

Backing up *wind turbines*

The Danvest Wind/Diesel (WD) systems is based on normal diesel-generator sets fitted with Danvest patented WD equipment for backing up wind turbines from 0 to 100 % of the wind energy supply in automatic and continuous operation :

- When the wind energy is sufficient to supply all consumption – the engine is clutch out and stopped – the alternator remains connected to the busbar for controlling of : reactive power, voltage and frequency (dumpload controlling).
- When wind is decreasing/consumer is increasing – the engine is started and clutch in automatic again in 1-3 sec.
- Dumpload controlling – fast dynamic load balance between the fluctuating wind energy and the varying consumer supply thus having stable Voltage and Frequency – 50/60 HZ +/- 0,1-0,3 HZ, so that the resulting fluctuation are negligible.
- Fitted with the Danvest W/D equipment the engines are able to operate at low load for longer periods thus maintaining normal service intervals.

With our method a yearly fuel-saving up to 50-90% can be obtained, thus saving so much fuel, that the saving can pay more than the more-cost for the wind turbines and the W/D equipment.

The cooling system obtain all waste- and surplus wind energy for water desalination/purification or central heating and in this way the highest Plant efficiency is obtained.

Raw water feeding systems are integrated in the total cooling system and both RO- and destilation processes are combined for obtaining the high efficiency.

The Danvest WD concept which is especially designed for remote areas is containerised and simple to install and operate.

The Danvest system offer a complete infrastructure solution with electrical energy, pure water and/or central heating in one compact turn-key system.

Existing Wind Power installations can be converted to WD systems for Grid-stabilization and back-up with continious power supply of highest quality. Installations can be extended with water-purification/desalination and central heating production.

See our web side : [www. Danvest.com](http://www.Danvest.com)

WDS2 A/S – Desalination Systems:

Vestesen A/S, previous Danvest Energy is also a part of – WDS2 A/S – specialize in Wind/Diesel/Desalination Systems.

The desalination systems are designed as containerised modules with production capacities from 10 to 3.800m³/day/unit. The modules can supply fresh water for : irregation, Municipal basis water supply, industrial process water and drinkingwater of high quality.

The desalination modules are based on “State of the Art” technologies with-

in Reverse Osmosis processes, Ultra Filtration, destillation and desinfection.

Danvest offers also stand-alone high efficient diesel-based containerised waterpurification systems for remote areas without adequate wind conditions.

Turnkey solutions – WDS2 designs the total system and in consortium cooperation with – acknowledged manufacturers for wind turbines (Vestas Wind Systems), desalination equipment (Provital A/S), finance houses, local contractors – WDS2 supply the total turn-key solutions

See our web side : www.WDS2.dk

Capacity :	Electric Power	100 - 5.000 kW/h
	Fresh water	100 - 60.000 m ³ /day
	Standard module	3,800m ³ /day – 1,000,000 Gallon/day

Summarizing

The preconditions for introducing wind energy conversion systems in isolated grids gives an

economical motivation to search for alternative technology which can replace energy production based on expensive fuel.

Vestesen A/S – previous Danvest Energy – has extensive know-how based on experince with design, engineering (diesel engine know – how), production, installation, operation and implementation of WD systems, and we have been in front of innovative developments and the designs of WD concepts to a viable and commercial extent.

The following key – features for the Danvest WD system with design philosophy for continuous development and operation strategies in order to be able to convince the Power Supplier – which often is sceptical for implamenting new technology for power supply – that high reability of operation and maintenance also is secured by the Danvest W/D system:

- The basis diesel generator sets operate independet but parallel with the W/D system, this means that if a brack down occur for the W/D equipemnt it is cut out and the basis diesel based generator sets continue the operating.
- The WD system must be simple and robust – making it possible for existing staff to operate andmaintain after a short introduction and training.
- The W/D system incl. wind turbines are based on world wide known and proven technology securing high reliability of the operation and maintenance.
- The W/D system operate automatically and continuously – often eplacing manual and periodic operation.
- At any operation mode power quality is within a predefined limits :

Frequence	50/60HZ +/- 0,1-0,3HZ
Voltage	400/480 volt +/- 3-6%
Power factor	0.8-0,98