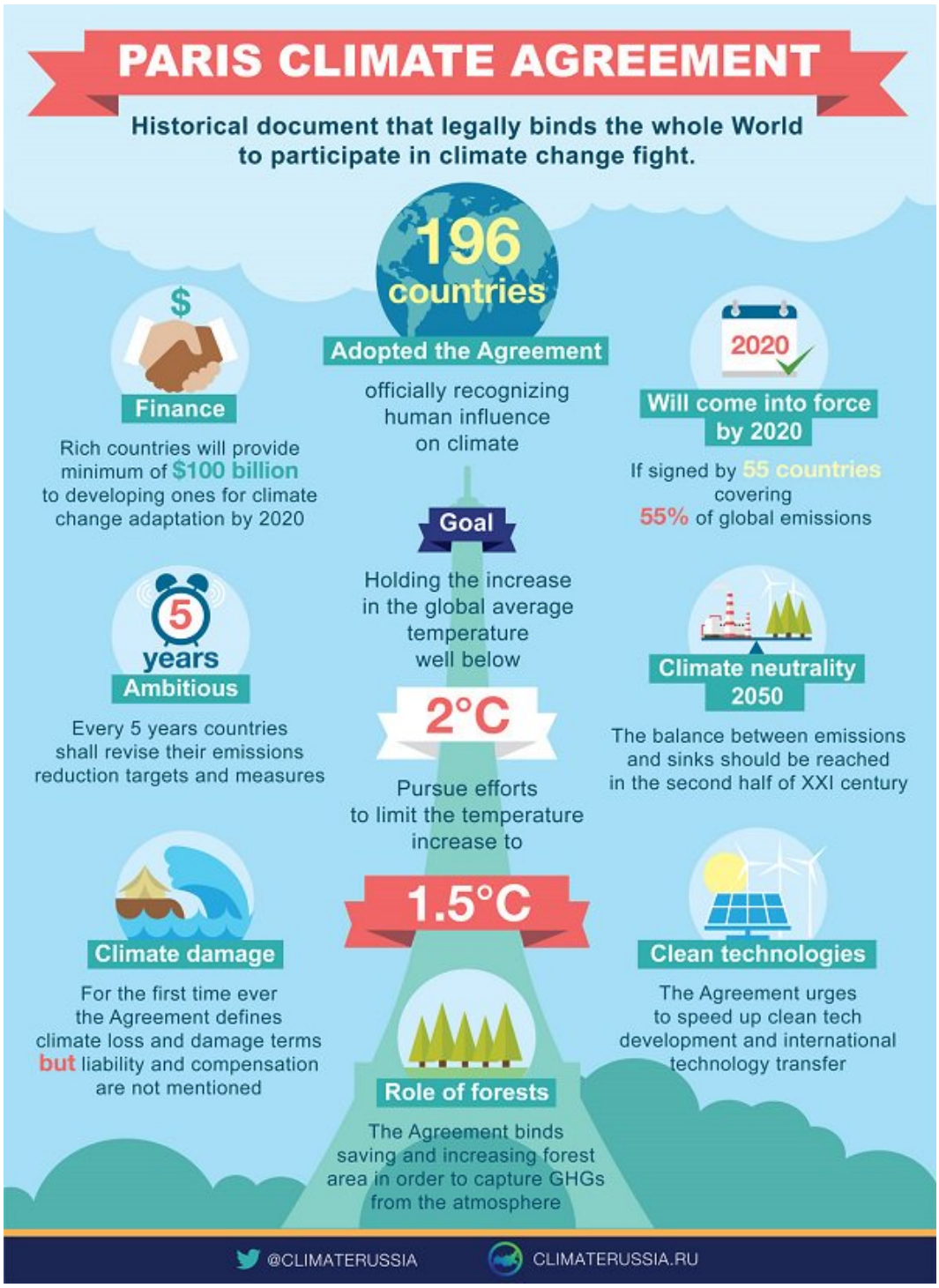
APPLIED NANOPARTICLES

Monthly Anaerobic Digestion Newsletter

December 2015 Compilation & Overview

"The Paris Agreement at COP21 is a beginning, not an end"



*December 2015. **World leaders agree climate deal at COP21 talks**.*
*"**The Paris agreement has been praised by world leaders and cautiously welcomed by scientists** (…)*
*Although concerns remain, **there is no doubt that this agreement is the first of its kind.***
It remains to be seen whether it will have lasting impacts in the years to come."

December 24, 2015. **Dallas Fed says U.S. has lost 70,000 oil jobs in the past year** by Collin eaton, FuelFix powered by aramco. "For American drillers, the New Year will likely bring more of the same – financial pressure and mass layoffs. **The U.S. petroleum industry hasn't seen this many bankruptcies in one quarter since the Great Recession**, the Federal Reserve Bank of Dallas says, counting nine Chapter 11 court filings in the year's final three-month period. And that's just a third of the year's domestic casualty count."

December 23, 2015. **This €1 Billion Power Plant May Never Be Switched on** by Tino Andresen and Weixin Zha, Bloomberg. "Utilities RWE, EON are biggest losers on DAX Index this year Both companies to separate traditional generation in 2016. **Germany's unprecedented energy shift is turning newly built power plants into white elephants that will never produce any electricity. Once the backbone that underpinned growth in Europe's biggest economy, coal and gas plants are being marginalized in a new world where solar and wind are all the rage**. With electricity prices at their lowest level in more than a decade, the outlook is now so bad that RWE AG will never start its 1 billion-euro ($1.1 billion) Westfalen-D plant, while EON SE applied this year to close two new unprofitable gas-fired units."

December 21, 2015. **Fossil fuel industry facing $33trn hit after Paris climate deal**. "The fossil fuel industry is facing a $US33 trillion hit to its revenues over the next 20 years as a result of the COP21 global climate deal signed in Paris earlier in December, according to analysts at Barclays bank (...) Energy analysts from Barclays bank in the UK said t**he climate deal will see renewable energy scaled up and will cause investors to rethink new investments in fossil fuel options.** Lead analyst at Barclays bank Mark Lewis says the effects on the fossil fuel industry will be significant, and forecast a loss in revenue of around $US33 trillion up to 2040 compared to business as usual estimates (...) **The implications will be felt most acutely in the oil sector which is estimated to lose $US22 trillion, with the gas sector losing $US6.1 trillion and the coal sector $US5.7 trillion**. The impact is mostly in relation to investments and projects that won't go ahead, as opposed to existing assets (...) Lewis said that the main reason why a deal at COP21 was possible was because the costs for different renewable energy technologies had fallen significantly in the last decade."

December 22, 2015. **Europe's Warmest Year Heralds Free German Power for Christmas** by Rachel Morison, Marek Strzelecki and Weixin Zha, Bloomberg. "**Wind output may prompt producers to pay buyers to take power**. Mild weather to add to reduced holiday season demand."

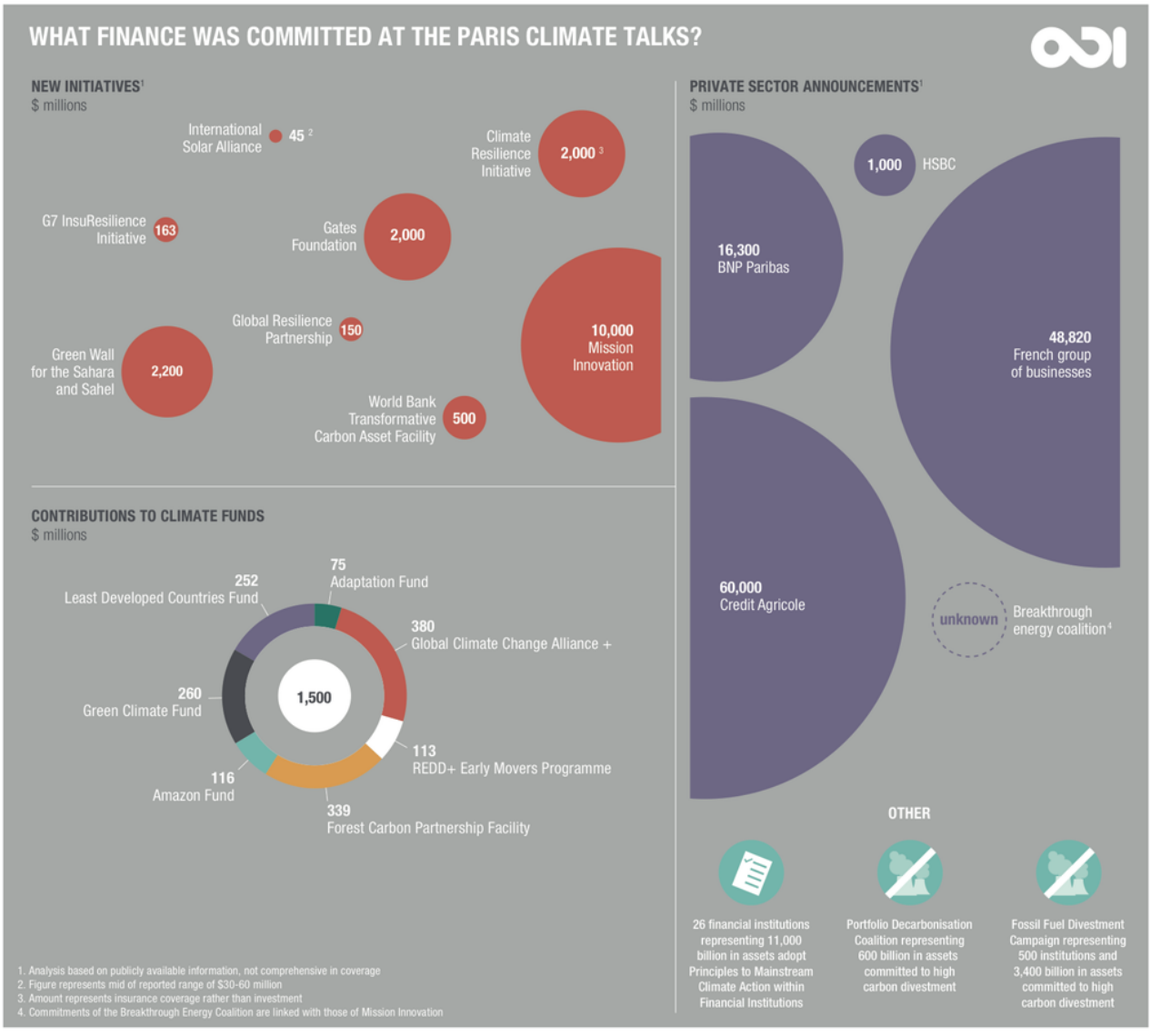
December 21, 2015. **Over 60 Groups Call for the Fossil Fuel Industry to Pay for their Climate Damage** by Kyla Mandel, DeSmog UK. "More than 60 organisations from around the world are calling for a carbon levy on fossil fuel extraction to help pay for the climate change impacts on the most vulnerable countries. The **Carbon Levy Project** declaration argues that **fossil fuel companies are causing approximately 70 per cent of the climate change experienced today. As a result, these companies should have to help mobilise funds to provide compensation for the damage**, it says. **This would be done through a tax on extraction (as opposed to emissions)** the declaration explains. Renowned climate scientist Naomi Oreskes, author Naomi Klein, 350.org's Bill McKibben, and Greenpeace's Kumi Naidoo, along with Ronny Jumeau, the Seychelles Ambassador to the UN, and Yeb Sano of the Philippines, have all signed the declaration following this month's historic Paris Agreement."

December 14, 2015. **Food Waste from COP21 Talks Used for Biogas Production** by Ben Messenger, WMW. "When any large group comes together to work on a project on the scale of the recent COP21 climate talks held in Paris, they have to eat. Unfortunately the inevitable consequence of that is food waste. Voice of America has published a video looking at what happened to the huge quantities generated by delegates to the talks. **The 40,000 people attending the talks were fed by**

six restaurants. The result? Over one tonne of food waste to dispose of every day. To process the food waste from the talks specialist firm Moulinot uses an anaerobic digestion facility to produce biogas for energy generation."

December 4, 2015. **COP 21: il rapporto annuale di Ispra (Istituto Superiore per la Protezione e la Ricerca Ambientale) evidenzia il ruolo del biogas nella riduzione delle emissioni del settore agricolo**. "Per il settore agricolo, la tendenza di gas serra dal 1990 al 2013 mostra una diminuzione del 14,9%. (...) A concorrere al risultato ha contribuito significativamente anche l'incremento della produzione di biogas da deiezioni animali." Italian Greenhouse Gas Inventory 1990-2013. National Inventory Report, 2015

November 2, 2015. **Vast Energy Value In Human Waste** by UN University. "Biogas from human waste, safely obtained under controlled circumstances using innovative technologies, is **a potential fuel source great enough in theory to generate electricity for up to 138 million households** – the number of households in Indonesia, Brazil, and Ethiopia combined. A **report** today from UN University's Canadian-based Institute for Water, Environment and Health estimates that **biogas potentially available from human waste worldwide would have a value of up to US$ 9.5 billion in natural gas equivalent. And the residue, dried and charred, could produce 2 million tonnes of charcoal-equivalent fuel, curbing the destruction of trees**. Finally, experts say, the large energy value would prove small relative to that of the **global health and environmental benefits that would accrue from the proper universal treatment of human waste**."



“Great innovations are happening in the energy sector, and this biogas project is one of them”

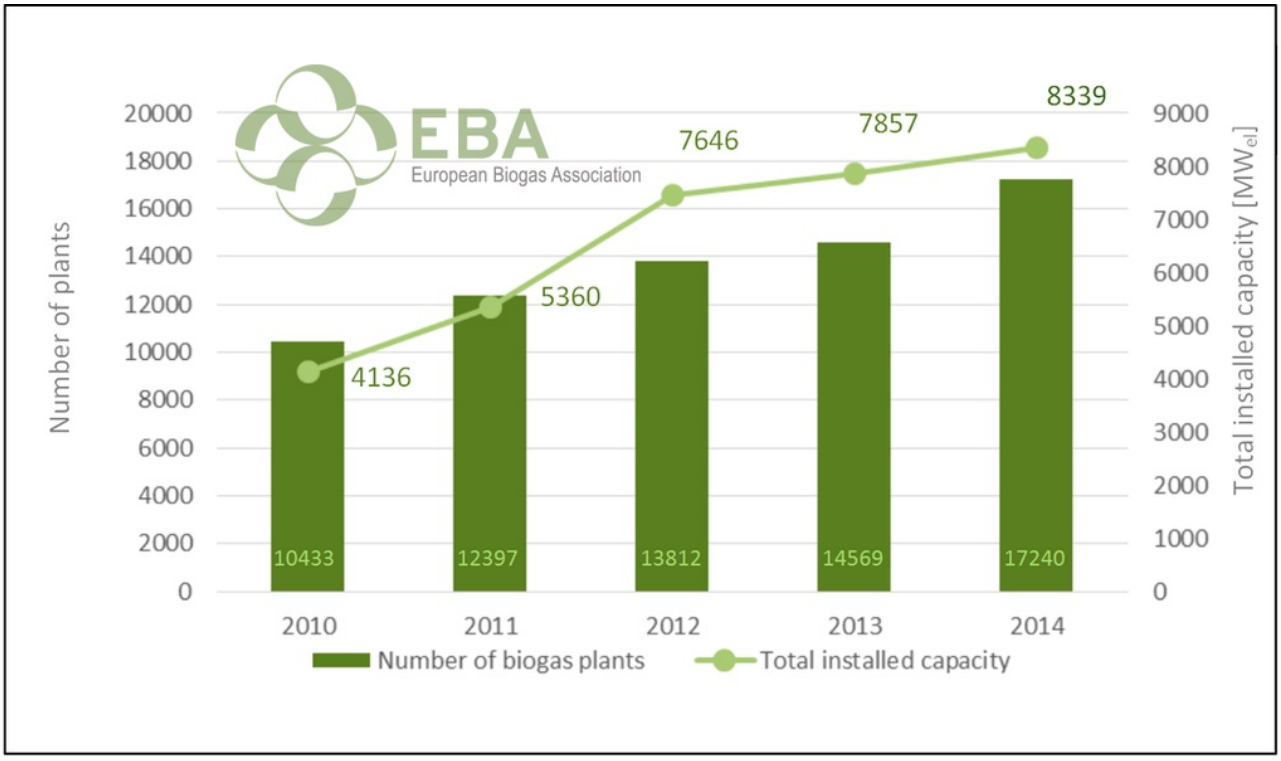
December 26, 2015. **HomeBiogas – Turn Your Garbage into Energy** by M. Hatipoglu, TendinTech. “Turning organic waste into energy is nothing new. Some cities around the have been creating big landfill areas that designed to capture the gas that came out from the reaction inside the garbage. And the gas that releases has been used by cities for transportation or producing electric. But **with HomeBiogas, you can have your gas source for yourself.** You can cook or keep your home warm. And the reaction that create the cooking gas also gives you a high-quality fertilizer. HomeBiogas can’t be considered as a startup company. They already finished all the research and installed the HomeBiogas system many places already. In their first 24 hours, they reached their $100,000 goal in Indiegogo.”

November 27, 2015. **Conoce la primera máquina de biogás casera**. “Convierte 1 kilo de desechos alimenticios en 200 litros de gas”

June 15, 2015. **Israeli Home Device Turns Trash Into Biogas Fuel** By Maya Yarowsky, NoCamels. “The Western world may have grown accustomed to microwave ovens and electric burners, but the majority of developing populations still cook their food and heat their homes over an open fire. While that may seem like a more “pastoral” and healthy way to live, the **World Health Organization reports that up to four million people die each year from the direct and indirect effects of cooking with solid fuels, like wood, charcoal and coal**. **This staggering statistic hadn’t come to the attention of the Israeli inventors of the HomeBioGas system, until the information was pointed out to them by none other than United Nations Secretary General Ban Ki-moon**. During a visit with Israeli President Reuben Rivlin last year, Ban expressed the global need for a sustainable and safe solution to this dire issue, naming Israel’s HomeBioGas’s bio-digester as a very viable answer.”

Biogas Report 2014: Biogas & Biomethane Record Growth In Europe

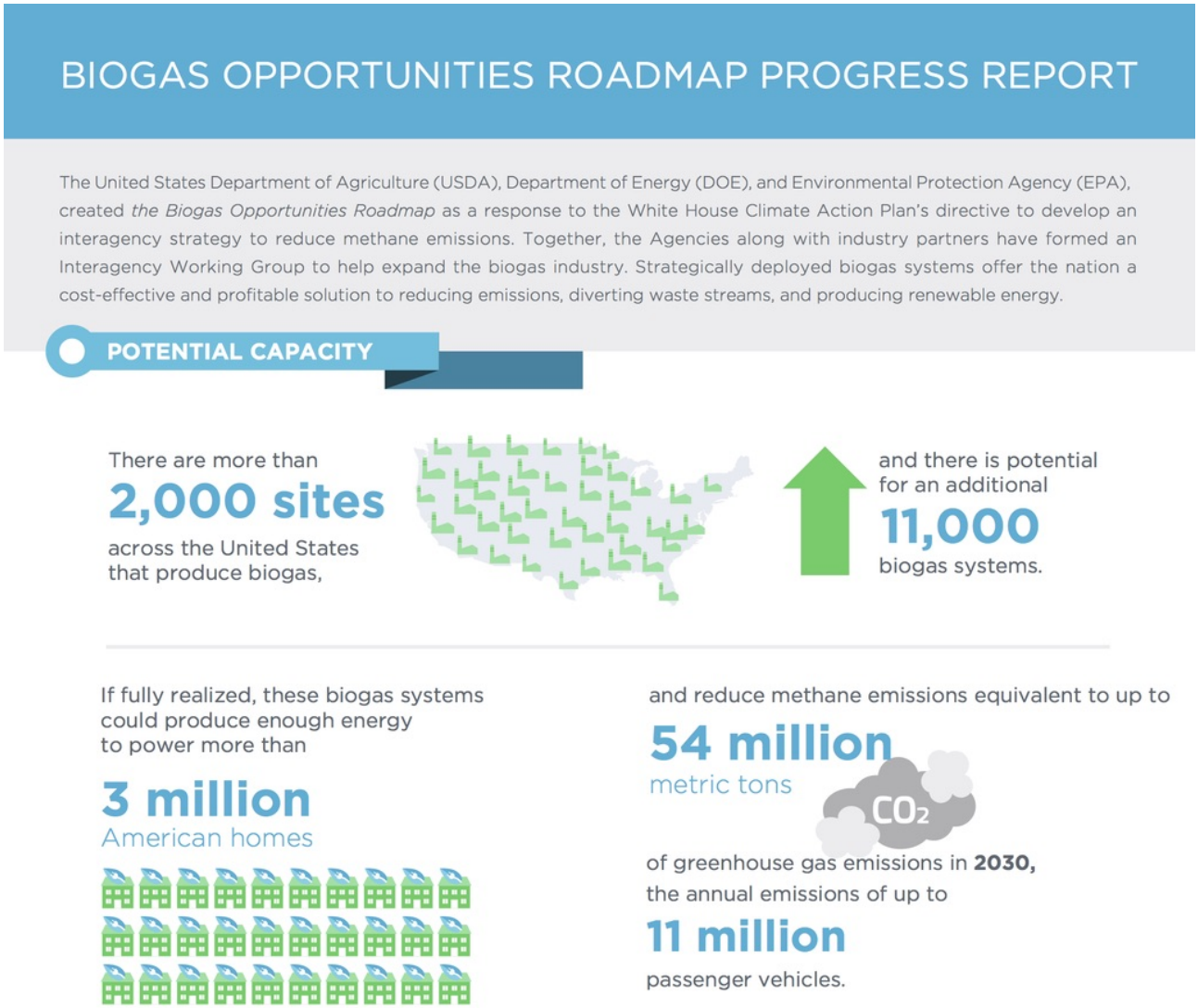
December 17, 2015. **Report: Biogas & Biomethane Record Growth In Europe**. "The European Biogas Association (EBA) presents the fifth edition of its statistical report, a comprehensive compendium of the state of the art of biogas and biomethane in Europe. This edition reflects the **record-high growth in Europe in terms of number of plants and production**. Dr. Jan Štambaský, EBA President, said: "There were **17,240 biogas plants in Europe by the end of 2014**. This is a remarkable number, especially when realizing that it represents 18% growth. Also development of **biomethane industry shows outstanding results, with 367 plants**, 23% increase compare to 2013." In fact, the rate of growth has sky rocketed in certain countries, such as the UK, where the number of biogas plants has been doubled in just one year. **However, the overall augmentation of the number of plants has followed two different scenarios**; on the one hand are countries who haven't commissioned any new plants and have seen only minor developments (such as Austria, Czech Republic, Hungary), and on the other are those countries who have increased their biogas market with a substantial number of new biogas installations: the UK, France and Belgium among others. In terms of biogas production, national associations and third-party observers quantify the **total amount of electricity produced from biogas at 63.3 TWh**, a number that corresponds to the annual consumption of 14.6 million European households. A steady increase can be appreciated in the biomethane sector, with 87 new biogas upgrading units commissioned. Germany leads the growth rate, followed by Sweden and the UK. Despite its small size in terms of gas consumption, **Sweden has placed itself as the European front runner in biomethane production and especially, the use of biomethane in transport**: the country dedicated 78% of its 1,303 GWh production to fuel almost 50,000 vehicles. These numbers reflect a clear development in Europe, showing that the biogas industry is a mature one, capable of withstanding less profitable times while able to successfully seek for opportunities in the meantime. **It can be then expected that these positive trends will continue in the short future, while all eyes are set on the policy development expected at an international level as a result of the recent COP21 meeting in Paris**."



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

USA Biogas: "We are currently 20 years behind Europe"

December 23, 2015. **Dairy Digesters are a Good Investment for California**. According to a new study by Ramboll Environ, dairy methane digesters are among the most cost-effective investments the State of California can make to reduce greenhouse gas emissions (GHG) and help achieve the state's climate change prevention goals. The study prepared for Sacramento based Dairy Cares indicates that projects currently funded by the state provide **a return on investment ranging from as low as $2 to as much as $1,250 per metric ton of carbon dioxide equivalents reduced. Dairy digesters represent one of the most cost effective investments of state funds with a rate-of-return of just $7 per ton of reduction**. Equally important, because dairy digesters destroy methane, a short-lived climate pollutant, the value to the state's efforts to address climate change is much greater because climate-forcing emissions reductions can be realized sooner. When these short-term investments are factored in, the cost per ton of reduction is closer to $2, and as a result, even more cost effective



December 18, 2015. **DOE, USDA, EPA release update of biogas activities** By Erin Voegele, Biomass Magazine. The U.S. Department of Energy, U.S. EPA and USDA have released a report providing an update of the federal government's progress to reduce methane emissions through biogas systems since the Biogas Opportunities Roadmap was completed by the three agencies in

July 2014. The updated report, titled **Biogas Opportunities Roadmap Progress Report**, highlights actions taken by the agencies to date, along with a description of challenges and opportunities. It also identifies next steps that will be taken to support the growth of a robust biogas industry."

December 17, 2015. **20 years behind Europe. Anaerobic digestion facility seeks to divert waste from landfills**. Boulder Weekly. "Currently, according to the American Biogas Council, **there are approximately 191 digesters on farms, and around 1,500 operating in wastewater treatment facilities around USA**. With the invention of food depackaging units that separate plastics and nonorganic material from food waste before sending the waste into the digester, larger chain grocery stores such as Wal-Mart are considering these machines for their distribution centers. However, therein lies the problem: **There needs to be a suitable amount of waste**. As with most things, it comes down to dollar signs. The return on investment needs to be high enough to justify the introduction of an AD unit. Anaerobic digesters are not designed for home, or even small-scale farm use. And while mini digesters are on the drawing boards of engineers across Europe, a time may never come when every city is equipped with its very own energy-producing vessel. **And it's still a new idea in the United States**. "We are currently 20 years behind Europe," says Will Hancock, a pre- and post-consumer food waste specialist for AD applications in North America. He believes the **trend will continue to rise in the States as real estate becomes more valuable than burying waste, and with increasing support from the government subsidies**."

Biogas will continue to be promoted by the state in Germany

December 18, 2015. Fachverband Biogas e.V. (German Biogas Association): **German federal states want to secure advantages of biogas for energy transition**. "The Bundesrat today adopted by a large majority a resolution to strengthen the electricity produced from biomass in the Renewable Energies Act (EEG). In it, the federal government is asked to anchor economic prospects for existing and new installations. The German Biogas Association welcomes the broad alliance of lander that comes in time for the next EEG amendment 2016th "The resolution of the Federal Council is an important signal to the federal government and the Bundestag, biogas to take a chance as an important player in the Energiewende," explains the General Manager of the German Biogas Association, Dr. Claudius da Costa Gomez. In its resolution, the lander emphasize the advantages of bioenergy for a reliable, flexible and needs-based electricity production. The background to this admonition: **storable energy carriers such as biogas can step in if the supply of electricity from wind power or solar energy fluctuates**. These advantages of bioenergy wants the Federal secure for the future and recognizes the "special importance as a system service" in the electricity market. So far, unfortunately, most still take fossil fuels to compensate for the fluctuating electricity production from wind and sun. "If the federal government is serious about the Energiewende and climate targets agreed in Paris just by the world community, it must strengthen the renewable and quickly end our dependence on climate-damaging fossil fuels. For this we need the good storable biogas," says da Costa Gomez (...) **After the last major change in the EEG in 2014, the biogas power in Germany has barely grown**. In EEG, an annual additional construction of 100 MW had been set. Because of strong deterioration in the biogas promotion occurs in 2015 but only for a newly installed capacity of approximately 19 MW biogas work-related performance. "With the current conditions of the EEG, biogas threatens a thread breakage, when the promotion for installations producing today expires in a few years. Therefore we need 2016 with the new EEG law which is the benefits of biogas production needs. We have it made concrete proposals, which we will introduce in the next few weeks and months ahead in the discussion," said da Costa Gomez."

Re-commitment with biogas in key European Union countries

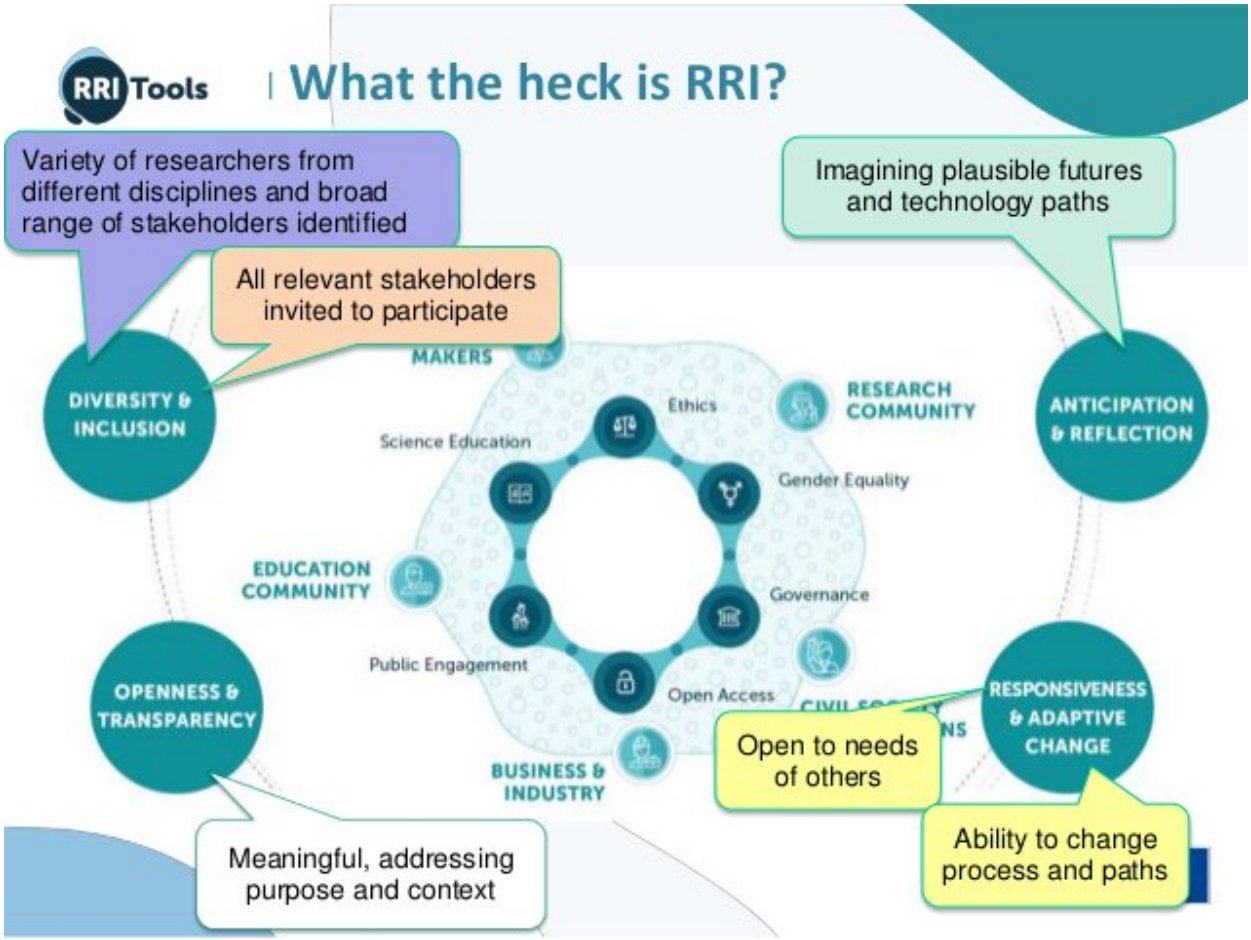
December 22, 2015. **Polish Biogas Association praised new government' declared desire to improve situation agricultural biogas operators** who currently operate on the verge of profitability in the face of the collapse of the market for green certificates.

December 22, 2015. **Press Release Goverment Denmark: The EU has approved support for biogas**.

December 22, 2015. **Green gas trimming carbon this Christmas in UK**.

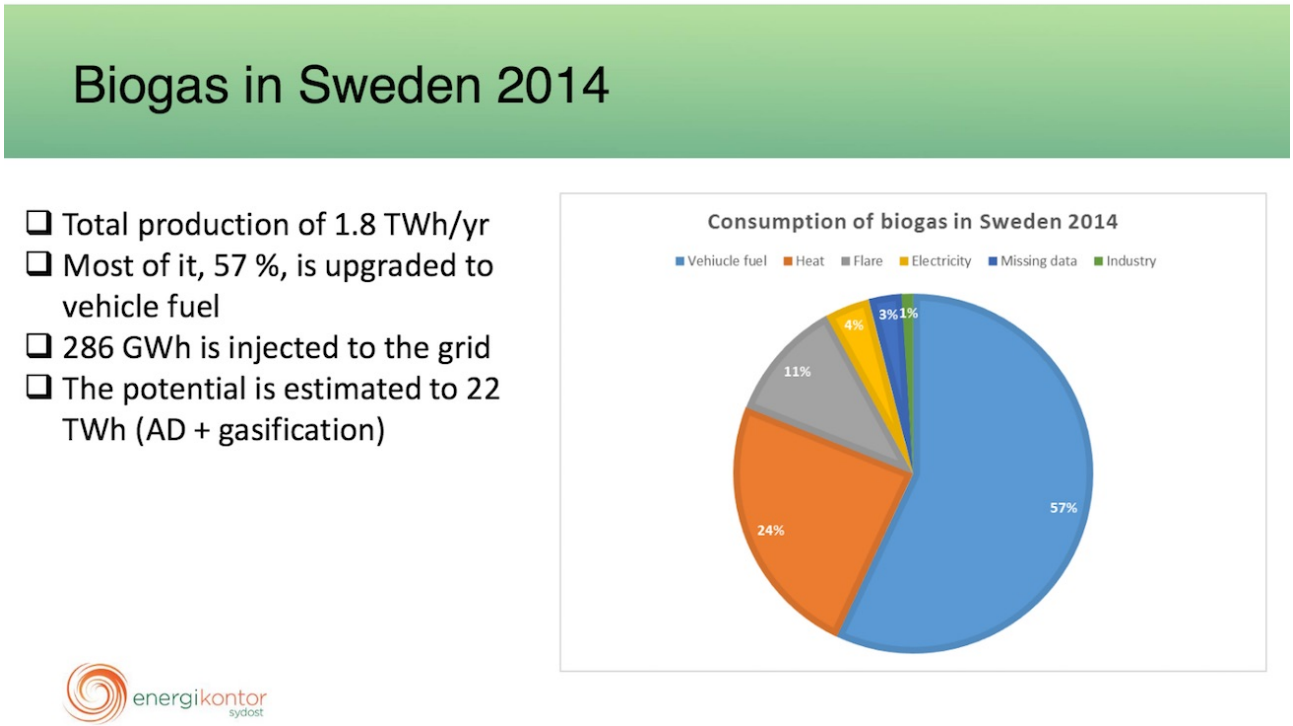
December 20, 2015. **Press Release Goverment of Sweden: Biogas is tax exempt for five more years**. "The European Commission has approved the Swedish tax exemption of biogas as a fuel until the end of 2020. Tax exemption or tax credit of other sustainable biofuels than biogas have been approved until the end of 2018th."

December 17, 2015. **Press Release Goverment UK: Changes to renewables subsidies**. "Further revisions to renewable energy subsidies which ensure bill payers get value for money (...) The Feed-in Tariff is a scheme where you can be paid (the tariff) for the electricity you generate from solar, wind, hydro or Anaerobic Digestion power. This gets paid even if you use it yourself as well as for any surplus electricity you export to the grid. In the Feed-in Tariff (FIT) review consultation we proposed updated tariffs for solar, wind and hydro power, and asked for industry and public feedback."



Sweden leads the world in biogas as a fuel: Biogas is pretty close to the ideal fuel

December 22, 2015. **They want to stop the bus dispute between electricity and biogas** by Martina Frisk, MiljöAktuellt. "**The one-sided focus on electric drive makes biogas overshadowed. It can have devastating consequences**, warns the debaters. In an article on gp.se writes, among other things, Maria Khorsand, CEO of SP Sveriges Tekniska Forskningsinstitut, and Åsa Odell, vice chairman of Federation of Swedish Farmers, on how more and more municipal and regional bus company invests in electricity and electric hybrid vehicles. This, says the debaters, can have devastating consequences for Sweden's biogas production and the possibility to reach the climate targets. **"Instead of setting renewable interests against each other as in the case of bus services, one should therefore work together to focus on winning market share from fossil fuels."**



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December 1, 2015. **Sweden: National biogas strategy launched**. "A target of 15 TWh of biogas in 2030 and a series of priority measures and instruments. The proposal for a national biogas strategy is the result of a unique and broad cooperation with leading representatives of the production, distribution and use of biogas. There is great interest around the proposed national biogas strategy presented today at a seminar in Stockholm. Six of the parliamentary energy spokespersons involved as well as representatives of the project and the reference group. SSAB, Volvo, Preem and Ikea are some actors who included in the reference group. **The proposal underlines biogas many social benefits in climate, environment, employment and export policy which allows the biogas to be a unique resource** (...) The proposal for a national biogas strategy is developed by Region Skåne, the trade organization Energigas Sweden and infrastructure company Swedegas "

November 26, 2015. **Conference "Experience in Using biomethane in public transport (The Netherlands, Sweden and Estonia)"** organized by Eesti Biogaasi Assotsiatsioon: Swedish

experience on using biomethene in public transport by Ms Hannele Johansson, Project Manager Biogas Southeast, Energy Agency for Southeast Sweden. 5 most important issues in development on sustainable public transport via use of biomethane by Ms Helen Maalinn, Strategist Environmental Management Systems, SL- Stockholm Public Transport.

November 14, 2015. **Food waste from Nobel Prize Banquet at Stockholm City Hall turned to biogas** (video). "Esteemed Nobel Prize winners, there´s a lot more than honor and prize money to bring back home from Stockholm. A film about **the Swedish way of turning urban road transport fossil free: Biogas-the game changer**. Please try this at home"

January 2015. **BalticBiogasBus: Biogas - the natural choice for city buses**. "Cleaner public transport in the Baltic Sea Region is **an effective measure to mitigate climate change, but also to improve air quality on a local scale, especially in cities**. Introducing biogas as fuel together with hybrid electrical technologies is the natural choice for public transport buses. In addition, l**ocally produced biogas can be part of building sustainable communities and of securing fuel supply**. Thanks to co-financing of the EU, cities, companies and other organisations have worked together in the **Baltic Biogas Bus project** to further develop and share the opportunities for introducing biogas as fuel for public transport in more cities and regions in the Baltic Sea Region. After five years of highly valuable cooperation, the Baltic Biogas Bus project has come to an end. The final two years of cooperation focused on eco-driving, hybrid biogas buses and biogas upgrading and is described in this report."

Where is your biogas? Living in Stockholm gives you an amazing opportunity to contribute to solving the climate crisis. **The countries of the world are looking for ways of replacing diesel and petrol, and Sweden has found one**. In our city many busses and cars run on Biogas, a fuel produced in the city that simultaneously reduces the climate problem and makes city air cleaner. The hero is played by you and your food waste. This website tells you how to make your food waste useful in biogas production. Click the icon correspondning to your situation. Read the instructions on how to get started. At home or at work. Tens of thousands of stockholmians are already doing it, and with you, things will be even better!