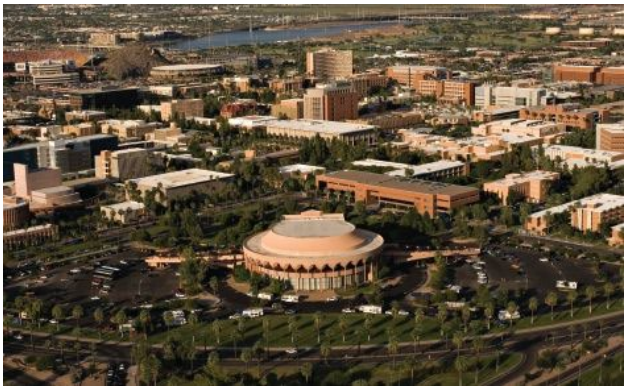
Put to Practice: Arizona State University Climate Neutrality Roadmap

Background



Arizona State University (ASU) is the largest university by student enrollment and one of the fastest-growing public research universities in North America. ASU leaders have long recognized the strategic importance of pursuing climate neutral operations and have integrated related stretch goals into the institution's mission and charter. In 2006, President Michael Crow demonstrated strong leadership by becoming one of twelve founding signatories of the American College and University Presidents' Climate Commitment (ACUPCC), thereby committing ASU to achieve climate neutrality for the university's entire greenhouse gas (GHG) emissions footprint, including Scope 1, 2, 3, and de minimis emissions, by 2025 (2035 including transportation).

By 2012 ASU had made significant progress toward achieving climate neutrality goals, with an average emissions reduction of 3.3 percent per year (2006-2012). Along the way, the university built over 40 LEED Gold and Platinum buildings, installed 25 megawatts of distributed solar, implemented energy efficiency measures on its four teaching campuses and the ASU Research Park, and more than tripled bicycling and public transit use among students. If this emissions reduction rate were to continue until 2035, ASU would have cut GHG emissions by 69 percent—impressive, but not sufficient to reach ASU's targeted climate neutrality goals.

As a result, ASU decided to seek out a Strategic Climate Neutrality Alliance Partner to facilitate more significant, ongoing greenhouse gas emissions reductions. ASU selected Ameresco as a strategic alliance partner and executed a Master Strategic Alliance Agreement for Climate Neutrality in May 2013. After executing the Climate Neutrality Alliance Agreement with ASU, Ameresco hired Mark Wilhelm as the project director. Mark brought extensive energy and carbon reduction planning experience. He quickly formed a team and defined a strategy to make progress toward the goals of the alliance.

Developing the Climate Neutrality Roadmap

The first key deliverable of the Climate Neutrality Alliance was the comprehensive GHG emissions reduction strategy, called the Climate Neutrality Roadmap (Roadmap). The Roadmap serves as a companion document to ASU's Climate Action Plan and helps to enable ASU's leadership to make informed decisions along the university's pathway to climate neutrality. The Climate Neutrality Roadmap offers ASU a pathway to reach the established targets through various strategies and projects associated with building energy conservation and efficiency, infrastructure improvements, renewable energy supply and transportation initiatives.

Starting in June 2013, on behalf of Ameresco, Mark led a team of 30 professionals to work closely with ASU to develop a comprehensive Climate Neutrality Roadmap for the university.

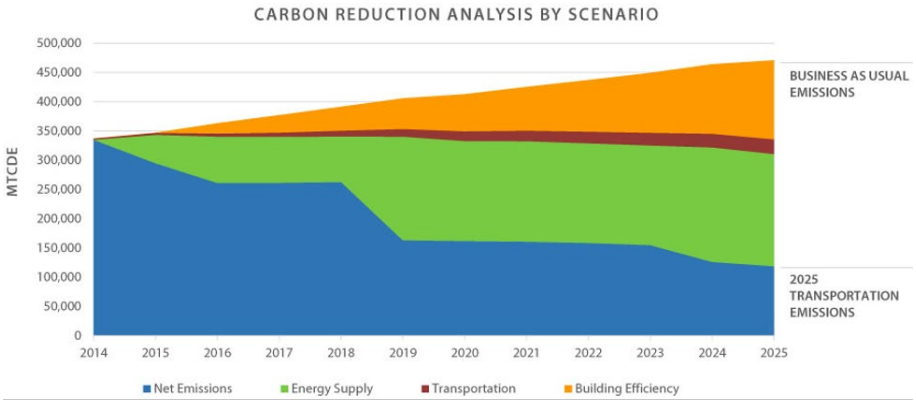
Process Undertaken

The road mapping process included:

- Stakeholder interviews to understand key goals, obstacles, and opportunities
- In-depth review of pertinent documentation
- Characterization of building and central plant performance load shapes
- Development of baseline and climate neutral modeling scenarios
- Review by industry subject matter experts
- Assessment of 23 million square feet of buildings, fleet, infrastructure, and supply assets
- Regular meetings to address buildings, infrastructure, supply, transportation, and institutional initiatives
- Site visits and energy modeling of discrete buildings and plant assets
- Use of portfolio assessment modeling and microgrid assessment modeling tools
- Identification of discrete and bundled projects
- Evaluation of enabling project delivery and project financing methods
- Understanding of political and regulatory obstacles and opportunities
- Evaluation and improvement of institutional organization, policies, programs, and procedures that would help enable project implementation
- Understanding of facility condition index and deferred maintenance for all assets
- Understanding of onsite and offsite renewable energy and carbon offset project opportunities

Roadmapping Process Highlights

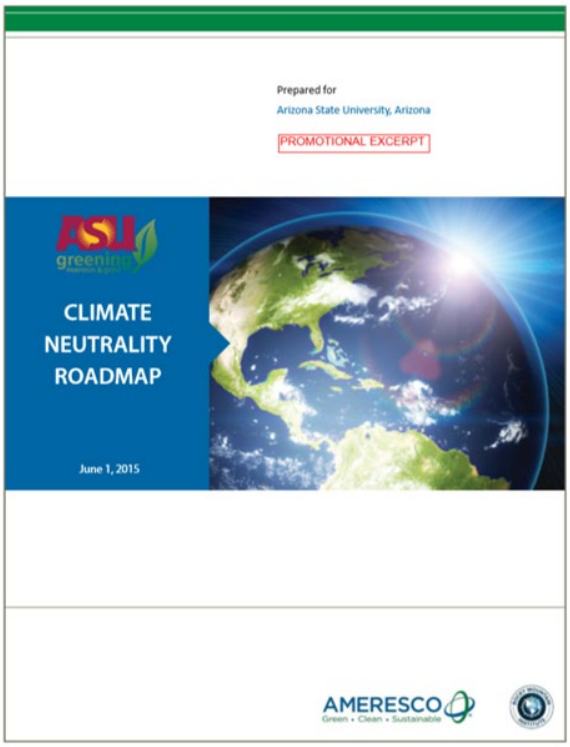
- Assessment of 23M ft^2 of ASU assets
- Energy modeling of discrete buildings and plant assets, characterizing building and central plant performance load shapes
- Scope 1,2 and 3 GHG emissions analysis
- Engaging 20 project leadership stakeholders
- Planning project phasing & bundling



The Climate Neutrality Roadmap for ASU addressed Scope 1, 2, and 3 GHG emissions for over 23 M ft^2 of buildings, infrastructure, supply assets, fleet, and commuting.

Roadmap Deliverable

The Roadmap detailed a path to drive ASU to achieve zero net greenhouse gas emissions for all operations by 2035 (including Scopes 1, 2, and 3 and de minimis sources).



The Roadmap deliverable covers:

- Comprehensive GHG emissions baseline and project baseline increases through 2025 and 2035
- Technical analysis and list of potential projects/carbon reduction measures (CRMs) and associated funding structures and/or investments required to meet climate goals
- Life Cycle Cost Analysis, strategic project bundling, and cost optimization projections for recommended projects, including an analysis of the why and when of proposed projects/initiatives and the who, how, and when the projects will be achieved
- Technical implementation plans for Buildings, Electric Supply and Infrastructure, Transportation, and Institutional Initiatives
- Recommendations for implementing demand-side initiatives, supply-side initiatives at grid and microgrid level, and utility-grade renewable energy production
- Identification and engagement of strategic partners
- Recommendations for engaging the University research community and students
- Recommendations to lead efforts to modify statutory, regulatory, and policy changes
- Recommendations regarding operational and organizational structure, policies, programs, and procedures to enable the implementation of projects
- Recommendations regarding funding sources and deal structures to better enable project implementation

> The ASU Climate Neutrality Roadmap offers deep technical insight, recommendations for next steps and implementation of campus improvements as well as recommendations for external policy and regulations that impact ASU's goals. Moreover, the Roadmap contextualizes ASU's goals, commitments, and course of action within the broader climate change imperative, in both macro and local considerations.

The ASU Climate Neutrality Roadmap provided ASU with an implementable plan to reach climate neutrality at a lower net present cost than the Business-as-Usual scenario. This was the first time any team members had seen such a result. As a result, ASU reached carbon neutrality for campus operations in 2019, which was six years earlier than planned.