

AHK-Deutsch-Brasilianische Industrie- und Handelskammer/Hamburg

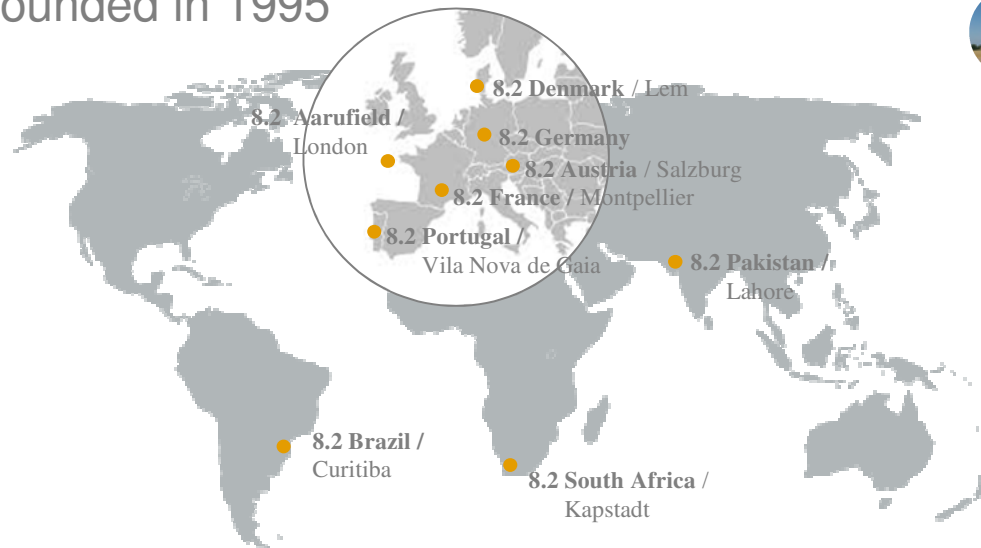
Condition Monitoring

CMS-View at the end of warranty (EoW)

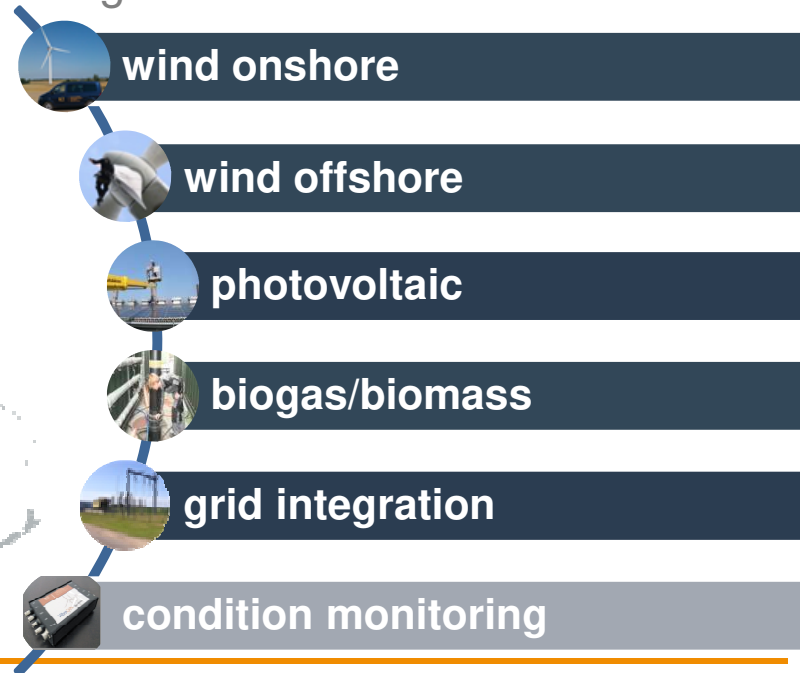
Dipl.-Ing Bernd Höring
managing director
8.2 Monitoring GmbH

8.2 Group

International network of experts in renewable energies
founded in 1995



- 130 experts worldwide | active in 50 countries



8.2 Group



**longtime experience
with all different WPP-types
> 22 000 WPP inspected**

**Due Diligence for more than
6 000 MWs onshore/offshore
worldwide**



**international Due Diligence
for more than 2.5 GWs
PV projects**

**design review realised
for a huge amount of
offshore turbines**



- technical consulting
- Due Diligence technology
- damage- und value analysis
- techn. inspection (WKP, ZOP, IBN, EOW)
- report of continued operation (20+)
- report of grid integration
- QS-/production- & construction monitoring
- online and offline condition monitoring
- fundament inspection & constr. monitoring
- rotor blade inspection
- videoendoscopy & mediation

8.2 Group



40.000

Technical
inspections –
wind power



32

Branch offices



5

GWs
condition
monitoring



15,2

GWs TDD –
wind power



130

Experts
worldwide

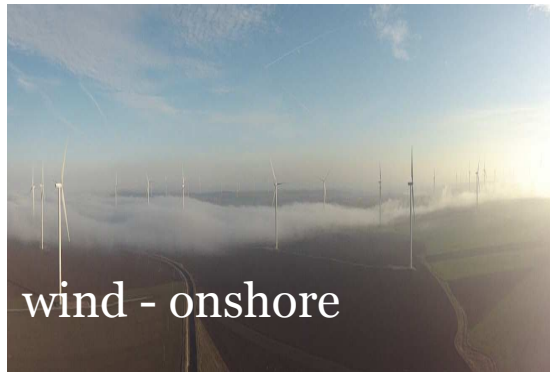


5.000

Customers

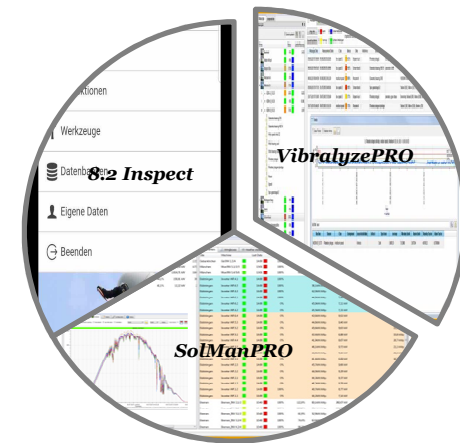
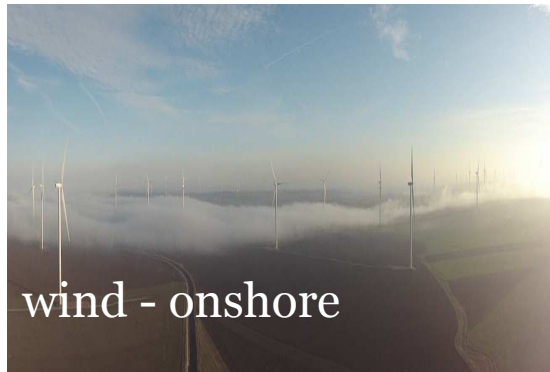
8.2 Monitoring GmbH / Hamburg

- specialised company within the 8.2 Group
- completely self-contained and independent
- focused on on- and offshore condition monitoring



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8.2 Monitoring GmbH / Hamburg



30 years
CMS practice experience
wind and other industries

selfmade
CMS analysis software
for different types of
CMS hardware



market leader in
independent
CMS analysis of
offshore - plants

independent
condition monitoring centre



- different hardware solutions
- analysis software VibraLyzePRO
- remote monitoring centre
- CMS data analysis
 - “parallel”-monitoring for operators/BF
 - **end of warranty** (EoW/EoFSC)
 - expiry of maintenance contracts
 - continued operation
- development of CMS solutions with industry partners
- CMS consulting

A photograph of an offshore wind farm at sunset. The sky is a mix of blue, orange, and yellow. Several wind turbines are visible in the distance, and one is prominently featured in the foreground on the right. The ocean is dark blue with white-capped waves.

**condition monitoring
is our passion**

condition monitoring - our passion

end of warranty – recognise claims and document claims

producer-CMS use for your own purposes

Preconditions for CMS-analysis

- **1. Access** is **necessary** to the CMS-data !

Previously a contractual arrangement is necessary for the CMS!!!

- Access to the CMS / CMS-dataserver
- Delivery of raw data
- A released download!



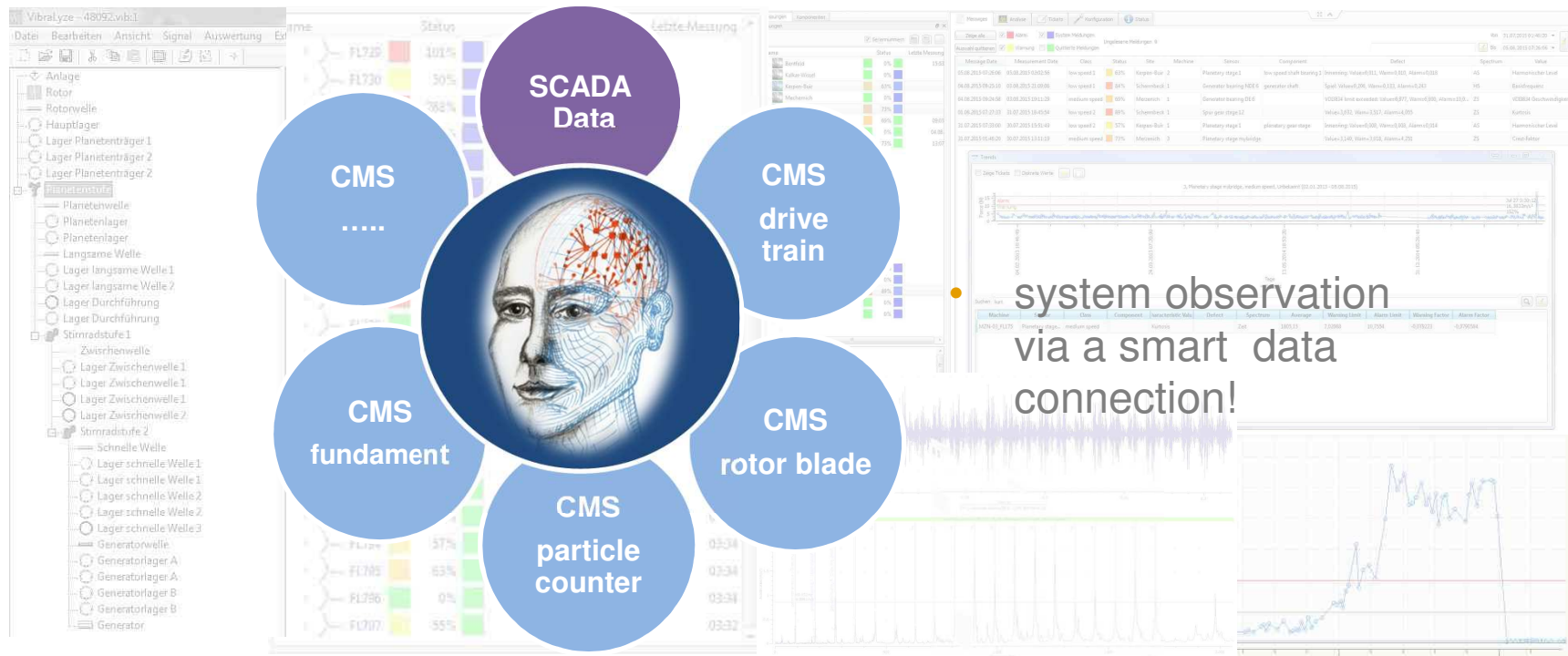
- **2. Interfaces** to CMS-data is needed !
- **3. Software**, which can analyse any type of data.

2. Our Interfaces to external-CMS

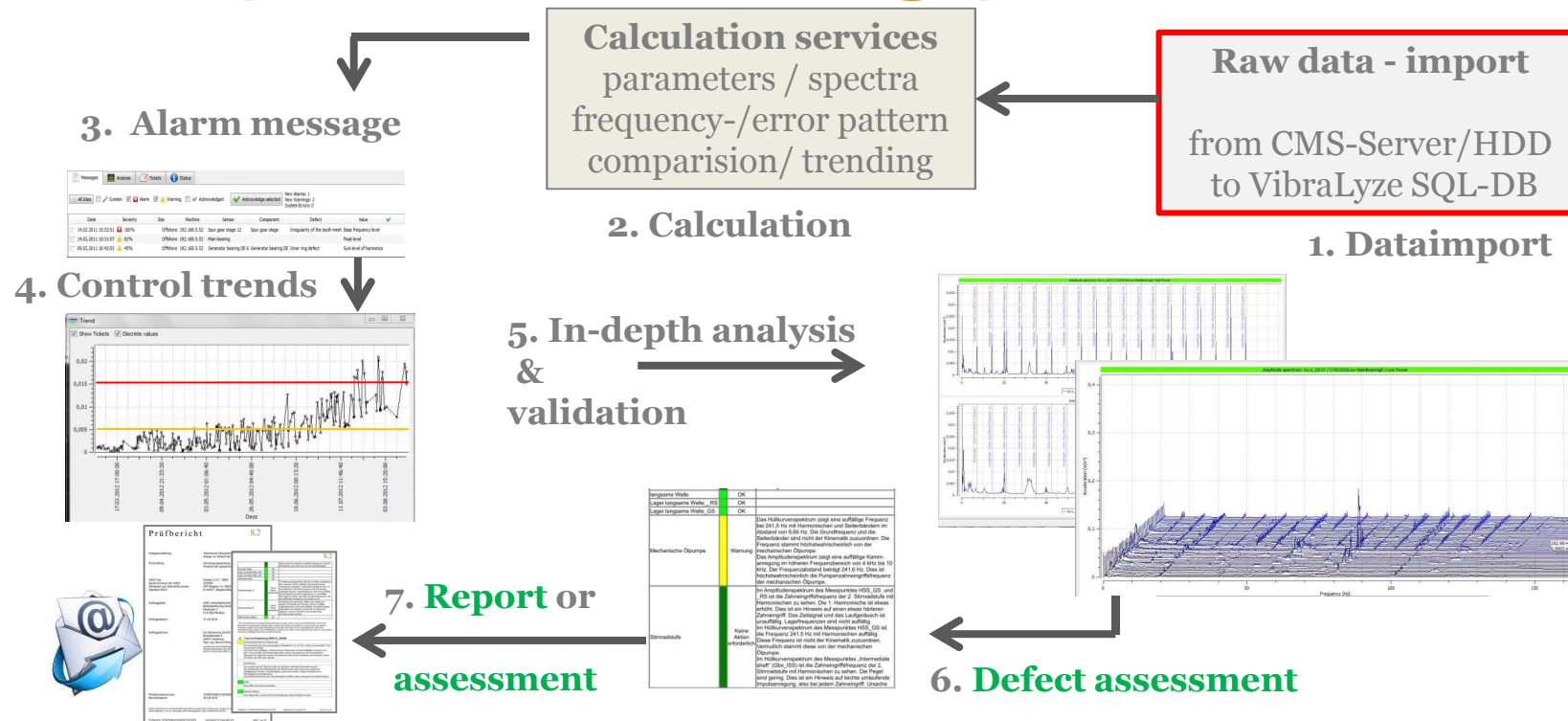


- The interfaces allow us to **analyse all different kinds of CMS-types** !

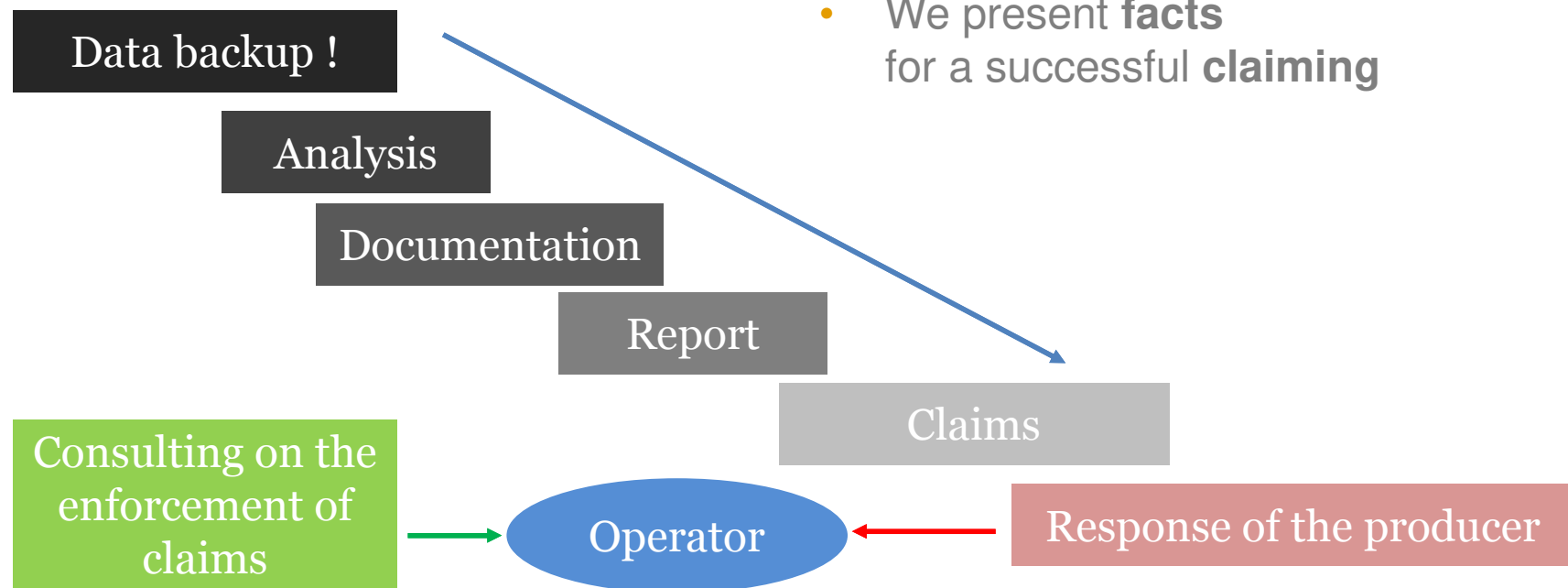
3. Our software - VibraLyzePRO



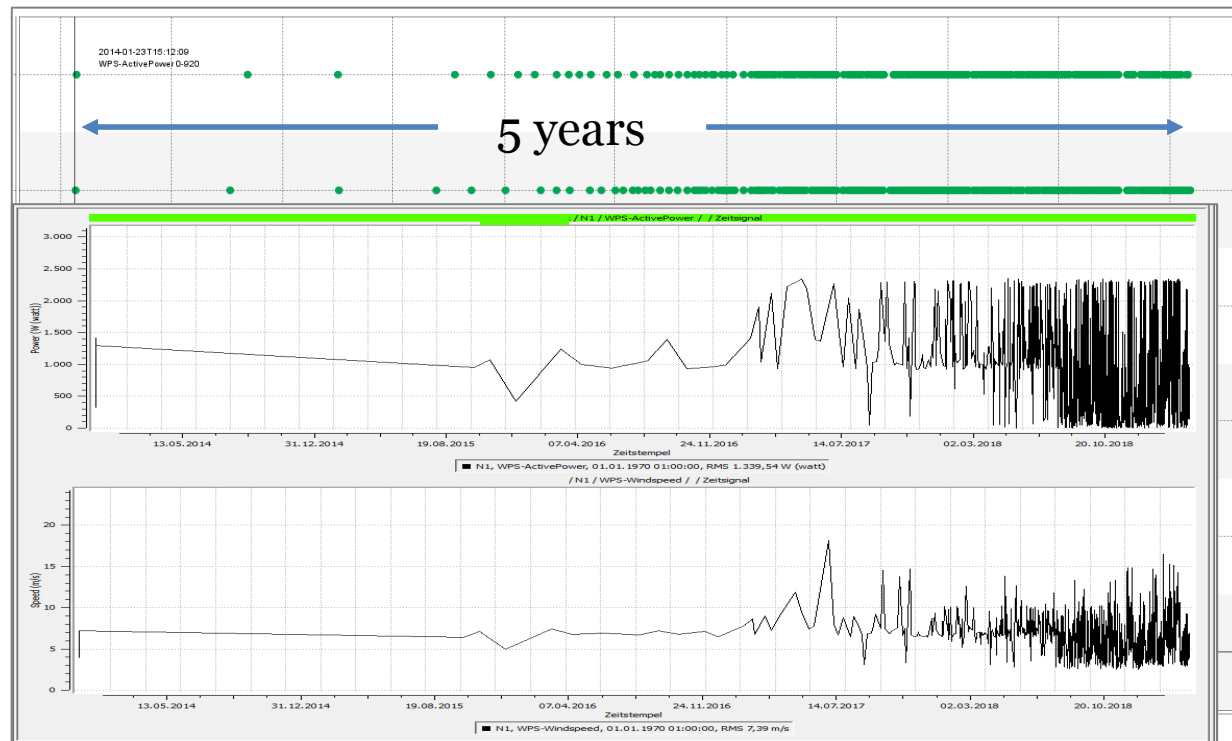
CMS / 8.2 Monitoring / Workflow



Claiming as a result of an analysis of the manufacturer-CMS



Premature data backup !



All data will be
thinned out
systematically !!!

To some
thinn out begins
after 90 days

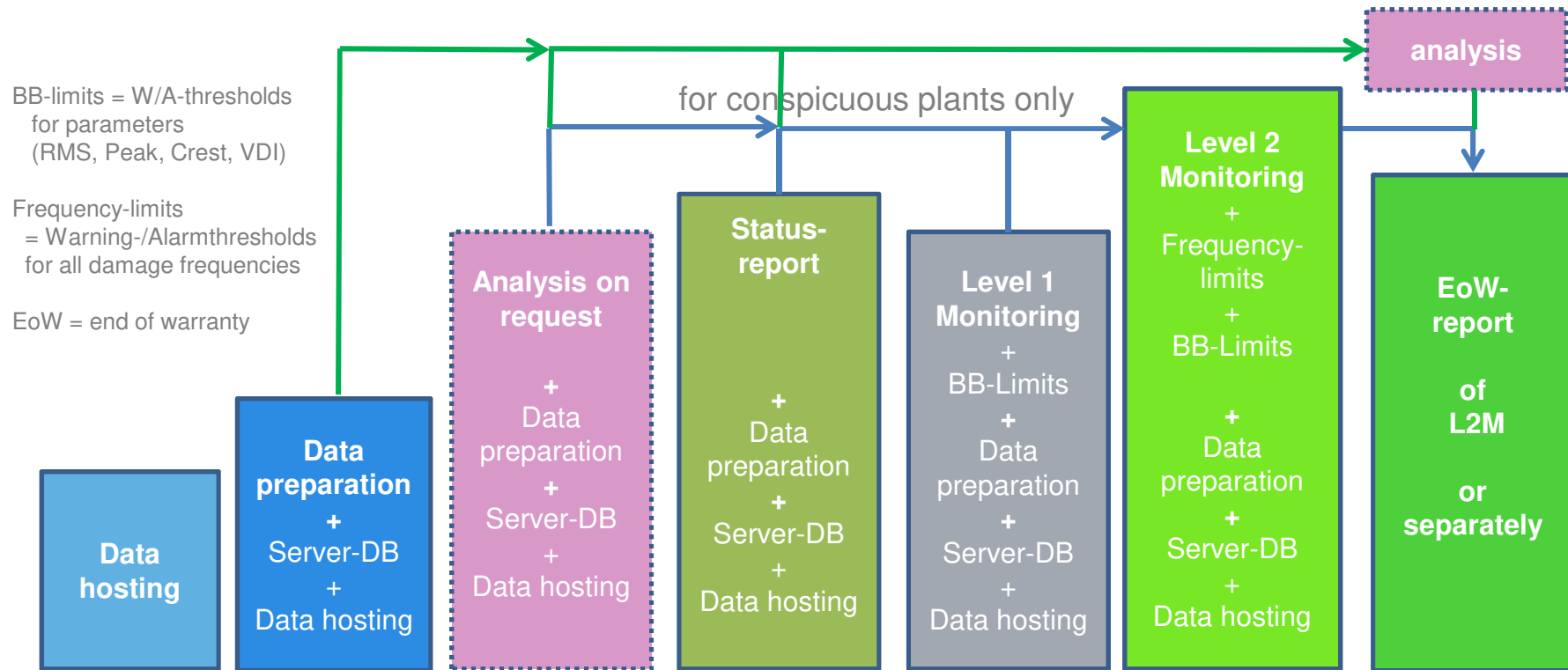
Often the moment of
the initial damage is
not provable
anymore!

„Parallel-Monitoring“/ EoW-Report

CMS-Packages / step plan:

- Data hosting only to backup data for EoW-report
- Data hosting + data preparation for a quick analysis on request
- Data hosting + data preparation + one-time status report
- Level 1 monitoring (monitoring the parameters RMS, Crest,..)
- Level 2 monitoring (standard – daily monitoring and reporting)
- End of warranty report based on CMS-data

CMS-Packages / offshore



CMS-projects: Examples

- onshore
- offshore

different CMS-hardware

parallel-monitoring by 8.2

CMS-service since 2015

29 x FL2500 / Kazanlak -Bulgaria

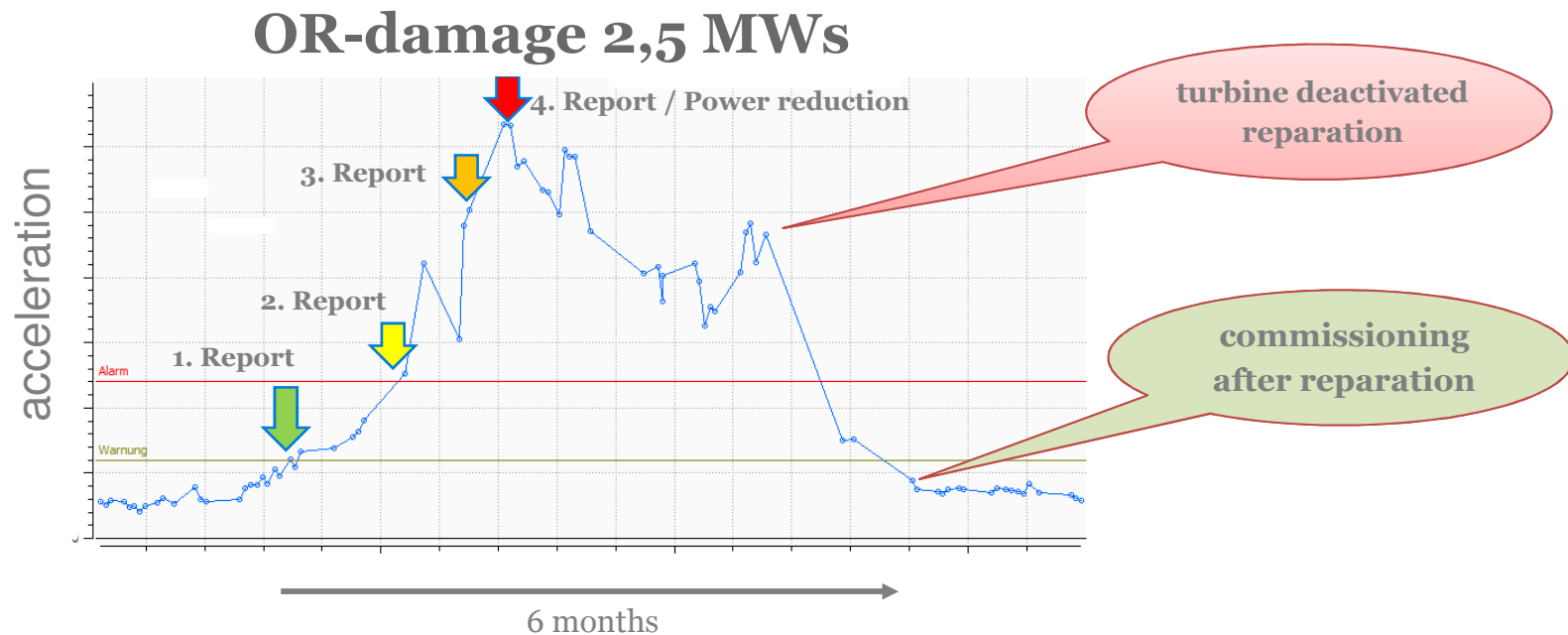
- Full-monitoring for all main components
- Difficult location (much wind, ice (!), accessability)
- Problem: turbine manufactuer insolvent + series defect
- fully risk control !

CMS: WPP-Comos by ISTec



Problem: Main bearing defects

Example: – detected main bearing - claim



CMS-Service – mobile measurements Enercon E-66, E-70, E-82, E-92, E-115

- **cost pressure → control at the end of EPC-contract**
- **now even with mobile measurements**
- **main bearing damages can be detected mobile**

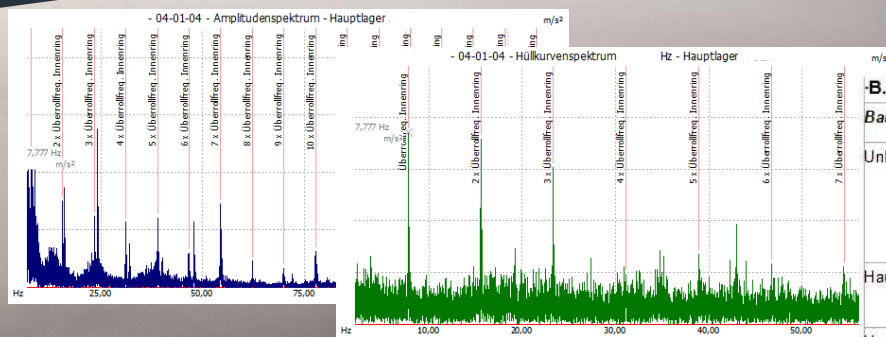
CMS: 8.2 VibraLyze DataRecorder

CMS-Service – mobile measurements

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CMS: 8.2 VibraLyze DataRecorder

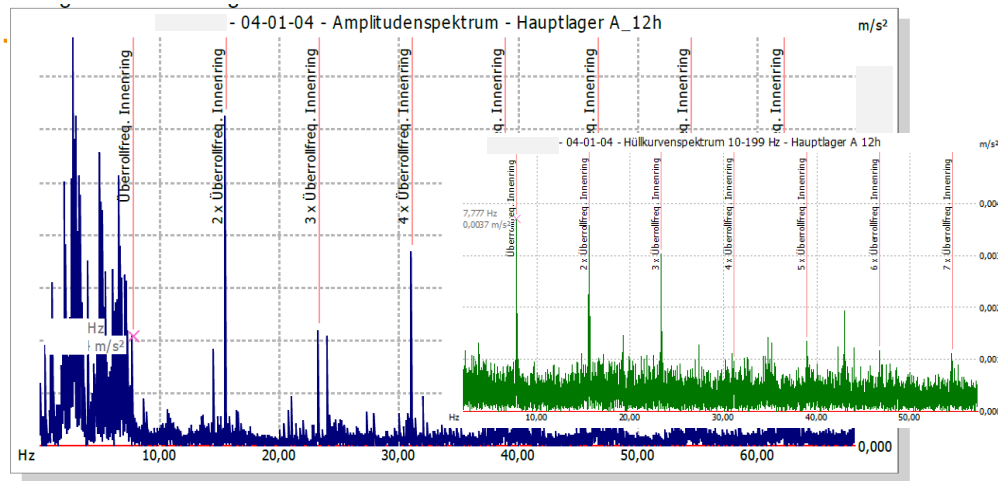


B.1- Ergebnis-Schwingungsmessung¶

Bauteil¶	2017	Status¶	Auffälligkeiten¶
Unbekannte Frequenz¶		Keine Aktion erforderlich¶	Im Amplitudenspektrum erkennt man eine unbekannte Frequenz mit 7.999 Hz und deren Vielfache. Die Herkunft ist unklar. Wahrscheinlich handelt es sich um eine vom Generator induzierte Erregung. Sie hat keine Bedeutung für die Beurteilung des Hauptlagers.¶
Hauptlager 1 (RS)¶		Alarm¶	Der Innenring des Lagers ist im Hüllkurven- und Amplitudenspektrum deutlich auffällig. Im Zeitsignal ist ein deutliches „rattern“ zu hören.¶
Hauptlager 2 (GS)¶		OK¶	Keine Lagerfrequenzen erkennbar¶

03-06-2019

Critical moment: End of EPC



mobile vibration-
measurement before
end of EPC

B.1- Ergebnis-Schwingungsmessung		
Bauteil	2017 Status	Auffälligkeiten
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Hauptlager 2 (GS)	OK	Keine Lagerfrequenzen erkennbar.



We are the market leader of independent analyses
of CMS on offshore turbines

CMS-Service for three offshore windfarms since 2013

- Full-monitoring, data analysis on request
- Statusreports main components, drive train
- Selective monitoring for „problem cases“!
- Preparation EoW/recurring inspection-campaign
- Determination of priorities for repairs
- Damage analysis

CMS: SIPLUS4000, OmegaGuard III, TCM


BARD Offshore 1, Meerwind S|O, Global Tech 1, Baltic 1+2

CMS-Service since 2015

80x SWT3.6-120, Meerwind S|O

- Status-Quo for all main components
- Analysis in case of an alarm of the TCM-system
- Fully monitoring for conspicuous components
- Preparation EoW-campaign
- recurring inspection-plant selection

CMS: TCM by Siemens Windpower/G&J



CMS-Service since 2016

80x AD5-116, Global Tech I

- **Status-Quo for all main components**
- **Fully monitoring for main bearing & conspicuous components**
- **Preparation EoW-campaign**
- **recurring inspection-plant selection**

CMS: OmegaGuard III by Bachmann

First EoW-project - ongoing 30x SWT3.6-120, Riffgat

- Data hosting to prepare EoW-campaign since Dec. 2018
- Data analysis drive train
- EoW-report
- Support on claiming

CMS: TCM by Siemens (G&J)

Second EoW-Project – ongoing **80 x SWT 3.6-120, OWP Butendiek**

- **Data hosting to prepare EoW-campaign since Jan. 2019**
- **Data analysis drive train – Status Quo - report**
- **EoW-report**
- **Support on claiming**

service: independent CMS analysis

Third EoW-Project – ongoing 80x SWT3.6-120, Meerwind S|O

- **Data hosting since 2015**
- **Status-Quo for all main components at the beginning**
- **Analysis in case of an alarm of the TCM-system**
- **Full-monitoring for conspicuous components**
- **Preparation EoW-campaign – info for videoendoscopy**
- **Support on claiming**

CMS: TCM by Siemens Windpower/G&J

Conclusion

- **Message:** We can analyse producer-CMS independently
- We can **get** more **information of the CMS-data** than you would get from the producer.
- We can **help** to record the original status of the assets, to **detect risks and to secure claims!**
- Especially on bigger plants, you **should observe main bearings**



8.2 | The Experts in Renewable Energy



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