INTEGRATING FOOD INTO LOCAL CLIMATE POLICY

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In the United States, governmental efforts to limit climate change have largely focused on reducing greenhouse gas (GHG) emissions from transportation and electricity, the top two sources of GHG emissions on a national level. With a few notable exceptions, American governmental entities have paid much less attention to reducing GHG emissions from agriculture or food. These are overlapping sources of emissions because many agricultural emissions are released through the process of making food for human consumption.

This Article argues that local governments are well-positioned to add food policy more squarely to their climate policy toolkit and, perhaps in so doing, to broaden the agenda of climate policy to incorporate more food policy measures. In addition, we endorse a modest, but potentially important, step which cities could take to help make the case for integrating food policy into climate policy: estimating, on a regular basis, the GHG emissions from food procured by city governments for city-funded facilities such as schools, hospitals, homeless shelters, and jails. Better data on the contributions of city government-funded consumption of food to GHG emissions might help more people understand the climate costs of food choices and set the stage for more governmental efforts to reduce GHG emissions from

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agriculture and food as part of climate mitigation. More immediately, better data would provide a basis for cities to commit to reducing GHG emissions from their food purchases and tracking whether they are meeting these GHG reduction commitments.

INTRODUCTION

In the United States, governmental efforts to limit climate change have largely focused on reducing greenhouse gas (GHG) emissions from transportation and electricity, the top two sources of national GHG emissions.[1] With a few notable exceptions, governments have paid much less attention to reducing GHG emissions from agriculture or food.[2] These are overlapping sources of GHG emissions; many emissions could be labeled either "food" or "agricultural" emissions because many agricultural emissions are released in making food for humans. In particular, the production of meat and dairy products for

1. ENVT'L PROT. AGENCY, INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS ES-26 tbl. ES-6 (2021) [hereinafter INVENTORY], https://www.epa.gov/sites/default/files/2021-04/documents/us-ghg-inventory-2021-main-text.pdf?VersionId=UUA7i8WoMDBOc0M4ln8WVXMgn1GkujvD. [https://perma.cc/E9PZ-W3JK.]

2. PETER H. LEHNER & NATHAN A. ROSENBERG, FARMING FOR OUR FUTURE: THE SCIENCE, LAW, AND POLICY OF CLIMATE-NEUTRAL AGRICULTURE 3, 7 (2021). *See also* OECD, Climate Change and Food Systems, https://www.oecd.org/agriculture/topics/climate-change-and-food-systems/ ("Emission reductions from food production have so far received less attention in GHG mitigation policies than those from energy, transport and other industrial sectors; consequently emissions from agriculture could become the dominant source of global emissions by mid-century.").

human consumption constitutes a significant share of agricultural emissions.[3] Emissions from agriculture and food could be reduced upstream, meaning at the farm where food is produced, or downstream, by persuading people living in urban areas to change the food that they eat and to waste less food.[4]

From one perspective, the limited governmental focus on agricultural and food policy as climate policy is surprising. The Intergovernmental Panel on Climate Change and the World Resources Institute have both published reports in recent years emphasizing the significance of agriculture and food as sources of GHG emissions.[5] Internationally, agriculture accounts for 25% of GHG emissions; in the U.S., agriculture is the fifth largest source of emissions, accounting for 10%

3. *See* Lisa Friedman, Kendra Pierre-Louis & Somini Sengupta, *The Meat Question, by the Numbers*, N.Y. TIMES (Jan. 25, 2018), https://www.nytimes.com/2018/01/25/climate/cows-global-warming.html ("In the United States, 42 percent of agricultural emissions come from animal agriculture. Two-thirds of those gases are directly emitted by ruminants: animals like cows, buffalo and sheep that use bacteria in their stomachs to ferment food."); Oliver Lazarus, Sonali McDermid & Jennifer Jacquet, *The Climate Responsibilities of Industrial Meat and Dairy Producers*, 165 CLIMATIC CHANGE 1, 18 (2021) ("beef production" is 40% of U.S. agricultural emissions and roughly 3.7% of total U.S. GHG emissions); Janet Ranganathan, Daniel Vennard, Richard Waite, Patrice Dumas, Brian Lipinski, Tim Searchinger & Globagri-WRR Model Authors, *Shifting Diets For a Sustainable Food Future, Creating a Sustainable Food Future* (World Res. Inst., Working Paper, 2016), https://files.wri.org/d8/s3fs-public/Shifting_Diets_for_a_Sustainable_Food_Future_1.pdf. *See also infra* notes 25-32 and accompanying text.

4. *Food Waste FAQs,* U.S. DEP'T OF AGRIC., https://www.usda.gov/foodwaste/faqs (last visited Feb. 15, 2022) [https://perma.cc/XC3D-Z5R3] ("In the United States, food waste is estimated at between 30–40 percent of the food supply."). *See also infra* note 35.

5. CHEIKH MBOW, CYNTHIA ROSENZWEIG, LUIS G. BARIONI, TIM G. BENTON, MARIO HERRERO, MURUKESAN KRISHNAPILLAI, EMMA LIWENGA, PRAJAL PRADHAN, MARTA G. RIVERA-FERRE, TEK SAPKOTA, FRANCESCO N. TUBIELLO & YINLONG XU, *Food Security*, *in* CLIMATE CHANGE AND LAND: AN IPCC SPECIAL REPORT ON CLIMATE CHANGE, DESERTIFICATION. LAND DEGRADATION, SUSTAINABLE LAND MANAGEMENT, FOOD SECURITY, AND GREENHOUSE GAS FLUXES IN TERRESTRIAL ECOSYSTEMS (Noureddine Benkeblia et al. eds., 2019) [hereinafter IPCC FOOD SECURITY]; TIM SEARCHINGER, RICHARD WAITE, CRAIG HANSON & JANET RANGANATHAN, WORLD RES. INST., CREATING A SUSTAINABLE FOOD FUTURE: A MENU OF SOLUTIONS TO FEED NEARLY 10 BILLION PEOPLE BY 2050 (2018). *See also* BRENT LOKEN, JEFF OPPERMAN, STUART ORR, MARTINA FLECKENSTEIN, SARAH HALEVY, PETER MCFEELY, SARAH PARK & CHRISTOPHER WEBER, WORLD WILDLIFE FUND, BENDING THE CURVE: THE RESTORATIVE POWER OF PLANET-BASED DIETS (2020), https://files.worldwildlife.org/wwfcmsprod/files/Publication/file/7b5iok5vqz_Bending_the_Curve__The_Restorative_Power_of_Planet_Based_Diets_FULL_REPORT_FINAL.pdf.pdf; TIM G. BENTON, CARLING BIEG, HELEN HARWATT, ROSHAN PUDASAINI & LAURA WELLESLEY, CHATHAM HOUSE, FOOD SYSTEM IMPACTS ON BIODIVERSITY LOSS: THREE LEVERS FOR FOOD SYSTEM TRANSFORMATION IN SUPPORT OF NATURE (2021), https://www.chathamhouse.org/2021/02/food-system-impacts-biodiversity-loss; LEHNER & ROSENBERG, *supra* note 2.

of national emissions in 2019 (compared with 29% from transportation and 25% from electricity).[6] However, from other perspectives, the limited attention paid to agriculture and food as part of climate policy is par for the course. The agricultural industry is famously politically powerful, and it is exempted from many provisions of federal environmental law or only weakly regulated.[7] Moreover, the subsets of the industry that would need to be regulated if government were to address GHG emissions on the supply side—meat and dairy producers—include some of the most powerful components of the industry.[8] Lastly, regulating GHG emissions by seeking to reduce consumer demand for meat and dairy almost certainly would be politically contentious in many places, especially at the national level. For many people, food is a matter of personal choice, heavily influenced by family, culture, and religion, and meat and dairy are popular foods and important sources of protein and other nutrients.[9] Perhaps sensing the political obstacles likely to be encountered in trying to change diets to address climate change, major U.S. environmental groups have generally not argued that climate policy should include a focus on food, although there are some environmental groups that work on food policy.[10]

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6. INVENTORY, *supra* note 1. In Table ES-6 in EPA's 1990–2019 national GHG inventory, agriculture is the fourth largest source of emissions because this table treats the residential and commercial building sectors distinctly and does not aggregate them as does the EPA source cited earlier in this footnote. *Id*. at ES-26 tbl. ES-6.

7. *See, e.g.*, Margot J. Pollans, *Drinking Water Protection and Agriculture Exceptionalism*, 77 OHIO ST. L.J. 1195, 1213–14 n.114 (2016) (citing J.B. Ruhl, *Farms, Their Environmental Harms, and Environmental Law*, 27 ECOLOGY L.Q. 263, 298–304 (2000)). *See also* KAREN BRADSHAW, WILDLIFE AS PROPERTY OWNERS: A NEW CONCEPTION OF ANIMAL RIGHTS 106 (2020) (attributing the outsourcing to Mexico of efforts to recover thick-billed parrots, an endangered species, partly to the political power of cattle grazers in Southern Arizona).

8. Jennifer Jacquet, *The Meat Industry is Doing Exactly What Big Oil Does to Fight Climate Action*, WASH. POST. (May 14, 2021), https://www.washingtonpost.com/outlook/the-meat-industry-is-doing-exactly-what-big-oil-does-to-fight-climate-action/2021/05/14/831e14be-b3fe-11eb-ab43-bebddc5a0f65_story.html (comparing meat and dairy companies to oil and gas companies); Andrew Jacobs, *Scientific Panel on New Dietary Guidelines Draws Criticism from Health Advocates*, N.Y. TIMES (June 17, 2020), https://www.nytimes.com/2020/06/17/health/diet-nutrition-guidelines.html (benefits of a plant-based diet for health and sustainability omitted from 2015 national dietary guidelines after "an outcry from the livestock industry"). The slaughtering and packing of meat are concentrated in four major companies. Peter S. Goodman, *Record Beef Prices, but Ranchers Aren't Cashing In,* N.Y. TIMES (Dec. 29, 2021), https://www.nytimes.com/2021/12/27/business/beef-prices-cattle-ranchers.html.

9. *See, e.g*., HARRIET BULKELEY, CITIES AND CLIMATE CHANGE 67 (2013) (describing the role of dairy products in the UK).

10. The Natural Resource Defense Council works on food as part of its New York Regional, Healthy People & Thriving Communities Program. Margaret Brown & Mark Izeman, *New York City Puts Food Front and Center*, NRDC (Oct. 4, 2019),

Notwithstanding the limited attention generally paid to agriculture and food as part of climate policy, there have been some governmental efforts to reduce GHG emissions from this sector. The State of California has a target to reduce methane emissions from the dairy and livestock sectors by 40% by 2030 (relative to 2013 emissions).[11] Most notably for present purposes, some local governments have taken measures to reduce meat consumption and to increase fruit and vegetable consumption, some of which have been partly framed as efforts to reduce GHG emissions as well as improve public health.[12] A number of local government entities across the U.S. are using their procurement of food for city operations, schools, hospital, and jails to reduce the consumption of meat.[13] Meatless Mondays and Vegan Fridays in locally administered operations, such as schools, are a tangible example.[14] At a policy level, in 2021, New York City signed the

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https://www.nrdc.org/experts/margaret-brown/new-york-city-puts-food-front-and-center. Earthjustice has a Sustainable Food and Farming Program. *Sustainable Food & Farming Program: Who We Are*, EARTHJUSTICE, https://earthjustice.org/about/offices/sustainable-food-farming (last visited Feb. 15, 2022) [https://perma.cc/3NLC-7G63]. For an article identifying the potential benefits of reducing meat consumption through demand-side measures, see Lingxi Chenyang, *Is Meat the New Tobacco? Regulating Food Demand in the Age of Climate Change*, 49 ENV'T L. REP. 10344, 10349–52 (2019).

11. To achieve this goal, California has implemented several programs aimed at reducing agricultural GHG emissions and sequestering carbon, including research and development on dairy digesters, and programs aimed at manure management, healthy soils, and water efficiency. For analysis of the progress toward achieving this target, *see generally* CAL. LEGIS. ANALYST'S OFFICE, ASSESSING CALIFORNIA'S CLIMATE POLICIES – AGRICULTURE (2021), https://lao.ca.gov/Publications/Report/4483; CAL. AIR RES. BD., ANALYSIS OF PROGRESS TOWARD ACHIEVING THE 2030 DAIRY AND LIVESTOCK SECTOR METHANE EMISSIONS TARGET (2021), https://ww2.arb.ca.gov/sites/default/files/2021-06/draft-2030-dairy-livestock-ch4-analysis.pdf; Liza Gross, *Can California Reduce Dairy Methane Emissions Equitably?*, INSIDE CLIMATE NEWS (AUG. 9, 2021), https://insideclimatenews.org/news/09082021/california-dairy-methane-emissions/. In contrast, New York State, which, like California, has an aggressive state legislative mandate to decarbonize its economy, has expressly exempted livestock emissions from binding GHG emission control requirements. N.Y. ENV'T CONSERV. LAW § 75-0109(2)(b).

12. *See generally* ADALENE MINELLI, JEFF SEBO, DANIELLE SPIEGEL-FELD & KATRINA WYMAN, TOWARDS PLANT-FORWARD DIETS: A TOOLKIT FOR LOCAL POLICYMAKERS (2021), *available at* https://drive.google.com/file/d/1kFZX4AS4_2XEUb2XZarihmCJDYRnDG73/view.

13. MINELLI ET AL., *supra* note 12, at 6-8; Lisa Held, *NYC is on the Cusp of Making its Food Purchasing Sustainable. It Won't be Easy,* CIVIL EATS (Dec. 21, 2021), https://civileats.com/2021/12/21/nyc-is-on-the-cusp-of-making-its-food-purchasing-sustainable-it-wont-be-easy/.

14. MINELLI ET AL., *supra* note 12, at 6 (referring to examples of Meatless Mondays in school systems in the U.S.); Priya Krishna, *New York's Mayor is Building An Agenda Around Food. Will It Satisfy?*, N.Y. TIMES (March 14, 2014), https://www.nytimes.com/2022/03/14/dining/eric-adams-vegan-nyc.html (referring to the

Cool Food pledge, committing itself to reducing the GHG emissions from the food that the city procures by 25% by 2030.[15] That same year, Washington, D.C. passed legislation requiring that the city reduce the GHG emissions from the food that it purchases by 25% by 2030 (a target consistent with the Cool Food pledge), and develop a mechanism to track the emissions from the food that the city government purchases.[16] Echoing the local use of governmental food procurement to reduce GHG emissions, the Biden Administration is apparently considering developing policies to reduce these emissions from federal food procurement.[17]

This Article argues that local governments are well-positioned to add food policy more squarely to their climate policy toolkit and, perhaps in so doing, to broaden the agenda of climate policy to incorporate more food policy measures. In addition, we endorse a modest, but potentially important, step which cities could take to help make the case for integrating food policy into climate policy and tracking their progress in reducing GHG emissions from food: estimating, on a regular basis, the GHG emissions from food procured by city governments for city-funded facilities such as schools, hospitals, homeless shelters, and jails. Better data on the contributions of city government-funded consumption of food to GHG emissions might help more people un-

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launch of Vegan Fridays in New York City schools); Jessica Fu, *New York City's Vegan-Fridays School-Food Program Is As Vegan As Its Mayor – That is, Not Entirely*, THE COUNTER (Feb. 9, 2022), https://thecounter.org/new-york-city-vegan-fridays-school-lunch-food-program-eric-adams/ (school lunch offerings on Vegan Fridays are not entirely vegan and Vegan Fridays are not entirely novel).

15. *Sustainable Food*, NYC OFF. OF CLIMATE & SUSTAINABILITY, https://www1.nyc.gov/site/sustainability/achievements/sustainable-food.page (last visited Feb. 27, 2022)) ("In 2021, New York City became the first city in the nation to join the Cool Food Pledge. Through the pledge, the City committed to reduce the greenhouse gases associated with the food it serves by 25 percent by 2030—a level of ambition in line with achieving the goals of the Paris Climate Agreement."). In February 2021, New York City also released a 10-year food policy plan, "Food Forward NYC," which includes sustainability goals for the city's food system such as pursuing "legislative changes to allow the City to directly address a broader range of [environmental] challenges through its food procurement." MAYOR'S OFF. OF FOOD POL'Y, FOOD FORWARD NYC: A 10 YEAR FOOD POLICY PLAN 70-71 (2021) (Goal 4(A)). https://www1.nyc.gov/assets/foodpolicy/downloads/pdf/Food-Forward-NYC.pdf.

16. Green Food Purchasing Amendment Act of 2021, D.C. Code § 8-151.09b (d).

17. In a December 2021 Executive Order, President Biden directed that "[t]he Chair of CEQ [Council on Environmental Quality] shall consider establishing Federal food procurement policies to reduce associated greenhouse gas emissions and drive sustainability in the Federal food supply chain." Press Release, The White House, Executive Order on Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability (Dec. 8, 2021), https://www.whitehouse.gov/briefing-room/presidential-actions/2021/12/08/executive-order-on-catalyzing-clean-energy-industries-and-jobs-through-federal-sustainability/. [https://perma.cc/9VQH-9XPJ].

derstand the climate costs of food choices and set the stage for more governmental efforts to reduce GHG emissions from agriculture and food as part of climate mitigation. More immediately, better data would provide a basis for cities to commit to reducing GHG emissions from their food purchases, and tracking whether they are meeting these GHG reduction commitments.

I.
The Connection Between Agriculture, Food and Climate Change

While many people recognize that burning fossil fuels such as coal, oil, and natural gas contributes to climate change, fewer people are likely aware that agriculture also contributes to climate change. This part sets out the key ways in which agriculture contributes to climate change and discusses several of the leading sources arguing that changes in human food choices can help reduce agricultural emissions globally and in the United States.

A. Sources of Agricultural Emissions

Agriculture contributes to greenhouse gas emissions in several ways[18] which span the supply chain.[19] First, land use changes are a primary contributor.[20] Clearing land for growing crops to feed animals and humans,[21] as well as deforestation for cattle grazing in areas such as the Brazilian Amazon, leads to the release of GHG emissions.[22] In

18. *GLEAM 2.0 – Assessment of Greenhouse Gas Emissions and Mitigation Potential*, Food & Ag. Org. of the U.N., https://www.fao.org/gleam/results/en/ (last visited Feb. 15, 2022) [https://perma.cc/GN3S-S7DN].

19. Hannah Ritchie, *You Want to Reduce the Carbon Footprint of Your Food? Focus on What You Eat, Not Whether Your Food is Local*, Our World in Data (Jan. 24, 2020), https://ourworldindata.org/food-choice-vs-eating-local.

20. *Id.*

21. John Lynch, Michelle Cain, David Frame & Raymond Pierrehumbert, *Agriculture's Contribution to Climate Change and Role in Mitigation is Distinct from Predominantly Fossil CO_2-Emitting Sectors,* Frontiers in Sustainable Food Sys. (2021), https://www.frontiersin.org/articles/10.3389/fsufs.2020.518039/full.

22. Lazarus et al., *supra* note 3, at 16 ("The majority of Cargill's and Tyson's emissions are the result of land-use changes for feed production in places like the Brazilian Amazon."); Matthew N. Hayek, Helen Harwatt, William Ripple & Nathaniel Mueller, *The Carbon Opportunity Cost of Animal-Sourced Food Production on Land*, Nat. Sustainability 4 (2021), https://scientists.forestry.oregonstate.edu/sites/sw/files/Hayek2020.pdf. Deforestation contributes to climate change in a number of ways. Trees and forests store carbon dioxide, and, when they are destroyed through processes such as slash-and-burn deforestation, the carbon they stored is released back into the atmosphere. Additionally, trees are a natural carbon sink, meaning they absorb carbon dioxide to grow; deforestation eliminates this carbon sink. *Tropical deforestation and global warming*, Union of Concerned Scientists (2021), https://

the United States, agricultural soil management practices—such as the production and usage of fertilizers—also lead to significant GHG emissions in the form of nitrous oxide.[23] The need to grow crops to feed animals raised for human consumption leads some people to call animals "inefficient food converters" because humans could instead eat the crops directly.[24] Beyond land management, livestock themselves produce emissions.[25] Cattle release methane when they belch due to their digestive process of enteric fermentation;[26] manure also emits methane and nitrous oxide.[27] In fact, in the United States, "56 percent of total [CO_2e] emissions from the agricultural sector" come from livestock.[28] Meat and dairy are the greatest culprits.[29] Encapsulating the contributions of cows to climate change, Jeremy Coller,

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www.ucsusa.org/resources/tropical-deforestation-and-global-warming (last updated Nov. 10, 2021) [https://perma.cc/94CJ-3HRS].

23. INVENTORY, *supra* note 1, at 2-21 & 2-22.

24. *Feed-to-Meat – Conversion Inefficiency Ratios*, A WELL-FED WORLD, https://awellfedworld.org/feed-ratios/ (last visited Feb. 15, 2022) [https://perma.cc/RVJ7-NY65]. *See also* Jillian P Fry, Nicholas Mailloux, David Love, Michael Milli & Ling Cao, *Feed Conversion Efficiency in Aquaculture: Do We Measure It Correctly?,* 13 ENV'T RSCH. LETTER 024017 (2018), https://iopscience.iop.org/article/10.1088/1748-9326/aaa273/meta (stating that Feed Conversion Ratios (FCRs) "are typically 6.0–10.0 for beef" compared to "1.7–2.0 for chicken"); *Id*. (using the common measurement of Feed Conversion Ratios, "fed aquaculture and chickens are similarly efficient at converting feed into animal biomass, and both are more efficient compared to pigs and cattle"). According to the World Resources Institute, "[p]roducing beef, for example, uses 20 times the land and emits 20 times the emissions as producing beans, per gram of protein" Richard Waite & Daniel Vennard, *Without Changing Diets, Agriculture Alone Could Produce Enough Emissions to Surpass 1.5°C of Global Warming*, WORLD RES. INST. (Oct. 17, 2018), https://www.wri.org/insights/without-changing-diets-agriculture-alone-could-produce-enough-emissions-surpass-15degc. *See also* Gidon Eshel, Alon Shepon, Tamar Makov & Ron Milo, *Land, Irrigation Water, Greenhouse Gas, and Reactive Nitrogen Burdens of Meat, Eggs, and Dairy Production in The United States,* 111 PROC. NAT'L ACAD. SCI. 11996, 11998 (2014), https://www.pnas.org/content/111/33/11996 ("beef is consistently the least resource-efficient of the five animal categories [which are beef, dairy, poultry, pork, and eggs] in all four considered metrics [which are land, water, GHGs, reactive nitrogen]").

25. *Feed-to-Meat – Conversion Inefficiency Ratios*, *supra* note 24.

26. Livestock, and especially ruminant livestock such as cows, produce methane during digestion, which results in "over a quarter of the emissions from the agricultural economic sector." *Sources of Greenhouse Gas Emissions*, ENV'T PROT. AGENCY, https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions (last visited Feb. 15, 2022) [https://perma.cc/CL69-798T].

27. According to the EPA, "[m]anure management accounts for about 12 percent of the total greenhouse gas emissions from the Agriculture economic sector in the United States." *Id*. When methane emissions from enteric fermentation and manure management are aggregated, agriculture is the largest source of methane emissions in the U.S., surpassing natural gas and oil production. *Id.*

28. Livestock includes beef cattle, dairy cattle, swine, horses, mules, goats, sheep, bison, and poultry. The majority of emissions are from beef cattle, followed by dairy cattle and then swine. U.S. DEP'T OF AGRIC., U.S. AGRICULTURE AND FORESTRY

chair of the Farm Animal Investment Risk & Return (FAIRR) network, recently proclaimed "cows are the new coal."[30]

Other sources of emissions on the farm include the energy costs of farm machinery.[31] And, while most agricultural GHG emissions are generated in the production phase,[32] beyond the farm, converting raw animal products to food items,[33] transporting food from where it is grown to where it is consumed,[34] retail, and packaging all contribute to GHG emissions stemming from agriculture as well. Food waste is also a significant contributor to total food-related emissions.[35] World-

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GREENHOUSE GAS INVENTORY: 1990–2018 at 12–13 (2022), https://www.usda.gov/sites/default/files/documents/USDA-GHG-Inventory-1990-2018.pdf.

29. Data from the USDA shows that "beef cattle contributed the largest fraction (55 percent) of GHG emissions from livestock in 2018, with the majority of emissions in the form of CH4 from enteric fermentation and N2O from grazed land soils," and that "dairy cattle were the second-largest livestock source of GHG emissions (31 percent)." *Id.*

30. Aryn Baker, *"Cows Are the New Coal." How the Cattle Industry Is Ignoring the Bottom Line When It Comes to Methane Emissions*, TIME (DEC. 2, 2021), https://time.com/6125014/cows-agricultural-emissions/; Press Release, FAIRR, $5 Trillion Investor Group and Former UN Secretary-General Urge G20 Leaders to Set Clear Emissions Targets for Agriculture (June 30, 2021), https://www.fairr.org/article/5-trillion-investor-group-and-former-un-secretary-general-urge-g20-leaders-to-set-clear-emission-targets-for-agriculture/; *see also Treating Beef Like Coal Would Make a Big Dent in Greenhouse-Gas Emissions*, THE ECONOMIST (Oct. 2, 2021), https://www.economist.com/graphic-detail/2021/10/02/treating-beef-like-coal-would-make-a-big-dent-in-greenhouse-gas-emissions.

Grass-fed beef might be thought to be more environmentally friendly than factory-farmed beef. However, grass-fed cattle produce more methane emissions than factory-farmed beef. *See, e.g.*, Matthew N. Hayek & Rachael D. Garrett, *Nationwide Shift to Grass-fed Beef Requires Larger Cattle Population*, 13 ENV'T RSCH. LETTERS 1, 4 (2018) ("Taken together, an exclusively grass-fed beef cattle herd would raise the United States' total methane emissions by approximately 8%.").

31. Ray Massey & Drew Kientzy, *Agriculture and Greenhouse Gas Emissions*, EXTENSION UNIV. OF MO., 2 (2021), https://extension.missouri.edu/publications/g310 ("When electric-related emissions are distributed to the economic sectors, agriculture released an additional 35 MMT Carbon Dioxide Equivalent.").

32. Ritchie, *supra* note 19.

33. *Id*.

34. Christopher L. Weber & H. Scott Matthews, *Food-Miles and the Relative Climate Impacts of Food Choices in the United States*, 42 ENV'T SCI. & TECH. 3508 (2008), https://pubs.acs.org/doi/10.1021/es702969f. This article finds that while food may be transported long distances, "GHG emissions associated with food are dominated by the production phase," and that when it comes to food transport, "transportation as a whole represents only 11% of life-cycle GHG emissions." *Id.* at 3508. Notably, the percentage of total emissions that transport represents is higher for non-meat products.

35. A 2018 study examining global emissions from food "found that almost one-quarter—24%—of food's emissions come from food that is lost in supply chains or wasted by consumers. Almost two-thirds of this (15% of food emissions) comes from losses in the supply chain which result from poor storage and handling techniques; lack of refrigeration; and spoilage in transport and processing. The other 9% comes

wide, across the supply chain, ruminant meat (such as beef and lamb) and dairy have the greatest GHG emissions per kilogram of food product.[36]

B. Calls For Shifting to Earth-Friendly Diets to Reduce GHG Emissions

One way in which agricultural emissions can be mitigated is by changing the food that people eat. Recognizing the contributions of agriculture and food to climate change, the Intergovernmental Panel on Climate Change (IPCC) and World Wildlife Fund (WWF) have recently issued reports highlighting the potential to mitigate global GHG emissions by reducing consumption of meat and dairy products.[37] The IPCC report found that a diet high in coarse grains, fruit, and vegetables and low in animal-sourced foods presents "major opportunities for reducing GHG emissions from food systems."[38] A diet such as this, which is "plant-based, but allow[s] for moderate animal-source food consumption, including meat" is known as a "flexitarian" diet.[39] The WWF report found that "[f]ollowing a flexitarian diet would reduce total global food-related GHG emissions [from 14Gt] down to 9.9Gt."[40] The WWF report also highlights the potential to reduce emissions by cutting back on meat and dairy consumption.[41] As it stands, "[r]ed meat and dairy currently account for just over half of total global food-related GHG emissions (7.4Gt of 14.3Gt)"—but shifting to a flexitarian diet reduces that number to only 2.9Gt.[42] Going a step further and shifting to an entirely vegan diet (where no animal products are consumed) would allow GHG emissions to be "reduced to near the climate planetary boundary for food solely through a dietary shift."[43] The WWF report lays out the need to "re-

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from food thrown away by retailers and consumers." Hannah Ritchie, *Food Waste is Responsible for 6% of Global Greenhouse Gas Emissions*, OUR WORLD IN DATA (March 18, 2020), https://ourworldindata.org/food-waste-emissions (drawing on Joseph Poore & Thomas Nemecek, *Reducing Food's Environmental Impacts Through Producers and Consumers*, 360 SCI. 987 (2018), https://www.science.org/doi/10.1126/science.aaq0216). This means that "food wastage is responsible for around 6% of total global greenhouse gas emissions." *Id.*

36. Ritchie, *supra* note 19.

37. IPCC FOOD SECURITY, *supra* note 5; LOKEN ET AL., *supra* note 5, at 27.

38. IPCC FOOD SECURITY, *supra* note 5, at 440.

39. LOKEN ET AL., *supra* note 5, at 9. ("Dietary Patterns Assessed").

40. LOKEN ET AL., *supra* note 5, at 27.

41. *Id.* at 28.

42. *Id.*

43. *Id.* at 27; Bruce M. Campbell, Douglas J. Beare, Elena M. Bennett, Jason M. Hall-Spencer, John S. I. Ingram, Fernando Jaramillo, Rodomiro Ortiz, Navin Ramankutty, Jeffrey A. Sayer & Drew Shindell, *Agriculture Production as a Major*

duce total greenhouse gas emissions from food production to at most 5 Gt CO_2-eq" and urges that shifting diets away from meat and dairy can help us get there.[44]

Such calls have also been made on a national scale. The World Resources Institute (WRI) and Chatham House have both issued reports recently, urging increased consumption of plants and reduction in meat consumption in the United States.[45] The WRI found that agricultural land use has a massive impact on carbon emissions and that beef accounts for roughly half of that land use.[46] In fact, by amortizing the carbon emissions associated with agricultural land use changes over a 20 year period, they determined that the average U.S. diet causes emissions of nearly 17 tons of CO_2e per person per year—an amount on par with per capita emissions from energy use in the United States.[47] The WRI also identified "reductions in consumption of ruminant meat (beef, sheep, and goat) as the most promising strategy for reducing land requirements and GHG emissions."[48] Supporting this point, a 2020 study found that if U.S. consumers cut their consumption of animal-based food in half, it would lead to a 35% drop in per capita GHG emissions "associated with agricultural production of the average diet" from baseline levels.[49] Cutting consumption even further—down to 10% of the current level—would reduce emissions associated with animal-based food products by 51%.[50] This study emphasizes the key role diet can play in mitigating emissions.

The Chatham House report echoes these calls for dietary shifts, proclaiming that "global dietary patterns need to converge around diets based more on plants."[51] The report states that if everyone in the United States made the switch from beef to beans, it would contribute substantially to achieving climate goals (in this example, "meeting between 42 and 74 per cent of the U.S. GHG reduction goal for

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Driver of the Earth System Exceeding Planetary Boundaries, 22 ECOLOGY & SOC'Y 8 (2017). The WWF report cites Campbell et al. in their discussion of climate planetary boundaries (CPBs). CPBs are "the boundary of a safe operating space for humanity." *Id*. at 8.

44. LOKEN ET AL., *supra* note 5, at 25, 28.

45. SEARCHINGER ET AL., *supra* note 5; BENTON ET AL., *supra* note 5.

46. SEARCHINGER ET AL., *supra* note 5, at 15.

47. *Id.* at n.115

48. *Id.* at 66.

49. MARTIN HELLER, GREGORY KEOLEIAN & DIEGO ROSE, CTR. FOR SUSTAINABLE SYS., REPORT NO. CSS20-01, IMPLICATIONS OF FUTURE US DIET SCENARIOS ON GREENHOUSE GAS EMISSIONS 3 (2020), https://css.umich.edu/sites/default/files/publication/CSS20-01.pdf.

50. *Id.*

51. BENTON ET AL., *supra* note 5, at 2.

2020").[52] The public good from shifting diets away from meat and dairy does not stop at climate impacts; such shifts could also lead to improved dietary quality, reduced incidence of diet-related disease (especially that associated with the consumption of red meat), and reduced pandemic risk.[53] Air quality also might improve, with a recent study finding that in the United States, "80% of the 15,900 annual deaths that result from food-related fine particulate matter (PM2.5) pollution are attributable to animal-based foods."[54]

While there are powerful arguments for reducing meat and dairy consumption to reduce GHG emissions, some argue that such reductions in consumption are unnecessary to address climate change. For example, researchers are uncovering ways of reducing the methane emissions from cow belches by changing the foods that cows are fed. Introducing foods, such as seaweed, into the diets of cows might reduce their methane emissions from belching, at least within industrial agricultural settings.[55] However, even if methane emissions from ru-

52. *Id.* at 23–24.

53. *Id.* at 24.

54. Nina Domingo, Srinidhi Balasubramanian, Sumil K. Thakrar, Michael A. Clark, Peter J. Adams, Julian D. Marshall, Nicholas Z. Muller, Spyros N. Pandis, Stephen Polasky, Allen L. Robinson, Christopher W. Tessum, David Tilman, Peter Tschofen & Jason D. Hill, *Air quality–related health damages of food*, PROC. NAT'L ACAD. SCI. (May 18, 2021), https://www.pnas.org/content/118/20/e2013637118.

55. Maddie Duley, *UC Davis Research Shows Seaweed Reduces Cow Methane Emissions by as Much as 82%*, CAL. AGGIE (Apr. 13, 2021), https://theaggie.org/2021/04/13/uc-davis-research-shows-seaweed-reduces-cow-methane-emissions-by-as-much-as-82/; Oliver Morrison, *JBS Inks Feed Additive Deal to Cut Cow Methane Emissions Globally*, FOOD NAVIGATOR (Nov. 8, 2021), https://www.foodnavigator.com/Article/2021/11/08/JBS-inks-feed-additive-deal-to-cut-cow-methane-emissions-globally; *Bovaer: Farm-wise Climate-Friendly*, DSM, https://www.dsm.com/corporate/markets/animal-feed/minimizing-methane-from-cattle.html (last visited Feb. 15, 2022). For a defense of animal agriculture that critiques what it calls the "narrative" that cows are the new coal, see Joseph W. McFadden, *Cows are Not the New Coal – Here's Why*, THE HILL (Dec. 16, 2021), https://thehill.com/opinion/energy-environment/586052-cows-are-not-the-new-coal-heres-why. For an overview of the results of research on the effects of food additives on methane emissions from enteric fermentation, see ROGER S. HEGARTY, RODRIGO PASSETTI, KYLE DITTMER, YUXI WANG, SADIE SHELTON, JEREMY EMMET-BOOTH, EVA WOLLENBERG, TIM MCALLISTER, SINEAD LEAHY, KAREN BEAUCHEMIN & NOEL GURWICK, GLOBAL RSCH. ALL. ON AGRIC. GREENHOUSE GASES, AN EVALUATION OF EVIDENCE FOR EFFICACY AND APPLICABILITY OF METHANE INHIBITING FEED ADDITIVES FOR LIVESTOCK (2021), https://hdl.handle.net/10568/116489. *See also* M. Honan, X. Feng, J.M. Tricarico & E. Kebreab, *Feed Additives as a Strategic Approach to Reduce Enteric Methane Production in Cattle: Modes of Action, Effectiveness and Safety*, ANIMAL PROD. SCI. (2020), https://www.publish.csiro.au/an/an20295. According to a 2021 draft report from the California Air Resources Board, "no feed additives with demonstrated long-term methane mitigation potential have been approved by the U.S. Food and Drug Administration and are commercially available." CAL. AIR RES. BD., ANALYSIS OF PROGRESS TOWARD ACHIEVING THE 2030 DAIRY AND LIVESTOCK SECTOR METHANE EMISSIONS

minants could be reduced by altering their food, animal agriculture for human consumption would still be releasing GHGs from deforestation and land use changes, fertilizers, and manure, at least under existing technology, suggesting that there are still reasons from a climate perspective for reducing human consumption of meat and dairy. Moreover, there are arguments that reducing meat consumption also might help humans adapt to climate change by freeing up water and energy for purposes other than raising meat for human consumption.[56]

II.
WHY CITIES MAY BE WELL-POSITIONED TO INTEGRATE FOOD INTO CLIMATE MITIGATION POLICY

There are four reasons for thinking that local governments may be well-placed to seek to reduce meat and dairy consumption as part of their climate policy, notwithstanding the political forces likely to resist such efforts to lower consumption.

First, many cities are politically progressive places where Democrats predominate, with few climate change deniers among the voting public.[57] This means that city residents are more likely to support climate action in the first place than people living in rural areas.[58] Nonetheless, it is important not to overstate the extent to which city governments are currently reducing GHG emissions. Some data suggests that city governments may be better at rhetorically embracing action to reduce GHG emissions than actually reducing these emissions.[59]

TARGET ES-4 (June 2021), https://ww2.arb.ca.gov/sites/default/files/2021-06/draft-2030-dairy-livestock-ch4-analysis.pdf.

56. Chenyang, *supra* note 10, at 10347.

57. Derek Thompson, *How Democrats Conquered the City*, THE ATLANTIC (September 13, 2019), https://www.theatlantic.com/ideas/archive/2019/09/brief-history-how-democrats-conquered-city/597955/.

58. Emily Pechar Diamond, Robert Bonnie & Elizabeth Rowe, *Rural Attitudes on Climate Change*, DUKE NICHOLAS INST. FOR ENV'T POL'Y SOLUTIONS 6 (2020), https://nicholasinstitute.duke.edu/publications/rural-attitudes-climate-change-lessons-national-and-midwest-polling-and-focus-groups ("In general, rural voters were more divided about the importance of climate change action than their urban and suburban counterparts. . .. In both the rural and urban/suburban samples, however, climate change attitudes were highly polarized along party lines.").

59. According to a 2020 study for the Brookings Institution, "[o]f the 100 most populated cities in the United States, only 45 have established greenhouse gas reduction targets and corresponding baseline GHG inventories." SAM MARKOLF, INÊS M. L. AZEVEDO, MARK MURO, AND DAVID G. VICTOR, BROOKINGS, PLEDGES AND PROGRESS: STEPS TOWARD GREENHOUSE GAS EMISSIONS REDUCTIONS IN THE 100 LARGEST CITIES ACROSS THE UNITED STATES 10 (2020), https://www.brookings.edu/wp-content/uploads/2020/10/FP_20201022_ghg_pledges_v4.pdf. Furthermore, the study found that of the 45, only 32 have conducted follow-up GHG inventories to their

Second, reducing meat and dairy consumption could benefit city residents, and potentially city governments, in ways other than reducing GHG emissions. Such dietary changes might improve individual health, and these health benefits could be an important motivation for individuals to change the foods that they eat in ways that would also benefit the climate. Processed meat (such as hot dogs and deli meats) is recognized by the World Health Organization as a carcinogen; the WHO also considers red meat a probable carcinogen.[60] While we hesitate to wade into the contentious field of nutrition science,[61] consuming meat and dairy has been linked to diabetes,[62] high cholesterol,[63] heart disease,[64] and obesity.[65] Moreover, human consumption of animals also contributes to greater interaction between humans and animals, which creates more pathways for pathogens to jump from animals to humans, leading to more epidemics and pandemics, many

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baseline inventory and "about two-thirds of [these] cities are currently lagging their targeted emission levels." *Id.* at 18; *see also id*. at 16.

60. The WHO considers processed meat to be a "Group 1" carcinogen, meaning that there is "convincing evidence that the agent causes cancer." The WHO considers red meat to be a "Group 2A" probable carcinogen, meaning that "a positive association has been observed between exposure to the agent and cancer" but that they have not entirely ruled out other causes. *Cancer: Carcinogenicity of the Consumption of Red Meat and Processed Meat*, WORLD HEALTH ORG. (Oct. 26, 2015), https://www.who.int/news-room/questions-and-answers/item/cancer-carcinogenicity-of-the-consumption-of-red-meat-and-processed.

61. *See generally* Jane E. Brody, *Confused by Nutrition Research? Sloppy Science May Be to Blame,* N.Y. TIMES (Oct. 29, 2018), https://www.nytimes.com/2018/10/29/well/live/confused-by-nutrition-research-sloppy-science-may-be-to-blame.html; Joseph S. Alpert, *The Great Meat Debate*, 133 AM. J. OF MED. 769 (2020), https://www.amjmed.com/article/S0002-9343(20)30138-8/fulltext.

62. Neal Barnard, Susan Levin & Caroline Trapp, *Meat Consumption as a Risk Factor for Type 2 Diabetes*, 6 NUTRIENTS 897, 906 (2013), https://doi.org/10.3390/nu6020897 ("Meat consumption is consistently associated with diabetes risk.").

63. Nathalie Bergeron, Sally Chiu, Paul T. Williams, Sarah M. King & Ronald M. Krauss, *Effects of Red Meat, White Meat, and Nonmeat Protein Sources on Atherogenic Lipoprotein Measures in the Context of Low Compared with High Saturated Fat Intake: A Randomized Controlled Trial*, 110 AM. J. OF CLINICAL NUTRITION 24, 29 (2019), https://academic.oup.com/ajcn/article/110/1/24/5494812. ("[C]ompared with nonmeat as the major protein source, diets containing high amounts of either red or white meat, and without differences in other macronutrients, result in higher concentrations of LDL cholesterol.").

64. Jennifer Abbasi, *TMAO and Heart Disease: The New Red Meat Risk?*, 321 JAMA 2149, 2149-50 (2019), https://pubmed.ncbi.nlm.nih.gov/31116376/ (discussing evidence that suggests that consumption of red meat increases levels of TMAO, which increases the risk of heart disease and is a "triple threat" to the cardiovascular system.).

65. Y. Wang & M. A. Beydoun, *Meat Consumption is Associated with Obesity and Central Obesity Among US Adults*, 33 INT'L J. OF OBESITY 621, 621 (2009), https://doi.org/10.1038/ijo.2009.45. This "US national cross-sectional data show[s] positive associations between MC and risk for obesity and central obesity." *Id*.

of which are zoonotic in origin.[66] Human consumption of industrially raised cattle, which is often fed antibiotics, also contributes to antibiotic resistance in humans.[67]

Local governments might be interested in developing food policies that encourage people to improve their health. In the recent past, local governments have implemented food policies to improve public health, for example, to reduce obesity, and some of these innovative local policies, such as banning trans fats, have subsequently been adopted nationally.[68] A 2021 Washington, D.C. city council committee report argues that shifting away from "GHG-intensive foods" could promote "racial equity,"[69] which might help to spur local governments in progressive cities to pursue policies promoting changes in people's food choices. Also, the public health benefits of reducing

66. Romain Espinosa, Damian Tago & Nicolas Treich, *Infectious Diseases and Meat Production*, 76 ENV'T RES. ECON. 1019, 1020 (2020), https://doi.org/10.1007/s10640-020-00484-3. (finding that "75% of emerging infectious diseases are zoonotic" and that "intensive animal farming creates conditions for the emergence and amplification of epidemics because of the physical and genetic proximity of the billions of animals" raised each year).

67. *See* Christian Lindmeier, *Stop Using Antibiotics in Healthy Animals to Prevent the Spread of Antibiotic Resistance*, WORLD HEALTH ORG. (Nov. 7, 2017), https://www.who.int/news/item/07-11-2017-stop-using-antibiotics-in-healthy-animals-to-prevent-the-spread-of-antibiotic-resistance.

68. *See generally* Maeve E. Gearing & Theresa Anderson, *Innovations in NYC Health & Human Services Policy: Food Policy*, URBAN INST. (2014), https://www.urban.org/research/publication/innovations-nyc-health-and-human-services-policy-food-policy (describing food policies in New York City under Mayor Michael Bloomberg); Eric Crosbie, Jennifer L. Pomeranz, Kathrine E. Wright, Samantha Hoeper & Laura Schmidt, *State Preemption: An Emerging Threat to Local Sugar-Sweetened Beverage Taxation*, 111 AM. J. OF PUB. HEALTH 677, 677 (2021), https://ajph.aphapublications.org/doi/full/10.2105/AJPH.2020.306062. (discussing the implementation of soda taxes by Navajo Nation and seven U.S. cities between 2014 and 2017); Krishna, *supra* note 14 (discussing New York City's ban on trans fats that was federalized under the Obama Administration); Katrina M. Wyman & Jeff Sebo, *Food Law Policy: Eric Adams Can Innovate in NYC*, STATE & LOC. GOV'T L. BLOG (Oct. 24, 2021), https://www.sloglaw.org/post/food-law-policy-eric-adams-can-innovate-in-nyc (describing New York City's ban on trans fats and mandatory calorie counts, which were adopted at the federal level).

69. COMM. ON THE TRANSP. AND THE ENV'T, COUNCIL OF THE DIST. OF COLUMBIA., COMMITTEE REPORT: B24-18, THE "GREEN FOOD PURCHASING AMENDMENT ACT OF 2021" 4 (2021), https://lims.dccouncil.us/downloads/LIMS/46320/Committee_Report/B24-0018-Committee_Report1.pdf. *Id.* at 4 ("[T]he environmental and public health harms associated with carbon intensive foods are disproportionately borne by Black, Latinx, and Indigenous communities, who are more likely to be exposed to agriculture-related climate and pollution impacts, as well as to the food insecurity and inequitable food access caused by GHG-intensive food production practices."). *See also* COMM. ON THE TRANSP. AND THE ENV'T, COUNCIL OF THE DIST OF COLUMBIA, COMMITTEE REPORT: B24-18, THE "GREEN FOOD PURCHASING AMENDMENT ACT OF 2021" attach. C (2021), https://lims.dccouncil.us/downloads/LIMS/46320/Committee_Report/B24-0018-Committee_Report1.pdf.

meat and dairy consumption might translate into potentially quantifiable cost savings for local governments, for example if they operate health services such as hospitals.[70] One report found that, on a national level, current consumption trends could cost the United States "between $197 billion and $289 billion annually by 2050 in health- and climate-related costs."[71]

Local governments might be motivated to adopt changes to local food procurement policies not only by the potential health benefits of adopting GHG friendly food choices but also by a sense of ethical obligation. City governments purchase a considerable amount of food,[72] and they might be regarded as having an ethical obligation to provide the vulnerable people whom they feed healthy plant-based food options.[73] By serving only unhealthy food to people who turn to them for food, governments might be contributing to disease.[74] On the other hand, limiting vulnerable people to only healthy food choices might be regarded as depriving them of the right to choose the food they consume that is enjoyed by people with more resources.[75] Re-

70. Additional cost savings may come from the reduced cost of plant-based foods; for example, the Oakland Unified School District "reduc[ed] its purchases of animal products by 30 percent and replac[ed] them with plant-based proteins and more fruits and vegetables," ultimately saving the school district $42,000 annually. KARI HAMERSCHLAG, ALICIA CULVER, CHLOË WATERMAN & BECCA BARTHOLOMEW, FRIENDS OF THE EARTH, MEAT OF THE MATTER: A MUNICIPAL GUIDE TO CLIMATE-FRIENDLY FOOD PURCHASING 10 (2017), https://1bps6437gg8c169i0y1drtgz-wpengine.netdna-ssl.com/wp-content/uploads/2017/12/MunicipalReport_ko_120117_v2-1.pdf#page=10&zoom=100,0,0.

71. MINELLI ET AL., *supra* note 12, at 8 (citing Lauren Cassani Davis, *The Economic Case for Worldwide Vegetarianism*, THE ATLANTIC (Mar. 28, 2016), citing MARCO SPRINGMAN ET AL., ANALYSIS AND VALUATION OF THE HEALTH AND CLIMATE CHANGE COBENEFITS OF DIETARY CHANGE (2016)).

72. *See infra* note 103 and accompanying text (referring to New York City and its agencies spending $500 million a year on food).

73. *WHO Urges Governments to Promote Healthy Food in Public Facilities,* WORLD HEALTH ORG. (Jan. 12, 2021), https://www.who.int/news/item/12-01-2021-who-urges-governments-to-promote-healthy-food-in-public-facilities. ("Public places that serve the entire community, including our most vulnerable populations, must be places where healthy diets are promoted not discouraged. . . no public funds should be spent on food contributing to unhealthy diets").

74. *Transcript: Ezra Klein Interviews Eric Adams*, N.Y. TIMES (Oct. 1, 2021), https://www.nytimes.com/2021/10/01/podcasts/transcript-ezra-klein-interviews-eric-adams.html ("If a person is homeless, if a person is on some form of food pantry allotment, they go to the government because they don't have any other choices. So it's almost a betrayal when you know someone has no other choice but to eat what you give them, and you're giving them food that feeds their chronic diseases."). *See* Chenyang, *supra* note 10, at 10360 ("[T]he government influences private food choice . . . by shaping food environments for captive customers.").

75. *See, e.g.*, Kimberley Leonard, *The Great Government Takeover*, U.S. NEWS & WORLD REP. (June 5, 2015) (quoting people who criticize governmental efforts to

gardless, vulnerable people who rely on governments for food should at least have similar opportunities to eat healthier food as people who do not depend on public assistance for food.

Third, cities are generally not major producers of food, and so meat and dairy producers are not likely to be politically powerful interest groups in city politics. As Professor Jonathan Rosenbloom emphasizes in an important article on how local governments calculate city GHG emissions, most American cities import most of their food and are not major sites of food production.[76] Generally located outside of cities, large producers of meat and dairy products are unlikely to wield significant political power in city politics, leaving city politicians more leeway to adopt policies that reduce demand for meat and dairy products than politicians representing jurisdictions with significant food production industries.[77] However, a few important caveats are in order. There may be distributors, retailers, and artisanal producers of meat and dairy foods within cities who might oppose local efforts to reduce meat and dairy consumption, especially if these firms cannot easily transition to selling more plant-based foods. These constituencies might amplify the voices of consumers concerned about local governments seeking to influence people's food choices. Furthermore, rural meat and dairy producers—alone, or with assistance from urban interest groups—might have the leverage to have states preempt local efforts to reduce meat and dairy consumption.[78] State preemption might be an especially potent threat to Democrat-controlled cities in states where Republicans predominate at the state level because of the Republican leanings of many rural state voters.

Fourth, city leaders might think of increasing consumption of plant-based foods—a likely corollary to reducing meat and dairy consumption—as a local economic development strategy. Local governments and others have become increasingly interested in promoting urban agriculture.[79] Such agriculture encompasses a wide range of ac-

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influence food choices of people generally, not specifically the people to which governments are supplying food).

76. Jonathan Rosenbloom, *Outsourced Emissions: Why Local Governments Should Track and Measure Consumption-Based Greenhouse Gases*, 92 UNIV. OF COLO. L. REV. 451, 486 (2021).

77. *Id.*

78. On state preemption of local food policies, *see, e.g.*, Jennifer L. Pomeranz, Leslie Zellers, Michael Bare, and Mark Pertschuk, *State Preemption of Food and Nutrition Policies and Litigation: Undermining Government's Role in Public Health*, 56 AM. J. OF PREVENTIVE MED. 47 (2019), https://pubmed.ncbi.nlm.nih.gov/30467091/.

79. Mindy Bridges, *Growing Interest in Urban Agriculture*, NAT'L CONF. OF STATE LEGIS. (Sept. 2018), https://www.ncsl.org/research/environment-and-natural-resources/growing-interest-in-urban-agriculture.aspx ("States, along with federal and local gov-

tivities—from community gardens to for-profit outfits growing lettuce in greenhouses—which generally have in common growing plants, not raising cattle for human consumption as meat and dairy.[80] Reductions in consumption of meat and dairy products might create more demand for the products of for-profit urban agriculture firms growing plant-based food or new city-based food technology companies. We emphasize, though, that it is unlikely that cities would ever feed themselves entirely from produce grown within their borders.[81]

In combination, the four arguments discussed above suggest that the cities that might be most open to thinking of climate mitigation policy as encompassing food policy would have a number of characteristics. They would be politically progressive cities already pursuing climate mitigation with organized constituencies interested in public health. They would have existing in-city for-profit producers, distributors, and retailers of plant-based foods with an interest in growing their local businesses. These cities also probably would not be located in states where large-scale agricultural producers exert sufficient political power at the state level to be able to persuade enough state-level elected officials to preempt city policy experiments.

III.
A MODEST PROPOSAL: ESTIMATING GHG EMISSIONS FROM CITY GOVERNMENT PROCURED FOOD

Assuming there is a political constituency at the local level to reduce GHG emissions from food (and consequentially to improve public health), how might local governments integrate food policy into climate policy? As mentioned earlier, there are many levers available to local governments to reduce GHG emissions from food, including through changes in the foods that local governments and other local institutions, such as schools, purchase; subsidies that reduce the cost

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ernments, are creating food policy councils, task forces and other bodies to bring together the producers, processors, distributors, sellers and consumers on which local food systems rely."); *see also* Jonah Allon, *The New Agrarian Economy Report on Expanding Urban Agriculture in NYC*, AGRITECTURE (Feb. 22, 2021), https://www.agritecture.com/blog/2021/2/22/the-new-agrarian-economy-report-on-expanding-urban-agriculture-in-nyc.

80. See the USDA description of urban agriculture. U.S. DEP'T OF AGRIC., *Urban Agriculture Grants and Engagement Opportunities,* U.S. DEP'T OF AGRIC., https://www.farmers.gov/your-business/urban/opportunities (last visited Feb. 15, 2022).

81. *See, e.g.*, Wylie Goodman & Jennifer Minner, *Will the Urban Agricultural Revolution Be Vertical and Soilless? A Case Study of Controlled Environment Agriculture in New York City*, 83 LAND USE POL'Y 160, 167–69 (2019) (the food produced by commercial urban farming operations in New York City is likely mostly expensive leafy greens).

of individuals buying fruits and vegetables; and the provision of information to the public about the GHG emissions from different foodstuffs.[82] This Article advocates that local governments estimate GHG emissions from city-government procured food as one step in incorporating food policy into climate policy.

A. Existing Local GHG Emission Inventories and Food

Local governments in over 40 large cities in the U.S. have conducted inventories of the GHG emissions from their communities.[83] Professor Rosenbloom's Article on how local governments calculate local GHG emissions emphasizes that most local governments currently count only the emissions that occur within their borders (often called scope 1 emissions[84]), plus emissions from generating electricity even if that electricity is generated beyond the city's borders (often called scope 2 emissions[85]). The resulting "sector-based" inventory focusing on GHGs that are produced in the city is consistent with the way in which national emissions are tracked, as national inventories count GHGs from production within the country plus imported electricity.[86] However, this standard sector-based inventory of local GHG emissions significantly undercounts "scope 3 emissions," which include the GHGs released in producing the products that cities import for local consumption,[87] of which food is a prime example. Under the standard sector-based inventories, buildings are the top local source of GHG emissions, except in a few places where transportation is the leading source and buildings second; food does not appear as a major source at all.[88]

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82. MINELLI ET AL.., *supra* note 12 (outlining a toolkit of measures that local governments can take to reduce meat consumption and thereby reduce GHG emissions from food, and improve public health and animal welfare).

83. MARKOLF ET AL., *supra* note 59.

84. Rosenbloom, *supra* note 76, at 464 ("Scope 1 emissions come *directly* from sources in the local jurisdiction (typically including fossil fuel combustion).").

85. *Id.* ("Scope 2 emissions result indirectly from purchased electricity. Scope 2 emissions are 'indirect' because they occur outside the locality and 'physically occur at the facility where electricity is generated.' ") (excerpting AECOM, City of Chicago Greenhouse Gas Inventory Report: Calendar Year 2015 7 (2017)).

86. BULKELEY, *supra* note 9, at 47–49.

87. Rosenbloom, *supra* note 76, at 464-465. *See also* BULKELEY, *supra* note 9, at 117 (inventory focused on Scope 1 emissions "excludes the emissions implicated in the consumption of goods and services within the city"). Rosenbloom, *supra* note 76, at 464–65 ("Scope 3 emissions are indirect emissions other than Scope 2 emissions (these are typically the upstream lifecycle emissions included in a Consumption-based Inventory, such as waste disposal). Scope 3 emissions . . . stem[ ] from sources and activities outside a locality's boundary but are a consequence of local activities.").

88. Rosenbloom, *supra* note 76, at 465.

B. Adding Consumption-Based GHG Emission Inventories?

To underscore how cities contribute to GHG emissions through the products that they consume but do not make within their borders, such as food, cities might undertake consumption-based accountings of GHG emissions. Indeed, Professor Rosenbloom recommends that cities perform consumption-based emissions inventories (CBEIs) that include GHGs released in producing, transporting, and using the products that cities import, in addition to the standard sector-based inventory of local GHG emissions.[89] To date, only a small number of local governments have undertaken CBEIs. Rosenbloom identifies three—San Francisco, California; Multnomah County, Oregon; and King County, Washington—though other sources suggest that a few more local governments in the U.S. (and abroad) have conducted CBEIs.[90] Existing CBEIs suggest that the diffusion of consumption-based accounting would highlight that food is a significant way through which

89. Rosenbloom, *supra* note 76. Other advocates of cities performing consumption-based emissions inventories include C40, an important organization of cities committed to addressing climate change. It recommends that local governments perform consumption-based accountings of emissions "if possible". C40 Cities Climate Leadership Group, *How to Cut Your City's Consumption-Based Emissions*, C40 KNOWLEDGE (Jan. 2022), https://www.c40knowledgehub.org/s/article/How-to-cut-your-city-s-consumption-based-emissions?language=EN_US. ("Conduct a consumption-based emissions inventory (CBEI), if possible."). In 2022, as this Article was in publication, C40, New York City and London announced an initiative to undertake consumption-based emissions inventories for London and New York City, with the assistance of American Express. C40, Press Release, C40 announces collaboration to map consumption-based emissions in two of the world's biggest cities (May 9, 2022), https://www.c40.org/news/amex-map-consumption-emissions-london-new-york-city.

90. Rosenbloom, *supra* note 76, at 457 n.13 ("San Francisco, California, Multnomah County, Oregon [which includes Portland], and King County, Washington State [which includes Seattle]."). Other local governments identified as having done CBEIs include Eugene, Oregon; Minneapolis, Minnesota; London, UK; Gothenburg, Sweden. Derik Broekhoff, Peter Erickson & Georgia Piggot, *Estimating Consumption-Based Greenhouse Gas Emissions at the City Scale*, STOCKHOLM ENV'T INST. 12 (2019), https://www.sei.org/wp-content/uploads/2019/03/estimating-consumption-based-greenhouse-gas-emissions.pdf.; *Creating a CBEI for Your City*, Urb. Sustainability Dirs. Network, https://sustainableconsumption.usdn.org/climate/cbei-guidebook/estimating-emissions. (last visited Feb. 15, 2022); C40 KNOWLEDGE, *supra* note 89. *See also* CHRIS JONES, DAVID BURCH & JACKIE WINKEL, BAY AREA QUALITY MANAGEMENT DISTRICT CONSUMPTION-BASED REGIONAL GHG EMISSIONS INVENTORY (2015), https://coolclimate.berkeley.edu/files2/BAAQMD-Oct-7-2015.pdf. C40 also produced a major report based on consumption-based accountings it did for member cities. C40 CITIES CONSUMPTION-BASED GHG EMISSIONS OF C40 CITIES (2018), https://cdn.locomotive.works/sites/5ab410c8a2f42204838f797e/content_entry5ab410fb74c4833febe6c81a/5ad4c0c274c4837def5d3b91/files/C40_GHGE-Report_040518.pdf?1540555698. As previously noted, C40 is adding to its past efforts by undertaking an initiative to develop consumption-based emissions inventories for London and New York City. *Supra* note 89.

cities contribute to GHG emissions. Food and beverages are consistently the second largest source of GHG emissions in the three local U.S. jurisdictions that Rosenbloom identifies as having done CBEIs.[91]

The consumption-based accountings that have been done to date seem to rely on broadly similar methodologies, although there is no protocol for undertaking local CBEIs that is as widely accepted by local governments as the Global Protocol for Community-Scale Greenhouse Gas Inventories used for the standard sector-based inventories.[92] The CBEIs are based on estimates of consumer spending and GHG emissions for products, often drawn from national averages. In broad terms, the accountings start with national estimates of consumer spending on many products, which are downscaled to reflect local characteristics that influence consumption, such as incomes in the locality.[93] The accountings are not based on actual data about the

91. On food and beverages as the number two sources of emissions, *see* Rosenbloom, *supra* note 76, at 473–74. *But see* CHRISTOPHER M. JONES, CONSUMPTION BASED GREENHOUSE GAS INVENTORY OF SAN FRANCISCO FROM 1990 TO 2015 7 (2020), https://escholarship.org/uc/item/4k19r6z7 ("In 2015, [in San Francisco,] the services category (24%) was the largest contributor to household carbon footprints, followed by transportation (23%), food (21%), goods (16%), and housing (16%)."); *Eugene's Consumption Emissions, in* EUGENE'S COMMUNITY CLIMATE ACTION PLAN 2.0: A ROADMAP FOR EUGENE'S CLIMATE JOURNEY, 65, 68 (2020), https://www.eugene-or.gov/ImageRepository/Document?documentId=55986 ("The food and beverages consumed in Eugene represent the largest source (16%) of community consumption-based emissions."). *See also* AMELIA LINN, CLIMATE-FRIENDLY DIETS: HOW CITIES CAN CUT EMISSIONS AND IMPROVE PUBLIC HEALTH 3-4 (2018), https://guarinicenter.org/wp-content/uploads/2018/07/Linn-Climate-Friendly-Diets-FINAL.pdf

92. The Global Protocol for Community-Scale Greenhouse Gas Inventories seems to be the dominant protocol that cities use in undertaking sector-based inventories. WEE KEAN FONG, GREENHOUSE GAS PROTOCOL, GLOBAL PROTOCOL FOR COMMUNITY-SCALE GREENHOUSE GAS INVENTORIES: AN ACCOUNTING AND REPORTING STANDARD FOR CITIES (2021), https://ghgprotocol.org/greenhouse-gas-protocol-accounting-reporting-standard-cities. *See also* Rosenbloom, *supra* note 76, at 462 (GPC is the basis for "numerous local Sector-based Inventories"). The Global Protocol was developed by the World Resources Institute, ICLEI and C40. *Id*. On the history of the standardization of approaches to measuring local GHG emissions, *see, e.g.,* BULKELEY, *supra* note 9, at 47–54, 110–12. On the lack of a standard protocol for measuring GHG emissions from local consumption, see C40 Knowledge, *supra* note 89 ("While cities' sector-based emissions inventories are supported by the *Global Protocol* standardised framework, there is not yet an equivalent standardised framework for assessing consumption-based emissions."). *But see* "Scope 3 Evaluator." GREENHOUSE GAS PROTOCOL, CORPORATE VALUE CHAIN (SCOPE 3) ACCOUNTING AND REPORTING STANDARD (2014), https://ghgprotocol.org/standards/scope-3-standard.

93. JONES, *supra* note 91, at 13 ("Our methodology starts with detailed results from the Consumer Expenditures Survey (CE) for the average U.S. households for the years 1990 to 2015, aggregated into a single file . . . The CE, conducted by the Bureau of Labor Statistics (BLS), is the only annual national survey of household consumption in the United States."); *Id.* at 36–81; *see also* BROEKHOFF ET AL., *supra* note 93 at 11 (The CoolClimate "tool estimates locally specific patterns of consumer spending,

amount of these products purchased in the locality whose consumption is being inventoried. For example, the estimates of how much meat and clothing are consumed in a city are not based on counting the actual volume of meat and clothing bought in stores or on the internet in the city; instead, the estimates are derived from national level surveys of household spending adjusted to reflect local characteristics, such as income levels, that affect consumption.[94] GHG emissions factors are estimated for the lifecycle of the consumer products in the inventory (such as for the production, transportation, and use of a product). Emissions factors are the quantity of GHG emissions per dollar of spending on a product.[95] The emissions factors used in local CBEIs seem to be based on national level data about emissions, although emissions factors for some products may reflect the GHG emissions associated with a product in the locality.[96] National GHG emission factors likely elide important differences across jurisdictions.[97] For example, if there are far fewer GHGs emitted in producing

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transportation, and household energy use (using "downscaled" national data) and combines this with national input-output analysis and fuel emissions factors from the EPA and other sources to estimate GHG emissions"). *But see id.* at 11 ("One compromise, adopted in a number of cities, is to pursue a hybrid approach that combines different methods to produce a comprehensive CBEI with local resolution for some consumption categories. For example, the ecoCity Footprint Tool—applied to Vancouver, B.C. and other Canadian cities (as well as at least one US city, Iowa City)—uses local activity (utility bills, transportation surveys) and waste composition data when available. But it supplements this with national data or archetypal types of consumption to fill gaps in local data."). Rosenbloom mentions that consumption-based accountings are more difficult to conduct than sector-based inventories and "tend to rely on data trends as opposed to actual emissions." Rosenbloom, *supra* note 76, at 490.

94. UC Berkeley's CoolClimate Network, which has done CBEIs for San Francisco and the Bay Area Air Quality Management District, among others, seems to have the most refined approach to CBEI. The CoolClimate Network at UC Berkeley and the Stockholm Environment Institute both rely on national level data about consumption that they adjust to reflect local characteristics, and GHG emission factors for the purchased goods and services from national sources. The two approaches differ principally in that CoolClimate refines the national level consumption data using six factors, while the Stockholm Environment Institute refines it using only one factor (income). BROEKHOFF ET AL., *supra* note 90; COOLCLIMATE NETWORK, https://coolclimate.berkeley.edu (last visited Apr. 24, 2022); JONES, *supra* note 91. CoolClimate compares the two approaches here: JONES, *supra* note 91, at 36–39.

95. JONES, *supra* note 90, at 46 ("CEDA [Comprehensive Environmental Data Archive] produces emission factors as kg CO2 equivalent per dollar of sector output in producer or purchaser prices.").

96. JONES, *supra* note 91, at 17 ("We use local data on emissions wherever possible so long as they correspond with a consumption-based approach.").

97. BROEKHOFF ET AL., *supra* note 90; *Estimating Emissions,* USDN, https://sustainableconsumption.usdn.org/climate/cbei-guidebook/estimating-emissions (last visited Feb. 15, 2022).

the meat consumed in one city compared with another, using national estimates of GHGs per dollar spent on meat will not recognize that one city's emissions from meat are less than another's per dollar spent.

CBEIs attribute "GHG emissions to the final consumers of . . . goods and services, rather than to the original producers of those GHG emissions."[98] Thus, CBEIs highlight the ways in which communities contribute to climate change by consuming products made outside their borders, such as food.[99] In so doing, CBEIs complement traditional sector-based inventories which focus on the emissions produced within the city's borders.[100]

Local preparation of CBEIs likely would help to make the case for adopting food policies to reduce GHG emissions because these accountings would highlight the GHG emissions that come from producing the foods—especially meat and dairy products—consumed in cities. Nonetheless, there are practical disadvantages to CBEIs which may inhibit many local governments from pursuing CBEIs until these issues are addressed.

First, as already mentioned, there is no standard protocol for local governments to use to prepare CBEIs. This means that local governments, which often have limited resources to devote to climate change policy, may need to hire an external contractor to help them prepare the CBEI.[101] Moreover, the absence of an accepted protocol means that local government officials may feel that they have little guidance in setting standards for the preparation of a CBEI. The lack of an established protocol is by no means an insurmountable barrier to the diffusion of CBEIs at the local level, but it is likely a reason why CBEIs have not yet caught on at the local level.

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98. C40 CITIES, CONSUMPTION-BASED GHG EMISSIONS OF C40 CITIES (2018), https://cdn.locomotive.works/sites/5ab410c8a2f42204838f797e/content_entry5ab410fb74c4833febe6c81a/5ad4c0c274c4837def5d3b91/files/C40_GHGE-Report_040518.pdf?1540555698.

99. JONES, *supra* note 91, at 5.

100. *Id.*

101. Many cities—including some of the most populous in the U.S.—do not seem to undertake even sector-based inventories on an annual basis. MARKOLF ET AL., *supra* note 59, at 5 ("Of the 45 cities analyzed in this report, none have GHG inventories for years 2018 or 2019, and only two have GHG inventories for 2017 (an additional 10 have inventories for 2016). Similarly, the lower rate of activity among the smaller cities (only six of the climate action plans came from among the group of cities with the 76th- to 100th-largest populations) suggests the challenges that resource constraints can pose for developing GHG reduction targets and related emissions inventories."). On the additional resources that CBEIs would demand of local governments, see Rosenbloom, *supra* note 76, at 490 ("[C]onsumption-based Inventories are more complicated and more expensive to assemble.").

Second, many local governments may be reluctant to undertake CBEIs at this point because the current methodologies for CBEIs cannot easily be used to monitor the impacts of local government policy efforts to reduce emissions from consumption. As discussed above, the key inputs to CBEIs, such as the estimates of consumer spending and the GHG emissions associated with that spending, are often based on national level estimates, not actual data about local consumption or emissions from products consumed locally. Thus, if a local government were to adopt policies to discourage consumption of foods whose production releases many GHGs, the resultant reductions in emissions attributable to the locality would not likely be captured in the CBEI. In short, the local government would not be able to estimate—or show its constituents—how much its policies are contributing to reducing GHGs. The national estimates of consumer spending and emissions that are the basis for estimating GHG emissions from local consumption are not sufficiently granular to reflect changes over time in consumption due to local government policies.[102] Again, this practical disadvantage with CBEIs could be addressed through methodological innovations in consumption-based accounting. But for now, the inability of local governments to use CBEIs to track the impacts of policies that they adopt is likely a factor discouraging local preparation of CBEIs.

C. Estimating GHG Emissions From City-Government Procured Food

While it is likely desirable for cities to undertake CBEIs, we endorse a more modest step in this Article: cities (with the resources) should estimate the GHG emissions from the city government's procurement of food. This is a more modest endeavor than undertaking a CBEI because it involves estimating GHG emissions only from one product consumed in cities: food. Also, the city government would estimate only the GHG emissions from the food procured by the city government and local government institutions such as schools, hospitals, and jails—not the emissions from the food that city residents purchase. By contrast, a comprehensive CBEI would estimate the GHG emissions from food as well as other products consumed in cities, and from products consumed by the community, not just the city government.

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102. However, San Francisco's 2020 consumption-based GHG inventory suggests that there have been methodological advances in consumption-based accounting. JONES, *supra* note 91. It was done by Christopher Jones of CoolClimate Network at UC Berkeley.

City governments and their agencies are major purchasers of food, which underscores the value of trying to count the GHG emissions from their food purchases. For example, New York City and its agencies spend "a combined $500 million on food each year."[103] According to the Center for Good Food Purchasing, "if NYC shifted just 15 percent of meat purchases to plant proteins, it would decrease annual greenhouse emissions by over 100 million pounds of carbon-dioxide equivalent—the same as taking nearly 10,000 passenger vehicles off the road."[104]

Under the proposal, cities would estimate the GHG emissions from the food that they purchase based on how much they spend on different categories of food, or the volumes purchased of different food categories.[105] We recognize the difficulties that cities might encounter in gathering data about how much money they are spending on different categories of food or how much they are buying by weight of different categories, especially the first time that they compile this information. For example, food procurement in New York City is highly decentralized, with multiple agencies, some of which are not governmental entities, purchasing the food for which the city government pays.[106] A city would need to develop the capacity to track spending on different categories of food, or the volumes of different foods purchased, perhaps with the assistance of its suppliers.

To make the data gathering more manageable, the city government might focus on estimating spending or volumes purchased of only a subset of the food products for which the city pays, such as the food products that are likely to be the largest food sources of GHG

103. Held, *supra* note 13.

104. *Id.*

105. *See, e.g.*, RICHARD WAITE, DANIEL VENNARD & GERARD POZZI, WORLD RES. INST., TRACKING PROGRESS TOWARD THE COOL FOOD PLEDGE: SETTING CLIMATE TARGETS, TRACKING METRICS, USING THE COOL FOOD CALCULATOR, AND RELATED GUIDANCE FOR PLEDGE SIGNATORIES 25 (2019), https://files.wri.org/d8/s3fs-public/tracking-progress-toward-cool-food-pledge.pdf (explaining how estimates of weight can be derived from spending estimates).

106. New York City contracts with many different entities, such as centers that serve senior citizens, to provide a range of services, including food, and these entities purchase the food for which the city's funding pays. Held, *supra* note 13. This fragmentation makes it hard for the city government to acquire data about how much it is spending on food. MAYOR'S OFF. OF FOOD POL'Y, CITYWIDE GOALS & STRATEGY FOR THE IMPLEMENTATION OF GOOD FOOD PURCHASING 2, 4, 5 (2021), https://www1.nyc.gov/assets/foodpolicy/downloads/pdf/GFP-Citywide-Goals-Strategy.pdf. The city has "data on the source of the food . . . for less than half of the total purchases due to gaps in traceability." Held, *supra* note 13.

emissions, like meat and dairy products.[107] Another way of reducing the information gathering would be to limit the agencies whose food purchases were counted to a subset of city agencies, such as the agency (or agencies) spending the most on food in the city. For example, in New York City, the Department of Education accounts for $200 million out of the $500 million that the city government spends on food.[108]

To estimate the GHG emissions from the city's food procurement, the city would apply GHG emissions factors to the estimates of the city's spending on different food categories. There are existing data sets of GHG emissions factors for different categories of food.[109] These data sets estimate the GHG emissions associated with different stages of the "life" of different food categories (such as the GHG emissions from the production of the food, its transportation, etc.).[110]

While there is no established protocol for local government CBEIs, the World Resources Institute (WRI), a widely respected environmental nonprofit, has developed the "Cool Food Calculator" that cities can use to estimate the GHG emissions from their purchases of different categories of foods.[111] Under the organization's "Cool Food" pledge, signatories commit to reducing their emissions from the food that they purchase by 25% by 2030, a target in line with the Paris Agreement.[112] Signatories are required to annually report, by volume, their purchases of certain categories of foods whose production generally generates high levels of GHG emissions.[113] Drawing on published data, WRI has incorporated into its Cool Food Calculator emissions factors for different food categories.[114] These emissions factors (de-

107. The Cool Food Pledge, administered by the World Resources Institute, provides a source of information about which foods are likely leading sources of GHG emissions. The Pledge requires that signatories report the volume of a select number of food products that the signatory buys each year and maintains that the food items for which purchase volumes must be reported "collectively tend to account for more than 80 percent of signatories' total food-related agricultural supply chain emissions, land use, and carbon opportunity costs." WAITE, ET AL., *supra* note 106 at 11. Existing consumption-based inventories also might be consulted to determine the food products whose emissions should be counted. *See* Rosenbloom, *supra* note 76 (identifying three existing local government consumption-based GHG accountings).

108. Held, *supra* note 13; *see* MAYOR'S OFF. OF FOOD POL'Y, *supra* note 105, at 5.

109. WAITE ET AL., *supra* note 105 at 13 (Table 2: Comparison of Three Recent Life Cycle Meta-analyses, Including the Data Set in the Cool Food Calculator).

110. *Id*.

111. WAITE ET AL., *supra* note 105.

112. *Pledge*, COOL FOOD, https://coolfood.org/pledge/ (last visited Feb. 15, 2022).

113. WAITE ET AL., *supra* note 105, at 11 (Box 3: Reporting Food Purchases By Type).

114. *Id*. at 12–13.

nominated in GHGs per kg of food category) are based on GHG emissions from the production, "transport, processing, packaging, and upstream losses of the supply chain" of different foods in different regions of the world.[115] Under some conditions, signatories may rely on more granular country-level data instead of the regional data about emissions factors in the Cool Food Calculator.[116] The Cool Food Calculator "estimates [GHG emissions] for each food type and totals them."[117] WRI does not make public the GHG emissions from individual signatories' food purchases,[118] but there does not appear to be any obstacle to cities making public the calculator's estimates of the emissions from the signatories' food purchases and changes over time in these emissions. Indeed, as this Article was in publication, New York City published online estimates calculated by WRI of the GHG emissions from food purchased by six City agencies in 2019.[119]

The Cool Food Pledge and the Cool Food Calculator were not designed to enable cities in particular to track the GHG emissions from the food that they procure, and most of the signatories to the Pledge are not cities. As of this writing, New York City is the only U.S. city to have signed the Pledge, although some cities from other countries have signed.[120] As mentioned above, Washington, D.C.'s legislated commitment to reduce emissions from its food procurement, is in line with the Cool Food Pledge.[121] Washington, D.C. is also legislatively required to adopt a mechanism for tracking the GHG emissions from its food procurement, and it potentially could use the Cool Food Calculator, which would help to build momentum among cities for the tool.[122] To use the Cool Food Calculator, cities would first

115. *Id*. at 13 (Table 2 — Comparison of Three Recent Life Cycle Meta-analyses, Including the Data Set in the Cool Food Calculator) (note a); *see also id*. at 12, 13.

116. *Id*. at 13.

117. *Id*. at 12.

118. *Id*. at 6.

119. NYC Food Policy, Dashboard: NYC Food Purchasing at a Glance, https://www1.nyc.gov/site/foodpolicy/good-food-purchasing/dashboard.page (The Carbon FootPrint of the City's Food Purchases).

120. COOL FOOD, https://coolfood.org/pledge/ (list of signatories).

121. *Supra* note 16 and accompanying text.

122. In 2021, Washington, D.C. adopted the Green Food Purchasing Amendment Act, which instructs the City to reduce the greenhouse gas emissions from food that the City purchases by 25% by 2030 from a "baseline assessment" established by the Department of Energy and the Environment (DOEE). D.C. CODE § 8-151.09b(d) (2022). The legislation also directs the DOEE to "adopt a methodology, . . . for the District to estimate, to the extent practicable, the greenhouse gas emissions that occur through the life cycle of food and beverages purchased by covered agencies, including by third-party vendors that provide food and beverages on behalf of the covered agencies." D.C. CODE § 8-151.09b(a)(1) (2022). Lehner and Rosenberg suggest that bills

need to prepare a food purchase database, logging the quantity of food purchased by weight across a set of food-item categories (e.g. beef, lamb, poultry, milk, etc.).[123] Some cities may already record this information. Others, however, may need to obtain this information from "food service providers – who, in turn, may need to obtain data from their vendors and suppliers for certain items."[124] For cities without this data at hand, the WRI recommends starting the process of data collection by focusing on the most high-emissions food, such as meat and dairy products.[125] Data must be recorded in units of weight (e.g. kilograms, pounds) in order to be used in the Cool Food Calculator; thus, cities may need to establish protocols for converting from metrics such as gallons, cases, and dollars to units of weight.[126] The biggest hurdle for cities in using the Cool Food Calculator will likely be setting up a system for collecting their food purchase data in a usable format. However, once a system is in place, using the Cool Food Calculator should be a relatively simple way for cities to "track progress towards emissions reduction targets."[127]

The existence of the Cool Food Calculator means that there is already a tool, produced and maintained by a prominent environmental organization with name brand recognition in local government circles, that can be used to estimate GHG emissions from local food procurement. Given the small number of municipal government signatories to the Cool Food Pledge, it is premature to describe the calculator as the accepted protocol for estimating these emissions. Moreover, the calculator is not perfect; for example, it likely would produce more accurate estimates of emissions if the emissions factors were more granular and not based on emissions in different regions of the world.[128] Additionally, recent research has found that using the conventional carbon dioxide equivalent metrics to measure the global

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similar to the legislation that passed in Washington, D.C. have been introduced in other jurisdictions. LEHNER & ROSENBERG, *supra* note 2, at 235.

123. WAITE ET AL., *supra* note 105.

124. *Id*. Note that strategies for "obtaining food purchase data from supply chain partners" are listed in Table A-1.

125. *Id*. at 24. WRI suggests that focusing efforts on high-emitting foods will allow cities "to capture the majority of their food-related emissions while keeping the data collection workload manageable." *Id.*

126. *Id*. at 25. It would be beneficial to collaborate with supply chain partners in developing a "practicable way for tracking the data over time," so that data collection in the proper units becomes an integrated part of the procurement protocol. *Id.* at 24. The WRI has resources available to help cities with these conversions.

127. *Id*. at 1.

128. The calculator's creators seem to recognize this limitation. WAITE ET AL., *supra* note 105, at 13.

warming potential of emissions "can misrepresent the impact of short-lived climate pollutants—which, importantly for agriculture, include methane—on future long-term impacts on global temperature."[129] Nonetheless, the existence of the calculator means that local governments are not left to their own devices to the same extent as they are in attempting to undertake CBEIs.[130]

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129. WAITE ET AL. *supra* note 105 at 8.

130. Even if the Cool Food Pledge and Calculator do not emerge as a standard for estimating GHG emissions from local government food procurement, other tools may develop to enable these estimates to be made. Local governments and institutions already have been undertaking analyses of the GHG emissions from their procurement, including, but not limited to, their procurement of food. These analyses are sometimes called "supply-chain analyses" because they analyze the GHG emissions from the products that local governments are consuming; these analyses suggest the feasibility of the supply chain analysis of food paid for by a city. *Id*. *See also, e.g*., TRUCOST, SUSTAINABLE SUPPLY CHAIN ANALYSIS: EXECUTIVE SUMMARY REPORT (2016), https://www.portland.gov/sites/default/files/2020-06/sustainable-supply-chain-analysis-2016-executive-summary-final.pdf (supply chain analysis for Portland, Oregon prepared by Trucost); *Supply Chain Sustainability Report*, ALAMEDA CNTY. SUSTAINABILITY, https://www.acgov.org/sustain/what/purchasing/report.htm (last visited Apr. 24, 2022). (Alameda County, California supply chain analysis prepared by Good Company); JENNA GARMON & TRACY FISHER, METRO GREENHOUSE GAS EMISSIONS INVENTORY FY 2016–17 (2018), https://static1.squarespace.com/static/5e1380910c47256ea5b5c982/t/6041b5a4e3b52c4f1ba6cd4d/1614919082218/Portland_Metro-FY2017_GHG_Inventory_Report-FINAL.pdf (Oregon Metro GHG inventory for internal operations, which includes supply chain analysis for internal operations at 13).

A 2015 meta-analysis of supply-chain analyses examined analyses from 15 city, county and regional governments, and city parks and recreation and country transit agencies. WEST COAST CLIMATE FORUM, SUPPLY CHAIN GREENHOUSE GAS INVENTORY META-ANALYSIS 5 (2015), https://westcoastclimateforum.com/files/related_documents/TA%20Final.pdf. Notably, the 2015 meta-analysis indicates that "construction and maintenance" is by far the largest source of supply-chain emissions for the 17 public agencies (15 local governments or agencies plus two state governments) in the analysis; "[f]ood, lodging and transport" is a relatively minor source of supply-chain emissions for these governments. *Id*. at 11 (fig. 6) (percentage of supply chain emissions, by organizational type, and purchasing category). It would be interesting to know the estimated emissions from food distinct from transport and lodging; and whether the local governments whose analyses are included in the meta-analysis operate schools, jails and hospitals that tend to serve a lot of food, or whether the included local governments' food procurement is limited to feeding people employed by the local government.

As with CBEIs, there appear to be various contractors assisting local governments with these supply chain analyses, and they appear to use a broadly similar methodology. The analysis sorts the local government's spending on procurement into categories used by "Federal statistical agencies." TRUCOST at 4 n.4. Then GHG emissions factors are applied to these various categories of expenditures. The GHG emissions factors come from lifecycle assessment tools, such as EPA's US Environmentally-Extended Input-Output Models, which "provides impact factors per dollar spent based on national data from federal sources." GOOD COMPANY, ANALYSIS OF SUSTAINABILITY IMPACTS OF ALAMEDA COUNTY SUPPLY CHAIN EXPENDITURES: EXECUTIVE SUMMARY 2 (2019), https://www.acgov.org/sustain/documents/supp-

Estimating the GHG emissions from food procurement may not only seem more feasible for local governments than CBEIs but also more useful. As mentioned above, the methodologies currently used to conduct CBEIs mean that they cannot be used to track and showcase the impacts of local government policy efforts to reduce GHG emissions from food. This is because the key inputs to CBEIs—estimates of consumer spending and GHG emission factors for consumer products—are typically based on national level estimates, not actual data about local consumer expenditures or the GHG emissions of the specific products consumed locally.

In contrast, cities could likely track and highlight the effects of changes in their procurement policies if cities estimated the GHG emissions from the food for which they pay. As set out above, a key input to these GHG estimates would be estimates of the amount that the city government is spending on different categories of food, or the volumes of these different foodstuffs. If a city decided to reduce its purchases of high GHG-foods, such as meat and dairy products, the city's spending on these foods, or the volumes of them that it purchases, would decline. Even if the emissions factors for the foods remain constant, the decline in the spending or the volumes for certain categories of foods would reduce the city's GHG emissions from food procurement, because these emissions are a function of the amount of food purchased as well as the emissions factors. Thus, a local government that implemented policies to reduce GHG emissions from food procurement would likely be able to show progress in reducing these emissions, something which might appeal to local policymakers. Notably, local officials in New York City have called for tracking GHG emissions from food procurement,[131] and the City's recent release of GHG estimates from food procured by six City agencies would appear to be a step in this direction.[132]

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lychainreport.pdf. *See US Environmentally-Extended Input-Output (USEEIO) Models*, U.S. ENV'T PROT. AGENCY, https://www.epa.gov/land-research/us-environmentally-extended-input-output-useeio-models (last visited Feb. 15, 2022). *See also* the description of the methodology for supply-chain analyses in WEST COAST CLIMATE FORUM, *supra* at 8 ("The estimate stems from multiplying the quantity of purchases, or spend, (the first term) by carbon intensity of a given economic sector per dollar spent (the second term). The product of this equation is then summed across purchasing categories to estimate total supply chain emissions of an organization.").

131. For example, in the Democratic primary for mayor in 2021, the current mayor of New York City Eric Adams stated that "NYC should track its emissions from food procurement and consumption." *Mayoral Food Forum 2021: Town Hall on the Future of Food in New York City*, CITY & HARVEST, https://www.cityharvest.org/2021/01/mayoral-forum/ (last visited Feb. 15, 2022).

132. *Supra* note 119 and accompanying text.

In addition to the feasibility and utility of estimating GHG emissions from city food procurement, a third reason for estimating these emissions is the potential that the information generated could help to lay the groundwork for expanding the range of local policies to reduce GHG emissions from food. The absence of food from local inventories of GHG emissions means that local policymakers currently lack a complete picture of the ways that their cities are contributing to climate change.[133] One would not expect the local emissions profile to perfectly match the national profile, since urban areas are by no means a perfect microcosm of the nation as a whole. However, the glaring absence of major contributors to national emissions from local emissions inventories undermines the value of the local inventories, especially when casual observation suggests that the locality contributes to emissions from these sources.

Local inventories are notable for not capturing the GHG emissions from products consumed in cities but produced elsewhere. The EPA's inventory of national GHG emissions identifies transportation, electricity, industry, the commercial and residential sectors, and agriculture as sources of GHG emissions.[134] Emissions from four of these sectors are reflected in the standard sector-based local inventories of GHG emissions. Transportation sector emissions, the top source of emissions in the EPA's inventory, are included in local inventories.[135] Electricity sector emissions, the second largest source of emissions

133. In emphasizing the importance of tracking GHG emissions from food purchased by local governments to promote a more accurate understanding of local contributions to climate change, we draw on the argument of Professor Rosenbloom that "[f]ailing to inventory and regulate consumption-based GHGs may dramatically skew the justification and accuracy of local regulatory actions." Rosenbloom, *supra* note 76, at 497.

134. *See* INVENTORY, *supra* note 1, at ES-26 tbl. ES-6. This table provides emissions totals for the transportation, industry, agriculture, commercial and residential sectors; notably, electricity is listed as a separate line item and the emissions from electricity are not distributed to the emission totals for each end use sector. Electricity emissions are allocated to the end-use sectors of transportation, industry, agriculture, and commercial and residential in Table ES-7: U.S. Greenhouse Gas Emissions by Economic Sector with Electricity-Related Emissions Distributed (MMT CO2 Eq.). *Id*. at ES-27.

135. The transportation sector GHG emissions in the NYC GHG Inventory includes buses, heavy duty trucks, medium duty trucks, passenger cars, solid waste collection vehicles, railways, marine navigation and aviation. See data filtered by "citywide" and sector "transportation." NYC Mayor's Off. of Sustainability, *Inventory of New York City Greenhouse Gas Emissions*, https://nyc-ghg-inventory.cusp.nyu.edu/ (last visited Feb. 15, 2022). In EPA's national inventory, the emissions totals for transportation are in Table ES-6, which does not allocate to this sector the grid supplied electricity emissions attributable to this sector. There is not a clear definition of "transportation" associated with that table. However, the transportation section of EPA's inventory includes GHGs from "passenger cars, light duty trucks, medium and heavy duty trucks, buses, motorcycles, commercial aircraft, other aircraft, ships and boats, rail and pipelines." *See* INVENTORY, *supra* note 1, at tbl. 2-13.

nationally, and emissions from the residential and commercial sectors, are captured in the local inventories under the buildings category (also referred to as the stationary energy category). For example, in New York City's sector-based inventory, the stationary energy category includes emissions from grid-supplied electricity, and fossil fuels combusted onsite in buildings.[136] Noticeably absent from the sector-based local inventories are emissions from agriculture or food. It seems anomalous that food, which is the end product of agriculture and is definitely consumed in cities, is not included among the sources of local GHG emissions in the standard local inventory.[137] Although beyond the focus of this article, another notable omission from the standard local sector-based inventories are the emissions arising in producing industrial products used in cities,[138] such as construction

136. The NYC GHG Inventory defines "stationary energy" to include "energy used by buildings and other stationary sources, as well as fugitive emissions from natural gas distribution within city limits." The stationary sources include biofuel, electricity, natural gas, natural gas, steam, #2 fuel oil, #4 fuel oil and #6 fuel oil. NYC Mayor's Off. of Sustainability, *supra* note 135.

In the EPA GHG Inventory, Table ES-6 identifies the GHG emissions from the commercial and residential sector categories; the emissions figures for these sectors do not include the grid supplied electricity emissions attributed to the sectors. There is no definition of "commercial" or "residential" that corresponds to Table ES-6. However, later, in the report, commercial and residential sector emissions are defined as the direct, on-site use of fossil fuels, such as "the consumption of natural gas and petroleum for heating and cooking." *See* INVENTORY, *supra* note 1, at ES-14. In Table ES-7, electricity emissions are re-allocated to end-use sectors. *Id*. at ES-27 tbl. ES-7.

137. Table ES-6 in EPA's inventory does not provide a cohesive definition of the "agriculture" category. INVENTORY, *supra* note 1, at ES-26. However, agricultural emissions are defined at the outset of the inventory's chapter on agriculture. The EPA inventory of GHGs measures agriculture emissions from a variety of sources, including "methane (CH_4) and nitrous oxide (N_2O) emissions from enteric fermentation in domestic livestock, livestock manure management, rice cultivation, agricultural soil management, and field burning of agricultural residues; as well as carbon dioxide (CO_2) emissions from liming and urea fertilization." EPA, INVENTORY, *supra* note 1, at 5-1. Additionally, GHG fluxes "from agriculture-related land-use and land-use conversion activities, such as cultivation of cropland, grassland fires, aquaculture, and conversion of forest land to cropland are presented in the Land Use, Land-Use Change, and Forestry (LULUCF) chapter [of the inventory];" "emissions from stationary and mobile on-farm energy use [are] reported in the Energy chapter under the Industrial sector emissions;" and "methane and N2O emissions from mobile on-farm energy use are reported in the Energy chapter under mobile fossil fuel combustion emissions." EPA, INVENTORY, *supra* note 1, at 5-1.

138. Table ES-6 in EPA's inventory does not define the "industry" category. INVENTORY, *supra* note 1, at ES-26. However, later in the report, the "industrial processes" whose emissions are counted in that chapter are defined as including "iron and steel production & metallurgical coke production;" cement production; petrochemical production and many other processes. *Id.* at 4-2 fig. 4-1. The emissions attributed to industry in Table ES-6 do not appear to include the emissions associated with the electricity used by industry; however, in Table ES-7, industry emissions include emissions from electricity used by industry. *Id*. at ES-27 tbl. ES-7. Industry is the number

materials like steel.[139] The absence of food (and industrial products) from local inventories likely reduces understanding at the local government level of the extent to which cities contribute to important sources of emissions at the national level, and holds back policy development.

Counting GHG emissions from food paid for by the city could provide information and a basis for city policymakers and advocates to emphasize that food choices have implications for the climate, not just the individuals eating the food. The GHG emissions from food production are an externality that are not currently priced into food products, and so people—and governments—can ignore them in buying food. Tracking the GHG emissions from food procured by city governments could be a small step toward increasing awareness among local policymakers, advocates, and the public at large of the consequences of the current levels of meat and dairy consumption for the climate. Tracking these emissions also could set the stage for more local governments to commit to reducing emissions from food procured by cities, and monitoring whether these GHG reduction commitments are met.[140] Once cities figure out how to count the GHG emissions from the food products that they themselves purchase, they might expand their GHG inventories to include consumption-based accounting of GHG emissions from food and other products purchased generally within the city, by private actors as well as governments.

CONCLUSION

In 2019, Republican politicians attacked the Green New Deal as a threat to people's continuing right to eat hamburgers.[141] While the Green New Deal never included a threat to ban hamburgers,[142] the

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one source of U.S. emissions when the emissions for the electricity that industry uses are attributed to industry. *Id*. at ES-27.

139. On embodied carbon in buildings, see CARBON LEADERSHIP FORUM, https://carbonleadershipforum.org/ (last visited Feb. 15, 2022).

140. In 2021, Washington D.C. simultaneously legislated to track the GHG emissions from the food it procures and reduce the GHG emissions from this food. D.C. CODE § 8-151.09b (2022). *See also* Daniel Zarrilli, *7 Climate Steps for the Adams Administration to Move New York City Ahead*, GOTHAM GAZETTE (Dec. 27, 2021), https://www.gothamgazette.com/games-archive/130-opinion/10994-7-climate-steps-eric-adams-administration-new-york-city (once New York City counts scope 3 emissions, it could "upgrad[e] procurement rules to reduce greenhouse gas emissions from purchased products and food").

141. Emily Atkin, *The Potency of Republicans' Hamburger Lie*, THE NEW REPUBLIC (Mar. 4, 2019), https://newrepublic.com/article/153187/potency-republicans-hamburger-lie.

142. *Id.*

episode demonstrates the political risks of taking on the consumption of meat to limit climate change, at least at the national level. Many people would likely be uncomfortable with, if not downright hostile to, the federal government attempting to reduce people's consumption of meat, which is an important source of protein and other nutrients and a part of American food culture.

This Article suggests that progressive politicians in leading American cities may have more political latitude to experiment with policies to reduce meat and dairy consumption as part of limiting climate change—and improving public health and animal welfare. As if to prove the point, while reducing meat consumption has been fodder for attack politics at the federal level, the city of Washington, D.C. has passed an ordinance mandating that the city reduce the GHG emissions from the food that it purchases.[143] This Article endorses one modest step to which Washington, D.C. already has committed itself, and that other local governments could take as well, to draw attention to the harms to the planet from our food choices: tracking the GHG emissions resulting from the foods that city governments procure. Doing so might set the stage for reducing these emissions and broadening an understanding of the ways that people are contributing to climate change.

143. *See supra* note 16.