



# ANTARES E<sup>2</sup>

Being there  
when it matters.

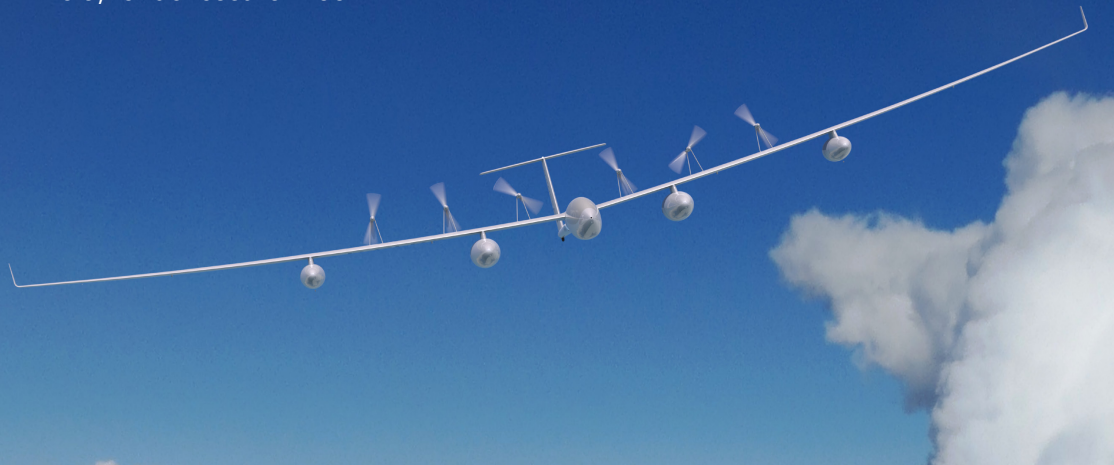


GOING FURTHER  
GOING SAFER  
GOING GREENER  
GOING NOW

FACTSHEET  
SUSTAINABILITY

**GOING FURTHER**  
**GOING SAFER**  
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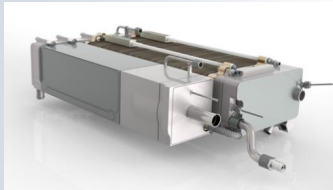
- CO2 neutral flight operation
- Emission-free
- Methanol from renewable resources
- 40 kW clean propulsion energy
- € 5,40 fuel cost for 100 km



# Facts & Figures Sustainability

## Hybrid electric drive system

The Antares E2 is the first small scale production and orderable aircraft in commercial aviation with a hybrid electric drive. A high power density enables the vision of electric flying with big payload. As a drive, the aircraft has six electric motors and just as many fuel cells to generate electricity. The electricity generated by the cells is used via a load control system as an alternative to charging the batteries and powering the motors.



Electric drives are very low maintenance and efficient in the use of resources. The low number of moving parts and low vibrations lead to little wearout of components. The total energy use is clearly superior to conventional combustion systems

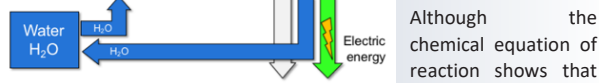
## Environment and emission

The Antares E2 is quiet and clean, free of pollutants and produces barely audible noise. Neither nitrogen oxides nor particulate matter are emitted. The CO2 balance is neutral (depending on the mode of production of the purchased methanol). The noise development of an aircraft is essentially due to the engines and to the sounds of the flow of air around the aircraft. Due to the construction as a motor glider the basic noise is minimal. The electric motor as a drive is far ahead of combustion engines or steel engines even in this discipline.

## Hydrogen and methanol

The use of methanol is a very cost effective solution, and considers at environmental aspects. The Antares E2 uses fuel cells from SERENERGY, the cost of fuel is 60% lower than the comparison costs with diesel.

With the use of methanol, a flight can be completely CO2 neutral. Because no fine dust is emitted during operation, the contrails are clearly reduced and barely visible. Methanol is also clean (depending on the type of production) compared to using pure hydrogen.



At the end, the same amount of CO2 is extracted from the ambient air during the production of methanol from hydrogen (electrolysis) and artificially "bound" to the hydrogen.

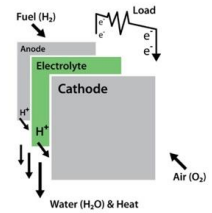
The overall efficiency of energy utilization is significantly better with a hybrid electric drive than with conventional drives. Of the total energy used, more than 50% will be in the drive.

## Methanol and sustainability

Methanol can be obtained in several variants. The industry distinguishes three different origins:

"Black methanol": Black methanol is extracted from coal. China, which consumes about 30% of world production, produces 75% of its methanol from coal.

"Grey methanol:" Grey methanol is extracted from waste and recycled products. Grey methanol is renewable as far as it can be recovered from waste. Nevertheless, it is not sustainable in the ecological sense.



"Green methanol:" Green methanol is the truly sustainable solution. It can alternatively be generated from the utilization of biomass or arises from the sustainable use of surplus renewable energy (wind power, solar power) through electrolysis.

## Low noise

The Antares E2 flies very quietly. The typical noise levels for commercial aviation during takeoff and landing are not so significant here. But for the monitoring of public events (festivals, Oktoberfest, demonstrations, ...) the low-noise operation is a great advantage over the helicopters typically used here.

Verkehrsflugzeug (Airbus A300, TO)	89 db*
Kleinflugzeug (Cessna 208B)	84 db*
Hubschrauber (Sikorsky S-76C, TO)	96 db*
Antares E2 (TO)	<65 db**

\* TO = take off noise level, FAA Study AC30-1, 2012 \*\* calculation

Due to the tremendous stamina, you can carry out such event observations with the Antares E2 without interruption, including the access and departure routes in their entirety and all at once.

## Longevity and vibration

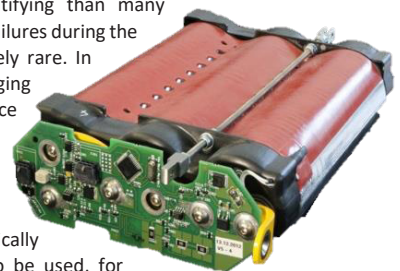
The design of the machine is a major contribution to sustainability in aviation. The extremely low-vibration electric motor stresses the statics and the molding compound significantly less than with conventionally powered aircraft.

The maintenance and test cycles for engine, fuselage, wings and internals are reduced to a fraction of the previous effort. This saves on the one hand costs for the operation and brings on the other hand a sustainable use of materials and resources.

## Battery and disposal

What is the environmental impact of the batteries? Is an environmentally friendly disposal of the electrochemical storage possible? And how relevant is the recovery of raw materials?

The answers are more gratifying than many skeptics suspect. First of all, failures during the warranty period are extremely rare. In addition, weakening or damaging the battery does not force replacement. This is a problem with electric drives because it reduces the range.



But this is not technically defective. It can continue to be used, for example as a stationary buffer in the house to buffer electricity from photovoltaic systems and receive it a "second life".

The Association of Electrical Engineering (VDE) assumes in a paper that the life is extended to "20 years and more". That the batteries of electric drives are just special waste is a fairy tale. Recycling is possible and already practiced.



# GAME-CHANGING TECHNOLOGY

The Antares E2 uses a state of the art electric drivetrain consisting of fuel cells and electric motors with multiple redundancy. This yields a combination of high endurance and high reliability which means that expensive sensor-payloads can safely be carried further and longer.

Built-in capabilities for rough weather combined with the possibility of flying both manned and unmanned applications gives the aircraft a high degree of mission readiness exibility. The payload carrying capability of the Antares E2 allows the installation of a comprehensive set of sensors and communication systems, making the system well suited for a wide variety of applications.

ANTARES E2 - A GAME-CHANGER IN REMOTE SENSING.

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