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Draft Scoping Plan Comments
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RE: RMI Comments on New York Climate Action Council Draft Scoping Plan

Earlier this year, the UN's Intergovernmental Panel on Climate Change released its latest climate report making it clear that we can still secure a future at 1.5°C (2.7°F) above pre-industrial levels, but only if we act now at unprecedented scale and speed.[1] New York's Climate Leadership and Community Protection Act (CLCPA) represents a nation-leading commitment to equitable, economywide decarbonization in support of this global goal.[2]

The Climate Action Council's Draft Scoping Plan is a critical first step to achieving the CLCPA's required 2030 and 2050 emissions reductions, evaluating specific pathways for New York that can reduce greenhouse gas emissions, improve human health, create economic opportunity for New Yorkers.[3] RMI is grateful for the opportunity to provide comments on the Draft Scoping Plan and stands ready to assist New York in this endeavor.

In our comments below, we outline strong support for the Draft Scoping Plan's emphasis on energy efficiency and electrification to decarbonize New York's Buildings sector. We highlight four specific areas in the proposed plan, and respectfully provide additional rationale and details to the CAC and policymakers in finalizing the Scoping Plan. The four areas are:

(1) Prioritize energy efficiency and electrification strategies for decarbonizing buildings, given the scaling and cost constraints of low-carbon fuel for buildings.
(2) Incorporate air pollution reduction and human health benefits of building decarbonization and electrification interventions.
(3) Adopt zero-emission appliance standards and development of an equitable implementation plan.
(4) Begin scaling down the gas system to ensure an equitable transition for ratepayers and utility workers.

1. Prioritize energy efficiency and electrification strategies for decarbonizing buildings, given the scaling and cost constraints of low-carbon fuel for buildings.

The Draft Scoping Plan aligns with several recent studies in recognizing the limits of hydrogen and biomethane in heating buildings, and the key role of efficiency and electrification as core strategies for

[1] IPCC, "Climate Change 2022: Impacts, Adaptation and Vulnerability," The Intergovernmental Panel on Climate Change, 2022, https://www.ipcc.ch/report/ar6/wg2/.
[2] New York State, "Our Climate Act: Climate Leadership and Community Protection Act," NYSERDA, 2022, https://climate.ny.gov/Our-Climate-Act.
[3] New York State Climate Action Council, *Draft Scoping Plan* (Dec. 30, 2021) [hereinafter "DSP"].

decarbonizing buildings.[4] Specifically, the Plan notes that "widespread building electrification is needed even with the strategic utilization of low-carbon fuels that are projected to be available".[5]

RMI's research strongly supports this conclusion. Strategies relying on hydrogen, biomethane, and synthetic methane require extensive spending on gas distribution infrastructure and new production facilities for those gases. These investments would divert substantial resources from necessary efficiency and electrification upgrades to New York's buildings. While green hydrogen offers substantial value in decarbonizing other sectors, especially in industrial processes, it represents a costly distraction from more effective solutions in the buildings sector.[6]

We present the following points for the CAC's consideration to further communicate the scaling and cost constraints of low-carbon fuel for buildings.

Hydrogen strategies for buildings impose impractical infrastructure requirements and high costs

There are several factors that make green hydrogen an impractical choice for heating buildings in New York. Many New York buildings are heated by fossil gas, which consists predominantly of methane and is delivered via a distribution pipeline system. Hydrogen, on its own, cannot be substituted 1-for-1 for fossil gas in either the pipeline system or in end-use appliances. The different physical properties of hydrogen gas can lead to metal pipeline embrittlement if high concentrations of hydrogen are transported via existing pipelines.[7] New York's gas utilities currently operate nearly 49,000 miles of distribution pipeline, with over 22,000 miles of steel or cast-iron pipes, which could require upgrade or replacement to accommodate a high blend of hydrogen, adding costs and logistical challenges.[8] For context, Con Edison has proposed spending $1.3 billion in 2023–2025 to replace just 255 miles of leak-prone pipe.[9]

Inside buildings, millions of end-use appliances that currently burn fossil gas in New York would also have to be upgraded or replaced for a complete transition to green hydrogen. For utilities to run green hydrogen through the distribution system, all appliances on that network would need to be upgraded in a coordinated fashion before hydrogen flows to customers. Hydrogen-capable furnaces, boilers, and water heaters do not have any notable market presence in New York today, so these appliances would also need to be commercialized and rapidly scaled. Continued investment in the gas distribution system — especially any investment predicated on future use of low-carbon fuels — risks sinking funds into a

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[4] DSP at 120; Princeton University, "Net-Zero America," Net-Zero America, October 2021, https://netzeroamerica.princeton.edu/the-report; and New Jersey, "2019 New Jersey Energy Master Plan Pathway to 2050," n.d., https://www.nj.gov/emp/docs/pdf/2020_NJBPU_EMP.pdf.

[5] DSP at 120.

[6] Emily Beagle, Stephen Doig, Chathurika Gamage, Thomas Koch Blank, Cato Koole, Patrick Molloy, and Tessa Weiss, *Fueling the Transition: Accelerating Cost-Competitive Green Hydrogen,* RMI, 2021, https://rmi.org/insight/fueling-the-transition-accelerating-cost-competitive-green-hydrogen/

[7] Pipeline embrittlement refers to the degradation of a metal pipeline, including cracking, blistering, hydride formation, and loss in tensile ductility, due to reactions between hydrogen gas and the pipeline material. The risks for hydrogen-caused embrittlement are greatest in high-pressure steel transmission pipelines, but steel distribution pipes may also suffer long-term damage from concentrations of hydrogen. Source: Melaina, Antonia, and Penev, "Blending Hydrogen into Natural Gas Pipeline Networks: A Review of Key Issues," NREL, March 2013, https://www.nrel.gov/docs/fy13osti/51995.pdf.

[8] New York State, "NYS Pipeline Safety Program," www3.dps.ny.gov, July 28, 2021, https://www3.dps.ny.gov/W/PSCWeb.nsf/All/4606B847387FBCB6852580A700678AD0?OpenDocument;

[9] Consolidated Edison Company of New York, Inc, "Gas Infrastructure, Operations and Supply Panel - Gas," New York Department of Public Service, https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7b4FC9F0EF-2F94-4E1C-8401-85DA4848D221%7d.

system facing declining usage and poses an opportunity cost when that investment could directly support proven and established carbon-free solutions like energy efficiency and electrification.[10]

Beyond the potential billions of dollars in pipeline infrastructure replacement costs that would ultimately be borne by ratepayers, green hydrogen is an expensive fuel to produce for mass heating use. In the United States, green hydrogen costs around $5/kg today on average (or $37/MMBtu).[11] With expected investments in green hydrogen technology, analyst forecasts and government targets point toward prices of $1–$2/kg as soon as 2030.[12] However, that still equates to about $7.40–$15.00/MMBtu. The CAC assumes in its analysis that green hydrogen will cost more than $21/MMBtu by 2030 and $13.70/MMBtu by 2050.[13]

At these costs, widespread use of hydrogen for home heating would mean a major increase in energy bills for New York residents. For many customers, this compares to a status quo in which fossil gas prices have held in the $2–$3/MMBtu range for years before spiking to $6–$7/MMBtu in spring 2022, causing significant gas bill increases.[14] Even before recent gas price spikes, heating with efficient cold-climate heat pumps was comparable in terms of energy costs to heating with fossil gas in New York, and gas price volatility has only made electrification more economically attractive.[15] Furthermore, given New York State's electrification goals, the customer base for the gas distribution network will inevitably shrink.[16] Allowing costly investments in the gas system for the sake of integrating or converting to low-carbon fuels would leave a dwindling pool of customers on the hook for costly capital expenditures as well as a more expensive fuel.

Producing green hydrogen for heating buildings is an inefficient use of clean electricity

Producing and burning hydrogen for building heat requires much more electricity generation than heating buildings directly with electric heat pumps. Exhibit 1 shows the step-by-step energy flows required to deliver a year's worth of heating for a typical New York home with a gas furnace and gas water heater. Such a home might require about 50 MMBtu (equivalent to 15 MWh) of heating energy annually. Meeting this demand with green hydrogen would require over 25 MWh of clean electricity, due to the efficiency losses during the production of green hydrogen and the relative inefficiency of end-use appliances.[17] Using a high-performing electric heat pump could require as little as 5–6 MWh of clean

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[10] Ashita Gona & Mike Henchen, *US Can't Meet Climate Goals While Spending Billions on Gas Infrastructure,* RMI (Aug. 2, 2021), https://rmi.org/us-cant-meet-climate-goals-while-spending-billions-on-gas-infrastructure/

[11] U.S. Department of Energy, "Hydrogen Shot," Office of Energy Efficiency & Renewable Energy, 2021, https://www.energy.gov/eere/fuelcells/hydrogen-shot.

[12] Emma Penrod, "Rapid Development Could Push Cost of Hydrogen below $2/Kg in the next 10-20 Years, Analysts Say," Utility Dive, April 11, 2022, https://www.utilitydive.com/news/rapid-development-could-push-cost-of-hydrogen-below-2kg-in-the-next-10-20/621836/; and "Hydrogen Shot"

[13] DSP at Appendix G: Integration Analysis Technical Supplement, Emma Penrod, "Rapid Development Could Push Cost of Hydrogen below $2/Kg in the next 10-20 Years, Analysts Say," Utility Dive, April 11, 2022, https://www.utilitydive.com/news/rapid-development-could-push-cost-of-hydrogen-below-2kg-in-the-next-10-20/621836/.

[14] U.S. Energy Information Administration, "Henry Hub Natural Gas Spot Price (Dollars per Million Btu)," U.S. Department of Energy, June 15, 2022, https://www.eia.gov/dnav/ng/hist/rngwhhdm.htm.

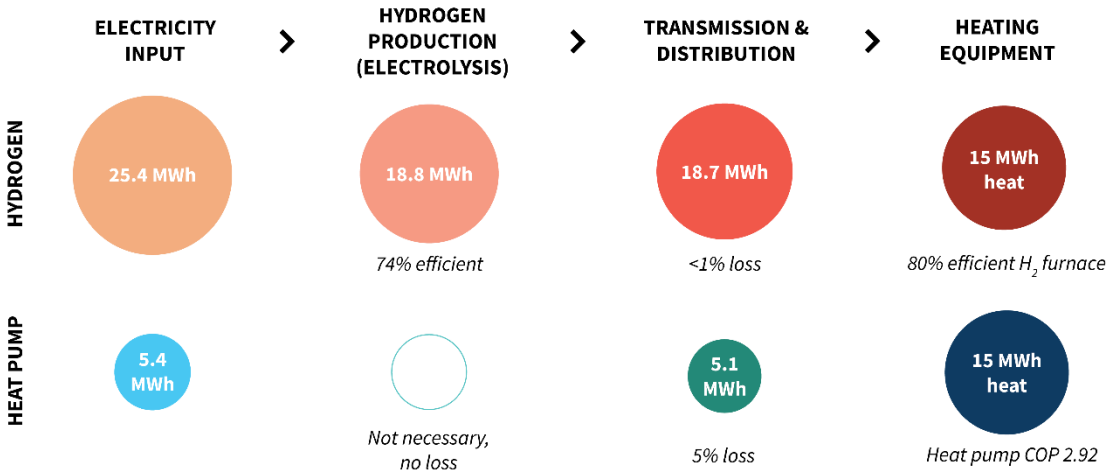
[15] Claire McKenna, Amar Shah and Leah Louis-Prescott, *The New Economics of Electrifying Buildings,* RMI (2020), https://rmi.org/insight/the-new-economics-of-electrifying-buildings

[16] Dave Kovaleski, "New York Gov. Hochul Proposes Plan for 2 Million Electrified Homes by 2030," Daily Energy Insider, January 7, 2022, https://dailyenergyinsider.com/news/33367-new-york-gov-hochul-proposes-plan-for-2-million-electrified-homes-by-2030/#:~:text=homes%20by%202030-.

[17] *See* "Making the Hydrogen Economy Possible: Accelerating Clean Hydrogen in an Electrified Economy," Energy Transitions Commissions, April 2021, p. 16.

electricity. That is, heating with green hydrogen would require about 4.4 times as much clean electricity as heating directly with a heat pump.

Exhibit 1: ***Heating a New York home with hydrogen would require significantly more energy input than heating with an electric heat pump***[18]



The consequences of this energy comparison are stark at a statewide scale. New York's residential and commercial buildings currently consume about 828 TBtu of natural gas each year.[19] To meet that consumption with green hydrogen, New York State would need to build out additional clean electricity generation to produce 308 TWh/y for hydrogen production. Meeting that load via direct electrification with high-performing heat pumps would only require 69 TWh/y. For comparison, the CAC anticipates about 320 TWh/y total electricity production for all sectors by 2050. The hydrogen heating pathway for buildings would require nearly this much generation just to displace gas in the residential and commercial sectors.

Strategies centered on low-carbon fuels in buildings divert resources from urgently needed efficiency and electrification solutions

As New York pursues rapid, economywide decarbonization and leadership in the green hydrogen economy, there are opportunities for the Draft Scoping Plan to communicate the limits of any potential future applications of low-carbon fuels more clearly.[20]

The Final Scoping Plan can include analysis accounting for the full cost of transitioning to low-carbon fuels in buildings, including but not limited to (1) full costs of necessary infrastructure upgrades e.g., mitigating metal pipeline embrittlement, (2) comparative electricity consumption for heating versus conventional electric options, and (3) identify further challenges to scaling low-carbon fuels as a carbon-free solution. Additionally, the Draft Scoping Plan should provide further information about the health

[18] Olivia Prieto & Mike Henchen, *Low-Carbon Fuels Have a Limited Role to Play in New York's Buildings,* RMI (May 25, 2022), https://rmi.org/low-carbon-fuels-have-a-limited-role-to-play-in-new-yorks-buildings/
[19] This figure refers to average residential and commercial natural gas consumption in 2017–2021, per EIA data.
[20] New York State, "Governor Hochul Announces Multi-State Agreement Signed with Major Hydrogen Ecosystem Partners to Propose a Regional Clean Energy Hydrogen Hub | Governor Kathy Hochul," March 24, 2022, https://www.governor.ny.gov/news/governor-hochul-announces-multi-state-agreement-signed-major-hydrogen-ecosystem-partners.

impacts of low-carbon fuels as a solution, something currently only noted in the statement that "the combustion of renewable natural gas (RNG) is likely to result in pollutant emissions similar to fossil gas combustion".[21] This is especially in light of recent findings that demonstrate climate and health risks of burning hydrogen in buildings.[22] This clarity will be crucial for advancement of meaningful policies that upgrade the state's buildings for high efficiency, stop the expansion of gas use, and ramp up programs to rapidly convert from gas heating to efficient electric alternatives powered by clean energy.

2. Incorporate air pollution reduction, human health, and equity benefits of building decarbonization and electrification interventions.

"Chapter 8: Public Health" of the Draft Scoping Plan addresses critical gaps in climate action by clearly recognizing the link between the many direct and indirect public health benefits New Yorkers can enjoy from the state's efforts of mitigating GHG emissions and adapting to climate change.[23] We provide two opportunities for consideration, for policymakers in formulating strategies to maximize health benefits for our residents.

Clarify and emphasize the negative impact of fossil fuel appliances on air pollution and health – specifically for NO_x pollution

In Chapter 8.2, the Draft Scoping Plan provides a discussion of the state's compliance with certain health-protective air quality standards but does not address the significant NO_x pollution emitted by fossil fuel appliances in buildings and the resulting negative impact on air quality and health.[24] Fossil fuel appliances in New York emit over 43,800 tons of outdoor NO_x that contribute to the formation of health-harming ozone and fine particle pollution. They are a significant source of NO_x pollution, accounting for nearly 18% of all statewide NO_x pollution, second to only light duty vehicles.[25] Exposure to NO_x is commonly linked to respiratory diseases, particularly childhood asthma.[26] Outdoors, NO_x leads to the formation of ozone, also known as smog. Exposure to this health-harming pollutant is associated with decreased lung function, respiratory illnesses, emergency department visits, and even premature mortality.[27]

Further, the Draft Scoping Plan notes that New York is currently in compliance with several health-protective air quality standards set by the U.S. Environmental Protection Agency but makes limited

[21] DSP at 61.
[22] Andee Krasner and Barbara Gottlieb, "Hydrogen Pipe Dreams: Why Burning Hydrogen in Buildings Is Bad for Climate and Health" (Physicians for Social Responsibility, 2022), https://www.psr.org/wp-content/uploads/2022/06/hydrogen-pipe-dreams.pdf.
[23] DCP at 59.
[24] DSP at 57.
[25] RMI analysis of EPA 2017 National Emissions Inventory data, https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data#dataq. Appliance emission estimates include residential and commercial emissions for the gas, oil, and other fuel categories. Some commercial source classification codes have been excluded to avoid counting certain non-appliance sources like pipeline compressor stations and industrial-scale boilers. All commercial nonpoint source emissions are included, and commercial point source emissions are included if they have input heat capacities less than 10 MMBtu/hr or if they are classified as space heaters.
[26] Weiwei Lin, Bert Brunekreef, and Ulrike Gehring, "Meta-Analysis of the Effects of Indoor Nitrogen Dioxide and Gas Cooking on Asthma and Wheeze in Children," *International Journal of Epidemiology* 42, no. 6 (August 20, 2013): 1724–37, https://doi.org/10.1093/ije/dyt150.
[27] U.S. Environmental Protection Agency, "Health Effects of Ozone Pollution | US EPA," US EPA, October 10, 2018, https://www.epa.gov/ground-level-ozone-pollution/health-effects-ozone-pollution.

mention of the "severe" non-attainment of others – specifically ozone.[28] Outdoors, fossil-fuel appliances in buildings are responsible for over 23% of all NO_x in the 10 New York counties in ozone nonattainment areas. This is 4.7 times as much NO_x that is produced from all power plants in those counties.[29]

Targeted efforts and new policies are needed to address previously overlooked sources of pollutants that lead to the formation of ozone – particularly NO_x from buildings. Lower-income households are more likely to be exposed to poor outdoor air quality which contributes to several health problems.[30] Asthma is the most common chronic condition in children, with children of color experiencing the highest asthma prevalence.[31] The association between pollution from fossil fuel combustion and resulting health impact disparities is already acknowledged and elaborated on in the Draft Scoping Plan. By more clearly recognizing the role and magnitude of fossil fuel appliances in contributing to health harming air pollution, the state can both be more intentional and discerning in how protects its residents, and make concerted steps to achieving its equity, public health, and climate commitments.

Implement energy efficiency and electrification as a package; one without the other can have detrimental impacts on residents' health

"Chapter 8.3: Sector-Specific Health Co-Benefits of Climate Policies – Housing/ Residential Built Environment" of the Draft Scoping Plan currently distinguishes between the health benefits of energy efficiency measures from electrification measures. To maximize New Yorkers' wellbeing and health, the final scoping plan should call for comprehensive packages of interventions that are a combination of energy efficiency and electrification measures. Without additional measures, energy efficiency retrofits such as increasing air tightness can result in higher levels of indoor pollutants and mold growth – and consequently higher health costs.[32] Additionally, recent research recommends the complete elimination of gas stoves, as even opening windows or running mechanical ventilation are inadequate to address the

[28] EPA, *Determinations of Attainment by the Attainment Date, Extension of the Attainment Date, and Reclassification of Areas Classified as Serious for the 2008 Ozone National Ambient Air Quality Standards*, 87 Fed. Reg. 21,825 (April 13, 2022), https://www.federalregister.gov/documents/2022/04/13/2022-07509/determinations-of-attainment-by-the-attainment-date-extension-of-the-attainment-date-and.

[29] RMI analysis of EPA 2017 National Emissions Inventory data, https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data#dataq. Appliance emission estimates include residential and commercial emissions for the gas, oil, and other fuel categories. Some commercial source classification codes have been excluded to avoid counting certain non-appliance sources like pipeline compressor stations and industrial-scale boilers. All commercial nonpoint source emissions are included, and commercial point source emissions

[30] Michelle L. Bell and Keita Ebisu, "Environmental Inequality in Exposures to Airborne Particulate Matter Components in the United States," *Environmental Health Perspectives* 120, no. 12 (December 1, 2012): 1699–1704, https://doi.org/10.1289/ehp.1205201.

[31] American Lung Association, "Asthma and Children Fact Sheet," ALA, October 23, 2020, https://www.lung.org/lung-health-diseases/lung-disease-lookup/asthma/learn-about-asthma/asthma-children-facts-sheet#:~:text=Asthma%20is%20the%20most%20common; and Hatice S. Zahran et al., "Vital Signs: Asthma in Children — United States, 2001–2016," *MMWR. Morbidity and Mortality Weekly Report* 67, no. 5 (February 9, 2018): 149–55, https://doi.org/10.15585/mmwr.mm6705e1.

[32] Matthew Collins and Seraphim Dempsey, "Residential Energy Efficiency Retrofits: Potential Unintended Consequences," *Journal of Environmental Planning and Management* 62, no. 12 (December 21, 2018): 2010–25, https://doi.org/10.1080/09640568.2018.1509788; and
Koen F. Tieskens et al., "The Impact of Energy Retrofits on Pediatric Asthma Exacerbation in a Boston Multi-Family Housing Complex: A Systems Science Approach," *Environmental Health* 20, no. 1 (February 14, 2021), https://doi.org/10.1186/s12940-021-00699-x.

health-harming levels of NO_x stemming from their usage.[33] Therefore, we recommend that any mention of energy efficiency interventions go hand in hand with electrification.[34] For example, "pollution source control" can be added to the statement "tight insulation in residential buildings without ensuring appropriate ventilation, filtration, and/ or inadequate weatherproofing can negatively impact air quality".[35]

Electrification of gas cooking alongside energy efficiency and electrification measures will yield significant health benefits. Gas stoves are a main contributor to poor indoor air quality and pollution levels, serving as a significant source of pollution in the home. Cooking common meals on a gas stove often results in pollution levels that exceed the limits of outdoor air quality standards and are much higher than guidelines set by the World Health Organization.[36] Gas stoves emit several pollutants – particulate matter ($PM_{2.5}$), NO_x as well as carbon monoxide (CO), and formaldehyde.[37] Children living in a home with a gas stove have a 42% increased risk of having asthma symptoms and a 24% increased risk of being diagnosed with asthma by a doctor, according to the most recent 2013 peer-reviewed meta-analysis.[38] New Yorkers carry an asthma burden much higher than the national average, nearly 10% of our population has a current asthma diagnosis, or 1.4 million adults and 315,0000 children.[39] Asthma leads to 287 deaths annually in New York.[40]

Approaches that encompass a combination of both energy efficiency and electrification measures have been demonstrated to maximize both energy and non-energy benefits at the individual and community level. These benefits include (1) improving indoor air and environmental quality, (2) improving neighborhood air quality, (3) ensuring safer indoor temperatures during extreme heat and cold, (4) increasing safety from the removal of gas infrastructure, (5) and improving energy security.[41] The Draft Scoping Plan already notes many of these benefits, and can more explicitly frame them in the context of

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[33] Christopher Bland et al., "Studying the Optimal Ventilation for Environmental Indoor Air Quality Studying the Optimal Ventilation for Environmental Indoor Air Quality Prepared for the JPB Foundation and Enterprise Community Partners," *National Center for Healthy Housing*, April 13, 2022, https://nchh.org/resource-library/report_studying-the-optimal-ventilation-for-environmental-indoor-air-quality.pdf.

[34] Christopher Bland et al., "Studying the Optimal Ventilation for Environmental Indoor Air Quality Studying the Optimal Ventilation for Environmental Indoor Air Quality Prepared for the JPB Foundation and Enterprise Community Partners," *National Center for Healthy Housing*, April 13, 2022, https://nchh.org/resource-library/report_studying-the-optimal-ventilation-for-environmental-indoor-air-quality.pdf.

[35] DSP at 66.

[36] Brady Anne Seals & Andee Krasner, *Health Effects from Gas Stove Pollution* at 11 (2020), https://rmi.org/insight/gasstoves-pollution-health/, Jennifer Logue et al., "Pollutant Exposures from Natural Gas Cooking Burners: A Simulation-Based Assessment for Southern California," *Environmental Health Perspectives* 122, no. 1 (November 3, 2013), https://doi.org/10.1289/ehp.1306673; and World Health Organization, *WHO Global Air Quality Guidelines: Particulate Matter ($PM_{2.5}$ and PM_{10}), Ozone, Nitrogen Dioxide, Sulfur Dioxide and Carbon Monoxide: Executive Summary* (World Health Organization, 2021), https://apps.who.int/iris/handle/10665/345334.

[37] RMI, "All-Electric Homes," RMI (2021), https://rmi.org/all-electric-homes-a-health-professionals-guide/?utm_medium=email&utm_source=spark&utm_content=spark&utm_campaign=2022_02_03; and Eric D. Lebel et al., "Methane and NO_x Emissions from Natural Gas Stoves, Cooktops, and Ovens in Residential Homes," *Environmental Science & Technology* 56, no. 4 (January 27, 2022), https://doi.org/10.1021/acs.est.1c04707.

[38] *See* Weiwei Lin, "Meta-Analysis of the Effects of Indoor Nitrogen Dioxide and Gas Cooking on Asthma and Wheeze in Children", https://doi.org/10.1093/ije/dyt150.

[39] Center for Disease Control and Prevention, "Most Recent Asthma State Data | CDC," www.cdc.gov, March 24, 2020, https://www.cdc.gov/asthma/most_recent_data_states.htm#source.

[40] *See* CDC, *Most Recent Asthma State Data,* https://www.cdc.gov/asthma/most_recent_data_states.htm#source.

[41] Yu Ann Tan and Bomee Jung, *Decarbonizing Homes: Improving Health in Low-Income Communities through Beneficial Electrification,* RMI (2021), http://www.rmi.org/insight/decarbonizing-homes.

holistic electrification efforts implemented in tandem with energy efficiency upgrades to comprehensively address housing quality.

3. Adopt zero-emission appliance standards and development of an equitable implementation plan.

To address the significant air quality and climate impacts from building appliances, RMI supports the Draft Scoping Plan proposal for zero-emissions appliance standards, while working with the relevant state agencies to ensure equitable and effective implementation of these rules. The Draft Scoping Plan currently proposes zero-emission equipment standards that phase in between 2030 and 2035 (depending on equipment and building type), and if paired with an equitable implementation plan, can be complementary to other key proposals focused on an effective and equitable electrification transition.[42]

Clean, efficient appliances like electric heat pumps can eliminate direct building emissions. State agencies including the New York State Energy Research and Development Authority (NYSERDA), the Department of Environmental Conservation (DEC), and the New York Department of State (DOS) can drive this transition forward by enacting zero-emission appliance standards. These standards would require all newly sold appliances, or an increasing percentage of them, to be pollution-free.[43] They would not require that existing appliances be removed but would instead take advantage of the most cost-effective opportunities to electrify at the point of equipment replacement. As with other policies that will affect residents in their homes, it is vital that the responsible agencies (NYSERDA and DEC) work together with communities and other local and state government entities to ensure that these zero-emissions standards are implemented equitably. We provide the following points both in support and for additional consideration:

Zero-emissions appliance standards can accelerate a transition away from polluting fossil-fuel appliances toward a clean building future, with many benefits to New Yorkers

Emission standards are a time-tested and effective policy for driving widespread adoption of clean technologies to meet environmental challenges. If designed thoughtfully, they can enable major cost reductions and, along with key parallel policies and investments, support inclusive, equitable, and affordable technology adoption. Just as zero-emissions vehicles standards have helped catalyze the transition from fossil-fuel vehicles toward clean electric vehicles, so too can zero-emissions appliance standards help move away from polluting fossil-fuel-fired appliances toward clean and efficient heat pumps.

Appliance emission standards have a long history of reducing air pollution from appliances in states throughout the country. The U.S. EPA first developed emission standards for residential wood stoves in the 1980s.[44] And several states, including Texas, Utah, and many air districts in California have had low-NO_x gas appliance standards for years.[45] Two California air districts are now taking the next step forward

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[42] DSP at 129.
[43] Jim Dennison, Leah Louis-Prescott & Talor Gruenwald, *How Air Agencies Can Help End Fossil Fuel Pollution from Buildings*, RMI (2021), https://rmi.org/insight/outdoor-air-quality-brief.
[44] Jack Lienke et al., *Regulating New Fossil-Fuel Appliances Under Section 111(b) of the Clean Air Act* at 3, Institute for Policy Integrity (Oct. 2021), https://policyintegrity.org/files/publications/Gas_Appliances_Report_v3.pdf.
[45] *See, e.g.*, 30 Tex. Admin. Code § 117.3205(a)(2)(A), https://texreg.sos.state.tx.us/public/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=30&pt=1&ch=117&rl=3205; Utah State Construction and Fire Codes Act § 15A-6-102(2)(a)(i),

by developing zero-NO_x appliance standards.[46] And statewide zero-GHG appliance requirements have been proposed in California and for some commercial-scale boilers in New Jersey.[47] Most recently, legislation in Maryland has directed its Department of the Environment to issue regulations that will eliminate GHG emissions from the state's large commercial and residential buildings by 2040.[48] These existing and proposed standards show that air agencies like New York's DEC have the authority and expertise needed to advance air quality and climate goals by addressing building pollution.

Just as New York needs to reduce building appliance pollution to meet state air quality standards, the state also needs to address building appliance emissions to meet state climate goals. New York's Climate Leadership and Community Protection Act requires an 85% reduction in statewide GHG emissions by 2050. New York cannot meet this target without rapidly electrifying the state's new and existing buildings as the Draft Scoping Plan's Integration Analysis Technical Supplement makes clear.[49] In every scenario evaluated, heat pumps begin to dominate new appliance sales in the 2020s, and "no fossil-emitting appliances are sold after 2035."[50] This rapid building electrification cuts at least 55 $mmtCO_2e$ per year by 2050, forming a crucial wedge in the state's overall emission reduction strategy.[51] To achieve these major emission reductions, New York must address existing buildings, which account for the vast majority of building emissions and the greatest emission reduction potential.[52] And New York must take "near-term action," given the 15–30-year lifetimes of many appliances.[53] Clean appliance standards can meet both of these requirements.

Some benefits that zero-emission appliance standards can provide include job creation, energy security and reliability, climate resilience, and improved indoor air quality. New York's Just Transition Working Group found that the buildings sector will account for well over half of the projected 211,000 new jobs associated with New York's decarbonization pathways, and that the residential HVAC subsector will see

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https://le.utah.gov/xcode/Title15a/C15A_1800010118000101.pdf; Cal. Air Res. Bd., *2022 State Strategy for the State Implementation Plan: Draft Measures* 54 (Oct. 6, 2021) (summarizing California air districts' low-NO_x standards), https://ww2.arb.ca.gov/sites/default/files/2021-10/2022_SSS_Draft_Measures.pdf.

[46] Bay Area Air Quality Management District, *Workshop Report: Draft Amendments to Building Appliance Rules* (Sept. 2021), https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-9-rule-4-nitrogen-oxides-from-fan-type-residentialcentral-furnaces/2021-amendments/documents/20210930_01_wsr_rules0904and0906-pdf.pdf?la=en; South Coast Air Quality Management District, *2022 AQMP Proposed Draft NO_x Stationary Source Measures* (Nov. 10, 2021), http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2022-air-quality-management-plan/am-pres-agenda-item-3-zero-emission-technology-110621.pdf?sfvrsn=6.

[47] California Air Resources Board, *Draft 2022 State Strategy for the State Implementation Plan* 85-87 (Jan. 31, 2022), https://ww2.arb.ca.gov/sites/default/files/2022-01/Draft_2022_State_SIP_Strategy.pdf; N.J. Department of Environmental Protection, *Proposed Rule: Control and Prohibition of Carbon Dioxide Emissions* 36 (Dec. 6, 2021), https://www.nj.gov/dep/rules/proposals/20211206a.pdf.

[48] Md. Senate Bill 528, Climate Solutions Now Act of 2022 § 5, p. 91, https://mgaleg.maryland.gov/2022RS/Chapters_noln/CH_38_sb0528e.pdf.

[49] DSP Appendix G: Integration Analysis Technical Supplement, at 30-35.

[50] DSP Appendix G, at 30, 33.

[51] DSP Appendix G, Annex 2: Key Drivers and Outputs, "Emissions Wedges" tab.

[52] *Compare* Yu Ann Tan et al., *New York Set to Pioneer a Move to All-Electric Buildings*, RMI (March 15, 2022) (finding that a statewide all-electric new construction requirement could avoid about 6 $mmtCO_2e$ cumulatively by 2040), https://rmi.org/new-york-set-to-pioneer-a-move-to-new-all-electric-buildings/, *with* DSP at 23-25. Buildings represent 32% of New York's 379.4 $mmtCO_2e$ total emissions, and emissions related to fuel combustion represent 86% of all building emissions – indicating that fossil fuel appliances account for about 100 $MMtCO_2e$ per year, and that electrifying all new appliances in existing and new buildings by 2035 could avoid 55 $MMtCO_2e$ per year by 2050).

[53] DSP at 124.

some of the greatest job growth.[54] Electric appliances can promote energy security by reducing consumers' exposure to volatile gas and oil prices.[55] And efficient, grid-interactive electric appliances can improve grid reliability and drive down energy bills, especially when paired with energy efficiency.[56] Zero-emitting heat pumps can also promote climate resilience and climate justice by providing both cooling and heating with a single appliance, expanding access to protection from increasingly common extreme heat.[57] Finally, the zero-emission standards proposed in the Draft Scoping Plan will reduce indoor air pollution by ensuring electrification of gas stoves. This will eliminate NO_x emissions from gas stoves that can quickly exceed EPA's outdoor air quality standards, and that have been linked to a 42% increased risk of childhood asthma symptoms.[58]

Zero-emission appliance standards will also help meet health and air quality requirements that New York has long struggled to attain. As mentioned above, New York City has recently been deemed an area of "severe nonattainment" for ozone levels, because the area has failed to achieve health-based federal air quality standards by the statutory deadline.[59] Previous efforts have not been sufficient to address the health threat from ozone, and new policies are needed to address previously overlooked sources of ozone-forming NO_x. Meanwhile, building appliances emit nearly a quarter of all NO_x in New York's nonattainment area and are largely unregulated.[60] Zero-emission appliance standards are the most effective way to eliminate this major source of direct NO_x emissions.[61]

Develop an equitable implementation plan through an inclusive, coordinated stakeholder engagement process so that zero-emission appliance standards can effectively and efficiently address appliance pollution in New York

As a companion to adopting the proposed appliance pollution standards, RMI recommends the CAC develop a pathway for their equitable implementation. Zero-emission appliance standards, when paired

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[54] DSP at 50-51. *See also* DSP at 121 (noting that rapid electrification is projected to generate 100,000 new jobs in energy-efficient construction and clean heating and cooling).
[55] Talor Gruenwald, *Reality Check: The Myth of Stable and Affordable Natural Gas Prices*, RMI (Nov. 17, 2021), https://rmi.org/the-myth-of-stable-and-affordable-natural-gas-prices/.
[56] See Steven Nadel et al., *Energy Efficiency and Demand Response: Tools to Address Texas's Reliability Challen*ges, ACEEE (Oct. 13, 2021), https://www.aceee.org/white-paper/2021/10/energy-efficiency-and-demand-response-tools-address-texas-reliability.
[57] Lacey Tan & Mohammad Fathollahzadeh, *Why Heat Pumps Are the Answer to Heat Waves*, RMI (Aug. 12, 2021), https://rmi.org/why-heatpumps-are-the-answer-to-heat-waves/; *see also* E3, *Advancing Carbon Neutrality in California: PATHWAYS Scenarios Developed for the California Air Resources Board* at 34 (Oct. 2020) ("The transition to all-electric HVAC also has the potential to provide cooling for households that do not currently have air conditioning (since heat pumps provide both heat and cooling), which could help [residents] cope with increasing temperatures due to climate change."), https://ww2.arb.ca.gov/sites/default/files/2020-10/e3_cn_final_report_oct2020_0.pdf.
[58] *See* Weiwei Lin et al, "Meta-Analysis of the Effects of Indoor Nitrogen Dioxide and Gas Cooking on Asthma and Wheeze in Children," https://doi.org/10.1093/ije/dyt150; and Brady Anne Seals & Andee Krasner, *Health Effects from Gas Stove Pollution*, https://rmi.org/insight/gasstoves-pollution-health/
[59] EPA, *Determinations of Attainment by the Attainment Date, Extension of the Attainment Date, and Reclassification of Areas Classified as Serious for the 2008 Ozone National Ambient Air Quality Standards*, 87 Fed. Reg. 21,825 (April 13, 2022), https://www.federalregister.gov/documents/2022/04/13/2022-07509/determinations-of-attainment-by-the-attainment-date-extension-of-the-attainment-date-and.
[60] *See* RMI, How Air Agencies Can Help End Fossil Fuel Pollution from Buildings, June 1, 2022, https://rmi.org/insight/outdoor-air-quality-brief.
[61] The NO_x reduction potential from electrification is especially great in New York, which has committed to achieving 100% zero-emission electricity by 2040 and whose average electric-sector NO_x emission rates are already 34% lower than the national average. *See* U.S. Energy Information Administration, *Electricity Emissions by Plant and by region*, https://www.eia.gov/electricity/data/emissions/.

with policies focused on an equitable transition, are the best and surest way to electrify new appliance sales at the speed and scale needed to address the health and climate impacts from gas appliances. However, without careful attention to equitable design and implementation, standards could reinforce existing injustices in our housing and energy systems. As the Draft Scoping Plan already recognizes, standards must be carefully designed to advance and complement key equity-focused policies and phase in as the conditions for equitable electrification continue to develop in New York.

We present for consideration the following principles of equitable appliance standard design, which the CAC can develop and refine through engagement with impacted communities:[62]

a. Plan, develop, and implement standards alongside equity-focused policies and investments.

To ensure successful and equitable implementation, zero-emission standards must be accompanied by parallel policies and investments in at least the following four areas: (1) affordable upfront costs, (2) affordable energy costs, (3) necessary health, safety, and weatherization upgrades, and (4) anti-displacement and renter protections.[63] Several provisions of the Draft Scoping Plan address one or more of these policy areas,[64] and the final plan can strengthen and expand upon these proposals in a comprehensive equitable electrification strategy.

Many key equity policies should be enacted by agencies other than DEC, NYSERDA, and DOS (who the Draft Scoping Plan directs to develop appliance standards), so inter-agency planning, and coordination will be essential. The multi-agency collaboration proposed in the Draft Scoping Plan is a crucial first step. Long-term success will require strengthening the Draft Scoping Plan's equity-focused provisions and ensuring that they are implemented in time to pave the way for successful adoption of zero-emission appliance standards.

b. Provide clear regulatory signals, adequate lead time, and a smooth phase-in.

As the Draft Scoping Plan already recognizes, zero-emission standards should "send a clear policy signal, with compliance dates that allow regulated entities to plan and build capacity while regulators protect

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[62] "Stakeholder engagement must include meaningful involvement of households, businesses, and community-based organizations from frontline communities, LMI households, public housing authorities and residents, environmental justice organizations, and affordable housing groups." DSP at 123. In developing standards and other policies, agencies should promote inclusive participation by sharing accessible summaries of draft materials, holding hearings at multiple times of day and in multiple languages, compensating community members for their time and participation, and other measures.

[63] *See, e.g.*, Chelsea Kirk, *Los Angeles Building Decarbonization: Tenant Impact and Recommendations*, Strategic Actions for a Just Economy (2021), https://www.saje.net/wp-content/uploads/2021/12/LA-Building-Decarb_Tenant-Impact-and-Recommendations_SAJE_December-2021-1.pdf; Greenlining Institute and Energy Efficiency for All, *Equitable Building Electrification: A Framework for Powering Resilient Communities* (2019), https://greenlining.org/wp-content/uploads/2019/10/Greenlining_EquitableElectrification_Report_2019_WEB.pdf; Emerald Cities Collaborative and PODER, *Climate Equity and Community Engagement in Building Electrification: A Toolkit* (2020), emeraldcities.org/wp-content/uploads/2021/05/Climate-Equity-and-Community-Engagement-Toolkit_Nov102020.pdf; Ruth Ann Norton et al., *Leading with Equity and Justice in the Clean Energy Transition: Getting to the Starting Line for Residential Building Electrification*, Green and Healthy Homes Initiative (2021), www.greenandhealthyhomes.org/wp-content/uploads/2021-GHHI-Leading-with-equity_wp_Final.pdf. Some of these sources are compiled and summarized in Jim Dennison, Leah Louis-Prescott & Talor Gruenwald, *How Air Agencies Can Help End Fossil Fuel Pollution from Buildings* at 13-15, RMI (2021), https://rmi.org/insight/outdoor-air-quality-brief.

[64] *See, e.g.*, DSP at 121-23, 135-36 (detailing elements of equitable electrification policy, the need to prioritize investment in LMI households, affordable housing, and Disadvantaged Communities, the need to protect against displacement and threats to affordability, and the need to align different agencies' regulatory frameworks).

low-income households from cost burdens."[65] This means that development of zero-emission standards should begin as soon as possible, to allow time for a thorough stakeholder engagement process and as much lead time as possible before implementation.

Standards can also be designed for a smooth transition by requiring electrification for a percentage of new equipment sales that ramps up to 100% by the compliance dates proposed in the Draft Scoping Plan. For example, standards could require electrification of 60% of new space and water heating equipment in single-family and low-rise residential buildings in 2025, 75% in 2027, and 100% in 2030. Manufacturers could receive additional credits for zero-emitting equipment sold with income-qualified rebates or installed in low-income areas and affordable housing. Alternatively, manufacturers could pay a penalty for failing to meet required percentages of zero-emission sales, and these penalties could be used to fund incentives for low-income purchasers.[66] An approach like this could promote a smooth transition, opportunities to identify and address issues with equitable standard implementation, affordability for low- and moderate-income (LMI) households, and additional near-term emission reductions.

c. Evaluate progress toward equitable electrification before standards take effect.

To ensure that the proposed standards can be implemented equitably, DEC, NYSERDA, and DOS can conduct one or more public interim evaluations of progress toward an inclusive and affordable transition between enactment and full implementation of zero-emission standards.[67] This interim evaluation should assess at least the four equitable electrification policy areas addressed above.

The Bay Area Air Quality Management District provides a valuable example of this approach: The district has committed to issuing public reports on the accessibility and affordability of zero-emission appliances at least two years before its proposed zero-emission appliance standards take effect and determining whether any changes to the standards are required in response. These reports will aim to address affordability, "assurance that policy promotes affordable housing and anti-displacement outcomes," and "access to health and safety benefits."[68]

4. Begin scaling down the gas system to ensure an equitable transition for ratepayers, utility workers, and New Yorkers broadly.

Meeting the climate and equity mandates of the CLCPA requires a dramatic departure from business as usual across all sectors, and current models of utility regulation and decision-making must transform accordingly. As discussed in the first section, low-carbon fuels will not serve as a panacea for decarbonization, and electrification will be the best solution for the vast majority of New York buildings. Electrification, in combination with energy efficiency, will result in a dramatic decline in both gas throughput and customer count.

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[65] DSP at 122.
[66] The South Coast Air Quality Management District's heat pump rebate program could provide a model. That program provides rebates for customers located in disadvantaged and low-income zip codes, which are funded by fees that manufacturers pay if they fail to achieve the district's appliance emission requirements. *See* SCAQMD, *Clean Air Furnace Rebate Program*, https://www.cleanairfurnacerebate.com/.
[67] *See* Dennison et al., *How Air Agencies Can Help End Fossil Fuel Pollution from Buildings* at 18-19.
[68] BAAQMD, *Workshop Report: Draft Amendments to Building Appliance Rules* 12-13 (Sept. 2021), https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-9-rule-4-nitrogen-oxides-from-fan-type-residentialcentral-furnaces/2021-amendments/documents/20210930_01_wsr_rules0904and0906-pdf.pdf?la=en.

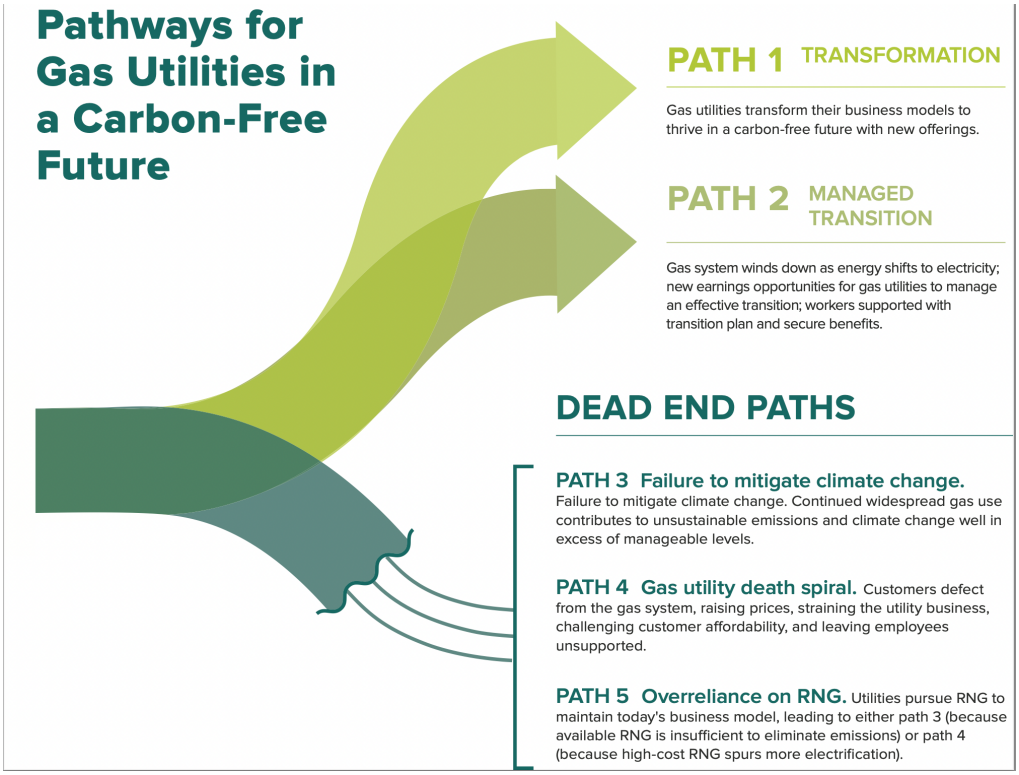
The CAC recognizes the core implication in Chapter 18 that "achievements of the emission limits will entail a downsizing of the fossil gas system".[69] The Draft Scoping Plan correctly calls out the need for New York to proactively plan for a transition away from gas. In fact, the CAC can go further, with directives for the Public Service Commission (PSC) to develop a plan for such a downsizing, in line with the requirements of the CLCPA for the Final Scoping Plan.

To meet the state's climate goals, New York should not only cease expansion of the gas system, but gas use in the state must also begin to decline. To protect customers from bill increases and reduce stranded asset risk as gas use declines, the gas system must also begin to shrink, through active and coordinated efforts between the PSC, utilities, and communities. This imperative is in direct tension with the current utility business model, which was designed to incentivize expanding service to as many customers as possible, while providing safe, reliable, and affordable service. In fact, as recently as May of 2022, New York State's official policy has been to expand natural gas service, as exemplified by the PSC's gas expansion policy proceeding.[70] In recognition of the tension between this policy and CLCPA mandates, the PSC formally closed this proceeding in its recent Order Adopting Gas System Planning Process, Case 20-G-0131 ("Gas Planning Order"). Meeting New York's emissions reduction targets will require more than simply no longer encouraging gas expansion, however – utility regulation and planning must be wholly realigned with state climate policy.

The Draft Scoping Plan tackles the critical challenge of managing the gas transition head-on. In the absence of a clear, deliberate plan for system contraction, New York will either fall short of its climate goals, or the gas system will unravel with negative outcomes for customers, workers, and utilities. Indeed, as demonstrated in Exhibit 2 below, there are a limited number of viable pathways for utilities to take; they can either transform and adapt to provide new services, such as thermal energy networks, or they can undergo a managed transition. Ignoring the need to plan for a transition leads only to dead ends.

[69] DSP at 268.
[70] PSC Case 12-G-0297, https://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterCaseNo=12-G-0297&CaseSearch=Search.

Exhibit 2: ***Pathways for Gas Utilities in a Carbon-Free Future*** [71]



New York must act to cease expansion of the gas system

Limiting further expansion of the gas system is necessary both to meet state climate objectives and to protect customers from future rate spikes. However, sections of the Public Service Law ("PSL") directly impede that goal and must now be changed. For example, the "100-foot rule" requires utilities to provide at least 100 feet of gas line for new customers, incentivizing individual customers to install gas equipment.[72] Updating the 100-foot rule may require legislative change, but the need for such change is becoming clearer: National Grid recently proposed to offer electrification incentives in lieu of installing up to 100 feet of gas infrastructure at no cost to the new customer, and the Public Service Commission now requires gas utilities to file reports about the number, length, and costs of new gas extensions over the past five years.[73] Accurately reporting the costs to ratepayers is an important first step, but ensuring

[71] Sherri Billimoria and Mike Henchen, *Regulatory Solutions for Building Decarbonization: Tools for Commissions and Other Government Agencies*, RMI, 2020, https://rmi.org/insight/regulatory-solutions-for-building-decarbonization/.
[72] 16 NYCRR § 230.2(c), (d), and (e).
[73] "National Grid: Gas Customer Connection Costs and Electrification Incentives Report," National Grid, May 12, 2022, PSC Case 19-G-0310, https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={C26D25E9-EB04-4AD9-85E7-6649022927CD}. "Order Adopting Gas System Planning Process," Public Service Commission of New York, May 12, 2022, PSC Case 20-G-0131 ("Gas Planning Order"), https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={130B05B5-00B4-44CE-BBDF-B206A4528EE1}.

the gas system does not continue to expand in order to mitigate the potential for future stranded assets requires the repeal of the 100-foot rule.[74]

The "obligation to serve" is another aspect of PSL that needs updating considering state climate goals. The obligation to serve establishes the entitlement to gas, electric, and steam services for all customers.[75] However, given the lower cost of all-electric new construction and serious climate and health risks of gas use, such a policy is no longer in the best interest of New Yorkers, and the CAC should consider legislative options to protect customers' right to safe, affordable energy and heating, while eliminating the requirement for gas service specifically.[76]

As the gas system shrinks, some investment in the system will continue to be needed to ensure safety and reliability of existing infrastructure. However, any new gas investment should be considered differently than that already in the ground. Most gas capital projects are depreciated over at least a 40-year timeframe, far beyond New York's 2050 target for carbon neutrality, and thus pose a significant stranded asset risk.[77] New investments, such as those required for safety or reliability, should receive different financial treatment than the traditional long-lived depreciation timelines to mitigate the stranded asset risk associated with long-term investments in gas infrastructure. Such treatment could include accelerated depreciation, which mitigates these risks by recovering the bulk of new investment from current and near-future customers. Accelerated depreciation may have implications for cost allocation across customer classes and time, and the PSC will need to take care to ensure that such costs are being allocated equitably and fairly. Accordingly, the PSC's recent Gas Planning Order instructs gas utilities to study the impact of accelerated depreciation on a holistic level.[78] While such a study is an important step, the CAC should highlight the urgent need to deploy alternative financial treatment for gas investments, as current and continued investments in the gas system already pose significant risks to ratepayers.[79]

Further, the PSC's recent Gas Planning Order makes clear that non-pipes alternatives (NPAs) should be a key solution in limiting and preventing gas system expansion. The PSC order explicitly leaves certain questions open, in anticipation of further guidance from the CAC final scoping plan. Therefore, it is crucial that the final scoping plan provide clear guidance to regulators, instructing the PSC to limit new gas investment only to those required for safety and reliability, while beginning larger efforts to shrink the system. The recent Con Edison Request for Proposals seeking non-pipes alternatives to support early pipe

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[74] For more detailed recommendations on reforming gas line extension policy, see: Abigail Alter, Sherri Billimoria, and Mike Henchen, *Overextended: It's Time to Rethink Subsidized Gas Line Extensions*, RMI, 2021, https://rmi.org/insight/its-time-to-rethink-subsidized-gas-line-extensions/.

[75] FindLaw.com - New York Consolidated Laws, Public Service Law - PBS § 30. Residential gas, electric and steam service policy - *last updated January 01, 2021,* | https://codes.findlaw.com/ny/public-service-law/pbs-sect-30.html.

[76] Claire McKenna, Amar Shah, and Leah Louis-Prescott, *The New Economics of Electrifying Buildings,* RMI, 2020, https://rmi.org/insight/the-new-economics-of-electrifying-buildings/; and Yu Ann Tan and Bomee Jung, *Decarbonizing Homes: Improving Health in Low-Income Communities through Beneficial Electrification*, RMI, 2021, https://rmi.org/insight/decarbonizing-homes/.

[77] See, e.g., "NYSEG & RG&E Depreciation Study: Potential Impacts of Climate Change Policies and Laws," March 2022, PSC Case 19-G-0379, https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={7F823979-8855-4DDC-87F8-D8CA017E268B}.

[78] Gas Planning Order at 61.

[79] Lucas Davis and Catherine Hausman, *Who Will Pay for Legacy Utility Costs?* Energy Institute at Haas, March 2022, https://haas.berkeley.edu/wp-content/uploads/WP317.pdf.

retirement is a strong initial example, and the CAC should instruct the PSC to seek additional programs that scale this effort across all gas utilities.[80]

A clear and proactive transition plan will support gas workers

An unplanned gas transition will harm gas utility workers. If declining gas throughput dramatically reduces gas revenues, gas utilities may be incented to reduce costs by shrinking their workforce in unmanaged ways. On the other hand, with appropriate planning and foresight, current gas utility workers could undergo training and reskilling. Especially for dual-fuel utilities, there may be opportunities to retrain gas workers to work on the electric side of the business. Gas-only utility workers will need additional options; district geothermal, or "thermal energy networks" provide an opportunity for just transition; indeed, the United Association of Plumbers, Pipefitters and Sprinkler Fitters supported the Utility Thermal Energy Network and Jobs Act, recently passed by the New York State Legislature and awaiting the Governor's signature.[81] A Gridworks study in California provides several recommendations to consider in developing a transition plan, including bridge or buyout programs for current retirement programs, funding for workers to be trained, re-trained and uptrained into other crafts; wage protection programs, and more.[82] All of these measures require planning over many years; they cannot only be considered in a decade or two as the transition is unfolding.

Comprehensive system mapping and segmentation will enable targeted electrification

An orderly, managed gas transition requires careful system planning for both future gas infrastructure investments and existing infrastructure. To maximize cost and process efficiency and benefits, New York should segment the gas system, prioritizing some segments for targeted electrification in the near term. To identify these priority segments, utilities should conduct a thorough, multi-layered analysis of their gas systems, including mapping by infrastructure age and end use to support the identification of sections for prioritized electrification.[83]

As New York begins to consider system segments that are prime for targeted electrification and decommissioning of existing gas infrastructure, segmentation will help identify locations on the system where decommissioning would maximize societal benefit. In identifying priority segments, the state should focus on three high-opportunity characteristics: (1) buildings where the economics of electrification are already positive; (2) opportunities to avoid expanding or replacing gas infrastructure; and (3) the balance of equity and health benefits for disproportionately impacted or environmental justice populations. While these characteristics can overlap, they are distinct criteria which can help in determining which segments of the gas system should be prioritized for the near-term deployment of full electrification solutions. Across all scenarios and solutions, utilities should work closely with customers

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[80] *Request for Proposal: Non-Pipeline Alternatives to Provide Whole Building Electrification Services*, Consolidated Edison Company of New York, Inc., July 2021, ("ConEdison RFP"), https://www.coned.com/en/business-partners/business-opportunities/-/media/23db06efb6e145379d6fc8d420743736.ashx.

[81] "Utility Thermal Energy Network and Jobs Act," S9422, 2021-2022 Legislative Session of the State of New York, https://legislation.nysenate.gov/pdf/bills/2021/S9422. *Note: this bill was passed by the legislature but is currently pending Governor Hochul's signature as of June 21, 2022.*

[82] https://gridworks.org/wp-content/uploads/2019/09/CA_Gas_System_in_Transition.pdf

[83] A comprehensive mapping of New York's energy systems should include both gas and electric system characteristics (i.e., electric distribution capacity, potential for distributed energy resources, and leak rate of gas infrastructure) as well as community characteristics (i.e., income factors or disadvantaged communities, building age, and building type).

and communities to both understand their specific needs and co-design solutions to meet those needs. Further, utilities should leverage non-utility sources of funding at the local, state, and federal level for energy efficiency, weatherization, and other measures. A significant expansion of full electrification in the near term should be targeted to the cases where it is the most attractive in line with the following principles or other measures of societal benefit. Even with a targeted approach, it is critical that the PSC and utilities expeditiously advance strategies at scale for these electrification solutions to achieve meaningful impact toward the CLCPA mandates and to develop the opportunity for further growth in the long term.

We present below for consideration, key prime opportunities for targeted decommissioning, and strategies to pursue each:

a. Positive Economics: New Construction and Highly Efficient or Recently Constructed Buildings

New construction is a prime candidate for full electrification because the total cost of electrification is often either low or less expensive than constructing a building served by both gas and electricity.[84] Further, the grid impact of either a new, all-electric, recently constructed or recently renovated, efficient building is generally lower than the impact of retrofitting existing, older buildings. Indeed, New York City recently passed a local law requiring the phase-out of combustion fuels in new buildings, with all new buildings fully electric by 2027.[85] To maximize the economic benefits of electrification, the CAC should build on this work and direct program implementers to target efficient buildings with existing 200-amp service and access to electric distribution lines with adequate capacity for new load. For new construction, New York should reform the 100-foot rule in line with our recommendations above, and the CAC should direct utilities to develop electrification program offerings targeting new developments.

b. Avoided Gas Infrastructure: Capacity Projects, Targeted Leak-Prone Pipe Decommissioning, and Thermal Energy Networks

Avoiding the expansion or replacement of gas infrastructure can help to realize savings on the gas system and reduce the cost recovery burden on remaining gas customers. Capacity projects are one such set of opportunities, where anticipated growth in gas demand would require the expansion of existing gas infrastructure or the construction of additional facilities. In these cases, gas utilities should conduct capacity planning well in advance of anticipated need, to enable sufficient lead time to develop and implement non-infrastructure solutions. Utilities should develop a standard suite of program offerings targeted at customers in areas facing current or future capacity shortfalls. Such offerings could include enhanced electrification and efficiency incentives to customers in these areas, above the incentives offered to all customers through existing efficiency programs.

Another critical opportunity to implement targeted electrification to avoid gas investments is in areas served by leak-prone pipes, or pipes otherwise in need of retirement. As in the case of projected capacity needs, gas utilities will need to identify such opportunities some years in advance of their replacement to provide time for customers to transition away from gas. The targeted electrification of leak-prone pipes

[84] Claire McKenna, Amar Shah, and Leah Louis-Prescott, *The New Economics of Electrifying Buildings,* RMI, 2020, https://rmi.org/insight/the-new-economics-of-electrifying-buildings/.
[85] "Mayor de Blasio Signs Landmark Bill to Ban Combustion of Fossil Fuels in New Buildings," City of New York, December, 2021, https://www1.nyc.gov/office-of-the-mayor/news/852-21/mayor-de-blasio-signs-landmark-bill-ban-combustion-fossil-fuels-new-buildings.

("LPP") should begin with segments serving smaller groups of customers, to build capacity with the goal of expanding such projects to enable the retirement of larger segments of LPP.

Implementing targeted electrification to decommission LPP will require the PSC to reform the gas utilities' obligation to serve, to create a viable path for asset decommissioning as well as clear guidelines for supporting customers through the transition. Notably, in many New York communities, including Ithaca and New York City, local governments and community organizations have demonstrated eagerness to electrify buildings and transition away from gas use. These communities can be partners in implementing targeted electrification projects, and the CAC should direct the PSC to consider amendments to utilities' obligation to serve which explicitly allow leading local governments to adopt a more aggressive transition pathway than exists statewide, including clear standards for decommissioning of assets shared by many customers. To the extent these amendments require legislative action, the CAC should recommend the legislature take up the PSC's proposals to align public service law with the CLCPA.

While thermal energy networks are a type of targeted electrification solution with many similarities to targeted electrification solutions generally, thermal energy networks specifically show significant potential to decarbonize buildings in New York while mitigating peak impacts to the electric grid. The New York State Legislature's recent passage of the Utility Thermal Energy Network and Jobs Act marks a positive step in the direction of enabling such networks in New York.[86] Thermal energy networks, in addition to replacing LPP, can also serve as efficient decarbonization solutions for communities distant from the gas system today.

c. Equity and Health Benefits for Low-income and Disadvantaged Communities

Low-income households and disadvantaged communities should be prioritized for full electrification, to maximize the health benefits from improved indoor air quality, increase comfort and safety, and reduce these communities' exposure to volatile and escalating gas rates. This prioritization is in line with the CLCPA's requirement that disadvantaged communities receive a minimum of 35% of the benefits generated by the state's climate programs.[87]

As emphasized earlier in our comments, the health impacts of fuel combustion are significant and disproportionate. In New York, pollution from combustion appliances caused up to 1,317 premature deaths in 2017.[88] The annual combined health and climate costs of appliance pollution in New York are at least $14.4 billion.[89] Decarbonization solutions that continue to result in fuel combustion in buildings

[86] "Utility Thermal Energy Network and Jobs Act," S9422, 2021-2022 Legislative Session of the State of New York, https://legislation.nysenate.gov/pdf/bills/2021/S9422. *Note: this bill was passed by the legislature but is currently pending Governor Hochul's signature as of June 21, 2022.*
[87] CLCPA §2, amending Environmental Conservation Law §75-0117.
[88] RMI analysis using median estimates from the results of 3 reduced complexity models used in: Jonathan J. Buonocore (Harvard T.H. Chan School of Public Health) et al., A Decade of The U.S. Energy Mix Transitioning Away from Coal: Historical Reconstruction of the Reductions in the Public Health Burden of Energy, 2021 Environ. Res. Lett. 16 054030, https://doi.org/10.1088/1748-9326/abe74c, as well as additional analysis from Jonathan Buonocore, Sc.D., the study's lead author.
[89] RMI analysis using EIA GHG emissions data, Interagency Working Group 2020 social cost of carbon values using a 3% discount rate, EPA's value of statistical life, and median pollution-related mortality estimates from the results of 3 reduced complexity models used in: Jonathan J. Buonocore (Harvard T.H. Chan School of Public Health) et al., A Decade of The U.S. Energy Mix Transitioning Away from Coal: Historical Reconstruction of the

pose significant harms to air quality and health relative to electric alternatives. Coupling electrification with ventilation, envelope, and grid interactivity improvements further maximizes such benefits as: indoor and outdoor air quality, improved energy security, and safer indoor temperatures during both extreme heat and extreme cold.[90]

Even substituting a non-methane gas, such as hydrogen, for part or all the gas combusted in building appliances fails to eliminate the health and air quality impacts of fuel combustion. Indeed, gas utilities in California have acknowledged that blended hydrogen and methane gas "may yield higher NO_x emissions than natural gas, because hydrogen burns faster than natural gas, which increases combustion temperatures and reduces ignition lag."[91] For populations facing additional risk factors such as increased exposure due to smaller and older homes or higher rates of asthma, such as communities of color and lower-income populations, the health impacts of burning fuels in buildings may be particularly disproportionate. Thus, the benefits of solutions that eliminate fuel combustion in buildings may be even greater for communities that currently face disproportionate air quality and health burdens.

d. Planning for hard-to-electrify need not prolong investment in the gas system

While building electrification is the best solution for decarbonizing much of the buildings sector, it is important to note that this electrification will not happen overnight, and certain industrial and other sectors will be more difficult to electrify.[92] As New York plans for the shrinking of the gas system, it is necessary to ensure that the system remains safe and reliable as long as it is operational. Detailed mapping and segmentation of the system will aid in this critical effort, by identifying opportunities to avoid, for instance, a costly pipeline replacement through targeted electrification of the buildings served by that segment of pipe. Segmentation may also aid the PSC in considering under what circumstances a dedicated system for green hydrogen might be appropriate, such as for a hub of difficult-to-electrify industrial customers.

As the PSC noted in the Gas Planning Order, gas planning processes will continue to evolve over time as utilities and stakeholders learn by doing. Throughout, the PSC will need to ensure that system maintenance and efforts to decarbonize difficult-to-electrify sectors do not unduly prolong use of the gas system beyond those specific uses for which electrification is not a feasible option. In some cases, onsite combustion of zero-carbon or carbon-negative fuels may be a reasonable emissions-reduction solution that does not require further investment in the shared gas network. For instance, a water treatment facility

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Reductions in the Public Health Burden of Energy, 2021 Environ. Res. Lett. 16 054030, https://doi.org/10.1088/1748-9326/abe74c, as well as additional analysis from Jonathan Buonocore, Sc.D., the study's lead author. U.S. Energy Information Administration, Environment, Sectoral Specific Emission Tables by State, https://www.eia.gov/environment/emissions/state/; Interagency Working Group on Social Cost of Greenhouse Gases, Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990 (2021), https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf; EPA, Technical Support Document: Estimating the Benefit per Ton of Reducing Directly-Emitted $PM_{2.5}$, $PM_{2.5}$ Precursors and Ozone Precursors from 21 Sectors, at 19 (Table 6) (2022), https://www.epa.gov/system/files/documents/2021-10/source-apportionment-tsd-oct-2021_0.pdf.

[90] Yu Ann Tan, Mark Kresowik, "Investing in Healthier Low-Income Housing," October 2021, https://rmi.org/investing-in-healthier-low-income-housing/.

[91] "Reclaiming Hydrogen for a Renewable Future," Earthjustice, August 2021, https://earthjustice.org/sites/default/files/files/hydrogen_earthjustice.pdf.

[92] *See*, e.g., DSP at 264: "Under all scenarios, the vast majority of current fossil gas customers (residential, commercial, and industrial) will transition to electricity by 2050."

that captures the methane that occurs because of its normal operations may be best served by burning that captured methane to meet its onsite heat and power needs. While such instances of onsite fuel-combustion should be limited (and subject to extra scrutiny when in proximity to already disproportionately impacted communities), the potentiality of continued combustion end-uses need not, and indeed does not, justify continued business-as-usual investment in the gas system.

e. External funding to support an equitable transition for all New Yorkers

To ensure an equitable transition away from gas in New York, decisionmakers must act to protect LMI households from the gas price volatility and escalating rates that will result if stranded assets are not kept in check. Low-income households and renters are less likely to be able to afford the up-front costs of electrification, and thus risk being left behind on the gas system as wealthier customers electrify. Spreading the fixed costs of the gas system over fewer customers will cause rates to increase, putting further pressure on already energy-burdened New Yorkers.[93]

As the Draft Scoping Plan shows, economy-wide decarbonization generates significant benefits for New Yorkers. Yet, electrification and the gas transition require upfront funding, and to avoid inequitable outcomes, the state will need to seek non-ratepayer sources of funding. There are multiple potential avenues for such funding but given the broad societal benefits of achieving a managed transition away from fossil fuels, public funding may be especially appropriate. Because utility bills are regressive, funding decarbonization primarily through these bills will unfairly burden LMI income customers.[94] Federal, state, or other public funding should thus be used to support the gas transition, whether through a gas transition fund or other mechanism.

f. CAC recommendations to the PSC should set clear direction for urgent action to begin scaling down the gas system.

The PSC's recent Gas Planning Order takes important initial steps to align gas utility investments and planning with the CLCPA. Yet the order explicitly looks to the CAC for guidance and leaves room to "incorporate the CAC recommendations when they are finalized," stopping short of the managed, equitable, and "strategic decommissioning of much of the fossil gas distribution system" the Draft Scoping Plan notes is needed.[95] In other words, the PSC intends to follow the CAC's lead, meaning that the Scoping Plan should include clear, robust directives to ensure gas planning aligns with state climate mandates. With the CLCPA's ambitious 2030 emissions reduction targets less than eight years away, there needs to be a clear path to scale down the gas system, protect customers, and achieve the emissions reductions required by the CLCPA—and the CAC should make that clear in the Draft Scoping Plan. This requires moving beyond small-scale pilots or even the pursuit of NPAs for individual gas infrastructure projects by using system segmentation and mapping to pursue targeted solutions at scale today. Gas planning must also transform to achieve fundamentally different and new goals: namely, the safe, equitable, and managed phase down of the gas system. Failure to do transform utility regulation in this

[93] See, e.g., "Comments by Renewable Heat Now Regarding the Forthcoming Staff White Paper," Renewable Heat Now, August 2020, https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={B0CA1935-42FC-40CD-B766-B0C7C6621E9F}.
[94] Maria Castillo, Jon Rea, and Uday Varadarajan, "Build Back Better Act would reduce the burden of household energy costs," Canary Media, October 2021, https://www.canarymedia.com/articles/energy-equity/build-back-better-act-would-reduce-burden-of-household-energy-costs.
[95] Gas Planning Order at 19; DSP at 264.

way puts New Yorkers at substantial risk of experiencing a gas utility death spiral, with escalating gas rates hitting low-income and disadvantaged New Yorkers hardest. It is thus essential that the CAC clearly and unequivocally direct the PSC to develop and implement a clear plan for gas utilities' transition in line with the climate and equity provisions of the CLCPA.

Shrinking the gas system is central to a long-term decarbonized vision for New York State and requires urgent action. The decisions made today around gas infrastructure investments not only have significant impact on emissions, but they also impact the viability of the utility business model, the just transition pathways available to gas utility workers, and the energy bills that New Yorkers pay. The CAC and PSC can lead in setting a course for shrinking the gas system to ensure an equitable and managed transition for New York.

Conclusion

RMI applauds the CAC and Integration team's work to evaluate a variety of pathways to achieve the CLCPA's requirements, and to identify the strategies most aligned with prosperous, healthy, and equitable outcomes for New Yorkers. The Draft Scoping Plan sets a roadmap for action in the building sector with a strong emphasis on energy efficiency and electrification and limitations of low carbon fuels; discussion of air quality and health co-benefits of building decarbonization, proposed zero-emission appliance standards; and a call for a managed transition away from gas use in buildings. We look forward to continued emphasis on these key principles in the finalized Scoping Plan and stand ready to support New York in achieving these goals.

Thank you very much for your consideration and extensive investment in these issues.

Sincerely,

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