Wind Turbine Retrofit

Life Extension & AEP Increase of WTG's in Spain

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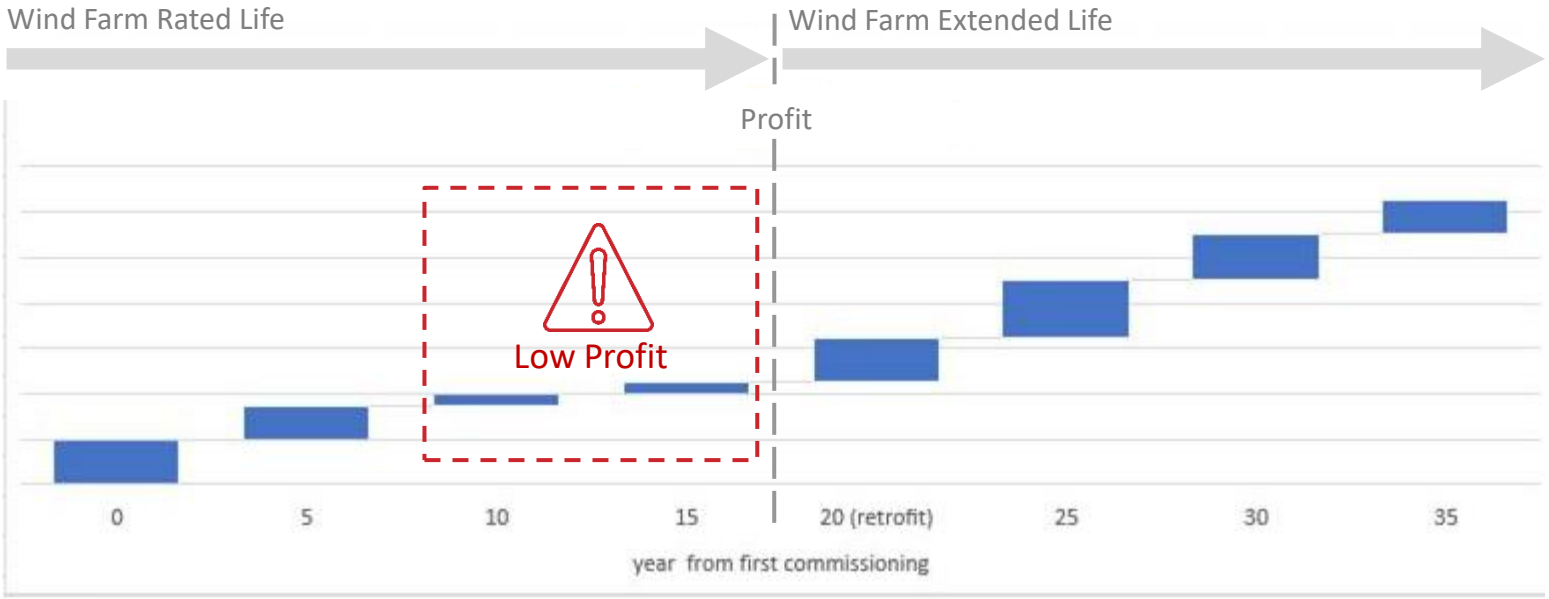
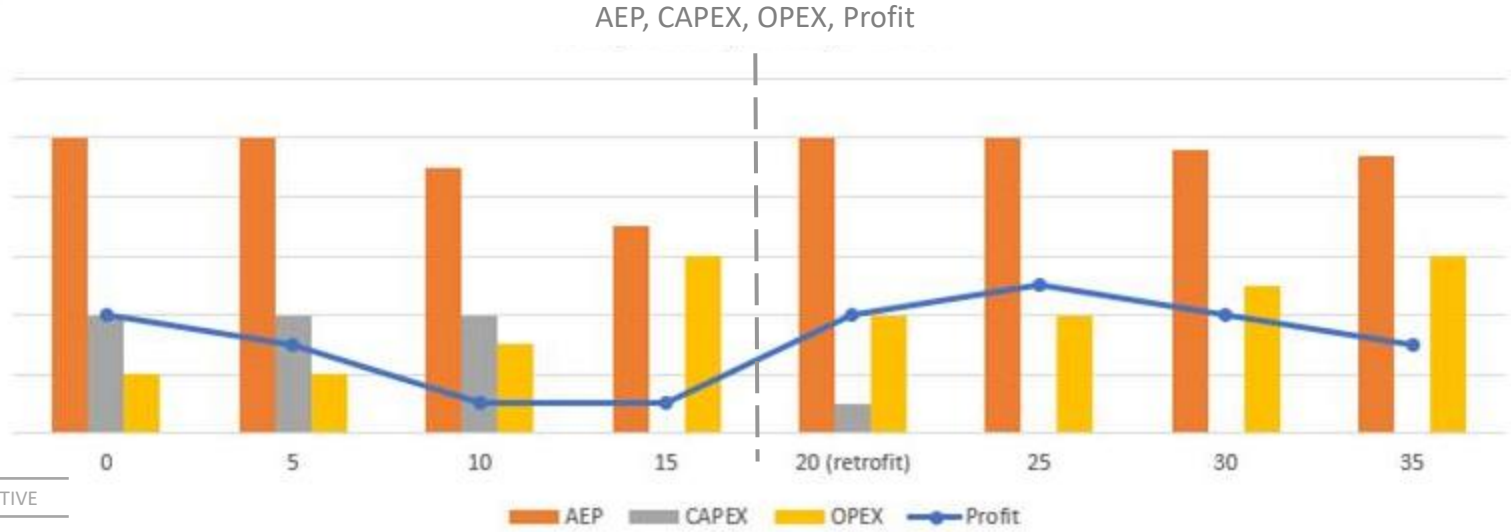
Life Extension & AEP Increase of Turbines in Spain





ILLUSTRATIVE

WTG Retrofit:

- Access to spare parts
- Service optimization
- Predictive maintenance
- Minimize loads
- Full remote control
- Independency
- Increased AEP

In Spain represented by:

- LATIS Wind
  Michel Bellaiche
  mrb@latiswind.tech
  +34 938 144 404
  www.latiswind.tech

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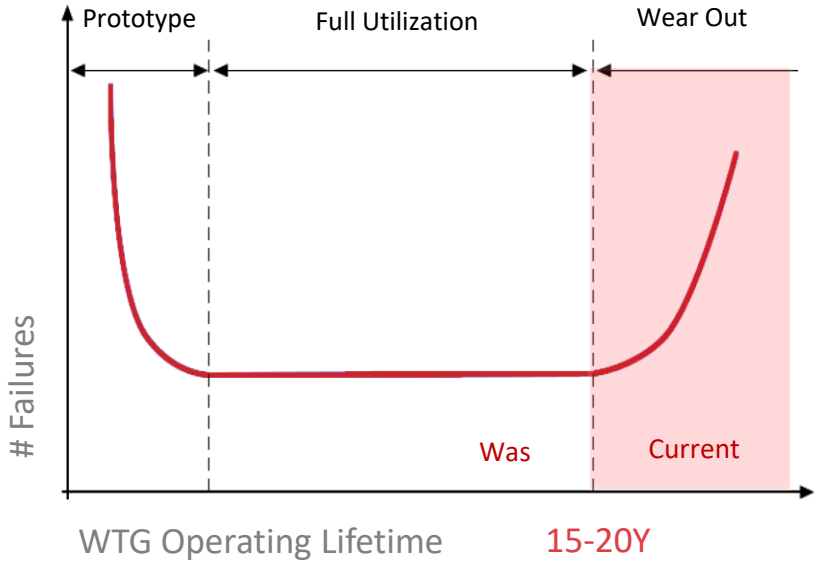
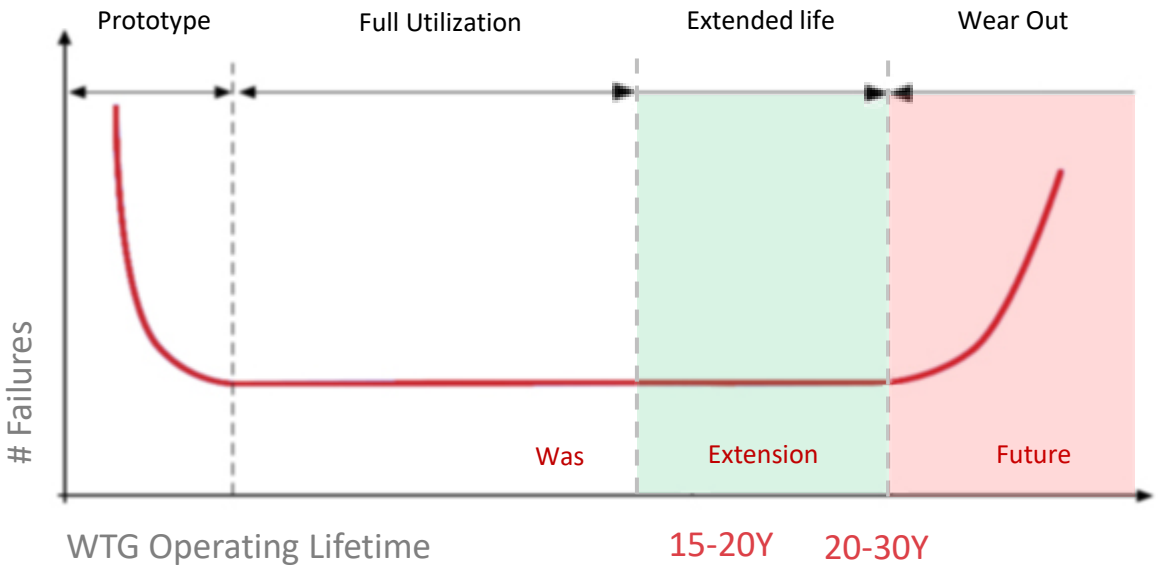
Lifetime Extension

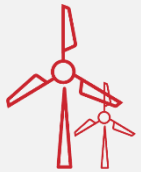
Before WTG Retrofit:



After WTG Retrofit:



Turbine Control



Park Control

Pitch Control

SCADA

Condition Monitoring

- WTG Life Extension
- One Day Installation
- Open SCADA Protocols

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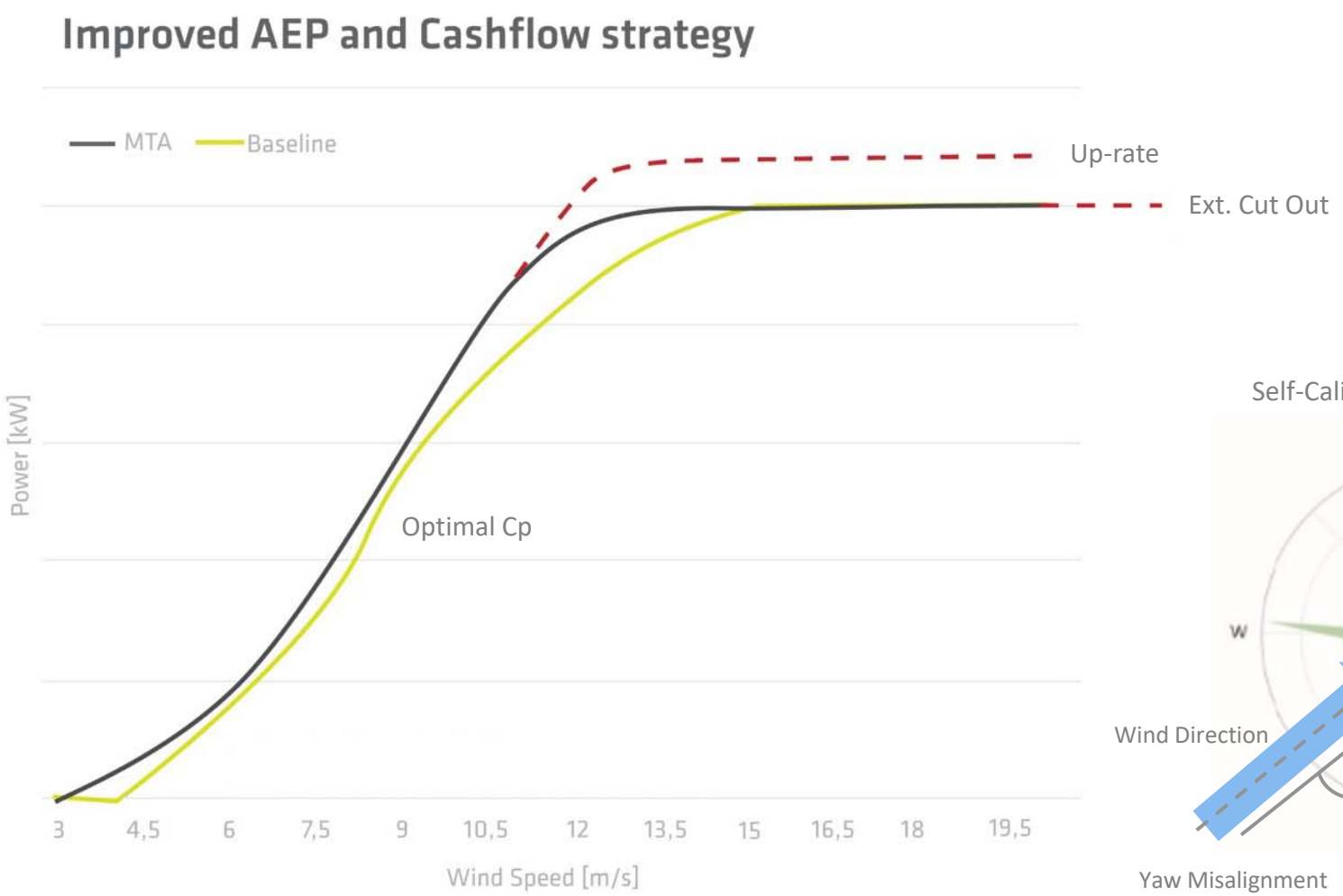
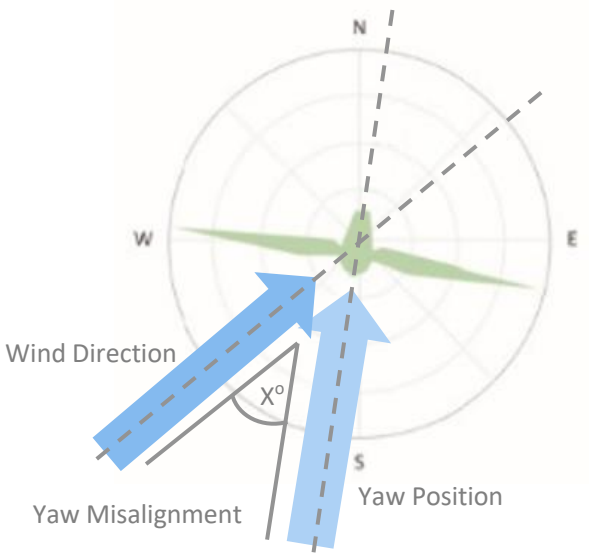
AEP Increase



Self-Calibrating Yaw Control:



- Condition Monitoring
- SCADA
- Self-Calibrating Yaw Control
- Cyber Security
- Independence

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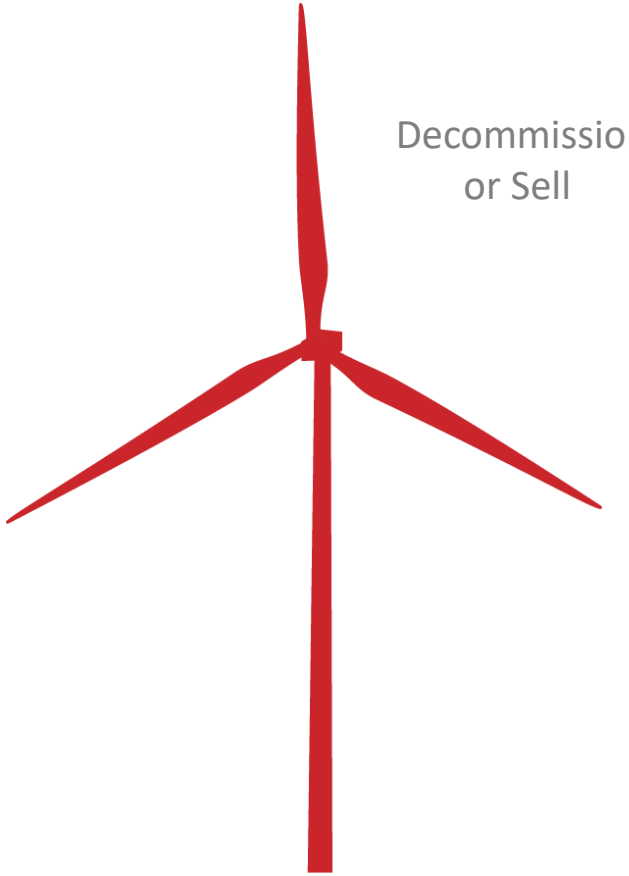
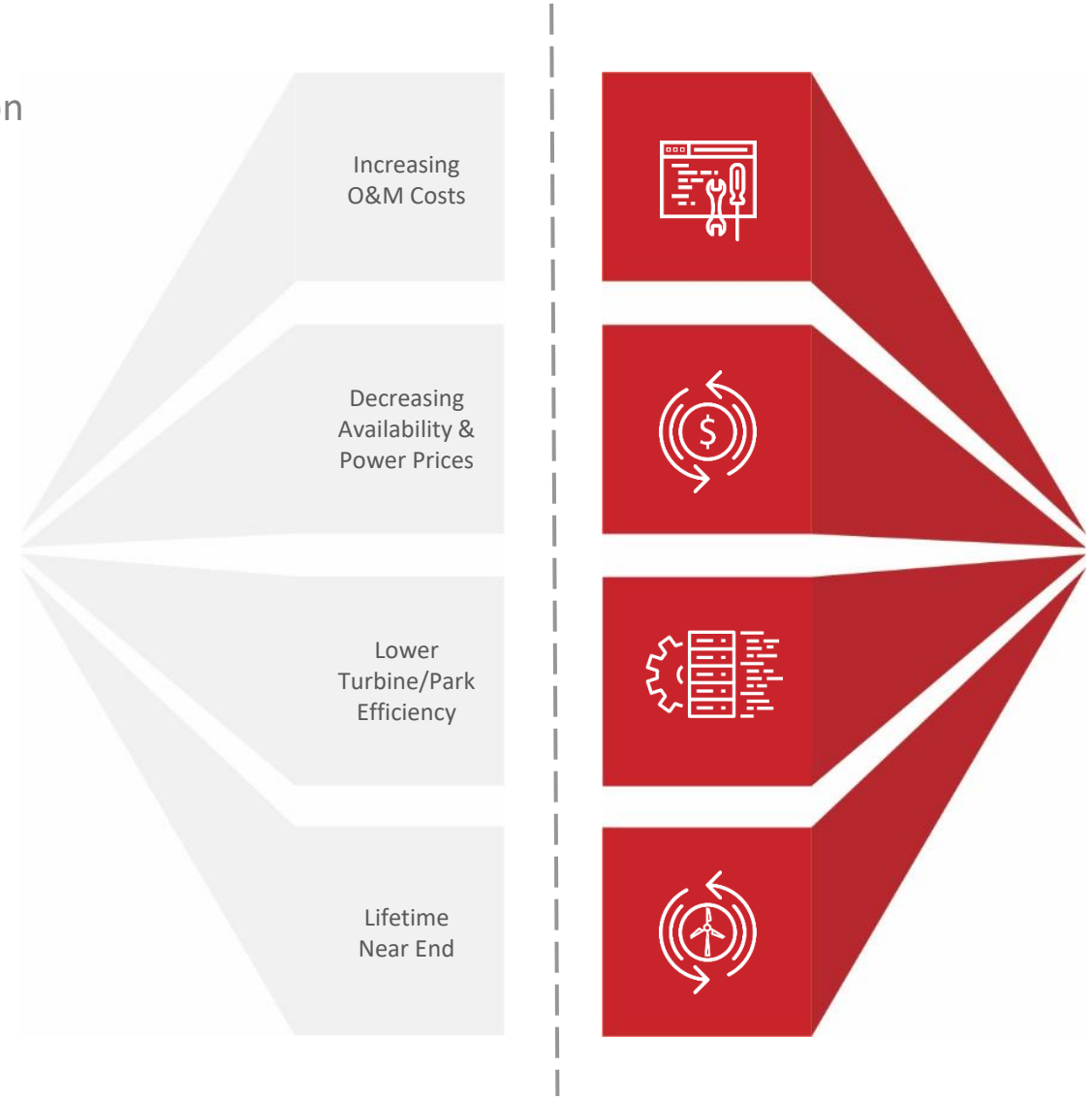
Better Economy - Decommission or Retrofit your Assets



Decommission
or Sell



Life Extension

- Increased performance via increased Power Curve
- Compliance to modern grid requirement = increased kWh-price
- Reduce service cost
- Reduce spare parts cost
- Independency from the OEM
- CMS - avoid bearing and gear brake down
- Wind/solar/storage
- Financed solutions

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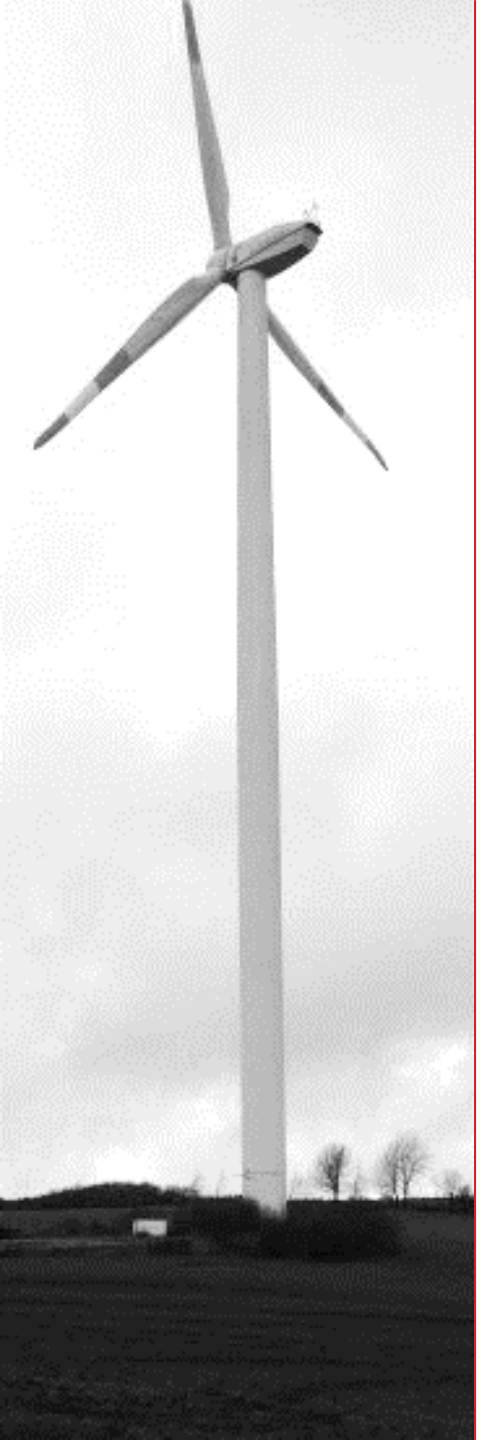


Case: 30 x Senvion MD 1.5 MW - Pitch
Task: AEP Improvement & SDL Bonus

Initial State

- Germany
- 1.5 MW MD7x
- # of turbines 30
- Commissioned ~2004

Retrofit Solution

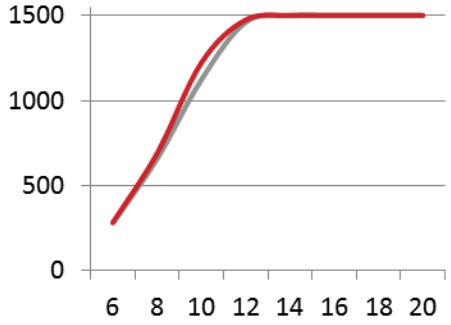
- WP3100 MK II, Plug´n Play
- New Converter (GE)
- 2-3 days installation time per turbine
- Advanced Control
- LVRT

New Status

- 2.6% AEP increase
- ROI 1,6 years (control)
- Renewed warranty on control and converter
- PPA(SDL) certified adding 0,7 €Cent per kWh additionally

Before WTG Retrofit:

After WTG Retrofit:



Case: Vestas V47 - 660 kW - Pitch
Task: Lifetime Extension

Vestas

Initial State

- Normal working
- Denmark

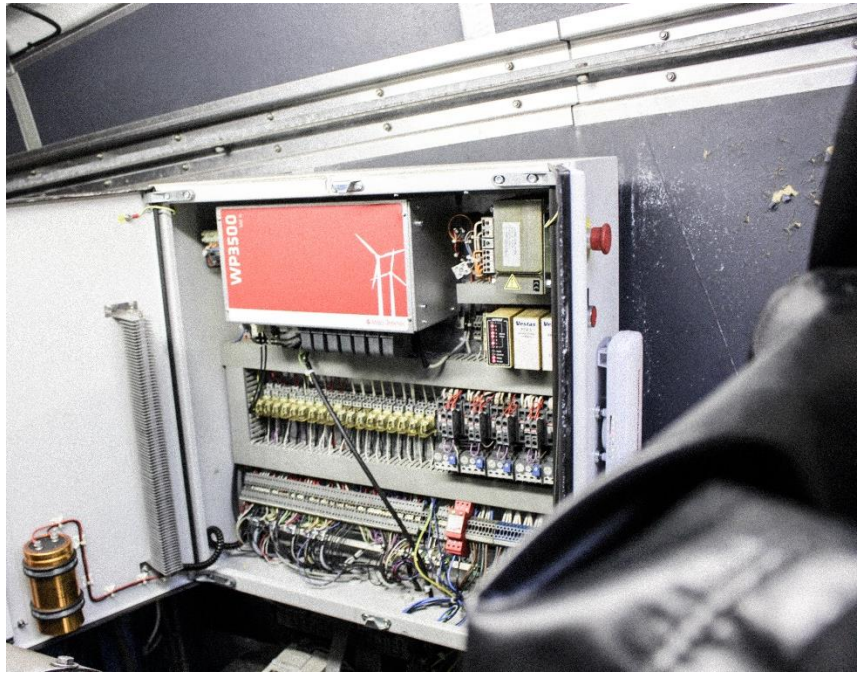
Retrofit Solution

- Reusing existing cabinets
- WP3500 MK II
- Plug ’n Play solution installed
- 1-day downtime
- Component Monitoring
- New Advanced Control Algorithm
- Site tuned

New Status

- Availability at 99,1%
- 2.5 % more basic AEP
- 710 kW uprate option
- 28 m/s ext. cut out option
- Re-certified by DKVIND

After WTG Retrofit:



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Case: 12 x Senvion MM92 - PMU and SCADA
Task: Cost optimization

Initial State

- Turbines are running
- Bachman controller used across the farm (turbine controller, PMU and Met station)
- Limited access to parameters and data

Retrofit Solution

- Turbine retrofit with WP4200 controller including CMS
- PMU and Met station Retrofit with WP100 controller
- Interface to 3rd party SCADA MiScout Data Collector installed
- 1 day installation time per turbine

New Status

- Project running after less than 3 week of installation
- 3rd party SCADA system integrated
- Availability at avg. 99%
- Renewed access to spare parts
- Complete access to data
- Complete data remote control over the internet
- Re-certification not needed

Before WTG Retrofit:

After WTG Retrofit:

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Upgrades Ready to Deploy

Bonus/Siemens
- Bonus B37 450 kW
- Bonus/Siemens 1.3 MW

Dewind
- Dewind D6 1.25 MW
- Dewind D4 600 kW

Fuhrländer
- Fuhrländer FL 250 kW
- Fuhrländer FL 600 kW
- Fuhrländer MD7X 1.5 MW

GE
- GE1.5, 1.5MW

Nordex/Südwind
- Nordex N27 150 kW
- Nordex N54 1 MW
- Nordex N60 1.3 MW
- Nordex S70 1.5 MW
- Südwind N3127 270 kW

Micon/NEG-Micon
- Micon M1500 500/600 kW
- Micon M1800 600/750 kW
- NEG Micon NM44 600/750 kW
- NEG Micon NM48 750 kW
- NEG Micon NM52 900 kW

Senvion
- Senvion MD7X 1.5 MW
- Senvion MM82 2 MW
- Senvion MM92 2 MW

Suzlon
- Suzlon S33-350 350 kW
- Suzlon S64 1.25 MW

Tacke
- Tacke TW500 500 kW
- Tacke TW600 600 kW

Vestas
- Vestas V17 75 kW
- Vestas V25 200 kW
- Vestas V27 225 kW
- Vestas V39 500 kW
- Vestas V42 600 kW
- Vestas V44 600 kW
- Vestas V47 660 kW
- Vestas V80 2 MW

Various OEM
- Autoflug A1200 1.2 MW
- Dongfang FD77 1.5 MW
- HSW 250 T 250 kW
- Mitsubishi MWT-600 600 kW
- Nordtank NTK300 300/200 kW
- Norwin 225 225 kW
- Sewind 1.25 MW
- Sinovel SL1500 1.5 MW
- Wind Master 300 kW

Controls and Performance-Optimization

Deliveries

Extending Lifetime, Boost Performance, Reducing Downtime

- Turbine Control
- Park Control
- Load & Pitch Control
- Retrofit & Optimization
- Wind, Solar, Storage
- Condition Monitoring
- SCADA

Analysis

Data Management, Surveillance and AEP Improvement

- Digital Control
- Big Data
- Condition Monitoring
- Data Insight
- Cyber Security
- SCADA

Results

AEP $ Performance Improvement

- Full Flexibility
- Full Insight
- Full Control
- Independency of OEMs

Co-financed, Optimum Cash Flow

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- Leading provider of intelligent wind power technology
- Established in 1969
- Wind industry pioneer
- +60,000 control systems worldwide

We Make Wind Competitive

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