

LEGACY *of* DISCOVERY  
— in —  
SUSTAINABILITY

Thriving today  
**protecting  
tomorrow**

In 2004, Arizona State University President Michael Crow convened a meeting in Temozón, Mexico, that mobilized a small but distinguished group of intellectual leaders who were exploring a new idea—sustainability science.

These scientists and practitioners gathered to consider how a large, public research university could best commit itself to sustainability as a core value in its teaching, research and outreach activities. Universities have always played a role in finding answers to critical issues, but solving highly complex, global-scale sustainability challenges requires fundamental change.

ASU is firmly grounded in the belief that sustainability—in the context of people, the environment and the economy—should transcend all academic disciplines. In 2004, the university launched the Julie Ann Wrigley Global Institute of Sustainability with a \$15 million gift from Julie Ann Wrigley.

Building on ASU's foundational expertise in sustainability-related disciplines, the institute provides a hub for supporting research, education, outreach, solutions and operations. Approximately 375 faculty members from across the university now hold joint appointments as sustainability scientists and scholars, embedding sustainability in every school and college at ASU. In addition, the institute connects researchers with practitioners from business, industry, municipalities and government to collaborate on solutions for sustainability challenges.

## Leading by example

ASU's sustainability operations and practices serve as a model to other institutions around the country.

- The university's comprehensive solar energy program provides a total solar generation capacity of more than 24 MW equivalent.
- ASU aims to eliminate 100 percent of its greenhouse gas emissions from building energy and waste-related sources by 2025, and 100 percent of its carbon emissions from transportation by 2035.
- ASU requires, to the fullest extent practicable, LEED Silver certification or better for all new university construction.
- ASU is moving toward zero waste through recycling, composting, reuse and aversion.
- Low-flow water fixtures in campus buildings use approximately 30 percent less water than their conventional counterparts. ASU composts about 12 tons of landscaping trimmings monthly.

### Solar testing lab 1992

The Photovoltaic Testing Laboratory (PTL) is established at ASU's Polytechnic campus. It is the only lab in the United States accredited for photovoltaic design qualification and type approval. In 2008, ASU-PTL joins forces with TUV Rheinland Group to form the spinoff company TUV Rheinland PTL.

### Decisions in the desert 2004

The Decision Center for a Desert City (DCDC) opens. DCDC conducts climate, water and decision research, developing tools to bridge the boundary between scientists and decision-makers. One of those tools is WaterSim 4.0, an integrated simulation model to help local water stakeholders explore decision tradeoffs for a range of climate and policy futures.

### LightWorks 2009

ASU launches LightWorks, an initiative that pulls light-inspired research under one strategic framework. The program is directed by Gary Dirks, who was formerly president of BP China and Asia-Pacific. LightWorks capitalizes on ASU's unique strengths in renewable energy fields, including artificial photosynthesis, biofuels and next-generation photovoltaics.

### A hub for urban ecology 1997

ASU becomes home to the Central Arizona-Phoenix Long-Term Ecological Research (CAP LTER) program, led by ASU ecologist Nancy Grimm. CAP is one of only two LTER sites funded by the National Science Foundation that specifically studies urban ecology. Since its inception, CAP LTER scientists have made impactful discoveries that have shaped the field of ecology. (see story p. 34)

### First School of Sustainability 2006

ASU establishes the first-ever School of Sustainability in the United States as part of the Julie Ann Wrigley Global Institute of Sustainability. In 2007, the school welcomes the nation's first master's degree student in sustainability and in 2008 honors its first graduate.

### A plastic problem 2010

ASU engineer Rolf Halden finds that plastic in the world's water sources poses hazards to human health and the ecosystems we depend on. His research shows that there is six times more plastic than plankton in some regions of the world's oceans. This includes patches of oceanic garbage—some as large as the state of Texas—with a high volume of non-biodegradable plastics.

### Sustainable P 2010

Phosphorus is a key component of the fertilizers used to produce our food, but it is a finite resource, and our current use is unsustainable. ASU launches the Sustainable P Initiative as a solution-driven response to what might be called "the biggest problem you've never heard of."

### Save the whales 2012

Leah Gerber, a population ecologist at ASU, develops a new strategy for saving whales: put a price on them. Working with an economist and a marine scientist, Gerber proposes the use of quotas that can be bought and sold, creating a market that is economically, ecologically and socially viable for whalers and whales alike.

### Artificial leaf 2014

Working with scientists at Argonne National Laboratory, ASU chemists use X-ray crystallography and optical and magnetic resonance spectroscopy techniques to capture a step in the natural photosynthesis process in order to mimic it in an "artificial leaf." The ultimate goal of this project is to convert water cheaply and efficiently into fuel using solar energy.

### Pricing nature 2016

What is the dollar value of untouched natural resources like groundwater? ASU economist Joshua Abbott and colleagues from Yale, California State University at Chico, Michigan State University and the National Oceanic and Atmospheric Administration developed an equation grounded in economic theory to find out. In their latest study, they discover that the state of Kansas lost about \$110 million per year of capital value by depleting groundwater.

### QESST for solar 2011

ASU is chosen to lead a new national Engineering Research Center (ERC) focused on harnessing solar power in economically viable and sustainable ways. The ERC for Quantum Energy and Sustainable Solar Technologies (QESST) is led by ASU engineer Christiana Honsberg. Also this year, ASU exceeds 10 megawatts (MW) of solar-energy capacity, making it the only higher education institution in the United States to have a solar capacity of this size.

### Citizen climate science 2013

ASU climate scientist Kevin Gurney launches a first-of-its-kind online "game" to better understand the sources of global warming gases. By engaging citizen scientists, Gurney and his colleagues aim to locate all the power plants around the world and quantify their carbon dioxide emissions. The game is housed on a website called "Ventus," where people around the world can play.

### Locusts and land use 2015

ASU sustainability scientist Arianne Cease is lauded in Popular Science's Brilliant 10 for developing an integrated understanding of the ecological and socioeconomic connections between locusts, crops and livelihoods. Her groundbreaking research shows for the first time that heavy livestock grazing promotes locust outbreaks by lowering plant nitrogen content.