

Vestas®

PowerPlus®

Validated gains in Annual
Energy Production from wind
parks around the world

Wind. It means the world to us.™

Today, Vestas PowerPlus® performance upgrades have been retrofitted on more than 10,000 wind turbines worldwide. To verify the energy production gains from Vestas PowerPlus® upgrades, Vestas has developed different validation methods. The validation methods are based on proven concepts and use some of the latest advancements in turbine control optimisation technology to accurately validate gains.

Currently, Vestas has validated the performance on more than 165 wind parks around the world. A selection of validated results is displayed below:

COUNTRY	WIND TURBINE MODEL	POWERPLUS PRODUCT	ANNUAL ENERGY PRODUCTION GAIN (%)
Ireland	V90-2.0MW	Aerodynamic Upgrades	0,85%
Italy	V100-1.8 MW	Aerodynamic Upgrades	1,48%
USA	V100-1.8 MW	Aerodynamic Upgrades	0,90%
Canada	V100-1.8MW	Aerodynamic Upgrades	0,91%
Cyprus	V100-1.8MW	Aerodynamic Upgrades	1,36%
USA	V100-1.8MW	Aerodynamic Upgrades	1,13%
USA	V100-1.8MW	Aerodynamic Upgrades	1,07%
France	V100-2.0MW	Aerodynamic Upgrades	1,36%
France	V100-2.0MW	Aerodynamic Upgrades	1,22%
Germany	V80-2.0MW	Aerodynamic Upgrades	1,11%
Japan	V80-2.0MW	Aerodynamic Upgrades	1,01%
Japan	V80-2.0MW	Aerodynamic Upgrades	0,95%
Australia	V82-1.65MW	Aerodynamic Upgrades	0,96%
Australia	V82-1.65MW	Aerodynamic Upgrades	0,49%
India	V82-1.65MW	Aerodynamic Upgrades	2,14%
India	V82-1.65MW	Aerodynamic Upgrades	1,37%
India	V82-1.65MW	Aerodynamic Upgrades	0,74%
Austria	V90-2.0MW	Aerodynamic Upgrades	0,73%
France	V90-2.0MW	Aerodynamic Upgrades	1,38%
Germany	V90-2.0MW	Aerodynamic Upgrades	0,92%
Italy	V90-2.0MW	Aerodynamic Upgrades	1,93%
Italy	V90-2.0MW	Aerodynamic Upgrades	1,86%
UK	V90-2.0MW	Aerodynamic Upgrades	1,19%
Australia	V90-3.0MW	Aerodynamic Upgrades	0,73%
Australia	V90-3.0MW	Aerodynamic Upgrades	0,75%
France	V90-3.0MW	Aerodynamic Upgrades	0,76%
Romania	V90-3.0MW	Aerodynamic Upgrades	0,47%
Spain	V90-3.0MW	Aerodynamic Upgrades	1,76%
Turkey	V90-3.0MW	Aerodynamic Upgrades	1,45%
UK	V90-3.0MW	Aerodynamic Upgrades	1,04%
USA	V90-3.0MW	Aerodynamic Upgrades	1,88%
USA	V90-3.0MW	Aerodynamic Upgrades	1,72%
USA	V90-3.0MW	Aerodynamic Upgrades	1,19%
Canada	V100-1.8MW	Extended Cut Out	4,23%
Italy	V100-1.8MW	Extended Cut Out	0,79%

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Italy	V100-1.8MW	Extended Cut Out	0,67%
Italy	V100-1.8MW	Extended Cut Out	0,60%
South Africa	V100-1.8MW	Extended Cut Out	1,27%
Spain	V100-1.8MW	Extended Cut Out	0,57%
USA	V100-1.8MW	Extended Cut Out	0,19%
Italy	V100-2.0MW	Extended Cut Out	0,20%
Turkey	V100-2.0MW	Extended Cut Out	1,25%
Canada	V80-1.8MW	Extended Cut Out	2,44%
UK	V80-2.0MW	Extended Cut Out	0,47%
Italy	V90-2.0MW	Extended Cut Out	0,47%
Italy	V90-2.0MW	Extended Cut Out	0,47%
Canada	V90-3.0 MW	Extended Cut Out	0,08%
Philippines	V90-3.0 MW	Extended Cut Out	0,17%
Sweden	V90-3.0 MW	Extended Cut Out	1,10%
UK	V90-3.0 MW	Extended Cut Out	1,11%
UK	V90-3.0 MW	Extended Cut Out	0,30%
USA	V90-3.0 MW	Extended Cut Out	0,01%
Costa Rica	V90-3.0MW	Extended Cut Out	5,27%
Denmark	V90-3.0MW	Extended Cut Out	0,70%
France	V90-3.0MW	Extended Cut Out	2,21%
Italy	V90-3.0MW	Extended Cut Out	0,08%
Norway	V90-3.0MW	Extended Cut Out	0,31%
Sweden	V90-3.0MW	Extended Cut Out	0,62%
UK	V90-3.0MW	Extended Cut Out	0,54%
USA	V90-3.0MW	Extended Cut Out	2,33%
USA	V90-3.0MW	Extended Cut Out	2,03%
USA	V90-3.0MW	Extended Cut Out	2,03%
USA	V90-3.0MW	Extended Cut Out	1,67%
USA	V90-3.0MW	Extended Cut Out	1,56%
USA	V90-3.0MW	Extended Cut Out	1,29%
USA	V90-3.0MW	Extended Cut Out	0,97%
USA	V90-3.0MW	Extended Cut Out	0,66%
Italy	V110-2.0MW	High Wind Operation	0,94%
Turkey	V110-2.0MW	High Wind Operation	1,08%
USA	V110-2.0MW	High Wind Operation	0,18%
USA	V110-2.0MW	High Wind Operation	0,10%
USA	V110-2.0MW	High Wind Operation	0,09%
Romania	V112-3.0MW	High Wind Operation	0,02%
USA	V112-3.3MW	High Wind Operation	2,42%
USA	V112-3.3MW	High Wind Operation	1,81%
Norway	V112-3.45MW	High Wind Operation	1,04%
Taiwan	V80-2.0MW	High Wind Operation	2,82%
UK	V80-2.0MW	High Wind Operation	0,04%
Spain	V90-2.0MW	High Wind Operation	0,56%
Spain	V90-2.0MW	High Wind Operation	0,52%

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Spain	V90-2.0MW	High Wind Operation	0,06%
Canada	V100-1.8MW	Power Optimised Mode	3,67%
Canada	V100-1.8MW	Power Optimised Mode	3,51%
Canada	V100-1.8MW	Power Optimised Mode	3,26%
Poland	V100-1.8MW	Power Optimised Mode	1,95%
Argentina	V100-2.0MW	Power Optimised Mode	2,54%
Finland	V112-3.0MW	Power Optimised Mode	1,75%
South Africa	V112-3.0MW	Power Optimised Mode	0,97%
Sweden	V112-3.0MW	Power Optimised Mode	1,19%
Uruguay	V112-3.0MW	Power Optimised Mode	1,01%
Turkey	V112-3.2MW	Power Optimised Mode	3,48%
Ukraine	V112-3.2MW	Power Optimised Mode	1,02%
Uruguay	V112-3.2MW	Power Optimised Mode	1,02%
Guatemala	V112-3.3MW	Power Optimised Mode	1,48%
Turkey	V112-3.3MW	Power Optimised Mode	1,60%
Turkey	V112-3.3MW	Power Optimised Mode	1,54%
Turkey	V112-3.3MW	Power Optimised Mode	0,98%
Turkey	V112-3.3MW	Power Optimised Mode	0,90%
Turkey	V112-3.45MW	Power Optimised Mode	1,62%
Sweden	V117-3.45MW	Power Optimised Mode	1,68%
Serbia	V126-3.6MW	Power Optimised Mode	1,15%
Argentina	V90-1.8MW	Power Optimised Mode	3,15%
USA	V90-1.8MW	Power Optimised Mode	3,20%
India	V100-1.8MW	Power Optimised Modes	0,97%
Sweden	V112-3.0MW	Power Optimised Modes	0,71%
Turkey	V112-3.0MW	Power Optimised Modes	1,24%
Spain	V90-2.0MW	Power Optimised Modes	2,86%
Canada	V100-1.8MW	Power Performance Optimisation	0,27%
Italy	V100-1.8MW	Power Performance Optimisation	0,43%
South Africa	V100-1.8MW	Power Performance Optimisation	0,24%
Spain	V100-1.8MW	Power Performance Optimisation	0,48%
USA	V100-1.8MW	Power Performance Optimisation	0,31%
Brazil	V100-2.0MW	Power Performance Optimisation	0,39%
France	V100-2.0MW	Power Performance Optimisation	1,10%
USA	V100-2.0MW	Power Performance Optimisation	0,58%
USA	V100-2.0MW	Power Performance Optimisation	0,15%
Ukraine	V112-3.2MW	Power Performance Optimisation	0,86%
Germany	V112-3.3MW	Power Performance Optimisation	0,47%
Germany	V112-3.3MW	Power Performance Optimisation	0,34%
Poland	V112-3.3MW	Power Performance Optimisation	0,33%
Germany	V112-3.45MW	Power Performance Optimisation	0,51%
Germany	V112-3.0MW	Power Performance Optimisation	1,06%
Germany	V112-3.0MW	Power Performance Optimisation	0,74%
Germany	V112-3.0MW	Power Performance Optimisation	0,56%

**Includes controller upgrade

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Germany	V112-3.0MW	Power Performance Optimisation	0,11%
Germany	V112-3.0MW	Power Performance Optimisation	0,82%
South Africa	V112-3.0MW	Power Performance Optimisation	0,54%
South Africa	V112-3.0MW	Power Performance Optimisation	0,38%
South Africa	V112-3.0MW	Power Performance Optimisation	0,23%
Sweden	V112-3.0MW	Power Performance Optimisation	0,36%
Sweden	V112-3.0MW	Power Performance Optimisation	1,01%
Australia	V112-3.075MW	Power Performance Optimisation	0,97%
Germany	V112-3.075MW	Power Performance Optimisation	0,85%
Sweden	V112-3.075MW	Power Performance Optimisation	0,78%
Sweden	V112-3.075MW	Power Performance Optimisation	0,78%
Germany	V112-3.0MW	Power Performance Optimisation	1,66%
Germany	V112-3.0MW	Power Performance Optimisation	1,11%
Germany	V112-3.0MW	Power Performance Optimisation	1,06%
Germany	V112-3.0MW	Power Performance Optimisation	0,52%
Poland	V112-3.0MW	Power Performance Optimisation	0,50%
Sweden	V112-3.0MW	Power Performance Optimisation	0,74%
Sweden	V112-3.0MW	Power Performance Optimisation	0,53%
Germany	V112-3.3MW	Power Performance Optimisation	0,63%
Germany	V112-3.3MW	Power Performance Optimisation	0,43%
Ireland	V112-3.3MW	Power Performance Optimisation	0,59%
Sweden	V112-3.3MW	Power Performance Optimisation	0,83%
Germany	V112-3.45MW	Power Performance Optimisation	0,54%
Ireland	V112-3.45MW	Power Performance Optimisation	0,75%
Ireland	V112-3.45MW	Power Performance Optimisation	0,71%
Finland	V126-3.3MW	Power Performance Optimisation	0,40%
Germany	V126-3.3MW	Power Performance Optimisation	0,30%
Germany	V126-3.3MW	Power Performance Optimisation	0,01%
Germany	V126-3.3MW	Power Performance Optimisation	0,31%
Germany	V126-3.3MW	Power Performance Optimisation	0,67%
Germany	V126-3.45MW	Power Performance Optimisation	0,37%
Japan	V80-2.0MW	Power Performance Optimisation	0,89%
Japan	V80-2.0MW	Power Performance Optimisation	1,12%
France	V80-2.0MW	Power Performance Optimisation	0,42%
UK	V80-2.0MW	Power Performance Optimisation	1,59%**
UK	V80-2.0MW	Power Performance Optimisation	0,32%
Denmark	V90-3MW	Power Performance Optimisation	0,34%
Norway	V90-3.0MW	Power Performance Optimisation	0,73%
Philippines	V90-3.0MW	Power Performance Optimisation	0,18%
Germany	V90-2.0MW	Power Performance Optimisation	0,56%
Germany	V90-2.0MW	Power Performance Optimisation	0,54%
Ireland	V90-2.0MW	Power Performance Optimisation	0,19%
Italy	V90-2.0MW	Power Performance Optimisation	0,24%
UK	V90-2.0MW	Power Performance Optimisation	0,54%
UK	V90-2.0MW	Power Performance Optimisation	0,54%
Germany	V112-3.45MW	Power Performance Optimisation	0,54%

**Includes controller upgrade

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