



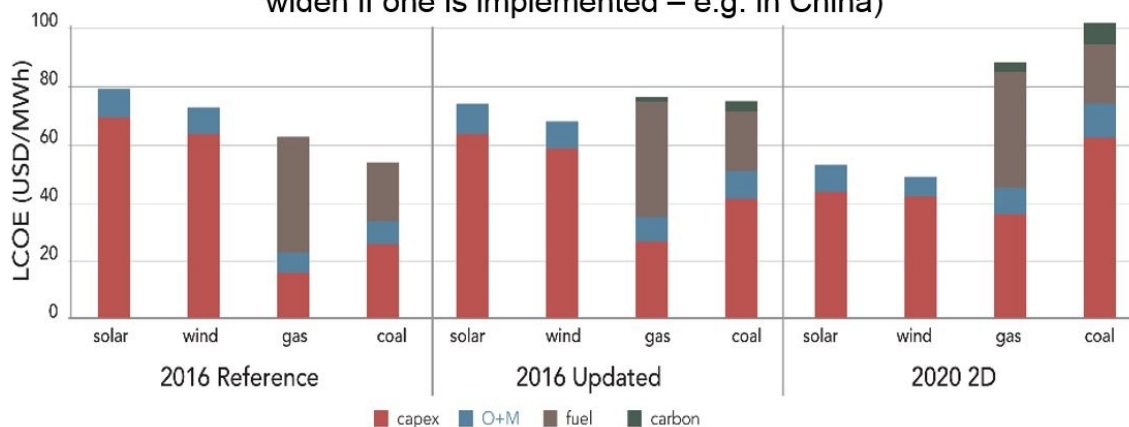
**“A low-carbon future is the only available”**

October 27, 2016. **10 years on from the Stern report: a low-carbon future is the 'only one available'** by Damian Carrington, The Guardian. “Economist says **green development is the only route to global economic growth and points to China leading the world on climate change action** (...) Stern, speaking ahead of two lectures to mark the 10th anniversary of the highly influential Stern report, said **the cost of not acting to halt global warming had risen while the costs of doing so had fallen**. The 2006 Stern report, commissioned by the UK government, found that the economic damage caused by unchecked climate change could be 5-20% of global GDP each year, but that cutting carbon emissions would cost just 1% of GDP. The report warned against delaying action, but this has not been heeded, said Stern. “We have delayed action,” he said. “The potential damages now look bigger than I suggested then. In that sense I underplayed the consequences of not getting on with it. But the costs of action are a good deal lower than I indicated then, in that technical progress has been faster than we thought. The cost of solar power [for example] is not far off a factor of 10 less than in 2006.” Today, he said, a low-carbon future is the sole option for prosperity. “It is the only one available and it is a very exciting growth story,” Stern said. “**Any attempt to follow high-carbon growth will eventually be self destructive due to the very hostile environment it creates**. There was an old alleged tension between growth on the one hand and climate responsibility on the other, but it’s a completely fake horse race.”

**Renewables are cheapest power source today**

On average, wind and solar are cheaper than coal and gas.

The advantage does not depend on a carbon price (but will only widen if one is implemented – e.g. in China)



Source: Carbon Tracker, *The End of the Load for Coal and Gas?*, 2016



*Renewables better on average in 2016 – with or without a carbon price*

October 27, 2016. **Plus de la moitié des vertébrés ont disparu en quarante ans** par Audrey Garric, Le Monde. “La pression exercée par l’humanité sur les écosystèmes est telle qu’il nous faut chaque année l’équivalent de 1,6 planète Terre pour satisfaire nos besoins, selon le World Wildlife Found. **Partout, les écosystèmes sont menacés, et rien ne semble pouvoir enrayer la tendance.** Alors que les pressions humaines sur l’environnement ne cessent de s’aggraver, plus de la moitié du vivant, parmi les vertébrés, a disparu ces quarante dernières années. C’est sur ce nouveau constat alarmant que s’ouvre la onzième édition du rapport « Planète vivante », un vaste bilan de santé de la Terre et de sa biodiversité.”

October 27, 2016. **WWF's Living Planet Report 2016.** “**The future of the planet is in our hands.** WWF's Living Planet Report 2016 shows the scale of the challenge – and what we can do about it.”

**THE SIZE AND SCALE OF THE HUMAN ENTERPRISE HAVE GROWN EXPONENTIALLY SINCE THE MID-20TH CENTURY. AS A RESULT, NATURE AND THE SERVICES IT PROVIDES TO HUMANITY ARE SUBJECT TO INCREASING RISK. SCIENTISTS SUGGEST THAT WE HAVE TRANSITIONED FROM THE HOLOCENE INTO A NEW GEOLOGICAL EPOCH, CALLING IT THE “ANTHROPOCENE”. THE FUTURE OF MANY LIVING ORGANISMS IS NOW IN QUESTION. SPECIES POPULATIONS OF VERTEBRATE ANIMALS HAVE DECREASED IN ABUNDANCE BY 58 PER CENT BETWEEN 1970 AND 2012. THE MOST COMMON THREAT TO DECLINING ANIMAL POPULATIONS IS THE LOSS AND DEGRADATION OF HABITAT. INCREASINGLY, PEOPLE ARE VICTIMS OF THE DETERIORATING STATE OF NATURE: WITHOUT ACTION THE EARTH WILL BECOME MUCH LESS HOSPITABLE TO OUR MODERN GLOBALIZED SOCIETY. HUMANS HAVE ALREADY PUSHED FOUR PLANETARY SYSTEMS BEYOND THE SAFE LIMIT OF THEIR SAFE OPERATING SPACE. BY 2012, THE BIOCAPACITY EQUIVALENT OF 1.6 EARTHS WAS NEEDED TO PROVIDE THE NATURAL RESOURCES AND SERVICES HUMANITY CONSUMED IN THAT YEAR. TO MAINTAIN NATURE IN ALL OF ITS MANY FORMS AND FUNCTIONS AND TO CREATE AN EQUITABLE HOME FOR PEOPLE ON A FINITE PLANET, A BASIC UNDERSTANDING MUST INFORM DEVELOPMENT STRATEGIES, ECONOMIC MODELS, BUSINESS MODELS AND LIFESTYLE CHOICES: WE HAVE ONLY ONE PLANET AND ITS NATURAL CAPITAL IS LIMITED. A SHARED UNDERSTANDING OF THE LINK BETWEEN HUMANITY AND NATURE COULD INDUCE A PROFOUND CHANGE THAT WILL ALLOW ALL LIFE TO THRIVE IN THE ANTHROPOCENE.**

October 27, 2016. **German experts petition EU to include carbon capture in RED.** “German experts on CO2 utilization from the Nova-Institut have launched **a petition for the full integration of renewable carbon capture and utilisation (rCCU) in the EU Renewable Energy Directive.** According to the authors, the ongoing development of the 2030 Climate and Energy Framework and the reform of the RED is a unique opportunity to establish a regulatory framework in which rCCU is fully integrated. CO2 can be captured from biofuel and biogas production or various industrial processes, from flue gas from coal, natural gas, or crude oil plants (purified and conditioned) or directly from the air (direct air capture). A wide range of fuels and chemicals can be produced from CO2 and H2 by catalytic processes, such as methanisation, methanol synthesis (and further processes), or Fischer-Tropsch synthesis. CCU technologies also include biotechnology processes with bacterial systems, algae, cyanobacteria, and synthetic biology. The different microorganisms process CO2 using different sources of energy and produce a wide range of fuels and chemicals. **The authors argue that CCU technologies will play a crucial role in the future renewable energy system and for climate protection.**”

October 24, 2016. **Climate Change May Trigger Next Financial Crisis, Fisher Says** by Emily Cadman, Bloomberg. “Climate change could spark the world’s next financial crisis, according to Paul Fisher, who retired as deputy head of the Bank of England body which supervises the country’s banks. “It is potentially a systemic risk. **A sudden repricing of assets as a result of climate**

**change could be the trigger for the next financial crisis,”** he added. Fisher pointed to the renewed fall in sterling earlier this month, after the government set out a timetable for leaving the European Union, as an example of the way that prices can shift suddenly. “That is exactly the sort of event you might get with climate change,” said Fisher, formerly deputy head of the U.K.’s Prudential Regulation Authority (...) **“You don’t need to believe in climate change, you don’t need to believe that it is man-made,”** Fisher said. **“You just need to believe that governments are going to do stuff and that is going to affect your business. And then it is a material risk.”**

October 21, 2016. **Diversification des pétroliers.** “La montée des préoccupations environnementales a également servi de moteur aux grandes compagnies **pour se développer dans le renouvelable.**”



October 14, 2016. **New movement for the global commons.** “Leaders from international organizations, business, and civil society have rallied around a new effort to safeguard the global commons on which all life depends (...) **At this critical juncture for the survival of the diversity of life on earth and the systems on which humanity depends, we are catalysing a movement to defend, enhance, and sustain our Global Commons** through: Protecting the diversity of life on earth; Developing innovative solutions that reflect the interdependence of all systems including food, urban, energy, production & consumption, freshwater, and oceans; and Engaging both top down and bottom up communities. Because never before have we understood our place in the Global Commons as we do now; never before have we had the tools, knowledge, and creativity that we have now; and never before have we had the shared purpose and will to act that we have now. And because **never again will we have the opportunity** (...) The International Dialogue on Our Global Commons was convened by the Global Environment Facility (GEF) and International Union for the Conservation of Nature (IUCN), in partnership with the International Institute for Applied Systems Analysis, the Stockholm Resilience Centre, the World Resources Institute and the World Economic Forum Environmental Systems Initiative.”

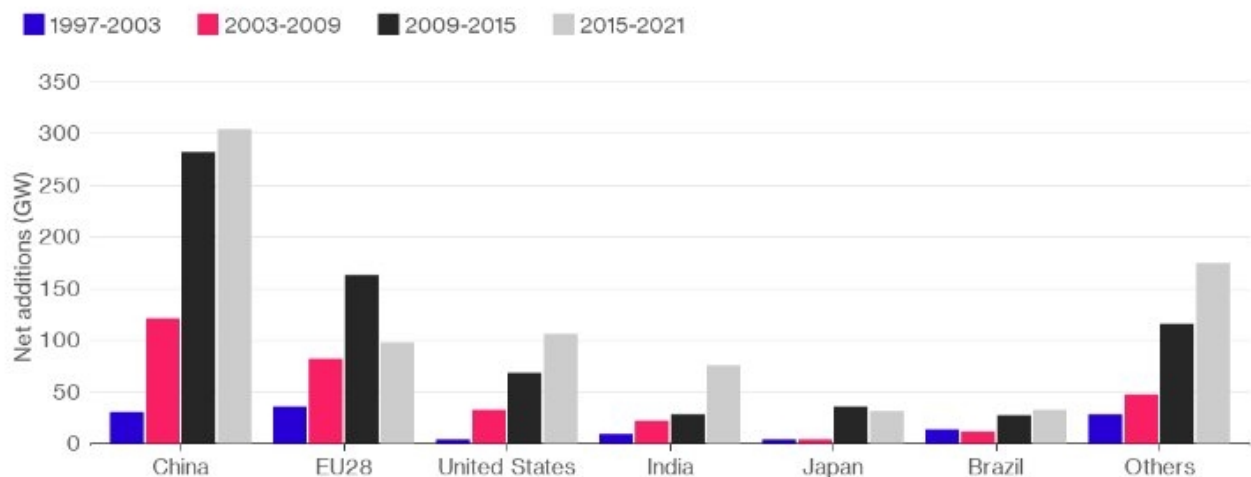
October 11, 2016. **Investor Expectations of Automotive Companies 2016. Shifting gears to accelerate the transition to low carbon vehicles** by Institutional Investors Group on Climate Change (IIGCC).

## New Energy Horizons: “The Grand Transition is unstoppable”

October 26, 2016. **Renewables overtake coal as world’s largest source of power capacity** by Pilita Clark, Financial Times. Though coal still generates more electricity, wind and solar installations hit record. “Although coal and other fossil fuels remain the largest source of electricity generation, **many conventional power utilities and energy groups have been confounded by the speed at which renewables have grown and the rapid drop in costs for the technologies.** Average global generation costs for new onshore wind farms fell by an estimated 30 per cent between 2010 and 2015 while those for big solar panel plants fell by an even steeper two-thirds, an IEA report showed. The Paris-based agency thinks costs are likely to fall even further over the next five years, by 15 per cent on average for wind and by a quarter for solar power (...) Mr Frankl, head of the IEA’s renewable energy division said the move by countries to ratify the **Paris climate agreement** only 11 months after its adoption last December — at least a year earlier than expected — was **likely to give another boost to renewables.** But he cautioned that growth still depends heavily on government policies that are shifting in many countries (...) “There is still lots to be done here. **There is too much policy uncertainty,**” he said”

### The Clean Energy Boom, By Country

Global renewable electricity net additions to power capacity



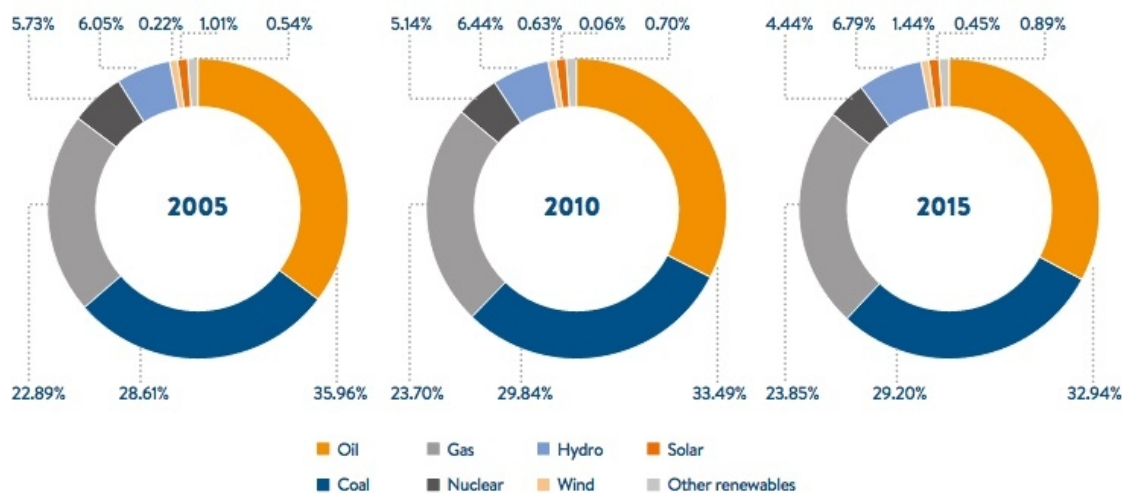
Source: International Energy Agency

Bloomberg

October 25, 2016. **IEA raises its five-year renewable growth forecast as 2015 marks record year.** “Last year marked a turning point for renewables. Led by wind and solar, **renewables represented more than half the new power capacity around the world,** reaching a record 153 Gigawatt (GW), 15% more than the previous year. Most of these gains were driven by record-level wind additions of 66 GW and solar PV additions of 49 GW. About half a million solar panels were installed every day around the world last year. In China, which accounted for about half the wind additions and 40% of all renewable capacity increases, two wind turbines were installed every hour in 2015. **“We are witnessing a transformation of global power markets led by renewables and, as is the case with other fields, the center of gravity for renewable growth is moving to emerging markets,”** said Dr Fatih Birol, the IEA’s executive director. There are many factors behind this remarkable achievement: more competition, enhanced policy support in key markets, and technology improvements. While climate change mitigation is a powerful driver for renewables, it is not the only one. In many countries, cutting deadly air pollution and diversifying energy supplies to improve energy security play an equally strong role in growing low-carbon energy sources, especially in emerging Asia.”

October 13, 2016. **New World Energy Council Chair gives inaugural speech.** “The energy industry is in a grand transition because of broader global trends, ranging from climate change to the so-called Fourth Industrial Revolution, which is fundamentally transforming the global economic landscape. **We are seeing a paradigm shift from a carbon-based economy powered by the combustion of fossil fuels to one based on new sources of energy and new modes of power generation.** Yet, fossil fuels will continue to play an important role because we cannot meet our pressing energy demands without them. According to our latest Scenarios, fossil fuels will comprise at least 50% of the global primary energy mix even in 2060. Confronted with this reality, what can we still do to prepare for the future? The answer is twofold. We not only need to develop clean and more efficient ways to produce and use fossil fuels, but also search for new technologies for alternative energies, The coming decades will help define the winners and losers of this energy transition. **All of us must innovate or eventually perish.** We already know the global energy industry is confronted with a ‘trilemma’ – balancing the competing priorities of energy security, sustainability and affordability. These choices are about to become even more pressing in light of threats from climate change. In this vein, we share the spirit of the Paris Agreement at COP21 and the United Nations Sustainable Development Goals for universal access to affordable, reliable, and modern energy services. **Now what our industry sorely needs are visionaries who have the whole picture of this sea change in their sight.** There are many competing energy scenarios for the future. But an emerging consensus is that we have to desperately search for a new generation of sustainable technology (...) We need to recapture the spirit of devotion and passion that was present at the beginning of the modern energy industry. This spirit was embodied by Faraday who sparked the electricity revolution in the 19th century that transformed the whole world (...) **Energy companies must reinvent themselves. We are at the threshold of a whole new industrial era** (...) Now, more than ever we need to nurture a whole new generation of energy innovators. We must explore ways to inspire the most brilliant minds to come up with appropriate energy solutions. Then, we must bring them together with forward-looking financiers to help commercialize technological breakthroughs. We must connect the brightest minds with the deepest pockets (...) The energy industry must deal with the fact that **food, energy, and water sectors are becoming more interdependent due to pressures from climate change.** Thus, any breakdown in one element of the nexus inevitably affects negatively on either one or both of the remaining elements. The collapse of the food, energy, water nexus would eventually undermine the very foundations of the global economy.”

### COMPARATIVE PRIMARY ENERGY CONSUMPTION OVER THE PAST 15 YEARS



October 12, 2016. **World Energy Resources Report : Increase in renewables has led to an unprecedented change in energy supply.** “The energy landscape has changed with most countries achieving a more diversified energy mix as well as a growth in community ownerships and an evolution of micro grids. The new World Energy Resources report launched at the 23rd World Energy Congress reveals that the unexpectedly high growth in the renewable energies market, in terms of investment, new capacity and high growth rates **in developing countries**, is a key factor in this notable shift. **It has contributed to falling prices and the increased decoupling of economic growth and greenhouse gas (GHG) emissions (...)** With stagnating growth potential in the oil sector and with coal likely to be of little importance by 2060, there will be a shift in the discussion from stranded assets, predominantly enterprise owned, to stranded resources in oil and coal, predominantly state owned. This has the potential to cause significant stress to the current global economic and geopolitical equilibrium and will need to be part of a broadened carbon and climate dialogue.”

October 12, 2016. **Innovative technology is the key to clean technology.** “**Innovations in energy storage are the most critical technological challenge for the industry.** This was the consensus at the World Energy Congress session on that sought to identify the priorities to delivering future energy needs. Fluctuations in supply, especially wind and solar, as well as inefficient storage technology is a key issue that also needs addressing. Decarbonising the housing and transport sectors, achieving commercial viability of renewables, deregulating the energy industry and creating a policy framework that promotes the development of new technologies were also discussed.”

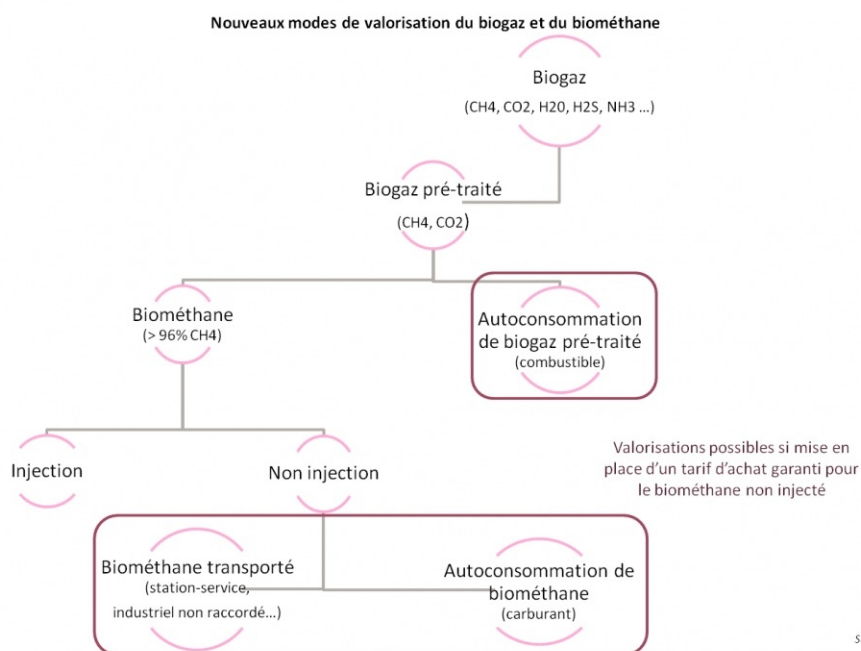
October 12, 2016. **Las renovables reclaman abordar ya el proceso de transición energética.** Piden una estrategia a largo plazo para que España consiga descarbonizar su economía en 2050.

October 8, 2016. **Embracing the New Frontiers for Energy. Statement issued by the World Energy Council ahead of the 23rd World Energy Congress.** “**The world is undergoing a Grand Transition** driven by a combination of factors including the fast-paced development of new technologies, an unstoppable digital revolution, global environmental challenges and changing growth and demographic patterns. **Over the coming years this energy transformation has the potential to change the way in which we produce and consume energy.** This will impact operating models and the economic foundation of both nation states and businesses, leading to a rebalancing across new-frontiers sectors and regions with knock-on effects on the wider global economy. The next decade will begin to define the winners and losers of the energy transformation, making it crucial to understand the new realities for the energy sector.”

## **Biogas is an important contribution to decarbonisation of energy sector**

October 27, 2016. **Une tarification pour le biométhane non injecté : un élan pour la filière biogaz** par Sia Partners. “**En parallèle des injections sur les réseaux français, la France devra donc également mettre en place un système de valorisation du gaz vert non injecté dans les réseaux avec un potentiel à horizon 2030, de 8 Twh (...)** Le Club Biogaz, qui représente la filière a mis en place un groupe de travail en 2015 afin d’étudier les conditions de mise en place d’un dispositif de soutien pour le biométhane non injecté. Il propose d’établir une prime spécifique pour la filière « non injection » qui viendrait s’ajouter au tarif de base et à la prime intrant qui existent déjà pour la filière « injection ». Cette prime permettrait ainsi de couvrir uniquement les surcoûts liés à la filière « non injection » tels que l’unité de compression ou de liquéfaction afin de ne pas

créer de distorsion économique avec la filière existante (...) Etant donné que le biométhane injecté et non injecté ont les mêmes caractéristiques, on peut se poser la question si ces nouveaux tarifs impacteraient de manière négative la filière « injection ». En analysant les deux marchés, on s'aperçoit que **le biométhane non injecté est compatible avec l'alimentation d'une flotte de véhicules locale en circuit court, avec une autoconsommation de combustible ou encore avec l'approvisionnement en gaz de sites industriels non raccordés au réseau. En revanche, le biométhane injecté est destiné à des consommateurs ayant accès au réseau, avec des besoins en gaz variables et pouvant être éloignés du lieu de production. Ces deux produits seraient donc sur deux marchés différents.**”



Octobre 26, 2017. **Un rapport parlementaire appelle à soutenir la filière GNV et bioGNV.** “Un rapport parlementaire appelle à un meilleur soutien de la filière GNV et bioGNV, **notamment dans le secteur des transports lourds.** Résultat de quelques 42 auditions plénières et 86 auditions complémentaires, cette mission d’information sur « **l’offre automobile française dans une approche industrielle, énergétique et fiscale** » est présentée par les députées Sophie Rohfritsch et Delphine Batho et formule plusieurs propositions en faveur de la filière gaz et en particulier du bioGNV (...) Les auteures du rapport appellent en outre au lancement d’un second appel à projets de l’ADEME destiné à soutenir « la création de stations bioGNV de proximité dans les territoires ». Côté biométhane, le rapport invite la législation française à le reconnaître comme un « biocarburant avancé » et à lui appliquer un taux spécifique de TICPE, aujourd’hui alignée sur celle du GNV.”

October 26, 2016. **Le rapport parlementaire sur l'offre automobile française, remis le 26 octobre 2016 au Président de l'Assemblée Nationale, formule des propositions concrètes et pertinentes en faveur du GNV et du bioGNV !** “Il comporte pas moins de 120 propositions. Quatre de ces propositions concernent, particulièrement, le GNV et le bioGNV: Proposition n° 1 : Formaliser, avant fin 2016, l’acte fondateur de l’**alliance française écologie-automobile**, sous la forme d’engagements réciproques et volontaires, donnant lieu à un protocole signé par l’État et la filière automobile : - L’accélération du déploiement des infrastructures électriques et du bioGNV pour les transports lourds. Proposition n° 29 : Le gazole redevenant un carburant adapté aux usages professionnels et utilitaires, adapter les mesures fiscales de compensations existantes à chaque secteur professionnel (agriculture, transport de marchandises, taxis, travaux publics) pour les protéger les secteurs en difficulté de la répercussion de la hausse de la TICPE sur le diesel.

Concernant le transport routier de marchandises, ouvrir une discussion avec la profession pour que l'augmentation soit intégralement restituée sous forme d'une aide à la conversion adaptée pour les poids lourds, afin de prendre en charge le surcoût du GNV lors du renouvellement des flottes (actuellement de 30 %). Proposition n° 64 : **Développer résolument le GNV et le bioGNV pour le transport routier de marchandises par poids lourds** : - la législation française doit reconnaître le biométhane comme un biocarburant avancé pris en compte dans les objectifs de 10 % de carburants renouvelables à l'horizon 2020 et de 15 % à l'horizon 2030, que fixe la programmation pluriannuelle de l'énergie (PPE) ; - mettre en place une aide de l'ADEME aux PME pour l'achat de poids lourds GNV pour la conversion progressive des flottes des PME ; - préparer un second appel à projet de l'ADEME pour soutenir la création de stations bioGNV de proximité dans les territoires ; - pour le GNL, accélérer la présentation du programme national de déploiement de ce carburant prévu par la législation européenne. Proposition n° 66 : Appliquer « la règle des 5 ans » au cadre fiscal des énergies de la mobilité propre et renouvelable. Dans ce cadre, créer un taux spécifique de TICPE pour le bioGNV.”

October 26, 2016. [Jumping on the biomethane powered bandwagon](#) by Tom Freyberg, WWi magazine. “Water services provider Aqualia has started a five-year collaboration project with Spanish car manufacturer SEAT **to fuel cars on biomethane produced from wastewater**. Following in the tracks of French company Suez, which has been working on its BioGNVAL project, the Spanish partnership will see two SEAT Leon cars tested at a wastewater treatment plant (WWTP) in Jerez. Estimates suggest that a medium sized wastewater treatment plant can produce more than 1,000 m<sup>3</sup>/day of biogas, enough for 300 vehicles to cover 15,000 km per year. The Jerez trials are separate to Aqualia's existing All-Gas project, which instead focuses on growing algae at the WWTP of El Torno Chiclana, which is then used to fuel a VolksWagen, the parent company of SEAT (...) Called SMART Green Gas, the SEAT/Aqualia collaboration has five partners, including Gas Natural Fenosa and Naturgas EDP, as well as public research organisations such as the Catalan Institute for Water Research and the universities of Girona, Valladolid and Santiago de Compostela. Matthias Rabe, VP for R&D at SEAT, said: “With this development and collaboration project with Aqualia, SEAT has become **the first brand in the country's automotive sector to use 100% Spanish biomethane obtained from wastewater**.”



October 26, 2016. [Abierto un nuevo punto de repostaje de biogás para modelos a GNC en Jerez de la Frontera gracias a SEAT](#). “En los últimos años SEAT se ha unido al selecto grupo de



fabricantes que han añadido motorizaciones a base de Gas Natural a sus modelos, y que parecen querer apostar por una infraestructura que nuestro país es más bien escasa. De ese modo, hace dos años incorporaban el SEAT León TGI y SEAT Mii a GNC a su oferta de vehículos. Ahora, nos presentan un proyecto para, no solo potenciar la infraestructura de repostaje, sino para hacerlo de un modo más ecológico. Se trata de una colaboración con la compañía Aqualia, Gas Natural Fenosa y Naturgas EDP (junto a las Universidades de Girona, Valladolid y Santiago de Compostela) para ofrecer **biogás proveniente de aguas residuales y compatible con los modelos que demandan GNC**. El primer punto donde ya se puede acceder a este combustible se encuentra en Jerez de la Frontera, en Cádiz (...) Bautizado como **proyecto SMART Green Gas, nos cuentan que una depuradora de aguas residuales de tamaño medio puede producir más de 1.000 m<sup>3</sup> de biogás al día, cantidad suficiente para que 300 vehículos puedan hacer más de 15.000 km al año.**”

October 24, 2016. **Aqualia y Seat mantienen su relación con el biometano en fase piloto** por Javier Rico, Energías Renovables. “Según uno de los últimos informes de la Unión Internacional del Biogás, el número de vehículos que se mueven con biometano en Suecia llega ya a los 50.000. En España, sin una legislación bien definida al efecto y con proyectos en fase de investigación y/o piloto, Aqualia y Seat acaban de anunciar el inicio de las pruebas en la planta depuradora de aguas residuales de Jerez de la Frontera (Cádiz) para inyectar el biometano obtenido en vehículos tras un proceso de digestión anaerobia y posterior purificación del biogás. **La iniciativa se enmarca en el proyecto Smart Green Gas, aunque ambas compañías trabajan en una línea similar en otro proyecto: Methamorphosis** (...) Aqualia y Seat informan en una nota de prensa conjunta que Smart Green Gas, que concluye en septiembre de 2018, inicia este mes de octubre pruebas piloto en la planta depuradora de aguas residuales de Jerez de la Frontera. “Para ello, Seat ha entregado dos vehículos del modelo León TGI a Aqualia, con los que se podrán realizar las pruebas necesarias con el biometano obtenido de aguas residuales para confirmar y verificar toda la cadena de producción hasta la obtención y uso del combustible.”

context:

May 2015. **El uso del biogás permitiría cubrir el consumo energético anual de los hogares de la ciudad de Barcelona**. “El técnico del Área de Gestión Energética del Instituto Catalán de Energía (ICAEN), Albert Salas, explicó el proyecto METHAmorphosis, liderado por FCC AQUALIA, en el que participan GAS NATURAL FENOSA, FCC, el Área Metropolitana de Barcelona, SEAT y el ICAEN. El proyecto propone demostrar dos innovadores sistemas de tratamiento de residuos sólidos urbanos y porcinos para generar biometano para vehículos ligeros y pesados. El ponente señaló que **incorporando los purines a las 15 plantas de biogás existentes en España se generaría biogás vehicular que podría mover una flota de 750.000 vehículos.**”

October 19, 2016. **Hunosa entra en el negocio del biogás con una tecnología propia que ha patentado** por Julio Vivas, La Nueva España. “La hullera ya sirve electricidad y calefacción al matadero de Gijón, y lo hará a una explotación ganadera de Gozón a partir de sus residuos. Tras apostar por la geotermia, la hullera estatal Hunosa **ha entrado de lleno ahora en el negocio del biogás obtenido a partir de la depuración de los residuos orgánicos de las ganaderías e industrias alimentarias.**”

October 10, 2016. **The potential of agricultural residues for biogas in 2030**. “**Between 2000 and 2013 the production of biogas in Europe increased six fold, from 2.2 to 13.5 Mtoe**, with the main producers being Germany, UK and Italy, followed by Czech Republic, France and the Netherlands (...) October 10, 2016. The potential of agricultural residues for biogas in 2030. “Between 2000 and 2013 the production of biogas in Europe increased six fold, from 2.2 to 13.5 Mtoe, with the main producers being Germany, UK and Italy, followed by Czech Republic, France and the Netherlands (...) Today agricultural biogas is mainly produced using energy crops such as maize or sorghum, often in co-fermentation with animal waste, however **the use of energy crops for biogas has been questioned lately due to sustainability concerns. Therefore, introducing new, cost-competitive and sustainable feedstock such as manure, straw and even grass, will be**

**increasingly important for the biogas sector to deliver its full potential in the future energy scenario.** Researchers from Aalborg University in Denmark have mapped the potentials of animal manure, cereal straw and grass from both rotational and perennial grasslands for biogas production in the EU by 2030. By using official Eurostat statistics and assuming different utilization scenarios for each resource, the study identified **a total energy potential from all these resources ranging between 39.3-66.9 Mtoe. This amount could cover 2.3-3.9% of the total EU energy consumption or 8.4-14.3% of the total supply of renewables in 2030 (...)** **If this amount is added to the current biogas production, the total energy potential reaches 52.75-80.35 Mtoe. This means as much as 11.3 to 17.2% of the total supply of renewables projected by 2030.** If the consumption of natural gas in the EU in 2030 stays within this range, the projected biogas deriving energy yields from the investigated resources could replace  $\approx$ 9- 16% of the total consumption of natural gas.”

## The potential contribution to EU28

**39- 68 Mtoe** from manure, straw and excess grass

**8.4-14.3%** of the total supply of renewables targeted for 2030

Adding the current production (2014 level):

**11.3-17.2%** of the total supply of renewables targeted for 2030

**$\approx$ 9-16%** of the current total consumption of natural gas.



*From Sustainable biomass substrates: potentials and perspectives in Europe.  
The potential of animal manure, straw and grass for european biogas production in 2030*