Home Is Where the Carbon Is: Using the Tax Code to Reduce Carbon Emissions in the Residential Sector

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I. INTRODUCTION

Five years ago, two young families of four moved in next door to one another in a historic neighborhood in Memphis, Tennessee; the Renters into a 1,500-square-foot, three-bedroom apartment while the

Buyers purchased a 3,000-square-foot, four-bedroom house.[1] The Buyers and Renters spent the same amount each month on their housing, but the Buyers had the added costs of home maintenance.[2] Both families were concerned about the environment and the cost of utilities, so they adjusted their thermostats and tried to take short showers, but the Buyers always used more energy because they had a bigger house.[3] The Buyers and Renters sent their kids to the same school, attended the same neighborhood block parties, but eventually decided that their homes no longer suited their families' needs and moved away. Home values in Memphis had increased over those five years, so the Buyers sold their house at a gain of $100,000. After accounting for their home maintenance costs, the Buyers walked away $75,000 ahead of the Renters, but the housing market was only part of the reason.[4] Over the course of those five years, the federal government, through the Tax Code, provided subsidies totaling over $38,000 for the Buyers and provided the Renters with nothing.[5] At the

1. This example is based on two homes in Memphis, TN with the following simplifying and anonymizing assumptions:

The Buyers purchased their house in 2018 with a purchase price of $250,000 and a thirty-year fixed rate mortgage with a loan amount of $225,000 and a mortgage interest rate of 5%. The Buyers sold their house in 2023 for $350,000. Over the five years: (1) the Buyers paid $54,083 in mortgage interest, realized $100,000 of capital gains on the sale of the house, and earned $45,000 of imputed rental income; (2) the average rental price of the apartment and the average mortgage payment (including taxes and homeowners' insurance) were both $1,800 per month and the Buyers spent $5,000 per year on home maintenance and repairs; and (3) the Buyers' home used an average of 11,200 cubic feet of natural gas and 1,200 kWh of electricity per month while the Renters' apartment did not use any natural gas and used an average of 700 kwh of electricity per month. The Buyers and Renters both filed their taxes as married filing jointly, had a marginal tax rate of 24% each year from 2018–2023, and itemized their tax deductions.

2. *See supra* note 1.

3. *See supra* note 1 (providing details on the average energy use for each home).

4. *See supra* note 1. Based on the assumptions in note 1, both families paid the same amount each month for housing. The Buyers realized $100,000 of gain on the sale of the home but spent $25,000 on home maintenance. The Renters realized no gain but also spent nothing on home maintenance.

5. *See supra* note 1; I.R.C. §§ 1(h), 1(j)(2)(A), 121, 163(h)(3) (2022); U.S. DEP'T OF TREASURY: OFF. OF TAX ANALYSIS, TAX EXPENDITURES FY2023, at 9–10 (2021). Based on the assumptions in note 1, the Buyers did not pay taxes on the

same time, the Buyers' house emitted more than three times as much carbon dioxide as the Renters' apartment.[6] This story illustrates how the United States encourages homeownership through tax incentives.[7] But it also illustrates how the structure of these incentives increases the United States' carbon dioxide emissions and undercuts the goal of combatting global climate change.

Climate change caused by human-produced greenhouse gas emissions is an existential threat to the ecology, national security, and general welfare of the United States and the entire world.[8] The window

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$100,000 of capital gains on the home sale, which was worth $15,000 ($100,000 x 15%); the Buyers could deduct the $54,084 from their taxable income, which was worth $12,980 ($54,084 x 24%); and the homeowner could exclude the $45,000 of imputed rental income, which was worth $10,800 ($45,000 x 24%), for a total tax benefit of $38,780.

It is worth noting that these benefits are significant but far less than some taxpayers enjoy. Taxpayers with higher incomes receive more benefits because of their high tax bracket and similarly situated home sellers with more gain may exclude up to $500,000 ($250,000 for single filers) from capital gains tax, homeowners may deduct the mortgage interest on up to $750,000 of home loans, and more expensive homes yield greater imputed rental income taxpayers exclude with no cap. I.R.C. §§ 121, 163(h)(3); *see also* U.S. DEP'T OF TREASURY: OFF. OF TAX ANALYSIS, TAX EXPENDITURES FY2023, at 9–10 (2021) [hereinafter TAX EXPENDITURES FY2023] (describing the tax expenditures connected to housing).

6. *See supra* note 1; *Carbon Footprint Calculator*, EPA, https://www3.epa.gov/carbon-footprint-calculator (last visited Jan. 31, 2023). Applying the assumptions from note 1 to the EPA's carbon footprint calculator, the house emits 16,071 pounds of carbon dioxide each year from the natural gas consumption and 20,110 pounds of carbon dioxide from its electricity consumption for a total of 36,181 pounds of carbon dioxide each year. The apartment emits 11,731 pounds from its electricity consumption. For both homes, no electricity was specifically produced by zero-carbon sources, such as rooftop solar panels or purchased "green power".

7. *See generally What Are the Tax Benefits of Homeownership?*, TAX POL'Y CTR.: BRIEFING BOOK (May 2020), https://www.taxpolicycenter.org/briefing-book/what-are-tax-benefits-homeownership (describing the tax benefits of homeownership).

8. *See* U.S. GLOB. CHANGE RSCH. PROGRAM, CLIMATE SCIENCE SPECIAL REPORT: FOURTH NATIONAL CLIMATE ASSESSMENT 34 (D. J. Wuebbles et al. eds., 2017) [hereinafter FOURTH NATIONAL CLIMATE ASSESSMENT], https://science2017.globalchange.gov/downloads/CSSR2017_FullReport.pdf (describing the risks to the ecology and economy of the United States); NAT'L INTEL. COUNCIL, NATIONAL INTELLIGENCE ESTIMATE: CLIMATE CHANGE AND INTERNATIONAL RESPONSES INCREASING CHALLENGES TO U.S. NATIONAL SECURITY

of opportunity to prevent the worst effects of climate change is small and closing, but there is significant reason for hope.[9] The cost of renewable energy has plummeted in the last decade, countries around the world have passed laws limiting carbon emissions, and the United States recently passed the Inflation Reduction Act, its most significant climate bill to date.[10] The Inflation Reduction Act is designed to accelerate existing trends toward lower emissions in the electricity generation and transportation sectors, largely through changes to the tax code.[11] Although experts project that the Inflation Reduction Act will bring the United States within striking distance of its carbon emissions reduction goals, more is necessary to reach those goals and stave off the worst effects of climate change.[12]

Tax provisions of the Internal Revenue Code ("I.R.C.") increase or decrease the United States' net carbon emissions by incentivizing

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THROUGH 2040, at 3–15 (2021), https://www.dni.gov/files/ODNI/documents/assessments/NIE_Climate_Change_and_National_Security.pdf (describing the national security risks of climate change).

9. Press Release, U.N. Secretary-General Antônio Guterres, Window of Opportunity to Keep 1.5 Degrees Celsius Alive Will Close Forever Without Sustained Emission Cuts, Secretary-General Warns, at Expert Group Launch, U.N. Press Release SG/SM/21220 (Mar. 31, 2022).

10. *See* Christine Ro, *Renewable Energy Costs Have Dropped Much Faster than Expected, but There's a Catch*, FORBES (Sept. 14, 2022, 8:07 AM), https://www.forbes.com/sites/christinero/2022/09/14/renewable-energy-costs-have-dropped-much-faster-than-expected-but-theres-a-catch/?sh=506da6a83164 (describing the rapidly falling cost of wind and solar electricity production); Joanna Foster, *The U.S. Has the Inflation Reduction Act. Here are 5 Other Groundbreaking 2022 Environmental Laws from Around the World*, ENV'T DEF. FUND: VITAL SIGNS (Dec. 22, 2022), https://www.edf.org/article/us-has-inflation-reduction-act-here-are-five-other-groundbreaking-2022-environmental-laws (describing new laws in various countries that limit carbon emissions); Nadja Popovich & Brad Plumer, *How the New Climate Bill Would Reduce Emissions*, N.Y. TIMES (Aug. 12, 2022), https://www.nytimes.com/interactive/2022/08/02/climate/manchin-deal-emissions-cuts.html (describing the Inflation Reduction Act to the extent to which it is projected to decrease the United States' carbon emissions).

11. *See* Popovich & Plumer, *supra* note 10 (describing the ways that the Inflation Reduction Act will reduce carbon emissions).

12. *See id.* (explaining the projected effect of the Inflation Reduction Act on United States' carbon emissions and comparing that with the United States' stated carbon emissions goal).

certain behaviors.[13] While recent changes to the I.R.C. spur decarbonization, other tax provisions continue to subsidize carbon-intensive activities, particularly in the residential sector.[14] This Note argues that Congress should further amend the I.R.C. by expanding the tax provisions that discourage carbon emissions in the residential sector and altering or repealing those that encourage carbon emissions.

Part II of this Note provides necessary background to connect the United States' role in the global response to climate change with the role and function of the I.R.C. Part III identifies and analyzes several existing tax provisions that encourage or discourage carbon emissions in the residential sector. Part IV recommends changes to those provisions to fully align them with the United States' carbon emissions reduction goals. Finally, Part V concludes this Note with a summary identifying potential outcomes of those recommended changes to the tax code.

II. BACKGROUND: CLIMATE CHANGE, THE UNITED STATES, AND THE TAX CODE

Human-caused climate change is a global problem that requires a coordinated global response, and the Paris Climate Agreement provides the framework for that response.[15] To fulfill its commitments in the Paris Climate Agreement, the United States must alter every sector of its economy to reach its goal of net-zero carbon emissions by 2050.[16] The I.R.C. is a policy tool that can be used to encourage certain

13. *See generally* Roberta F. Mann, *Back to the Future: Recommendations and Predictions for Greener Tax Policy*, 88 OR. L. REV. 355 (2009) (describing the way that tax expenditures encourage or discourage carbon emitting activities by taxpayers).

14. *See* CCH AnswerConnect Ed., *Inflation Act Includes Big Changes in Energy-Related Tax Credits for Homeowners and Car Buyers*, WOLTERS KLUWER (Oct. 11, 2022), https://www.wolterskluwer.com/en/expert-insights/inflation-reduction-act-includes-changes-in-energy-related-tax-credits-for-homeowners-and-car-buyers (describing decarbonization incentives in the Inflation Reduction Act); *see generally* Mann, *supra* note 13 (describing aspects of the I.R.C. that incentivize increased carbon emissions).

15. *Infra* Section II.A.

16. *Infra* Section II.B.

taxpayer behavior.[17] This Note focuses on six tax provisions impacting carbon emissions in the residential sector.[18]

A. Global Climate Change and the Paris Climate Agreement

Over the last century, the average global temperature has risen by one degree Celsius because of human activities that added carbon dioxide, methane, and other greenhouse gases to the atmosphere.[19] By 2014, global emissions were on track to increase global average temperatures by four degrees Celsius by 2100.[20] Such an increase would cause cataclysmic effects around the world including extreme heat waves, a significant rise in sea level that inundates coastal cities, disruptions to food and water systems, and substantial loss in biodiversity.[21] Similarly, Fourth National Climate Assessment predicted that human-caused climate change would cause a host of environmental problems in the United States, including temperature changes, precipitation changes, droughts and floods, wildfires, extreme storms, ecosystem effects, arctic changes, sea level rise, and ocean acidification.[22] The National Intelligence Council also identified climate change as a driver of national security risks and threats as the effects of climate change cause unrest and mass migration around the world.[23] The causes of climate change are global, as are its impacts and effects, so the response must be global as well.

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17. *Infra* Section II.C.

18. *Infra* Section II.D.

19. FOURTH NATIONAL CLIMATE ASSESSMENT, *supra* note 8, at 39–40.

20. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2014: MITIGATION OF CLIMATE CHANGE: SUMMARY FOR POLICYMAKERS 8 (Ottmar Edenhofer et al. eds., 2014), https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_summary-for-policymakers.pdf.

21. Press Release, The World Bank, New Report Examines Risks of 4 Degree Hotter World by End of Century (Nov. 18, 2012), https://www.worldbank.org/en/news/press-release/2012/11/18/new-report-examines-risks-of-degree-hotter-world-by-end-of-century.

22. FOURTH NATIONAL CLIMATE ASSESSMENT, *supra* note 8, at 14–17, 185, 207, 231, 240, 257, 277, 303, 333, 364.

23. NAT'L INTEL. COUNCIL, *supra* note 8, at 7–8. One of the functions of the National Intelligence Council ("NIC") is to advise policy makers on long term strategy based on information from U.S. intelligence services. *See id.* at i–ii. The NIC

In 2015, 195 countries committed to the Paris Climate Agreement.[24] The Paris Agreement requires all signatory countries to reduce their greenhouse gas emissions to limit global average temperature rise to 2 degrees Celsius above preindustrial levels—the point at which many of the worst effects of climate change become irreversible.[25] Signatory nations each set individual carbon emissions reduction goals which are measured, assessed, and reevaluated every five years based on updated data.[26] The United States is a crucial participant in the Paris Climate Agreement because it is the largest historical emitter of carbon dioxide and currently the second-largest emitter worldwide.[27]

The United States has a complicated history with the Paris Climate Agreement.[28] The United States government, particularly President Obama and his administration, had a leading role in brokering the original agreement in 2015 and set the United States' initial goal of reducing carbon emissions to 26–28% of 2005 levels by 2025.[29] But in 2017, President Trump announced his intention to the withdraw the United States from the Paris Agreement and abandoned efforts to

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identified climate change as a long-term threat to U.S. national security because it can cause or exacerbate unrest in affected regions and provoke mass migration and refugee crises. *Id.*

24. Coral Davenport, *Nations Approve Landmark Climate Accord in Paris*, N.Y. TIMES (Dec. 12, 2015), https://www.nytimes.com/2015/12/13/world/europe/climate-change-accord-paris.html.

25. *Id.* ("[A]n increase in atmospheric temperatures of two degrees Celsius . . . is the point at which, scientific studies have concluded, the world will be locked into a future of devastating consequences, including rising sea levels, severe droughts and flooding, widespread food and water shortages and more destructive storms.").

26. *Id.*

27. *See* Jonathan Ellis & Douglas Alteen, *The Paris Climate Agreement: What You Need to Know*, N.Y. TIMES (Jan. 21, 2021), https://www.nytimes.com/2021/01/21/climate/biden-paris-climate-agreement.html. The United States make up about 4% of the global population but are responsible for about a third of all excess carbon emission. *Id.* China currently emits the most carbon dioxide per year, but the United States was the top emitter for years prior and is responsible for more carbon emissions than any other nation. *Id.*

28. *See id.* (describing the United States' early involvement in the Paris Agreement, its withdrawal under President Trump, and its recent rejoining under President Biden).

29. *See* Davenport, *supra* note 24.

achieve the emissions reduction goals.[30] Despite President Trump's antipathy to the Paris Agreement, the United States significantly reduced carbon emissions through actions of states, cities, universities, and private companies.[31] Unfortunately, these reductions were not sufficient to keep the United States on track to achieve its Paris Agreement goals.[32] The United States officially completed its withdrawal from the Paris Agreement on November 4, 2020, the day after President Trump lost the 2020 presidential election.[33] President Biden promptly recommitted the United States to the Paris Agreement after he took office in 2021.[34] The United States now has two carbon emission reduction goals as a part of its Paris Agreement commitments: (1) reduce annual carbon emissions to 50% of 2005 levels by 2030, and (2) produce net-zero carbon emissions by 2050.[35] To meet these goals, the United States has embarked on a massive project of decarbonization.

B. The Six Pillars of Decarbonization

To meet its decarbonization goals, the United States must transform several sectors of its economy over the next few decades.[36] Princeton University published a report in 2021 identifying five

30. *See* Ellis & Alteen, *supra* note 27. On June 1, 2017, President Trump announced that the United States would withdraw from the Paris Climate Agreement. *Id.* However, under the terms of the Paris Climate Agreement, the withdrawal did not officially occur until November 4, 2020. *Id.*

31. *See* Hiroko Tabuchi & Henry Fountain, *Bucking Trump, These Cities, States and Companies Commit to Paris Accord*, N.Y. TIMES (June 1, 2017), https://www.nytimes.com/2017/06/01/climate/american-cities-climate-standards.html.

32. *Id.*

33. Ellis & Alteen, *supra* note 27.

34. *Id.*

35. Press Release, The White House, FACT SHEET: President Biden Sets 2030 Greenhouse Gas Pollution Reduction Target Aimed at Creating Good-Paying Union Jobs and Securing U.S. Leadership on Clean Energy Technologies (Apr. 22, 2021), https://perma.cc/N7LH-M8TH.

36. ERIC LARSON ET AL., FINAL REPORT SUMMARY OF NET-ZERO AMERICA: POTENTIAL PATHWAYS, INFRASTRUCTURE, AND IMPACTS 6 (2021) [hereinafter NET-ZERO AMERICA REPORT], https://netzeroamerica.princeton.edu/img/Princeton%20NZA%20FINAL%20REPORT%20SUMMARY%20(29Oct2021).pdf.

possible pathways for the United States to achieve its Paris Agreement goals using existing technologies.[37] Each pathway assumes different technological priorities but all are based on the Six Pillars of Decarbonization: (1) End-use energy efficiency and electrification,[38] (2) Clean electricity,[39] (3) Clean fuels,[40] (4) Carbon capture and

37. *Id.* at 9. The report bases the five pathways on different policy priorities and technologies and names them their primary assumptions (e.g., the E+ Pathway assumes aggressive electrification of cars, furnaces, and other technologies that currently rely on burning fossil fuels while the E- Pathway assumes a more modest pace of electrification). *Id.* All pathways are technologically feasible ways to reach the goal of net-zero emissions by 2050. *See id.* The E+ Pathway assumes "aggressive end-use electrification" with minimal constraints on energy-supply options utilized so long as the result is net-zero emissions by 2050. *Id.* The E- Pathway assumes slower end-use electrification with the same minimal energy supply constraints as E+. *Id.* The E- B+ assumes the slower end-use electrification of E- with a higher biomass supply, primarily for liquid fuels. *Id.* The E+ RE- assumes the end-use electrification of E+ but with slower renewable energy growth; it constrains growth of wind and solar to "30% greater than [the] historical maximum single year record" and expands CO2 storage to allow more fossil fuel use. *Id.* Finally, the E+ RE+ Pathway assumes the electrification of E+ with faster renewable energy growth; it assumes no new nuclear plants, no underground carbon storage, and no fossil fuel use by 2050. *Id.*

38. *Id.* at 18. End-use energy efficiency and electrification involves replacing devices that run on fossil fuels with devices that run on electricity, increasing the energy efficiency of devices, buildings, processes, and electricity transmission, and increasing electricity transmission capacity. *Id.* For example, replacing petroleum-powered cars, natural gas home heating, and coal-fired steel production with electric cars, heat pumps, and arc furnaces. *Id.* Increasing efficiency reduces the amount of electricity required and increasing transmission capacity will carry the electricity that these new devices and processes will require. *Id.*

39. *Id.* at 24. The Clean Electricity Pillar involves substantially increasing the total electricity generation capacity of the United States and producing that electricity from low- or no-carbon sources. *Id.* Depending on the Pathway, the additional electricity requirements imposed by the first pillar will require the United States to double to quadruple total electricity production capacity by 2050. *Id.* Additionally, low- or no-carbon electricity will go from 37% of the current electricity production to 70–85% by 2030 and 98–100% by 2050. *Id.* In all Pathways, all or nearly all coal-fired electricity generation is retired by 2030, wind and solar power expands dramatically, natural gas generation declines, and nuclear power expands, declines, or maintains current levels depending on the Pathway. *Id.*

40. *Id.* at 33. The Clean Fuels Pillar involves replacing oil and natural gas with carbon neutral or carbon negative liquid and gaseous fuels. *Id.* Hydrogen, used both as a fuel gas and as an ingredient in synthetic liquid and gaseous fuels, is the key to this pillar. *Id.* Hydrogen can be produced by electrolyzing water, gasifying biomass,

utilization or storage,[41] (5) Reduced non-CO2 emissions,[42] and (6) Enhanced land sinks.[43] The Pillars of Decarbonization apply to every sector of the United States' economy, but this Note focuses on the residential sector.

The residential sector is a major source of carbon emissions accounting for about 17% of the United States' total carbon emissions.[44] These emissions come mostly from energy consumption; the residential sector accounts for 15% of direct natural gas consumption and 39% of total electricity consumption.[45] The End-Use Energy Efficiency and Electrification Pillar of Decarbonization requires transitioning energy use to electricity and increasing energy efficiency to use as little energy as possible.[46] The Clean Electricity

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or reforming natural gas. *Id.* Biomass is also important for this pillar, but only E-B+ requires using additional cropland beyond that which is already being used for corn-based ethanol. *Id.*

41. *Id.* at 38. All Pathways require large-scale carbon dioxide capture and utilization, and all but E+ RE+ require large-scale carbon dioxide capture and underground geological storage. *Id.* Carbon dioxide will be captured from point sources such as cement production, combustion-based power generation, and the process of creating carbon-free fuel from natural gas and biomass. *Id.* Carbon dioxide will be transported via pipeline from point sources to utilization facilities, such as synthetic fuel production, and to underground geological storage basins. *Id.*

42. *Id.* at 44. Methane and nitrous oxides, the primary human-produced greenhouse gases other than carbon dioxide, are emitted by widely dispersed sources, making capture and mitigation difficult and expensive. *Id.* Most reductions in non-CO2 emissions will occur as drilling for fossil fuels decreases. *Id.*

43. *Id.* at 46, 48. Land carbon sinks refer to the natural uptake and long-term storage of carbon in trees and soil. Land sinks are necessary for a net-zero future to offset necessary carbon emissions. *Id.* Land sinks can be enhanced by a variety of methods including altering agricultural practices, avoiding deforestation, and reforesting existing pasture and cropland. *Id.*

44. *Climate Change Indicators: U.S. Greenhouse Gas Emissions*, EPA (Nov. 2023), https://www.epa.gov/climate-indicators/climate-change-indicators-us-greenhouse-gas-emissions.

45. *U.S. Energy Consumption by Source and Sector, 2021*, U.S. ENERGY INFO. ADMIN. (April 2022), https://www.eia.gov/energyexplained/us-energy-facts/images/consumption-by-source-and-sector.pdf.

46. *See* NET-ZERO AMERICA REPORT, *supra* note 36, at 18. For residences, this includes (1) replacing natural gas- and oil-fueled appliances, such as stoves, hot water heaters, and furnaces, with their electric counterparts; (2) replacing energy-intensive appliances with more efficient ones, such as replacing furnaces and conventional air conditioning with electric heat pumps or geothermal systems; and (3) improving the

Pillar requires generating more, and eventually all, electricity from no-carbon sources, some of which will be generated by home-based systems such as solar panels and wind turbines.[47] The Clean Fuels Pillar requires using hydrogen, synthetic low- or no-carbon fuels, or biomass in place of oil and gas including for residential power and heating.[48] To meet its 2030 and 2050 carbon emissions goals, the United States government must adopt policies that advance the six pillars of decarbonization within the residential sector, including through tax incentives.

C. Tax Incentives as a Policy Tool

The United States Tax Code encourages certain taxpayer behaviors by using tax incentives which in turn generate tax expenditures.[49] When a tax provision reduces taxes for certain taxpayers, the federal government collects less revenue than it would with a baseline tax system; the revenue loss associated with a tax provision is a tax expenditure.[50] A baseline tax system would not provide preferential treatment in the tax code.[51] For instance, it would not (1) tax income at different rates based on its source,[52] (2) exclude

thermal and energy efficiency of the house itself, such as by installing energy efficient windows and additional insulation.

47. *See supra* note 39 and accompanying text.

48. *See supra* note 40 and accompanying text.

49. *See* Mann, *supra* note 13, at 356–59 (describing the history and function of tax expenditures as government subsidies and policy instruments that influence taxpayer behavior).

50. TAX EXPENDITURES FY2023, *supra* note 5, at 1 (quoting Congressional Budget Act of 1974, 2 U.S.C. § 622) ("Tax expenditures are defined in the law as 'revenue losses attributable to provisions of the Federal tax laws which allow a special exclusion, exemption, or deduction from gross income or which provide a special credit, a preferential rate of tax, or a deferral of tax liability.'").

51. *See* TAX EXPENDITURES FY2023, *supra* note 5, at 2–3 (describing the baseline tax system used to measure tax expenditures). The baseline tax system removes preferential tax treatment for various activities but maintains the basic structure of the tax code. *Id.* The baseline tax system only taxes income when it is realized, separates personal and corporate income tax, and includes the same progressive tax brackets of current law. *Id.*

52. *E.g.*, *id.* at 11 ("The baseline tax system generally would tax all income under the regular tax rate schedule. It would not allow preferentially low tax rates to apply to certain types or sources of income. Under current law, capital gains on assets

income from certain sources from taxation,[53] (3) allow the expensing or accelerated depreciation of certain capital assets, [54] (4) allow tax deductions for certain personal taxpayer expenditures,[55] or (5) provide tax credits for certain taxpayer activities.[56] Deductions, credits, exclusions, and other incentives in our tax system are deviations from that baseline and are forms of government spending that advance

held for more than one year are taxed at a preferentially low rate that is no higher than 20 percent . . . .").

53. *E.g.*, *id.* at 16 ("Exclusion of employer contributions for medical insurance premiums and medical care.—Under the baseline tax system, all compensation, including dedicated payments and in-kind benefits, should be included in taxable income. In contrast, under current law, employer-paid health insurance premiums and other medical expenses (including long-term care or Health Reimbursement Accounts) are not included in employee gross income even though they are deducted as a business expense by the employ[er].").

54. *E.g.*, *id.* at 5 (2021) ("Expensing of exploration and development costs [for fossil fuel mines and wells] . . . . Under the baseline tax system, the costs of exploring and developing oil and gas wells and coal mines or other natural fuel deposits would be capitalized and then amortized (or depreciated) over an estimate of the economic life of the property. This ensures that the net income from the well or mine is measured appropriately each year. In contrast to this treatment, current law allows immediate deduction, i.e., expensing, of intangible drilling costs for successful investments in domestic oil and gas wells (such as wages, the cost of using machinery for grading and drilling, and the cost of unsalvageable materials used in constructing wells). Current law also allows immediate deduction of eligible exploration and development costs for domestic coal mines and other natural fuel deposits. Because expensing allows recovery of costs sooner, it is more advantageous to the taxpayer than amortization."); *id.* at 10 (Accelerated depreciation on rental housing . . . . Under a [baseline tax system], the costs of acquiring a building are capitalized and depreciated over time in accordance with the decline in the property's economic value due to wear and tear or obsolescence. This ensures that the net income from the rental property is measured appropriately each year. Current law allows depreciation that is accelerated relative to economic depreciation.").

55. *E.g.*, *id.* at 16 ("Deductibility of charitable contributions . . . . The baseline tax system would not allow a deduction for personal expenditures including charitable contributions. In contrast, the Tax Code provides taxpayers a deduction for contributions to charitable, religious, and certain other nonprofit organizations. Taxpayers who donate capital assets to charitable organizations can deduct the assets' current value without being taxed on any appreciation in value.").

56. *E.g.*, *id.* at 10 ("Credit for low-income housing investments.—The baseline tax system would uniformly tax all returns to investments and not allow credits for particular activities, investments, or industries. However, under current law taxpayers who invest in certain low-income housing are eligible for a tax credit.").

particular policy goals.[57] These incentives subsidize certain taxpayer behaviors and increase the relative tax burden on taxpayers who either choose not to or cannot avail themselves of those subsidies.[58] The Department of Treasury estimates the amount of each tax expenditure every year to show how much money the government spends each year through the tax code to subsidize certain behaviors.[59] Different types of tax incentives function differently depending on whether they take the form of a deduction, exclusion, or credit.[60] Because of these

57. *See id.* at 1 (explaining that tax expenditures are policy instruments that are comparable alternatives to direct government spending or regulation).

58. *See* Mann, *supra* note 13, at 358–62 (describing the history and function of tax expenditures as government subsidies and policy instruments); *see also* WILLIAM P. KRATZKE, BASIC INCOME TAX 27 (2022–2023 ed. 2022) ("If two taxpayers have equal incomes, a reduction in one taxpayer's taxable income reduces that taxpayer's income tax liability. If the government is to raise a certain amount of money through an income tax, a reduction in one taxpayer's tax liability necessarily means that someone else's tax liability must increase."). Kratzke's analysis is in the context of deductions or exclusions, but the same logic also applies to tax credits and all other forms of tax expenditure. *See id.* Kratzke goes on to note that "[t]he policy considerations that justify reducing one taxpayer's tax liability but not another's are the essence of tax policy." *Id.*

59. See TAX EXPENDITURES FY2023, *supra* note 5, at 1–2, for a description of the assumptions underlying tax expenditure estimates. The estimates for any given expenditure do not necessarily represent the amount the Government would save by repealing that provision because they cannot account for the ways that taxpayers would change their behavior if the provision was repealed and because many of the provisions are interdependent. *Id.* However, the estimates provide a reasonable approximation of the magnitude of each provision as well as a reliable comparison of the relative costs of different provisions. *Id.* This Note uses the Department of Treasury estimates for analysis, but the congressional Joint Committee on Taxation also periodically publishes an independent estimate of tax expenditures and there is some discrepancy in the estimates due to differing assumptions and methodology. *See generally* JOINT COMMITTEE ON TAXATION, ESTIMATES OF FEDERAL TAX EXPENDITURES FOR FISCAL YEARS 2020–2024 (2020).

60. *See* KRATZKE, *supra* note 58, at 427–34 (describing the differences in function of the three primary types of tax expenditure: exclusions, deductions, and credits). Exclusions treat some sources of income as though they are not income or as though they have already been taxed. *Id.* For instance, capital gains from the sale of a taxpayer's home are excluded from the taxpayer's gross income with some conditions and limitations. *See* TAX EXPENDITURES FY2023, *supra* note 5, at 10 (describing the capital gains exclusion on home sales).

Deductions reduce a taxpayer's taxable income based on the way that their income is used. *See* KRATZKE, *supra* note 58, at 428. Deductions do not affect a

differences, deductions and exclusions provide more benefit to higher-income taxpayers, while credits provide similar benefits to taxpayers regardless of their income level.[61] Refundable tax credits are the most efficient way to encourage particular behaviors because all taxpayers

taxpayer's adjusted gross income but instead reduce his taxable income. *Id.* For instance, a taxpayer may deduct the interest that he pays on a home mortgage or home equity loan from his taxable income with some conditions and limitations. *See* TAX EXPENDITURES FY2023, *supra* note 5, at 10 (describing the deduction for mortgage interest expense on owner-occupied residences). Taxpayers may choose either to itemize deductions or to take a standard deduction, so deductions are only valuable to taxpayers whose total deductible expenses exceeds the standard deduction. *See* KRATZKE, *supra* note 58, at 427.

Credits reduce a taxpayer's taxes based on specific taxpayer behaviors or purchases. *See id.* at 428–29. Credits do not affect a taxpayer's adjusted gross income or taxable income but rather reduce their tax liability. *Id.* For instance, the child tax credit provides a credit of up to $2,000 for each of a taxpayer's children under the age of eighteen with some conditions and limitations. *See* TAX EXPENDITURES FY2023, *supra* note 5, at 18 (describing the child credit). Credits may be non-refundable, meaning that they can only reduce a taxpayer's tax liability to zero, or refundable, meaning that a taxpayer will receive payment for the value of the credit to the extent that it reduces the taxpayer's liability below zero. *See* KRATZKE, *supra* note 58, at 430.

61. *See* KRATZKE, *supra* note 58, at 427–30 (describing the differences between exclusions, deductions, and credits and showing the "upside-down" effect of deductions and exclusions). Deductions and exclusions benefits provide a greater benefit to higher income taxpayers. *Id.* Taxpayers in a higher tax bracket have a greater percent benefit than taxpayers in lower brackets. *Id.* For instance, two taxpayers, one in the 22% bracket and one in the 35% bracket, each pay $1,000 in home loan mortgage interest. *See id.* at 730. The higher income taxpayer will reduce his tax bill by $350 while the lower income taxpayer will only reduce his by $220. *See id.*

Credits benefit based on behavior without regard to income level. *Id.* at 428–30. For instance, if the same two taxpayers spend $500 on energy efficient doors for their houses which are eligible for a 10% tax credit, both taxpayers may reduce their tax bill by $50 regardless of their income level or tax bracket. *See id.*

Deductions also only provide benefits to taxpayers who itemized their deductions because their total deductions exceed the standard deduction. *Id.* at 427–28. Most taxpayers do not and should not itemize deductions, particularly after the Tax Cuts and Jobs Act doubled the standard deduction. *See id.* 427–30. Deductions (other than the standard deduction) are predominantly a benefit for the top 20% of income earners, and particularly for the top 5% of earners. *See* Scott Eastman, *How Many Taxpayers Itemize Under Current Law?*, TAX FOUNDATION (Sept. 12, 2019), https://taxfoundation.org/standard-deduction-itemized-deductions-current-law-2019. Deductions (other than the standard deduction) usually do not benefit taxpayers in the bottom 80% of incomes. *Id.*

who qualify for the credit receive the benefit regardless of their income level and tax liability.[62] Tax expenditures influence taxpayer behavior in many areas of life, including choices related to housing.

D. Tax Incentives in the Residential Sector

This Note focuses on six existing tax incentives that influence the residential sector. The New Energy Efficient Home credit provides a tax credit for contractors who build energy-efficient homes.[63] For a single-family home, the credit is $2,500 for an Energy Star certified home and $5,000 for a more efficient Zero Energy Ready home, with similar provisions for units in a multi-family home.[64] The Energy Efficient Home Improvement credit provides a non-refundable tax credit for homeowners who install energy-efficient upgrades, replacements, and renovations in existing homes.[65] The credit is 30% of costs for energy efficiency improvements, energy property improvements, or home energy audits, with annual limits for specific items.[66] The overall annual limit on the credit is $1,200 for most improvements, plus a separate $2,000 cap for heat pumps, heat pump

62. Lily L. Batchelder et al., *Efficiency and Tax Incentives: The Case for Refundable Tax Credits*, 59 STAN. L. REV. 23, 24 (2006) (arguing that refundable tax credits are the most economically efficient way of motivating desired taxpayer behavior because the benefit is not limited by a taxpayer's income level).

63. I.R.C. § 45L (2022).

64. *Id.* The provisions for multi-family homes are based both on energy efficiency and whether prevailing wage requirements are met for the construction. *Id.* If the contractor pays local prevailing wage rates, then the credit is $2,500 per unit for Energy Star Certified units and $5,000 per unit for Zero Energy Ready home units. *Id.* If the contractor does not pay local prevailing wage rates on the project, then the credit is only $500 per unit for Energy Star Certified units and $1,000 for Zero Energy Ready home units. *Id.*

65. *See* I.R.C. § 25C (2022). I.R.C. §§ 21–26 are non-refundable tax personal tax credits. See *supra* notes 60 and 62 for an explanation of the difference between refundable and non-refundable tax credits.

66. *See* I.R.C. § 25C (2022). Energy efficiency improvements include installing Energy Star rated windows and doors and installing insulation. *Id.* Energy property improvements include installing high efficiency hot water heaters or air conditioners. *Id.* Some of the annual limits include $600 for window replacements, $600 for energy property replacements (air conditioners, hot water heaters, boilers, etc.), $250 per door replacement and $500 for all door replacements, and $150 for energy audits. *Id.*

water heaters, and biomass stoves and boilers, for a maximum of $3,200 per year.[67] The Residential Clean Energy credit provides a non-refundable tax credit for property owners who install specific low- or no-carbon energy systems on their home or property.[68] The credit is 30% of expenditures for the installation of qualifying solar electric panels, solar water heaters, small wind turbines, geothermal heat pumps, fuel cell energy systems, and battery storage systems; the credit has no annual limit.[69]

The other three tax expenditures subsidize homeownership itself: the exclusion of net imputed rental income,[70] the exclusion of capital gains on home sales,[71] and the mortgage interest deduction on owner-occupied homes.[72] The exclusion of imputed rental income, a

67. *See* I.R.C. § 25C (2022).

68. *See* I.R.C. § 25D (2022).

69. *See id.* The only limits for this tax credit are that the system must be used primarily to generate or store energy for the taxpayer's personal use and for fuel cells, and the credit is limited to $500 per half kilowatt of power capacity. *Id.*

70. TAX EXPENDITURES FY2023, *supra* note 5, at 10 ("Under the baseline tax system, the taxable income of a taxpayer who is an owner-occupant would include the implicit value of gross rental income on housing services earned on the investment in owner-occupied housing and would allow a deduction for expenses, such as interest, depreciation, property taxes, and other costs, associated with earning such rental income. In contrast, the Tax Code allows an exclusion from taxable income for the implicit gross rental income on housing services, while in certain circumstances allows a deduction for some costs associated with such income, such as for mortgage interest and property taxes.").

71. *Id.* ("The baseline tax system would not allow deductions and exemptions for certain types of income. In contrast, the Tax Code allows homeowners to exclude from gross income up to $250,000 ($500,000 in the case of a married couple filing a joint return) of the capital gains from the sale of a principal residence. To qualify, the taxpayer must have owned and used the property as the taxpayer's principal residence for a total of at least two of the five years preceding the date of sale. In addition, the exclusion may not be used more than once every two years.").

72. *Id.* at 9 ("Under the baseline tax system, expenses incurred in earning income would be deductible. However, such expenses would not be deductible when the income or the return on an investment is not taxed. In contrast, the Tax Code allows an exclusion from a taxpayer's taxable income for the value of owner-occupied housing services and also allows the owner-occupant to deduct mortgage interest paid on his or her primary residence and one secondary residence as an itemized non-business deduction."). It is worth noting that the deduction of state and local taxes provides an additional tax benefit to many homeowners because it allows for the

$124 million expenditure in 2021, excludes from a homeowner's taxable income the value of living in the home that they own; for each homeowner, this exclusion equals the fair-market rental value of their home less the costs of owning that home.[73] The exclusion of capital gains on home sales, a $40.9 million expenditure in 2021, allows homeowners to sell their homes without paying taxes on capital gains from that sale.[74] The deduction of mortgage interest on owner-occupied homes, a $29.4 million expenditure in 2021, allows homeowners to deduct the amount they pay in mortgage interest from

deduction on property taxes. *See* I.R.C. § 164. However, this benefit is beyond the scope of this Note.

73. *See* TAX EXPENDITURES FY2023, *supra* note 5, at 10, 22 (stating that in certain circumstances a homeowner may receive "a deduction for some costs associated with [rental] income, such as for mortgage interest and property taxes"). At $124 million in 2021, the exclusion of imputed rental income is the second largest tax expenditure and is more than fifteen times larger than the average tax expenditure, $8.242 million. See *id.* at 22–24, for a noting of the total income tax expenditures for 2021; *see also What Are the Tax Benefits of Homeownership?*, TAX POL'Y CTR.: BRIEFING BOOK (May 2020), https://www.taxpolicycenter.org/briefing-book/what-are-tax-benefits-homeownership (noting that homeowners who live in their homes effectively act as both landlord and renter in their own home). In our tax system, renters do not deduct the rent they pay from their taxes and landlords must treat the rent they receive as income. *Id.* However, "the tax code treats homeowners the same as renters while ignoring their simultaneous role as landlords." *Id.*

74. *See* TAX EXPENDITURES FY2023, *supra* note 5, at 10, 22 (estimating the cost of each tax expenditure); I.R.C. § 121 (2017). At $40.9 million in 2021, the exclusion of gain from home sales is one of the largest tax expenditures and is approximately five times larger than the average tax expenditure, $8.242 million. *See* TAX EXPENDITURES FY2023, *supra* note 5, at 22. Under this exclusion, taxpayers who sell a home need not include gain from that sale as income for taxation purposes if they have owned the home and used it as their principal residence for at least two of the previous five years. *See id.* at 10, 22. The exclusion is limited to $250,000 for single taxpayers and $500,000 for married taxpayers filing jointly. *Id.* at 10. *See also* JANE G. GRAVELLE, CONG. RSCH. SERV., RL32978, THE EXCLUSION OF CAPITAL GAINS FOR OWNER-OCCUPIED HOUSING 1–3 (2022) (discussing the current tax treatment of an individual who sells their home and receive capital gains). Congress enacted the exclusion because of concerns that paying capital gains would disincentivize homeowners from moving which would hurt the real estate market and the economy more generally because of decreased labor mobility. *Id.* at 7. There was also a motivation to free up wealth for retirees who could sell their homes and access their capital without paying taxes on the gain. *Id.* at 8.

their taxable income each year.[75] These six tax provisions both support and undermine the six pillars of decarbonization based on the taxpayer behaviors they subsidize.

III. ANALYSIS

The Internal Revenue Code is not carbon neutral; many tax incentives subsidize taxpayer behaviors that support or undermine one or more of the six Pillars of Decarbonization.[76] In the energy sector, tax incentives support the Pillars of Decarbonization by subsidizing emissions-reducing activities such as (1) the construction of new low- or no-carbon electricity generation,[77] (2) the production of electricity with low- or no-carbon energy sources,[78] (3) the production of electricity from advanced nuclear power stations,[79] and (4) the capture and storage of carbon dioxide.[80] Other tax incentives in the energy sector undermine the Pillars of Decarbonization by subsidizing taxpayers who mine and drill for fossil fuels.[81] In the transportation sector, tax incentives support the Pillars of Decarbonization by

75. *See* I.R.C. § 163(h)(3)(E) (2020); TAX EXPENDITURES FY2023, *supra* note 5, at 9, 22 (estimating the cost of each tax expenditure). At $29.4 million, the deduction for mortgage interest is one of the largest tax expenditures and is approximately 3.5 times larger than the average tax expenditure, $8.242 million. *See* TAX EXPENDITURES FY2023, *supra* note 5, at 22. The deduction is currently limited to the interest on the first $1,000,000 ($500,000 for a married individual filing separately) of acquisition indebtedness or $100,000 ($50,000 for a married individual filing separately) of home equity indebtedness. I.R.C. §§ 163(h)(3)(B)(ii), (C)(ii). In 2026, the limit on acquisition will be "the limitation under subparagraph [I.R.C. §163(h)(3)](B)(ii) shall be applied to the aggregate amount of indebtedness of the taxpayer described in subparagraph (B)(i) without regard to the taxable year in which the indebtedness was incurred." *Id.* § 163(h)(3)(F)(ii).

76. See *supra* notes 37–43 and accompanying text for a description of the six Pillars of Decarbonization.

77. I.R.C. § 48 (2023).

78. I.R.C. § 45 (2022).

79. I.R.C. § 45J (2018).

80. I.R.C. § 45Q (2022).

81. *See* I.R.C §§ 45I, 611–13, 617, 631 (2005). The marginal wells tax credit, the excess of percentage over cost depletion deduction, the expensing of fossil fuel exploration and development costs, and the treatment of royalties on coal as capital gains all subsidize mining and drilling for fossil fuels. *See id.*

subsidizing (1) the purchase of electric vehicles,[82] (2) the installation of electric vehicle charging stations,[83] and (3) the use of public transportation.[84] On the other hand, tax incentives that subsidize parking undermine the Pillars of Decarbonization.[85] In the energy and transportation sectors, the tax incentives that support the Pillars of Decarbonization significantly outweigh those that undermine them.[86] But the residential sector is different: the United States spends sixty times as much on residential tax incentives that undermine the Pillars of Decarbonization than on incentives that support them.[87]

A. Tax Credits That Support the Pillars of Decarbonization in the Residential Sector

Three tax expenditures, all of which were recently altered and expanded by the Inflation Reduction Act, support the Pillars of Decarbonization in the residential sector: the New Energy Efficient Homes credit, the Energy Efficient Home Improvement credit, and the Residential Clean Energy credit. [88]

82. I.R.C. § 30D (2022).

83. I.R.C. § 30C (2022).

84. *See* I.R.C. § 132(f)(1)(B) (2018) (excluding employer provided transit passes from gross income).

85. *See* I.R.C. § 132(f)(1)(C) (2018) (excluding employer provided parking from gross income). This undermines the Pillars of Decarbonization to the degree that it encourages employees to commute to work in fossil fuel-powered cars.

86. *See supra* notes 77–85 and accompanying text. In the energy and transportation sectors, the total tax expenditures generated by provisions that support the Pillars of Decarbonization are much greater than those generated by the provisions that undermine them. *See* TAX EXPENDITURES FY2023, *supra* note 5, at 22–25.

87. *See infra* Section III.C (comparing the relative impact of the six residential tax provisions).

88. I.R.C. §§ 25C, 25D, 45L (2022); *see also* CCH AnswerConnect Ed., *supra* note 14. The Inflation Reduction Act restructured and expanded all three credits and renamed two of them: the Nonbusiness Energy Property credit is now the Energy Efficient Home Improvement credit, and the Residential Energy Efficient Property credit is now the Residential Clean Energy credit. *Id.*

1. The New Energy Efficient Homes Credit and the Pillars of Decarbonization

The New Energy Efficient Homes credit supports the End Use Energy Efficiency and Electrification Pillar of Decarbonization because the credit encourages home construction that is 10 to 50% more energy efficient than standard construction and increases the incentive for more efficient homes.[89] Additionally, the Zero Energy Ready home portion of this credit supports the Clean Power Pillar of Decarbonization because the Zero Energy Ready certified homes can be powered entirely by a home renewable energy system, such as rooftop solar panels.[90]

The New Energy Efficient Homes credit may seem too minimal to impact taxpayer behavior, but the credit is significant enough to make energy-efficient home construction competitive with conventional home construction. While the $5,000 maximum credit is much smaller than the cost of building a house, which was on average $285,675 in 2022, the additional cost to build a Zero Energy Ready home is only 0.9% to 2.5% more than the cost to build a house to code.[91] Thus, in many cases, additional costs incurred by the contractor

89. I.R.C. § 45L (2022). The tax credit doubles the incentive for the more efficient Zero Energy Ready homes. *Id.* Energy Star homes are at least 10% more efficient than homes built to code and are 20% more efficient on average. *About Energy Star Homes – 2021*, EPA (Apr. 2022), https://www.energystar.gov/sites/default/files/asset/document/2021-about-energy-star-homes-508-051322.pdf. Zero Energy Ready homes on the other hand are built so that a home solar panel can provide all power needs; they are 40–50% more energy efficient than homes built to standard building codes. Allie Ogletree, *Zero Energy Ready Homes: Everything You Need to Know*, ANGI (Sept. 15, 2022), https://www.angi.com/articles/zero-energy-ready-home.htm; *see also Zero Energy Ready Home Program*, DOE, https://www.energy.gov/eere/buildings/zero-energy-ready-home-program (last visited Jan. 29, 2023, 11:22 AM).

90. *See Zero Energy Ready Home Program*, DOE, https://www.energy.gov/eere/buildings/zero-energy-ready-home-program (last visited Jan. 29, 2023, 11:22 AM).

91. *How Much Does It Cost to Build a House in 2022?*, HOME ADVISOR, https://www.homeadvisor.com/cost/architects-and-engineers/build-a-house (last visited Jan. 12, 2023); ALISA PETERSEN ET AL., ROCKY MOUNTAIN INST., THE ECONOMICS OF ZERO-ENERGY HOMES: SINGLE FAMILY INSIGHTS 7 (2019), https://rmi.org/wp-content/uploads/2018/10/RMI_Economics_of_Zero_Energy_Homes_2018.pdf.

to build an energy-efficient home are less than the value of the credit.[92] The credit's small size means it creates a relatively small tax expenditure.[93] The New Energy Efficient Home credit supports the End Use Efficiency and Electrification and Clean Electricity Pillars of Decarbonization by motivating contractors to build homes that are energy efficient and designed for home renewable electricity systems.[94] This support is limited only by the small size of the credit relative to the cost of building a house, but the credit is still a meaningful incentive because of the modest cost difference between a home built to code and an energy-efficient home.[95]

2. The Energy Efficient Home Improvement Credit and the Pillars of Decarbonization

The Energy Efficient Home Improvement credit supports the End Use Efficiency and Electrification Pillar of Decarbonization by subsidizing home improvements that increase the energy efficiency of existing homes and, for some improvements, subsidizes the transition from gas- or oil-fueled appliances to electric- or biomass-fueled appliances.[96] The credit also partially supports the Clean Fuels Pillar by subsidizing biomass stoves and boilers and biofuel boilers and

92. *See* I.R.C. § 45L (2022); *How Much Does It Cost to Build a House in 2022?*, *supra* note 91; PETERSEN ET AL., *supra* note 91, at 7. The typical range of new home construction is $111,772 to $459,972, and the cost increase to make a home Zero Energy ready is 0.9%–2.5%, and so, the typical range of increased cost is $1,005 to $11,499 to make a home Zero Energy ready. *See id.* Much of this range is less than the $5,000 credit.

93. *See* TAX EXPENDITURES FY2023, *supra* note 5, at 32–34 (ranking income tax expenditures). In 2021, the New Energy Efficient Homes created a tax expenditure of $370 million, less than 5% of the average tax expenditure, $8.242 million, and less than 0.2% of the largest tax expenditure, the exclusion of employer contributions for medical insurance premiums, which cost $221 million. *Id.*

94. *See supra* notes 89–90 and accompanying text.

95. *See supra* notes 91–93 and accompanying text.

96. *See* NET-ZERO AMERICA REPORT, *supra* note 36, at 18–20. While all the improvements covered by the Energy Efficient Home Improvement credit generally support this Pillars goal of improving energy efficiency, replacing existing space heating equipment (usually gas, oil, or electric furnaces) with heat pumps is specifically mentioned as a key required transition between now and 2050. *Id.* at 18.

furnaces.[97] This credit creates a relatively small tax expenditure but that is largely because of its limited application.[98] The credit's non-refundability, its annual limits, and its inclusion of some fossil-fuel-powered appliances all limit its support of the Pillars of Decarbonization.[99] Because the credit is non-refundable, it is unavailable to taxpayers who do not have tax liability, approximately 40% of households.[100] Many of these individuals are low- or middle-income homeowners who would derive the most benefit from the credit relative to their income.[101] Additionally, the credit's annual limit of

97. *See generally id.* at 33. The focus of the Clean Fuels Pillar is the production of hydrogen gas; however, biomass-powered stoves and boilers will play a small role in the transition away from fossil fuels. It should be noted that while biomass-powered stoves and boilers emit CO2 during use, they are still a carbon-neutral technology because the CO2 they emit was taken out of the atmosphere by plants. *See id.*

98. *See* TAX EXPENDITURES FY2023, *supra* note 5, at 32–34 (ranking income tax expenditures). In 2021, the Energy Efficient Home Improvement credit was a $240 million tax expenditure which is less than 3% of the average tax expenditure, $8.242 million, and approximately 0.1% of the most expensive tax expenditure, the exclusion of employer contributions for medical insurance premiums, which cost $221 million. *Id.*

99. *See infra* notes 100–04 and accompanying text.

100. *See* Howard Gleckman, *The Number of Those Who Don't Pay Federal Income Tax Drops to Pre-Pandemic Levels*, TAX POL'Y CTR.: TAX VOX (Oct. 27, 2022), https://www.taxpolicycenter.org/taxvox/tpc-number-those-who-dont-pay-federal-income-tax-drops-pre-pandemic-levels. According to Tax Policy Center's estimates, approximately 40% of households will pay no federal income tax in 2022 or 2023; this is down significantly from a pandemic-induced peak of 60% in 2020 and comparable to the rates in 2017–2019. *Id.* None of these household would receive any benefit from the Energy Efficient Home Improvement credit even if they otherwise qualify for it. *See id.* Individuals with no tax liability receive no benefit from non-refundable tax credits. *Id.*; *See* KRATZKE, *supra* note 58, at 430 (explaining the difference between refundable and non-refundable tax credits).

101. According to the Tax Policy Center's estimates, there are more than 70 million households with low to middle incomes that will have no tax liability for 2022. *T22-0132 - Distribution of Tax Units with Zero or Negative Individual Income Tax, By Expanded Cash Income Percentile, 2022*, TAX POL'Y CTR.: MODEL ESTIMATES (Oct. 25, 2022), https://www.taxpolicycenter.org/model-estimates/tax-units-with-zero-or-negative-federal-individual-income-tax-oct-2022/t22-0132. And the National Association of Realtors estimates that more than 53 million low- to middle-income households are homeowners. *See* Gay Cororaton, *Distribution of Housing Wealth Across Income Groups from 2010–2020*, NAT'L ASS'N OF REALTORS: ECONOMISTS' OUTLOOK (Mar. 11, 2022), https://www.nar.realtor/blogs/economists-outlook/distribution-of-housing-wealth-across-income-groups-from-2010-2020.

$1,200 to $3,200 encourages an incremental, piece-meal approach to energy-efficient home improvement, consequently discouraging large-scale home improvement.[102] This disincentive slows implementation of the End Use Efficiency and Electrification Pillars.[103] Finally, the credit partially undermines the End Use Efficiency and Electrification Pillar because it subsidizes gas and oil-fueled water heaters and boilers, albeit only highly efficient ones.[104] The End Use Efficiency and Electrification Pillars require that these long-lived appliances be replaced with electric ones at their next replacement because there are so few replacement opportunities before 2050, and so, providing a subsidy for fossil fuel-powered appliances undermines that portion of the Pillar.[105] The incentives in the Energy Efficient Home credit support the End Use Efficiency and Electrification and Clean Fuels Pillars of Decarbonization by encouraging homeowners to increase the energy efficiency of their homes and transition to low- to no-carbon

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While it is impossible to know the exact number, it can be reasonably inferred from these data sets that there are several million households who are homeowners and who will have no tax liability. These taxpayers would receive the most benefit from the Energy Efficient Home Improvement credit relative to their income but cannot receive any benefit at all because the tax credit is non-refundable.

102. *See supra* notes 65–67 and accompanying text. For example, a homeowner who hires a company to do an energy audit ($450) and based on the recommendations installs new insulation ($4,000), replaces an air conditioner and gas furnace with a heat pump heating and cooling system ($6,000), replaces a gas water heater with an electrical heat pump water heater ($4,000), upgrades an electrical panel ($4,000), replaces twelve windows ($500/window x 12 = $6,000), replaces three exterior doors ($750/door x 3) = $2,250, and replaces a gas fireplace with a wood stove ($6,500) for a total cost of $33,200. All of these improvements are individually eligible for the tax credit without exceeding individual item maximums, so the homeowner could receive up to $9,960 in tax credits but only if the taxpayer breaks the improvements up over 4–5 years to avoid the $1,200 annual limit on most items and $3,200 maximum. If the taxpayer completes all of the work at once, an optimal decision for the purposes of the End Use Energy Efficiency and Electrification Pillar, the homeowner would only receive $3,200 in tax credits.

103. *See* NET-ZERO AMERICA REPORT, *supra* note 36, at 18–29 (explaining the End Use Efficiency and Electrification Pillar).

104. *See* I.R.C. § 25C (2022). Natural gas, propane, or oil fueled furnaces and water heaters are eligible for the tax credit if they meet or exceed the highest efficiency tier established by the Consortium of Energy Efficiency. *Id.*

105. *See* NET-ZERO AMERICA REPORT, *supra* note 36, at 23 (explaining of why longer-lived assets, such as heaters and air conditioners, need to be replaced with low- or no-carbon options at their next end-of-life replacement).

energy sources.[106] But the credit simultaneously limits and undermines that support because the credit is non-refundable, has low annual limits, and subsidizes some fossil-fuel-based appliances.[107]

3. The Residential Clean Energy Credit and the Pillars of Decarbonization

The Residential Clean Energy credit supports the Clean Energy Pillar of Decarbonization because it subsidizes the installation of low- and no-carbon home energy systems as well as battery storage for those systems.[108] The credit also supports the Clean Fuels Pillar by subsidizing hydrogen fuel cell home energy systems.[109] The only significant limitation on the credit's support of these Pillars is that it is non-refundable.[110] As discussed above, there are many low- and middle-income homeowners who would receive the most benefit from this credit relative to their income but cannot receive any benefit because they do not have any tax liability.[111] This credit is a greater expenditure than either the New Energy Efficient Home credit or the Energy Efficient Home Improvement credit but is still a relatively small tax expenditure.[112] The incentives in the Residential Clean

106. *See supra* notes 96–98 and accompanying text.

107. *See supra* notes 100–05 and accompanying text.

108. *See* I.R.C. § 25D (2022); NET-ZERO AMERICA REPORT, *supra* note 36, at 24–30. The Clean Electricity Pillar requires doubling to quadrupling total electricity generation by 2050 using only low- and no-carbon sources and requires dramatically increasing battery capacity for short-duration electricity storage. NET-ZERO AMERICA REPORT, *supra* note 36, at 24. All of the systems that qualify for the Residential Clean Energy Credit either produce electricity from low- or no-carbon sources (i.e., electric solar panels and wind turbines), reduce the need for additional electricity (i.e., geothermal heating and solar water heaters), or provide short term electricity storage (i.e., battery systems). *See id.* at 24–30.

109. *See* NET-ZERO AMERICA REPORT, *supra* note 36, at 36. The Clean Fuels Pillar emphasizes replacing existing fossil fuel powered systems with hydrogen fueled systems.

110. *See* I.R.C. § 25D (2022). I.R.C. §§ 21-26 are all non-refundable personal credits.

111. *See supra* notes 101–02 and accompanying text (explaining that there are millions of homeowners who do not have tax liability and therefore are unable to benefit from non-refundable tax credits).

112. *See* TAX EXPENDITURES FY2023, *supra* note 5, at 32–34 (ranking income tax expenditures). The New Energy Efficient Home credit was a $370 million

Energy credit support the Clean Energy and Clean Fuels Pillars of Decarbonization by encouraging homeowners to invest in low- or no-carbon energy sources.[113] But the credit is non-refundable, so it only encourages those investments for homeowners with tax liability.[114]

B. Tax Expenditures That Undermine the Pillars of Decarbonization in the Residential Sector

The three homeownership tax provisions—the exclusion of Net Imputed Rental Income, the exclusion of Capital Gains on Home Sales, and the Mortgage Interest deduction—encourage homeownership over renting and fail to equally spread the benefit among homeowners.[115] Because these are deductions and exclusions, they provide the greatest benefit to high-income taxpayers.[116] And because their value scales with the cost of a home, they provide the greatest benefit to the most expensive homes.[117] Additionally, the deductibility of mortgage

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expenditure in 2021. *Id.* The Energy Efficient Home Improvement credit was a $240 million expenditure in 2021. *Id.* In 2021, the Residential Clean Energy credit was a $2.59 million tax expenditure which is 31% of the average tax expenditure, $8.242 million, and approximately 1% of the most expensive tax expenditure, the exclusion of employer contributions for medical insurance premiums, which cost $221 million. *Id.*

113. *See supra* notes 108–109 and accompanying text.

114. *See supra* notes 101–102 and accompanying text.

115. *See* TAX EXPENDITURES FY2023, *supra* note 5, at 10; *see also supra* notes 57–58 and accompanying text. In this case, if there are two otherwise equally situated taxpayers and one rents his home while the other buys it, the tax burden on the renter will be greater than the tax burden on the buyer. *See* KRATZKE, *supra* note 58, at 432–33.

116. *See supra* notes 60–61 and accompanying text. Taxpayers in higher tax brackets benefit more from deductions and exclusions because the value of the benefit is the amount of the deduction or exclusion multiplied by the tax rate of the taxpayer. *See* KRATZKE, *supra* note 58, at 427–33.

117. *See supra* notes 70–75 and accompanying text. There is no limit to the exclusion of imputed rental income, so generally, the more valuable the home the greater the exclusion. *See* TAX EXPENDITURES FY2023, *supra* note 5, at 9–10, 22. For the exclusion of gain on home sales, it is the gain that is excluded not the gross price but generally, for homes in similar markets that are owned for similar amounts of time, there will be more gain on the sale of more expensive homes and so there is a greater tax benefit for the sale of expensive homes up to the exclusions $250,000 or $500,000 limits. *Id.* The deduction for mortgage interest is not strictly based on the value of the home but rather on loan amount, interest rate, and term and is limited to

interest is only valuable to taxpayers who itemize deductions rather than taking the standard deduction which is less than 14% of taxpayers, almost all of whom are in the top quintile of income level. [118] These tax expenditures also likely do not increase homeownership rates because they disproportionately benefit high income taxpayers who are likely to own homes anyway.[119] Further, the homeownership tax expenditures disproportionately subsidize homeownership in low population density neighborhoods.[120] These expenditures are very expensive, costing the United States a combined $194 million in 2021, and disproportionately subsidize high-income homeowners with more expensive homes in low population density neighborhoods.[121]

The highest-income homeowners and the most expensive homes also emit more carbon into the atmosphere than lower-income households and less expensive homes.[122] Researchers studied greenhouse gas emissions of the residential sector and found that high-income households produce 25% more greenhouse gases than low-

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the first $750,000 ($375,000 for married individuals filing separately) but for otherwise similar loans within the limit there is a greater tax benefit for the taxpayer with the larger loan. *Id.*

118. *See supra* notes 60–61 and accompanying text (discussing the differences between exclusions, deductions, and credits); Eastman, *supra* note 61 (estimating the percentage of taxpayers who itemize their deductions rather than taking the standard deduction and then breaking that estimate down by income level).

119. *See What Are the Tax Benefits of Homeownership?*, TAX POL'Y CTR.: BRIEFING BOOK (May 2020), https://www.taxpolicycenter.org/briefing-book/what-are-tax-benefits-homeownership (showing that comparison with other similar countries indicate that the homeownership tax expenditures do not increase homeownership rates and arguing that this is largely because low-income households, who need aid to afford homeownership, get little or no benefit from existing tax incentives).

120. *See* Roberta F. Mann, *The (Not so) Little House on the Prairie: The Hidden Costs of the Home Mortgage Interest Deduction*, 32 ARIZ. ST. L.J. 1347, 1386–92 (2000) (arguing that the mortgage interest deduction encourages and exacerbates urban sprawl).

121. *See supra* notes 73–75 and accompanying text. In 2021, the three home ownership expenditures cost an estimated $124 million, $40.9 million, and $29.4 million respectively for a total of approximately $194 million.

122. Benjamin Goldstein et al., *The Carbon Footprint of Household Energy Use in the United States*, 117 PNAS 19122, 19123–25 (2020), https://www.pnas.org/cgi/doi/10.1073/pnas.1922205117.

income households on average.[123] Moreover, homes in the most expensive neighborhoods in a given city emit up to fifteen times as much carbon dioxide as the homes in the least expensive neighborhoods.[124] The researchers similarly found that homes with more floor space per person emit more carbon dioxide.[125] In short, homes that have the largest carbon footprint are large, expensive homes of high income people—the same homes that the homeownership tax provisions subsidize the most.[126] The homeownership tax provisions undermine the End Use Efficiency and Electrification Pillar and the entire project of decarbonization by delivering the greatest homeownership subsidies to homes producing the most carbon emissions.

C. Net Effect of the Six Residential Tax Expenditures

The three home energy tax credits support the Pillar of Decarbonization for the residential sector by encouraging construction of new energy-efficient homes, improvements to existing homes to make them energy efficient, and installation of clean energy systems to homes.[127] While these credits have limitations, they all encourage changes to the residential sector that support the United States' goal of net-zero carbon emissions by 2050.[128] Even so, the three homeownership tax incentives undermine the Pillars of Decarbonization and the United States' goal of net-zero carbon emissions by 2050.[129] The nature of these homeownership tax incentives means that their benefit primarily goes to taxpayers whose homes have the largest carbon footprint—high-income taxpayers with large and expensive homes.[130] These homeownership tax incentives also create tax expenditures that are sixty times as large as the three

123. *Id.* at 19,122.

124. *Id.*

125. *Id.* at 19,124.

126. *See supra* notes 115–121 and accompanying text (explaining that the homeownership tax provisions disproportionately subsidize high-income taxpayers and large, expensive houses).

127. *See supra* Section III.A.

128. *See supra* Section III.A.

129. *See supra* Section III.B.

130. *See supra* Section III.B.

home energy tax expenditures.[131] Without significant changes, these six residential tax provisions will continue to undermine the United States' goal of net-zero carbon emissions far more than they support it.

IV. SOLUTIONS

The best way to use the tax code to support the Pillars of Decarbonization in the residential sector is to align the incentives in the tax code so that living in a home with a small carbon footprint receives the greatest tax subsidy and living in a home with a large carbon footprint receives little or no tax subsidy.[132] Congress should adopt two basic approaches: (1) revise and expand the home energy tax credits that already support the Pillars of Decarbonization, and (2) replace or revise the homeownership tax incentives to encourage living in a home with a small carbon footprint.[133] The proposals below favor refundable tax credits because they are the most efficient way to encourage emissions-reducing choices for all taxpayers.[134] These changes will expand the number of taxpayers who are eligible for the tax benefits without increasing the overall cost of the tax expenditures.[135] The I.R.C. should incentivize all taxpayers to live and invest in homes that have a small carbon footprint without putting additional pressure on the Federal Budget.[136]

A. Revision and Expansion of the Home Energy Tax Credits

While existing home energy tax credits support the Pillars of Decarbonization, that support is limited by the design of each credit.[137] The solutions below modify each credit to increase their efficacy in

131. *See* TAX EXPENDITURES FY2023, *supra* note 5, at 32–34 (ranking income tax expenditures). In 2021, the three home ownership tax credits cost approximately $194 million while the three home energy credits cost approximately $3.2 million. *Id.*

132. *See* discussion *infra* Sections IV.A–B.

133. *See* discussion *infra* Sections IV.A–B.

134. *See supra* Section II.C (comparing the function of deductions, exclusions, and credits as tools to encourage taxpayer behavior and explaining why refundable tax credits are the most efficient way to encourage specific taxpayer behaviors).

135. *See infra* Section IV.C.

136. *See infra* Section IV.C.

137. *See* discussion *supra* Section III.A (explaining how the home energy tax credits support the Pillars of Decarbonization).

reducing carbon emissions by removing those design limits and expanding the availability of each credit.

1. Maintain the New Energy Efficient Homes Credit and Add a Similar Demand-Side Credit

The New Energy Efficient Homes credit already provides a meaningful incentive for contractors to build energy-efficient homes, and the size of the credit is often greater than the increased cost of building an efficient home.[138] Rather than increase the amount of this credit, Congress should create a demand side credit for homebuyers. This "Energy Efficient Homebuyers credit" would be a refundable personal credit for buying a home that meets the same Energy Star or Zero Energy Ready certifications.[139] The credit amounts should be the same as the New Energy Efficient Homes credit: $2,000 for a home that meets the Energy Star certification and $5,000 for a home that meets the Zero Energy Ready certification.[140] On top of increasing the demand for new energy-efficient homes, this credit will encourage homeowners to improve the energy efficiency of their existing homes so that the home qualifies for the credit when sold and to maintain their home's energy efficiency so that they do not lose the certification when selling. The addition of the Energy Efficient Homebuyers credit encourages homebuyers to choose an energy-efficient home, which supports the End Use Efficiency and Electrification pillars.

2. Allow Carry Forward of Expenses and Expand the Availability of the Energy Efficient Home Improvement Credit

In its current form, the Energy Efficient Home Improvement credit discourages homeowners from completing multiple energy-efficient improvements in a single year because of its annual limits.[141] To remove this disincentive, Congress should modify the credit to

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138. *See supra* Section III.A.1.

139. *See supra* notes 89–90 and accompanying text (describing Energy Star and Zero Energy Ready homes).

140. *See supra* notes 89–90 and accompanying text.

141. *See* discussion *supra* Section III.A.2 (explaining how the Energy Efficient Home Improvement credit discourages multiple energy efficient home improvements in a single year).

allow qualifying expenses in excess of the annual limit to carry forward for up to ten years.[142] The carry-forward provision would allow taxpayers to complete multiple energy improvements in a single year while continuing to fully benefit from the credit. The existing item-based limits prevent abuse of the credit.[143] Additionally, the credit should be made refundable so that homeowners without tax liability in a given year are still encouraged to make energy-efficient improvements to their homes.[144]

Congress should also create a similar credit for owners of rental property called the "Energy Efficient Residential Property credit" as the existing energy efficiency improvement deduction for commercial property does not apply to rental property.[145] The Energy Efficient Residential Property credit would be a business credit that mirrors the Energy Efficient Home Improvement credit but is available to owners of residential rental property. For both credits, gas- and oil-fueled appliances should not be subsidized because this would undermine the transition away from fossil fuels.[146] These changes to the Energy Efficient Home Improvement credit and the addition of the Energy Efficient Residential Property credit would support the End Use Efficiency and Electrification Pillar by incentivizing all residential property owners to improve the energy efficiency of their homes and units and by removing the disincentive to large energy-efficient home improvement projects.

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142. *See generally* I.R.C. § 170(d)(ii) (describing the carryover of excess charitable contributions). This provision would function similarly to the deduction for charitable contributions which allows qualifying contributions in excess of the annual limit to be deducted in subsequent years. *Id.*

143. *See supra* notes 66–67 and accompanying text (describing the item-based limits in the Energy Efficient Home Improvement credit).

144. *See supra* notes 100–101 and accompanying text (describing why the Energy Efficient Home Improvement credit is unavailable to taxpayers without tax liability in a given year).

145. *See* I.R.C. § 179D. The Energy Efficient Commercial Buildings deduction provides a tax deduction for improvements in the energy efficiency of commercial buildings but does not apply to most residential rental property. *Id.*

146. *See supra* notes 104–105 at 22–23 and accompanying text (describing the how the inclusion of gas- and oil-based appliances in the credit undermines the Pillars of Decarbonization).

3. Expand the Availability of the Residential Clean Energy Credit

The Residential Clean Energy credit already effectively supports the Clean Electricity and Clean Fuels Pillars by encouraging homeowners to install clean energy generation systems on their homes.[147] However, the credit's current structure limits its implementation throughout the residential sector.[148] First, this credit should be made refundable to encourage homeowners without any tax liability in a given year to install clean energy systems on their homes.[149] Second, the credit should be made available to owners of residential rental property. While there are existing business tax credits and accelerated depreciation advantages that owners of residential rental property may use, the Residential Clean Energy credit is better suited to residential properties and should be made available as an alternative.[150] These changes to the Residential Clean Energy credit would increase its support of the Clean Electricity Pillar by encouraging more residential property owners to install clean energy systems on their properties.

B. Replacement and Revision of the Homeownership Tax Expenditures

The exclusions of Imputed Rental Income and Home Sales capital gains, and the Mortgage Interest deduction currently provide the greatest subsidy to taxpayers with homes that tend to produce the most carbon emissions.[151] These expenditures should be replaced or modified to encourage the purchase and sale of Low Carbon Footprint ("LCF") homes. A LCF home would need to meet one of the following

147. *See* discussion *supra* Section III.A.3 (explaining how the Residential Clean Energy credit supports the Clean Electricity and Clean Fuels Pillars of Decarbonization).

148. *See supra* Section III.A.3 (describing the limits on the Residential Clean Energy credit).

149. *See supra* notes 101–102 and accompanying text (explaining that millions of homeowners do not have tax liability and therefore these homeowners do not benefit from non-refundable tax credits).

150. *See e.g.*, I.R.C. § 48. The Energy credit provides a credit for businesses who install solar panels and some other low- and no-carbon energy systems, but it does not apply to all residential rental buildings. *Id.*

151. *See* discussion *supra* Section III.B.

criteria: (1) meet the energy efficiency standards of the Zero Energy Ready certification,[152] (2) have a floor area per person of 500 square feet or less,[153] or (3) have a per capita emissions rate of 1.5 tons CO_2-equivalent per person or less.[154]

1. Replace the Exclusion of Imputed Rental Income with a Homeownership Tax Credit That Encourages Living in a LCF Home.

Currently the exclusion of Imputed Rental Income provides the greatest tax benefit to homes that produce more carbon emissions.[155] To continue subsidizing homeownership without undermining the Pillars of Decarbonization, the Exclusion of Imputed Rental Income should be replaced with a Homeowners credit that provides a greater benefit for taxpayers who buy, sell, and own LCF homes.[156] The Homeowners credit would be a refundable, annual credit for homeowners of $500 for individual filers and $1,000 for joint filers, which would double to $1,000 for individual filers and $2,000 for joint filers for homeowners whose homes qualify as LCF.[157] The Homeowners credit would be available to all homeowners who file an income tax return. The annual tax expenditure for this tax credit would be less than the expenditure it would replace.[158] The Homeowners

152. *See supra* notes 89–90 and accompanying text. Zero Energy Ready certified homes have a low carbon footprint because they are 50% more energy efficient than homes built to code and can generally be powered by a home renewable energy system.

153. *See* Goldstein et al., *supra* note 122, at 19,127–28. The researcher's model suggests that new homes must be built smaller to reach net-zero carbon emissions by 2050 and calls for a 10% reduction in floor area per person. *Id.* The 500 square foot threshold for a LCF home is based on this requirement.

154. *See id.* at 19,124. Residential energy use currently produces an average of approximately three tons of CO2 per person per year. *Id.* The 1.5 ton per person per year threshold represents a 50% reduction in carbon emissions.

155. *See* discussion *supra* Section III.B (explaining how the homeownership tax credits disproportionately subsidize homes with a large carbon footprint).

156. *See supra* Section III.B (explaining that homes in high-income neighborhoods produce more carbon emissions than low-income neighborhoods).

157. See *supra* notes 152–154 and accompanying text for the LCF home criteria and supporting rationale.

158. *See* TAX EXPENDITURES FY2023, *supra* note 5, at 32–34 (ranking income tax expenditures). In 2021, the exclusion of imputed rental income and the mortgage interest deduction combined cost approximately $124 million and there were

credit would support the End Use Efficiency and Electrification and Clean Electricity Pillars by (1) subsidizing energy-efficient homes and homes receiving energy from low- and no-carbon sources and (2) removing the existing larger subsidy for homes with larger carbon footprints.

2. Convert the Mortgage Interest Deduction to a Credit That Encourages Loans for LCF Homes

The Mortgage Interest deduction currently provides the greatest benefit to high-income taxpayers with large, expensive homes; that is, homes with large carbon footprints.[159] Congress should eliminate the Mortgage Interest deduction and replace it with a Mortgage Interest credit that increases for LCF homes. The baseline Mortgage Interest credit would be a non-refundable credit equaling 20% of the annual interest paid on the first $250,000 of home acquisition indebtedness.[160] The Mortgage Interest credit for a LCF home would be a refundable credit equaling 30% of the annual interest paid on the first $750,000 of home acquisition indebtedness.[161] Because so few taxpayers are eligible for the Mortgage Interest deduction, the proposed credit would

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approximately 83 million owner-occupied homes. *American Community Survey: DP04 Selected Housing Characteristics*, U.S. CENSUS BUREAU (2021), https://data.census.gov/table?q=homeownership&tid=ACSDP1Y2021.DP04 (estimating national housing statistics based on the 2021 American Community Survey results). The Home Ownership Tax Credit would cost less if the average credit is less than $1,494 and it almost certainly would be because of the number of single filers and the relatively small number of low carbon footprint homes.

159. *See* discussion *supra* Section III.B (explaining how the homeownership tax credits disproportionately subsidize homes with a large carbon footprint).

160. The $250,000 limit is based on the average mortgage balance in the United States, $236,443 as of September 2022. Chris Horymski, *Total Mortgage Debt Increases to $11.2 Trillion in 2022*, EXPERIAN (Mar. 27, 2023), https://www.experian.com/blogs/ask-experian/how-much-americans-owe-on-their-mortgages-in-every-state. It is worth noting that while the baseline Mortgage Interest credit will reduce the tax benefit to high-income taxpayers, it will benefit far more taxpayers because only 14% of homeowners currently itemize their deductions. *See supra* Section III.B.

161. *See supra* notes 152–154 and accompanying text (discussing the LCF home criteria and supporting rationale).

likely create a larger expenditure than the deduction it replaces.[162] Replacing the Mortgage Interest credit with the proposed deduction would support the Pillars of Decarbonization by providing the greatest benefit to taxpayers who choose to live in LCF homes.

3. Limit the Exclusion of Gains on Home Sales to the Sale of Low Carbon Footprint Homes

The exclusion of capital gains on home sales currently provides the greatest subsidy to homes with the largest carbon footprint.[163] Congress should alter the exclusion to apply only when the homeowner sells a LCF home or if the homeowner uses the gains to buy a LCF home.[164] Limiting the exclusion to LCF homes would incentivize three emissions-reducing behaviors: (1) selling new and existing low-carbon footprint homes, (2) improving existing homes to make them low-carbon footprint homes, and (3) buying a low-carbon footprint home after the sale of a high-carbon footprint home. Limiting the exclusion in this way also reduces the overall cost of the tax expenditure because most homes in the United States are not LCF homes.[165] This exclusion supports the Pillars of Decarbonization by subsidizing the sale and purchase of energy-efficient homes and homes that use low- and no-carbon energy sources and by removing a subsidy from the sale of homes with a large carbon footprint.[166]

C. Benefits and Relative Costs of Solutions

These recommended changes to the tax code align residential tax expenditures with the Pillars of Decarbonization and the United

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162. *See supra* Section III.B (explaining that less than 14% of taxpayers are eligible for the existing Mortgage Interest deduction).

163. *See* discussion *supra* Section III.B (explaining how the homeownership tax credits disproportionately subsidize homes with a large carbon footprint).

164. *See supra* notes 152–154 and accompanying text (discussing the LCF home criteria and supporting rationale).

165. *See* TAX EXPENDITURES FY2023, *supra* note 5, at 32–34. In 2021, the Capital Gains exclusion on home sales cost $40.9 million. *See id.* The recommended limitation of the exclusion would dramatically reduce the cost because only home sales that involved a low-carbon-footprint home would be eligible.

166. *See* NET-ZERO AMERICA REPORT, *supra* note 36, at 18, 24 (describing the End Use Efficiency and Electrification and Clean Electricity Pillars).

States' goal of net-zero carbon emissions by 2050. The recommended changes to the home energy tax credits expand their availability and impact, and would consequently increase the tax expenditures those credits create.[167] That said, the recommended changes to the homeownership tax incentives would significantly reduce their combined expenditures because a relatively small percentage of existing homes qualify as LCF.[168] The reduced cost of the homeownership expenditures would likely more than offset the additional costs of the home energy tax credits, at least until a substantial percentage of the United States' housing is LCF.[169]

V. CONCLUSION

As the United States continues to work toward its decarbonization goals, it is crucial that tax incentives align with these goals. Even as the United States has created many incentives that encourage decarbonization, it has failed to remove other incentives that subsidize carbon-intensive activities.[170] Nowhere is this truer than in the tax provisions for the residential sector. There are three important though relatively small tax expenditures that subsidize the decarbonization of the residential sector, but simultaneously, three of the largest tax expenditures subsidize homeownership in a manner that provides the greatest subsidy for homeowners with the largest carbon footprint.[171] Although the tax provisions of the residential sector have an alignment problem, Congress can solve it. The solutions proposed in this Note accelerate the work of decarbonization in two ways: (1) expanding incentives that support the Pillars of Decarbonization,[172] and (2) aligning the incentives for homeownership so that the greatest

167. *See* discussion *supra* Section IV.A. All the recommendations would expand the tax credits and would increase the overall cost.

168. *See supra* notes 158, 162 and 165 (discussing the change in tax expenditures for each of the proposed homeownership tax provisions).

169. *See supra* note 137 and accompanying text. The current homeownership expenditures are so large that even a modest 10% reduction in those expenditures would pay for a six-fold increase in the cost of home energy expenditures.

170. *See, e.g.*, *supra* notes 76–88 and accompanying text.

171. *See* discussion *supra* Sections III.A-B.

172. *See* discussion *supra* Section IV.A.

subsidies go to homeowners with the smallest carbon footprint.[173] If these changes are made they will help decarbonize the residential sector, increase homeownership rates,[174] and cost less than existing expenditures.[175] The United States can and should make these changes to reach its decarbonization goals.

173. *See* discussion *supra* Section IV.B.

174. *See supra* notes 121–125 and accompanying text. More low- and middle-income potential homeowners could take advantage of the proposed homeownership incentives and so there would likely be an overall increase in homeownership rates.

175. *See supra* notes 160–62 and accompanying text.