Q&A Session 1

APQP4Wind manual and workbook in details
Welcome and agenda

09.15 – Welcome to Vestas Wind Systems A/S and APQP4Wind
09.25 – Business context for APQP4Wind
09.40 – Manufacturer's view
10.10 – The APQP4Wind project
10.30 – Coffee break
10.45 – Suppliers' view
11:00 – Training concept and Training Providers
11:15 – APQP4Wind kick-off
11:30 – Plenary Q&A
12:00 – Buffet and networking

12.45 – Q&A Session 1
13.45 – Coffee break
14.00 – Q&A Session 2
15.00 – Thank you & goodbye
**APQP4Wind kick-off**

- **APQP4Wind in detail**
  - Introduktion
  - APQP4Wind Manual
  - APQP4Wind Workbook
  - Q&A
APQP4Wind - Introduction

- Requirements for Quality Assurance
- Product release process (PPAP)
- Set of information on Quality concepts
  - FMEA
  - MSA
  - Special Characteristics etc...
- Detailed workbook to support documentation of requirement
APQP4Wind - Introduction

**Vision**
- Standardized and mature global wind industry supply chain with low cost of poor quality

**Mission**
- Provide Standards, Tools and Methods for the Global Wind Industry based on common accepted and available APQP principles and guidelines

**Purpose**
- To attain a aligned approach to supplier quality within the Wind Industry.

**Goal**
- The aim of APQP4WIND is to strive for reducing risk when introducing new designs and components.
- Bring down cost of energy by reducing cost of quality “cost of ownership perspective” for the wind turbine industry value chain, setting common standards for Quality Training, Methods and Procedures.
- To develop a common standard on APQP for suppliers within the Wind Industry.
APQP4Wind – Customer-Supplier hierarchy

CUSTOMER

Wind Power Customer

Wind Turbine Manufacturer

SUPPLIER

Wind Turbine Manufacturer

Tier 1 (Supplier)

Tier 2 (Sub-Supplier)

Customer

Wind Turbine Manufacturer

Tier 1 (Supplier)

Tier 2 (Sub-Supplier)

Level 1

Level 2

Level 3
APQP4Wind – APQP/PPAP Process flow

Manufacturer Requirements
- Product Design Requirements
- Process Design Requirements
- Technical Specifications
- Drawings
- Other Specific Requirements

Supplier Execution
- Receive & Review Requirements
- Initiate Quality Program & Form Team
- Develop Product Quality Plan
- Plan & Scope PPAP
- Execute Product Quality Plan
- Submit PPAP
- Discuss & Agree Correction Plan
- Monitor Product Quality Plan

Manufacturer Review & Approval
- Receive & Review PPAP
- Product & Process Approval
- PSW Documents
- Sign PSW
APQP4Wind - Framework
Supplementary information detailing the APQP4Wind Manual on 5 elements.

- Special Characteristics
- PFMEA
- Process Capability Studies
- Measurement System Analysis
- Production Part approval Process (PPAP)
## APQP4Wind – Responsibility Matrix

<table>
<thead>
<tr>
<th>APQP4Wind Phases</th>
<th>APQP Chapter</th>
<th>APQP4Wind Element</th>
<th>Design Responsible Supplier</th>
<th>Manufacture to Spec Supplier</th>
<th>Material Processing Supplier</th>
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<tbody>
<tr>
<td>1.0 Plan, Define &amp; Scope Quality Program</td>
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<td>Voice of Customer</td>
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<td>Historical Data &amp; Quality Information</td>
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### Supplier Nature
- Design Responsible
- Manufacture to Specification
- Material Processing suppliers
As a minimum the supplier shall:

- Understand the manufacturer’s expectations.
- Identify potential constraints and risks in fulfilling the manufacturer’s requirements.
- Identify cost and timeline for on-time delivery of product.
- Determine assistance required from manufacturer.
- Identify potential sub supplier’s and processes to fulfill requirements.
As a minimum the supplier shall:

• Conduct an in-depth review of the Engineering and technical requirements of manufacturer.
• Identify potential issues and challenges to be addressed in the design.
• Ensure that the product is feasible to manufacture.
• Ensure a product design which fulfills manufacturer expectations.* (*only for design responsible supplier's)
• Identify critical characteristics.
• A plan to verify the design factors.*
• Identify tooling, equipment and gage requirements.
• Initiate engaging of sub supplier’s based on assessments.
As a minimum the supplier shall:
• Ensure the product design is verified.
• A prototype of the product is build, tested and approved. (If applicable)
• Design for tooling is completed and approved. (If applicable)
As a minimum the supplier shall:

- Ensure a preliminary flow of the production process is developed.
- Identify potential failures and mitigation actions.
- Conduct a preliminary analysis on capability of the process under design.
- Develop a plan for Measurement System Analysis.
As a minimum the supplier shall:

- Secure Process flow documentation.
- The measurement system in the process is analyzed and found capable to the intended use. (for measurement of special characteristics)
- Control plans for initial production run are made available.
- Statistical analysis on Process capability is done for special characteristics.
- Special characteristics on process are controlled.
As a minimum the supplier shall:

- Ensure a production trial is conducted.
- Process performance is validated and documented.
- Ensure product validation is done against the design requirements.
- Relevant testing and certifications reports documented.

During the 0-Series production the supplier shall validate that the control plan and process flow chart are being followed and the products meet manufacturer requirements.
As a minimum the supplier shall:

- Secure all applicable PPAP documentation is completed.
- Submission of PPAP documents as agreed with the manufacturer.
APQP4Wind – The Workbook

- All PPAP templates in one place!
- Lean and easy to use.
- Total of 22 templates with user friendly functions inbuilt.
Q&A from the audience

Questions and answer session

Arun John Selva
Vestas Wind Systems A/S

Bent Weibel
Siemens Wind Power A/S
Welcome and agenda

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Thank You