Blueprint for Increasing Building Energy Efficiency Fact Sheet

North Central Texas Council of Governments

Introduction

In 2024, the Department of Energy released Decarbonizing the U.S. Economy by 2050.[1] This plan aims to reduce building greenhouse gas emissions by 65% by 2035 and 90% by 2050. The blueprint outlines four key strategic objectives:

1. Increase Building Energy Efficiency
2. Accelerate On-Site Emissions Reductions
3. Transform the Grid Edge Performance
4. Minimize Embodied Life Cycle Emissions

This fact sheet will summarize Strategic Objective #1: Increase Building Energy Efficiency and its applicability within the NCTCOG region.

NCTCOG produced another factsheet on Strategic Objective 2: Accelerate On-Site Emissions Reductions, which can be viewed on the Conserve North Texas website.[2]

Why Increase Building Energy Efficiency?

Energy efficient buildings play a central role in creating indoor environments that are healthy, affordable, comfortable, and resilient. Additionally, improving efficiency leads to a reduction in emissions, energy use, and electricity demand. With Texans spending $46 billion annually on building energy costs,[3] improvements in energy efficiency can bring these costs down and result in customer energy bill savings. Furthermore, buildings that are aging and in need of repairs are also the most energy-intensive,[4] so improvements to efficiency are necessary for stronger building resiliency. The emissions reductions achieved through energy efficiency are especially important to the NCTCOG region as they assist ongoing efforts to attain federal ozone standards.[5]

Performance Target: *Reduce on-site energy use intensity in buildings 35% by 2035 and 50% by 2050, based on 2005 levels*

The Blueprint has set a target of a 35% reduction in building energy use intensity (EUI) per unit of floor area by 2035, based on 2005 levels. This goal was driven by studies showing that in 2022 building EUIs were only 16% lower than 2005 levels.

Energy Efficiency Fast Facts

- In the US, buildings are responsible for 74% of electricity use- most of this is space heating and cooling.
- In 2023, nearly 11 million US homes reported a water leak and 4 million had mold.
- In 2021, 52% of building energy emissions came from electricity use.
- As of 2024, 27 states have adopted energy efficiency resources standards (EERSs) that determine energy-saving targets for utilities and program administrators.

To achieve 2035 goals and subsequent 2050 goals, the Blueprint recommends the adoption of high performance appliances equipment, improving the building envelope (the physical barrier between the inside and the outside of the building), and creating greater demand flexibility in buildings.

Key Strategic Measures

The Blueprint outlines key measures to support the goal of energy efficiency. Figure A, on the next page, explains how each measure supports EUI reductions on a larger scale, and what benefits it provides to community members.

Measure I: *Develop high-performing building envelopes*

Because the greatest building energy consumption comes from heating and cooling demands, efficient building envelope performance offers a reduction in energy expenditures. An efficient envelope enables the use of smaller equipment and fewer electrical upgrades,

1. https://www.energy.gov/eere/articles/decarbonizing-us-economy-2050
2. https://www.conservenorthtexas.org/item/Accelerate-On-Site-Emissions-Reductions-Factsheet
3. https://www.eia.gov/state/data.php?sid=TX#ConsumptionExpenditures
4. https://odphp.health.gov/healthypeople/priority-areas/social-determinants-health/literature-summaries/quality-housing
5. http://www.nctcog.org/airquality

Energy Efficiency		
Key Measures	**Economy-wide Implications**	**Benefits to People**
• High-performance building envelopes (e.g., highly insulating windows, insulation, air and duct sealing) and passive building designs and retrofit approaches.	• Delivers persistent reductions in building energy use by reducing waste in the provision of those services	• Saves consumers money on energy bills (directly and indirectly by reducing peak demand, which lowers electricity rates); reduces conumser exposure to volatile energy prices
• High-performance electric equipment and appliances (e.g., air- and ground source heat pumps, ENERGY STAR appliances)	• Reduces peak demand to limit the scale of clean generation, storage, and grid infrastructure, potentially lowering electric rates for consumers.	• Delivers multiple other co-benefits (e.g., improved thermal resilience, comfort, health, and productivity).
• Technologies for optimizing ventilation rates and thermal loads (e.g., energy recovery, demand-controlled ventilation, occupant sensing)	• Enables electrification by reducing required equipment capacities and avoiding electrical infrastructure upgrades.	

Figure A: Key measures for increasing building energy efficiency

making it easier to electrify heating and cooling loads. Additionally, high-performing building envelopes can help save money, with efficient envelopes and equipment having enabled a reduction in building energy costs by 20%. Strategies such as adding insulation, air sealing, and replacing windows can reduce heat or keep cool air from escaping.

Measure II: *Deploy high-performance electric equipment and appliances*

The use of energy-efficient appliances, such as heat pumps and appliances recognized through the ENERGY STAR program, may help reduce building energy demand, while still offering comparable performance levels, particularly in the realm of heating and cooling needs, which are significant sources of energy consumption for buildings. More details on heat pumps can be found in the Strategic Objective 2 fact sheet.[6]

Measure III: *Provide greater building demand flexibility*

By switching from water heaters to ground and air heat pumps, property owners can expect greater building efficiency. This can be taken a step further by coupling heat pumps with smart thermostats to enable greater demand management for these already efficient technologies. These strategies, in combination with a sound building envelope, pave the way for thermal energy storage by "pre-heating or pre-cooling" a building, providing greater demand flexibility, and ensuring demand is efficiently met. The resulting reduction in peak demand also reduces the need to invest in grid infrastructure.

Barriers to Increasing Building Energy Efficiency

Barrier I: *Limited tools to accelerate building efficiency retrofits*

- An estimated 75% of current residential buildings and 50% of current commercial buildings will still be in place in 2050.
- Older buildings are likely to still be operating under outdated and outmoded efficiency practices and infrastructure.
- Current efficiency standards do not address the key sources of building energy consumption: the building envelope in residential structures and ventilation in commercial properties.

Barrier II: *Lack of transparent valuation of efficiency in the marketplace*

- Single-family residential real estate markets may be undervaluing the impact a property's energy efficiency rating can have on the market.
- Multifamily residential and commercial properties can undervalue their properties by not engaging in energy benchmarking and transparently sharing results.

Barrier III: *Substandard building conditions*

- Mold, asbestos, lead, structural damage, and other conditions can be a challenge for property owners wishing to engage in energy efficiency or weatherization programs.
- Problems that pose a health or safety risk can cost

6. https://www.conservenorthtexas.org/item/Accelerate-On-Site-Emissions-Reductions-Factsheet

a significant amount to repair, and result in the cancellations of weatherization jobs due to safety risks to workers.

Strategies for Overcoming Barriers

Strategy I: *Establish building performance standards (BPSs) for existing commercial buildings*

BPSs can be used to encourage efficiency improvements in existing structures and cover the gap left by outdated building codes. While BPSs have not been enacted in Texas, there are multiple Texas cities that have adopted a benchmarking policy, which is a first step towards BPS development. A toolkit is available from HARC for those interested in exploring BPSs.[7]

Strategy II: *Use benchmarking and transparency to drive the market value of energy-efficient properties*

Requiring benchmarking, disclosure, and energy efficient labeling in real estate transactions may help spur leasing agreements that prioritize energy-efficient buildings. These activities may also provide energy savings and increase the value of efficient properties. While Austin is the only city in Texas that currently requires energy benchmarking through their Energy Conservation Audit & Disclosure (ECAD) ordinance,[8] cities such as Fort Worth have encouraged voluntary benchmarking through participation in the Better Buildings Challenge.[9]

Strategy III: *Incorporate health and safety building upgrades into existing retrofit and weatherization programs*

Adding funding that addresses deferred maintenance and health and safety concerns, such as mold, asbestos, lead, etc., to existing weatherization programs would avoid the cancellation of jobs due to concerns over existing building conditions. Further, this expansion in service may serve to increase awareness of weatherization and retrofit opportunities, supporting greater workforce development.

Actions State and Local Governments Can Take to Increase Building Energy Efficiency

The Blueprint includes strategies that state and local governments can use to support its goals. A few relevant items are discussed below.

Action I: *Adopt and enforce energy code requirements*

- Adopt energy codes for new construction and ensure they stay up to date with the latest recommendations. NCTCOG recommends local governments adopt the 2024 amendments to the IECC as of March 27, 2025.[10]
- Enforce code requirements and be proactive about addressing code compliance issues.

Action II: *Enact BPSs that meet energy and/or emissions based targets*

- Set BPSs as goals or concrete standards for new construction.

Objective 1: Increase Building Energy Efficiency	
By 2035	**By 2050**
• >75% of building contractor education and training programs include energy efficiency skills as a graduation requirement.	• Building energy disclosure requirements adopted in states and jurisdictions representing >75% of people in the United States and include point-of-sale/rental disclosure requirements for homes.
• Building energy disclosure requirements are adopted in states and jurisdictions representing >50% of people in the United States and include point-of-sale/rental disclosure requirements of homes.[11]	• Zero-energy or equivalent codes and BPS are adopted in states and jurisdictions representing >50% of people in the United States.
• Zero-energy or equivalent codes and BPS are each adopted in states and jurisdictions representing >25% of people in the United States.	• All federal buildings meet stringent energy use intensity (EUI) targets.[12]
• At least 75% of new buildings are constructed at or above the latest model energy code performance levels.	• All primary electric resistane space and water hearing is replaced by heat pumps

Figure B: Milestones to obtaining building energy efficiency in 2035 and 2050

7. https://energyhub.harcresearch.org/interactive-tools/bps?tab=about
8. https://austinenergy.com/energy-efficiency/ecad-ordinance
9. https://betterbuildingssolutioncenter.energy.gov/partners/fort-worth-tx
10. https://www.nctcog.org/getmedia/404d9d2c-0ed0-4d28-b0ad-fb393ca3b399/2025-Memo-to-Jurisdictions_Signed-official.pdf
11. See also: https://www.naseo.org/Data/Sites/1/documents/jx-documents/home-energy-labeling-map_v2.pdf
12. https://www.sustainability.gov/pdfs/EO_14057_Implementing_Instructions.pdf

- Benchmarking is key to uncovering the hidden value of energy-efficient buildings, as well as assessing how a building meets standards.

Action III: *Develop building performance programs*

- State utility regulators may develop programs together with municipally owned and cooperative utilities.
- Programs may provide rebates and incentives for building electrification and efficiency activities. Current programs can be found through the Database of State Incentives for Renewables & Efficiency.[13]

Action IV: *Take part in zoning reform to support the development of homes with decreased energy demand*

- Zoning reform to allow smaller residences can help improve efficiency as smaller residences consume less energy. Reforms may be modeled after SB 15 (2025).[14]

Milestones to Achieve Increased Building Energy Efficiency

Reducing building EUI will require intentional and strategic investment. Along the way, various milestones will be paramount to assess progress and course correction. Figure B, above, outlines key milestones to achieving increased building energy efficiency. One key milestone is the development of building contractor education that includes energy efficiency as a skill, with 75% of training programs addressing energy efficiency in their curriculum by 2035. Of additional note is the milestone in enacting building energy disclosure requirements. In 2035, this would take place in jurisdictions representing over 50% of the U.S. population, and over 75% the U.S. population by 2050.

Conclusion

To meet the building energy efficiency target, a concerted effort will be needed to pivot from fossil-fired equipment, enhance the building envelope, and support greater demand flexibility. On the local scale, this will involve revising policies, standards, and codes to address barriers to retrofitting, grappling with zoning challenges, and placing greater emphasis on benchmarking in the real estate market. As each stakeholder works to achieve efficiency milestones, continued investment in training and education will keep the US on track to meet 2035 and 2050 targets.

Cross Cutting Goals

Guiding the pathway to achieving building emissions reductions are two cross-cutting goals: affordability and resiliency. Together, these goals establish a people-centered lens through which the actions outlined in this factsheet are rooted in.

Affordability

- Providing customer savings by reducing building energy demand.
- Tapping into energy efficiency measures early rather than waiting for equipment to fail.
- Utilizing state and federal funding to help with the high up-front costs.

Resiliency

- Increasing energy efficiency and resiliency of buildings to withstand or recover from disasters, outages, and extreme weather.
- Improving the structural durability and thermal resiliency by upgrading building envelopes.

13. https://programs.dsireusa.org/system/program
14. https://capitol.texas.gov/BillLookup/History.aspx?LegSess=89R&Bill=SB15