

# CLIMATE GOALS:

**Winning the challenge of climate goals  
through the creation of skills and  
competences worldwide**

Report of the international research promoted  
by Fondazione MAIRE with IPSOS

sponsored by

 **NEXTCHEM**

 **TECNIMONT**

# **CLIMATE GOALS:**

**Winning the challenge of climate goals  
through the creation of skills and  
competences worldwide**

Report of the international research promoted  
by Fondazione MAIRE with IPSOS



## INDEX

<b>1</b>	<b>INTRODUCTION: The goals of the research and the role of Fondazione MAIRE and MAIRE Group</b>	<b>2</b>
<hr/>		
»	1.1 The subject of the research	5
»	1.2 The need for competences to make the energy transition real	6
»	1.3 The role of Fondazione MAIRE	8
»	1.4 Transferring competences: the role of MAIRE Group	9
»	1.5 The approach of the research, credits and acknowledgments	10
<b>2</b>	<b>KEY FINDINGS FROM RESEARCH CONDUCTED BY IPSOS</b>	<b>11</b>
<hr/>		
»	2.1 Executive summary	12
»	2.2 An overview on sustainable energy transition	18
»	2.3 Setting goals for energy transition	29
»	2.4 Raising awareness: the need for energy transition-specific training	33
»	2.5 Key competences for successful energy transition	40
»	2.6 Education: owners, beneficiaries, international policy tools, actions at country and global level including COP28 recommendations	45
»	2.6.1 Key player on training on energy transition	45
»	2.6.2 Strategies for Energy Transition Skills development	47
»	2.6.3 International Policy Tools and Organizations for Energy Transition Education	49
»	2.6.4 Climate Change and Energy Transition: Actionable Strategies for COP28	50
<b>3</b>	<b>METHODOLOGICAL NOTE</b>	<b>51</b>
<hr/>		
»	3.1 Questionnaire structure and flow	51
»	3.2 Sample and methodology: target population	52
»	3.3 IPSOS Sustainability Cluster	53
»	3.4 Sample and methodology: target opinion leaders	54

# **1 INTRODUCTION:**

## **The goals of the research and the role of Fondazione MAIRE and MAIRE Group**

---

This report presents the results of an international research promoted by Fondazione MAIRE and the worldwide research Institute, IPSOS, with the partnership and support of the MAIRE Group companies for Sustainable Technology Solutions and Integrated Engineering & Construction Solutions, NextChem and Tecnimont.

The research examines how new skills (or competences) and education meet the energy transition, mitigation and adaptation goals over the coming years are perceived and is presented for COP28 in Dubai. The research aims to and bring the topic for discussion at the conference table and propose it as one of the areas for development during the 2024 UAE's Presidency of COP.

## 1.1 The subject of the research

---

The Presidency of COP28 has stated broad ambitions for the UAE Conference of Parties, with a will for it to be a call for transformative action and remembered for uniting everyone in action.

The world demands transitional progress, the world needs transformational action and transformation needs competence, competences that needs designing and updating quickly and across the board.

There should be seven years left to reduce emissions by 43 % and keep the ambitions of the Paris Agreement alive, even if according to the obtained results this seems to be quite difficult without improving the efforts in decarbonization processes, education, and technological development. To meet this challenge, we need to accelerate cross sectoral progress on mitigation and adaptation, and we need to train thousands of new engineers, economists, scientists, technicians, communicators, educators worldwide. Women and men should adopt roles and responsibilities in industry institutions and administrations, and in civil society.

Millions of people need to be educated to behave differently with a view to mitigation and adaptation, building global climate resilience. Developing competences during the energy transition is pivotal to this task, and this has to happen worldwide, reducing gaps in know-how and enabling decar-

bonisation in every country, for a fair and equitable transition that leaves no one behind. Thousands of innovative solutions need developing to modify processes, business models, to make products with a lower carbon footprint, to defend and restore natural carbon sinks, coasts, homes, and our heritage. Tens of thousands of projects and infrastructures need to be realized worldwide for a new low carbon economy and for restoration.

But how strongly is the perception about the need for developing new competences and professional profiles to make it feasible and possible to reach the decarbonization goals being considered internationally?

What kind of competences are needed to make a net zero economy real?

Who are the players and what are the levers in this transition of competences?

What internationally applicable tools for coordinating efforts to increase competences systemically and inclusively for the energy transition exists?

These are the topics of our research.

They are core subjects in climate goal discussions. Without significant effort invested in creating new competences and changing the culture throughout business and civil society, succeeding in the challenge of reducing GHG emissions to the targets required to mitigate global warming will be impossible.

## 1.2 The need for competences to make the energy transition real

---

“Millions of new jobs in clean energy sectors will create a once-in-a-generation opportunity for employment growth across the world. Future growth in clean energy industries is closely correlated with the simultaneous development of a qualified workforce to implement projects.”

This sentence comes from IEA’s report *Skill development and inclusivity for the energy transition*.

Over 130 countries have set or are considering setting a goal of net-zero emissions by 2050. Achieving net-zero on a global scale requires \$125 trillion in climate investment by 2050, according to the research commissioned by the United Nations Framework Convention on Climate Change (UNFCCC). It is said that this might lead to a lack of a sufficiently skilled workers to undertake the scale of new projects required for a low-carbon economy.

According to the IEA’s World Energy Employment Report, the energy sector employs over 65 million people in total, around 2% of global employment in 2019. To reach the net zero emissions goal, the transition could create 14 million clean energy technology-related new jobs, shift around 5 million workers from fossil fuels, and require additional skills and training for an estimated 30 million employees, according to the IEA’s landmark report *Net Zero by 2050*.

In most cases, this will require developing both upskilling or reskilling.

Some countries are already tackling these aspects. Here are a few examples. The United Kingdom is working on a roadmap aiming at targeting net zero emissions by 2050 by developing a workforce with transferable skills to support 130.000 jobs across the energy sector through a plan for a more flexible, diverse, multi-skilled and technology-enabled workforce. A large part of this will come from the reskilling of the traditional oil and gas workforce with medium to high skills transferability to enable them to work in other energy sectors, including off-shore wind, carbon capture, usage and storage (CCUS) and hydrogen.

The U.S. Department of Energy is behind the Hydrogen Education for a Decarbonized Global Economy (H2EDGE) workforce development initiative that is designed to develop and grow the emerging industry’s workforce to advance hydrogen technologies and end-use applications, both developing

newly-trained personnel and enabling the existing labour force to migrate into the hydrogen field.

Inclusion and equal participation in the workforce is a relevant aspect and it directly covers SDG10- (Reduced inequalities), SDG5 (Gender equality) and SDG8 (Decent work and economic growth), as well as other SDGs indirectly. Inclusive education for the energy transition is a great opportunity to reduce social inequalities. Women and minorities are underrepresented in the energy labour force. Women currently account for only 16% of conventional energy sector employment. The new energy workforce should be more inclusive and gender-balanced, according to the International Energy Agency and the World Economic Forum.

As we learn from the IEA's report and from the Global Commission on People-Centred Clean Energy Transitions recommendations, a number of initiatives are already underway around the world to support this outcome, targeting education and skills training programmes for specific groups, notably women, young people and marginalised communities.

We hope that this study will be of help to promote, design and coordinate new educational initiatives at national and international levels.

We are confident that multiplying educational initiatives worldwide will contribute spreading awareness and knowledge across the society and the industrial and economic sectors.

This will definitively contribute to achieve the climate goals by feeding with new skills and competences the improvement of the strategic levers: technological, as development of solutions, economic, as new business models and market balances, financial, as funds and mechanisms to cover the costs.

## 1.3 The role of Fondazione MAIRE

---

Fondazione MAIRE has the scope to help develop the “humanistic engineering” as a discipline that could and will be pivotal for the worldwide paradigms transformation. People with a multidisciplinary culture, a broad outlook, and soft skills who can blend technical and technological know-how and expertise with economic vision, with environmental and social sustainability knowledge and sensitivity, and with a broader multi-cultural approach and sense that progress represents human evolution.

Among other activities, Fondazione MAIRE is involved in courses specifically designed for female students to bring them closer to STEM disciplines, and engineering, energy sector and energy transition job opportunities in the future. It also participates in training initiatives on the digital and ecological twin transitions; promotes the engagement of young artists on sustainability themes; and partners with schools, associations, and institutions to encourage young people to go into a technical career to become the protagonists behind this progress in the industry and across society over the coming decades.

With this footprint, Fondazione MAIRE aims to use this report to stimulate a debate on the steps the international community has to take towards developing the necessary competences that make achieving the climate goals possible. People will need to broaden their skills to adapt to

this disruptive change in the economy and in the society. Skills relating to collaboration, leadership, knowledge of multiple disciplines, creativity, ethics and flexibility will be of critical importance. Future players in the energy transition need to understand the impact of technology on society, people and organisations, and they need to be capable of leading this change.

This is what the Fondazione MAIRE calls a new type of engineer, the humanist engineer of the future who will be human-centric and able to work across disciplines to find the solutions that consider the many facets and complexity of this new paradigm.

Fondazione MAIRE has developed a training project in conjunction with ENEA<sup>1</sup> in Italy aimed at training high school female students on STEM (Science Technology Engineering and Math) disciplines, the engineering sector and energy efficiency and transition with over 2,000 hours of training provided so far.

Fondazione MAIRE has promoted courses in school and technical lectures at universities on an individual bases, training over 500 students on circular economy and the hydrogen economy and it is partner of the TRED Project, a high school course on the Ecological and Digital Transition, recognised by the Italian Ministry of Education and provided by the consortium ELIS, training 800 students from 30 Italian schools each year.

---

<sup>1</sup> Italian National Agency for New Technologies, Energy and Sustainable Economic Development

## 1.4 Transferring competences: the role of MAIRE Group

---

MAIRE S.p.A. is the founding company of the Fondazione MAIRE. It heads a technology and engineering group that develops and implements innovative solutions to enable the Energy Transition, offering Sustainable Technology Solutions and Integrated E&C Solutions for nitrogen fertilisers, hydrogen, circular carbon, fuels, chemicals, and polymers.

MAIRE is listed on the Milan Stock Exchange and creates value in 45 countries, relying on over 7,000 employees, and is supported by the over 20,000 people engaged in its projects worldwide. Its basket of expertise and a bold sustainability strategy to go with the transformation and growth of the business makes it possible to store, develop and improve the competences that need transferring worldwide. In 2021, the Group created the first Research Center on Circular Economy within NITK<sup>2</sup> in India, and a specific laboratory for the polymer characterisation at Baku Higher Oil School in Baku, Azerbaijan, in 2022, as well as promoting fellowship and technical lectures.

The Group has both a network of over 24 universities worldwide and Open Innovation platforms, which aim to create R&D ecosystems that will help innovation in the energy transition to flourish. In India, the MAIRE Group is developing Corporate Social Responsibility programmes that include energy transition educational projects, sensitisation and awareness campaigns for correct waste management, and the creation of micro/small energy facilities fed by bio-waste to produce gas

and renewable energy to supply the disadvantaged population.

In India, MAIRE supported the WISE (Women in Science and Engineering) project, which involved 160 girls from rural areas in 3 Indian States taking part in an in-person, one-week long awareness and training programme.

With deep-dive sessions at the IITB<sup>3</sup> Campus in Mumbai (with women role-modelling sessions), female IITB engineering students mentor the girls remotely to sustain their interest. Another CSR project is carried out in Paradip, India, with NITK: a circular plant that uses waste to produce biogas to prepare meals for people living below the poverty line.

This project will involve minorities during the collection of organic waste from local communities. MAIRE will provide training for the plant workforce via NITK, and the plant itself will be used as a case study as part of the NITK faculty courses and the first inter-disciplinary “Maire Tecnimont Centre for Research on Waste Recycling and Circular Economy”

---

<sup>2</sup> National Institute of Technology, Karnataka

<sup>3</sup> Indian Institute of Technology - Bombay

## 1.5 The approach of the research, credits and acknowledgments

---

This research was conducted in over ten countries and can help provide a picture on the perceived way to build new competences for the energy transition and sustainable development, and the role that new profiles of “humanist engineers” may play regarding global climate goals.

The outcome is an initial snapshot that might create the bases for broader research and common initiatives starting from COP28UAE.

The project was coordinated by the Director of Fondazione MAIRE, Ilaria Catastini. The team members were Valentina Grieco and Mary Gio' Zaki.

We thank the International Science Council for their cooperation, and the MAIRE Group companies, NextChem and Tecnimont, the Fondazione MAIRE board of directors and MAIRE's communication department for their support.

## 2 KEY FINDINGS FROM RESEARCH CONDUCTED BY IPSOS

---

To explore the topic of energy transition and understand the role of skills and education in defining an effective and inclusive process, IPSOS conducted an international survey involving public opinion (1,700 highly educated individuals) and opinion leaders (15 in-depth interviews, managed by psychologists, with experts and professionals belonging to different areas of expertise/memberships). The sample included individuals from 10 countries and 4 continents worldwide - Italy and the United Kingdom from Europe; Turkey, Saudi Arabia, the United Arab Emirates, China, India from Asia; Algeria from Africa; United States of America and Chile from the Americas.

The interviews with the educated population were self-completed and collected through the IPSOS online panel (Computer Assisted Web Interviews). The opinion leader interviews were conducted via a phone or web call, based on a discussion guide.

*Please see the methodological note at the end of the report for additional information.*

The IPSOS research team was coordinated by Nando Pagnoncelli, President of IPSOS Italy, and included Andrea Alemanno, Head of Corporate Reputation and Public Affairs, Ilaria Ugenti, Corporate Reputation Leader, Paola Simonetta, Senior Researcher. The survey was conducted from September to November 2023.

The following chapters aim at presenting the survey's main findings.

## 2.1 Executive summary

---

The energy transition – the process of shifting from a fossil sources based economy to an economy based on renewable and circular sources, necessary to reduce GHG emissions and combat global warming and the resulting climate change – is an important and complex issue. It brings about various costs and benefits across different areas, including environmental, health, and economic. However, the environmental benefits are often the most recognized.

The energy transition will have potential impacts on different stakeholders. New businesses and jobs will be created in the renewable energy, technology and industrial sectors, as well as in administrations and civil society. At the same time, many workers will need reskilling of competences. There is a need for strong leadership and commitment from governments, accompanied by effective policies and regulations. Furthermore, collaboration and cooperation between countries are crucial, as energy systems are becoming increasingly interconnected. Additionally, a shift in people's attitudes and behaviors plays pivotal role in the energy transition process. This is because it's essential for individuals to understand the importance of energy efficiency and be open to changing their energy consumption habits.

The research realized by Fondazione MAIRE with IPSOS explored global understanding and opinions on energy transition, involving highly educated people committed to the environmental issue and key opinion leaders from 10 countries across four continents. The key scope of the research was to understand the perceived importance and urgency of creating new skills and competences as enablers of the process to achieve climate goals. The results present a geographically interesting picture in terms of how different countries worldwide are adapting to circumstances. They are developing their roadmaps to achieve decarbonization goals and creating business and job opportunities to make the energy transition a competitive field.

The energy transition is perceived as an urgent and necessary process to tackle climate change, even though its priority varies across countries. Western economies, like Italy, the UK, and the USA, are often seen as more advanced in the transition process. However, respondents from these countries perceive the urgency of the process as lesser and consider their countries' situations as average or even lagging. On the other hand, countries such as Saudi Arabia, the UAE, India, and China view

this issue as a priority for them and consider their country more committed. They tend to have a more positive perception about the overall progress. There is a third group, including countries like Chile, Algeria, and Turkey, where the energy transition is a priority for individuals more than what the governments seem to pursue and these countries are perceived as lagging in the process.

Beyond its prominent environmental benefits, the energy transition acts as a catalyst for societal and economic transformation, making it crucial to identify and to leverage these opportunities. One significant benefit commonly associated with this process is the creation of new jobs, a point prominently acknowledged by respondents from India, Algeria, Turkey, and Saudi Arabia. Indeed, the potential for job creation in the green energy sector is enormous. Countries like China and India seem to grasp this more than most, identifying it as one of the main opportunities of the process. The aspect of job creation, especially in countries like India is considered particularly relevant for women, providing them with the chance to advance their education and careers in a rapidly expanding sector. In countries like India and Saudi Arabia, the recognition of these opportunities for women is particularly pronounced. The energy transition is perceived to have great potential in reducing gender inequalities, and this involves not only educational policies but also social policies.

The differences between countries like India, China, Saudi Arabia, UAE and Western advanced economies are fascinating and are explained by variety of factors, such as the rapid industrialization and their economic growth, increasing investment in renewable energy businesses and electric automotive. The shift towards these countries indicates a significant change in the global energy transition landscape.

These findings underscore the necessity of comprehensive education on energy transition, aimed at equipping individuals with the necessary skills and knowledge. Additionally, enhancing public awareness emphasizes the holistic benefits for both the planet and its inhabitants. The importance of education and training is particularly recognized in Middle Eastern countries (Saudi Arabia, the

UAE, Turkey), Algeria, and Chile, where a substantial portion of individuals stress its importance and urgency. However, there's a concern that educational progress is still too slow. This issue is further complicated by a lack of specialized workforce (especially in the western countries), a shortage of talent, and by a gap between academic education and industry needs.

The required skills for future energy transition professionals vary across countries, but it's evident that both technical and soft skills are crucial. The emphasis on creativity (in the UK, Algeria, Saudi Arabia, India and UAE), problem-solving (in Italy, Turkey, Saudi Arabia, China, the USA, and Chile), critical thinking (in the UK), and analytical skills signals the need for well-rounded professionals in the energy transition. This also highlights the need for a workforce that is not only less-executional, but also more self-entrepreneurial.

At the same time, technical knowledge on environmental impact analysis (in the UK, the UAE, and the USA), alternative materials (in China), renewable energy sources (in Turkey, Saudi Arabia and Algeria), and circular economy principles (in India, most of all), are seen as pivotal. This reflects these countries' awareness of the educational gaps that need to be addressed.

In Italy and Chile, competences on the impacts on the territory are pivotal, indicating that the challenges in creating well-integrated infrastructures are key points in these countries. These skills, combined with relational competencies and cultural understanding, are necessary for effective stakeholder engagement. Overall, the responsibility for education on energy transition is widely recognized to be collectively held by public authorities, universities, and private businesses.

There is a call for concrete cooperation among Governments, Universities and private companies through a continuous dialogue to assess current needs, required skills and technological competencies. This should also forecast emerging needs in the near future.

Fostering skills development on a global scale includes technology transfer and competency exchange among nations, international energy agencies, and companies. There is no need to create new international bodies; instead, the focus should be on reinforcing existing organizations such as IRENA (in particular the Energy Transition Education Network), UNESCO, UN Environment Programme, EU, IEA, the European Education and Culture Executive Agency, the Union for the Mediterranean and COP. As a possible starting point, an assessment of the current state of education and training for the energy transition, potentially operated by the UN, is suggested. From a programming and design point of view it is already late, but local entities are already playing a critical role in effectively implementing energy transition measures. They have a better understanding of the specific needs, challenges, and resources of their regions. They are often more agile and can experiment with innovative solutions, which can then be scaled up.

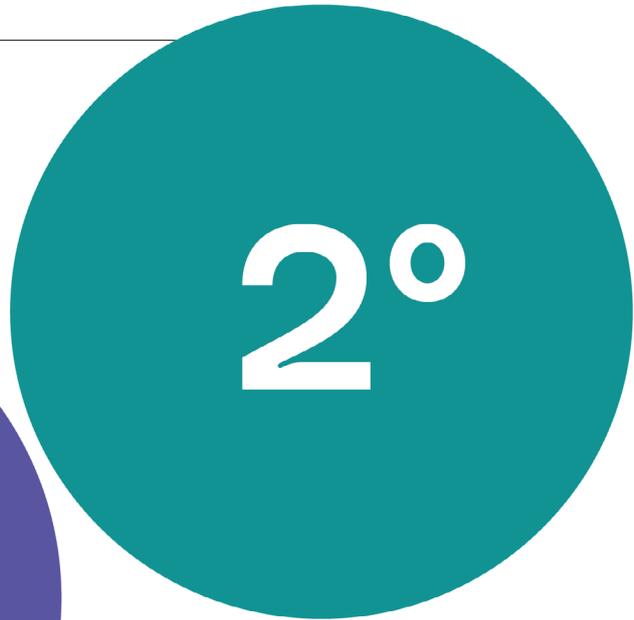
Coordinating the efforts of local and supranational entities can indeed lead to significant efficiency gains in the energy transition. However, this also implies a need for financial resources to face and address this issue, and an attention to managing the financial aspect of the education, ensuring that funding is not only directed towards a few wealthy countries, but also towards interventions that reward virtuous behaviors. There is a need to create an energy transition skills development plan.

This includes the crucial need to establish and fund common digital platforms that are globally shared and accessible even in the most remote parts of the world. Furthermore, targeted scholarships and the promotion of internationalization of public employees through exchanges and work experiences abroad, should be organized for staff from different countries. Training on authorization issues and environmental assessment is needed to make the system functional.

The transition is a common goal and it's unnecessary for each country to act separately. There is significant potential for efficiency of scale. This is not only beneficial for reducing greenhouse gas emissions and combating climate change, but also for promoting economic growth and social development by providing significant opportunities for a more sustainable and equitable future.



Technology is seen as second in importance as enabling factor



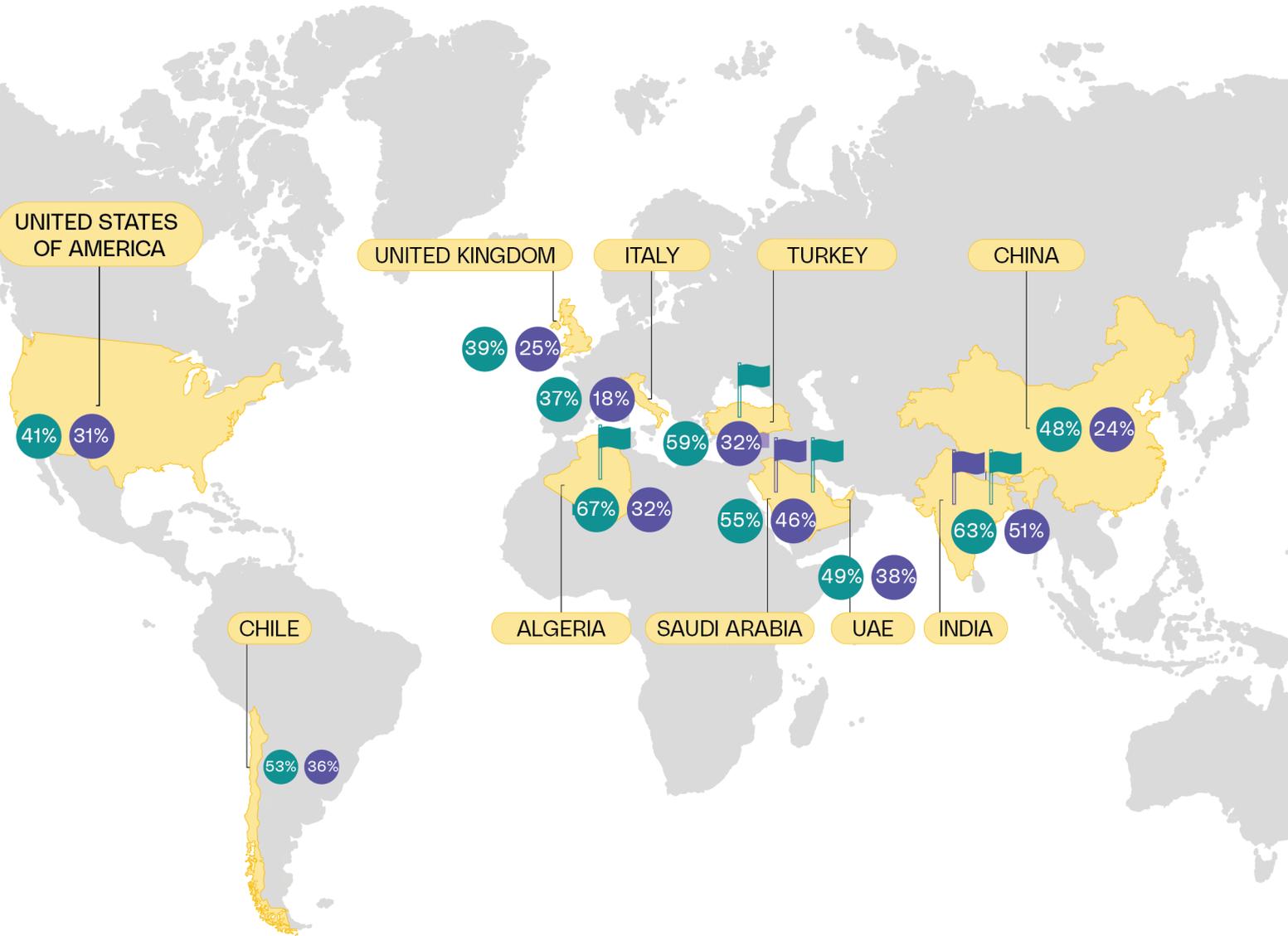
1/5 of the interviewed people emphasize the role of corporations in promoting adoption of sustainable practices



40% of the sample consider a priority the creation of skills and competences for the energy transition



# Perception of energy transition benefits across countries



Base: Total Sample - % Values

● Countries covered



Higher value of awareness of occupational benefits of energy transition process



Higher value of awareness of opportunity of women inclusion in the energy transition process

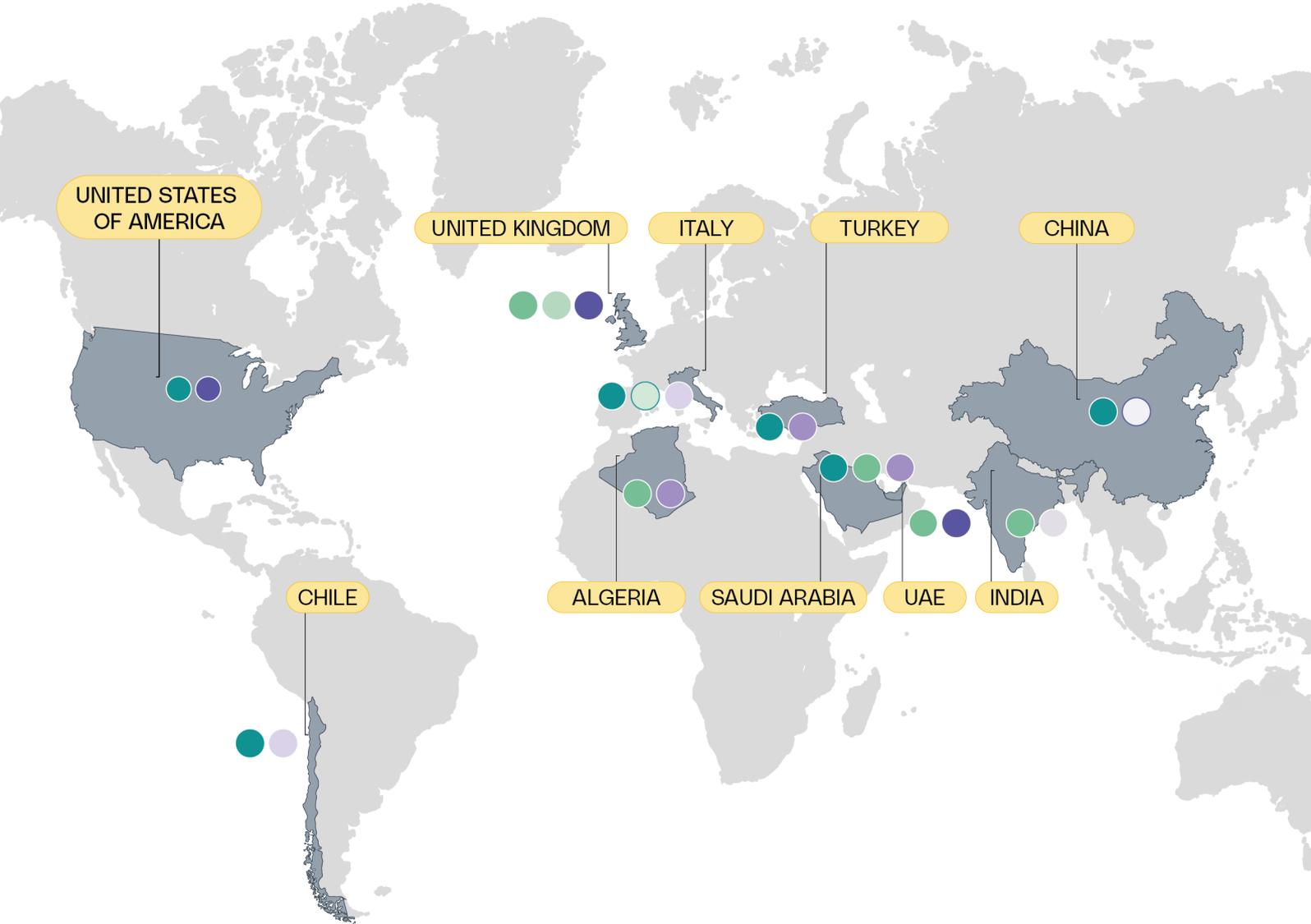


Awareness of occupational benefits of energy transition process



Awareness of opportunity of women inclusion in the energy transition process

# Key skills and competences prioritized for energy transition



Base: Total Sample - % Values

● Countries covered

## Hard Skills

- Assess the environmental impact
- Renewable energy sources
- Assess the impact on the territory
- Circular economy
- Alternative materials

## Soft Skills

- Problem solving
- Creativity
- Critical thinking
- Multidisciplinary approach

## 2.2 An overview on sustainable energy transition

---

***Energy transition is considered a multidimensional topic with significant societal, economic, and environmental implications. Countries are adopting global plans to promote this transition, but the process is complex and requires the involvement of many stakeholders, such as governments, private companies, and citizens. Awareness and the priority of the topic vary across countries, but they are generally high in advanced economies. However, the perception of a country's commitment to energy transition can sometimes be biased, with some countries overestimating their progress. Opportunities associated with energy transition include job creation and raising public awareness, while the development of new infrastructure is considered challenging.***

Energy transition is currently a widely discussed and well-known topic. It is considered the “key” for addressing climate change-related issues and non-renewable energy resource depletion. In fact, the transition to renewable energy sources like solar and wind power from traditional energy sources such as coal and oil is pivotal for reducing greenhouse gas emissions and increasing environmental sustainability, as is the introduction of technological solutions and new processes in industry. Many countries are adopting or have already adopted plans and policies to promote energy transition and reduce dependence on non-renewable energy sources.

Among opinion leaders, there is a common belief that energy transition is a complex and ambitious process that requires the transformation of society at many levels. To run this process, it is necessary to involve many different stakeholders with diverging interests that need to be combined to reach the final goal. In addition, the idea of a cultural change impacting the lifestyle of citizens, their beliefs, and behaviors is seen as crucial to effectively contribute to the transition process.

Energy transition also refers to an inevitable process, signifying the urgent need to act. It also presents an opportunity, a positive turning point, with potentially positive effects for the planet and its inhabitants.

*“Energy transition is inevitable; there’s no doubt about it. The process has its own significant, predictable dynamic. The question is whether it will be more turbulent or more managed than other transitions. It involves a higher investment phase than other transitions, with a reduction in management costs”*

Top Manager – Italy

**Table 1** Awareness on energy transition process

Q1A. Have you ever heard of energy transition?

Base: Total Sample - % Values

	EUROPE		ASIA					AFRICA	AMERICAS	
	ITALY	UK	TURKEY	SAUDI ARABIA	UAE	CHINA	INDIA	ALGERIA	USA	CHILE
TOTAL AWARENESS	97%	95%	90%	96%	97%	97%	95%	96%	96%	99%
I am very familiar with it	60	59	47	55	50	37	63	56	63	42
I have heard of it, but I only have a vague idea	37	36	43	41	47	60	32	40	33	57
I have never heard of it	3	5	10	4	3	3	5	4	4	1

Overall, more than 90% of respondents have heard of energy transition across countries. Familiarity with this topic is particularly high in the advanced economies as Italy (60%), the UK (59%), the USA (63%), and in India (63%). In countries such as China, Chile and Turkey, less than half well educated respondents are familiar with the energy transition process. Saudi Arabia and Algeria cover an intermediate position: whereby more than one-in-two respondents is familiar with this process.

*“I would put culture, the change of mentality and conception of the problem, and also the social aspect in first place, because if part of the population does not have access to new technologies, it is unthinkable that they will develop them.”*  
Academic - Italy

**Table 2** Perceived importance of energy transition process

Q2\_2. In your opinion, how important is energy transition?

Base: Total Sample - % Values

	EUROPE		ASIA					AFRICA	AMERICAS	
	ITALY	UK	TURKEY	SAUDI ARABIA	UAE	CHINA	INDIA	ALGERIA	USA	CHILE
It's a priority	57	59	70	62	65	65	70	64	59	66
It is important, but on par with other areas of commitment	41	40	28	35	34	35	29	35	34	31
It is of secondary importance	2	1	2	3	1	0	1	1	7	3

The importance of this topic is widely acknowledged by almost all respondents in general (Table 2), and about two-in-three respondents considers it a priority, particularly in Turkey (70%) and India (70%), followed by in Asian, African, and Latin American countries. Energy transition is a priority for more than half of respondents in the European countries and the USA, but there are other issues to focus on.

There is a greater sense of urgency in countries where the energy transition process is less fami-

liar, except in India, where the high level of familiarity, stated by better educated people highlights the priority of the energy transition.

It's challenging to establish clear priorities due to the interrelation with other significant global issues such as international conflicts and digitalization. Opinion leaders confirm that energy transition takes precedence over all other matters of global importance.

### Table 3 Energy transition perception across countries

Q3A. How much do you agree or disagree with each of the following statements?

Energy transition...

Base: Total Sample - % Values

% Scores 10-9

Ranked on Italy

Higher Values in bold

	EUROPE		ASIA				AFRICA	AMERICAS		
	ITALY	UK	TURKEY	SAUDI ARABIA	UAE	CHINA	INDIA	ALGERIA	USA	CHILE
It is crucial for <b>combating climate change and global warming</b>	38	52	65	62	61	53	62	74	50	65
It creates <b>new job opportunities</b> in the renewable energy and clean technology sectors	37	39	59	55	49	48	63	67	41	53
It <b>reduces dependence on imported energy sources</b> and the risk of <b>supply disruptions</b>	36	39	49	53	47	45	61	52	44	52
It significantly <b>benefits human health and the environment</b> by reducing greenhouse gas emissions and air pollution	36	42	59	58	58	54	65	79	47	66
It <b>leads to better energy efficiency</b> , reducing long-term costs	35	38	57	52	51	45	61	62	44	56
Investment in energy transition is a <b>priority over other areas</b>	25	29	41	55	49	45	58	45	32	37
It represents an <b>opportunity for more female participation</b> and provides <b>new employment opportunities for women</b>	18	25	32	46	38	24	51	32	31	36

The energy transition process is closely associated with environmental benefits such as combating climate change and global warming and reducing greenhouse gas emissions. The positive effects on human health are recognised too (Table 3).

Algerian respondents recognise the benefits of the energy transition process most, while Italians are the most sceptical about energy transition benefits.

It's worth noting that benefits not generally closely associated to this process, such as the creation of new job opportunities, are strongly recognised

by Indian and Algerian respondents, and by Turkish and Saudi Arabian individuals. The creation of job opportunities for women ranks last, achieving varying levels of agreement across countries. This benefit is particularly recognised in India and Saudi Arabia, while there are limited levels of agreement in the UK, China and in Italy in particular.

The need to educate people on the implications of the energy transition process is clear, to clarify that all the benefits are for both the environment and society as a whole when viewed from economic and health standpoints.

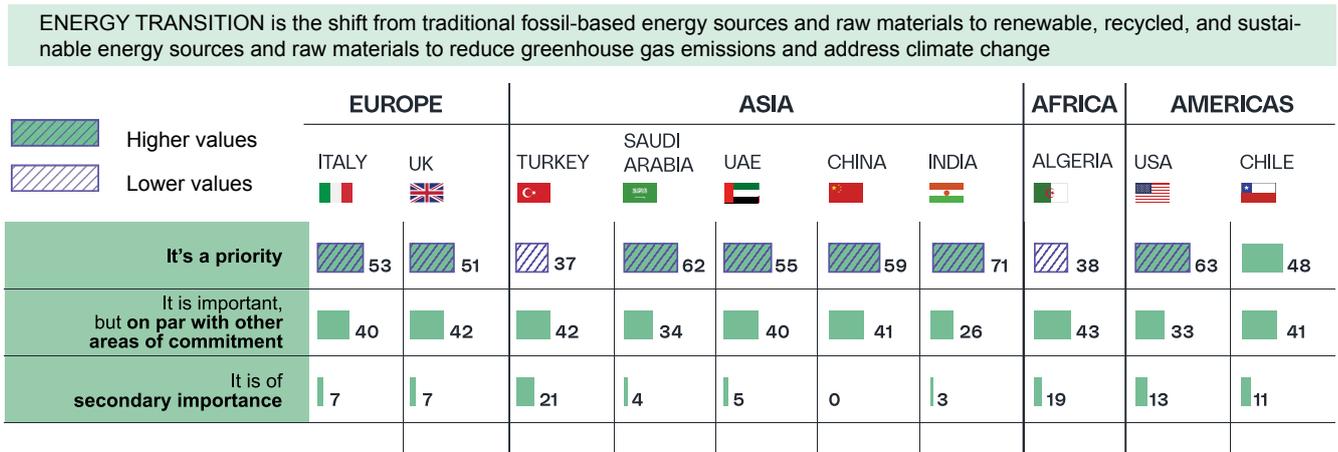
Among opinion leaders, many associations are made with global temperature, clean energy, zero emissions, decarbonisation, alternative sources, like solar or wind, electrification, green technologies, circular economy, and technologies advancements.

*“Decarbonize and reduce pollution and do it consciously, not based on trends. Consider the importance of energy in society. Today energy sources are demonized but we forget that 150 years ago the average lifespan was 45 years. Then consider that the world cannot do without it and there is a need for backups from secure sources. Today the renewables par excellence are sun, wind, and water but they are beyond our control. Low-polluting sources are needed in the energy mix. Finally, the entire life cycle must be considered in the carbon footprint”*  
 Top Manager – USA

### Table 4 Countries’ commitment to energy transition

Q2\_1. Which of the following statements best describes the level of commitment in your country?

Base: Total Sample - % Values

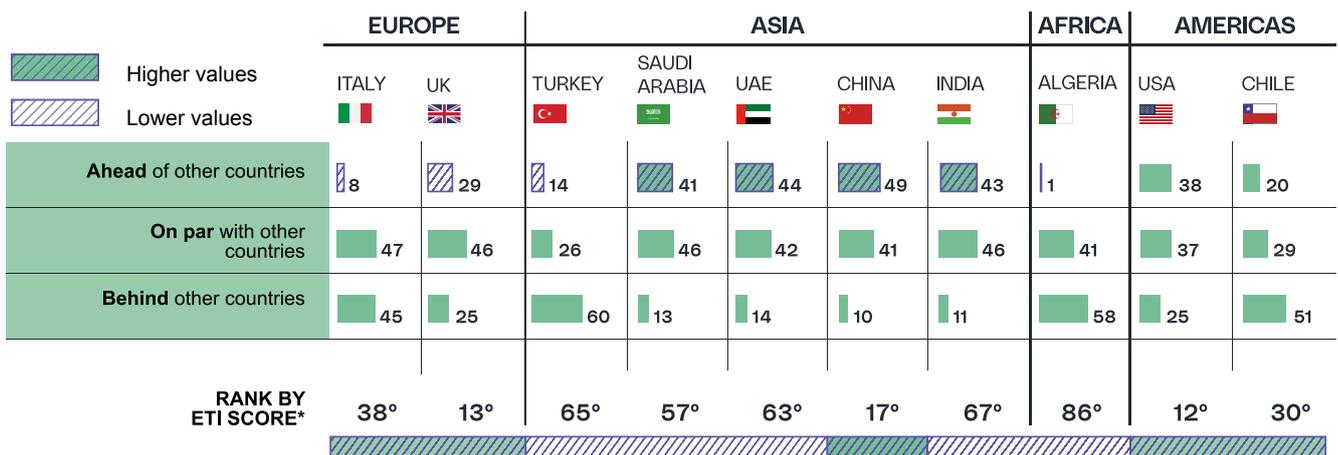


### Table 5 Country positioning on energy transition

Q13. In your opinion, how would you rank your country’s level in the energy transition process?

Base: Total Sample - % Values

\*Source: WEF, Fostering Effective Energy Transition 2023 Edition



Governments' ambitious goal to promote the use of alternative energy sources and circular feedstocks is recognised as a priority by half of the respondents on average, other than in Turkey and Algeria (Table 4). The commitment to energy transition is recognised as a priority, but on par with other issues in these countries. Asian and Middle East countries underline the high level of commitment to reduce gas emissions and address climate change. A very low percentage across the countries consider it of secondary importance.

If we consider the recent study by the World Economic Forum ("Fostering Effective Energy Transition", 2023 Edition), which uses the Energy Transition Index (ETI) to classify countries according to their performance and preparedness for the energy transition, better-positioned countries as the UK or the USA clearly evaluate their situation as equal or even lagging other countries in the world.

On the other hand, well-educated people living in SA, the UAE and India, which are the low performers, overestimate their countries' commitment to the energy transition process (Table 5).

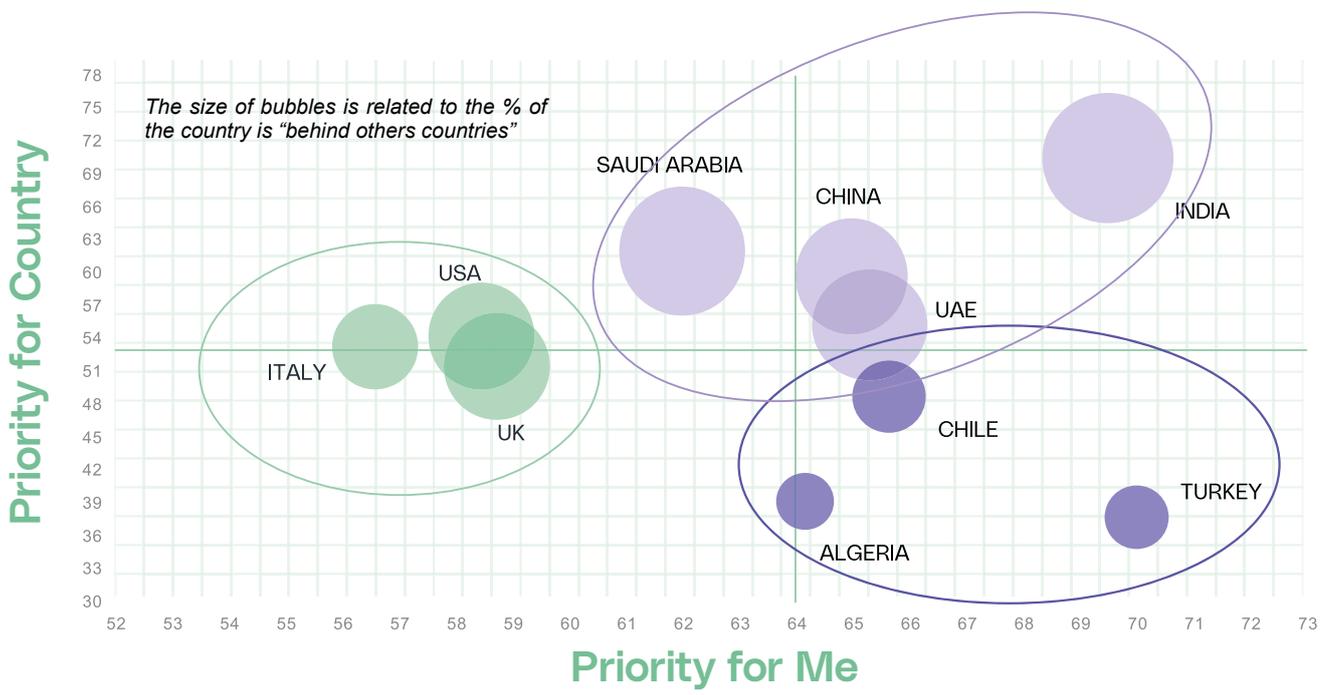
The map below (Table 6) shows this misperception clearly. In fact, respondents in Saudi Arabia, China, the UAE, and India rank their countries as the most advanced in the transition process, and that they consider it a priority.

A second group of countries - Italy, the UK, and the USA – think that government commitment is about average, while the energy transition process is a below-average priority for citizens.

A third group of countries are behind the others, - Algeria, Chile and Turkey and respondents believe that the energy transition process is more of a priority for them than it is for the governments.

### Table 6 Positioning map

Q2\_2. In your opinion, how important is energy transition?  
 Q2\_1. Which of the following statements best describes the level of commitment in your country?  
 Q13. In your opinion, how would you rank your country's level in the energy transition process?  
 Base: Total Sample - % Values



Opinion leaders agree that Northern Europe and the USA, alongside China, have made more progress in energy transition. Overall, Europe stands out for having implemented effective EU legislation that incentivizes virtuous behavior regarding energy management and pollution. To run this process, it is necessary to involve many different stakeholders with diverging interests that need to be combined to reach the final goal.

The main opportunities and benefits of energy transition vary across countries (Table 7), even though creation of new jobs ranks first, except in Italy. This percentage is highest in China at 43%. Raising awareness about energy and environmental issues is ranked like new jobs in the UK and the UAE. In Algeria, Turkey, China and India, raising public awareness is considered the second most important opportunity, whereas the development of energy and environmental policies is another opportunity from the energy transition

process in Saudi Arabia, Chile, Algeria and UAE. The development of new infrastructures is a recognized benefit in the USA.

Italians think that the active involvement of all stakeholders is the main opportunity of the energy transition process.

*“The guidelines are the first essential step to be taken for EU countries but also for other countries. Everything starts from common guidelines transmitted to individual countries. The problem is that many people who work on these issues - not so relevant in the past - do not have specific and up-to-date skills. Targeted tenders are needed to recruit specific staff to support those with obsolete skills. In general, more staff and more trained personnel are needed”*  
 Institution – North Africa

**Table 7** Main opportunities and benefits of energy transition

Q5\_1. Which are main opportunities and benefits of energy transition?

Base: Total Sample - % Values

	EUROPE		ASIA				AFRICA		AMERICAS	
	ITALY	UK	TURKEY	SAUDI ARABIA	UAE	CHINA	INDIA	ALGERIA	USA	CHILE
Ensuring the <b>active involvement of all stakeholders</b> in the energy transition process	32	21	21	21	19	26	16	16	21	27
Creation of <b>new jobs</b> in sectors focused on sustainability and climate solutions	27	35	36	37	33	43	39	37	38	32
Development of energy and <b>environmental policies by the government</b>	24	29	27	32	29	24	23	30	23	32
<b>Engagement of private companies</b> to adopt renewable energy	24	19	23	20	23	13	26	17	21	25
Development and <b>implementation of new infrastructures</b>	21	23	21	21	22	27	25	27	29	26
<b>International collaboration</b> for sharing knowledge, resources, and experiences	19	19	17	19	18	27	29	25	21	16
<b>Training of professionals</b> in the energy transition process	18	12	11	17	17	9	13	14	14	21
<b>Raising public awareness</b> about energy and environmental issues	17	35	29	25	31	31	29	32	21	18
None of these	5	2	2	1	-	1	-	1	5	-

The most mentioned options for each country are highlighted

Ranked on Italy

The main challenges of the energy transition process are clearly identified country by country, and development of new infrastructures is mentioned most. This is one of the main challenges in the UK, Turkey, SA, the UAE, India and the USA in particular. The second most mentioned challenge is public awareness about energy and environmental issues (Italy, Turkey, SA, China and Algeria).

The engagement of private companies is the main concern in Chile, which is also a challenge also in Italy, the UK and the USA.

The development of energy and environmental policies by the government is an issue in the UK, Turkey, China and Algeria.

The active involvement of all stakeholders is a significant challenge in Italy, Turkey, China and India.

The least mentioned challenges relate to international collaboration for sharing knowledge, resources and experiences, the training of professionals, and job losses in the traditional sectors.

*There are various programs as the United Nations Environmental Program with the possibility for third countries to benefit from specific training for adaptation to climate change and other sustainability issues. The Observatoire Méditerranéen de l'Energie within the Green Energy Committee also organizes regular meetings between countries on the northern and southern shores of the Mediterranean with a mutual exchange of expertise. The transversal exchange in training on these topics is fundamental because, among other things, the level of the Southern Mediterranean countries is now as high as that of the Northern countries”*  
Institution – MENA

## Table 8 Main challenges of energy transition

Q5\_2. In your opinion, what are the main challenges with energy transition process?

Base: Total Sample - % Values

	EUROPE		ASIA				AFRICA		AMERICAS	
	ITALY	UK	TURKEY	SAUDI ARABIA	UAE	CHINA	INDIA	ALGERIA	USA	CHILE
<b>Raising public awareness</b> about energy and environmental issues	27	17	27	32	31	35	23	39	24	27
<b>Engagement of private companies</b> to adopt renewable energy	26	30	17	17	14	19	26	22	29	40
Ensuring the <b>active involvement of all stakeholders</b> in the energy transition process	25	27	28	25	23	30	32	15	19	32
Development and <b>implementation of new infrastructures</b>	23	33	29	29	36	25	33	27	34	17
<b>International collaboration</b> for sharing knowledge, resources, and experiences	23	18	16	27	21	23	17	24	20	14
<b>Training of professionals</b> in the energy transition process	21	17	21	19	23	17	29	21	18	23
<b>Job losses</b> in traditional sectors that do not embrace sustainable solutions for the environment and climate	21	17	20	21	20	18	15	19	15	12
Development of <b>energy and environmental policies</b> by the government	20	31	33	21	22	30	25	31	27	31
<i>None of these</i>	2	2	1	1	1	2	-	-	4	-

 The main challenges for each country are highlighted

Ranked on Italy

Table 9 shows the differences between the opportunities and challenges with the transition. The fears and hopes expressed by people vary across countries, except for the creation of new jobs, which is seen as an opportunity, and the education of tomorrow’s professionals, which represents a challenge for everyone

Governments and large companies play a crucial role in promoting energy transition process (Table 10) through the adoption of policies, and investments in renewable energy projects.

The contribution of citizens, the scientific community, experts, and national politicians is also important, as they can make a difference by adopting sustainable behaviours, providing knowledge and solutions, and promoting policies at a local level.

Journalists, celebrities, and key influencers also have a role in raising awareness and involving people in energy transition through sustainable messages and practices.

*“There are entire strands within EU Horizon with specific calls dedicated to the research and development of new materials - materials engineering; everything will be played out in the coming years on the development of new materials that represent launch sources for energy transition projects.”*  
Institution – MENA

**Table 9 Opportunities vs challenges of energy transition**

Q5\_1. Which are main opportunities and benefits of energy transition?

Q5\_2. In your opinion, what are the main challenges with energy transition process?

Base: Total Sample - % Values

	EUROPE			ASIA			AFRICA		AMERICAS	
	ITALY	UK	TURKEY	SAUDI ARABIA	UAE	CHINA	INDIA	ALGERIA	USA	CHILE
Development of <b>energy and environmental policies</b> by the government	4	-2	-6	11	7	-6	-2	-1	-4	1
Development and implementation of <b>new infrastructures</b>	-2	-10	-8	-8	-14	2	-8	0	-5	9
<b>International collaboration</b> for sharing knowledge, resources, and experiences	-4	1	1	-8	-3	4	12	1	1	2
<b>Engagement of private companies</b> to adopt renewable energy	-2	-11	6	3	9	-6	0	-5	-8	-15
<b>Raising public awareness</b> about energy and environmental issues	-10	18	2	-7	0	-4	6	-7	-3	-9
<b>Training of professionals</b> in the energy transition process	-3	-5	-10	-2	-6	-8	-16	-7	-4	-2
<b>Job creation</b> in traditional sectors that do not embrace sustainable solutions for the environment and climate*	6	18	16	16	13	25	24	18	23	20
Ensuring <b>the active involvement of all stakeholders</b> in the energy transition process	7	-6	-7	-4	-4	-4	-16	1	2	-5

\*Change in wording for Q5\_2 “Job losses in traditional sectors that do not embrace sustainable solutions for the environment and climate”

## Table 10 Key players in energy transition

Q7. In your opinion, who are the key players in the energy transition in your country?

Base: Total Sample - % Values

  The most/least mentioned options for each country are highlighted

	EUROPE		ASIA					AFRICA	AMERICAS	
	ITALY	UK	TURKEY	SAUDI ARABIA	UAE	CHINA	INDIA	ALGERIA	USA	CHILE
Ranked on Italy										
Public entities/government	48	37	57	34	39	65	39	42	37	57
Large companies	45	45	37	39	43	41	32	41	47	56
Citizens	37	39	37	37	35	23	36	30	37	45
Scientists and experts	27	31	31	31	31	41	36	43	33	29
Politicians from your country	23	43	37	13	16	30	27	25	30	33
Engineers and technicians	20	19	13	20	24	29	19	11	28	12
International organizations	17	20	15	26	27	16	25	14	13	16
Politicians from other countries	9	15	7	13	9	8	13	4	11	6
NGOs, non-profit organizations	8	9	17	22	17	6	18	16	9	11
Journalists	8	5	5	13	6	5	5	21	7	4
Climate change activists	7	16	12	21	22	15	27	30	22	7
Celebrities and influencers	7	5	7	13	14	13	11	10	9	5

*“For the Mediterranean area there is already an entity that has these tools available - it is the Union for the Mediterranean launched in 2008 by Sarkozy - and which includes all EU countries + 15 others on the Mediterranean shore. Unfortunately, this organization is unknown to most people because it works by consensus and it is impossible to make even the slightest decision given the heterogeneity of the countries but also for other reasons.*

*The Union for the Mediterranean’s training projects could be very useful if there were clearer rules. This organization could be a key institution for energy and environmental policies”*

Institution – North Africa

Government and private companies are also considered the main players by opinion leaders. Their coordinated efforts shape the energy transition:

- » governments produce regulations and decide on incentive policies;
- » private companies determine investments and drive technological innovation.

However, some negative views suggest a lack of coordination among these two actors.

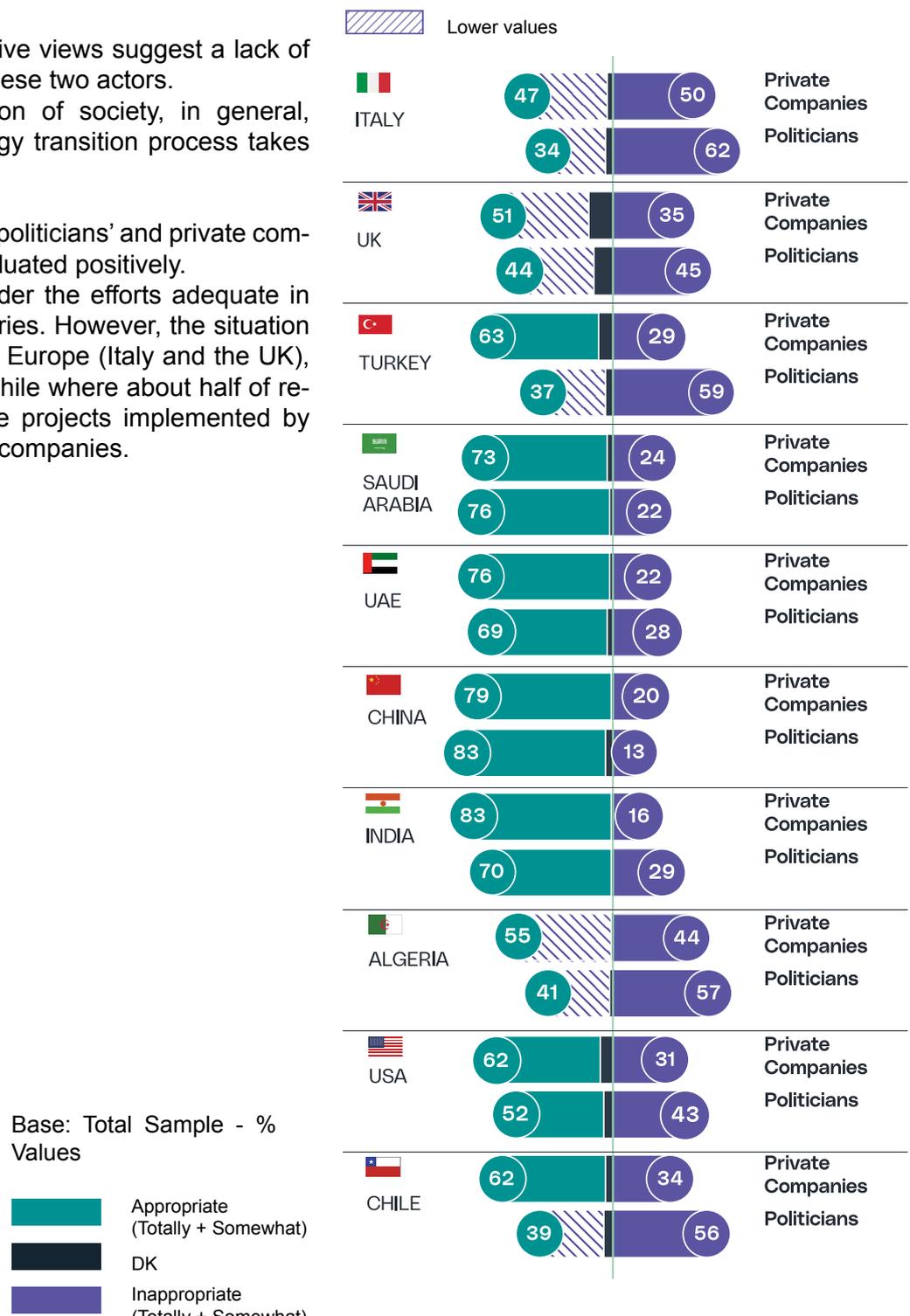
Finally, the contribution of society, in general, ensures that the energy transition process takes shape.

As shown in Table 11, politicians' and private companies' efforts are evaluated positively.

More than 80% consider the efforts adequate in almost all Asian countries. However, the situation is more challenging in Europe (Italy and the UK), Turkey, Algeria, and Chile where about half of respondents criticise the projects implemented by the political class and companies.

**Table 11** Evaluation of strategies and efforts

Q15. Thinking about the energy transition challenges in your country, how would you rate the strategies and efforts of...



**Table 12** Most important actions to ensure a successful transition process

Q6. Which are most important actions to ensure the energy transition process is a success in your country?

Base: Total Sample - % Values

 The most mentioned options for each country are highlighted

	EUROPE		ASIA				AFRICA	AMERICAS		
	ITALY	UK	TURKEY	SAUDI ARABIA	UAE	CHINA	INDIA	ALGERIA	USA	CHILE
Ranked on Italy										
<b>Reduction waste by companies and individuals</b>	<b>33</b>	<b>37</b>	34	25	<b>35</b>	34	33	34	31	<b>34</b>
<b>Engagement of local communities in energy transition process</b>	31	30	31	<b>37</b>	<b>35</b>	30	<b>40</b>	36	30	32
Adoption of <b>renewable energy sources</b>	30	<b>37</b>	26	26	30	<b>37</b>	24	<b>34</b>	34	28
Improvement of energy efficiency in industrial and transp. sectors	24	28	20	29	21	18	25	14	26	26
Facilitation of <b>investments into renewable energies</b> (public policies and regulations)	23	26	<b>41</b>	27	27	20	23	<b>44</b>	28	33
Development of smart energy grids for efficient energy manag.	23	19	22	21	21	18	23	26	27	18
Improvement to companies' production processes	21	19	23	23	28	23	28	32	25	31
Improvement of energy efficiency in residential buildings	20	29	19	18	16	11	22	11	18	13
<b>Transition of traditional vehicles to sustainable mobility</b>	19	14	16	23	25	<b>37</b>	31	21	20	22
Energy technologies innovation	17	25	23	23	24	33	15	23	25	21
Low-carbon industrial technologies innovation	10	15	12	24	18	25	20	11	14	21

Individuals and companies coming together is emphasized when the main actions that will ensure the success of the energy transition, are identified (Table 12).

Companies and individuals adopting virtuous collective behaviours is highlighted as the top priority in almost all countries.

The involvement of local communities is a central topic in India (40%), the UAE (35%), and Saudi Arabia (37%), as is the adoption of renewable energy resources.

Public investments into renewable energies are mentioned as actions to ensure a successful transition in Turkey (41%) and Algeria (44%), while China focuses on sustainable mobility (37%).

Technological innovation, low carbon industrial technologies and residential energy efficiency are mentioned least across all countries. This is because energy transition is still mainly associated with the production of renewable sources of energy and is not yet associated with a change of technologies and manufacturing processes in the industry.

*“We need targeted scholarships - the possibility of promoting the internationalization of public employees through exchanges and work experiences abroad organised for staff from different countries”*

Institution – North Africa

## 2.3 Setting goals for energy transition

---

***The benefits of the energy transition process, both economic and environmental, will outweigh the costs, especially in the long run. The opinion leaders acknowledge upfront costs (such as infrastructure setup and workforce training) but recognize them as necessary investments for future benefits. They also emphasize the increasing urgency of energy transition due to escalating climate change impacts. There's a consensus that attention to energy transition has increased over the past 2-3 years, more so by private companies than by politicians. Companies are seen as key players in driving sustainable innovation and education. To successfully navigate the energy transition, they need to switch to renewable energy sources, implement transparent reporting, assess and develop necessary skills, and promote cultural change.***

Overall, the benefits of the energy transition process are higher than the costs (Table 13).

The costs of this process will outweigh the benefits in the short term in Turkey and Algeria, where government commitment to energy transition process is considered inadequate.

When thinking over the medium-long term, the benefits outweigh costs to a wider extent than in the near in every country, including Turkey and Algeria.

For opinion leaders, the initial costs of transitioning to renewable energy can be quite high due to factors such as research and development, setting up new facilities, and training the workforce. However, once these initial investments are made, the running costs can be significantly lower. As time goes on and the initial investments are paid off, the benefits - both economic and environmental - can grow exponentially.

*"A starting point should be to run a gap analysis identifying what is missing with respect to the technologies to be developed in the future taking care of reaching/maintaining a certain level of alignment among countries. As a second step it should be useful to define a sort of positioning paper - a roadmap - of where we want to arrive in order to write the development plan including also the homogenization among universities so that the different educational modules could be easily transfer among countries. Lastly, define – on the basis of the above analyses – tenders that answer to the emerged needs"*

Institution – North Africa

Additionally, the inevitability of the energy transition process leads to a higher valuation of its benefits. The existence of high costs - especially in the initial phases - is widely recognized. However, the awareness of the ultimate benefits for the entire global society outweighs these costs. These costs are, in fact, becoming less and less impactful when considering the ever-increasing costs of extreme events caused by climate change.

*“There are many benefits in exchange for reduced costs. The transition leads to a reduction in costs once the necessary investments have been made. By reducing my company’s exposure to the volatility of oil and environmental risks, I decrease the risk to my company... there is a colossal advantage”*  
 Top Manager – Italy

**Table 13** Cost-benefit analysis of energy transition process

Q14\_1. Over the **short-term** (1-3 years), what would you say regarding energy transition in your country?

Q14\_2. Over the **medium to long-term** (more than 3 years), what would you say regarding energy transition in your country?

Base: Total Sample - % Values

	EUROPE		ASIA					AFRICA	AMERICAS	
	ITALY	UK	TURKEY	SAUDI ARABIA	UAE	CHINA	INDIA	ALGERIA	USA	CHILE
<b>OVER THE SHORT-TERM</b>										
The <b>benefits will outweigh</b> the costs	37	46	26	50	34	26	45	17	43	34
The costs and benefits will <b>balance out</b>	42	35	43	43	55	52	44	57	37	44
The <b>costs will outweigh</b> the benefits	21	19	31	7	11	22	11	26	20	22
<b>OVER THE MEDIUM/LONG-TERM</b>										
The <b>benefits will outweigh</b> the costs	51	51	39	41	39	60	45	35	55	47
The costs and benefits will <b>balance out</b>	42	43	37	52	55	35	47	46	32	41
The <b>costs will outweigh</b> the benefits	7	6	24	7	6	5	8	19	13	12

 Higher values  
 Lower values

Furthermore, people recognise that private companies and politicians pay more attention to the energy transition process compared to 2-3 years ago (Table 14).

Private companies “pay more attention” to the topic than politicians in Italy, Turkey, India and Chile, with a significant gap recorded.

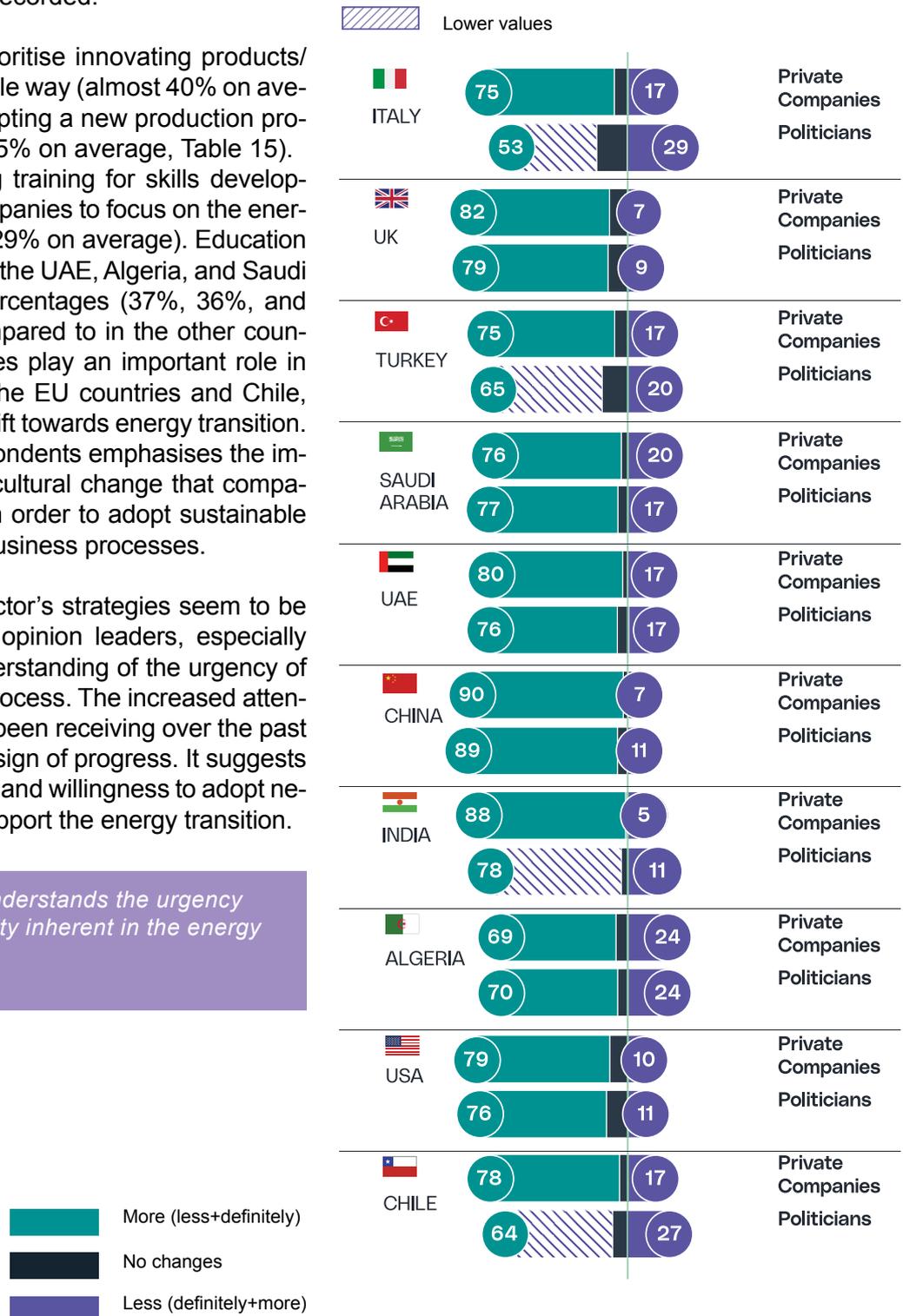
Companies should prioritise innovating products/services in a sustainable way (almost 40% on average), followed by adopting a new production process (approximately 35% on average, Table 15). Furthermore, providing training for skills development should allow companies to focus on the energy transition process (29% on average). Education is emphasised more in the UAE, Algeria, and Saudi Arabia, with higher percentages (37%, 36%, and 29% respectively) compared to in the other countries. Private companies play an important role in raising awareness in the EU countries and Chile, promoting a cultural shift towards energy transition. About one in four respondents emphasises the importance of the deep cultural change that companies should promote in order to adopt sustainable practices within their business processes.

Overall, the private sector’s strategies seem to be appreciated by many opinion leaders, especially given the sector’s understanding of the urgency of the energy transition process. The increased attention that this topic has been receiving over the past 2-3 years is a positive sign of progress. It suggests a growing commitment and willingness to adopt necessary changes to support the energy transition.

*“The private sector understands the urgency but also the opportunity inherent in the energy transition”*  
Institution – MENA

**Table 14** Attention to energy transition issue

Q16. Thinking about 2-3 years ago, do the following pay more/less attention to energy transition today?



More (less+definitely)  
 No changes  
 Less (definitely+more)

**Table 15** Companies commitment to energy transition

Q17. Which of the following actions should companies focus on most for energy transition?

Base: Total Sample - % Values

	EUROPE		ASIA					AFRICA	AMERICAS	
	ITALY	UK	TURKEY	SAUDI ARABIA	UAE	CHINA	INDIA	ALGERIA	USA	CHILE
Adopting new production processes	34	37	33	25	25	41	39	29	37	38
Providing training/education for skills development	28	31	19	29	37	24	30	36	32	23
Innovating products and services in a sustainable way	25	37	35	31	34	50	38	39	37	37
Promoting a cultural shift	25	23	18	15	14	9	14	11	15	27
Implementing new organizational strategies with dedicated roles	23	19	13	21	28	21	31	21	20	18
Defining decarbonization plans	18	15	26	25	20	26	17	21	15	15
Undertaking dedicated outreach activities	15	10	6	25	17	10	13	19	10	12
Reporting on sustainability	14	15	16	21	15	17	17	17	17	18

Regarding the concrete actions to be undertaken, the primary aspect is the need for a real and concrete switch to renewable energy sources.

This implies a **preliminary assessment of infrastructures and equipment** needed to **source the energy in a sustainable manner**, either by building solar, wind or geothermal power plants.

The switch to renewable energy sources requires implementing new organizational strategies to assure transparency in reporting, making an assessment of the skills required, and, if necessary, defining ad hoc training programs.

**Finally**, it is of great importance that **private companies** act in supporting a cultural change of the population both by developing product innovations but also by promoting specific educational initiatives among citizens and consumers.

*“Emirates significantly expanded the use of renewable energies in the energy mix”*  
Top Manager – UAE

## 2.4 Raising awareness: the need for energy transition-specific training

---

***The key factors contributing to the successful implementation of energy transition include environmental, technological, and economic considerations. Environmental factor is seen as pivotal. Technological advancements are also crucial, specifically in the development of innovative sustainable solutions. The role of the economy is recognized due to the lack of investments needed for the implementation of new technologies, infrastructure, and production processes. Familiarity with the energy transition process is widespread, but there is a recognition of the need for further training.***

***The importance of targeted educational programs is widely recognized, with almost all respondents considering sector-specific training programs as essential.***

***Lastly, the urgency of providing training for those involved in the energy transition process is underscored, with the majority of respondents expecting training to take place in the short term.***

The environment, the economy, and technology are the three fundamental pillars for successful energy transition (Table 16).

Reducing the environmental impact (environment 60%) by controlling gas emissions and using renewable energy sources plays a crucial role in the energy transition process.

Technology is second in terms of importance (technology 55%), enabling the energy transition by the development of innovative and sustainable solutions.

One in two respondents recognise the major relevance of investments into new technologies, infrastructure, and production processes.

Furthermore, education is considered by 40% of individuals on average, but particularly in Turkey (55%), Saudi Arabia (51%), the UAE (47%), Algeria (54%), and Chile (48%).

About one in three respondents believe that promoting behavioural changes (culture 27%), adopting regulatory policies (regulation 35%), and achieving equitable access to energy (society 32%) could contribute further to the energy transition process, albeit to a lesser extent.

Among opinion leaders, the importance of each area and the mutual influence of one area on the others is well recognised. Technology is conside-

red the most important one for an effective realisation of the process: the development of new technologies for renewable energy production and the modification of industrial processes are fundamental aspects.

The economic area follows in importance, but the level of investments dedicated to energy transition is not sufficient. It is considered as strategic because it necessitates collaboration between companies - who budget the investments - and governments - who must establish regular and effective economic incentives to facilitate the industrial energy transition.

Regulation is also considered a fundamental lever to address the strategies of companies in moving towards production models with a low environmental impact through a setting that support sustainable energy policies, including carbon reduction targets, bans on polluting technologies, and reforms of existing energy policies. Even when it is considered an important aspect, regulation is not judged in a good state of progress.

As expected, the environment is a must-have consideration. All activities that can help protect the planet through the production of alternative energy sources, reducing environmental impact, preserving natural resources, promoting renewable energy, and low or zero-emissions industrial technologies, are key to achieving a full transition.

Society and culture, while acknowledged as important, are not top-of-mind elements. Achieving equitable access to energy and improving quality of life seem to be more like consequences of the other factors and raising awareness to encourage changes in behaviour underpins the cultural shift that increases the necessary commitment and participation by citizens.

Those who consider education a key asset believe that it creates a solid base to build more efficient energy transition processes in other areas. More specifically, education and training plans can influence the creation of efficient energy policies (regulation) and the definition of incentives to invest in the creation of infrastructure (economy). Indeed, the progress of educational activities is

considered not very adequate. Overall, the concern is related to the fact that the educational process in the energy transition is not occurring at the right speed and breadth to truly impact the transition itself. Moreover, it is often too specialised and does not cover a wide range of topics.

Another issue concerning the current inadequacy of educational progress is the general lack of a specialised workforce, further exacerbated by a mismatch between academic education on energy transition and the needs of companies in the energy industry. In some regions, such as the USA and the Arabic area, or within the framework of international bodies, the view on education progress in the energy transition is different and more positive due to the development of dedicated projects.

*“The educational and training efforts are not adequate. For example, if we think at the power plants that should be realised by 2050, we can easily estimate that the necessary labour force is totally insufficient. Only in France there is a need of 60 thousand new technicians not including the needs coming from the induced business”*  
Institution – EU

**Table 16** Perceived importance of energy transition areas\*

Q4. Which of the following aspects do you consider most important for energy transition? RANKING

Base: Total Sample - % Values

The most mentioned options for each country are highlighted  
% 1<sup>o</sup>+2<sup>nd</sup>+3<sup>rd</sup> positions  
Ranked on Italy

	EUROPE		ASIA				AFRICA	AMERICAS		
	ITALY	UK	TURKEY	SAUDI ARABIA	UAE	CHINA	INDIA	ALGERIA	USA	CHILE
<b>ENVIRONMENT</b>	65	69	49	54	60	70	63	65	61	53
<b>ECONOMY</b>	54	56	51	49	49	48	42	50	58	49
<b>TECNOLOGY</b>	53	61	51	50	48	70	51	57	58	49
<b>REGULATION</b>	37	41	30	34	27	50	34	24	40	33
<b>SOCIETY</b>	35	27	35	33	35	27	40	25	30	35
<b>EDUCATION</b>	28	25	55	51	47	16	41	54	31	48
<b>CULTURE</b>	27	21	29	29	33	21	30	26	25	34

(\*) Each item of the question has been defined as follows: **TECNOLOGY**: development of sustainable technologies for renewable energy production, such as solar, wind, hydro, nuclear, and other methods, as well as modifying industrial processes in non-fossil fuel-based production of intermediates and products; **ECONOMY**: energy transition requires significant investment into building infrastructure for producing and distributing new sustainable energy sources, modifying industrial processes, and establishing new green facilities; **ENVIRONMENT**: reducing the environmental impact and preserving natural resources using alternative energy sources (non-fossil fuel-based), promoting renewable energy, and low or zero emissions industrial technologies; **SOCIETY**: achieving equitable access to energy for everyone and improving people’s quality of life; **CULTURE**: engaging and raising awareness on energy and environmental issues to promote behavioural changes, such as energy conservation, waste recycling, purchasing goods made from recycled materials, and adopting more sustainable lifestyles; **REGULATION**: adoption of regulations supporting sustainable energy policies, including carbon reduction targets, bans on polluting technologies, and reforms of existing energy policies; **EDUCATION**: specialised training for personnel involved in the energy transition process.

“It is not happening at speed and a scale to have a strong transition phase. We need to have them at a higher speed and much broader to make it happen. Education is more on renewable energies only. We need to mix and integration to renewable with other disciplines”  
Institution - UAE

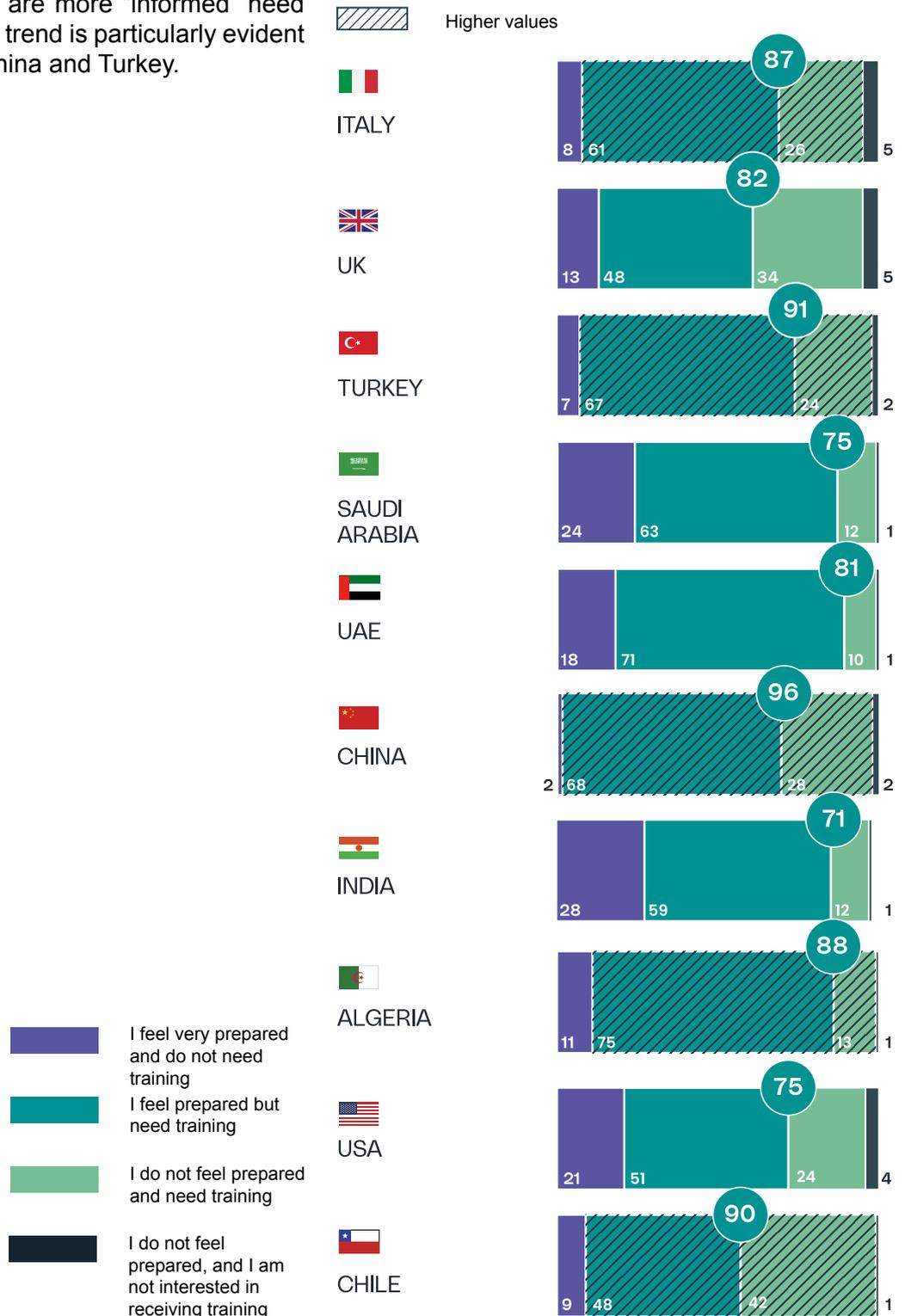
Familiarity with the energy transition process is widespread; however, many respondents believe that further training is necessary (Table 17).

Over 85% consider their skills need improving in Italy, Turkey, China, and Algeria, with the figure remaining over 75% in the other countries. It's worth noting that those who are more "informed" need further education. This trend is particularly evident in Algeria, the UAE, China and Turkey.

**Table 17** Need for training on energy transition

Q11. How prepared do you feel on the topic of energy transition?

Base: Total Sample - % Values

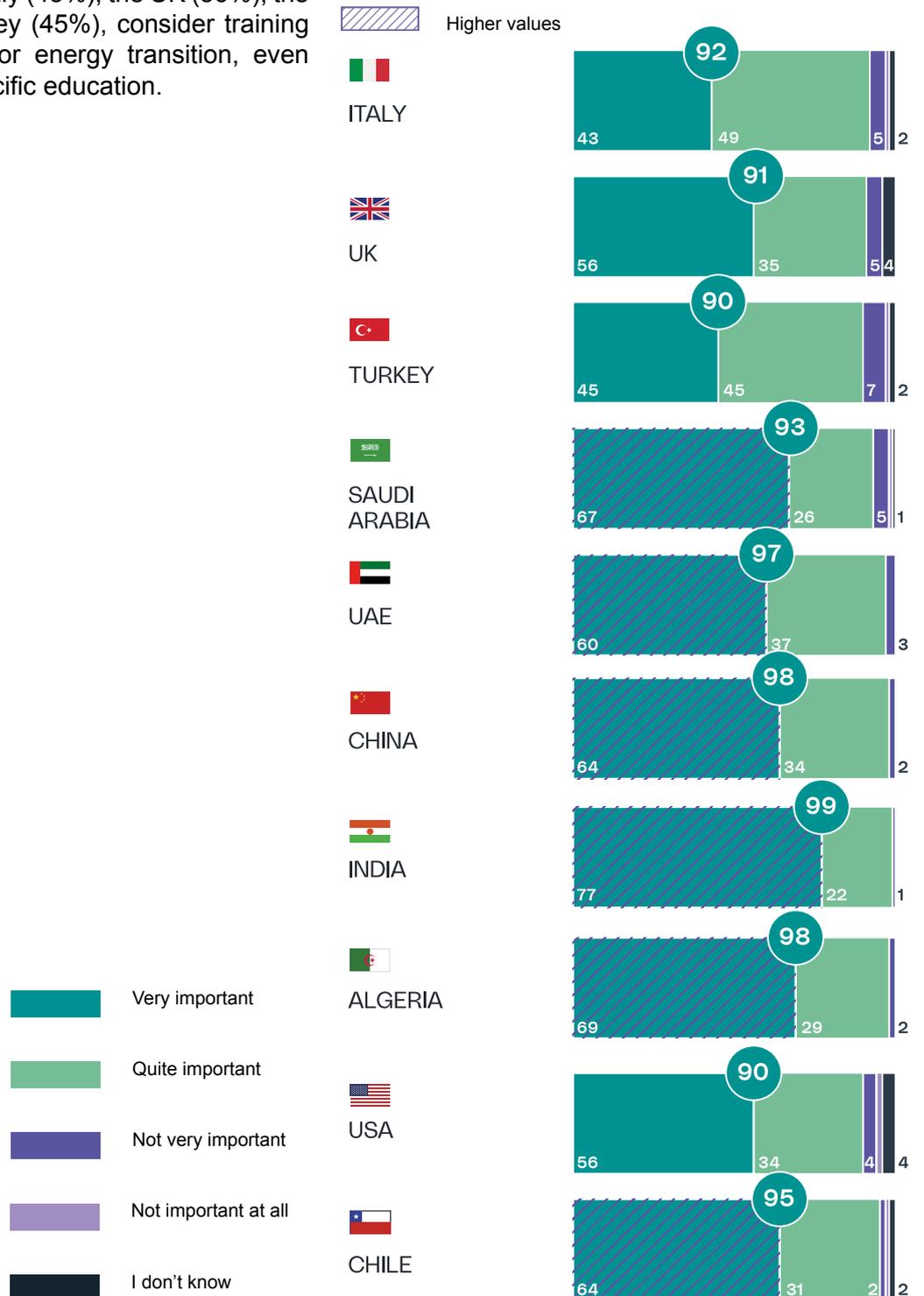


In fact, the importance of developing targeted educational programmes is widely recognised across the countries (Table 18).

Almost all respondents consider sector-specific training programmes essential, particularly in Saudi Arabia (67%), Algeria (69%), and India (77%). On the other hand, about one in two respondents in countries such as Italy (43%), the UK (56%), the USA (56%), and Turkey (45%), consider training programmes crucial for energy transition, even though they need specific education.

**Table 18** Importance of developing educational programs on energy transition

Q12. In your opinion, how important is developing educational and training programs for energy transition?  
Base: Total Sample - % Values



Television and national newspapers are considered “reliable” sources of information on energy transition, particularly in Asian countries, while specialised magazines or academic publications are more reliable sources in Italy, the UK, and the USA (Table 19).

Educational activities on energy transition involve several phases, influenced by the national context and the specific needs of involved companies and professionals. However, the urgency of training for those involved in energy transition process clearly emerges (Table 20), particularly in Turkey, Chile, China, India, the USA.

Only 10% of respondents across countries expect longer timelines (over 10 years), and a very small percentage believes it is possible to wait even longer (on average, 2% of total respondents). Italy is the main country that thinks the training of people involved in the energy transition process can be postponed over time.

*“Acceptance of the necessary infrastructure is clearly a critical step. [...] communication and relational skills are fundamental: the information that arrives through the media is clearly opinion-forming”*  
Institution – EU

**Table 19** Reliable sources on energy transition

P0. Which sources do you consider reliable for information on energy transition?

Base: Total Sample - % Values

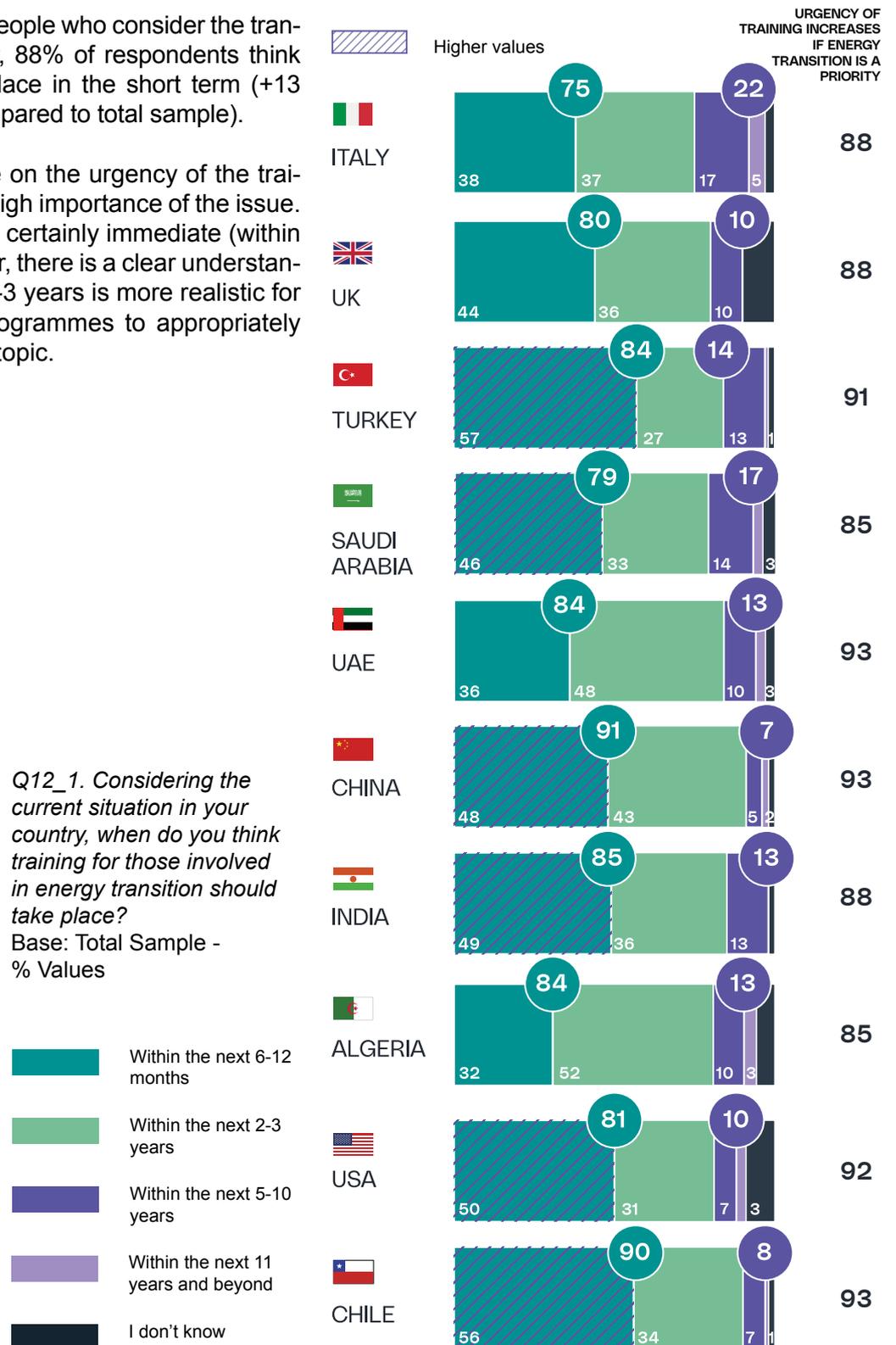
Ranked on Italy	EUROPE		ASIA					AFRICA	AMERICAS	
	ITALY	UK	TURKEY	SAUDI ARABIA	UAE	CHINA	INDIA	ALGERIA	USA	CHILE
Specialised magazines	43	35	19	49	44	56	55	41	29	44
Academic publications/articles	37	51	69	47	44	53	53	48	49	58
TV	35	38	24	47	51	50	73	40	40	51
National newspaper	33	42	20	45	47	49	73	29	44	37
Websites	31	35	36	31	31	46	59	53	42	43
None of these	6	11	3	1	0	1	1	0	9	0

The urgency of training and equipping individuals with the necessary skills to effectively combat climate change increases among those who consider it a priority.

For example, among people who consider the transition a priority in Italy, 88% of respondents think training should take place in the short term (+13 percentage points compared to total sample).

Opinion leaders agree on the urgency of the training, highlighting the high importance of the issue. The ideal timeframe is certainly immediate (within 6-12 months), however, there is a clear understanding that a period of 2-3 years is more realistic for defining plans and programmes to appropriately address this complex topic.

**Table 20** Timing of training in energy transition



## 2.5 Key competences for successful energy transition

---

***The future professionals in the energy transition process will need both hard and soft skills. The “humanist engineer” – a professional who combines technical expertise with a keen awareness of social, economic, and environmental implications – is emerging as a key player in the process. When it comes to soft skills, creativity, problem-solving, critical thinking, flexibility, and teamwork are all highlighted as essential. As for hard skills, the capability to analyze and assess environmental impact, and knowledge of raw materials and renewable energy sources are considered most important. Communication is also considered an essential soft skill. However, understanding the needs of different stakeholders, addressing their difficulties and resistance, and demonstrating cultural sensitivity are all important factors.***

***The renewable energy and energy transition sector is growing worldwide, but there is a need for more technical professionals with energy transition skills.***

The specific skills required for future professionals in the energy transition process vary across countries, depending on the energy landscape, the available resources, and policies. However, both hard and soft skills undeniably play a crucial role in education (Table 21).

Both soft and hard skills are considered central and relevant for education on energy transition, except for in India, SA and the UAE, where one in two respondents consider technical knowledge more important than personal skills.

This interesting combination of technical and soft skills allows the identification of the “humanist engineer”, a professional with a solid technical background, who is attentive to the social, economic, and environmental implications of the transition process. A “humanist engineer” could factor human needs and social well-being into decision-making processes and sustainable energy solution development.

**Table 21** Competence requirements for energy transition

Q8\_1. In your opinion, when it comes to training those involved in energy transition...

Base: Total Sample - % Values

		EUROPE		ASIA					AFRICA	AMERICAS	
		ITALY	UK	TURKEY	SAUDI ARABIA	UAE	CHINA	INDIA	ALGERIA	USA	CHILE
	Technical knowledge is more important than personal skills and qualities	37	28	37	45	48	23	51	25	33	32
	Technical knowledge and personal skills are equally important	61	69	60	51	49	76	48	73	62	67
	Technical knowledge is less important than personal skills	2	3	3	4	3	1	1	2	5	1
<b>MOST REQUIRED Technical Knowledge</b>	Impact on the region	Environmental impact	Renewable energy sources	Renewable energy sources	Environmental impact	Renewable/ recycled raw materials	Recycling/ circular economy	Renewable energy sources	Environmental impact	Impact on the region	
<b>MOST REQUIRED Personal skill</b>	Problem-solving Multidisciplinary approach	Critical thinking Creativity	Problem-solving	Problem-solving	Creativity	Problem-solving	Creativity	Creativity	Problem-solving	Problem-solving	

Creativity and problem-solving are essential soft skills for future operators in the energy transition (Table 22). Half of respondents in almost every country mention problem-solving (first in Italy, Turkey, Saudi Arabia, China, the USA, and Chile) and creativity/innovation. 52% of respondents in the UK consider critical thinking and analytical skills most important. Flexibility is particularly important in Saudi Arabia (40%) and the USA (40%), while teamwork skills are considered crucial in Turkey (50%) and Algeria (49%). Empathy (emotional intelligence) and communication skills, as well as language skills, are considered the least relevant skills. The specific technical knowledge requirements are expected to be the ability to analyse and assess environmental impact (39% on average), and knowledge of raw materials and renewable energy sources (38%).

The ability to analyse the impact of the energy transition on the territory is considered crucial by 42% and 39% in Italy and Chile respectively.

Knowledge of the environmental impact is a key requirement in the UK, the UAE, and the USA.

Knowledge of alternative and sustainable energy sources ranks first in Turkey (39%), Saudi Arabia (39%), and Algeria (47%).

One in two in China consider the requirement relating to knowledge of alternative and sustainable materials crucial. Skills relating to the circular economy and recycling rank first in India. Familiarity with the regulatory framework is mentioned less frequently as a crucial requirement, although it is still considered important in Italy, India, and Chile.

*“It is an area where the hard or STEM sciences need to be complemented by humanities, social sciences, and even arts. Making them steAm sciences, where the ‘a’ stands for Arts. We truly need an integration of knowledge, otherwise we end up with technocrats lacking a broader and more integrated vision”*  
Academic – Italy

### Table 22 Soft skills for energy transition

Q9\_1. What are the most important personal skills for those involved in energy transition?

Base: Total Sample - % Values

The most/least mentioned options for each country are highlighted

% 1<sup>o</sup>+2<sup>nd</sup>+3<sup>rd</sup> positions  
Ranked on Italy

	EUROPE			ASIA				AFRICA	AMERICAS	
	ITALY	UK	TURKEY	SAUDI ARABIA	UAE	CHINA	INDIA	ALGERIA	USA	CHILE
<b>Problem-solving skills</b>	46 <sup>1°</sup>	43 <sup>1°</sup>	59 <sup>1°</sup>	47 <sup>1°</sup>	38	56 <sup>1°</sup>	37	48	52 <sup>1°</sup>	50 <sup>1°</sup>
<b>A multidisciplinary approach</b>	45 <sup>1°</sup>	33	34	30	27	45	32	31	35	43
<b>Critical thinking and analytical skills</b>	43	52 <sup>1°</sup>	34	25	38	33	38	27	40	31
<b>Creativity and innovation</b>	37	51 <sup>1°</sup>	47	48 <sup>1°</sup>	63 <sup>1°</sup>	54	43	69 <sup>1°</sup>	42	45
<b>Flexibility and adaptability</b>	33	38	23	40	36	37	39	39	40	35
<b>Teamwork skills</b>	27	30	50	37	34	37	36	49	30	38
<b>Emotional intelligence</b>	25	15	15	17	17	7	26	5	16	24
<b>Communication and networking skills</b>	23	28	25	29	33	23	32	19	32	25
<b>Fluency in the English language</b>	20	10	13	27	13	10	20	13	16	9

### Table 23

### Technical knowledge requirements for energy transition soft skills for energy transition

Q8\_2. What are main technical knowledge requirements for those involved in energy transition?

Base: Total Sample - % Values

The most/least mentioned options for each country are highlighted

% 1<sup>o</sup>+2<sup>nd</sup>+3<sup>rd</sup> positions - Positioning <sup>1°</sup>  
Ranked on Italy

	EUROPE			ASIA				AFRICA	AMERICAS	
	ITALY	UK	TURKEY	SAUDI ARABIA	UAE	CHINA	INDIA	ALGERIA	USA	CHILE
<b>Analyse and assess the impact on the region</b>	42 <sup>1°</sup>	27	35	27	29	26	27	32	33	39 <sup>1°</sup>
<b>Understanding environmental issues and analyse and assess their environmental impact</b>	37	46 <sup>1°</sup>	33	29	41 <sup>1°</sup>	39	33	45	46 <sup>1°</sup>	36
<b>Knowledge of various renewable energy sources</b>	37	41	39	39	39	32	37	47	33	35
<b>Knowledge of alternative renewable raw materials and recycled materials to substitute traditional materials</b>	36	38	35	33	29	48	36	44	37	37
<b>Knowledge of regulatory frameworks</b>	31	19	21	23	11	14	25	8	19	25
<b>Knowledge of sustainability issues, ESG principles, and sustainable design criteria</b>	30	31	27	35	33	36	33	32	29	26
<b>Knowledge of techn. issues related to recycling and circular economy</b>	23	33	27	33	30	39	40 <sup>1°</sup>	25	35	26
<b>Manage the economic sustainability of projects</b>	22	27	24	31	33	26	23	26	24	25
<b>Manage economic resources in a fair and inclusive manner</b>	22	16	31	28	35	25	25	27	26	25
<b>Sensitivity to social issues and the ability to analyse and assess their impact on society</b>	21	22	27	22	19	17	25	13	22	27

In general, opinion leaders, especially academics and institutions, emphasise the need to ensure the availability of both technical and transversal skills, to ensure an educational process for energy transition. For top managers, technical knowledge (hard skills) takes priority over soft skills.

More specifically, in terms of technical skills, the relevance is primarily attributed to the disciplines of engineering, physics, chemistry, mathematics, as well as natural sciences, geology, and medical sciences. These skills are the core of the education for those dealing with energy transition, as they enable the design and construction of modern, efficient energy production plants and infrastructures.

However, it should also be underlined that technical skills need to be complemented with knowledge in human and social sciences, as well as regulatory policies/legal competencies. Finally, economics is fundamental for analysing projects and establishing sustainable investment plans.

Communication is a crucial soft skill for understanding of complex themes such as energy transition. Professionals need to possess effective communication skills to convey information, including technical details, to provide all stakeholders with the necessary information for making informed decisions on the topic of energy transition.

Relational skills, communication capabilities, and the ability to network and engage are also important for understanding the needs of different stakeholders and effectively addressing their difficulties and resistance.

A deep willingness to understand other cultures and sensitivities is also crucial. Soft skills will guide the appropriate approach: environmental sustainability, sensitivity towards culture, and empathy for people are all important factors.

*“Knowledge should be varied, leaning more towards technical implementation. 'Mechatronics' is the term that summarizes everything required in the world of energy transition. There is also a need for enhanced economic and engineering skills among the country's leaders, where massive gaps exist. Often, they are unaware of their lack of knowledge”*

Top Manager – Italy

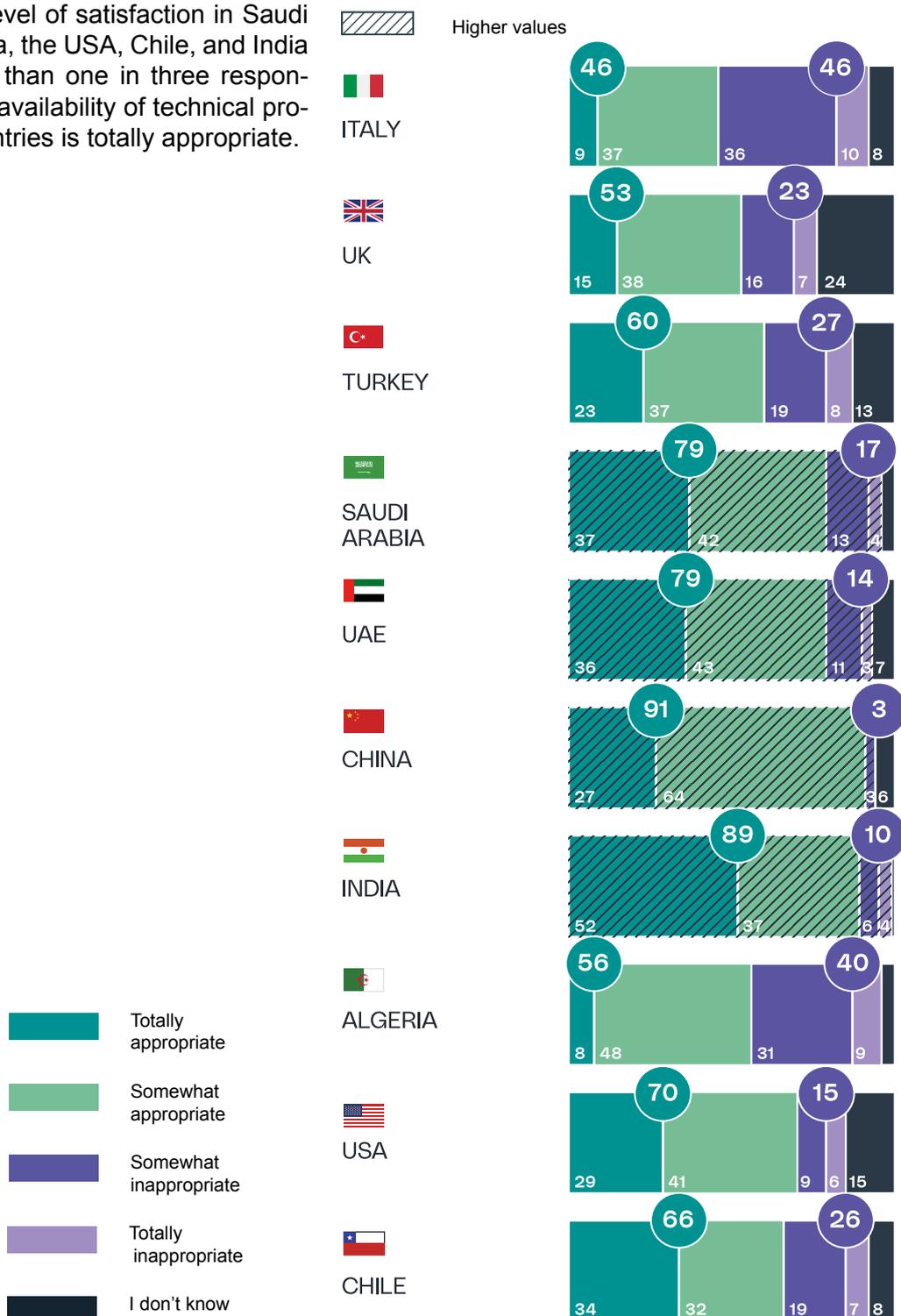
The renewable energy and energy transition sector is growing worldwide, with investment from many countries. However, there is room for improvement regarding the availability of technical professionals with the skills for energy transition, particularly in Italy, the UK, Turkey and Algeria (Table 24).

There is a very high level of satisfaction in Saudi Arabia, the UAE, China, the USA, Chile, and India in particular, as more than one in three respondents believe that the availability of technical professionals in their countries is totally appropriate.

**Table 24** Availability of energy transition professionals

Q10. How would you rate the **availability of technical professionals with skills for energy transition** in your country?

Base: Total Sample - % Values



## 2.6 Education: owners, beneficiaries, international policy tools, actions at country and global level including COP28 recommendations

*The key figures responsible for education on the energy transition primarily include central governments, mentioned by an average of 61% of respondents, and public entities such as research centers and universities, cited by 57% and 48% respectively. Private companies also play a central role, with 40% of respondents considering the contributions of their dedicated research and development centers as crucial.*

### 2.6.1 Key players on training on energy transition

Opinion leaders indeed highlight the collective responsibility of both public and private actors in training those involved in the energy transition. Despite recognition and efforts, tangible results seem to be delayed. When asked about the availability of professionals in charge of providing formal specialised training for energy transition, most opinion leaders indicate that the current situation is not fully satisfactory. This suggests a strong need for further investment in this area to foster a workforce equipped with the necessary skills and knowledge for the energy transition.

*“Communication with the communities - this is the big challenge”*  
Academic – USA

**Table 25** Key player for training of those involved in energy transition

Q9.2. Who should be responsible for training those involved in energy transition?  
Base: Total Sample - % Values

Ranked on Italy

Higher Values in bold

	EUROPE		ASIA				AFRICA		AMERICAS	
	ITALY	UK	TURKEY	SAUDI ARABIA	UAE	CHINA	INDIA	ALGERIA	USA	CHILE
Public research and development centres	53	57	46	58	66	49	66	75	54	48
Government responsible for energy policies	52	67	53	56	58	79	71	56	60	60
Private energy sector companies	43	49	17	49	39	34	61	26	41	45
Universities	42	44	49	49	47	42	46	71	41	50
Private company research and development centres	32	46	30	42	46	30	61	36	43	42
Professional sector associations	15	35	26	25	19	50	42	21	31	24
Foundations	3	10	6	13	11	5	17	12	11	8

The education of individuals involved in the energy transition has been established as a primary topic for discussion and analysis during the survey. This is due to its pivotal role not only in the present but also, increasingly, in the future perspective.

(Q.8 Who should be responsible for training those who are or will be involved in the energy transition process?)

The analysis begins by identifying those who should bear the responsibility of training individuals who are, or will be, involved in the energy transition process. Overall, the responses underscore that the responsibility is collectively held by public authorities, government bodies, and universities.

More specifically:

- » Policy makers should prioritize environmental and energy transition topics in their agenda, also promoting the development of quality courses and the provision of formal certifications recognized in the labor market.
- » The central role of universities in facilitating the education of specialists in the energy transition process is a commonly held belief.

However, it is also strongly emphasized that the educational process should begin in primary school and continue through a consistent learning approach across different levels of study, encompassing all types of high schools and colleges.

Specific programs implemented in primary and secondary schools are crucial for raising awareness among children and adolescents about energy transition issues. This contributes to fostering a future population accustomed to reasoning with an environmentally respectful approach.

Within this process, research centres (both public and private) and foundations are also key players, along with private businesses that conduct specific on-the-job training activities.

- » More specifically, foundations can supplement formal educational programs by reaching a broader demographic (such as the unemployed and elderly) through a diverse offering of courses, for example, on environmentally friendly methods of energy consumption and the operation of new technologies.

- » As for the private sector, the belief that companies currently carry most of the burden is quite widespread. This is particularly true as they face skill shortages in the energy transition field that are challenging to fill, pushing them to the forefront in developing specific training programs.

However, the aforementioned players - Public authorities, Universities, Research centres, foundations, and Private businesses - should collaborate at various levels to create formally and widely recognized training projects.

These projects should cater to the needs of companies, following a common approach aimed at enhancing the overall level of energy transition awareness and education.

In addition, the need for greater coordination between individual countries and the European institutions was also mentioned.

Finally, it's important to emphasize that for broader and more extensive visibility of the energy transition topic among the general public, there should be significant engagement from the media communities.

*“Academia should be involved but the major problem is disciplinary training, like department of electrical engineering or environmental sciences. They are not teaching energy transition”*  
Academic – India

(Q.10 Who are the main beneficiaries of energy transition educational programs and projects?)

A clear message emerges regarding the primary beneficiaries of energy transition educational programs: students and workers are placed at the highest level. Possessing specific skills in energy transition will open professional opportunities, easing access to the labor market.

- » At a more general level, citizens and communities will also reap benefits from educational programs in the energy transition process. Virtuous behaviors, such as reducing pollution, have significant positive impacts on climate change and overall quality of life, especially for those most vulnerable to extreme weather events.
  - Women are not specifically mentioned as beneficiaries of educational programs on energy transition. However, the emergence of new professions in this industry can offer women - especially the younger ones - an opportunity for university education and entry into the labor market, thereby increasing their overall participation in the labor force, particularly in certain countries
- » Researchers, in a broader sense, and public administrations are also mentioned among the beneficiaries.
- » Private companies are also considered among the beneficiaries, primarily because the energy transition enables the development of new technologies. These can be leveraged by companies to enhance their production processes and manage their resources more effectively.

*“Women’s education is very much required as energy transition can be fuelled by woman participation... it is crucial to meet the energy transition goals: providing an opportunity for women to get to high quality jobs can support energy transition”*  
Academic - India

## 2.6.2 Strategies for Energy Transition Skills development

(Q.11 What activities and actions should be implemented to create an energy transition skills development plan?)

Different suggestions have emerged regarding the activities or actions that should be implemented to create an energy transition skills development plan.

- » One notable suggestion is the expansion of access to training courses and formal educational initiatives to a broader group of individuals. This includes courses already offered by private companies and the introduction of the energy transition topic early in primary and secondary schools. On the educational front, one action could be the strengthening of STEM discipline teachings, which could also open more opportunities for women who - particularly in some countries - are still underrepresented in these faculties.
- » Some initiatives pertain more to private companies, such as the reward of virtuous behaviors, especially for those companies investing in energy transition training for their employees. Moreover, businesses can also play a key role in specific initiatives if they regularly incorporate sustainability issues into their corporate strategies.

Some opinion leaders highlight the importance of establishing and maintaining a dialogue between companies and universities to assess and forecast future skills and technology needs in the energy transition – a critical aspect for the functioning of the labor market.

Existing training programs from some private companies should be institutionalized on a national scale. There’s no need to create anything new, just a matter of expanding the scale. For instance, courses in technical schools and refresher courses for workers could be implemented on a national level to facilitate industrial conversion. It would suffice to utilize the programs of private companies and broaden their scope.

Among the various contributions, a detailed and

structured action plan is suggested, which includes the development of a positioning paper and specific tenders.

Regarding the level of intervention, both local and supranational entities can play roles with their specific characteristics.

*(Q.15 What actions could help countries implement energy transition skills development plans?)*

When analysing the actions needed for the development of energy transition skills plans at the country level, it first appears that viewpoints on guidelines are twofold.

Regulations seem to carry significant weight, and incentives could be a key element for countries to leverage.

There is broad consensus on the need for concrete cooperation among countries in developing skills plans.

Opinion leaders suggest drawing from the private sector, given the current delay at the country level in defining skills plans for energy transition.

Additionally, they emphasize the importance of online training courses - potentially supported by UN agencies - and underline the critical need to establish common digital platforms. These platforms could be shared globally and accessible even in the most remote parts of the world.

*"We need to bring companies and universities together and understand the type of profiles they need and where they are missing today. I'm looking for an expert, a CTO who knows how to compare costs and technologies for the production of hydrogen on-site, but I can't find one. I find the super technician or the super expert but I can't find figures that have the overview"*

Top Manager – USA

*(Q.14 What activities or tools could be implemented to foster skills development on a global scale?)*

On the possible activities and tools useful to foster skills development on a global scale, the transfer of technology and the exchange of competencies among countries are considered relevant.

Opinion leaders also mentioned the role of international energy agencies and international companies.

Someone else suggest the use of audit processes as tools to foster skills development on a global scale.

Finally, online education has been mentioned as another possible tool.

There are also those who do not believe that a global approach is the right one for actions or tools to foster skills development and instead rely more on local instruments.

*"It needs all the countries involved - as the COP28 campaign that brings good practices in climate and energy education. Common platforms to inform the countries about energy transition - to create awareness programmes among students and increase the education on food waste - to teach students to use food waste and transform it into biogas and use it in the kitchen -> teach practical skills so that students can think beyond this and create their own ideas. International Renewable Energy Agency (IRENA) does a lot of efforts to create education for the energy transition; US department of energy; Maire Tecnimont can play a big role in energy transition"*

Academic – India

### 2.6.3 International Policy Tools and Organizations for Energy Transition Education

*(Q.12 What international policy tools should be used to facilitate education on energy transition issues?)*

Regarding the international policy tools that could facilitate education on energy transition, the importance of activities run by international organizations such as IRENA, UN, COP, EU, and the Union for the Mediterranean has been emphasized to increase awareness on this topic. According to academics, the EU is the most virtuous of the global actors. The EU's taxonomy (SDGs) helps facilitate education on the energy transition topic. International treaties and the United Nations 2030 Agenda have also been mentioned as key tools. The Union for the Mediterranean contributes through the regular organization of high-level meetings with relevant policy makers, and through its training activities.

In an ethical perspective, some opinion leaders mentioned the need to reward countries, especially the least developed ones, that are most affected by the worsening environmental situation. This rewarding could involve funding deployment and the transfer of technologies. Other opinion leaders focused on the issue of decarbonization, and net-zero carbon emissions, calling for global intervention that includes training (such as the Net Zero Academies) and education for not only engineers or technical professionals but also a broader range of individuals. Targeted scholarships are also relevant, that is the possibility of promoting the internationalization of public employees through exchanges and work experiences abroad organised for staff from different countries. They also highlight the importance of a proper regulatory framework.

*(Q.13 Which existing international organizations should be involved? Do new ones need creating? What exactly needs doing?)*

When asked about the international organizations that should be involved in the education on energy transition, opinion leaders mentioned, among others, IRENA, UNESCO, UN, IEA, the European

Education and Culture Executive Agency, and COP. It is widespread the view that there is **no need to create new international bodies** but, on the contrary, **the focus should be on reinforcing the existing organizations** by providing clear operating rules and reducing bureaucracy to improve their effectiveness. An example is the energy transition education network, made with IRENA.

*“Outside EU facilitated transfer of technologies to developing countries (especially least developed countries) and this includes also research. In addition, more EU research collaborations with third countries”*  
Institution – EU

## 2.6.4 Climate Change and Energy Transition: Actionable Strategies for COP28

*(Q.16 Delegates from different countries will meet to discuss issues relating to climate change at COP28. If you had to suggest as part of this event, what measure or action would you recommend for immediate approval to help develop energy transition skills?)*

All in all, when asked about very concrete actions to recommend at COP28 in Dubai for an immediate approval to help develop energy transition skills, a varied set of answers has emerged.

- » Some opinion leaders focused on a decisive precondition: **the need for money** and financing to face and address this issue.
- » Other opinion leaders ask for an avoidance of the greenwashing approach, suggesting instead to be **as transparent as possible in communicating** on energy transition topics.
- » Other views focus on the need to **take a more holistic view to fix the complex issue of education** in energy transition. Some opinion leaders focus **more specifically on how education and training could be leveraged to contribute to the creation of a future skilled labor force** in the energy sector. As a possible starting point with respect to this, an assessment of the current state of the art has been suggested, which could be operated by the UN.
- » Educational and social policies can be used to **remove the still-existing gender inequalities in education** in general, and especially in energy transition education. There is a lot of potential in removing the gender inequalities, but this is not only educational policies but also social policies. Enact gender inequalities in education fields is necessary for energy transition and the design of policies that make energy transition careers attractive.
- » **Greater homogenization of policies** and interventions has been expressed, especially referring to the Mediterranean. This area should be more and more in the center of attention, as it is

among the areas in the world most impacted - negatively - by climate changes.

- » The need to **clarify the role of the public and private sectors**.

*“Not necessary any new international organizations. We could exploit more IEA (International Energy Agency), IRENA, UNESCO. For the EU level European Education and Culture Executive Agency (Erasmus Plus programme)”*  
Institution – EU

*“There are already many international organizations. UN environmental programme is the most important probably”*  
Academic – USA

## 3 METHODOLOGICAL NOTE

### 3.1 Questionnaire structure and flow

---

**To achieve the research objectives, a structured questionnaire consisting of closed and pre-coded questions has been prepared.**

**The questions are formulated clearly and unambiguously to allow respondents to answer easily. They have been ordered in a way that doesn't influence the responses, with rotations between question items provided to avoid response bias.**

The flow of the interview can be summarized as follows:

- » Collection of socio-demographic data to ensure proper sample selection;
- » Assessment of perception of the energy transition to define the context and measure the levels of knowledge and perceived importance of the concept;
- » Identification of the critical success factors of the energy transition, to introduce and measure the level of importance of training and education, understand the skills required for future industry operators, and realize the urgency of dedicated training programs;
- » Evaluation of the commitment of governments and companies to the energy transition process;
- » Collection of additional information useful for final profiling.

## 3.2 Sample and methodology: target population

**A total of 1,700 interviews were conducted across 10 countries: Italy, UK, Turkey, Saudi Arabia, UAE, China, India, Algeria, USA, and Chile.**

The target population was chosen based on socio-demographic characteristics, with a focus on those employed and with a high level of education. In addition, attitudinal characteristics were also considered. We aimed to identify individuals who were the most active and aware of environmental sustainability issues. This was done through profiling questions related to sustainability clusters (see following paragraph).

The sampling was carried out based on quotas for gender, age groups, geographical macro-areas, education levels, and employment status. The interviews were conducted using the online CAWI (Computer Assisted Web Interviewing) methodology via Ipsos' proprietary panel, IIS (Ipsos Interactive Services). The average length of an interview was approximately 12 minutes. The interviews were conducted from September 22nd to October 9th, 2023 (see Table 1).

**Table 1** Population target, sample, methodology and period of fieldwork

Target Population	Methodology	Number of Interviews	Period of fieldwork
Population with a high level of education, employed, active in the energy transition*	Online quantitative survey (CAWI)	<b>10 countries, 1,700 interviews</b> 	22 September - 9 October 2023

\* People who feel the urgency to combat climate change and have already adopted virtuous behaviors (IPSOS cluster)

### 3.3 IPSOS Sustainability Cluster

---

**Ipsos' Environmental Sustainability Segmentation is a global segmentation study covering 15 markets. The study was conducted from February 10 to 13, 2022, on the Global Advisor online platform, among 10,000 adults aged 18-74 in Canada and the United States and 16-74 in Australia, Brazil, China, France, Germany, Italy, Spain, India, Japan, Mexico, South Africa, South Korea, and the United Kingdom.**

To create the sustainability segments, a targeted segmentation approach was used. That approach combines multiple dimensions into one segmentation strategy by leveraging the relationships between different types of information gathered. In this case, the relationship between two sets of variables: level of concern for the environment vs how many action/intended action was taken by individuals to reduce their own impact on the environment was taken into account.

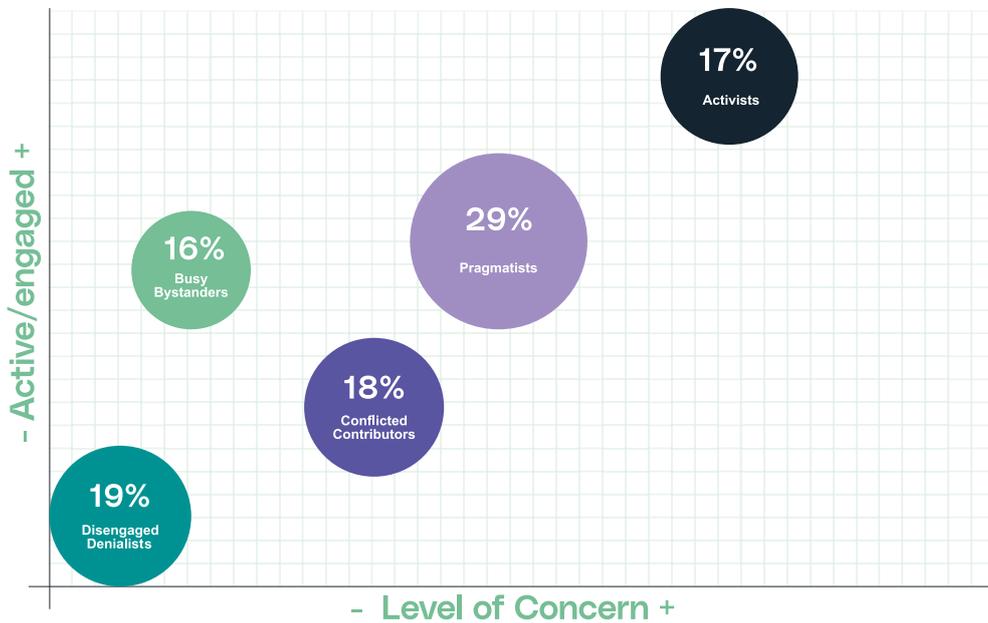
As a result, five segments (Table 2) were identified across that two main dimensions:

- » variables selected for segmentation;
- » concern for the environment;
- » perception of positive action and willingness to act;
- » actions currently being taking;
- » beliefs, values and attitudes towards environment;
- » challenges faced;
- » expectation of government, industry and individuals to act.

First step was data recording and transformations of selected variables. For all scales DK/NA was re-coded in the middle point of the scale. Then all variables were transformed to fit in the analysis, which was i.e. standardization, to ensure comparability between countries, or centering around mean, to reduce scale usage bias.

Finally, canonical correlations were run to find relationships between two main areas of interests: level of concern for the environment vs how many action/intended actions were taken by individuals to reduce their own impact on the environment was considered.

Having that, combination of exploratory hierarchical cluster analysis and k-means cluster analysis was run to finalize segments.



**Table 2**  
Environmental Sustainability Segmentation

### 3.4 Sample and methodology: target opinion leaders

Alongside the quantitative phase (involving 1.700 interviews with a highly educated population), 15 individual interviews were conducted across 5 countries (Italy, UK, UAE, India, USA) with Key Opinion Leaders among sustainability and energy transition experts, selected from 3 different targets: academics, institutions, and top managers of private companies.

The interviews were conducted via telephone and the online platform Teams by qualified psychologists. The average duration of the interviews was approximately 40 minutes, and they took place from 22 September to 16 November 2023 (see Table 3).

**Table 3** KOL target, sample, methodology and period of fieldwork

Target KOL	Methodology	Number of Interviews	Period of fieldwork
<b>Private companies</b> specialized on topics related to energy transition; <b>Institution, Universities</b>	In-depth <b>qualitative interviews</b> by web call or phone	<b>5 countries and global profiles, 15 in-depth interviews</b> EU ITALY UK INDIA USA UAE 	9 October - 16 November 2023





Fondazione MAIRE is the corporate foundation of MAIRE Group. Established in 2021, it has defined as its own mission to foster the training of tomorrow's "humanist engineers" who will be able to apply their broad vision and multidisciplinary knowledge to contribute to the energy and digital transition. Fondazione MAIRE carries out projects to provide training and combat educational poverty together with schools, universities and the third sector players. In this perimeter Fondazione sustains projects which aim to grant equitable access to educational opportunities, with a focus on contexts of social marginalization. Fondazione also manages the historical archives of the MAIRE Group, a precious documentary heritage of Italian projects in engineering and architecture, seeing to their preservation and promoting greater awareness of them and their use by an ever-widening public leveraging art and culture as a means of communication.



MAIRE is an Italian company leading a technology and engineering multinational group that develops and implements innovative solutions to enable the Energy Transition. The Group offers Sustainable Technology Solutions and Integrated E&C Solutions in nitrogen fertilizers, hydrogen, circular carbon, fuels, chemicals, and polymers. MAIRE creates value in 45 countries and relies on over 7,000 employees, supported by over 20,000 people engaged in its projects worldwide. Listed on the Milan stock exchange since 2007, MAIRE boasts 130 patent families registered in several countries and over 1,850 individual patents.



Tecnimont, part of MAIRE's Integrated Engineering and Construction Solutions business unit, is an international leader in the field of plant engineering, rooted in the pioneering experience of Italian industrial technology shaping the new frontiers of Engineering Innovation. It embodies the contractor spirit of MAIRE Group in Engineering, Procurement & Construction of large-scale projects worldwide. Tecnimont's expertise in realizing mega Projects all over the world has positioned the company among the top-notch players, with outstanding references in the management of large integrated turn-key complex projects by acting as the EPC contractor for the Client. Tecnimont is a top-class safety performer. An impressive track record, continuously confirming Zero Incident target, is sound evidence of its outstanding commitment to Safety all over the world.



NEXTCHEM leads MAIRE's Sustainable Technology Solutions business unit. Thanks to the extensive know-how of nitrogen, hydrogen, carbon capture, fuels, chemicals and polymers, it offers innovative solutions and processes to fully enable the energy transition. Its technology solutions are designed to make the energy transition happen by slashing the environmental impact of traditional industries, leveraging our consolidated know-how in hydrogen and carbon-capture technologies, transforming waste into valuable resources like chemicals, fuels, and recycled plastic, finding new processes from non-fossil feedstock.





This Report was edited by Fondazione MAIRE  
in November 2023 in Italy.  
Graphic designed by VitamineD.

Special thanks to IPSOS and all those who  
contributed to the realization of this report.

For any feedback about this publication,  
please send an e-mail to:  
[secretary@mairefoundation.com](mailto:secretary@mairefoundation.com)

