



ADES DESIGN

An ADES solar park is designed to be the most efficient design of your solar project, speed and technological progress.

A RANGE OF COMPETITIVE ADVANTAGES

- Areas that integrate the most hydraulic control system and the most efficient inverter extension.
- Option to integrate the inverter extension.
- Capacity of installation (with slight extension) the tracker with ground.
- Increased reliability and robustness compared to other alternatives.
- Arrangement of modules rows in the field.

DESIGN STRUCTURAL

- Low height and minimum weight.
- Perfect stability of the assembly and increased coefficient of wind resistance for the machine, due to the lower design of panel structure.

OTHER ADVANTAGES

- Astronomical tracking system for increased focus precision and higher control.
- Minimum power consumption per machine (only one hydraulic actuator for both tracker movements).
- FLUG & PLAY machine ensures the independence of tracking movement, leaving the tracker from grid tension variations and saving base days of autonomy in a battery mode of the tracker.
- Tractor system through hydraulic technology.
- Monitoring of tracking movement.
- Density average 1 MW / 7.4 acres (3.6 ha) assuming flat land and 220m modules.
- Guaranteed stability even in conditions in which the protection systems fails due to gusts of wind of 65 mph (105 km/h) as demonstrated by tension and fatigue resistance studies carried out on each component.
- Important quality control at both internal and external levels.
- Possibility of adapting any module (standard design for panels maximum length up to 1700 mm) for other lengths please contact ADES.

FOUNDATIONS



PRODUCTION AND TRANSPORT: HIGHLY OPTIMIZED

Thanks to experience and sophisticated design, ADES trackers can easily be transported in a highly efficient process. ADES knows how to design trackers with the highest ratio (MW transported) per truck or container. For example, 10MW of trackers (371 machines) can be shipped in 40 containers. The simplicity of the different spare parts of the trackers enables ADES to partially utilize local manufacturers for welding, galvanization processes, etc.

EXTREME WEATHER CONDITIONS PACKAGE

Photovoltaic installations utilizing ADES trackers can be placed in extreme weather condition zones (frozen, snow belt or desert areas). ADES controls its adapting trackers so as to accommodate the specific conditions. The trackers are designed to clean and protect the mechanical and hydraulic elements that are in the heart (bottom) of the machine. Please contact us for more information.

FOUNDATIONS: MADE-TO-MEASURE

The tracker foundations are an important factor in successful power plant implementation. A simple geotechnical study of the land, confirming its composition (factor), will optimize foundation design and costs. With geotechnical information, ADES will generate the best foundation design addressing the specific needs of the project site.

TECHNOLOGY

Some closed down than



FAILURES

For solar trackers



ABOUT ADES

ADES is a pioneering Spanish research and development engineering firm, created in 1992, that develops proprietary renewable energy technologies that contribute to the sustainable development of the planet.

ADES has developed a range of unique, adaptable and robust solar trackers tracking over 150 MW and 5000+ trackers since 2004. ADES has achieved a strong position as international market leaders on the cutting edge of tracking technology. ADES prides itself on superior customer service and best of sector product warranties.

With a consistent commitment to developing breakthrough technologies and adding ongoing technological improvements to existing products and services, ADES delivers solar park expertise and outstanding customer service to a wide range of satisfied clients in diverse markets.



ABOUT SOLAR TRACKERS

Solar tracking is a widely-applied proven technology that increases solar park production by directing photovoltaic or concentrated photovoltaic to follow the sun along its path from dawn until dusk, capturing the maximum solar radiation for the longest time possible.

ADES TRACKERS: UNIQUE DESIGN FEATURES FOR INCREASED PRODUCTION
ADES has conducted extensive in-depth research into photovoltaic components and pre-calculated meteorological factors to determine unique design features of ADES trackers that offer important increases in production compared to fixed installation panels and other trackers.

EFFECT OF THE TRACKER ON THE EFFICIENCY OF THE INVERTER
Solar trackers make a positive impact on the total gain of the whole system, causing the inverter to work as much time as possible at a better level of performance.

For CPV trackers, please contact us.



SOME OF OURS CUSTOMERS

- AGINTA
- AMES INGENIERIA Y SISTEMAS
- AR SOLAR
- CHM - DRAGAGE GROUP
- ENDESA INGENIERIA
- DES BEMSA - GAMESA GROUP
- ICOM INGENIERIA
- IGORION
- SOLUX CORSPAN
- MATIFREX SOLAR

WARRANTY

ADES proposes a 10 year structural guarantee, and an initial mechanical 2 year guarantee which may be extended to 5 or 10 years by prior contractual agreement for preventive and corrective maintenance performed by qualified ADES technicians. Please contact ADES to discuss other available options.



PRODUCTION GAINS: FIXED PANEL vs ADES TRACKERS

LOCATION	Annual Production Fixed Panel (kWh/m ²)	Annual Production ADES Tracker (kWh/m ²)	Gain	LOCATION	Annual Production Fixed Panel (kWh/m ²)	Annual Production ADES Tracker (kWh/m ²)	Gain
San Diego CA	1548	2024	34.8%	Wilmington NC	1248	1686	35.1%
Las Vegas NV	1700	2341	37.6%	New York NY	1174	1612	37.3%
Portland OR	1300	1803	41.0%	Chicago IL	1097	1797	38.5%
Seattle WA	1276	1776	39.2%	Daytona FL	1532	2123	38.6%
Denver CO	1564	2161	38.2%	Boston MA	1359	1913	40.6%
Albuquerque NM	1759	2419	37.5%	Boston MA	1313	1817	38.4%
Oklahoma City OK	1428	1957	37.1%				
Memphis TN	1204	1791	35.3%	Toronto ON (Canada)	1176	1615	37.2%
Miami FL	1525	2067	36.8%	Ottawa ON (Canada)	1060	1715	36.0%
Charlotte NC	1347	1797	33.4%	Győrújszabolcs (Hungary)	1206	1659	40.5%



The installation of all projects varies by site and conditions and will require specific assessments of particular locations. Use only the above information as a general guide. The results are based on specific configuration (number of modules) and taking into account energy losses after the inverter.

PRODUCTS UNDER PATENTS

- ES-2004-02157
- ES-2007-00392
- US-11/214-400
- MX-PA-2005-003945

COMMUNICATIONS

Utilizing the ADES system of production, greater potential systems follow.

The control system is integration of other systems.

COMPREHENSIVE SOFTWARE PROGRAM

Our software program Software Program, the communications by

INFORMATION

The monitoring system has a configuration application that provides accumulated energy reports according to the information supplied by the system of inverters or meters connected to the communication network.

REMOTE CONTROL

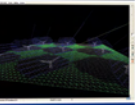
By means of a broadband internet connection, it is possible to use remote control if you were sitting in the installation control centre itself to direct tracker activity.



SHADOW PROGRAM: ADES SOLAR PARK DESIGN

A complimentary park design and shading program, available online at www.ades.es, is available to assist in the design of solar parks utilizing ADES solar trackers.

SolarFarm is a design tool for solar parks that permits the analysis of shadows thrown by a certain distribution of solar trackers to help identify terrain at any orientation, detecting any interference in the shadows thrown by a machine and machine nearby.



WORKING WITH ADES: CUSTOMER SERVICE

ADES offers the maximum level of consultation available in the marketplace from a Solar Tracker manufacturer.

SOLAR PLANT DESIGN
Customers enjoy the advice of ADES technical staff for the design of the plant (preparation of the trackers on the land).

LOGISTICS AND SCHEDULES

A reliable and reliable planning schedule is determined between the customer and ADES in order to guarantee timely deliveries and installation.

INSTALLATION

ADES will always provide a chief installation officer to train your workforce and guarantee the quality installation of your trackers.

AFTER SALES

ADES maintenance programs are available for our customers. The maintenance can be conducted by our team (or authorized staff) or by your own labor force trained by ADES experts.



PHYSICAL CHARACTERISTICS

Configuration (rows - length)	6 rows - 101 x 1,258 m
Area (area according to the module)	Up to 2708 M ² (250 m ²)
Adjustable inclination angle	Up to 40°
Annual sweep	250°
Type of tracking	Aximuthal Automatic Precision 13"
Annual energy consumption	Automatic Hydraulic cylinders controlled by control room Approximately 160 Kw/year

MECHANICAL CHARACTERISTICS

Resistance to wind	Structure designed to resist up to 32.4 mph (150 km/h) in safety position
Weight of the structure without modules	2,201 LB (850 kg)
Tracker system	Hydraulic tractor clamp

SYSTEM SAFETY DEVICES: OUR PRIMARY OBLIGATION

Current safety devices without structural damage under strong winds	Reduction of the pressure on the machine under windy conditions
Guards of wind	Solar project includes anemometer, installed
	Automatic positioning in safety position when wind speeds exceed 37.2 mph (60 km/h)
	High protection position
	Thick difficulties
Under strong weather conditions (beyond back of machine) and failure of park security systems, the structure supports up to 87.1 mph (150 km/h) (from NABE, AE 80)	

ADES reserves the right to modify the following (without structural damage) 36, 37, 32 Regulation 79, 09/12 regarding Low Voltage Electromagnetic Compatibility in accordance with 36, 300/02, which sets in accordance to 168, 46/00. Metallic structure in accordance to Norm 168/00.