> Developing and operating wind farms in France since 2000.
$>$ Wind farm portfolio: 157 MW in operation
217 MW going to construction 259 MW awaiting approval


- Spinning: 156.95 MW

Permitted : 217 MW
Submitted for approval : 259.30 MW

> A legacy of developing and operating wind farms in France (www.innovent.fr) makes InnoWind one of the few fully integrated renewable IPP developers in southern Africa with a demonstrable track record of project delivery. In France the company pioneered the first wind farms and currently controls a portfolio of over 600 MW under development and operation.


Established in mid 2008 in the logistics hub city of Port Elizabeth, InnoWind (Pty) Ltd has for the past two and half years been identifying, securing and developing a portfolio of wholly owned wind farm sites across the Eastern and Western Cape Provinces of South Africa and Namibia.

| Project | Region | Size <br> (MW) | Connection | Distance-to-Grid (km) | INDEX <br> (page) |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Vryheid | Overberg, Western Cape | 30 | Vryheid 66 kV | 1.5 | 7 |
| Heidelberg | Overberg, Western Cape | 15 | Heidelberg 66 kV | 1.3 | 8 |
| Albertinia | Langeberg, Western Cape | 18 | Albertinia 66 kV | 4.0 | 9 |
| Proteus | Langeberg, Western Cape | 126 | Proteus 66 kV | 1.0 | 10 |
| Coega IDZ | Eastern Cape | 60 | Motherwell 22 kV | 4.6 | 11 |
| Coega PPC | Eastern Cape | 165 | Grassridge 132 kV | 1.2 | 12 |
| Makana/Waainek | Eastern Cape | 24 | Grahamstown 66 kV | 2.2 | 13 |
| Thomas River | Eastern Cape | 80 | Thomas River 132 kV | 1.2 | 14 |
| Chaba | Eastern Cape | 20 | Chaba 22 kV | 3.1 | 15 |
| Ncora | Eastern Cape (former Transkei) | 40 | Qolweni 22 kV | 5.0 | 16 |
| Nqamakwe | Eastern Cape (former Transkei) | 30 | Nqamakwe 66 kV | 1.2 | 17 |
| Qunu | Eastern Cape (former Transkei) | 12 | Qunu 22 kV | 4.3 | 18 |
| Walvis Bay | Erongo, Namibia | 60 | Transmission lines 66 kV | 1.5 | 19 |

$>$ One of the defining features of InnoWind's portfolio is its variability of project sizes and their extreme proximity to grid connection points with confirmed available connection capacity. This is the result of a strategy of site selection based on network connection points that require little to no augmentation thereby minimizing project lead-times and costs; two factors of primary importance in Eskom's declared IPP selection criteria.

## Broad based black Economic Empowerment vision

Over and above the environmental benefits of wind, one of InnoWind's primary missions in pursuing renewable energy projects in South Africa is to structure these to deliver significant social development and welfare up-liftment to local historically disadvantaged communities. During the implementation of its wind projects, InnoWind works with local communities in the vicinity of each project's locations, integrating them through the formation of carefully designed community Trusts into the equity structure of the projects themselves. Significant dividend flow from these projects is thereby channelled into local communities and townships for general welfare up-liftment and into education that promotes the science, social science and vocational skills that influence sustainable technology and its socio-economic spin-offs.
Unlike large and highly centralized "utility-scale" power projects, InnoWind sees the small and distributed nature of wind powered electricity generation as ideally suited to disseminating and democratising the benefits and ownership of electricity. As exemplified by our 30 MW project currently underway in Grahamstown, and the Makana Winds of Change community trust being developed in collaboration with Rhodes University, we view our business model as entirely in keeping with the Government's own Black Economic Empowerment vision for boosting the economic and social performance of the country over the next decades.


## SOUTH AFRICA : 605 MW

Western Cape : 189 MW
1:Swellendam/Vryheid:30 MW
2 : Heidelberg: 15 MW
3:Albertinia: 18 MW
4 :Mossel Bay/Proteus : 126 MW

Eastern Cape : 416 MW
5:Coega IDZ: 60 MW
6: Coega PPC quarry: 150 MW
7:Grahamstown : 24 MW
8:Thomas River: 80 MW
9:Chaba:20 MW
10:Ncora:40 MW
11: Nqamakwe:30 MW
12: Qunu: 12 MW

## NAMIBIA : 60 MW

Walvis Bay: 60 MW



Vryheid wind farm project
Western Cape

| Size | 30 MW (< grid evacuation capacity) |
| :--- | :--- |
| Land | 5 years option on 20 year extendable lease |
| EIA | Started December 2009. Final Scoping Report accepted by DEA (15 ${ }^{\text {th }}$ March 2011) |
| Meteorology | @ 18m since November 2009 $\rightarrow$ @ 34m since August 2010 |
| Output | 2,830 production hours for a WinWinD 3 MW wind turbine (103 m diameter) <br> $32 \%$ load factor @ 90m hub height and $0.05 \%$ shear factor |
| Grid | Vryheid Eskom substation (66/22 kV). New 66/22 kV 40 MVA is required, space is <br> available. |
| Distance-to-Grid | 1.5 km |



Project as seen from farmer house 2.7 km away (south-east) from nearest turbine


Heidelberg wind farm project Western Cape

| Size | 18 MW (current grid evacuation capacity) |
| :--- | :--- |
| Land | 5 years option on 20 year extendable lease |
| EIA | Started December 2009. Final Scoping Report accepted by DEA (15 ${ }^{\text {th }}$ March 2011) |
| Meteorology | @ 18m since November 2009 $\rightarrow$ @ 34 m since August 2010 |
| Output | 2,453 production hours for a Siemens $2,3 \mathrm{MW}$ wind turbine (101 m rotor) <br> $28 \%$ load factor @ 90m hub height and $0.05 \%$ shear factor |
| Grid | Heidelberg Eskom substation (66/22 kV). New $66 / 22 \mathrm{kV} 40 \mathrm{MVA}$ is required, space is <br> available. |
| Distance-to-Grid | 1.3 km |



Project as seen from the N2 east entry of Heidelberg, 4.6 km away (north) from the nearest turbine


| Size | 18 MW (< grid evacuation capacity) |
| :---: | :--- |
| Land | 5 years option on 20 year extendable lease |
| EIA | Started December 2009. Final Scoping Report accepted by DEA (15 ${ }^{\text {th }}$ March 2011) |
| Meteorology | @ 18m since February 2010 $\rightarrow$ @34m since August 2010 |
| Output | 2,889 production hours for a WinWinD 3 MW wind turbine (103 m rotor) <br> $33 \%$ load factor @ 90m hub height and $0.05 \%$ shear factor |
| Grid | Albertinia Eskom substation (66/11 kV), 10 MVA. New 66/33kV 20 MVA trf required |
| Distance-to-Grid | 4 km |



Project as seen from north of Albertinia, 3.6 km away from nearest turbine


Proteus wind farm project Eastern Cape

| Size | 126 MW (<large evacuation capacity) |
| :--- | :--- |
| Land | 5 years option on 20 year lease |
| EIA | Started December 2009. Final Scoping Report accepted by DEA (15 ${ }^{\text {th }}$ March 2011) |
| Meteorology | @ 20m since February $2010 \rightarrow$ @ 60m since November 2010 |
| Output | 2,361 production hours for WinWinD 3 MW wind turbine (120 m rotor) <br> $27 \%$ load factor @ 100m hub height and $0.05 \%$ shear factor |
| Grid | Proteus Eskom substation (400/132/66 kV). New 66/33 kV 2x80 MVA trf required |
| Distance-to-Grid | 1 km |



Project as seen from Patrysfontein farm, 1 km from the nearest turbine


Coega (IDZ) wind farm project Eastern Cape

| Size | 60 MW (< grid evacuation capacity) |
| :--- | :--- |
| Land | 5 years option on 20 year extendable lease |
| EIA | Started December 2009. Final Scoping Report accepted by DEA (1 ${ }^{\text {st }}$ April 2011) |
| Meteorology | @ 45m (Telkom tower) since December 2009 $\rightarrow$ @ 60m since October 2010 |
| Output | 2,715 production hours for a WinWinD 3 MW wind turbine (103 m rotor) <br> $31 \%$ load factor @ 90m hub height |
| Grid | Motherwell municipal substation (132/22 kV) $2 \times 40 \mathrm{MVA}$ trf. No upgrade required |
| Distance-to-Grid | 7 km |



Project as seen from the south of the N2 inside the Coega IDZ


CoEga (PPC) wind farm project


## Eastern Cape

| Size | 165 MW (< large evacuation capacity) |
| :--- | :--- |
| Land | 20 year lease with Pretoria Portland Cement (PPC) |
| EIA | Started December 2009. Final Scoping Report accepted by DEA (1 $1^{\text {st April 2011) }}$ |
| Meteorology | @ 45m (Telkom tower) since December 2009 $\rightarrow$ @ 60m since October 2010 |
| Output | 2,898 production hours for a WinWinD 3 MW wind turbine (103 m diameter) <br> $33 \%$ load factor @ 90 m with a conservative 0.05\% shear factor |
| Grid | Grassridge Eskom substation (400/132 kV). New 132/33 kV 2x80 MVA trf required, <br> space is available |
| Distance-to-Grid | 1 km. |



[^0]

Watinek wind farm project Eastern Cape

| Size | 24 MW (<municipal grid evacuation capacity) |
| :--- | :--- |
| Land | signed in November 2009, January 2010 for 30 years |
| EIA | RoD granted on $15^{\text {th }}$ March 2011 |
| Meteorology | 20 m Telecom tower since April 2010. 60 m mast since November 2010 |
| Output | 3,901 production hours for a WinWinD 3 MW wind turbine (103 m rotor) <br> $45 \%$ load factor @ 90m hub height |
| Grid | Waainek Municipal Substation (66/11 kV). New 66/33 kV 20 MVA trf required |
| Distance-to-Grid | 2.5 km |



Project as seen from the monastery (1,1km)


Project as seen from the cemetery road (1.6 km)



Thomas River wind farm project Eastern Cape

| Size | 80 MW wind + 3 MW PV (= grid evacuation capacity) |
| :--- | :--- |
| Land | 5 years option on 20 year extendable lease |
| EIA | Started May 2010. Final Scoping Report accepted (23 ${ }^{\text {rd }}$ March 2011) |
| Meteorology | @ 18m since November 2009 $\rightarrow$ @ 34m since August 2010. |
| Output | 2,399 production hours for a WinWinD 3 MW wind turbine (103 m rotor) <br> $27 \%$ load factor @ 90m hub height and $0.05 \%$ shear factor |
| Grid | Thomas River Eskom traction station (132 kV). New 132/33 kV 80 MVA trf <br> required |
| Distance-to-Grid | 1.2 km |



Project as seen from the N6 road between Stutterheim and Cathcart (5.3 km from the nearest turbine)


Chaba wind farm project
Eastern Cape

| Size | 20 MW (< evacuation capacity) |
| :--- | :--- |
| Land | 5 years option on 20 year extendable lease |
| EIA | Started May 2010. Final Scoping Report accepted (23 ${ }^{\text {rd }}$ March 2011) |
| Meteorology | @ 25m Telecom tower since August 2010 |
| Output | 2,475 production hours for a WinWinD 3 MW wind turbine (103 m rotor) <br> $28 \%$ @90m hub height and $0.05 \%$ shear factor |
| Grid | Chaba Eskom substation (132/22 kV), no upgrade required |
| Distance-to-Grid | 3.5 km |



Project as seen from the Chaba substation ( 3.5 km away from the nearest turbine)


Ncora Wind farm Project Former Transke, Eastern Cape

| Size | 40 MW wind + 4 MW PV (< grid evacuation capacity) |
| :--- | :--- |
| Land | Application to Department of Land Affairs submitted November 2010 |
| EIA | Started August 2010 |
| Meteorology | @ 34m mast since November 2010 |
| Output | 2,432 production hours for a WinWinD 3 MW wind turbine (103 m rotor) <br> $28 \% ~ @ ~ 90 m ~ h u b ~ h e i g h t ~ a n d ~ 0.05 \% ~ s h e a r ~ f a c t o r ~$ |
| Grid | Qolweni Eskom substation (132/66/22 kV). New 66/33 kV 40 MVA trf required |
| Distance-to-Grid | 5 km |



Project as seen from the Msthanyane traditional council


Nqamakwe Wind Farm Project

| Size | 30 MW wind + 4 MW PV (= grid evacuation capacity) |
| :--- | :--- |
| Land | Application to Department of Land Affairs submitted in November 2010 |
| EIA | Started August 2010 |
| Meteorology | @ 20m Telecom tower since August 2010 |
| Output | 4,897 production hours for a WinWinD 3 MW wind turbine (103 m rotor) <br> $56 \%$ load factor @ 90m hub height and $0.05 \%$ shear factor |
| Grid | Nqamakwe Eskom substation (66/22 kV) 15 MVA. New 66/33 kV 30 MVA trf required |
| Distance-to-Grid | 5 km |



[^1]16


Qunu Wind Farm Project

## Former Transkel, Eastern Cape

| Size | 12 MW wind + 4 MW PV (< grid evacuation capacity) |
| :--- | :--- |
| Land | Application to Department of Land Affairs submitted Nov 2010 |
| EIA | Started August 2010 |
| Meteorology | @ 34m from February 2011 |
| Output | TBD |
| Grid | Qunu Eskom substation (132/22 kV) 20 MVA. No upgrade required |
| Distance-to-Grid | 5.2 km |



Project as seen from north of Ngaphezulu and Qunu


View along D1983 from Rooibank to Walvis Bay

|  | VRYHEID | HEIDELBERG | ALBERTINIA | PROTEUS | GRAHAMSTOWN | THOMAS RIVER | COEGA | WALVIS BAY |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Number of MW | 30 | 15 | 18 | 126 | 30 | 78 | 210 | 60 |
| Number of 3 MW wind turbines | 10 | 5 | 6 | 42 | 10 | 26 | 70 | 26 de 2,3 MW |
| Wind hours per year | 2830 | 2453 | 2889 | 2361 | 3900 | 2399 | 2715 | 2138 |
| Price per MW* in euros | 1200000 | 1200000 | 1200000 | 1200000 | 1200000 | 1200000 | 1200000 | 1200000 |
| CAPEX in $€$ | 36000000 | 18000000 | 21600000 | 151200000 | 36000000 | 93600000 | 252000000 | 72000000 |
| PPA (rand/MW) | 1250 | 1250 | 1250 | 1250 | 1250 | 1250 | 1250 | 1000 |
| CER per year* | 849000 | 367950 | 520000 | 2974860 | 1170000 | 1871220 | 5701500 | 1282800 |
| Operational cost per MW per year in $€$ | 33000 | 33000 | 33000 | 33000 | 33000 | 33000 | 33000 | 33000 |
| Financing | 70\% | 70\% | 70\% | 70\% | 70\% | 70\% | 70\% | 70\% |
| Equity | 30\% | 30\% | 30\% | 30\% | 30\% | 30\% | 30\% | 30\% |
| Interest rate | 8\% | 8\% | 8\% | 8\% | 8\% | 8\% | 8\% | 8\% |
| Taxes | 33\% | 33\% | 33\% | 33\% | 33\% | 33\% | 33\% | 33\% |
| Turnover in € per year* | 10697400 | 4636170 | 6552250 | 37483236 | 14742000 | 23577372 | 71838900 | 12956280 |
| IRR | 35\% | 26\% | 36\% | 24\% | 62\% | 25\% | 32\% | 11\% |

CER per year* : 1 ton of $\mathrm{CO}_{2}$ avoided = 1 CER / 2500 tons of $\mathrm{CO}_{2}$ avoided =1 MW in South Africa. Currently about 1 CER =10€
Price per $\mathrm{MW}^{*}=$ wind turbine + civil works + connection + road access works + electrical works + other expenses + shipping
Turnover* $=$ number of MW x wind hours per year x PPA + CERs


[^0]:    Project as seen from PPC quarry site entry, 330 m . away (south-east) from the closest turbine

[^1]:    Project as seen from the R409 between Tsomo and Nqamakwe

