



NEW DEEP-TECH SKILLS SET

ALTERNATIVE MATERIALS FOR SUSTAINABLE BOATBUILDING

2025



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GREENBOATS


EBI
European
Boating Industry



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GDANSK UNIVERSITY
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POLBOAT

EXECUTIVE SUMMARY

This report presents the findings from an extensive assessment of over 120 interviews conducted with both large and small shipyards across Europe, covering the majority of the region's boat production across all segments. The primary objective was to identify emerging and potential green skills necessary for sustainable boatbuilding and to align these competencies with the ESCO skillset.

The study highlights key challenges in adopting and implementing these skills, including high costs associated with sustainable materials and processes, concerns regarding the performance of eco-friendly materials, and limited customer interest and demand. Despite these barriers, the majority of interviewees expressed confidence in their ability to integrate advanced materials into their production processes, if they have a skilled workforce.

While a wide range of skills were identified as necessary for the sector, three stood out as particularly critical and missing from the sector: promotion of sustainability, assurance of compliance with environmental legislation, and waste management. Additionally, the report underscores a significant gap between existing skills and the industry's actual needs, emphasizing the necessity for further training and upskilling initiatives to bridge this divide.

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AIMS OF THE DATA-BASE

01

Identify green skills gaps in  deep-tech materials

02

Assess boatbuilding curricula using ESCO* green taxonomy

03

Provide ESCO with a new boatbuilding green skill set.

04

Build the baseline for VET course and train-the-trainers

To understand the **readiness of the industry** and to acknowledge a **significant transformation towards sustainability** in boat-building, driven by environmental regulations, evolving market expectations, and the **need for greener technologies**

* European Skills, Competences, and Occupations. It identifies and categorises skills, competences, and occupations relevant for the EU labour market and education and training.



INTRODUCTION & METHODOLOGY

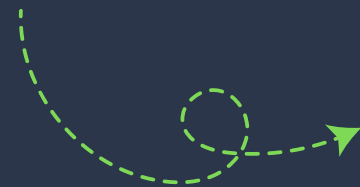
There is a **significant transformation towards sustainability** in boat-building, driven by environmental regulations, evolving market expectations, and the need for greener technologies

To better understand the readiness of the industry:

Short questionnaire was made with 6 questions both quantitative and qualitative

Key insights on:

- importance of sustainability in boatbuilding.
- skills **gap** in green technologies and materials.
- confidence levels in adopting sustainable materials.
- challenges companies face in implementing eco-friendly practices





124 people interviewed: Market leaders, smaller players and start-ups included

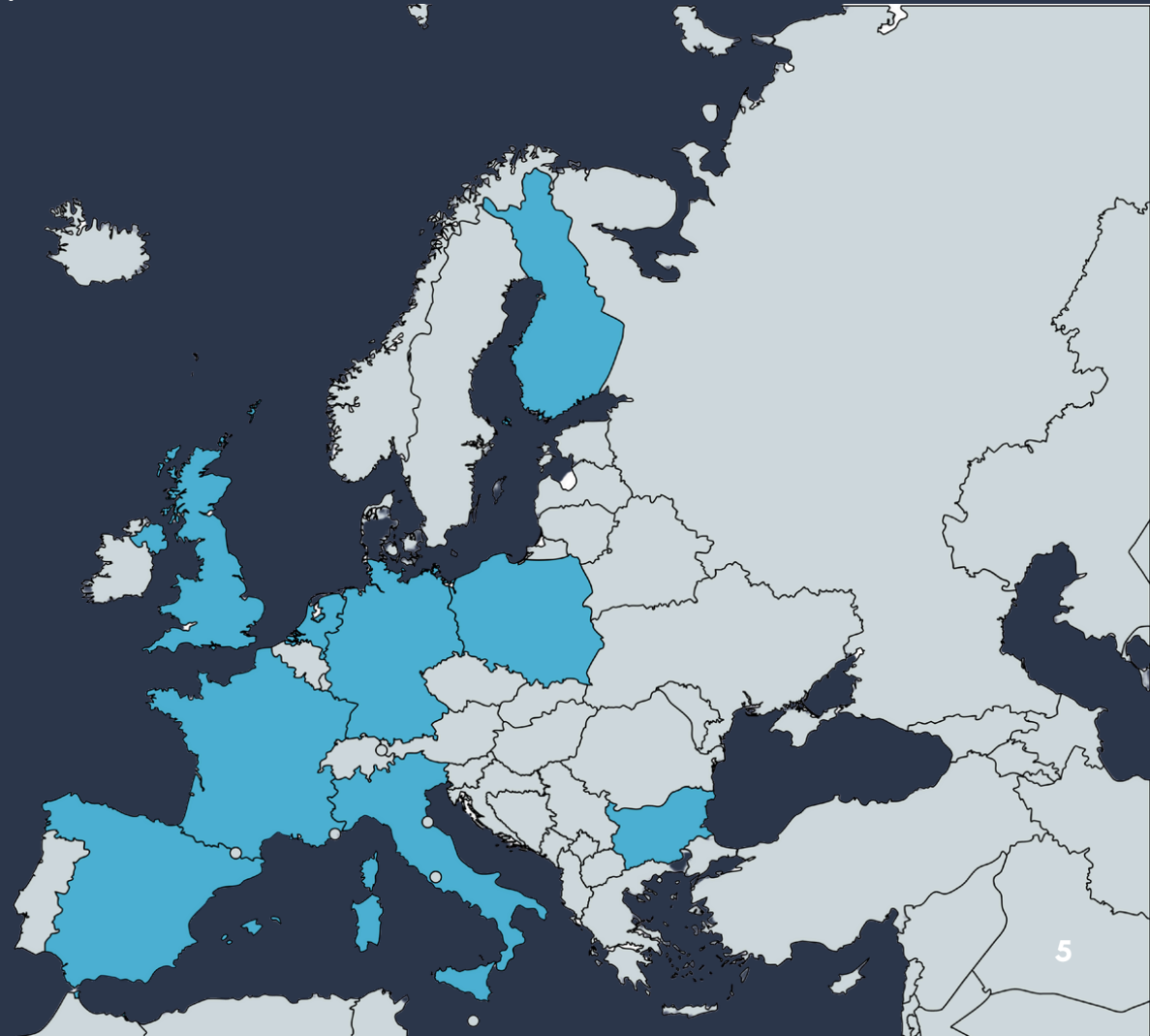


Big & small shipyards: Majority of European boat production covered by the study across all segments



Key boatbuilding countries in Europe covered:

- ITALY
- FRANCE
- SPAIN
- GERMANY
- POLAND
- UK
- BULGARIA
- NETHERLANDS
- FINLAND





...PREVIOUSLY...

Two researches have been made to identify green skills:

01

**Curriculum Research
Assessment Report**

02

**Skills Identification &
Assessment Guidelines**

01

Curriculum Research Assessment Report

“Only 22-25% include sustainable/green content.”



Objective: Evaluate training programs in shipbuilding to identify gaps in green skills and advanced technologies.



Methodology: Analyze 141 validated curricula across 16 European countries.



Key Areas: Vocational Education and Training (VET), Higher Education (HE), and content on sustainability and disruptive technology.



Identified Gaps: Lack of integration of advanced technologies (deep-tech) and green skills in nautical training.

01

Curriculum Research Assessment Report

RECOMMENDATIONS:



- **Collaboration:** Strengthen the connection between industry and education.
- **Continuous Training:** Develop training programs focused on sustainability and green technologies.
- **Technology:** Incorporate digital tools for practical training.
- **Research:** Conduct comparative analyses to enhance education in the sector.

02

Skills Identification & Assessment Guidelines



Objective: Analyze EU-funded projects to identify skill gaps and training needs in the shipbuilding sector, focusing on green and blue skills.



Focus Areas: Transition to sustainable practices, adoption of green technologies, and skill development in areas like circular economy, energy efficiency, and digitalization.



Methodology: Evaluation of 23 European projects using a structured analysis to address digital, technical, and sustainable skill needs.



Identified Gaps: Lack of green, digital, and technical skills in the boating industry.

02

Skills Identification & Assessment Guidelines

RECOMMENDATIONS:



Align training with market needs, promote industry partnerships, and advance green and digital skills for a sustainable **boatindustry**.



LINKS WITH DEEP-TECH SKILLS DEVELOPMENT



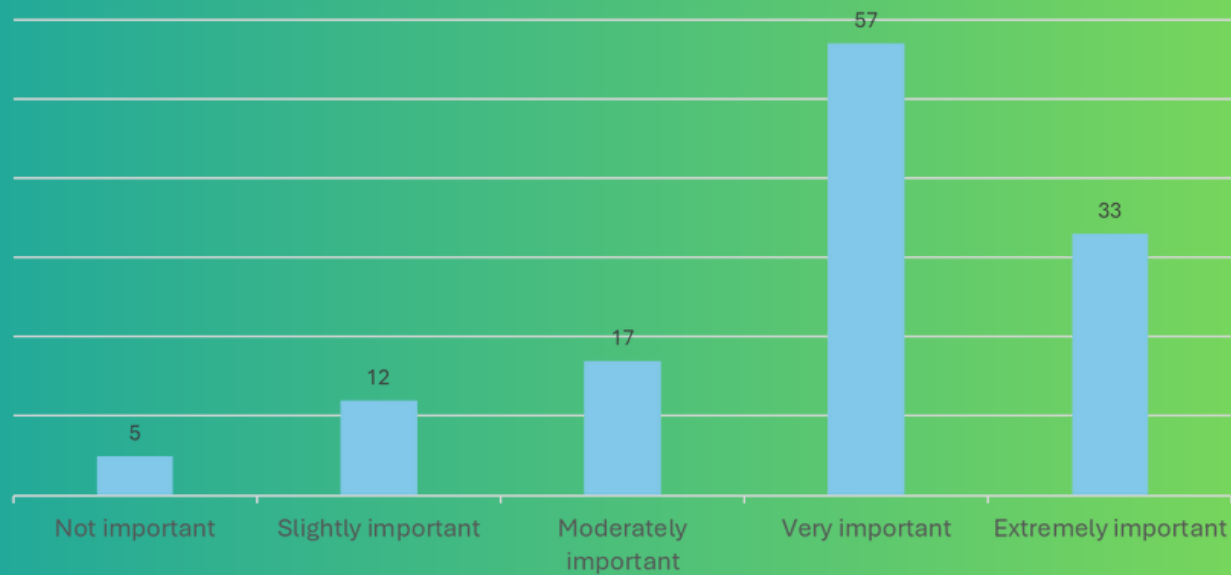
- **Identified Skill Gaps:** All reports emphasize significant deficiencies in green skills and advanced technologies (deep-tech) for the maritime sector, especially in sustainable material management and digital tools.
- **Alignment with Deep-tech skills:** It focuses on creating a "Deep-Tech Skill Set Database," which directly addresses the gaps identified in the previous analyses (1 & 2), ensuring better curriculum integration.
- **Strategic Relevance:** The skill database supports aligning vocational and higher education with market needs, fostering green and digital competencies essential for the EU Green Deal.
- **Implementation Pathways:** Collaboration between industry, VET, and HE institutions is vital for designing effective training programs, as highlighted across all deliverables.
- **Outcome:** Together, the reports and the database form a comprehensive framework to modernize training, ensuring the boat industry's sustainable and competitive future.

SUMMARY OF INTERVIEWS



GREEN TRANSITION

Q1: On a scale from 1 to 5, how important is the green transition in boatbuilding to your company?

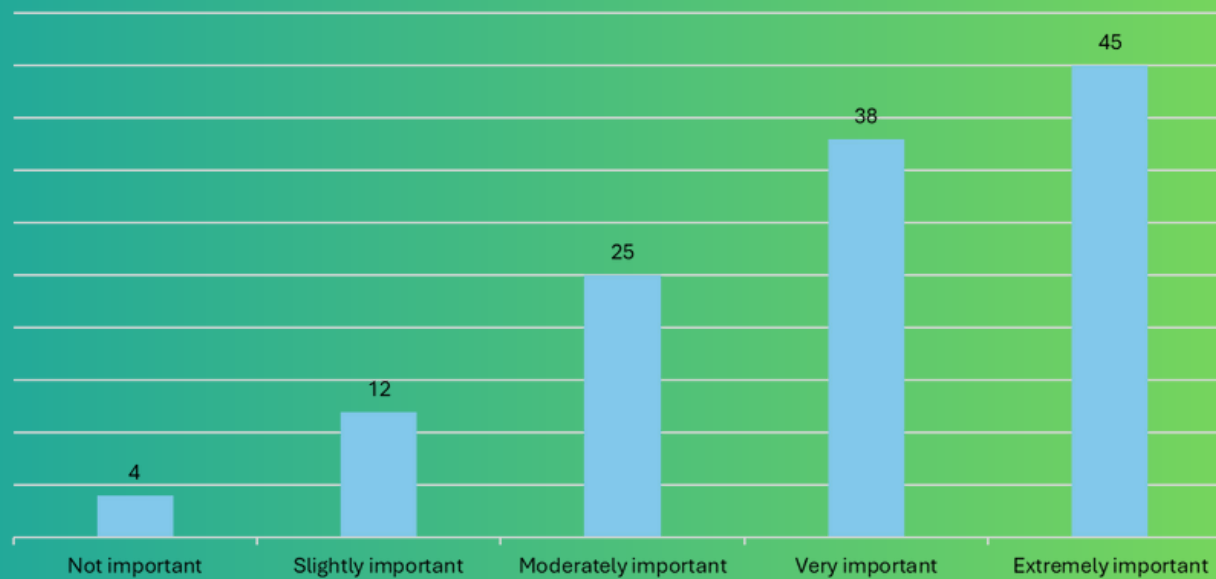


Over 72% of companies consider the green transition as **very or extremely important**

Only 4% consider the green transition as not important

...RELATED TO MATERIALS

Q2: On a scale from 1 to 5, how important is the green transition related to materials in boatbuilding to your company ?

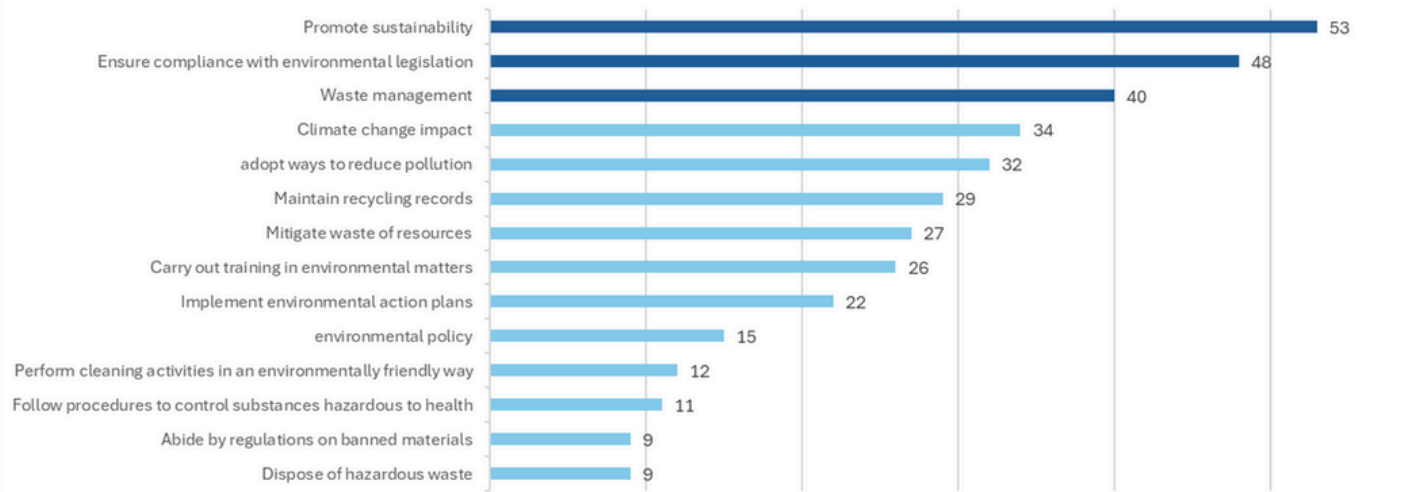


On average 70% of boatbuilders consider the green transition related to materials very important or extremely important

Only 3% of them consider it not important

CRITICAL SKILLS

Q3: From the list of ESCO skills below, what are the 3 most critical green skills currently missing in your workforce?



Promotion of sustainability

Ensure compliance with environmental legislation



Waste management



**ARE THERE OTHER SKILLS OR
AREAS YOU WOULD LIKE TO
MENTION?**

Sustainable materials & eco-design

- Advanced application of bio-based resins and natural fibers in boatbuilding
- Development of industry standards for composite recyclability and **teacking**
- LCA implementation for product sustainability

Circular economy & waste management

- Development of recycling strategies for composites and hazardous waste
- Water filtration techniques and microplastic reduction in boatyards
- Efficient material use and waste **minimisation** during production

Skills development & workforce training

- Training of **apprentices** and existing workforce in green technologies
- Awareness of funding opportunities and grants for sustainability projects
- Customer education on eco-friendly materials and practices

**Regulations,
Compliance
& workforce
training**

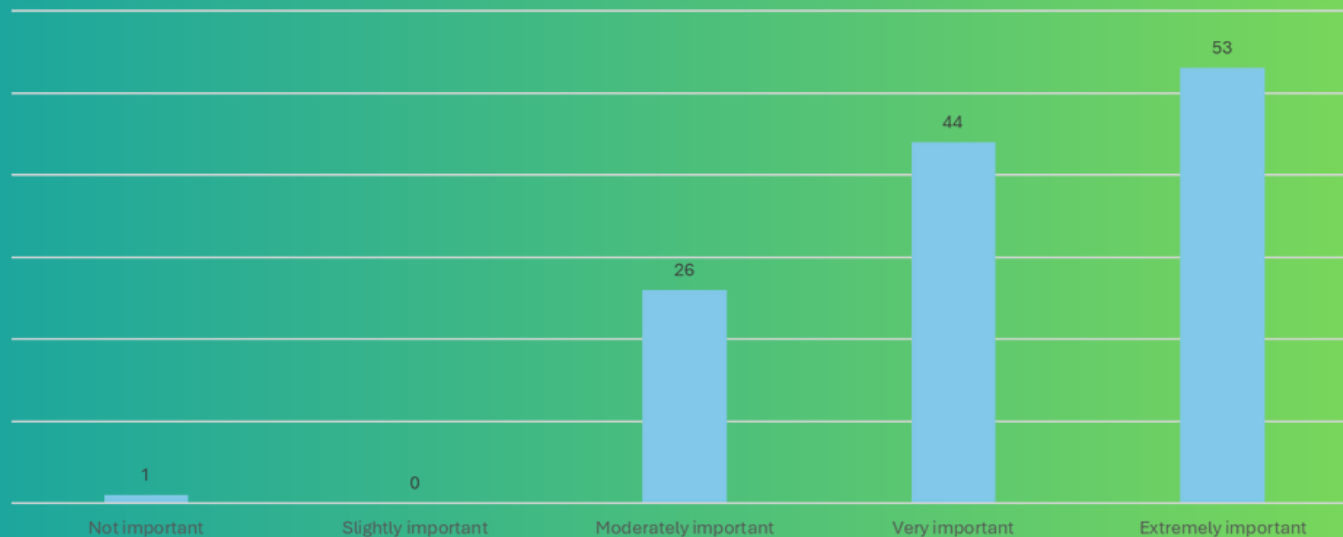
- In-depth knowledge of ISO, ESCO skills, and environmental certifications
- Monitoring and auditing **supplier environmental impact**
- End-of-life boat dismantling and sustainable disposal strategies

**Global Value
Chain &
Industry
Collaboration**

- Understanding and addressing supply chain sustainability challenges
- Knowledge-sharing and benchmarking with global best practices
- Integration of eco-conscious purchasing and sustainable transport strategies

BOAT BUILDING CURRICULA

Q4: How important would it be to have boat building curricula (academic and VET) to include green skills for new sustainable materials?

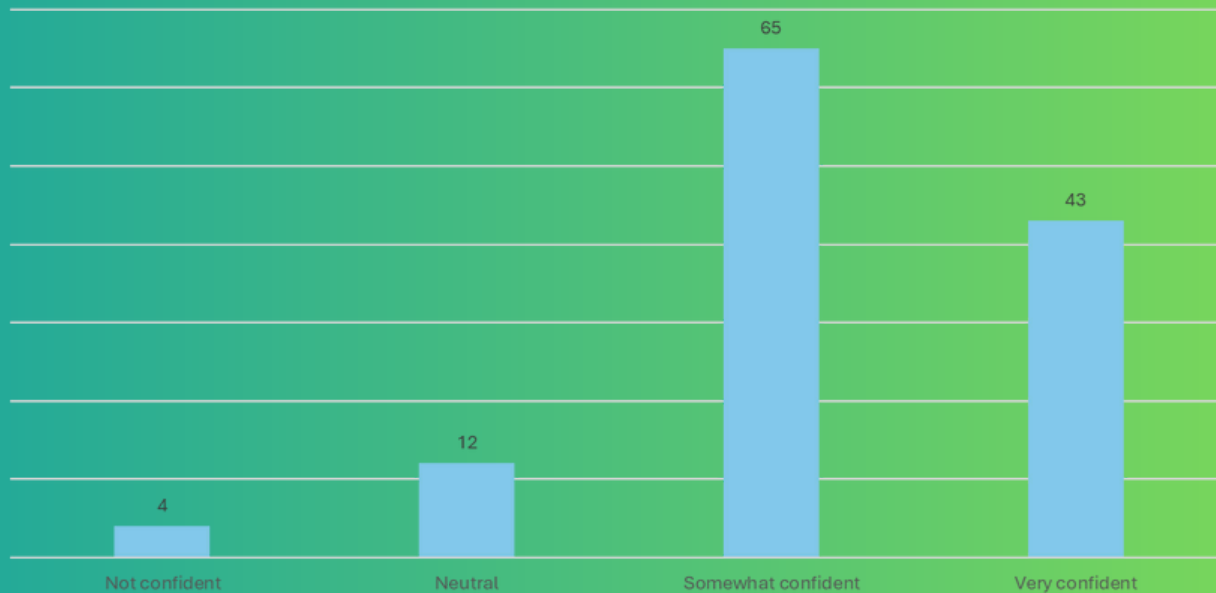


Almost 80% of the boat building companies believe in the importance of academic and VET curricula

Only 1% disagrees (the reason is dictated by the internal organisation of the company, they already have a research center that trains workers)

COMPANY'S ABILITY

Q5: How confident are you in your company's ability to implement advanced materials (e.g., bio composites) for sustainable boats ?



Almost 90% of the boat building companies feels somewhat confident or very confident

Only the 3% feel not confident

Less than 10% neutral



**WHAT DO ALL OF THEM
HAVE IN COMMON?**

Need for Industry Collaboration & Legislative Support

Companies recognize the need for change but feel policy and supply chain improvements are necessary.

- Call for **stronger regulation** to support material transition.
- Need for **cross-industry collaboration** (e.g., learning from the automotive sector).
- Expect material suppliers to **take more initiative** in offering solutions.

"We need to work with other industries and repurpose their waste."

"We need strong legislative drivers to push for greener materials."

"A prepared supply chain is key for advanced materials implementation."



**WHAT ARE THE CHALLENGES
OF ADOPTING ECO-
FRIENDLY MATERIALS OR
PRACTICES?**

CHALLENGE

KEY ISSUES

High costs

Sustainable materials & process cost more, limiting affordability

Performance Concerns

Sustainable /green materials must be durable, resistant, and meet marine standards

Supply chain Gaps

Lack of suppliers, especially local ones, increases difficulty

Lack of training & Knowledge

Need for workforce education, VET programs and upskilling

Regulatory Uncertainty

Compliance with certifications & unclear legal framework

Low Customer Demand

Market is not ready to pay extra for green solutions

Challenges

New materials require modifications and investments in manufacturing



EXAMPLE OF ADOPTION

KEY INITIATIVES

Companies using bio-materials

Flax fibers, PET foam, bio-resins, recycled composites

Circular economy efforts

Reusing production waste, reducing material consumption





Electric propulsion

Companies focusing on greener energy solutions

Waiting for market push

Interested in sustainability but need regulation or demand

COMPARATIVE INSIGHTS

BOAT-BUILDING COMPANY	SUSTAINABILITY APPROACH	KEY CHALLENGES	SUSTAINABLE INNOVATIONS
	Circular economy, recycled composites	Energy costs, market demand	Recycled materials, R&D partnerships
	Mass production, cost-focused	High costs, market demand	Solar panels, wood waste repurposing
	Serial production leader	Scaling green materials (to avoid high costs)	Flax fiber, Elixir resin, training programs
	Performance yachts, sustainable materials	Balancing speed and weight while using new materials	Flax composites, cork decks, hydrogen propulsion

CONCLUSION & NEXT STEP: A TRAINING COURSE



The three most **commonly identified challenges** to implement sustainable practices and materials:



**SKILL GAPS, LACK OF
KNOWLEDGE & TRAINING
OPPORTUNITIES**



**RUDIMENTARY COLLABORATION
BETWEEN INDUSTRY AND EDUCATION**



**GAP BETWEEN SECTOR NEEDS
& SUSTAINABILITY GOALS**

The three **most critical skills missing:**



PROMOTION OF SUSTAINABILITY



ASSURANCE OF COMPLIANCE WITH ENVIRONMENTAL LEGISLATION



WASTE MANAGEMENT

The interviews conducted and their evaluation serve as a **great entry point to:**



**BUILD ON THE INTEREST & CONFIDENCE
IN THE SECTOR TOWARDS GREEN
MATERIALS AND PROCESSES**



**ALIGN SOME OF THE IDENTIFIED SKILLS
WITH ESCO SKILLS SETS:**

WASTE MANAGEMENT &
DISPOSE OF
HAZARDOUS WASTE

COMPLIANCE

ENVIRONMENTAL POLICY

PROMOTION OF
SUSTAINABILITY



**EXPAND AND PROVIDE MORE DETAILS
ON SKILLS AND KNOWLEDGE **AREAS****

TEcoNaut will carry on
with two actions:

1 ENRICHING THE ALREADY-EXISTING ESCO SKILL SETS AND ADD THE PREVIOUSLY IDENTIFIED ONES,

to holistically represent crucial competences needed for green transition in the boating sector

2 DEVELOPING A TRAINING COURSE FOR VET STUDENTS BASED ON IDENTIFIED SKILLS

to learn about different aspects of sustainable materials, practices along with practical exercises to fill the identified skills & knowledge gaps.

Sustainable materials & eco-design

Circular economy & waste management

Skills development & workforce training

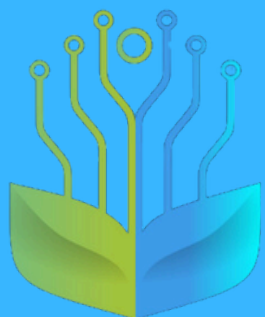
Regulations, Compliance & workforce training

Global Value Chain & Industry Collaboration

Out from the identified skills that are needed to bridge the knowledge gaps, the following ones will be included in the

Teconaut training program:

- Advanced application of bio-based resins and natural fibers in boatbuilding
- Development of industry standards for composite recyclability and teacking
- LCA implementation for product sustainability
- Development of recycling strategies for composites and hazardous waste
- Efficient material use and waste minimisation during production
- Training of apprentices and existing workforce in green technologies
- Awareness of funding opportunities and grants for sustainability projects
- In-depth knowledge of ISO, ESCO skills, and environmental certifications
- Monitoring and auditing supplier environmental impact
- End-of-life boat dismantling and sustainable disposal strategies
- Understanding and addressing supply chain sustainability challenges
- Knowledge-sharing and benchmarking with global best practices
- Integration of eco-conscious purchasing and sustainable transport strategies



TECONAUT

USING DEEP TECH TO FACILITATE THE ECO
TRANSITION IN THE NAUTICAL SECTOR

Would you like to learn more about the
training?

Are you curious how can you implement the
curricula in your teaching?

Are you interested in our work?

STAY INFORMED!

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info@teconaut.eu



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