



Practical experience with site assessment in France

Amsterdam – October 27th 2006

Intelligent Energy  Europe



HORISUN

INTRODUCTION

Wind Resource Assessment in France

Introduction

👉 **Sites identification** in partnership with City officers of LYON, GRENOBLE and LILLE of the potential implementing bodies



WHY ?

👉 **Excellent lever to wind energy development in urban environment**

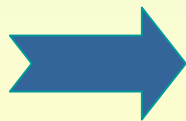
Methodology

① Selection of a building likely to receive a wind turbine

HOW ?

- Owner,
- Building height,
- Type of roof, accessibility and surface roof in m²

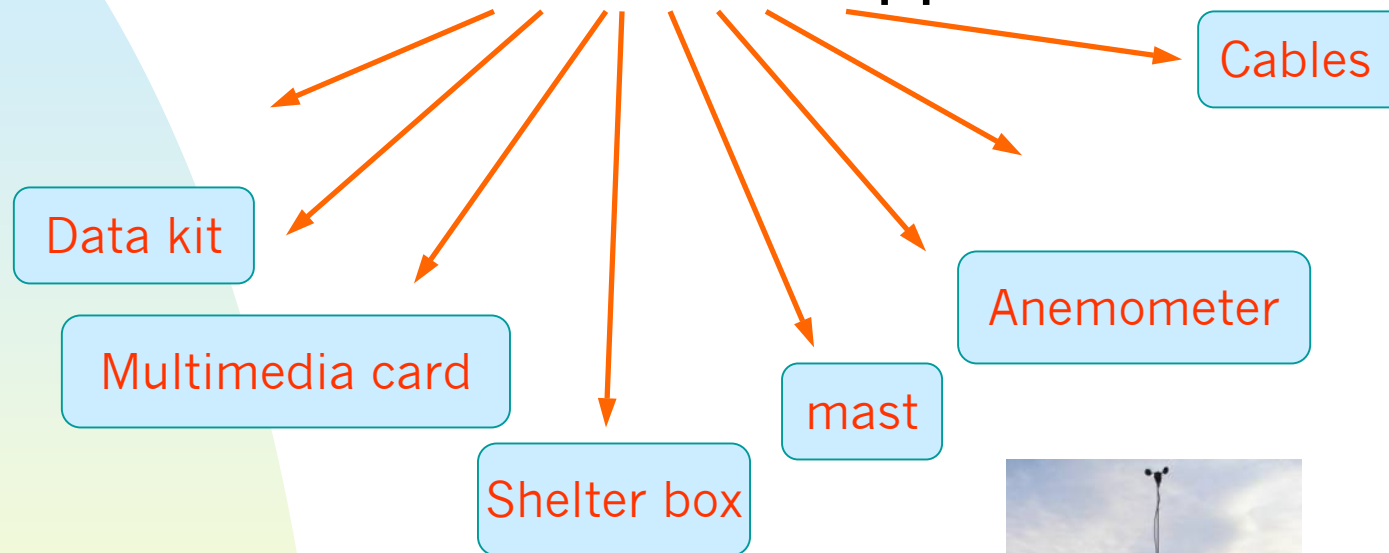
② Study of the Wind direction distribution



- ◆ Wind Data from the French Meteorological office
- ◆ Wind measurements on the field

Wind Measurement Process

Wind Measurement Apparatus



- ◆ Data Recovery every 15 days
- ◆ Data analysis



GRENOBLE

Site Location

Partners:

- ◆ **Grenoble Community**
- ◆ **Public Housing office ACTIS**

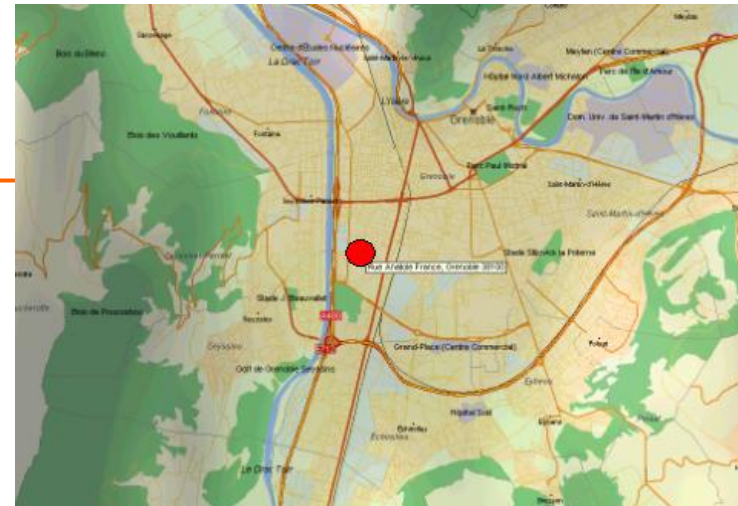
Location:

- ◆ **Mistral Area: collective settlement**

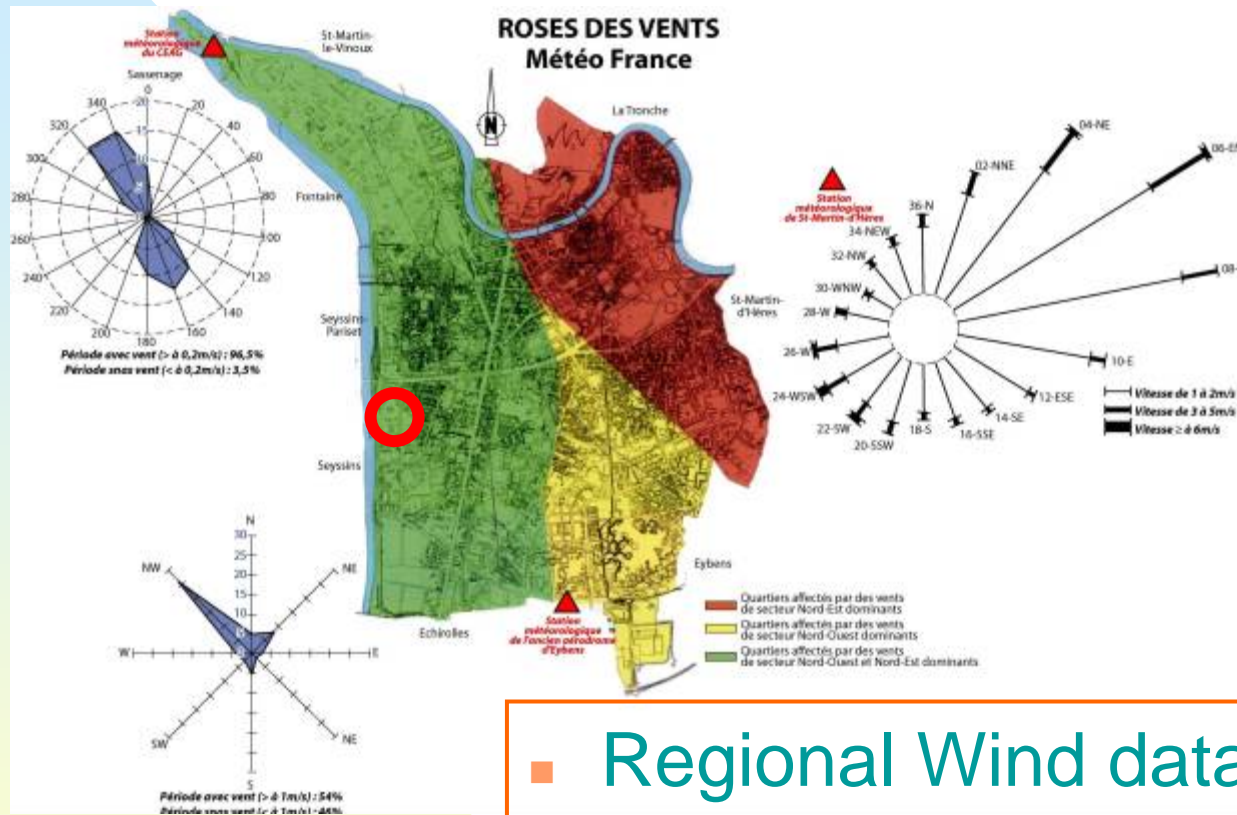


No particular constraints:

- High height
- No obstacles
- No special visual impacts

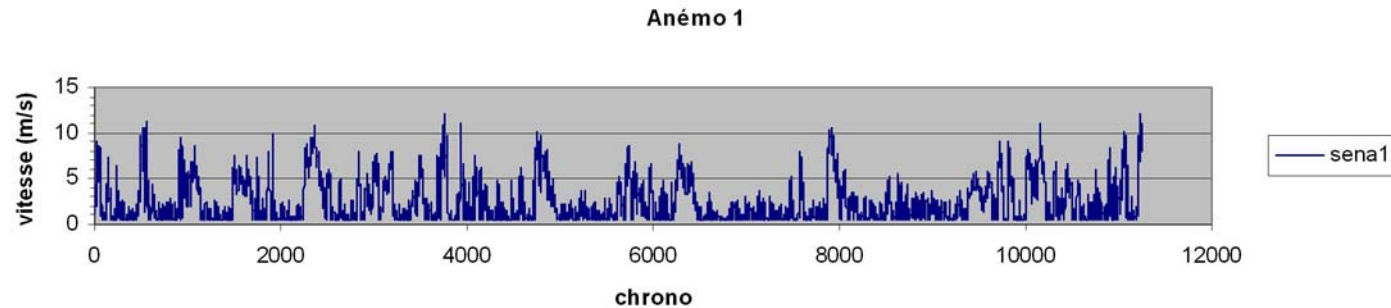


Resource assessment

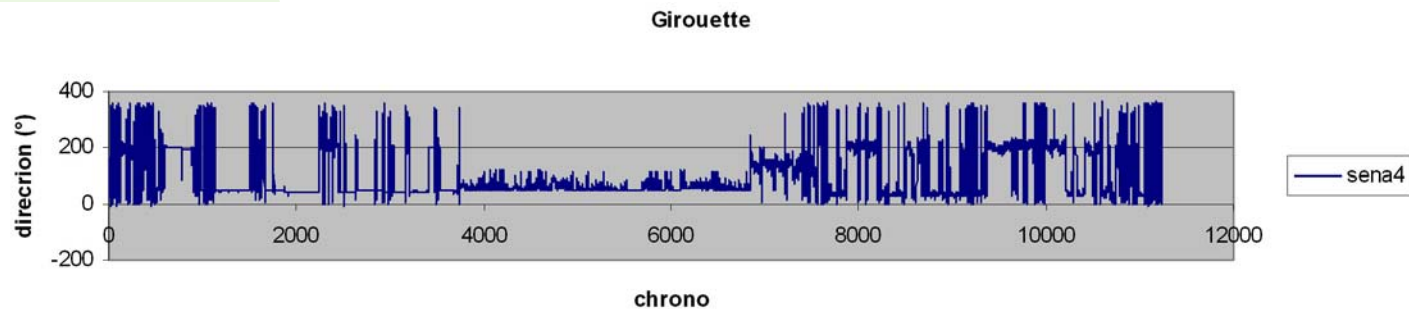


- Regional Wind data from Météo France
- Wind Measurement period: 4 months

Example of data recovery



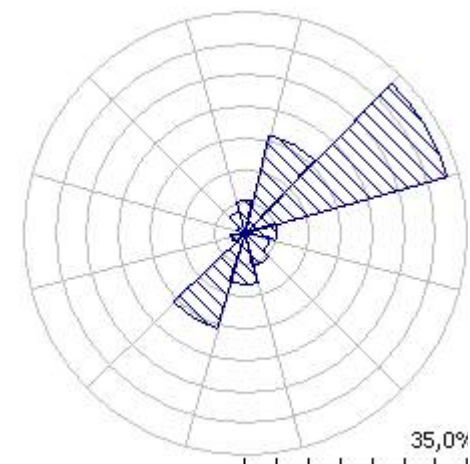
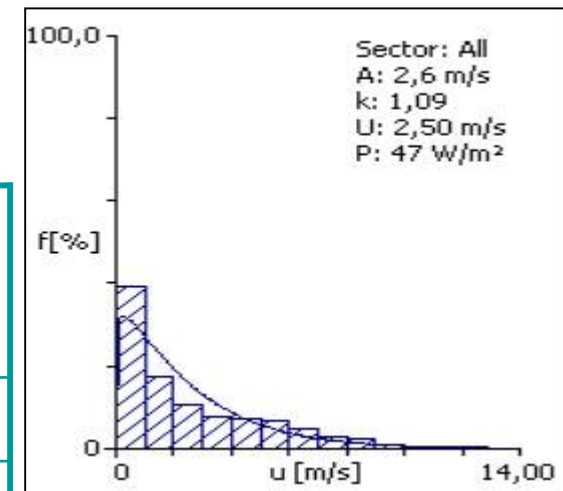
Wind speed variation over the measuring period



Direction variation over the measuring period

Results from the data analysis

Measuring period	From October 28th to February 19th 2006
Speed availability	68 %
Direction availability	52 %
Average Wind speed	2.36 m/s
% of time when speed > 5 ms	15.5 %
Average standard deviation	0.82



LILLE

Site Location

Two Sites:

- ◆ ROUBAIX: Cultural building “La condition publique”
- ◆ TEMPLEMARS: Sports complex

Partner:

- ◆ Lille Agglomeration

Wind Potential = prevailing wind



- South West direction
- Average wind speed = 5 m/s

Site Location (2)

Roubaix:

- Urban area but weak density
- Near industrial area
- Historic constraints



- ➔ Town Planning revision (PLU)
- ➔ Evaluation procedures for Building historical constraints

Site Location (3)

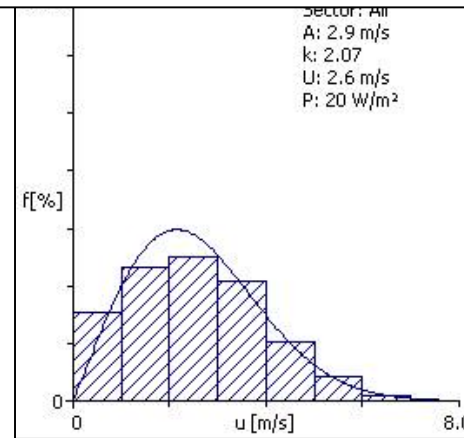
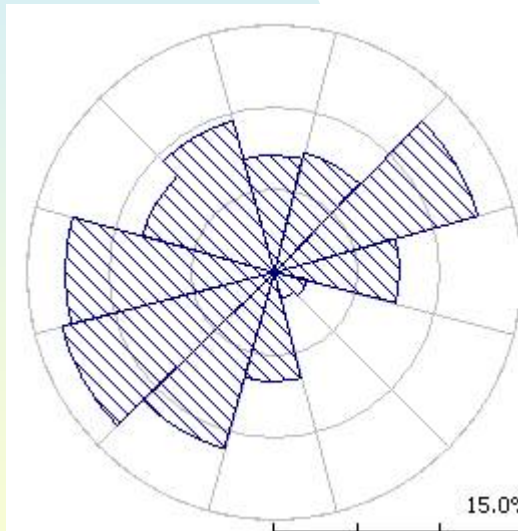
Templemars:

- Sports complex in urban area, weak density
- No obstacles → interesting wind potential
- No special visual impacts



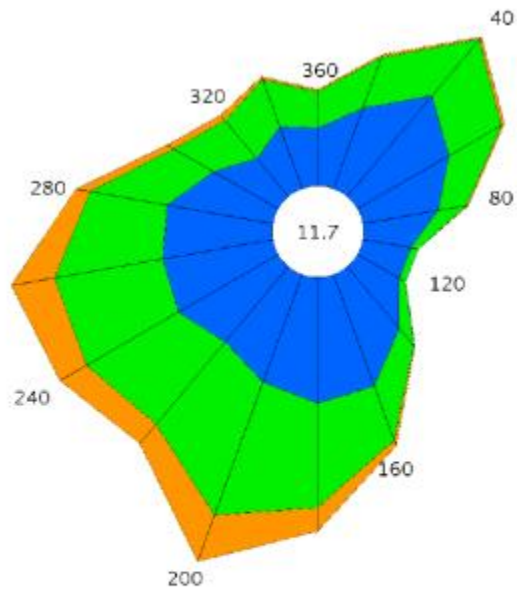
→ No objection from the overhead easement (Lesquin airport)
→ Town Planning revision (PLU)

Results from Roubaix



Measuring period	From February 1st to March 13th 2006
Speed availability	94 %
Direction availability	93 %
Average Wind speed	2.54 m/s
% of time when speed > 5 ms	4.48 %
Average standard deviation	1.00

Results from Templemars



No precised measurements but a wind rose from the nearest meteorological station

◆ South West direction

Groupes de vitesses (m/s)

[1.5;4.5 [[4.5;8.0 [>= 8.0

Pourcentage par direction



LYON

Site Location

Partners:

- **OPAC Grand Lyon: public social housing**

Location:

- **Social Public Building area of Laënnec**

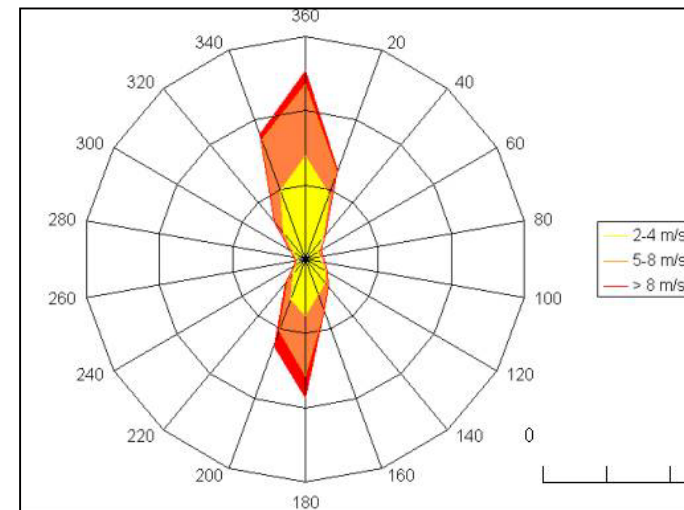
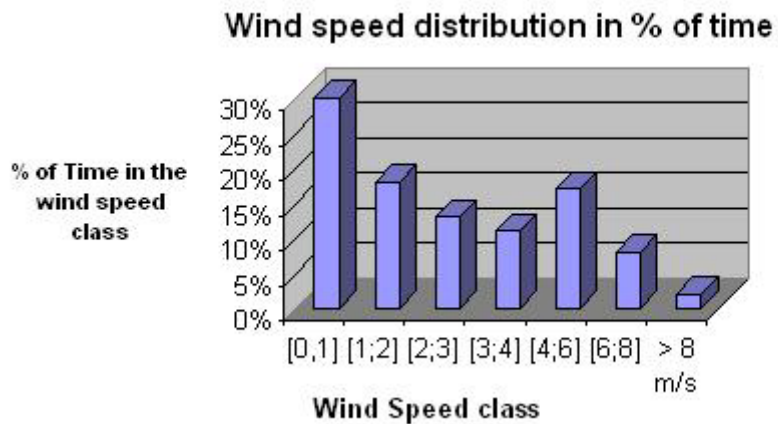


No particular constraints:

- ◆ High height
- ◆ No obstacles (noise, visual)
- ◆ No historical constraints

Results from the data analysis

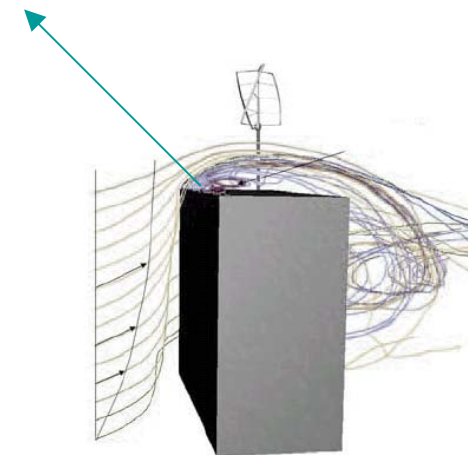
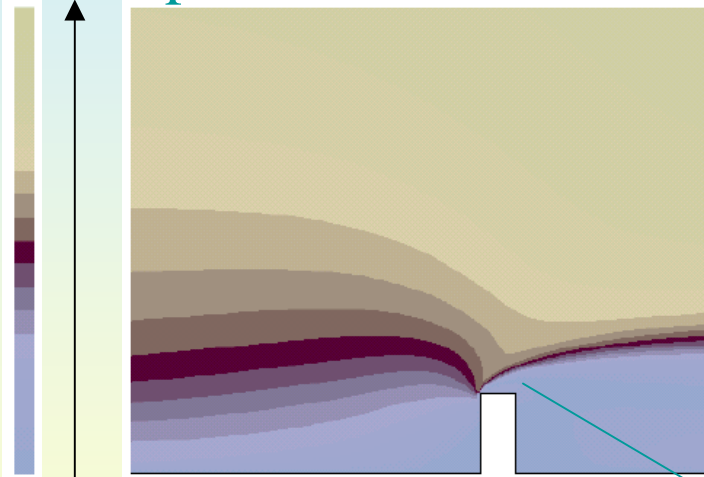
Measuring period	From April 12th to June 10th 2006
Speed availability	87%
Average Wind speed	3 m/s



Main findings

important turbulences

Wind speed



Apparently weak resources



Main findings

In urban context presenting important roughness, a HAWT placed in the middle of the roof of a building must be placed above a height higher than 35%/50% the height of the building to avoid the phenomena related to turbulence.

Alternatively, VAWT collect turbulent flow. Studies undertaken by the university of Delph show that certain VAWT positioned in a judicious way can have an energy effectiveness increased in turbulent phenomena.