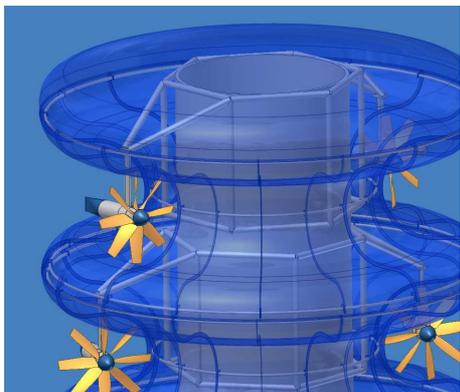




SUBURBAN WIND POWER

Renewable energy and distributed generation

AEROCAP TOWERS



Commercial brochure

Technopôle Brest-Iroise

Site de la pointe du diable

29280 Plouzané

Tél : +33 2 98 45 74 91

Fax : + 33 2 98 45 77 84

Email : contact@windcap.fr

<http://www.windcap.fr>

Private document statement (Sept 2008)

*This document contains private industrial information.
As such, it cannot be commercially used, reproduced or dispatched
without the express written permission of its owner, Windcap Energy SAS.*

COMPANY AND ACTIVITY :

Windcap Energy, a French company located at Brest (Brittany), is dedicated to the development of wind and marine renewable energies with 2 proprietary systems.

- **AEROCAP TOWERS**
- **SEACAP PLATEFORMES**
(see separate brochure)

This brochure describes only the wind power system :

Windcap Energy, is organized along 3 activities :

- ✓ Development and exploitation of renewable energies generation systems from wind and marine resources.
- ✓ Distribution and maintenance of production equipment.
- ✓ Engineering, technical assistance.

Windcap Energy, is located at Technopôle Brest-Iroise.

During its early development stage, the company uses the resources of ICCAP, an associated service company and also benefits from the knowledge and experience in O&G, marine, defense and aeronautics of its common founders.



Windcap HQ (Renewables) et Iccap (Services)

To produce its tower modules, WINDCAP, as an industrial builder, uses local qualified subcontractors services (structure, composite, cabling). This stimulates the local economic development due to the already small import content of its technology.

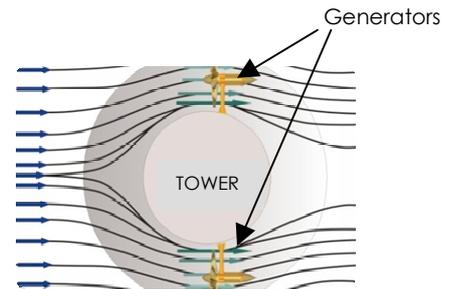
PRODUCTS:

- **AEROCAP TOWERS** are wind powered “ **Electrical generators** ”, innovative, modular and well suited to suburban zonings.
- Based upon a new concept of “**distributed energy**” :

- ✓ Efficient
- ✓ Durable
- ✓ Standard
- ✓ Modular
- ✓ Evolutive



The Windcap concept comes from an innovative energy conversion idea using « **ambient wind speed amplification** » (Warp-Eneco patented) and a proprietary energy conversion module (developed by Windcap). The wind speed amplification factor is between 1,5 and 1,7.



Venturi effect

The Venturi effect comes from the Bernoulli's principle.

When a fluid goes thru a reduced flow section, its speed increases in this circulation area.

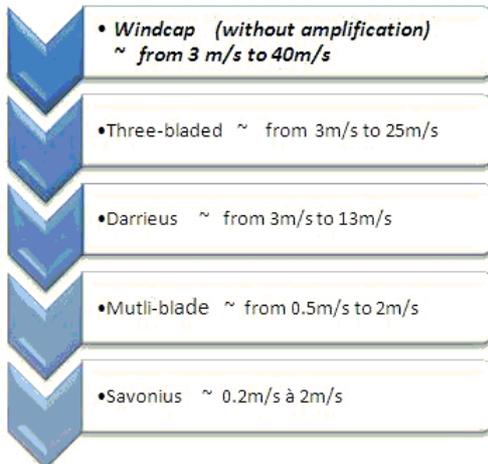
This application permits, for an **equal quantity** of energy produced, to use **smaller and more robust blades, operating in much larger range of wind speeds**. The assembly of several superposed modules and/or parallel towers allows reaching the expected or needed power goals.

In addition, Windcap offers complete services such as: current energy consumption analysis, elaboration of alternative solutions, installation and maintenance of equipments.

ADVANTAGES:

One of the advantages of the wind turbine Aerocap is its operational range of capture of the winds from 3 m/s to storm conditions (limited only by the resistance of the structure and energy conversion).

Range of the operational winds:



The annual producible power depends on the site of installation. We estimate at 5 000 hours / year the operational operability of a Windcap tower, allowing the system to benefit from the largest wind speed distribution (max . 8760 hr/year).

The turbine blades are studied to resist to extreme weather conditions in order to obtain maximum efficiency in any wind condition.

Advantages of q reduced blade diameter:

- Small environmental impact
- Limited material stress
- Easy Repair
- Weak Noise
- High efficiency



Thanks to its modularity and its industry standard 'off the shelf' components, it is very easy to adapt the system to the architecture of buildings, to their wind exposure and to the energy needs of the customer. The components have a life cycle friendly to the environment and they are easily recycled.

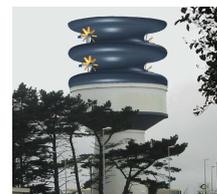
A **multi-levels / multi-towers** conception allows an exceptional adaptability to a suburban environment. Towers can become integrated to contemporary or ancient buildings alike or even to commercial 'totem' shaped poles. The size and number of modules vary in accordance with the energy needs of the client and its capability in future investments.



Urban zone



Academic campus



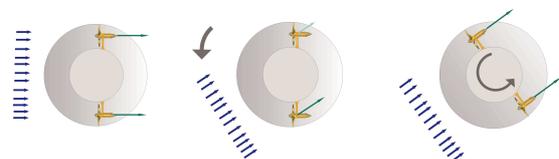
Highway services



Water tower

Aerocap towers are self-orientating and can therefore take advantage of the best wind direction and speed.

The system was especially studied to answer immediately to abrupt wind direction shifts and so capture a maximum of energy.



Aerocap self orienting system

Due to its size and positioning, Aerocap towers are easily accessed for their maintenance and do not require heavy lift equipment.

ENERGY :

The energy produced fits the standard norms and regulations. The current is stable and eligible to network distribution. The energy take off may be credited to the owner of the installation. The Aerocap windmill towers can be used in isolated zones (islands) as an autonomous power generator and the energy produced may be directly consumed **in association with any other complementary generation systems** (hydraulics, solar energy, solar, diesel, batteries, hydrogen...).



Due to the varying power level dependant upon the number of modules, numerous domains of application are possible. **As an example**, a range between 100kW and 500kW, may supply a significant part (from renewable energy) of the power needs of an industrial building.

With the possibility to respond, if needed in the future, to higher (or lower) power levels as energy demand increases (or decreases), thanks to the modularity feature of the system.

The system in general amortizes itself over less than 10 years. Its life time is estimated to 20 years.



Aerocap towers give a **high tech design** and may also be used as a **communication support** (above pictured 'totems').

Aerocap towers enjoy an acceptable visual impact in this environment setting, contrary to huge three blades aero generators which are more restrained to wind parks and massive production towards an electrical network.



(Approximate representation at similar energy delivery)

PRODUCTION :

The production is limited by the site wind distribution. If unavailable, Windcap shall offer a preliminary survey of the site energy potential.

Of course, it is also dependant upon the size and number of proposed modules. This makes it **adaptable** to the site and **evolutive with the needs and budget of the user**.

It is projected to offer 3 standard models :

- **BASIC** : tower diameter 4.00m
(8 500 kWh/yr x nb of modules)
- **SMALL BUSINESS** : tower diameter 5.00m
(12 000 kWh/yr x nb of modules)
- **INDUSTRY** : tower diameter 6.00m or more
(> 20 000kWh/yr x nb of modules)

For other cases, Windcap will undertake a study to match specific needs of the customer and environmental constraints.