

CREATE YOUR OWN WIND TURBINE INDUSTRY

CS Wind-Marine, Inc.

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Wind Industry

- Today the market is totally dominated by a very few producers.
- The delivery time for all components is at least of 16 months....
- These suppliers make the price they want and you have to accept!
- Some of the components are not of the best quality...
- And the most important component, the blades, are made by hand.
- The best qualified human labor cannot be perfect:
 - It is impossible to produce blades of more than 40 m now by hand without having quality problems.
 - We noticed frequently weight differences of some 400 kg from one blade to the other.
 And this obviously affects the wind turbine operation.
 - Bad finish is very common. The human hand is not perfect!

With our robotic system, all bad finish problems will go away! The blades will have the same weight And your wind turbine will turn round!



WIND ENERGY **MOBILE AUTOMATED FACTORY**





Wind Energy Mobile Automated Factory?

- Why CSWM Mobile Automated Factory?
 - With a global project of more than 2.000 MW the investment will represent less than 5% of the wind turbine price!
 - Mobile because it is easier and cheaper to manufacture wind turbines where you want to implement the wind farm rather than producing them in an industrial area and transport it there.
 - Automated, because you cannot always find the appropriate labor,
 - Automated for continuous high quality.
 - A factory? Because it's a better investment than paying the full price of the wind turbines you want to install!
 - Our factory will be delivered ready to work, personal trained.



Mobile Solutions

The purpose of our system is to move the construction processes to the wind farm site The facility may be completely set up and operational in 30-45 days

> The factory can produce the plugs, molds, blades, tower, nacelle and assemble all components

Floor space and vertical height required for the complete production line is about 50 x 250 x 10 m.





To avoid high transport costs





To avoid hand labor problems









Wind Energy Mobile Automated Factory?

- Why CS Wind Marine Wind Energy Mobile Automated Factory?
 - CS Wind-Marine, Inc. (CSWM) is prepared to design and develop for you, and with you, a complete wind turbine system, based on the best known technologies,
 - CSWM will provide a complete system, machinery and processes to produce the whole components on site.
 - These systems will be based on our Marine/aerospace experience.
 - Each component will be designed to be produced by robots.
 - This will be a unique system with no equivalent in the world.
 - You will be able to produce all wind turbines you need for your country, and export all over the world.

With a global project of at least 2.000 MW We can help you to create your own technology, and even more important your own industry!



Automation Solutions

- Manufacturing associated costs contribute for more of 50% of total costs for producing fiber composite products and even more for blades!...
- CS Wind-Marine, Inc. Industrial Robotic technology could reduce this cost by over half
- Bad finish will go away
- A better, constant quality, faster and at a lower cost !
- The CSWM gantry robot systems are unique
- The <u>"PFE"</u>TM technology was developed in an effort to reduce the costs







Fully Automated Blade Manufacturing System

This system will produce the plugs, molds And three complete blades every 24 hours.





Fully Automated Blade Manufacturing System

The lines will utilize twelve gantry robots and twenty four heavy lift robots on linear tracks.





Fully Automated Blade Manufacturing System

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Approximate floor space and vertical height required for the Blade production line is 50 x 150 x 10 m.





Steel tower production

To use the existing steelworks industry, we are suggesting to sub contract the rolled tower sections and only weld them on inside the mobile factory.





Nacelle production

Nacelles, made in composite, like the blades





- CS Wind-Marine, Inc. provides "turn-key" solutions
- CSWM is an affiliate of Composite Systems, Inc. who has been a systems integrator of industrial robotics since 1997
- These systems have included processes such as welding, cutting, drilling, machining, material handling, packaging and palletizing and composite lay-up.
- Our "turn-key" solutions include:
 - process concept and development,
 - selection and integration of all equipment,
 - facilities layout,
 - manufacturing,
 - installation,
 - training and support.
- All our systems are protected under a "proprietary" and "non-disclosure" agreements protecting our customers' "process and intellectual properties".



Factory Complex Configurations

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- MFC = Mobile factory Complex Container modules.
- PMFC = Permanent Equipment only, plant provided by customer to our specifications
- B = Blades Molds and blade production
- T = Tower fabrication (steel)
- MA = Mechanical Hubs, turbines, gearboxes, electrical, etc., <u>assembled from purchased</u> components and/or materials
- MM = Mechanical Hubs, turbines, gearboxes, electrical, etc., <u>manufactured under license</u>.
- 100, 200, 300, 400 = complete <u>systems</u>, annually
- We can supply with any type of factory, adapted to your requirements:
 - If you wish to employ more people we can automate less production.
 - If you wish to reduce costs, we can automate more.
 - If you wish to do both, we will work together and find the intermediate solution....



Our Blade designers

- Our engineers are experimented Blade designers
- They designed and certified the following:
 - Rotor blades design of GE37c, GE43
 - Certification of GE37c, GE48
 - NV Certification PMC 25.8
 - Design improvement on Noise related problems of rotor blades.
- Technology transfers
 - 2x GE37c to Brazil
 - 2x 40mtr+ to Germany
 - 2x GE37c to USA
 - 3x GE37c + 1x GE34c to China (via USA)







• ELICSE INTERNATIONAL will be in charge of the Project Management:

- Follow-up of the project
- Coordinate:
 - Design and development,
 - Systems delivery, installation and Training,
- Organizing the systems maintenance.
- Our supply will be complete:
 - Wind turbine design
 - Mobile and Automated Factory
 - Equipment and tooling
 - Production technology
 - Wind turbine technology and calculations
 - Wind turbine Components
 - Rotors (blades) Design
 - Documentation
 - Measurements
 - Training & Support



Conclusion

- We are totally flexible and we can supply you with what you want:
- The <u>automated and mobile factory</u>, to produce:
 - your own Plugs, molds and blades
 - the tower,
 - the nacelle,
 - And all turbine components
- Or the complete <u>automated equipment only</u>, to produce them inside your actual factory.
- Our systems allow to produce wind turbine faster and produce electricity sooner.
- Our factories have a total flexibility, being modular, they can produce any size of blade.

WE CAN SUPPLY YOU WITH THE WHOLE TECHNOLOGY AND SYSTEMS TO PRODUCE YOUR OWN WIND TURBINE AND ALL COMPONENTS!





CS Wind-Marine, Inc.

All together with our Team: we will be very proud to cooperate with you to Make you build your Own Wind Turbine industry !

