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| Greyrock - Transforming Natural Gas |
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| Greyrock, Tsinghua University and the Desert Research Institute Report on Research Studies that Assess the Potential of Using Clean Synthetic Diesel Fuel to help Improve Beijing’s Air Quality  |
| http://img-ak.verticalresponse.com/media/4/2/f/42ff12aa8e/bcc87914c6/86e80d0378/library/beijing-email.jpg**Beijing, China (November 9, 2017)** – Tsinghua University (Beijing, China), the Desert Research Institute (DRI) (Reno, Nevada), and Greyrock Energy, Inc. (Sacramento, California), announced the results of a research program to evaluate potential improvement in Beijing’s air quality from the use of premium, clean synthetic fuels, such as those produced by Greyrock. The study focused on providing immediate improvements in air quality without the need for changes in fueling infrastructure or the vehicle fleet.Beijing’s poor air quality is the result of emissions from vehicles, manufacturing plants, the use of coal for cooking, and other sources. Diesel vehicles were chosen for this study since they contribute about 74% of the particulate matter/soot (PM) from vehicle emissions, one of the major sources of smog and poor air quality in Beijing.The study concluded that PM emissions from current vehicles in Beijing could be reduced by approximately 19% by simply blending 20% synthetic diesel with currently available diesel. This improvement can be accomplished with no changes to the current vehicle fleet, no material changes to infrastructure and no involvement by the consumer. Other benefits from a 20% fuel blend include reductions in carbon monoxide (CO), nitrogen oxides (NOx), and methane (CH4) emissions by a projected 24%, 5.5%, and 11%, respectively. The control of CH4 emissions is important since it is approximately 84 times more potent as a greenhouse gas than carbon dioxide (CO2), measured over a 20-year period. Additional advantages of synthetic fuel use include improved fuel economy, enhanced vehicle performance and increased engine life.Synthetic liquid fuels have been produced from resources such as natural gas for many decades. However, due to high production costs, they remain an insignificant portion of the market, at less than 0.25% of the total global volume of oil products. Greyrock, a company headquartered in Sacramento, California, provides systems that produce premium synthetic diesel fuel and gasoline blends economically from various sources such as flare gas, natural gas, industrial waste gas, CO2, and biomass. Greyrock’s premium synthetic diesel fuel contains no sulfur and features premium properties such as high cetane. When used in diesel fuel engines, synthetic fuels result in lower emissions as compared to engines that consume traditional petroleum based fuels.The World Bank reported that in 2015 that China produced approximately 2.08 billion m3/year of natural gas associated with the production of oil, which was flared primarily due to lack of infrastructure and available markets. This volume of gas would be sufficient to produce up to 432 million gallons per year of synthetic diesel, kerosene, and gasoline fuels, and if blended at 20 volume% with petroleum based diesel, it would provide about 2.16 billion gallons/year for China’s diesel vehicle fleet. In addition to the production of synthetic fuel from gas that would otherwise be flared, Greyrock technology may be used to produce synthetic fuel from China’s abundant agriculture and forest biomass residues.The study also concluded that if this synthetic fuel was produced from the 2.08 billion m3/year of associated natural gas in China as an alternative to flaring, then NOx, CO and PM emissions could be reduced by a projected 109, 590, and 9.8 thousand tons/year in China, respectively. In addition, the greenhouse gases CH4 and CO2 would be reduced by up to 154 and 5,270 thousand tons per year, respectively.“Greyrock is focused on providing immediate solutions to help drive the global lower carbon emissions future. By simply adding next generation synthetic fuels to traditional oil based diesel and gasoline, immediate improvements in air quality and reductions in global greenhouse gas emissions can be achieved without the need for vehicle redesign or new fueling infrastructure investment.” said Robert Schuetzle, President and CEO of Greyrock Energy. Professor Wu, Ye and Dr. Wu, Xiaomeng at the School of Environment at Tsinghua University commented that “this study has demonstrated that the air quality in Beijing and other Chinese cities can be significantly improved by substituting current petroleum fuels with synthetic fuels produced from flare gas and other surplus resources, when included with programs that require more efficient vehicle emission control systems and the reduction of fuel sulfur to low levels.  These approaches are expected to reduce current vehicle emissions of CO, HC, NOx and PM by 56%, 49%, 58% and 71% by 2030, respectively.”Professors Hoekman and Wang, of DRI commented that “they are particularly interested in future studies on the multiple benefits of using China’s agricultural waste to generate synthetic fuels, thereby reducing air pollutant and greenhouse gas emissions from biomass burning, and finding better uses for China’s large quantities of agricultural waste. This otherwise wasted resource is an ideal feedstock for the production of synthetic fuels.”About Tsinghua UniversityTsinghua University is a research university located in Beijing, China which was established in 1911. With strong research and training, Tsinghua University is consistently ranked as one of the top academic institutions in China and globally. More information about Tsinghua is available at [http://www.tsinghua.edu.cn](https://linkprotect.cudasvc.com/url?a=http://cts.vresp.com/c/%3fGreyrockEnergy/bcc87914c6/2986b69ec0/68e09fd723&c=E,1,sz9kIfiD8fQBEz1kB_yviqpzVAuWVxX3vXoMRfy4VZAp443GnS44RGfyf1bQA4pEmLo7pPhqPXWwWDcKU6thr_YSzLhXtrvA3ROw10o_qF3SLhjuUg,,&typo=1).About Desert Research InstituteDesert Research Institute (DRI) was established in 1959 as the non-profit research arm of the Nevada System of Higher Education. DRI is a world leader in environmental sciences through the application of knowledge and technologies to improve people’s lives throughout Nevada and the world. More information about DRI is available at [www.dri.edu](https://linkprotect.cudasvc.com/url?a=http://cts.vresp.com/c/%3fGreyrockEnergy/bcc87914c6/2986b69ec0/27919be5dd&c=E,1,ToHq2T4PPgU85gkK5Qgs5C_b7i124SvPaZsBMv-rGqxQ1-RzYxZlpv6yGC9hwzU_uMefiRbBrv-1t9BLAZEhfKdpJV754olA4FrpXF9-CVY,&typo=1).About Greyrock EnergyFounded in 2006, Greyrock has developed its state of the art Direct Fuel Production™ technology and GreyCat™ catalyst, enabling distributed production of clean liquid fuels from a variety of resources, including natural gas, natural gas liquids, flare gas, bio-gas, biomass residues, carbon dioxide and other wasted resources. More information about Greyrock is available at [www.greyrock.com](https://linkprotect.cudasvc.com/url?a=http://cts.vresp.com/c/%3fGreyrockEnergy/bcc87914c6/2986b69ec0/d2647e306e&c=E,1,MUN2ASDpsNtG5oEp18wFpDoJMR1kdLCik2wpAm3Hm209ao3Ul1Qqakk78Y-y8HSLbyJ5BLrkeAv7NedSfIQu2FRkbaXj78bGRdK8WwsUDZY4HgSl&typo=1) and [www.FlaretoFuels.com](https://linkprotect.cudasvc.com/url?a=http://cts.vresp.com/c/%3fGreyrockEnergy/bcc87914c6/2986b69ec0/eb233ff971&c=E,1,Dg-f8FYNwxanePckFF35NaMRp6zeuNDH6h6CWCa1DC-8sVtu5FIBbRTF0GGQZr8w4MNBlvzCrTvab_uQogoW29V-lZLZ9_6rxUkSR6-c&typo=1).  |
| Greyrock2020 L Street, Suite 120, Sacramento, California 958111-916-504-5222    info@greyrock.com |