

GOVERNING THE GASOLINE SPIGOT: GAS STATIONS AND THE TRANSITION AWAY FROM GASOLINE

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SUMMARY

Gas stations are America's largest carbon spigot, a leading source of neighborhood-based pollution, and a sacred cow. This Article takes a comprehensive look at gas stations through the lens of the climate crisis and the rise of electric vehicles, and proposes steps to improve and shrink the country's gas station network in an environmentally and fiscally prudent manner. It argues that state and local government should regulate gas stations to advance their climate goals, reduce pollution of air, soil, and groundwater, improve public health, and save taxpayers money. They should require them to clean up their contaminated soils, install modern tanks and piping, and abide by strict limits on carcinogenic benzene emissions. They should also halt construction of new gas stations and eliminate subsidies for existing ones.

On 45th Street, in the heart of Seattle's vibrant Wallingford district, amidst a jumble of coffee shops, restaurants, offices, and houses, is a business prominently exhibiting the logo of one of the world's largest corporations. For more than a decade, this business has been polluting the water flowing into nearby Lake Union with benzene, a known carcinogen and fish toxin, at a level more than 360 times the legal limit.¹

It spews benzene vapors at the window of a house 10 feet away and at the other tightly packed, expensive homes clustered nearby. About six million pounds of carbon flows from the business into the atmosphere every year. What is this business, and how can it get away with such copious pollution in an upscale neighborhood just a stone's throw from the University of Washington?

The business is the Wallingford Shell gas station, and the pollution it causes is typical of gas stations in every neighborhood in the United States.

Occupying busy street corners everywhere, gas stations have long been an inexhaustible source of gasoline for drivers and a powerful symbol of the centrality of gasoline in American life. They are the final link in a long supply chain that starts in distant oil fields and ends in air pollution and atmospheric carbon dioxide (CO₂).

Government took a laissez-faire approach to regulating gas stations from their emergence in the 1910s until the 1980s. In 1984, a *60 Minutes* exposé of gasoline contamination of drinking water in Long Island spurred a wave of federal and state laws mandating replacement of gas stations' underground storage tanks (USTs) and vapor recovery systems.² While regulations instituted in the 1980s and 1990s reduced some sources of gas station pollution, gas stations have continued to pollute the air, soil, and water.³

Gas stations have received little attention from policy-makers in recent years, even though their toxins are widely present in neighborhoods and their pumps are one of the largest sources of carbon pollution.⁴ Of the 14 legal journal articles relating to gas stations published since 1990, all focus narrowly on financial responsibility related to leaking USTs and contaminated soils.⁵ None provides a broader

1. Washington State Department of Ecology, *Shell 120877*, <https://apps.ecology.wa.gov/gsp/Sitepage.aspx?csid=5569> (last visited Nov. 9, 2020).

2. Candace Gauthier, *The Enforcement of Federal Underground Storage Tank Regulations*, 20 ENV'T L. 261, 266-67 (1990); Mark D. Oshinskie, *Tanks for Nothing: Oil Company Liability for Discharges of Gasoline From Underground Storage Tanks Divested to Station Owners*, 18 VA. ENV'T L.J. 1, 3 (1999).

3. E. Blaine Rawson, *Are We Properly Controlling Our LUSTs?: A Review of the Problems With Underground Storage Tank Regulation*, 40 IDAHO L. REV. 111, 114-17 (2003).

4. U.S. Environmental Protection Agency (EPA), *Sources of Greenhouse Gas Emissions*, <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions> (last updated Sept. 9, 2020).

5. See Scott Owens, *State v. Green: Redefining the Environmental Responsibility of Landowners in New York*, 8 ALB. L. ENV'T OUTLOOK J. 108 (2002); Amanda Cohen Leiter, *Environmental Insurance: Does It Defy the Rules?*, 25 HARV. ENV'T L. REV. 259 (2001); Sharman Braff, *Oil Companies and*

view of the full scope of harms caused by gas stations and the need for a new regulatory framework to address them.

Now, four emerging issues are challenging the gas station status quo:

- The transportation sector is now the single biggest source of carbon pollution in the United States in a time of climate crisis, with the majority of the emissions coming from burning gasoline and diesel. In many American cities, gasoline use causes about one-half of total carbon pollution. Local and state governments are making climate action plans calling for deep cuts in carbon emissions in their jurisdictions, and cutting gasoline use will be critical in meeting their goals.⁶
- Electric vehicles (EVs) have broken gasoline's 100-year monopoly on automotive drivetrains.⁷ Plug-in vehicles constituted 7.7% of all new vehicles sold in California in 2019, double the 2016 total.⁸ Many analysts predict that EVs will continue to erode the market share of gasoline vehicles, and that EVs will have a majority of new vehicle market share before 2040.⁹

In September 2020, California Gov. Gavin Newsom issued an order phasing out the sale of new gas vehicles in 2035.¹⁰ Numerous other states are considering measures to stop the sale of new gas vehicles between 2030 and 2035.¹¹ The rise of EVs will likely

Their Branded Dealers' Contaminated Gas Stations: The Case for Arranger Liability Under Washington's and Alaska's Environmental Cost Recovery Statutes, 19 HASTINGS W.-NW. J. ENV'T L. & POL'Y 129 (2013); Derek Nagel, *Not Quite Off the Hook: Why There Should Be a Legislative Solution for MTBE Contamination Without a Safe Harbor for MTBE Producers*, 1 ENV'T & ENERGY L. & POL'Y J. 319 (2007); Gauthier, *supra* note 2; William W. Sapp, *Field Citation Programs: The "Ticket" to Better Environmental Compliance*, 20 COLUM. J. ENV'T L. 1 (1995); Christen Carlson White, *Regulation of Leaky Fuel Tanks: An Anatomy of Regulatory Failure*, 14 UCLA J. ENV'T L. & POL'Y 105 (1995/1996); William Stanley Sneath, *Pennsylvania's Storage Tank Act: Statute, Regulations, and Guidances*, 6 VILL. ENV'T L.J. 75 (1995); Rawson, *supra* note 3; Allison Rittenhouse Hayward, *Common Law Remedies and the UST Regulations*, 21 B.C. ENV'T AFF. L. REV. 619 (1994); Oshinski, *supra* note 2; Haitao Yin et al., *Risk-Based Pricing and Risk-Reducing Effort: Does the Private Insurance Market Reduce Environmental Accidents?*, 54 J.L. & ECON. 325 (2011); B. Suzi Ruhl & Sharon K. Lowe, *Review of Florida Legislation: A Super Response to LUST in Florida*, 14 FLA. ST. U. L. REV. 607 (1986).

6. In 2020, Menlo Park, California, set a goal of reducing gasoline sales by 10% per year from a 2018 baseline as part of its climate action plan. CITY COUNCIL OF MENLO PARK, CALIFORNIA, RESOLUTION OF THE CITY COUNCIL OF MENLO PARK ADOPTING SUSTAINABLE VEHICLE FLEET POLICY NO. CC-20-011 TO REDUCE GREENHOUSE GAS EMISSIONS BY INCREASING THE NUMBER OF ZERO-EMISSION FLEET VEHICLES: RESOLUTION NO. 6552 (2020), https://menlopark.org/AgendaCenter/ViewFile/Minutes/_03262020-3417; ENVIRONMENTAL QUALITY COMMISSION, 2030 CLIMATE ACTION PLAN (2020), <https://www.menlopark.org/ArchiveCenter/ViewFile/Item/11486>.
7. U.S. Department of Energy (DOE), *U.S. Plug-In Electric Vehicle Sales by Model*, <https://afdc.energy.gov/data/10567> (last updated Jan. 2020); Rebecca Matulka, *The History of the Electric Car*, DOE, Sept. 15, 2014, <https://www.energy.gov/articles/history-electric-car>.
8. *Hybrid Vehicle Market Share Increased to 5.5 Percent in 2019*, CAL. AUTO OUTLOOK, Fourth Quarter 2019, at 2, <https://www.cncda.org/wp-content/uploads/Cal-Covering-4Q-19.pdf>.
9. See, e.g., BLOOMBERGNEF, ELECTRIC VEHICLE OUTLOOK 2020, <https://bnf.turtl.co/story/evo-2020/>.
10. Cal. Exec. Order No. N-79-20 (Sept. 23, 2020), <https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf>.
11. A New York State senator introduced a bill setting a 2035 gas car phaseout date (Michelle Lewis, *A New York Bill Quietly Seeds the Ban of New ICE*

Figure 1. Abandoned Gas Station, Seattle, Washington



Source: Matthew Metz.

shrink the demand for gasoline, and threaten the viability of many gas stations, which rely on gasoline for nearly 70% of their total sales.¹²

- The USTs that were installed in the 1980s and 1990s in response to tightened regulation are reaching or exceeding their useful safe life of 25-30 years.¹³ Their risk of leaking grows every year.¹⁴ A survey of Seattle gas stations found that about two-thirds of their USTs were at least 25 years old.¹⁵
- New scientific research is establishing that gas stations pollute the air to a much greater extent than previously understood, and that exposure to benzene is a significant cause of leukemia and other cancers.

These issues have pushed gas stations to a critical juncture. While the trend away from gasoline and gas stations promises a less carbon-intensive transportation system and less pollution, it also portends more abandoned and contaminated gas station sites pockmarking the landscape and draining public coffers. The growing demand of citizens for

Cars by 2035, ELECTREK, Oct. 5, 2020, <https://electrek.co/2020/10/05/new-york-bill-ban-new-ice-cars-2035/>), and the New Jersey Department of Environmental Protection similarly called for a 2035 sunset on sales of new gas cars in that state (David Iaconangelo, *N.J. Calls for 100% EVs by 2035, a First for East Coast*, E&E NEWS, Oct. 19, 2020, <https://www.eenews.net/stories/1063716489>). A legislator in Washington State introduced a bill providing that all new vehicles registered in the state must be electric starting with model year 2030 (H.B. 2515, 66th Leg., 2020 Reg. Sess. (Wash. 2020), <https://app.leg.wa.gov/billssummary?BillNumber=2515&Initiative=false&Year=2019>).

12. *NACS: Strong Fuel Sales Drove Overall U.S. C-Store Business to \$654.3B in 2018*, CONVENIENCE STORE NEWS, Apr. 4, 2019, <https://csnews.com/nacs-strong-fuel-sales-drove-overall-us-c-store-business-6543b-2018>.
13. MICHAEL MANIS, LOCKTON COMPANIES, UNDERGROUND STORAGE TANKS: A CHANGING MARKETPLACE (2015), https://www.lockton.com/whitepapers/Underground_Storage_Tanks.pdf.
14. *Id.*
15. Matthew Metz, *Ban New Gas Stations and Require Cleanups to Tackle the Big Polluter on the Corner*, URBANIST, May 14, 2020, <https://www.theurbanist.org/2020/05/14/ban-new-gas-stations/>.

climate action intensifies the need for tighter governance of the gasoline spigot.

State and local governments, which exercise substantial regulatory authority over gas stations, are able to have an enormous impact on the future direction of the gas station industry and ultimately the future of gasoline sales in their states.

As they address the modernization of gas station regulation, policymakers will face a raft of difficult and novel questions, including: How would the aging storage tanks beneath roughly one-half of existing gas stations best be addressed? Who should bear the costs of cleaning up the growing number of abandoned and contaminated gas stations, which now account for roughly one-half of America's 450,000 brownfields? What levels of pollution should be tolerated, if any? Should state and local governments seek to accelerate the decline of gas stations as a carbon reduction strategy? Does local government have a responsibility to ensure the flow of inexpensive gasoline? How should economic impacts to gas station owners and their employees be mitigated? What powers do state and local jurisdictions already possess to regulate gas stations, and what additional powers may be necessary?

This Article explores these questions and maps a regulatory path for addressing the emerging challenges facing governments and gas stations. It argues that state and local governments should regulate toward an increasingly smaller and cleaner network of gas stations for a smooth and rapid transition to a gasoline-free future.

Parts I and II review the environmental, health, and economic trends affecting gas stations and the convenience stores that typically accompany them. Part III outlines a new approach to regulating gas stations, examining how better enforcement of existing laws and implementation of new regulatory measures can best serve public health, economic, and climate goals. Part IV concludes.

I. The Harms of Gas Stations

Gas stations' harms flow in many directions. This part describes the principal pathways of pollution from gas stations and the resulting health effects. It explores other gas station harms that are less commonly discussed, including the atmospheric carbon pollution caused by gasoline, the inequitable distribution of gasoline's harms to communities of color, the sale of tobacco and other unhealthy products in gas station convenience stores, and the crime associated with gas stations.

A. Gas Station Pollution Pathways

1. Gas Pumps

Gasoline spills occur when the nozzle is moved back and forth from the gas pump to the car, when the automatic

shutoff valve fails, or when the customer tops off the tank.¹⁶ One study found that between .007% and .01% of gasoline dispensed was spilled in liquid form while refueling.¹⁷ Based on the figures cited in the study, a typical gas station dispensing one million gallons a year would spill 70 to 100 gallons. For large volume gas stations at Costco and other large box stores, which can sell 20 million gallons of gasoline per year, the spillage could reach 2,000 gallons.

Gasoline from fueling spills can enter runoff water,¹⁸ from which it can make its way into drinking water, groundwater, streams, and other bodies of water.¹⁹ Contaminant levels in convenience store/gas station runoff can be five to 30 times higher than in residential runoff.²⁰ Spilled gasoline can also penetrate the concrete near the gas pumps and contaminate the soil and groundwater beneath it.²¹

Some of the spilled gasoline evaporates.²² A 2019 study conducted in New York State found that in 14 of 16 fueling sessions, gasoline vapors escaped from the pump nozzle, vehicle, and tank,²³ despite the fact that all cars but one were equipped with onboard refueling vapor recovery systems, designed to prevent leakage.²⁴ Leakage of gasoline vapors was also found in the hose joints in four of the six gas stations surveyed.²⁵

2. USTs and Piping

Gasoline is typically stored at gas stations in USTs.²⁶ The storage tanks are connected to piping that connects to the fuel dispensers (gas pumps). Leaks can occur at any point in the system.²⁷ A study of 31 new petroleum releases in California found that 16 occurred in the UST, seven in the piping, five in the fuel dispensers, and in eight cases, the source was unknown.²⁸

16. Markus Hilpert et al., *Hydrocarbon Release During Fuel Storage and Transfer at Gas Stations: Environmental and Health Effects*, 2 CURRENT ENV'T HEALTH REP. 412 (2015), available at <https://pubmed.ncbi.nlm.nih.gov/26435043/>.
17. James J. Morgester et al., *Comparison of Spill Frequencies and Amounts at Vapor Recovery and Conventional Service Stations in California*, 42 J. AIR & WASTE MGMT. ASS'N 284 (1992).
18. Markus Hilpert et al., *Infiltration and Evaporation of Small Hydrocarbon Spills at Gas Stations*, 170 J. CONTAMINANT HYDROLOGY 39 (2014).
19. Philipp Göbel et al., *Storm Water Runoff Concentration Matrix for Urban Areas*, 91 J. CONTAMINANT HYDROLOGY 26 (2007), available at <http://wanko.free.fr/COURS/Ges.eaux%20pluviales/Storm%20water%20runoff%20concentration%20matrix%20for%20urban%20areas.pdf>.
20. Thomas R. Schueler, *Hydrocarbon Hotspots in the Urban Landscape: Can They Be Controlled?*, in THE PRACTICE OF WATERSHED PROTECTION 13 (Thomas R. Schueler & Heather K. Holland eds., Center for Watershed Protection 2016), available at http://owl.cwp.org/mdocs-posts/elc_pwp2/.
21. Hilpert et al., *supra* note 18.
22. *Id.*
23. Jenni A. Shearston & Markus Hilpert, *Gasoline Vapor Emissions During Vehicle Refueling Events in a Vehicle Fleet Saturated With Onboard Refueling Vapor Recovery Systems: Need for an Exposure Assessment*, 8 FRONT. PUB. HEALTH 1 (2020), available at <https://doi.org/10.3389/fpubh.2020.00018>.
24. *Id.*
25. *Id.*
26. U.S. EPA, *Underground Storage Tanks (USTs)*, <https://www.epa.gov/ust> (last updated Sept. 29, 2020).
27. U.S. EPA, *Leaking Underground Storage Tanks Corrective Action Resources*, <https://www.epa.gov/ust/leaking-underground-storage-tanks-corrective-action-resources> (last updated July 16, 2020).
28. CALIFORNIA WATER BOARDS, CALIFORNIA UST LEAK PREVENTION: JANUARY-JUNE 2019 SEMI-ANNUAL REPORT (2019), https://www.waterboards.ca.gov/water_issues/programs/ust/adm_notices/final_accessibility_california_ust_leak_prevention_report-Jan-June2019.pdf.

Figure 2. Gas Station Air Pollution Pathways

Source: Google Street View.

When gasoline leaks from a failed UST system, it moves from the backfill surrounding the tank and piping into the native soil and groundwater.²⁹ The movement of leaked gasoline depends on numerous physical, chemical, and biological factors.³⁰ Gasoline leaks can move underground and contaminate neighboring properties.³¹

A 10-gallon spill of petroleum can contaminate 12 million gallons of groundwater.³² Groundwater is the source of drinking water for one-half of all Americans.³³ Discharge from leaking USTs can also contaminate surface water.³⁴

As of March 2020, there were approximately 542,000 USTs nationwide storing petroleum or hazardous substances at 193,000 facilities,³⁵ and there was a backlog of 63,677 leaking UST sites awaiting cleanup.³⁶ Even after the “cleanup” of a contaminated site occurs, in many cases, large amounts of gasoline are left in the ground.³⁷

The total number of leaking tanks in the United States is unknown. Detection of leaks most often occurs when USTs are removed.³⁸ Leak reporting often depends on the good-faith cooperation of gas station operators, who sometimes have strong incentives not to report them. Tampering with leak control technology is common.³⁹

3. Vent Pipes

USTs vent through four-meter tall pipes to equilibrate pressures.⁴⁰ Gasoline vapors can be released through vent pipes when gasoline is pumped into or out of the USTs and when vapor expands or contracts due to temperature or barometric pressure changes.⁴¹

B. Health Risks of Gas Stations

1. Exposure to Benzene

Benzene typically constitutes 1%-3% of the volume of gasoline.⁴² It is a carcinogen associated with lung cancer,

29. GROUND WATER PROTECTION COUNCIL, GROUND WATER REPORT TO THE NATION: A CALL TO ACTION (2007) [hereinafter GROUND WATER REPORT], <http://www.gwpc.org/sites/default/files/GroundWaterReport-2007-.pdf>.

30. *Id.*

31. See, e.g., Brandon Macz, *Long Cleanup Ahead Around Former Lower Queen Anne Gas Station*, QUEEN ANNE & MAGNOLIA NEWS, June 28, 2019, <https://queenannenews.com/MobileContent/Business/Business/Article/Long-cleanup-ahead-around-former-Lower-Queen-Anne-gas-station/108/468/40266>.

32. GROUND WATER REPORT, *supra* note 29.

33. *Id.*

34. *Id.*

35. U.S. EPA, SEMIANNUAL REPORT OF UST PERFORMANCE MEASURES, MID FISCAL YEAR 2020 (2020), <https://www.epa.gov/sites/production/files/2020-06/documents/ca-20-12.pdf>.

36. U.S. EPA, 20 YEARS OF PROGRESS CLOSING LUST SITES (2020), <https://www.epa.gov/sites/production/files/2020-05/documents/percent-backlog-reduction-4-27-20-508.pdf>.

37. GROUND WATER REPORT, *supra* note 29.

38. CALIFORNIA WATER BOARDS, *supra* note 28.

39. Margaret Talev, *Officials Guard Against Leaks at Gas Stations*, L.A. TIMES, Aug. 19, 2002, <https://www.latimes.com/archives/la-xpm-2002-aug-19-me-gas19-story.html>; see also *Santa Barbara Gas Station Ordered to Pay \$25k for Environmental Violations*, KEYT, Oct. 27, 2020, <https://keyt.com/news/environment/2020/10/27/santa-barbara-gas-station-ordered-to-pay-25k-for-environmental-violations/>.

40. Markus Hilpert et al., *Vent Pipe Emissions From Storage Tanks at Gas Stations: Implications for Setback Distances*, 650 SCI. TOTAL ENV'T 2239 (2019), available at <https://doi.org/10.1016/j.scitotenv.2018.09.303>.

41. *Id.*

42. Peter F. Infante, *Residential Proximity to Gasoline Stations and Risk of Childhood Leukemia*, 185 AM. J. EPIDEMIOLOGY 1 (2017).

non-Hodgkin's lymphoma, chronic lymphoid leukemia, multiple myeloma, chronic myeloid leukemia, and acute myeloid leukemia.⁴³ Long-term exposure to benzene can cause blood cancers, affect bone marrow, and result in anemia, low white blood cell count, and low blood platelet count.⁴⁴ Benzene is linked with leukemia in children, even at relatively low levels of exposure.⁴⁵ Animal studies suggest that exposure to benzene in gasoline fumes can lower sperm counts and impede fertility.⁴⁶

Organizations differ on how much, if any, exposure to benzene is safe for humans. The World Health Organization maintains that there is no safe level of exposure.⁴⁷ The National Institute for Occupational Safety and Health (NIOSH) sets unsafe benzene exposure as anything above 0.1 parts per million (ppm) on average for a 10-hour workday.⁴⁸ The Occupational Safety and Health Administration defines unsafe workplace benzene exposure as anything above 1 ppm based on eight hours of exposure per day,⁴⁹ and requires protective equipment such as respirators at higher exposure levels.⁵⁰

Gas station workers, gas station customers, and those occupying residences, businesses, and schools near gas stations can be exposed to elevated levels of air pollution—primarily due to benzene exposure.⁵¹ Benzene levels were found to be at unsafe levels 160 meters from one gas station, and 10 times higher than the estimates used to derive safe setback distances from gas stations.⁵²

Numerous studies indicate increased risk of leukemia for people living near gas stations.⁵³ A French study found that children living next to a gas station were 7.7 times more likely to contract acute nonlymphocytic leukemia.⁵⁴ Leukemia is the most common cancer in children and adolescents.⁵⁵ In another study, gas station workers were

found to be at elevated risk of contracting cancer.⁵⁶ A study of female gas station workers indicated that exposure to gasoline vapors was associated with menstrual and hormonal disorders.⁵⁷

Gas station workers can be exposed to concentrations of benzene up to .23 ppm for many hours in a week⁵⁸—more than double the NIOSH safe level of .1 ppm over a 10-hour day. This is of particular concern in Oregon and New Jersey, where self-service of gasoline is prohibited and attendants pump gasoline for customers.⁵⁹ Gas station customers also breathe in substantial volumes of gasoline vapors; a study measuring the breath of persons before and after refueling found a mean 18-fold increase in breath benzene levels.⁶⁰

A Canadian study found benzene at the boundaries of service stations 1.4 times higher than NIOSH safe levels in summer and 4.61 times higher in winter, with levels spiking as high as 54 times safe levels.⁶¹ Another study found vapor concentrations three times NIOSH safe levels at residences within 30 meters of a gas station.⁶² A Spanish study found that gas stations can create unsafe vapor levels up to 100 meters away. It recommended a minimum distance of 50 meters between gas stations and housing, and a distance of 100 meters for facilities such as hospitals, schools, and retirement homes.⁶³

2. Exposure to Other Toxic Substances

The other primary toxic substances in gasoline include toluene, ethylbenzene, and xylene, which also carry significant health risks. Toluene is a solvent that naturally occurs in crude oil and that is added to gasoline along with benzene and xylene to improve octane ratings.⁶⁴ It affects the nervous system and is associated with cognitive impairment.⁶⁵

Breathing high levels of ethylbenzene for short periods can cause eye and throat irritation and dizziness.⁶⁶ It has been shown to damage hearing and kidney function in

43. *Carcinogenicity of Benzene*, 18 LANCET 1574 (2017), available at <http://www.hpa.gov.uk/wp-content/uploads/2018/01/Carcinogenicity-of-benzene.pdf>.

44. American Cancer Society, *Benzene and Cancer Risk*, <https://www.cancer.org/cancer/cancer-causes/benzene.html> (last revised Jan. 5, 2016).

45. Jorunn Kirkeleit et al., *Maternal Exposure to Gasoline and Exhaust Increases the Risk of Childhood Leukemia in Offspring—A Prospective Study in the Norwegian Mother and Child Cohort Study*, 119 BRIT. J. CANCER 1028 (2018), available at <https://doi.org/10.1038/s41416-018-0295-3>.

46. Folarin O. Owagboriaye et al., *Effect of Gasoline Fumes on Reproductive Function in Male Albino Rats*, 25 ENV'T SCI. & POLLUTION RES. 4309 (2018).

47. Roy Harrison et al., *Benzene, in WHO GUIDELINES FOR INDOOR AIR QUALITY: SELECTED POLLUTANTS 15* (World Health Organization 2010), available at <https://www.ncbi.nlm.nih.gov/books/NBK138708/>.

48. Centers for Disease Control and Prevention (CDC) NIOSH, *Pocket Guide to Chemical Hazards: Benzene*, <https://www.cdc.gov/niosh/npg/npgd0049.html> (last reviewed Oct. 30, 2020).

49. 29 C.F.R. §1910.1028(c)(1) (2012).

50. *Id.*

51. Hilpert et al., *supra* note 16.

52. Hilpert et al., *supra* note 40.

53. Jean D. Brender et al., *Residential Proximity to Environmental Hazards and Adverse Health Outcomes*, 101 AM. J. PUB. HEALTH SUPPLEMENT S37 (2011), available at <https://ajph.aphapublications.org/doi/10.2105/AJPH.2011.300183>.

54. Christoph Steffen et al., *Acute Childhood Leukaemia and Environmental Exposure to Potential Sources of Benzene and Other Hydrocarbons: A Case-Control Study*, 61 OCCUPATIONAL & ENV'T MED. 773 (2004), available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1763669/pdf/v061p00773.pdf>.

55. Jessica L. Barrington-Trimis et al., *Trends in Childhood Leukemia Incidence Over Two Decades From 1992-2013*, 140 INT'L J. CANCER 1000 (2017), available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5550103/>.

56. Sunisa Chaiklang et al., *Risk Assessment on Benzene Exposure Among Gasoline Station Workers*, 16 INT'L J. ENV'T RES. & PUB. HEALTH 2545 (2019); Tanasorn Tunsaringkarn et al., *Cancer Risk Analysis of Benzene, Formaldehyde, and Acetaldehyde on Gasoline Station Workers*, J. ENV'T ENGINEERING & ECOLOGICAL SCI. (2012), https://www.academia.edu/8175058/Cancer_risk_analysis_of_benzene_formaldehyde_and_acetaldehyde_on_gasoline_station_workers.

57. Christopher E. Ekpenyong et al., *Effects of Gasoline Inhalation on Menstrual Characteristics and the Hormonal Profile of Female Petrol Pump Workers*, 4 J. ENV'T PROTECTION 65 (2013), available at <http://dx.doi.org/10.4236/jep.2013.48A1009>.

58. *Id.*

59. OR. REV. STAT. §480.330 (2019); N.J. STAT. ANN. §34:3A-7 (2019).

60. Peter P. Egeghy et al., *Environmental and Biological Monitoring of Benzene During Self-Service Automobile Refueling*, 108 ENV'T HEALTH PERSP. 1195 (2000), available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1240202/pdf/ehp0108-001195.pdf>.

61. Gerald G. Akland, *Exposure of the General Population to Gasoline*, 6 ENV'T HEALTH PERSP. SUPPLEMENTS 27 (1993), available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1520004/pdf/envhper00383-0033.pdf>.

62. Hilpert et al., *supra* note 40.

63. *Gas Stations Pollute Their Immediate Surroundings, Spanish Study Finds*, SCI. DAILY, Feb. 5, 2011, <https://www.sciencedaily.com/releases/2011/02/110204130315.htm>.

64. AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, TOXICOLOGICAL PROFILE FOR TOLUENE 1 (2017).

65. *Id.*

66. *Id.*

animals.⁶⁷ Xylene exposure at high levels can cause irritation of the skin, eyes, nose, and throat; difficulty in breathing; impaired function of the lungs; delayed response to a visual stimulus; impaired memory; stomach discomfort; and possible changes in the liver and kidneys.⁶⁸ Animal research indicates that long-term inhalation exposure of xylene at low levels can cause nervous system effects.⁶⁹

C. Atmospheric Carbon Pollution

Gas stations are the last link in the supply chain connecting the oil field and internal combustion engine (ICE) vehicles.⁷⁰ ICE vehicles produce CO₂ at the rate of 20 pounds of CO₂ per gallon of gasoline burned.⁷¹

The transportation sector is the largest source of CO₂ emissions in the United States,⁷² with gasoline and diesel responsible for 77% of those emissions.⁷³ In 2019, about 142 billion gallons of gasoline were consumed in the United States, an average of about 390 million gallons per day.⁷⁴ Gasoline and diesel use accounted for 1,091 million metric tons of CO₂ equivalent, or roughly 21% of U.S. energy-related carbon emissions.⁷⁵ The average U.S. driver purchases 522 gallons of gasoline every year.⁷⁶

D. Negative Equity and Social Justice Impacts

A study of leaking USTs in South Carolina found that African Americans and poor people there are significantly more likely to live close to a leaking UST.⁷⁷ Another study found that majority-Black neighborhoods are 44% more likely to be located near a gas station than those with small Black populations.⁷⁸ People living close to a gas station are

at higher risk for pollution exposure.⁷⁹ Proximity to gas stations in Black neighborhoods has a strongly negative effect on property values, which in turn restricts upward income mobility for Black children.⁸⁰

E. Other Harms of Gas Stations

1. Sale of Unhealthy Products in Associated Convenience Stores

Convenience stores, 80% of which sell gasoline, are distribution platforms for many unhealthy products.

☐ *Tobacco and vaping products.* Seventy-one percent of cigarettes are sold through convenience stores.⁸¹ Cigarettes accounted for about 27% of all in-store sales.⁸² The sale of vaping products, cigars, papers, and other non-cigarette tobacco products in convenience stores rose 27% in 2019 relative to 2018.⁸³ Cigarette smoking causes more than 480,000 deaths each year in the United States, nearly one in five deaths.⁸⁴

☐ *Sugary drinks.* Sodas, energy drinks, ice teas, and other packaged beverages are the principal in-store revenue source for convenience stores after tobacco.⁸⁵ Fifty-one percent of Americans purchase a beverage at a gas station every week, with 20% doing so daily.⁸⁶ Sodas and other sugary drinks are strongly associated with obesity, type 2 diabetes, heart disease, gout, poor bone health, and premature death.⁸⁷ Energy drinks are associated with binge drinking, and other adverse health effects in children, teenagers, and young adults.⁸⁸

☐ *Alcohol.* Fifty-six percent of all beer not sold in bars and restaurants is sold in convenience stores.⁸⁹ Twenty-two states permitted convenience stores to sell liquor as of

67. *Id.*

68. AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, PUBLIC HEALTH STATEMENT: XYLENE, CAS#1330-20-7 (2007), <https://www.atsdr.cdc.gov/ToxProfiles/tp71-c1-b.pdf>.

69. *Id.*

70. U.S. Energy Information Administration (EIA), *Weather and Other Events Can Cause Disruptions to Gasoline Infrastructure and Supply*, TODAY IN ENERGY, Feb. 1, 2013, <https://www.eia.gov/todayinenergy/detail.php?id=9811>.

71. FuelEconomy.gov, *How Can a Gallon of Gasoline Produce 20 Pounds of Carbon Dioxide?*, https://www.fueleconomy.gov/feg/contentIncludes/co2_inc.htm (last visited Nov. 9, 2020).

72. EIA, *Frequently Asked Questions (FAQS): How Much of U.S. Carbon Dioxide Emissions Are Associated With Electricity Generation?*, <https://www.eia.gov/tools/faqs/faq.php?id=77&t=11> (last updated May 26, 2020).

73. EIA, *Use of Energy Explained: Energy Use for Transportation*, <https://www.eia.gov/energyexplained/use-of-energy/transportation.php> (last updated June 2, 2020).

74. EIA, *Frequently Asked Questions (FAQS): How Much Gasoline Does the United States Consume?*, <https://www.eia.gov/tools/faqs/faq.php?id=23> (last updated Sept. 4, 2020).

75. EIA, *Frequently Asked Questions (FAQS): How Much Carbon Dioxide Is Produced From U.S. Gasoline and Diesel Fuel Consumption?*, <https://www.eia.gov/tools/faqs/faq.php?id=307> (last updated May 20, 2020).

76. NACS, CONVENIENCE STORES KEEP DRIVERS FUELED, https://www.convenience.org/Topics/Fuels/Documents/USDDrivers_infographic.pdf.

77. Sacoby Wilson et al., *Leaking Underground Storage Tanks and Environmental Injustice: Is There a Hidden and Unequal Threat to Public Health in South Carolina?*, 6 ENV'T JUST. 175 (2013), available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3980862/>.

78. ANDRE PERRY ET AL., METROPOLITAN POLICY PROGRAM AT BROOKINGS & GALLUP, THE DEVALUATION OF ASSETS IN BLACK NEIGHBORHOODS: THE CASE OF RESIDENTIAL PROPERTY 4 (2018), <http://btbcoalition.org/>

[index%20page%20images/2018.11_Brookings-Metro_Devaluation-Assets-Black-Neighborhoods_final.pdf](https://www.brookings.edu/wp-content/uploads/2018/11/Brookings-Metro_Devaluation-Assets-Black-Neighborhoods_final.pdf).

79. Brender et al., *supra* note 53, at S37-S52.

80. PERRY ET AL., *supra* note 78.

81. Melissa Kress, *Data Highlights Important Relationship Between C-Stores & Tobacco*, CONVENIENCE STORE NEWS, Feb. 12, 2019, <https://csnews.com/data-highlights-important-relationship-between-c-stores-tobacco>.

82. CONVENIENCE STORE NEWS, CONVENIENCE STORE NEWS INDUSTRY REPORT 2020: LITTLE TIME TO CELEBRATE (2020) [hereinafter LITTLE TIME TO CELEBRATE], <https://csnews.com/convenience-store-news-industry-report-2020-little-time-celebrate>.

83. *Id.*

84. CDC, *Health Effects of Cigarette Smoking*, https://www.cdc.gov/tobacco/data_statistics/fact_sheets/health_effects/effects_cig_smoking/index.htm (last reviewed Apr. 28, 2020).

85. LITTLE TIME TO CELEBRATE, *supra* note 82.

86. Beth Newhart, *Convenience Store Beverage Purchases Rise in the U.S.*, BEVERAGE DAILY, Aug. 1, 2019, <https://www.beveragedaily.com/Article/2019/08/01/C-store-drink-consumption-is-up-20-of-Americans-shop-daily>.

87. Harvard T.H. Chan School of Public Health, *Sugary Drinks*, <https://www.hsph.harvard.edu/nutritionsource/healthy-drinks/sugary-drinks/> (last visited Nov. 9, 2020).

88. National Center for Complementary and Integrative Health, *Energy Drinks*, <https://www.nccih.nih.gov/health/energy-drinks> (last updated July 2018).

89. Terri Allan, *Chugging Along*, NACS MAG., Oct. 2019, <https://www.nacs-magazine.com/issues/october-2019/chugging-along>.

2018.⁹⁰ A high density of alcohol outlets, particularly those that sell alcohol late at night, as many gas stations do, is also associated with disorderly conduct, noise, neighborhood disruption, public nuisance, and property damage in nearby neighborhoods.⁹¹

Excessive alcohol use is responsible for 88,000 deaths in the United States annually, and one in 10 deaths among adults aged 20–64. In 2010, it cost the United States \$249 billion in health care and related costs.⁹²

□ *Displacement of healthy food sources.* Less than 5% of convenience store sales are edible groceries.⁹³ Low-income zip codes have 30% more convenience stores and 25% fewer chain supermarkets than middle-income zip codes.⁹⁴ Schools located in low-income neighborhoods or communities of color are more likely to have at least one convenience store nearby.⁹⁵ Proximity of convenience stores is associated with lower fruit and vegetable intake.⁹⁶ People with access only to convenience stores and not supermarkets have the highest rates of obesity (32%–40%) and excess weight (73%–78%).⁹⁷

2. Crime

Convenience store employees' rate of death by workplace homicide is second only to that of taxicab drivers.⁹⁸ Convenience store robberies account for approximately 6% of all robberies reported to police.⁹⁹

3. Blight

Gas stations have also been blamed for blight, negative alteration of community character, and noise.¹⁰⁰ Jane Jacobs, in her urban planning classic *The Death and Life of*

Great American Cities, termed them “a powerful and insistent instrument of city destruction.”¹⁰¹

II. Gas Station Industry Trends

Effective modernization of gas station regulation requires understanding the many trends and challenges facing the industry. This part explores the competitive dynamics of gasoline retailing, provides a glimpse into the convenience stores that are operated in conjunction with 80% of gas stations, and examines the lingering problems of aging and leaking USTs and abandoned gas stations. It also explores the rising challenges posed by EVs and the climate crisis.

A. Fewer Gas Stations Are Selling More Gasoline

The number of gas stations in the United States decreased from 250,000 in 1976 to roughly 130,000 by 2018.¹⁰² In 2015, the decline leveled off,¹⁰³ with the building of new gas stations in some areas offset by declines in other areas.¹⁰⁴ Particularly in high-cost urban markets, rising land values are reducing the number of gas stations. The number of gas stations in San Francisco declined by 40% between 2007 and 2017,¹⁰⁵ and in Manhattan, they declined 60% between 2008 and 2017.¹⁰⁶

Despite the decline, the United States still has more than twice the per capita number of gas stations as the European Union. The United States has one gas station for every 2,524 people and 1,928 cars.¹⁰⁷ The European

90. Peter Callaghan, *Hearing Offers Snapshot of Next Battle Over Minnesota's Liquor Laws: Selling Booze in Grocery Stores*, MINNPOST, May 16, 2018, <https://www.minnpost.com/politics-policy/2018/05/hearing-offers-snapshot-next-battle-over-minnesotas-liquor-laws-selling-booze/>.

91. CDC, *GUIDE FOR MEASURING ALCOHOL OUTLET DENSITY* (2017), <https://www.cdc.gov/alcohol/pdfs/CDC-Guide-for-Measuring-Alcohol-Outlet-Density.pdf>; Shelley Ross Saxer, *Down With Demon Drink: Strategies for Resolving Liquor Outlet Overconcentration in Urban Areas*, 35 SANTA CLARA L. REV. 123 (1994); NACS, *Convenience Media Unite to Combat Human Trafficking*, CONVENIENCE STORE NEWS, Jan. 4, 2019, <https://csnews.com/nacs-convenience-media-unite-combat-human-trafficking>; Robert A. Hahn et al., *Effectiveness of Policies Restricting Hours of Alcohol Sales in Preventing Excessive Alcohol Consumption and Related Harms*, 39 AM. J. PREVENTIVE MED. 590 (2010), available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3712516/>.

92. CDC National Center for Chronic Disease Prevention and Health Promotion, *Excessive Alcohol Use*, <https://www.cdc.gov/chronicdisease/resources/publications/factsheets/alcohol.htm> (last reviewed Sept. 21, 2020).

93. LITTLE TIME TO CELEBRATE, *supra* note 82.

94. POLICY LINK & FOOD TRUST, *THE GROCERY GAP: WHO HAS ACCESS TO HEALTHY FOOD AND WHY IT MATTERS* (2010), http://thefoodtrust.org/uploads/media_items/grocerygap.original.pdf.

95. *Id.*

96. *Id.*

97. *Id.*

98. ALICIA ALTIZIO & DIANA YORK, U.S. DEPARTMENT OF JUSTICE, *ROBBERY OF CONVENIENCE STORES* (2007), https://popcenter.asu.edu/sites/default/files/sites/default/files/problems/pdfs/convenience_store_robbery.pdf.

99. *Id.*

100. Community and Environmental Defense Services, *Gas Stations & Convenience Stores*, <https://ceds.org/gasstation/> (last visited Nov. 9, 2020).

101. JANE JACOBS, *THE DEATH AND LIFE OF GREAT AMERICAN CITIES* 338 (Vintage Books 1961), available at http://www.petkovstudio.com/bg/wp-content/uploads/2017/03/The-Death-and-Life-of-Great-American-Cities_Jane-Jacobs-Complete-book.pdf.

102. *Selling America's Fuel*, NACS, Apr. 12, 2019, <https://www.convenience.org/Topics/Fuels/Who-Sells-Americas-Fuel>.

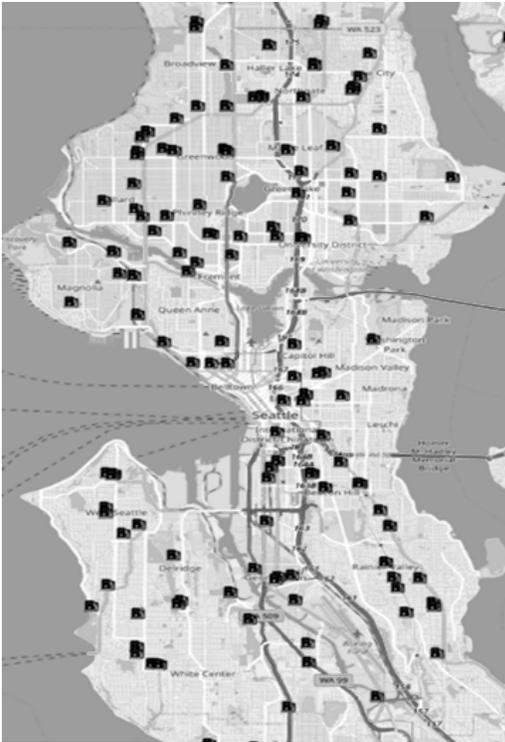
103. Jeff Lenard, *The 2020 NACS Consumer Fuels Survey*, NACS MAG., Mar. 2020, <https://www.nacsmagazine.com/issues/march-2020/2020-nacs-consumer-fuels-survey>; Ronda Kaysen, *A Clean New Life for Grimy Gas Stations*, N.Y. TIMES, July 10, 2012, <https://www.nytimes.com/2012/07/11/real-estate/commercial/a-clean-new-life-for-grimy-gas-stations.html>; NACS, *U.S. Convenience Store Count*, <https://www.convenience.org/Research/Fact-Sheets/ScopeofIndustry/IndustryStoreCount> (last visited Nov. 9, 2020).

104. See, e.g., Judy Smestad-Nunn, *New Stores Under Construction*, JERSEY SHORE ONLINE, July 20, 2020, <https://www.jerseyshoreonline.com/brick/new-stores-under-construction/>; Rebecca Sitzes, *Murphy Gas Station in the Works for Shelby*, GASTON GAZETTE, July 31, 2020, <https://www.gastongazette.com/news/20200731/marathon-gas-station-in-works-for-shelby>; Shea Lazansky, *Several New Oswego Businesses Eye Fall Openings*, KENDALL COUNTY NOW, July 24, 2020, <https://www.kendallcountynow.com/2020/07/17/several-new-oswego-businesses-eye-fall-openings/awxcdmu/>; Nathalie Graham, *Hey Seattle, Where Are All of Your Gas Stations?*, STRANGER, Aug. 29, 2018, <https://www.thestranger.com/news/2018/08/29/31438154/gas-stations-in-seattle-are-disappearing>; NACS, *supra* note 103.

105. Michael Buhr, *Gas Stations Will Disappear Sooner Than You Think*, HILL, Oct. 1, 2017, <https://thehill.com/opinion/technology/352884-gas-stations-will-disappear-sooner-than-you-think>.

106. *Id.*; *With Gas Station's Closing, a Fuel Desert Expands in Manhattan*, N.Y. TIMES, Apr. 16, 2016, <https://www.nytimes.com/2016/04/16/nyregion/a-gas-station-closes-in-soho-making-lower-manhattan-a-gasoline-desert.html>.

107. See Bureau of Transportation Statistics, *Number of U.S. Aircraft, Vehicles, Vessels, and Other Conveyances*, <https://www.bts.gov/content/number-us-aircraft-vehicles-vessels-and-other-conveyances> (last visited Nov. 30, 2020); U.S. Census Bureau, *Quick Facts*, <https://www.census.gov/quickfacts/fact/table/US/PST045219> (last visited Nov. 30, 2020).

Figure 3. Map of Seattle Gas Stations

Source: Matthew Metz.

Union has one gas station for every 6,686 residents and 3,492 cars.¹⁰⁸

Gas stations are a low-density use of land, typically housing only gas pumps, a convenience store, and many parking spaces. As land values and the density of surrounding properties in urban areas increase, the highest and best use of land tends toward dense, multistory structures. Gas stations are unable to increase their density because gas pumps must be open to the air. Meanwhile, property taxes increase as assessed land values rise. In some cases, urban gas stations can raise the price of gasoline to meet these higher costs, but such cost increases are constrained by competition from other gas stations and non-gasoline-dependent modes of travel.¹⁰⁹

Despite the decreasing number of gas stations, sales of gasoline increased 50% from 1975 to 2005, and then plateaued until COVID-19 led to a dip in gasoline consumption in 2020.¹¹⁰

108. See FUELS EUROPE, STATISTICAL REPORT (2019), <https://www.fuels-europe.eu/wp-content/uploads/FuelsEurope-Statistical-Report-2019-2.pdf>; European Automobile Manufacturers Association, *Vehicles in Use*, <https://www.acea.be/statistics/tag/category/vehicles-in-use#:~:text=There%20are%20some%20308.3%20million,one%20for%20every%20two%20European> (last visited Nov. 30, 2020); European Union, *Living in the EU*, https://europa.eu/european-union/about-eu/figures/living_en#size-and-population (last visited Nov. 30, 2020).

109. William P. Nowak & Ian Savage, *The Cross Elasticity Between Gasoline Prices and Transit Use: Evidence From Chicago*, 20 TRANSPORT POL'Y 38 (2013).

110. EIA, *Petroleum & Other Liquids: Series History*, https://www.eia.gov/dnav/pet/pet_cons_psup_a_EPM0F_VPP_mbb1_a.htm (last released Oct. 30,

B. Gas Station Ownership Is Consolidating and Oil Companies Divesting

Consolidation in the gas station/convenience store industry is accelerating, as well-capitalized owners of large chains enter the market and small businesses exit.¹¹¹ While single-store owners constitute 58% of convenience store gas operations, 30% are now owned by operators of more than 50 locations.¹¹² Warehouse stores such as Costco are taking increasing market share, fueled by their ability to sell large volumes at prices nearly 10% below other retailers.¹¹³ Since the 1980s, oil majors have largely divested from direct ownership of gas stations, with the exception of a few gas stations operated with higher-end convenience stores.¹¹⁴

Ownership of the land that a gas station sits on is often distinct from the ownership of the gas station. In many cases, the gas station/convenience store operator leases from a third-party landowner who is often also a petroleum distributor.¹¹⁵ Gas station lease agreements can lock station operators into long-term gasoline purchasing contracts.¹¹⁶

C. Gas Stations Are Increasingly Operated With Convenience Stores

Beginning in the 1970s, convenience stores began to displace auto repair shops as the complementary business operated alongside gas stations. In 1980, 16% of all gas stations were operated with convenience stores, rising to 80% by 2019.¹¹⁷ Gas station/convenience store combinations account for 80% of all gasoline sales.¹¹⁸ Large retailers such as Costco sell most of the rest.¹¹⁹

The customer base for convenience stores is predominantly lower-income, with 40% of convenience store customers coming from households earning less than \$29,000

2020); EIA, *Short-Term Energy Outlook*, <https://www.eia.gov/outlooks/steo/> (last released Nov. 10, 2020).

111. *U.S. Convenience Store Count Stands at 152,720 Stores*, NACS, Feb. 3, 2020, https://www.convenience.org/Media/Daily/2020/Feb/3/1-US-C-Store-Count-Stands-at-152720-Stores_NACS; see also Chris Blasinsky, *Adaptable for Change*, NACS MAG., June 2019, <https://www.nacsmagazine.com/issues/june-2019/adaptable-change>.

112. *Selling America's Fuel*, *supra* note 102.

113. Samantha Oller & Greg Lindenberger, *Fuels 50 2019: Retailers in the Fast Lane*, CSP DAILY NEWS, Apr. 4, 2019, <https://www.cspdailynews.com/fuels/fuels-50-2019-retailers-fast-lane>.

114. *Photo Gallery: The Design Behind the First-Ever Shell Select Convenience Store*, CONVENIENCE STORE NEWS, Oct. 4, 2018, <https://csnews.com/photo-gallery-design-behind-first-ever-shell-select-convenience-store>.

115. See, e.g., Mark E. Battersby, *Rewards for Owning the Building*, CSTORE DECISIONS, Sept. 11, 2014, <https://cstoredecisions.com/2014/09/11/rewards-owning-building/>. The authors were not able to find reliable statistics on the percentage of gas station operators that own the land their gas station rests on.

116. Braff, *supra* note 5.

117. JOHN A. JAKLE & KEITH A. SCULLE, *THE GAS STATION IN AMERICA* 156 (Johns Hopkins Univ. Press, 1994).

118. Robert Ferris, *America's Gas Stations and Convenience Stores Grapple With an Uncertain Future*, CNBC, Mar. 18, 2020, <https://www.cnb.com/2020/03/18/americas-gas-stations-and-convenience-stores-grapple-with-an-uncertain-future.html>.

119. SANTA BARBARA COUNTY 2018 MVFF ANNUAL REPORT (2019), *available at* https://drive.google.com/file/d/1Nz3RyJ_WbZ7feKXxNUeX2DSEyRjR-D7B/view.

per year, and 72% from households earning \$70,000 or less.¹²⁰ The average land parcel for a convenience store/gas station nationally is 27,900 square feet (.64 acres),¹²¹ enough to accommodate about 15 three-story rowhouses.¹²²

In 2018, the average convenience store employee made \$10.74 per hour.¹²³ Convenience store employee annual turnover was 118%—double the 59% turnover rate for all retail.¹²⁴ Only 34% of all new convenience store hires lasted 90 days on the job.¹²⁵ The convenience store industry employs 2.36 million people.¹²⁶

Convenience stores increasingly find themselves in competition with dollar stores, which are proliferating especially in lower-income communities.¹²⁷ Additional competition comes from new mobile fueling companies that deploy tanker trucks to fill cars with gasoline at large employers and in other parking lots, thereby allowing consumers to fuel while avoiding gas stations altogether.¹²⁸

D. USTs Are Aging and Difficult to Insure on Private Markets

Roughly one-half of USTs and piping systems now in use are either past their 25 to 30-year useful life, or are only single-walled rather than the current double-walled standard.¹²⁹ A 2015 study found that the average age of USTs was 22.6 years and one-third of the piping was older than 20 years.¹³⁰ Given the wave of UST replacements that occurred in the early 1990s, the number of USTs past their useful age is likely to continue increasing. The odds of USTs leaking rise sharply as they age.¹³¹ Modern fuel blends can accelerate tank failure. For example, ethanol, a common additive to gasoline, is known to accelerate degradation of fiberglass USTs.¹³²

There are no uniform criteria for assessing the risk of release from USTs and piping systems.¹³³ Although the

120. Blasinsky, *supra* note 111.

121. Liam O'Connell, *Average Area of Convenience Stores in the United States in 2019*, STATISTA, June 15, 2020, <https://www.statista.com/statistics/1016023/convenience-store-square-footage-us/>.

122. John G. Ellis, *Explaining Residential Density*, 16 PLACES 34 (2004), available at <https://placesjournal.org/assets/legacy/pdfs/explaining-residential-density.pdf>.

123. Blasinsky, *supra* note 111.

124. *Id.*

125. *Id.*

126. Marianne Wilson, *Convenience Stores Getting Bigger; Building, Operating Costs Going Up*, CHAIN STORE AGE, Apr. 3, 2019, <https://chainstoreage.com/store-spaces/convenience-stores-getting-bigger-building-operating-costs-going-up>.

127. Tammy Mastroberte, *How C-Stores Can Play Defense Against Dollar Stores*, CONVENIENCE STORE NEWS, Jan. 9, 2020, <https://csnews.com/how-c-stores-can-play-defense-against-dollar-stores>.

128. Monica Nickelsburg, *Washington State Authorizes Mobile Fueling; Legislators Call It "Timely" as Residents Practice Social Distancing*, GEEKWIRE, Mar. 20, 2020, <https://www.geekwire.com/2020/washington-state-authorizes-mobile-fueling-legislator-calls-timely-residents-practice-social-distancing/>.

129. AGING TANKS WORKGROUP, ASSOCIATION OF STATE AND TERRITORIAL SOLID WASTE MANAGEMENT OFFICIALS, AN ANALYSIS OF UST SYSTEM INFRASTRUCTURE IN SELECT STATES: FINAL REPORT 3 (2015), <https://plia.wa.gov/wp-content/uploads/2016/12/2015-10-ASTSWMOAgingTanks-Report-Final.pdf>.

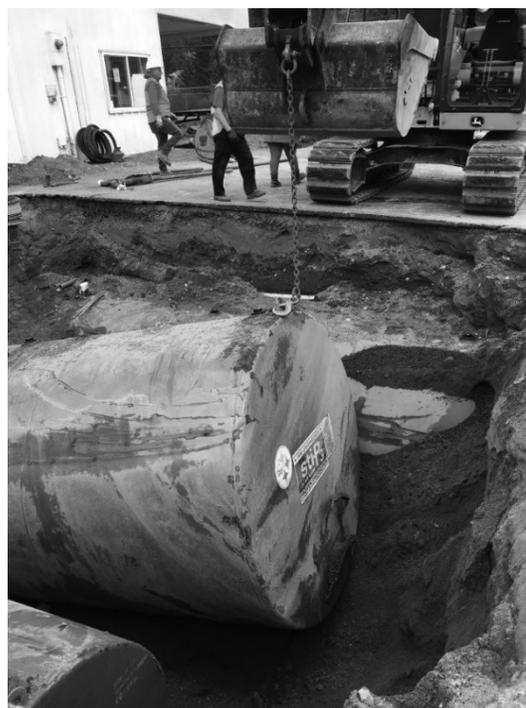
130. *Id.*

131. MANIS, *supra* note 13.

132. AGING TANKS WORKGROUP, *supra* note 129, at 8-9.

133. *Id.* at 9-10.

Figure 4. UST Removal



Source: Matthew Metz.

2005 Energy Policy Act required states to report on the “source and cause” of leaks, states have not complied with the requirement, and there remains considerable doubt as to the cause of most UST leaks.¹³⁴ Two studies suggest that piping, joints, connectors, gaskets, and dispensers are more likely to leak than the USTs.¹³⁵

In a 2019 routine inspection of 7,076 California UST facilities, 69% were found to have priority violations of UST rules, and a total of 13,373 such priority violations were found.¹³⁶ Priority violations include such practices as falsification, unsafe UST operation, and failure to record unauthorized releases.¹³⁷

The U.S. Environmental Protection Agency (EPA) requires that owners or operators of USTs provide adequate assurance of financial responsibility.¹³⁸ This requirement is generally met by private insurance or by insurance through a state insurance fund.¹³⁹ Thirty-six states presently provide UST insurance to gas stations.¹⁴⁰ At least four of these

134. *Id.*

135. *Id.*

136. CALIFORNIA WATER BOARDS, *supra* note 28.

137. *Id.*

138. 40 C.F.R. §§280.90-.115 (2019) (Subpart H, Financial Responsibility).

139. STATE FUNDS TASK FORCE, ASSOCIATION OF STATE AND TERRITORIAL SOLID WASTE MANAGEMENT OFFICIALS, GUIDE TO TANK INSURANCE (2011), http://astswmo.org/files/policies/Tanks/2011.10_Guide_to_Tank_Insurance_FINAL.pdf; ASSOCIATION OF STATE AND TERRITORIAL SOLID WASTE MANAGEMENT OFFICIALS, 2019 STATE FUND SURVEY tbl.1 (2020), http://astswmo.org/files/Policies_and_Publications/Tanks/2019_State_Funds_Survey/2019-Table-1.pdf.

140. ASSOCIATION OF STATE AND TERRITORIAL SOLID WASTE MANAGEMENT OFFICIALS, 2019 STATE FUND SURVEY summary tbl. (2020), http://astswmo.org/files/Policies_and_Publications/Tanks/2019_State_Funds_Survey/2019-summary-table.pdf.

funds have claims exceeding the fund balance.¹⁴¹ State insurance funds paid an average of \$152,000 per release in 2019.¹⁴² Outstanding claims on state funds increased from \$160 million in 2015 to \$354 million in 2019.

Private insurers are reluctant to insure USTs over 20 years old.¹⁴³ For older tank systems, deductibles can reach \$50,000 or more per claim.¹⁴⁴

E. Sales and Redevelopment of Gas Station Properties Are Hindered by Contamination

Gas station properties are often difficult to transfer because of concerns about petroleum contamination of the soil.¹⁴⁵ Contamination at gas stations is very common.¹⁴⁶ A survey of 109 gas stations in Seattle identified 74 with a documented history of contamination.¹⁴⁷ In Long Island, New York, 32 of 52 gas stations surveyed were found to have previously unidentified petroleum spills.¹⁴⁸ Because small spills caused by consumer fueling are also very common,¹⁴⁹ and because some of those spills pass through the concrete pad into the soil below,¹⁵⁰ it is likely that virtually all gas stations have at least some contaminated soil.

The gas station sales process often triggers prepurchase assessment of site contamination.¹⁵¹ Banks often require as a condition of financing that prospective purchasers of gas station properties conduct Phase I and Phase II environmental site assessments.¹⁵² A Phase I assessment includes a site inspection, record review, and review of surrounding areas.¹⁵³ A Phase II assessment involves taking soil samples from the areas around the USTs, piping system, and fuel dispensers to determine if contamination has occurred. However, because the findings of a Phase II assessment are limited to the areas sampled, they often fail to disclose the full scope of contamination and cost of cleanup.

Often, gas station site owners are reluctant to try to sell gas stations because of the likelihood of contamination, uncertainty as to the scope and cost of cleanup, and the discount that risk-averse buyers will seek. Additionally, negative Phase II findings can stigmatize a property, and even cause a shutdown or forced cleanup of the gas station

Figure 5. Prepurchase Soil Assessment



Source: Matthew Metz.

if an active spill is identified. By the same token, many real estate developers avoid purchasing gas station sites because of the fear of an expensive cleanup.¹⁵⁴

Gas station property owners are thus incentivized to maintain the status quo by operating or leasing the station with existing (and often aging) tanks and piping. Many states allow “natural attenuation” of contaminated soil and groundwater, whereby site owners are only required to monitor and wait for groundwater, volatilization, bacteria, and other natural processes to slowly carry away or lower the levels of contaminants in the soil, thereby reducing or eliminating the need for an active cleanup.¹⁵⁵

In urban areas with rising property values, site owners are incentivized to delay selling and wait for appreciation of their land. All of these factors favor the survival of “zombie” gas stations—polluting and contaminated gas stations that continue operating long after economic and land use changes would ordinarily dictate their replacement.

F. Advocacy Against New Gas Stations Is Emerging

In recent years, climate advocates have been organizing, often successfully, against the permitting of new gas stations. In Hayward, California, a proposal to build a 24-pump gas station as part of an existing Costco was rejected in July 2020.¹⁵⁶ One council member who voted against the proposal said it ran against the city’s goals to promote environmentally friendly projects.¹⁵⁷ Also in California, residents of Tustin have mobilized to block construction of a new gas station in the Tustin Ranch neighborhood, arguing that the harms to traffic flow and air quality are not worth it for a region already served by

141. *Id.*

142. *Id.*

143. Parker Bunbury, *The Problem With Storage Tanks: What You Need to Know to Own or Operate*, WOODRUFFSAWYER, Aug. 8, 2019, <https://woodrufflawyer.com/property-casualty/storage-tank-problems/>.

144. MANIS, *supra* note 13.

145. Kaysen, *supra* note 103.

146. A survey of 52 gas stations in Long Island found 32 of them to have previously unidentified petroleum spills. Matt Mabe, *32 Gas Stations in Report Show Spillage Signs*, N.Y. TIMES, Apr. 27, 2008, <https://www.nytimes.com/2008/04/27/nyregion/nyregionspecial2/27mtbeli.html>.

147. Metz, *supra* note 15.

148. Mabe, *supra* note 146.

149. Hilpert et al., *supra* note 18.

150. *Id.*

151. *Don't Let Due Diligence Missteps Tank Your Next Gas Station Purchase*, PM ENV'T, Mar. 19, 2018, <https://www.pmenv.com/articles/don%E2%80%99t-let-due-diligence-missteps-tank-your-next-gas-station-purchase>.

152. Joseph Philip Forte, *Environmental Due Diligence: A Guide to Liability Risk Management in Commercial Real Estate Transactions*, 5 FORDHAM ENV'T L. REV. 349 (2011).

153. *Id.*

154. Kaysen, *supra* note 103.

155. U.S. EPA, HANDBOOK OF GROUNDWATER PROTECTION AND CLEANUP POLICIES FOR RCRA CORRECTIVE ACTION (2004) (EPA530-R-04-030), <https://www.epa.gov/sites/production/files/2017-02/documents/gwhb041404.pdf>.

156. Peter Hegarty, *Divided Hayward Council Rejects Costco Gas Station*, MERCURY NEWS, July 23, 2020, <https://www.mercurynews.com/2020/07/22/hayward-possible-service-station-at-costco-rejected/>.

157. *Id.*

plenty of other gas stations.¹⁵⁸ And in Charleston, South Carolina, residents successfully opposed two separate proposals for a new gas station in the historic West Ashley neighborhood.¹⁵⁹

G. EVs Are Challenging Gas Stations' Core Business

EVs do not use gasoline and thus pose a major long-term challenge to gas stations. In 2019, about 2% of all new cars sold in the United States were EVs.¹⁶⁰ The Edison Electric Institute and Boston Consulting Group estimate that EVs will make up around 21% of annual new car sales by 2030.¹⁶¹ Bloomberg predicts EVs will reach 60% market share of vehicles in the United States by 2040.¹⁶² Uber and Lyft, the leading ride-sharing companies in the United States, have announced that all vehicles on their platform will be electric by 2030.¹⁶³

Regulation phasing out gasoline-powered vehicles could sharply accelerate EV adoption rates. Twenty countries and provinces have announced plans to phase out the sale of new gasoline vehicles by or before 2040.¹⁶⁴ Nearly a dozen countries (most of them in Europe) have announced a goal of phasing out gas car sales by or before 2035,¹⁶⁵ a goal matched in a plan released by Democrats in the U.S. House of Representatives in 2020.¹⁶⁶ California Governor Newsom issued an executive order calling for an end to the sale of gasoline-powered cars by 2035, and other states are considering similar measures.¹⁶⁷

Some analysts believe that autonomous or self-driving vehicles will be all or mostly electric.¹⁶⁸ To the extent such vehicles gain market share, they could further accelerate the movement away from gasoline.¹⁶⁹ The trend away from cars powered by gasoline will result in significant cuts in gasoline use and will threaten the economic model on which gas stations rely.¹⁷⁰

Some have proposed that gas stations transition to fueling electric cars.¹⁷¹ There is uncertainty around the extent to which gas stations will be able to make this transition. Currently, EV drivers do more than 80% of charging at home (using an ordinary household 110-volt electrical outlet or a 240-volt outlet like that used for electric clothes dryers), where electricity is generally cheaper than that provided by public fast chargers.¹⁷² EV charging is often available at workplaces as well—in many instances free of charge.¹⁷³

Currently, even high-speed charging takes 30 minutes or more, and so it is often located in parking lots of businesses and restaurants where drivers can use that time for shopping or dining. However, as fast-charging times approach the time required to fill up with gasoline, offering EV charging may become an option for gas stations—especially those located near highways. And already today, some gas stations in the United States and Europe are adding EV charging.¹⁷⁴ Germany is requiring all gas stations to install EV.¹⁷⁵

H. Abundance of Gas Stations Is Impacting Gasoline Price and Use

As noted above, the United States has twice the per capita number of gas stations as Europe. The United States has the highest per capita gasoline consumption in the world, at 1.15 gallons per day.¹⁷⁶ An analysis of the extent

158. Protect Tustin Ranch, *Home Page*, <http://protecttustinranch.org/> (last visited Nov. 9, 2020).

159. Alexis Simmons, *Gas Station Design Rejected for Old Piggly Wiggly Site*, LIVE 5 WCSC, Sept. 19, 2016, <https://www.live5news.com/story/33132276/gas-station-design-rejected-for-old-piggly-wiggly-site/>.

160. *FOTW #1124, March 9 2020: U.S. All-Electric Vehicle Sales Level Off in 2019*, DOE, Mar. 9, 2020, <https://www.energy.gov/eere/vehicles/articles/fotw-1124-march-9-2020-us-all-electric-vehicle-sales-level-2019>.

161. ADAM COOPER & KELLEN SCHEFTER, EDISON FOUNDATION INSTITUTE FOR ELECTRIC INNOVATION & EDISON ELECTRIC INSTITUTE, *ELECTRIC VEHICLE SALES FORECAST AND THE CHARGING INFRASTRUCTURE REQUIRED THROUGH 2030* (2018), <http://www.ehcar.net/library/rapport/rapport233.pdf>; Xavier Mosquet et al., *Who Will Drive Electric Cars to the Tipping Point?*, BOSTON CONSULTING GROUP, Jan. 2, 2020, <https://www.bcg.com/publications/2020/drive-electric-cars-to-the-tipping-point>.

162. BLOOMBERGNEF, *supra* note 9.

163. Tina Bellon, *Lyft Promises Switch to 100% Electric Vehicles by 2030*, REUTERS, June 17, 2020, <https://www.reuters.com/article/us-lyft-electricvehicles/lyft-promises-switch-to-100-electric-vehicles-by-2030-idUSKBN23O37R>; Andrew J. Hawkins, *Uber Pledges to Shift to "100 Percent" Electric Vehicles by 2030*, THE VERGE, Sept. 8, 2020, <https://www.theverge.com/2020/9/8/21427196/uber-promise-100-percent-electric-vehicle-ev-2030>.

164. Coltura, *Gasoline Vehicle Phaseout Advances Around the World*, <https://www.coltura.org/world-gasoline-phaseouts> (last visited Nov. 9, 2020).

165. SANDRA WÄPPELHORST, INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION, *THE END OF THE ROAD? AN OVERVIEW OF COMBUSTION-ENGINE CAR PHASE-OUT ANNOUNCEMENTS ACROSS EUROPE* (2020), <https://theicct.org/sites/default/files/publications/Combustion-engine-phase-out-briefing-may-11-2020.pdf>.

166. Anthony Adragna, *Democrats Unveil Sweeping Plan to Tackle Climate Change*, POLITICO, June 30, 2020, <https://www.politico.com/news/2020/06/30/democrats-unveil-sweeping-plan-to-tackle-climate-change-345503>.

167. Cal. Exec. Order No. N-79-20, *supra* note 10; *see also supra* note 11. For a comprehensive discussion of state-based efforts to phase out gasoline-powered vehicles, *see Metz & London, infra* note 252.

168. Chanan Bos, *Self-Driving Gas Car—A Horse Led by a Carrot on a Stick?*, CLEANTECHNICA, July 13, 2019, <https://cleantechnica.com/2019/07/13/self-driving-gas-car-this-is-why-elon-musk-calls-it-a-horse/>.

169. Andrew Slaughter & Thomas Shattuck, *Your Mileage May Vary: The Future of Mobility and the Downsizing of U.S. Gasoline Demand*, DELOITTE INSIGHTS, Nov. 15, 2016, <https://www2.deloitte.com/us/en/insights/focus/future-of-mobility/impact-on-transportation-fuel-gasoline-demand.html>.

170. *Id.*

171. Brittany Chang, *A Maryland Gas Station Became the First EV Charging Station in the U.S. That Converted From Selling Oil—Here's How It's Doing*, BUS. INSIDER, Jan. 24, 2020, <https://www.businessinsider.com/gas-station-ditched-oil-first-electric-vehicle-charging-station-2019-10>.

172. DOE Office of Energy Efficiency and Renewable Energy, *Charging at Home*, <https://www.energy.gov/eere/electricvehicles/charging-home> (last visited Nov. 9, 2020).

173. Donna Marbury, *Electric Vehicle Charging: Creating a Workplace Charging Plan of Action*, SMART COLUMBUS, Oct. 2, 2020, <https://smart.columbus.gov/playbook-assets/electric-vehicle-charging/creating-a-workplace-charging-plan-of-action>.

174. Fred Lambert, *Chevron Starts Deploying EV Charging Stations at Its Gas Stations*, ELECTREK, May 20, 2019, <https://electrek.co/2019/05/20/chevron-ev-charging-gas-stations/>; Roddy Scheer & Doug Moss, *Shell, BP, Chevron Offer EV Charging at Select Stations*, EARTHTALK, Sept. 3, 2020, <https://emagazine.com/oil-companies-and-evs>.

175. Christoph Steitz & Edward Taylor, *Germany Will Require All Petrol Stations to Provide Electric Car Charging*, REUTERS, June 4, 2020.

176. *Gasoline Consumption Per Capita Around the World*, GLOBALPETROLPRICES.COM, Aug. 4, 2016, <https://www.globalpetrolprices.com/articles/52/>.

to which its relatively abundant gas stations drive higher gasoline consumption has not been published.

However, analogies can be made to other products. For instance, a causal link has been found between the increased availability of fast food outlets and greater consumption of fast food.¹⁷⁷ Many studies have found that alcohol consumption grows along with the number of alcohol outlets in a neighborhood.¹⁷⁸

Gas stations' ubiquitous presence and highly visible signage are frequent reminders of gasoline's availability. A study found that alcohol advertising influences consumption and can diminish the impact of public health guidelines advising moderation.¹⁷⁹ Similarly, the ubiquity and high visibility of gas stations may help create norms encouraging gasoline consumption, and diminish the impact of messaging concerning the urgency of transitioning away from fossil fuel use.

The pervasiveness of gas stations, especially those operated by independent retailers, tends to lower the price of gasoline.¹⁸⁰ Increases in the price of gasoline lower gasoline consumption and encourage adoption of more fuel-efficient vehicles.¹⁸¹

I. Gas Station Abandonment Is Common and Expensive

EPA estimates that about one-half of the 450,000 brownfield sites in the United States are contaminated by petroleum, largely from leaking USTs at abandoned gas stations.¹⁸²

The cleanup of abandoned gas stations can be a heavy burden on state budgets. For instance, Kiel Bros. Oil Co., owned in part by the family of Vice President Mike Pence, operated a chain of more than 200 gas stations in Illinois, Indiana, and Kentucky.¹⁸³ In 2004, the company

went bankrupt, leaving behind more than 85 contaminated sites that leaked toxic chemicals into soil, streams, and wells.¹⁸⁴ As of 2018, the state of Indiana had spent more than \$20 million cleaning up about 40 sites, and cleanups are still outstanding on the remainder of the company's sites.¹⁸⁵

Further waves of gas station abandonment are likely as accelerating EV penetration reduces gasoline demand, rendering gas stations increasingly obsolete.¹⁸⁶ One real estate expert estimates that 50% of gas stations will close by 2030, in significant part due to the rise of the electric car.¹⁸⁷ Increased gasoline sales competition from large retailers such as Costco and Sam's Club, mobile fueling, and convenience store competition from dollar stores will likely continue to drive some gas stations out of business. Meanwhile, gas station property owners will face environmental cleanups and declines in underlying property values.¹⁸⁸

III. Modernizing Gas Station Regulation

The four emerging trends affecting gas stations—the climate crisis, rise of EVs, aging of gas stations' USTs, and growing understanding of the health risks of gas station pollution—require a new regulatory regime. Jurisdictions that effectively regulate gas stations will realize a shrinking, cleaner network of gas stations, reduce carbon and vehicle pollution, reduce taxpayer expenditure, and enhance public health. Jurisdictions that fail to address these trends will likely perpetuate the existing sprawling and ramshackle network of gas stations, experience more vehicle and carbon pollution, spend more money on cleanups, and achieve poorer public health outcomes.

This part describes options for modernizing regulation of gas stations. It proposes both stricter state and local enforcement of existing regulation and options for new regulations.

A. Requiring Upgrades of Obsolete USTs and Piping Systems

1. Federal and State Regulation of USTs

USTs are federally regulated pursuant to the Resource Conservation and Recovery Act (RCRA) and its implementing regulations.¹⁸⁹ RCRA, like many other federal environmental statutes, employs a cooperative federalism approach. The federal government creates and enforces UST regulations unless a state steps in with its own alter-

177. Mark D. Jekanowski et al., *Convenience, Accessibility, and the Demand for Fast Food*, 26 J. AGRIC. & RES. ECON. 58 (2001), available at <https://ageconsearch.umn.edu/record/31162>.

178. Carla A. Campbell et al., *The Effectiveness of Limiting Alcohol Outlet Density as a Means of Reducing Excessive Alcohol Consumption and Alcohol-Related Harms*, 37 AM. J. PREVENTIVE MED. 556 (2009), available at <https://www.thecommunityguide.org/sites/default/files/publications/Alcohol-AJPM-evrev-outlet-density.pdf>.

179. MARK PETTICREW ET AL., ALCOHOL ADVERTISING AND PUBLIC HEALTH: SYSTEM PERSPECTIVES VERSUS NARROW PERSPECTIVES (London School of Hygiene and Tropical Medicine, Working Paper, 2016), https://discovery.ucl.ac.uk/id/eprint/1524310/1/O%27Mara-Eves_FINAL%20VERSION%20Alcohol%20advertising%20and%20public%20health%2014th%20July%202016.pdf.

180. Justine S. Hastings, *Vertical Relationships and Competition in Retail Gasoline Markets: Empirical Evidence From Contract Changes in Southern California*, 94 AM. ECON. REV. 317 (2004), available at <https://pubs.aeaweb.org/doi/pdf/10.1257/000282804322970823>.

181. WEIWEI LIU, MODELLING GASOLINE DEMAND IN THE UNITED STATES: A FLEXIBLE SEMIPARAMETRIC APPROACH (State University of New York at Binghamton, Working Paper, 2011), <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.363.1203&rep=rep1&type=pdf>; Arie Beresteanu & Shanjun Li, *Gasoline Prices, Government Support, and the Demand for Hybrid Vehicles in the United States*, 52 INT'L ECON. REV. 161 (2011), available at http://li.dyson.cornell.edu/pdf/IER_2011.pdf.

182. U.S. EPA, *Underground Storage Tanks (USTs): Petroleum Brownfields*, <https://www.epa.gov/ust/petroleum-brownfields> (last updated July 15, 2020).

183. Brian Slodysko, *Cleanup of Pence Family Gas Stations Cost Indiana More Than \$20 Million*, CHI. TRIB., July 14, 2018, <https://www.chicagotribune.com/business/ct-pence-family-gas-stations-indiana-20180713-story.html>.

[com/business/ct-pence-family-gas-stations-indiana-20180713-story.html](https://www.chicagotribune.com/business/ct-pence-family-gas-stations-indiana-20180713-story.html).

184. *Id.*

185. *Id.*

186. Marc Dunec, *5 Questions: Electric Vehicles and the End of Gasoline Stations*, REAL ASSETS ADVISER, Dec. 1, 2019, <https://irei.com/publications/article/5-questions-electric-vehicles-end-gasoline-stations/>.

187. *Id.*

188. *Id.*

189. 42 U.S.C. §§6991-6991(m), ELR STAT. RCRA §§9001-9014; 40 C.F.R. pt. 280 (2019).

native program.¹⁹⁰ State regulation of UST owners and operators can displace EPA authority if it is at least as stringent as EPA requirements covering release detection, prevention, and correction.¹⁹¹ States are free to go beyond the federal rules and develop stricter regulation of USTs.¹⁹² Forty-seven states have UST regulations meeting the federal UST requirements.¹⁹³

In 2015, EPA tightened regulations for USTs, going beyond the initial requirements of RCRA to match key portions of the Energy Policy Act of 2005.¹⁹⁴ The 2015 regulations require all new tanks and piping to have secondary containment, or double walls.¹⁹⁵ They do not, however, impose such requirements on existing USTs, even if they are obsolete or beyond their recommended life.¹⁹⁶

2. Policy Option: Mandatory Replacement of Aging USTs

Mandated replacement of tanks with single walls and those beyond a certain age is a cost-effective means to reduce the biggest sources of gasoline pollution of soil and water. At least nine states of 38 polled in 2015 already impose at least a partial version of this policy.¹⁹⁷ Connecticut requires that all USTs be replaced within 30 years of their installation. New Hampshire required that all single-walled USTs and piping be closed by 2015.¹⁹⁸ Rhode Island began phasing out old single-walled USTs in 2017, with a requirement that they all be replaced by 2024.¹⁹⁹ California requires that single-walled USTs be removed by the end of 2025.²⁰⁰

Many state regulators have not used their existing statutory authority to regulate USTs to mandate replacement of single-walled or aged-out existing USTs and piping. In Washington State, for example, a statute²⁰¹ directs the Depart-

ment of Ecology to enact statewide requirements for USTs “consistent with and no less stringent than the requirements in the federal regulations and the underground storage tank compliance act of 2005,” and to develop regulations upgrading existing UST systems.²⁰² Despite the statutory direction, the Department of Ecology regulations do not yet require upgrades to double-walled tanks.²⁰³

3. Impact of Mandated UST Upgrades

Mandated UST upgrades of existing USTs to federal standards for new USTs will substantially reduce the risk of soil and water contamination. Further, removal and replacement of USTs generally requires soil sampling for petroleum around the tanks and piping after the USTs are pulled out of the ground,²⁰⁴ a process that frequently uncovers gasoline contamination and can trigger a cleanup. In certain jurisdictions, such as in the city of Seattle, UST upgrades can also trigger requirements to install surface water retention and separation systems.²⁰⁵

Mandated UST upgrades thus force a reckoning upon gas stations—either spend the money to upgrade to modern USTs and clean up existing contamination or exit the business.

B. Requiring Cleanup of Gas Stations With Known Contamination

1. Federal and State Regulation of Contaminated Gas Stations^s

RCRA created a duty for owners and operators of USTs to report and clean up their spills.²⁰⁶ Federal regulations implementing RCRA mandate investigation and cleanup of leaking USTs, and allow EPA (or a state acting pursuant to a delegation from EPA) to recover costs of cleanup from current and prior owners and operators of USTs.²⁰⁷

Under RCRA, states can enact programs governing cleanups of USTs.²⁰⁸ Many state governments have the statutory right to order cleanups of existing contamination or conduct the cleanup themselves and require the landowner and/or polluter to pay for it.²⁰⁹ If the polluter fails to pay, the state agency can in many cases clean up the property and put a lien on the land to recoup the cost of the cleanup.

190. 42 U.S.C. §6991(e).

191. *Id.* §6991b(a) (defining scope of federal regulatory authority over USTs); *id.* §6991c(b)(1) (allowing for approval of state regulatory programs that “are no less stringent” than the corresponding federal law).

192. See U.S. EPA, *State Underground Storage Tank (UST) Programs*, <https://www.epa.gov/ust/state-underground-storage-tank-ust-programs> (last updated Oct. 19, 2020) (describing EPA approval for state programs that are “no less stringent than federal standards,” language that leaves room for states to go beyond the federal baseline).

193. *Id.*

194. 40 C.F.R. pts. 280 & 281 (2015); see also U.S. EPA, *Revising Underground Storage Tank Regulation—Revisions to Existing Requirements and New Requirements for Secondary Containment and Operator Training: Final Rule*, <https://www.epa.gov/ust/revising-underground-storage-tank-regulation-revisions-existing-requirements-and-new> (last updated Sept. 18, 2019); U.S. EPA, *Secondary Containment for Underground Storage Tank Systems—2005 Energy Policy Act*, <https://www.epa.gov/ust/secondary-containment-underground-storage-tank-systems-2005-energy-policy-act> (last updated May 30, 2017).

195. 40 C.F.R. pts. 280 & 281 (2015).

196. See U.S. EPA, *IMPLEMENTATION TIME FRAMES FOR 2015 UNDERGROUND STORAGE TANK REQUIREMENTS* (2015), <https://www.epa.gov/sites/production/files/2015-09/documents/implementbrochure091515.pdf> (outlining deadlines for compliance with various aspects of the 2015 UST regulations, but not including a deadline by which all outdated tanks must be closed or upgraded).

197. AGING TANKS WORKGROUP, *supra* note 129.

198. N.H. CODE ADMIN. R. ENV-OR 408.05(c) (2020), <https://www.des.nh.gov/organization/commissioner/legal/rules/documents/env-or400.pdf>.

199. RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT, *FACT SHEET: SINGLE-WALL CLOSURE DEADLINE* (2017), <http://www.dem.ri.gov/programs/benviron/waste/pdf/ustfs-swcd.pdf>.

200. S.B. 445, 2013/2014 Leg., Reg. Sess. (Cal. 2014).

201. WASH. REV. CODE §70A.355.020 (2020).

202. Energy Policy Act of 2005, Pub. L. No. 109-58, 119 Stat. 594 (tit. XV, subtit. B), 42 U.S.C. §§15801-16524; see also 430 ILL. COMP. STAT. ANN. 15/2(1)(b) (2020) (granting the Office of the State Fire Marshal authority to “promulgate rules providing for the . . . revocation of permits” for gas stations that fail to comply with UST rules).

203. See WASH. ADMIN. CODE ch. 173-360A (2020).

204. See, e.g., *id.* §§173-360A-0810, 173-360A-0730.

205. SEATTLE DEPARTMENT OF CONSTRUCTION AND INSPECTIONS, *CLARIFICATION SHEET FOR BMP 10 FUELING AT DEDICATED STATIONS* (2016), <https://www.seattle.gov/Documents/Departments/SDCI/Codes/Clarification-SheetAttachment2.pdf>.

206. 42 U.S.C. §6991.

207. 40 C.F.R. §§280.50-.66 (2019).

208. 42 U.S.C. §§6991b et seq.; 40 C.F.R. pt. 281 (2019).

209. RCRA does not provide for recovery of cleanup costs by private parties when cleanup has already been performed. *Meghrig v. KFC W., Inc.*, 116 S. Ct. 1251, 1256, 26 ELR 20820 (1996).

States often fail to exercise their regulatory powers, however.²¹⁰ The Wallingford Shell station in Seattle discussed in the introduction has operated for more than 10 years despite the gasoline spill underneath it leaching benzene into the groundwater at 360 times the legal limit.²¹¹ Seventy-four of 109 operating Seattle gas stations have a documented history of contamination of the soil or groundwater.²¹²

Due to underfunding of agencies charged with cleanups, inadequate cleanup and insurance funds, and concern about the impact on small business, states often allow gas stations with significant contamination to continue operating indefinitely. The analysis below reviews the authority of four states to order cleanups.

□ *Washington.* In Washington, the state may investigate and conduct remedial actions of toxic sites, or require potentially liable persons to do so.²¹³ Property owners and persons responsible for site contamination are liable for the costs of cleanup.²¹⁴ The state has lien authority to recover cleanup costs by placing a lien for cleanup costs on the property.²¹⁵

□ *California.* The California Department of Toxic Substances Control administers the Site Remediation Account, which funds investigation, remediation, and maintenance of contaminated sites and sites suspected of contamination with hazardous material.²¹⁶ The state can recover costs incurred pursuant to a remedial action from liable parties.²¹⁷ Responsible parties include current owners/operators and the owner/operator at the time of a release.²¹⁸

Responsible parties are strictly liable for cleanup costs. A liable party who establishes by a preponderance that it is only liable for a portion of the costs shall only be liable to pay that portion.²¹⁹ Costs recoverable from owners of property subject to or affected by the remedial action are secured by a lien on the property.²²⁰ Cleanup actions are prioritized according to factors including current and historical activities, site characteristics, hydrology, evidence of poor management of materials, and complaints.²²¹

□ *Illinois.* The Illinois EPA operates the state's Site Investigation and Remedial Activities Program, which is responsible for investigation into and remediation of sites contaminated by hazardous material other than oil spills.²²²

210. See, e.g., Brenda Flanagan, *Toxic NJ: Cleanup Backlog*, NJ SPOTLIGHT NEWS, Dec. 10, 2015, <https://www.njtvonline.org/news/video/toxic-nj-cleanup-backlog/>.

211. See *supra* the introduction.

212. Metz, *supra* note 15.

213. WASH. REV. CODE §70A.305.030(1)(a)-(b) (2020).

214. *Id.* §70A.305.040(2).

215. *Id.* §70A.305.060.

216. CAL. HEALTH & SAFETY CODE §25337 (2020).

217. *Id.* §25360(a).

218. *Id.* §25323.5(a)(1).

219. *Id.* §25363.

220. *Id.* §25365.6(a).

221. California Water Boards, *Site Cleanup Program (SCP): Resolution 92-49*, https://www.waterboards.ca.gov/water_issues/programs/site_cleanup_program/resolution_92_49.html (last updated June 11, 2018).

222. 415 ILL. COMP. STAT. ANN. 5/58.3(a) (2020).

When seeking recovery, the agency must prove that the person at issue is the proximate cause of the release. If more than one person is the proximate cause, neither is responsible for more than their share of the responsibility.²²³ In addition to cost recovery, liable parties can be subject to civil penalties of up to \$50,000, plus \$10,000 per day of violation.²²⁴

□ *New Jersey.* New Jersey's Spill Compensation and Control Act covers releases of hazardous material into the ground as well as water.²²⁵ When a hazardous substance is discharged, the New Jersey Department of Environmental Protection may clean it up itself, contract with a third party to clean it up, or direct the discharger to clean it up. Any discharger who fails to comply will be liable for three times the cost of cleanup and removal.²²⁶

Liability extends to any person who actually discharged the hazardous substance as well as the owner/operator of a facility, without regard to fault, jointly and severally, for up to \$50 million. That monetary cap is removed and the owner/operator is responsible for the full cost of cleanup if it is shown that the release was the result of gross negligence or willful misconduct.²²⁷ Until paid off, the debt owed by any liable party is secured by a lien on that party's property.²²⁸

2. Policy Option: Strict Exercise of Existing State Cleanup Authority

As previously discussed in Section II.E, owners of gas stations operating on contaminated sites have an incentive to keep their stations operating indefinitely, with the goal of kicking the can down the road until such time as the contamination is carried away by groundwater or otherwise disappears, or until the land values of the property have increased substantially. States can discourage such "zombie" gas stations by using their existing authorities to require that operating gas stations on contaminated sites undergo prompt cleanup or face closure. Cleanups will in many cases trigger upgrades to modern UST standards.

Owners may drag their feet in response to state cleanup orders. In such cases, state regulators may take necessary actions to protect the environment from a release and impose institutional controls on the offender.²²⁹ If cleanups still do not occur, many states have the authority to initiate a cleanup on their own and lien the land for the cost of the cleanup. States may use discretion regarding which stations are ordered to clean up first. For example, states might prioritize locations where there is strong demand for housing or other uses for gas station land, liability is clear, a third-party deep pocket is responsible, and communities are already adequately served by other gas stations.

225. See, e.g., *Morristown Assocs. v. Grant Oil Co.*, 220 N.J. 360, 45 ELR 20025 (2015).

226. N.J. STAT. §58:10-23.11f(a)(1) (2020).

227. *Id.* §58:10-23.11g(b); *id.* §58:10-23.11g(c)(1).

228. *Id.* §58:10-23.11g(c)(2).

229. See, e.g., WASH. REV. CODE §70A.305.030(1)(f)-(g) (2020).

States should seek, where possible, contribution from the oil companies whose product is contaminating the ground.²³⁰ Oil majors frequently maintain long-term fuel supply contracts with convenience store operators, and provide them with marketing support and signage to promote the fuel brand.²³¹ Under an “arranger liability” theory, for example, a state may be able to hold an oil refiner responsible when the company sells gasoline to a petroleum retailer pursuant to an exclusive supply agreement.²³²

3. Impact of Mandated Cleanups

Mandated cleanups will force contaminated stations to reckon with their contamination and upgrade to modern USTs or exit the gas station business. In dense urban environments where land values are high, cleanups may cause land to be redeveloped for other uses, particularly housing.

In the cases where third-party deep pockets are responsible for the costs of cleanup,²³³ mandated cleanups will bring resources into the community. Cleanups help unlock the land for redevelopment, which can better serve the public’s needs while boosting property and sales tax revenues.

C. Preventing Air Pollution

1. Federal and State Regulation of Gas Station Air Pollution

Federal and state law do not set limits on overall vapor emissions from gas stations. Some states mandate technology designed to limit vapor emissions from vent pipes and gas pumps. For example, California has laws regarding vapor recovery systems designed to control emissions during fueling.²³⁴

2. Policy Option: Measure, Report, and Strictly Limit Gas Station Air Pollution

There are no existing reliable field measurements of benzene levels in or at the perimeter of gas stations in the United States, but they can be obtained at reasonable cost.²³⁵ Such

measurements have been made in other countries.²³⁶ Governmental agencies responsible for air quality should first measure the benzene pollution emanating from the gas stations in their jurisdiction.

Once data are collected on a sample of gas stations, air quality management districts and state pollution agencies should set limits on benzene concentrations at gas stations and at the property perimeter consistent with public health needs and technological advancement. Compliance should be monitored by regular measurement of benzene levels in the gas station and at the gas station perimeter, and stations not meeting limits should be prevented from operating until they are able to reliably control their air emissions.

3. Impact of Limiting Gas Station Air Pollution

Measurement and control of overall levels of benzene emissions from gas stations should improve health outcomes of people who live, work, or spend time at or near gas stations. Making the measurements publicly accessible will allow cities, air pollution districts, and others to take informed action to reduce nearby residents’ risk of benzene exposure.

D. Controlling Stormwater Pollution

1. Federal, State, and Local Protection of Stormwater From Gasoline Spills

Gasoline contaminates stormwater when small spills of gasoline that occur during fueling are carried away by rainwater into storm drains. Local governments have increasingly developed expansive stormwater control programs that are separate from and broader than the requirements of the Clean Water Act (CWA).²³⁷ While municipal programs vary widely, many localities have moved to adopt green infrastructure that moves surface runoff into natural areas rather than sewers, and contractual provisions requiring developers to allow inspections, take corrective action, or guarantee the performance of stormwater runoff controls.²³⁸

2. Policy Option: Required Installation of Surface Water Control Systems

In the city of Seattle, stormwater regulations require a catch basin underneath the concrete pad where the gas pumps are and a roof canopy covering the pump area.²³⁹ Gasoline caught by the catch basin is separated from the water flowing into the sewer system and channeled into a dead-end

230. A review of all the different theories upon which oil companies can be made to pay for cleanups is beyond the scope of this Article. For discussion of those theories, see Oshinskie, *supra* note 2.

231. *How Branded Stations Operate*, NACS, Feb. 17, 2020, <https://www.convenience.org/Topics/Fuels/How-Branded-Gasoline-Stations-Work>.

232. Braff, *supra* note 5.

233. As the federal government imposed regulation on USTs, oil majors began divesting themselves of gas stations and moving to a franchise model, in an apparent effort to avoid liability. See Oshinskie, *supra* note 2, at 4. However, liability may still be imposed on major oil companies for leaks at their franchisees under theories of ability to control, products liability, or fraudulent concealment. *Id.*

234. See, e.g., CAL. HEALTH & SAFETY CODE §41954 (2020).

235. Robert M. Healy et al., *Assessment of a Passive Sampling Method and Two On-Line Gas Chromatographs for the Measurement of Benzene, Toluene, Ethylbenzene, and Xylenes in Ambient Air at a Highway Site*, 10 ATMOSPHERIC POLLUTION RSCH. 1123 (2019), available at <https://www.sciencedirect.com/science/article/abs/pii/S1309104218306561>.

236. See, e.g., Sergio M. Correa et al., *The Impact of BTEX Emissions From Gas Stations Into the Atmosphere*, 3 ATMOSPHERIC POLLUTION RSCH. 163 (2012).

237. MELINE G. MACCURDY, STORMWATER PERMITTING AND MANAGEMENT PROGRAMS (2019); 33 U.S.C. §§1251-1387, ELR STAT. FWPCA §§101-607.

238. *Id.*

239. SEATTLE DEPARTMENT OF CONSTRUCTION AND INSPECTIONS, *supra* note 205.

sump.²⁴⁰ Other cities should follow Seattle and require a full surface water control system to control gasoline runoff at all gas stations installing new tanks, pipes, or pumps.²⁴¹

3. Impact of Protecting Stormwater From Gasoline Spills

Improved stormwater management will reduce the incidence of gasoline contamination of groundwater, streams, rivers, and lakes.

E. Prohibiting Construction of New Gas Stations

1. Federal, State, and Local Authority Over New Gas Station Construction

Broadly speaking, state governments are assumed to have all powers not expressly delegated to the federal government by the U.S. Constitution or preempted by federal statutory or constitutional law.²⁴² State “police power” encompasses a broad range of regulatory authority to promote public health, safety, and welfare.²⁴³ This includes the authority to regulate local commerce, pass health laws, punish offenses, and a number of other actions, as long as they do not run afoul of the federal powers or individual rights enumerated in the Constitution.²⁴⁴

The scope of state and local police power can be limited by the U.S. Congress’ exercise of its Article I, Section 8 authority over interstate commerce, as well as by the “dormant Commerce Clause,” a judicially created doctrine that limits state interference with interstate commerce even where federal law is silent.²⁴⁵ In considering dormant Commerce Clause challenges, a court weighs the impact of state or local regulation on interstate commerce against the legitimate state interest in the regulation, scrutinizing the regulation closely for economic protectionism.²⁴⁶

Forty states provide “home rule” to cities in their state constitutions or by statute (although some states require that cities be of a certain size to be eligible).²⁴⁷ Home rule grants localities authority to regulate their local affairs, except when a conflicting state statute preempts a local

measure.²⁴⁸ Cities without home-rule authority can often have broad implied powers.²⁴⁹ However, the specifics of municipal power vary across states, and sometimes even among municipalities within a state.²⁵⁰ States generally do provide local governments with broad control over zoning and land use decisions under state law, subject to overarching state priorities, and to the reasonableness of the regulation.²⁵¹

Because federal law does not regulate where gasoline is sold, it is unlikely to prevent a city or state from exercising its traditional powers over land use to limit the locations where a gas station can be sited.²⁵² City and county zoning powers are broad, and most cities already have regulations strictly limiting the locations where gasoline can be sold.²⁵³ These regulations could be tightened to ban the new construction of gas stations citywide or countywide. Given the traditional strength of local control over land use decisions, city- and county-level zoning restrictions are likely to be upheld if challenged in court.²⁵⁴

248. See Erin Adele Scharff, *Hyper Preemption: A Reordering of the State-Local Relationship?*, 106 GEO. L.J. 1469 (2018).

249. *Id.*

250. For example, Pennsylvania allows municipalities to opt for “home rule” governments. Home rule, established by state law, gives local governments all powers not specifically denied to them by the state constitution, state assembly, or home rule charter. Alternatively, cities that have not opted for home rule can only act in ways specifically authorized by state law. Kate Lao Shaffner, *What Is Home Rule*, WHY?, July 24, 2014, <https://why.org/articles/what-is-home-rule/>. Forty-four states have some form of home-rule provision in state law. *Id.*

251. ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT, THE GOVERNANCE OF LAND USE: COUNTRY FACT SHEET UNITED STATES 1-2 (2017), <https://www.oecd.org/regional/regional-policy/land-use-United-States.pdf> (“States have the authority to regulate land use, but all states have, to a large degree, delegated this authority to local governments.”); see also Hannah J. Wiseman, *Disaggregating Preemption in Energy Law*, 40 HARV. ENV’T L. REV. 293, 309-10 (2016) (arguing that courts in “home rule” states may be hesitant to preempt local decisions in areas of traditional municipal control, such as land use).

Some states, including Pennsylvania and New Jersey, place restrictions on local zoning authority if the zoning ordinance in question is shown to be unduly restrictive or exclusionary. *C & M Dev., Inc. v. Bedminster Zoning Hearing Bd.*, 820 A.2d 143, 151 (Pa. 2002); *Southern Burlington County NAACP v. Township of Mount Laurel*, 67 N.J. 151, *appeal dismissed*, 423 U.S. 808 (1975); see also *Beaver Gasoline Co. v. Osborne Borough*, 445 Pa. 571, 577 (1971) (Pennsylvania Supreme Court remanded a case to a zoning hearing board to give a borough the opportunity to provide evidence of a valid public purpose to justify a zoning ordinance that would have excluded gas stations from being located anywhere within a borough). See also *In re Appeal of Elocin, Inc.*, 461 A.2d 771, 772-73 (Pa. 1983) (“the constitutionality of a zoning ordinance which totally excludes a legitimate use is regarded with circumspection and, therefore, such ordinance must bear a more substantial relationship to a stated public purpose than a regulation which merely confines that use to a certain area within the municipality”).

252. For a more detailed discussion of the limits federal law places on the ability of states to regulate motor vehicle fuel, see Matthew N. Metz & Janelle London, *State Vehicle Electrification Mandates and Federal Preemption*, 9 MICH. J. ENV’T & ADMIN. L. 433 (2020). We conclude that while certain types of state regulation of motor fuel would be preempted by federal laws that contemplate gas-powered vehicles, most state action would survive a legal challenge. *Id.* The case that a regulation of gas stations would be upheld against a challenge based on a fuel-economy-focused statute is even stronger than in the area of EVs, because regulation of the gas pump is one step further removed from fuel economy than regulation concerning EVs. See also Ohm, *supra* note 243, at 626.

253. *E.g.*, SEATTLE, WASH., CODE §23.47A.028 (2020), https://library.municode.com/wa/seattle/codes/municipal_code?nodeId=TIT23LAUSCO_SUBTITLE_IIIILASRE_CH23.47ACO_23.47A.028STDRBU.

254. See Ferrey, *supra* note 245.

240. A “sump” is a pit or reservoir serving as a drain or receptacle for liquids. MERRIAM-WEBSTER, *Sump*, <https://www.merriam-webster.com/dictionary/sump> (last visited Nov. 9, 2020).

241. SEATTLE DEPARTMENT OF CONSTRUCTION AND INSPECTIONS, *supra* note 205.

242. See, e.g., *Bond v. United States*, 572 U.S. 844, 854 (2014) (“The States have broad authority to enact legislation for the public good—what we have often called a ‘police power.’”).

243. See Brian W. Ohm, *Some Modern Day Musings on the Police Power*, 47 URB. LAW. 625, 626, 631 (2015).

244. *Id.*

245. See Steven Ferrey, *Sustainable Energy, Environmental Policy, and States’ Rights: Discerning the Energy Future Through the Eye of the Dormant Commerce Clause*, 12 N.Y.U. ENV’T L.J. 507, 578-79 (2004).

246. See *Pike v. Bruce Church*, 397 U.S. 137, 143 (1970).

247. JOHN D. RUSSELL & AARON BOSTROM, AMERICAN CITY COUNTY EXCHANGE, FEDERALISM, DILLON RULE, AND HOME RULE 1-11 (2016), <https://www.alec.org/app/uploads/2016/01/2016-ACCE-White-Paper-Dillon-House-Rule-Final.pdf>.

2. Policy Option: Ban Construction of New Gas Stations

A ban on construction of new gas stations would most likely be enacted via an amendment to a municipal or county zoning code.²⁵⁵ In Baltimore, Maryland, a city council member introduced legislation in July 2020 to ban the construction or establishment of a new gas station in any zoning district within the city.²⁵⁶

The California Air Resources Board recommends that large gas stations (stations dispensing 3.6 million gallons or more per year) not be sited within 300 feet of sensitive land uses such as schools, parks, and residential communities.²⁵⁷ A buffer zone similar to that recommended by California's Air Resources Board could be expanded to 160 meters, the distance at which acutely harmful levels of benzene have been shown to spread.²⁵⁸

3. Impact of Ban on New Gas Stations

Banning the construction of new gas stations is a powerful policy to arrest the growth of retail gasoline outlets in the implementing jurisdiction. It also provides an effective backstop preventing gas stations shuttered because of environmental concerns from reopening in another location.

The larger the jurisdiction that implements a ban, the less likely drivers will simply travel to neighboring jurisdictions to purchase gasoline. If a city implements a ban, neighboring cities allowing gas stations might see a surge in new permitting applications. If a county implements one, gas stations would be impeded from moving from one city within a county to another. A state ban would prevent all new gas station construction within the state.

A ban on the construction of new gas stations will help jurisdictions contain the spread of the environmental impacts associated with gas station operation. It will prevent the contamination of air, soil, and water in a new location, and avert impacts to the uses and values of neighboring properties.

A ban will prevent new gas stations from increasing the number of outlets advertising gasoline for sale, will tend to make purchasing of gasoline less convenient, and will impede the expansion of "gasoline culture" to new areas. It will decrease the likelihood of abandonment of existing gas stations, because the ban will lead to fewer stations competing for the gasoline market.

Controversial impacts of a ban on new gas station construction could include the possibility of some persons traveling greater distance to purchase gasoline and less competition between gas stations, which could lead to higher gasoline prices.

255. See, e.g., Juliana Maantay, *Zoning, Equity, and Public Health*, 91 AM. J. PUB. HEALTH 1033 (2001), available at <https://ajph.aphapublications.org/doi/pdf/10.2105/AJPH.91.7.1033>.

256. Baltimore, Md., Ordinance 20-0561 (introduced July 6, 2020).

257. CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY, CALIFORNIA AIR RESOURCES BOARD, AIR QUALITY AND LAND USE HANDBOOK: A COMMUNITY HEALTH PERSPECTIVE (2005), <https://ww3.arb.ca.gov/ch/handbook.pdf>.

258. See Shearston & Hilpert, *supra* note 23.

F. Phasing Out of Existing Gas Stations

1. State and Local Authority to Phase Out Existing Gas Stations

The authority of state and local jurisdictions to phase out existing gas stations rests on the same police powers that allow the banning of new gas stations. However, with existing gas stations, jurisdictions need to be careful to avoid "regulatory takings" that could trigger requirements to pay compensation, unless the jurisdiction has the budget allocation to pay such compensation.

Constitutional protection of existing uses under the Takings Clause²⁵⁹ is often assumed, but is not mandated under existing law.²⁶⁰ In a takings analysis of an existing use, courts seek to balance the "reliance interests" (essentially, expectation that the regulatory environment will stay the same) of an owner or investor with the need for regulators to have flexibility in adapting to changed circumstances.²⁶¹

Nuisance law typically permits elimination of existing land uses for the purpose of preventing harm without the requirement of payment of compensation under the Takings Clause.²⁶² Gas stations' contribution to air, water, and soil pollution makes them strong candidates for application of nuisance doctrine, particularly if it could be demonstrated that air pollution from a gas station is above NIOSH safe thresholds.

A jurisdiction could also avoid payment of compensation by giving gas stations a reasonable period of time to exit the business. This concept, known as amortization, occurs when a government allows a nonconforming existing use to continue for a defined period of time.²⁶³ Under this doctrine, a city could order gas stations to sunset their operations within 10 years or some other reasonable period.²⁶⁴

A city may also consider using eminent domain authority to acquire gas stations at a reasonable cost, particularly those that are near sensitive locations such as schools, universities, or housing. The appraisal of a

259. The Takings Clause of the Fifth Amendment provides, in pertinent part, "nor shall private property be taken for public use, without just compensation."

260. See generally Christopher Serkin, *Existing Uses and the Limits of Land Use Regulation*, 84 N.Y.U. L. REV. 1222 (2009) (arguing that although many people presume that preexisting uses are constitutionally protected in the face of zoning changes, the actual status of such protections is unclear and not based on sound policy or constitutional reasoning).

261. See Kenneth A. Stahl, *Reliance in Land Use Law*, 2013 BYU L. REV. 949, 958-59 (2013).

262. See, e.g., *Hadacheck v. Sebastian*, 239 U.S. 394 (1915) (upholding statute eliminating existing brickyard from residential neighborhood).

263. See Serkin, *supra* note 260. Pennsylvania does not allow amortization of an ongoing nonconforming use unless the use is a nuisance. *Pennsylvania N.W. Distribs. v. Zoning Hearing Bd.*, 526 Pa. 186, 195, 584 A.2d 1372 (Pa. 1991). A federal district court in Pennsylvania held that a leaking gas station could constitute a public nuisance. *Graham Oil Co. v. BP Oil Co.*, 885 F. Supp. 716, 723, 26 ELR 20432 (W.D. Pa. 1994).

264. In *City of Garland v. Valley Oil Co.*, 482 S.W.2d 342, 346 (Tex. Civ. App. 1972), a court ruled that a one-year amortization period for a nonconforming gas station was lawful. See also *Standard Oil Co. v. City of Tallahassee*, 185 F.2d 410, 413 (5th Cir. 1950) (upholding discontinuance of a gas station use by a zoning ordinance enacted after the construction of the gas station).

property for eminent domain purposes should take into account the cost of cleanup, legal costs, financing effects, future liability, stigma, and other financial impacts of property contamination.

G. Reducing or Eliminating Insurance Subsidies for Gas Stations

1. Federal and State Laws Pertaining to UST Insurance

Federal regulations require owners and operators of UST systems to have insurance of a minimum of \$1 million per occurrence for corrective action and third-party claims.²⁶⁵ Thirty-six states help their gas stations meet federal insurance requirements by offering UST insurance to gas station owners and operators through state financial assurance funds.²⁶⁶ The state of Washington reinsures policies written by private insurers.²⁶⁷

State financial assurance funds are typically financed by a fee or tax on gasoline. California, for example, charges \$.02 per gallon, while Idaho charges only \$.002 per gallon.²⁶⁸ Gas station owners insured pursuant to state insurance funds typically pay a flat annual fee per UST, typically less than \$100 per year, regardless of tank age.²⁶⁹

A number of state cleanup programs are facing financial difficulty, making it unclear how effectively they will be able to handle necessary cleanups going forward. For example, Illinois' UST Fund was \$20 million short of being able to cover its obligations as of 2016.²⁷⁰

North Carolina has ensured its fund will not run dry, but at the cost of limiting cleanups. The state's Department of Environment and Natural Resources is now only permitted to order cleanups to the extent the fund can reimburse the cleanup activity within 90 days of completion.²⁷¹

2. Policy Option: Strengthen State Cleanup Funds by Charging Risky Gas Stations More

Because state insurance funds do not price discriminate between low-risk gas stations operating with new USTs and high-risk stations operating with aging USTs, they subsidize aging tank operation, thereby creating "moral hazard." Moral hazard occurs when the provision of insur-

ance implies that individuals do not bear fully the consequences of their actions.²⁷² Rather than subsidize risky operations, states should adopt a risk-based pricing mechanism whereby operators pay more to insure single-walled tanks and those over 20 years old.

States should also fully fund their insurance funds. North Carolina's practice of limiting cleanups to available funds is a subsidy to gas stations, because it allows gas stations to avoid paying the full cost of their environmental risk.

3. Impact of Risk-Based Insurance

States that abandoned state insurance funds and required private coverage have caused operators to upgrade their tanks to make them more insurable in the private market.²⁷³ By abandoning unnecessary subsidies for older USTs, states can better protect the public and avoid subsidizing a product with substantial negative environmental and health consequences. A movement to risk-based pricing will likely increase UST replacement and reduce contamination, while forcing "zombie" gas stations to exit the business.

States fully funding their cleanup funds will allow them to better protect the environment and avoid subsidizing pollution-causing activity.

H. Placing Climate Change Warning Labels on Gas Pumps

1. Federal, State, and Local Authority to Require Warning Labels

Cambridge, Massachusetts,²⁷⁴ recently enacted an ordinance that would require gas pumps to display labels warning consumers that gasoline use is a cause of climate change, and Santa Monica, California,²⁷⁵ and Berkeley, California,²⁷⁶ have considered similar ones. Authority to require gas pump warning labels has been challenged on First Amendment grounds.

265. 40 C.F.R. §281.37 (2019).

266. U.S. EPA, *State Financial Assurance Funds*, <https://www.epa.gov/ust/state-financial-assurance-funds> (last updated Sept. 9, 2020).

267. See WASH. REV. CODE §§70.148.005-900 (2020); WASH. ADMIN. CODE §§374-30-010, 374-30-060 (2020).

268. ASSOCIATION OF STATE AND TERRITORIAL SOLID WASTE MANAGEMENT OFFICIALS, *supra* note 140.

269. *Id.*

270. Tim Landis, *State of Illinois Has \$20.3 Million Hole in Fuel-Tank Cleanup Program; U.S. EPA Threatening to Pull Approval*, ST. J.-REG., Apr. 7, 2016, <https://www.sj-r.com/article/20160407/NEWS/160409652>.

271. NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY, FINANCIAL ASSURANCE FOR UNDERGROUND STORAGE TANK CLEANUPS: EXECUTIVE SUMMARY 1 (2005), <https://files.nc.gov/ncdeq/Waste%20Management/DWM/UST/Reports/UST%20Insurance%20White%20Paper%202005.pdf>.

272. See also JOSEPH E. STIGLITZ, RISK, INCENTIVES, AND INSURANCE: THE PURE THEORY OF MORAL HAZARD 5 (Geneva Papers on Risk and Insurance No. 26, 1983), <https://edisciplinas.usp.br/mod/resource/view.php?id=1462897>.

273. Haitao Yin et al., *Risk-Based Pricing and Risk-Reducing Effort: Does the Private Insurance Market Reduce Environmental Accidents?*, 54 J. L. & ECON. 325, 326-27 (2011) (finding that Michigan's decision to eliminate its financial assurance fund in the mid-1990s resulted in more than 3,000 UST releases avoided over an eight-year period, avoiding roughly \$400 million in cleanup costs).

274. Cambridge, Mass., Ordinance No. 1418 (2020), http://cambridgema.iqm2.com/Citizens/Detail_LegiFile.aspx?ID=10472 (last visited Nov. 9, 2020).

275. SANTA MONICA, CALIFORNIA, CITY COUNCIL REPORT, CITY COUNCIL REGULAR MEETING: SEPTEMBER 8, 2015 (2015), <https://publicdocs.smgov.net/WebLink/edoc/2325128/SR-09-08-2015-3J.pdf?dbid=0&repo=SMGOV> (last visited Nov. 9, 2020).

276. *Berkeley May Consider Gas Pump Warnings About Global Warming*, L.A. TIMES, June 17, 2014, <https://www.latimes.com/local/lanow/la-me-ln-berkeley-gas-pump-warnings-20140617-story.html>.

The Western States Petroleum Association (WSPA), an oil industry trade group, wrote a letter in 2014 to the city of Berkeley opposing Berkeley's proposed gas pump warning label ordinance, arguing that such an ordinance would constitute compelled speech in violation of the First Amendment.²⁷⁷ The letter states that, pursuant to decisions in *Zauderer v. Office of Disciplinary Counsel*²⁷⁸ and *Video Software Dealers Ass'n v. Schwarzenegger*,²⁷⁹ governments cannot compel product disclosures that do not convey "purely factual and uncontroversial information" and do not prevent deception of consumers. WSPA argued that because the labels would force businesses to advance California's contested policy position that global warming caused by greenhouse gases is a threat to California's economy and environment, and because they do not prevent consumer deception, they impermissibly compel speech.²⁸⁰

In *CTIA v. City of Berkeley*,²⁸¹ the U.S. Court of Appeals for the Ninth Circuit, in upholding a Berkeley city ordinance requiring that cell phone retailers display a poster warning of cell phone radiation, clarified that government can compel speech to further public health and welfare, provided that it can show a substantial government interest in doing so. It further held that a compelled disclosure can satisfy the "purely factual and uncontroversial" criterion if it is factual, even if it relates to a topic that can be controversial.

Applying the *CTIA* logic to the gasoline context, governments could argue that they have a substantial "public health and welfare interest" in avoiding excessive carbon in the atmosphere. Whether a statement such as "The U.S. government has determined that gasoline use causes global warming" would be considered "purely factual and uncontroversial" is less clear. While the statement is factual in that the U.S. government has determined that gasoline use causes global warming,²⁸² it may remain controversial for many.

The *CTIA* court applied a commonsense factual analysis to the cell phone radiation warnings, and held that a warning relating to subjects that are controversial, such as the health impacts from cell phone radiation, are not inherently controversial when the facts within the compelled statement are not themselves controversial.²⁸³ Accordingly, federal, state, and local jurisdictions have grounds on which to claim authority to require warning labels on gas pumps despite a First Amendment challenge.

2. Policy Option: Require Warning Labels on Gas Pumps

Cities or states could require labels on gas pumps stating a provable fact such as "The U.S. government has deter-

277. SANTA MONICA, CALIFORNIA, *supra* note 275.

278. 471 U.S. 626 (1985).

279. 556 F.3d 950, 965-67 (9th Cir. 2009), *aff'd sub nom.* Brown v. Entertainment Merchs. Ass'n, 564 U.S. 786 (2011).

280. *Id.*

281. 928 F.3d 832, 844 (9th Cir. 2019), *cert. denied*, 140 S. Ct. 658 (2019).

282. *See, e.g.*, U.S. EPA, *Overview of Greenhouse Gases*, <https://www.epa.gov/ghgemissions/overview-greenhouse-gases> (last updated Sept. 8, 2020).

283. *CTIA*, 928 F.3d at 844.

mined that gasoline use causes global warming," or listing statistics around the proven harms of gasoline.

3. Impact of Requiring Warning Labels

Impacts of warning labels will vary depending on the content, design, and placement of the warning, and the extent to which purchasers of gasoline pay attention to the warnings or disregard them.

The evidence of the effectiveness of warning labels in other contexts is mixed. Cigarette warning labels have been shown to stimulate thoughts about the risk of smoking, which lead to stronger intentions to quit and attempts to quit.²⁸⁴ Conversely, labels regarding the dangers of driving, operating machinery, and pregnancy while using alcohol have been shown to have little influence on drinking behavior, although they appear to have increased awareness of the message on the labels.²⁸⁵

I. Mandated Gasoline Sales Reporting and Disclosure

1. Federal, State, and Local Authority to Mandate Gasoline Sales Reporting

The federal government collects gasoline sales information, and states collect such information to provide to the federal government. States are required to report total monthly sales of gasoline taxed by the state to the Federal Highway Administration (FHWA),²⁸⁶ and to report fuel sales to the Internal Revenue Service (IRS).²⁸⁷

States can also require reporting of gasoline sales data from retail fuel outlets in connection with vehicle emissions standards. For instance, in Iowa, the Department of Revenue obtains gasoline sales data for the Retailers Fuel Gallons Annual Report to measure progress toward its renewable fuel standards.²⁸⁸ The California Air Resources Board requires retail fueling stations to report "throughput data," or annual gasoline sales volumes, as part of its Air Toxics "Hot Spots" Emission Inventory Criteria and Guidelines Regulation.²⁸⁹ In California, fueling stations must also report annual gasoline

284. Hua-Hie Yong et al., *Mediational Pathways of the Impact of Cigarette Warnings on Quit Attempts*, 33 HEALTH PSYCH. 1410 (2014).

285. Claire Wilkinson & Robin Room, *Warnings on Alcohol Containers and Advertisements: International Experience and Evidence on Effects*, 28 DRUG & ALCOHOL REV. 426 (2009).

286. U.S. Department of Transportation Office of Highway Policy Information, *Motor Fuel Data and the Highway Trust Fund*, <https://www.fhwa.dot.gov/policyinformation/motorfueldata.cfm> (last modified Apr. 2, 2020).

287. INTERNAL REVENUE SERVICE, PUBLICATION No. 510, EXCISE TAXES (2020), <https://www.irs.gov/pub/irs-pdf/p510.pdf>.

288. *See, e.g.*, Iowa Department of Revenue Releases 2018 Retailers Fuel Gallons Annual Report, FUEL IOWA, Apr. 2, 2019, <https://www.fueliowa.com/latest-news.cfm/Article/LATEST-kaigNEWS/Iowa-Department-of-Revenue-Releases-2018-Retailers-Fuel-Gallons-Annual-Report/2019-4-2>.

289. CAL. CODE REGS. tit. 17, §§93400-93410 (2020), <https://ww3.arb.ca.gov/regact/2018/ctr2018/ctrfro.pdf>; California Air Resources Board, "Hot Spots" Inventory Guidelines, <https://ww2.arb.ca.gov/hot-spots-inventory-guidelines> (last visited Nov. 9, 2020).

and diesel sales, identified by specific type of fuel, to the California Energy Commission.²⁹⁰

Local jurisdictions may also have authority to compel gas stations to provide gasoline sales data to them. For example, the California Constitution provides that cities and counties may make and enforce within their limits all local, police, sanitary, and other ordinances and regulations not in conflict with general laws.²⁹¹ This “police power” is the source of counties’ and cities’ regulatory authority to protect public health, safety, and welfare.²⁹²

It could be argued that understanding gasoline sales volumes from gas stations within city limits is necessary to protect the public health of residents living near gas stations. A “dose-response” connection has been established between gasoline sales volumes and health impacts. For instance, benzene emissions from gas stations are correlated with volumes of gasoline sold.²⁹³

2. Policy Option: Mandate Gasoline Sales Volume Reporting and Disclosure

State governments, and possibly local governments, could mandate that retail fuel outlets report their gasoline sales volume data at least annually and make public these gasoline sales figures at the most detailed level possible—ideally at the gas station level, city level, and zip code level.

3. Impact of Mandating Gasoline Sales Volume Reporting and Disclosure

Local governments armed with gasoline sales volume data will be able to set goals around reducing gasoline sales, and then track and measure progress toward those goals. As such, they will be able to assess the effectiveness of their transportation emissions reduction strategies and refine those strategies based on the gasoline sales data. For instance, Menlo Park, California, has adopted a climate action plan goal of reducing gasoline sales at retail fueling stations within the city by 10% annually from a 2018 baseline.²⁹⁴ With gasoline sales volume data, it will be able to

track progress toward this goal and focus public attention on achieving it.

Obtaining gasoline sales volume data at the gas station level will also enable “dose-response” correlations to be made between volumes of gasoline sold and demographics of the surrounding areas such as health, property values, crime rates, smoking, and obesity. Further, it will enable measurement of the impact of steps to reduce gasoline consumption, including ordinances requiring EV charging infrastructure in new or existing construction, EV car-sharing programs, adding bike lanes, and increasing housing density near transit.

IV. Conclusion

The climate crisis requires prompt reappraisal of all major pathways of carbon use and pollution. Gas stations have largely escaped scrutiny, despite their status as America’s biggest carbon spigot and their ubiquitous and highly visible presence in American cities.

Gas station regulation has historically prioritized low gasoline prices over public health, environmental protection, and climate recovery. Gas stations have been permitted to pass the costs of pumping gas onto unwitting neighbors and employees, government, and future generations. While this approach served past goals of expanding use of private, gas-powered passenger vehicles, it does not fit the 21st-century imperatives of rapidly drawing down carbon emissions, decreasing pollution of air, soil, and groundwater, and increasing equity in health outcomes.

To do their part to meet their climate goals, city, state, and federal governments will need to act quickly and decisively to curb carbon emissions. Tighter regulation of gas stations offers a powerful and effective means for reducing the gas stations’ contamination of air, soil, and water. It will also disincentivize gasoline consumption by preventing gas stations from externalizing the costs of their environmental harms by reducing the reach and omnipresence of the gasoline spigot.

290. CAL. CODE REGS. tit. 20, art. 3, §§1361-1371 (2020).

291. CAL. CONST., art. XI, §7.

292. INSTITUTE FOR LOCAL GOVERNMENT, LOCAL AGENCY POWERS AND LIMITATIONS (2012), http://www.ca-ilg.org/sites/main/files/file-attachments/local_agency_powers_and_limitations.pdf.

293. Hilpert et al., *supra* note 40. Gasoline sales volumes at the city level are not generally available. Cities typically estimate carbon emissions by using International Council for Local Environmental Initiatives’ (ICLEI’s) U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions. ICLEI USA, U.S. COMMUNITY PROTOCOL FOR ACCOUNTING AND REPORTING OF GREENHOUSE GAS EMISSIONS, <https://icleiusa.org/publications/us-community-protocol/>. This method of calculating greenhouse gases from transportation relies on assumptions, estimates, and derivations from regional or state-level data about vehicle miles traveled and the types of vehicle used to travel those miles. Its metrics do not provide cities with a tool that is readily understandable to determine whether their policies and practices are having an impact on greenhouse gas emissions. In contrast, gasoline sales relate directly to greenhouse gas emissions. Every gallon of gasoline burned sends 20 pounds of CO₂ into the atmosphere. FuelEconomy.gov, *supra* note 71. Reducing gasoline sales from a city’s gas stations means reducing CO₂ emissions enabled by that city.

294. See CITY COUNCIL OF MENLO PARK, CALIFORNIA, SPECIAL AND REGULAR MEETING MINUTES FOR JULY 14, 2020 (2020) (adopting Resolution No. 6575, including Agenda Item F1(3)(a): “Set citywide goals for increasing

EVs and decreasing gasoline sales. Announce and promote citywide goals of 1) making all new vehicles be electric by 2025 and 2) reducing gasoline sales each year by 10%, based on the total reported in 2018.”), https://www.menlopark.org/AgendaCenter/ViewFile/Minutes/_07142020-3470.