Industrials/Multi-Industry

Building electrification key undervalued driver for US electrical demand

Industry Overview

10 November 2025

Equity
Americas
Industrials/Multi-Industry

Andrew Obin
Research Analyst
BofAS
+1 646 855 1817
andrew.obin@bofa.com

David Ridley-Lane, CFA
Research Analyst
BofAS
+1 646 855 2907
david.ridleylane@bofa.com

Sabrina Abrams
Research Analyst
BofAS
+1 646 556 3520
sabrina.abrams@bofa.com

Devin Leonard
Research Analyst
BofAS
+1 646 855 3698
devin.leonard@bofa.com

Building electrification: misunderstood & underappreciated

The biggest pushback to our electrical demand forecast in our June 2025 US grid report was building electrification being the biggest driver over data centers. We are forecasting that building electrification is driving an incremental 100bp to the 2024-35E CAGR vs data centers adding 80bps. This compares to building electrification growing at 0.2% CAGR 2014-2024 and data centers growing at 8.7% CAGR over the same time period. Our sense is that investors don't appreciate the importance and drivers of this key trend. Building electrification is not a new trend, but it is an accelerating one.

Regs drove electrification and will continue to drive it

Both businesses and consumers are opting for electricity over oil & gas. Historically, building electrification has been driven by federal regulations and incentives with help from state/local regulations. We note electrification has benefited from the demographic shift to the South where it is a more feasible technology. However, we see future electrification as being driven primarily by state/local regulations and incentives. While the current administration has done work on deregulation, we think it is less impactful to electrification than the market thinks. Deregulation has cut relevant tax credits, but has not impacted rebate funding. Federal regulations from under the Bush and Obama administration drove the push to electrification by creating energy efficiency tax credits as well as creating efficiency standards for products. Historically, state/local utility incentives have helped with $6.9bn spent on electricity efficiency programs in 2023. Electrification will continue to be driven at the state/local level. ~17 States, Washington D.C, and over 100 cities have some form of law, regulation, or building code that incentivizes building electrification or electric appliances. 48/50 states have utilities offering either resi or commercial incentives for electrification.

Commercial buildings: the shift towards all-electric

As of 2018, 31% of commercial buildings in the US were all electric. Electricity now represents 60% of total energy in commercial buildings, with natural gas a distant second at 34% of total energy consumption. Electrical intensity is rising further, likely driven by regulations at the state/local level. Buildings built since 2000 use 14.3 kilowatt hours (kWh) per square foot, or 15% more than buildings built 1960-99.

Residential opting for electric heat over fossil fuels

Electricity is the primary heating source for 52% of new single-family homes (up from 31% in 2005) and 76% of new multi-family units (up from 55% in 2005). Since 2009, electric heating has grown by 3.0bn sq. ft. while fossil fuel heating has declined by (4.7)bn sq. ft. This likely reflects electric heating being incentivized at both the state and federal level. Residential heat pumps have outsold fossil fuel furnaces since 2020, likely helped by federal and state incentives for heat pumps. Over the past five years, heat pump shipments have grown at a 6% CAGR versus a (2)% decline for fossil fuel furnaces. Declining use of natural gas also shows up in per-home consumption data. The average US residential customer used 21% less natural gas per year in 2024 versus 2014.

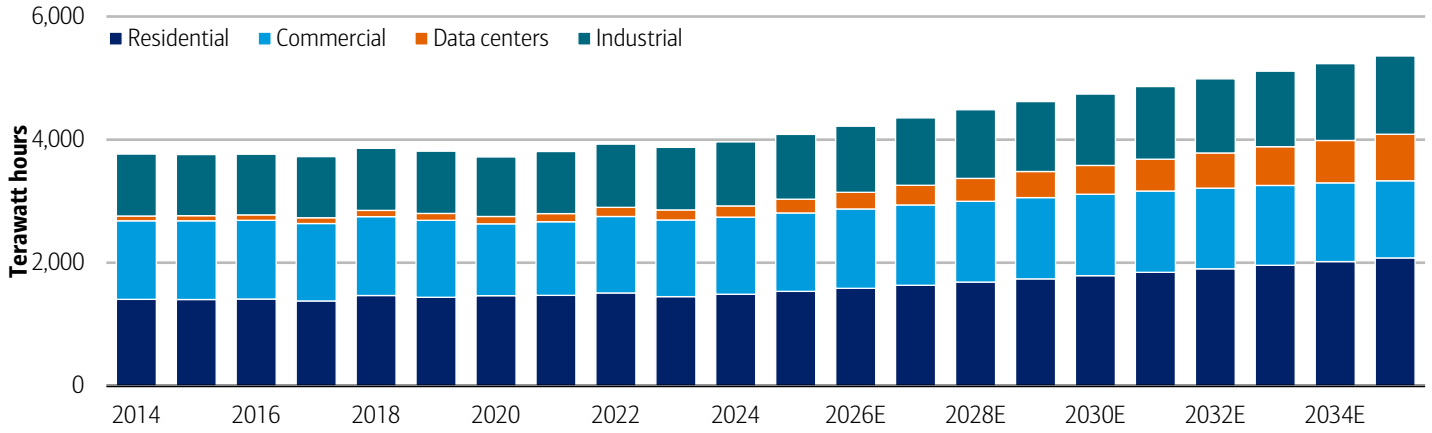
Refer to important disclosures on page 24 to 25.

Timestamp: 10 November 2025 05:00AM EST

US electrical load to grow at 2.8% CAGR

US electrical demand grew at a 0.5% CAGR over 2014-24. We project a 2.8% CAGR over 2024-35 to reflect incremental demand from 1) building electrification, 2) data centers, 4) "mega project" industrial demand, and 4) EV adoption.

Exhibit 1: US electrical demand (in terawatt hours per year) 2014–2035E
We forecast US electrical demand to grow at a 2.8% CAGR over 2024-35E



Source: BofA Global Research, US Energy Information Administration

BofA GLOBAL RESEARCH

Where the load growth comes from

Exhibit 2: Sources of incremental US electrical load growth, 2024-35E
We forecast US electrical demand to grow at a 2.8% CAGR over 2024-35E

Historical CAGR (2014-24)	**0.5%**
Building electrification	1.0%
Data centers	0.8%
Industrial growth	0.3%
EV adoption	0.2%
Forecast CAGR (2024-35E)	**2.8%**

Source: BofA Global Research, US Energy Information Administration

BofA GLOBAL RESEARCH

1. **Building electrification:** We assume electricity consumption gradually replaces natural gas for space and water heating, either through new construction or retrofit. Several states and cities have banned fossil fuel heating from new construction. This drives an incremental 100bp to the 2024-35E CAGR.

2. **Data centers:** We forecast an 14% CAGR for data center electrical loads, which adds 80bp to the 2024-35E CAGR.

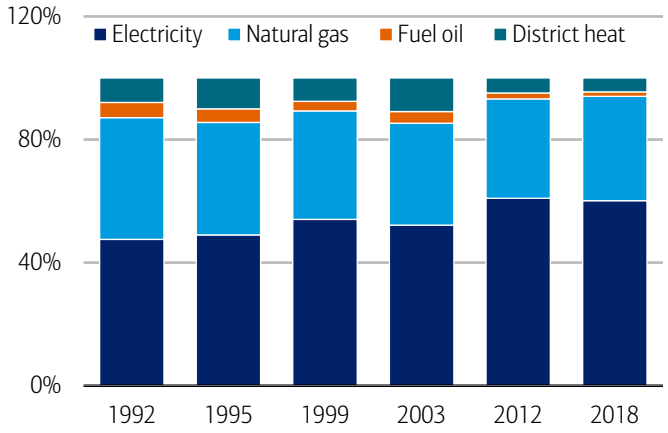
3. **Industrial growth:** We assume US industrial demand for electricity grows at a 1.9% CAGR. US manufacturing plant closures was a meaningful drag in 2014-24. Aided by greater reshoring and Federal policy support, US industrial firms are building new plants at a rapid pace. We view semiconductors, EV battery plants, and pharmaceutical as the largest areas of reshoring. Faster growth adds an incremental 30bp to the 2024-35E CAGR.

4. **EV adoption:** We assume EV adoption reaches 19% of the US passenger vehicle fleet in 2035, up from 2% in 2024. This adds an incremental 20bp to the 2024-35E CAGR.

Electrification is not new

Electricity already the most used energy type

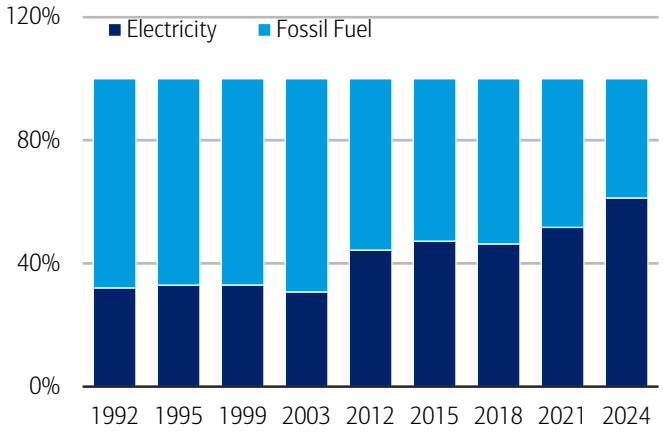
Exhibit 3: Electricity is the most used energy type for commercial buildings
Total energy consumption (tn BTU)



Source: U.S. Energy Information Administration

BofA GLOBAL RESEARCH

Exhibit 4: In resi homes electricity is the most used heating fuel
In resi (single family and multi-fam) electricity represents 61% of heating fuel used



Source: US Bureau of Census

BofA GLOBAL RESEARCH

Driver 1: Federal regulations

Federal policy from 2005 – 2009 likely helped drive the uptick in electrification. Two of the pieces of legislation came under President George W. Bush and one was under President Barack Obama. The federal regulations broadly provided funding to help with the switch to electrification, but some also created new requirements and initiatives.

Energy Policy Act of 2005

- Provided tax incentives and loan guarantees for energy production of various types. Tax credits include Renewable Electricity Production Tax credit, the establishment of key energy efficiency tax credits like 25C and 45L.
- Required federal facilities to draw a certain percentage of energy from renewable sources. From FY 2007 – 2009, 3% of electricity had to come from renewables. From FY 2010 – 2012, 5% of electricity had to come from renewables. From FY 2013 or after, 7% of electricity had to come from renewables.
- Authorized loan guarantees for “innovative technologies” that avoid greenhouse gases.
- Authorizes subsidies for wind energy, and other alternative energy producers.
- Provides tax breaks for those making energy conservation improvements to their homes.
- Expands the scope of Section 45 of the Code, which provides a tax credit for the production of electricity from wind, closed-loop biomass, open-loop biomass, geothermal energy, solar energy, small irrigation power, municipal solid waste and refined coal.

Energy Independence and Security Act of 2007

- Title III contains standards for ten appliances and equipment: residential boilers, clothes dryers, room air conditioners, clothes washers, residential water heaters, dishwashers, kitchen stove ovens, microwave ovens, and dehumidifiers. Previous national efficiency standards for covered products.

- New initiatives for promoting conservation in buildings and industry.
- Creates an Office of Commercial High Performance Green Buildings in the Department of Energy, and promotes the development of more energy efficient buildings.
- Aims to create a nationwide zero-net-energy initiative for commercial buildings built after 2025. Buildings built before 2025 should also meet the initiative by 2050.
- Requires all lighting in Federal buildings to use Energy Star products.
- New standards and grants for promoting efficiency in government and public institutions. New and renovated federal buildings must reduce fossil fuel use by 55% (from 2003 levels) by 2010, and 80% by 2020. All new federal buildings must be carbon-neutral by 2030.
- The Department of Energy must research and develop ways to improve the energy efficiency of equipment and processes used in industry.

American Recovery and Reinvestment Act of 2009

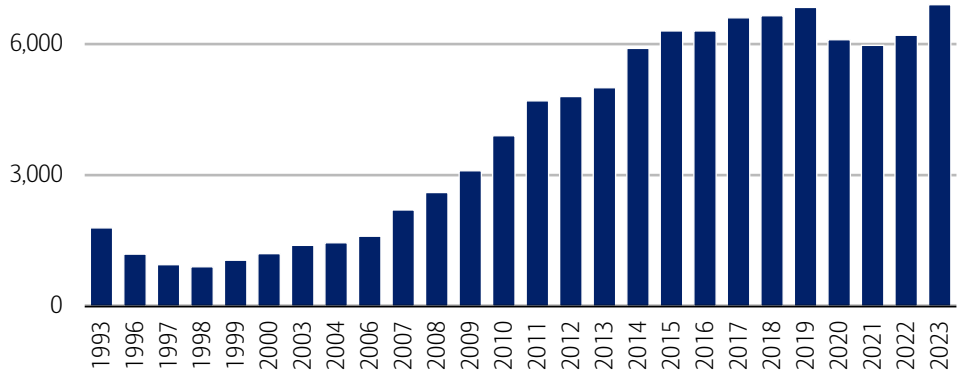
- $4.5 billion to increase energy efficiency in federal buildings.
- $8.5 billion to subsidize loans for renewable energy projects.
- $4.3 billion to provide an expanded credit to homeowners who make their homes more energy-efficient in 2009 and 2010. Homeowners could recoup 30 percent of the cost up to $1,500 of numerous projects, such as installing energy-efficient windows, doors, furnaces and air conditioners.
- $13 billion to extend tax credits for renewable energy production.
- $6 billion for renewable energy and electric transmission technologies loan guarantees.
- $5 billion for weatherizing modest-income homes.
- $3.2 billion toward Energy Efficiency and Conservation Block Grants.
- $3.1 billion for the State Energy Program to help states invest in energy efficiency and renewable energy.
- $602 million to support the use of energy efficient technologies in building and in industry.
- $300 million for energy efficient appliance rebates.
- $300 million for energy efficient appliance rebates.
- $4 billion to the Department of Housing and Urban Development (HUD) for repairing and modernizing public housing, including increasing the energy efficiency of units.

Driver 2: Local incentives

Incentives for electrification are coming from both state/local government and the regional utilities.

From their low point in 1998, utility's annual investments in electricity efficiency programs increased more than 7x by 2018, from approximately $900 million to $6.6 billion. Electricity efficiency investments in 2023 reached a new high of $6.9 billion.

Exhibit 5: Utility's annual investments in electricity efficiency programs was ~$6.9bn in 2023
Utility's annual investments in electricity efficiency programs 1993 - 2023

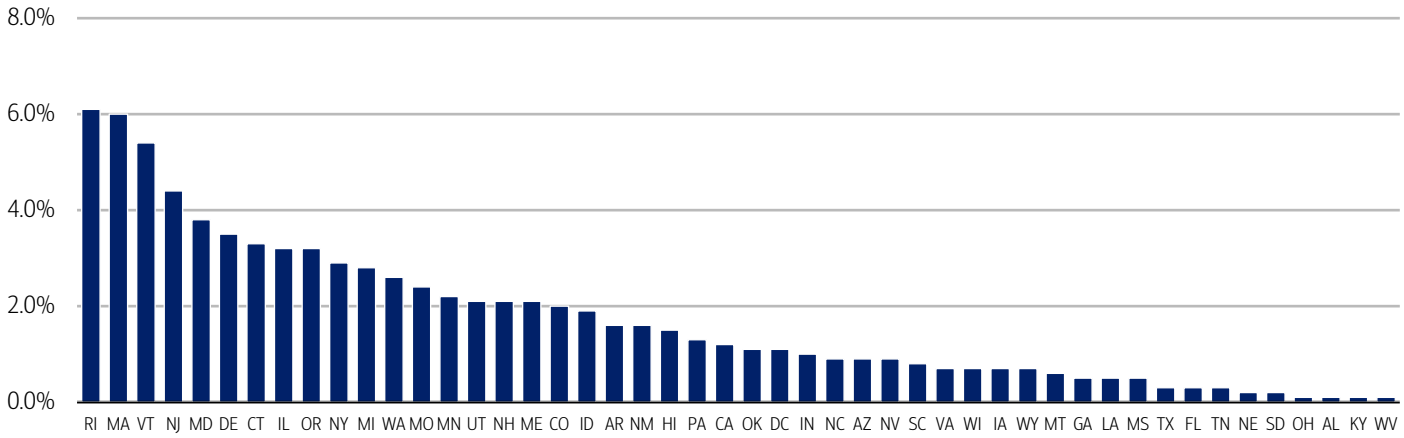


Source: American Council for an Energy-Efficient Economy

BofA GLOBAL RESEARCH

47 out 50 States in 2023 spent funds to increase electrification/ electric efficiency. The three that did not are Alaska, Kansas, and North Dakota.

Exhibit 6: State's electrification spending as a % of revenue in 2023
Rhode Island was the state who spent the most to incentivize electrification in 2023 at 6.1% of the state's revenue



Source: American Council for an Energy-Efficient Economy

BofA GLOBAL RESEARCH

Driver 3: Newer buildings consume more energy

Electricity usage (measured in BTUs) for US housing is up 30% for homes build after 2000 versus pre-1960. Buildings built since 2000 use 14.3 kWh per square foot, or 15% more than buildings built 1960-99.

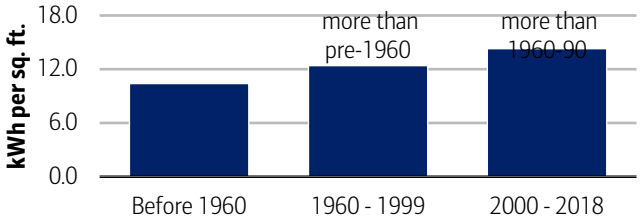
Exhibit 7: Resi: US electricity usage per house by year of construction
Homes built after 2000 use 30% more electricity versus homes build before 1960

	Houses (mns)	BTUs (tr)	BTU mns / house
Before 1960	32.7	1,008.0	30.8
1960 - 1999	64.6	2,393.0	37.1
After 2000	26.3	1,051.0	40.0
% difference			30%

Source: U.S. Energy Information Administration

BofA GLOBAL RESEARCH

Exhibit 8: Commercial: Newer building use more electricity per square foot
Buildings constructed since 2000 use 15% more electricity per sq. ft. than buildings built 1960-99



Source: U.S. Energy Information Administration

BofA GLOBAL RESEARCH

Electrification set to continue growing

Driver 1: Local regulations persist, and local incentives help

We see the various state and local regulations as more than enough to offset deregulation at the federal level. ~17 States, Washington D.C, and over 100 cities have some form of law, regulation, or building code that incentivizes building electrification, electric appliances, or electric heating systems.

State programs

On the state level, the regulations vary from strict building codes that force electrification (i.e. NY) to just setting up a heat pump office to distribute previously allocated block funding from the federal government. The 17 states that either incentivize or regulate electrification are: Arizona, California, Colorado, Georgia, Illinois, Indiana, Maine, Massachusetts, Michigan, Nevada, New Mexico, New York, North Carolina, Oregon, Rhode Island, Wisconsin, and Washington. For a detailed look at each State's regulations or incentivize see page 20. In addition to actual regulations or incentives to promote building electrification, 22 states have made some form of clean energy pledge.

Exhibit 9: States with commitments to some form of clean energy
Carbon free electricity is the most common clean energy pledge made

Commitment	States
Carbon Free Electricity	California, Colorado, Connecticut, Minnesota, Nevada, New Jersey, New Mexico, New York, Virginia, Wisconsin
100% Renewable Energy	District of Columbia, Hawaii, Puerto Rico, Rhode Island
100% Clean Energy	Illinois, Maine
Net Zero Green House gas emissions	Louisiana, Maryland, Massachusetts
Economy-wide carbon neutrality	Michigan
Net Zero Carbon emissions from generation resources	Nebraska
Carbon neutrality in the electricity sector	North Carolina
Greenhouse gas emissions reduced 100 percent below baseline emissions	Oregon
100% zero-emissions electricity	Washington

Source: BofA Global Research

BofA GLOBAL RESEARCH

The Home Electrification and Appliance Rebates (HEAR) and Home Efficiency Rebates (HOMES) are state-based block grant programs that are funded by funds from the Inflation Reduction Act (IRA). The IRA allocated $8.8bn to these programs with $4.3bn for the HOMES program and $4.5bn set aside for the HEAR program. While the "One Big Beautiful Bill Act" did eliminate tax credits 25C, 45L, and 149D that would have further incentivized electrification, it did not target the HEAR and HOMES programs (see note here). So far, Arizona, California, Colorado, Georgia, Indiana, Maine, Michigan, New

Mexico, New York, North Carolina, Rhode Island, Washington, D.C., and Wisconsin have all made at least one of rebates available. South Dakota and Idaho are the only states that will not be participating in the program. The HEAR grants are for low-to-moderate income households to replace fossil-fuel or inefficient electrical equipment and appliances. The grant is for up to $14,000 per household.

Exhibit 10: HEAR program allocated up to $14,000 per household for electrification
11 States and Washington DC have made the HEAR funds available so far

Upgrade Type	Qualified Product	Rebate Amount Not to Exceed
	Heat Pump Water Heater	$1,750
	Heat Pump for Space Heating or Cooling	$8,000
	Electric Stove, Cooktop, Range, Oven, or	
Appliance	Heat Pump Clothes Dryer	$840
	Electric Load Service Center	$4,000
	Insulation, Air Sealing, and Ventilation	$1,600
Building Materials	Electric Wiring	$2,500
Maximum Rebate		**$14,000**

Source: US Department of Energy

BofA GLOBAL RESEARCH

The HOMES grants are for achieving modeled energy efficiency increases for single and multi-family homes. The grant is up to $8,000 per household for projects that are modeled to reduce home energy use by at least 20 percent. Single-family homes and multifamily buildings are both eligible.

Exhibit 11: HOMES program funding for single family homes is for up to $8,000
5 States and Washington DC have made the HOMES funds available so far

Modeled Energy Savings	Income Level	Rebate Amount
	Less than 80% AMI	Lesser of $4,000 or 80% of project cost
20-34%	80% of AMI or greater	Lesser of $2,000 or 80% of project cost
	Less than 80% AMI	Lesser of $8,000 or 80% of project cost
35% and greater	80% of AMI or greater	Lesser of $4,000 or 80% of project cost

Source: US Department of Energy

BofA GLOBAL RESEARCH

Exhibit 12: HOMES program funding for multi-family homes is for up to $8,000
5 States and Washington DC have made the HOMES funds available so far

Modeled Energy Savings	Income Level	Rebate Amount
	A building with at least 50% of households with incomes less than 80% AMI	Lesser of $4,000 per dwelling or 80% of project cost
20-34%	A building with at least 50% of households with incomes 80% of AMI or greater	Lesser of $2,000 per dwelling or 80% of project cost
	A building with at least 50% of households with incomes less than 80% AMI	Lesser of $8,000 per dwelling or 80% of project cost
35% and greater	A building with at least 50% of households with incomes 80% of AMI or greater	Lesser of $4,000 per dwelling or 80% of project cost

Source: US Department of Energy

BofA GLOBAL RESEARCH

Local programs

Over 100 local governments have adopted a policy that either requires or encourages electrification. Towns that have created electrification programs or regulations vary in size from small towns like Morris MN to large population hubs such as New York City. Many local laws appear to be more far reaching than some of the state laws. While state laws tend to set carbon emission goals, local laws are actually creating the change to reduce carbon emissions. Local laws will likely be more impactful for our coverage in the short-term because they are affecting the new buildings being built.

New York City's local laws are likely to be some of the most impactful. New York City's Local Law 154 (LL154) begins the phase out of fossil fuel use in new construction beginning in 2024. LL154 sets restrictions on fossil fuel usage in newly constructed residential and commercial buildings by phasing in strict emissions limits. Buildings of all sizes must be constructed fully electric by 2027. Some of the penalties associated with non-compliance are fines and delays in obtaining permits. New York City's Local Law 97 (LL97) requires most buildings over 25,000 square feet meet GHG limits by 2024, with stricter limits coming into effect in 2030 and beyond, or face financial penalties, scaled

to the amount of emissions a building exceeds its target. The penalties for LL97 range, for exceeding the emissions limit the fine is $268 per metric ton of CO2 equivalent that the building's emissions exceed the annual limit. There are additional penalties associated with not filing the emissions report and making false statements.

Driver 2: Utilities helping incentivize electrification

48/50 states have utilities offering either resi or commercial incentives for electrification. The programs vary by appliance and amount but are going to help drive electrification going forward.

Utility spend has been a historical driver of electrification in the past (with $6.9bn spent in 2023) and we expect that to continue given how many States have utilities continuing to offer incentives.

Exhibit 13: States and whether the utility offers residential and/or commercial electrification incentives

48/50 states have utilities offering either resi or commercial incentives

	Resi	Commercial/ Industrial
Alabama	Yes	Yes
Alaska	No	No
Arizona	Yes	Yes
Arkansas	Yes	Yes
California	Yes	Yes
Colorado	Yes	Yes
Connecticut	Yes	Yes
Delaware	Yes	Yes
Florida	Yes	Yes
Georgia	Yes	Yes
Hawaii	Yes	Yes
Idaho	Yes	Yes
Illinois	Yes	Yes
Indiana	Yes	Yes
Iowa	Yes	Yes
Kansas	No	Yes
Kentucky	Yes	Yes
Louisiana	Yes	Yes
Maine	No	No
Maryland	Yes	Yes
Massachusetts	Yes	Yes
Michigan	Yes	Yes
Minnesota	Yes	Yes
Mississippi	Yes	Yes
Missouri	Yes	Yes
Montana	Yes	Yes
Nebraska	Yes	Yes
Nevada	Yes	Yes
New Hampshire	Yes	Yes
New Jersey	Yes	No
New Mexico	Yes	Yes
New York	Yes	Yes
North Carolina	Yes	Yes
North Dakota	Yes	Yes
Ohio	Yes	Yes
Oklahoma	Yes	Yes
Oregon	Yes	Yes
Pennsylvania	Yes	Yes
Rhode Island	Yes	Yes
South Carolina	Yes	Yes
South Dakota	Yes	Yes
Tennessee	Yes	Yes
Texas	Yes	Yes
Utah	Yes	No
Vermont	Yes	Yes
Virginia	Yes	Yes
Washington	Yes	Yes
West Virginia	Yes	No
Wisconsin	Yes	Yes
Wyoming	Yes	Yes

Source: DSIRE of NC State University

BofA GLOBAL RESEARCH

Driver 3: National building codes incentivize electrification

The International Energy Conservation Code (IECC) is the set of building codes developed by the International Code Council (ICC) that establishes minimum energy efficiency requirements for residential and commercial buildings. While the latest IECC was published in August 2024, only Rhode Island and Nevada have adopted this version. 23 States are still using the 2021 IECC. Large cities such as Austin, Phoenix, and Nashville have also adopted the 2024 IECC.

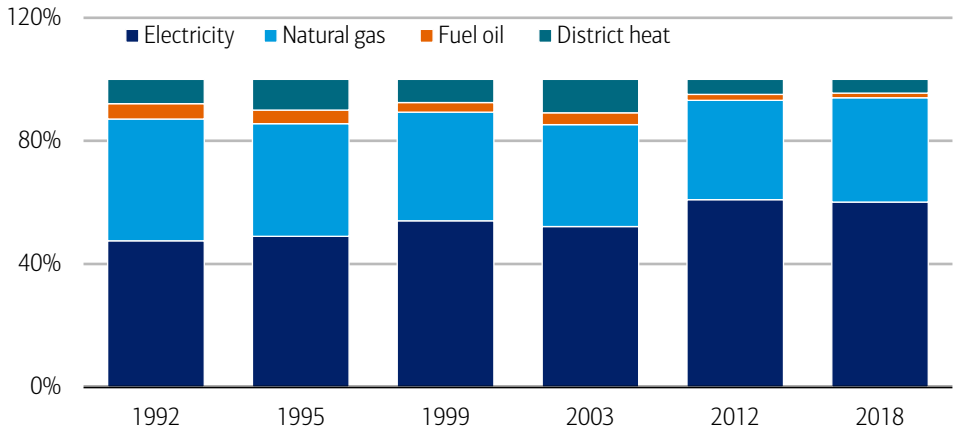
The DOE estimates that the 2024 edition of the IECC results in 6.6% energy cost savings and 7.8% site energy savings vs the 2021 IECC. The electrification-ready provisions mandate wiring and panel capacity for future electrification in both residential and commercial buildings. This includes EV charging readiness and support for heat pump water heaters. The 2024 IECC includes the addition of optional appendices (adoptable by states/cities) for all-electric buildings, zero-net energy designs, and renewable integration. This allows states/cities to mandate or incentivize full electrification. For commercial buildings, the 2024 IECC adds requirements for solar readiness and grid-integrated electrical systems, offering compliance credits.

Overall, the DOE estimates that the 2021 edition of the IECC results in site energy savings of 12.1% at the aggregate national level compared to the 2018 IECC edition. The 2021 IECC required low-rise resi buildings and some commercial buildings to select from 10+ options total at least 5 credits for resi or 10 credits for commercial. Improved HVAC efficiency (i.e. heat pumps), all electric water heating, or space conditioning all qualifies for 1-2 credits. These credits incentivize builders to elect to install electric appliance over gas. The 2021 IECC has zero energy appendices. The appendices introduced voluntary stretch goals for net zero buildings, crediting electrification with on-site renewables.

Electrification of commercial buildings

The electrification of commercial buildings has already started but is likely going to continuing to accelerate given state regulations forcing the transition. The private sector is opting for electricity vs oil & gas, with local incentives helping to ease the transition. The EIA conducts the Commercial Buildings Energy Consumption Survey (CBECS). Throughout the various CBECS, electricity remains the most used energy type. In 2018 (the most recent survey) Electricity represented 60% of total energy consumption. The second most used energy type is natural gas at 34% of total energy consumption.

Exhibit 14: Electricity is the most used energy type
Total energy consumption (tn BTU)



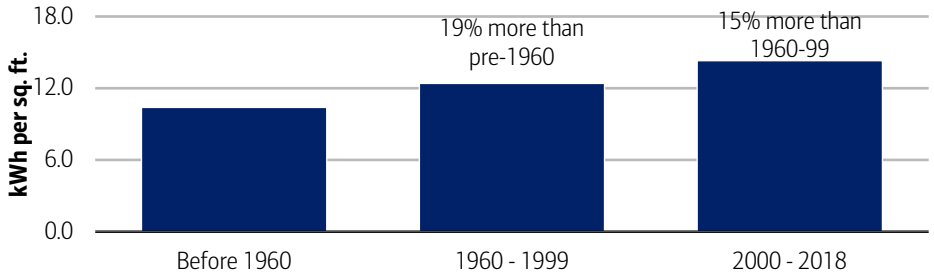
Source: U.S. Energy Information Administration

BofA GLOBAL RESEARCH

Newer buildings use more electricity

Newer buildings consume more energy overall, but particularly more electricity. Buildings built since 2000 use 14.3 kWh per square foot, or 15% more than buildings built 1960-99. If building owners perform upgrades, they tend to shift towards electricity. Buildings with an electrical or HVAC upgrade since 2000 use 13.7 kWh per square foot, or 15% higher than buildings without any upgrades.

Exhibit 15: Newer building use more electricity per square foot
Buildings constructed since 2000 use 15% more electricity per sq. ft. than buildings built 1960-99

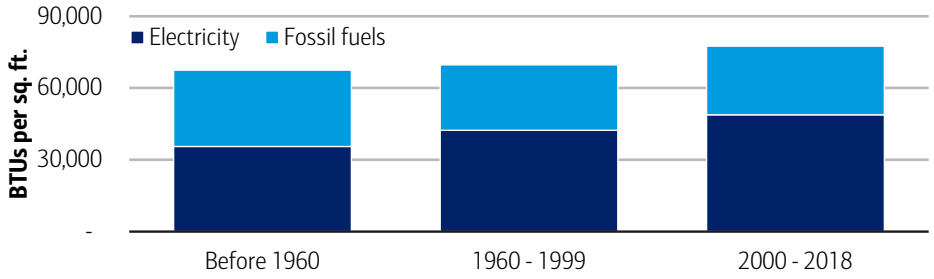


Source: U.S. Energy Information Administration

BofA GLOBAL RESEARCH

One could argue that improvements in energy efficiency, insulation, and other factors should cause energy usage to decline in newer buildings. However, the data shows the opposite. Newer buildings use more energy (as measured in British thermal units) on a per square footage basis versus older buildings. Buildings constructed since 2000 use 37% more electricity and 10% less fossil fuels per square foot compared to buildings built before 1960.

Exhibit 16: Newer building use more energy per square foot versus older buildings
Buildings constructed since 2000 use 37% more electricity and 10% less fossil fuels per square foot compared to buildings built before 1960



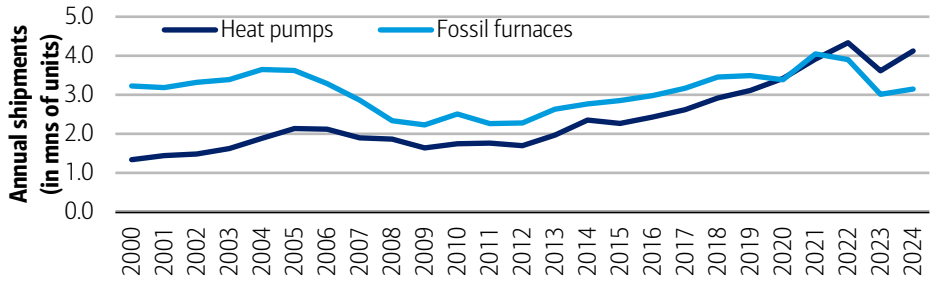
Source: U.S. Energy Information Administration

BofA GLOBAL RESEARCH

Fossil fuel appliances have been declining

US consumers have been opting for heat pumps versus traditional fossil fuel furnaces. This transition was helped by the various incentives for heat pumps at both the federal and state level. Heat pumps have outsold fossil fuel furnaces since 2020. Since 2000, heat pump shipments have grown at a 4.8% CAGR versus a (0.1)% decline for fossil fuel furnaces.

Exhibit 17: Heat pump shipments have outpaced fossil fuel furnaces since 2020
US consumers are opting for heat pumps versus traditional fossil fuel furnaces

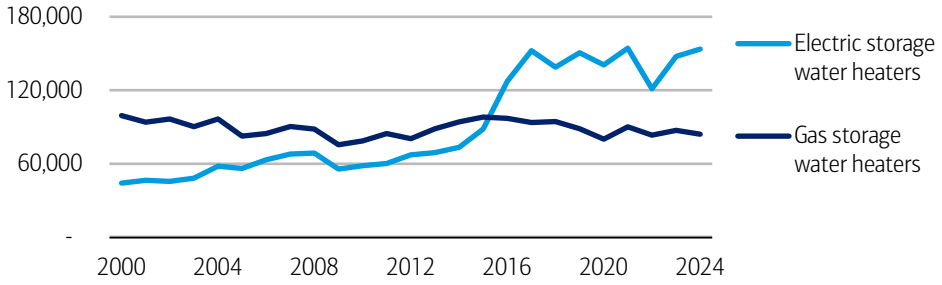


Source: Air Conditioning, Heating, and Refrigeration Institute

BofA GLOBAL RESEARCH

Similarly, commercial buildings have been opting for electric water heaters versus traditional gas water heaters. The switch is likely due to electric water heaters having better efficiency than gas water heaters. There are also rebates at the state level for commercial water heaters. Since 2000, commercial electric water heater shipments have grown at a 5.3% CAGR versus a (0.7)% decline for fossil fuel water heaters.

Exhibit 18: Since 2000, electric water heater shipments have grown at a +5.3% CAGR versus a (0.7)% decline for fossil fuel water heaters
Water heater shipment data 2000 - 2024



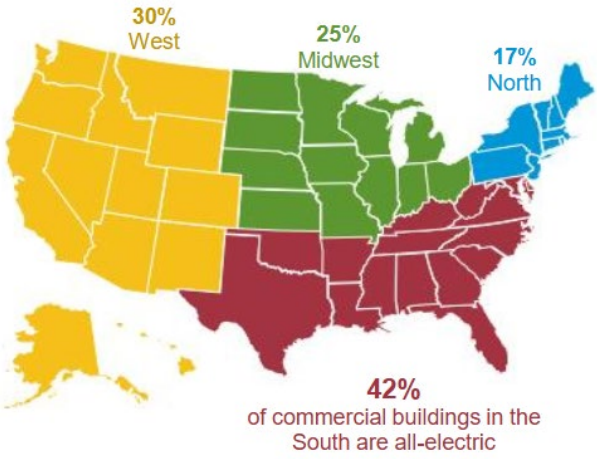
Source: Air Conditioning, Heating, and Refrigeration Institute

BofA GLOBAL RESEARCH

All-electric commercial buildings already a reality

As of 2018, 31% of commercial buildings in the US were all electric. By region, 42% of commercial buildings in the South are all-electric, 30% in the West, 25% in the Midwest, and 17% in the North. The higher concentration off all-electric buildings in the South is potential due to the warmer temperatures making it easier to heat the building, but the percentage of all-electric buildings in other regions may rise as high-efficiency heat pumps potentially are making in-roads in colder regions.

Exhibit 19: The South is the region with the most all-electric buildings
All-electric buildings by region

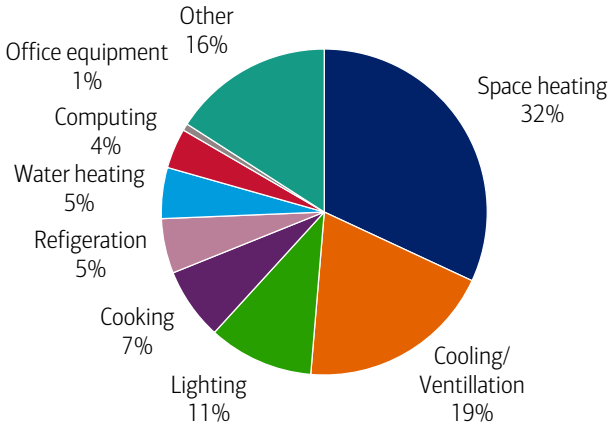


Source: U.S. Energy Information Administration

BofA GLOBAL RESEARCH

Electricity end uses

Exhibit 20: The largest end use for electricity is space heating at 32%
Electricity end uses



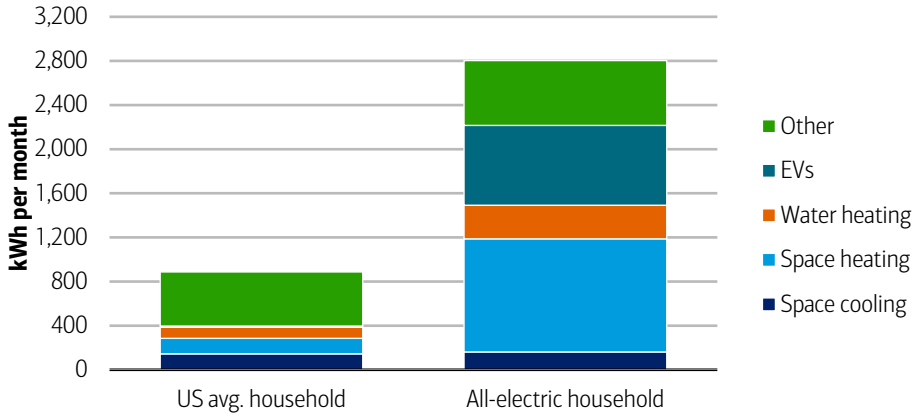
Source: U.S. Energy Information Administration

BofA GLOBAL RESEARCH

Residential electrification growing

The all-electric home – 200+% more power needed

Exhibit 21: Current US household electricity usage versus hypothetical all-electric household
The average household would need 220% more electricity to go all electric



Source: BofA Global Research, Energy Information Administration, Federal Highway Administration

BofA GLOBAL RESEARCH

In 2024, the average US household used 875 kilowatt hours (kWh) per month, according to the Energy Information Administration (EIA). Using EIA data implies that the average all-electric home would use 2,803 kWh/month, or an 220% increase.

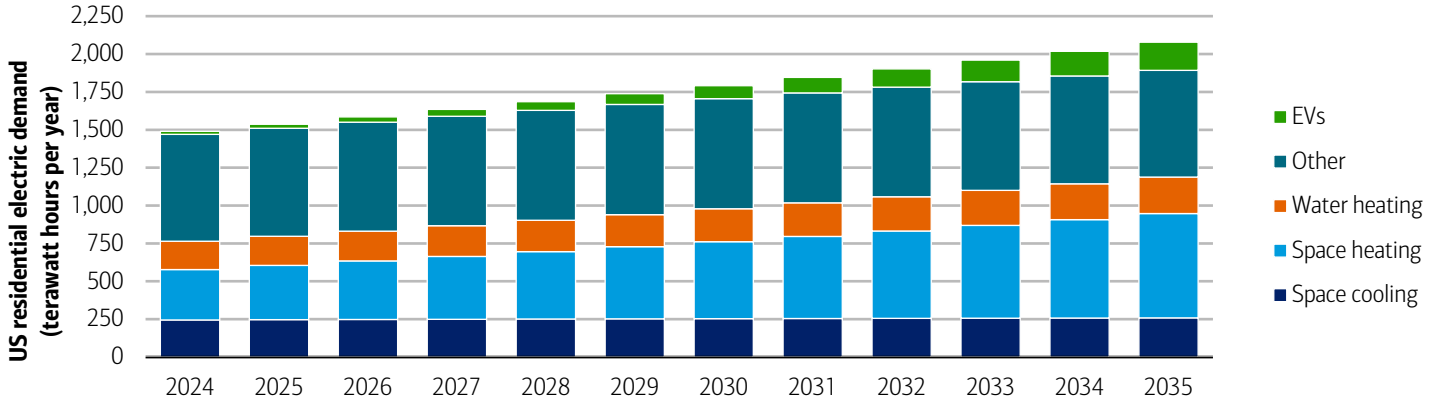
Currently fossil fuels power 54% of residential water heaters, 65% of space heating, and 98% of passenger vehicles. Replacing space heating would add 1,024 kWh/month and replacing water heaters would add 306 kWh/month. For EVs, we used average vehicle data from the Federal Highway Administration. We assume an average of 14,000 miles driven per vehicle, 1.79 vehicles per household, and 0.346 kW/mile efficiency. This yields 723 kWh/month for EV charging (assuming all charging is done at home).

We continue to view this as a conservative estimate for three reasons. First, we do not factor in smaller fossil fuel appliances (e.g., stoves, ovens, clothes dryers, and fireplaces). Second, we do not consider the lower efficiency of heat pumps in colder climates. Third, we do not factor in line losses between power plants and homes, which are typically 5% of total electricity generation.

By 2035, we assume electricity adoption reaches 61% of water heaters (versus 46% today), 70% for heat pumps & other electric heating (versus 35% today), and 19% for EVs (versus 2% today). We use the US Census forecast for population growth (0.4% CAGR over 2024-35E).

We forecast total US residential electric demand to rise from 1,490 terawatt hours/year in 2024 to 2,078 terawatt hours/year in 2035, or a 3.1% CAGR. This compares with a 0.6% CAGR over 2014-2024.

Exhibit 22: US residential electric demand forecast
We forecast residential electric demand to grow at a 3.1% CAGR (2024-2035E)



Source: BofA Global Research

BofA GLOBAL RESEARCH

Residential electrification is up

A similar pattern of higher electricity usage by year of construction can be seen in single-family housing. Electricity usage (measured in BTUs) for US housing is up 30% for homes build after 2000 versus pre-1960. Fossil fuel usage is down (45)% in homes built after 2000 versus pre-1960.

Exhibit 23: US electricity usage per house by year of construction
Homes built after 2000 use 30% more electricity versus homes build before 1960

	Houses (mns)	BTUs (tr)	BTU mns / house
Before 1960	32.7	1,008.0	30.8
1960 - 1999	64.6	2,393.0	37.1
After 2000	26.3	1,051.0	40.0
% difference			30%

Source: U.S. Energy Information Administration

BofA GLOBAL RESEARCH

Exhibit 24: US fossil fuel usage per house by year of construction
Homes built after 2000 use (45)% less fossil fuel versus homes build before 1960

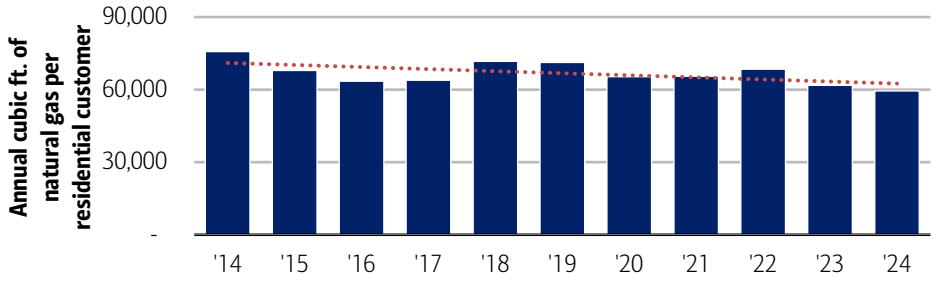
	Houses (mns)	BTUs (tr)	BTU mns / house
Before 1960	32.7	1,886.0	57.6
1960 - 1999	64.6	2,315.0	35.9
After 2000	26.3	829.0	31.6
% difference			(45)%

Source: U.S. Energy Information Administration

BofA GLOBAL RESEARCH

Declining use of natural gas also shows up in per-home consumption data. The average US residential customer uses 21% less natural gas per year in 2024 versus 2014. The same long-term trend is seen in commercial customers as well. Natural gas consumption in the power generation space has increased over this same period.

Exhibit 25: Natural gas consumption/home declining at a 2.4% CAGR
US homes use 21% less natural gas, on average, in 2024 vs 2014



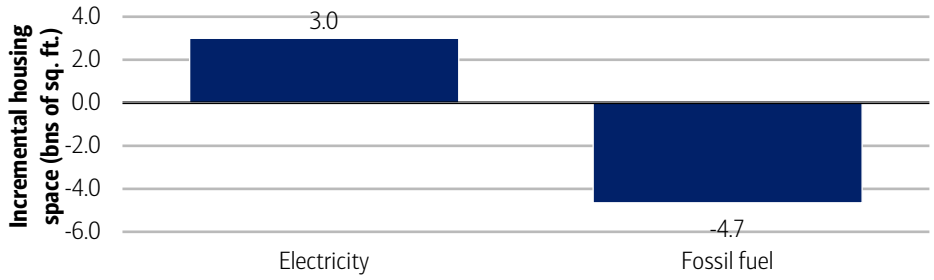
Source: U.S. Energy Information Administration

BofA GLOBAL RESEARCH

Heating equipment getting older and fossil fuel appliances have been declining

US consumers have been opting for electric heating versus traditional fossil fuels. Since 2009, electric heating has grown by 3.0bn sq. ft. while fossil fuel heating has declined by (4.7)bn sq. ft.

Exhibit 26: Since 2009 electric heating has grown an incremental 3.0bn sq. ft
Main space heating fuel by incremental housing space (bns of sq. ft)

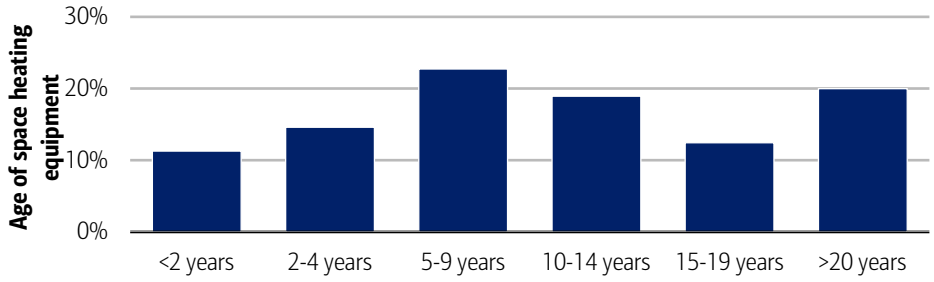


Source: U.S. Energy Information Administration

BofA GLOBAL RESEARCH

We argue retrofit is another opportunity for incremental electrification. Most residential heating units have a lifespan of 15 to 20 years. 20% of all heating units are over 20 years old and an additional 12% are in the 15-19 years old range. This suggests that there will be a meaningful level of retrofit opportunity in coming years.

Exhibit 27: 23% of heating units are 5-9 years old and 20% are over 20 years old
Main heating equipment age

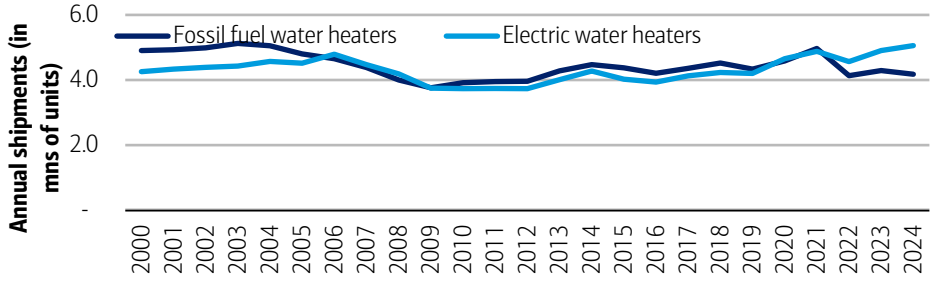


Source: Energy Information Agency

BofA GLOBAL RESEARCH

Similarly, US consumers have been opting for electric water heaters versus traditional gas water heaters. Over the past five years, electric water heater shipments have grown at a 4% CAGR versus a (1)% decline for fossil fuel water heaters

Exhibit 28: Over the past five years, electric water heater shipments have grown at a 2% CAGR versus a (2)% decline for fossil fuel water heaters
Water heater shipment data 2000 - 2024

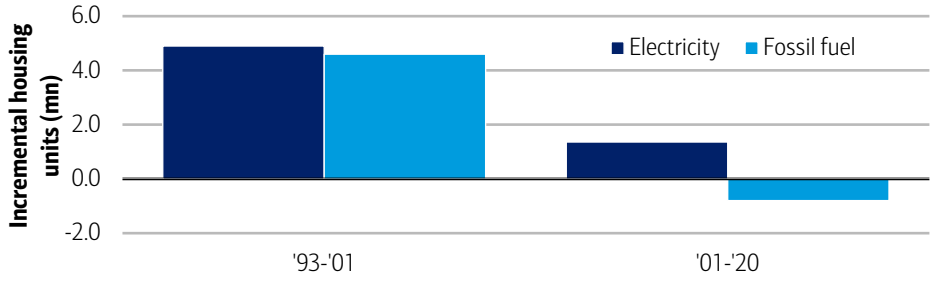


Source: Air Conditioning, Heating, and Refrigeration Institute

BofA GLOBAL RESEARCH

In addition, to making changes to electric heating, US consumers are shifting to electric cooking ranges and clothing dryers. Since the 2000s electric cooking rangers are up an incremental 1.4mn units vs fossil fuels down (0.8)mn units.

Exhibit 29: Since the 2000s electric cooking rangers are up an incremental 1.4mn units
Most-used fuel ranges by incremental housing units (mn)

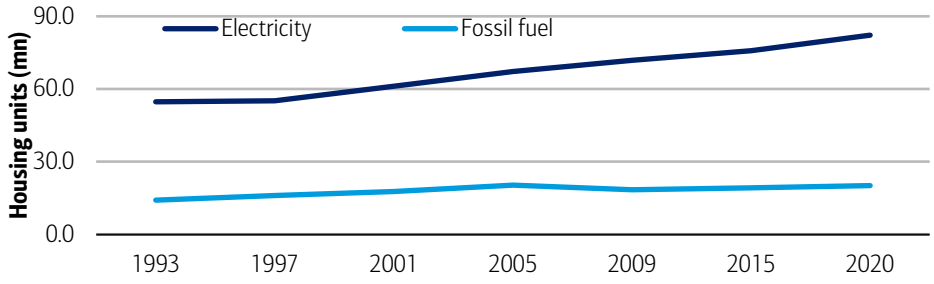


Source: U.S. Energy Information Administration

BofA GLOBAL RESEARCH

From 2015 to 2020 (latest data), electric clothing dryers have grown at a 2% CAGR versus a 1% CAGR for fossil fuel clothing dryers.

Exhibit 30: From 2015 to 2020 (latest data), electric clothing dryers have grown at a 2% CAGR
Clothing dryer fuel type by housing unit (mns)



Source: U.S. Energy Information Administration

BofA GLOBAL RESEARCH

Newer homes are larger and consuming more electricity

Newer buildings consuming more energy, with electricity usage rising the most, for both single family and multi-family housing. Electricity is the primary heating source in 52% of new single-family homes, up from 31% in 2005. Electricity is the primary heating source in 76% of newly constructed multi-family housing units, up from 55% in 2005.

Exhibit 31: Primary heating source for new single-family homes
Electricity was the primary heating source in 52% of new homes in 2023

Single Family	2005	2010	2015	2020	2022	2023
Natural Gas	66%	54%	60%	55%	51%	47%
Electricity	31%	43%	39%	45%	48%	52%
Oil	2%	1%	0%	0%	0%	n.a.
Other	1%	2%	1%	1%	1%	1%

Source: U.S. Bureau of Census

BofA GLOBAL RESEARCH

Exhibit 32: Primary heating source for new multi-family homes
Electricity was the primary heating source in 76% of new homes in 2023

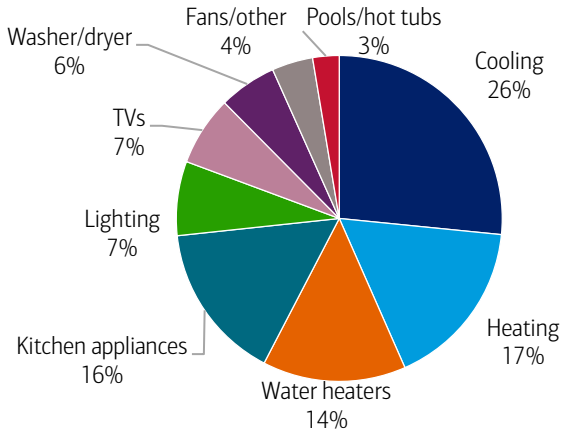
Multi-Family	2005	2010	2015	2020	2022	2023
Natural Gas	43%	35%	37%	33%	28%	24%
Electricity	55%	62%	63%	67%	71%	76%
Oil	2%	0%	0%	0%	1%	0%
Other	0%	3%	0%	0%	0%	0%

Source: U.S. Bureau of Census

BofA GLOBAL RESEARCH

Electricity end uses

Exhibit 33: The largest end use for electricity is cooling at 26%
Electricity end uses



Source: U.S. Energy Information Administration

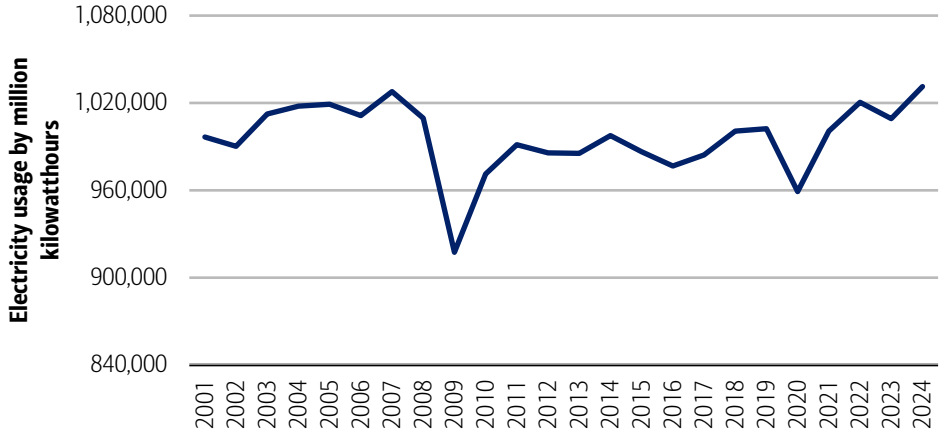
BofA GLOBAL RESEARCH

Reshoring to help electrification of industrial buildings

On the surface, US industrial electricity usage has been flat for the past 25 years. However, this reflects a decline in the number of US manufacturing sites, with electricity usage on a per site basis rising. Since 2010, the number of manufacturing plants has increased. Construction on new US plants has soared since 2021. The combination of increasing supply chain resilience and tariff cost optimization should drive further reshoring decisions in coming years. The pickup in US manufacturing is being helped by reshoring and megaprojects in industries like semis, pharma, electric vehicle battery plants, liquified natural gas, and chemical manufacturing.

Over the last 20 years U.S. Industrial electricity usage has grown at a 0.1% CAGR.

Exhibit 34: US industrial electricity usage has been effectively flat for ~25 years
Electricity usage by million kilowatt hours



Source: U.S. Energy Information Administration

BofA GLOBAL RESEARCH

The number of US manufacturing facilities declined from 1998-2010, but has increased since then. While the number of manufacturing facilities has declined at a (1.1)% CAGR over 1998-2018, it has grown 6% since 2010.

Exhibit 35: The 20-year CAGR for manufacturing facilities has declined at (1.1)%
Manufacturing establishments 1998 - 2018

Establishments		1998	2002	2006	2010	2014	2018	20-year CAGR
311	Food	16,553	15,089	14,128	13,271	13,690	15,842	-0.2%
312	Beverage and Tobacco Products	1,547	1,595	1,830	2,093	2,443	3,938	4.8%
313	Textile Mills	2,935	2,247	1,966	1,341	1,355	1,360	-3.8%
314	Textile Product Mills	4,216	3,457	3,332	3,531	4,277	4,116	-0.1%
315	Apparel	12,566	5,500	5,567	4,194	3,874	3,856	-5.7%
316	Leather and Allied Products	995	685	687	452	466	655	-2.1%
321	Wood Products	11,663	10,486	10,785	7,727	8,398	9,435	-1.1%
322	Paper	4,676	4,257	3,957	3,734	3,220	3,009	-2.2%
323	Printing and Related Support	25,782	20,220	18,916	15,313	14,005	12,614	-3.5%
324	Petroleum and Coal Products	1,756	1,916	1,814	2,024	1,918	1,883	0.3%
325	Chemicals	8,962	8,909	8,625	8,289	8,530	8,902	0.0%
326	Plastics and Rubber Products	11,944	10,538	9,823	8,268	8,217	8,317	-1.8%
327	Nonmetallic Mineral Products	11,333	11,593	11,975	11,997	12,184	12,035	0.3%
331	Primary Metals	3,830	4,166	3,290	3,196	3,138	3,226	-0.9%
332	Fabricated Metal Products	40,743	35,349	35,601	32,368	36,439	37,949	-0.4%
333	Machinery	19,577	17,381	16,296	14,370	15,307	14,919	-1.3%
334	Computer and Electronic Products	9,925	9,238	8,189	6,685	6,831	6,646	-2.0%
335	Electrical Equip., Appliances, and Components	4,526	3,886	3,595	3,294	3,298	3,295	-1.6%
336	Transportation Equipment	8,380	7,653	7,024	6,270	6,603	7,103	-0.8%
337	Furniture and Related Products	11,274	10,941	11,545	8,258	7,913	8,347	-1.5%
339	Miscellaneous	13,630	15,605	15,787	13,495	13,001	13,679	0.0%
	Total	**226,813**	**200,711**	**194,733**	**170,168**	**175,107**	**181,126**	**-1.1%**

Source: U.S. Energy Information Administration

BofA GLOBAL RESEARCH

Electricity usage (measured in kWh) declined at a slower rate number of manufacturing sites. This implies an increase in electricity per site.

Exhibit 36: The 20-year CAGR for electrical kWh for manufacturing facilities has declined at (0.7)%
Electrical kWh for manufacturing (ms)

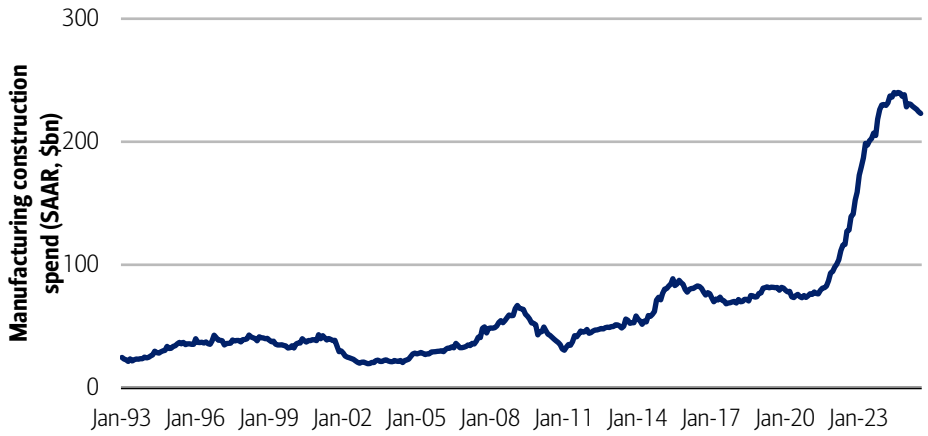
kWh mns		1998	2002	2006	2010	2014	2018	20-year CAGR
311	Food	67,390	73,143	78,003	80,993	76,701	94,854	1.7%
312	Beverage and Tobacco Products	8,242	8,452	9,480	8,694	10,014	14,442	2.8%
313	Textile Mills	29,907	25,462	19,753	13,333	12,687	10,949	-4.9%
314	Textile Product Mills	5,193	4,924	5,972	2,458	2,748	2,858	-2.9%
315	Apparel	5,271	3,588	2,060	1,069	803	724	-9.4%
316	Leather and Allied Products	762	716	413	243	316	226	-5.9%
321	Wood Products	22,603	22,438	28,911	16,713	22,353	22,526	0.0%
322	Paper	124,087	114,468	122,168	103,528	99,474	91,108	-1.5%
323	Printing and Related Support	15,051	14,770	13,089	13,704	14,232	10,044	-2.0%
324	Petroleum and Coal Products	54,137	54,688	60,149	66,002	67,662	71,694	1.4%
325	Chemicals	215,008	202,371	207,107	186,995	183,096	207,450	-0.2%
326	Plastics and Rubber Products	53,777	53,545	53,423	46,063	55,967	49,342	-0.4%
327	Nonmetallic Mineral Products	39,948	42,072	44,783	32,847	37,841	38,145	-0.2%
331	Primary Metals	168,620	150,522	139,985	122,967	138,437	121,469	-1.6%
332	Fabricated Metal Products	51,646	47,352	42,238	37,331	43,683	36,281	-1.8%
333	Machinery	28,355	24,694	32,733	20,505	23,758	23,810	-0.9%
334	Computer and Electronic Products	40,291	38,417	27,542	29,547	32,864	22,245	-2.9%
335	Electrical Equip., Appliances, and Components	16,229	13,908	12,870	10,689	11,764	11,083	-1.9%
336	Transportation Equipment	58,089	51,026	57,704	39,301	45,584	50,891	-0.7%
337	Furniture and Related Products	8,730	7,181	9,362	5,018	5,169	4,756	-3.0%
339	Miscellaneous	11,814	10,375	9,677	7,728	8,863	9,578	-1.0%
	Total	1,025,149	964,112	977,422	845,727	894,015	894,476	-0.7%

Source: U.S. Energy Information Administration

BofA GLOBAL RESEARCH

While manufacturing in the US had been declining, it is now expanding. For a more comprehensive view of the US market, we look at data from the US Census. They estimate construction spending on US manufacturing rose to an annualized pace of $223bn in July (latest data).

Exhibit 37: Manufacturing spending rose to $223bn annualized pace in July
US manufacturing construction spending ($bn, SAAR)



Source: US Census Bureau, BofA Global Research

BofA GLOBAL RESEARCH

The pickup in US manufacturing is being helped by reshoring and megaprojects in industries like semis, pharma, EV battery plants, LNG, and chemical manufacturing. The average US manufacturing plant uses ~6mn kilowatt hours (kWh) of electricity. However, semi fabs are far larger and more energy intensive. For example, Samsung's two fabs in Texas cover 11.4mn square feet. Semi fabs also use roughly double the electricity per square foot.

EV battery plants are also electrically intensive. Battery manufacturers use large industrial ovens to bake the semi-liquid batter slurry on to metal plates. According to a study by Argonne National Laboratory, a 1 kWh battery requires 47 kWh of electricity to manufacture. Other researchers estimate 50-65 kWh per 1 kWh battery. This suggests that it would take 6 MW to manufacture a single 131 kWh battery pack powering the Ford F-150 Lighting truck.

Below we look at semis and pharma mega projects that have been announced.

Exhibit 38: Semis reshoring announcements total $201.5bn
Semis manufacturing announcement by company, size, construction, and location

Company	Size	Completion	Location	Construction start date
Intel	$20.0bn	2024	Chandler, AZ	Sept 2021
Intel	$3.5bn	1/24/2024	Rio Rancho, NM	June 2022
Intel	$20.0bn	~2027	Columbus, OH	Sept 2022
Micron	$20.0bn	~2026	Clay, NY	
Micron	$15.0bn	~2026	near Boise, Idaho	Early 2023
Samsung	$17.0bn	2026	Taylor, TX	June 2022
TSMC	$12.0bn	Dec-24	Phoenix, AZ	June 2021
TSMC	$28.0bn	~2027	Phoenix, AZ	
TSMC	$25.0bn	2030	Phoenix, AZ	
Texas Instruments	$30.0bn	~2025	Sherman, TX	May 2022
Texas Instruments	$11.0bn	early 2026	Lehi, Utah	Nov 2023
Total	**$201.5bn**			

Source: Company reports

BofA GLOBAL RESEARCH

Exhibit 39: An aggregate of $324.4bn of reshoring announcements have been made so far this year
Pharma reshoring announcements by company and size

Company	Amount ($bn)
AbbVie	$10.0bn
Amgen	$1.5bn
AstaZeneca	$50.0bn
Biogen	$2.0bn
Bristol-Myers Squibb	$40.0bn
Eli Lilly	$27.0bn
Gilead Sciences	$11.0bn
GSK	$30.0bn
Hikma Pharmaceuticals	$1.0bn
Johnson & Johnson	$57.0bn
Kimberly-Clark	$2.0bn
Merck	$9.9bn
Novartis	$23.0bn
Regeneron Pharmaceuticals	$3.0bn
Roche	$50.0bn
Thermo Fisher Scientific	$2.0bn
UCB	$5.0bn
Total	**$324.4bn**

Source: Company reports

BofA GLOBAL RESEARCH

Electrification further helped by regulations

While electrification has been broadly rising for resi and commercial buildings, it is being further incentivized electrification requirements and regulations

State regulations

Arizona

Arizona launched its HEAR program at the end of August 2024. Arizona received $76.4mn to distribute under the HEAR program.

California

The California Energy Commission passed the 2022 Energy Code that went into effect January 1, 2023. The Energy Code required that most new construction for residences and commercial buildings will need to have heat pumps for heating and electric appliances instead of natural gas equipment. This code also requires new constructions to be electric-ready and have stronger ventilation standards.

California received $290.3mn to distribute under the HEAR program.

Colorado

Colorado in 2021 passed HB1286 which requires annual energy reporting for Colorado's large buildings (over 50,000 square feet) and development of a performance standard to reduce GHG emissions from these structures 20% by 2030 relative to 2021 levels

Senate Bill 21-264 in Colorado has a Clean Heat Standard that establishes GHG reduction targets for gas distribution facilities. The required reduction is set at 4% by 2025 and 22% by 2030.

Colorado received $70.0mn to distribute under the HEAR program.

Georgia

Georgia's HEAR and HOMES programs fully launched on March 31, 2025, transitioning out of the pilot phase. Georgia received $109.2mn to distribute under the HEAR program. Georgia received $109.8mn to distribute under the HOMES program.

Illinois

Senate Bill 2408 was passed in September 2021 and puts the state on the path to 100% clean energy. The bill also forces fossil fuel plants offline by 2045.

Indiana

Indiana's HEAR and HOMES programs launched on May 14, 2025. Indiana received $90.7mn to distribute under the HEAR program. Indiana received $91.3mn to distribute under the HOMES program.

Maine

Maine's new electrification law (L.D. 1959) was signed into use May 2, 2022. The new law seeks to reduce greenhouse gas emissions 80% by 2050 and will require electric utilities to undertake grid planning every five years. Maine received $35.7mn to distribute under the HEAR program.

Maryland

Maryland passed it Building Performance standards in 2022. Unlike other BPS regulations this law only applies to "direct greenhouse gas emissions" i.e. only emissions produced on site and not from electricity generation. The law apples to buildings over 35,000 sq feet and directs the Department of the Environment to develop performance standards to achieve a 20% reduction in direct GHG emissions between 2025 and 2030, with a net-zero direct GHG emissions target before 2040.

Massachusetts
Senate Bill 9 signed into office March 2021 established a commitment to reach net-zero emissions by 2050. The law established an emissions limit of no less than 50% for 2030 and no less than 75% for 2040. It also created optional energy efficient building codes.

Michigan
On April 23, 2025, Michigan announced the opening of the Michigan Home Energy Rebates program (MIHER), which includes both the HOMES and HEAR programs. Michigan $105.3mn to distribute under the HEAR program. Michigan $105.9mn to distribute under the HOMES program.

Nevada
Nevada adopted Senate Bill 448 in May 2021. This bill advances Nevada's goal to reach 100% carbon-free resources by 2050 and raised the state's Renewable Portfolio Standard. The bill also will require utilities to forecast a path to achieve an 80% reduction in carbon dioxide emissions from 2005 levels by the end of the decade.

New Mexico
New Mexico choose to update statutes rather than pass laws. With Section 62-8-12 the state required half the state's electricity to come from renewables by 2030 and all its power to come from zero-carbon resources by 2045.

New Mexico received $43.7mn to distribute under the HEAR program.

New York
Starting in 2026, New York's All Electric Buildings Act goes into effect. The legislation requires that most new construction of buildings in New York that are seven stories or shorter must be built to use electric heat and appliances. This will also apply to larger commercial buildings with 100,000 square feet or more of conditioned floor area (bigger businesses). Taller residential buildings and smaller commercial buildings will be rolled into the program in 2029.

New York received $158.4mn to distribute under the HEAR program.

North Carolina
House Bill 951 was signed October 2021 and it requires a 70% reduction in carbon emissions by 2030 and carbon neutrality by 2050.

North Carolina received $104.3mn to distribute under the HEAR program. North Carolina received $104.9mn to distribute under the HOMES program.

Oregon
Oregon passed a building performance standard in 2023. The Oregon BPS targets commercial and multifamily buildings with at least 20,000 square feet. The first data disclosures are not due until 2028, with stakeholder engagement beginning in 2025. The rule separates buildings into two separate tiers, based on use and size.

Rhode Island
House Bill 5445 updated Rhode Islands' emission reduction guide requiring a 45% cut by 2030 instead of 2035; 80% cut by 2040 instead of 2050; and 100% cut (net zero emissions) by 2050.

Rhode Island received $31.8mn to distribute under the HEAR program.

Washington
In 2019, Washington was the first state to establish a statewide building performance standard. The BPS applies to commercial buildings larger than 50,000 square feet and sets targets equivalent to 15% less than 2009–2018 average energy usage intensity (EUI). BPS rules were finalized at the end of 2020; mandatory compliance begins in

2026, and an early adopter incentive program started in July 2021. A bill signed on March 25, 2022, expands the BPS to buildings greater than 20,000 square feet and includes multifamily buildings; benchmarking is to begin in 2027 with mandatory rules taking effect in 2031 Washington state has mandated all electric space heating and hot water systems for new commercial and large multifamily buildings with four or more floors that went into effect in 2023.

Washington D.C.
Washington D.C. passed its building performance standard in 2023. The District of Columbia's Affordable Housing Retrofit Accelerator is also offering technical and financial assistance for affordable multifamily buildings to meet BPS performance requirements.

Wisconsin
Wisconsin's HEAR program launched in December 2024 and its HOMES program in August 2024. Wisconsin received $74.5mn to distribute under the HEAR program. Wisconsin received $74.9mn to distribute under the HOMES program.

Local regulations

Atlanta, GA
Despite Georgia's law to prohibit electrification laws, Atlanta has come up with work arounds to force the electrification of buildings. Atlanta passed legislation to source 100% of its electricity from renewables by 2035. Ordinance 03-0-0693 mandated that all major renovations and new construction of buildings 5,000 square feet or more would be required to obtain LEED New Construction Silver Certification or greater. Ordinance 15-O-1101 mandated that all commercial and multifamily buildings more than 25,000 square feet and all municipal buildings are required to conduct and submit an ASHRAE Level II Energy Audit every 10 years. Finally, Atlanta also mandated that all commercial and multifamily buildings more than 25,000 square feet and all municipal buildings must track and report their annual energy use using the ENERGY STAR and submit data to the city.

Athens, OH
In Athens, voters agreed to a carbon fee of 0.2 cents per kilowatt-hour of electricity use, creating ~$100,000 annually for electrification projects.

Boston, MA
In September 2021, Boston passed an ordinance requiring all buildings over 20,000 square feet achieve zero carbon emissions by 2050. This rule will affect approximately 4% of the city's buildings.

Burlington, VT
Starting in 2024, existing commercial buildings over 50,000 SF and municipal buildings must install 100% renewable technology or fuels for replacement heating or water heating systems at the time of permit. Buildings that continue to use a fossil fuel system will pay a carbon pollution impact fee.

Denver, CO
The Energize Denver Building Performance Policy mandates all commercial buildings over 25,000 square feet move to electrification. However, in 2025, Denver extended the deadline for compliance with its electrification ordinance from 2028 to 2032.

Denver's City Council in November 2021 passed an ordinance that requires large commercial and multifamily buildings to cut emissions through efficiency and electrification upgrades. To assist with the upfront cost of electrification, the city also launched an extensive incentives program to help homeowners transition away fossil fuels.

Ithaca, NY

In November 2021, the Ithaca Common Council voted to electrify and decarbonize every building in the city. The city of Ithaca raised $100 million through private equity investment to fund a first phase of upgrades that target about 1,600 buildings.

New York, NY

New York City's Local Law 154 (LL154) begins the phase out of fossil fuel use in new construction beginning in 2024. LL154 sets restrictions on fossil fuel usage in newly constructed residential and commercial buildings by phasing in strict emissions limits. Buildings of all sizes must be constructed fully electric by 2027. The new law provides limited exemptions for certain uses, such as commercial kitchens and emergency or standby power.

New York City's Local Law 97 (LL97) requires most buildings over 25,000 square feet meet GHG limits by 2024, with stricter limits coming into effect in 2030 and beyond, or face financial penalties, scaled to the amount of emissions a building exceeds its target.

Seattle, WA

In February 2021, Seattle changed their energy codes to prevent the use of space and water heating in new construction for commercial and apartment buildings. In order to incentivize all-electric heat, the city also adopted a $0.24/gallon tax on home-heat oil.

Disclosures

Important Disclosures

BofA Global Research personnel (including the analyst(s) responsible for this report) receive compensation based upon, among other factors, the overall profitability of Bank of America Corporation, including profits derived from investment banking. The analyst(s) responsible for this report may also receive compensation based upon, among other factors, the overall profitability of the Bank's sales and trading businesses relating to the class of securities or financial instruments for which such analyst is responsible.

Other Important Disclosures

From time to time research analysts conduct site visits of covered issuers. BofA Global Research policies prohibit research analysts from accepting payment or reimbursement for travel expenses from the issuer for such visits.
Prices are indicative and for information purposes only. Except as otherwise stated in the report, for any recommendation in relation to an equity security, the price referenced is the publicly traded price of the security as of close of business on the day prior to the date of the report or, if the report is published during intraday trading, the price referenced is indicative of the traded price as of the date and time of the report and in relation to a debt security (including equity preferred and CDS), prices are indicative as of the date and time of the report and are from various sources including BofA Securities trading desks.
The date and time of completion of the production of any recommendation in this report shall be the date and time of dissemination of this report as recorded in the report timestamp.

Recipients who are not institutional investors or market professionals should seek the advice of their independent financial advisor before considering information in this report in connection with any investment decision, or for a necessary explanation of its contents.
Officers of BofAS or one or more of its affiliates (other than research analysts) may have a financial interest in securities of the issuer(s) or in related investments.
Refer to BofA Global Research policies relating to conflicts of interest.
"BofA Securities" includes BofA Securities, Inc. ("BofAS") and its affiliates. Investors should contact their BofA Securities representative or Merrill Global Wealth Management financial advisor if they have questions concerning this report or concerning the appropriateness of any investment idea described herein for such investor. "BofA Securities" is a global brand for BofA Global Research.
Information relating to Non-US affiliates of BofA Securities and Distribution of Affiliate Research Reports:
BofAS and/or Merrill Lynch, Pierce, Fenner & Smith Incorporated ("MLPF&S") may in the future distribute, information of the following non-US affiliates in the US (short name: legal name, regulator): Merrill Lynch (South Africa): Merrill Lynch South Africa (Pty) Ltd., regulated by the Financial Sector Conduct Authority; MLI (UK): Merrill Lynch International, regulated by the Financial Conduct Authority (FCA) and the Prudential Regulation Authority (PRA); BofASE (France): BofA Securities Europe SA is authorized by the Autorité de Contrôle Prudentiel et de Résolution (ACPR) and regulated by the ACPR and the Autorité des Marchés Financiers (AMF). BofA Securities Europe SA ("BofASE") with registered address at 51, rue La Boétie, 75008 Paris is registered under no 842 602 690 RCS Paris. In accordance with the provisions of French Code Monétaire et Financier (Monetary and Financial Code), BofASE is an établissement de crédit et d'investissement (credit and investment institution) that is authorised and supervised by the European Central Bank and the Autorité de Contrôle Prudentiel et de Résolution (ACPR) and regulated by the ACPR and the Autorité des Marchés Financiers. BofASE's share capital can be found at www.bofaml.com/BofASEdisclaimer; BofA Europe (Milan): Bank of America Europe Designated Activity Company, Milan Branch, regulated by the Bank of Italy, the European Central Bank (ECB) and the Central Bank of Ireland (CBI); BofA Europe (Frankfurt): Bank of America Europe Designated Activity Company, Frankfurt Branch regulated by BaFin, the ECB and the CBI; BofA Europe (Madrid): Bank of America Europe Designated Activity Company, Sucursal en España, regulated by the Bank of Spain, the ECB and the CBI; Merrill Lynch (Australia): Merrill Lynch Equities (Australia) Limited, regulated by the Australian Securities and Investments Commission; Merrill Lynch (Hong Kong): Merrill Lynch (Asia Pacific) Limited, regulated by the Hong Kong Securities and Futures Commission (HKSFC); Merrill Lynch (Singapore): Merrill Lynch (Singapore) Pte Ltd, regulated by the Monetary Authority of Singapore (MAS); Merrill Lynch (Canada): Merrill Lynch Canada Inc, regulated by the Canadian Investment Regulatory Organization; Merrill Lynch (Mexico): Merrill Lynch Mexico, SA de CV, Casa de Bolsa, regulated by the Comisión Nacional Bancaria y de Valores; BofAS Japan: BofA Securities Japan Co., Ltd., regulated by the Financial Services Agency; Merrill Lynch (Seoul): Merrill Lynch International, LLC Seoul Branch, regulated by the Financial Supervisory Service; Merrill Lynch (Taiwan): Merrill Lynch Securities (Taiwan) Ltd., regulated by the Securities and Futures Bureau; BofAS India: BofA Securities India Limited, regulated by the Securities and Exchange Board of India (SEBI); Merrill Lynch (Israel): Merrill Lynch Israel Limited, regulated by Israel Securities Authority; Merrill Lynch (DIFC): Merrill Lynch International (DIFC Branch), regulated by the Dubai Financial Services Authority (DFSA); Merrill Lynch (Brazil): Merrill Lynch S.A. Corretora de Títulos e Valores Mobiliários, regulated by Comissão de Valores Mobiliários; Merrill Lynch KSA Company: Merrill Lynch Kingdom of Saudi Arabia Company, regulated by the Capital Market Authority.
This information: has been approved for publication and is distributed in the United Kingdom (UK) to professional clients and eligible counterparties (as each is defined in the rules of the FCA and the PRA) by MLI (UK), which is authorized by the PRA and regulated by the FCA and the PRA - details about the extent of our regulation by the FCA and PRA are available from us on request; has been approved for publication and is distributed in the European Economic Area (EEA) by BofASE (France), which is authorized by the ACPR and regulated by the ACPR and the AMF; has been considered and distributed in Japan by BofAS Japan, a registered securities dealer under the Financial Instruments and Exchange Act in Japan, or its permitted affiliates; is issued and distributed in Hong Kong by Merrill Lynch (Hong Kong) which is regulated by HKSFC; is issued and distributed in Taiwan by Merrill Lynch (Taiwan); is issued and distributed in India by BofAS India; and is issued and distributed in Singapore to institutional investors and/or accredited investors (each as defined under the Financial Advisers Regulations) by Merrill Lynch (Singapore) (Company Registration No 198602883D). Merrill Lynch (Singapore) is regulated by MAS. Merrill Lynch Equities (Australia) Limited (ABN 65 006 276 795), AFS License 235132 (MLEA) distributes this information in Australia only to 'Wholesale' clients as defined by s.761G of the Corporations Act 2001. With the exception of Bank of America N.A., Australia Branch, neither MLEA nor any of its affiliates involved in preparing this information is an Authorised Deposit-Taking Institution under the Banking Act 1959 nor regulated by the Australian Prudential Regulation Authority. No approval is required for publication or distribution of this information in Brazil and its local distribution is by Merrill Lynch (Brazil) in accordance with applicable regulations. Merrill Lynch (DIFC) is authorized and regulated by the DFSA. Information prepared and issued by Merrill Lynch (DIFC) is done so in accordance with the requirements of the DFSA conduct of business rules. BofA Europe (Frankfurt) distributes this information in Germany and is regulated by BaFin, the ECB and the CBI. BofA Securities entities, including BofA Europe and BofASE (France), may outsource/delegate the marketing and/or provision of certain research services or aspects of research services to other branches or members of the BofA Securities group. You may be contacted by a different BofA Securities entity acting for and on behalf of your service provider where permitted by applicable law. This does not change your service provider. Please refer to the Electronic Communications Disclaimers for further information.
This information has been prepared and issued by BofAS and/or one or more of its non-US affiliates. The author(s) of this information may not be licensed to carry on regulated activities in your jurisdiction and, if not licensed, do not hold themselves out as being able to do so. BofAS and/or MLPF&S is the distributor of this information in the US and accepts full responsibility for information distributed to BofAS and/or MLPF&S clients in the US by its non-US affiliates. Any US person receiving this information and wishing to effect any transaction in any security discussed herein should do so through BofAS and/or MLPF&S and not such foreign affiliates. Hong Kong recipients of this information should contact Merrill Lynch (Asia Pacific) Limited in respect of any matters relating to dealing in securities or provision of specific advice on securities or any other matters arising from, or in connection with, this information. Singapore recipients of this information should contact Merrill Lynch (Singapore) Pte Ltd in respect of any matters arising from, or in connection with, this information. For clients that are not accredited investors, expert investors or institutional investors Merrill Lynch (Singapore) Pte Ltd accepts full responsibility for the contents of this information distributed to such clients in Singapore.
General Investment Related Disclosures:
Taiwan Readers: Neither the information nor any opinion expressed herein constitutes an offer or a solicitation of an offer to transact in any securities or other financial instrument. No part of this report may be used or reproduced or quoted in any manner whatsoever in Taiwan by the press or any other person without the express written consent of BofA Securities.
This document provides general information only, and has been prepared for, and is intended for general distribution to, BofA Securities clients. Neither the information nor any opinion expressed constitutes an offer or an invitation to make an offer, to buy or sell any securities or other financial instrument or any derivative related to such securities or instruments (e.g., options, futures, warrants, and contracts for differences). This document is not intended to provide personal investment advice and it does not take into account the specific investment objectives, financial situation and the particular needs of, and is not directed to, any specific person(s). This document and its content do not constitute, and should not be considered to constitute,

investment advice for purposes of ERISA, the US tax code, the Investment Advisers Act or otherwise. Investors should seek financial advice regarding the appropriateness of investing in financial instruments and implementing investment strategies discussed or recommended in this document and should understand that statements regarding future prospects may not be realized. Any decision to purchase or subscribe for securities in any offering must be based solely on existing public information on such security or the information in the prospectus or other offering document issued in connection with such offering, and not on this document.

Securities and other financial instruments referred to herein, or recommended, offered or sold by BofA Securities, are not insured by the Federal Deposit Insurance Corporation and are not deposits or other obligations of any insured depository institution (including, Bank of America, N.A.). Investments in general and, derivatives, in particular, involve numerous risks, including, among others, market risk, counterparty default risk and liquidity risk. No security, financial instrument or derivative is suitable for all investors. Digital assets are extremely speculative, volatile and are largely unregulated. In some cases, securities and other financial instruments may be difficult to value or sell and reliable information about the value or risks related to the security or financial instrument may be difficult to obtain. Investors should note that income from such securities and other financial instruments, if any, may fluctuate and that price or value of such securities and instruments may rise or fall and, in some cases, investors may lose their entire principal investment. Past performance is not necessarily a guide to future performance. Levels and basis for taxation may change.

This report may contain a short-term trading idea or recommendation, which highlights a specific near-term catalyst or event impacting the issuer or the market that is anticipated to have a short-term price impact on the equity securities of the issuer. Short-term trading ideas and recommendations are different from and do not affect a stock's fundamental equity rating, which reflects both a longer term total return expectation and attractiveness for investment relative to other stocks within its Coverage Cluster. Short-term trading ideas and recommendations may be more or less positive than a stock's fundamental equity rating.

BofA Securities is aware that the implementation of the ideas expressed in this report may depend upon an investor's ability to "short" securities or other financial instruments and that such action may be limited by regulations prohibiting or restricting "shortselling" in many jurisdictions. Investors are urged to seek advice regarding the applicability of such regulations prior to executing any short idea contained in this report.

Foreign currency rates of exchange may adversely affect the value, price or income of any security or financial instrument mentioned herein. Investors in such securities and instruments, including ADRs, effectively assume currency risk.

BofAS or one of its affiliates is a regular issuer of traded financial instruments linked to securities that may have been recommended in this report. BofAS or one of its affiliates may, at any time, hold a trading position (long or short) in the securities and financial instruments discussed in this report.

BofA Securities, through business units other than BofA Global Research, may have issued and may in the future issue trading ideas or recommendations that are inconsistent with, and reach different conclusions from, the information presented herein. Such ideas or recommendations may reflect different time frames, assumptions, views and analytical methods of the persons who prepared them, and BofA Securities is under no obligation to ensure that such other trading ideas or recommendations are brought to the attention of any recipient of this information.

In the event that the recipient received this information pursuant to a contract between the recipient and BofAS for the provision of research services for a separate fee, and in connection therewith BofAS may be deemed to be acting as an investment adviser, such status relates, if at all, solely to the person with whom BofAS has contracted directly and does not extend beyond the delivery of this report (unless otherwise agreed specifically in writing by BofAS). If such recipient uses the services of BofAS in connection with the sale or purchase of a security referred to herein, BofAS may act as principal for its own account or as agent for another person. BofAS is and continues to act solely as a broker-dealer in connection with the execution of any transactions, including transactions in any securities referred to herein.

Materials prepared by BofA Global Research personnel are based on public information. Facts and views presented in this material have not been reviewed by, and may not reflect information known to, professionals in other business areas of BofA Securities, including investment banking personnel. BofA Securities has established information barriers between BofA Global Research and certain business groups. As a result, BofA Securities does not disclose certain client relationships with, or compensation received from, such issuers. To the extent this material discusses any legal proceeding or issues, it has not been prepared as nor is it intended to express any legal conclusion, opinion or advice. Investors should consult their own legal advisers as to issues of law relating to the subject matter of this material. BofA Global Research personnel's knowledge of legal proceedings in which any BofA Securities entity and/or its directors, officers and employees may be plaintiffs, defendants, co-defendants or co-plaintiffs with or involving issuers mentioned in this material is based on public information. Facts and views presented in this material that relate to any such proceedings have not been reviewed by, discussed with, and may not reflect information known to, professionals in other business areas of BofA Securities in connection with the legal proceedings or matters relevant to such proceedings.

This information has been prepared independently of any issuer of securities mentioned herein and not in connection with any proposed offering of securities or as agent of any issuer of any securities. None of BofAS any of its affiliates or their research analysts has any authority whatsoever to make any representation or warranty on behalf of the issuer(s). BofA Global Research policy prohibits research personnel from disclosing a recommendation, investment rating, or investment thesis for review by an issuer prior to the publication of a research report containing such rating, recommendation or investment thesis.

Any information relating to sustainability in this material is limited as discussed herein and is not intended to provide a comprehensive view on any sustainability claim with respect to any issuer or security.

Any information relating to the tax status of financial instruments discussed herein is not intended to provide tax advice or to be used by anyone to provide tax advice. Investors are urged to seek tax advice based on their particular circumstances from an independent tax professional.

The information herein (other than disclosure information relating to BofA Securities and its affiliates) was obtained from various sources and we do not guarantee its accuracy. This information may contain links to third-party websites. BofA Securities is not responsible for the content of any third-party website or any linked content contained in a third-party website. Content contained on such third-party websites is not part of this information and is not incorporated by reference. The inclusion of a link does not imply any endorsement by or any affiliation with BofA Securities. Access to any third-party website is at your own risk, and you should always review the terms and privacy policies at third-party websites before submitting any personal information to them. BofA Securities is not responsible for such terms and privacy policies and expressly disclaims any liability for them.

All opinions, projections and estimates constitute the judgment of the author as of the date of publication and are subject to change without notice. Prices also are subject to change without notice. BofA Securities is under no obligation to update this information and BofA Securities ability to publish information on the subject issuer(s) in the future is subject to applicable quiet periods. You should therefore assume that BofA Securities will not update any fact, circumstance or opinion contained herein.

Certain outstanding reports or investment opinions relating to securities, financial instruments and/or issuers may no longer be current. Always refer to the most recent research report relating to an issuer prior to making an investment decision.

In some cases, an issuer may be classified as Restricted or may be Under Review or Extended Review. In each case, investors should consider any investment opinion relating to such issuer (or its security and/or financial instruments) to be suspended or withdrawn and should not rely on the analyses and investment opinion(s) pertaining to such issuer (or its securities and/or financial instruments) nor should the analyses or opinion(s) be considered a solicitation of any kind. Sales persons and financial advisors affiliated with BofAS or any of its affiliates may not solicit purchases of securities or financial instruments that are Restricted or Under Review and may only solicit securities under Extended Review in accordance with firm policies.

Neither BofA Securities nor any officer or employee of BofA Securities accepts any liability whatsoever for any direct, indirect or consequential damages or losses arising from any use of this information.