

Bringing Sustainability to CAP



CIVIL AIR PATROL
U.S. AIR FORCE AUXILIARY



SustainableCAPability

"Bringing Sustainability to Civil Air Patrol"

CAPStone
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Bringing Sustainability to CAP

Sustainability is the practice of meeting the needs of the present without compromising the ability of future generations to meet their own needs.

It involves balancing environmental, social, and economic factors to ensure long-term health and resilience for both human societies and the planet.

This concept emphasizes the responsible use of natural resources, minimizing waste, and promoting renewable energy, while also fostering social equity and economic stability.

Sustainability is not just about "going green"; it's about securing our future and supporting the Civil Air Patrol's everyday activities and long-term goals.

We aim to implement changes that are practical, scalable, and aligned with U.S. Air Force and Department of Defense sustainability policies.¹

At its core, sustainability ensures that the resources we use today are available for future generations. In the Civil Air Patrol, this means making conscious choices in our operations—from aviation to logistics—that minimize waste and maximize efficiency.

Sustainability Efforts and Policies

The U.S. Air Force and Department of Defense pursue various sustainability goals, which the Civil Air Patrol can adopt in the future. These goals include energy efficiency, renewable energy

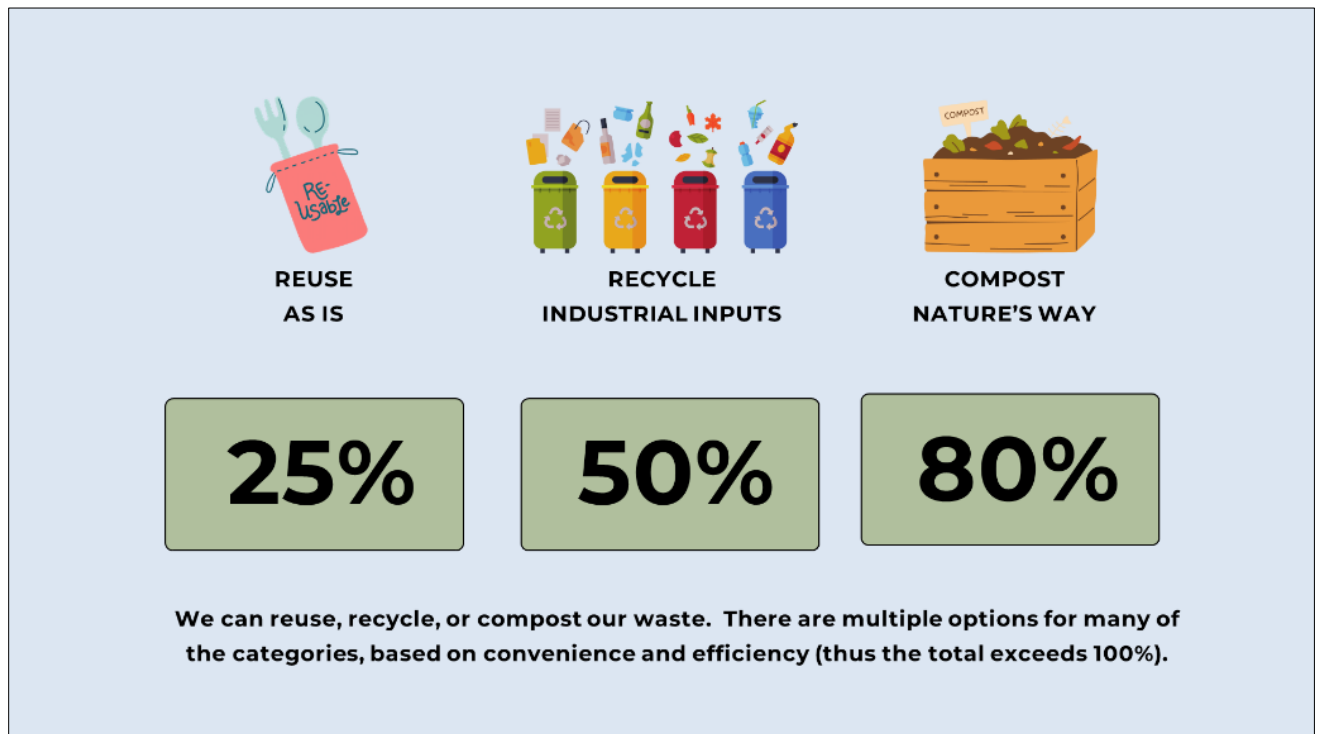
¹ See Appendix 1.

use, sustainable aviation fuel, environmental stewardship, energy resiliency and security, sustainable infrastructure, climate change adaptation, recycling, and waste reduction. These initiatives align with broader U.S. federal goals of reducing greenhouse gas emissions and enhancing resilience to environmental changes.

The Civil Air Patrol can promote energy efficiency in its operations, reduce environmental emissions, and educate cadets and members about sustainability.



events by eliminating single-use items, encouraging recycling and composting, and educating members on reducing waste in their daily lives.



Water/Waste Water

Water conservation and treatment is another area where we can improve. By collecting, treating, and reusing water more efficiently, we can lower our water consumption and operating costs. The image below shows a few examples of how we can manage water resources.



Energy Efficiency Solutions

Some of the most immediate improvements we can make involve low-cost, high-impact technology solutions. Upgrading lighting, adding caulking, installing door sweeps, and using movable insulation are simple changes that can greatly reduce energy consumption. Weatherization projects, such as improving insulation and sealing air leaks, are some of the



easiest ways to reduce energy costs. By ensuring our buildings are well-insulated and energy-efficient, the Civil Air Patrol can lower utility expenses and reduce its carbon footprint.

Below are some examples of energy-efficient equipment we can adopt.

Energy-Efficient Equipment

- **heat pumps/air conditioners**
- **water pumps**
- **refrigerators**
- **ice makers and ice houses**
- **induction stoves**
- **water purifiers**
- **waste water aerators**
- **laundry washers**
- **medical equipment**



Renewable Energy Adoption

By adopting renewable energy sources like solar and wind, the Civil Air Patrol can take the next step in its sustainability journey. These clean energy sources are becoming increasingly affordable and can help reduce our dependence on fossil fuels.

For example, the Air Force uses shelters powered by renewable energy. In the future, we may explore innovative structures like barn-shaped, cone-shaped, sphere-shaped, or pyramid-shaped buildings to enhance energy efficiency.





Portable Power Units

Portable solar-powered generators can provide renewable energy in the field. These units can be carried on backpacks and used for communication, sensors, and lighting, or they can scale up for better storage and more power. The possibilities are vast.

Solar-Powered Off-Road Bike and Trailer

The solar-powered off-road bike and trailer offer innovative solutions for remote and rugged terrain. These units are versatile, making them ideal for search-and-rescue missions, delivering supplies, or transporting communication equipment.



Disaster Response

Disaster response is a critical area where the Civil Air Patrol can incorporate sustainability. By using portable solar units, electric vehicles, and renewable energy-powered shelters, we can enhance our ability to provide long-term support during emergency operations.

Aerospace: Communications, GPS, Weather, Imaging



Sustainability in Aerospace

Sustainability in aerospace includes using solar-powered space craft for communication, GPS, and weather imaging. These craft can fly for long durations without fuel, providing essential information. Small solar-powered drones can also be used for search-and-rescue operations, delivering supplies, and gathering data in inaccessible areas.

Future improvements may include advanced sensors to assist in complex missions and long-duration drones equipped with solar panels. These drones will be critical for future CAP aviation operations, staying airborne for extended periods and providing information and support without traditional fuel sources.

Electric Aircraft

The U.S. Air Force, Space Force, and Civil Air Patrol can also explore electric aircraft and hybrid systems. These will require charging infrastructure. Investing in solar-powered charging stations for our aircraft will ensure operational readiness while reducing and eliminating reliance on fossil fuels.



One example is a solar-powered plane that has been operational for over two decades.



Next Steps

Our suggested next steps include defining Civil Air Patrol policy, creating a task force, increasing education efforts, conducting audits, and launching pilot programs for wins. Our reliance on fossil fuels can be replaced by renewable energy within a 10-year timeframe, funded by using fewer resources than we do now.



Resources and References

Sustainability

<https://www.sustainablejack.com>

Sustainable NASA “Preserving the Cosmos” 1:48

<https://www.youtube.com/watch?v=s1oCsdXRyaY&t=9s>

Electric and solar aircraft

First sunseeker duo flight. 3:49

https://www.google.com/search?client=safari&rls=en&q=Sunseeker+duo+pic&ie=UTF-8&oe=UTF-8#fpstate=ive&vld=cid:123f208f,vid:cbDv38aI_l8,st:0

Electric Beaver Amphibian 36:15 <https://www.youtube.com/watch?v=GvKm6rp9tyg&t=120s>

P 2 Xcursion Amphibian. 5:35 https://www.youtube.com/watch?v=0a-7FY33y_I

USAF electric dreams video. 15:50 <https://www.youtube.com/watch?v=Xug8WE2qJoU>

Regent Seaglider. 1:23 <https://www.youtube.com/watch?v=Ka1GpNGdjXM>

Elon University Drone day presentations 2021, 2022, 2023 webpage with videos 25,34,27 min.

<https://www.elon.edu/u/academics/communications/elon-drone-day/2023-elon-drone-day/>

6 seat Solar Aircraft concept video. 2:06 <https://www.youtube.com/watch?v=h-4bwyR5SvU>

These Smallest eVTOLs are the Future Ultralight Aircraft 18:59

<https://www.youtube.com/watch?v=p5EVP7FmuSw>

Solar Drone article

<https://www.maxongroup.com/en-in/knowledge-and-support/blog/xsun-a-self-contained-solar-powered-drone-172862>

Drone in a Box article <https://www.commercialuavnews.com/international/sky-solutions-offers-an-autonomous-solar-powered-drone-in-a-box>

Zipline drone video. 11:28 “

<https://www.youtube.com/watch?v=4C8s6CmcJcQ>

Electric Search and Rescue

Electric Search and Rescue Light Electric Vehicles. 1:24

<https://www.youtube.com/watch?v=8yM7rYa9zp4>

Search and Rescue E-bike Team. 2:13 “

<https://www.youtube.com/watch?v=twkNoXlgsKY>

Light Solar Vehicles PowerPoint

Appendix 1



U.S. AIR FORCE

The **U.S. Air Force (USAF)** has a strong commitment to sustainability, reflected in its various policies and initiatives. The Air Force emphasizes sustainability as part of its mission to ensure energy security, environmental stewardship, and readiness for future operations.

Key elements of the USAF's sustainability policy include:

1. Energy Efficiency and Renewable Energy

- The Air Force seeks to reduce its reliance on fossil fuels by increasing energy efficiency and adopting renewable energy sources.
- USAF is investing in **solar, wind, and geothermal energy** projects on its bases to reduce energy consumption and enhance resilience to energy disruptions.

2. Sustainable Aviation Fuel (SAF)

- The USAF is exploring the use of **sustainable aviation fuel** to decrease carbon emissions from its fleet.
- It partners with industry & research institutions to develop alternative environmentally friendly fuels.

3. Environmental Stewardship*

- The Air Force integrates **environmental protection** into its operations by managing water resources, waste, and hazardous materials responsibly.
- USAF adheres to strict environmental regulations to minimize its impact on air, water, and land.

The Air Force also engages in **habitat and species conservation**, especially on or near its installations.

4. Energy Resilience and Security

- To ensure operational readiness, the USAF focuses on **energy resilience**, ensuring that critical missions can continue in the event of power disruptions.
- It works to secure its energy infrastructure, such as installing microgrids and on-site energy generation systems, to reduce vulnerabilities.

5. Sustainable Infrastructure

- The Air Force is committed to constructing **energy-efficient buildings** and retrofitting existing structures to meet modern sustainability standards.
- The Air Force Civil Engineer Center (AFCEC) leads efforts to ensure that new infrastructure incorporates green building standards like **LEED (Leadership in Energy and Environmental Design)**.

6. Climate Change Adaptation

- The USAF recognizes climate change as a threat to national security and is working to **adapt its operations and infrastructure** to the changing environment.

- The Air Force's efforts align with broader Department of Defense (DoD) policies, which prioritize resilience to extreme weather and climate-related risks.

7. Recycling and Waste Reduction

- The Air Force promotes **waste reduction, recycling**, and responsible disposal of hazardous materials as part of its everyday operations.



The USAF's sustainability efforts are part of a larger **Department of Defense (DoD) strategy** to reduce the environmental impact of military operations while maintaining mission readiness. These initiatives are consistent with the **U.S. federal government's broader goals** for reducing greenhouse gas emissions and enhancing resilience to environmental changes.



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