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Great in small turbines



BWEA Small System Industry Meeting

Balthasar Klimbie

Nov 26th 2008



1- Schoondijke test field

2- NWEA activities

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Turbines:

- 1- Windwalker**
- 2- Ampair**
- 3- Turby**
- 4- Montana**
- 5- Passaat**
- 6- Energy Ball**
- 7- WRE 030**
- 8- Swift**
- 9- Airdolphin**
- 10- SkyStream**
- 11- WRE 060**



Initiative by:

- Delta Utility**
- Province of Zeeland**
- Windcooperation Zeeuwind**
- Community of Schoondijke**
- Greenlab Utility**



Facts:

- Started 2005**
- First turbines October 2007**
- Begin measurement period April 1st to September 30st**
- Average wind speed during test 3,5 m/s**

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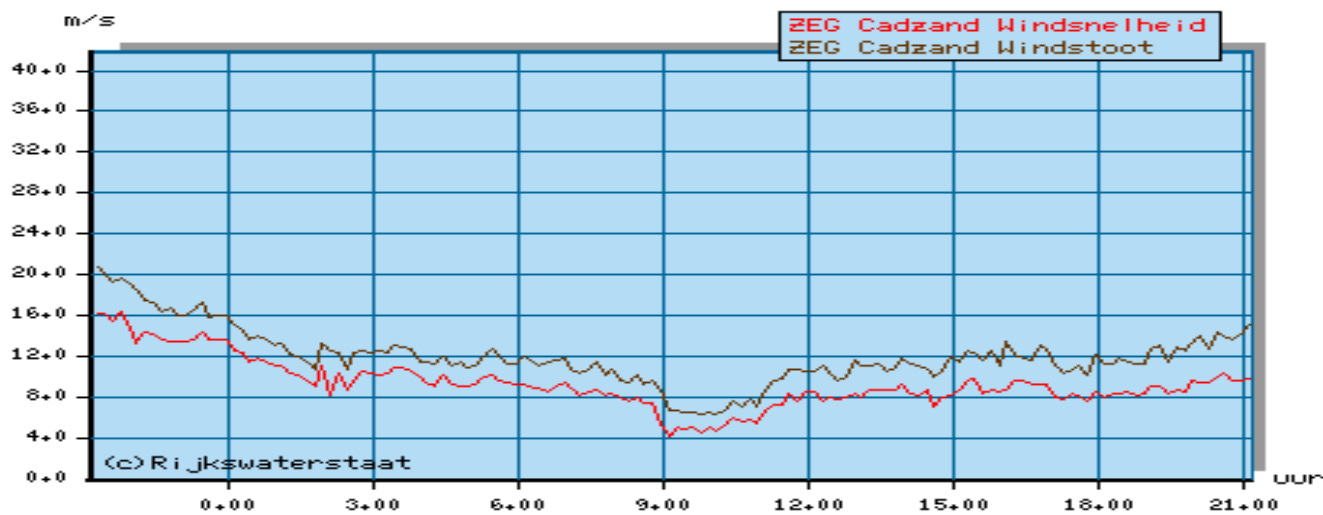
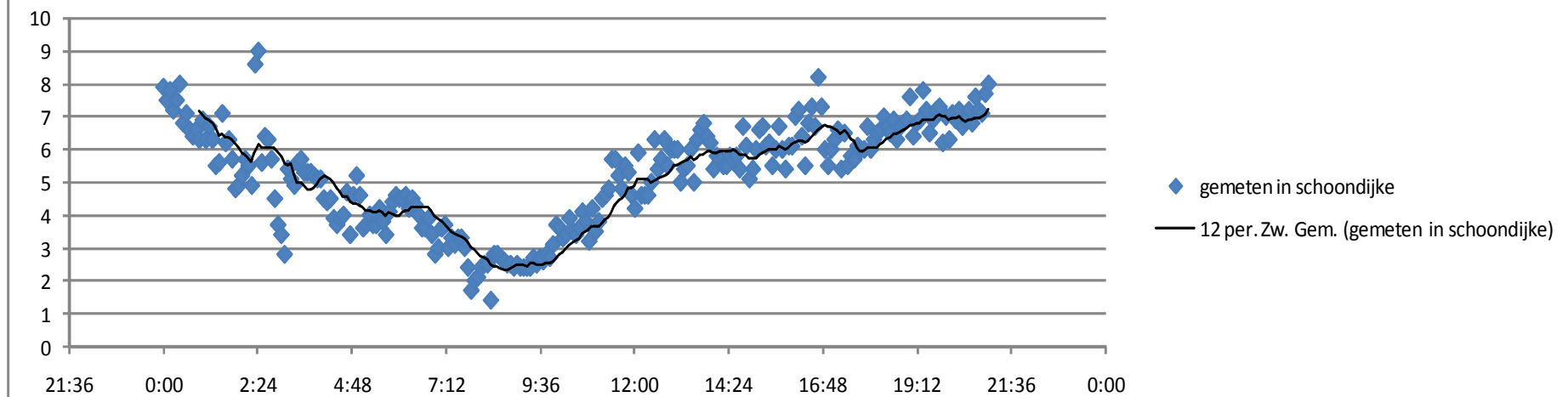
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Wind speed

gemeten in schoondijke



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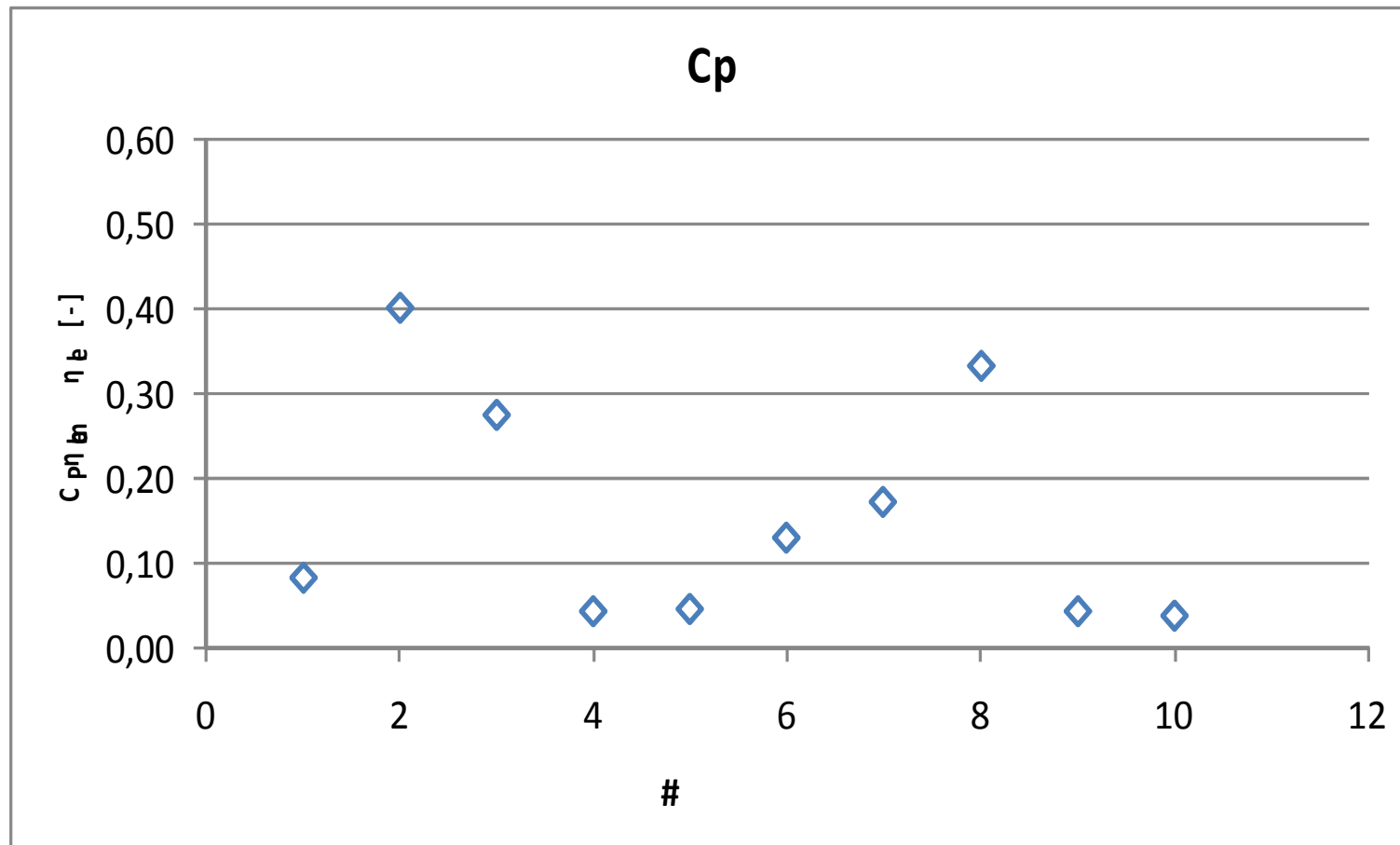
Test period April 1st - September 30st

average wind speed 3,5 m/s

	net kWh	expected annual yield
Windwalker	0	500
Ampair	76	1500
Turby	43	2000
Montana	1162	4500
Passaat	261	1250
Energy Ball	22	500
WRE 030	62	1000
Swift	28	2500
Airdolphin	124	1800
SkyStream	774	n.a.
WRE 060	212	6000

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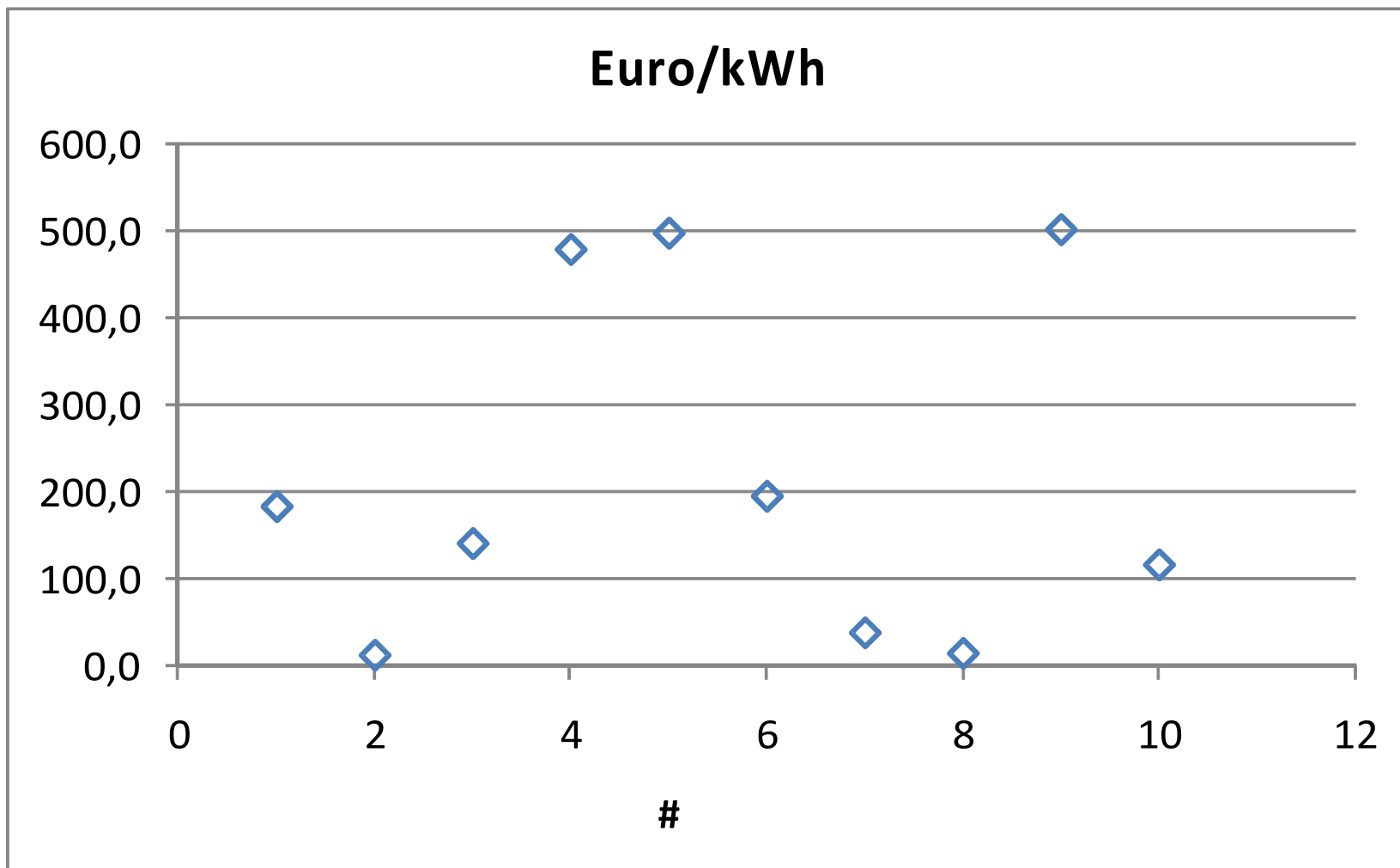
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Graph supplied by Ingreenious BV, Sander Mertens

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Test period April 1st - September 30st

average wind speed 3,5 m/s

	net kWh	expected annual yield	price	euro/production	kWh produced	kWh consumed
Windwalker	0	500			0	0
Ampair	76	1500	8925	117	83	7
Turby	43	2000	21350	497	107	64
Montana	1162	4500	18508	13	1264	2
Passaat	261	1250	9239	35	234	0
Energy Ball	22	500	4324	197	22	0
WRE 030	62	1000	30862	498	64	2
Swift	28	2500	13208	472	68	40
Airdolphin	124	1800	17548	142	153	29
SkyStream	774	n.a.	10742	14	844	70
WRE 060	212	6000	39162	185	213	1



Why 'certification'?

To move towards a more mature market.

Requirements:

- Easy step in model for manufacturers**
- As fair as possible**
- Information for potential clients**
- Information for planning officers**
- International valid**
- For open fields as both as urban environments**



Two step approach:

1- Datasheet:

- DIY datacollection;
- Check by Gaskeur;
- Power, noise and safety issues;
- Needed for grants;

2- Certification:

- Same standard as IEC 61400;



Data collection:

- open field according to IEC standard**
- urban environment with database for real results.**



Safety:

- CE
- Max RPM and redundant limiter
- Stop switch
- Rotor blade inspection



Questions:

- Code of conduct?
- Wind calculation in urban environment
- Lifetime of a product

Advertorial



Alliance for Rural Electrification

Shining a Light for Progress

