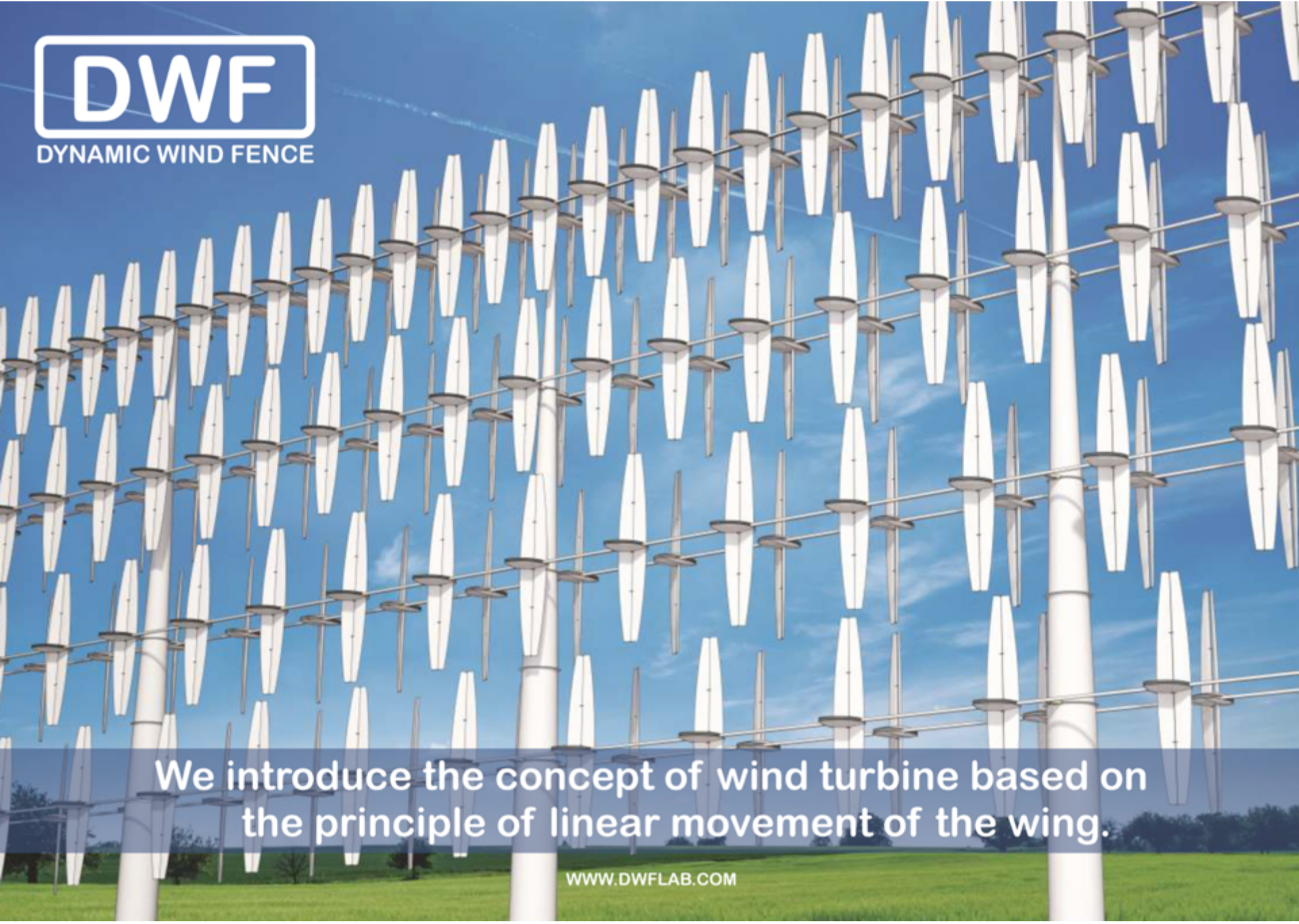
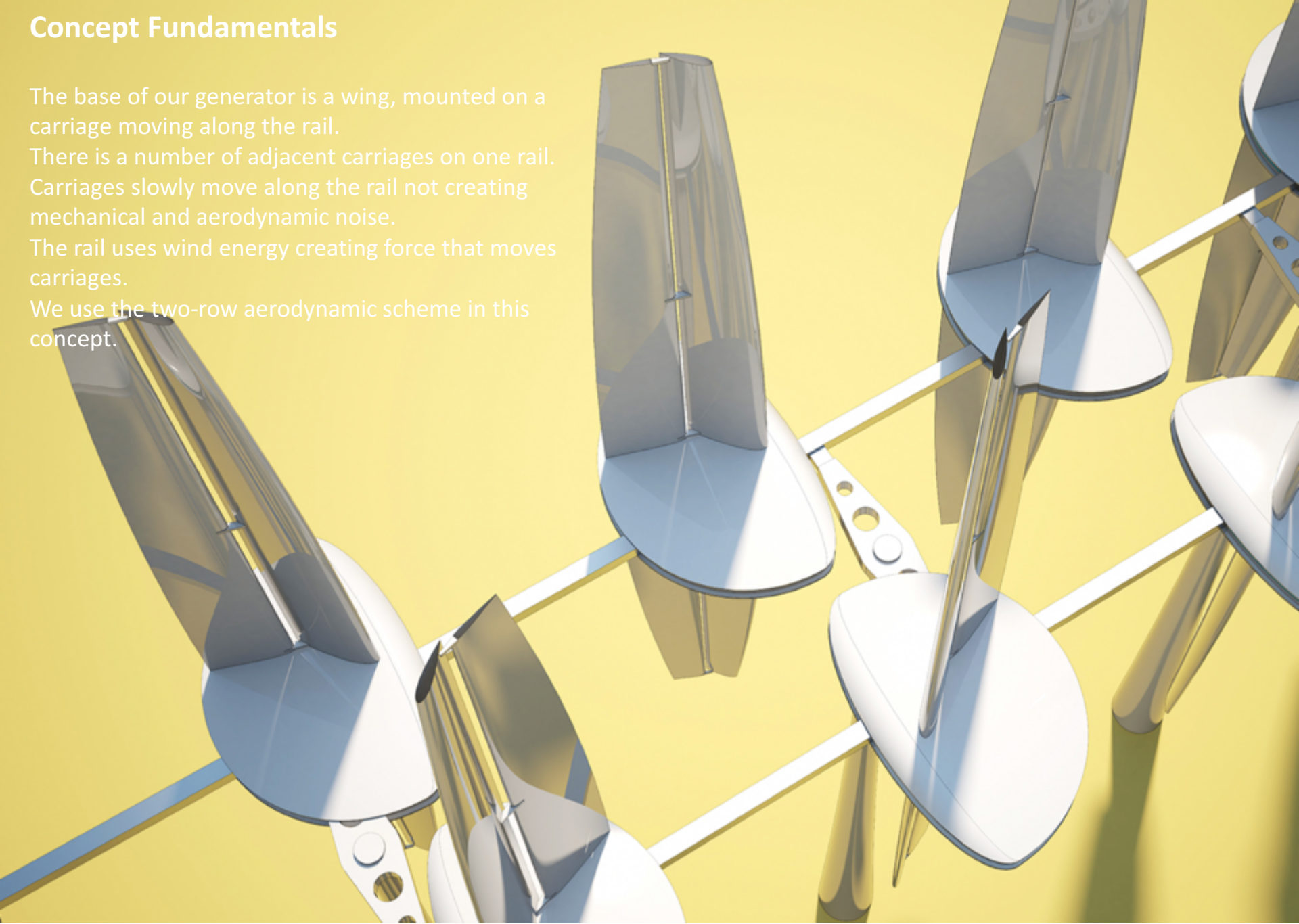
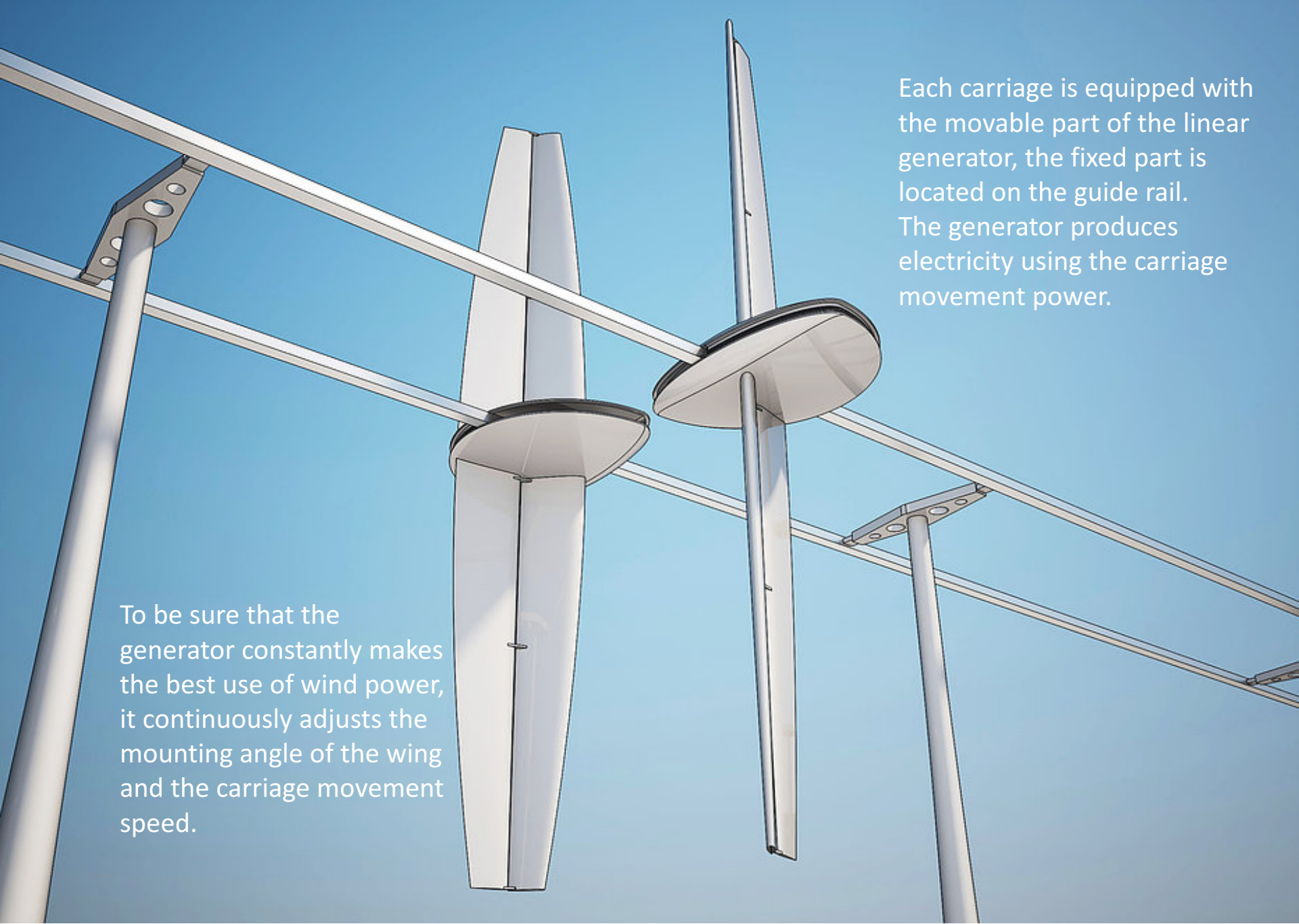
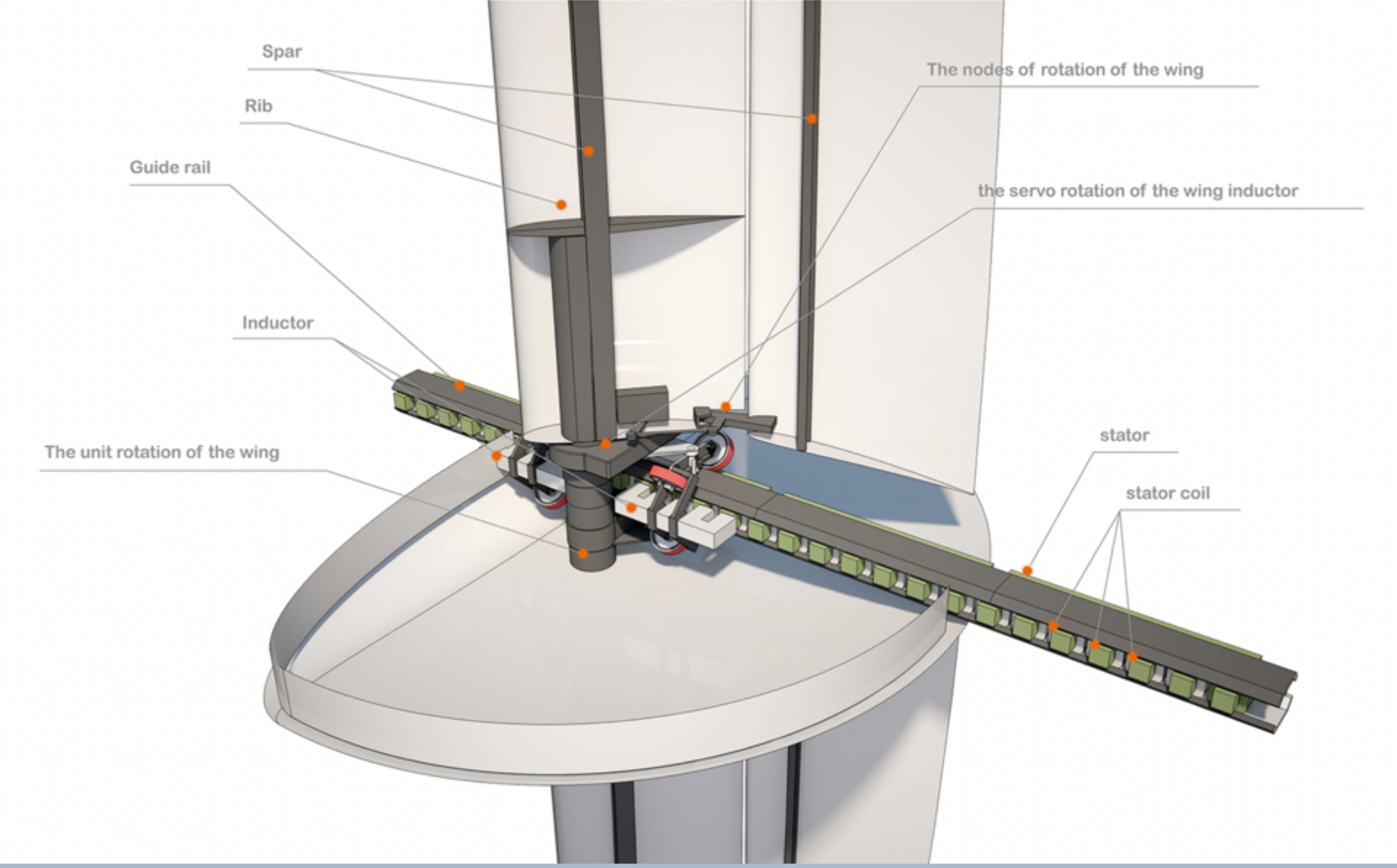

DWF
DYNAMIC WIND FENCE
We introduce the concept of wind turbine based on the principle of linear movement of the wing.
WWW.DWFLAB.COM

Concept Fundamentals

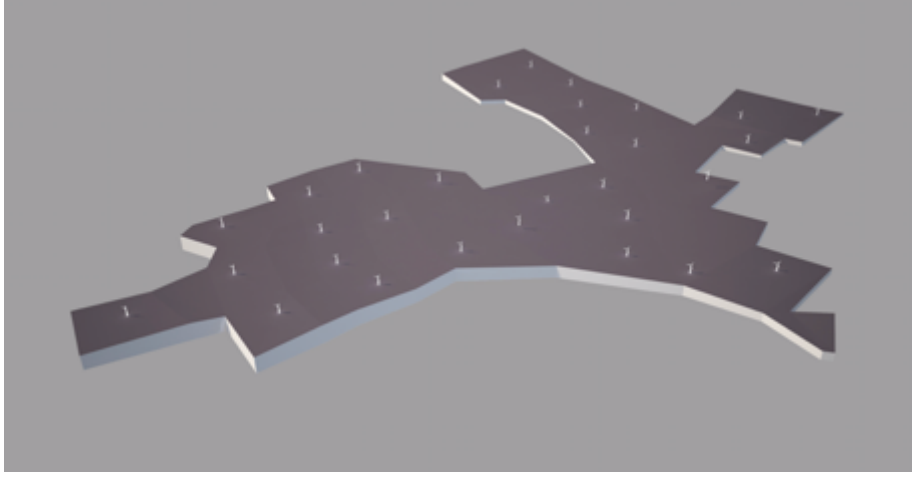
The base of our generator is a wing, mounted on a carriage moving along the rail.
There is a number of adjacent carriages on one rail.
Carriages slowly move along the rail not creating mechanical and aerodynamic noise.
The rail uses wind energy creating force that moves carriages.
We use the two-row aerodynamic scheme in this concept.

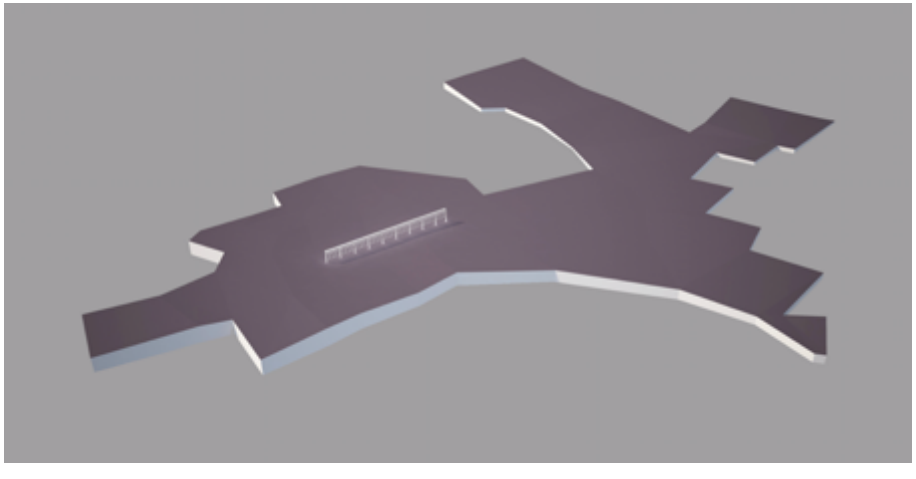



Each carriage is equipped with the movable part of the linear generator, the fixed part is located on the guide rail. The generator produces electricity using the carriage movement power.
To be sure that the generator constantly makes the best use of wind power, it continuously adjusts the mounting angle of the wing and the carriage movement speed.



The number of running carriages may be changed thus we ensure the high efficiency of the generator upon different wind conditions. The generator may continuously adjust the angles of wings depending on the wind stream, wings movement speed and the total area of working wings. Total electric power of generators is regulated and the losses caused by the low wings movement speed are prevented.





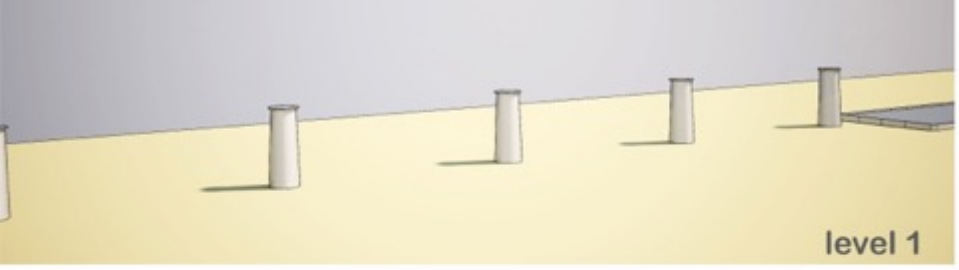
Main advantages of DWF Wind Park

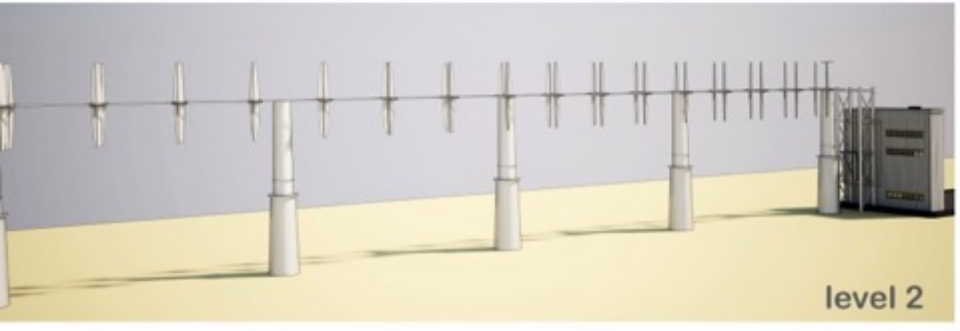
It’s capacity is the same as the one of existing wind parks

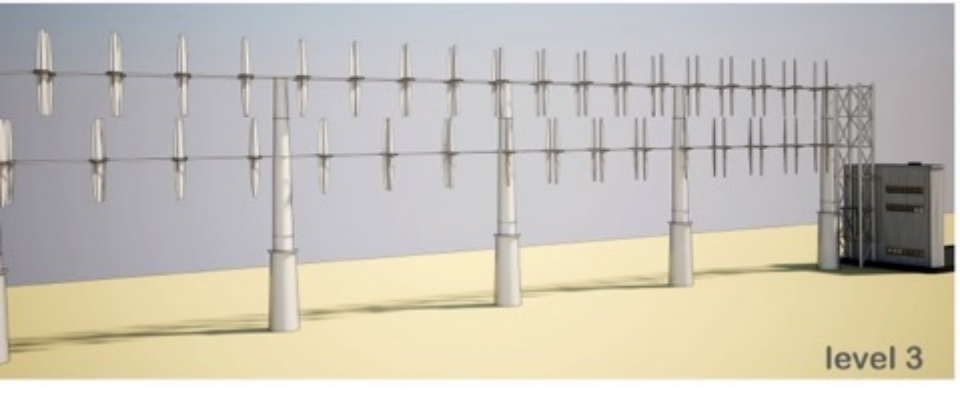
The average generator efficiency is the same as the efficiency of the best current wind generators due to the regulated working area of wings

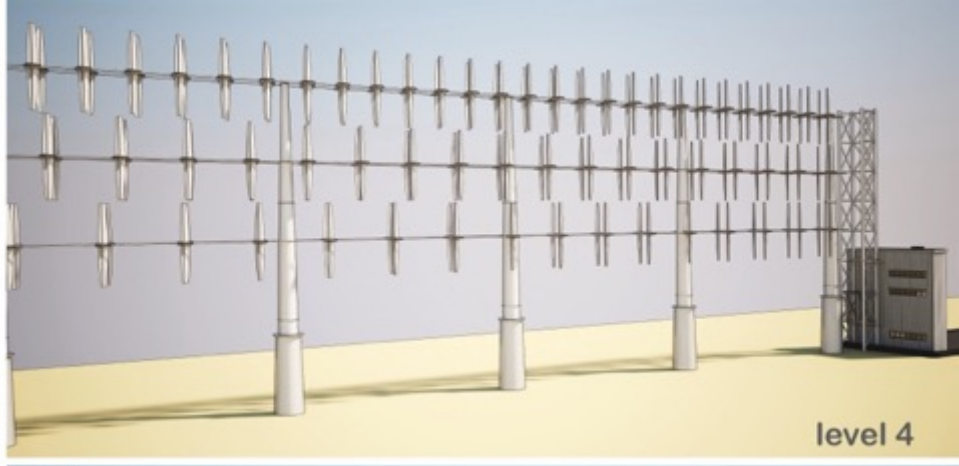
The noise level is 15% less – due to the lower wing speed ratio

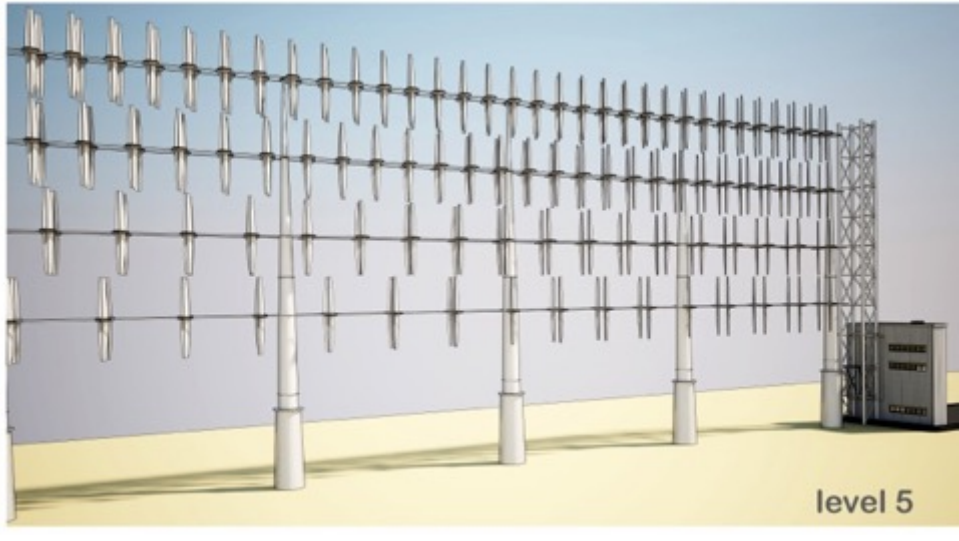
Greater convenience in use of wind park territory for agricultural purposes due to greater safety and less noise level.





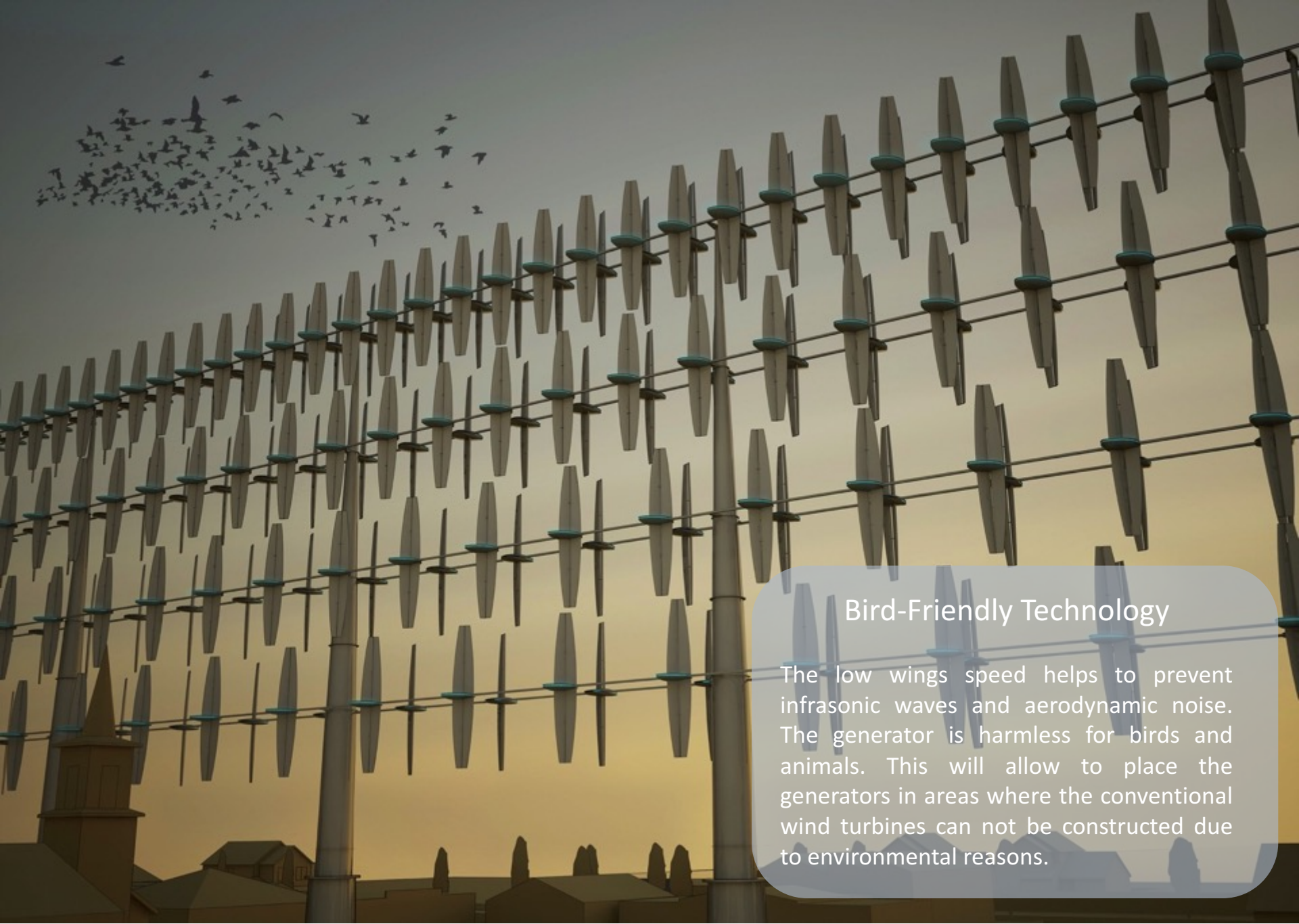






Module Technology

The generator design bases on the modular principle, allowing level-by-level construction of the generator. Even with only one level finalized the generator starts to produce energy.
These modules can form a path of any length and configuration, for any landscape.
Due to the small size and weight of modules it is easy to deliver and mount the generator, easy to maintain and repair the modules if needed.



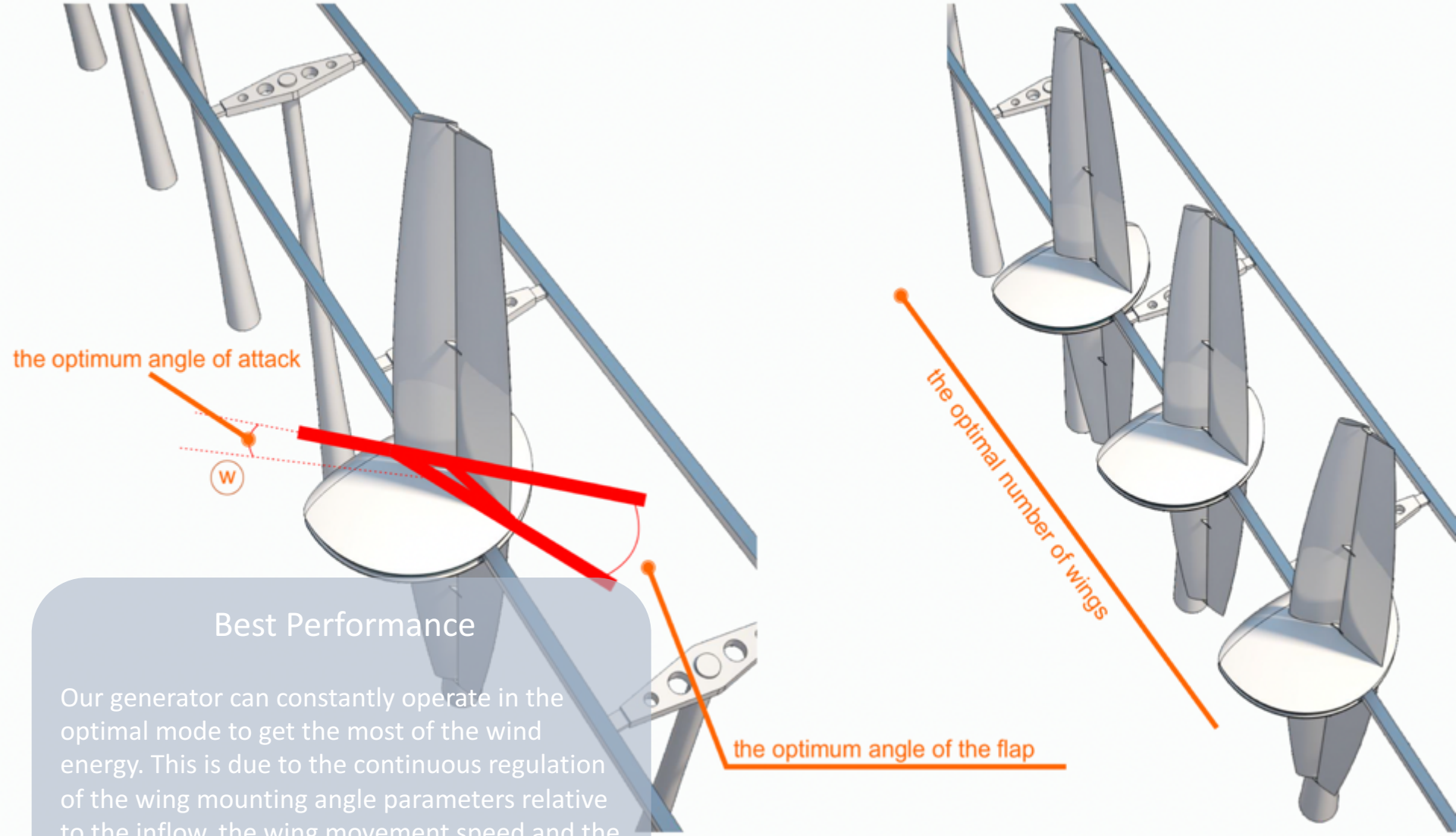
Bird-Friendly Technology

The low wings speed helps to prevent infrasonic waves and aerodynamic noise. The generator is harmless for birds and animals. This will allow to place the generators in areas where the conventional wind turbines can not be constructed due to environmental reasons.

Environmentally Friendly

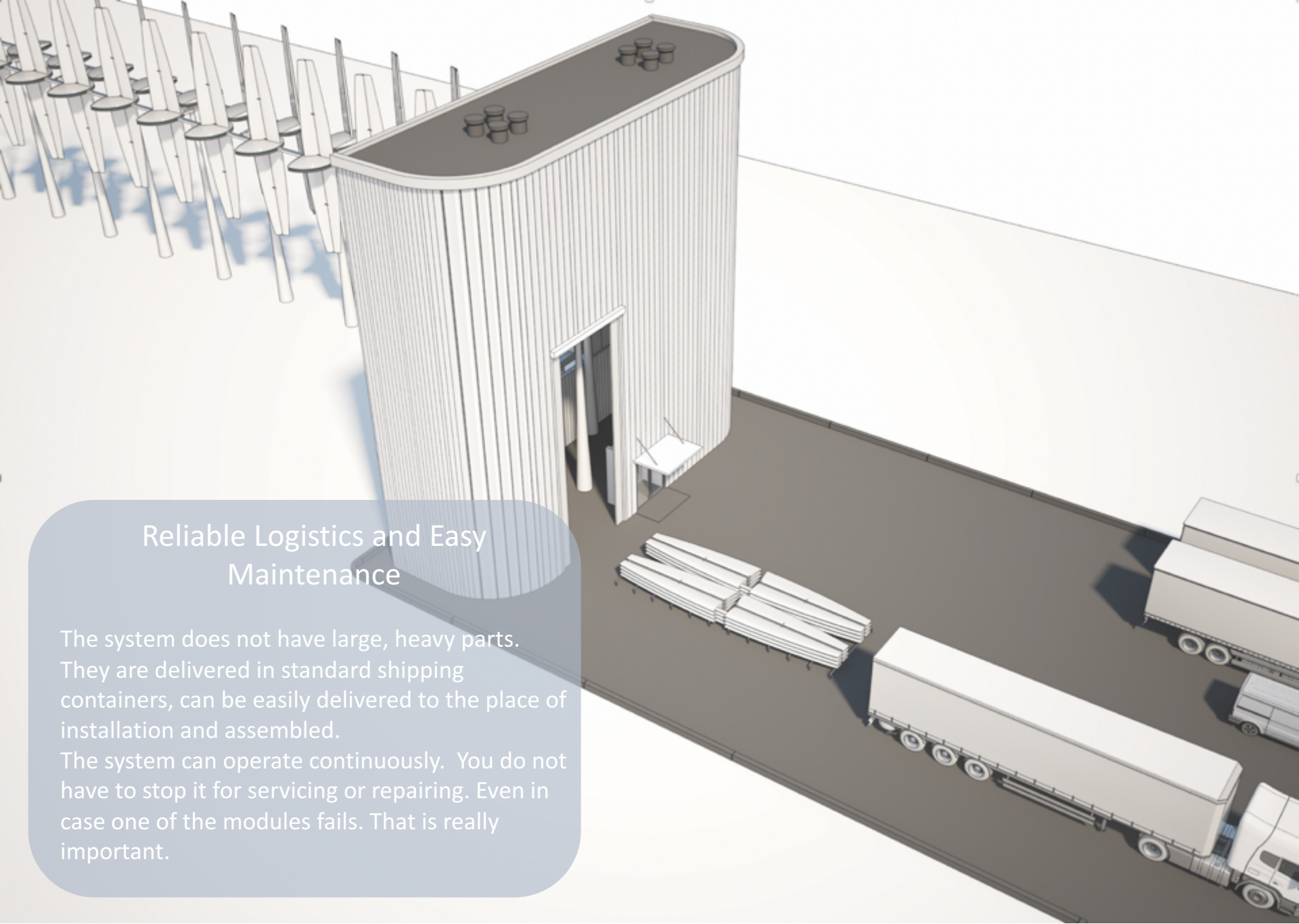
We use technologies allowing to avoid impacts on the environment that conventional generators may cause.

No need to use high strength composite materials due to small aerodynamic load per unit. Wings can be made of inexpensive, easily recyclable materials like steel, molded wood, thermoplastic, film. Hazardous chemicals are not used during production. The inductor type of the electric generator uses only inexpensive and easily recyclable materials – iron and copper. There is no need to use earth magnets.



Best Performance

Our generator can constantly operate in the optimal mode to get the most of the wind energy. This is due to the continuous regulation of the wing mounting angle parameters relative to the inflow, the wing movement speed and the number of working wings.



Reliable Logistics and Easy Maintenance

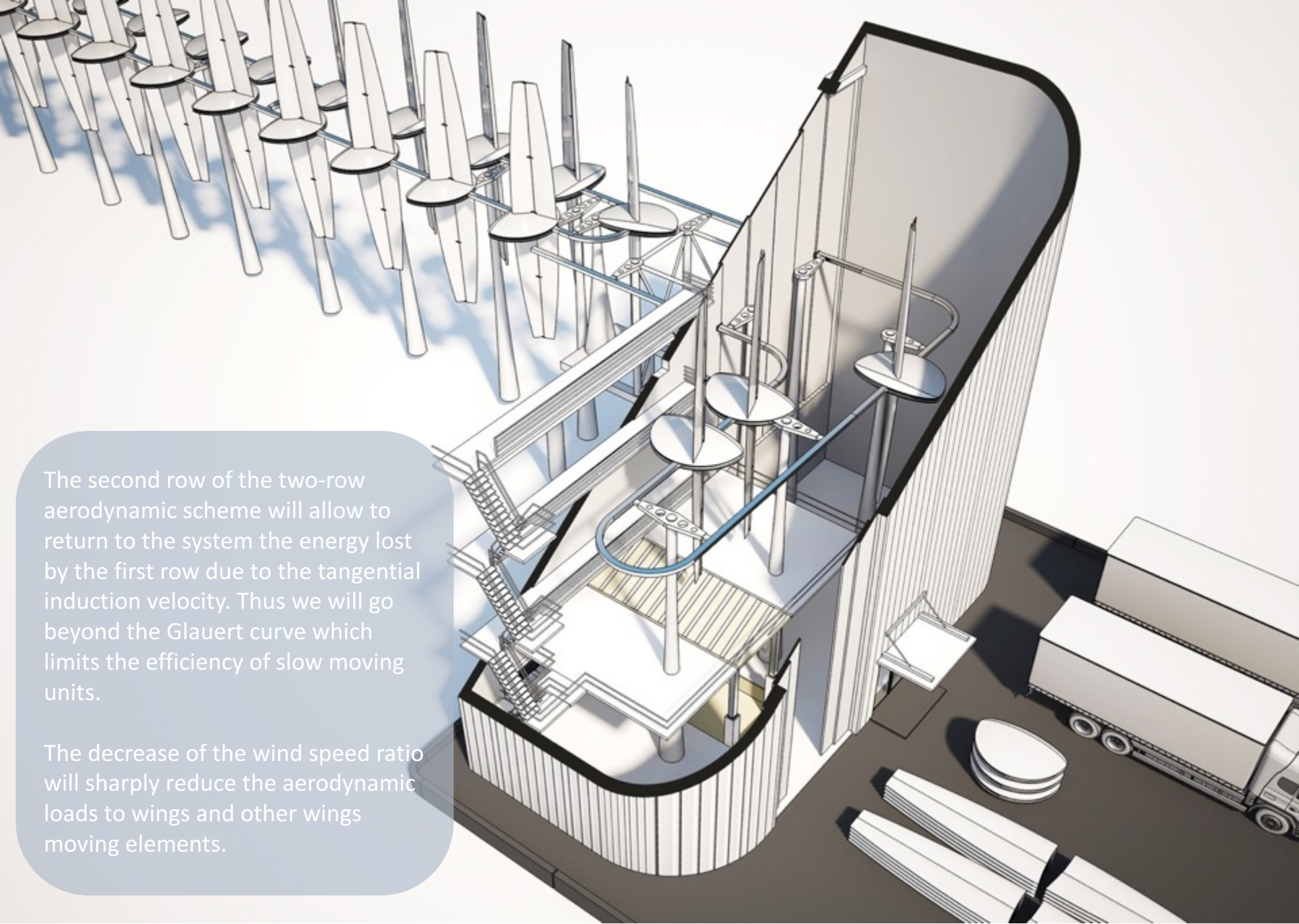
The system does not have large, heavy parts. They are delivered in standard shipping containers, can be easily delivered to the place of installation and assembled.
The system can operate continuously. You do not have to stop it for servicing or repairing. Even in case one of the modules fails. That is really important.

Smart Technologies

The generator control system uses modern microprocessors allowing to use the intelligent wing control technology.
It constantly maintains optimum mounting angles and the wing geometry, uses valve induction generator made of inexpensive materials and flexibly managed by the electronic processors.

Aerodynamic Features

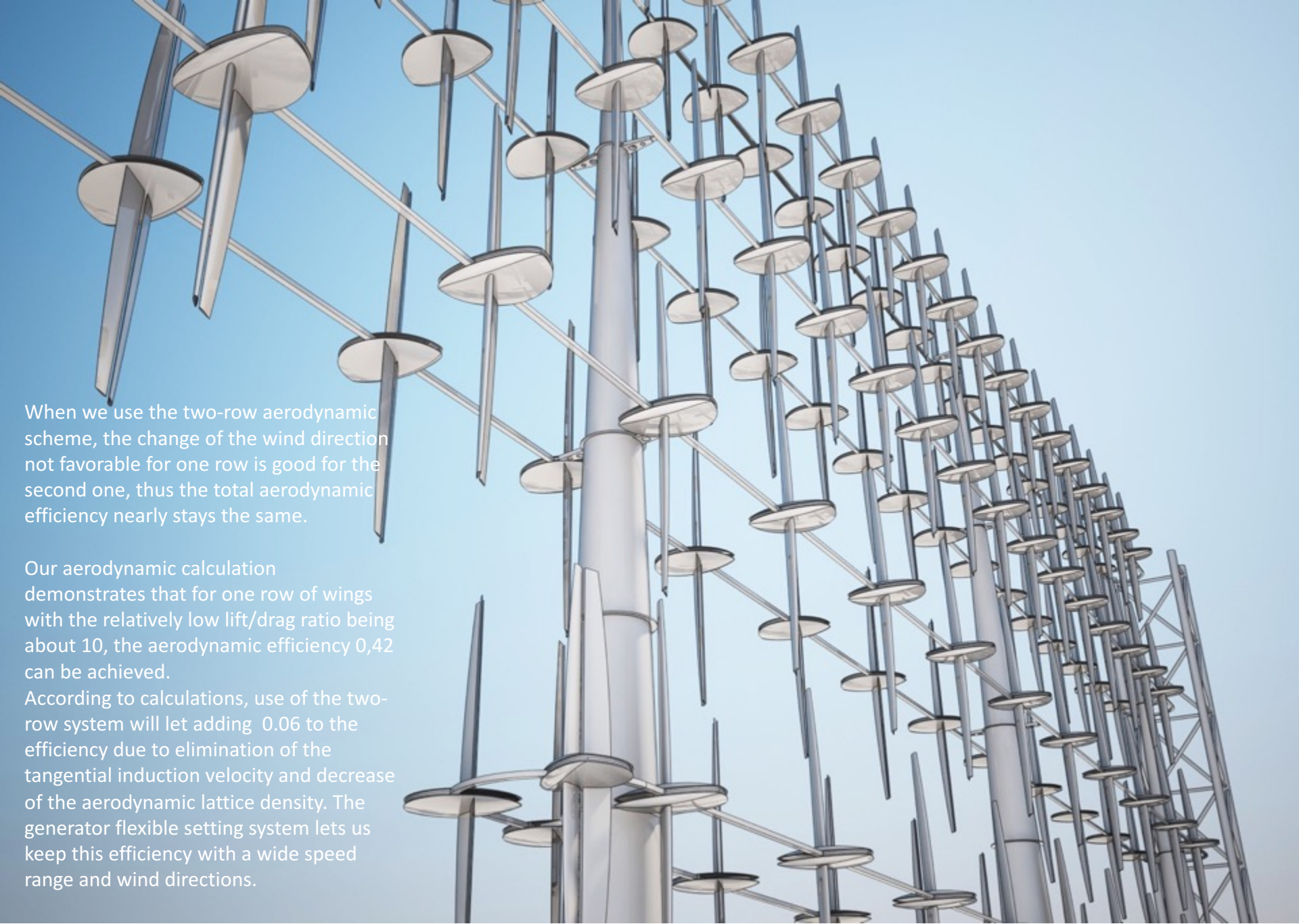
The system we offer uses a continuous wind window letting reduce the area needed for the wind park by 20….40 times keeping the same power output.
The estimated efficiency makes 0.42 for one row and 0,48 for two-row plant.
The efficiency mentioned can be maintained with a wide speed range and wind directions, due to control of wings total area. This efficiency is achieved with the low wing speed ratio causing no aerodynamic noise and being safe for birds.
There are quite low aerodynamic loads on wings and low requirements to the wing aerodynamic efficiency.



The second row of the two-row aerodynamic scheme will allow to return to the system the energy lost by the first row due to the tangential induction velocity. Thus we will go beyond the Glauert curve which limits the efficiency of slow moving units.

The decrease of the wind speed ratio will sharply reduce the aerodynamic loads to wings and other wings moving elements.

The decrease of the wing speed ratio of working wings leads to the situation when the wing aerodynamic cleanliness is no longer of high importance. Without any significant losses, we may use wings with a small wing aspect ratio, quite low accuracy of airfoil and low requirements to the wing surface quality. Combined with low aerodynamic loads it will let significantly decrease the cost of 1 sq.m. of the wing.



When we use the two-row aerodynamic scheme, the change of the wind direction not favorable for one row is good for the second one, thus the total aerodynamic efficiency nearly stays the same.

Our aerodynamic calculation demonstrates that for one row of wings with the relatively low lift/drag ratio being about 10, the aerodynamic efficiency 0,42 can be achieved.
According to calculations, use of the two-row system will let adding 0.06 to the efficiency due to elimination of the tangential induction velocity and decrease of the aerodynamic lattice density. The generator flexible setting system lets us keep this efficiency with a wide speed range and wind directions.

Concept Advantages

1. Compact size wind farm. With the same capacity of 1 sq.m. of the wind window, it may be unlimitedly lengthened without any changes of the components base. Thus the wind park has quite a simple linear configuration and the land area needed for the wind park construction is decreased by tenfold.

2. Parts easy to be transported. The largest module is 12 meters length and may be transported in a standard container or a truck body. Thus the system logistics, mounting and maintenance do not require any special operations.

3. Flexible aerodynamic setting system. The relative wing area may be changed (solidity). As you may also control the wing speed ratio and the wing mounting angle, it is possible to get the aerodynamic efficiency about 0.4 ... 0.48 with a wide speed range and wind directions.

4. Significant decrease of losses caused by the tangential induction velocity due to use of two-row aerodynamic scheme, even with the low wing speed ratio. Thus our generator is a low-speed system, which do not produce an aerodynamic noise and infrasound, safe for birds and animals.

5. Low loads per the plant units. Low load per every wing and no centrifugal loads – significant decrease of the units weight. We may use inexpensive mechanical components and manufacture wings using cheap, easy recyclable materials, for example thermoplastic.

6. Serial production of components. The system consists of a number of identical modules, which allows to organize a large-scale production of components and decrease their cost.

DWFLab Team

Viacheslav Yakymchuk | CEO project |

Roman Kozlov | Project leader |

Alexander Chapine | Aviation engineer | specialist on Aero-and hydrodynamics and composite materials

Andrey Shapoval | Aviation engineer | specialist in automation systems

Max Zhivov | Designer |

www.dwflab.com