

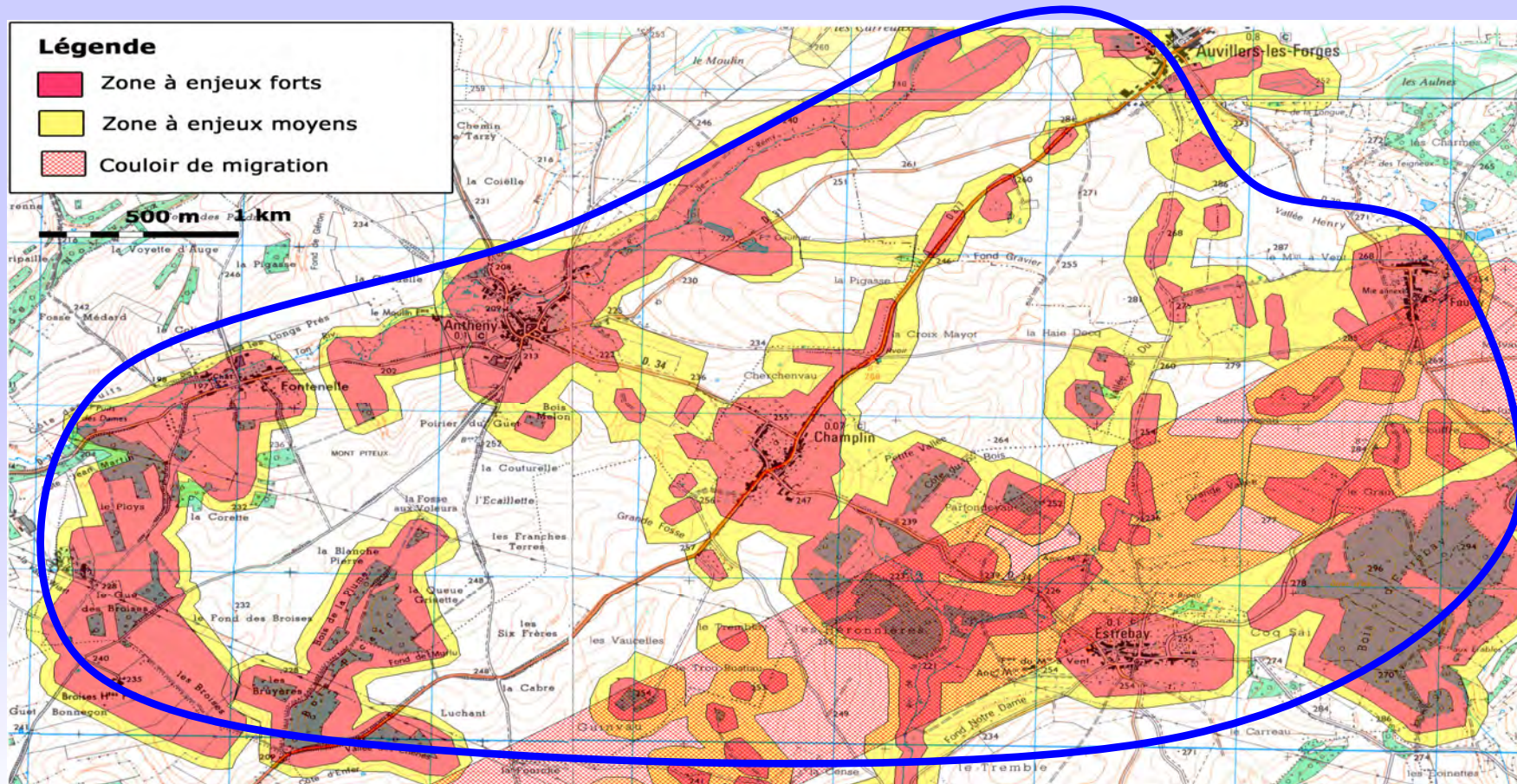


# CHIROTECH

The only bat-friendly control system

# The problem

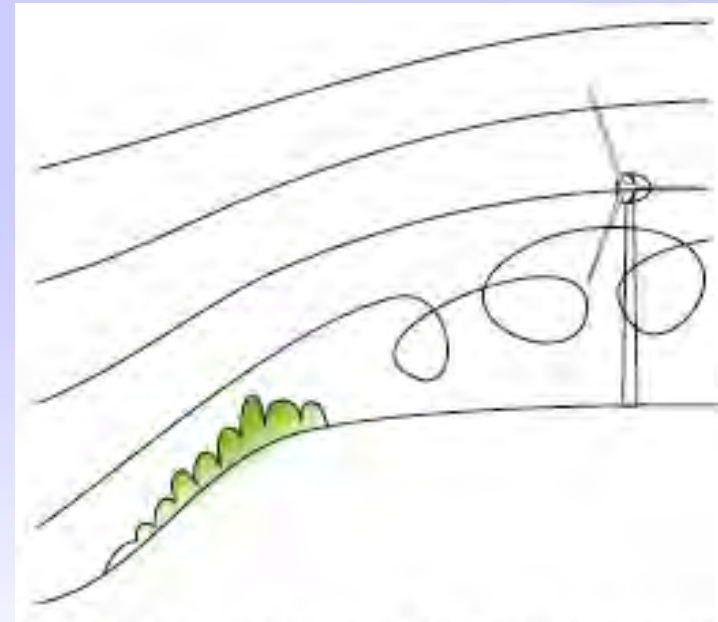
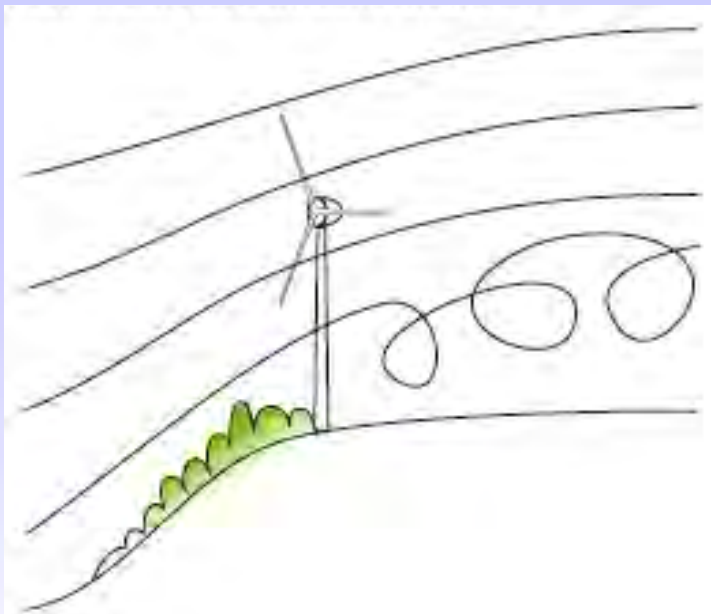
- Chiroptera (= bats) is a protected species in many countries  
=> many projects are blocked because of being in a chiroptera area (red on the example map below)



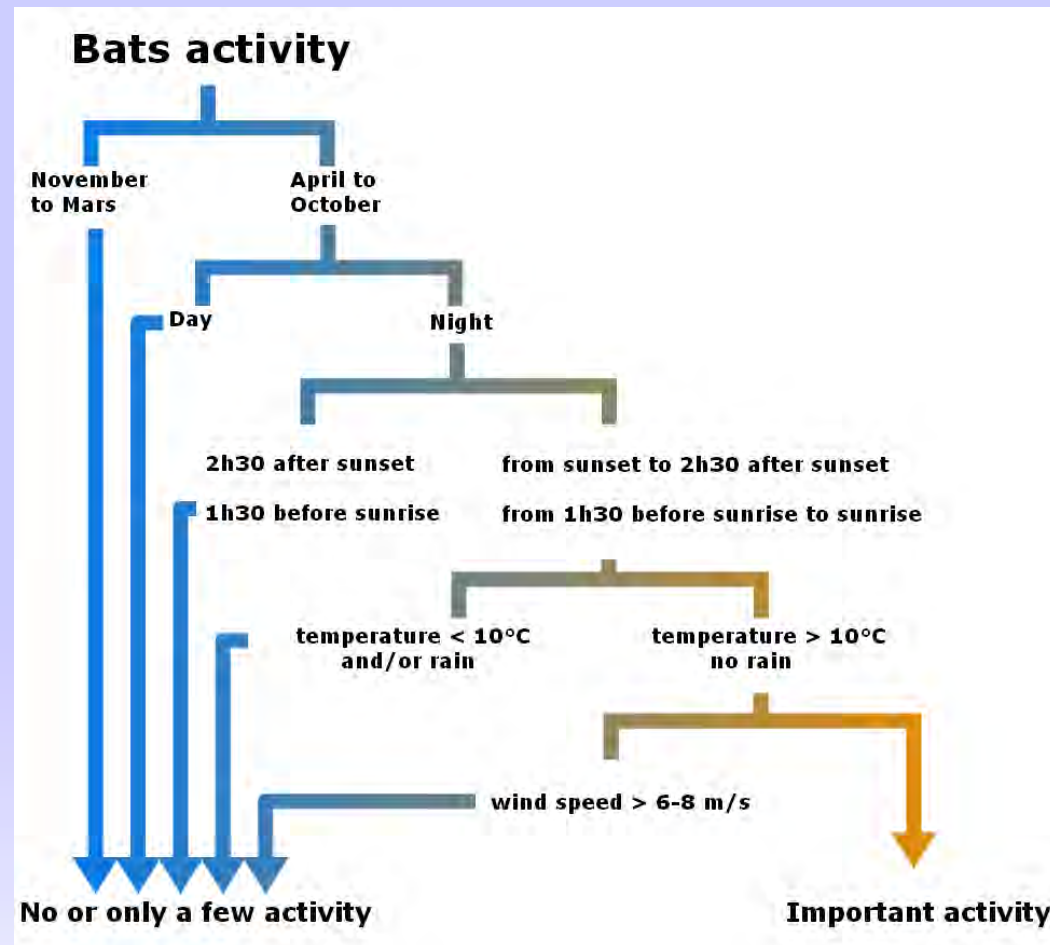


## The problem

- "Moving" wind turbines out of a chiroptera area often reduces the production of the machines, because the wind conditions are not optimal anymore

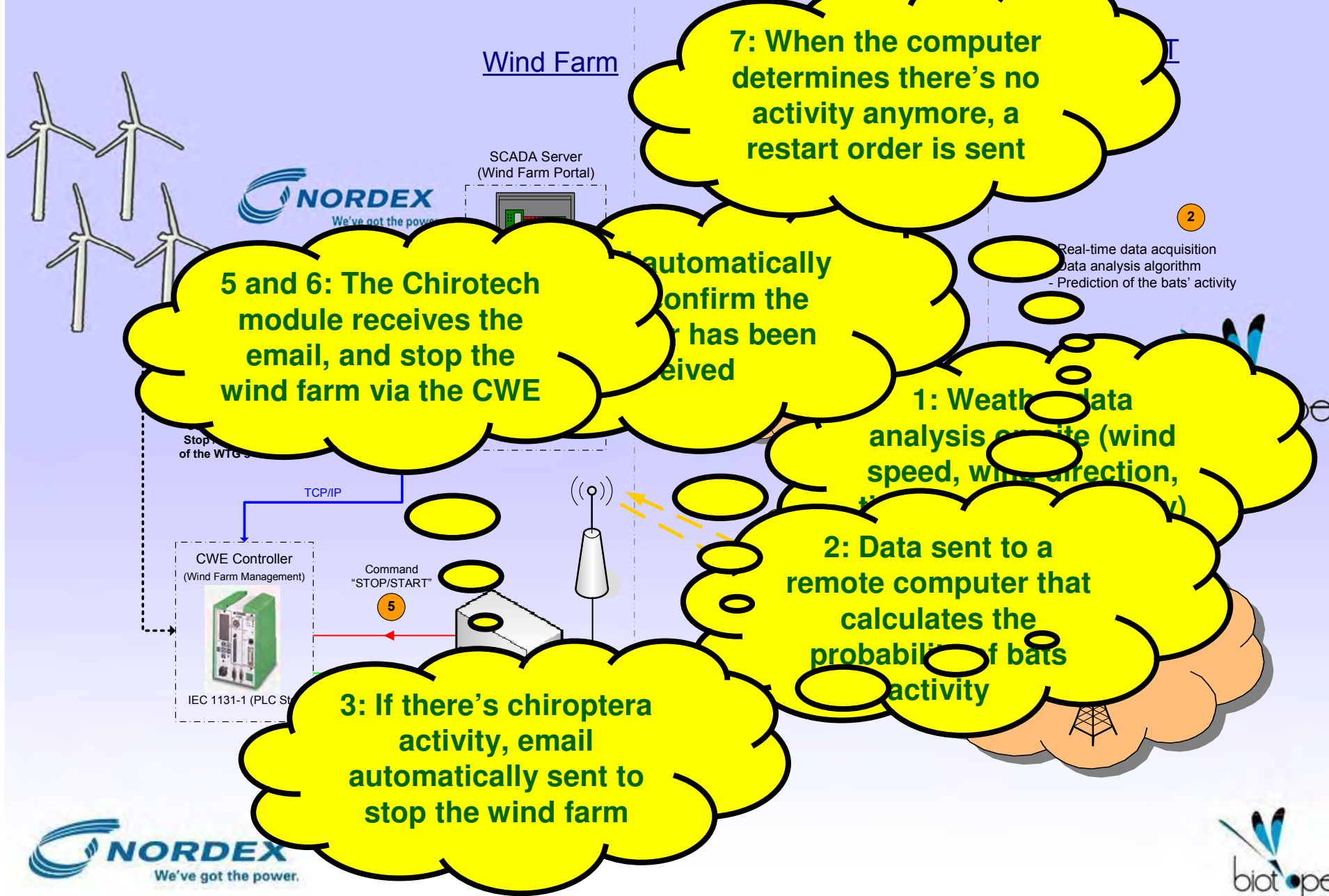


# The idea



Chiroptera activity is limited to some very particular conditions  
=> use of an algorithm defining the probability of chiroptera activity  
(designed by Biotope)

# How does the solution work?



## Currently being tested

- On wind farm Bouin (France)
- Since early 2009
- And it works well...



16.06.2009 21:43:39 Bat detection  
16.06.2009 21:44:08 Staggered shutdown by binary input

0.00 MW 0.0 MVar 0.00 kV 16.06.2009 22:05:58

Alarm Log Command Log Active Alarms Alarm History Event History 10 min. Values Trends

Selection Visualisation

Generated 16.06.2009 22:05:45

Index	Date	Time	Oper	Name	Message
1	16.06.2009	21:44:08:898	0	FM79	Staggered shutdown by binary input
2	16.06.2009	21:43:39:390	0	FM0	System OK
3	16.06.2009	21:43:39:312	0	FM67	Bat detection
4	16.06.2009	16:29:14:117	0	FE0	System OK
5	16.06.2009	16:29:14:039	0	FM84	Communication failure turbine 05

It really works well ...

Wind Farm cut-out



## Still to be done

- Analysis of the chiroptera mortality for 2009 by LPO (french association for the protection of birds)
- => To be done at the end of the year (below: example 2008)

Date	Eolienne	nom espèce	grand oiseau	petit oiseau	cs	mort attribuée aux éoliennes	Coord N	Coord V	végét
05/08/08	1	Pipistrelle commune 1			1	oui	46°56'37.1"	2°03'22.7"	sol nu
05/08/08	2	chiro sp 2			1	oui	46°56'46.7"	2°03'06.0"	sol nu
12/08/08	4	Mouette rieuse	1			oui	46°57'10.5	2°02'38.9	blé coupé
12/08/08	4	Tadorne de Belon	1			oui	46°57'08.8"	2°02'42.1"	blé coupé
19/08/08	7	Pipistrelle commune 3			1	oui	46°57'37.5"	2°02'31.9"	plateforme
27/08/08	3	Noctule commune			1	oui	46°56'58,3"	2°02'50,6"	plateforme
10/09/08	6	Mouette bleue	1			oui	46°57'29.5"	2°02'29.6"	labour
16/09/08	6	Noctule de Leisler			1	oui	46°57'29	2°02'28	champs labouré
16/09/08	1	Pipistrelle de Nathusius			1	oui	46°56'37	2°03'22	plateforme
16/09/08	1	Pipistrelle de Nathusius			1	oui	46°56'38	2°03'22	champs labouré
16/09/08	1	Pipistrelle de Nathusius			1	oui	46°56'37	2°03'23	
16/09/08	2	Pipistrelle de Nathusius			1	oui	46°56'47	2°03'06	plateforme
16/09/08	1	Tourterelle turque		1		oui	46°56'38	2°03'22	
16/09/08	1	Roitelet triple bandeau		1		oui	46°56'38	2°03'23	
24/09/08	6	Faucon crécerelle	1			oui	46°57'29.1"	2°02'31.9"	
01/10/08	8	Roitelet triple bandeau		1		oui	46°57'44	2°02'33	plateforme
01/10/08	8	Roitelet triple bandeau		1		oui	46°57'45	2°02'32	
01/10/08	5	Mouette rieuse	1			oui	46°57'18	2°02'33	labour
01/10/08	6	Pipistrelle de kulh			1	oui	46°57'28	2°02'29	labour
01/10/08	5	Pipistrelle de Nathusius			1	oui	46°57'18	2°02'33	labour
01/10/08	1	Pipistrelle commune			1	oui	46°56'36	2°03'22	labour
01/10/08	1	Pipistrelle de Nathusius			1	oui	46°56'37	2°03'20	labour
08/10/08	3	Roitelet triple bandeau		1		oui	46°56'57,7"	2°02'50,4"	plateforme
15/10/2008	1	Roitelet triple bandeau		1		oui	46°56'38.5"	2°03'20.3"	labour
15/10/2008	1	Roitelet triple bandeau		1		oui	46°56'38.0"	2°03'23.5"	
15/10/2008	5	Roitelet triple bandeau		1		oui	46°57'19.1"	2°02'34.8"	plateforme
15/10/2008	2	Faucon crécerelle	1			oui	46°56'47.2"	2°03'06.4"	plateforme

NB : les dates absentes de ce tableau sont celles où rien n'a été trouvé (voir l'autre onglet pour les dates de prospection)

**Légende couleur**

Bleu : Oiseau

Vert : Chauve-souris

Noir : oiseaux déposés pour test prédation/efficacité

Rouge : doute sur l'origine de la mort



## Advantages of Chirotech

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- Very low production losses ( $\sim 1\%$ )
- Inexpensive system
- Site-specific algorithm
- Unbiased procedure (independence of Biotope)
- Can be installed afterwards
- Exclusive partnership Nordex-Biotope

- Would you need further information about Chirotech:

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