



Debunking the Heartland Institute

By Kellan McLemore

The Heartland Institute is a free market think tank that promotes an ideology driven by the principles of deregulation, privatization and cuts to government spending. As an advocate for deregulation, the Heartland Institute supports fewer regulations for industrial polluters, something that goes hand in hand with its role as the world's leader of the climate change denier movement. The Economist has characterized the Heartland Institute as "the world's most prominent think tank promoting skepticism about man-made climate change." Despite its heavy involvement on environmental issues and continuous production of information regarding the science behind climate change and other environmental issues, it is important to be clear about the fact that the Heartland Institute is not a scientific organization and the large majority of the world's scientists disagree with most of the Heartland Institute's positions on environmental issues.

In support of the continued use fossil fuels, the Heartland Institute has recently spent a considerable amount of time and effort on the frac sand mining industry in Wisconsin, due to its close ties to hydraulic fracturing and shale gas production. The Heartland Institute is actively fighting for the deregulation of the frac sand mining industry through the production and distribution of articles and the lobbying of citizens and local officials with the intention of influencing regulatory decisions at the municipal level.

Isaac Orr, a research fellow for energy and environmental policy at the Heartland Institute and graduate of the University of Wisconsin - Eau Claire Geology program, is the Heartland Institute's primary author on frac sand-related issues and in the last few years has produced numerous publications that have been widely distributed to local government officials, such as "Frac Sand Study Lots of Scare, Little Science," "Economic Impacts of Industrial Silica Sand (Frac Sand) Mining," and "Environmental Impacts of Industrial Silica Sand (Frac Sand) Mining." Although Orr serves as the Heartland Institute's resident expert on the frac sand mining industry, his opinions are unabashedly one-sided and his attempts at presenting a "holistic and objective" view of the facts are seriously marred by his deep allegiance to the fossil fuel industry. Much of Orr's writing on frac sand issues has been distributed to local government officials throughout western Wisconsin as an attempt to convince them of the benefits of frac sand mining while dismissing any concerns about negative impacts of any kind. The following commentary on the numerous false or misleading opinions put forth by Orr is intended to serve as unbiased, factual information that can be relied upon by citizens and local government officials in their evaluations of the frac sand mining industry and how it ties into the larger climate change discussion.

Orr's publications have covered nearly every aspect of the frac sand mining industry, from economic benefits to environmental impacts, and even its contribution to the fight against climate change. This commentary will not cover every false statement or position ever put forward by Isaac Orr, but it will focus on his positions on frac sand mining, air pollution and climate change, and his thoughts on renewable energy potential.

The Truth about (Frac) Sand Mining

Since the beginning of the frac sand mining boom in Wisconsin, Orr has continuously praised the frac sand industry as being a “significant driver of economic growth,” while also arguing that “silica sand operations do not pose a threat to people living near these facilities.” However, in reality, there is a serious lack of credible research and data to support the majority of his positions; and the real life experiences of the citizens living near frac sand operations present a significantly different viewpoint than Orr’s. Due in part to lack of initiative on behalf of the Wisconsin Department of Natural Resources (WDNR) and in part to the fact that frac sand is still a relatively young industry, there remains an extensive amount of research and data collection that needs to be done before any definitive conclusions can be made about the public health, environmental and economic impacts of this industry. That being said, the Midwest is now five years into the frac sand boom, and there are a few things that we do know about the frac sand mining industry.

We know that frac sand mining is an extremely land and resource intensive activity capable of permanently destroying the highly valued character, aesthetics and natural resources of rural communities. We know that the frac sand industry is responsible for widespread environmental pollution and that violations of the environmental regulations, which are in place to protect the health of humans and the environment, are the norm, not the exception for this industry.¹

We know that despite a serious lack of quantitative data concerning public health impacts, there is an extensive record of qualitative evidence that has been produced by citizens who live near frac sand operations and have experienced negative impacts first-hand. We know that frac sand operations do a poor job of managing noise and that some neighboring properties are subject to noise and stadium lighting 24-hours a day. We know that there are families living next to frac sand operations that cannot open their windows and have had to buy air filters because of the significant amount of dust blowing into their homes. We know that there are already instances of individuals living directly adjacent to frac sand operations developing respiratory illness and receiving confirmation from their health care provider that it is being caused by increased inhalation of particulate matter from the nearby frac sand operations. We know that during periods of low demand mines and processing facilities sit dormant while massive dust clouds blow off of exposed sand piles into neighboring communities.

We know that neighbors of mining operations experience discharges of polluted water onto their cropland after major storm events cause holding ponds at mining sites to overflow. We know that mining companies have had to replace private wells because of damage caused by blasting activities. And we know that all of the aforementioned occurrences are a legitimate reason to demand further research and data collection by the WDNR.

We know the frac sand mining industry is extremely susceptible to economic volatility, which results in closed facilities and layoffs, and seriously limits the potential economic benefit of the industry to any

¹ According to publically-available data collected by the Land Stewardship Project (*Breaking the Rules for Profit, 2014*): By the end of 2014, about three years into the Wisconsin frac sand boom, nearly half (43%) of the frac sand companies operating in Wisconsin had violated Wisconsin Department of Natural Resources (WDNR) air or water regulations and required substantial regulatory action to come into compliance (Stage 2 and Stage 3 violations).¹ Some companies still failed to come into compliance even after court action and the imposition of fines. That number did not even include companies that had Stage 1 violations, which are not tracked centrally by the WDNR, so the percentage of violators is likely even higher.

community.² We know that, according to the Wall Street Journal, “it is unlikely that the glory days of 2012 and 2013 will return when privately financed sand mines popped up everywhere,” and that “it used to be the case that higher-quality ‘white sand’ found in places like Minnesota... were most desirable, but as companies have ratcheted down costs, transportation expenses for sand have become an issue, so-called brown sand from locations closer to fields... appear more promising.”³

We know that major proponents of the frac sand mining industry, such as the Heartland Institute and GZA GeoEnvironmental, have continuously weighed in on frac sand mining debates by touting the local, national, and even global benefits of the frac sand industry, and characterizing any negative impacts as nonexistent or only attributable to a few bad actors. This is despite the fact that their conclusions are either entirely unsupported or based on a very limited quantity of deeply-flawed, and often misleading, industry-funded research.⁴ We know that these same proponents are only able to label the handful of industry-sponsored studies they rely upon as the “best available research” because there has been very little independent research or monitoring near frac sand operations conducted by government or academia, and not because of the actual quality of the research.

We know that many of the issues that industry proponents have made definitive claims about remain unsettled, and that the Wisconsin Department of Natural Resources acknowledged this fact in its recently released Strategic Analysis of the Industrial Sand Mining Industry.⁵ We know that the rapid expansion of this industry, and its associated impacts, have outpaced environmental and public health research and regulations. And finally, we know that at this point in time, any definitive statements about the lack of any environmental or public health impacts from the frac sand mining industry are premature, dangerous and are not based on the sufficient amount of quality research or data necessary to make such conclusions with any amount of certainty; and thus, should not be relied upon by decision-makers.

We are slowly, but surely, learning about much of the impacts associated with the frac sand mining industry; however, there are still a few very important things that we do not know about the frac sand mining industry – despite any claims to the contrary made by Orr.

We don’t know if this industry is capable of producing long-term economic benefit to a community, or for that matter, if demand for frac sand from the Midwest will even remain at a viable level for the next 5 to 10 years in light of changes to business strategies brought on by a prolonged depression of oil prices. We don’t know if the dust, sand, and particulate matter emissions from this industry will have long-term impacts on the respiratory health of citizens living near operations – something that would

² *New Auburn operation hit with layoffs*, The Chippewa Herald (March 25, 2016), http://chippewa.com/news/local/new-auburn-operation-hit-with-layoffs/article_0cb632cc-092c-5d0f-8a5a-80e2f94cdb4e.html; *EOG Resources has layoffs in Chippewa County*, The Chippewa Herald (April 22, 2016), http://chippewa.com/news/local/eog-resources-has-layoffs-in-chippewa-county/article_6922cda8-5f23-5281-a617-6e2e64fc5f6d.html; *Frac industry experts: Not all Wisconsin mines will survive market shift*, La Crosse Tribune (May 11, 2016), http://lacrosetribune.com/news/local/frac-industry-experts-not-all-wisconsin-mines-will-survive-market/article_50ab0c9c-51b3-5062-b560-ca4c392e45d5.html.

³ *Why Sand Is the Oil Industry’s Bellwether*, The Wall Street Journal (July 26, 2016), <http://www.wsj.com/articles/why-sand-is-the-oil-industrys-bellwether-1469547240>.

⁴ *MEA Review of Health Impact Assessment of Industrial Sand Mining in Western Wisconsin* (July, 2016), http://midwestadvocates.org/assets/resources/Frac%20Sand%20Mining/MEA_HIA_report_-_FINAL_w_attach.pdf.

⁵ *Wisconsin Department of Natural Resources Industrial Sand Mining in Wisconsin: Strategic Analysis for Public Review*, June 2016.

likely take 10 to 20 years to determine. We don't know if there is the potential for the high concentrations of heavy metals that have been measured in holding ponds at mining sites to pollute surface or groundwater resources, including drinking water resources.⁶

We don't know the extent of the existence of unsealed exploratory boreholes, such as those for which a mining company was recently fined \$17,000, and which provide a direct conduit for contamination from the surface to underlying drinking water aquifers.⁷ We don't know how many groundwater areas of the state of Wisconsin are susceptible to the cumulative impacts of multiple high capacity wells in close proximity to each other; or if high capacity wells that are being approved by the WDNR will cause significant degradation of environmental quality of the biological and ecological aspects of affected water sources.⁸

We don't know if post-mining reclamation efforts will actually restore agricultural land to a state capable of producing pre-mining crop yields.⁹ And finally, most importantly, we don't know if this industry as a whole is capable of operating in a manner that is respectful of rural communities and that does not pose a threat to the health of citizens or the environment.

Air Pollution & Climate Change

One of the most often cited benefits of frac sand mining by Orr is its link to hydraulic fracturing and natural gas production. Orr recently expanded his high praise for frac sand and hydraulic fracturing in an article titled, *Frac Sand Mining Contributing to Cleaner Air*.¹⁰ In that article Orr argues that "natural gas is a clean-burning fuel, and it is helping to reduce the amount of PM_{2.5} in the air." Also, that "natural gas helps reduce air pollution, and in order to get natural gas, the nation needs more hydraulic fracturing operations."¹¹ Technically, Orr is correct about the fact that burning natural gas produces less nitrogen oxides and sulfur oxides, which are precursors to PM_{2.5}, than does burning coal. But, as is often the case with information provided by Orr, this is not the whole story.

First, despite the fact that lower sulfur dioxide emissions from natural gas result in the formation of less PM_{2.5} pollution, these health benefits are essentially offset by the fact that methane emissions from the natural gas system and nitrogen-oxide from natural gas combustion both contribute to the global

⁶ According to the WDNR Strategic Analysis of Industrial Sand Mining (p. 2-53), "a number of heavy metals were detected in some of the 2013 samples at levels that exceeded the groundwater enforcement standard," which has led WDNR to "convene a team of stakeholder experts to direct new research regarding possible linkages to increased concentrations of dissolved metals in groundwater..." However, at this point in time, monitoring of groundwater quality is not required by the WDNR for individual facilities.

⁷ *State of Wisconsin v. Northern Sands, LLC and Ahlgrimm Explosives Company, Inc*, Case No. 16-CX-11, Complex Forfeiture: 30109, Filed Jun 10 2016.

⁸ Following the guidance of a recent opinion by the Wisconsin Attorney General (OAG-01-16), the WDNR is no longer conducting the sufficient environmental impact analysis necessary to determine the potential for significant degradation of environmental quality or the potential for cumulative impacts caused by multiple wells in close proximity.

⁹ According to the WDNR Strategic Analysis of Industrial Sand Mining (p 3-98), "Reclamation of agricultural lands back into productivity may need to be measured in decades not years. Soil properties will likely not 'catch up' and the productivity may always be less than the land before mining unless extensive measures are used on the reclaimed mine."

¹⁰ *Frac sand mining contributing to cleaner air*, Isaac Orr (June 3, 2016).

¹¹ *Id.*

buildup of tropospheric ozone, which is a significant contributor to additional respiratory illness and mortality.¹² Additionally, when considering PM_{2.5}-related emissions in isolation, natural gas is a cleaner burning fuel than coal; however, when considering the greenhouse gas footprint of natural gas as a whole it becomes clear that “natural gas is not a near-term ‘low’ greenhouse-gas alternative, in absolute terms or relative to coal. Moreover, it does not provide a unique or special path to renewable energy, and as a result, it is not bridge fuel and is not a useful component of a sustainable energy plan.”¹³ Not only does the life cycle of natural gas from shale formations (which includes indirect emissions of CO₂ from fossil fuels used to extract, develop, and transport the gas, and direct emissions of CO₂ from end-use consumption) release a considerable amount of CO₂, but it also releases significant amounts of methane – a greenhouse gas that has a global warming potential that is 72-105 times greater than CO₂ over a twenty year period.¹⁴

The fact that natural gas is composed largely of methane is particularly worrisome because “methane is far more effective at trapping heat in the atmosphere than is carbon dioxide, and so even small rates of methane emissions can have a large influence on the greenhouse gas footprints of natural gas use.”¹⁵ Such an increase in the amount of heat trapped in the atmosphere over the next twenty years is critical, because a failure to control significant emission of methane during that period could push climate change past a point in which the majority of climate scientists believe there is little opportunity for reconciliation.

Another important, but often overlooked, aspect of the life cycle of hydraulic fracturing is the contribution of the emissions from the production and distribution of the frac sand, which makes hydraulic fracturing possible. Research has shown that a lower estimate of CO₂ emissions from frac sand production is likely around 3.3 million tons per year, and that a lower estimate of CO₂ emissions from frac sand distribution is likely around 1.2 million tons per year, which means frac sand mining is likely contributing, at a minimum, an additional 4.5 million tons per year of CO₂ to the life cycle of natural gas production from shale formations.¹⁶ This means CO₂ emissions from the life cycle of natural gas production are likely to be 5-35% higher than most predictions, which is alarming when considered alongside the aforementioned significant methane emissions.

Thus, despite Orr’s claims, it appears that the last thing we should be doing is investing further in natural gas production from shale formations. Orr loves to make reference to “the latest and best research” when making claims about environmental impacts, however, according to 2014 Cornell University study, “Using these new, best available data and a 20-year time period for comparing the warming potential of methane to carbon dioxide, the conclusion stands that both shale gas and conventional natural gas have a larger GHG than do coal or oil, for any possible use of natural gas and particularly for the primary use of residential and commercial heating.”¹⁷

¹² Jacobson, et al., *Examining the feasibility of converting New York State’s all-purpose energy infrastructure to one using wind, water, and sunlight*, Energy Policy 57 (2013) 585-601.

¹³ Jacobson, et al., *Examining the feasibility of converting New York State’s all-purpose energy infrastructure to one using wind, water, and sunlight*, Energy Policy 57 (2013) 585-601.

¹⁴ IPCC, 2007, *Fourth Assessment Report, The Physical Science Basis*.

¹⁵ R.W. Howarth, *A bridge to nowhere: methane emissions and the greenhouse gas footprint of natural gas*, Energy Science & Engineering, 2014.

¹⁶ Nelson, N., *Climate Change and Hydraulic Fracturing Proppants: Calculating the Carbon Dioxide equivalent Emissions from Silica Sand Production in Wisconsin*, University of California, Santa Barbara.

¹⁷ R.W. Howarth, *A bridge to nowhere: methane emissions and the greenhouse gas footprint of natural gas*, Energy Science & Engineering, 2014.

Renewable Energy

Another part-truth that Orr uses to advocate for frac sand mining is his position on the role of fossil fuels – essentially that fossil fuels, natural gas in particular, play an absolutely necessary role in powering our nation, and apparently must continue to do so for an indefinite period of time. In his article, *Here's What The New York Times Completely Missed In Its Criticism Of Fracking*, Orr makes the argument that renewable energy resources are not capable of fueling our cars, keeping the lights on at our schools, or powering lifesaving hospitals, and thus, oil and natural gas must continue to be used.¹⁸ Clearly, one does not have to think that a full transition to renewables can, or will, happen overnight in order to see the flaws in Orr's extremely short-sighted opinion, or to see that his "live-for-the-moment" point of view ignores the fact that a transition to renewables is already underway and decisions about energy production require us to think more than a week, month, or even a year ahead.

A transition to complete, or even increased, dependence on renewables is not being held up by a lack of technology or the cost effectiveness of harvesting renewable resources, but instead is being held up by social and political barriers and anti-renewable rhetoric continuously being put out by the fossil fuel industry and think-tanks such as the Heartland Institute. For example, a common and legitimate concern is whether electric power demand can be met with renewable energy supply on a minute-to-minute, hourly, daily, and seasonal basis. In response to this concern, several studies in the last decade have examined the current ability of regional renewable resources to meet 100% of power demand for specified regional power grids. These two multi-year studies, one of the California grid¹⁹ and one of the PJM Interconnection (multi-state grid in the eastern U.S.)²⁰, analyzed hourly load and resource data and accounted for the intermittency of available wind and solar resources, and both found that up to 99.8 percent of electricity demand could be produced for those major grids using only renewable resources.

Additionally, states such as Iowa and South Dakota already get nearly 30% of their electricity from wind²¹, California plans to generate 60% of its electricity from renewables by 2030²², and a study from Cornell University has shown that it is feasible for New York State to convert its all-purpose energy infrastructure to one entirely dependent on renewables by 2030.²³ Moreover, the installed wind energy capacity in the U.S., on its own, is currently capable of producing enough electricity to power more than 19 million homes, and the U.S. is only beginning its endeavors into off shore wind farms.²⁴

¹⁸ Here's What The New York Times Completely Missed In Its Criticism Of Fracking, The Heartland Institute (June 29, 2016), <https://www.heartland.org/news-opinion/news/heres-what-the-new-york-times-completely-missed-in-its-criticism-of-fracking?source=policybot>.

¹⁹ Hart, E.K., Jacobson, M.Z., 2011. *A Monte Carlo approach to generator portfolio planning and carbon emissions assessments of systems with large penetrations of variable renewables*. *Renewable Energy* 36, 2278-2286.

²⁰ Budischak, et al., 2013. Cost-minimizing combinations of wind power, solar power, and electrochemical storage, powering the grid up to 99.9% of the time. *Journal of Power Sources* 225, 60-74.

²¹ *Wind energy top source of new electric capacity in 2015*, American Wind Energy Association, <http://www.awea.org/MediaCenter/pressrelease.aspx?ItemNumber=8393>.

²² *Stanford engineers develop state-by-state plan to convert U.S. to 100% clean, renewable energy by 2050* (2015) <http://news.stanford.edu/pr/2015/pr-50states-renewable-energy-060815.html>.

²³ Jacobson, et al., *Examining the feasibility of converting New York State's all-purpose energy infrastructure to one using wind, water, and sunlight*, *Energy Policy* 57 (2013) 585-601.

²⁴ *Wind energy top source of new electric capacity in 2015*, American Wind Energy Association, <http://www.awea.org/MediaCenter/pressrelease.aspx?ItemNumber=8393>.

What's more, according to Bloomberg, global investment in renewables is out-pacing that in fossil fuels 2 to 1, and batteries to store power when the sun doesn't shine or the wind doesn't blow are getting cheaper and improving capacity.²⁵ Despite the fact that in the U.S. renewable resources only produced 10% of the nation's total energy in 2015, according to the Energy Information Administration, renewables "are growing so fast that they are now expected to overtake nuclear energy by 2021 and coal by 2030."²⁶ Furthermore, wind energy was the top source of new generating capacity in the U.S. in 2015, accounting for more than 35 percent, while renewables as a whole accounted for 68 percent of the new capacity.²⁷ This is a direct reflection of the fact that renewables are now cost competitive with traditional forms of energy and will continue to decrease in cost as technology continues to advance. Even major utility companies are showing signs of a transition to renewables: Xcel Energy recently announced that it plans to spend \$6 billion on new wind and solar energy investment.²⁸ Some fossil fuel industry insiders, such as former Shell chairman Mark Moody-Stuart are even acknowledging that "the transformation to a world led by renewables is going to be faster than oil executives think."²⁹

Orr also argues that without hydraulic fracturing it would be significantly more expensive to power our nation and that the U.S. would be even more dependent on foreign countries for oil. However, economic forecasts around a transition to renewable energy sources indicate that investment in renewables will not only result in a stimulus to the job market but will also result in lower energy costs for consumers across the board. For example, MidAmerican Energy plans to add 1,050 megawatts of wind energy in Iowa, which is expected to be built at no net cost to the company's customers and to provide a rate reduction totaling \$10 million per year by 2017.³⁰ And according to the Department of Energy's *Wind Vision* report, consumer savings from wind are projected to reach \$14 billion a year by 2050, with cumulative savings on electricity bills reaching \$149 billion.³¹ Additionally, by examining economic modeling economists have determined that for each million dollars spent on energy production in the U.S., oil and gas create 3.7 direct and indirect jobs, whereas wind and solar create 9.5 and 9.8 jobs, respectively.³² Moreover, a transition to renewables would make the U.S. even less dependent on foreign countries for energy and would help insulate our national economy from economic turmoil caused by the volatility of the fossil fuel industry.

Finally, in an attempt to not only bolster his position on the U.S.'s dependence on frac sand and fossil fuels, but also to make his position more relevant to Midwestern communities, Orr warns that "Agriculture simply cannot be conducted without oil and natural gas. Tractors, combines, and the other heavy machinery used on farms run on gasoline and diesel fuel. The nitrogen-based fertilizer used to increase farm yields is made from natural gas." This is yet another misleading, and short-sighted, partly

²⁵ *Wind and Solar Are Crushing Fossil Fuels*, Bloomberg (April 6, 2016),

<http://www.bloomberg.com/news/articles/2016-04-06/wind-and-solar-are-crushing-fossil-fuels>.

²⁶ *Pumped Up: Renewables Growth Revives Old Energy-Storage Method*, The Wall Street Journal (July 22, 2016),

<http://www.wsj.com/articles/pumped-up-renewables-growth-revives-old-energy-storage-method-1469179801>.

²⁷ *Wind energy top source of new electric capacity in 2015*, American Wind Energy Association,

<http://www.awea.org/MediaCenter/pressrelease.aspx?ItemNumber=8393>.

²⁸ *Id.*

²⁹ *The Future of Big Oil? At Shell, It's Not Oil*, Bloomberg Businessweek (July 19, 2016),

<http://www.bloomberg.com/news/articles/2016-07-20/the-future-of-big-oil-at-shell-it-s-not-oil>.

³⁰ *Wind energy top source of new electric capacity in 2015*, American Wind Energy Association,

<http://www.awea.org/MediaCenter/pressrelease.aspx?ItemNumber=8393>.

³¹ *Wind Vision: A New Era for Wind Power in the United States*, U.S. Department of Energy.

³² Pollin et al., *The economic benefits of investing in clean energy*, Political Economy Research Institute, University of Massachusetts Amherst, 2009.

true statement made by Orr. He is correct that tractors and other farm equipment run on gasoline, but the part he forgets to mention is that they don't have to.

Today, there are already tractors in existence that are powered entirely by renewable sources of energy, such as hydrogen fuel or solar power. For example, a farmer, and former employee of NASA, in Iowa invented a full-sized tractor that runs entirely on two renewable fuels, hydrogen and ammonia, and results in no carbon emissions from the generation or consumption of the fuels. This new tractor technology relies on on-farm solar production of renewable fuels and allows farms to be self-sustaining without harming the environment. Additionally, according to the USDA, "a farmer, rural business, or cooperative wanting to replicate Schmuecker's commercially available renewable hydrogen technology can apply for financial assistance through the USDA's Rural Energy for America Program."³³

Take Away

I hope that this unbiased presentation of knowns, unknowns, truths, part-truths, facts and lies serves not only as a resource to the individuals and local government officials that require open and honest information to make policy decisions about the economic, public health and the environmental well-being of their communities, but also as an illumination of the lengths some people, organizations, corporations, etc. will go to in order to flood the pool of scientific literature with false science and misleading information. Despite my willingness to take up this task, it should not be the responsibility of a public interest organization, such as Midwest Environmental Advocates, to dedicate precious time and resources to combat false or misleading statements continuously put forth by those individuals who care nothing about the citizens or communities they may harm by their actions. Citizens have the right to know the facts about the environment in which they live, and if the facts are unknown, then citizens have the right to demand that their government (local, state, or federal) take the necessary steps to provide them with those facts. And finally, I encourage anyone who has or will receive any articles from Mr. Isaac Orr, or the Heartland Institute, to always remain open-minded about both sides of an issue and to take caution when plainly-biased statements or opinions are put forward as definitive facts.

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³³ *World's First Tractor to Run on Two Renewable Fuels With Zero Carbon Emissions Debuts on Iowa Farm*, WHO Newsradio – Des Moines, <http://whoradio.iheart.com/onair/the-big-show-4636/worlds-first-tractor-to-run-on-13581051/>.