

GIAR: A COMPARISON OF WIND FARMS

This document compares GIAR technology and traditional wind technology, highlighting key differences.

Two types of wind farms with distinct characteristics are therefore examined, which are compared under the performance, management and environmental profiles.

Visual impact is probably the main drawback of traditional wind technology. Living in an area with a high density of wind turbines is notoriously undesirable, due to the fact they have an impact from several points of view: they are invasive, noisy and dangerous for the birds and represent a real obstacle for the landscape.

Noise pollution is another major drawback of traditional wind technology. The noise produced by wind turbines can usually be heard from hundreds of meters away and can be particularly annoying and repetitive. In order not to undermine the peace of the citizens, it is in fact advisable to install wind power plants far from residential areas.

Table 1: Comparison of dimensional data

	Traditional Wind technology	GIAR Wind technology
Plant Power [MW]	30,50	30,00
Plant cost [€]	36.000.000,00	36.000.000,00
Number of Turbines [n.]	10	200
Occupied land [kmq]	2,50	0,50
Diametro del Rotore [m]	101,00	-
Front Surface Width [m]	-	8,86
Front Surface Height [m]	-	20,00
Wind area of the Plant [mq]	80.118,65	35.440,00

- Table 1 shows that, compared to traditional wind technology, GIAR technology:
 - Occupies only 20% of the land;
 - Rises only 20% of the height;
 - Has much less visual impact;
 - Does not generate noise pollution;
 - Can be implemented almost anywhere;
 - Is easily transportable by normal means of transport and on normal communication routes;
 - Can be easily installed with low-capacity lifting cranes;
 - Is very easy to be maintained, as the electrical components are at ground instead of at high altitude.

The following figures show the dimensional relationships between a wind farm with traditional technology and a wind farm with GIAR technology.

Fig. 1. Wind farm with traditional technology – Dimensions [mm]

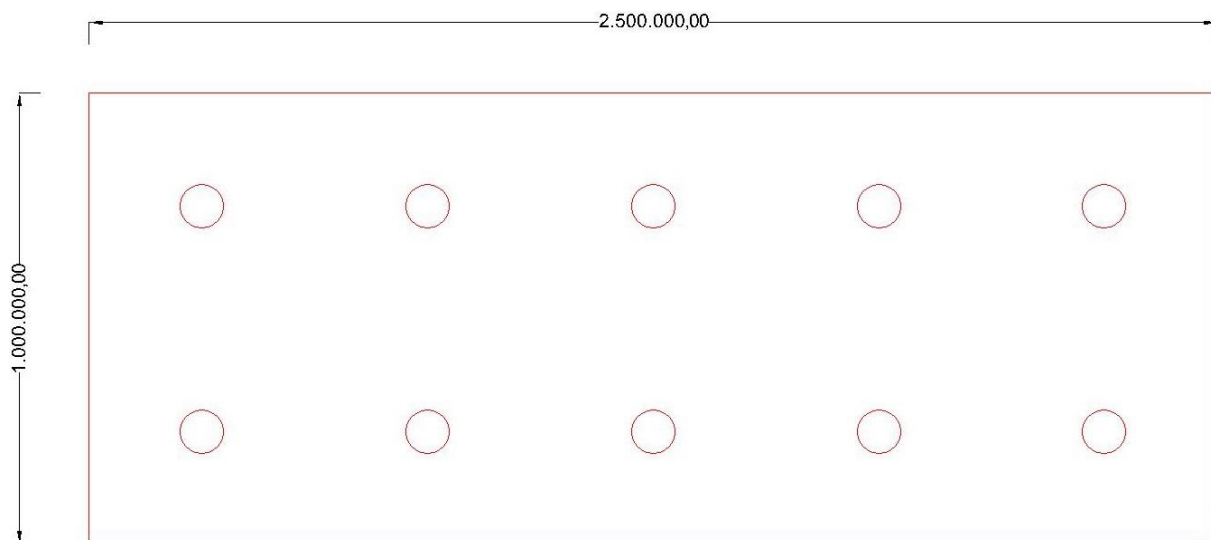


Fig. 2. Wind farm with GIAR technology – Dimensions [mm]

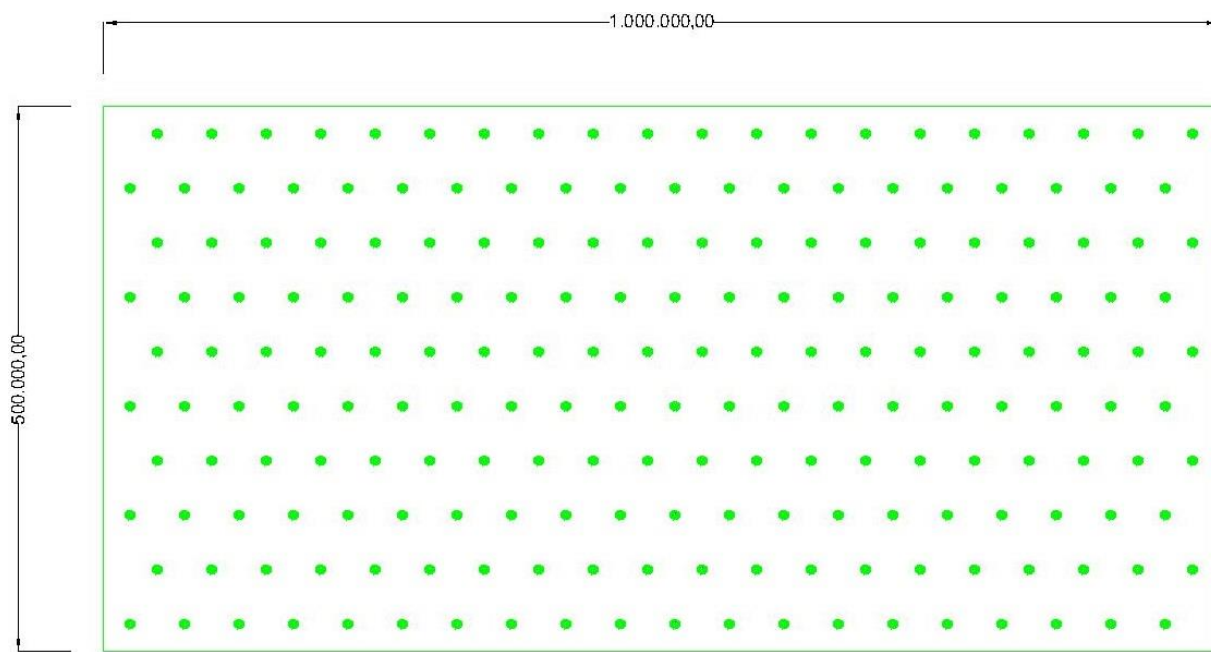


Fig. 3. Wind farms with traditional technology and with GIAR technology – Dimensions compared [mm]

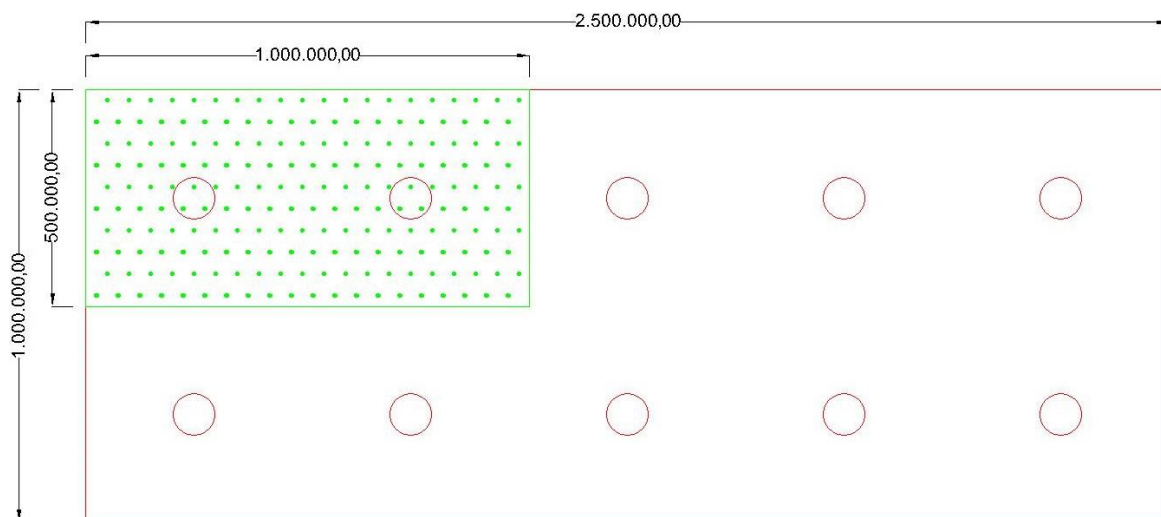


Table 2: Comparison of performance data

	Traditional Wind technology	GIAR Wind technology
Wind speed [m/s]	Power [kW]	Power [kW]
1	-	9,60
2	30,00	76,80
3	250,00	259,20
4	820,00	614,40
5	1.740,00	1.200,00
6	3.210,00	2.073,60
7	5.320,00	3.292,80
8	8.150,00	4.915,20
9	11.800,00	6.998,40
10	16.120,00	9.600,00
11	18.900,00	12.777,60
12	20.000,00	16.588,80
13	20.500,00	21.091,20
14	20.500,00	26.342,40
15	20.500,00	32.400,00
16	20.500,00	39.321,60

- Table 2 shows that, compared to traditional wind technology, GIAR technology is:
 - Active even with very low wind speed;
 - Much more advantageous in environments characterized by very strong winds.

With high wind speeds, due to the downforce that occurs on the back of the blades themselves with the air turbulence, the traditional wind blade stalls.

With GIAR technology, on the other hand, as the wind speed increases the power increases and, with it, the production of electricity: the stall phenomenon does not occur, since the turbine works with resistance and not with lift, therefore it is not sensitive to air turbulence.

Thanks to its small size and low infrastructure requirements, GIAR technology can be installed to extract energy from the wind where other technologies cannot reach.

For this reason, GIAR technology represents a valuable solution both in wind farms (for connection to the electricity grid) and in isolated or inaccessible locations (for connection to power grid or self-consumption).

The cost of GIAR wind farms is justified by their fundamental environmental advantages. In the wind power sector too, GIAR technology allows the production of renewable energy in full respect of the Environment.