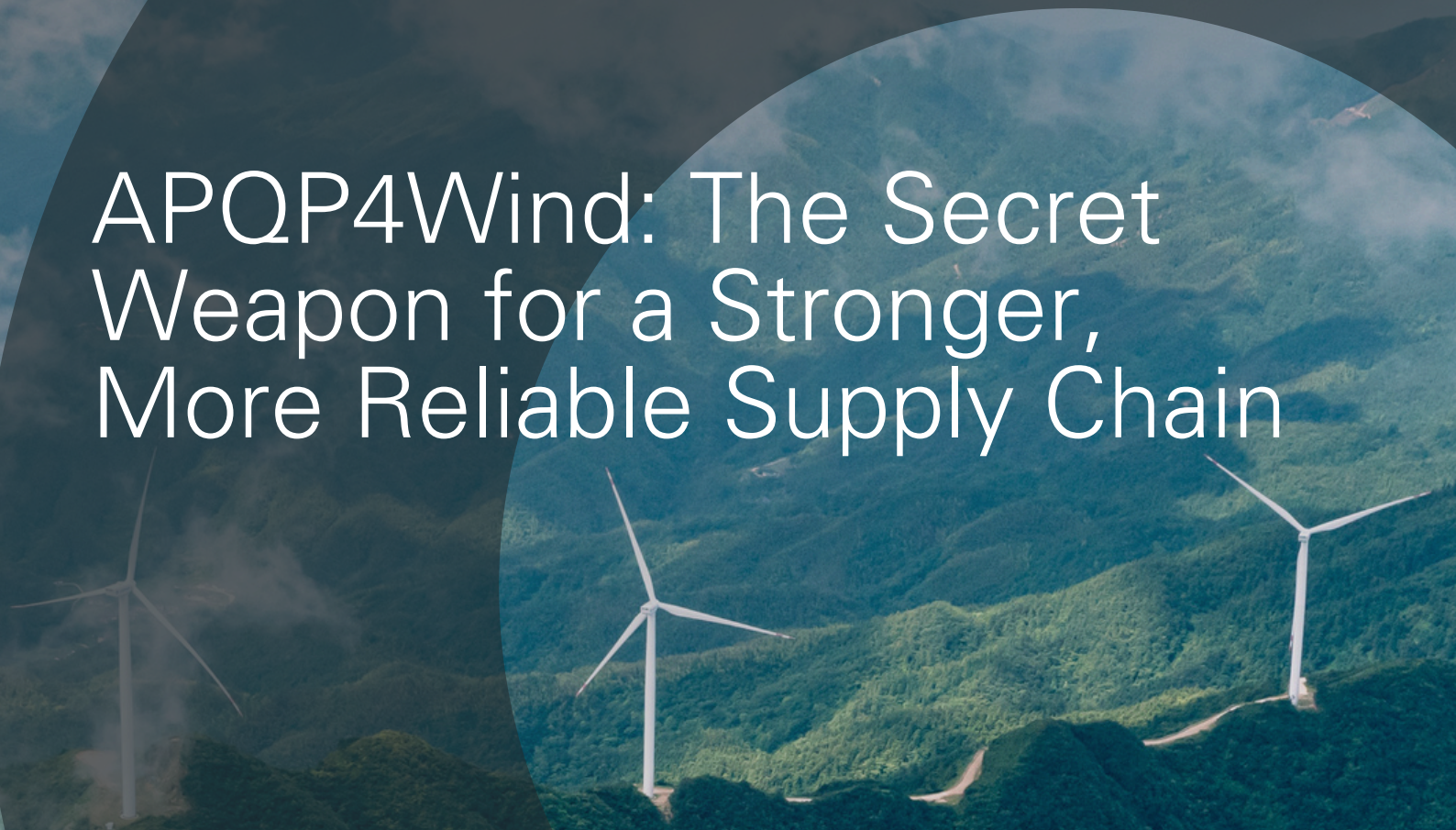
I&E INDUSTRIES & ENVIRONMENT

# APQP4Wind: The Secret Weapon for a Stronger, More Reliable Supply Chain



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# Contents

# Enhancing Quality and Collaboration in the Wind Industry

## EXECUTIVE SUMMARY

As the wind industry continues to scale rapidly with increasing turbine sizes and ambitious global targets, the pressure on supply chains has intensified. Cost of Poor Quality (CoPQ), inconsistent processes, and lack of standardization pose serious challenges. This paper explores APQP4Wind (Advanced Product Quality Planning for Wind) as a transformative framework to strengthen quality assurance, mitigate risks, and enhance collaboration among stakeholders. Drawing from insights presented at the All-Energy 2025 Conference, this paper outlines the implementation roadmap, benefits, and SGS's role as an accredited global partner in deploying APQP4Wind.

# Introduction

## THE WIND INDUSTRY AT A CROSSROADS

Wind turbines have grown taller, wider, and more complex. With towers reaching up to 300 meters and blades exceeding 100 meters in length, engineering sophistication has outpaced traditional supply chain capabilities.

Supply chain players across all levels faces multiple challenges:

- Inconsistent product quality and rework
- High warranty claims vs. provisions
- Lack of standardization
- Firefighting mentality due to late-stage defect detection
- Lack of supply chain risk visibility
- Increased Levelized Cost of Energy (LCOE)

These challenges underscore the need for a unified quality framework that aligns all stakeholders, from OEMs to sub-component suppliers.

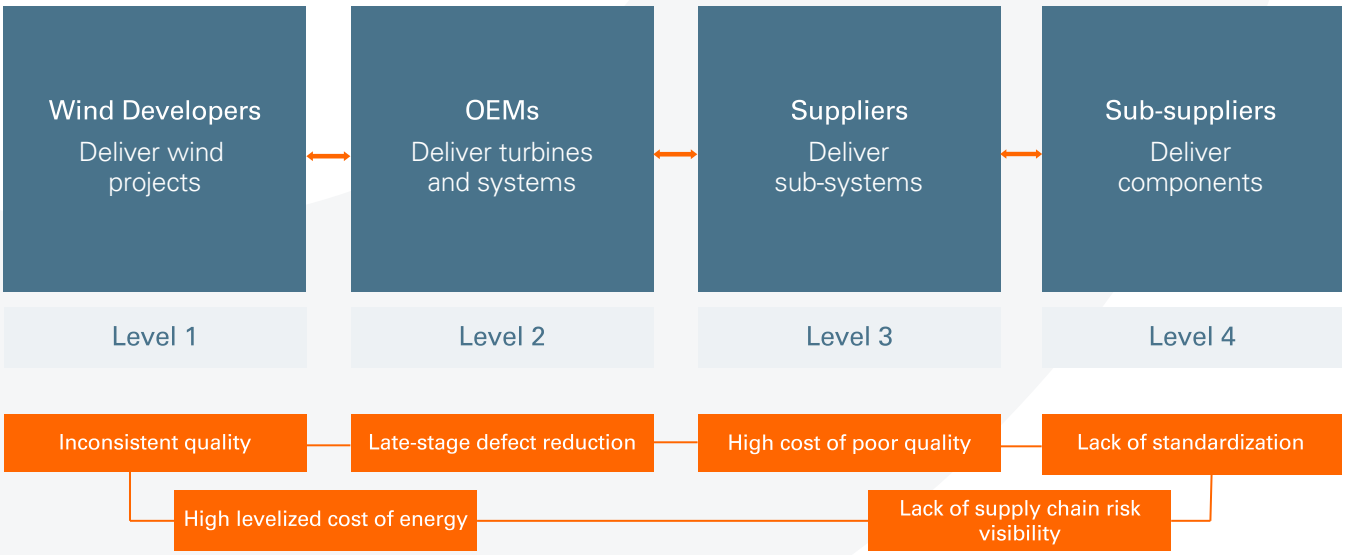



Figure 1. Key Challenges of Wind Supply Chain Players

# Enter APQP4Wind: A Strategic Enabler

## HOW APQP4WIND DRIVES PROACTIVE QUALITY PLANNING AND RISK MITIGATION ACROSS FUNCTIONS

Founded in 2018, APQP4Wind is a non-profit initiative endorsed by leading OEMs, utilities, and suppliers. It standardizes the Quality Assurance processes primarily for a New Part Development (NPD) program, fosters preventive action, and ensures quality integration throughout the product development lifecycle.

The vision of APQP4Wind:
To create a standardized and collaborative quality planning framework for the wind industry.

The key benefits:
- Early Risk Detection
- Standardization
- Culture of Prevention
- Faster Time to Market
- Supplier Development
- Reduced Financial/Reputational Risk

- Companies that lack executive-level integration of APQP4Wind often face poor top management commitment and ineffective tracking of Total Cost of Quality metrics.
- Without incorporating APQP4Wind into the Sales function, organizations miss the opportunity to use it as a competitive differentiator and to fully understand the cost-benefit impact of seamless production launches and lower lifecycle warranty costs.
- Engineering departments that do not apply APQP4Wind may overlook design-related risks, which can cascade into manufacturing and operations, leading to increased repair and warranty expenses.
- Manufacturing and Service functions that do not adopt APQP4Wind tend to skip process evaluations, disconnect inspections from design risks, and miss long-term product performance considerations.
- Project Management teams that do not integrate APQP4Wind may be unaware of key APQP milestones in the project schedule, leading to missed opportunities for early risk assessment and mitigation.

# Implementation Framework

## A FIVE-PHASE APPROACH FOR SEAMLESS APQP4WIND ADOPTION AND TRANSFORMATION

The APQP4Wind transformation is fundamentally a change management initiative that organizations must undertake. It requires not only the technical implementation of processes but also a significant shift in organizational culture and mindset. To support this transition, SGS offers a structured five-phase deployment roadmap (see Figure 2) that guides clients through each stage of APQP4Wind implementation.

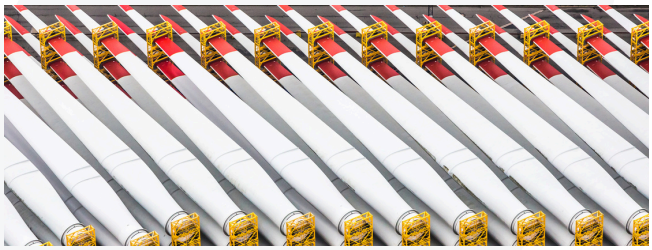



Figure 2. Typical APQP4Wind Transformation Roadmap

# Detailed Breakdown of the Phase-based Approach

## PHASE 0: PLANNING FOR RISK ASSESSMENT AND TRAINING

This step is optional, as the risk and training needs assessment is typically conducted at the beginning of the APQP4Wind transformation journey. It involves categorizing components based on product risk, process complexity, and the supplier's profile and capability - helping to prioritize resource allocation and define effective risk mitigation strategies.

This phase can include the following activities:

- Virtual meetings: Initial discussions and planning sessions are conducted virtually with key all key stakeholders to align on project objectives and scope.
- Desktop documentation reviews: Existing quality documents are reviewed to assess baseline compliance and identify preliminary gaps.
- An optional training need assessment can be carried to understand the current competency level of key personnel of the organization, which will be followed by a recommendation on APQP4Wind training needs across key functions and various sites of the organization

## PHASE 1: TRAINING

Based on the training needs assessment or as determined through discussions, shortlisted personnel from the organization can participate in one or more of the following training programs:

General Awareness:
Introduces the APQP4Wind framework and benefits to key personnel across functions. This course is designed for General Managers, Managers, Sales Managers, Quality Managers and Key Account Managers working in companies that are suppliers to the wind industry.

Specialist Training:
Equips selected professionals with in-depth knowledge of APQP4Wind principles and application methods. This course is designed for Quality Managers and Engineers, system, product and/or process Engineers, Project Managers and Engineers, Specialists, auditors and others involved in the APQP4Wind process.

Assessment Tool Training:
Enables users to effectively utilize the APQP4Wind Assessment Tool for process evaluations. This course is designed for Quality Managers and Engineers, system, product and/or process Engineers, Project Managers and Engineers, Specialists, auditors and others involved in the APQP4Wind process. It is highly recommended that these participants have already completed the specialist training.

While there are several trainings available from APQP4Wind, these are the key courses to cover first.

## PHASE 2: GAP ASSESSMENT

- On-site evaluation by SGS experts: Trained auditors visit OEM or supplier facilities to observe practices and compare them against APQP4Wind standards.
- Use of APQP4Wind Assessment Tool: A structured evaluation methodology is applied to identify process strengths and areas for improvement.
- Tailored improvement recommendations: Feedback reports are provided with targeted suggestions to bridge process gaps and enhance quality outcomes.

## PHASE 3: IMPLEMENTATION

- Expert deployment to supplier sites: SGS deploys experienced professionals to guide on-site implementation activities based on the recommendations from Phase 2.
- On-the-ground support: Continuous assistance is provided throughout the process changeover and system integration phases.
- Executive reporting: Regular updates ensure leadership visibility and alignment with strategic business goals.

# Detailed Breakdown of the Phase-based Approach

## PHASE 4: VALIDATION

- Monitoring and benchmarking: Key performance indicators are tracked and benchmarked to measure progress against APQP4Wind best practices.
- Process audits: Formal audits verify compliance with updated quality systems and readiness for certification.
- Readiness review verifies that all enhancements align with stakeholder expectations and fulfill the criteria identified during the gap assessment.
- It confirms that the recommended improvements are implemented effectively and are in line with agreed-upon quality and compliance standards.

# Supplier Maturity and Deployment Matrix

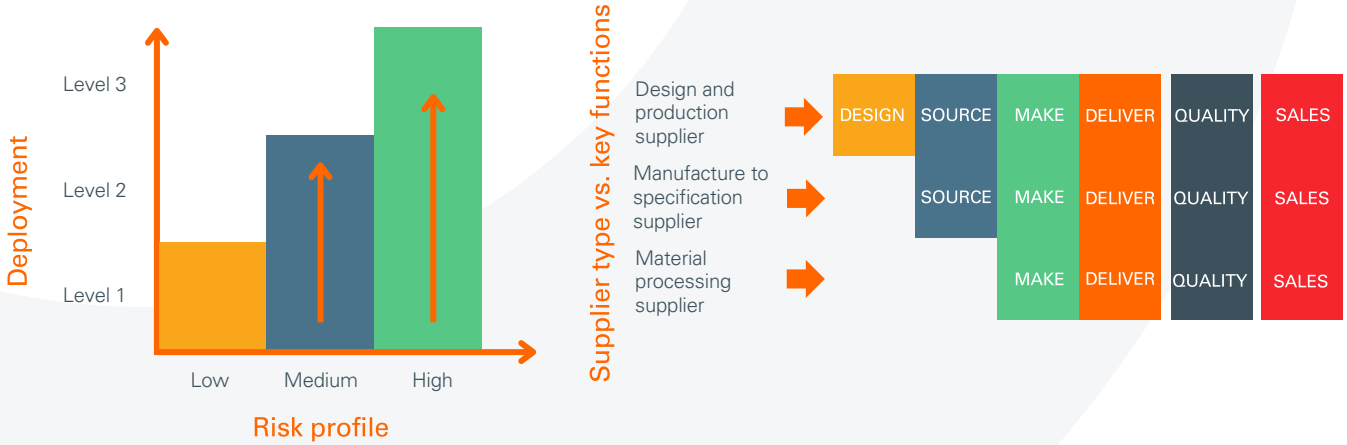
## OPERATIONAL EXCELLENCE THROUGH STRUCTURED IMPLEMENTATION

The full benefits of APQP4Wind can only be realized when organizations adopt a structured deployment approach. To support this, APQP4Wind recommends a three-tiered implementation framework that enables organizations to build capability over time.

The maturity matrix (see Figure 3) outlines a path from initial readiness to targeted maturity. At Level 1, all major suppliers are expected to establish foundational internal capabilities by ensuring both leadership and technical experts are trained in the APQP4Wind framework. For leadership teams, participation in the APQP4Wind Management Awareness Training is essential. This training helps them understand the framework's core principles and assemble a capable team equipped to meet its requirements.

Technical specialists must gain hands-on experience and complete mandatory APQP4Wind training to develop the expertise needed for effective implementation. The number of individuals requiring training—both managers and specialists—depends on the supplier's role, whether in Design and Production, Build-to-Spec, or Material Processing. To meet operational and strategic goals, all critical functions—Design, Source, Make, Deliver, Quality, and Sales—must be supported by an adequate number of certified personnel aligned with the organization's current maturity level and growth objectives.

Note: The APQP4Wind program should only be led by individuals who have completed the Specialist Training.




- All company sites: multiple managers and multiple specialists per key function
- All company sites: 1 manager and 1 specialist per key function
- Per company: 1 manager and 1 specialist

Figure 3. APQP4Wind Maturity Implementation Guideline

# Verification versus Validation: Key to Quality Assurance

## A FOUNDATION FOR RELIABILITY AND ZERO-DEFECT PERFORMANCE

Verification and validation (V&V) are critical in the wind industry because they ensure that components and systems not only meet design specifications (verification) but also fulfill their intended operational purpose under real-world conditions (validation).

Given the increasing complexity and scale of modern wind turbines, V&V minimizes the risk of late-stage failures, reduces warranty claims, and ensures safety and reliability throughout the lifecycle.

Within the APQP4Wind framework, V&V aligns with its core principles of early risk identification, preventive quality planning, and cross-functional collaboration.

They serve as structured checkpoints that enable "built-in quality" by confirming conformance to requirements at every critical stage—from design to final product delivery—thereby supporting the industry's drive toward zero-defect performance and reduced Cost of Poor Quality (CoPQ).

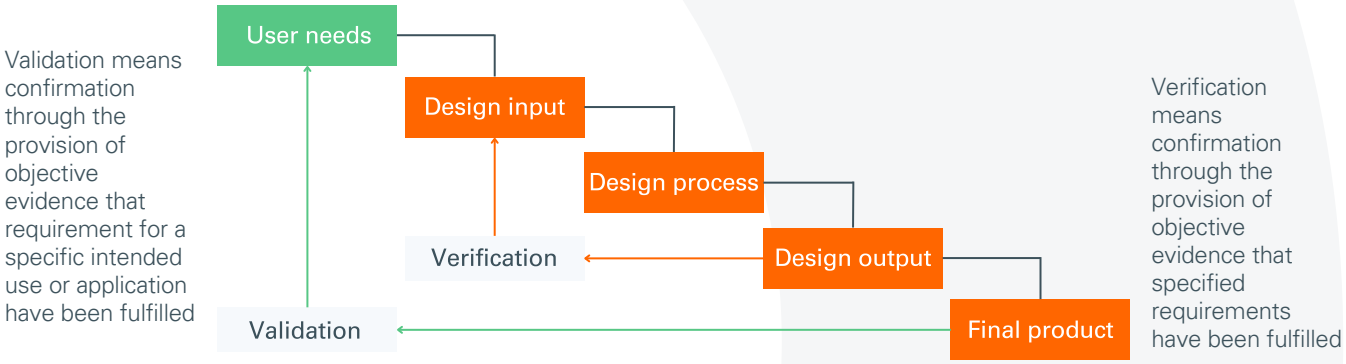



Figure 4. Verification and validation

# The SGS Engagement Model

## OUR SERVICES

| | | | |
|---|---|---|---|
| Training | Implementation support | Expert staffing | Assesssment, reporting |

# Conclusion

## A NEW STANDARD FOR QUALITY IN THE EVOLVING WIND INDUSTRY

As the industry stands at the forefront of a rapidly expanding and increasingly complex wind energy landscape, one truth has become clear: supply chains must evolve as quickly as the turbines themselves. The old ways of working - reactive firefighting, siloed development, and late-stage defect discovery - are no longer sustainable.

APQP4Wind is not just a process - it's a paradigm shift. It empowers organizations to move quality planning earlier in the development cycle, detect risks early, create a common language across the value chain, and build a culture of proactive excellence. From developers to OEMs, and from suppliers to sub-suppliers, this aligns everyone towards a common goal: getting it right the first time.

APQP4Wind is no longer a nice-to-have. Like a secret weapon, it has become essential for survival, credibility, and competitiveness. If we want to reduce warranty claims, increase stakeholder trust, and deliver turbines on time, in full, and without compromising on quality - let's stop asking: "Can we afford to implement APQP4Wind?" The real question is: "Can we afford not to?"

# When you need to be sure



**CONTACT US**
Ready to start your APQP4Wind journey or want to learn more?
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