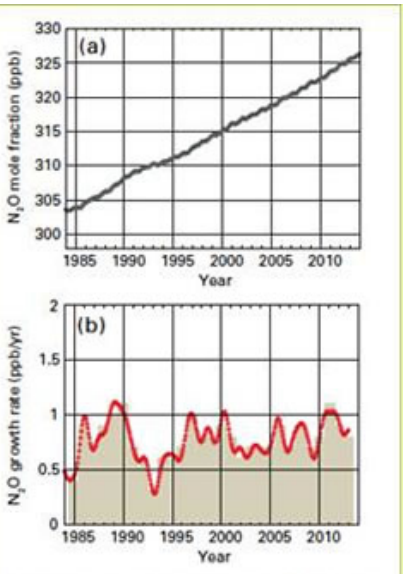


Figure 5. Globally averaged N_2O mole fraction (a) and its growth rate (b) from 1984 to 2013. Differences in successive annual means are shown as shaded columns in (b).

Government leaders also committed to reach an ambitious and universal climate agreement in Paris in 2015 and pledged to work under the UN Framework Convention on Climate Change to reach it.

"Looking forward, we must maintain the spirit of compromise and commitment that characterized our discourse," Mr. Ban concluded. "We must fulfill and expand on all the pledges and initiatives brought forward today. **As we walk together on the road to Paris in December 2015** (United Nations Climate Change Conference)**, let us look back on today as the day we decided – as a human family – to put our house in order to make it liveable for future generations**." The announcements and commitments made at the Climate Summit can be found at www.un.org/climatechange/summit and on Twitter from @climate2014live #climate2014

context:

September 25, 2014. **UN-supported Principles for Responsible Investment (PRI) launches the Montreal Carbon Pledge**. By signing onto the **Montreal Carbon Pledge**, **investors commit to measure and publicly disclose the carbon footprint of their investment portfolios on an annual basis**. Overseen by the PRI, the Montreal Carbon

Pledge aims to attract US $3 trillion of portfolio commitment in time for the United Nations Climate Change Conference in December 2015. It also allows investors to formalize their commitment to the goals of a recently introduced Portfolio Decarbonization Coalition, co-founded by the United Nations Environment Programme Finance Initiative (UNEP-FI). "We are proud to launch the Montreal Carbon Pledge, a commitment by investors to translate climate talk into walk," said Fiona Reynolds, Managing Director of the Principles for Responsible Investment. "The first step to managing the long-term investment risks associated with climate change and carbon regulation is to measure them, and this initiative sets a clear path forward." **Carbon footprinting enables investors to quantify the carbon content of a portfolio**.

September 25, 2014. **Global investment funds pledge 'carbon footprint' disclosure** by Janet McFarland, The Globe and Mail. Eight funds are inaugural participants, including the $298-billion (U.S.) California Public Employees' Retirement System, which is the largest pension plan in the United States, and France's public sector pension plan known as ERAFP. "**We think we must move to a new stage in responsible investment, and that is about capital allocation**. For us, measuring our footprint means considering reducing our carbon footprint. So we will need to see how we can rethink our asset management in these terms." 78 per cent of the 500 largest public companies in the world report publicly on their carbon emissions, as well as 335 of the 500 companies comprising the U.S. S&P 500 index. 42 investment funds globally already report the carbon footprint of their investments. The availability of reported data has allowed consulting firms to develop software programs that investment funds can use to easily calculate the carbon emissions of their portfolio holdings without having to do the work themselves. "**Carbon is kind of the metric of prime time now because the majority of companies are reporting it, and there is really a lot of investor interest**."

September 22, 2014. **Measuring the Global Fossil Fuel Divestment Movement** by Arabella Advisors and the Divest-Invest coalition, puts the fossil fuel divestment movement in perspective. According to the Arabella report, **181 institutions and local governments and 656 individuals representing over $50 billion dollars have pledged to divest to-date.** That number includes the $860 million Rockefeller Brothers Fund, which was built on the Standard Oil fortune — a sign of the times? All told, the report indicates that **divestment commitments have doubled since January 2014**.

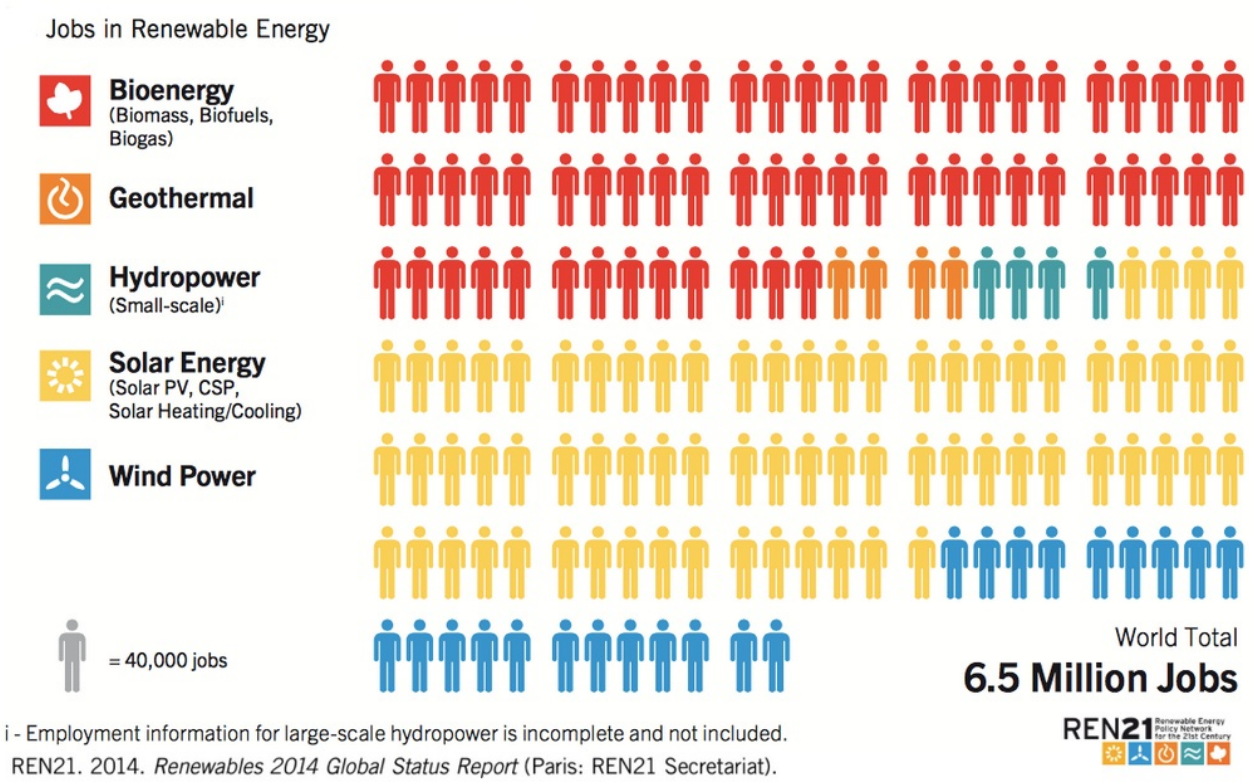
September 21, 2014. **Rockefellers, Heirs to an Oil Fortune, Will Divest Charity From Fossil Fuels** By John Schwartz, New York Times. "The family whose legendary wealth flowed from Standard Oil is planning to announce on Monday that its $860 million philanthropic organization, the Rockefeller Brothers Fund, is joining the divestment movement that began a couple years ago on college campuses. The announcement, timed to precede Tuesday's opening of the United Nations climate change summit meeting in New York City, is part of a broader and accelerating initiative. In recent years, 180 institutions — including philanthropies, religious organizations, pension funds and local governments — as well as hundreds of wealthy individual investors have pledged to sell assets tied to fossil fuel companies from their portfolios and to invest in cleaner alternatives. In all, the groups have pledged to divest assets worth more than $50 billion from portfolios, and the individuals more than $1 billion, according to Arabella Advisors, a firm that consults with philanthropists and investors to use their resources to achieve social goals."

September 21, 2014. **People Climate March**, the biggest climate march in history. **Today, the world marched for climate action**. From Manhattan to Melbourne, more than half a million people took to the streets in a unified global move to demand ambitious commitments from world leaders in tackling the climate crisis. By end of day estimates, the flagship march in New York City drew approximately 400,000 people–more than quadrupling the pre-march estimates of 100,000–just two days before world leaders converge here for an emergency UN Climate Summit. **"We said it would take everyone to change everything — and everyone showed up."** The New York march was led by indigenous and frontline communities who came from across the globe to highlight the disproportionate impact of climate change–from communities hit hardest by Superstorm Sandy to people living in the shadow of coal-fired power plants and oil refineries to those living in Island Nations already faced with evacuating their homes. "The frontlines of the climate crisis are low-income people, communities of color and indigenous communities here in the US and around the globe. We are the hardest hit by both climate disruption—the storms, floods and droughts—as well as by the extractive, polluting and wasteful industries causing global warming," said Cindy Wiesner, Co-Director of The Climate Justice Alliance. "**We are also at the forefront of innovative community-led solutions that ensure a just transition off fossil fuels, and that support an economy good for both people and the planet**."

September 15, 2014. **Laureates ask philanthropists to invest for climate: 'Environmental Laureates' Declaration on Climate Change'** Distinguished environmentalists from 46 countries are calling on foundations and philanthropists to use endowments worth billions of dollars to turn the tide on global warming. The group, all winners of major environmental awards, issued their call to action in an **'Environmental Laureates' Declaration on Climate Change'**,

published in the International New York Times, on Monday 15th September 2014, one week before world leaders arrive in New York for a UN Climate Summit. “We, 160 winners of the world’s environmental prizes, call on foundations and philanthropists everywhere to deploy their endowments immediately in the effort to save civilization,” say the laureates. “The world’s philanthropic foundations, given the scale of their endowments, hold the power to trigger a survival reflex in society, so greatly helping those negotiating the climate treaty.” The European Environment Foundation (EEF), which circulated the declaration to prize-winning environmentalists for signature, will now write to foundations individually asking them to use their financial power to create a tipping point in climate action:

1. **By investing directly in clean energy companies and low-carbon projects**;
2. By withdrawing investments from fossil fuel companies or campaigning as shareholders for them not to develop new reserves;
3. By making grants to support clean energy start-ups and stimulate the development of low-carbon markets.



i - Employment information for large-scale hydropower is incomplete and not included.
REN21. 2014. *Renewables 2014 Global Status Report* (Paris: REN21 Secretariat).

TECNOLOGÍA	EMPLEO				TOTAL
	FABRICACIÓN E INSTALACIÓN	OPERACIÓN Y MANTENIMIENTO	TOTAL DIRECTO	TOTAL INDIRECTO	
BIOGÁS	721	6.485	7.205	7.385	14.590
BIOMASA	23.350	12.375	35.725	31.438	67.163
FOTOVOLTAICA	22.224	9.491	31.715	14.272	45.987
MINIEÓLICA	3.526	941	4.466	3.573	8.040
TOTAL	49.820	29.291	79.111	56.668	135.779

Renovables: Empleo potencial en España “El autoconsumo energético y la generación distribuida renovable como yacimiento de empleo”

The Green Gas in the Energy Transition

September 12, 2014. **Renewable Energy Association Manifesto: Growing the Renewable Energy Economy**. REA intends for the manifesto to be used as a blueprint for the next government to secure the sector's growth in the UK. The association notes that the next government will be responsible for meeting or missing the 2020 renewable energy targets. According to the manifesto in order to hit the legally-binding targets, the UK must double the amount of renewable electricity, more than double the use of renewable transport fuels, and more than quadruple the use of renewable heat by 2020.

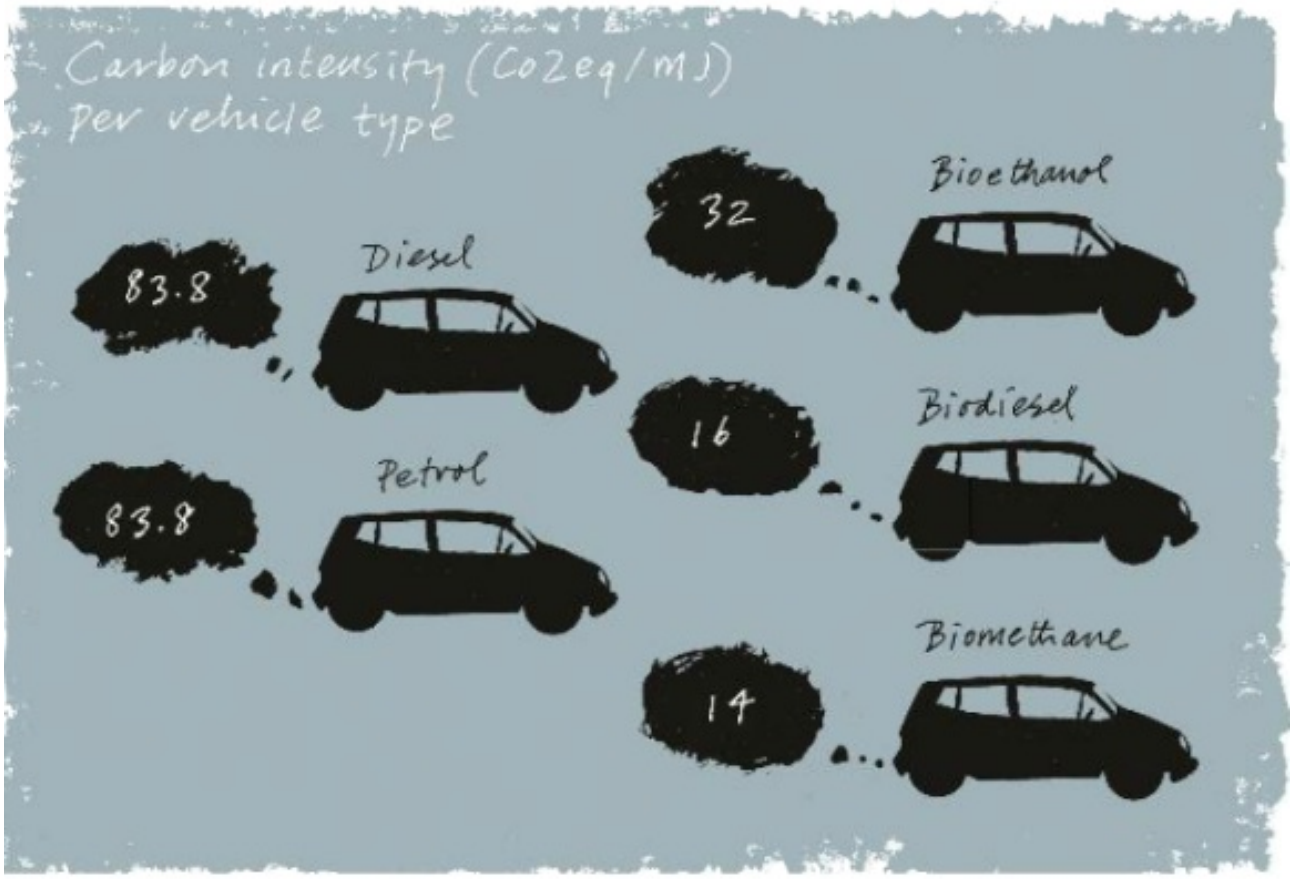
September 19, 2014. **New challenges for the biogas industry: First Biogas large operators insolvent**, AC Biogas AG (Germany). The biogas plant operators AC biogas based in Münster has filed for bankruptcy with the District Court Muenster. The **company claims to be the "largest biogas plant operators in Europe"** and employs 290 people, 100 of them at its headquarters in Münster. In Germany alone, the company operates 100 plants with a power output of 103 megawatts. **The bankruptcy comes as a surprise**. The company claims to be the "largest biogas plant operators in Europe" and employs 290 people, 100 of them at its headquarters in Münster. In Germany alone, the company operates 100 plants with a power output of 103 megawatts.

September 26, 2014. **From Biogas to Bioresources – why ADBA widened its remit** by Bill Bruce, FoodBev.com. ADBA has announced that it is changing its name from the Anaerobic Digestion & Biogas Association, to the Anaerobic Digestion & Bioresources Association.**This is in response to a rapidly changing political and economic landscape**. Central to this decision is the recognition that, **as new technologies and products develop**, there will be opportunities to innovate and incorporate them with anaerobic digestion to improve profitability and sustain the industry's growth. Commenting on the name change, chief executive, Charlotte Morton, said: "AD has always been about more than the biogas – we all value the nutrients and minerals in the digestate, too. Our name change, therefore, reflects the wider objective to fully represent all the current benefits of AD as well as those emerging in the biochemistry and products arena. Thus **ADBA will now cover all products and technologies that transform organic waste materials into high value biotechnology products or biogas, power and digestate opportunities**.

“The technologies and processes that ADBA now represents under ‘bioresources’ are all complementary to the existing AD process and its products. **We want to support the AD industry to take advantage of the huge potential of these novel emerging technologies**, so that our members can continue to support the UK to make the best use of its available resources. As the trade association for the industry, ADBA is setting the agenda to prepare the sector for an important and potentially changeable few years. Our wider remit and new name will ensure that our members will be appropriately supported and represented through this period of change.” ADBA board member and development director for SITA UK, Stuart Hayward-Higham, added: "Anaerobic digestion was always about more than recovering energy and generating electricity. It was about making best use of biological materials, returning nutrients and minerals to the land and **delivering a circular solution**. So changing the name to include all bioresources, from those we currently manage, through to emerging technologies such as high value green chemicals, bioplastics, algae and other nutrient production, is both logical and timely.”

September 23, 2014. **EBA’s response to the article on EurActiv: EU risks wasting billions on gas infrastructure 'white elephants'**. Reading this morning’s EurActiv news, European Biogas Association (EBA) was baffled and concerned about the ignorance and one-sidedness of the article on the need of a gas infrastructure. We would like to underline that **gas networks, similarly to electricity, indeed do transmit energy from a variety of sources**: gas in not “just gas”! **Biomethane that is a 100% renewable energy source, profit from the natural gas’ infrastructure due to its similar chemical composition and energy content**. There is an increasing amount of biomethane plants in Europe (232 in 2012, 259 in 2013) and most of the produced biomethane (77% of the 166 000 m3/h capacity in 2012) is injected into the gas grid. In 2030, the overall potential for biogas is at least 50 billion m3. Thus, by 2030 and with right policies in place, the industry could in the best case scenario deliver 2-4% of the EU’s electricity needs and reach a 15-30% share of the overall gas market. **It should also be noted that with power-to gas technologies, which convert surplus green electricity into biomethane, green electricity can be reasonably balanced. However, to realise the full potential of these innovative technologies and green gas deliveries to all over Europe, there is a clear need for a strong European gas network.** Increased production and use of biomethane has several benefits for Europe’s economy and environments. Biomethane is a domestically produced energy source that revitalises European rural areas with green jobs; in 2013, the biogas sector alone employed almost 70 000 Europeans. Biomethane can be produced from any organic material contributing to the European climate targets by reduced GHG emissions and improved air quality (while fossil fuels are replaced, particulate (< PM10) and NOx emissions are massively reduced). Therefore, investments in gas infrastructure are certainly not any “waste of public money”. Similarly to “green electricity”, there is also “green gas” with a huge potential to decarbonise the European energy sector.

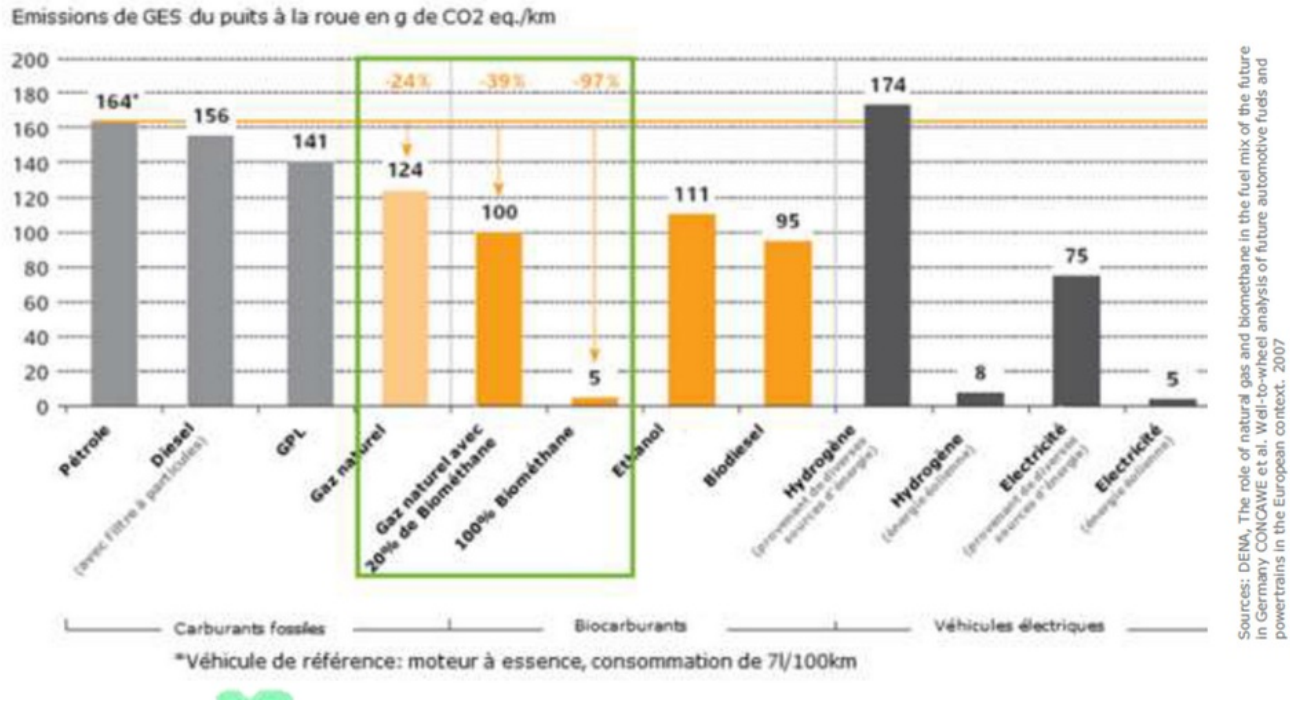
The Fuel of Tomorrow



September 29, 2014. **Sweden: Historic premiere for biogas in the national grid** – Gas pipeline links up biogas plant to the gas grid. **Biogas has now been fed into the Swedish transmission gas grid for the very first time**. The Jordberga biogas plant outside Trelleborg is the first in Sweden to use the grid for the distribution of gas. **Customers include the public transport company Skånetrafiken, which will use the biogas as fuel for its buses**. This is a milestone for the transmission system operator Swedegas in the move towards increasing the proportion of biogas in the system. The companies behind the biogas plant are Swedish Biogas International, E.ON Gas, Skånska Biobränslebolaget and Nordic Sugar. Together with partners in seven countries in Europe, Swedegas has signed t**he Green Gas Commitment, which aims to have a 100% carbon-neutral gas supply by 2050**. For Swedegas, this undertaking means that **the gas in the Swedish grid will be 100% renewable**.

September 28, 2014. **Water firms to pipe biomethane gas generated at sewage-treatment works into Britain's homes**. Cooking with 'poo-power' could hold substantial environmental benefits. Thousands of UK residents will soon be cooking with "poo-power"'. **In a national first, water firms are preparing to pipe a continuous supply of biomethane gas directly from sewage-treatment plants into the National Grid**. In the past, water firms have used gas produced in sewage treatment to generate electricity on site, but this will be the first time advanced technology to treat methane will produce high-quality biomethane suitable for use in homes. “Greenhouse-gas emissions reductions could be significant as the methane normally generated at sewage works is 25 times more harmful to the atmosphere than carbon dioxide. By capturing methane and pumping it into the National Grid water companies could turn from greenhouse-gas emitters into renewable-energy generators.” Severn Trent was first to activate its gas-to-grid systems, this week, injecting 1,200m3 of biomethane into the Grid from Minworth sewage works in Birmingham. Wessex Water's gas-to-grid project at the Bristol sewage works will be the first and largest plant of its kind, using food waste as well as sewage to produce up to 2,000m3 of biomethane an hour, enough to fuel 8,300 homes for a year. Food waste, generates “twice as much” biogas as sewage.

September 26, 2014. **Projet de loi à l'Assemblée National Française : le titre III sur les transports propres est adopté**. Les députés ont adopté en commission spéciale de l'Assemblée nationale, le titre III du projet de loi relatif à la transition énergétique pour la croissance verte, consacré aux transports propres et à la qualité de l'air. **Le développement des transports moins polluants est un objectif important pour faire baisser la facture énergétique de la France et des français, améliorer la qualité de l'air et préserver la santé**. Le projet de loi prévoit des mesures ambitieuses, tant au niveau national que local, pour que la mobilité contribue aux économies d'énergie, et pour réduire les pollutions. La définition dans la loi des véhicules propres, pour les voitures particulières et pour les poids lourds et les bus, est précisée. Un décret viendra fixer les technologies qui entrent dans cette définition (véhicules électriques, hybrides rechargeables, hydrogène, GNV etc…) en fonction de leur taux d'émissions de gaz à effet de serre et de polluants atmosphériques.



September 25, 2014. **GreenGasGrids published Biomethane Roadmap for Germany**. **Biomethane as renewable, storable and flexible energy source takes an important function within the German energy mix.** Biomethane is able to use the existing natural gas infrastructure and is thereby a particularly efficient versatile energy source. As a natural gas substitute from domestic production it decreases the dependency on imported fossil fuels. These properties and advantages of biomethane are important in all kinds of applications and are necessarily to be noticed in case of further development of the legal framework. With a view to the short-term stagnating sales development in Germany, bordercrossing trade of biomethane offers great opportunities. In countries like Switzerland or Sweden the supply cannot keep up with the demand. Other countries focus on the import of renewable energy sources to reach national renewable energy targets. Due to its central position in Europe, Germany has a direct connection to many European countrys´ gas grids. This is an optimal starting situation to meet the high demands on biomethane abroad.

September 25, 2014. **Le gaz naturel liquéfié, le carburant de demain?** Par Sia Partners, L'Express. La première station-service de GNL (gaz naturel liquéfié) vient d'ouvrir en France à Castets dans les Landes alors qu'au niveau européen, la filière possède déjà une cinquantaine de stations. Quelle est l'avenir de cette filière de carburants?

September 15, 2014. **Commissioning of the worlds biggest biomethane production plant in Montreal, Canada**, by New Zealand clean-tech company, Greenlane Biogas Technologies. The plant produces up to 16,000 m3 per hour of biomethane. "While this plant is the world's largest by 60% gas production capacity, Greenlane had previously commissioned a plant in Gustrow, Germany, which is now the world's second largest plant." To upgrade biogas to natural gas or vehicle fuel quality, carbon dioxide, hydrogen sulphide and other contaminants need to be separated and removed. Initially, biogas upgrading was driven by the need for an environmentally friendly, sustainable and economically viable fuel which is interchangeable with natural gas. **Many of the market's initial installations provided fuels for natural gas vehicles. The market is now shifting to include systems that inject upgraded biogas – biomethane – into existing natural gas pipeline networks**.

context=

September 19, 2014. Greenlane Biogas sold to UK investor for $25m. Pressure Technologies said it had bought the business and certain assets of the New Zealand company, which is a global developer and supplier of patented technology for upgrading raw biogas into high purity bio-methane. The deal takes effect from Oct. 1 and involves an initial payment of $12 million and the rest deferred as an earn out over four years. Greenlane Biogas had a funds injection in March from well-known local investors Tenby Powell and Sharon Hunter with the aim of turning the troubled company around and reclaiming its position as the world leader in the supply of biogas equipment.

September 12, 2014. International Energy Agency Bioenergy study: **Biomethane Status and Factors Affecting Market Development and Trade** The publication focusses on the status of biomethane (**which includes upgraded biogas and bio-SNG**) production, grid injection and use in different IEA countries. It also illustrates the options and needs for the development of biomethane supply strategies with the focus on improved trade. Further, an overview of expected future development of the biomethane sector is given. Results from a dedicated questionnaire were assessed to get an insight into the opportunities and barriers for biogas and biomethane in the market in a number of countries.

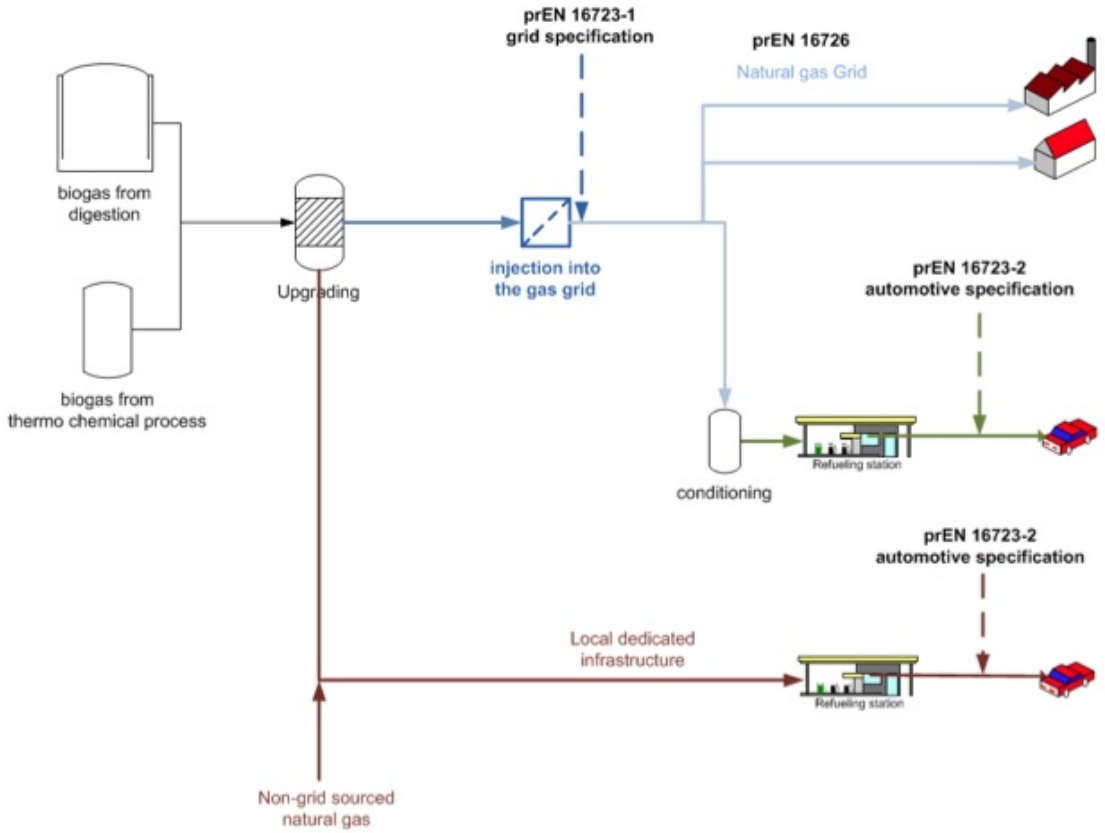


Figure 2-4. Schematic of the biomethane and natural gas transport system, showing in which points of the gas network the different standards of CEN/TC408 will apply; the point of entry for injection, and the point of use as automotive fuel. Source: CEN/TC408 working group.

September 12, 2014. **Biomethane: London's answer to saving thousands of lives** In the week in which senior industry leaders came together at ADBA's second UK Biomethane & Gas Vehicle Conference to discuss the sector's strong growth and limiting factors, the Mayor of London has appeared before the House of Common's Environmental Audit Committee over concerns that **London continues to breach European laws on air pollution after almost five years**. Current expectations are that London is not expected to meet the EU standards on nitrogen dioxide pollution until 2030, which is a matter of great concern to Londoners as research commissioned by the Mayor suggests that **the city's pollution levels cost 4,300 lives each year**. Conceding that more can be done, Boris Johnson said, "there are great things we could do with low carbon vehicles, with stimulating the market for low carbon vehicles." In response, **ADBA is emphasising the important role that biomethane can play in improving poor air quality in our towns and cities**. During the biomethane conference, was reported the potential benefits of using biomethane as including: 80 – 90% reduction in Nox; 95% reduction in particulate emissions; 20-30% reduction in carbon dioxide levels; 78 pence per litre equivalent costs; and a payback period of 12-24 months. **Mr Johnson's solution, however, rests with electric cars** at a time when industry regulator, Ofgem, has reported that spare electricity power production capacity could fall to 2% by 2015; dramatically increasing the risk of blackouts. In addition, according to the Gas Vehicle Alliance, electric cars are still responsible for 75gCO2 eq./km in greenhouse emissions compared to just 5gCO2 eq./km for biomethane. With strong growth in the use of road gas, a more targeted approach towards converting London's biggest polluters -such as HGVs, vans and buses which contribute around 40% of the UK's vehicle emissions- could significantly reduce associated environmental and health risks.

September 9, 2014. **Second UK Biomethane and Gas Vehicle Conference**. As the trade body for the UK's anaerobic digestion and biogas sector, ADBA is producing this event in line with our strategic vision **to realise the full potential of biomethane as a transport fuel**. ADBA is uniquely placed to understand the issues faced by the biomethane supply chain and end vehicle users, including the availability and deliverability of biomethane. ADBA actively lobbies to clear pathways for both producers and users, enabling the industry to receive the best value, strengthening the supply chain from beginning to end.

September 1, 2014. **Rapid biogas filling station network expansion in Finland**. Three new stations were taken into use within the last few days by 3 different operators bringing the total number of public biogas filling stations to 24. **All of them sell 100 % biogas (CBG100,** Compressed BioGas 100%**) and only biowaste based biogas**, like the earlier stations. **Finland and Iceland are the only countries in the world where CBG100 is available in all public biogas stations**. Blends of biogas and natural gas are not available in these countries.

Digestate

September 4, 2014. Crop Best Practice Launched: **Voluntary guidelines on best practice for crop feedstocks in anaerobic digestion** (AD). The voluntary guidelines on Best Practice for Crop Feedstocks in anaerobic digestion, prepared and supported by ADBA (Anaerobic Digestion & Biogas Association), NFU, CLA, REA and NNFCC, was officially launched today following considerable collaborative efforts between AD and farming industries in consultation with government and other key stakeholders. The choice of crop and the farming practices used can affect soil quality and structure, nutrient retention and leaching, greenhouse gas emissions and biodiversity among many other things. The guidelines, which draw on existing regulations and standards, aim to show the wide benefits of crop-based AD to sustainable farming and how good practice can be used to bring positive environmental outcomes and avoid risks, in particular by integrating crops for AD into the whole farm system.

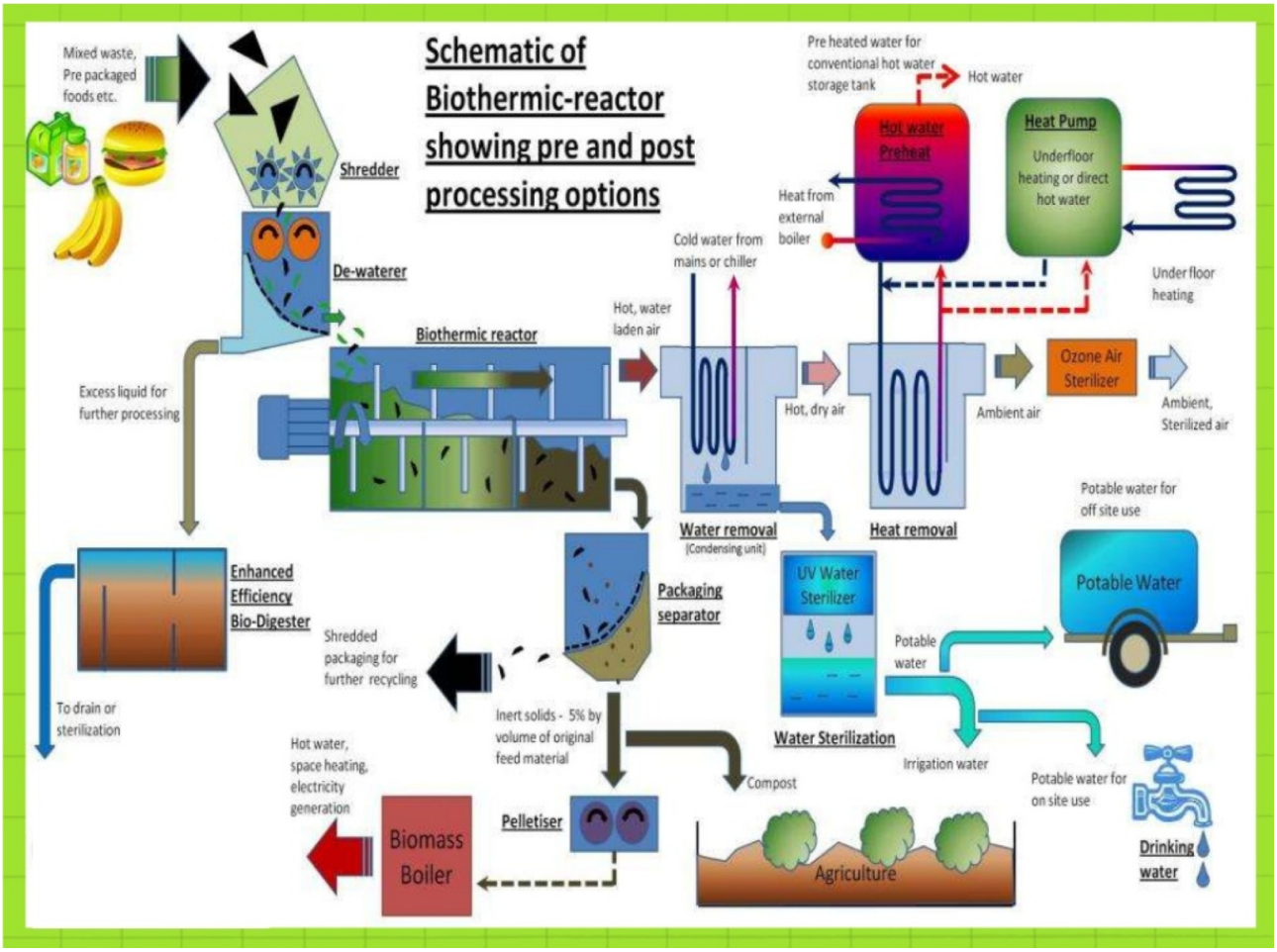
Other form of Bio-stimulation for Waste Management

September 9, 2014. **Bio Thermic Digester May Become Major Competitor To Anaerobic Digestion?** Bio Thermic Digester (BTD) is the term for an innovative type of industrial-scale biological high temperature-digester which uses Aerobic Extremophilic Bacteria to achieve a remarkably high level of mass reduction. The Advetec Bio-thermic Digester (BTD) is at most installations, a bespoke containerized unit, which is described by them as capable of converting 33 tonnes of organic waste material over a 48 to 72 hour period, reducing the volume by over 97 per cent. This new technology is the result of what is described as eight years' of development, and is has been developed, designed and manufactured in the UK.

Advetec Holdings Ltd, which is based in Somerset, UK, is described as leading the world in what is being called **bio-stimulation. It looks as if this is a unique approach, which is based upon invigorating bacteriological activity**. By applying this technique they have been able to develop products that enhance *thermophilic* and *extremophilic bacteria* strains, in ways that entice them to digest organic waste. The technology is currently being trialled by a number of UK Water Companies, at their Wastewater Treatment Works (WWTWs), and full-scale operating Advetec Bio Thermic Digester systems are also being installed at some of the initial pilot study Water Company WWTs. In addition, it has been announced that in July 2014, London's Regional Waste Recycling has chosen Advetec Technologies to install a new water treatment system. The core of that system will be Advetec's first industrial-scale, Bio Thermic Digester that will reduce organic waste from fat traps, septic tanks, filter cakes and municipal collections and reduce it by an amazing 96% by weight. It also has been awarded its first US permit for its Bio Thermic Digestion process in the US. In fact, it seems that Advetec in conjunction with Organic Solutions Inc. has been awarded the first and only Solid Waste Organics Recycling Pilot Project in the USA, for a pilot in Florida.

Worldwide, municipal authorities are experiencing a serious, and ever more difficult challenge as waste tonnages keep rising, in disposing of their waste in a sustainable, well controlled, and responsible manner. It is still early days yet, but this state of the art piece of equipment which uses one of the most basic of life-forms to simply dissolve away difficult organic waste, seems to be **emerging as a contender for greatness within the list of tools for modern waste management**.

The inventors of the process says that it uses specifically cultivated and stimulated bacteria commonly found around 2-3 miles below the surface of the sea around the outlets of raging volcanoes. These bacteria thrive on waste and process it remarkably rapidly. The by-products from the (BTD) process are said to be useful, and include heat, water, and odour sterilisation. The tiny proportion left afterwards, it is stated, can be used as a biomass fuel to produce electricity.



Anaerobic Digestion is being hailed as the preferred method of governments to treat the organic fraction of municipal solid waste, but it only converts 30% to 40% of waste (known as its mass-reduction) to methane. The by-product of digestate which is left can be a useful product when the source material is food and farm waste, but for anaerobic digestion plants which process municipal solid waste due the concentrations of heavy metals, and unwanted inorganic residues, limits its usefulness as a soil conditioner. That's where the very high mass reduction of the Advetec (BTD) process looks so promising. Perhaps the biggest benefit of the BTD process comes from the way that it could massively reduce the amount of food waste, currently being taken to our landfills, and that really is good because food waste is one of the waste types that it is most important to stop sending to landfill. **However, the BTD does not produce any methane**. The question that needs answering may well be, whether the BTD process is more sustainable for this application than the alternative anaerobic digestion process, with all the benefits of a renewable fuel and industrial chemical source which come from methane production.

Responsible Research and Innovation

September 16, 2014. **International cooperation context of Responsible Research and Innovation** (Issue 48 International Research, European Commission, September 2014). **In an increasingly globalized world, efforts to foster the take up of Responsible Research and Innovation (RRI) could lead to positive and durable impacts provided they are not restricted solely to national or European boundaries; but rather, are implemented worldwide**. The EU-funded project RESPONSIBILITY brings together ten European partners from eight EU countries, as well as three partners from Asia and South America. Additionally, the Advisory Board members from three European and associated countries, Australia and UNESCO enrich the consortium with

international experience and advice. RESPONSIBILITY is creating an RRI Forum and virtual Observatory, which facilitate a network of stakeholders to adopt and diffuse a common understanding of RRI between different actors in Europe and around the globe. The project's vision is to become an effective knowledge transfer tool that diffuses scientific knowledge and simultaneously involves researchers, policy makers as well as societal stakeholders in a user-friendly manner, to further the concept and practice of RRI.

September 16, 2014. **Responsible Research and Innovation in action** by Jack Stilgoe. List of examples of Responsible Research and Innovation in action.

September 12, 2014. **RRI Tools: de la teoría a la práctica ¿Es posible mejorar la relación entre ciencia y sociedad? ¿Se puede hacer que la ciencia aporte más a la sociedad? ¿Y lograr que la sociedad apoye la ciencia como motor de progreso?** Partiendo de estas preguntas, que no son en absoluto novedosas, estamos asistiendo en los últimos meses a la emergencia de un nuevo término: la **Investigación e Innovación Responsables**, más conocido como **RRI** (por sus siglas en inglés). Entre otras cosas, la RRI aboga por **implicar a todos los actores relevantes, durante todo el proceso, para reflexionar sobre los objetivos y los resultados y consecuencias de la investigación y la innovación**. En estas primeras etapas de su vida, la RRI se ha convertido en una idea muy amplia y que intenta dar respuesta conjunta a diferentes demandas. Es un concepto jugoso, que corre rápidamente en boca de todos, pero también hay que admitir que, en gran medida y para la mayor parte de los implicados, la RRI se trata por ahora de un concepto abstracto.

Es aquí donde entra en juego el proyecto **RRI Tools**,que inició su andadura a principios de 2014. Concebido con la ambición de proporcionar apoyo práctico para implementar la RRI en el Espacio de Investigación Europeo, los objetivos de RRI Tools son generar **herramientas innovadoras**, impartir **formación** para su uso y alcanzar una amplia **difusión** del concepto. Para ello, cuenta con **26 socios y 19 Hubs de RRI** repartidos por toda Europa y coordinados por un **equipo del Departamento de Ciencia y Medio Ambiente de la Obra Social "la Caixa"**

Con vistas a cumplir estos objetivos, en este primer año de vida, **RRI Tools** está trabajando en establecer una **definición de trabajo de RRI** (centrada en los requerimientos y los resultados de los procesos de investigación e innovación) y en una **amplia consulta** que permita conocer cuáles son las necesidades de los diferentes agentes implicados. El proyecto intenta aplicar lo que predica, implicando a la máxima diversidad de actores desde las primeras etapas del proceso. Las metodologías de consulta desarrolladas tienen como objetivo recabar todas las ideas posibles sobre cómo deben ser las herramientas necesarias para implementar la RRI, entendiendo que consultar con los futuros usuarios es la mejor manera de asegurar su utilidad. ¿Y qué sería de una herramienta sin alguien que la use? Desde el primer momento, RRI Tools está creando una **Comunidad de Práctica**, compuesta por personas e instituciones con interés en RRI, y en particular en hacer uso del futuro **RRI Toolkit**. Para todos aquellos interesados en saber más del proyecto, en participar en actividades relacionadas con RRI, o simplemente en sumarse a esta creciente Comunidad de Práctica, RRI Tools tiene abiertos sus canales de comunicación, tanto a través de la **web del proyecto**, como de las **redes sociales** (basta con buscar RRI Tools en FB, TW, y LinkedIn).

September 5, 2014. **What could be the negative impacts of Responsible Innovation – some ideas?** By Hilary Sutcliffe. We should certainly do for the 'field' of Responsible Innovation, what we are telling others to do – namely consider in advance the potential and actual negative social, ethical and environmental impacts of Responsible Innovation. We should then think about what to do about our findings. Here's a starter, it would be helpful to have further views? **Constrain Creativity – is fear of public backlash responsiveness to stakeholders or gutlessness?** (…) **Drive technology underground with uncertain consequences for commerce & safety?** (…) **Does the 'hassle factor' constrain responsible development?** (…) **Excessive regulatory precaution constraining technology development – evidence says not really?** (…) **Are broad based 'ology' fears constraining risk assessment and therefore innovation?** (...)