Chapter 5: Tackling the Problem of CAFOs and Climate Change: A New Path to Improved Animal Welfare?

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The trajectory of global climate change is not a happy one. The World Meteorological Organization of the United Nations reported that 2014 was the warmest year on record, consistent with the overall

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trend toward hotter years.[1] The Intergovernmental Panel on Climate Change (IPCC) in its most recent round of work explained that, absent additional efforts to mitigate anthropogenic greenhouse gas (GHG) emissions, "warming by the end of the 21st century will lead to high to very high risk of severe, widespread, and irreversible impacts globally."[2]

Most of the key drivers of anthropogenic climate change are now receiving attention from U.S. policymakers. The Obama Administration's Climate Action Plan relies on a combination of regulations and incentives to reduce carbon pollution from power plants, accelerate the shift to clean energy, reduce emissions from transportation, and improve energy efficiency in industry, businesses, and homes.[3] The centerpiece of this plan is the U.S. Environmental Protection Agency's (EPA's) set of proposed regulations to reduce carbon emissions from new and existing power plants.[4] New proposed rules on methane from extractive industry activities have also been announced.[5] State and regional efforts, too, are ongoing—from California's Global Warming Solutions Act[6] to the Regional Greenhouse Gas Initiative (RGGI) in the Northeast.[7] And the climate crisis will soon be playing lead on the international stage: at the end of 2015, parties to the United Nations Framework Convention on Climate Change (UNFCCC), including the United States, will meet in Paris to negotiate an international agreement on climate change.[8]

Largely absent from the legal and policy dialogue on GHG mitigation has been the need to deal with emissions resulting from agricultural operations—and, in particular, emissions attributable directly and indirectly to

1. Clare Nullis, *Warming Trend Continues in 2014*, World Meteorological Org., Feb. 2, 2015, https://www.wmo.int/media/?q=content/warming-trend-continues-2014.
2. The IPCC reached this conclusion with high confidence. IPCC, Climate Change 2014 Synthesis Report: Summary for Policymakers 17 (2014).
3. Exec. Office of the President, The President's Climate Action Plan (June 2013), *available at* http://www.whitehouse.gov/sites/default/files/image/president27sclimateactionplan.pdf.
4. Standards of Performance for Greenhouse Gas Emissions From New Stationary Sources: Electric Utility Generating Units, 79 Fed. Reg. 1429 (proposed Jan. 8, 2014); Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, 79 Fed. Reg. 34829 (proposed June 18, 2014); Carbon Pollution Standards for Modified and Reconstructed Stationary Sources: Electric Utility Generating Units, 79 Fed. Reg. 34960 (proposed June 18, 2014).
5. Office of the Press Sec'y, *FACT SHEET: Administration Takes Steps Forward on Climate Action Plan by Announcing Actions to Cut Methane Emissions*, The White House, Jan. 14, 2015, http://www.whitehouse.gov/the-press-office/2015/01/14/fact-sheet-administration-takes-steps-forward-climate-action-plan-anno-1.
6. California Global Warming Solutions Act of 2006, A.B. 32, 2005/2006 Leg., Reg. Sess. (Cal. 2006) (codified at Cal. Health & Safety Code §§38500-38599).
7. *See*, *e.g.*, Regional Greenhouse Gas Initiative, *Program Overview*, http://www.rggi.org/design/overview (last visited May 3, 2015).
8. *See* Int'l Inst. for Sustainable Dev., *UNFCCC Conference of the Parties (COP) 21*, http://climate-l.iisd.org/events/unfccc-cop-21/ (last visited May 3, 2015) (discussing Paris COP).

the production of meat and dairy. The intensive confinement of farm animals is the norm in U.S. agriculture. Improving the welfare of animals confined in concentrated animal feeding operations (CAFOs),[9] and alleviating their suffering, is a high priority across the animal protection movement. This is true for animal protection organizations like the Humane Society of the United States,[10] Animal Legal Defense Fund,[11] and the Animal Welfare Institute,[12] as well as for animal rights organizations like People for the Ethical Treatment of Animals.[13] Animal organizations focus on the welfare of confined farm animals not only because of highly publicized instances of abuse revealed by undercover investigations, but also because of the consequences of the daily conditions of their confinement.

As is true with respect to other environmental consequences of the CAFO system of production, impact litigation, new legislation, and policy advocacy directed at reining in GHG emissions are unlikely to produce direct and immediate improvements for the welfare of farm animals. Legal and policy shifts to address GHGs can, however, help to improve operating standards and reduce the externalization of costs to the public—and to animals—from these facilities. Mitigation of GHG emissions attributable to U.S. livestock production can benefit the animals at the heart of this system indirectly and over the long term, while also serving to educate the public about the inner workings of the food system. Too, the still unfolding response to climate change gives animal lawyers an opportunity not only to draw on environmental law to advance animal welfare in the CAFO arena, as they have long done,[14] but also to shape the content and direction of climate law. GHG emissions resulting from the production of meat and dairy are a significant driver of climate change, yet little has been done to address this dimension of the climate dilemma.[15]

Part I of this chapter describes the problem of livestock production and climate change and introduces the main approaches to mitigation. Part II

9. Although used as shorthand in this chapter for any large, industrial animal confinement facility, regardless of animal type, "CAFO" is a term of art under the Clean Water Act and EPA regulations. 33 U.S.C. §1362(14); 40 C.F.R. §122.23(b)(2) (2015).
10. Humane Soc'y of the United States, *Timeline of Major Farm Animal Protection Advancements*, http://www.humanesociety.org/issues/confinement_farm/timelines/timeline_farm_animal_protection.html?credit=web_id424367309 (last visited May 3, 2015).
11. Animal Legal Def. Fund, *Farmed Animals and the Law*, http://aldf.org/resources/advocating-for-animals/farmed-animals-and-the-law/ (last visited May 3, 2015).
12. Animal Welfare Inst., *Who We Are*, https://awionline.org/content/who-we-are (last visited May 3, 2015).
13. People for the Ethical Treatment of Animals, *Animals Used for Food*, http://www.peta.org/issues/animals-used-for-food/ (last visited May 3, 2015).
14. *See supra* Chapter 4.
15. *See*, *e.g.*, Ripple et al., *infra* note 24, at 3-4.

discusses how reduction of GHG emissions from meat and dairy production could beneficially, if indirectly, affect animal welfare. Part III canvasses key legal and policy routes—some existing and some new—through which animal lawyers may seek to be heard, with an emphasis on GHG emissions resulting from CAFOs. Part IV acknowledges the substantial obstacles to legal reform in this area, including the need for a better public understanding of the role of meat and dairy production as a driver of climate change. At the same time, the growing public discourse on climate impacts has presented an unprecedented opportunity for animal lawyers to move the needle on both environmental protection *and* animal welfare—an opportunity that animal lawyers are already seizing.

I. Livestock Production as a Driver of Climate Change

A. Emissions

The overwhelming majority of meat and dairy products in the United States results from an industrial model based on maintaining large numbers of animals in close quarters. Feed is produced in one location through the use of intensive chemical inputs, then transported to another location and fed to the confined animals.[16] As discussed earlier in this volume and extensively documented elsewhere, the intensive confinement model of meat and dairy production has wide-ranging implications for the environment, resource use, and public health.[17] Least discussed of these environmental impacts has been the role that industrial food animal production plays as a driver of anthropogenic climate change.[18]

Industrial farm animal production generates GHGs in numerous ways.[19] The key GHGs emitted are carbon dioxide (CO_2), methane (CH_4), and

16. *E.g.*, Pew Commission on Industrial Farm Animal Production, Putting Meat on the Table: Industrial Farm Animal Production in America 3-7 (2008).
17. *See supra* Chapter 4.
18. *See generally* Rob Bailey et al., Livestock—Climate Change's Forgotten Sector: Global Public Opinion on Meat and Dairy Consumption 17-21 (Dec. 2014), *available at* http://www.chathamhouse.org/sites/files/chathamhouse/field/field_document/20141203LivestockClimateChangeBaileyFroggattWellesley.pdf.
19. This chapter is principally concerned with *industrial* farm animal production, because the intensive model of producing meat and dairy is dominant in the United States due to its efficiencies, and it has been a focus of environmental protection efforts in recent years. However, pasture-based systems also are responsible for GHG emissions. The current view is that while grass-fed cows actually produce more methane than cows in CAFOs, there is evidence that cows raised in a well-managed pasture-based system are responsible for lower *overall* GHG emissions than cows raised in an intensive-confinement system. *See generally* Animal Welfare Approved, A Breath of Fresh Air: The Truth About Pasture-Based Livestock Production and Environmental Sustainability (2013).

nitrous oxide (N_2O).[20] CO_2 emissions result principally from transportation and energy usage. Sources of these emissions range from the manufacture of chemical inputs for feed production (such as pesticides and fertilizer), to the on-farm operation of farm machinery and equipment, to the processing and transporting of final products. The production of animal feed is a significant source of GHG emissions; the fertilizers, pesticides, and herbicides used to grow feed are energy-intensive inputs that must be manufactured and transported.

Livestock rearing and waste disposal are major sources of emissions, and methane is the key culprit. In the United States and worldwide, agricultural activities are the primary source of anthropogenic methane emissions, with livestock as the primary contributor.[21] In fact, in the United States, livestock production outpaces natural gas and petroleum production as a source of methane.[22] Cows and other ruminants expel methane as a byproduct of their digestive process, called enteric fermentation.[23] Ruminants are overwhelmingly responsible for livestock methane emissions; globally, ruminant livestock production is the largest single source of anthropogenic methane emissions.[24]

Storing and processing vast quantities of manure from any livestock also generates methane. Despite methane's much shorter atmospheric lifespan compared with CO_2 (9-12 years versus 50-200 years), methane paints a troubling climate picture.[25] First, its potency as a heat-trapping gas has likely been underestimated until recently. According to the IPCC, methane's heat-trapping capacity (or global warming potential, GWP) is 34 times that of CO_2 over a 100-year time frame.[26] Second, there is probably more methane in the atmosphere than previously thought. A 2013 Harvard study on methane published in the *Proceedings of the National Academy of Sciences* found that U.S. emissions of the gas due to ruminants

20. For detailed discussion of life-cycle GHG impacts of industrial meat and dairy production, see generally Tackling Climate Change Through Livestock, *infra* note 29. Though hydrofluorocarbons used for refrigeration are incredibly potent GHGs, the United Nations Food and Agriculture Organization (FAO) deems their emission "marginal on a global scale." *Id.* at 15.
21. *See* U.S. EPA, *Overview of Greenhouse Gases—Methane*, http://epa.gov/climatechange/ghgemissions/gases/ch4.html (last visited May 3, 2015).
22. *Id.*
23. The process is described in Tackling Climate Change Through Livestock, *infra* note 29, at 20.
24. William Ripple et al., *Commentary: Ruminants, Climate Change and Climate Policy*, 4 Nature Climate Change 2, 2 (Jan. 2014).
25. *Id.* at 2; U.S. EPA, *supra* note 21.
26. Gunnar Myhre et al., *Anthropogenic and Natural Radiative Forcing*, *in* Climate Change 2013: The Physical Science Basis, Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change 714 (T.F. Stocker et al., eds., 2013). This GWP takes into account what are known as climate-carbon feedbacks. *Id.*

and manure are actually up to twice the magnitude shown in existing GHG inventories.[27]

Agricultural soil management and the manufacture of chemical fertilizer are major sources of N_2O emissions. The storing and processing of manure also releases N_2O. N_2O's GWP is about 300 times that of CO_2 on a 100-year time horizon.[28]

The complete life cycle of livestock production results in significant overall contributions of GHGs to the atmosphere. According to the United Nations Food and Agriculture Organization (FAO), 14.5% of all heat-trapping GHGs emitted worldwide into the atmosphere as a result of human activity is attributable, directly or indirectly, to the livestock sector.[29] Some global estimates run far higher.[30]

Although the comparable U.S. figure is almost certainly lower than the global figure—because deforestation and landclearing for agriculture are not a significant factor here as they are in some other nations[31]—there is currently no available analysis that provides an apples-to-apples comparison with the FAO global figure. In the United States, the most credible estimates of livestock's contribution to climate change come from the national GHG emissions inventory prepared annually by EPA.[32] EPA estimates total GHG contributions from agriculture in 2013 at 515.7 million metric tons (MMT) of carbon dioxide equivalent (CO_2e), or 7.7% of national emissions.[33] Methane and nitrous oxide emissions resulting from enteric fermentation and manure management total approximately 243.2 MMT CO_2e, or about 3.6% of national GHG emissions.[34] But these figures do not factor in

27. Scot M. Miller et al., *Anthropogenic Emissions of Methane in the United States*, 110 PNAS 20018, 20018, *available at* http://www.pnas.org/content/110/50/20018.full.pdf?sid=6f5ed6ca-a79c-4d49-8e1e-aa277f23fff7.
28. Myhre et al., *supra* note 26.
29. P.J. Gerber et al., U.N. Food & Agric. Org., Tackling Climate Change Through Livestock—A Global Assessment of Emissions and Mitigation Opportunities 15 (2013) (updating FAO's earlier ground-breaking report, which estimated livestock's global contribution to GHG emissions at 18%) (H. Steinfeld et al., Livestock's Long Shadow—Environmental Issues and Options 112 (2006)).
30. Robert Goodland & Jeff Anhang, *Livestock and Climate Change: What If the Key Actors in Climate Change Are Cows, Pigs, and Chickens?,* World Watch, Nov./Dec. 2009, at 10, 10-11 (claiming FAO's early work underestimated a variety of GHG contributions and taking into account emissions due to livestock respiration). *Compare* M. Herrero et al., *Livestock and Greenhouse Gas Emissions: The Importance of Getting the Numbers Right,* 779 Animal Feed Sci. & Tech. 166-67 (2011) (criticizing Goodland/Anhang findings but reaffirming need to provide policymakers with accurate GHG emissions estimates).
31. *See, e.g.*, West et al., *infra* note 37, at 326 (identifying Brazil and Indonesia as leverage points for reducing agriculture's impact on climate through tropical deforestation).
32. U.S. EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2013 (Apr. 15, 2015).
33. *Id.* at 5-1.
34. Percentage calculated by authors based on data contained in the EPA Inventory. *See id.* at ES-4, 5-2.

various other categories of emissions fairly attributable to livestock production, such as those related to fertilizer manufacture, feedstock production, and transportation.[35]

The absence of a definitive figure for livestock's contribution to overall GHG emissions in the United States does not change the fact that the contribution is significant. And livestock's substantial role in methane emissions is clear: under EPA's methodology, the livestock sector accounts for over one-third of domestic methane emissions.[36] Nor is this problem likely to resolve on its own, as Americans remain among the top per-capita meat eaters in the world, and the global demand for meat continues to boom alongside the global population.[37] Research indicates that by 2050, current dietary trends, if maintained, will be a major contributor to an estimated 80% increase in global GHG emissions attributable to all aspects of food production.[38]

B. Mitigation

Greenhouse gas emissions associated with industrial meat and dairy production can be reduced either by producing meat and dairy in ways that result in lower levels of emissions, or by producing less meat and dairy overall, or both. The first type of approach, known as "technical mitigation," may be undertaken voluntarily by producers (usually with government incentives) or, conceivably, required by regulation. Today, climate policy with respect to livestock is focused almost exclusively here—with an emphasis on taxpayer-

35. EPA follows the IPCC's methodology. *See id.* at 1-1 to 1-2.

36. EPA reports that the livestock sector is responsible for over 35% of anthropogenic methane emissions (25.9% from enteric fermentation and 9.6% from manure management). *See* U.S. EPA, *supra* note 32, at 5-1.

37. U.N. Env't Programme (UNEP), *Growing Greenhouse Gas Emissions Due to Meat Production*, *in* UNEP Global Environmental Alert Service 2 (Oct. 2012) (United States among top per capita consumers of meat, worldwide); *see, e.g.*, Paul West et al., *Leverage Points for Improving Global Food Security and The Environment*, 345 Sci., July 18, 2014, at 325, 326 (noting that "[m]eat and dairy consumption is increasing globally and generally increases with wealth"); FAO, Food Outlook: Biannual Report on Global Food Markets (Oct. 2014) (world meat production is anticipated to grow modestly in 2014); Bloomberg Sch. of Pub. Health at Johns Hopkins Univ., *Meat Consumption: Trends and Health Implications*, http://www.jhsph.edu/research/centers-and-institutes/johns-hopkins-center-for-a-livable-future/projects/meatless_monday/resources/meat_consumption.html (last visited May 3, 2015) (citing U.N. Food & Agric. Org., The State of Food and Agriculture: Livestock in the Balance (2009)) ("Americans are now among the top per capita meat consumers in the world; the average American eats more than three times the global average.").

38. David Tilman & Michael Clark, *Global Diets Link Environmental Sustainability and Human Health*, 515 Nature, Nov. 27, 2014, at 518.

subsidized technology, such as methane digesters.[39] Technical mitigation can yield substantial climate benefits.[40]

The second broad approach—lowering GHG emissions by lowering production levels—would most likely result from decreased consumer demand for meat and dairy. Lower demand could be caused by increased cost for the products (e.g., due to increased costs of inputs, new taxes, or higher regulatory compliance costs), changes in consumer behavior and preferences (e.g., avoiding all meat and dairy, eating less industrially produced meat and dairy, or eating these products less often), or from a combination of factors.[41] Not surprisingly, research points to the intuitive conclusion that meaningful, long-term mitigation of livestock-related GHG emissions will require *both* types of approaches—technical mitigation by agricultural producers *and* lower levels of consumption of meat and dairy.[42]

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39. *See infra* notes 136-58 and accompanying text. Methane digesters are economically viable typically only at large industrial livestock facilities, and some environmental and animal protection advocates have sharply criticized the wisdom of promoting GHG reductions through a taxpayer subsidy that has the effect of supporting the prevailing model of intensive animal production. *E.g.*, Sierra Club, Sierra Club Guidance: Methane Digesters and Concentrated Animal Feeding Operation (CAFO) Waste (opposing public subsidies to such energy generation at large CAFOs); Nicole DiCamillo, *Methane Digesters and Biogas Recovery—Masking the Environmental Consequences of Industrial Concentrated Livestock Production*, 29 UCLA J. Envtl. L. & Pol'y 365 (2011) (comment) (arguing against digester subsidies). Beyond methane digesters, the U.S. Department of Agriculture (USDA) could, through a variety of federal agricultural assistance programs, take steps to incentivize mitigation of GHG emissions attributable to livestock production. For a detailed treatment, see generally Romany Webb & Steven Weissman, Addressing Climate Change Without Legislation (Vol. 3): How the U.S. Department of Agriculture Can Use Its Existing Legal Authority to Reduce Greenhouse Gas Emissions and Increase Clean Energy Use 34-48 (Aug. 2014) (canvassing USDA's many options).

40. Manure management, animal husbandry, feeding practices, and grazing land management all offer opportunities for GHG mitigation. FAO estimates that as much as a 30% global reduction in sectoral GHG emissions is possible through the adoption of practices that are already available and in use. Tackling Climate Change Through Livestock, *supra*, note 29, at 45-58.

41. Whether it is preferable to consume *no* meat and dairy versus climate-friendly meat and dairy remains a potential source of disagreement between some animal protection advocates and environmentalists. *Compare*, *e.g.*, Farm Animal Rights Movement, *About FARM*, http://www.farmusa.org/about.htm (last visited May 3, 2015), *with* Center for Food Safety, *Cool Foods Campaign*, http://www.centerforfoodsafety.org/issues/305/food-and-climate/4-eliminate-industrial-meat-and-dairy-consumption (last visited May 3, 2015).

42. *See*, *e.g.*, Martin Heller & Gregory Keoleian, *Greenhouse Gas Emission Estimates of U.S. Dietary Choices and Food Loss*, J. Indus. Ecology 1 (2014) (concluding that technological improvements in agriculture will not be enough to match population growth and rising demand for meat and dairy; changes in behavior, including dietary shifts, are needed—especially in developed countries); *see also* IPCC, *Summary for Policymakers*, *in* Climate Change 2014: Mitigation of Climate Change, Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change 25 (O. Edenhofer et al., 2014) (discussing supply-side and demand-side opportunities for agricultural mitigation, and noting that "[d]emand-side measures, such as changes in diet and reductions of losses in the food supply chain, have a significant, but uncertain, potential to reduce GHG emissions from food production "). For an excellent recent discussion of the many ways to mitigate GHG emissions in agriculture, see generally Amy Dickie et al., Strategies for Mitigating Climate Change in Agriculture: Abridged Report (Apr. 2014).

These approaches to GHG mitigation from livestock production are not necessarily tied to any one particular type of legal intervention discussed in Part III, below.

II. The Link Between Mitigating GHG Emissions From Industrial Farm Animal Production and Improved Animal Welfare

Animal law's stake in the CAFO system of production is clear. With billions of farm animals slaughtered for food annually in the United States,[43] industrial farm animal production has the potential for enormous animal welfare gains—or losses. But why might lawyers concerned with animal welfare invest resources in the sub-field of climate law involving livestock emissions?

The answer begins with the fact that on-farm animal welfare is neither the subject of current federal law nor of most state anti-cruelty laws.[44] As a result, the animal lawyer is left either to press for new legislation to address welfare needs or to search elsewhere in the law for levers to influence intensive farm animal production practices. The direct, legal-reform approach advances incremental legislative improvements within the existing production model of intensive confinement. This route has resulted in major state-by-state victories for animal welfare, including eliminating battery cages for chickens,[45] banning veal crates for calves,[46] and prohibiting the use of gestation crates for pigs.[47]

43. Humane Soc'y of the United States, *Farm Animal Statistics: Slaughter Totals*, http://www.humanesociety.org/news/resources/research/stats_slaughter_totals.html (last visited May 3, 2015) (approximately 9 billion cattle, chickens, ducks, hogs, sheep and lambs, and turkeys slaughtered annually, with chickens representing the vast majority of that total).
44. The Animal Welfare Act expressly excludes "farm animals" from the statutory definition of "animal." 7 U.S.C. §2132(g). *See also* American Soc'y for the Prevention of Cruelty to Animals, *Legal Protections for Farm Animals/State Laws*, https://www.aspca.org/fight-cruelty/farm-animal-cruelty/legal-protections-farm-animals (last visited May 3, 2015).
45. *See*, *e.g.*, Missouri v. Harris, No. 2:14-cv-00341-KJM-KJN (E.D. Cal. Oct. 2, 2014) (dismissing challenge to California law requiring eggs sold in California to be produced in compliance with animal care standards), *appeal filed*, Ninth Circuit No. 14-17111 (Oct. 24, 2014).
46. *See* Humane Soc'y of the United States, *Veal Crates*, http://www.humanesociety.org/issues/confinement_farm/facts/veal.html (last visited May 3, 2015) ("The HSUS has helped pass regulations banning veal crates in several states, including Arizona, California, Colorado, Kentucky, Maine, Michigan, Ohio and Rhode Island.").
47. *E.g.*, Fla. Const. art. X, §21; Ariz. Rev. Stat. §13-2910.07 (2012); Or. Rev. Stat. §600.150 (2011). *Compare* Heather Haddon, *Gov. Chris Christie Vetoes Pig-Crate Ban*, Wall St. J., Nov. 28, 2014, http://www.wsj.com/articles/gov-chris-christie-vetoes-pig-crate-ban-1417223391. Also, *see generally* Elizabeth R. Springsteen, *A Proposal to Regulate Farm Animal Confinement in the United States and an Overview of Current and Proposed Laws on the Subject,* 14 Drake J. Agric. L. 437 (2009), *available at* https://www.animallaw.info/article/proposal-regulate-farm-animal-confinement-united-states-and-overview-current-and-proposed.

The other, more indirect approach for animal lawyers has been to bring lawsuits or engage in policy initiatives designed to compel industry and government to comply with existing laws that influence on-farm activities and thereby, at least indirectly, touch on the welfare of animals. Environmental law provides an obvious choice, as CAFOs are associated with significant pollution that environmentalists are already highly motivated to address. As a result, animal advocates have long worked, on their own and in tandem with environmental organizations, to tackle CAFO impacts such as the fouling of surface water, groundwater, and air.

How does ensuring an operation's compliance with environmental law lead to improved animal welfare? The answer lies in considering potential beneficial effects on welfare that are indirect and, at times, realized only over the long term. First, ensuring that a particular operation is complying with the law deters that operation and others from maintaining low or inadequate operating standards. Low environmental standards, in particular, may correlate with low animal welfare standards, and vice versa.[48] Second, an operation that satisfies its environmental obligations is likely less able to externalize the costs of pollution to others in society. For animal protection advocates with deeply held views that the intensive confinement of food animals is unethical, there is value in ensuring that these operations are not receiving a virtual subsidy that contributes to the profitability of the CAFO business model. And highlighting one type of subsidy may help to reveal other types, all of which support the CAFO model of production. Third, if some CAFOs are unable to operate profitably while remaining in full compliance with the law and must limit the scale of their operations, or shut down, the animals that would have lived in those CAFOs are spared that existence. Fourth, environmental litigation involving industrial farm animal production can serve an ancillary educational role, raising public awareness of the implications of this business model for animal welfare. Lastly, insofar as higher costs of production increase the price of animal products and thereby decrease consumer demand, production levels may drop. This could mean fewer CAFOs (or, potentially, slower growth in the number of new and expanded CAFOs) and could in the future equate to fewer total animals enduring life in close quarters, lower stocking density of animals, and, perhaps, fewer animals subject to individual abuses.[49]

48. This potential correlation between reduced (or improved) animal welfare and environmental protection is an area that would benefit from additional research. Anecdotally, at least, this alignment of interests is borne out by examples of increasing collaboration between the animal protection movement and the environmental movement.

49. Rigorous economic analysis would aid in assessing how any particular legal or policy intervention on climate would affect consumer demand and thereby affect meat and dairy production levels.

Each of these links between ensuring a high level of environmental compliance by CAFOs and benefits to animal welfare applies with equal force in the context of mitigating GHG emissions resulting from meat and dairy production.[50] The educational dimension, in particular, is key from an animal welfare perspective. The public has little awareness about the role that meat and dairy production play as a driver of climate change. A recent survey conducted by the London-based think tank Chatham House revealed an "awareness gap" that has yet to be successfully addressed.[51] People tend to grasp that coal-fired power plants and automobile emissions are part of the climate equation—and even in these sectors, tenable climate responses have not yet been secured. By comparison, the public continues to greatly underestimate the impacts of meat and dairy consumption on the global climate. Nor has the environmental movement prioritized livestock's impact on climate change,[52] despite its efforts to highlight other environmental, natural resource, and public health impacts of the CAFO model of meat and dairy production.

Individual animals are at the heart of the industrial food system. From this perspective, the welfare concern permeates everything about the CAFO paradigm. Any environmental legal reform in this arena, whether it involves GHG emissions or other impacts, is inexorably linked to the animals that make the system possible and therefore touches, even if only nominally, on their well-being.

III. Legal and Policy Approaches to Reduced GHG Emissions[53]

Various legal strategies could be used to reduce GHG emissions—and, in particular, methane emissions—caused by industrial farm animal produc-

50. Proponents of animal protection have already been making the CAFO-climate connection and calling for legal and policy change. *See generally*, *e.g.*, David Cassuto, Animal Soc'y Inst., The CAFO Hothouse: Climate Change, Industrial Agriculture and the Law (2010); Humane Soc'y of the United States, An HSUS Report: The Impact of Animal Agriculture on Global Warming and Climate Change (updated 2011).

51. Bailey et al., *supra* note 18, at 17-21.

52. *See*, *e.g.*, Linnea Laestadius et al., Meat Consumption and Climate Change: The Role of Non-Governmental Organizations 36 (2013) (concluding "public education and policy advocacy efforts to reduce domestic meat consumption in light of climate change remain quite limited, particularly among environmental NGOs in the U.S. and Canada").

53. This discussion addresses legal opportunities in the United States. Although approaches under international law or the national laws of other countries are beyond the scope of this chapter, it bears noting that mitigation of GHG emissions from industrial meat and dairy has not been a priority in discussions under the U.N. Framework Convention on Climate Change. *See* Bailey et al., *supra* note 18, at 7; Ripple et al. *supra* note 24, at 4.

tion. Although each approach has strengths and weaknesses, they all provide opportunities for animal lawyers to redress a harmful effect of CAFOs on the global environment while also imparting information about the conditions in which animals are raised and working toward improved farm animal welfare.[54]

A. GHG Reporting

Undergirding climate policy is the need to understand the extent and sources of GHG emissions. Under regulations promulgated in 2009, EPA requires GHG reporting for large sources and suppliers emitting 25,000 metric tons or more of carbon dioxide equivalent[55] (CO_2e) per year.[56] As adopted, the regulations covered livestock facilities' manure management systems for stabilizing or storing manure, provided the level of emissions met the reporting threshold.[57] Covered facilities were required to gather data and calculate

54. This chapter focuses on government regulation of GHGs, but private governance approaches also offer a range of possibilities for addressing GHG emissions from CAFOs. Private governance can be defined as "the pursuit of public ends through private standards, monitoring, enforcement, and dispute resolution." Michael P. Vandenbergh, *Private Environmental Governance*, 99 Cornell L. Rev. 129, 129 (2013), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2237515. There are many private governance climate change- related initiatives. *E.g.*, Craig A. Hart, Climate Change and the Private Sector: Scaling Up Private Sector Response to Climate Change 151-53 (2013). To date, however, there are few specifically aimed at CAFOs. The most high-profile efforts are in the dairy industry. In 2009, the Innovation Center for U.S. Dairy set a voluntary goal to reduce GHG emissions of fluid milk by 25% by 2020. Innovation Ctr. for U.S. Dairy, 2013 U.S. Dairy Sustainability Report 27 (2013), *available at* http://www.usdairy.com/~/media/usd/public/2013%20u.s.%20dairy%20sustainability%20report.pdf. Other private governance approaches stem from higher up the supply chain. Wal-Mart has taken measures to meet its carbon reduction goals in part by looking to its suppliers and works to reduce dairies' emissions through promotion of methane digesters and removal of starches and stabilizers from products to allow for pasteurization and homogenization at lower temperatures that reduce energy use. Hart at 167; *see generally* Walmart, *2013 Global Sustainability Report—Sustainable Agriculture*, http://corporate.walmart.com/microsites/global-responsibility-report-2013/agriculture.html (last visited May 3, 2015). Other private governance approaches include voluntary reporting of carbon emissions and energy use to nongovernmental organizations such as the Carbon Disclosure Project (CDP), which provides data to investors and the public. Several dairies participate in CDP, including Stonyfield Farms, Inc. CDP, *Climate Change Programs*, https://www.cdp.net/en-US/Programmes/Pages/climate-change-programs.aspx (last visited May 3, 2015). *See also* Warren Braunig, *Reflexive Law Solutions for Factory Farm Pollution*, 80 N.Y.U. Envtl. L.J. 1505 (advocating for private (or public) CAFO certification regimes).

55. Carbon dioxide equivalent is a "measure used to compare the emissions from various greenhouse gases based upon their global warming potential (GWP). . . . The carbon dioxide equivalent for a gas is derived by multiplying the tons of the gas by the associated GWP." U.S. EPA, *Glossary of Climate Change Terms*, http://www.epa.gov/climatechange/glossary.html#C (last visited May 3, 2015).

56. Mandatory Reporting of Greenhouse Gases, 74 Fed. Reg. 56260, 56267 (Oct. 30, 2009).

57. 40 C.F.R. §98.360 (2015) ("A manure management system (MMS) is a system that stabilizes and/or stores livestock manure, litter, or manure wastewater in one or more of the following system components: Uncovered anaerobic lagoons, liquid/slurry systems with and without crust covers (including but not limited to ponds and tanks), storage pits, digesters, solid manure storage, dry lots (including feedlots), high-rise houses for poultry production (poultry without litter), poultry production with litter, deep bedding systems for cattle and swine, manure composting, and aerobic treatment.").

their emissions of methane and nitrous oxide from all manure management system components in aggregate, including methane associated with anaerobic digesters.[58] The rule as promulgated does not apply to small CAFOs (as determined by average annual animal population), even if they meet the emissions thresholds.[59] Accordingly, EPA estimated that only about 100-110 CAFOs were covered by the rule.[60] Through the appropriations process, however, Congress has barred EPA from spending funds to implement the rule as applied to agricultural sources, effectively blocking the application of the rule to any CAFOs.[61]

For the time being, it is likely that Congress will prohibit EPA from applying the reporting rule to CAFOs. Nevertheless, due to the value of reporting,[62] environmental advocates, as well as animal protection organizations, may continue to evaluate opportunities to highlight Congress' action and seek application of the rule to CAFOs.

58. *Id*. §§98.362-363.
59. *Id*. §98.360(a).
60. *See* U.S. EPA, Guide for the Agriculture and Livestock Sectors—Final Rule: Mandatory Reporting of Greenhouse Gases 2 (Nov. 2009), *available at* http://www.epa.gov/ghgreporting/documents/pdf/infosheets/agriculturegguide.pdf.
61. *E.g.*, Consolidated Appropriations Act of 2014, Pub. L. No. 113-76, 128 Stat. 5, 343 (Jan. 17, 2014) ("SEC. 421. Notwithstanding any other provision of law, none of the funds made available in this or any other Act may be used to implement any provision in a rule, if that provision requires mandatory reporting of greenhouse gas emissions from manure management systems."); *see also* U.S. EPA, Manure Management Systems—Final Rule: Mandatory Reporting of Greenhouse Gases 1 (Nov. 2009), *available at* http://www.epa.gov/ghgreporting/documents/pdf/infosheets/manuremanagement.pdf; U.S. EPA, *supra* note 60, at 1.
62. The value of disclosure has been observed with reporting programs under other environmental laws. Most notably, significant reductions in toxic chemicals emissions have been achieved in connection with the Toxics Release Inventory (TRI), which was established under the Emergency Planning and Community Right-to-Know Act. 42 U.S.C. §§11001-11050. The program requires certain types of facilities that manufacture, process, or use threshold amounts of toxic chemicals to file toxic chemical release reports, which are submitted to EPA and made publicly available. TRI's success has been attributed to a range of factors, including that: TRI information may affect future releases through industry self-analysis that identifies opportunities for reductions—which in some cases also can result in financial savings; governmental regulation as a response to newly-disclosed information; public pressure; and market pressure through capital markets, reputational harm, and other means. *See*, *e.g.*, U.S. EPA, 2007 TRI-MEweb Delivers Results for the TRI Program (2008), *available at* http://www.whitehouse.gov/sites/default/files/omb/assets/fea_docs/EPA_TRI-MEweb_success_2008.pdf; Archon Fung & Dara O'Rourke, *Reinventing Environmental Regulation From the Grassroots Up: Explaining and Expanding the Success of the Toxics Release Inventory*, 25 J. Envtl. Mgmt. 115 (Feb. 2000) (on file with Envtl. Law Inst.); Bradley C. Karkkainen, *Information As Environmental Regulation: TRI and Performance Benchmarking, Precursor to a New Paradigm?,* 89 Geological L.J. 257, 295 (2001). *See also*, *e.g.*, Braunig, *supra* note 54, at 1525-27; Paul A. Griffin & Yuan Sun, *Going Green: Market Reaction to CSR Newswire Releases*, Social Science Research Network, Jan. 29, 2012, http://ssrn.com/abstract=1995132 (reporting that stock values of 84 firms two days before and two days after the companies released carbon emissions information on average increased by about half a percentage point over the period of study and an even greater increase was found for smaller companies); Susanne Rust, *Disclosing Greenhouse Gas Emissions Boosts Business, Study Finds*, Cal. Watch, Feb. 6, 2012, http://californiawatch.org/dailyreport/disclosing-greenhouse-gas-emissions-boosts-business-study-finds-14765.

State programs also may provide opportunities for environmental and animal protection lawyers to seek emissions reporting from CAFOs—either by expanding current programs or adopting new requirements. According to the Center for Climate and Energy Solutions, approximately 18 states require reporting,[63] but the type of facilities covered and the thresholds vary by state. Among the states are California, Iowa, Wisconsin, and North Carolina.[64] In California, an animal protection organization has filed a petition for rulemaking with the California Air Resources Board (CARB) requesting that animal agriculture no longer be exempt from the state's mandatory reporting regulations for greenhouse gases.[65]

Obtaining more accurate, robust data on CAFO-related GHG emissions is critical to communicating the fact that this sector is a major contributor to climate change and that legal interventions are needed. This, together with the myriad benefits of environmental disclosure requirements more generally, suggests that reporting requirements are a possible place for animal and environmental lawyers to focus.

B. Regulation

This section examines the potential to address GHG emissions from CAFOs through federal regulations under the Clean Air Act, as well as through federal legislative amendments to existing law or new stand-alone legislation. In addition, state authorities to regulate GHG emissions from CAFOs are discussed.

1. Federal

a. Clean Air Act

EPA has not issued regulations to address livestock-related GHG emissions and has no plans to do so. Agricultural operations have long been exempt from many provisions of the major environmental laws.[66] Regulation of

63. Center for Climate and Energy Solutions, *Greenhouse Gas Reporting and Registries*, http://www.c2es.org/us-states-regions/policy-maps/ghg-reporting-and-registries (last visited May 3, 2015).
64. *Id.*
65. Pet. by Animal Legal Def. Fund Before Cal. Air Res. Bd., Rulemaking Petition to Regulate Greenhouse Gas Emissions From Animal Agriculture Under the Mandatory Reporting Regulation and the Cap-and-Trade Program (2014) (on file with authors). *See also infra* notes 128-32 and accompanying text, discussing GHG regulation in California and the state's ongoing efforts to formulate a strategy to better address short-lived but potent GHGs like methane.
66. *See* Linda Breggin & D. Bruce Myers Jr., *Subsidies With Responsibilities: Placing Stewardship and Disclosure Conditions on Government Payments to Large-Scale Commodity Crop Operations*, 37 Harv.

methane and other GHGs from CAFOs is no exception. The track record of carving out agriculture from environmental regulation, combined with the resistance EPA faces in regulating GHG emissions from any type of source, makes it especially challenging to seek new controls on GHGs from industrial meat and dairy production, as discussed below.

Nevertheless, the Clean Air Act (CAA), in theory, can be used to address these emissions. Specifically, EPA has authority under several CAA programs to regulate GHG emissions from CAFOs, provided it takes certain regulatory actions—and barring congressional intervention. The top candidates include the Prevention of Significant Deterioration (PSD) and New Source Performance Standards (NSPS) programs.[67] Each is briefly considered below. Due to the CAA's complexity, this discussion is necessarily simplified and serves only as a starting point for purposes of understanding the potential authorities that could be used.

PSD. CAFOs emitting certain levels of methane and other GHGs could be regulated under the PSD program, a permitting program for stationary new and modified "major emitting facilities"[68] (referred to as "major sources") of air pollution. The program applies to major sources located in areas that are in compliance with National Ambient Air Quality Standards (NAAQS) for at least one regulated pollutant.[69] The "criteria" pollutants for which there are NAAQS include nitrogen oxides, volatile organic compounds, fine particulates, sulfur dioxide, and lead.[70] The states have responsibility for implementation of NAAQS through state implementation plans that are approved by EPA.[71]

Envtl. L. Rev. 487, 507 (2013), *available at* http://journals.law.harvard.edu/elr/files/2013/08/Breggin-and-Myers.pdf; J.B. Ruhl, *Farms, Their Environmental Harms, and Environmental Law*, 27 Ecology L.Q. 263, 293 (2000).

67. This is not intended as an exhaustive survey of Clean Air Act authorities that could be used, as other options also are potentially available. *E.g.*, Angelo et al., *infra* note 105, at 177 (discussing state authority to fill gaps in federal regulation and regulate GHG emissions and other pollutants); Nathan Richardson et al., Greenhouse Gas Regulation Under the Clean Air Act: Structures, Effects, and Implications of a Knowable Pathway (Apr. 2010) (evaluating various options including National Ambient Air Quality Standards, international emissions regulation under §115 of the Clean Air Act, and the Hazardous Air Pollutant program, among others).
68. 42 U.S.C. §7479(1).
69. The Supreme Court explains that: "Since the inception of the PSD program, every area of the country has been designated attainment or unclassifiable for at least one NAAQS pollutant; thus, on EPA's view, all stationary sources are potentially subject to PSD review." Utility Air Regulatory Group v. EPA, 134 S. Ct. 2427, 2435 (2014).
70. 40 C.F.R. pt. 50 (2015); U.S. EPA Region 9, *Air Permits: Overview of the Prevention of Significant Deterioration Program*, http://www.epa.gov/region9/air/permit/psd-public-part.html (last visited May 3, 2015).
71. 42 U.S.C. §7410; U.S. EPA, *What Is a State Implementation Plan*?, *in* The Online State Implementation Plan Processing Manual (n.d.), *available at* http://www.epa.gov/region1/topics/air/sips/REVISED_WHAT_IS_A_SIP.pdf.

PSD permits are required before a new major source of criteria pollutants starts construction or before an existing major source makes "major" modifications.[72] Major sources are those that have the potential to emit more than 100 tons per year of any criteria pollutant and that are in a specific source category listed in the regulations (such as petroleum refineries).[73] For sources that are not in a listed source category, the threshold is the potential to emit 250 tons per year of any criteria pollutant.[74]

Among other requirements, facilities subject to the PSD program must implement best available control technology to limit pollution and conduct air quality impact analyses to show that any additional pollution will not, among other things, contribute to a violation of a NAAQS.[75] This ensures that new facilities or major modifications to existing facilities do not significantly degrade good air quality.[76]

An overview of EPA's efforts to date to regulate GHGs is needed to frame the discussion of how EPA might address CAFO emissions under the PSD program. In 2007, the Supreme Court ruled in *Massachusetts v. EPA* that EPA has CAA authority to regulate GHG emissions from new motor vehicles, provided the Agency concluded that such gases contribute to climate change.[77] In 2009, EPA concluded that projected and current concentrations in the atmosphere of GHGs may "reasonably be anticipated" to endanger public health and welfare of current and future generations by contributing to climate change.[78] After making this "endangerment finding," EPA and the U.S. Department of Transportation issued rules that apply GHG emissions standards to passenger cars, light duty trucks, and medium duty passenger vehicles ("tailpipe rule").[79] The tailpipe rule, in turn, triggered requirements that applied to stationary sources of pollution.[80]

72. 42 U.S.C. §7475(a), 7479; *see generally* 40 C.F.R. §51.166 (2015).
73. 40 C.F.R. §51.166(b) (2015).
74. *Id.* Thresholds for new major sources and major modifications of major sources are lower in areas that are not in attainment with NAAQS for a criteria pollutant. In nonattainment areas, sources are subject to the New Source Review program and the technology requirement is the "lowest achievable control technology." 40 C.F.R. §51.165 (2015). In addition, states also may regulate minor sources of criteria pollutants. U.S. EPA, Fact Sheet: New Source Review (NSR) (n.d.), *available at* http://www.epa.gov/oar/tribal/pdfs/NSRBasicsFactSheet103106.pdf.
75. 42 U.S.C. §7475(a)(3), (4); U.S. EPA Region 9, *supra* note 70.
76. *See* U.S. EPA, *New Source Review*, http://www.epa.gov/nsr/index.html (last visited May 3, 2015).
77. Massachusetts v. EPA, 549 U.S 497, 528 (2007).
78. Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66496, 66497-98 (Dec. 15, 2009).
79. Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards; Final Rule, 75 Fed. Reg. 25324 (May 7, 2010).
80. *See* Reconsideration of Interpretation of Regulations That Determine Pollutants Covered by Clean Air Act Permitting Programs, 75 Fed. Reg. 17004 (Apr. 2, 2010) (explaining that PSD and Title V permitting requirements are triggered once a pollutant is "subject to regulation" under either a provi-

After the tailpipe rule was promulgated, stationary sources that met the 100 or 250 tons per year potential to emit thresholds for CO_2e were in theory now subject to the PSD program. In addition, they were subject to Title V permitting requirements. The Title V permit program requires "major sources," defined to include, inter alia, sources with the potential to emit over 100 tons per year of "any air pollutant," to obtain permits to operate.[81] Title V permits include all requirements that apply to the source, such as emission limitations and reporting requirements, and do not impose any independent requirements.[82] The Supreme Court has explained, however, that Title V "imposes elaborate procedural mandates" that include development of a compliance plan, annual compliance certifications, and monitoring and reporting obligations.[83]

According to a leading agriculture law scholar, the "vast majority" of CAFOs would have been subject to the PSD and Title V permitting requirements because of their level of methane, nitrous oxide, and other GHG emissions.[84] As a result, these CAFOs would have been required to implement best available control technology, such as anaerobic digesters, lagoon covers, and aeration.[85]

Both Congress and EPA, however, took steps to limit the number of sources covered. Congress took action through the appropriations process to bar EPA from requiring Title V permits for GHG emissions from CAFOs,[86] dubbing the permit fee that funds administration of the program a "cow tax."[87] Since 2010, Congress has included language such as the following in the EPA appropriations bills:

> [N]one of the funds made available in this Act or any other Act may be used to promulgate or implement any regulation requiring the issuance of permits under Title V of the Clean Air Act . . . for carbon dioxide, nitrous oxide, water

sion in the CAA or a regulation adopted by EPA pursuant to the Act that requires actual control of emissions of that pollutant).

81. 42 U.S.C. §§7661(2)(B) & 7661b(a).
82. 40 C.F.R. §70.1(b) (2015); *see* U.S. EPA Region 9, *Frequently Asked Questions About Air Permits*, http://www.epa.gov/region09/air/permit/pmfaq.html#faq9 (last visited May 3, 2015); *see also* U.S. EPA, *Operating Permits—Basic Information*, http://www.epa.gov/oaqps001/permits/basic.html (last visited May 3, 2015).
83. Utility Air Regulatory Group v. EPA, 134 S. Ct. 2427, 2443 (2014).
84. Angelo et al., *infra* note 105, at 182.
85. *Id.* For a discussion of a range of existing technical options for the mitigation of GHG emissions associated with CAFO operations, see Gerber et al., *supra* note 29.
86. *See*, *e.g.*, Consolidated and Further Continuing Appropriations Act of 2015, Pub. L. No. 113-235, 128 Stat. 2130, 2448 (419) (Dec. 16, 2014).
87. *See* Stubbs, *infra* note 95, at 6.

vapor, or methane emissions resulting from biological processes associated with livestock production.[88]

While Congress focused exclusively on livestock sources, EPA used the rulemaking process to limit the vast number of facilities of *all* types that would be subject to permitting requirements for GHGs.[89] In its "tailoring rule" promulgated in 2010, EPA established a multi-step process for phasing in the rule. In the first phase, only those sources required to obtain PSD permits because of their emissions of other pollutants would be required to comply with best available control technology for GHGs—and only if the increase in potential to emit was 75,000 tons of CO_2e per year or more.[90] Similarly, only sources currently subject to the Title V permit program would be subject to Title V GHG requirements.[91] In the second phase, new sources that have the potential to emit 100,000 tons per year or more, or modified sources that have the potential to emit 75,000 tons per year or more, of CO_2e would be subject to PSD permit requirements regardless of their emissions levels of any other pollutants.[92] In addition, facilities that emit 100,000 tons per year or more of CO_2e would be subject to Title V permit requirements.[93] In the third phase, EPA would consider whether to reduce further the permitting thresholds.[94] EPA reportedly stated that the rule would not cover any agricultural operations, presumably because of the high threshold and because fugitive emissions from manure management systems were excluded.[95]

In 2014, the U.S. Supreme Court considered challenges to the tailoring rule. The Court concluded in *Utility Air Regulatory Group v. EPA* that

88. James E. McCarthy, EPA Regulation of Greenhouse Gases: Congressional Responses and Options 12 (Feb. 20, 2014) (quoting FY2014 appropriation, *supra* note 86), *available at* http://nationalaglawcenter.org/wp-content/uploads/assets/crs/R41212.pdf.

89. *See* Utility Air Regulatory Group v. EPA, 134 S. Ct. 2427, 2443 (2014) (summarizing EPA estimates that PSD program annual permit applications would increase from about 800 to almost 82,000 and Title V permit applications from less than 15,000 to about 6.1 million); Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule, 75 Fed. Reg. 31514, 31557, 31562-63 (June 3, 2010).

90. Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule, 75 Fed. Reg. 31516 (June 3, 2010).

91. *Id.*

92. *Id.*

93. *Id.*

94. *Id.* EPA subsequently decided that it would not further lower the PSD and Title V applicability thresholds for greenhouse gas emitting sources. 77 Fed. Reg. 41051 (July 12, 2012).

95. Megan Stubbs, Environmental Regulation and Agriculture 6-7 (June 16, 2014), *available at* http://fas.org/sgp/crs/misc/R41622.pdf (citing EPA Briefing on the Tailoring Rule, House Energy & Commerce Committee, May 14, 2010); *see also* Linda M. Chappell, Regulatory Impact Analysis for the Final Prevention of Significant Deterioriation [sic] and Title V Greenhouse Gas Tailoring Rule 8 (May 2010), *available at* http://www.epa.gov/ttnecas1/regdata/RIAs/riatailoring.pdf.

EPA "reasonably interpreted the Act to require sources that would need permits based on their emission of conventional pollutants to comply with best available control technology for greenhouse gases."[96] However, the Court also ruled that EPA could not use GHG pollutants as the only basis for determining that a facility is a "major source" that is required to obtain permits under the PSD or Title V programs.[97] In addition, the Court concluded that EPA "lacked authority to 'tailor' the Act's unambiguous numerical thresholds to accommodate its greenhouses-gas-inclusive interpretation of the permitting triggers."[98]

The effects of the rulings for the regulation of GHGs are not entirely clear, as EPA is "currently evaluating the implications" of the decision.[99] As of this writing, the U.S. Court of Appeals for the D.C. Circuit had yet to remand or vacate specific provisions of the tailoring rule based on the Supreme Court's decision. EPA, however, has already begun the process of applying the Supreme Court's decision by, for example, indicating that it will initiate a rulemaking that would allow it to rescind PSD permits that are no longer appropriate.[100]

The Court's ruling appears to prevent EPA from regulating GHGs from CAFOs under the PSD program unless the operations already are regulated under the program on the basis of their criteria pollutant emissions. A discussion of the number of CAFOs that potentially could be permitted under the PSD program and the efforts to date to do so is beyond the scope of this chapter.[101] Nevertheless, opportunities exist for animal protection and envi-

96. Utility Air Regulatory Group v. EPA, 134 S. Ct. 2427, 2432 (2014).
97. *Id.* at 2442.
98. *Id.* at 2446.
99. U.S. EPA, *Clean Air Act Permitting for Greenhouse Gases*, http://www.epa.gov/nsr/ghgpermitting.html (last visited May 3, 2015).
100. Memorandum from Cynthia Giles, Assistant Administrator for Enforcement & Compliance Assurance, U.S. EPA, to Janet McCabe, Acting Assistant Administrator, Office of Air & Radiation Regional Administrators, Regions I-X, at 2 (Dec. 19, 2014), *available at* http://www.epa.gov/nsr/ghgdocs/OECANoActionAssuranceMemo_December192014.pdf.
101. Historically, animal agriculture operations have not been regulated under the Clean Air Act in part because of failure to meet the emissions thresholds for major sources. As operations have become larger, it has become more likely that that some operations meet the emissions thresholds for major sources. Angelo et al., *infra* note 105, at 178. However, as the Congressional Research Service explains, "federal and state officials generally have placed a low priority on regulating agricultural sources." Claudia Copeland, Air Quality Issues and Animal Agriculture: A Primer 11 (Dec. 22, 2014). In fact, a key challenge in permitting animal agriculture has been lack of emissions data. In 2005, EPA entered into a consent agreement with a substantial portion of the CAFO industry under which EPA agreed to refrain from bringing certain enforcement actions against the participating companies in exchange for air quality monitoring data. EPA planned to use the data to develop emission estimating methods that could be used by animal feed operations to estimate their emissions and comply with regulatory requirements. To date, those methods have not been issued and the quality and range of data collected has been criticized. *See* Angelo et al., *infra* note 105, at 175-76; Claudia Copeland, Air Quality Issues and Animal Agriculture: EPA's Air

ronmental groups to continue to encourage regulation of CAFOs under the PSD program—now as a means of controlling not only emissions of criteria pollutants, but also GHGs.

NSPS. Under §111(b) of the Clean Air Act, EPA can establish federal emission levels on the basis of source categories. EPA must find that the source category "causes, or contributes significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare."[102] EPA can establish a "standard of performance" for any pollutant from that source category that is based on the "best system of emission reduction."[103] EPA standards for new and modified sources can be delegated to the states to implement and enforce. In addition, EPA can require states to submit plans for establishing, implementing, and enforcing standards for existing sources under §111(d).[104] The standards can be developed only for pollutants: (1) for which there is a standard of performance for new stationary sources; and (2) that are not covered by the NAAQS or Hazardous Air Pollutant programs.[105] State plans are subject to EPA review and EPA may issue a federal plan if a state plan is unsatisfactory.

New Source Performance Standards under both §111(b) and §111(d) could be used to regulate GHG emissions from CAFOs. To regulate new sources, EPA would have to find that CAFOs, as a source category, cause or contribute significantly to air pollution "which may reasonably be anticipated to endanger public health or welfare."[106] EPA could then establish a "standard of performance" for GHGs based on the "best system of emission reduction."[107]

In addition, EPA could require states to set standards for existing CAFO sources of GHG emissions under §111(d) if it already has set a standard for new CAFOs under §111(b), and provided EPA still has not regulated GHGs under the NAAQS or Hazardous Air Pollutant programs.[108] States would

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Compliance Agreement (Aug. 18, 2014), *available at* http://nationalaglawcenter.org/wp-content/uploads/assets/crs/RL32947.pdf.

102. 42 U.S.C. §7411(b)(1)(A).
103. *Id.* §7411(a)(1).
104. *Id.* §7411(d); 40 C.F.R. pt. 60.20-60.29 (2015).
105. 42 U.S.C. §7411(d)(1)(A); *see* Mary Jane Angelo, Jason J. Czarnezki & William S. Eubanks II, Food, Agriculture, and Environmental Law 167 (2013); Richardson et al., *supra* note 67, at 18.
106. 42 U.S.C. §7411(b)(1)(A).
107. *Id.* §7411(a)(1). This section also provides that best systems of emission reductions must be adequately demonstrated and take into account the costs of achieving the reductions and non-air quality health and environmental impacts, as well as energy requirements.
108. *Id.* §7411(d)(1)(A). The House version of the subsection includes a requirement that in addition to the pollutant, the source category cannot be regulated under the Hazardous Air Pollutant program. The conference report did not clarify the discrepancy. In any event, if CAFOs are not regulated for

then have to submit plans for establishing, implementing, and enforcing such standards.[109] State plans would be subject to EPA review and EPA could issue a federal plan if a state plan is unsatisfactory.

To date, EPA's only effort to regulate GHG emissions under the NSPS program is reflected in its proposed rules for power plants.[110] The proposed rules, which already face legal challenges from a dozen states,[111] would create a new source performance standard for CO_2 emissions for fossil fuel-fired plants, establish state-specific emission rate-based goals to curb CO_2 emissions from existing facilities, and set guidelines for development, submission, and implementation of state plans under §111(d).[112]

In 2009, the Humane Society of the United States, along with several other groups, including environmental organizations, petitioned EPA to add CAFOs to the list of sources regulated under §111(b) and (d), on the grounds that they are stationary sources that cause or contribute significantly to air pollution, including GHGs, which can endanger public health and welfare.[113] They also argued that regulation of CAFOs for GHGs and other pollutants was "effective and feasible" and would ensure that mitigation technologies are used.[114] EPA failed to respond to the petition, and in 2015 the groups filed a federal lawsuit to compel EPA to respond.[115]

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emissions of hazardous air pollutants, the discrepancy is irrelevant. Robert R. Nordhaus & Ilan W. Gutherz, *Regulation of* CO_2 *Emissions From Existing Power Plants Under Section 111(d) of the Clean Air Act: Program Design and Statutory Authority*, 44 ELR 10366, 10376 (May 2014).

109. 42 U.S.C. §7411(d)(1)(B); 40 C.F.R. pt. 60.20-60.29 (2015); Nordhaus & Gutherz, *supra* note 108; Angelo et al., *supra* note 105, at 167; Richardson et al., *supra* note 67, at 18.

110. Standards of Performance for Greenhouse Gas Emissions From New Stationary Sources: Electric Utility Generating Units, 79 Fed. Reg. 1429 (proposed Jan. 8, 2014); Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, 79 Fed. Reg. 34829 (proposed June 18, 2014); Carbon Pollution Standards for Modified and Reconstructed Stationary Sources: Electric Utility Generating Units, 79 Fed. Reg. 34960 (proposed June 18, 2014).

111. *E.g.*, West Virginia et al. v. EPA, No. 14-1146 (D.C. Cir. Nov. 26, 2014) (challenging EPA's authority to regulate existing power plants under §111(d) when the agency already regulates such plants under §112). Members of Congress have also publicly urged states to fight the regulations by refusing to develop and submit state plans. *See* Coral Davenport, *McConnell Urges States to Defy U.S. Plan to Cut Greenhouse Gas*, N.Y. Times, Mar. 4, 2015, http://www.nytimes.com/2015/03/05/us/politics/mcconnell-urges-states-to-defy-us-plan-to-cut-greenhouse-gas.html?_r=0.

112. *See* U.S. EPA, *FACT SHEET: Clean Power Plan & Carbon Pollution Fact Sheet*, http://www2.epa.gov/carbon-pollution-standards/fact-sheet-clean-power-plan-carbon-pollution-standards-key-dates (last visited May 3, 2015).

113. Pet. to List Concentrated Animal Feeding Operations Under Clean Air Act Section 111(B)(1)(A) of the Clean Air Act, and to Promulgate Standards of Performance Under Clean Air Act Sections 111(B)(1)(B) and 111(D) at 3, Humane Soc'y of the United States et al. v. Lisa Jackson (Sept. 21, 2009), *available at* http://www.humanesociety.org/assets/pdfs/litigation/hsus-et-al-v-epa-cafo-caa-petition.pdf.

114. *Id.* at 63.

115. Complaint for Declaratory and Injunctive Relief, Humane Soc'y of the United States v. Regina McCarthy, Civil Action No. 15-cv-0141 (D.D.C. Jan. 28, 2015).

Efforts in this area are likely to continue as many commentators contend that NSPS is the best way to regulate greenhouse gases generally under the Clean Air Act[116] and specifically greenhouse gases from CAFOs.[117] The prospects of using NSPS for regulating greenhouse gas emissions from CAFOs may become clearer as the NSPS for power plants are finalized and ultimately reviewed in the courts.

b. Legislative Reforms

Various bills have been introduced in Congress over the years seeking to respond in a comprehensive way to the climate crisis. None has succeeded, though a so-called cap-and-trade bill made it further than any other contender. Following is a brief discussion of that mechanism and the carbon tax, the two approaches that currently have the broadest appeal.

Cap-and-trade legislation for GHG emissions. A cap-and-trade program, or emissions trading program, establishes a limit, or "cap," on total emissions. Covered sources are granted allowances to emit up to a certain level, with the total of all allowances remaining under the cap. Sources make their own decisions as to how to satisfy their emissions requirements, which may include using pollution controls, increasing efficiencies, or engaging in the purchase or sale of allowances. Typically the cap is ratcheted down over time. This type of market-based approach, which was first used federally to address acid rain, is intended to allow flexibility and maximize efficiency across the overall system.[118] This legislative approach was pursued and failed in the federal climate context just over five years ago. The American Clean Energy and Security Act of 2009 (popularly known by its acronym, ACES, or as Waxman-Markey, for its sponsors)[119] would have established an economy-wide cap-and-trade program for GHGs in lieu of relying on the existing provisions in the CAA to address these pollutants. Waxman-Markey passed the U.S. House of Representatives in 2009, but its

116. *See* Richardson et al., *supra* note 67, at 18.
117. Angelo et al., *supra* note 105, at 167 (NSPS could cover many pollutants; cover all sizes of facilities, not just major sources; and set a national standard [for new facilities] rather than state-by-state regulations); Nicholas Hoover, *Can't You Smell That Smell? Clean Air Act Fixes for Factory Farm Air Pollution*, 6 Stan. J. Animal L. & Pol'y 1, 28 (2013) (NSPS would be a "flexible, comprehensive and effective way" to regulate air emissions, including greenhouse gases).
118. *See*, *e.g.*, U.S. EPA, *Cap and Trade—Basic Information*, http://www.epa.gov/captrade/basic-info.html (last visited May 3, 2015); Tom Mounteer, Climate Change Deskbook 60-62 (2009).
119. American Clean Energy and Security Act of 2009, H.R. 2454, 111th Cong. (2009).

counterpart legislation[120] died in the Senate in 2010, marking a resounding defeat for national climate legislation.[121]

Of particular interest with respect to Waxman-Markey is that the bill, as it passed the House, would have not only excluded animal agriculture sources from coverage under the emissions "cap," but it would have also created a carbon offset credit program under which the agricultural sector could earn income by selling its emission reductions.[122] Strikingly, this bill would have assigned oversight of the agricultural offset program to the U.S. Department of Agriculture (USDA) rather than to EPA.[123] Notwithstanding these substantial concessions to the agricultural industry, major agricultural interests opposed the bill.[124]

Carbon tax. Some form of a "carbon tax" or GHG emissions fee is another way to address climate change that has garnered considerable legislative attention. Many economists view it as the optimal way to mitigate climate change.[125] Among the issues that would need to be resolved under a carbon tax scheme is the proper point of taxation—e.g., should the tax be on GHG emissions, or on the inputs that result in the emissions? Other key considerations would include the rate of taxation and the use of revenues generated. In 2013, several lawmakers floated a "discussion draft" of a federal bill that would require large emitters to pay for carbon pollution.[126] For purposes of animal agriculture, the critical question is whether CAFO-related GHG emissions would be subject to the tax—much as the core question with respect to cap-and-trade is whether CAFO-related emissions come under the cap. According to the Center for Climate and Energy Solutions:

120. Clean Energy Jobs and American Power Act, S. 1733, 111th Cong. (2009).
121. For a discussion of these bills' movement through Congress in 2009/2010, see Copeland (Dec. 22, 2014), *supra* note 101, at 25-26.
122. *Id*. at 26.
123. *See generally* Renee Johnson, Agriculture and Forestry Provisions in Climate Legislation in the 111th Congress (Dec. 23, 2009).
124. *E.g.*, American Farm Bureau Federation, *Climate Bill Embarks on a Fool's Errand*, July 14, 2009, http://www.fb.org/index.php?fuseaction=newsroom.newsfocus&year=2009&file=nr0714.html.
125. *E.g.*, *Carbon Tax*, IGM Forum, Dec. 20, 2011, http://www.igmchicago.org/igm-economic-experts-panel/poll-results?SurveyID=SV_9Rezb430SESUA4Y (reporting that 90% of expert economists empaneled by the Initiative on Global Markets agreed that "[a] tax on the carbon content of fuels would be a less expensive way to reduce carbon-dioxide emissions than would a collection of policies such as 'corporate average fuel economy' requirements for automobiles").
126. The discussion draft was released by Rep. Henry A. Waxman (D-Cal.), Sen. Sheldon Whitehouse (D-R.I.), Rep. Earl Blumenauer (D-Or.), and Sen. Brian Schatz (D-Haw.). *See* Press Release, Waxman, Whitehouse, Blumenauer, and Schatz Release Carbon Price Discussion Draft (Mar. 12, 2013), *available at* http://www.whitehouse.senate.gov/news/release/waxman-whitehouse-blumenauer-and-schatz-release-carbon-price-discussion-draft-.

> A truly comprehensive and cost-effective carbon tax would target greenhouse gas emissions beyond CO_2 from energy-related activities. There are non-energy sources of CO_2 emissions, including land-use emissions from agriculture . . . . Emissions of other greenhouse gases like methane and nitrous oxide arise in the agricultural [and other] sectors as well as from land-use activities and can be measured and taxed in terms of their CO_2 equivalence.[127]

2. State and Regional

To date, no states have regulated methane emissions from CAFOs. California is taking positive steps. Under California's Global Warming Solutions Act (AB 32) initial Scoping Plan, installation of manure digesters was included as a voluntary measure for the agricultural sector. In its 2013 update of the Scoping Plan, CARB noted that manure digesters were not installed at the rate expected due to a variety of hurdles, such as economic recession and increased food and fuel prices.[128] The update explained that the Board will continue to work with stakeholders to decide "whether and how the program should become mandatory and/or more strongly incentivized."[129] In addition, offset credits can be generated by livestock operations for manure biogas control systems at dairy cattle and swine farms. The Compliance Offset Protocol for Livestock Projects sets out methods for measuring and reporting reductions.[130] Additionally, California's legislature has charged CARB with developing a comprehensive strategy to reduce emissions of short-lived GHGs, like methane.[131] The state is receiving a push from animal advocates: in 2014, an animal protection organization filed a Petition for Rulemaking with CARB, arguing that animal agriculture should be included in the state's cap-and-trade system for GHGs.[132]

Regional cap-and-trade programs to control GHG emissions provide another potential opportunity to address methane from CAFOs. For exam-

127. Center for Climate & Energy Solutions, Options and Considerations for a Federal Carbon Tax 6 (Feb. 28, 2013), *available at* http://www.c2es.org/docUploads/options-considerations-federal-carbon-tax.pdf.

128. Governor Edmund G. Brown Jr. et al., First Update to the Climate Change Scoping Plan: Building on the Framework 57 (May 2014), *available at* http://www.arb.ca.gov/cc/scopingplan/2013_update/scoping_plan_mobile.pdf.

129. *See id.*

130. Air Res. Bd., Cal. Envtl. Prot. Agency, *Compliance Offset Protocol Livestock Projects*, http://www.arb.ca.gov/cc/capandtrade/protocols/livestock/livestock.htm (last visited May 3, 2015).

131. This strategy is due by Jan. 2016. S.B. 605, 2013/2014 Leg. (Cal. 2014) (codified at Cal. Health & Safety Code §39730). CARB has released a Short-Lived Climate Pollutant Reduction Strategy concept paper that expressly identifies agricultural methane emissions from California's dairy industry as a key area of concern in formulating the strategy. The concept paper is available at http://www.arb.ca.gov/cc/shortlived/concept_paper.pdf (last visited May 22, 2015).

132. *See* Pet. by Animal Legal Def. Fund before Cal. Air Res. Bd., *supra* note 65.

ple, the Regional Greenhouse Gas Initiative (RGGI) is a market-based regulatory program among nine Northeastern states aimed at reducing CO_2 from the power sector.[133] Although animal agriculture is not covered by the program, compliance can be achieved in part through offsets—projects outside the power sector that reduce CO_2e.[134] Anaerobic digester projects that capture and destroy methane from manure management systems can be used as offsets.[135]

Environmental and animal protection lawyers could further explore whether and to what extent state programs such as AB 32 and regional programs such as RGGI could be modified or expanded to cover CAFO methane emissions.

C. Incentives and Subsidies

1. Federal

The White House issued a federal methane strategy in 2014 that addresses agricultural emissions "exclusively" through voluntary, nonregulatory actions—principally by targeting the increased adoption of biogas systems/methane digesters.[136] This strategy seeks to incentivize the use of anaerobic digesters to capture methane from manure management systems and convert it to biogas, a renewable energy source.[137] Biogas, which typically consists of 50-70% methane, can be used onsite to power farms or it can be sold for use offsite.[138] The process can also produce nutrient-rich soil amendments that can be used onsite or sold.[139]

From an environmental perspective, anaerobic digesters reduce GHG emissions as compared to the status quo, but from an animal welfare perspective may be at best neutral. Far from discouraging the intensive confinement

133. Regional Greenhouse Gas Initiative, *available at* http://www.rggi.org.
134. Regional Greenhouse Gas Initiative, *CO_2 Offsets*, http://www.rggi.org/market/offsets (last visited May 3, 2015).
135. Air Res. Bd., Cal. Envtl. Prot. Agency, Compliance Offset Protocol Livestock Projects: Capturing and Destroying Methane From Manure Management Systems 5 (Oct. 20, 2011), *available at* http://www.arb.ca.gov/regact/2010/capandtrade10/coplivestockfin.pdf.
136. The White House, Climate Action Plan— Strategy to Reduce Methane Emissions 6 (Mar. 2014), *available at* http://www.whitehouse.gov/sites/default/files/strategy_to_reduce_methane_emissions_2014-03-28_final.pdf.
137. *Id.*
138. *See* U.S. Dep't of Agric., U.S. EPA & U.S. Dep't of Energy, Biogas Opportunities Roadmap: Voluntary Actions to Reduce Methane Emissions and Increase Energy Independence 6 (Aug. 2014), *available at* http://www.usda.gov/oce/reports/energy/Biogas_Opportunities_Roadmap_8-1-14.pdf.
139. *See id.*

of animals that lies at the heart of concerns over animal welfare, digesters are associated with large CAFOs. They typically require taxpayer support to be viable, and they address only a portion of the methane emissions resulting from livestock production.[140] Yet the adoption of digesters can be perceived as a feel-good solution to GHG emissions from animal agriculture, which may distract from other impacts of this production model on animal welfare, public health, and the environment—or even suggest that a large CAFO is "green." Nevertheless, because incentivizing the use of digesters *is* a focal point of the federal government's efforts to address climate change impacts of CAFOs, the approach warrants a brief discussion.

The White House Climate Action Plan—Strategy to Reduce Methane Emissions provides that "USDA and EPA will also continue to support biodigester technology deployment by providing financial and technical assistance through voluntary programs."[141] Pursuant to the Strategy, in 2014, USDA, EPA, and the U.S. Department of Energy (DOE) released a Biogas Roadmap, which sets out federal actions to foster biogas development and reduce methane emissions through voluntary actions.[142]

According to the Roadmap, there is tremendous potential for additional biogas systems.[143] The Roadmap estimates that there are currently 239 manure-based biogas systems in the United States,[144] but with "proper support" there could be as many as 8,241 systems that could generate enough energy to power over 1,000,000 homes.[145]

The Roadmap outlines the challenges of increasing biogas, including the high upfront capital costs and the developing market for biogas products, and seeks to promote biogas usage in a variety of ways. These include government actions to "promote biogas utilization through existing programs, foster investment and strengthen markets for biogas systems and products, and improve coordination and communication."[146]

In promoting biogas in existing programs, the Roadmap points to numerous USDA programs and some EPA programs, as well as federal financial incentives.[147] Specifically, several EPA and USDA programs include incen-

140. Enteric fermentation represents a much larger share of methane emissions than manure management. *See* Miller et al., *supra* note 27*; see generally* DiCamillo, *supra* note 39 (critiquing methane digesters as an expensive, and at best, partial solution to CAFO GHG emissions).
141. Climate Action Plan, *supra* note 136, at 2.
142. *Id.* at 6; U.S. Dep't of Agric., U.S. EPA & U.S. Dep't of Energy, *supra* note 138.
143. Roadmap, *supra* note 138, at 17.
144. *Id.* at 17.
145. *Id.* at 4, 17.
146. *Id.* at 21.
147. *Id.*; *see also* News Release, FACT SHEET: Biogas Opportunities Roadmap: Voluntary Actions to Reduce Methane Emissions, Increase Energy Independence and Grow the Economy (Aug. 1, 2014), *available*

tives for renewable energy projects in the agriculture sector. For example, according to USDA, from 2003 to 2012 it awarded over $40 million in funding for anaerobic digesters through the Farm Bill's Rural Energy for America Program, including funds for feasibility studies on cost-effective renewable energy measures for producers and small businesses, commercial financing of renewable energy projects through loan guarantees, and grants to purchase and install renewable energy projects.[148] It also awarded funds through the Environmental Quality Incentives Program, Conservation Innovation Grants, and Value Added Producer Grants programs, among others.[149] EPA does not provide direct grants to agricultural operations, but its AgSTAR program[150] encourages the development and adoption of anaerobic digester systems for CAFOs by providing outreach, information, and tools to livestock operators.[151]

2. States

Many states provide incentives for anaerobic digesters for CAFOs. For example, Minnesota's Methane Digester Loan Program provides zero-interest loans to eligible livestock operations.[152] The state also offers a payment of 1.5 cents per kilowatt hour of electricity generated from anaerobic digesters on farms.[153] Numerous other states have incentive pro-

at http://www.usda.gov/wps/portal/usda/usdahome?contentidonly=true&contentid=2014/08/0166.xml.

148. *See* AgSTAR & U.S. Dep't of Agric., Funding Programs for Developing Anaerobic Digestion Systems (June 2012), *available at* http://www.epa.gov/agstar/documents/agstar_federal_incentives.pdf.
149. *See id.* In addition, the federal government provides methane-related tax incentives to produce electricity from captured methane, to build facilities to produce electricity from methane, and to produce alternative fuels from methane. Kelsi Bracmort et al., Methane Capture: Options for Greenhouse Gas Emission Reduction 14-15 (Jan. 7, 2011), *available at* http://fas.org/sgp/crs/misc/R40813.pdf.
150. AgSTAR, *Frequent Questions About AgSTAR*, http://www.epa.gov/agstar/anaerobic/faq.html#aboutagstar (last visited May 3, 2015).
151. *Id.*
152. DSIRE, *Minnesota—Methane Digester Loan Program*, http://programs.dsireusa.org/system/program/detail/2716 (last visited May 3, 2015).
153. U.S. EPA, *Renewable Energy Production Incentives*, http://www.epa.gov/osw/hazard/wastemin/minimize/energyrec/rpsinc.htm (last visited May 3, 2015).

grams, including but not limited to Illinois,[154] Vermont,[155] New York,[156] Washington,[157] and Texas.[158]

In sum, incentives exist for development of anaerobic digesters that may contribute to the reduction of GHG emissions from CAFOs. Animal protection advocates often do not support public policy subsidizing the use of methane digesters for large CAFOs because it has the effect of promoting the CAFO model. Nevertheless, given that digesters are integral to current federal and state approaches to addressing methane, animal lawyers should be aware of these initiatives.

IV. Moving Forward

The obstacles to near-term legal reform in the area of CAFOs and climate change are legion. Any concerted legal or policy effort to roll back GHG emissions associated with industrial livestock production in the United States will likely be greeted by a mix of ambivalence and active resistance.[159] Absent broader public awareness of the underlying problem, it will be difficult to persuade lawmakers, regulators, or even judges to support change. And spirited resistance to any new form of environmental regulation for agricultural

154. *See*, *e.g.*, Ill. Dep't of Commerce & Econ. Opportunity, *Biogas and Biomass to Energy Grant Program*, http://www.illinois.gov/dceo/whyillinois/KeyIndustries/Energy/Pages/02-BiogasBioMass.aspx (last visited May 3, 2015) (noting that "anaerobic digestion technologies are being targeted" for state grants).

155. *See*, *e.g.*, Vt. Pub. Serv. Dep't, *Funding Opportunities*, http://publicservice.vermont.gov/topics/renewable_energy/cedf/funding#grants (last visited May 3, 2015) (reporting that "a 2014 Clean Energy Development Fund grant to the Farm Energy Initiative will provide $350,000 to support the use of pre- and/or post-consumer food waste in farm based anaerobic digesters"). *See also* Vt. Econ. Dev. Auth., *Agricultural Energy Loan Program*, http://www.veda.org/financing-options/vermont-agricultural-financing/agricultural-energy-loan-program/ (last visited May 3, 2015).

156. *See*, *e.g.*, N.Y. State Energy Research & Dev. Auth., *PON 2828 Renewable Portfolio Standard Customer-Sited Tier Anaerobic Digester Gas-to-Electricity*, http://www.nyserda.ny.gov/Funding-Opportunities/Current-Funding-Opportunities/PON-2828-Renewable-Portfolio-Stand-Customer-Sited-Tier-Anaerobic-Digester-Gas-to-Electricity (last visited May 3, 2015) ("Approximately $20.4 million in New York State Renewable Portfolio Standard (RPS) funding is available through 2015 to support the installation and operation of Anaerobic Digester Gas (ADG)-to-Electricity Systems in New York State.").

157. *See*, *e.g.*, Wash. Rev. Code §82.08.900 (2006) (providing retail sales tax exemption for "sales to an eligible person establishing or operating an anaerobic digester or to services rendered in respect to installing, constructing, repairing, cleaning, altering, or improving an anaerobic digester, or to sales of tangible personal property that becomes an ingredient or component of the anaerobic digester" if the anaerobic digester is "used primarily to treat livestock manure").

158. St. Energy Conservation Office, *Funding and Incentives*, http://seco.cpa.state.tx.us/funding/ (last visited May 3, 2015) (noting Texas has established a state property tax exemption for businesss' installation or construction of anaerobic digestion systems).

159. *See* Bailey et al., *supra* note 18, at 14-16.

activities can be expected from the affected industries[160] and from many political quarters.[161]

Despite the legal and practical hurdles to addressing GHG emissions from industrial meat and dairy production, there is reason for optimism on the animal welfare front. Climate change itself is receiving unprecedented public attention, creating new openings to discuss the role of industrial livestock production as a contributor to GHG emissions and new opportunities to discuss the welfare of animals that exist at the heart of the contemporary food production system. Also, the importance of reduced meat and dairy consumption as part of the climate puzzle is increasingly being highlighted by scientists and other experts,[162] and people are being challenged to eat in more climate-friendly ways.[163] These factors are dovetailing and can help to set the stage for meaningful legal action on climate change.

160. *See*, *e.g.*, discussion of failed federal climate cap-and-trade bill at *supra* notes 118-124 and accompanying text.

161. For example, in response to the Obama Administration's issuance of a voluntary "Strategy to Reduce Methane Emissions" in Mar. 2014 as part of the administration's Climate Action Plan, more than a dozen U.S. senators wrote to USDA, DOE, and EPA to seek a written commitment "to refrain from proposing new regulations, guidelines, or other mandatory requirements on methane or other GHGs from the agriculture industry." Letter from Sen. John Thune to Secretary Tom Vilsack et al. (Apr. 10, 2014).

162. *See*, *e.g.*, Fredrik Hedenus et al., *The Importance of Reduced Meat and Dairy Consumption for Meeting Stringent Climate Change Targets*, 124 Climatic Change 79, 88-89 (Mar. 28, 2014) ("[D]eep cuts in emissions from food and agriculture do not seem plausible without large changes in consumption towards less GHG intensive food, in particular less ruminant meat and dairy. . . . [D]ietary changes are crucial for meeting the 2° C [climate change] target with high probability."); Annika Carlsson-Kanyama & Alejandro Gonzalez, *Potential Contributions of Food Consumption Patterns to Climate Change*, 89 Am. J. Clinical Nutrition 1704S, 1707S (Apr. 1, 2009) ("The analysis shows that changes toward a more plant-based diet could help substantially in mitigating emissions of GHGs. Unfortunately, this is a largely unexplored area of climate policy."). *See also* Bailey et al., *supra* note 18, at 12 (summarizing additional recent studies addressing meat and dairy consumption as key to mitigation of agricultural GHGs). In sum, "almost every study recognizes that solving the environmental problems caused by livestock farming will require reducing the demand for animal products." U.N. General Assembly, Doc. No. A/HRC/25/27, Report of the Special Rapporteur on the Right to Food 9 (Jan. 24, 2014).

163. For example, the public is hearing calls to cut back on personal consumption of meat and dairy; to avoid industrial meat and dairy; to follow a diet that minimizes the consumption of ruminant and other climate-unfriendly meat relative to other sources of protein; to eliminate animal-based food product waste; or to take a combination of these actions. *See*, *e.g.*, Gidon Eshel et al., *Land, Irrigation Water, Greenhouse Gas, and Reactive Nitrogen Burdens of Meat, Eggs, and Dairy Production in the United States*, *in* Proceedings of the National Academy of Sciences (Aug. 19, 2014) (discussing GHG and other environmental burdens of beef as compared to other livestock categories); Dana Gunders, Natural Res. Def. Council, NRDC Issue Paper 12-06-B, Wasted: How America Is Losing Up to 40 Percent of Its Food From Farm to Fork to Landfill (Aug. 2012) (U.S. food loss due to waste may be 40%); U.N. Food & Agric. Org., Global Food Losses and Food Waste—Extent, Causes, and Prevention 4 (2011) (globally, about one-third of food produced for human consumption is lost or wasted); *Cool Foods Campaign*, *supra* note 41; Environmental Working Group, *Meat Eater's Guide: Report*, http://www.ewg.org/meateatersguide/eat-smart/ (last visited May 3, 2015); The Monday Campaigns, Inc., *Meatless Monday*, http://www.meatlessmonday.com (last visited May 3, 2015).

Also, notwithstanding the serious near-term obstacles to change, there is a growing sense that climate legislation, in some guise and at some point in time, is inevitable. Even oil companies are now accounting internally for the price of carbon, suggesting an awareness that climate policy is evolving to the point where emitters are asked to accept financial responsibility for GHG emissions.[164] Given that the overwhelming policy emphasis has been on addressing emissions due to the burning of fossil fuels, animal lawyers may want to assume a leading role in articulating why, and how, agricultural emissions of methane and nitrous oxide drive anthropogenic climate change and how the law should be used to mitigate these emissions. Indeed, as discussed in this chapter, an encouraging—and accelerating—flurry of activity around methane at the state and federal levels over the past several years demonstrates a heightened awareness of this set of problems. There is increased evidence both of policymakers' willingness to act and of animal and environmental organizations' willingness to press for such action.

Conclusion

Unlike most sub-fields of environmental law, where the legal and regulatory architecture was built in the 1970s and 1980s, the story of climate law—much like the field of animal law itself—is still being written. Even if meaningful legal reform remains years away, animal lawyers have the opportunity to secure a seat at the table right now to ensure a voice for animal welfare, on the most important environmental issue of our time.

164. *See*, *e.g.*, Mark Schapiro & Jason Scorse, *Oil Companies Quietly Prepare for a Future of Carbon Pricing*, Yale Env't 360, Sept. 23, 2014, http://e360.yale.edu/feature/oil_companies_quietly_prepare_for_a_future_of_carbon_pricing/2807/.