INSTITUTE OF THE AMERICAS®

LATIN AMERICA ENERGY TRANSITION
WORKFORCE READINESS ASSESSMENT

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DEFINING ENERGY TRANSITION

At the Institute of the Americas, we have spent a considerable amount of time and effort developing a definition of energy transition to help shape our understanding of the concept and provide parameters for how we reference it in our work. The following assessment discusses our perspective on the concept of the energy transition.

Energy transition is about the impetus of climate change and the necessity of finding energy solutions that do not contribute to greenhouse gas (GHG) emissions. It provides an opportunity for Latin America to focus on promoting high-quality job creation, economic diversification, and energy security, while at the same time addressing the pressing issue of energy poverty. As such, a key component of energy transition is about human capital upskilling and workforce readiness. Although this document focuses on the energy aspect of GHG, other areas of economic activity—such as land management, deforestation, and agriculture—are also important contributors.

We believe that the energy transition should be centered around three Ds: decarbonization, decentralization, and democratization. Decarbonization refers to the development of low-carbon and/or Net Zero full cycle energy sources. Decentralization refers to economic solutions that are flexible and adaptable to the region's diverse energy sources and

Finally, democratization refers to the need to implement energy solutions that emanate from the bottom up, are built around communities' participation and consensus, and are aimed at reducing the region's energy inequities.

This document marks the end of several months' effort to evaluate the energy transition workforce readiness in several Latin American countries. The project began with a short questionnaire developed internally with input from our Non-Resident Fellows, after which we invited over 150 experts throughout Latin America to participate in our survey phase. We ended with an analysis of the survey responses and data to deduce trends and set forth policy recommendations. We also developed country-specific analyses, which we have termed Energy Transition Snap Shots, that present important country-level datasets and facts. The Snap Shots also provide further discussion of some of the nuances for the countries at the core of our research. Importantly, they allow us to disaggregate the regional context for the eight countries featured in our analysis and surveys. The Snap Shots are presented separately on the website.

The country surveys in this study were undertaken in late 2021 and early 2022. The results clearly show an uneven readiness and uneven commitment for the energy transition across Latin America. As the data were being analyzed, armed conflict in Europe began to raise new issues around global energy security. Certainly, this turn of events likely will lead to long-term changes in the supply of fossil fuels and greater desire for countries to be more energy secure and less vulnerable to global volatility. This trend, in turn, is leading to calls for more rapid deployment of renewable energy technologies and electrification. The geopolitical context emphasizes the importance of this study in assessing Latin America's workforce readiness for the energy transition.

Countries across Latin America have long faced challenges with regard to fostering sustained economic development, specifically in creating economic opportunities that translate to jobs. It is crucial to understand the role of the energy transition as a policy objective and overall economic framework for the region's governments, as well as within the private sector and academia. This understanding may help provide a more informed sense of the potential employment opportunities related to the energy transition, along with the extent to which the region is prepared to obtain them. To that end, the Institute of the Americas launched a research project to assess the readiness of Latin American countries to capture the jobs that will be generated from the energy transition and pursuit of Net Zero and clean energy targets.

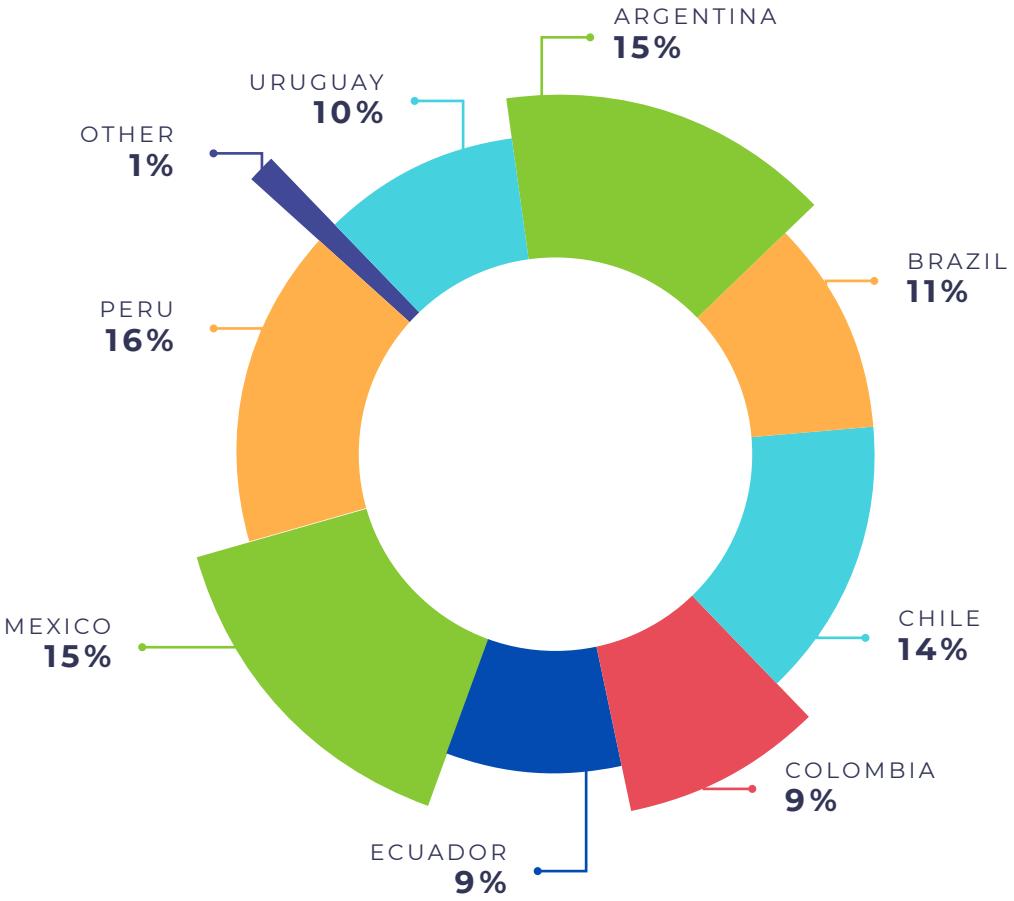
We derived our preliminary assessment from a series of discussions/Zoom meetings and short surveys completed by our team of Non-Resident Fellows. However, to go further and assess where the region stands today in terms of energy transition workforce readiness, we developed an expert survey component. The expert surveys allowed us to delve deeper into these issues in eight major markets: Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Peru, and Uruguay. The survey provided further insights on the readiness of Latin America's workforce to capture the promised jobs from the energy transition by measuring countries' training and preparedness policies and strategies.

Our goal was to survey a diverse yet manageable group of experts from across all facets of the energy transition. Through our Non-Resident Fellows and the Institute of the Americas' established network, we identified 150 energy experts for the survey. We focused on representatives from ministries of energy, state-owned energy companies, regulatory bodies, renewable energy chambers, renewable energy companies, private project developers, international companies from all segments of the energy sector, and citizen and environmental

* According to the United Nations, Net Zero means "cutting greenhouse gas emissions to as close to zero as possible, with any remaining emissions re-absorbed from the atmosphere, by oceans and forests for instance."

nongovernmental organizations (NGOs). We also included academics, lawyers, environmental consultants, and mining company executives. The representatives and other contributors on our list all were based and residing in the countries of the region. We attempted to have an even distribution of experts participating from across the eight countries selected (Figure 1).

FIGURE 1



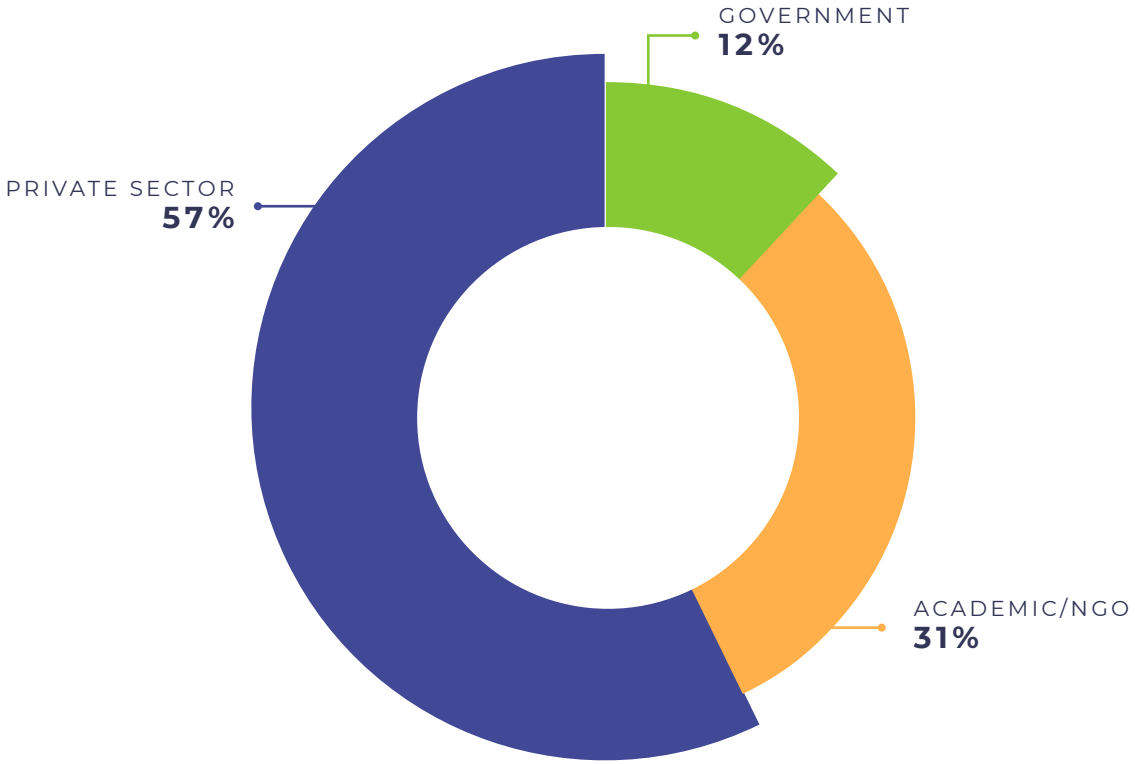
| COUNTRY REPRESENTATION BREAKDOWN |

| EXPERT SURVEY: SAMPLE AND BACKGROUND |

We developed an eight-question survey to provide us with essential input to further our analysis and move our assessment beyond existing literature and reports. Our main interest was in seeking the perspectives of more on-the-ground expert opinions from individuals managing or confronting the current reality. The survey responses provided the input for this report and our "Latin America Energy Transition Workforce Readiness Barometer."

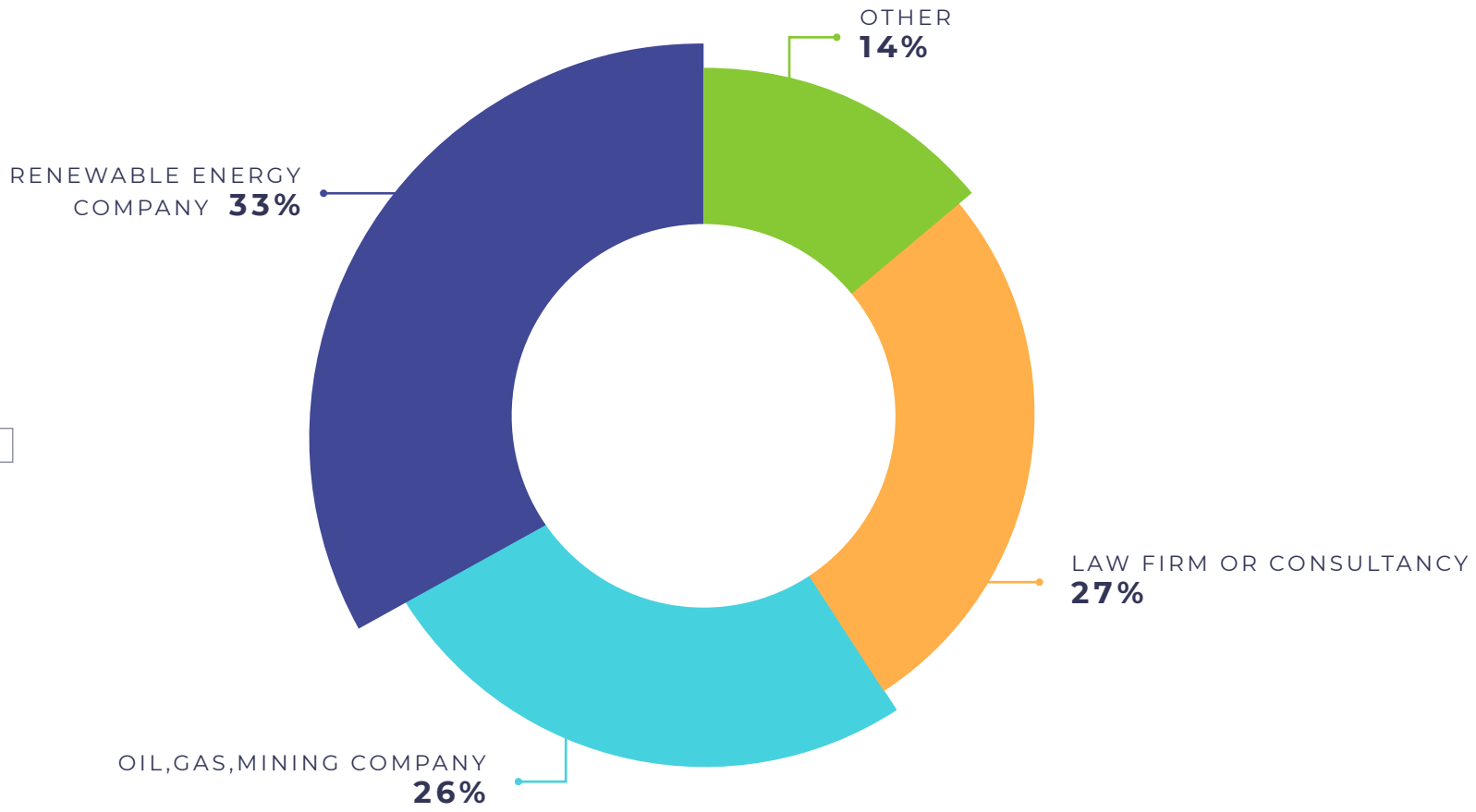
We conducted the surveys through Google Forms between November 15 and January 15 and received 88 completed expert surveys. The respondent breakdown was 12% government representatives, 57% from the private sector (over 50% of which were representatives from oil and gas and mining companies, as well as renewable energy companies) and 31% from NGOs/academia (see Figures 2 and 3). Annex I in this report presents a copy of the expert survey.

FIGURE 2



| DISTRIBUTION OF SECTORS BY RESPONDENTS |

FIGURE 3



| PRIVATE SECTOR BREAKDOWN |

Policymakers, government officials and industry representatives believe that the global goals and climate imperative to pursue Net Zero frameworks have strong economic and workforce upsides. They have touted the prospects for significant job creation in Latin America related to the energy transition. According to research done for the Inter-American Development Bank (IDB) and International Labour Organization (ILO), and assuming the low International Energy Agency emission scenario, around 22.5 million new jobs could be created, largely compensating for the 7.5 million jobs expected to disappear as the region adapts to a low-carbon economy.

Any policy or strategy aimed at maximizing employment from the energy transition must consider the current skill levels available in each country, the skills required for the energy transition, and the educational and training needs and options for the existing and future workforce. These elements of preparedness and readiness formed the core of our expert survey opinion; our assessment will be further detailed in Sections V and VI. For the energy transition to create the desired jobs, policymakers will need to coordinate appropriate policies impacting supply and demand.

From the demand side, policies would center on creating an ecosystem to make low-carbon technologies and production processes fully competitive with those that are more carbon intensive. Similarly, proper price signals will be needed to properly account for the negative externalities of carbon-intensive technologies. From the supply side, policies would focus on building the proper capacity for existing and new workforce, enabling them to gain the required skills and knowledge to succeed in the green economy. This approach will need to include efforts to find viable employment alternatives for those currently working in the fossil fuel economy, which represent a significant asset for the region's workforce in terms of technical skills.

Latin America faces a dilemma: either invest in expanding fossil fuel reserves and production to finance economic recovery and address the numerous social challenges worsened by the pandemic or reduce investments in those activities to encourage a more rapid approach to Net Zero and economic diversification. Governments face strong short-term pressure to maintain a carbon-intensive economy because of the impact that related industries have on key national exports and fiscal

SUMMARY

According to recent news reports and the current literature on the energy transition, Latin American countries appear to have embraced the concept. It is common to read news stories about new announcements pertaining to the broader energy transition. But to properly assess the extent and feasibility of the emerging job opportunities in this area, one must understand the details of the existing energy transition strategies and policies, the depth of their reach, and (perhaps most importantly) the extent to which stakeholders nationwide understand these policies, including those most interested and vested in such plans. Have certain countries in the region merely announced energy transition strategies without setting in place the requisite policy, regulatory, and communication supports to fully pursue energy transition and the corresponding economic and employment opportunities?

Our assessment is that, at a general level, countries have taken important steps and made great progress in coordinating and implementing energy transition strategies. However, these efforts have been uneven and often suffer from political intervention, and they have been poorly communicated to stakeholders across their respective nations. To wit, more than half (58%) of our expert survey respondents believed that their country had published an energy transition strategy (Figure 4). Additionally, 77% of our survey respondents who answered felt that their country's published strategy is supported by the necessary legal and regulatory framework; however, 35 experts left the question unanswered.

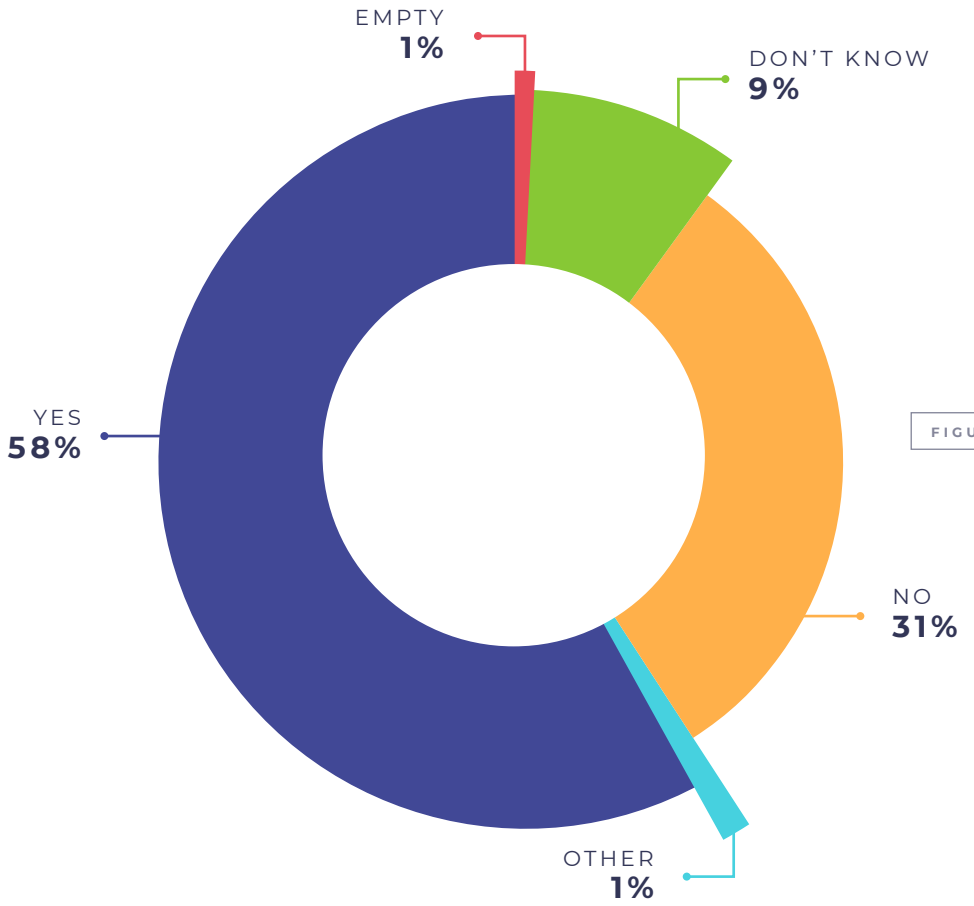


FIGURE 4

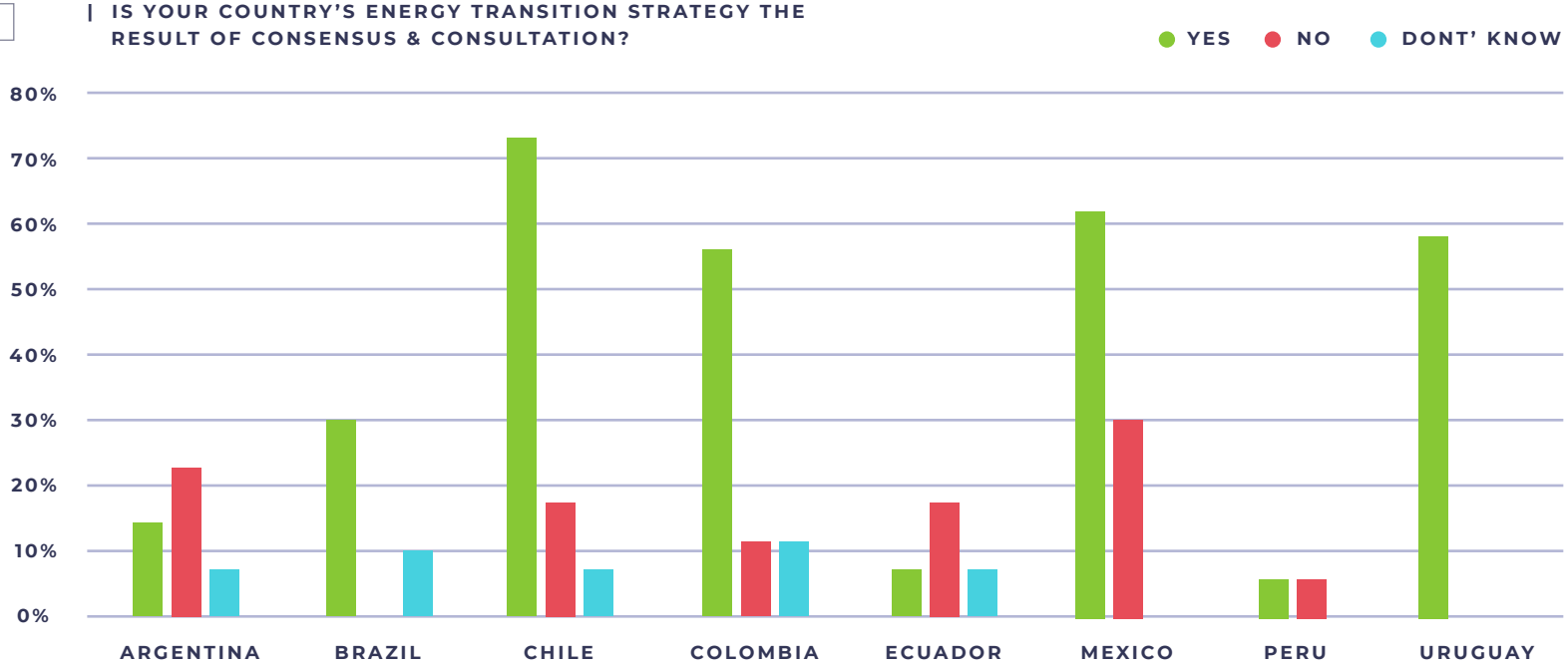
| DOES THE COUNTRY HAVE A PUBLISHED ENERGY TRANSITION STRATEGY? |

Notably, of those experts who chose to respond to this question, approximately 67% indicated that they believed the energy transition strategy had been the result of consensus and consultation with stakeholders from political parties, the private sector, and civil society. But once again, and viewed from a more negative vantage, 54 survey respondents chose not to answer whether their country's energy transition plans were derived from a consultative and consensus-building approach.

The survey respondents felt that the countries with the highest chance of implementing their energy transition strategies are Uruguay and Colombia, followed by Chile and Brazil. Chile, Mexico, and Uruguay appear to be the countries where the development of an energy transition strategy benefited from the input of different stakeholders. Most of the Colombia respondents agreed with that view, but some dissented. Notably, in Uruguay there appears to be a strong consensus about the participation of different stakeholders, but the respondents were less in agreement when considering if indeed Uruguay had an energy transition strategy and if it was supported by a legal framework (Figure 5).

FIGURE 5

| IS YOUR COUNTRY'S ENERGY TRANSITION STRATEGY THE RESULT OF CONSENSUS & CONSULTATION?

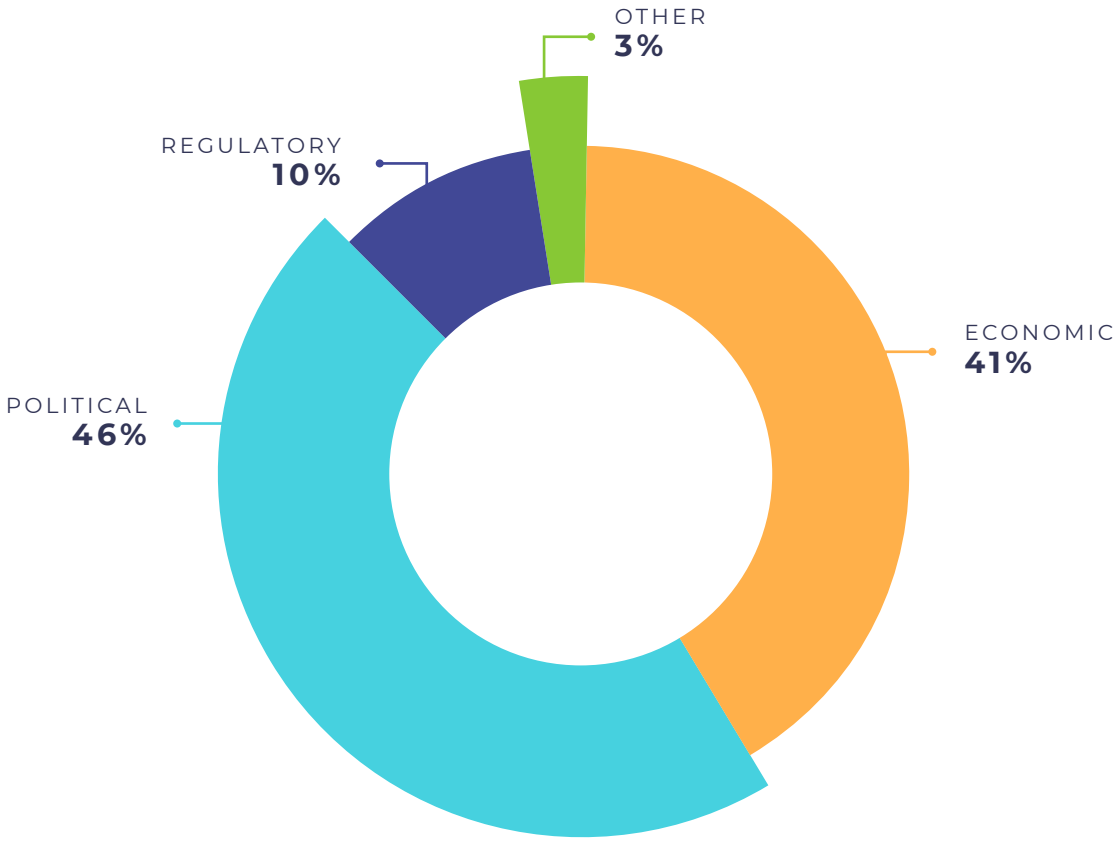


*Note: The country percentages may not total 100% as 54 respondents chose not to answer this question. For proper data representation, we have not included their answers in the three pre-set categories of Yes, No, Don't Know.

The lack of apparent support (or at least understanding) as well as lack of clarity are major hurdles for fostering the commensurate workforce preparedness necessary for beneficial outcomes in the sector. If the key players of the energy strategy do not know the content of their energy transition strategy, it is difficult to think that they would know what type of jobs or skills are required to train the local workforce in line with the energy strategy.

When asked as to the major factors or difficulties facing implementation of energy transition strategies, roughly 46% of the experts noted political risk and lack of political will. Almost 15% cited the cost factor; economic issues, taken together, were noted by 41%. Other experts mentioned a host of other issues (Figures 6 and 7).

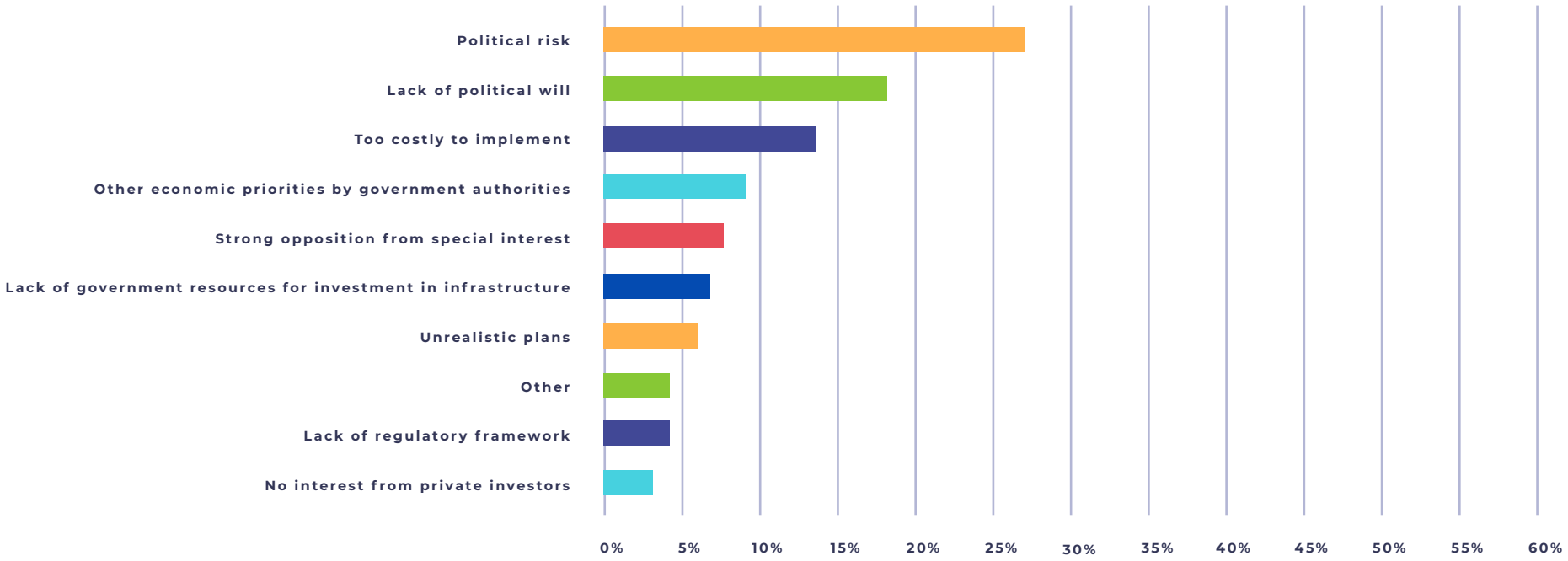
FIGURE 6



| WHAT IS THE MAIN DIFFICULTY FOR IMPLEMENTING THE ENERGY TRANSITION STRATEGY? |

FIGURE 7

| REASONS FOR DIFFICULTY IN STRATEGY IMPLEMENTATION



In our view, this lack of support is a major issue to be understood as part of the energy transition narrative across the region. It will have direct effects on the framework for building significant economic opportunities and grasping the level of workforce preparedness.

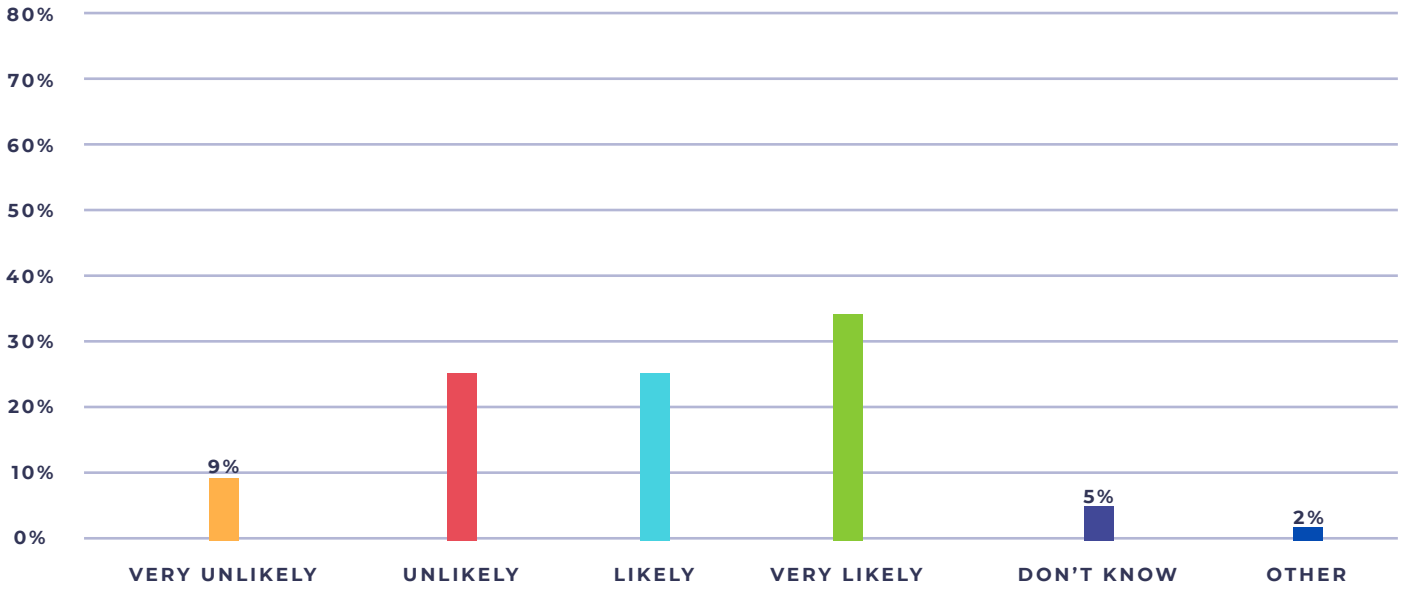
The sections that follow provide more in-depth insights on these policy facets, the ways in which they appear to inhibit the broader economic outlook and workforce opportunities, and specific jobs related to energy transition. Indeed, according to the experts, the challenge of the energy transition is not economic or technical but political. From the myriad reasons that the experts cited to explain why they think it would be difficult to meet the energy transition, those related to political reasons tend to dominate, followed by economic ones.

Our expert surveys underscore these points. Many respondents found it likely or very likely that their country would implement strategies to meet Net Zero 2050 targets (Figure 8). However, that optimism varies significantly by country. Experts from Mexico, Peru, and Argentina are more pessimistic about the implementation of the energy strategy, whereas those from Chile, Uruguay, and Colombia are more optimistic.

* According to the United Nations, "to keep global warming to no more than 1.5°C – as called for in the Paris Agreement – emissions need to be reduced by 45% by 2030 and reach net zero by 2050."

FIGURE 8

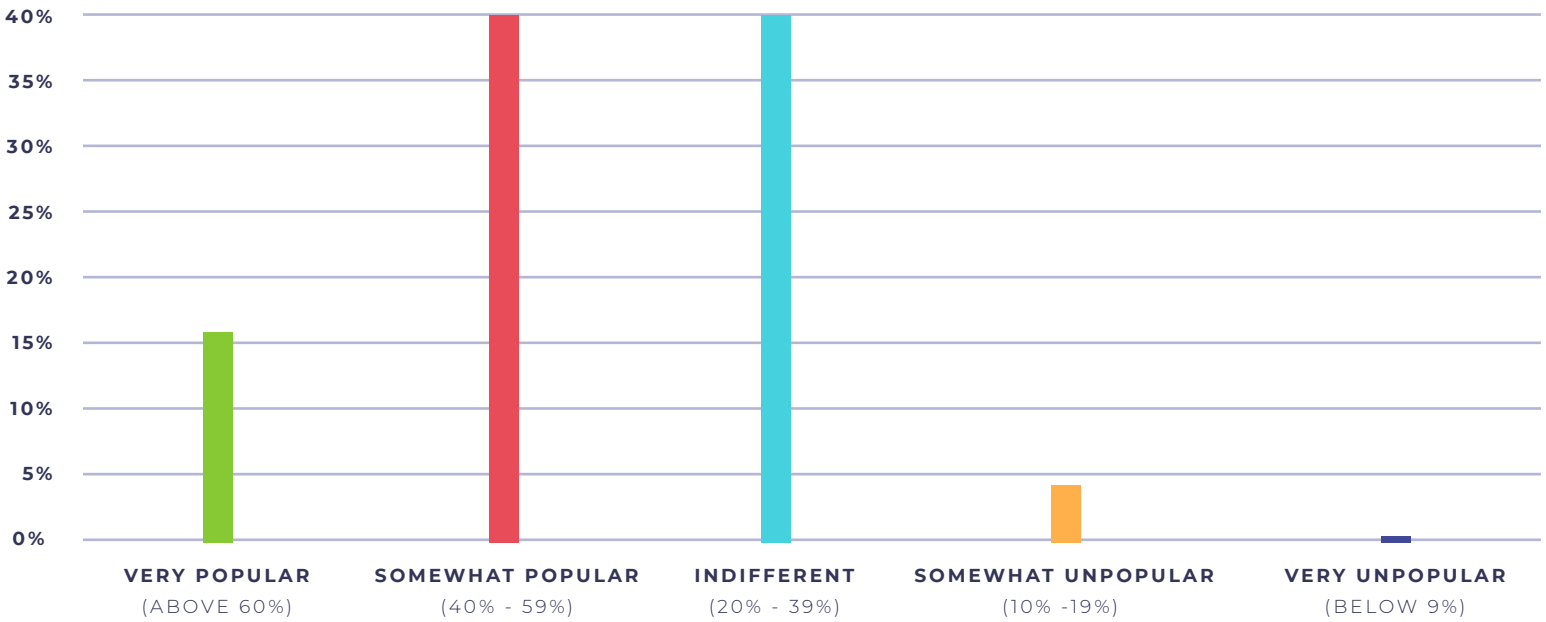
| LIKELIHOOD OF ENERGY TRANSITION IMPLEMENTATION



On a positive note, the region's energy transition strategies appear to be solidly popular (Figure 9). More than half of the experts indicated that the plans are viewed as somewhat popular or very popular in their countries. Interestingly, when we combine expert opinions on the likelihood of energy transition with their views on the popularity of the plans and strategies, Uruguay, Chile, and Colombia stand out as the countries that have in fact embarked on an energy transition path.

FIGURE 9

| POPULARITY OF ENERGY TRANSITION STRATEGIES



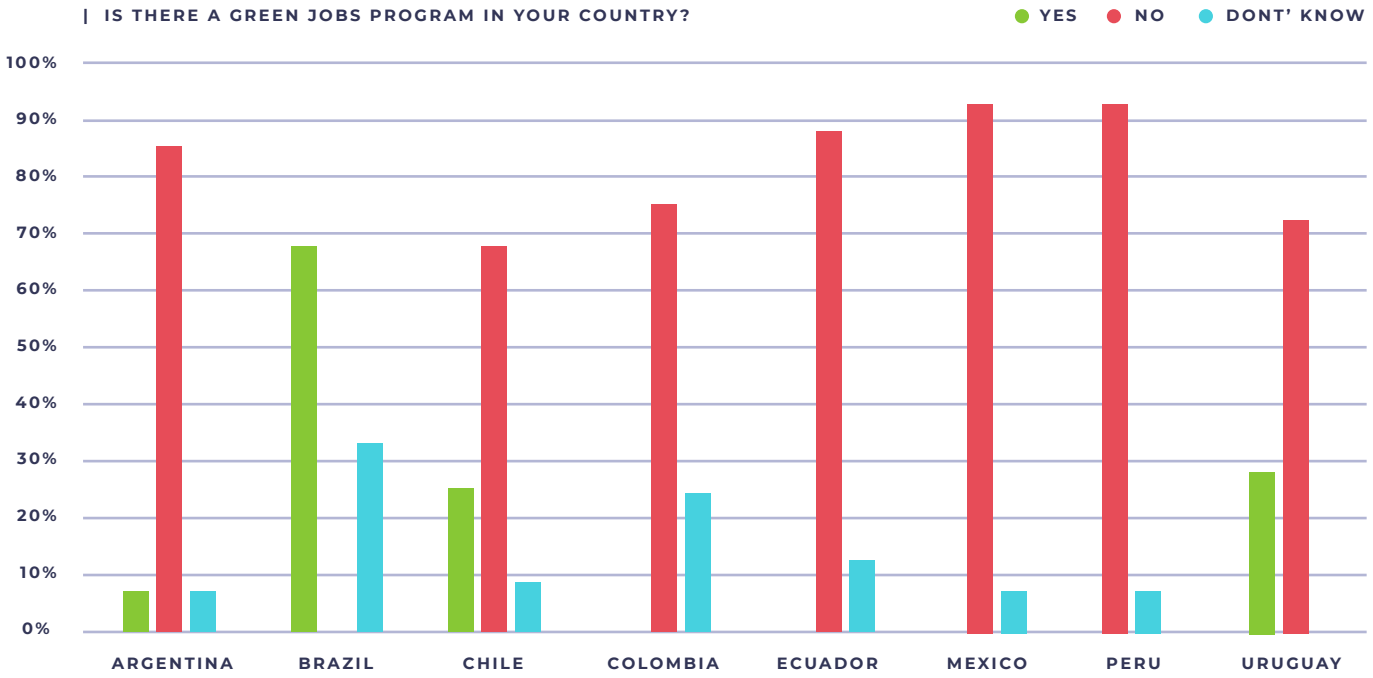
In sum, the foregoing questions measured experts' familiarity with the existence of an energy transition strategy. If a country does not have such a strategy, one can assume that it is less likely to try to develop policies and strategies to prepare a local workforce for energy transition. This situation makes it less likely that the country's workforce would be prepared to capture those jobs. If there is an energy strategy, but the experts are not aware of it, that also suggests that the strategy is an obscure document with little impact in terms of implementation. Further, if a country's population does not care about the strategy, its members would be less inclined to prepare for the jobs that may become available as part of the energy transition.

SUMMARY

As countries move to implement energy transition strategies, with the goal of capturing related jobs, they must contend with many aspects that go beyond the legal, regulatory, and investment frameworks mentioned earlier in this report. Specifically, it is crucial to understand the public's overall perceptions of what have been called "green jobs" and determine whether countries have put in place such programs to stimulate those workforce segments.

Based on our survey, the experts agreed as to the lack of specific "green jobs" programs. Most believed that their countries did not have green jobs programs. Only a few indicated that they did not know whether or not such programs existed. To understand these insights on a country-specific level, we note that (with the exceptions of Chile, Uruguay, and Argentina) expert opinions underscored the nonexistence of specific "green jobs" programs. It is possible that some programs exist but the experts are not familiar with them, which suggest that the programs could be irrelevant or poorly developed (Figure 10).

FIGURE 10

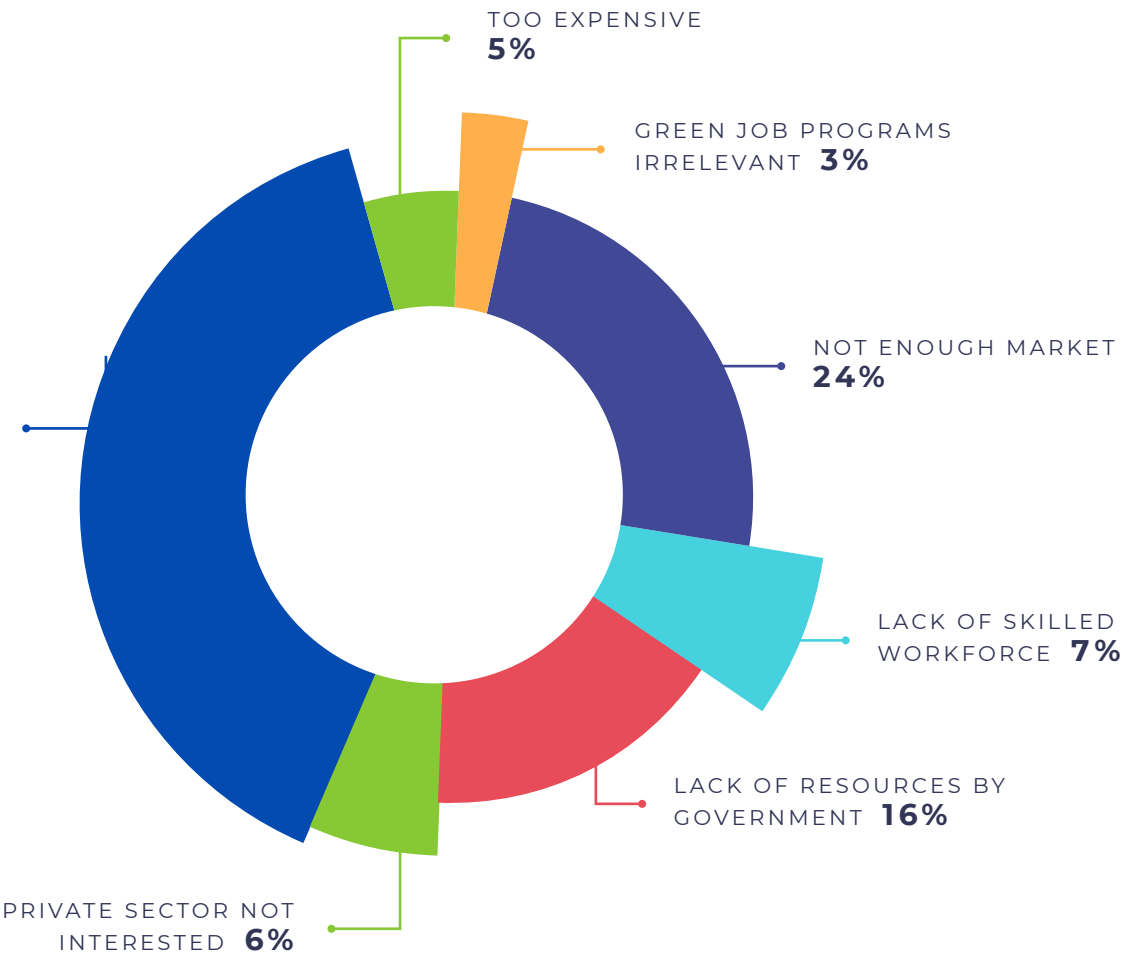


* According to the International Labour Organization, "green jobs are decent jobs that contribute to preserve or restore the environment, be they in traditional sectors such as manufacturing and construction, or in new, emerging green sectors such as renewable energy and energy efficiency."

When asked to further assess why there was such a pronounced gap in creating or developing a green jobs program, our survey respondents gave two principal reasons: lack of political support and not enough market for green jobs (Figure 11). The clear takeaway is that the lack of political support is likely attributable to the lack of a job market and constituency (voters), but those jobs will not occur in a significant manner without political intervention (political support).

Further, beyond the specific concept of green jobs are elements such as government-led and government-developed local content rules and policies. Another vital element is education, particularly whether technical training programs are available or being developed within the region. Latin America has historically lacked essential and relevant education and training, which must be addressed in the context of energy transition workforce development.

FIGURE 11



| WHY AREN'T THERE GREEN JOB PROGRAMS? |

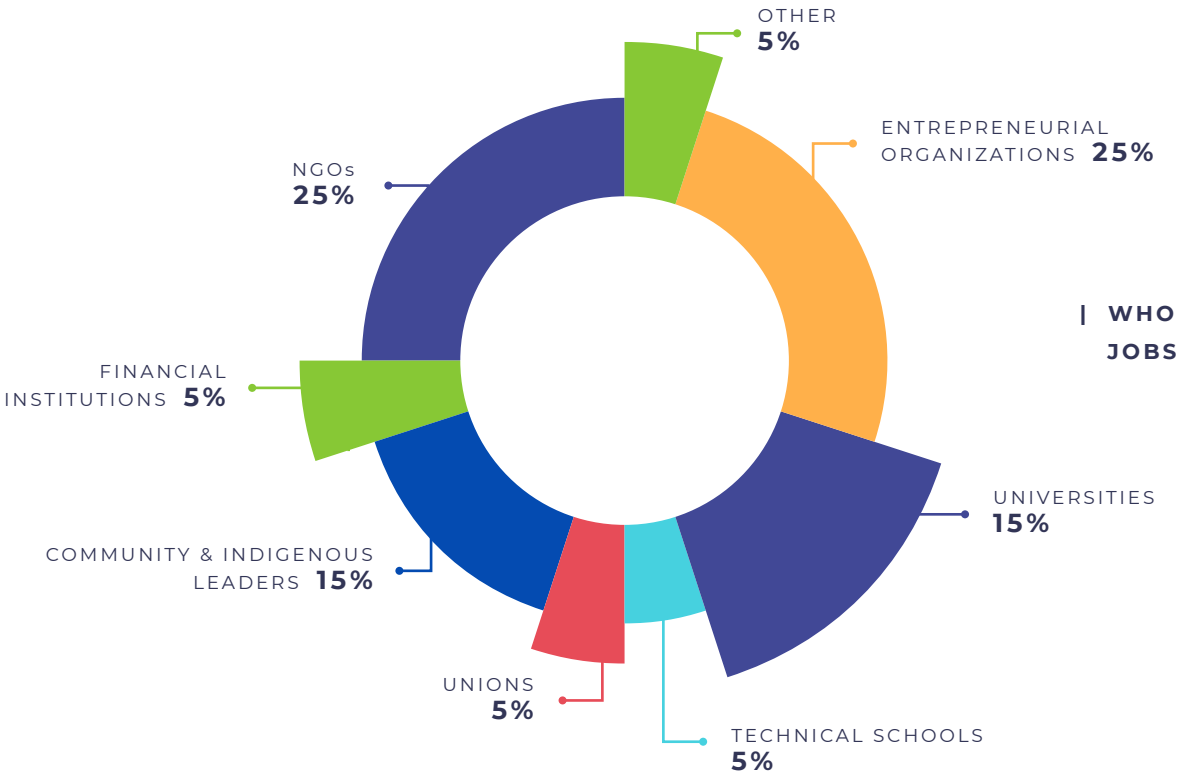
PRIVATE SECTOR EFFORTS

The literature on the role of the private sector in job creation in Latin America underscores that the most relevant and important opportunities are generated by the entrepreneurial sector. At the same time, structurally and historically, the region lacks midlevel enterprises—the same types of enterprises that tend to be innovators and more likely to adapt new technologies, process, and products that would be required to meet the challenge of Net Zero emissions.

When asked to consider the source of green jobs and their method of creation, our survey responses traced most of the efforts to NGOs. NGOs are not as accountable for the development of policy priorities and rely on different sources of funding. This shows the lack of political priority for green jobs. Not far behind NGOs in the opinion of the experts are entrepreneurial organizations and universities, who also appear to play an important role. However, our response level for this question was low, which could be interpreted as a lack of understanding or the inability to precisely indicate the source of green jobs or programs (Figure 12).

FIGURE 12

| WHO DEVELOPED THE GREEN JOBS TRAINING PROGRAMS?



LOCAL CONTENT

Local content has been widely used around the world in many economic and policy settings. It has been a popular policy and government-led effort to boost local manufacturing and thus workforce development and job creation. Indeed, many oil- and gas-producing countries in Latin America have implemented local content policies with much fanfare. But, after several years, the literature indicates that the results and impacts from the oil and gas sector have been limited or only modestly successful and there are ample lessons learned. The way in which it relates to the energy transition workforce merits review.

As part of our assessment and survey, we posed questions to our experts about local content policy aimed at renewable energy workforce development. In general terms, some of the countries have set forth policies on this topic, but again the overarching goals and objectives of local content policies for the energy transition appear to have uneven implementation and poor communication. From our survey, just under half of the experts responded that their countries have developed and implemented local content policies, while roughly one-third responded that their countries had no such frameworks. The remainder did not know (Figure 13).

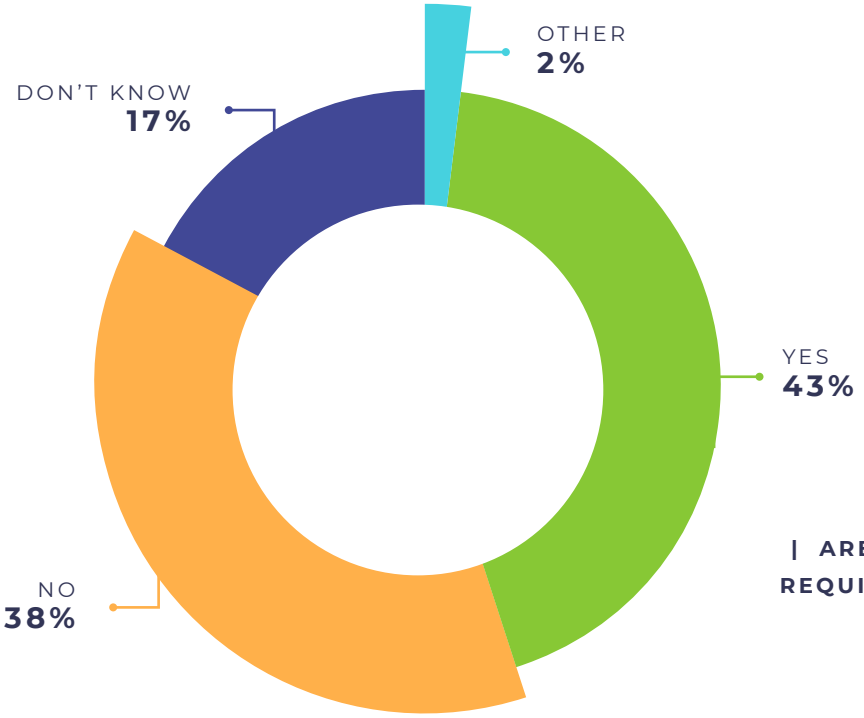
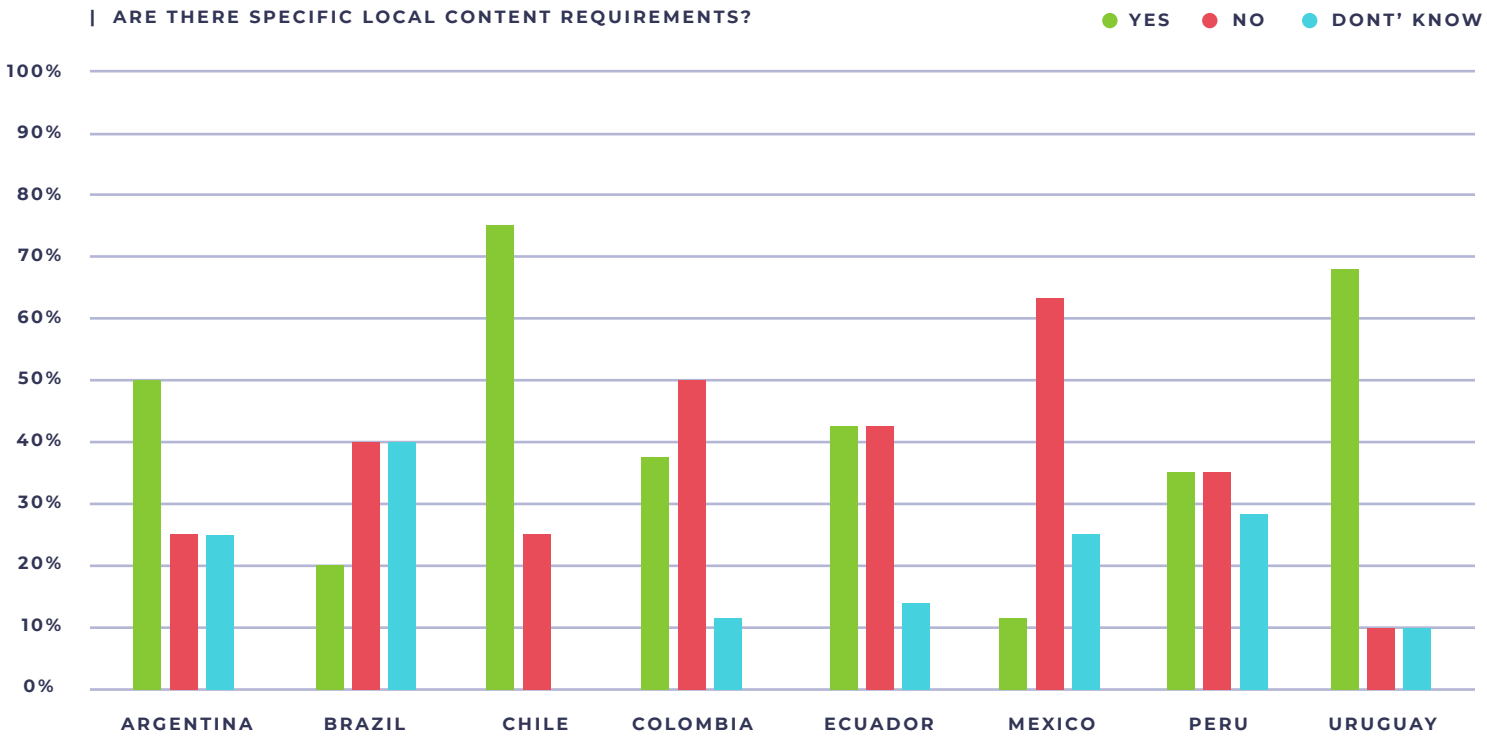


FIGURE 13

| ARE THERE SPECIFICAL LOCAL CONTENT REQUIREMENTS IN PUBLIC PROCUREMENT?

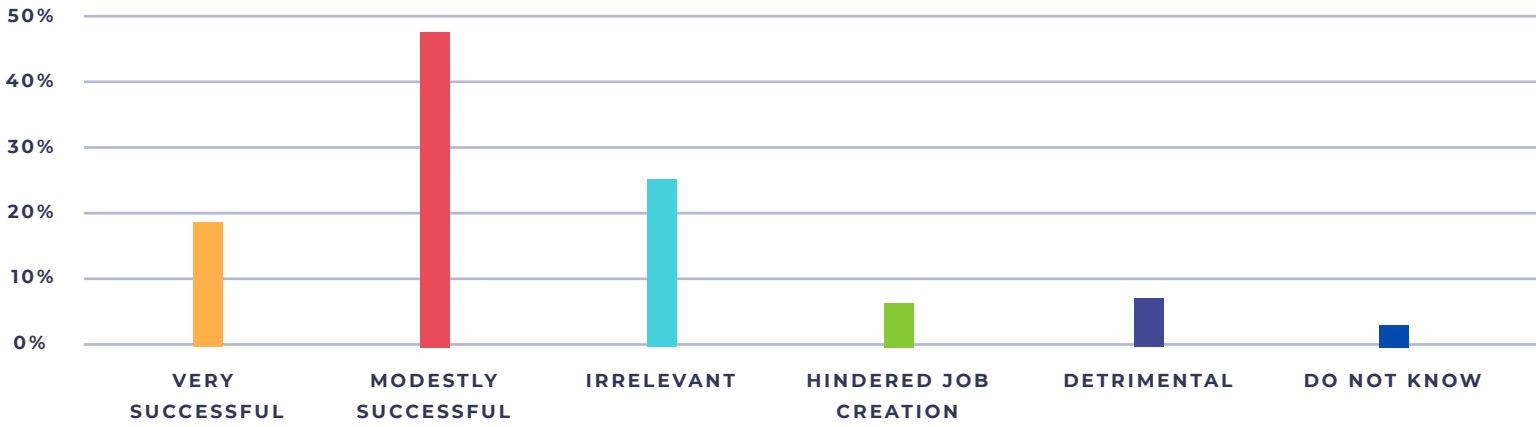
FIGURE 14



Disaggregating the overall responses, the experts from Uruguay, Chile, and Argentina indicate that there are related policies. Meanwhile, in Mexico it was well understood that such efforts were lacking. Further, there was a lack of clarity and a sense of disagreement among experts in Colombia, Ecuador, and Peru on the extent of renewable energy local content policies (Figure 14).

FIGURE 15

| IF THERE ARE LOCAL CONTENT REQUIREMENTS FOR RENEWABLE ENERGY ARE THEY:



Going beyond the policy frameworks, we sought to understand from the experts their opinions of the impact of local content policies (Figure 15). Just under 20% noted that the policies were detrimental, hindered, or irrelevant, while 27% responded that the policies only had "modest impact." Finally, around 10% responded that local content policies had been "very successful" in supporting renewable energy job opportunities. These responses strongly signal that these government-led efforts and policy frameworks should be reconsidered and revised.

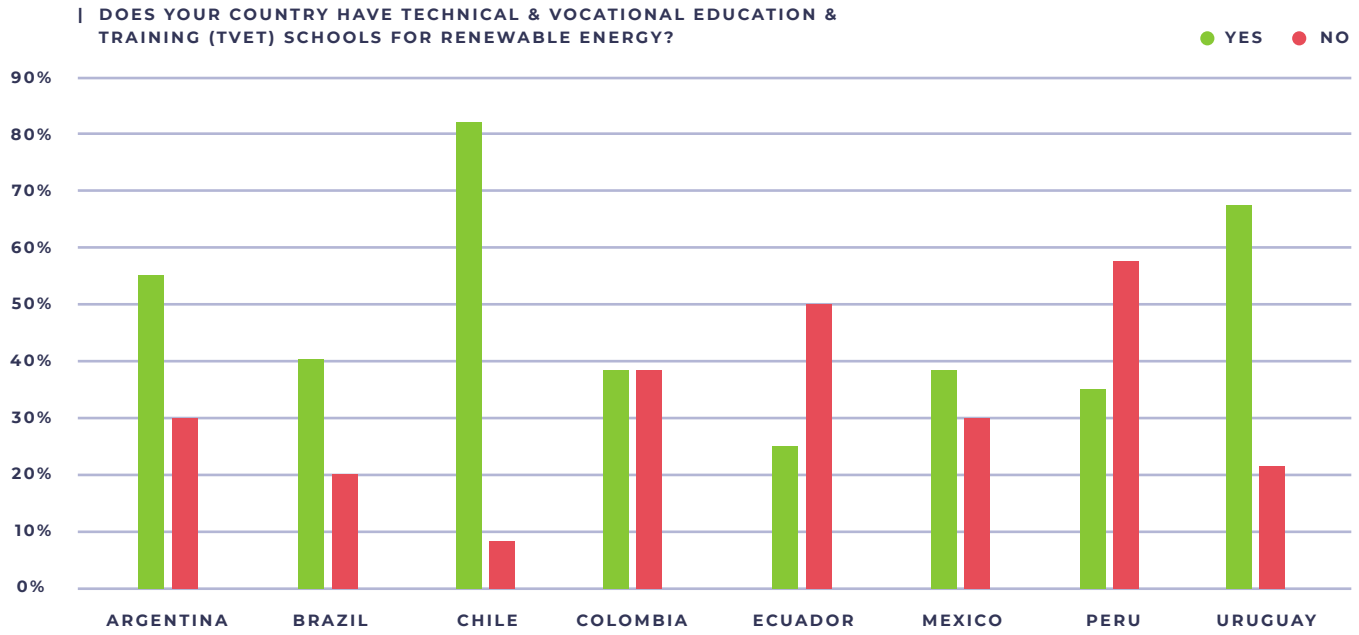
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING

As discussed previously, Latin America has profound regional historical and cultural legacies of inequality and economic opportunity. Although this research and survey effort is not focused on education per se, the ability to foster workforce development includes education—particularly what is known as technical and vocational education and training (TVET)—as a core facet of the issue. Indeed, a recent UNESCO report highlights that Latin America's long-standing economic model has largely focused on "low value-added industries and low productivity."

A relevant element in our assessment of energy transition workforce readiness and development is the ability to engender a structural transformation process. UNESCO argues that "TVET should play a key role in driving connections, complementarity, and updating of training provided by the educational system, together with labor market demands and demographic trends."

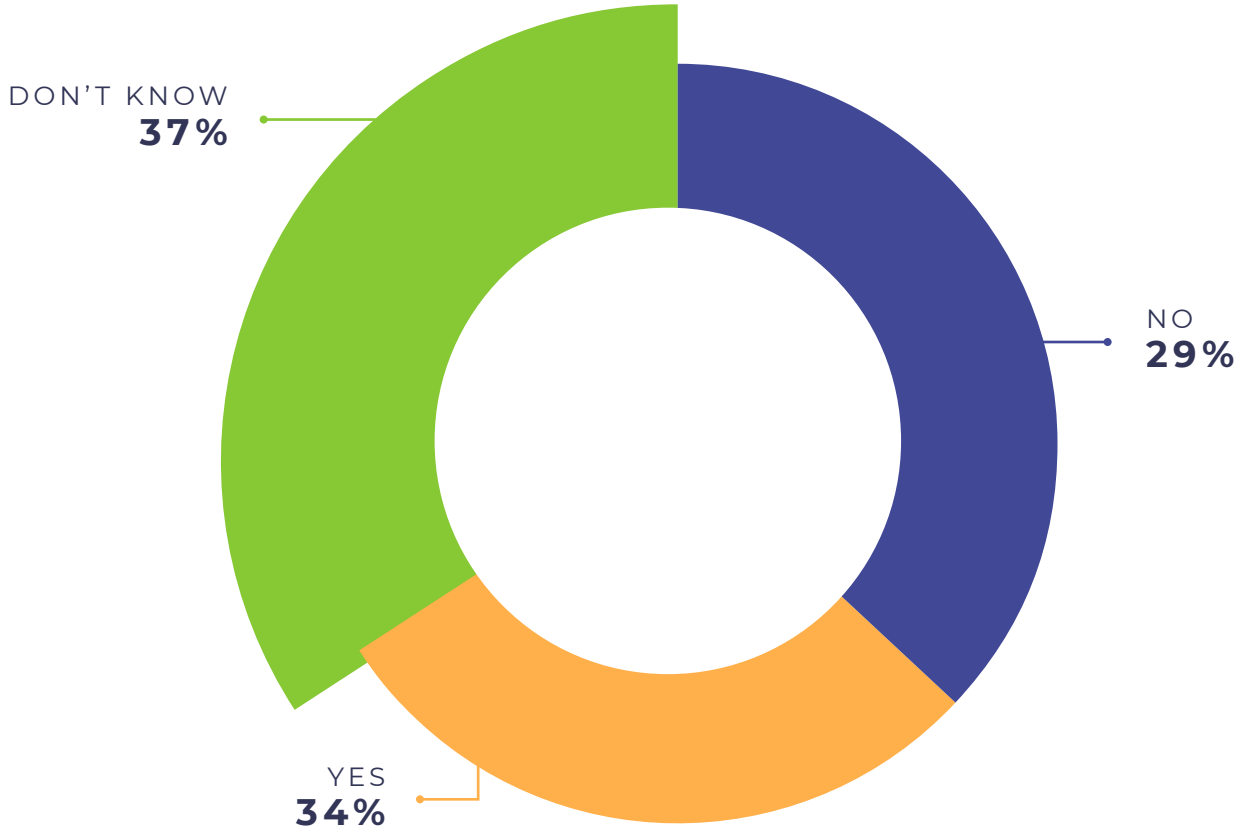
Our expert survey responses echoed the common argument of the fractured nature and lack of consistency in TVET development. When asked direct questions about the existence of TVET or degrees available in their countries, only the experts from Chile seemed to agree on the existence and availability of related TVET programs. Respondents from the other countries presented a divided and inconsistent set of opinions (Figure 16).

FIGURE 16



Specifically, there was no consensus as to the extent to which TVET programs had been designed to produce the skills and skill sets for energy transition and renewable energy (Figure 17).

FIGURE 17



| ARE TVET PROGRAMS DESIGNED ACCORDING TO A NATIONAL RENEWABLE ENERGY SKILLS REQUIREMENT?

Moreover, respondents who believe that their countries have TVET programs related to energy transition note that most are related to relatively low-technology activities, focusing on solar panel installation, repair, and maintenance. There appears to be limited appetite to move Latin America into the technology/manufacturing value chain in the energy transition (Figure 18).

| TECHNICAL & VOCATIONAL EDUCATION & TRAINING (TVET) AREAS OF TRAINING

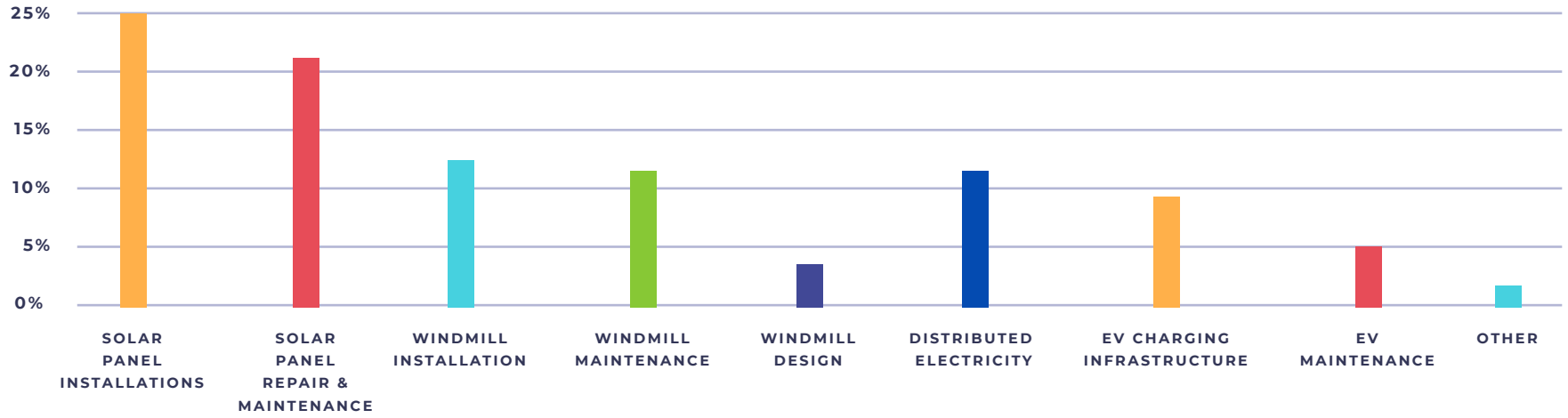
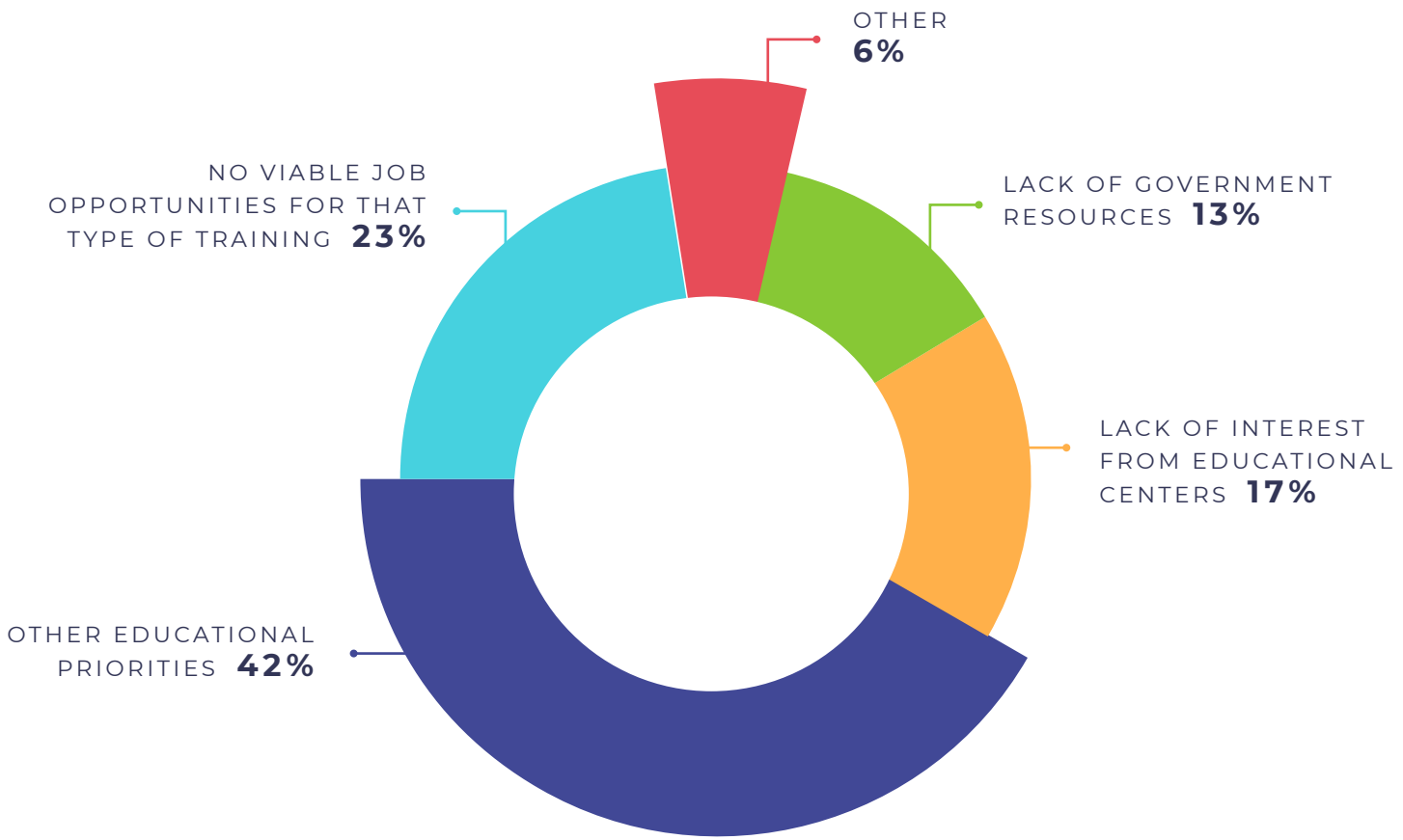


FIGURE 18

Specifically, there was no consensus as to the extent to which TVET programs had been designed to produce the skills and skill sets for energy transition and renewable energy (Figure 19).

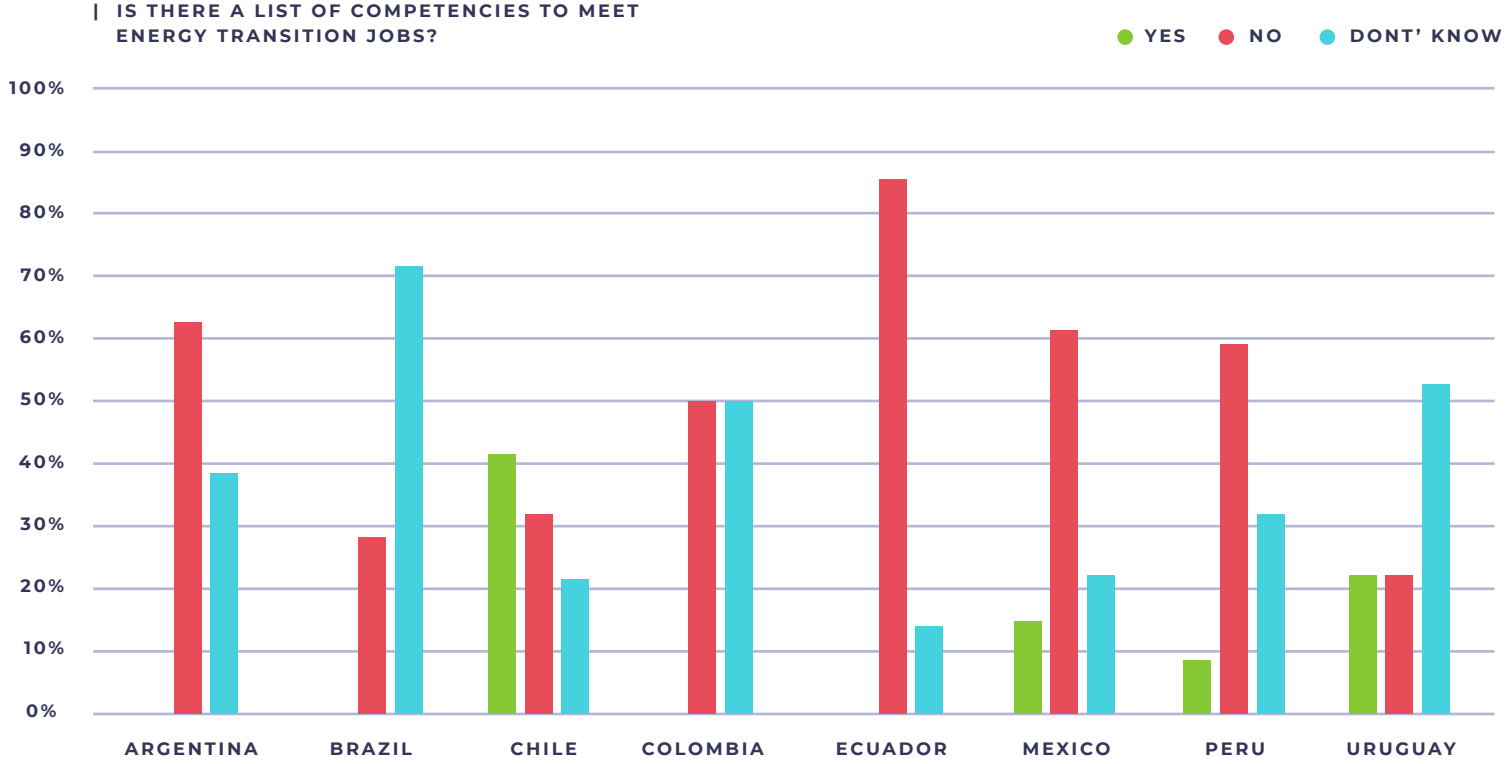
FIGURE 19



| WHAT EXPLAINS THE LACK OF TVET IN RENEWABLE ENERGY? |

FIGURE 20

| IS THERE A LIST OF COMPETENCIES TO MEET ENERGY TRANSITION JOBS?



Finally, when asked about a list of competencies to pursue energy transition jobs, most of the respondents indicated that they are not aware that their countries compile or retain such a list (Figure 20). If workers do not know what to train for, and education centers do not know what to kind of skills to teach, it is unlikely that the local workforce would be able to be trained and hired for those hypothetical jobs.

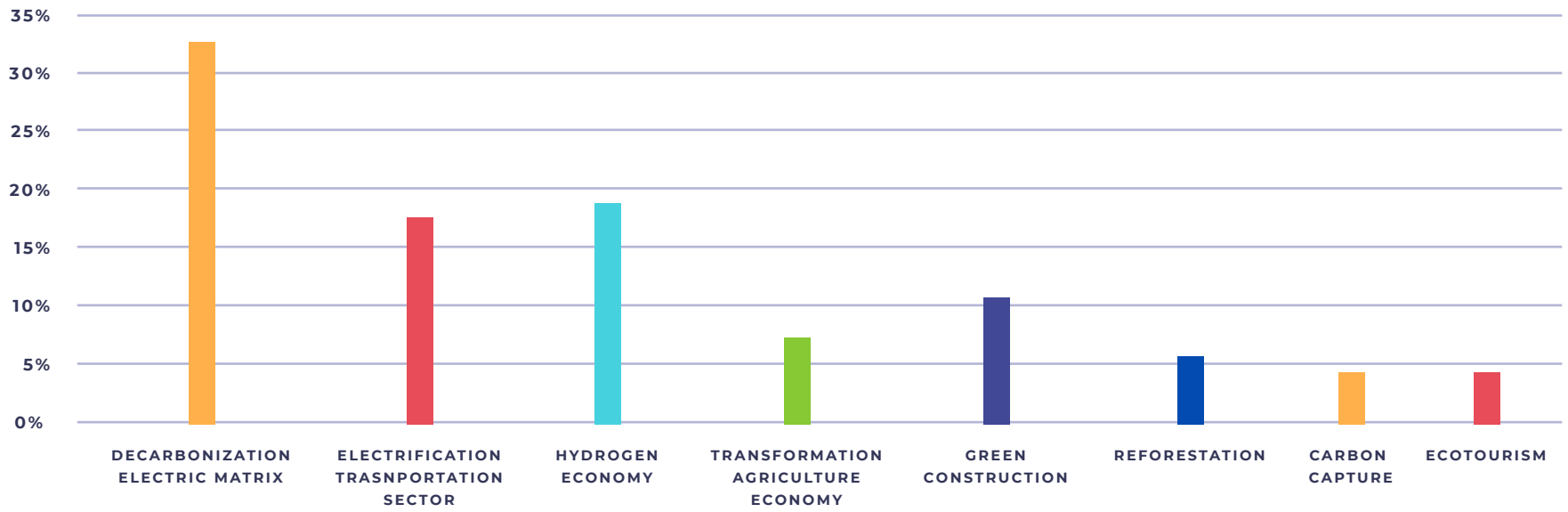
SUMMARY

According to the IDB/ILO, most potential energy transition jobs would be in the semiskilled category, at an estimate 13.5 million jobs. Their assessment also estimates a further 8.5 million unskilled jobs in energy transition, as well as a more modest number of less than 1 million skilled professional jobs. Thus, any policy or strategy to maximize employment from the energy transition must clearly understand the current skill levels available in each country, the skills required for the energy transition, and the educational and training needs and options available for the existing and future workforce.

From our expert surveys, almost 70% of respondents concur that three areas hold the most promise for boosting economic development and job creation: decarbonization of the electric matrix, transport electrification, and hydrogen economy development. It is useful to note these results even though the literature on the subject indicates that agriculture and forestry activities could have a greater impact on future employment. In this case, we assume the reason for such responses rests on the bias of our experts surveyed, as these experts tended to be mostly familiar with energy/electricity matters (Figure 21).

FIGURE 21

| ACTIVITIES WITH THE LARGEST JOB IMPACT IN THE ENERGY TRANSITION



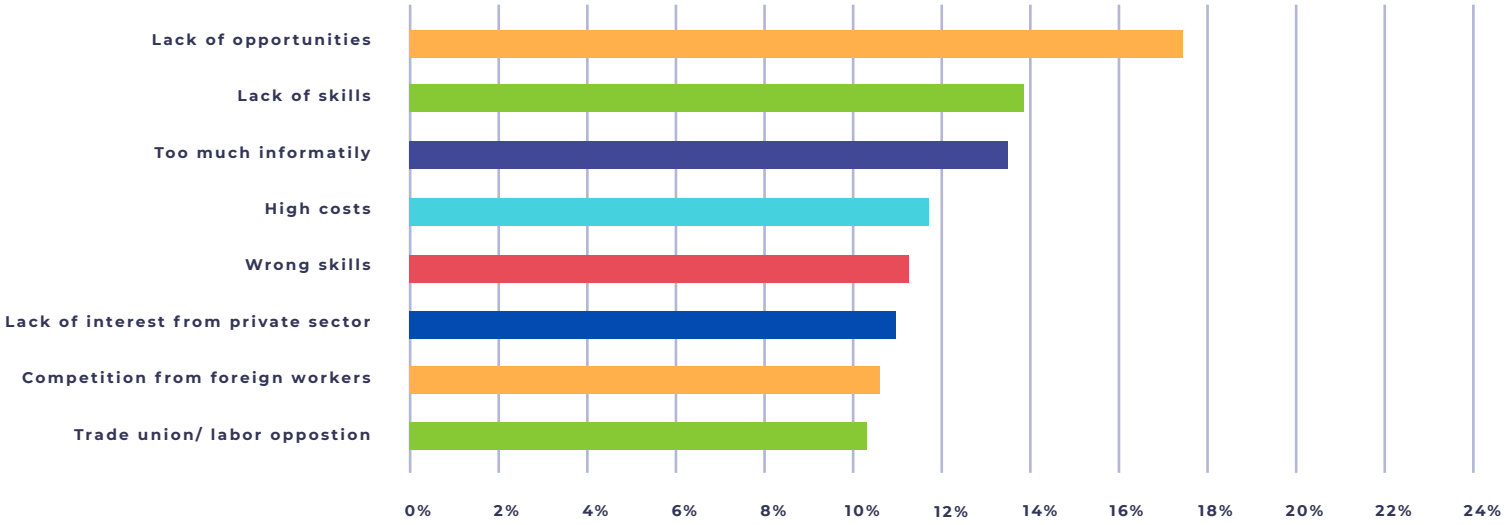
BARRIERS AND LIMITATIONS

A better understanding of the overall policy context for the level of preparedness to pursue energy transition jobs includes recognizing limitations and barriers. Once identified, policymakers and the private sector can develop appropriate solutions and enhancements to overcome or at least reduce the impediments.

When asked to enumerate and scale the main elements limiting the ability of their country's workforce to participate in the energy transition, our experts emphasized three primary challenges: not enough opportunities/lack of projects, lack of skills, and the high level of informal jobs in the economy (Figure 22).

FIGURE 22

| MAIN LIMITATIONS FOR WORKFORCE TO PRACTICE IN ENERGY TRANSITION



Despite a rapid growth in investments in renewable energy, for example, the experts still perceive that there are not enough jobs related to energy transition. However, the second most important reason suggested by the experts was a lack of skills in the workforce. We are then in a chicken-and-egg situation: investors do not seem to offer enough jobs and the workforce does not seem to have the right skills.

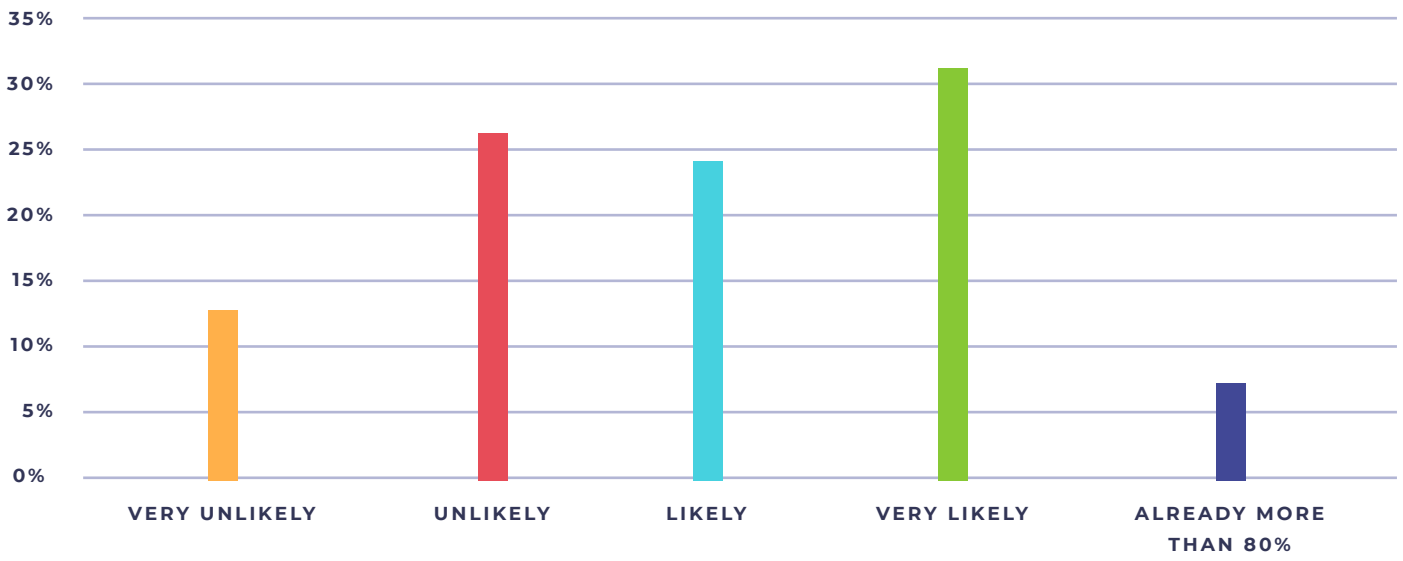
These areas are not the jurisdiction or responsibility of government, civil society, academia, or the private sector alone. Rather, as this analysis has noted, the most highly cited limitations to workforce preparedness all require major alignment of policies, legal and regulatory frameworks, government support, and private sector participation and commitment. Without a more robust strategy and plan developed by multiple stakeholders, the region surely will come up short.

RENEWABLE ENERGY

Latin America's electric mix and carbon footprint has long been considered "clean" owing to the historical and legacy preponderance of power derived from hydroelectricity. The survey input from the experts supports the positive outlook for the region to build upon its clean electric matrix and exceed the target of 80% of electrical power generated by renewable energy by 2050: More than 60% of respondents noted that it was likely or very likely that their countries would meet the goal, or that the goal already had been met (Figure 23).

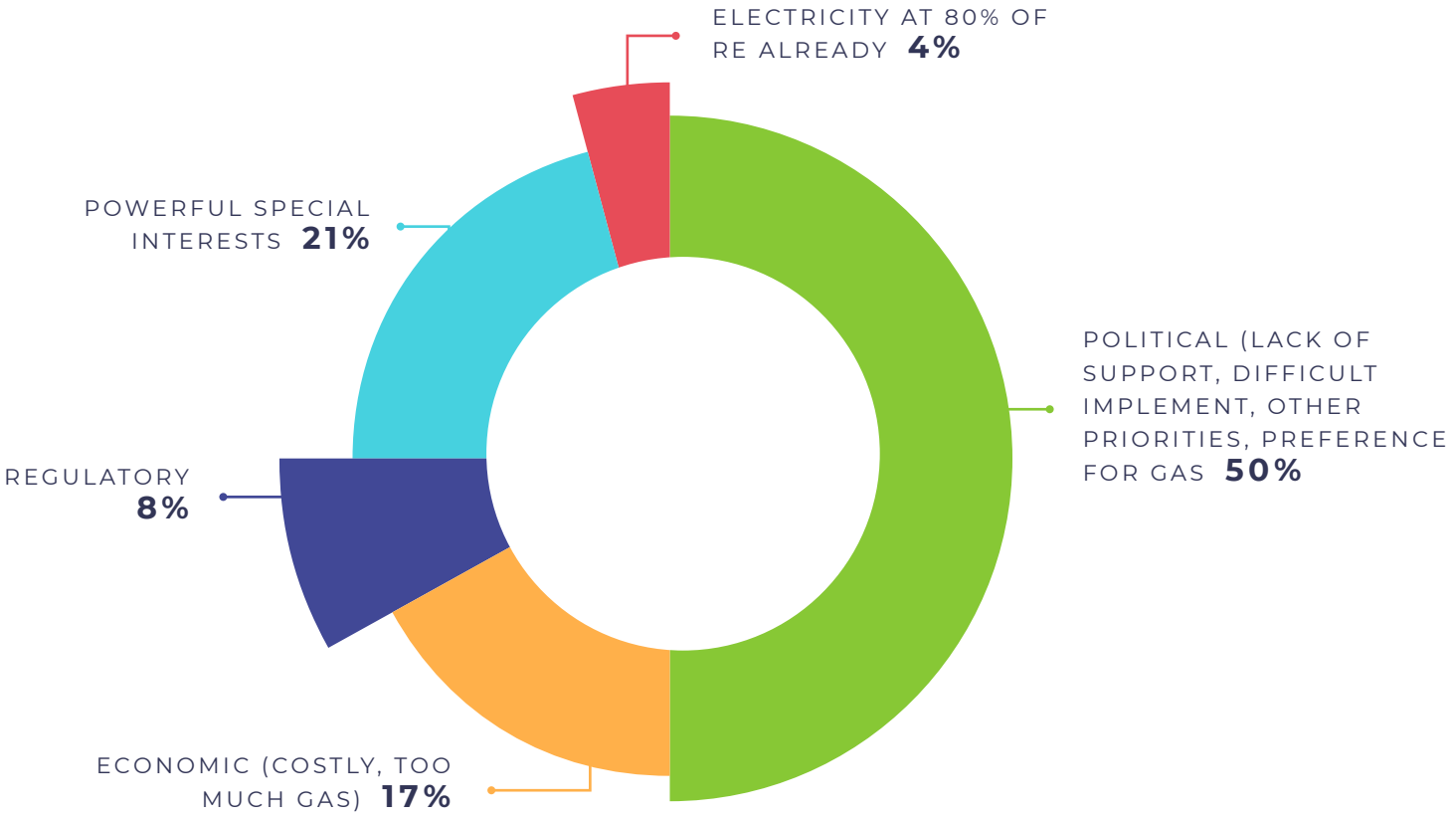
FIGURE 23

| DO YOU BELIEVE THAT BY 2050, 80% OF THE ELECTRICITY GENERATED IN YOUR COUNTRY WILL BE FROM RENEWABLE ENERGY?



Those experts who viewed it as unlikely or very unlikely that their countries would reach the 80% target of renewable energy within its power mix were asked to indicate the reasons for their opinion. Consistent with responses elsewhere in the survey, 50% cited political concerns—which comprised a range of facets—as the main source of their reasoning. The next most important reasons were powerful special interests (21%) and economic factors (17%) (Figure 24).

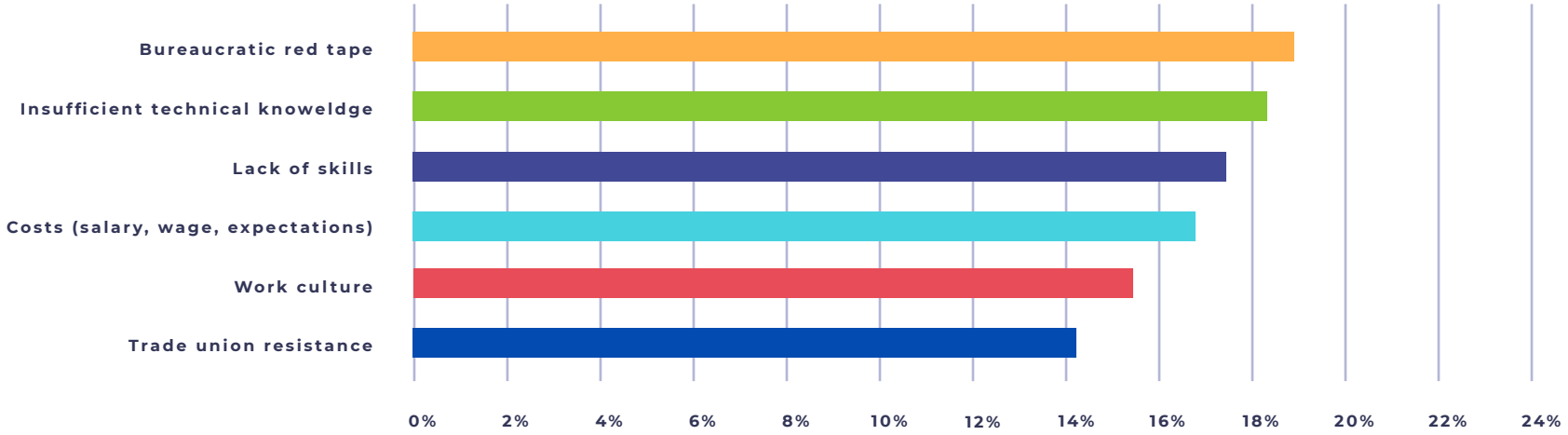
FIGURE 24



| WHY WON'T THE RENEWABLE ENERGY TARGETS BE MET |

FIGURE 25

| MAIN CHALLENGES RENEWABLE ENERGY COMPANIES ECOUNTER WITH LOCAL HIRING



Finally, and directly pertaining to issues of renewable energy workforce development, experts were queried as to the main challenges with local hiring encountered by companies in the renewable energy space. The most cited reasons were bureaucratic red tape and insufficient technical knowledge, followed closely by lack of skills. (See Figure 25)

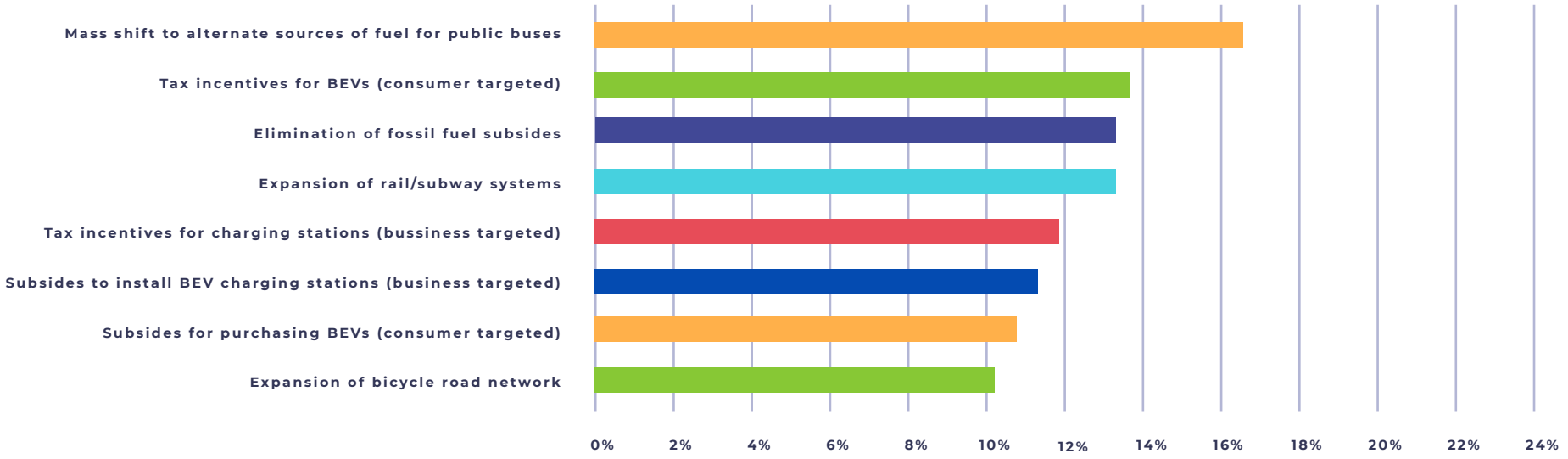
ELECTRIC VEHICLES AND BATTERIES

Clearly, in terms of Net Zero goals and objectives, the increased electrification of the transportation sector has become a focal point. Our experts cited electrifying transport as one of the three most promising and important segments for energy transition workforce opportunities (see Figure 21). Debates over how to manage this formation in Latin America routinely involve the question of fossil fuels and the fiscal aspects of fossil fuel use, particularly in terms of subsidies. To understand how to merge the evolving policy realm of electromobility with the current reality in most countries of the region, we asked the experts to assess the best options for directing fiscal policy in their country aimed at reducing GHG in passenger transportation.

The predominant, nearly consensus choice for the most important option was for the region to pursue a policy framework for the massification of public buses using alternative fuel sources other than diesel and gasoline. The elimination of fossil fuel subsidies also was deemed to be of great importance; a smaller percentage of experts called for the expansion of rail and subway systems. Other areas such as fiscal and tax incentives, as well as subsidies for the purchase of battery-powered electric vehicles (EVs), were almost uniformly identified as secondary options for directing fiscal policy (Figure 26).

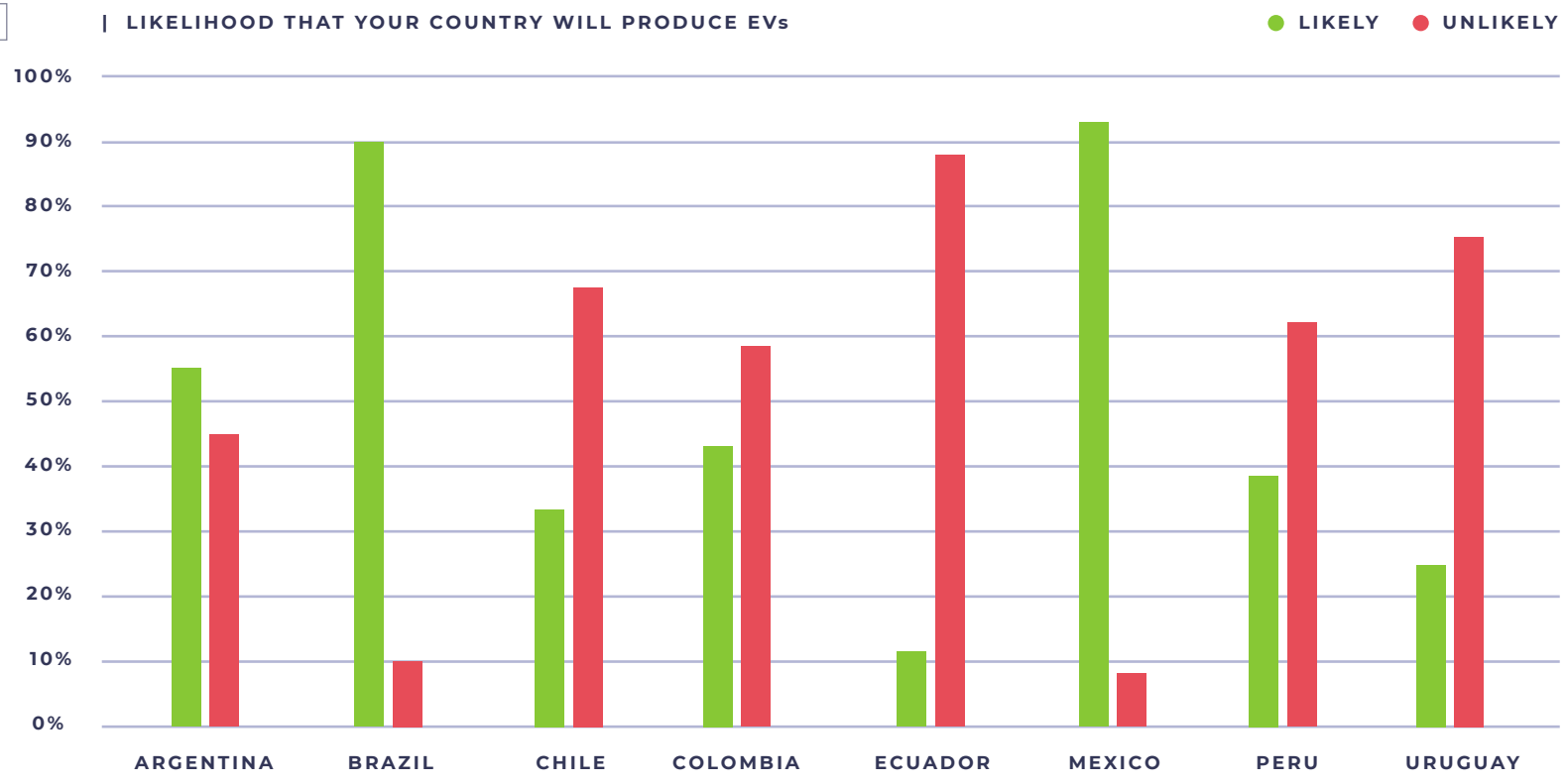
FIGURE 26

| BEST OPTIONS FOR DIRECTING FISCAL POLICY AIMED AT REDUCING GREEN HOUSE GASES (GHG) IN PASSENGER TRANSPORTATION



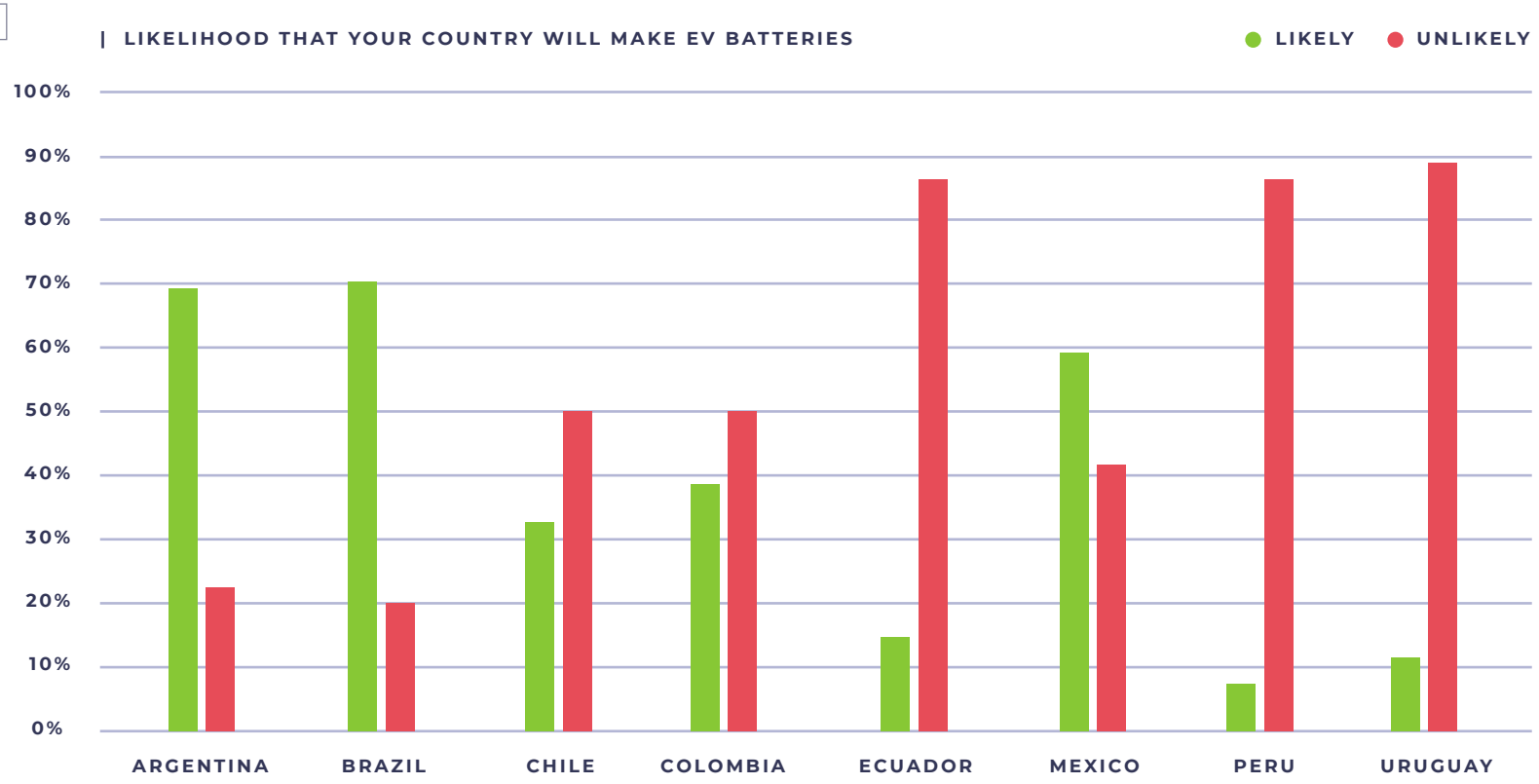
The overall view of EV manufacturing in the region is modest. Expert opinions were divided regarding the likelihood that Latin American countries will develop the ability to assemble EVs within the next five years. The most optimistic are Mexico and Brazil; the least optimistic is Ecuador. The positive responses pertaining to Mexico and Brazil are likely because they have already begun to manufacture EVs in those countries (Figure 27).

FIGURE 27



In assessing a key element in the value and technological chain of EVs, except for Argentina and Brazil, most of the experts do not believe their countries would be able to manufacture batteries for EVs in the next five years (Figure 28). This confirms the expectation that, according to the experts, Latin America's energy transition is likely to focus on low-value-added jobs, perhaps with limited linkages in the value chain. As such, we question whether energy transition will contribute to the region's industrialization efforts.

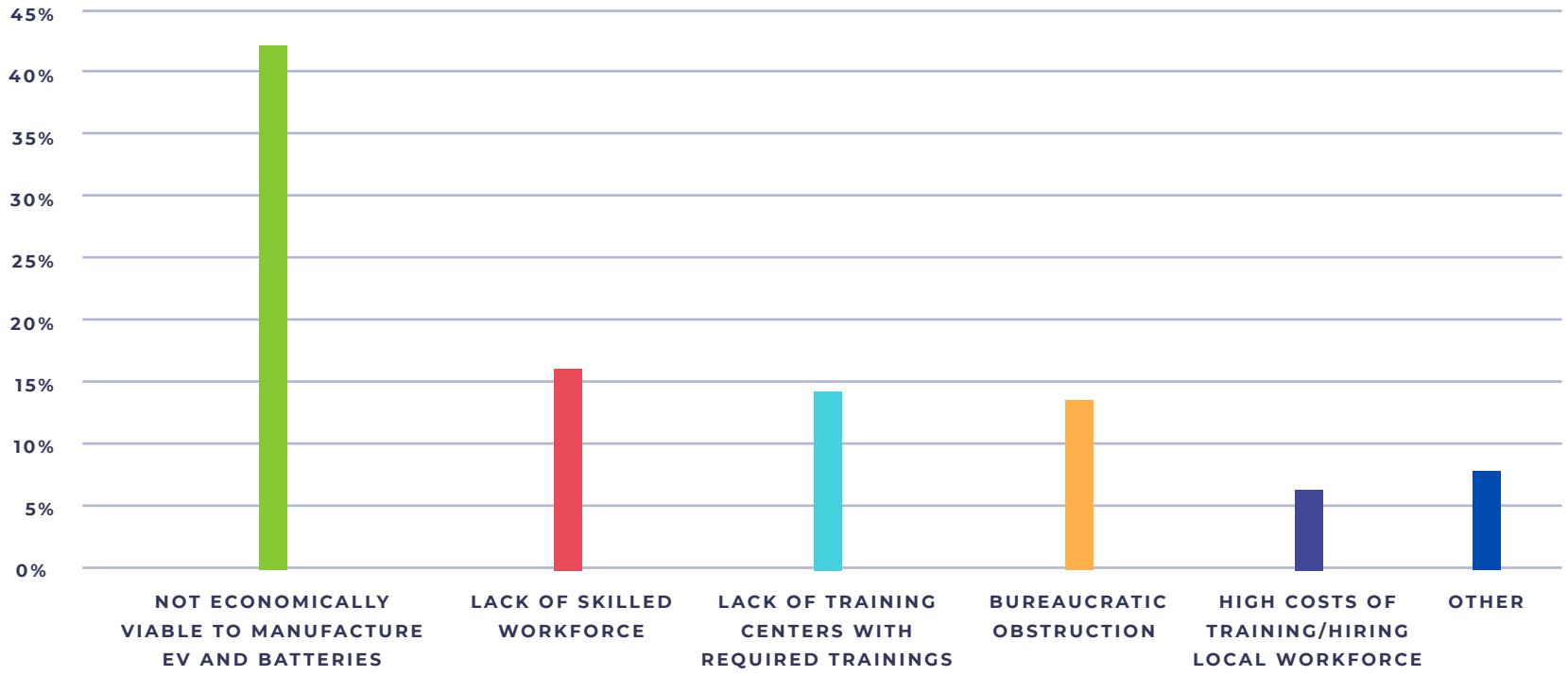
FIGURE 28



The main reason given by the experts for why they do not think batteries would be manufactured in their countries is the lack of economic viability (Figure 29). That pessimism may be based on economic theory thinking, which posits that countries should focus on the activities where they have a competitive advantage. This mentality, of course, ignores the possibility of developing future competitive advantages, for which an industrialization strategy is required.

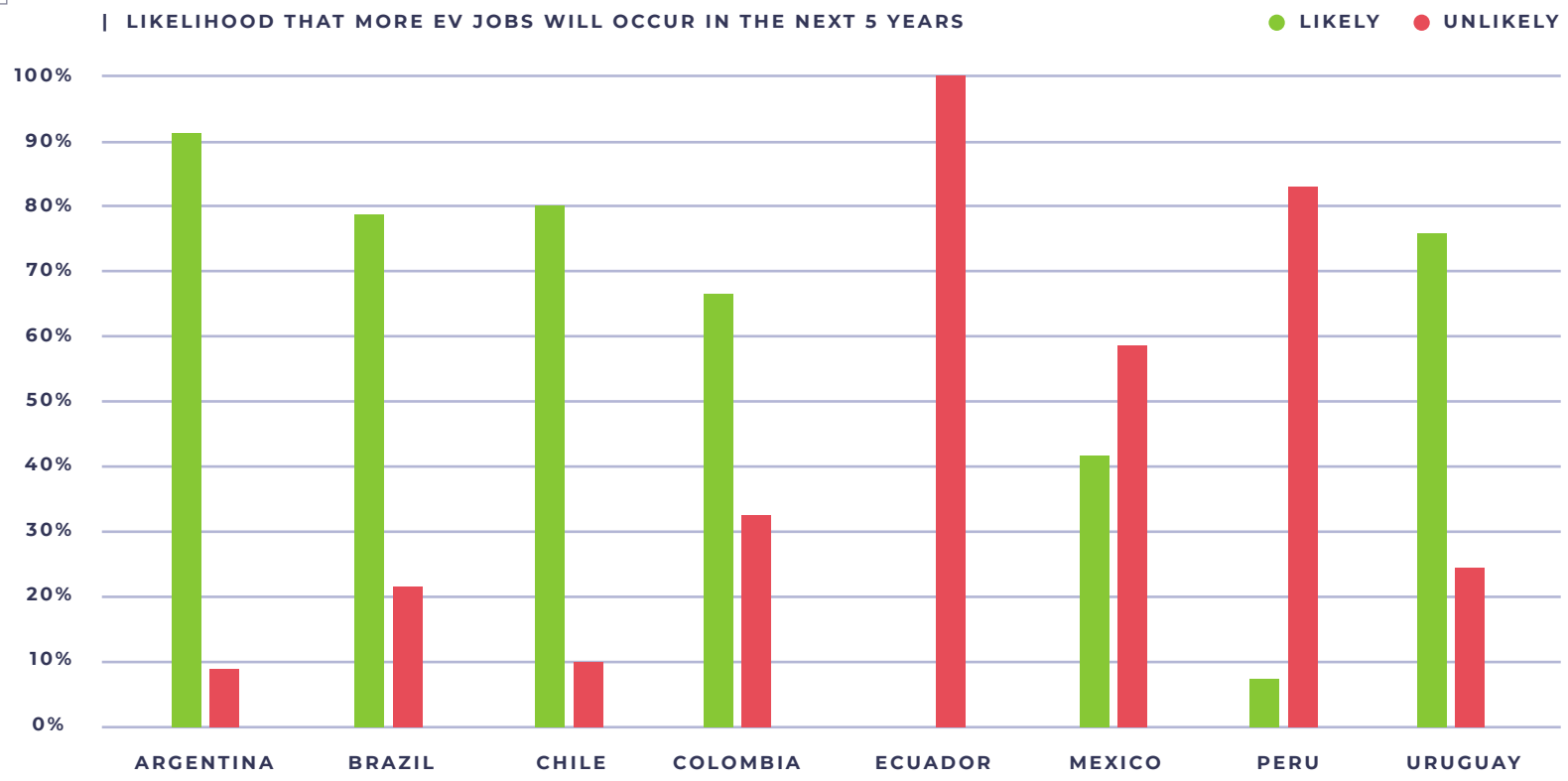
FIGURE 29

| WHY WOULD EV BATTERIES NOT BE PRODUCED?



Respondents expressed an evident cross-current of negativity with regard to the potential for Latin America to become a major EV manufacturer and participant in the battery value chain. However, they were more optimistic about the creation of jobs related to EVs in the next five years. The positive response concentrated in countries with already recognized manufacturing capabilities. Interestingly, respondents from Mexico—an automobile manufacturing powerhouse—were less optimistic. This contrary response may be derived from the current administration's posture toward renewables and energy transition more broadly (Figure 30).

FIGURE 30

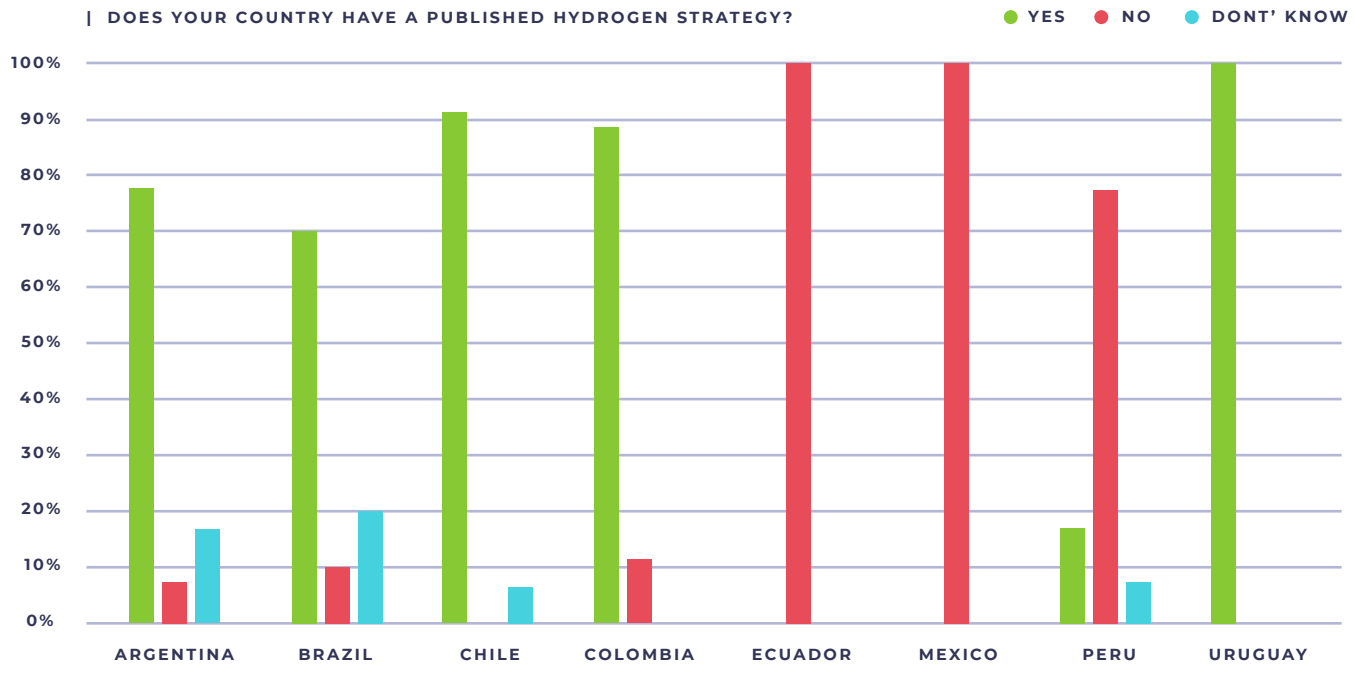


HYDROGEN

Perhaps the most important emerging segment of the energy transition is that of the so-called hydrogen economy , particularly plans and strategies to pursue green hydrogen. The distinction is important. By most estimations, green hydrogen is the only type of hydrogen production that is climate neutral, and therefore is useful (if not essential) for Net Zero 2050 goals and objectives. Moreover, many countries in Latin America find the prospect of harnessing their growing renewable energy markets for green hydrogen to be appealing.

The expert respondents considered questions related to workforce potential associated with hydrogen and green hydrogen. To begin, they evaluated whether their country has a published hydrogen strategy or planned to publish one in the next two years. The responses were split almost evenly, with just over 50% answering yes and just under 40% answering no. Only respondents from Ecuador and Mexico agreed on that their countries lacked a hydrogen strategy. The rest surveyed agreed with the statement that their countries have a hydrogen strategy (Figure 31).

FIGURE 31

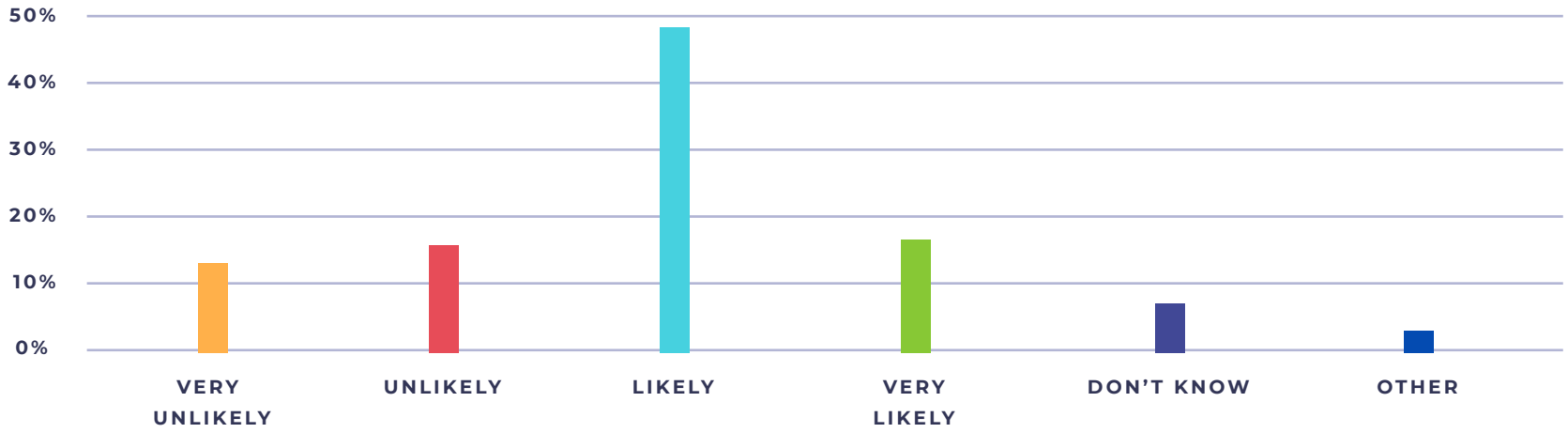


* The hydrogen economy is perhaps best considered as a system in which the dominant role of the energy carrier and fuel is hydrogen and is seen as a possible solution to decarbonize economic sectors which are hard to electrify.

Importantly, when queried as to the viability and likelihood of implementing a hydrogen strategy, 65% responded affirmatively that it was either likely or very likely (Figure 32).

FIGURE 32

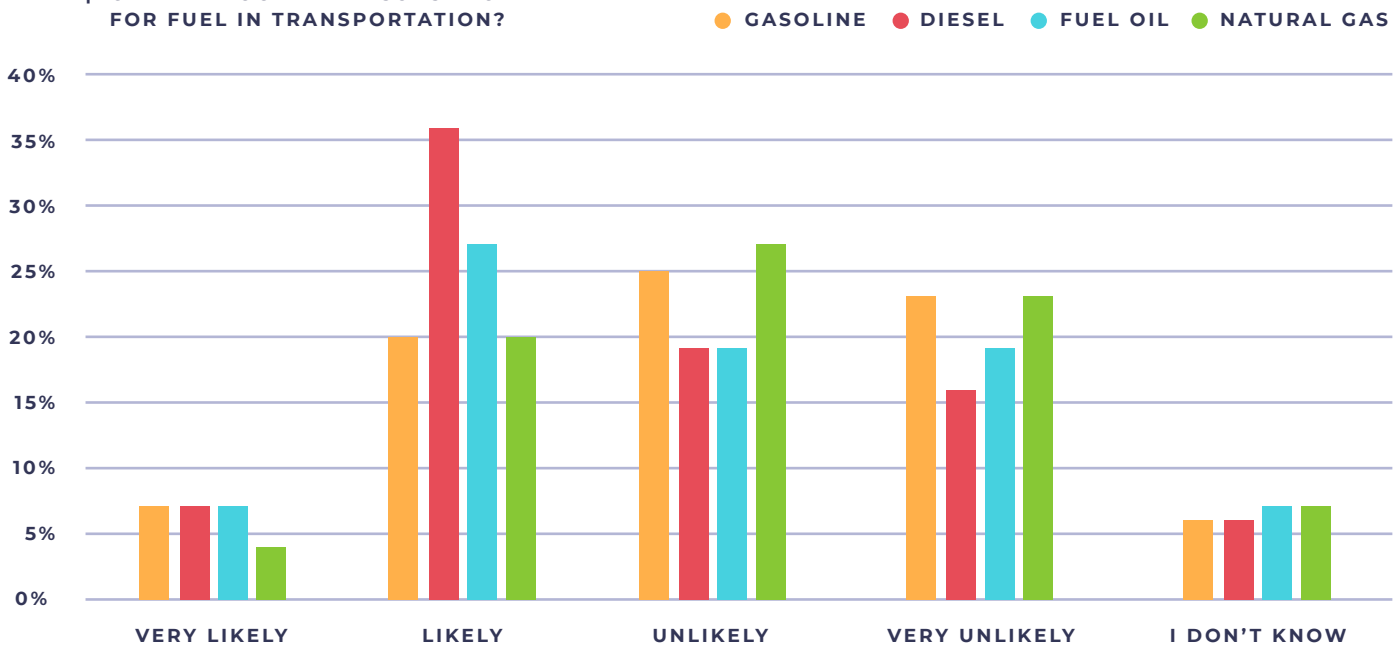
| WILL HYDROGEN STRATEGY BE IMPLEMENTED?



Moving beyond the overarching policy development and implementation questions, the experts were asked to identify the ability for hydrogen to substitute for current transport fuels, as well as the importance of a variety of possible markets for hydrogen. They strongly indicated that hydrogen would be able to substitute diesel and fuel oil in the transport fuel mix, but were less optimistic with regard to substitutions for gasoline and natural gas (Figure 33).

FIGURE 33

| CAN HYDROGEN BE A SUBSTITUTE FOR FUEL IN TRANSPORTATION?



The potential market developments for hydrogen, particularly at commercial scale, are difficult to accurately understand. Hydrogen, though not a new technology, has been used only in limited applications and scale. When queried as to the most important markets for the nascent hydrogen sector, the experts cited long-haul transportation, mass transit, and mining activity as primary economic segments. Slightly less important, according to the experts, would be deploying hydrogen in energy-intensive industries such as steel and aluminum production, as well as in maritime fuel use. They regarded the use of hydrogen for air transport and personal vehicles and transport as less important overall.

Politics, political intervention, and political will: regardless of the question or topic, these aspects of energy transition were the most frequently cited and referenced issues in our expert survey. Indeed, there is an abundantly clear and direct linkage from the role of politics to the uncertainty that was so evident in assessing the specific energy transition strategies and plans for the eight Latin American countries at the core of our research and survey. Moreover, according to our respondents, politics and lack of political will were the greatest impediments to creating the broad-based strategies that would then enable more concrete workforce opportunities.

This age-old (and not unique to Latin America) facet is further challenged by the insufficient education and technical training available to citizens of the region. But if we seek to understand the nuance from our expert surveys beyond these clear-cut (and less than encouraging responses) assessments of their country's politicians and policymakers, we can deduce that there is also a market and business case. In essence, perhaps instead of waiting on government to create perfect plans and strategies for energy transition, the private sector and other actors can strive to boost market development for renewable energy, hydrogen, lithium batteries, and EV demand that will pull regulations and policies forward to meet the necessary needs. Such efforts also ostensibly would solve the proverbial chicken-and-egg scenario implicit in these experts' opinions.

The good news is that this trend does seem to be occurring at various levels in certain countries.

Solving the “not enough market” challenge set forth in our survey is the opportunity for the region to move beyond the negative inertia and truly spur innovation. It is occurring. But, as our surveys highlighted, there are massive gaps in formal strategies, training, and education, and above all in consensus-building and robust communication and understanding across stakeholders far removed from the energy sector. If the key constituencies directly related to the energy transition and its corresponding economic development components are unaligned or unclear—as our expert surveys stress—it will be that much more problematic to foster opportunities for the public. In summary, a more broad-based alignment of policy, government, and private sector will be required for the region to position itself to take advantage of a significant number of jobs associated with the energy transition.

The experts’ opinions are clear: Latin America may not have a “failing grade” in terms of attaining economic gains and the potential for jobs related to the energy transition, but it has an “incomplete” standing, with much coursework to make up in a short period before the final grades are posted.

Recognizing the level of uncertainty and unevenness across the eight countries analyzed, we have developed four high-level recommendations. We believe these are a useful step to further position the region to capture employment opportunities pertaining to energy transition. Moreover, these concepts will allow near-term, nontechnical, and potentially useful consensus-building avenues for the broader energy transition objectives of ameliorating climate change, but also enhancing economic development and reducing workforce informality and inequality.

ENERGY TRANSITION WORKFORCE READINESS ADVISORY COUNCIL:

Develop and form the parameters for each country to adopt a council with the goal of formalizing the importance of energy transition employment. Each country would develop and integrate the council with their preferred members, but they should at least include the minister of education, minister of labor, minister of finance, minister of energy, the head of the National Oil Company (NOC), the head of the state power company, leaders of electrical unions and oil and gas unions, presidents/deans of TVET schools, and key representatives of the private sector who are suppliers of renewable energy and/or large energy consumers.

LATIN AMERICA ENERGY TRANSITION CORE COMPETENCIES:

Create a regional effort to develop and curate a high-level framework and outline for core competencies and standards for workforce development related to energy transition jobs and skills. These would form a Latin American Industry Classification System (LAICS) similar to the North American Industry Classification System (NAICS). Building upon lessons learned from creation and implementation of NAICS, ultimately, the effort could be expanded to have a harmonized standard across the Americas.

ENHANCED TECHNICAL & VOCATIONAL EDUCATION & TRAINING:

Develop an effort to build upon the first two recommendations through targeted integration of labor and harmonized energy transition standards and core competencies—LAICS—across the region's TVET and in formal curriculum, training, coursework, and administration. A specific goal would be to promote a Latin American network of TVETs that utilize the foregoing harmonized standards. Deepening the alignment between TVET and companies implementing solutions will be crucial to further define the employment opportunities and assist graduates with where and how to find these jobs. Specifically, TVETs can be adopted to the local level and part of the alignment can also include industries and resources where countries have a competitive advantage. A final consideration could be a mentorship program that seeks to create this alignment and more explicitly foster linkages between industry and training centers.

FOSSIL FUEL ECONOMY JOB RESKILLING:

Create a jobs reskilling program for workers operating in the region's current fossil fuel economy. Over the years, Latin America (through its NOCs) has developed important human capital in the oil and gas economies. Not only are these typically well-paying jobs, but they often constitute a large pool of technical expertise. In many cases, they are also highly unionized and provide a key stakeholder for consensus building Efforts should be considered to help reskill this workforce as more opportunities emerge in non-fossil-fuel-related activities. For example, oil and gas companies operating in the region will increase their requirements for emission reduction and efficiency gains that will demand new skill sets and thus translatable employment opportunities. Moreover, schools of petroleum engineering, geology, and the like should deepen the interconnection with their degrees and curricula for skills and technologies related to solutions for companies' commitments to attain Net Zero.

These recommendations would seek participation and, where necessary, financial support from key regional stakeholders such as ILO, CAF – Development Bank of Latin America, the Inter-American Development Bank (IDB), the Central American Bank for Economic Integration (CABEI), the Latin American Energy Organization (OLADE), and the World Bank.

| RESEARCH AND REPORT CONTRIBUTORS |

The analysis presented here is a culmination of several months of work by a large group of contributors. The project began as part of our Non-Resident Fellow Zoom meetings and discussions and evolved into an analysis of energy transition in the region that is reflected in the Energy Transition Snap Shots presented separately on the web site.

We also acknowledge all the experts across the hemisphere who participated in the survey phase that provided essential data to further our assessment of eight countries workforce readiness for the energy transition. The results of the survey are at the core of our report and the inputs for our Barometer, which is also presented separately on the web site.

We are extremely grateful to all our Non-Resident Fellows for their efforts: Leonardo Beltran, Maria Trinidad Castro, Andres Chambouleyron, Carla Lacerda, Nelson Narciso, Marta Jara, Francisco Xavier Salazar, Chris Sladen and Roger Tissot, who deserves additional recognition for his data analysis. The ultimate success of the project was also due in large measure to our research interns from UCSD's GPS graduate program: Marco Gutierrez-Casale and Ezra Kraus. And, of course, the work by Cecilia Aguillon, Energy Transition Initiative Director as well as the Energy & Sustainability team members Diana Rodriguez and Rita Oliveira, who always provide important and steady hands in all that we do at the Institute of the Americas.

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