

In-housing Vibration Analysis with Hardware Agnostic CMS Software

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Presenter introduction

8 years leading turbine data analytics teams incl. CMS engineering



Tom Hall

VP CMS Services,
SkySpecs

History

- 6 years at Siemens Wind Power and 6 years RWE Renewables.
- Inhousing of ~3,000WTGs at RWE which saved \$5,000 / WTG annually.
- Now at Skyspecs, leading the CMS Services business.

Current motivation

- Failure rates increasing both on ageing and new wind turbines.
- Condition monitoring is critical for keeping momentum in the renewable transition.

Agenda

Major themes of this presentation



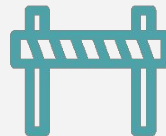
Key
benefits



5 steps to
consider



Additional
Advantages



Potential
challenges



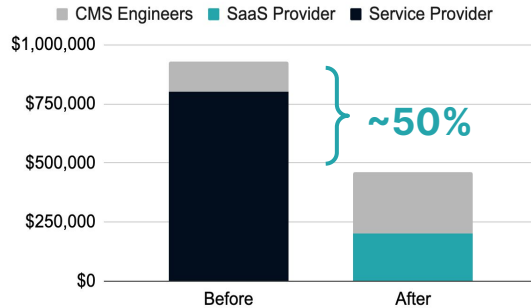
Taking the
first steps

The logic behind CMS in-housing

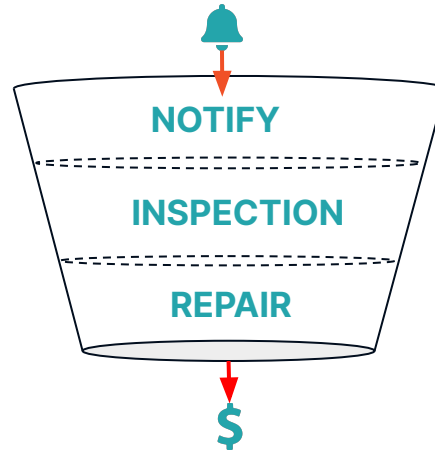
Major cost savings, efficiency gains, and flexibility

SAVE ON SERVICE PROVIDER(S)

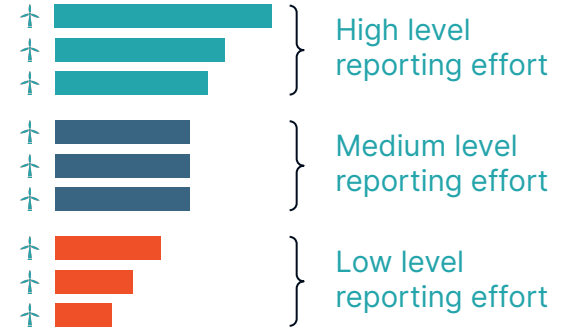
After vs. Before (1 year)



INCREASE EFFICIENCY

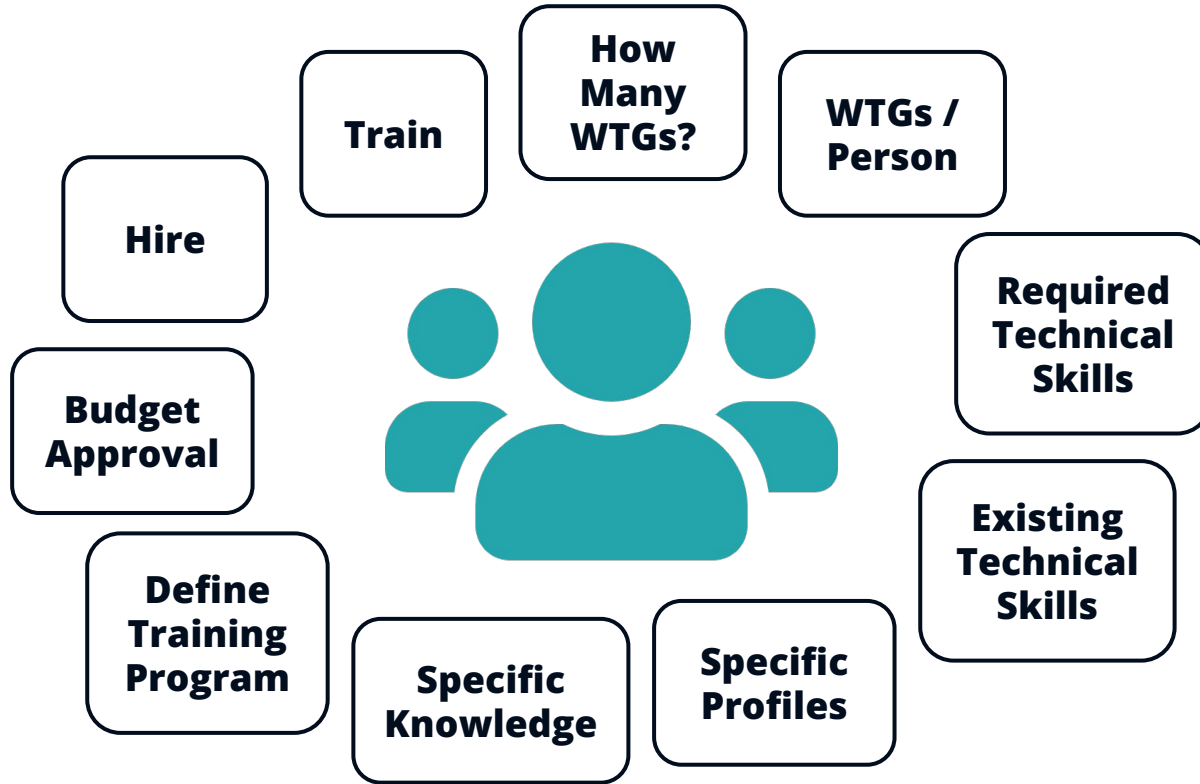


GREATER FLEXIBILITY



Step 1

Ensure you have the necessary headcount and training



Step 2

Determine which assets to in-house



Strategic Importance

Critical Assets (or not)



Cost

Expensive Service Provider(s)



Skill Set

Existing Skills and Expertise



Data security and compliance

Control and Protect



Risk Management

High Risk of Failure



Vendor dependency

Diversify Main Provider(s)

Step 3

Access data, establish connections and setup monitoring software



DATA ACCESS

Check data ownership, know exactly where it's located, including historical data



HARDWARE **AGNOSTIC**

Avoid going out to a bunch of different providers to buy their individual software products



INTUITIVE PLATFORM

Reduction of training time and transition costs when interface is easy to learn and use

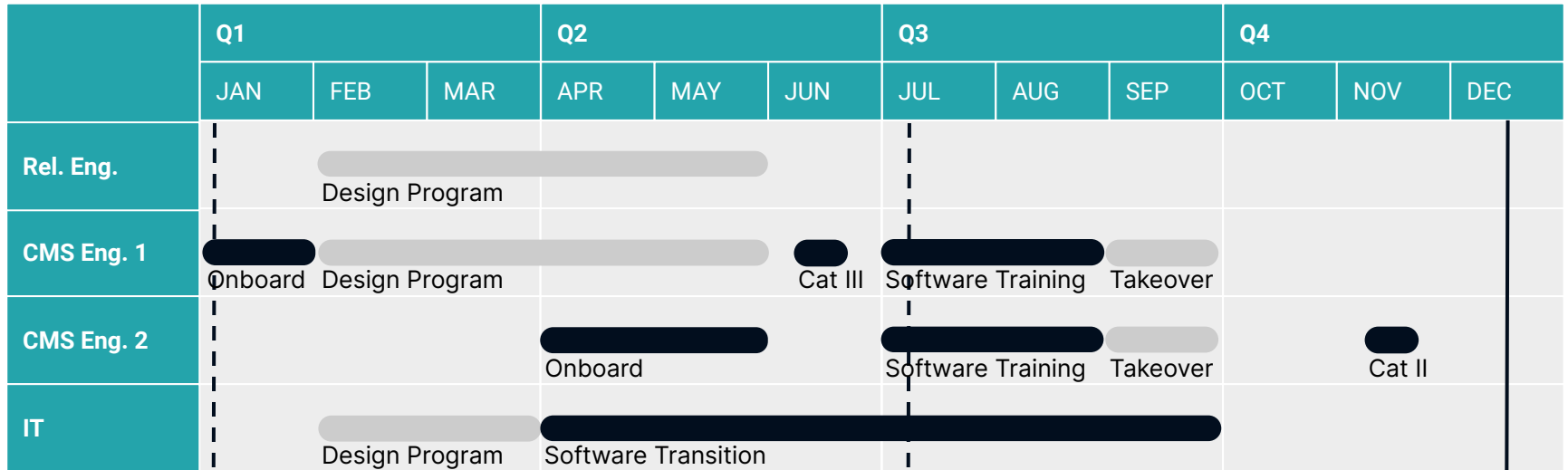


TRANSITION **SUPPORT**

Use provider's knowledge, expertise and resources to support the in-house setup

Step 4

Monitor and analyze performance and adjust as needed

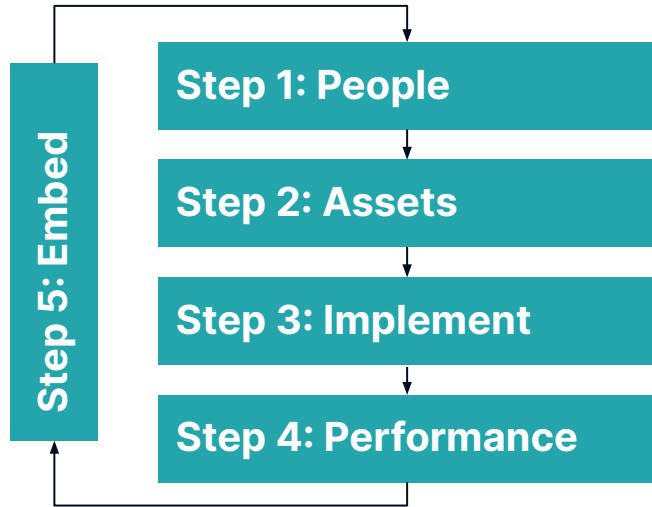


- - - - Performance Evaluations
 ————— Goal / Target Setting

Step 5

Transition from providers to your own environment

RINSE & REPEAT



SHIFT FOCUS TO OPERATIONS

- Improving Communication
- Improving Response Times
- Creating Tailored Solutions
- Make the Most of the Increased Flexibility
- Better Understand the Needs of Internal Stakeholders
- Improving Accountability

Unlocking the advantages of CMS in-housing

Cost reductions take the spotlight, but additional advantages to gain

COST REDUCTION



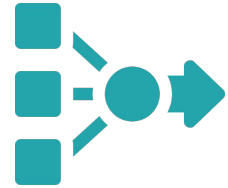
Save roughly \$5,000 / WTG / year through efficiency gains, greater flexibility and not paying a service provider/OEM anymore

QUALITY OF SERVICE



Speaking the same **“language,”** working towards the **same goals,** and taking advantage of time zones for **increased interaction**

KNOWLEDGE & OWNERSHIP



Unify all your data (CMS, SCADA, particle count etc.) in one platform for greater **insights** and increased **communication and responsibility**

CMS In-housing: Be ready for the hurdles

Finding Qualified Engineers

- No easy task
- Vibration analysis experience
- Wind-specific experience
 - Diagnose issues
 - Recommend actions

Training Time

- Plan to invest time and money into training of the CMS engineers
 - Wind specific diagnostics
 - CMS Software
 - etc.


Data Access

- Wind turbine OEMs offer limited or no data access to owner/operators
- Owner/operators often lack information on data ownership, location, access, and files needed for CMS analysis

Leadership Buy-In

- Financial and technical risk
- Headcount approval
- Accept the responsibilities
- Emphasize the benefits

Take the first step on your in-housing journey



How To In-House
Your Wind Turbine
Condition Monitoring

SKYSPECS

skyspecs.com/resources



Tom Hall
tom.hall@skyspecs.com

3 key takeaways

I hope you'll remember



In-housing CMS Analysis Saves \$\$\$

CMS operations costs are lowered, but also OPEX



Many Challenges Lie Ahead

Building the team, stakeholder management, embedding into operations



Partnering can Make the Journey Easier

Use their expertise to provide a customised transition plan



Simplify Renewable Energy **Asset Management**
so less can do more for the planet