

Charleston County

Sustainability Plan

Executive Summary



February 2024



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The Charleston County Sustainability Plan (SP) seeks to accelerate the transition to a clean energy economy, while simultaneously achieving multiple health, equity, economic, and resilience benefits. The energy system is in the midst of a transformation, with the increasing introduction of decentralized electricity production and energy storage, the electrification of transportation, and the advancement of policies and investments by governments to mitigate greenhouse gas (GHG) emissions and advance clean energy.

The transition to a cleaner energy economy requires using energy more efficiently, moving from fossil fuels to electricity wherever possible, and generating electricity with low- or zero-carbon emissions. The effort requires extensively retrofitting the existing building stock, significantly increasing the energy performance of new buildings, constructing new sources of zero- and low-carbon energy, and electrifying vehicles and heating systems. The result of this combination of efforts is a reduction of GHG emissions with a marginal net cost to society as a whole, and these investments represent significant opportunities for the public and private sector, with many projects both generating financial returns and improving quality of life.

E.1 The Process

The development of Charleston County's SP involved a dance between an engagement process and a technical analysis.

The technical analysis aimed to provide an investment roadmap using a detailed energy and emissions model. The analysis began by considering the drivers that determine energy consumption and greenhouse gas emissions to answer the question, "Where are we now?" Analysis of future trajectories included a Business-as-Planned (BAP) Scenario, which evaluated what might happen if no additional policies or actions are put in place. A Low Carbon (LC) Scenario explored the implications of achieving deep GHG reductions.

The engagement process provided insights and guidance on which strategies make sense for Charleston County and which mechanisms can be used to implement the Low-Carbon Scenario.

E.2 The Pathway

Embarking on this pathway will dramatically change how energy is used in Charleston County, as summarized in the following figure.

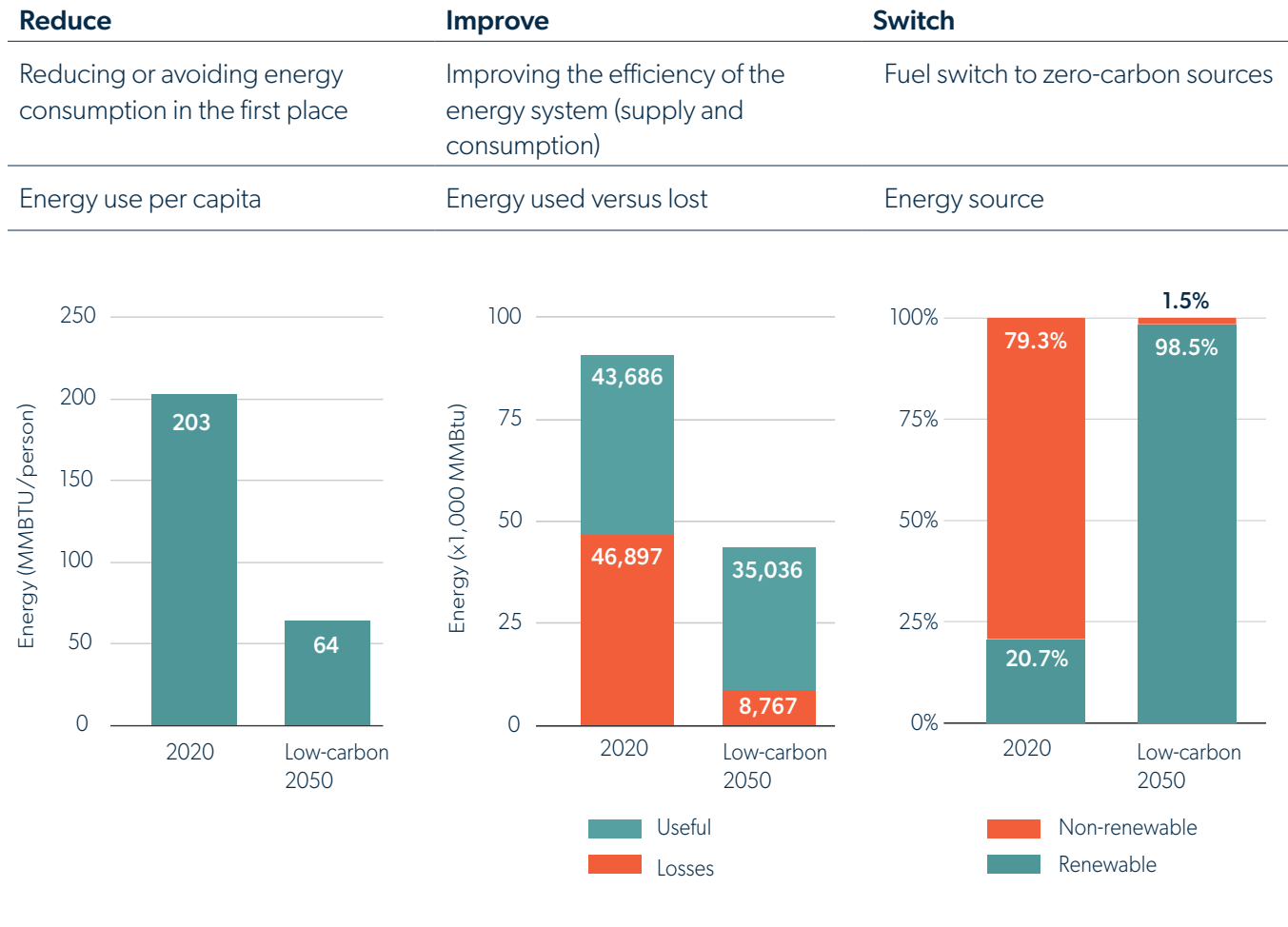


Figure 1. The transformation of Charleston County's energy system in three charts.

Charleston county's population is projected to grow by one quarter between 2023 and 2050. Despite this growth, the modeling results indicate that the Low-Carbon Scenario is technically and economically possible but also challenging. In this scenario, GHG emissions decline from 6,410 kMtCO_{2e} in 2020 to 380 kMtCO_{2e} in 2050, a decrease of 94% over that period.

The Low-Carbon Scenario focuses on investments in technologies available today. While future technological developments may enable additional GHG reductions and efficiency gains, their future costs and benefits are uncertain.

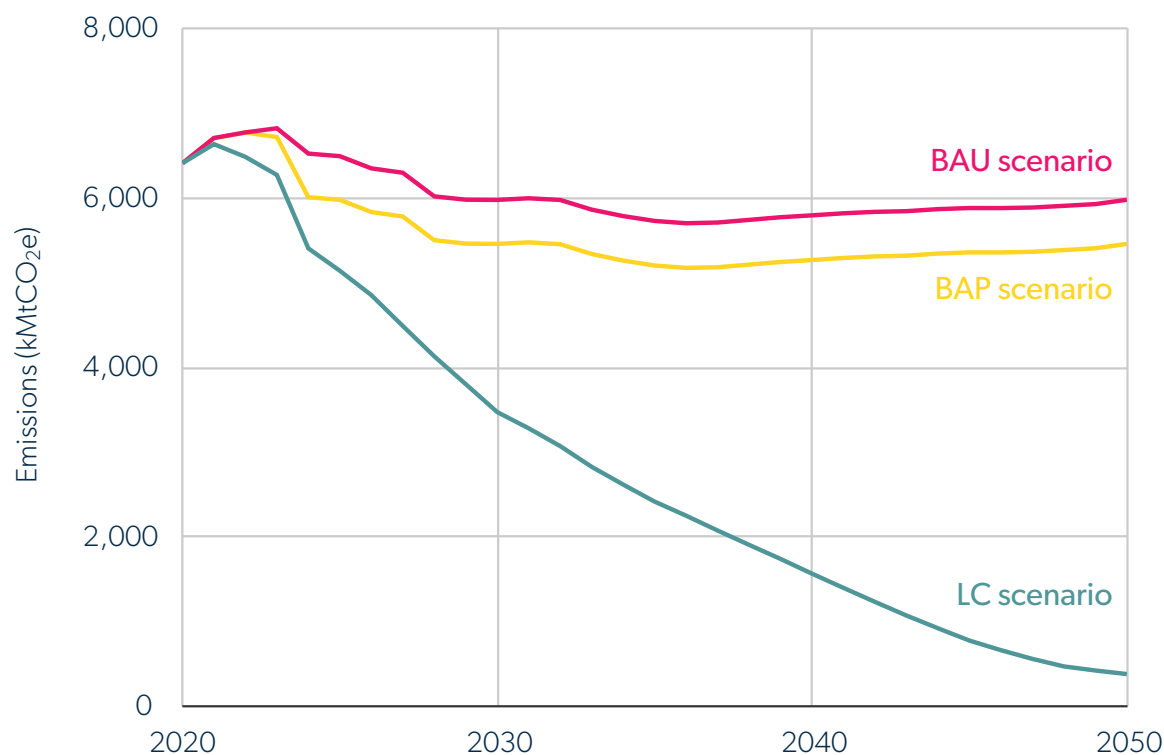


Figure 2. The Low-Carbon Scenario trajectory.

These investments in the Low-Carbon Scenario represent major opportunities for new and existing businesses, including companies providing heat pumps, building retrofits, renewable energy technologies, energy storage, electric vehicles (EVs), energy controls, etc.—a \$14 billion opportunity over 30 years, or approximately \$500 million per year, equivalent to approximately 1.5% of Charleston County’s annual GDP. Some of these investments will occur as a result of natural turnover of stocks—they have their own momentum and require no additional action (for example, each EV purchased represents a \$5,000 incremental investment or each home that is weatherized by someone making an upgrade contributes approximately \$60,000 to this total investment).

Figure 3 illustrates the total investments as a share of the investments in the Low-Carbon Scenario. The Inflation Reduction Act (IRA) will help stimulate and reinforce many aspects of Charleston County’s SP by providing opportunities for the County to raise funds and by providing grants and incentives to individuals and businesses to support low-carbon investments. The analysis in this paper indicates that the IRA could inject approximately \$150 million per year over the next 10 years. Securing these grants and investments will require active participation of residents and coordination by the County and other partners.

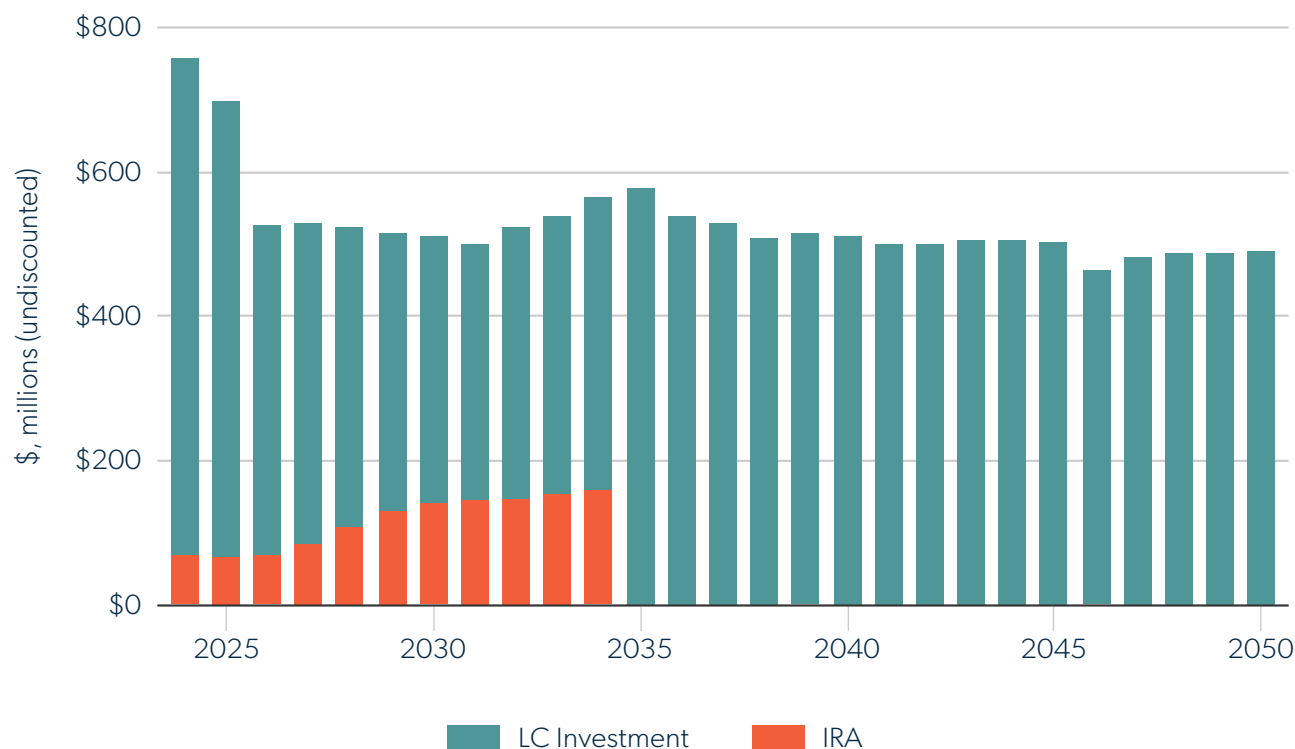


Figure 3. Potential contribution of the IRA to the investments in the Low-Carbon Scenario.

The active engagement of the County and other partners will be required to ensure that the actions and measures in the SP advance equity objectives, including ensuring that low-income and disadvantaged community members can help shape implementation of the SP.

The investments in the Low-Carbon Scenario will generate new jobs in the retrofits, renewable energy, and associated sectors. Total person-years of employment is estimated to be 88,000 by 2050, or approximately 3,300 per year.

E.3 Targets

Specific targets have been identified to track the Low-Carbon Scenario's implementation for the years 2035 and 2050. This information enables the County to monitor progress against the pathway described in the scenario.

The pathway to Charleston County's 2035 target aligns with the global GHG reduction required to prevent climate change.³ However, the 2035 target does not quite align with a fair-share target, which distributes the global GHG emissions reductions according to the economic capabilities of the jurisdiction.⁴ As a result, the County can continue to identify new technologies or opportunities to reduce GHG emissions beyond what is identified in the CAP.

Table 1. GHG targets.

	Baseline 2020	2035	2050	Cumulative (2024–2050)
Business-as-Planned Scenario				
Total (MtCO ₂ e)	6,410,000	5,202,000	5,457,000	146,401,000
% change over 2020		-19%	-15%	
Low-Carbon Scenario				
Total (MtCO ₂ e)	6,410,000	2,415,000	379,000	62,899,000
% change over 2020		-62%	-94%	
Per capita (MtCO ₂ e/capita)	15.5	5.2	0.7	
% change over 2020		-67%	-95%	

³ The IPCC identifies global reductions of 40–45% by 2030, Charleston County's low-carbon pathway achieves reductions of -46% by 2030.

⁴ The science-based targets' guidance recommends -70% over 2015 levels by 2030 for municipalities such as Charleston County. See: Science Based Targets Network (2022). Science-based Climate Targets—A Guide for Cities. Retrieved from: <https://sciencebasedtargetsnetwork.org/wp-content/uploads/2020/11/SBTs-for-cities-guide-nov-2020.pdf>

E.4 Findings

The SP envisions a transition to a low-carbon or decarbonized economy. The analysis indicates that this transition is technically and economically possible using existing technologies.

1. The transition focuses on reducing energy consumption first through high-performance buildings and land-use planning, then by improving the energy system by retrofitting existing buildings, and finally, by switching to renewable energy (primarily electricity) and, to a lesser degree, renewable natural gas and hydrogen. This pathway maximizes efficiency gains and therefore, minimizes the capital and operating costs of the energy transition.
2. The SP is an economic development strategy, requiring major investments. The investments in the energy system will generate employment in building design, retrofits/weatherization, renewable energy, electric vehicle maintenance, and other sectors. Using sector-specific employment generation rates, the plan will result in a total of 88,000 person-years of employment over the period, or an average of 3,300 person-years of employment per year.
3. The capital investments will be made by multiple actors—the County, households, businesses, and other levels of government. The incremental capital costs of the Low-Carbon Scenario are approximately 1.5% of the GDP of Charleston County. These capital investments result in energy savings and new revenues from renewable energy.
4. Energy is a major expenditure in Charleston County, totaling nearly \$2 billion per year. Efficiency gains due to the adoption of electric vehicles, heat pumps, building weatherization, and other measures will reduce these costs significantly, with the most benefit for low-income households. Household energy costs fall from over \$5,000 per household to less than \$2,000 per household by 2050 in the Low-Carbon Scenario.
5. Equity and resilience are threads that run throughout the engagement process, the technical analysis, and the implementation strategies, with many implementation strategies specifically focused on equity objectives.
6. The engagement process and the technical analysis identified 53 actions bundled into five Big Moves. These actions have varying return on investments and risk profiles. Some investments will be more suited to the municipality, whereas others will be more appropriate for private businesses. Which action is best associated with which entity has yet to be determined, but there are many promising investment opportunities.
7. Reduction in energy use and GHG emissions that occur as a result of land-use planning are essentially free in that they require no investment and deliver a range of other co-benefits. Therefore, the County should continue to advance densification strategies to enable GHG emissions reduction.

8. County interventions will be foundational in unlocking key strategies to advance the Low-Carbon Scenario. Potential interventions include creating policies to support intensification, enhancing building performance, supporting access to building weatherization/retrofits and IRA tax credits, encouraging renewable energy use, and providing education and support. Charleston County will need to hire additional staff in order to seize this opportunity.

E.5 Implementation

An implementation program has been developed, with recommended policies, initiatives, and programs, that will put the County on track to achieve the emissions reduction pathway modeled in this analysis. The program focuses on the following Big Moves:

1. Affordable and resilient buildings
2. Sustainable and inclusive transportation
3. Clean energy for all
4. Innovative industrial and agricultural sectors
5. Circular economy

E.6 Conclusion

The response to our changing environment has shifted from a historical emphasis on sacrifice to a new paradigm of opportunity. Sustainability now represents new business, new jobs, innovation, and an enhanced quality of life, and these themes are all evident in Charleston County's SP.

This plan describes a pathway to decarbonize the county that aligns with the latest science. A process that will generate new jobs, stimulate innovation, increase resilience, provide energy security, reduce household energy costs, advance equity, and improve quality of life. As a community plan, the pathway includes actions and investments by households, businesses, and the County. The County is responsible for providing policies, education, and incentives that stimulate these investments; ensuring the investments advance equity and improve the quality of life for County residents; coordinating partners; and tracking progress.

Charleston County's SP enables the community to address climate change, engage in the energy transition on its own terms, and future-proof the county against technological and climatic megatrends.

