

ENERGY DRONES TO UNLOCK THE POWER OF WIND IN THE ALPS

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A new wind energy technology creates a new opportunities for clean power production in areas with limited access

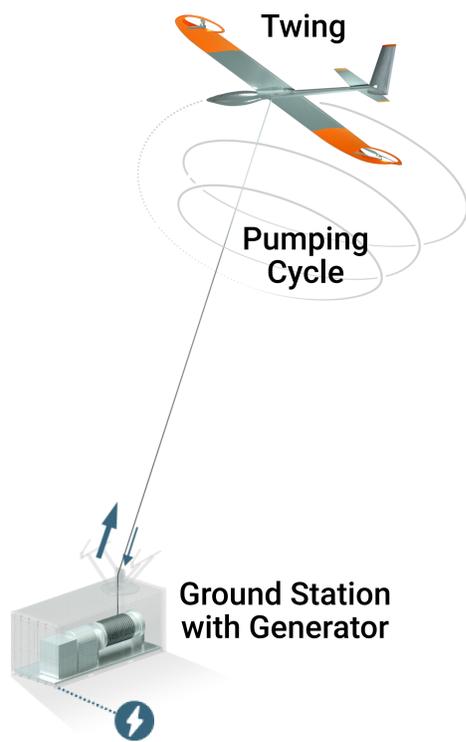
Exploiting the full potential of wind energy is crucial to speed up the transition to sustainable energy. A recent study estimates that up to 6 TW of wind energy generation is needed by 2050 to reach the climate goals, while the global installed base of wind turbines is projected to grow only to 3 TW in this time frame. Traditional horizontal axis wind turbines have limitations which restrain economically and technically their penetration potential. They are massive structures which need large trucks to be transported and huge cranes to be set up. Thus, good access roads are mandatory for the deployment of wind turbines which limit their potential in remote areas such as the Alps.

Airborne wind energy (AWE) is a novel wind energy technology. The main concept of AWE is to harness the energy of the wind with a tethered flying device. AWE provides many benefits over wind turbines: minimal material usage, mobile/compact systems, minimal structural forces and access to higher altitudes and thus better wind resources.

Redirecting forces from bending to tension is the key to optimize wind energy structures



- 1. Less material**
No tower or foundation is needed
-> 90% material reduction compared to WTG
- 2. Mobile / compact**
Easy to deploy and redeploy
- 3. High altitude winds**
Stronger winds at higher altitudes



The technical concept of AWE converges towards the autonomous energy drone pioneered by TwingTec, a spin-off from Empa and FHNW. The first product of TwingTec in the range of 100 kW will be focused on power production in remote off-grid locations, where the mobility of the system is key and where electric power is currently produced mainly with diesel generators at high costs. The system is integrated in a 20ft container. No crane is needed to set it up. The foundation requirements are minimal as no tipping moments have to be taken care of. Larger systems from 500 kW to 3 MW will serve both the off-grid and on-grid market. Using only about 10% of the material of a wind turbine, TwingTec's technology has a strong potential to reduce the LCOE of wind energy in the near future and to unlock the excellent wind resources in mountainous areas.

