

Quantitative Results of the Status Quo and Demand Analysis of Green Hydrogen and Heat Pumps in European VET Systems

A comparative analysis between Greece, Spain and Slovakia

Supported by:



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This project is part of the [European Climate Initiative \(EUKI\)](#) of the German Federal Ministry for Economic Affairs and Climate Action (BMWK).

Objective of Quantitative Need Analysis

Identification of Market Demands

- Assess local market requirements for skills in fields of „Green Hydrogen“ and „Heat Pumps combined with Renewable Energies (RE)
- Understand specific challenges and needs of businesses in target sectors in each country

Identification of VET Organizational Needs

- Determine requirements of Vocational Education and Training (VET) institutions to prepare young individuals for local market employment
- Identify necessary resources and curriculum adaptations for alignment with market demands

Definition of Target Group

- Identify a potential target group for the regions/countries in terms of skill levels



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Methodology and Dissemination

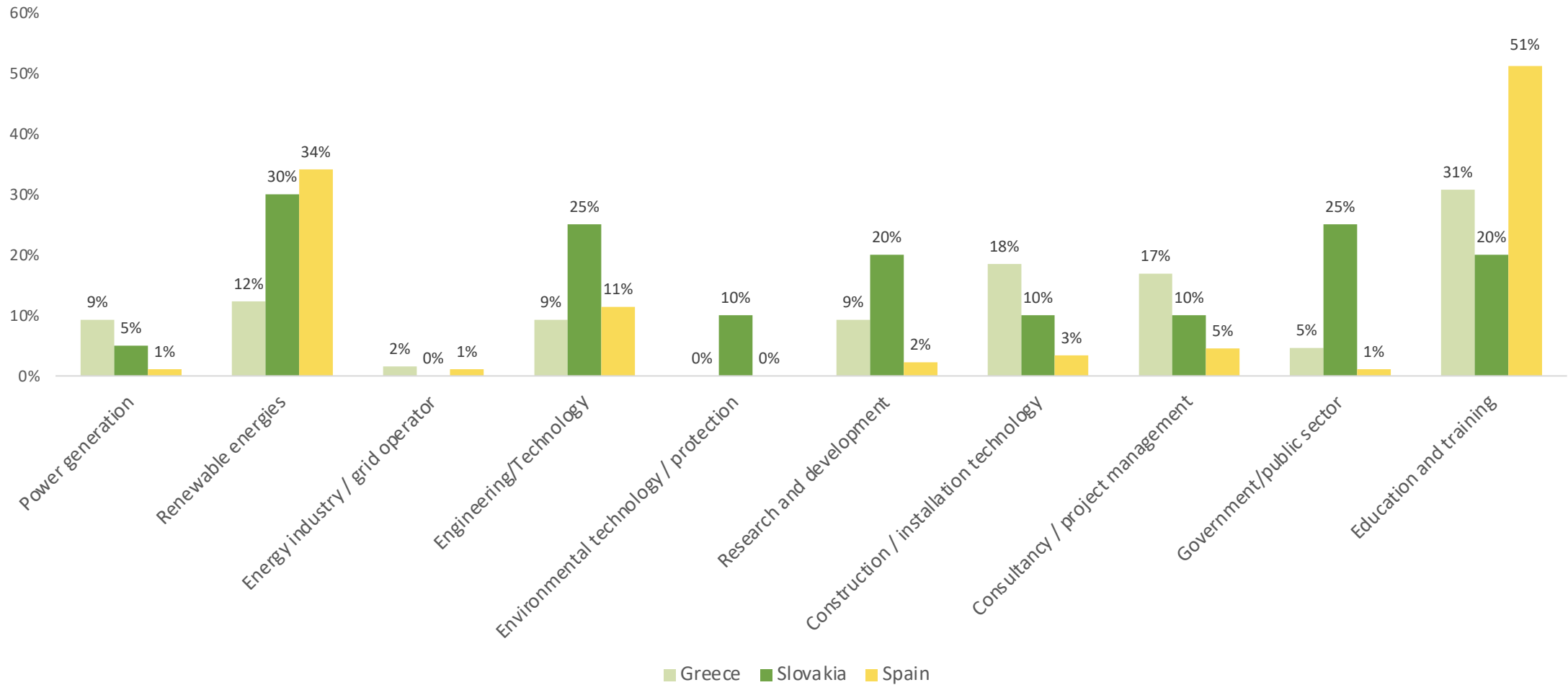
Format	Online survey with 13 multiple choice questions, translated into local languages, hosted on SurveyMonkey
Time Frame	01.02.2024 – 15.03.2024 with two collection phases. Originally planned for a 4-week period in February, with a mid-week reminder, extended to mid-March to increase response rate
Distribution	Country-specific direct outreach via partners email lists & indirect distribution via social media channels of the partners and the EUKI
Response Rate	Greece n = 65 Slovakia n = 20 Spain n = 88



General Information on respondents



Industry of Operation



Industry of Operation

Greece The 'Education and Training' sector accounts for the majority of responses (31%), followed by the 'Construction/Installation' sector (18%) and 'Consulting/Project Management' (17%).

Slovakia The 'Renewable Energy' sector has the highest proportion of participating enterprises at 30%, followed closely by 'Engineering/Technology' and the 'Government/public' sector at 25% each.

The 'Education and Training' and 'Research and Development' sectors also play an important role, each accounting for 20%.

Spain Organisations in the 'Education & Training' sector are most involved in the survey (51%), followed by organisations in the 'Renewable Energy' sector (34%).

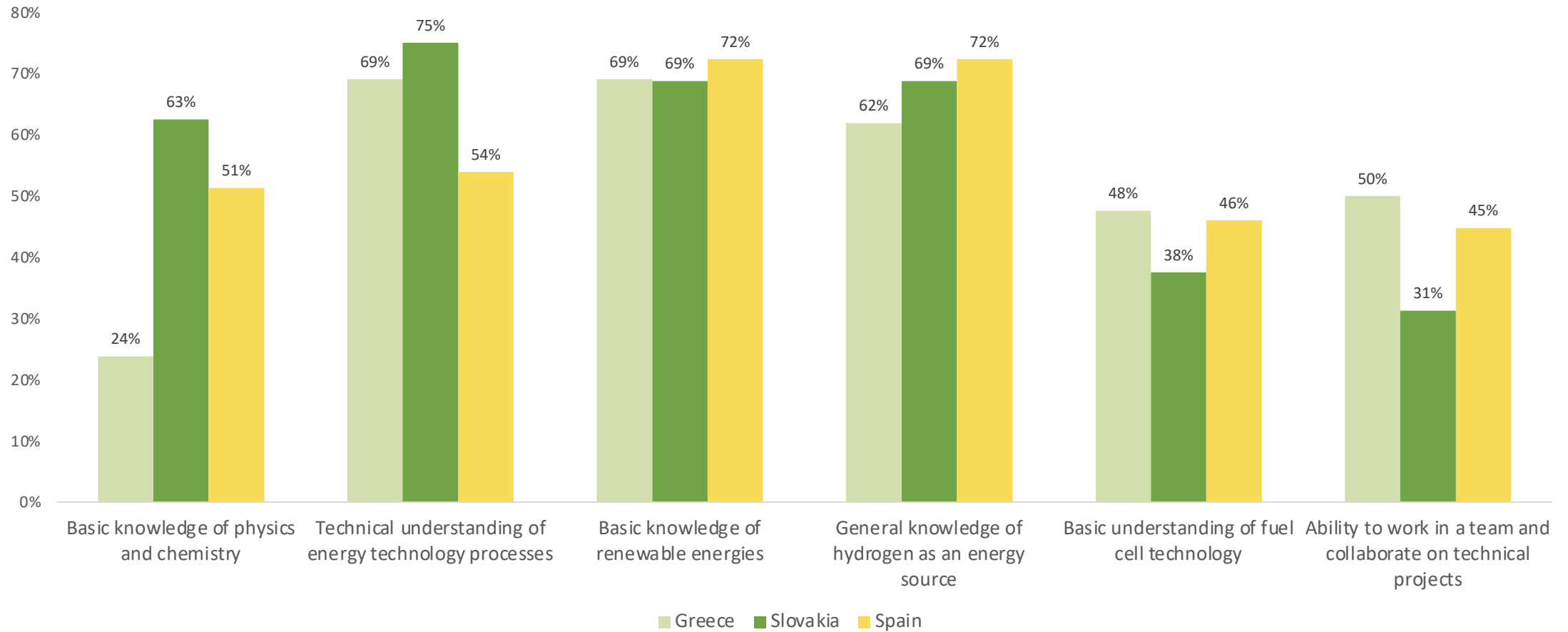
The results indicate that the 'Education and Training' sector is the dominant sector across the three countries, while the 'Renewable Energy' sector also shows significant involvement at 34%, with other sectors such as 'Construction/Installation' and 'Consulting/Project Management' also making significant contributions.



Needs of Local Markets & Companies



Basic Competences & Skills for Green Hydrogen Important for Local Market



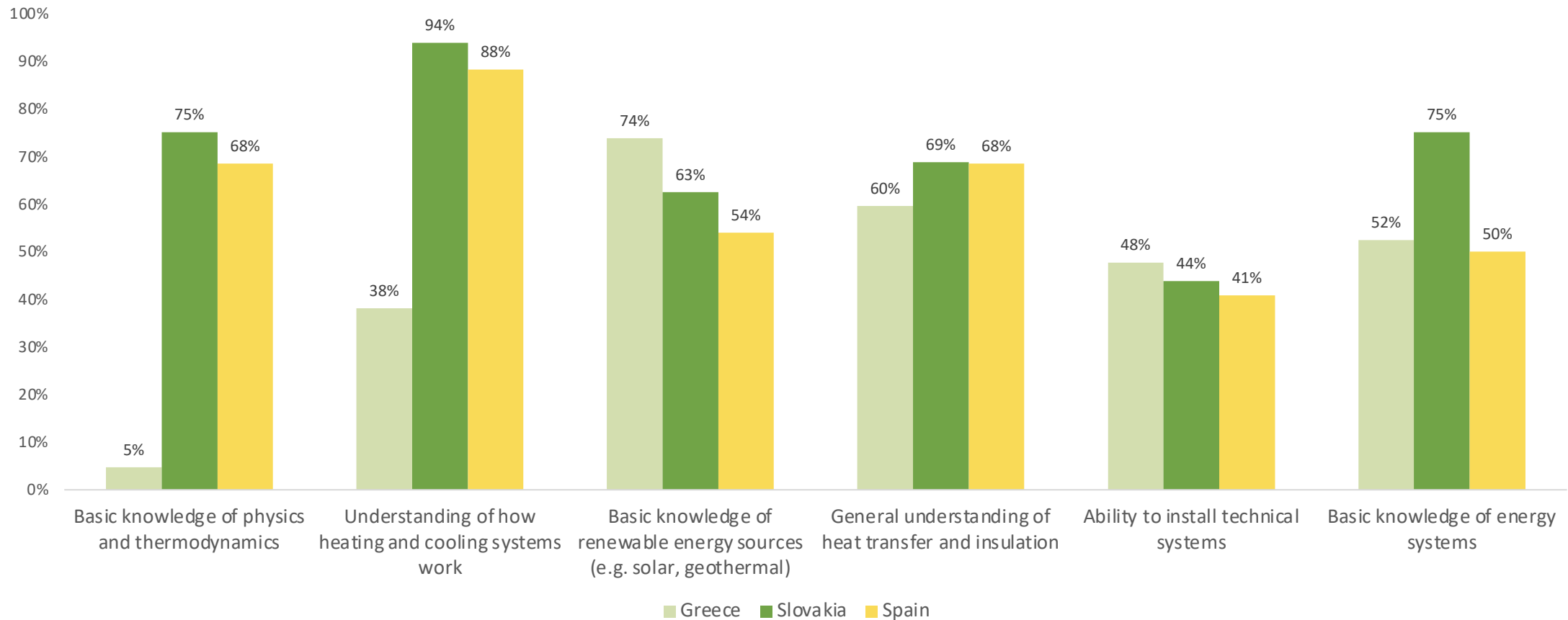
Basic Competences & Skills for Green Hydrogen Important for Local Market

- Greece** 'Technical understanding of energy processes' and 'Basic knowledge of renewable energies' were equally highly ranked at 69%, followed by 'General knowledge of hydrogen' at 62%. 'Basic knowledge of physics and chemistry' was considered the least important (24%).
- Slovakia** 'Technical understanding of energy processes' is the most important competence, with a score of 75%. 'Basic knowledge of renewable energies' and 'General knowledge of hydrogen' follow closely behind (69%).
The 'Ability to work in a team' is the least important competence (31%).
- Spain** The most important competences for the local market are 'Basic knowledge of renewable energies' and 'General knowledge of hydrogen' (72% each), followed by 'Technical understanding of energy processes' (54%), 'Basic knowledge of physics and chemistry' (46%), and the 'Ability to work in a team' (45%).

The most important competences in all three countries are 'Technical understanding of energy processes', 'Basic knowledge of renewable energies', and 'General knowledge of hydrogen'.



Basic Competences & Skills for Heat Pumps with RE Important for Local Market



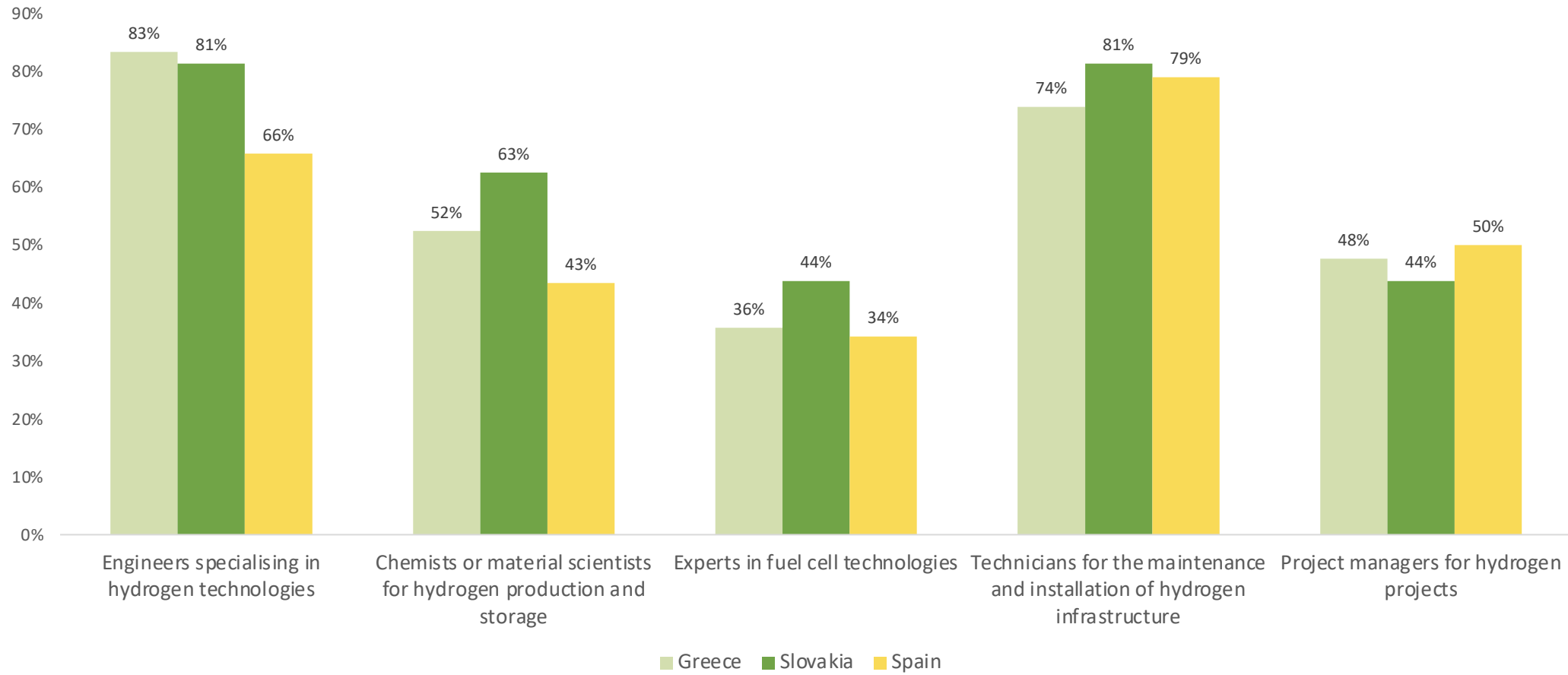
Basic Competences & Skills for Heat Pumps with RE Important for Local Market

- Greece** 'Basic knowledge of renewable energy sources' is the most highly ranked competence at 74%, followed by a 'General understanding of heat transfer' at 60% and 'Basic knowledge of energy systems' at 52%.
- Slovakia** 'Understanding how heating and cooling systems work' is the most important competence for respondents (94%), followed by 'Basic knowledge of physics and thermodynamics' and 'General knowledge of hydrogen' (both 75%).
- Spain** 'Understanding how heating and cooling systems work' is particularly important (88%), followed by 'Basic knowledge of physics and thermodynamics' and 'General understanding of heat transfer' (68% each).

Results indicate that knowledge of heating and cooling systems is highly valued by respondents in Slovakia (94%) and Spain (88%), but less so in Greece (38%). Similarly, familiarity with physics and thermodynamics is rated as important by 75% of respondents in Slovakia and 68% in Spain, in contrast to only 5% in Greece. Other competences are rated similarly highly across all regions.



Skills & Specialists Needed for Green Hydrogen



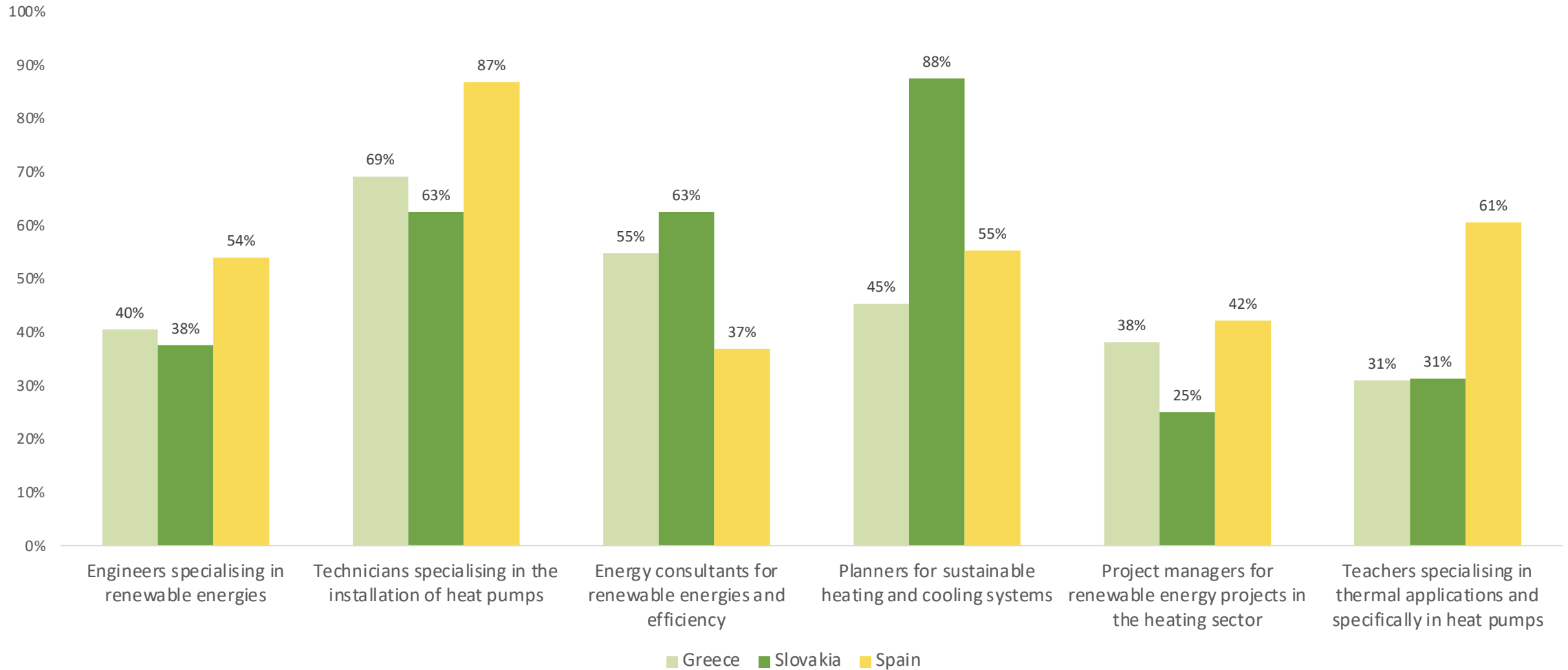
Skills & Specialists Needed for Green Hydrogen

- Greece** 'Engineers with expertise in green technology' (83%) were ranked highest among respondents, followed by 'Technicians responsible for maintaining and installing hydrogen infrastructure'.
- Slovakia** 'Engineers specialising in green technology' and 'Technicians for maintenance and installation of hydrogen infrastructure' are the most important skills (81% each).
- Spain** 'Technicians responsible for maintaining and installing hydrogen infrastructure' ranked first with 79%, followed by 'Engineers with expertise in green technology' with 66%.

In all three countries, the most in-demand skills for green hydrogen are 'Engineers with expertise in green technology' in green technology and 'Technicians for maintenance and installation of hydrogen infrastructure'. While all other skills are considered important, 'Experts in fuel cell technology' receive the least support at 34% in Spain.



Skills & Specialists Needed for Heat Pumps with RE



Skills & Specialists Needed for Heat Pumps with RE

Greece

'Technicians specialising in heat pump installation' (69%) are the most needed heat pump specialists, followed by 'Energy consultants for renewable energy and efficiency' (55%).

'Planners for sustainable heating and cooling systems' (45%) and 'Engineers specialising in renewable energies' (40%) also feature prominently.

Slovakia

'Planners for sustainable heating and cooling systems' received the highest ranking at 88%, followed by 'Energy consultants for renewable energy and efficiency', and 'Technicians specialising in heat pump installation', each with a ranking of 63%.

Spain

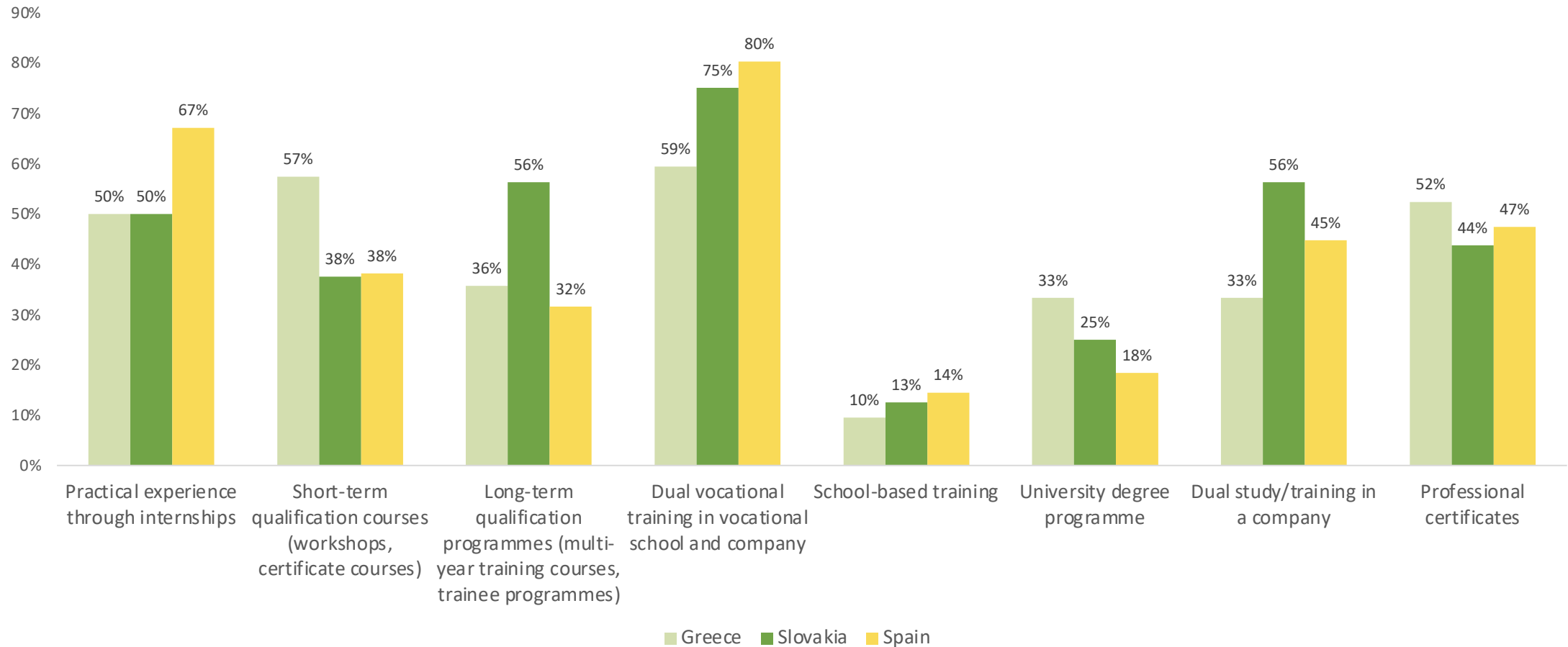
'Technicians specialising in heat pump installation' are the most in demand (87%).

'Teachers specialising in thermal applications' are in second place (61%), closely followed by 'Planners for sustainable heating and cooling systems' (55%) and 'Engineers specialising in renewable energies' (54%).

Peaks in demand for 'Planners for sustainable heating and cooling systems' and 'Energy consultants for renewable energy and efficiency' are observed in Slovakia, while in Spain, 'Technicians specialising in heat pump installation' are in high demand. 'Teachers specialising in thermal applications' are mentioned twice as often in Spain compared to Greece and Slovakia.



Qualifications Necessary for Green Hydrogen & Heat Pump Market



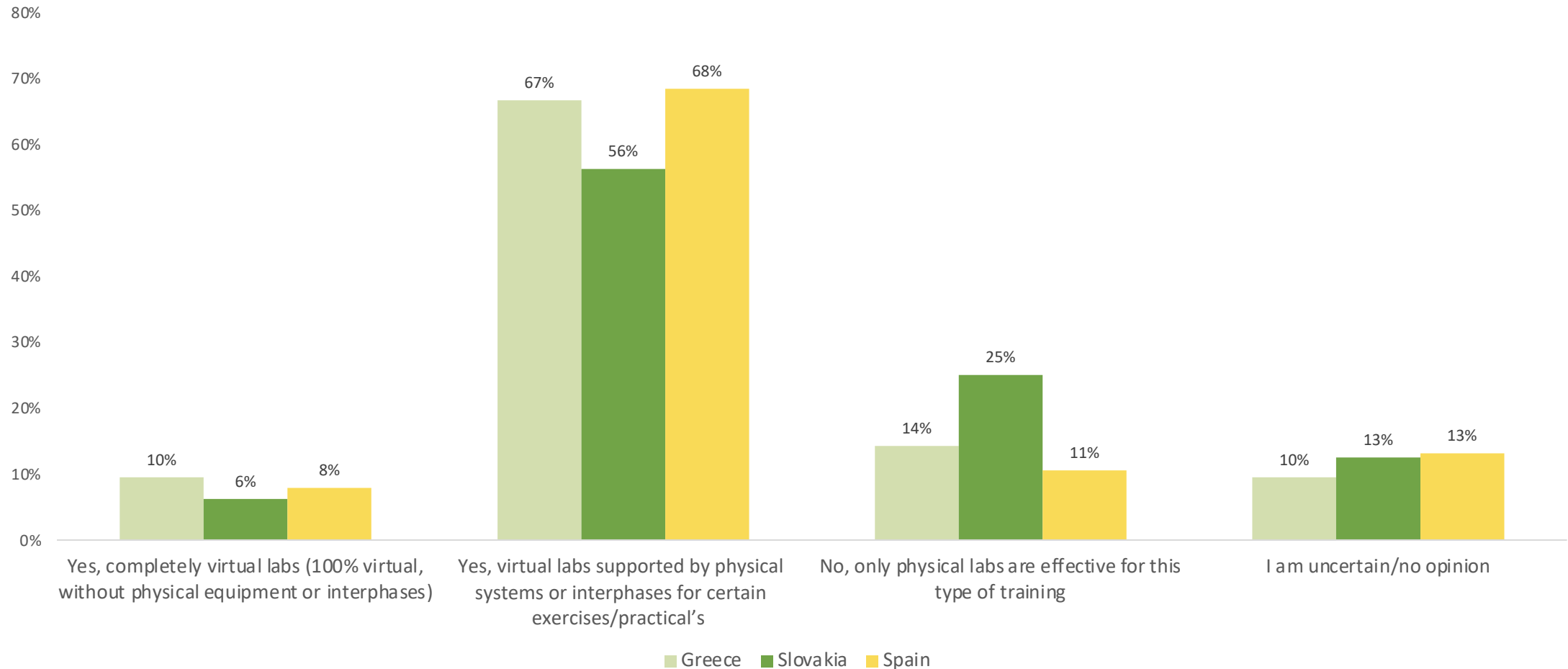
Qualifications necessary for Green Hydrogen & Heat Pump Market

- Greece** 'Dual vocational training in both vocational school and company' is mentioned first as a required qualification (59%).
'Short-term qualifications', 'Professional certificates' and 'Practical experience through internships' also have high values (all over 50%).
'School-based training' plays the least important role (10%)
- Slovakia** 'Dual vocational training in both vocational school and company' is the most popular option (75%) followed by 'Dual study/training in a company' and 'Long-term qualification programmes' (56% each)
'School-based training' plays the least important role (13%)
- Spain** 'Dual vocational training in both vocational school and company' is the most popular option (80%), followed by 'Practical internships' (67%).
'School-based training' also plays only a minor role (14%).

In Spain and Slovakia, there is a strong preference for required qualifications, which is less pronounced in Greece. In all three countries, school and university qualifications seem to hold little relevance for the green hydrogen and heat pump sectors.



Usefulness for Virtual Laboratories for Practical Experience on Green Hydrogen & Heat Pumps



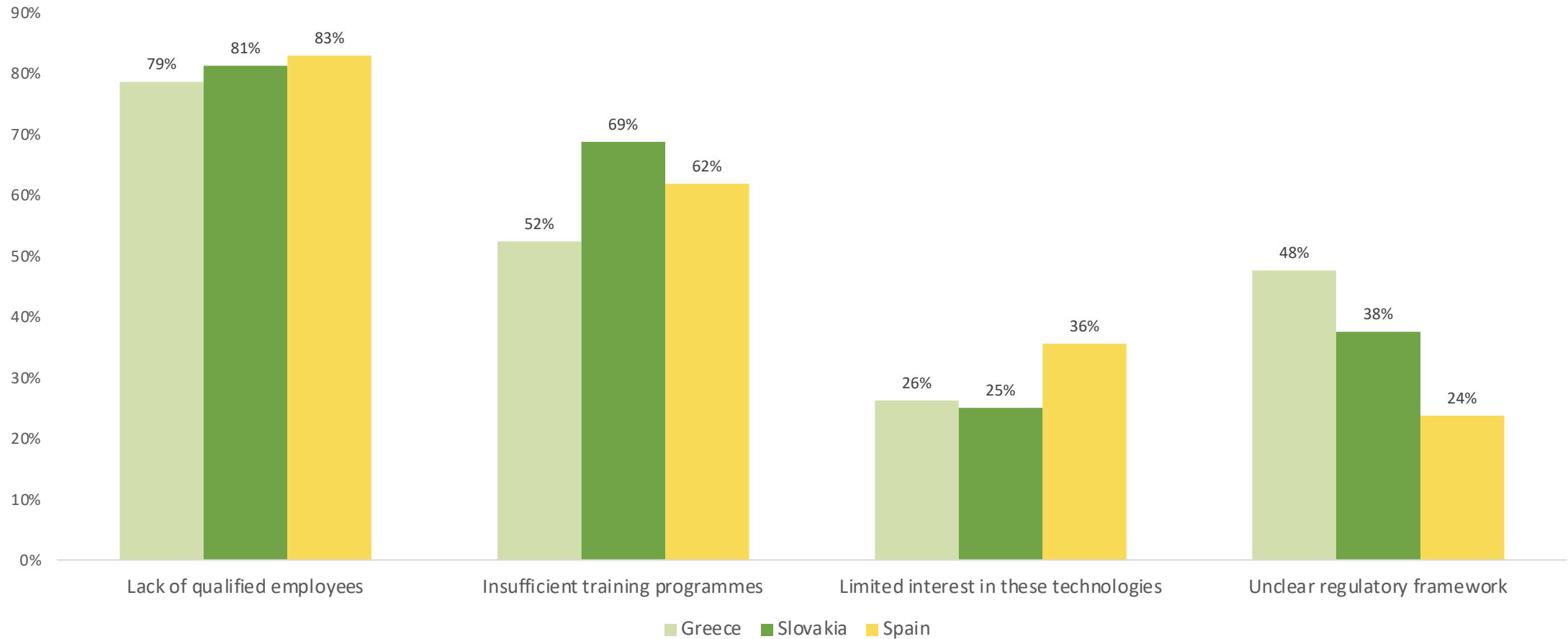
Usefulness for Virtual Laboratories for Practical Experience on Green Hydrogen & Heat Pumps

- Greece** 67% of respondents indicated that virtual labs supported by physical systems or interfaces are effective for certain exercises, while only 14% believe that physical labs are the most effective for this type of training.
- Slovakia** 56% of the respondents prefer virtual labs supported by physical systems or interfaces for certain exercises, while 25% consider only physical labs to be effective for this type of training.
- Spain** 68% of respondents showed a strong preference for virtual labs supported by physical systems or interphases for certain exercises.

The commitment to using virtual labs supported by physical systems or interfaces for certain exercises is evident and widespread over the countries.
However, completely virtual labs without physical equipment or interfaces are not preferred.



Challenges in Recruiting Green Hydrogen & Heat Pump Professionals



Challenges in Recruiting Green Hydrogen & Heat Pump Professionals

- Greece** The biggest challenge identified is the 'Lack of qualified employees' (79%). Other important concerns include 'Insufficient training programmes' (52%) and 'Unclear regulatory frameworks' (48%).
- Slovakia** The biggest challenge identified is the 'Lack of qualified employees' (81%) 'Insufficient training programmes' (69%) and 'Unclear regulatory framework' (38%) remain important areas of concern.
- Spain** The biggest challenge identified is the 'Lack of qualified employees' (83%). 'Insufficient training programmes' (62%) are the second most significant issue, followed by 'Limited interest in these technologies' (36%).

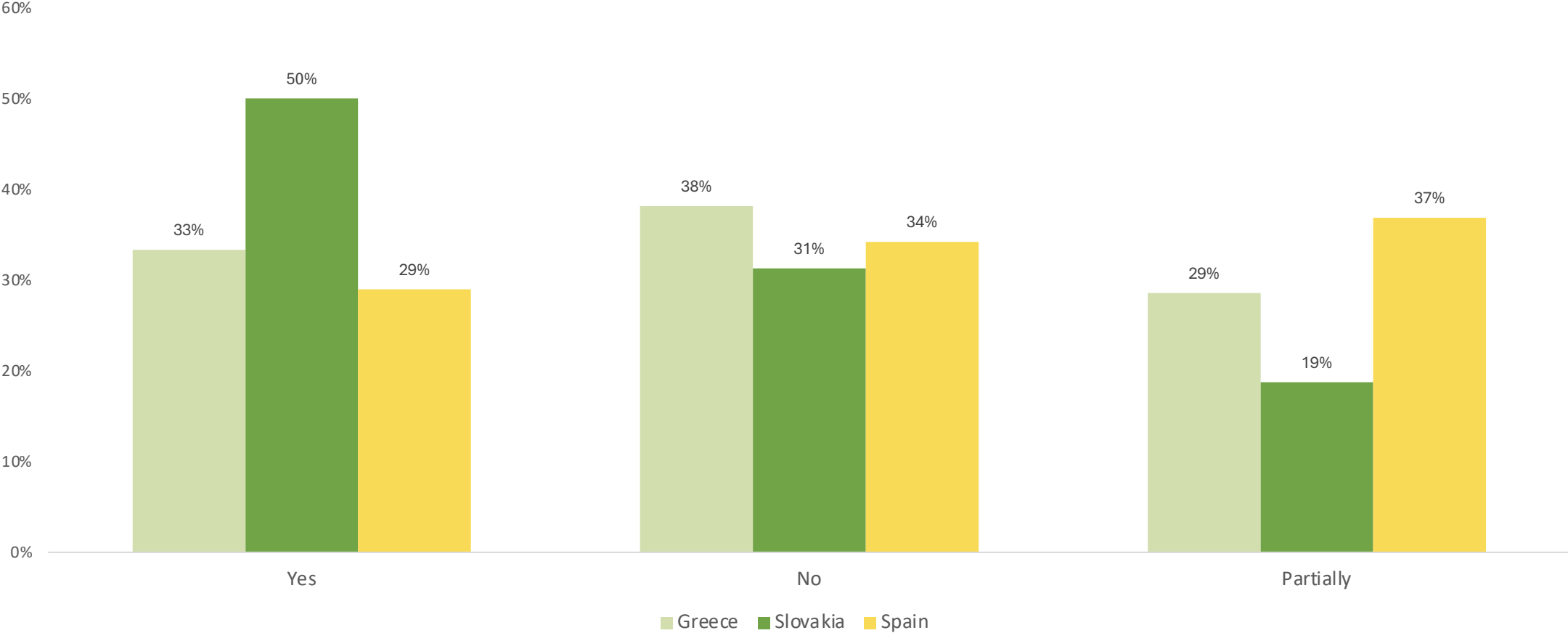
The identification of the 'Lack of qualified employees' as the primary issue is noteworthy. Existing programmes are rated as insufficient. The regulatory framework is unclear in Greece and Slovakia, while it appears to be better in Spain. However, Spain faces significant challenges with the limited interest in these technologies.



Status Quo on Vocational Qualifications



Awareness of Vocational Qualifications for Green Hydrogen & Heat Pumps



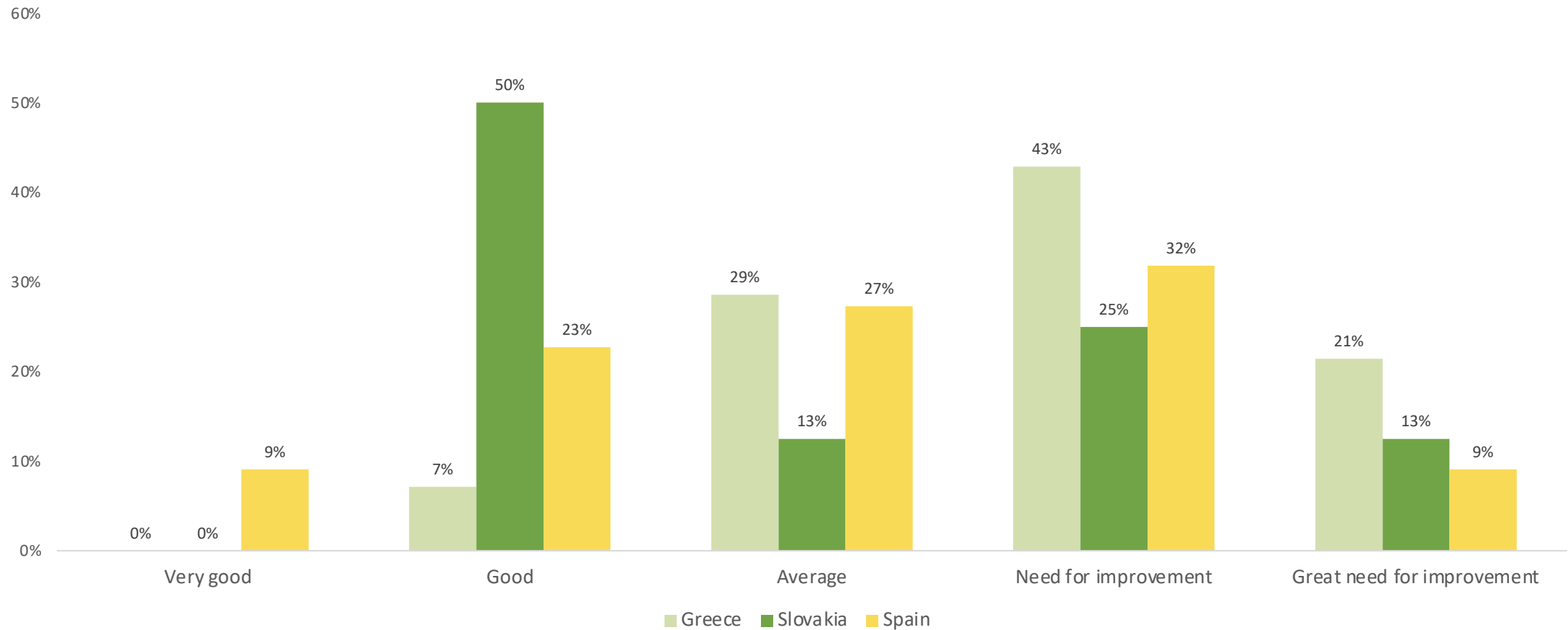
Awareness of Vocational Qualifications for Green Hydrogen & Heat Pumps

- Greece** Approximately 30% of respondents report awareness, while almost 40% report no awareness.
Just under 30% report partial awareness.
- Slovakia** Approximately 50% of respondents indicated awareness, while 30% did not.
Additionally, around 30% expressed partial awareness.
- Spain** Less than 30% of respondents agree that there is awareness of vocational qualifications for green hydrogen and heat pumps.
Additionally, only 35% of respondents partially agree.

In Slovakia, awareness is highest at 50%. However, approximately 30% of respondents in all three countries reported no awareness of vocational qualifications in the field of Green Hydrogen and Heat Pumps, indicating a need for increased awareness in all three countries.



Assessment of Current Status of Vocational Qualifications for Green Hydrogen & Heat Pumps



Needs of Educational Institutions



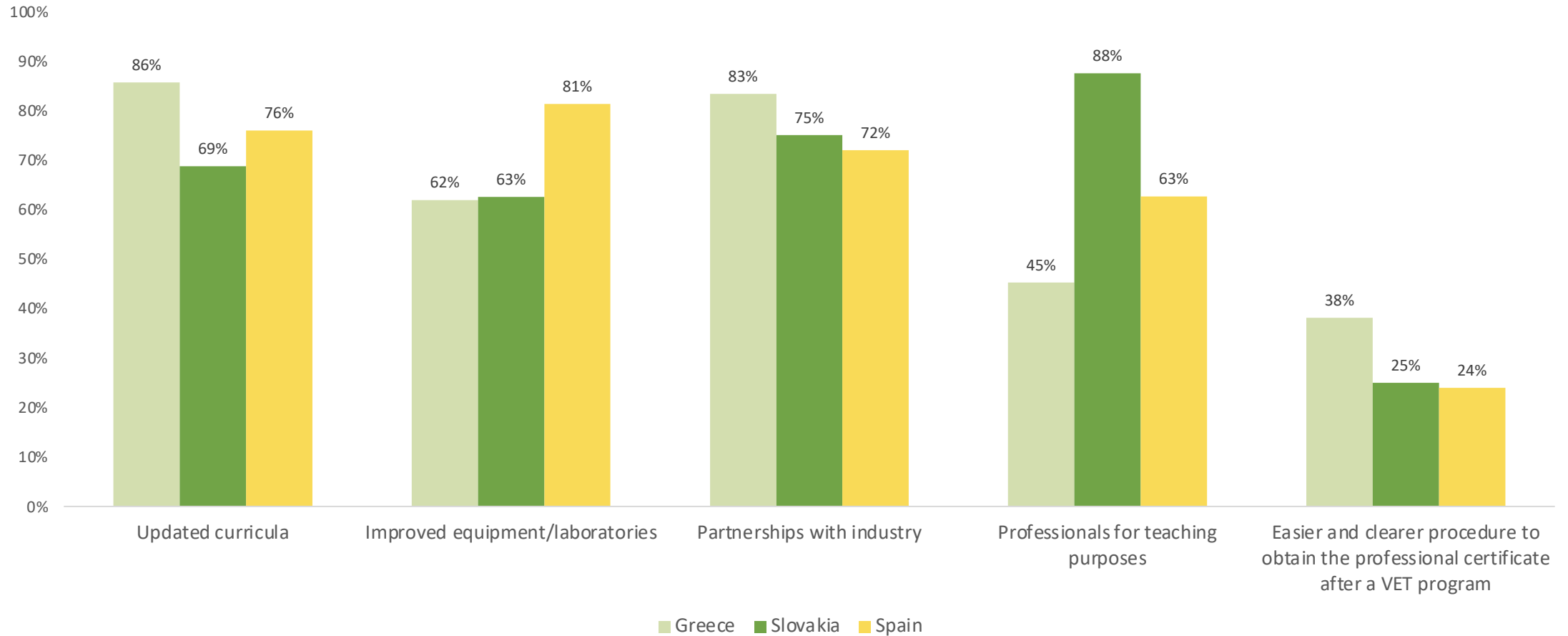
Assessment of Current Status of Vocational Qualifications for Green Hydrogen & Heat Pumps

- Greece** Only 7% of the respondents rated the assessment as 'Good', while 43% believed that there is a 'Need for improvement' and 21% that there is a 'Great need for improvement'.
- Slovakia** 50% of the respondents rated the assessment as 'Good', indicating a high level of satisfaction.
25% expressed a 'Need for improvement' and an additional 13% identified a 'Great need for improvement'.
- Spain** 9% of respondents rated the assessment as 'Very good', followed by 23% who gave it a 'Good' rating.
32% indicated a 'Need for improvement', while an additional 9% reported a 'Great need for improvement'.

The evaluation of vocational qualifications for Green Hydrogen and Heat Pumps reveals that Greece has the lowest rating of existing qualifications and therefore a particularly high need for further support. Slovakia and Spain received a comparatively good evaluation, however all three countries require further support to improve the qualifications in these sectors.



Need of Vocational Institutions to Qualify Young People on Green Hydrogen & Heat Pumps



Need of Vocational Institutions to Qualify Young People on Green Hydrogen & Heat Pumps

Greece The highest demand is for 'Updated curricula' (86%), followed by 'Partnership with industry' (83%).

Slovakia The primary requirement for VET institutions is 'Professionals for teaching purposes' (88%), followed by 'Partnerships with industry' (75%).

Spain The survey results indicate that the highest priority is on 'Improved equipment and laboratories' (81%).

Also a high need for 'Updated curricula' (76%) and 'Partnership with industry' (72%)

Respondents in all three countries consider 'Updated curricula', 'Improved equipment & laboratories', and 'Partnerships with industry' to be important.

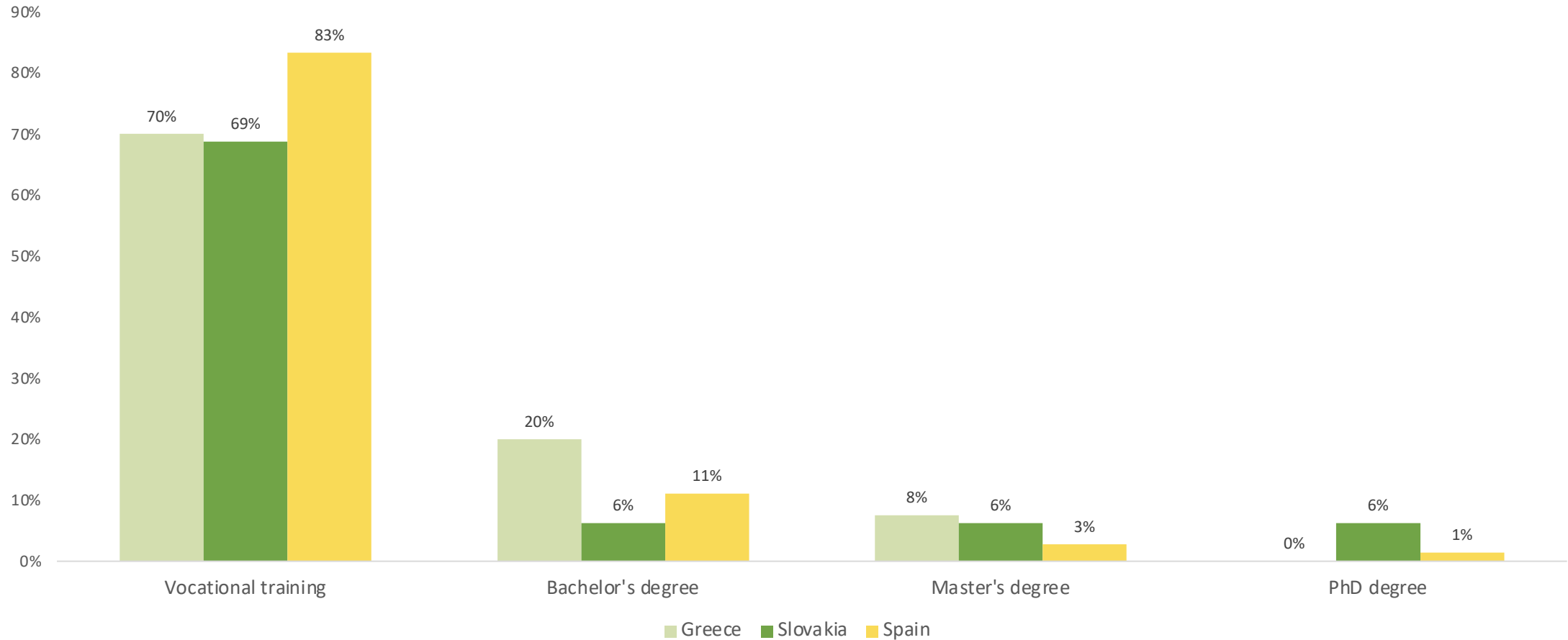
In addition, Slovakia stands out with a high need for 'Professionals for teaching purposes'. Although the 'Easier procedure of obtaining certificates after VET programmes' appears to be the least important overall, it should not be ignored.



Definition of Target Group



Target Groups Required Level of Qualification to Meet Needs of Green Hydrogen & Heat Pumps Market



Target Groups Required Level of Qualification to Meet Needs of Green Hydrogen & Heat Pumps Market

- Greece** Vocational training is rated as the the most important qualification for the green hydrogen and heat pump market (70%)
University qualifications are considered less important (Bachelor's degree 20%; Master's degree 8%).
- Slovakia** Vocational training is rated as the the most important qualification (69%).
University qualifications are considered less important (Bachelor's & Master's degree, PhD 6% each)
- Spain** Vocational training is rated as the the most important qualification (83%)
University qualifications are considered less important (Bachelor's degree 11%; Master's degree 3%, & PhD 1%)

Professional qualifications are the most important in all three countries, with a primary focus on vocational education and training to meet the demand for skilled workers.



Overall Conclusion



Overall Conclusion

Shared Challenges and Market Demands

- Key challenges as shortage of skilled workers and inefficient existing training programs need to be overcome
- Existing vocational qualifications have a high demand for improvement
- Lack of knowledge about professional qualifications in these technologies underlines the need for greater awareness, which is the aim of GreenVOCnet

Valuing VET qualifications with innovative character

- VET is considered the primary qualification for the green hydrogen and heat pump market
- The importance of updated curricula, improved equipment & laboratories, and industry partnerships is emphasised. The use of virtual labs with physical support is widely endorsed

Need for further analysis on tailored qualifications for GreenVOCnet

- The results provide an initial impression; qualitative in-depth interviews are conducted with various stakeholders to further analyse causes and needs.
- Due to shared challenges but slightly different needs of the countries, the qualifications must be customisable and at the same time meet a certain standard.
- As part of GreenVOCnet, new qualifications in these two key technologies are being developed to meet the requirements.





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Thank you!