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Fighting Climate Change in Post-Paris Agreement America: Reducing Livestock Emissions

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FIGHTING CLIMATE CHANGE IN POST-PARIS AGREEMENT AMERICA: REDUCING LIVESTOCK EMISSIONS

I. INTRODUCTION

President Donald J. Trump's decision to withdraw from the Paris Agreement incited anger in environmentalists, and inspired praise from climate change deniers. Regardless of where one's reaction falls on this spectrum, the withdrawal begs the question: "What's next?" While the Trump Administration has indicated through its withdrawal from the Paris Agreement that it will not support efforts to combat climate change, many states, municipalities, organizations, and individuals will continue to fight to make our planet sustainable for future generations. This Article will offer one solution that state and local governments may implement to help fight climate change in the absence of federal leadership: an excise tax on animal products.

The livestock sector accounts for more than 18% of global greenhouse gas (GHG) emissions.[1] Activities relating to the production of livestock emit carbon dioxide, methane, and nitrous oxide. Fossil fuel-powered equipment emits carbon dioxide during land tilling and deforestation operations, while the loss of forests further reduces the earth's natural ability to cycle carbon. Ruminant animals emit enormous amounts of methane through their digestive processes, and fertilizer is packed with nitrous oxide.[2] Less livestock would mean less of these emissions.

Implementing a "Methane Tax" would enable states and municipalities to substantially reduce these GHGs. The Methane Tax will make animal products more expensive, which will in turn encourage consumers to opt for less expensive and less carbon intensive plant-based alternatives. The goal is not to implement a ban on animal products; the goals are to: (1) ensure animal product prices reflect their true cost to society, with greenhouse gas emissions considered and (2) stimulate local economies while simultaneously incentivizing shifts to more sustainable farming practices.

The agriculture industry is one of the most powerful political groups in America. The Methane Tax is designed to reduce animal product demand, so industry groups must be assured that they can remain financially viable under a new system. The solution is to reinvest Methane Tax revenue back into the agriculture industry. Reinvestment will inject an additional revenue stream to local agricultural operations, which can then utilize the revenue to transition to plant-based farming models. For example,

1. Annise Maguire, *Shifting the Paradigm: Broadening Our Understanding of Agriculture and Its Impact on Climate Change*, 33 ENVIRONS ENVTL. L. & POL'Y J. 275, 278 (2010).
2. *Id.*

land that is currently used for cattle grazing or pig farming could be converted to cropland or hydroponic operations with the assistance of Methane Tax revenue reinvestment.

This Article offers a solution for state and municipal governments seeking to continue reducing greenhouse gas emissions, despite the federal government's withdrawal from the Paris Agreement. Part II examines the science of climate change and how the livestock industry contributes to global warming. It also addresses the implications of withdrawing from the Paris Agreement. Part III will discuss how the Methane Tax will function to reduce emissions and bolster local economies.

II. BACKGROUND: CLIMATE CHANGE SCIENCE AND REGULATIONS

A. Greenhouse Gas Emissions Cause Climate Change

Many American politicians, media personalities, and citizens refuse to acknowledge a causal link between human activity and global warming.[3] While skeptics continue to perpetuate the delusion that climate change is a "hoax,"[4] science is 95% certain that the earth's temperature is rising, and that human activity is the primary cause.[5]

Humans contribute to global warming by enhancing the earth's natural greenhouse effect.[6] It is true that life on earth would likely not be possible without the greenhouse effect,[7] but we all know what they say about too much of a good thing. Humans have created an enormous spike in greenhouse gas emissions since the industrial revolution, which led to a hyper-intensified greenhouse effect and an average rise in global temperatures of more than one degree Celsius.[8] Further warming will cause increases in extreme weather events,[9] food and water shortages,[10] species extinction,[11] and violent conflict.[12] In climate change discussions, much attention is devoted to the industry, energy, and transportation sectors, and

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3. For a discussion on the history of climate change denial, see Eric Pooley, *Climate Change Denial is the Original Fake News*, TIME (Feb. 14, 2017).

4. Donald Trump, (@realDonaldTrump), Twitter (Nov. 6, 2012 11:15 A.M.), https://twitter.com/realDonaldTrump/status/265895292191248385 ("The concept of global warming was created by and for the Chinese in order to make U.S. manufacturing non-competitive.").

5. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2014 SYNTHESIS REPORT, v (2014) (hereinafter "IPCC 2014 Report").

6. A concise description of the greenhouse effect is given in the *Intergovernmental Panel on Climate Change Fourth Assessment Report*, "What is the Greenhouse Effect?" FAQ 1.3 - AR4 WGI Chapter 1: Historical Overview of Climate Change Science, http://www.ipcc.ch/publications_and_data/ar4/wg1/en/faq-1-3.html.

7. *Id.*

8. IPCC 2014 Report, *supra* note 5, at 40.

9. *Id.* at 53.

10. *Id.* at 67.

11. *Id.*

12. For a quantitative analysis of climate change's impact on human conflict, see Solomon Hsiang, Marshall Burke, & Edward Miguel, *Quantifying the Influence of Climate Change on Human Conflict*, SCIENCE (2013).

rightly so, as they account for a majority of total greenhouse gas emissions.[13] The forgotten climate change driver, however, is the animal agriculture sector. Animal agriculture is responsible for 18% of global greenhouse gas emissions – more than the entire transportation sector combined.[14] The following subsections will examine exactly what types of greenhouse gases animal agriculture produces, and how.

1. Carbon Dioxide

Carbon dioxide is widely regarded as the most important, and potentially dangerous, greenhouse gas.[15] It is responsible for 60% of the enhanced greenhouse effect.[16]

Livestock's impact on atmospheric carbon dioxide level increase is twofold: first, farm equipment burns fossil fuels and produces carbon dioxide.[17] Second, millions of forested acres are cleared to make room for animal grazing or feed cropland.[18] Trees and plants remove carbon dioxide from the atmosphere through the process of photosynthesis.[19] When trees and plants are removed through deforestation, fossil fuels are burned (and carbon is emitted) in the process, and the earth's natural capacity to remove carbon dioxide from the atmosphere is diminished.[20]

2. Nitrous Oxide

Nitrous oxide is the most powerful of the major greenhouse gases.[21] It is 310 times more potent than carbon dioxide, measured by Global Warming Potential, or "GWP".[22] GWP is a comparative measure of the warming effect of a gas, in relation to the warming effect of carbon dioxide over a period of time.[23] For example, since nitrous oxide's GWP is 310, that means just one ton of nitrous oxide has the same warming effect as 310 tons of carbon dioxide.[24] Nitrous oxide's potent GWP is partially due to the fact that nitrous oxide can remain in the atmosphere for as long as 150 years.[25]

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13. IPCC 2014 Report, *supra* note 5, at 47.
14. Lisa Winebarger, *Standing Behind Beastly Emissions: The U.S. Subsidization of Animal Agriculture Violates the United Nations Framework Convention on Climate Change*, 27 AM. U. INT'L. L. REV. 991, 1007 (2012).
15. Maguire, *supra* note 1, at 285.
16. *Id.*
17. *Id.*
18. *Id.*
19. *Id.*
20. *Id.*
21. *Id.* at 289.
22. *Id.*
23. *Id.* at 286.
24. *Id.*
25. *Id.* at 289.

Scientists estimate that atmospheric levels of nitrous oxide have risen 8.8% since industrialization.[26] The primary anthropogenic source of nitrous oxide emissions is the use of nitrogen fertilizers.[27] These fertilizers are used for farming corn and soybeans that will eventually be fed to livestock.[28]

3. Methane

Atmospheric concentrations of methane have doubled since the pre-industrialization period.[29] While attention is almost exclusively devoted to carbon dioxide emissions, methane is responsible for 20% of the enhanced greenhouse effect.[30] With a GWP of around 30,[31] methane poses an immediate, substantial risk to the future of earth's climate.

Skeptics have perpetuated a running joke that methane produced through the digestive processes of animals could really have an impact on climate change.[32] Indeed, many find it hard to believe that their dinner was once an animal capable of producing substantial amounts of greenhouse gases. The reality is that one cow produces up to 500 liters of methane, *per day,* through the digestive process.[33] Reducing this source of methane would substantially reduce greenhouse gas emissions.

B. Post-Paris Agreement America

World leaders agreed to curtail greenhouse gas emissions through the Paris Agreement.[34] The Paris Agreement inspired descriptions including "historic," a "landmark," and the "world's greatest diplomatic success."[35] Yet, only days after its inception on November 4, 2016, uncertainty surrounding the Paris Agreement reared its ugly head as Donald Trump was elected as the 45th President of the United States.[36] On June 1, 2017, Pres-

26. *Id.*; This 8.8% figure sounds small at first glance, but consider that Nitrous Oxide's GWP is 310, and that this increase occurred over only about 150 years, and the cumulative effect is massive.
27. *Id.*
28. *Id.*
29. *Id.* at 286.
30. *Id.* at 287.
31. *Id.* at 286.
32. For just one example, see Hank Campbell, *Sorry Vegetarians, Cow Burps Are Not Causing (As Much) Global Warming,* Science 2.0 (May 27, 2011).
33. K.A. Johnson & D.E. Johnson, *Methane Emissions From Cattle*, 73 J. ANIMAL SCIENCE 2483 (2014).
34. Alexander Dunn, *J'Adore No More: President Trump and the Paris Agreement*, 11/28/2016 GEO. ENVTL. L. REV. ONLINE 1, 1 (2016).
35. Daniel Bodansky, *The Paris Climate Change Agreement: A New Hope?*, 110 AM. J. INT'L L. 288, 289 (2016).
36. Dunn, *supra* note 34.

ident Trump announced the United States will withdraw from the Agreement.[37] While this delivered a crushing blow to environmentalist efforts across the globe, the fight against climate change is far from over.

States, cities, and corporations have pledged to stay true to America's promise under the Agreement.[38] These states include New York, California, Washington, Connecticut, Delaware, Hawaii, Massachusetts, Minnesota, Oregon, Rhode Island, Vermont and Virginia[39] along with over 350 cities.[40] This Article suggests a weapon to add to their arsenals: an excise tax on animal products.

The current subsidization structure in America actually encourages animal agriculture, rather than discouraging it.[41] The numbers are truly mind-boggling. For example, United States taxpayers annually provide economic support to the dairy industry alone with nearly *five billion* dollars.[42] The animal agriculture industry naturally operates at a loss, and government subsidies enable it to continue operating.[43] The Methane Tax offers state and local governments the opportunity to break free from the inefficient and environmentally-damaging system that is large-scale animal agriculture.

The animal agriculture industry's greenhouse gas emissions have been scientifically quantified.[44] Animal agriculture, a source that globally produces more emissions than transportation, is an industry with massive potential to reduce total GHG emissions. This potential begs the question: *How* can state and local governments reduce livestock emissions?

III. ANALYSIS: THE METHANE TAX

Regulatory taxation is a method of incentivizing behavioral changes in consumers and producers.[45] A regulatory tax shifts the supply curve upward, creating a new equilibrium price, and a decreased quantity demanded of the product.[46]

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37. For a discussion, see Camila Domonoske & Colin Dwyer, *Trump Announces U.S. Withdrawal From Paris Climate Accord*, NPR (June 1, 2017), http://www.npr.org/sections/thetwo-way/2017/06/01/530748899/watch-live-trump-announces-decision-on-paris-climate-agreement.

38. *See* Bruce Finley, *Colorado Signs On to U.S. Climate Alliance, Joining States Committed to Exceeding Trump's Rejected Climate Targets*, THE DENVER POST (July 11, 2017).

39. *Id.*

40. *See* Climate Mayors, *353 US Climate Mayors Commit to Adopt, Honor, and Uphold Paris Climate Agreement Goals: Statement From the Climate Mayors In Response to President Trump's Withdrawal From the Paris Climate Agreement*, MEDIUM (June 1, 2017).

41. Winebarger, *supra* note 14, at 1009-15.

42. *Id.* at 1011.

43. *Id.* at 1015.

44. *See* Part II(A), *supra.*

45. Zachary Ludens, *Stemming a Rising Tide: Why the Clean Air Act Following* Massachusetts v. EPA *Provides a Sensible Vehicle Through Which To Regulate Greenhouse Gas Emissions*, 68 U. MIAMI L. REV. 251, 258 (2013).

46. *Id.*

Economic studies indicate that meat consumption is elastic, meaning that consumption decreases with increases in price.[47] Reduced demand for animal products will translate to fewer animals farmed and supplied, and ultimately, reduced greenhouse gas emissions. Even a small reduction in animal population would result in significant reductions in emissions, considering each cow produces 500 liters of methane per day — a greenhouse gas that is thirty times more damaging than carbon dioxide.[48] Placing a small—say five to ten percent tax[49]—on meat and animal products is the best way to encourage this market activity.[50]

A. Carbon Tax Efforts Offer a Blueprint for the Methane Tax's Implementation.

State or local governments seeking to implement a Methane Tax can look to existing carbon tax schemes as a general blueprint. A carbon tax is a tax levied on carbon dioxide emissions.[51] Implementing an emissions-based tax increases the price of emission-intensive goods, which leads to a reduced quantity of the goods demanded and supplied.[52] Consumers will opt for less expensive alternatives, which will ultimately lead to reduced total emissions.[53] A key to this system is tax revenue reinvestment into renewable energy.[54] This gives consumers a viable alternative, and if renewables can be subsidized to the point that they're cheaper than carbon-intense fuels, consumers will choose them.[55]

Greenhouse gas emissions are an externality associated with fossil fuel consumption.[56] Externalities are implications of an activity that are not reflected in their price.[57] Consumers make purchasing decisions based on the price they pay, not on the true cost to society. This results in over-consumption. The price of fuel is illustrative; gasoline is so cheap because it does not currently reflect the cost of the emissions associated with it. A carbon tax internalizes those emissions.[58]

Carbon taxes generate substantial revenue that can be reinvested to further reduce emissions.[59] If the revenue is simply redistributed back to

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47. Winebarger, *supra* note 14, at 1015.
48. K.A. Johnson & D.E. Johnson, *supra* note 33.
49. This tax should be proportionate to the level of emissions attributable to a given product. For example, beef produces more emissions than any other animal, so its tax would be the highest.
50. *See generally*, Stephen Sewalk, *Carbon Tax With Reinvestment Trumps Cap-and-Trade*, 30 PACE ENVTL. L. REV. 580 (2013) (arguing that a carbon tax is the best way to reduce the demand for carbon-intensive products).
51. *Id.* at 582.
52. Stephen Sewalk, *Designing a Better Carbon Tax: Only With Reinvestment*, 40 WM. & MARY ENVTL. L. & POL'Y REV. 769, 787 (2016).
53. *Id.*
54. *Id.*
55. *Id.*
56. *Id.*
57. *Id.*
58. *Id.*
59. *Id.*

the public, the only emissions reduction comes purely from the price elasticity of demand.[60] If the revenue is reinvested into renewable energy, jobs are created, the economy stays strong, and emissions decline over time as renewable energy becomes the standard.[61] Reinvestment is crucial.

A. Methane Tax Proposal

This Article introduces a tax on animal products called a Methane Tax. This tax is levied on all greenhouse gas emissions generated by animal agriculture. While it is called a Methane Tax, the excise tax on animal products would internalize all greenhouse gas emission externalities associated with livestock production, including carbon dioxide and nitrous oxide.

Just as emissions are an externality of fossil fuel consumption, emissions are also an externality of animal agriculture. Just like carbon, the problems are underpricing and overconsumption.[62] Go to any fast food shop in town, and you'll see they offer a burger for just a couple bucks.[63] This phenomenon is made possible by the United States federal government's subsidization of the animal agriculture industry with billions of taxpayer dollars annually.[64] This exacerbates the underpricing problem. A tax would increase the cost of animal products and deter overconsumption.[65] A methane tax could be tailored to reflect the emissions associated with any given animal product. Since cattle account for the most emissions of any type of livestock,[66] the tax on beef would be highest. This would send more accurate price signals to consumers, and purchasing decisions would reflect true cost to society. Many consumers would substitute a less expensive alternative, such as plant-based protein.

As with carbon taxes, a key to the Methane Tax is channeling tax revenue in the right direction. Methane tax revenue must be reinvested back into the agriculture industry, in the form of subsidies, to incentivize shifts to more sustainable practices and maximize livestock emissions reduction. Injecting new revenue into sustainable, plant-based agriculture is the key to the realization of any animal agriculture reform. Everyone must eat. Initializing new hydroponic and conventional farming operations to grow plant-based foods will help ensure that all Americans are fed and

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60. *Id.*

61. *Id.*

62. Americans consume 270 pounds of meat annually, one of the highest rates in the entire world. *See* Eliza Barclay, *A Nation of Meat Eaters: See How It All Adds Up*, NPR (June 27, 2012).

63. As of July, 2017, McDonalds offers a "Quarter Pounder with Cheese," which is 1/4 pound of beef, for $3.79 in many places, available at http://www.fastfoodmenuprices.com/mcdonalds-prices/. That quarter pound of beef required over 100 gallons of water, 6.7 pounds of grain, and 1,036 BTUs of fossil fuel energy – enough to power a typical microwave for 18 minutes. Barclay, *supra* note 62.

64. Winebarger, *supra* note 14, at 1009.

65. *Id.* at 1015.

66. Janet Ranganathan et al., *Shifting Diets for a Sustainable Food Future*, WORLD RESOURCES INSTITUTE 4 (2016) (reporting that beef produces nearly 5 times the GHG emissions of poultry, fish, or pork).

healthy, while preserving our planet. Finally, a state or local Methane Tax would divert revenue from large-scale, corporate farming operations and channel that money towards local farmers.

IV. CONCLUSION

A Methane Tax on animal products internalizes the externalities associated with animal agriculture. The Methane Tax will face resistance from the animal agriculture industry and carnivores alike. But creating economic incentives—not strict mandates—to consume a little bit less meat would be a tremendous step towards curbing our greenhouse gas emissions and ensuring a habitable earth for many generations to come. An excise tax on animal products is a powerful tool that state and local governments should utilize to send a strong message: Americans will continue to combat climate change in Post-Paris Agreement America.

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