

# Achieving Carbon Neutrality at Arizona State University

## Project overview

In 2019, Arizona State University achieved carbon neutrality for scope 1 and 2 emissions. Through this accomplishment, ASU seeks to inspire immediate action to address the climate emergency. Despite reaching this carbon neutrality goal six years early, ASU is committed to continuing to achieve neutrality going forward, including for scope 3 emissions by 2035.

## Offices and Departments

University Sustainability Practices, Energy Innovations, Facilities Development and Management, University Business Services, Business and Finance, Sustainability Initiatives Revolving Fund (SIRF) Committee

## Background

As set forth in ASU's charter, ASU takes fundamental responsibility for the economic, cultural, and overall health (including environmental health) of the communities it serves. This necessitates developing solutions to real-life challenges like accounting for, minimizing and mitigating ASU's climate impact.

As one of the original signatories of the American College and University Presidents' Climate Commitment, President Crow pledged that ASU would be carbon neutral with respect to its buildings and stationary sources by 2025 and completely carbon neutral (including transportation related emissions) by 2035. In response, ASU conducted its first greenhouse gas inventory in 2007 and began retrofitting buildings and implementing significant on-campus solar. President Crow re-affirmed and expanded ASU's resolve by signing the new Second Nature Climate Commitment in December 2015, which also includes climate resilience commitments.<sup>1</sup>

In December 2019, ASU's Sustainability Leadership Team (comprised of the CFO, CSO, facilities leadership, and sustainability, energy and facilities staff) decided to accelerate the timeline for achieving neutrality. The team concluded:

- In the spirit of the 50th Earth Day, ASU would demonstrate climate leadership, showing that action can be taken today while continuing to push for more advanced solutions
- Given the state of the climate emergency, it was time to highlight the urgency for action
- The purchase of market renewable energy certificates (RECs) and carbon offsets for the balance of ASU's emissions represented a straight-forward, cost-effective, interim strategy to achieve neutrality given the current state of technology
- This would be a milestone, not an end – ASU will push to continue to achieve neutrality through on-site and off-site efforts to reduce the need for market RECs and offsets and improve the quality of offsets by working to further tie them to the academic and research mission

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<sup>1</sup> <http://reporting.secondnature.org/institution/detail!146##146>

## Project goals

ASU sought to achieve:

- Carbon neutrality for scope 1 and 2 emissions
- Highlight the urgency for climate action
- Recognize the 50<sup>th</sup> anniversary of Earth Day

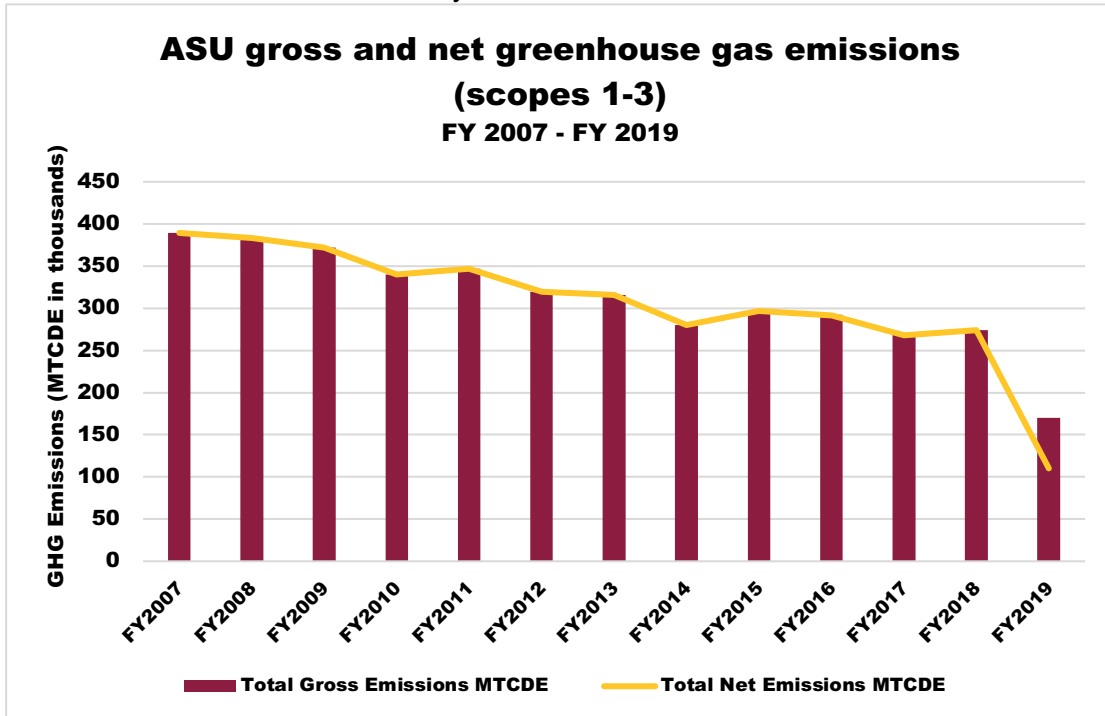
## Project implementation

- University Sustainability Practices provides solutions leadership, coordination, research support, data support, and purchasing support.
- Energy Innovations provides solutions leadership, technical research and analysis, and data support.
- Facilities Development and Management provides building and infrastructure planning, design, construction, operations and retrofit management, and is the home of Energy Innovations.
- The VP of University Business Services serves as the Chief Sustainability Officer and provides leadership.
- Business and Finance provides leadership decision-making (CFO), financial analysis and funding.
- The Sustainability Initiatives Revolving Fund Committee evaluates utility savings project proposals and provides funding recommendations to the CFO.
- The Sustainability Leadership Team develops operational sustainability strategy.
  - Membership
    - Chief Financial Officer
    - University Business Services, Vice President and Chief Sustainability Officer
    - Facilities Development and Management, Vice President
    - Business and Finance, Managing Director and Chief of Staff
    - Facilities Management, Assistant Vice President
    - Energy Innovations, Director
    - Facilities Management, Director
    - University Sustainability Practices, Director
    - University Sustainability Practices, Assistant Director
- University Sustainability Practices and Energy Innovations developed a framework for achieving neutrality by fiscal year 2025. Using this framework, a proposal was developed to achieve neutrality in fiscal year 2019 at the urging of the Chief Sustainability Officer.

## Project timeline

- Early 2000's – ASU began to seriously target energy through an energy services performance contract (ESPC), which involved the implementation of numerous energy conservation measures, including: lighting retrofits; lighting controls; Central Plant controls and upgrades, equipment replacements (e.g., motors, chillers, and variable air volume air handling units); energy management system upgrades; and building energy sub-metering installation.

- 2007: Founding signatory of the American College and University Presidents Climate Commitment
- 2007: Baseline GHG inventory developed
- 2007 and 2012: Installation of additional energy meters
- 2008 - present: Installation of on-site solar: approximately 24 MWdc equivalent comprised of 90 systems (~14,200 MTCDE or ~9% of scope 1 and 2 emissions)
- 2009: A second large energy services performance contract which led to the implementation of numerous energy conservation measures, including: control system upgrades; HVAC improvements; lighting retrofits; and steam system improvements
- 2010: Sustainability Initiatives Revolving Fund (SIRF) established to finance utility-saving capital projects
- 2015: Signed PPA with local utility to acquire 65,000 MWh/yr (equivalent to approx. 29 MWdc capacity) through development of new off-site solar facility (23,725 MTCDE or ~14% of scope 1 and 2 emissions)
- 2015: Founding signatory of the new Second Nature Climate Commitment
- 2018: Started the ASU Carbon Project which includes the air travel price on carbon and community offset bundles (local tree plantings combined with market offsets)
- 2018 -2020: Additional large energy conservation package of measures (~4,500 MTCDE annually)
- 2019: Developed aggressive energy requirements for new buildings as first step in implementing Climate Neutral New Construction policy
- 2007 - 2019: Reduced gross emissions by 56% over baseline while also growing gross square footage by 40% and on-campus students by 24%
- 2019: Decision to achieve neutrality



Note that emissions reductions were achieved while growing gross square footage of building space by 40% (FY2019 vs. FY2007).

## Financing

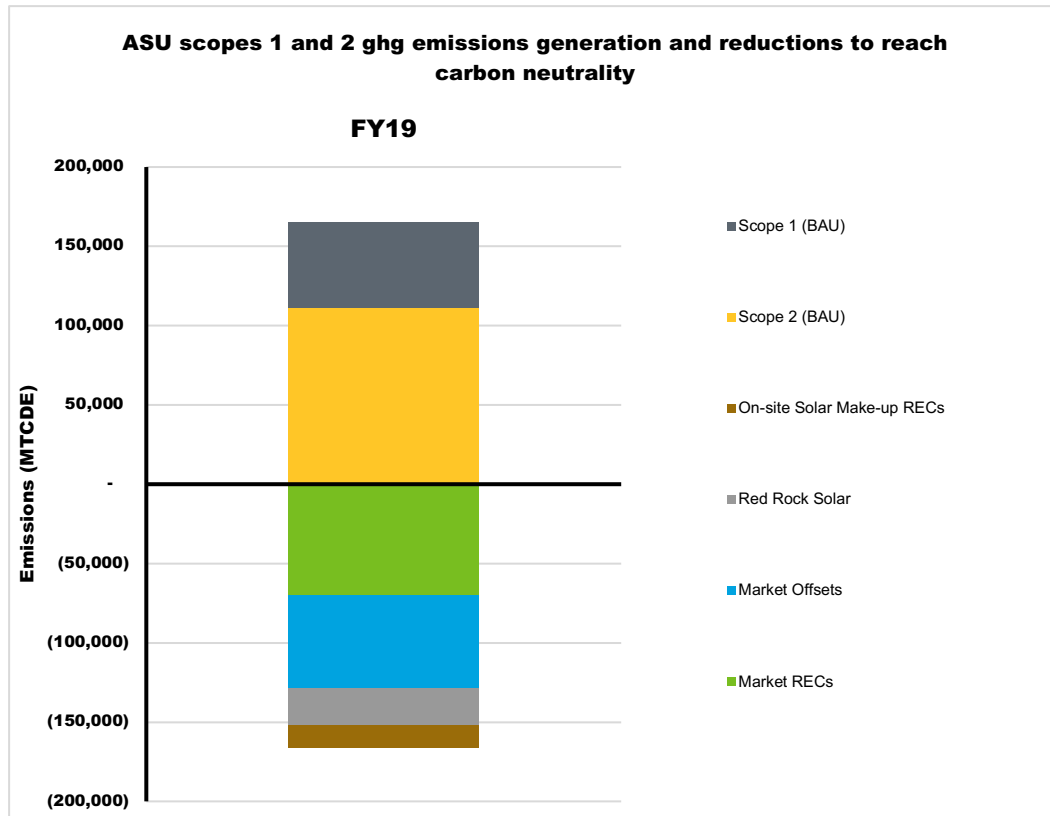
- Energy Conservation Measures: \$100M+ investment financed through a combination of bonds, Sustainability Initiatives Revolving Fund (SIRF) (ASU's internal sustainability revolving loan fund), university central funding, and utility rebates
- On-site renewable energy: majority are PPAs funded through operational budgets and some are owned through a variety of funding mechanisms
- Off-site renewable energy: PPAs funded through operational budgets
- Market Renewable Energy Certificates: \$163,043 (\$0.85 per)
- Market Offsets: \$26,876 (\$0.46 per)

## Project results

- Achieved carbon neutrality for scope 1 and 2 emissions, six years ahead of schedule
- First institution to achieve AASHE STARS Platinum under STARS v2.2
- EPA Green Power Partnership - #2 among college and university partners
- Reaffirmed ASU's commitment to improving upon the achievement through 2025 and continuing aggressive efforts to additionally eliminate scope 3 emissions by 2035

## Lessons learned

- Establish a leadership team with the key decision-makers and stakeholders
- Invest in sustained research and education of key leaders
- Find opportunities to continue making progress while more difficult challenges are resolved and technology evolves. This signals society of the urgency to act, signals the market of demand for technology solutions, and creates real climate impact by financing offset and renewable energy projects.



## Next Steps

ASU will continue working on improvements to Scope 1 and 2 emissions while also expanding efforts related to Scope 3 emissions. The primary challenge with Scope 1 emissions is reliance on a natural gas combined heat and power plant for electricity that complies with contractual federal research electricity reliability requirements. Strategies going forward:

- Continued energy efficiency retrofits of existing buildings and infrastructure
- Climate neutral new construction
- New on-site solar and storage where practicable
- Electrification of new buildings where practicable
- Reduce the purchase of market RECs and replace with RECs/energy from long term virtual power purchase agreement and new off-site solar project with utility.
- Fleet electrification
- Continued acquisition of Community Bundles (market offsets + local tree plantings) funded by the Air Travel Price on Carbon as part of the Carbon Project
- Planting of a native urban forest carbon sink at ASU West campus
- Development of carbon offset and/or carbon removal projects that are tied to the education, research and community embeddedness missions of the university
- Increased tele-commuting and remote work
- Aggressive transportation demand management initiatives
- Increased infrastructure and programs to encourage commuter vehicle electrification
- Continuous evaluation of clean technologies as they emerge and implementation as costs drop or otherwise become feasible