

# Alternative Transport Fuels

## Consumer Attitudes in Latin America and the Caribbean

Future Energy Leaders' Taskforce: Alternative Transport Fuels

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## Alternative Transport Fuels: Consumer Attitudes in Latin America and the Caribbean

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# 1. Executive Summary

Demand-side solutions are increasingly recognised as fundamental to securing a sustainable energy future. However, a lack of empirical research around consumer perspectives presents a challenge to identifying which demand-side solutions could have most traction and how best they should be implemented. To begin addressing this issue, the World Energy Council's community of Future Energy Leaders (FELs) conducted a global survey of more than 2,500 respondents providing insight into consumer attitudes and behaviours associated with alternative transport fuels.

With particular relevance for policymakers, vehicle manufacturers, fuel providers and urban planners, these findings demonstrate the level of appetite – and need – for policies that promote the uptake of alternative transport fuels in different countries and regions.

This report provides a deep-dive analysis of the survey results from the Latin American and the Caribbean (LAC) region and supports the following key findings:

- ▶ Consumers in the LAC region do care about the type of transport fuel they use. They say they are willing to pay more, on a monthly basis, for alternative transport fuels that have lower greenhouse gas emissions than conventional transport fuels.
  - 73% of respondents say they are willing to pay more for alternative transport fuels with lifetime greenhouse gas benefits over fossil fuels.
- ▶ Consumers in the region are more familiar with the energy–water–food nexus than consumers in other parts of the world. However, there is demand for more information on the quantifiable impacts of decisions associated with this dimension.
  - 63% of respondents are familiar with the energy–water–food nexus (compared to 44% of global respondents).
- ▶ Consumers in the region do not think that the transition to alternative transport fuels is happening fast enough. A lack of government support is cited as the main reason for this lethargy.
  - 69% of respondents do not think their country is transitioning to an alternative transport fuel future at an appropriate rate.
- ▶ A plurality of consumers in the LAC region predicts that natural gas will be the most significant contributor to the alternative transport fuel mix in the next 5–10 years.
  - 38% of respondents in the LAC region think that natural gas will be the most significant contributor to the transport fuel mix in the next 5–10 years. This

significantly contrasts with consumer views in Asia, Europe and North America which identify electric vehicles as the most important contributor.

- ▶ Consumers in the region are generally aware of alternative transport fuels, but they lack the practical understanding required to enable them to modify their behaviours and decisions.
  - 81% of respondents in the region are familiar with alternative transport fuels.
  - 53% of respondents do not know whether their personal vehicles can utilise alternative transport fuels.
- ▶ Consumers' main reason for travel occurs over short distances (under 50km). In urban contexts, the provision of better, more accessible, public transportation that utilises alternative fuels, could help to reduce demand for personal travel as well as the level of greenhouse gas emissions.
  - 78% of respondents travel under 50km for their main reason of transport.

This report shows that awareness of, and willingness to pay for, alternative transport fuels is relatively high in the LAC region. Consumers are sending a strong signal to decision makers that a transition to an alternative transport fuel future is not only warranted, but desirable.

Whilst awareness and willingness to pay is relatively high, potential solutions are less well defined. The findings of this report suggest a range of potential actions that could improve the uptake of alternative transport fuels. Solutions will need to be regionally and nationally tailored and should be undertaken by a range of stakeholders including policymakers, urban planners, vehicle manufacturers and transport fuel providers.

The FEL Taskforce believe that the recommendations identified in this report (a selection is noted below) will serve as a catalyst to speed-up the necessary transition to an alternative transport fuel future - and thus contribute to energy trilemma goals.

- ▶ Decision makers within public and private institutions, should note the high demand for products, investments and policies that encourage and enable greater uptake of alternative transport fuels
- ▶ There is a clear role for decision makers to work together to inform and communicate to the public, the quantifiable impacts of policies or projects that have an energy-water-food nexus dimension
- ▶ Governments should look to remove distortions in the market that discourage the uptake of alternative transport fuels; research and transparency around the true fiscal cost of fossil fuel subsidies is required
- ▶ Urban planners and governments are challenged to continue to prioritise urban transportation infrastructure that takes cars off the road and reduces fuel use

## 2. Introduction

### Transport and the energy trilemma

The invention of the internal combustion engine combined with the discovery of fossil fuels has underpinned recent human development. Transportation of goods, and connections that are made between people and via mechanisms that rely on fossil fuels, is a fundamental component of society as we know it. It is, and has been, the dominant global transport model for the best part of a century.

However, there are real problems and risks associated with the current transportation model (oil depletion, environmental impacts and perceived lack of competition). These risks are not sufficient to warrant an immediate halt to the production and utilisation of conventional fossil fuels for transport. A sensible approach appears to be to divide efforts and attentions between continuing to develop oil (concurrently improving the way we mitigate environmental impacts) and increasing understanding, awareness, and promotion of alternative transport fuels.<sup>i</sup>

But how do we reach this balance? The energy trilemma provides a clear framework to tackle some of these risks and shape the path towards more sustainable energy systems. In particular, the effective and efficient promotion of alternative transport fuels can theoretically help achieve energy trilemma goals.

Demand-side solutions are increasingly being recognised as key to ensuring a sustainable energy future. A key finding of the 2013 World Energy Congress in Daegu, Korea (Rep.) was that in order to maximise social and economic benefits out of our energy systems, the focus must continue to shift from the supply mix to demand efficiency.

There is a lot of quantitative information and general understanding about the supply-side of transportation energy. Statistics on energy production (by country and by fuel) are readily available. The demand-side of transportation energy is less clear - as human behaviour is notoriously difficult to predict. For example, how much do we really understand the extent to which consumers, as end-users, are motivated by the fuels that power their various modes of transport?

For these reasons, the Future Energy Leaders' Taskforce: Alternative Transport Fuels (the Taskforce)<sup>ii</sup> wanted to better understand consumer attitudes towards alternative transport fuels. The Taskforce was established through the Future Energy Leaders' Programme at the World Energy Congress 2013, and consists of seventeen Future Energy Leaders from sixteen countries.

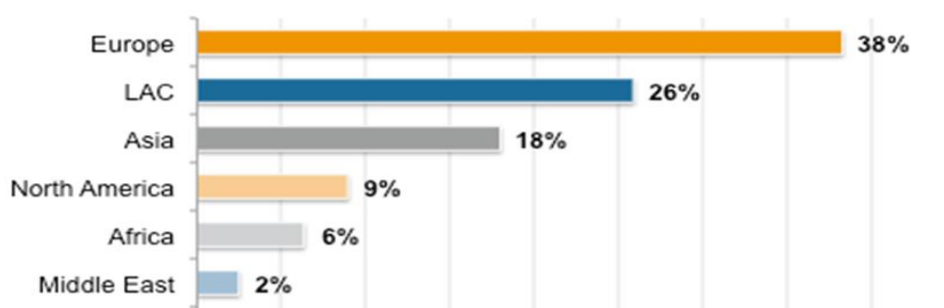
The Taskforce is well positioned to analyse consumer sentiment towards alternative transport fuels. Firstly, members of the group are part of a generation that has grown up around, and has looked to harness, the power of innovative and demand-driven

solutions (like Airbnb; Uber). Secondly, through an affiliation to the World Energy Council, the group has had access to an extensive global network. Thirdly, and most importantly, members of the group are driven to create a world that future generations want to live in.

## Global survey of consumer attitudes towards alternative transport fuels

The Taskforce undertook a global survey of consumer attitudes towards alternative transport fuels. In total, 2,585 people responded to the survey with responses from 98 countries. Figure 1 highlights the continental distribution of respondents.

**Figure 1: Survey responses (proportion of sample)**



Understanding consumer attitudes towards alternative transport fuels will supplement the evidence base available to decision-makers (government, industry, academia and NGOs) in the LAC region. It is hoped that better understanding consumer attitudes towards alternative transport fuels will ensure that appropriate transport investment decisions are made that will in turn assist in providing sustainable economic growth.

While data on all continents has been collected, this publication focuses on responses from the Latin America and Caribbean (LAC) region. The information complements the World Energy Scenarios, specifically the LAC Deep Dive.

The survey, and this accompanying report, is designed to provide an indication of consumer attitudes towards alternative transport fuels; it is not designed to be fully representative of entire communities. The Taskforce hope that this report will further contribute to a growing body of work that will look to better establish consumers' willingness to pay.

**The findings of the survey demonstrate the level of appetite for policies promoting the uptake of alternative transport fuels ....and should be used as an additional discussion aid for policymakers, urban planners, transport fuel representatives, automotive manufacturers, academics and NGO's**

## Report layout and scope

The substantive part of this report is broken into two main chapters of analysis:

- ▶ The Latin America and Caribbean region. Defined by the World Energy Council (WEC) and includes all of South America and the Caribbean.<sup>iii</sup>
- ▶ Country-specific case studies. Those countries in the LAC region where more than 60 survey responses were received (Argentina, Brazil, Colombia, Peru, Trinidad and Tobago and Uruguay).

The report does not present insights or recommendations from every question in the survey. Rather, the most notable findings have been extracted from the main data and additional insights and context are provided.<sup>iv</sup>

A chapter outlining conclusions and recommendations is also included.

An appendix includes:

- ▶ Limitations and biases: a description of the survey methodology, the statistical limitations and survey biases.
- ▶ Endnotes.



## 3. Regional Analysis

‘The LAC regional economy is in the midst of a period of economic transformation... and transportation decisions will lie at the heart of much of this evolution’

The Latin American and Caribbean (LAC) region is large and diverse. It has a growing population base and abundant natural resources which form the basis for economic growth.

The LAC region is currently in the midst of a period of economic transformation with increased commodity trade underpinning this activity (in some instances double-digit-per-annum growth is being experienced). Despite this economic renaissance, high levels of income and wealth inequality persist. These economic disparities are present in both the urban mega-cities and the rural hinterland.

Energy availability does not appear to be a major issue from the supply-side. Hydro energy, oil and gas and biomass are often abundant, and, in many respects, provide the competitive advantage for the region to thrive.

While the LAC region has been broadly synonymous with strategic government interventions in the energy sector, particularly following the 1970's oil crisis, it is arguable that more could be done to leverage these energy advantages. Additionally, some energy policies are currently believed to undermine the ability of the region to take further advantage of renewable and unconventional energy alternatives (that would better achieve energy trilemma goals). Nowhere is this history of intervention more apparent than in the transportation sector.

Increased commodity trade and a growing middle-class, which, whilst not necessarily wealthy, has increasing demands for social mobility, will contribute to increased transportation energy demand. In this context, transportation decisions are central to LAC regional evolution. Further broadening transport fuel options appears important.

Understanding consumer attitudes towards alternative transport fuels will supplement the evidence base available to decision-makers (government, industry, academia and NGOs) in the LAC region. It is hoped that better understanding consumer attitudes towards alternative transport fuels will ensure that appropriate transport investment decisions are made that will in turn assist in providing sustainable economic growth.

## World Energy Issues Monitor

The World Energy Issues Monitor (LAC responses are shown in Figure 2), highlights two critical uncertainties in the LAC region as 'energy and commodity prices' and 'capital markets'. While alternative transport fuels are important - particularly electric vehicles and unconventional - they do not appear to be issues that keep energy leaders in the LAC region awake at night.

**Figure 2: LAC Issues Monitor 2014**



This backdrop makes for an interesting comparison with the headline finding of the survey: consumers say they care about, and are willing to pay more per month for, alternative transport fuels that have lower greenhouse gas emissions than conventional transport fuels.

In particular, there appears to be a dichotomy between the World Energy Issues Monitor (which captures the views of over 800 energy leaders) and consumers. It is perhaps this disconnect that has contributed to the lack of recent penetration of alternative transport fuels in the LAC region.

Exposing the findings of the survey should serve to put the consumer at the forefront of decision-makers' minds, and facilitate policies and investments that help achieve energy sustainability.

## Findings

**Consumers in the region are generally aware of alternative transport fuels, but they lack the practical understanding required to enable them to modify their behaviours and decisions**

- ▶ 81% of respondents know what alternative transport fuels are
- ▶ 53% of respondents do not know, or are unsure, whether their private vehicle could utilise any alternative transport fuels

Consumers in the LAC region appear to be reasonably familiar with the concept of alternative transport fuels and are better informed than the global average. However, the presence of overt policies promoting the supply of bioethanol, biodiesel and compressed natural gas (CNG) in many LAC countries could help explain this data point.

**Figure 3: Do you know what alternative transport fuels are (LAC)?**

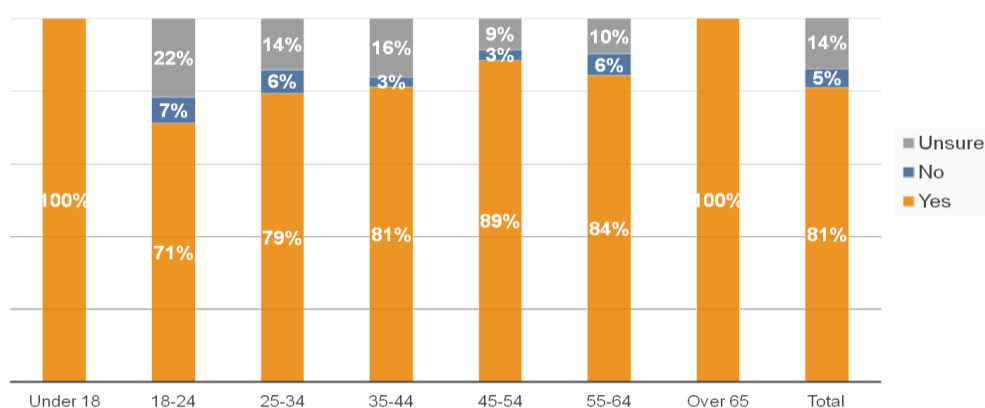
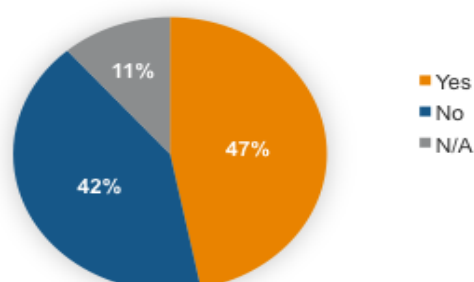


Figure 4 demonstrates that while progress has been made, consumers are in need of further education about the practicalities of alternative transport fuels - for example the capability of vehicles to utilise different alternative transport fuels.

**Figure 4: Do you know whether your private vehicle is able to utilise any alternative transport fuels (LAC)?**



The Taskforce note that despite an increasing amount of information made available on alternative transport fuels (for example through the presence of the internet, bodies like the WEC, and through overt public policies), there is still a concerning lack of awareness and understanding of the practical application of alternative transport fuels.

### Consumers' main reason for travel occurs over short distances (under 50km)

- ▶ 62% of respondents use their car as their main mode of transport
- ▶ 77% of respondents cite getting to work as their primary reason for travel
- ▶ 78% of respondents travel less than 50km for their main travel purpose
- ▶ 74% of respondents note that petrol or diesel fuels their main mode of transport

Figure 5 shows the diverse range of transport choices consumers are using. 32% of consumers in the LAC region use public transport as their main mode of transport which is marginally higher than the global response rate (30%). Bus patronage however is 10 percentage points higher than the global response.

There are significant variations in public transport uptake between some LAC countries, with Brazil (49% of respondents) and Trinidad and Tobago (20% of respondents) representing the extremes.

These figures need to be viewed with some caution as there is a clear sample bias towards urban, educated and wealthy respondents. These respondents clearly have a corresponding bias towards private vehicle use. The Taskforce note that in most LAC countries, car ownership rates are lower than first-world averages and that the majority of citizens utilise public transport. As an example, Colombia has a vehicle ownership rate of 148 private vehicles per 1,000 people, yet 73% of respondents stated they drove a private vehicle as the dominant mode of transport.

**Figure 5: What would you consider to be your main mode of transport (LAC)?**

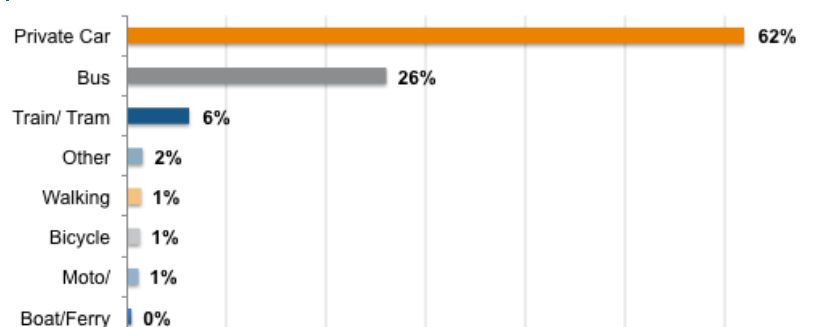
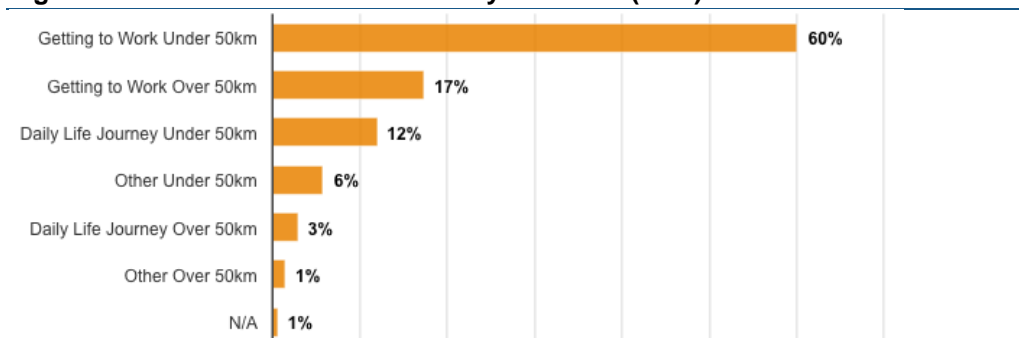


Figure 6 points to the opportunity that exists to further improve public transport networks in urban areas. 78% of respondents travel less than 50 km for their main reason for travel, of which the majority of these (60% of respondents) cite 'getting to work - under 50km' as their primary reason for travel. This finding correlates with the urban bias of our sample and also suggests that many respondents live near where

they work. Better provision of public transport, in particular, could help accommodate the needs of this cohort and improve energy trilemma outcomes for the region (by taking more cars off the road and reducing greenhouse gas emissions).

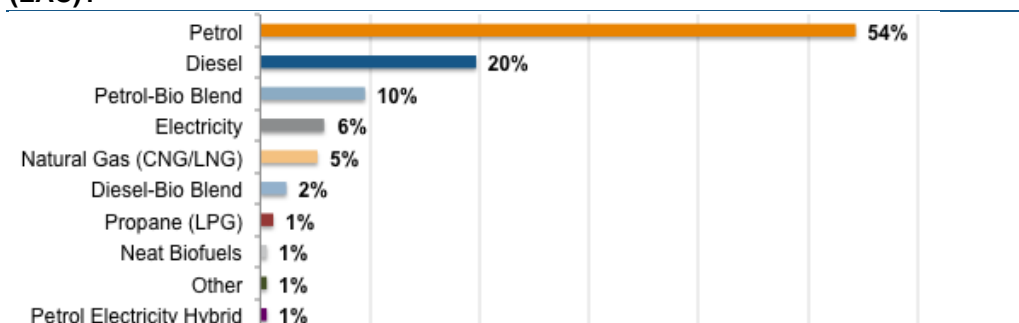
**Figure 6: What is the main reason for your travel (LAC)?**



Despite many countries in the LAC region having explicit policies promoting alternative transport fuels (for example the 25% blending mandate for bioethanol in Brazil), traditional transportation fuels remain popular. Figure 7 shows that 74% of respondents believe petrol or diesel fuels their main mode of transport.

This observation points to a need to better understand the barriers behind alternative transport fuels uptake – and a need to begin to address these systematically - as well as better presenting the benefits of alternative transport fuels. The presence of fossil fuel subsidies in many LAC countries is presumably playing a strong role in protecting the status quo.

**Figure 7: Do you know what type of fuel your main mode of transport consumes (LAC)?**



### Consumers say they care about, and are willing to pay more, for alternative transport fuels

- ▶ 80% of respondents say they care about the fuel they use
- ▶ 73% of respondents would pay more per month for alternative transport fuels that have lifetime GHG benefits over fossil fuels
- ▶ 52% of respondents earn less than US\$ 25,000 per annum

Figure 8 shows that four fifths of respondents care about the type of fuel that their main mode of transport uses. When read in conjunction with other findings of the survey, this points to a consumer group that is responsive to businesses and governments that promote alternative transport fuels. This responsiveness may prove an important catalyst for change.

**Figure 8: Do you care what type of fuel your main mode of transport uses (LAC)?**

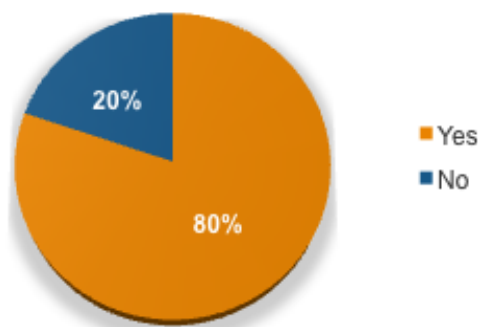
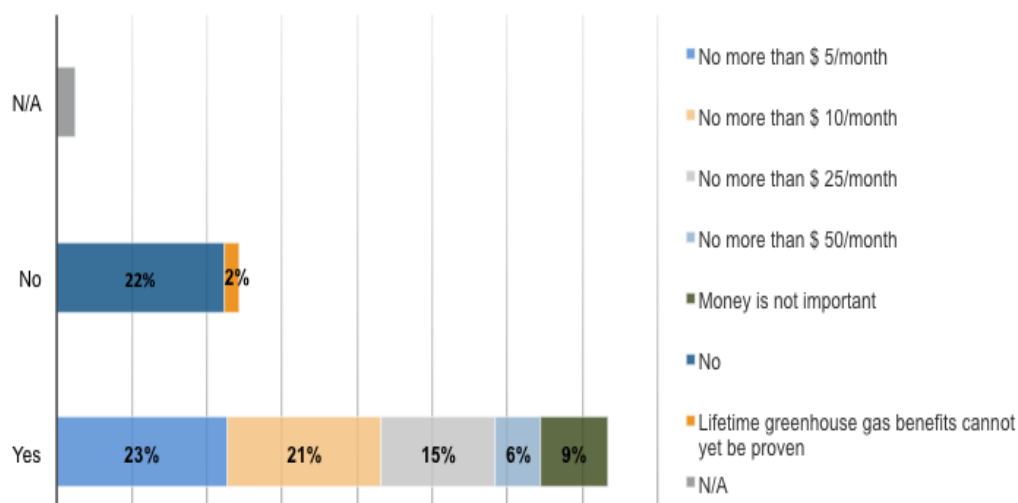


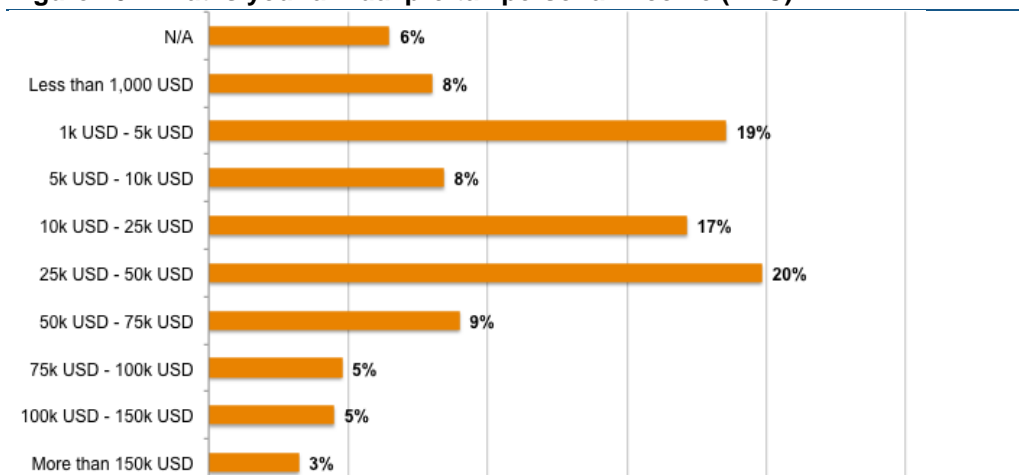
Figure 9 shows that consumers say they are willing to pay more for alternative transport fuels. These figures need to be treated with some caution as there is traditionally a bias in 'willingness to pay' survey questions between the amount people say they are willing to pay, and what they actually are willing to pay. Also increases in transportation costs will typically have a regressive impact on populations, which will be acutely felt by many in the LAC region, given high levels of income inequality. However, with three in four respondents (73%) willing to pay more for alternative transport fuels, this warrants recognition by decision makers.

**Figure 9: Would you be prepared to pay more per month for transport fuels with lower lifetime greenhouse gas emissions than conventional transportation fuels? If so, how much more (LAC)?**



This reported willingness to pay is more impressive when considered against the backdrop of regional income statistics. While there are notable examples of more wealthy and income equitable societies (Uruguay) there are often large income disparities within and between LAC countries. Even survey respondents, with the stated wealthy sample bias, are indicative of this income divide with 52% earning less than US\$ 25,000 per annum.

**Figure 10: What is your annual pre-tax personal income (LAC)?**



### Encouraging the uptake of alternative transport fuels is complex - tailored approaches are needed

- ▶ 69% of respondents do not think their country is transitioning to a transport system utilising alternative transport fuels at an appropriate rate
- ▶ The main reason respondents don't think their country is transitioning to an alternative transport fuel future is 'lack of government policies'

**Figure 11: Do you think your country is transitioning to a transport system utilising alternative transport fuels at an appropriate rate (LAC)?**

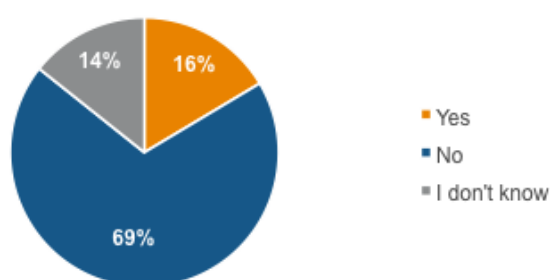
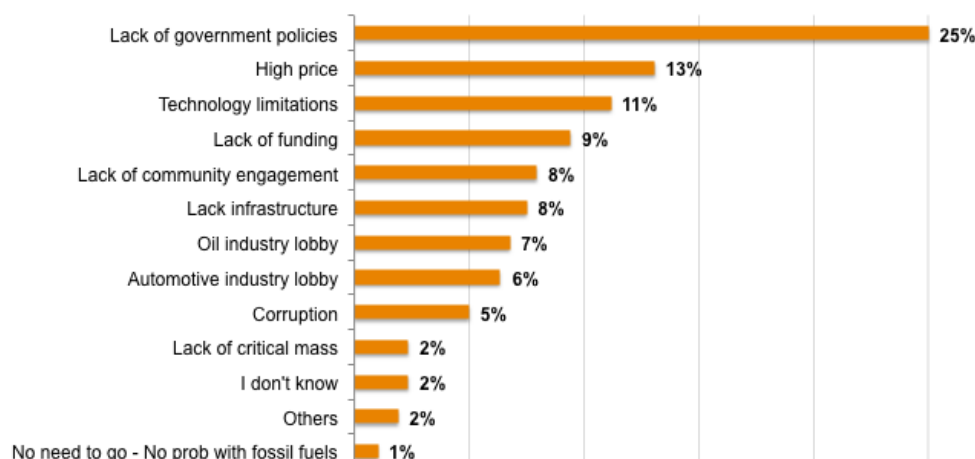
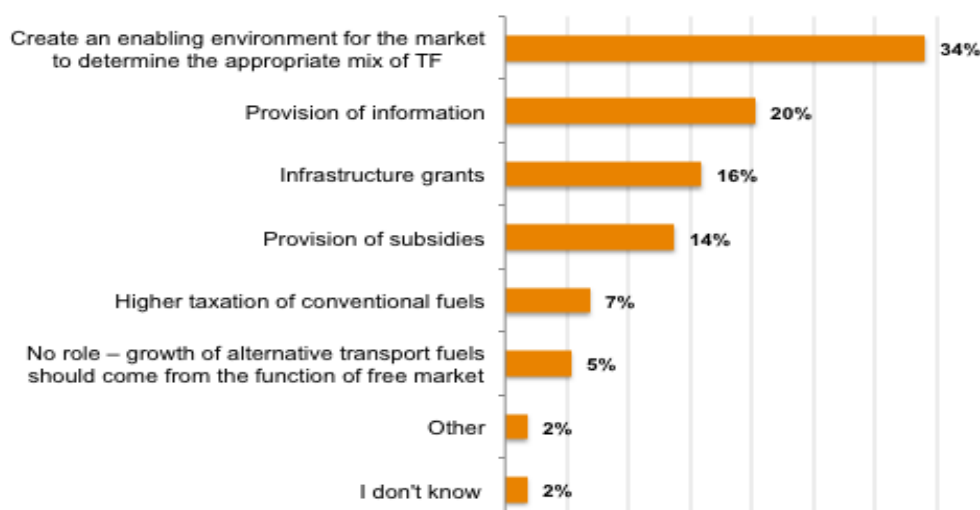


Figure 11 shows that most consumers in the LAC region do not think their particular country is transitioning to an alternative transport fuel future at an appropriate rate. This is somewhat surprising given the general interventionist nature of governments since the 1970's (in particular). What is also surprising in this context is that Figure 12 shows that consumers believe there is a stronger role for government in promoting alternative transport fuels, and for the most part, governments could - and should - do more.

**Figure 12: Why do you think your country's transition to alternative transport fuels is taking so long? (LAC)?**



**Figure 13: What should the role of government be in stimulating the growth of alternative transport fuels (LAC)?**



While Figure 13 shows there is reasonably strong support for governments (continuing) to 'create an enabling environment for alternative transport fuel uptake', it does not show the regional variation in responses; preferences do vary across LAC countries.

In considering the responses to these questions, the Taskforce also noted that there appears to be a universal role for all governments to fully understand - and communicate - the effect that fossil fuel subsidies have on alternative transport fuels. Subsidised prices for liquid fossil fuels in domestic markets and unsupported prices for many alternative transport fuels creates an unfair distortion which means consumers, and the market, cannot determine the most preferred transport fuel choice.



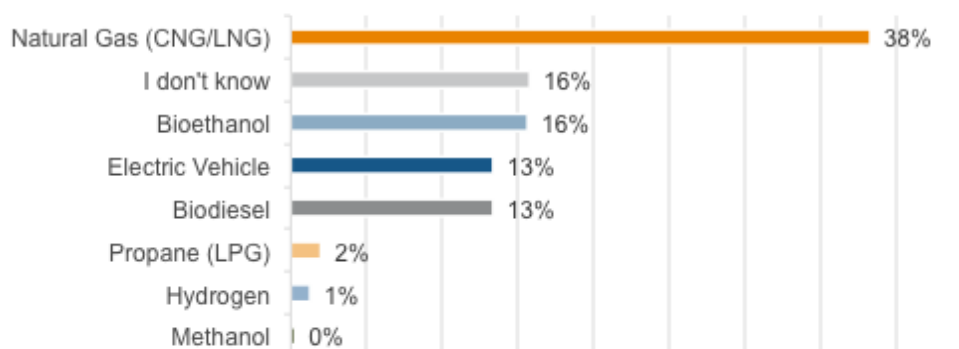
## Respondents see natural gas as the fuel most likely to contribute the most to the alternative transport fuel mix in 5-10 years

- ▶ 38% of respondents think that natural gas will be most important contributor to the transport fuel mix in the next 5-10 years

Despite strong incentives in place to promote the uptake of biofuels (in particular), Figure 14 shows that natural gas as a transport fuel is seen as potentially the biggest contributor to the energy future of the LAC region. This response was higher in countries that have stronger reserves of natural gas.

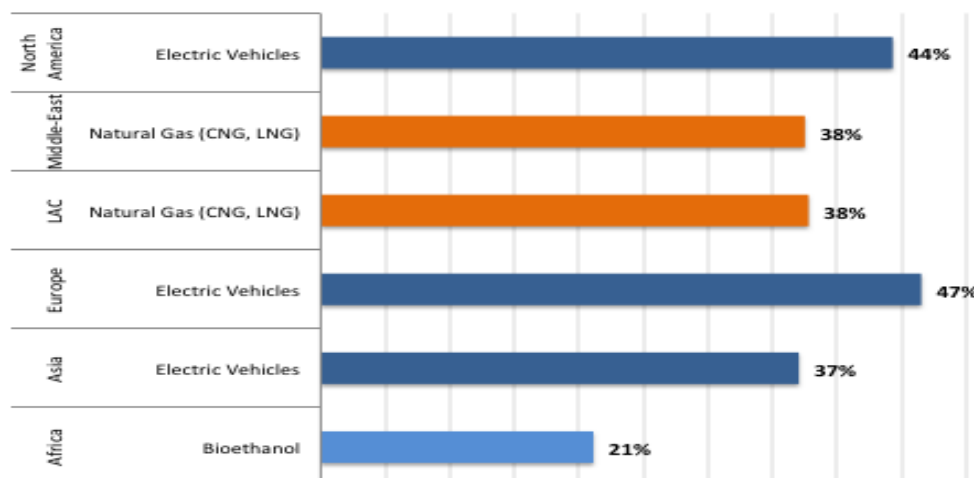
In principle, there is merit in those countries that have reserves of natural gas (Trinidad and Tobago and Argentina for example) considering the best way to use this resource strategically – for example conversion subsidies for CNG vehicles or promotion of natural gas in public transport and freight transport. In practice, this view may need to be tempered as the presence of subsidised prices for fossil fuels in domestic markets and 'free' prices in international gas markets may negate any incentives to switch to natural gas.

**Figure 14: Which alternative transport fuels do you think will be the MOST important contributor to your country's transportation fuel mix in the next 5-10 years (LAC)?**



Global respondents answered this question differently with the following fuels asserted to be the most important alternative transport fuel in the next 5-10 years: Africa (21%, bioethanol); Asia (37%, electric vehicles); Europe (47%, electric vehicles); Middle East (38%, natural gas); and North America (44%, electric vehicles).

**Figure 15: Which alternative transport fuels do you think will be the MOST important contributor to your country's transportation fuel mix in the next 5-10 years (Comparison by continent)?**



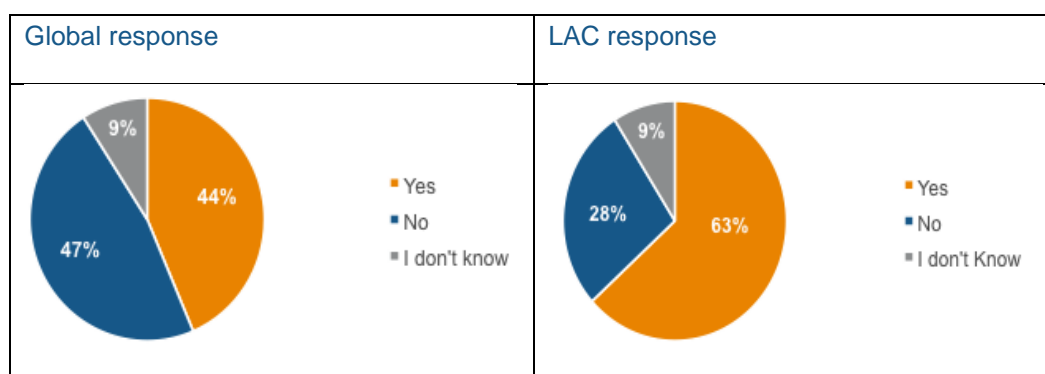
### Consumers are broadly familiar with the energy-water-food nexus but want more evidence of the quantifiable impacts

- ▶ 63% of respondents understand the energy-water-food nexus
- ▶ A significant number of respondents think decisions need to be made on a case-by-case basis as specific impacts need to be fully understood

Respondents in the LAC region are more familiar with the energy-water-food nexus compared to global respondents (44%), as demonstrated in Figure 16. Potential reasons for this divergence include:

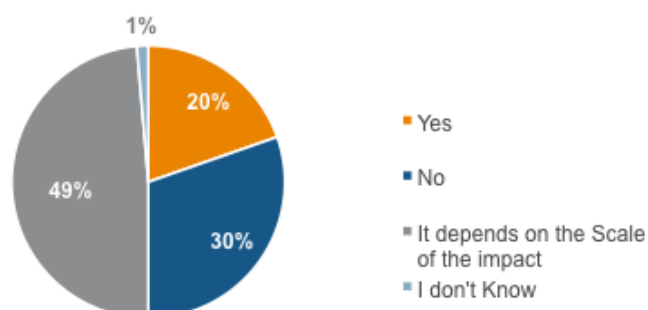
- ▶ The shape of the LAC economy: agricultural products and industries reliant on fresh water are strong contributors to economic growth and therefore issues that affect these industries may be more in the forefront of consumer consciousness;
- ▶ Primary energy supply: hydro and bio-derived energy in particular is strong in LAC region;
- ▶ History in promoting biofuels: many LAC countries have a long history in promoting alternative transport fuels - particularly biofuels. This promotion comes with substantial debate about the merits of using crops for energy, rather than for food, for example.

**Figure 16: Are you familiar with the energy-water-food nexus (LAC & Global)?**



Respondents had mixed views on the acceptability of using water and food crops to develop energy within the LAC region. A significant number of respondents think decisions need to be made on a case-by-case basis as specific impacts need to be fully understood. As an example, Figure 17 shows that 49% of respondents needed to understand the quantifiable impacts of decisions with an energy-water-food nexus dimension, rather than stating in-principle support.

**Figure 17: Are you comfortable with food crops being grown for the specific purpose of being refined to fuel vehicles – if this takes food crops out of circulation for human consumption (LAC)?**



Respondents also had mixed views on the role of government in managing the energy-water-food nexus. These views were very different across individual LAC countries, though in many instances, there was support for:

- ▶ Government setting bottom lines for factors such as water quality or greenhouse gas emissions and letting the market determine access and allocation (34%);
- ▶ Improving national understanding of key-trade-offs (31%);
- ▶ Facilitating a national debate on the key trade-offs inherent in the energy-water-food nexus (20%).

## 4. Country Analysis

### Argentina

‘Successive governments have been comparatively interventionist in promoting alternative transport fuels... However there remains a public perception of inaction’

Argentina is the second largest country in South America in terms of area and GDP, and is the third largest in terms of population. Its main economic activities include oil refining, metallurgy, petrochemicals, automobile manufacturing and agricultural and livestock production. It is a main exporter of agricultural commodities (soybeans and products, corn, and wheat) and vehicles (both light and heavy-duty).

The country experienced a decade of solid annual growth rates (3% annual average). This recent economic expansion, combined with the presence of energy subsidies, has caused demand for energy to grow faster than the domestic supply. As a consequence, Argentina became a net importer of oil products at the beginning of this decade. The government is now phasing out energy subsidies implemented during the previous decade(s).

Argentina is a significant producer of oil and natural gas and vast unconventional gas and oil potential has been identified in the Neuquén Basin, where conventional oil and gas production already takes place. Given the size of natural gas resources and the presence of soybean and sugarcane crops, it is unsurprising that successive governments have been relatively interventionist in promoting alternative transport fuel policies.

Argentina's utilisation of alternative fuels began in the 1980s, with the introduction of compressed natural gas (CNG) into the road transportation energy mix. The oil crisis of the 1970's had a significant impact on the local economy. This impact, combined with the discovery of domestic natural gas reserves, created the conditions for a national effort to replace oil. Despite an advantageous price differential between CNG and conventional alternatives, government intervention, in the form of incentives for the conversion of vehicles and construction of service stations, as well as the adoption of CNG-fuelled vehicles by the public transportation sector, was essential for the programme to take-off. Today, the success is evident: over two million light vehicles, or one quarter of the passenger car fleet, can use CNG. This is the largest CNG fleet in South America, and among the top 5 in the world.

In December 2013 the government announced an increase in the biodiesel blending mandate to 10%. Although there are no official environmental or social sustainability criteria for biofuels in Argentina, the government closely monitors the criteria of other countries in order to avoid export restrictions. In 2013, Argentina was the fourth largest producer of biodiesel in the world.

The 5% blending mandate for ethanol was first met in 2012. As one of the world's largest producers of maize, the expansion of corn ethanol plants was coherent with the model adopted in the biodiesel industry: build upon the country's competitive agricultural sector.

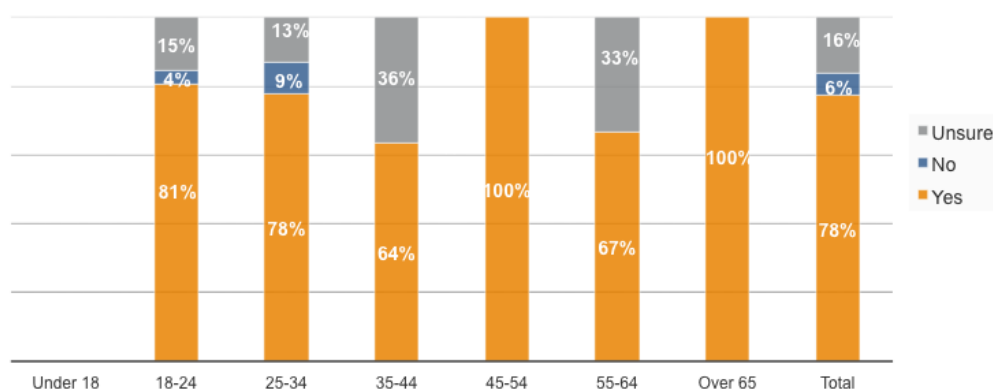
In addition to alternative transport fuels, Argentina generates over 90% of its renewable energy through hydropower, which ranks fourth in the LAC region for renewable energy production.

### Awareness of alternative transport fuels in Argentina is weaker than the LAC regional average and more targeted information provision is needed

- ▶ 78% of respondents know what alternative transport fuels are
- ▶ 60% of respondents do not know, or are unsure, whether their private vehicle can utilise any alternative transport fuels

At a general level, consumers in Argentina are less familiar with the concept of alternative transport fuels than the rest of the LAC region as demonstrated in Figure 18.

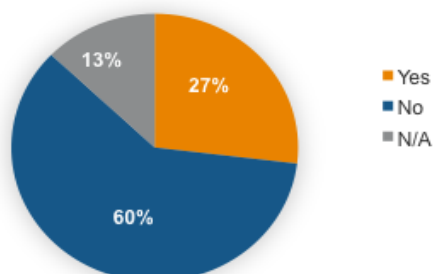
**Figure 18: Do you know what alternative transport fuels are (Argentina)?**



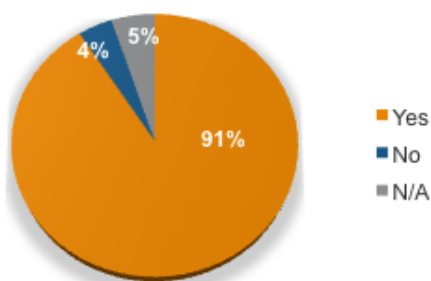
Like the LAC regional responses, there is a discrepancy between respondents knowing what alternative transport fuels are and knowing whether their personal vehicles can utilise them. Figure 19 shows that a significant number of respondents

(60%) do not know whether their personal car can utilise alternative transport fuels - even though 91% of respondents state that they knew what type of fuel their main transport mode uses (Figure 20).

**Figure 19: Do you know whether your private vehicle is able to utilise any alternative transport fuels (Argentina)?**



**Figure 20: Do you know what type of fuel your main mode of transport consumes (Argentina)?**

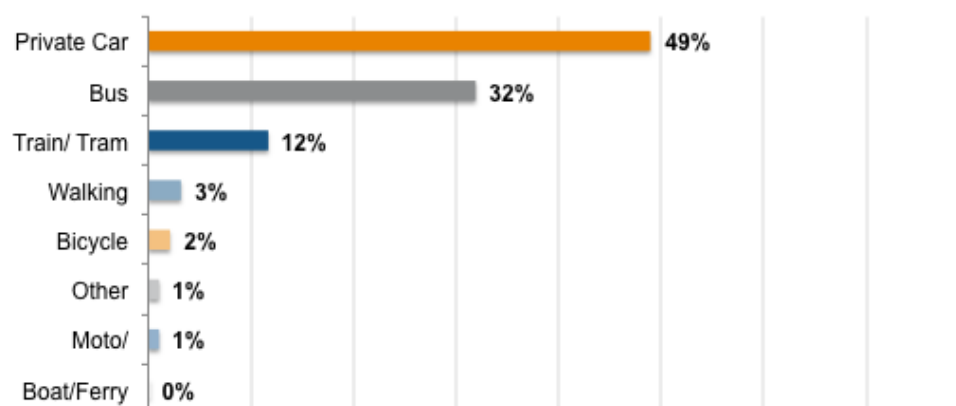


### Respondents are roughly as likely to use public transport as drive a private vehicle

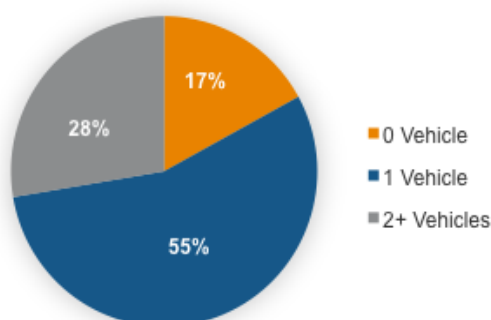
- ▶ 83% of respondents have access to at least one private vehicle
- ▶ 44% of respondents cite public transport as their main mode of transport: 32% bus and 12% train/tram
- ▶ 57% of respondents cite getting to work as their primary reason for travel
- ▶ 84% of respondents note that petrol or diesel fuels their main mode of transport - this is considerably different to transport sector energy demand figures (80% petrol and diesel)

While the majority of respondents use the car as the main mode of transport (49%), and 83% of respondents have access to at least one vehicle, a considerable number of respondents use bus (32%) and tram/train (12%) as their main mode of transport. These findings are much higher than the LAC regional average (32%) as noted in Figure 5.

**Figure 21: What would you consider to be your main mode of transport (Argentina)?**

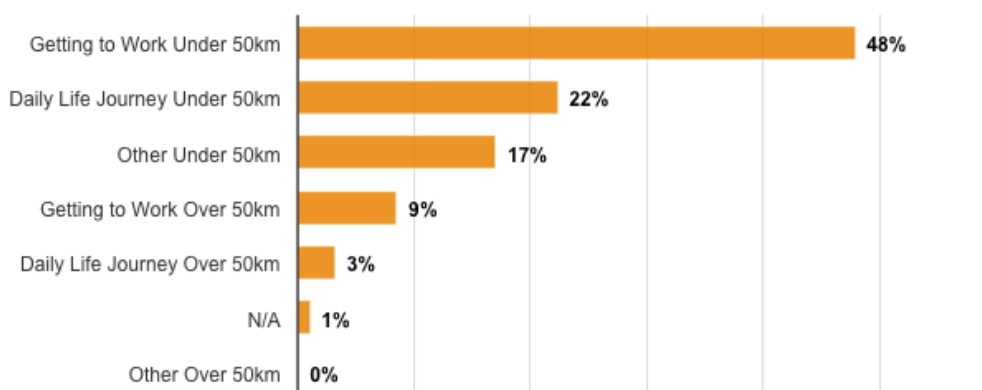


**Figure 22: How many private vehicle(s) do you have access to (Argentina)?**



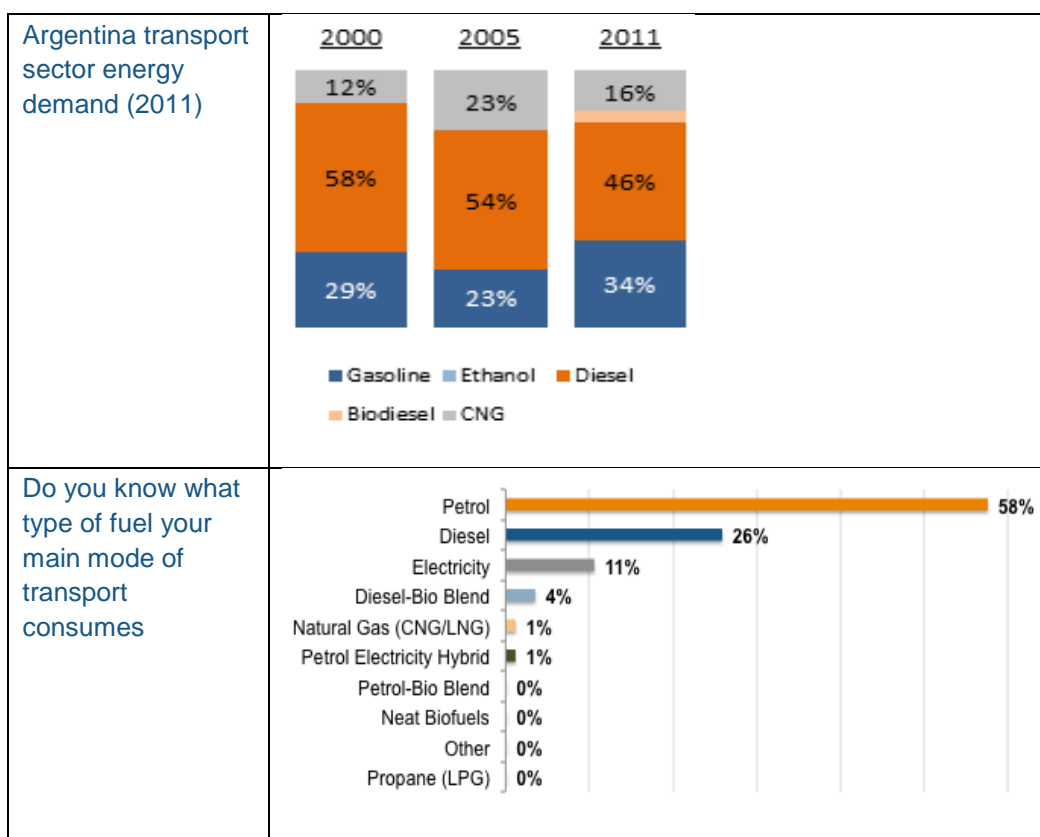
Consistent with trends across all other LAC region countries, 'getting to work - under 50km' was the main reason for peoples travel (48%). However there was a relatively high response rate for 'daily life journeys - under 50km' (22%) in Argentina as compared to LAC average of 12%. This suggests that respondents live in relatively compact cities and, combined with responses shown in Figure 21, public transport systems are reasonable and patronage is comparatively strong.

**Figure 23: What is the main reason for your travel (Argentina)?**



Petrol and diesel are the main fuels of choice (84% of respondents). This is comparable to transport energy demand figures, which show a slightly higher proportion of fuel being attributable to alternative transport fuels (20%).

**Figure 24: Comparison between Argentina transport sector energy demand and response to survey question 9 - Do you know what type of fuel your main mode of transport consumes?**



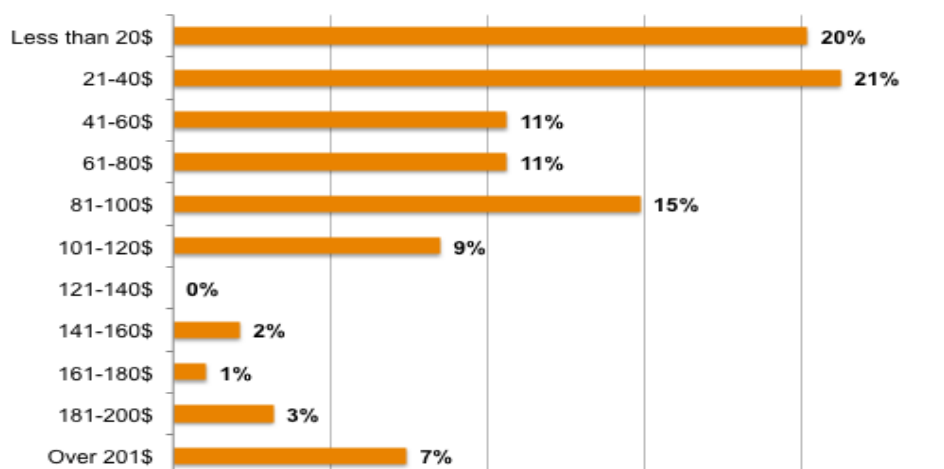
### Consumers are willing to pay more for alternative transport fuels

- ▶ 41% of respondents spend less than US\$ 40 per month on transport costs, yet 76% of respondents stated they would pay more per month for alternative transport fuels that have lifetime GHG benefits over fossil fuels
- ▶ 73% of respondents do care about the type of fuel that their main mode of transportation uses

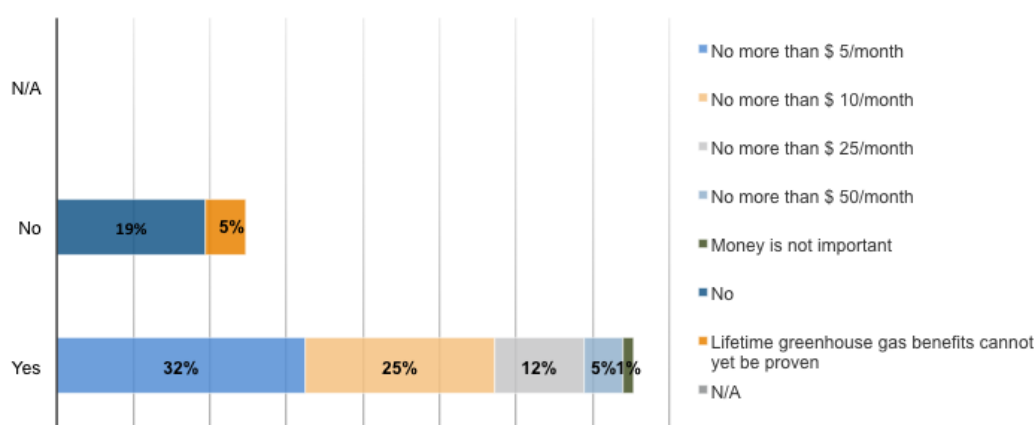
The majority of consumers (76%) said they were willing to pay more for alternative transport fuels – similar to the LAC average (Figure 9). This is interesting given that 41% of respondents spend a relatively small amount of money on transportation costs.



**Figure 25: How much do you currently pay for transportation per month - main mode + other modes (Argentina)?**

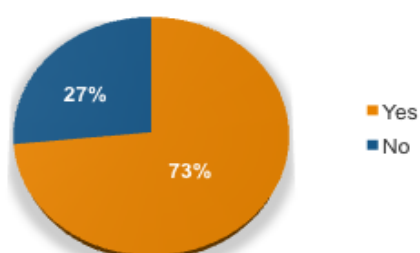


**Figure 26: Would you be prepared to pay more per month for transport fuels with lower lifetime greenhouse gas emissions than conventional transportation fuels? If so, how much more (Argentina)?**



Theoretically, the findings of the survey provide reasons for decision makers to speed up investment of resources into alternative transport fuels. Figure 26 shows the willingness of consumers to pay more for transportation fuels with lower greenhouse gas benefits, and Figure 27 shows 73% of respondents stating they care about the type of fuel their transport mode uses.

**Figure 27: Do you care what type of fuel your main mode of transport consumes (Argentina)?**



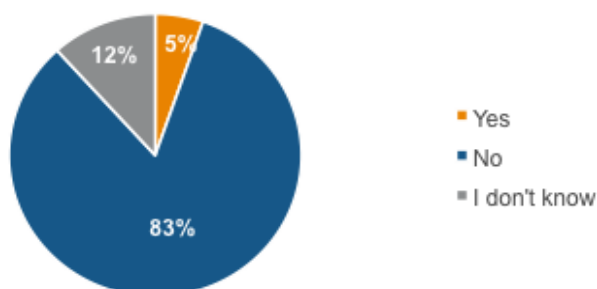
## Stronger interventions from government are warranted to further promote alternative transport fuels

- ▶ 23% of respondents know that their government is taking action
- ▶ 83% of respondents feel that their country is not transitioning to an alternative transport fuel future at an appropriate rate

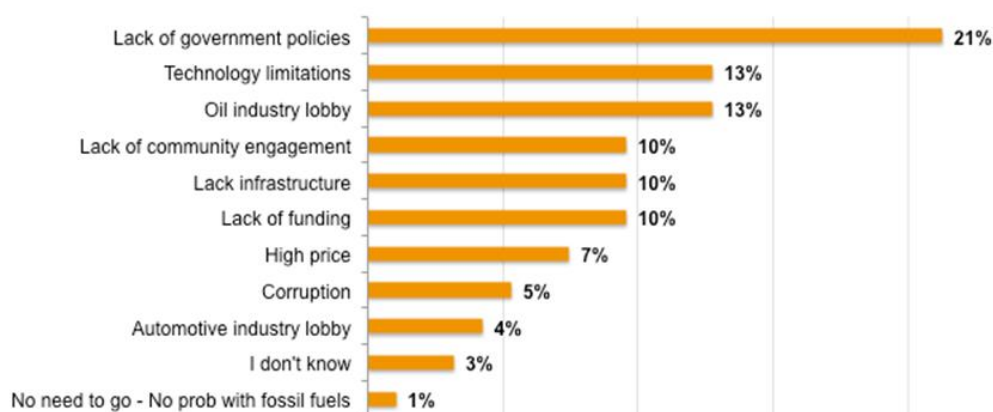
Successive Argentinean Governments have been reasonably interventionist in promoting alternative transport fuels over several decades. For example, following the oil crisis in 1970, incentives were introduced for the CNG conversion of vehicles and the construction of service stations. Moreover, substantial blending mandates for bioethanol and biodiesel were introduced in the early 2000's. Since then, the government has taken steps to remove fossil fuel subsidies for transport fuels which will further promote uptake of alternatives.

In this context, it is surprising to see a perception of inaction on behalf of government. 83% of respondents believe the country is not transitioning to a system utilising alternative transport fuels at an appropriate rate and a 'lack of government policies' is believed to be the main reason why. Moreover, only 23% of respondents think the government is taking any action to promote alternative transport fuels. This is significantly below the LAC average.

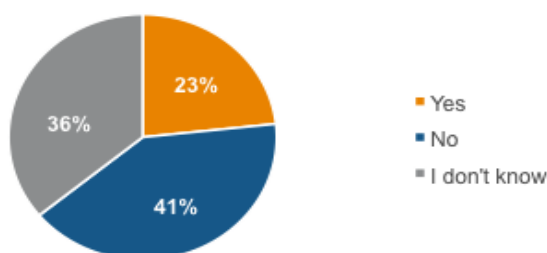
**Figure 28: Do you think your country is transitioning to a transport system utilising alternative transport fuels at an appropriate rate (Argentina)?**



**Figure 29: Why do you think your country's transition to alternative transport fuels is taking so long (Argentina)?**

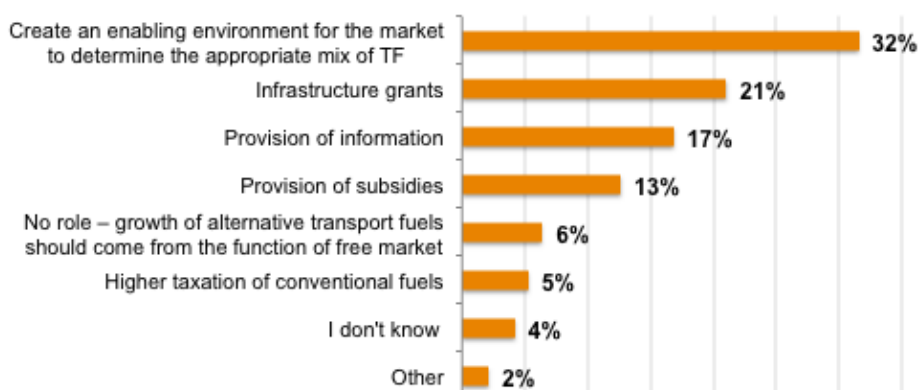


**Figure 30: Do you know whether your government is currently taking any action to promote alternative transport fuel uptake (Argentina)?**



Understanding what more the government could do to improve is an important discussion. The preferred role of government is perceived as creating an enabling environment for the market to determine the appropriate mix of alternative transport fuels (32%). This preferred role provides some flexibility in what an 'enabling environment' could be - reflecting the different states-of-play in different countries - but a continuation of the removal of fossil fuel subsidies, a continuation of blending mandates and development of a market for electric vehicles could feasibly fall within this remit. There is also reasonable support for the provision of infrastructure grants and the provision of more information.

**Figure 31: Why do you think your country's transition to alternative transport fuels is taking so long (Argentina)?**

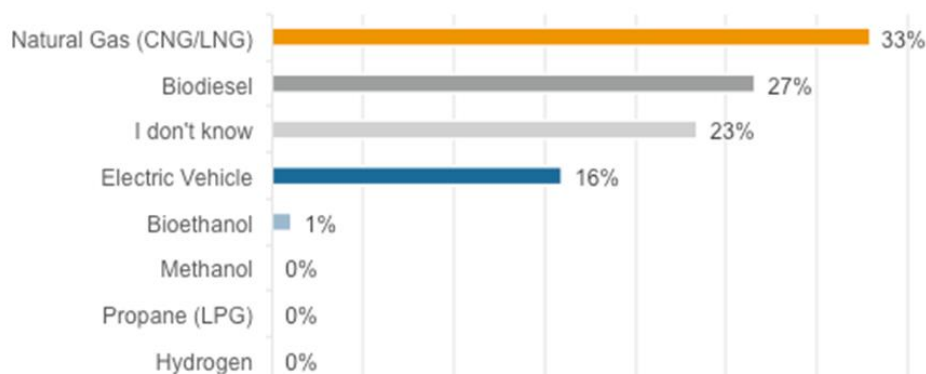


### Mixed views on which fuel will contribute most to the transportation system in the next 5-10 years

- ▶ CNG (33%) and biodiesel (27%) are projected to be the major contributors to the fuel mix in the next 5-10 years
- ▶ Bioethanol receives virtually no support (1%)

Domestically prominent alternative transport fuels were projected to continue to be major contributors to the future transport fuel mix (CNG 33% and biodiesel 27%), although electric vehicles also received strong support - despite limited policy emphasis on this area by government.

**Figure 32: Which alternative transport fuel do you think will be the MOST important contributor to your country's transportation fuel mix in the next 5-10 years (Argentina)?**



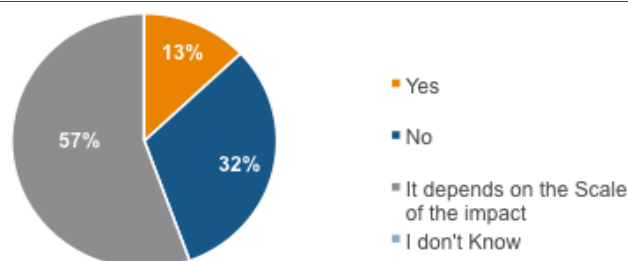
The lack of support for bioethanol is interesting. It can be interpreted in two ways: that respondents do not perceive bioethanol as a viable transport fuel in the longer-term (possibly reflecting concerns around the energy-water-food nexus) or, alternatively, that bioethanol is unlikely to be a major contributor - i.e. other fuels have more potential on a volumetric basis. In either case, the findings suggest that government may be best placed to use scarce political capital on promoting fuels with more public support (CNG, biodiesel or electric vehicles) rather than extending bioethanol blending mandates.

**Consumers are generally familiar with the energy-water-food nexus but there is a clear role for government in improving the understanding of quantifiable impacts of policies and decisions**

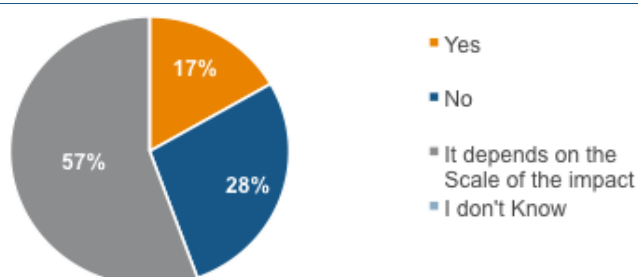
- ▶ 56% of respondents are familiar with the energy-water-food nexus.
- ▶ 42% of respondents want government to set environmental bottom lines (for factors such as water quality or greenhouse gas emissions) before letting the market determine whether energy projects should proceed

Hydro and biofuels play a strong role in Argentina's energy supply picture. Furthermore, agriculture and livestock form a significant part of the economy. In this context, water in particular is an important commodity that underpins economic activity. The findings of the energy-water-food nexus questions provide some guidance for decision makers - particularly around better understanding the impact of decisions.

**Figure 33: Are you comfortable with food crops being grown for the specific purpose of being refined to fuel vehicles – if this takes food crops out of circulation for human consumption (Argentina)?**

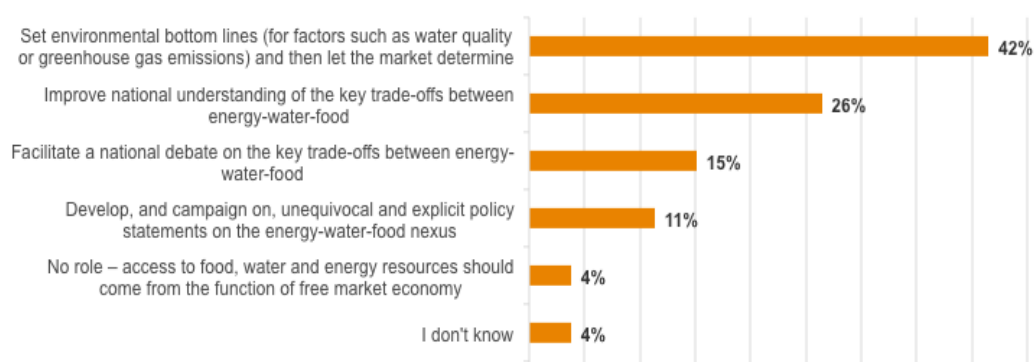


**Figure 34: Are you comfortable with water being stored in dams for hydro-electricity, with the specific intention of being used to power vehicles – if this takes water away from areas that need water to grow food for human consumption (Argentina)?**



Respondents believe that government has a strong role to play in decision making around energy projects that have an energy-water-food nexus dimension with 42% saying government should set environmental bottom lines (for factors such as water quality or greenhouse gas emissions) before letting the market determine whether energy projects should proceed. Improving national understanding of key trade-offs also received strong support.

**Figure 35: What should the role of government be in managing the energy-water-food nexus (Argentina)?**



## Brazil

### ‘Despite the successful introduction of biofuels as an alternative transport fuel, a mix of inappropriate and insufficient government action puts the program at risk’

Brazil is the largest country in South America in terms of area, population and GDP. Its main economic activities include oil and gas production, oil refining, mining, automobile manufacturing and agricultural and livestock production. It is a major exporter of mineral and agricultural commodities, such as iron ore, oil, soybeans, sugar, poultry and beef.

During the last decade, the Brazilian economy expanded at a pace not seen since the 1970's, driven primarily by increased foreign demand for commodities and policies that stimulated domestic consumption. This has provoked intense social mobility, with large impacts on the demand for energy. To illustrate this phenomenon, even though the country became self-sufficient in oil in 2006, the fast growth in the transport sector forced Brazil to return to the condition of net importer of oil four years later.<sup>v</sup>

In 2013 Brazil had the second largest oil reserves and sixth largest natural gas reserves in Latin America. Reserves for both have grown since 2000 (84% growth for oil, 107% for natural gas). The discovery of vast oil reserves in sub-salt layers in ultra-deep waters, 300 km off the coast, the Pré-sal, brought both immense opportunities and challenges, both of which are enhanced by a bold local content policy.<sup>vi</sup>

Brazil is responsible for approximately 60% of the renewable energy consumed in Latin America. Its share of renewables in the energy mix is the largest in Latin America and fourth in the world. Hydropower and sugarcane products (bioethanol and electricity) are responsible for 75% of this renewable energy, which introduces significant climatic dependence. Nevertheless, the harvest of sugar cane plant has a strong synergy within the electricity generation mix, since it coincides with the dry period of the main river basins area of Brazil.

The use of bioethanol as an alternative fuel in Brazil dates back to the 1920's. As one of the main producers and exporters of sugar, the dependence and volatility of international markets served as incentives to develop alternatives to add value to the sector. However, it was not until the oil crises of the 1970's that the government gave bioethanol a proper role in its energy policy. The Pro-álcool (a series of incentives to the sugar sector, auto industry and consumers) defined mandatory blend rates with gasoline at 10-20%, depending on the region, and supported the development of ethanol engines. Two specifications of ethanol became available then: i) anhydrous ethanol, blended with gasoline, and ii) hydrous ethanol, used unblended (E100) in ethanol vehicles. In the late 1980's, the fall in oil prices and increase in sugar prices resulted in a scarcity of ethanol and a crisis of confidence among owners of ethanol vehicles. Sales of ethanol vehicles dropped and the Government removed incentives to consumers and producers.

In the early 2000's, with the advent of flex-fuel (gasoline and ethanol) engines, consumer confidence was recovered and ethanol's role in the energy mix rose steeply. From 2000 to 2009, the demand for hydrous ethanol demand grew at a 15% annual average, while that of gasoline (blended with 20-25% ethanol) grew at just 1.3%. Since 2009, the sugar-ethanol industry in Brazil has been fighting a 'perfect storm' resulting from the combination of rising production costs, high levels of debt, lower than expected exports (as a result of changes in the biofuel programs in the US and Europe), low agricultural productivity gains, fall in sugar prices, government control of gasoline prices and bad weather.

Overall, the goal of replacing gasoline was achieved. It is estimated that the use of bioethanol saved at least 1.8 billion barrels of oil equivalent between 1975 and 2013, which corresponds to more than US\$ 80 billion. This value is at least four times higher than the investments and subsidies for the installation of production units and the research and development of the program. There were also significant environmental gains. The use of ethanol since the release of the Pro-álcool prevented the emission of more than one billion tons of carbon dioxide. The cultivation of large areas of sugar cane plant for sugar and bioethanol production and other types of plants for producing biofuels (such as biodiesel), considering the agricultural area of the country, does not compete with food production, nor is it located in the ecosystems that the country preserves – such as the Amazon forest.

Experiments with biodiesel also began in the 1920's and a specific programme (Pró-óleo) was also established after the oil crises in the 1970's. However, the lack of a well-established feedstock, such as sugarcane for bioethanol, limited the programmes success. Trials with different feedstocks and blends continued, but it was not until social concerns were brought into the picture that biodiesel gained importance in the energy scene. The National Programme for Biodiesel Production (PNPB) was implemented in the mid-2000's and defined a mandatory blend rate of 2% to begin in 2008, reaching 5% in 2013. An auction system was established, and suppliers were required to acquire a minimum percentage of feedstock from family farms. Different levels of tax incentives were applied to increase the competitiveness of less developed rural areas and feedstocks. From an energy supply standpoint, the programme is a success thus far, with the 5% target being anticipated to 2010 and an expansion to B7 recently approved. Nevertheless, the majority of the feedstock comes from soybeans and tallow produced in the well-developed agricultural sectors of the South and Midwest parts of the country, which undermines the social goals of the program. A few cities, such as São Paulo and Curitiba use higher blend rates (B20 and B100) in part of their public transport fleet (buses).

Despite a few pilot projects in the 1990s, CNG only became widely available in the 2000's, when the government initiated series of programmes to simulate consumption in the manufacturing, energy and transport sectors in order to optimise natural gas contracts with Bolivia. These measures were effective and during the first half of the 2000's natural gas demand by the transport sector grew at an average annual rate of 44%. During the second half of the decade, when gas prices increased and the Bolivian supply became less reliable, growth rates fell to more moderate levels (6% annual average) but were still greater than the rate of economic expansion. With the increase in relative prices (also caused by control of gasoline prices) and reduction in incentives, CNG's economic viability was restricted to high-mileage users, such as cabs.

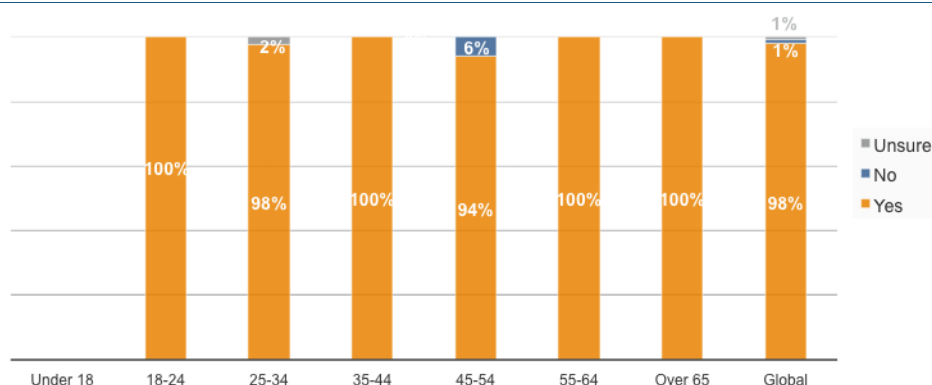
Hybrids and electric vehicles are currently not manufactured in Brazil. There are no federal policies in place, but initiatives at the local level are being discussed. The fleet is still very small: up until the end of the first semester of 2014, approximately 70 electric and 350 hybrid vehicles had been licensed in Brazil.

### Public consciousness on alternative transport fuels, knowledge of vehicle compatibility, and usage are very strong

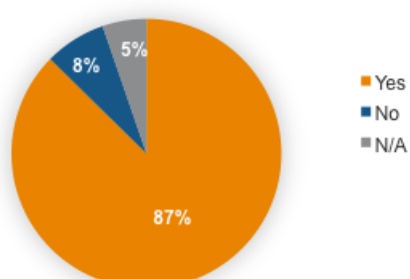
- ▶ 98% of respondents know what alternative transport fuels are
- ▶ Only 8% of respondents are unsure or do not know whether their private vehicle can utilise any alternative transport fuels
- ▶ 59% of respondents use alternative transportation fuels in their vehicles

The long relationship between consumers and alternative fuels in Brazil can be seen in the high levels of awareness regarding these fuels (98% of total respondents). It is possible that this extended and widespread presence of alternative transport fuels in the market has also made consumers more aware of the compatibility of these fuels and their private vehicles. As a consequence, a much larger share of the Brazilian respondents (59%) claimed to use alternative transport fuels in their private vehicles than the regional average (23%).

**Figure 36: Do you know what alternative transport fuels are (Brazil)?**

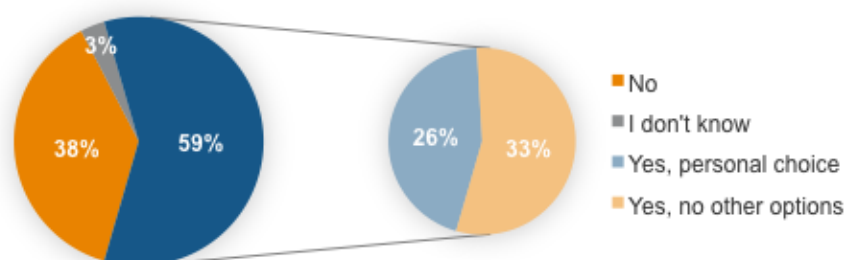


**Figure 37: Do you know what type of fuel your main mode of transport consumes (Brazil)?**





**Figure 38: Do you use alternative transport fuels in your private vehicle (Brazil)?**

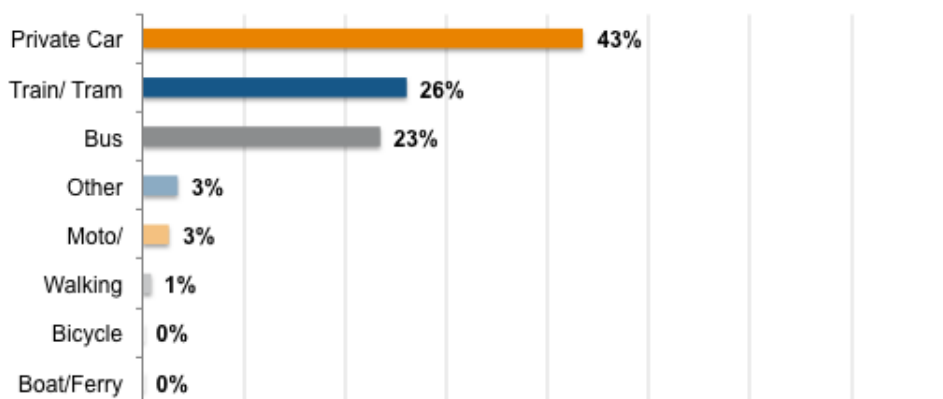


**Respondents are roughly as likely to use public transport as drive a private vehicle despite relatively high vehicle ownership rates**

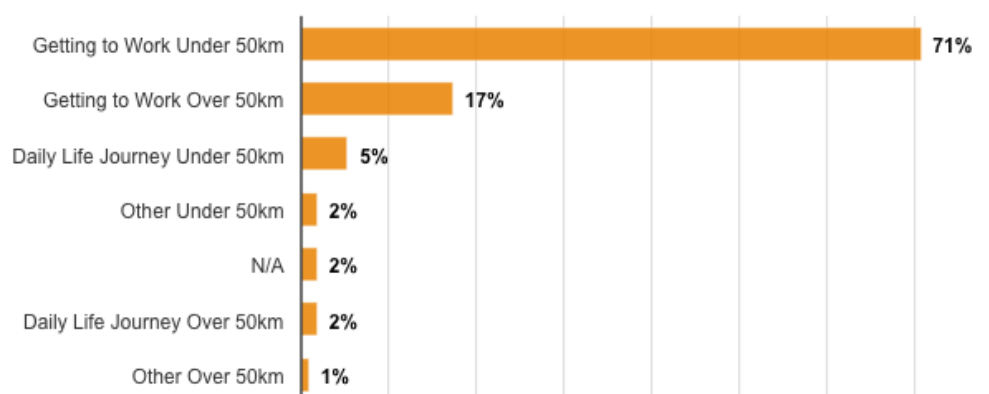
- ▶ 83% of respondents have access to at least one private vehicle
- ▶ 49% of respondents cite public transport as their main mode of transport: 26% train/tram and 23% bus.

A larger share of the respondents (49%) uses public transportation as their main mode of transport in comparison to the regional average (32%). The higher use of train/tram (26%) compared to the LAC's average (6%) suggest that a higher portion of the respondents live in large urban centres. This high usage of public transport may be influenced by the fact that a larger share (71%) of the Brazilian respondents selected 'getting to work - under 50km' as their main reason for travel (LAC's average was 60%), which could reflect the inconveniences of dealing with traffic and parking in the downtown areas of urban centres. This possibility is reinforced by the high availability of private vehicles among respondents.

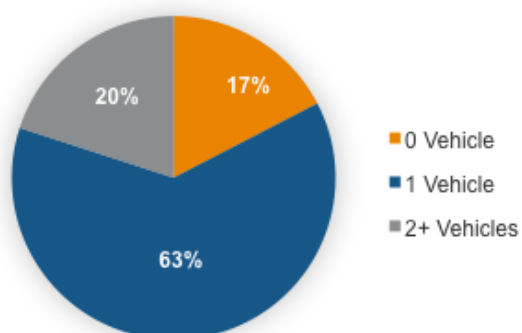
**Figure 39: What would you consider to be your main mode of transport (Brazil)?**



**Figure 40: What is the main reason for your travel (Brazil)?**



**Figure 41: How many private vehicle(s) do you have access to (Brazil)?**

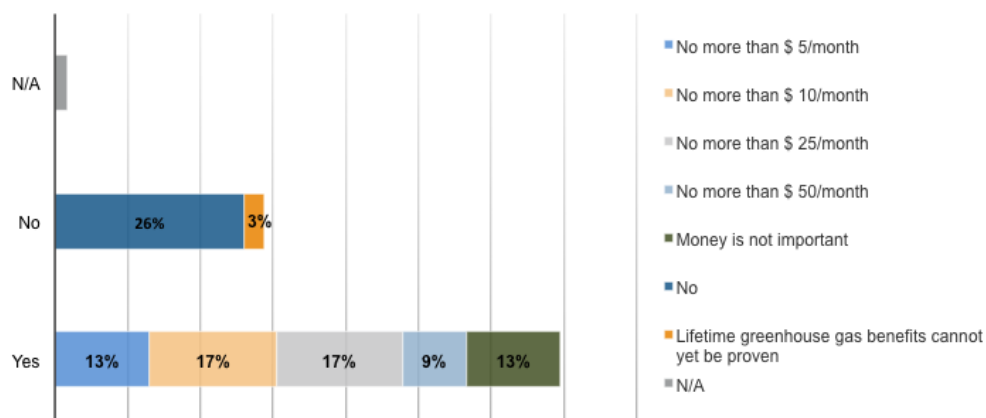


### Consumers say they are willing to pay more for alternative transport fuels

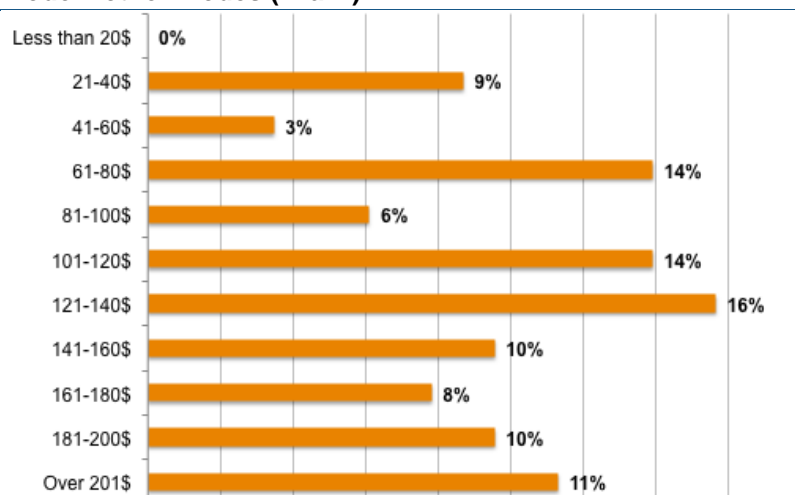
- ▶ 69% of respondents state they would pay more per month for alternative transport fuels that have lifetime GHG benefits over fossil fuels
- ▶ 69% of respondents spend more than US\$ 100 a month on transportation

Consistent with the LAC regional trend, the majority of Brazilian respondents said they were willing to pay more per month for alternative transport fuels that have lower greenhouse gas emissions than conventional transport fuels. A higher share (39%) was willing to pay more than US\$ 10 per month for these alternative transport fuels than the regional average (30%). Nevertheless, Brazilian respondents seem to have higher transportation costs than the LAC average since 69% of them pay more than US\$ 100 per month compared to 46% for the LAC region.

**Figure 42: Would you be prepared to pay more per month for transport fuels with lower lifetime greenhouse gas emissions than conventional transportation fuels? If so, how much more (Brazil)?**



**Figure 43: How much do you currently pay for transportation per month - main mode + other modes (Brazil)?**



### Despite more optimism regarding the participation of alternative transport fuels, government action is still needed

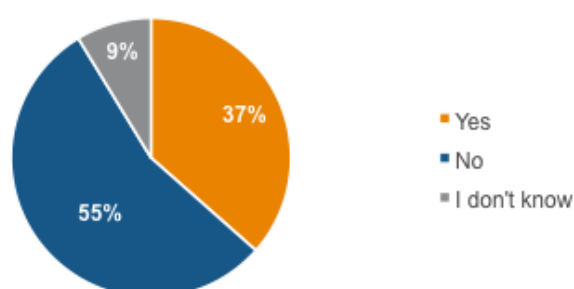
- ▶ 37% of respondents think that the country is transitioning to a transport system utilising transport fuels at an appropriate rate
- ▶ There is most interest in support for infrastructure investments and taxation of conventional fuels as areas for government action

A significantly higher share of Brazilian respondents (37%; LAC average 16%) believe the country's transport system is incorporating alternative transport fuels at an appropriate rate. This may reflect the early introduction of bioethanol, the high participation rate of flex-fuel vehicles in the passenger car fleet, as well as the more recent programmes for biodiesel and CNG.

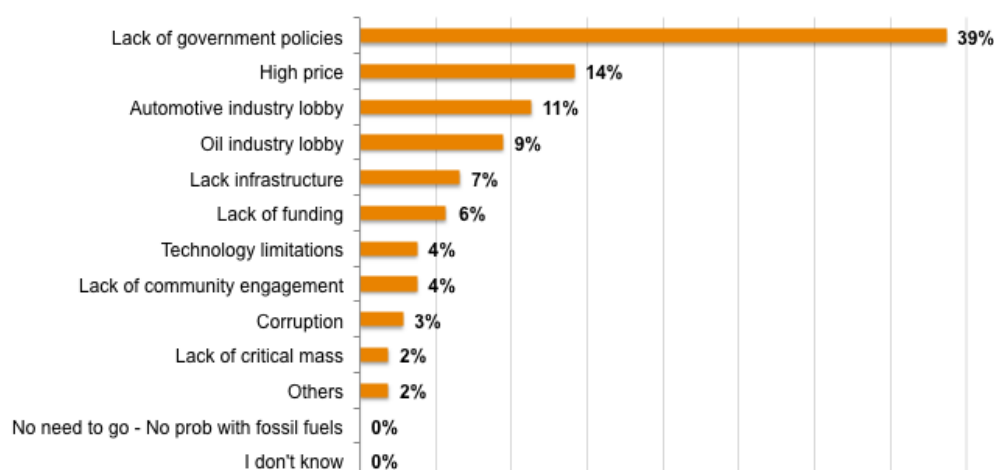
For those who believe the transition is not satisfactory, the main reasons indicated are in line with the LAC regional average ('lack of government policies' and 'high price'). It is interesting to note the higher importance of the lobby by the automotive industry.

Following the LAC regional trend, most respondents perceive the role of government as being one of 'creating an enabling environment for the market to determine the appropriate mix of alternative transport fuels'. Nevertheless, a higher share of answers identifies government priorities as 'infrastructure grants' and 'higher taxation of conventional fuels'. With regards to the latter, in order to control prices without affecting Petrobras' revenues, the federal government has matched price increases with reductions in CIDE, a special tax for oil products.

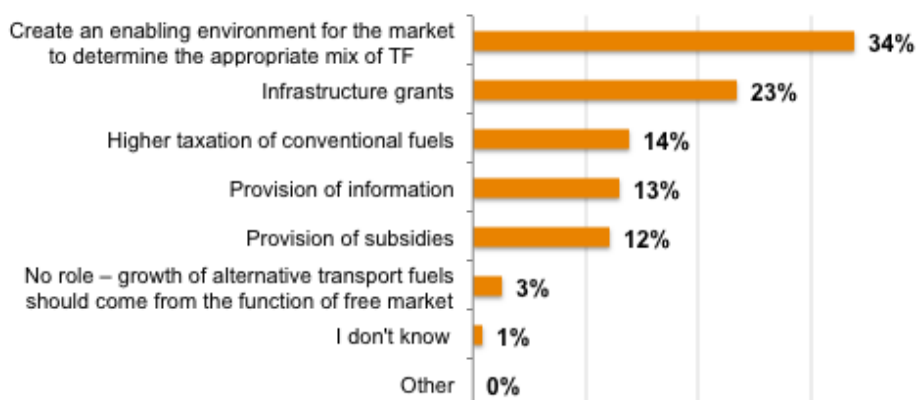
**Figure 44: Do you think your country is transitioning to a transport system utilising alternative transport fuels at an appropriate rate (Brazil)?**



**Figure 45: Why do you think your country's transition to alternative transport fuels is taking so long (Brazil)?**



**Figure 46: What should the role of government be in stimulating the growth of alternative transport fuels (Brazil)?**

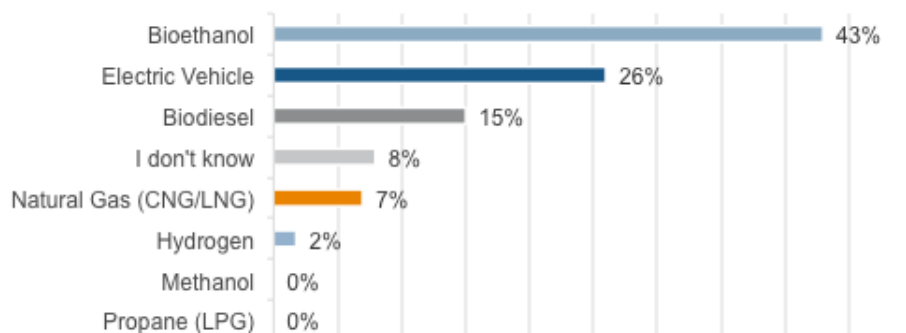


### Bioethanol and electricity are perceived to be the main alternative transport fuels in the transportation system in the next 5-10 years

- ▶ Bioethanol (43%) and electricity in electric vehicles (26%) are projected to be the major contributors to the fuel mix in the next 5-10 years
- ▶ Natural gas receives relatively low levels of support (7%)

In line with the country's intimate relationship with biofuels, the majority (58%) of the respondents believe bioethanol will be the main contributors to the transport fuel mix in the next 5-10 years. It is interesting to note that electric vehicles (26%) receive greater support than biodiesel, although the current size of the electric fleet is insignificant next to the fleet of diesel trucks and buses. It is also interesting to note the relative apathy towards natural gas, particularly given the strong regional support for the fuel.

**Figure 47: Which alternative transport fuel do you think will be the MOST important contributor to your country's transportation fuel mix in the next 5-10 years (Brazil)?**

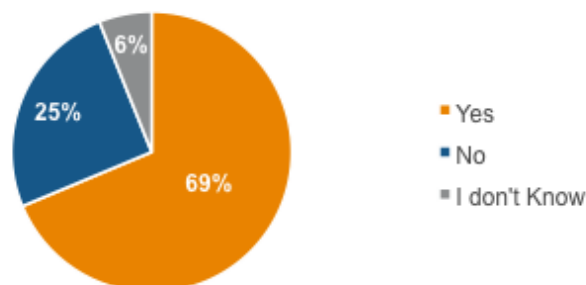


## Consumers are familiar with the energy-water-food nexus

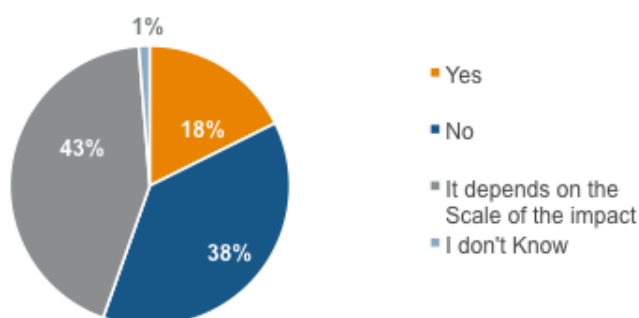
- ▶ 69% of respondents are familiar with the energy-water-food nexus
- ▶ Only 18% are comfortable with storing water in dams for hydropower in order to power electric vehicles if it does not affect food production
- ▶ 33% of respondents want government to facilitate a national debate on key trade-offs between energy-water-food

Over one-third of Brazil's primary energy consumption comes from renewable sources, with three-fourths of that being hydro and sugarcane biomass. This makes the energy-water-food nexus very visible both at the local and national level. Even though respondents are slightly more aware of these issues (69%) than the LAC average (63%), a significantly lower share of support for the use of hydroelectricity to power vehicles was seen (18% versus 26% for LAC region). This may reflect concerns regarding other trade-offs involving biodiversity and the sovereignty of indigenous peoples. As a result, current and future hydropower projects are all run-of-river.

**Figure 48: Are you familiar with the energy-water-food nexus (Brazil)?**

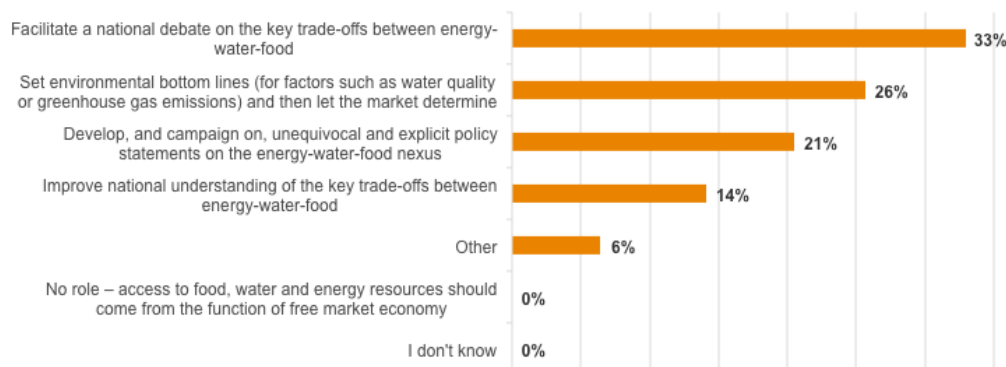


**Figure 49: Are you comfortable with water being stored in dams for hydro-electricity, with the specific intention of being used to power vehicles – if this takes water away from areas that need water to grow food for human consumption (Brazil)?**



Although setting environmental bottom-lines is regarded as an important area for government action for a large share of the respondents (26%), ‘facilitating a national debate on the key trade-offs’ receives the most support (33%). This may reflect the general misinformation regarding the real impacts of agricultural production (for biofuels or export) and the consequences of not expanding hydropower capacity. First, Brazil still has an enormous area of pasture land with low productivity (extensive grazing), which has been the main area being replaced with biofuel production. Expected growth in biofuel production can be fully incorporated by those areas. Second, recent low levels of rainfall have exposed the potential vulnerability of a concentrated hydropower electric system. The need to rely on fossil-based thermal plants not only raises the price of electricity, but also greatly increases the emissions of greenhouse gases.

**Figure 50: What should the role of government be in managing the energy-water-food nexus (Brazil)?**



## Colombia

### ‘...short trips look set to dominate Colombia's transport needs and further public transport investments might be justified ...’

Colombia is the third largest economy in South America. It is a major producer of gold, silver, emeralds and platinum. Colombia is a net exporter of crude oil and coal and its main industries are mining, oil, chemicals, health related products, food processing, agricultural products and automotive. The distribution of GDP by economic sector is: services (59%), manufacturing industries and mining (25%), construction (9%), and agriculture, cattle-rearing, hunting, forestry and fishing (7%).

Colombia has achieved a (nominal) 62% uplift in GDP between the years 2000-2010 which is broadly in-line with many countries in the LAC region. Most recently, Colombia's GDP increased 4.3% in 2012. At 10.4% of the total labour force, however, the Colombian unemployment rate is less impressive.

Colombia has substantial oil, coal and natural gas reserves which make up a significant proportion of the primary energy supply. In contrast, the electricity sector is largely dominated by hydropower generation (68%). Thermal generation (coal, natural gas and liquid fuels) contributes around 30% of total electricity generation. The remaining 2% of the total electricity generated in the country comes mainly from wind and co-generation systems.

In 2012 the total energy supply was only 2% higher than the previous year, yet final energy consumption decreased 0.6% over the same period. The largest decrease was recorded in coal, with a decrease of 51% from 2011. Energy consumption by sector was: industrial (22%), transport (45%), residential (19%), commercial/services (6%), agriculture/fishing (7%) and construction (1%).

Although Colombia is one of the Latin American countries with significant investments in infrastructure, it still has a shortfall in road infrastructures, bridges, railways and marine transport infrastructure. Transportation modes in Colombia are dominated by road (78%). The remaining 22% is shared between marine transport (13%) and aviation transport (8%). The share of the rail transport is lower than 0.5%.

In recent years, diesel has presented higher rates of growth, increasing its share in the market and therefore generating a decline in gasoline consumption. These market changes can be explained by factors such as changes in fuel prices and the successful development of public transport systems in large cities.

Like many countries in the LAC region, the Colombian Government has taken a supportive approach to the development of alternative transport fuels.

Colombia has biofuels mandates which differ across the country, although the following mandates have largely been put in place at a national level: B8/B10 (2012), and B20 is proposed for 2020. The Ministry of Mines and Energy has set a 10%



blending mandate of bioethanol for gasoline vehicles. In the border areas with Venezuela, biofuels are not blended. Venezuela exports oil products to Colombia for consumption in those areas under special conditions.

Colombia produces its own biofuels for the domestic market. The main raw materials currently considered include sugarcane, cassava and beetroot for ethanol, and palm oil for B100. Nowadays, there are two industrial facilities for palm oil with a capacity of about 300,000 litres per day. Additionally, there are plans to build another 3 industrial facilities for a total capacity of approximately 1.8 million litres a day. Additionally, biofuel production chains have created a significant number of quality jobs with employees receiving fair wages and access to social security.

CNG has been present in Colombian transport systems since the 1980's and is utilised in most public transportation systems. Despite an advantageous price differential between CNG and gasoline, government intervention in the form of incentives for the conversion of vehicles, mechanicals training and technical performance tests, as well as the adoption of CNG-fuelled vehicles by the public transportation sector, has been essential for the programme to take off (2004-2007). Recently, the CNG conversion of vehicles has decreased due to market changes (perception of natural gas shortages, new conversion regulations and costs, increase in the final price). The government is currently working with all actors in the chain of CNG vehicles to support for sustained growth of the sector.

Electric vehicles for public transportation are slowly being added to the market. There is a minor addition of some hybrid and pure electric vehicles for private use. While uptake remains low, the government has increased the annual import quota tariff of 750 units with zero percent tax on the import of electric vehicles and 750 units with tariff charge 5 percent, to plug-in hybrid vehicles. At the same time, 100 charging stations were approved with zero percent tax.

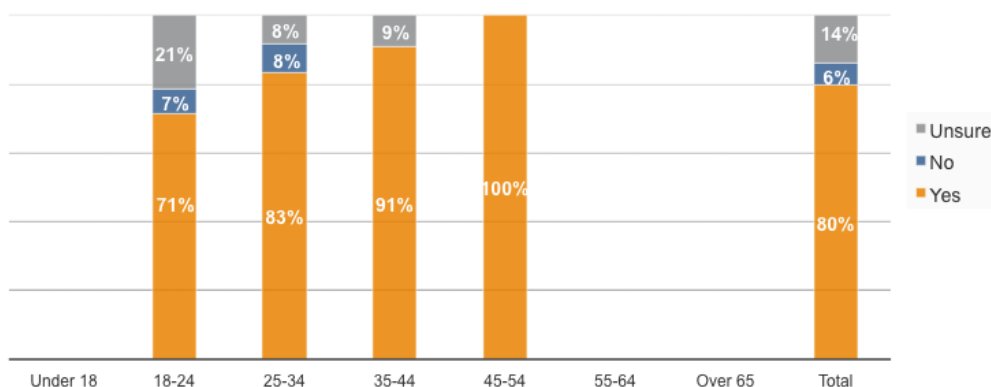
**Public consciousness of alternative transport fuels is strong, however information on alternative transport fuel compatibility with private vehicles is weak**

- ▶ 80% of respondents know what alternative transport fuels are
- ▶ 37% of respondents know whether their private vehicle can utilise any alternative transport fuels.

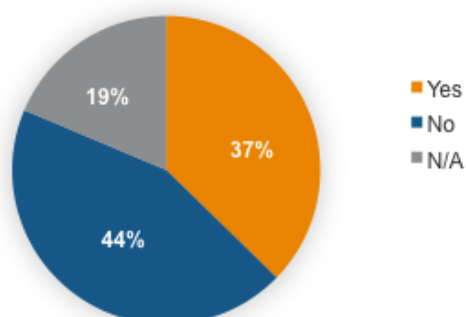
Responses from the survey showed that most Colombian consumers know about alternative transport fuels (Figure 51). However, similar to responses from the LAC region, their knowledge about the compatibility of alternative transport fuels with private vehicles is weak (Figure 52).

Figure 52 also shows that more efforts from the government, as well as vehicle manufacturers and alternative transport fuel providers, should be made to increase public awareness on the utilisation and benefits of alternative transport fuels. Only 37% of the respondents knew their vehicle fulfils technical requirements for a successful fuel shift.

**Figure 51: Do you know what alternative transport fuels are (Colombia)?**

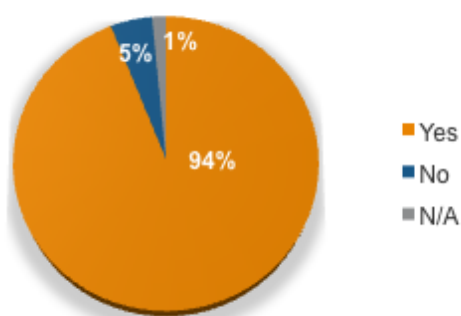


**Figure 52: Do you know whether your private vehicle is able to utilise any alternative transport fuels (Colombia)?**



In contrast, Figure 53 shows that respondents are highly aware of the type of fuel being used in their main transportation mode.

**Figure 53: Do you know what type of fuel your main mode of transport consumes (Colombia)?**



## Private vehicles are the dominant transport mode for respondents

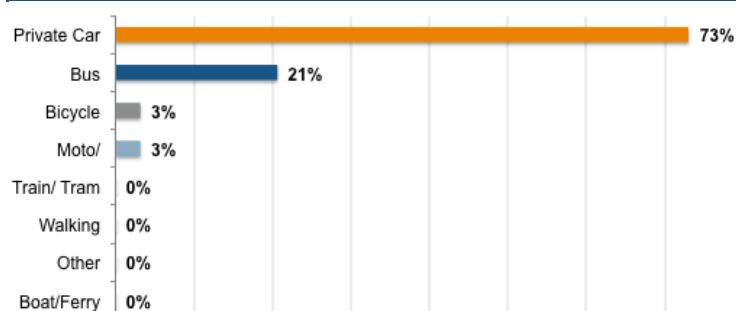
- ▶ 94% of respondents have access to at least one private vehicle
- ▶ 73% of respondents use a private vehicle as their main mode of transport

Private vehicles are identified as the dominant mode of transport for Colombian respondents - 73% of respondents use a personal vehicle as their main mode of transport. This finding stands somewhat against official statistics where less than 15% of the total population has a private vehicle (including cars and motorcycles). Colombia has a vehicle ownership rate of 148 private vehicles (80 cars and 68 motorcycles) per 1000 inhabitants.

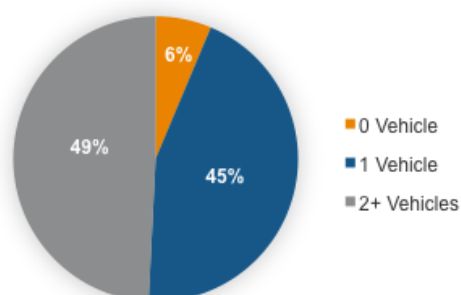
Furthermore, Figure 55 shows that 94% of respondents have access to at least one vehicle. The relatively high number of respondents with access to two vehicles (49%) could be a response to policies designed to control vehicle traffic (based on license plates). It may also be representative of the sample bias in the survey.

The majority of the population relies on public transport systems including, massive transport systems such as Transmilenio, Metro, and others. In this context it is surprising that public transportation (bus and rail) exhibit less integration in the market (only 21% of respondents).

**Figure 54: What would you consider is your main mode of transport (Colombia)?**



**Figure 55: How many private vehicle(s) do you have access to (Colombia)?**

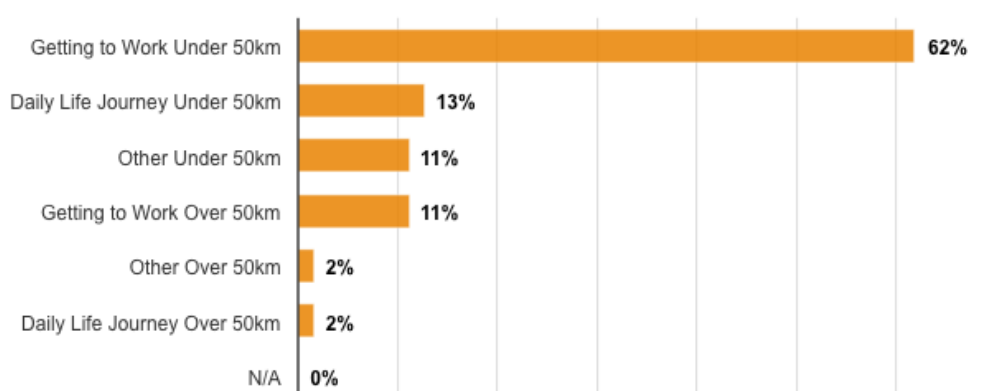


## Relatively short trips dominate transport needs

- ▶ Three quarters of respondents state the main reason for travel is to 'get to work (under 50km)' or to 'undertake daily life journeys (under 50km)'

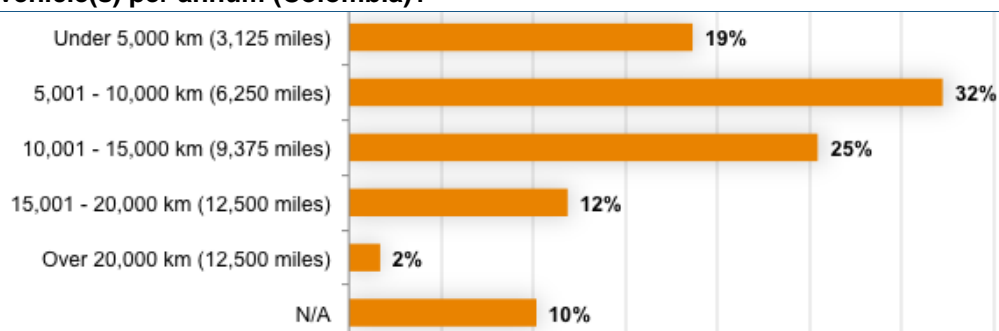
The majority of respondents state that short transport trips dominate their need for travel. 62% of respondents state their main reason for travelling is to get to work (under a distance of 50 km) while 13% state that daily life journeys (under 50km) are their main reason for travel. This indicates that most respondents live close to their work places - or in nearby urban centres.

**Figure 56: What is the main reason for your travel (Colombia)?**



The majority of respondents (51%) also travel less than 10,000km per year which is significantly below averages for first-world countries (where around 15,000km is considered average). This reinforces the assertion that short trips dominate Colombia's transport needs and suggests that further public transport investments might be justified.

**Figure 57: On average, how many km's (miles) do you travel in your private vehicle(s) per annum (Colombia)?**

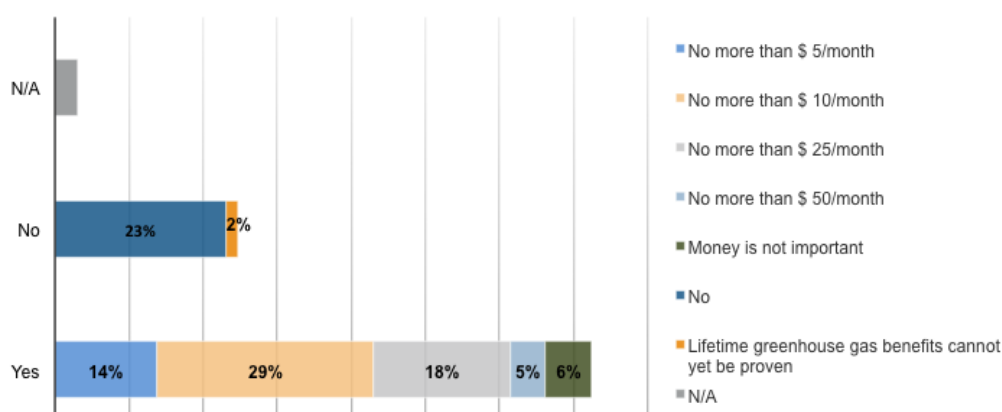


## Consumers say they are willing to pay moderately more for alternative transport fuels

- ▶ 72% of respondents say they would pay more for alternative transport fuels - although the majority of these are not prepared to pay more than US\$ 10 per month

Consistent with all country responses in the LAC region, Colombian respondents said they are willing to pay more per month for alternative transport fuels that have lower greenhouse gas emissions than conventional fossil fuels. 43% of respondents are not willing to pay more than US\$ 10 per month, however.

**Figure 58: Would you be prepared to pay more per month for transport fuels with lower lifetime greenhouse gas emissions than conventional transportation fuels? If so, how much more (Colombia)?**

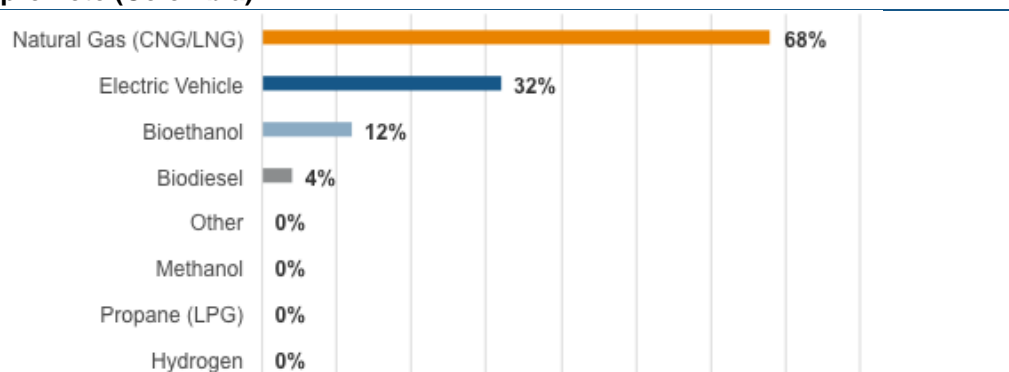


## There is good recognition of the work government is doing to stimulate demand for alternative transport fuels, but there remains a belief that government could do more

- ▶ 86% of respondents do not think that the country is transitioning to a transport system utilising transport fuels at an appropriate rate
- ▶ A lack of government policies is cited as the main reason (31%) why Colombia is not transitioning to a system utilising alternative transport fuels
- ▶ 37% of respondents want the government to create a better enabling environment

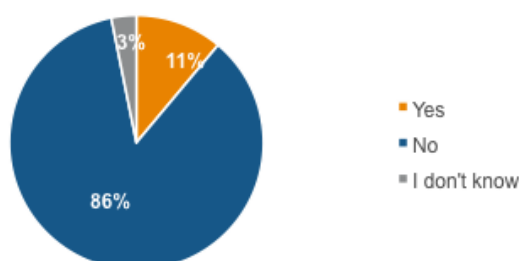
Survey responses portray a relatively accurate recognition of the work that government is doing to promote alternative transport fuels in Colombia. For example, meaningful numbers of respondents correctly noted actions the government is taking to improve uptake of specific fuels: natural gas (68%); electric vehicles (32%); bioethanol (12%). There is, however, a belief that government could do more.

**Figure 59: Which alternative transport fuels is the government taking action to promote (Colombia)?**

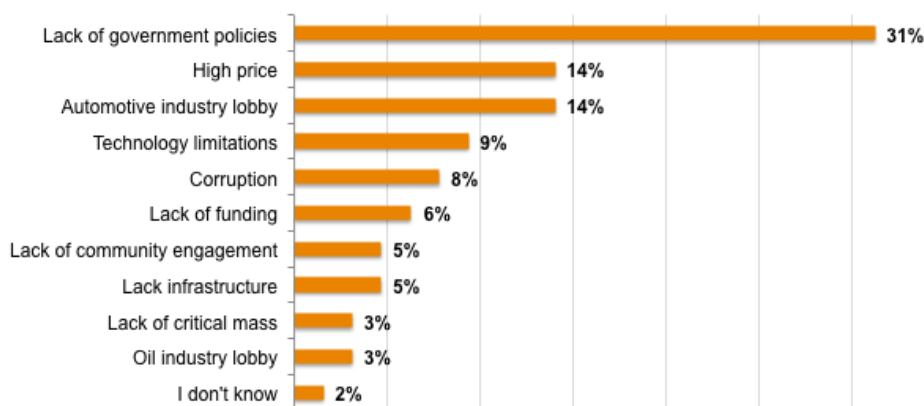


86% of respondents do not believe that the country is transitioning to a transport system utilising transport fuels at an appropriate rate, and cite a lack of government policies as the main reason. These findings are somewhat surprising given the extent to which the Colombian Government has already attempted to promote alternative transport fuel uptake. Government may need to do a better job of communicating to the public the actions they are taking.

**Figure 60: Do you think your country is transitioning to a transport system utilising alternative transport fuels at an appropriate rate (Colombia)?**

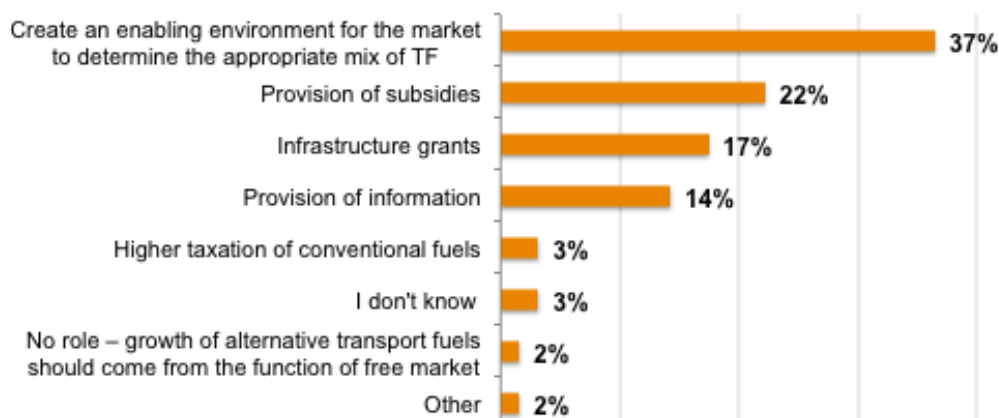


**Figure 61: Why do you think your country is not transitioning to a transport system utilising alternative transport fuels at an appropriate rate (Colombia)?**



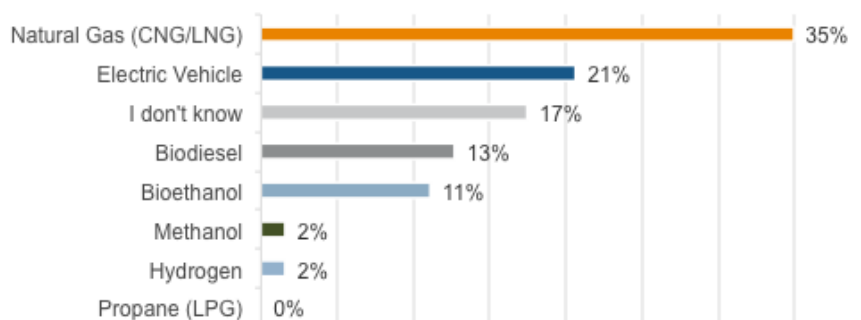
The preferred role of government is believed to be in creating an enabling environment for the market to determine the appropriate mix of alternative transport fuels (37%). This preferred role provides some flexibility in what an 'enabling environment' could be - reflecting the different states-of-play in different countries - but a continuation of blending mandates for biofuels and the more aggressive development of a market for electric vehicles could feasibly fall within this remit. Equally, there appears to be support for infrastructure grants and subsidies - both quite interventionist and requiring sufficient fiscal and political capital to pursue.

**Figure 62: What should the role of government be in stimulating the growth of alternative transport fuels (Colombia)?**



Colombians appear reasonably split on which transport fuel will likely be the most important contributor in the next 5-10 years. While natural gas is the preferred option, this spread of support for different fuels gives government more scope to research which fuels have most traction in Colombia.. This scope, combined with the mandate respondents are signalling, provides a compelling case for further government intervention.

**Figure 63: Which fuel do you think will be the biggest contributor to the transport fuel mix in the next 5-10 years (Colombia)?**

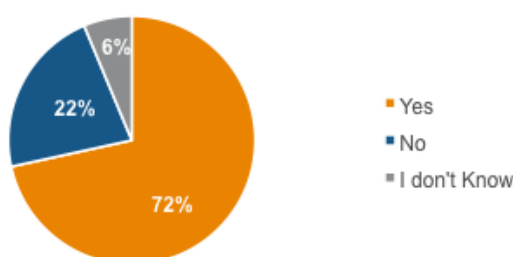


## Consumers are familiar with the energy-water-food nexus

- ▶ 72% of respondents are familiar with the energy-water-food nexus.
- ▶ 44% of respondents want government to set environmental bottom lines (for factors such as water quality or greenhouse gas emissions) before letting the market determine whether energy projects should proceed

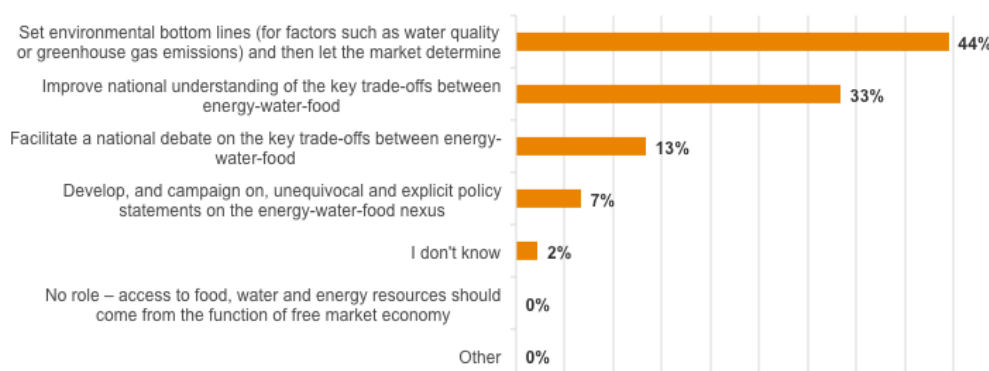
Colombia has diverse primary energy supplies, with 13% coming from hydro and 9% coming from biomass. Furthermore, water and crops are important for economic activity. Given this context, it is unsurprising that respondents are reasonably familiar with the energy-water-food nexus.

**Figure 64: Are you familiar with the energy-water-food nexus (Colombia)?**



Respondents believe that the Colombian Government has a strong(er) role to play in decision making around energy projects that have an energy-water-food nexus dimension, with 44% saying government should 'set environmental bottom lines (for factors such as water quality or greenhouse gas emissions) before letting the market determine whether energy projects should proceed'. An equally significant 33% want government to 'improve national understanding of the key trade-offs involved in decisions with an energy-water-food dimension'.

**Figure 65: What should the role of government be in managing the energy-water-food nexus (Colombia)?**





## Peru

### ‘Further development of rail networks could assist Peru in lowering its rising demand for transport energy, and could also assist in improving transport choices’

Peru is the fifth largest economy in South America and has the fourth biggest population. The basis for Peru's economic success is mining, with Peru a major producer of metals and minerals including copper, silver, zinc, tin, lead and gold. Peru has also recently developed its natural gas resources. Peru's economy is more diverse than just mining and significant investment has occurred recently in a range of sectors including fishing, construction and the commercial sector.

The Peruvian economy experienced an economic boom in the 2000's and has continued to show economic growth throughout the early part of this decade with GDP growth of 5.8% in 2012. With export commodities a big part of this buoyant period, and the subsequent need to move these goods, it is little wonder that energy demand in the transport sector has doubled from 3,500 ktoe in 2006 to ~7,000 ktoe in 2012. Interestingly, increased demand for transport energy has occurred despite Peru having one of the lowest personal vehicle ownership rates in the LAC region.

Peru's primary energy supply is reasonably diverse with resources in oil, coal, natural gas and uranium. The electricity sector is predominantly supplied by hydropower (55%) with the remainder coming from thermal sources.

Transportation networks are dominated by road, with rail being limited primarily to the transport of minerals from production centres to distribution hubs (traditionally ports).

The uptake of alternative transport fuels in Peru has occurred due to a mix of government intervention and market forces. The Peruvian Government developed a legal framework for the provision of biofuels in 2003. The main rationale for these laws was to substitute imported diesel, promote the development of agribusiness chains and reduce greenhouse gas emissions. Peru now has biofuel mandates with B5 since 2011 and E7.8 since 2010.

Despite a desire to improve agribusiness chains, Peru struggles to meet its own biofuel demands with 99.5% of biodiesel and 78% of ethanol requirements being imported. There remains weakness in the agriculture sector which is stymying progress, with land tenure conflicts, water scarcity, high transportation costs and uncertainty of plantation productivity determining features.

The facilitation of CNG (and to a lesser extent LPG) in Peru is less about government assistance and more a story of market demand. In mid-2000s, Peru became a net exporter of LPG, which has significantly improved price differentials. Amongst other things, these favourable pricing conditions have led to the dynamic growth of LPG filling stations which number over 700. CNG filling stations only number 217, but the

uplift in compatible vehicles from zero to 175,000 in nine years reinforces the dynamism in the CNG sector too.

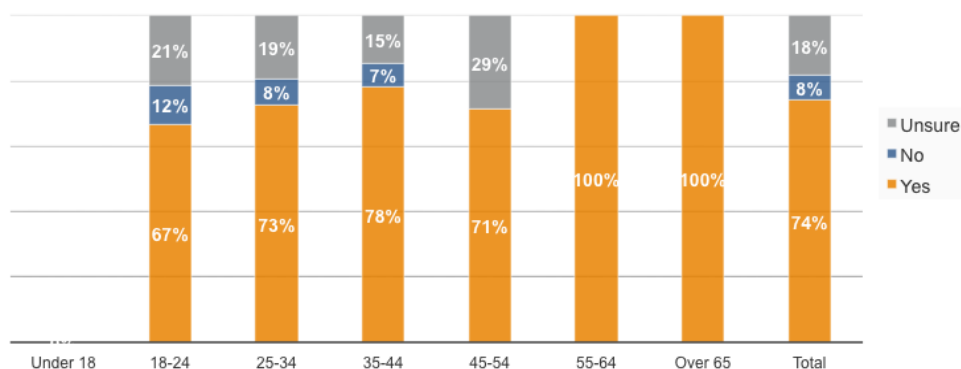
Like most other LAC countries, the uptake of electric vehicles has been slow. For example, only 0.01% of the electricity market can be attributable to transport demand - primarily with the incorporation of an electric train in Lima, in 2011.

### Awareness of alternative transport fuels in Peru is lower than the LAC average and more targeted information provision is needed

- ▶ 74% of respondents know what alternative transport fuels are
- ▶ 51% of respondents do not know whether their private vehicle can utilise any alternative transport fuels.

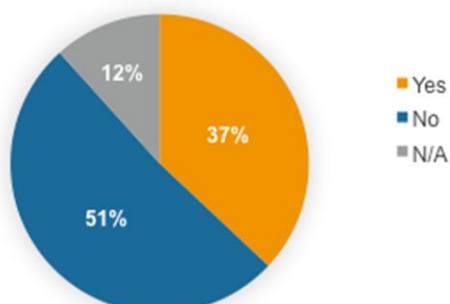
At a general level, consumers in Peru are less familiar with the concept of alternative transport fuels than the rest of the Latin America and Caribbean (LAC) region as demonstrated in Figure 66.

**Figure 66: Do you know what alternative transport fuels are (Peru)?**

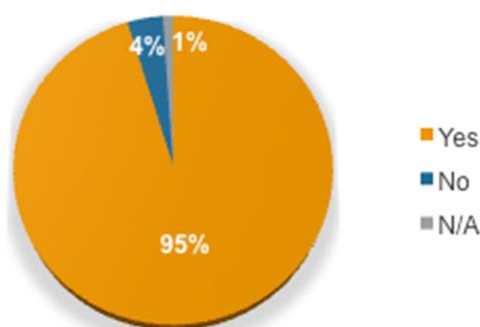


Similar to the LAC responses, Figure 67 shows that there are a significant number of respondents (51%) who do not know whether their car can utilise alternative transport fuels. This is despite 95% of respondents stating that they know what type of fuel their main transport mode uses (Figure 68).

**Figure 67: Do you know whether your private vehicle is able to utilise any alternative transport fuels (Peru)?**



**Figure 68: Do you know what type of fuel your main mode of transport consumes (Peru)?**



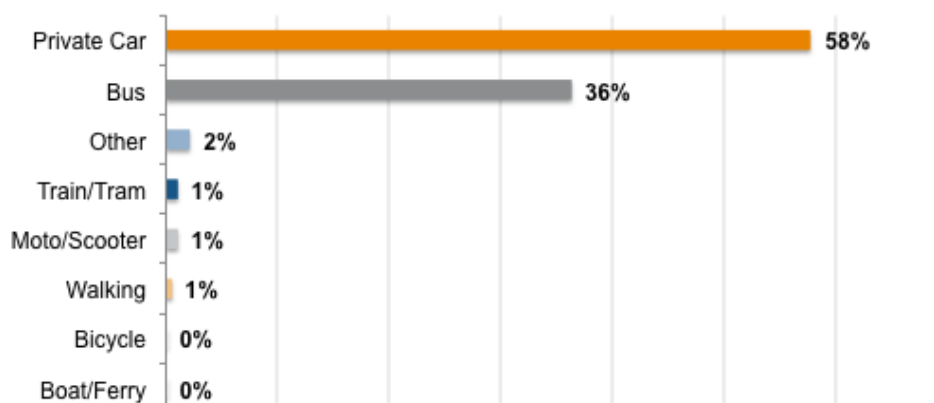
### Transport mode polarity with buses and cars dominant

- ▶ 58% of respondents use a car for their main mode of travel - 36% of respondents catch the bus
- ▶ 67% of respondents note that petrol or diesel fuels their main mode of transport. This is somewhat different to transport sector energy demand figures (80% petrol and diesel)

Peru appears to have transport mode polarity with cars and buses dominant (Figure 69). This is also reflected by the relative paucity of viable rail alternatives; an electric train in Lima was only developed in 2011. Rail is predominantly used for the transportation of minerals.

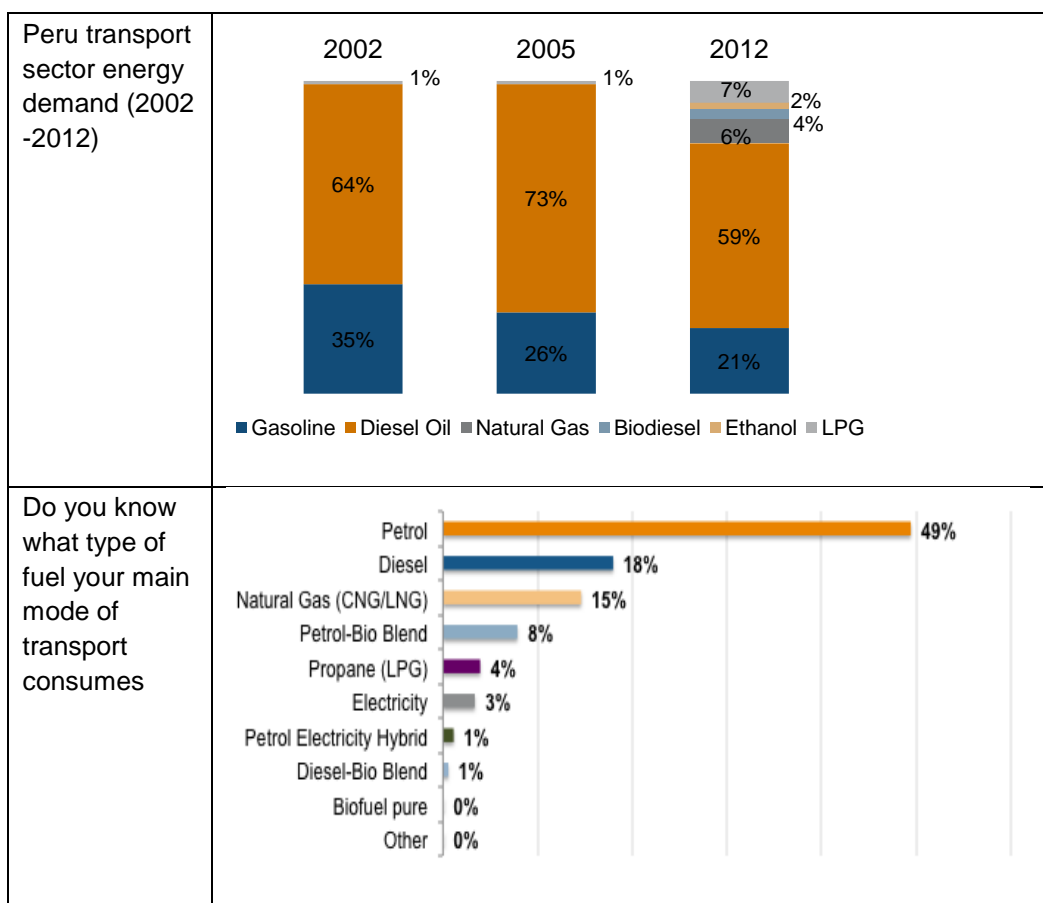
Further development of rail networks could assist Peru in lowering its rising demand for transport energy, and could also assist in improving proving other transport choices.

**Figure 69: What would you consider to be your main mode of transport (Peru)?**



The type of fuel used in respondents' main mode of transport was remarkably varied. While petrol was still the most dominant fuel choice (49% of respondents), there was a range of other fuel choices notably ranging from natural gas (15%) to electricity (3%). This somewhat fits with the observed Peruvian transport energy demand figures (2012).

**Figure 70: Comparison between Peruvian transport sector demand (2012) and response to survey question 9: Do you know what type of fuel your main mode of transport consumes (Peru)?**



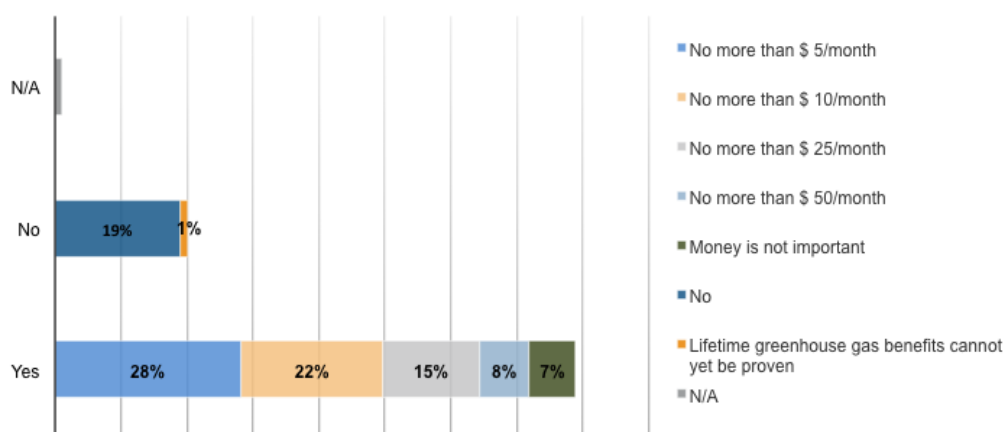
### There is a clear mandate for government to lead a faster transition to an alternative transport fuel future

- ▶ 86% of respondents state that they care about the type of fuel their main mode of transport consumes
- ▶ 79% of respondents state that they would pay more per month for alternative transport fuels that have lifetime GHG benefits over fossil fuels

- ▶ 64% of respondents do not think Peru is transitioning to a transport system utilising alternative transport fuels at an appropriate rate
- ▶ Respondents cite a 'lack of government policies' (26%) as the main reason for this lethargy

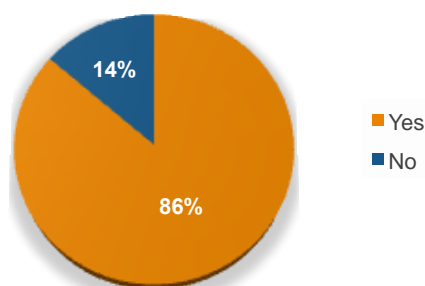
There is a clear mandate for a faster transition to an alternative transport fuel future. The majority of respondents say they are willing to pay more for alternative transport fuels (although 50% of these state that they would only pay a relatively modest US\$ 10 more per month).

**Figure 71: Would you be prepared to pay more per month for transport fuels with lower lifetime greenhouse gas emissions than conventional transportation fuels? If so, how much more (Peru)?**

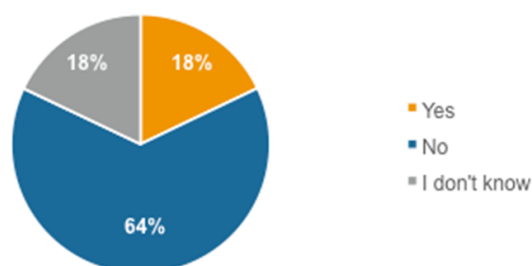


In addition to this stated willingness-to-pay, there is a clear mandate for further actions, investments and interventions. 86% of respondents state that they care about the type of fuel their main mode of transport consumes, and 64% of respondents do not think Peru is transitioning to an alternative fuel transport system at an appropriate rate.

**Figure 72: Do you care what type of fuel your main mode of transport consumes (Peru)?**

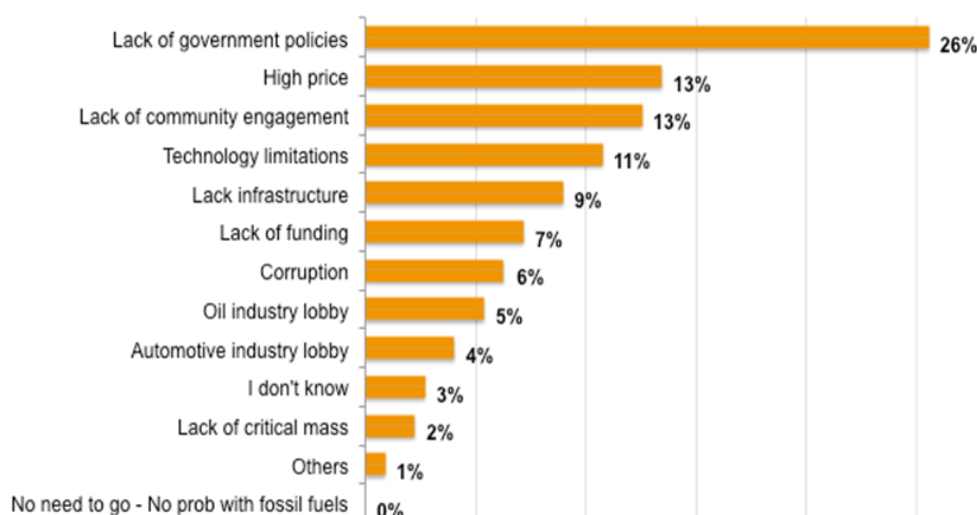


**Figure 73: Do you think your country is transitioning to a transport system utilising alternative transport fuels at an appropriate rate (Peru)?**



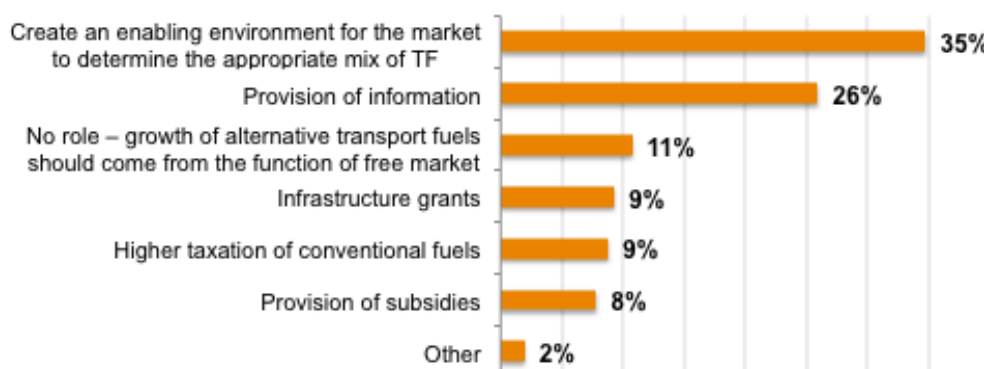
Respondents also believe that government should be the driving force behind the transition. While there is a broad range of reasons that are cited as to why the transition is taking too long, the most commonly cited reason is a 'lack of government policies.' This stands in contrast to the activities undertaken by the Peruvian government, particularly in the biofuels sector, but does give a good mandate for further action - particularly when coupled with the stated consumer's willingness-to-pay.

**Figure 74: Why do you think your country's transition to alternative transport fuels is taking so long (Peru)?**



Understanding what more the government can do is, therefore, a point worth focusing on. The preferred role of government appears to be 'creating an enabling environment for the market to determine the appropriate mix of alternative transport fuels' (35%). This preferred role provides some flexibility in what an 'enabling environment' can be - reflecting the different states-of-play in different countries. A continuation of removal of fossil fuel subsidies, continued blending mandates together with the development of a market for electric vehicles, feasibly falls within this remit. There is also support for greater provision of information.

**Figure 75: What should the role of government be in stimulating the growth of alternative transport fuels (Peru)?**

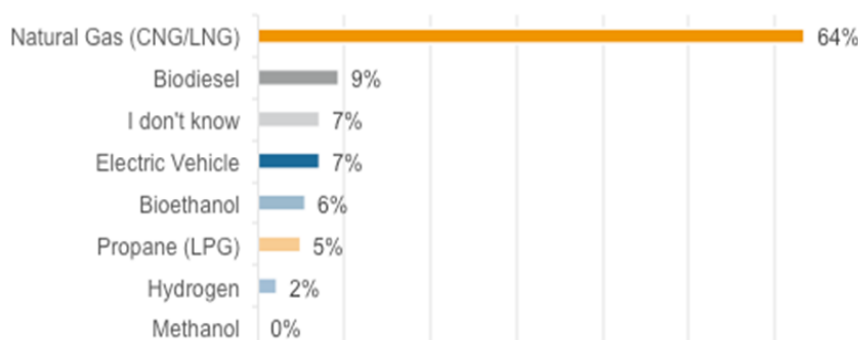


**Natural gas is strongly projected by respondents to contribute most to the transportation system in the next 5-10 years**

- ▶ 64% of respondents thought natural gas would be the major contributor to the fuel mix in the next 5-10 years

Natural gas is projected to be the most important contributor to the transport fuel mix in the next 5-10 years. This is perhaps unsurprising given the substantial natural gas reserves that Peru has discovered and developed in recent years. There is single-digit support for a range of other alternative transportation fuels, suggesting that a diversified fuel mix may also be envisioned.

**Figure 76: Which alternative transport fuel do you think will be the MOST important contributor to your country's transportation fuel mix in the next 5-10 years (Peru)?**

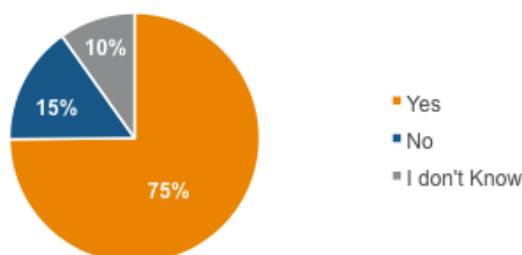


## Consumers are very familiar with the energy-water-food nexus - more so than in any other LAC country surveyed

- ▶ 75% of respondents are familiar with the energy-water-food nexus.
- ▶ 45% of respondents want government to improve the national understanding of the key trade-offs between energy water and food

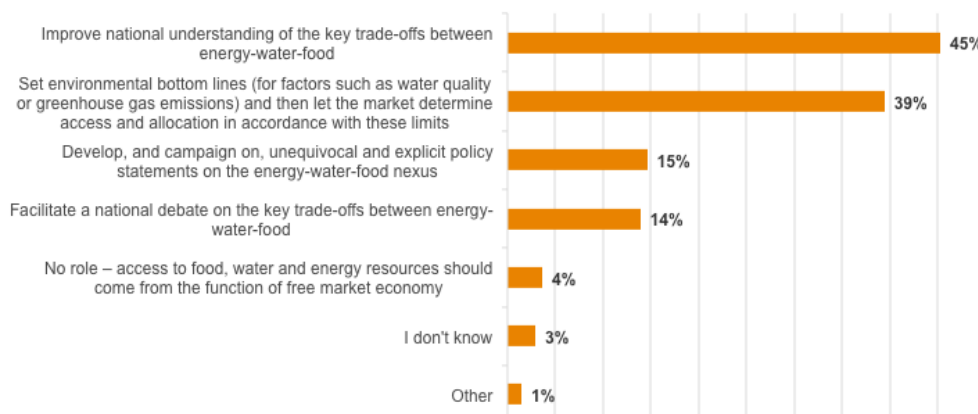
Peru has a diverse primary energy supply mix, most notably with 9% coming from biomass and 8% coming from hydro sources. In this context, water and biomass are important contributors to economic activity. The findings of the energy-water-food nexus questions provide some issues for decision makers to consider - particularly around better understanding the impact of decisions, policies and projects with an energy-water-food dimension.

**Figure 77: Are you familiar with the energy-water-food nexus (Peru)?**



Respondents give government a strong steer that the impacts of decisions affecting the energy-water-food nexus need to be better understood, and that there is a prominent role for government in facilitating better understanding of these trade-offs. Respondents also want governments to set environmental bottom lines.

**Figure 78: What should the role of government be in managing the energy-water-food nexus (Peru)?**





## Trinidad and Tobago

### ‘It appears prudent for Trinidad and Tobago to continue to promote the domestic consumption of natural gas and the export of crude oil’

The twin islands of Trinidad and Tobago (T&T) comprise the southernmost Caribbean nation, just off the coast of Venezuela. It is the largest oil and natural gas producer in the Caribbean, the success of which has enabled T&T to become a country with a higher standard of living than most others in the region.

The oil and gas sector is oriented towards natural gas, though still produces enough oil for export. The country has the third largest natural gas reserves in the LAC region, and the largest natural gas processing facility in the Western Hemisphere. T&T is the world's sixth largest Liquefied Natural Gas (LNG) exporter. Natural gas consumption accounts for almost all domestic electricity needs.

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The oil and gas sector in T&T is nevertheless going through a fundamental shift. The sector accounts for about 48% of GDP and more than 80% of exports, but only 5% of employment. Whereas economic growth averaged over 8% between 2000 and 2007, like most developing countries, T&T's economic growth has been weak (~1.5%) since the global financial crisis, this is due to low natural gas prices, but largely to constrained production as a result of continued infrastructure maintenance. The United States' imports of T&T natural gas have declined by 74% from 2008 to 2013 as a consequence of the shale gas boom and the resulting depressed Henry Hub price. However these LNG cargoes have been going to more lucrative markets in South America, Europe and the Far East.

Given the size of the oil and gas sector in T&T, until now there has not been a significant drive to develop in a sustainable manner alternative transport fuels. This can be attributed to subsidies on conventional transport fuels consumed in the domestic market. The average annual subsidy over the last 5 years has been approximately TT\$ 3.5 billion (approx. US\$ 0.5 billion).

These three dynamics – declining reserves of natural gas, reduced natural gas prices and export demand from abroad, and the presence of significant petroleum subsidies – make it prudent for Trinidad and Tobago to continue to promote the domestic consumption of natural gas and the export of crude oil.<sup>vii</sup>

One of the ways T&T can promote the consumption of natural gas is through the use of natural gas as a domestic transport fuel. The government is now spearheading the roll-out of (35) CNG-equipped fuelling stations by the first quarter of 2016, adding to nine such stations already in existence. If the T&T government can encourage a shift to CNG-powered cars, it will make it more politically acceptable to remove fossil fuel subsidies, reduce carbon emissions, and improve the country's position in the international economy.

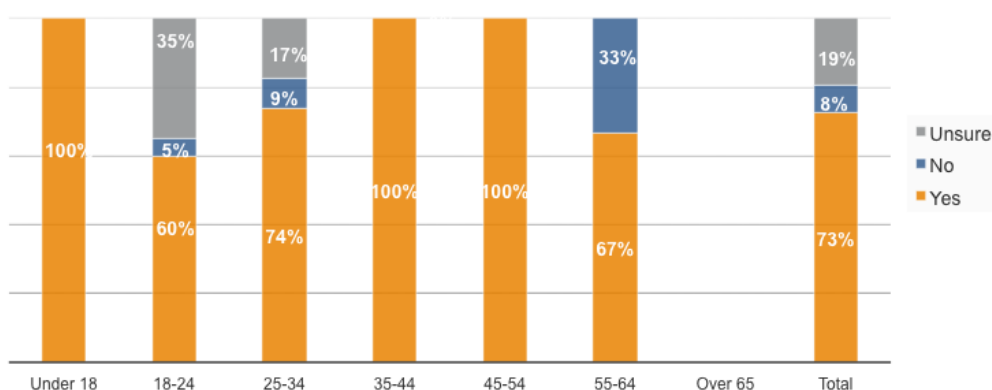
Understanding consumers' attitudes towards alternative transport fuels will help predict the extent to which this initiative will be successful. It is also hoped that understanding consumer attitudes towards alternative transport fuels in T&T will allow the government to gauge political resistance to removing the fossil fuel subsidy, ensure better transport investment decisions are made to ensure economic growth, and guide future steps for a sustainable future. It is to be noted however that the Ministry of Energy and Energy Affairs have recently launched an awareness campaign on the viability, convenience and usage of alternative transport fuels.

### Improved awareness of alternative transport fuels is needed

- ▶ 27% of respondents do not know, or are unsure, what alternative transport fuels are
- ▶ 32% of respondents know whether their private vehicle(s) can utilise any alternative transport fuels

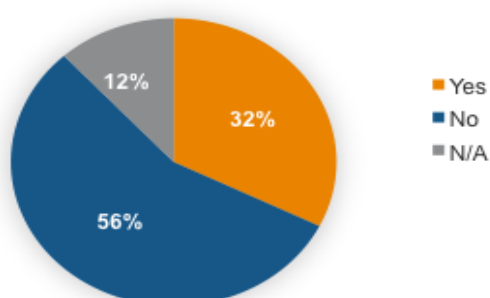
Figure 79 shows that, at a general level, consumers in T&T are less familiar with the concept of alternative transport fuels than the rest of the LAC region (Figure 3). Lack of awareness is assumed to be attributable to two main reasons: first, the country's natural resources has meant that there has been no imperative to promote alternative transport fuels for energy security reasons; second, the presence of the fuel subsidy mean that consumers have no financial incentive to use other fuels.

**Figure 79: Do you know what alternative transport fuels are (T &T)?**



Similar to the LAC responses, it is shown that despite a reasonable amount of respondents knowing what alternative transport fuels are, Figure 80 shows that there are fewer respondents (32%) who know whether their private vehicle(s) can utilise alternative transport fuels.

**Figure 80: Do you know whether your private vehicle is able to utilise any alternative transport fuels (T&T)?**

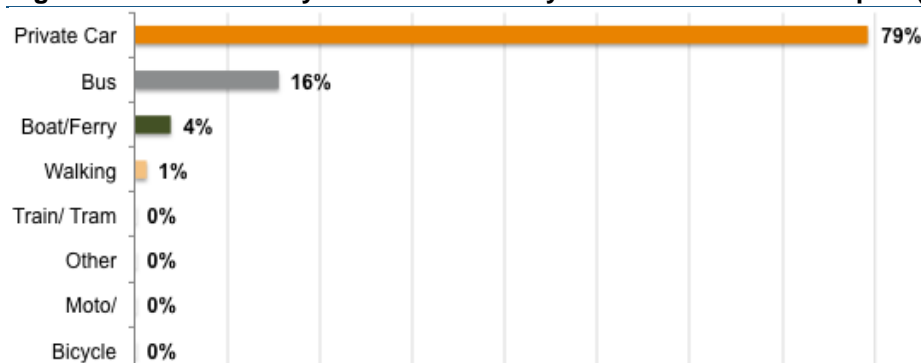


### Private vehicles are the primary mode of transport

- ▶ 79% of respondents cite a private vehicle as their main mode of transport
- ▶ 83% of respondents cite getting to work as their primary reason for travel
- ▶ 95% of respondents note that petrol or diesel fuels their main mode of transport

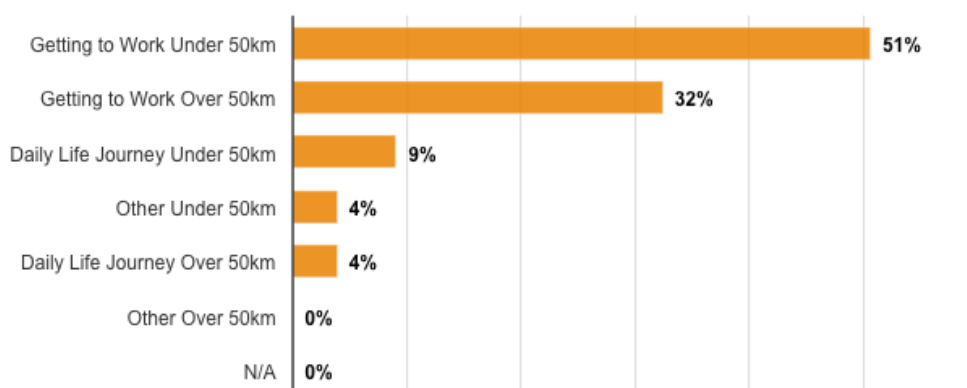
A large majority (79%) of respondents use a car as their main mode of transport. Only 16% use buses and thus public transport use is about half that of the LAC region.

**Figure 81: What would you consider to be your main mode of transport (T & T)?**



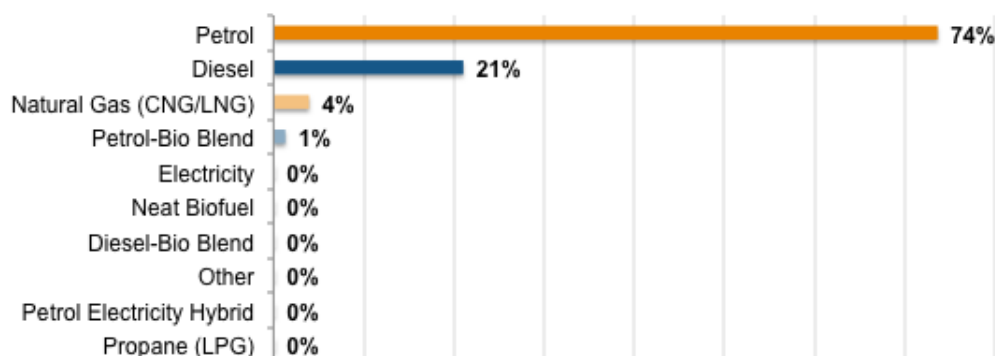
83% of respondents travel to get to and from work and a much smaller group (13%) travel for their errands (examples of daily life journeys given were for school and for groceries). If it becomes acceptable to telecommute – to work from home, it could reduce congestion and fuel use. The majority of the journeys (64%) are short – under 50km. If urban transportation infrastructure can be developed, it could take cars off the road and reduce fuel use.

**Figure 82: What is the main reason for your travel (T&T)?**



Alongside these findings 95% of respondents are found to use either petrol or diesel in their primary form of transportation. With 4% of respondents using CNG as their primary fuel, this is more than the national average – only 2% of passenger cars are CNG enabled nationally.

**Figure 83: Do you know what type of fuel your main mode of transport consumes (T & T)**



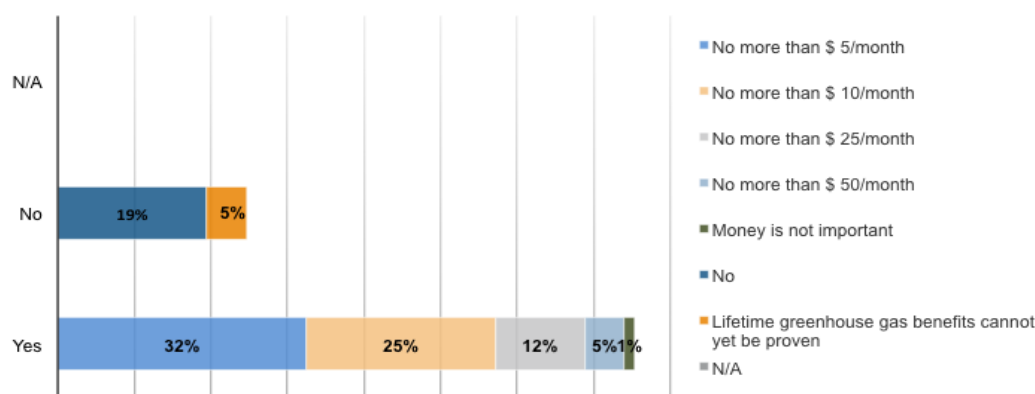
### Consumers are willing to pay more for alternative transport fuels

- ▶ 76% of respondents say they would pay more per month for alternative transport fuels that have lifetime GHG benefits over fossil fuels
- ▶ 75% of respondents do care about the type of fuel that their main mode of transportation uses

The majority of consumers say they were willing to pay more for alternative transport fuels – similar to the LAC average. 75% of respondents report that they do care about the type of fuel their mode of transportation uses.

Given income inequality is not as severe in T&T as compared with other countries in the LAC region, and since GDP per capita is much higher, increases in transportation costs are currently more politically feasible (relatively speaking) than other countries.

**Figure 84: Would you be prepared to pay more per month for transport fuels with lower lifetime greenhouse gas emissions than conventional transportation fuels? If so, how much more (T&T)?**



### Getting consumers to choose alternative transport fuels will be difficult without financial incentives

- ▶ 12% of respondents say that they would choose alternative transport fuels because of greenhouse gas mitigation benefits
- ▶ The responses of 54% of respondents suggest alternative transport fuels would need to be cheaper than fossil fuels before a switch is considered

There are a range of reasons that consumers cite as being important to changing behaviour. A lower proportion of respondents (12%) state they would choose alternative transport fuels for greenhouse gas reduction reasons as compared to the LAC-wide response (25%). This is interesting as T&T respondents could be expected to care more about the risk of global warming: T&T is at risk from sea level rise and is an active member of the Alliance of Small Island States, suggesting that people do not see their decisions and actions as detrimental to that of their country's long-term future.

**Figure 85: What would be the main reason(s) for you to switch to alternative transport fuels (T&T)?**

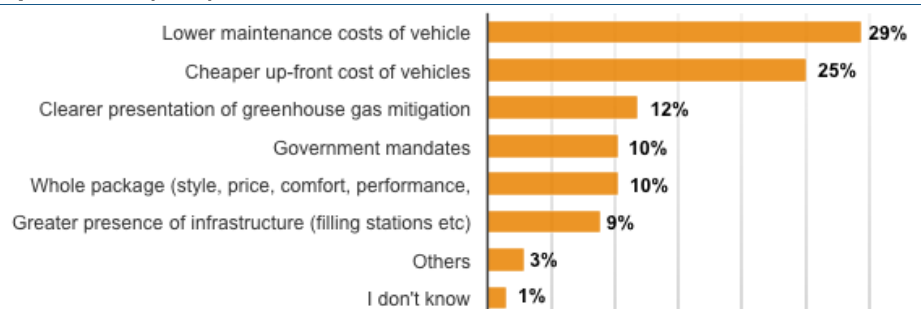


Figure 84 suggests that respondents would be willing to pay more to switch to alternative transport fuels, whereas Figure 85 suggests that cost incentives are needed for them to make the switch to using alternative transport fuels. The combination of these two results suggests that cost incentives to switch to alternative transport fuels are needed.

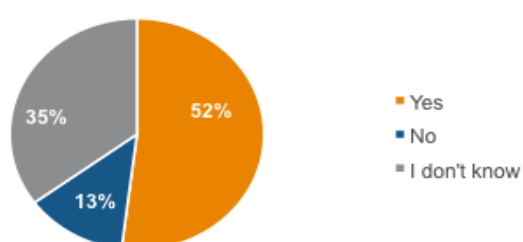
It is also important to note that the government's initiative to build 35 CNG filling terminals by 2016 will not be the only policy needed to encourage uptake of alternative transport fuels – only 9% of respondents said that the primary reason to choose alternative transport fuels would be a greater presence of infrastructure. Additional measures to make CNG competitive will be necessary.

### There is a role for government in promoting alternative transport fuels

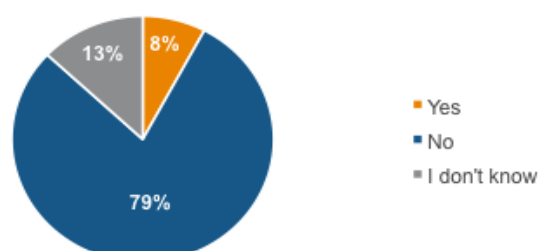
- ▶ 52% of respondents know that their government is taking action to promote the uptake of alternative transport fuels
- ▶ 79% of respondents feel that the country is not transitioning to an alternative transport fuel future at an appropriate rate

Figure 84 shows there is a willingness to allow change – people do believe that a transport system utilising alternative transport fuels should be possible. People are aware that the T&T government is making moves to promote alternative transport fuel uptake (Figure 86), however the results of government actions are seen to be insufficient (Figure 87).

**Figure 86: Do you know whether your government is currently taking any action to promote alternative transport fuel uptake (T&T)?**

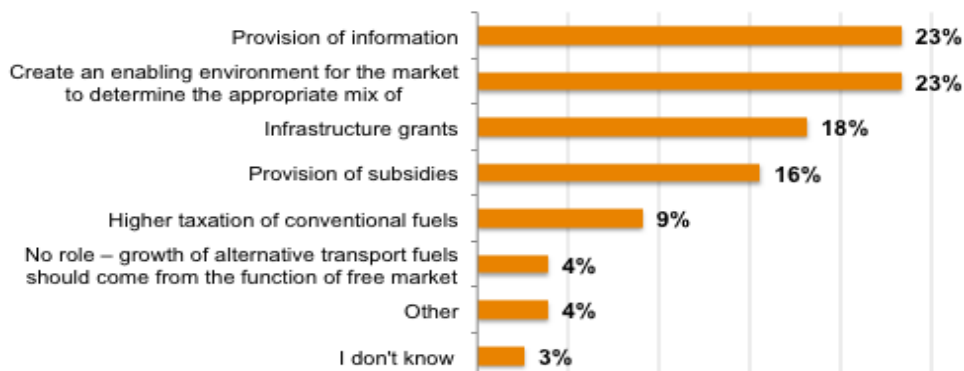


**Figure 87: Do you think your country is transitioning to a transport system utilising alternative transport fuels at an appropriate rate (T&T)?**



These results show it is important to understand what government can do to improve. 'Provision of information' and the 'creation of an enabling environment' were the two most popular choices for the role of government in promoting alternative transport fuels. Whether or not an 'enabling environment' can be considered support for removal of fuel subsidies is debatable. There is also support for infrastructure grants.

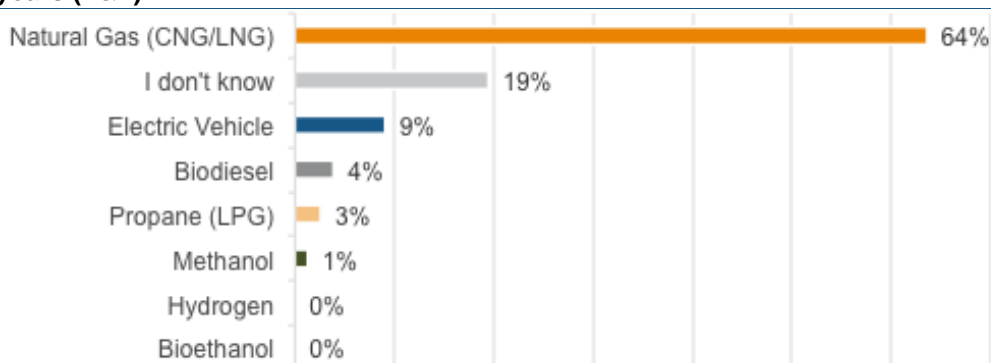
**Figure 88: What should the role of government be in stimulating the growth of alternative transport fuels (T&T)?**



### Consumers have little doubt about the future role of CNG in the market

- ▶ 64% of respondents think that natural gas will be most important contributor to the transport fuel mix in the next 5-10 years

**Figure 89: Which alternative transport fuels do you think will be the MOST important contributor to your country's transportation fuel mix in the next 5-10 years (T&T)?**



The role of natural gas is well established in T&T and is likely the only alternative transport fuel to be adopted in the near future. Facilitating a swap in consumption from petrol to CNG based cars will be highly beneficial strategically and economically for the country. However, it will be difficult for several reasons. First, people have invested in (expensive) cars which means that they are unable to switch to a CNG based car right away. Second, there needs to be a cost incentive for consumers to

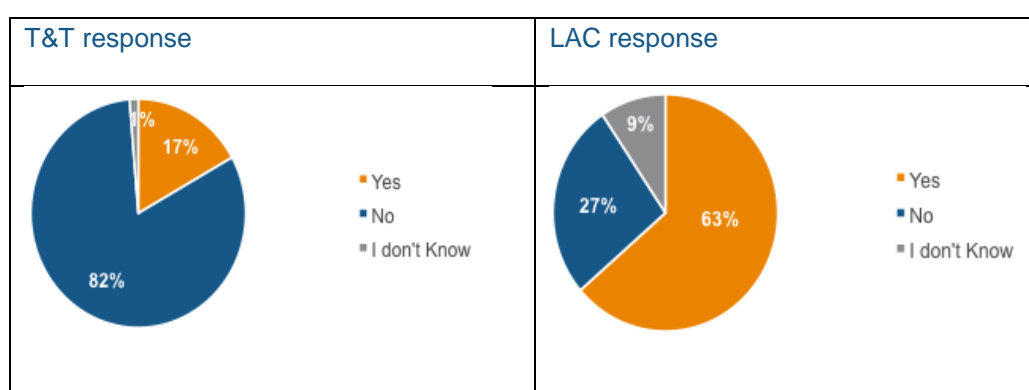
switch to CNG based cars. This, it seems, is sensible from an economic and fiscal perspective for T&T government remove fossil fuel subsidies. The survey has also shown that there is consumer appetite for change - which may allay concerns around the level of political capital required to make such a change.

### Consumers were not familiar with the energy-water-food nexus

- ▶ Only 17% of respondents are familiar with the energy-water-food nexus.

Compared to the LAC response rate (63%) respondents in the T&T sample are much less familiar with the energy-water-food nexus as demonstrated in Figure 90.

**Figure 90: Are you familiar with the energy-water-food nexus (T&T and LAC)?**



The energy-water-food nexus is unlikely to come into play for T&T with respect to alternative transport fuels, because biofuels and electric cars are unlikely to be widely utilised (owing to the country's clear natural gas advantage). However, it is interesting to see how the country's strength in natural gas is illustrated into attitudes about the energy-water-food nexus.

The energy-water-food nexus is an important one for Trinidad but not in the context of alternative transport fuels, at least for the short-term. With only limited land and fresh water, addressing issues in the nexus will be important for the sustainability of the country, but there may be limited leeway to do so, given the country's strong oil and natural gas resources.



## Uruguay

‘Government intervention has encouraged the uptake of alternative transport fuels, but there is room for improvement, particularly when it comes to public awareness of alternative transport fuels and the options available to motorists.’

Uruguay is the second smallest country by area in South America and has the fourth smallest population, with 60% concentrated in the metropolitan area of Montevideo. The Human Development Index places Uruguay in third place among those with the highest level of human development and it is one of the most equitable countries in Latin America.

Uruguay's economy is based on agriculture, cattle rearing, industries and services. Mineral and energy resources are scarce, and its main industries are: dairy products, abattoirs, alcohols, paper mill, cement and oil refining.

The country has shown significant economic growth during the period 2000-2013 including a steady annual increase of GDP per capita. Most recently, Uruguay's GDP increased 4.4% on 2012.

Uruguay has not, to date, developed proven reserves of crude oil, natural gas or coal. It has already taken full advantage of large-scale hydro resources and, consequently, has a significant climatic dependence on the electricity sector. It also has several power plants, based on gas, diesel oil and fuel oil, which are used as a backup in the absence of water. Uruguay is in the process of diversifying the electricity mix with the installation of wind power plants, biomass plants and the construction of a LNG plant.

In 2012 Uruguay's energy supply mix consisted of 59% oil and oil products, 29% biomass, 10% hydro-electric power and a marginal share of natural gas and imported electricity. The final energy consumption in Uruguay had an increase of 1% compared to 2011 and the largest increase was recorded in biofuels.

Transportation modes are dominated by road (97%). The remaining 3% is shared between marine, rail and aviation transport, so the most consumed energy products in 2012 were diesel oil (54%) and gasoline (43%). In recent years, gasoline has increased its market share in the mix while diesel has dropped, largely due to changes in relative prices between diesel and gasoline.

Uruguay is a net importer of natural gas, but it is mainly used to meet residential demand. The uncertainty of natural gas supply has limited the possibility of venturing into CNG technology. There is currently a lack of existing technology for CNG uptake in the transportation sector.

Uruguay's utilisation of alternative fuels began in the 2000s, with the introduction of biofuels. Given the country's natural conditions for crops and the absence of domestic reserves of fossil fuels, it is unsurprising that successive governments have been relatively interventionist in promoting biofuels policies.

The country produces its own biofuels for the domestic market. Penetration of the local market is helped by the existence of public policies that set blending mandates, targets and incentives through a legal framework. The aim of these policies is to encourage energy diversification and substitution of oil products, reduce dependence on foreign energy, reduce greenhouse gases and emissions that can cause adverse health effects, promote the development of agribusiness chains, and promote the economic and social development of different regions within Uruguay.

Biofuels have been part of the energy mix in Uruguay since 2010. The share of biofuels in the transport sector was 2% in 2012. Nowadays, the average blend corresponds to 5% ethanol in automotive gasoline and 5% biodiesel in diesel. Biofuels production capacity is expected to increase threefold by next year, and there are discussions around the possibility of further increasing the blending ratio.

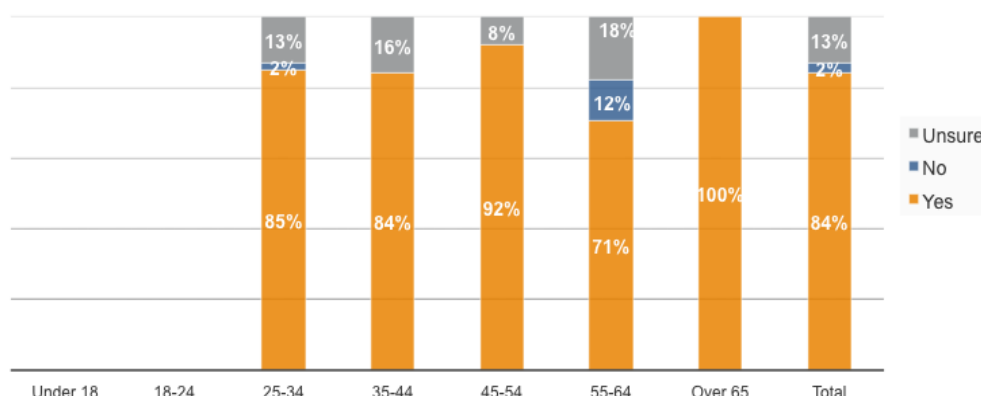
Electric vehicles in the transport sector are slowly making inroads with the addition of hybrid and pure electric vehicles. Although the size of their fleet is still small (less than 0.1% of the total fleet), there are discussions around expanding this at municipal and national levels by introducing incentives that encourage the uptake of electric vehicles.

**Awareness of alternative transport fuels in Uruguay is better than the LAC regional average however information on technology adaptability of private vehicles is weak**

- ▶ 84% of respondents know what alternative transport fuels are
- ▶ 48% of respondents know whether their private vehicle(s) can utilise any alternative transport fuels
- ▶ 26% of respondents cite use of alternative transport fuel in their private vehicle 'because there is no other option'

At a general level, consumers in Uruguay are more familiar with the concept of alternative transport fuels than the LAC regional average, as demonstrated in Figure 91.

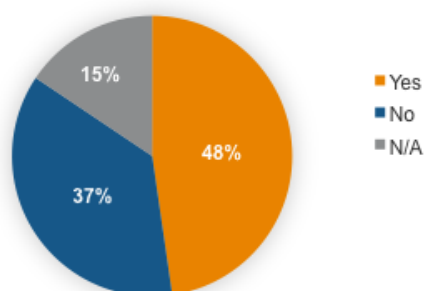
**Figure 91: Do you know what alternative transport fuels are (Uruguay)?**



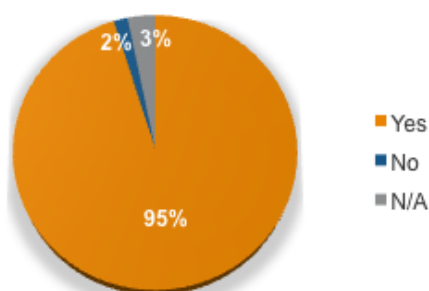
While knowledge of alternative transport fuels is generally higher than other LAC countries, only half of the surveyed group know whether their personal vehicles can utilise alternative transport fuels (Figure 92). This finding is in spite of 95% of respondent's stating that they know what type of fuel their main transport mode uses (Figure 93).

Figure 94 suggests that just 26% of respondents with access to private vehicles cite that they use alternative transport fuels 'because there is no other option'. This appears to be related to a lack of information on alternative transport fuels in Uruguay. This suggests the government may need to do a better job of communicating actions and policies to the public.

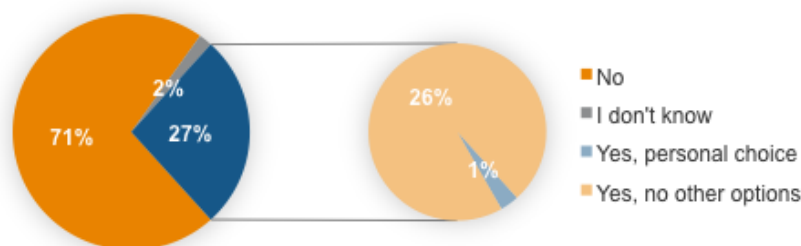
**Figure 92: Do you know whether your private vehicle is able to utilise any alternative transport fuels (Uruguay)?**



**Figure 93: Do you know what type of fuel your main mode of transport consumes (Uruguay)?**



**Figure 94: Do you use alternative transport fuels in your private vehicle (Uruguay)?**

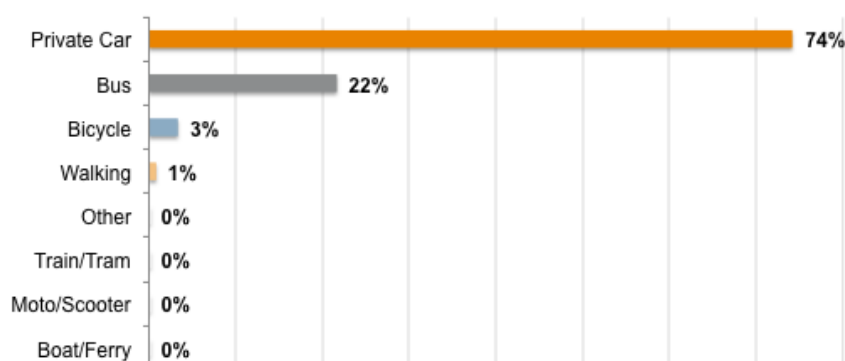


### Respondents cite the use of private vehicles to drive short distances as the primary mode and distance of travel

- ▶ 91% of respondents have access to at least one private vehicle
- ▶ 22% of respondents cite public transport as their main mode of transport
- ▶ 76% of respondents cite getting to work as their primary reason for travel
- ▶ 80% of respondents note that petrol or diesel fuels are used by their main mode of transport
- ▶ 7% of respondents note that petrol-electricity hybrid fuel is used by their main mode of transport. This is considerably different to road fleet composition (less than 0.1%) and is significantly higher than results for any other LAC country

The majority (74%) of respondents use the car as their main mode of transport, while only 22% use buses. Public transport use is lower than the LAC regional average whilst the non-motorised modes of transport use is higher than the LAC regional survey. The binary approach to transport modes in Uruguay (with cars and buses dominating) is also reflected by the relative paucity of viable rail alternatives.

**Figure 95: What would you consider to be your main mode of transport (Uruguay)?**



A significant 91% of respondents have access to at least one vehicle. This is above the LAC regional average, and correlates with the fact that Uruguay are a well-developed nation with relatively high vehicle ownership rates.

**Figure 96: How many private vehicle(s) do you have access to (Uruguay)?**

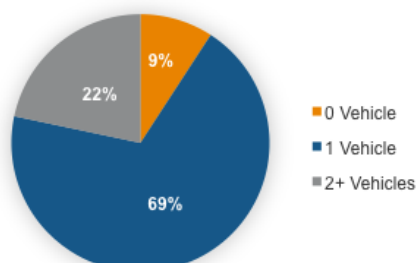
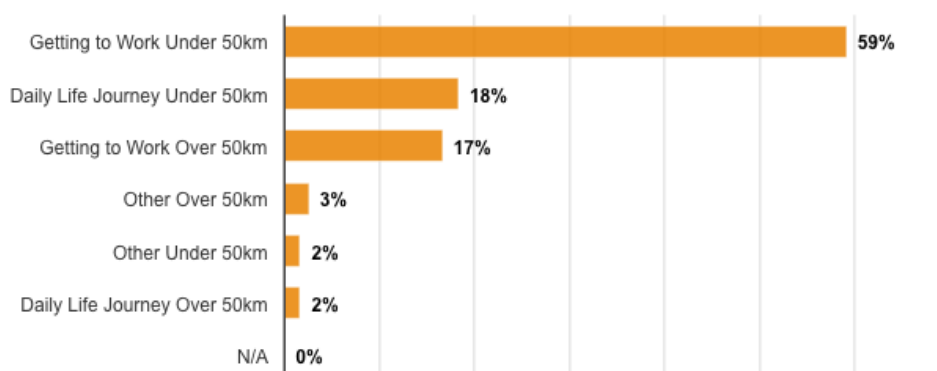


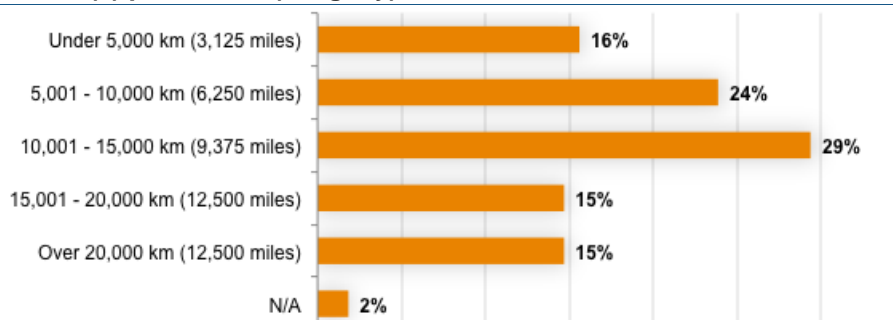
Figure 97 shows that 76% of respondent's main reason for travel is to get 'to and from work'. Consistent with trends across all other countries, 'getting to work - under 50km' is the main reason for peoples' travel (59%). However, there is a relatively high response rate for 'daily life journeys - under 50km' (18%) as compared to LAC average of 12%. This suggests that the respondents live in relatively small cities where the distances between places are short.

**Figure 97: What is the main reason for your travel (Uruguay)?**



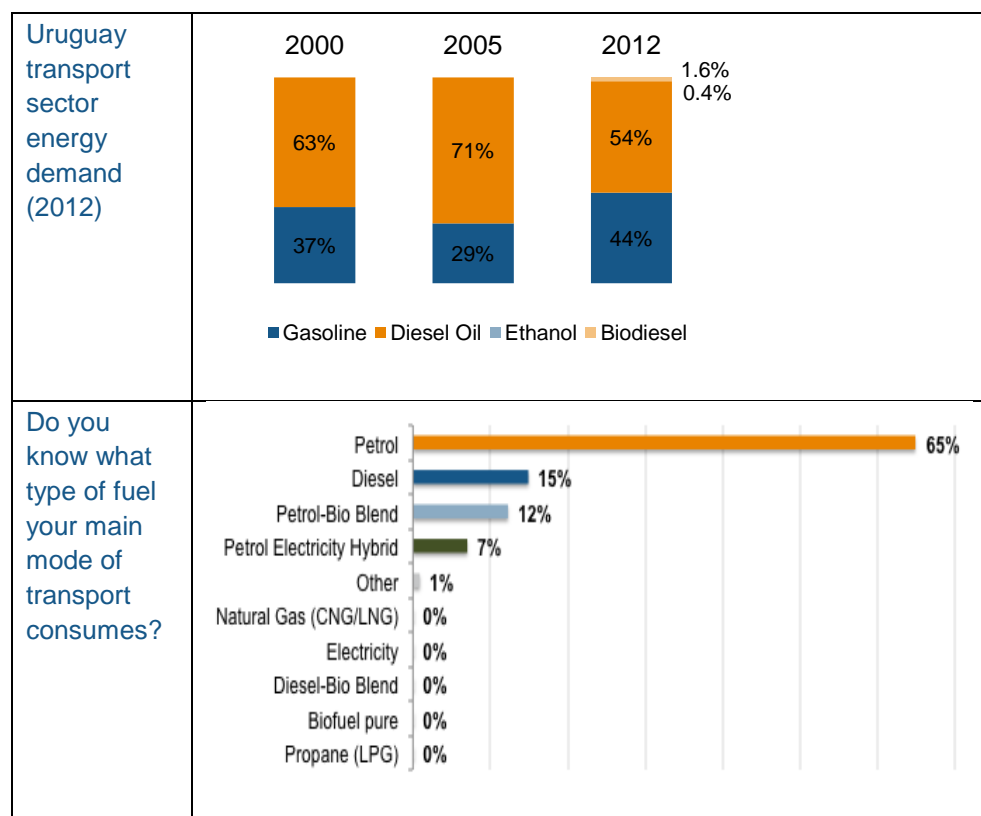
A high number of respondents (69%) travel less than 15,000km per year (Figure 98). Combining the high uses of private cars with the limited options of public transport reinforces the assertion that short trips will dominate Uruguayans transport needs and that further public transport improvements and investments might be justified.

**Figure 98: On average, how many km's (miles) do you travel in your private vehicle(s) per annum (Uruguay)?**



The survey also highlights that 80% of respondents use either petrol or diesel in their primary form of transportation. A notable 7% of respondents use a petrol/electricity-hybrid as their primary fuel. This is surprising since it is much higher than the share of these vehicles in the road fleet composition (less than 0.1%) and is significantly higher than any other LAC country.

**Figure 99: Comparison between Uruguay transport sector energy demand and response to survey question 9 - Do you know what type of fuel your main mode of transport consumes (Uruguay)?**

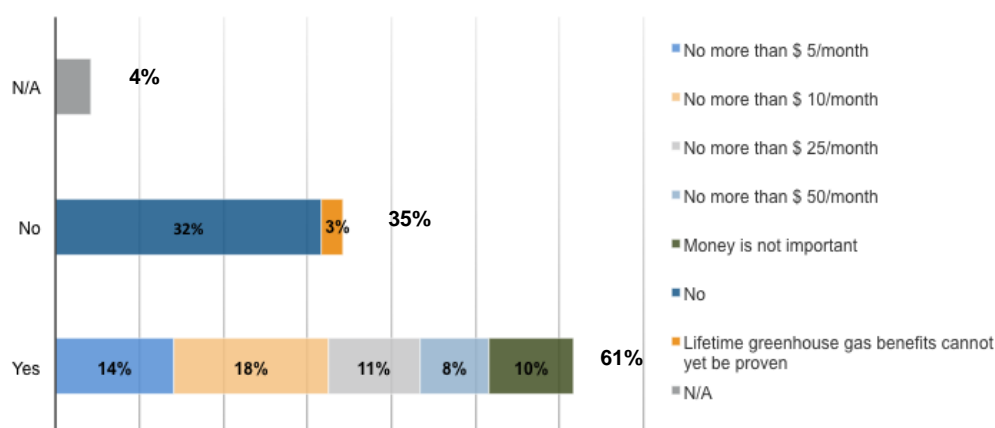


### Consumers say they are willing to pay more for alternative transport fuels - albeit less than the LAC average

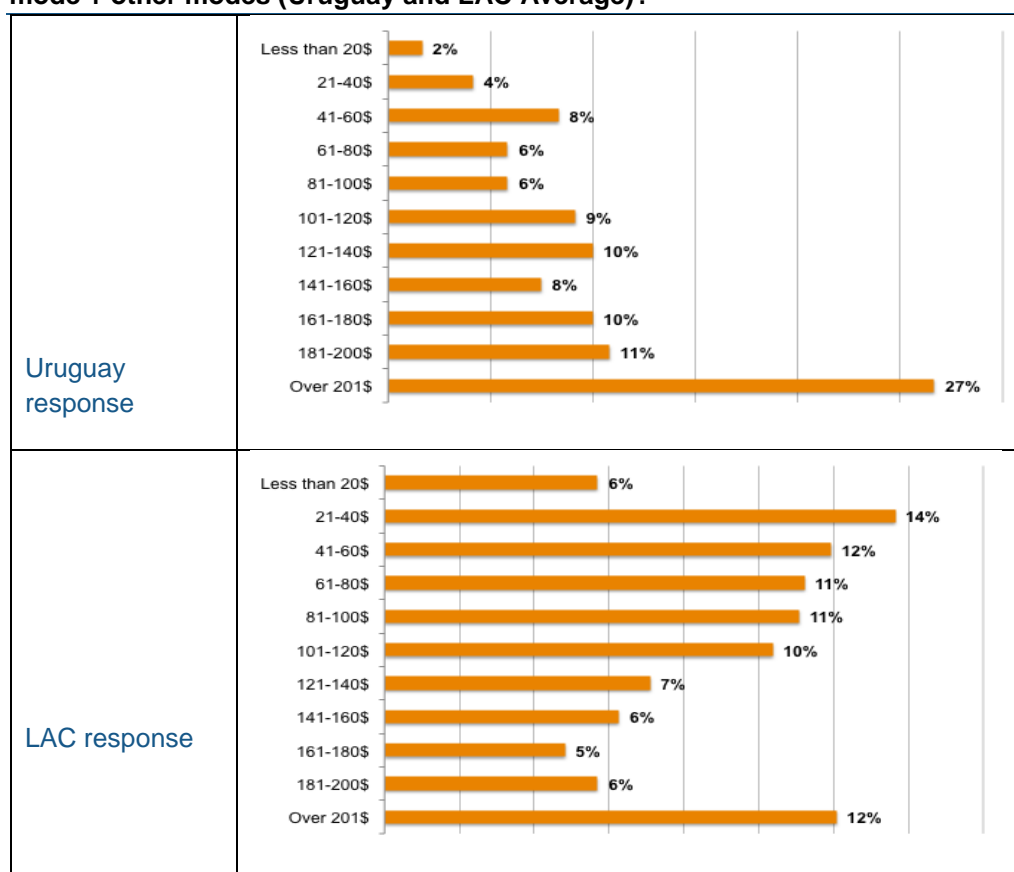
- ▶ 66% of respondents spend more than US\$ 121 per month on transport costs, yet 61% of respondents state they would pay more per month for alternative transport fuels that have lifetime GHG benefits over conventional transport fuels
- ▶ 78% of respondents care about the type of fuel their main mode of transportation uses

Figure 100 shows that 61% of respondents say they are willing to pay more for alternative transport fuels. Uruguayan responses show how expensive transportation already is in the country with 27% of the respondents spending more than US\$ 201 per month; more than twice of the average LAC region. This high level of expenditure on transportation, perhaps explains why 32% of respondents are prepared to pay less than US\$ 10 extra per month.

**Figure 100: Would you be prepared to pay more per month for transport fuels with lower lifetime greenhouse gas emissions than conventional transportation fuels? If so, how much more (Uruguay)?**



**Figure 101: How much do you currently pay for transportation per month - main mode + other modes (Uruguay and LAC Average)?**

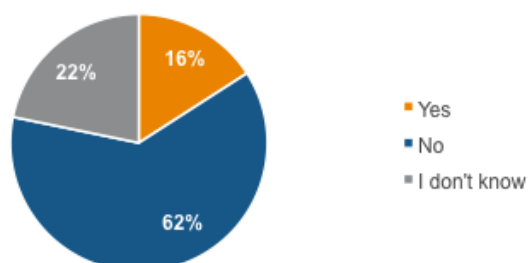


## Mixed views on why Uruguay is not transitioning to a transport system utilising alternative transport fuels at an appropriate rate

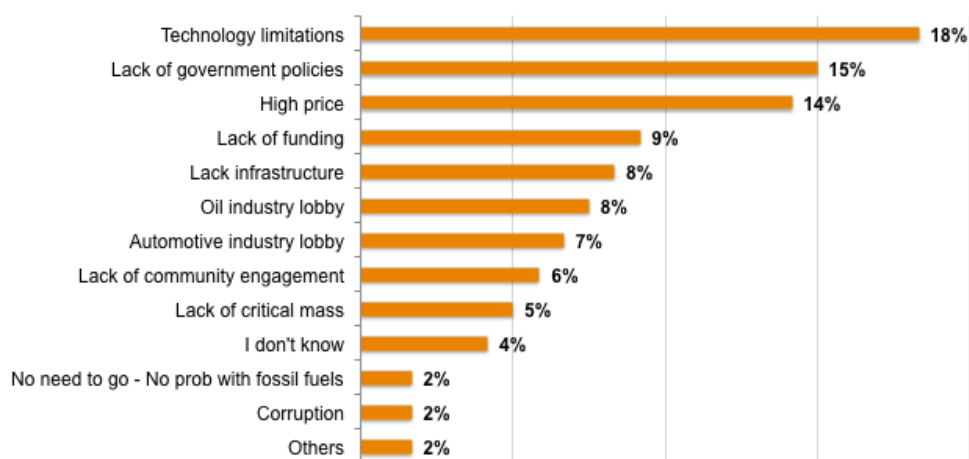
- ▶ 62% of respondents do not think that the country is transitioning to a transport system utilising transport fuels at an appropriate rate
- ▶ Technology limitations (18%), lack of government policies (15%) and high prices (14%) are cited as the main reasons
- ▶ 61% of respondents know that government is taking action to promote alternative transport fuels

62% of respondents do not believe Uruguay is transitioning to a transport system utilising transport fuels at an appropriate rate and cite technologic limitations, lack of government policies and high prices as the main reasons. However, 61% of respondents think the government is taking action to promote alternative transport fuels. This is significantly higher than the LAC average.

**Figure 102: Do you think your country is transitioning to a transport system utilising alternative transport fuels at an appropriate rate (Uruguay)?**



**Figure 103: Why do you think your country is not transitioning to a transport system utilising alternative transport fuels at an appropriate rate (Uruguay)?**





**Figure 104: Do you know whether your government is currently taking any action to promote alternative transport fuel uptake (Uruguay)?**

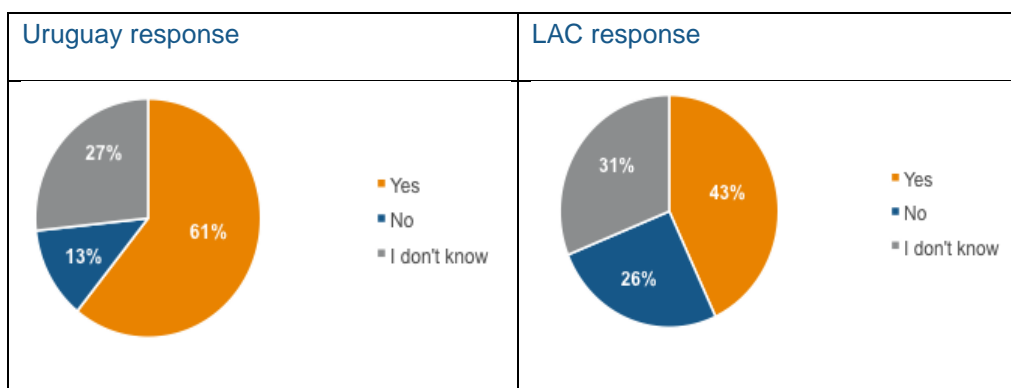
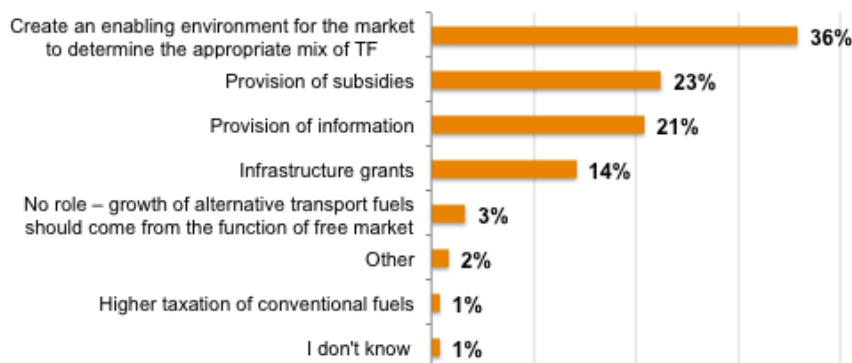


Figure 105 shows the preferred role of government is perceived as 'creating an enabling environment for the market to determine the appropriate mix of alternative transport fuels' (36%). This preferred role provides some flexibility in what an 'enabling environment' could be, but a continuation of blending mandates, exceptions or reductions of taxes for alternative transport fuel powered vehicles and development of a market for electric and CNG vehicles could feasibly fall within this remit. Furthermore, 21% of the respondents believe the government should provide more information on alternative transport fuels, and 23% think that the government needs to provide more subsidies.

**Figure 105: What should the role of government be in stimulating the growth of alternative transport fuels (Uruguay)?**



### Mixed views on which fuel will contribute most to the transportation system in the next 5-10 years

- ▶ Biodiesel (28%), CNG (22%) and bioethanol (19%) are projected to be the major contributors to the fuel mix in the next 5-10 years
- ▶ 23% of the respondents are unsure which will be the most important contributor to Uruguayan transportation fuel mix in the next 5-10 years.

**Figure 106: Which alternative transport fuels do you think will be the MOST important contributor to your country's transportation fuel mix in the next 5-10 years (Uruguay)?**

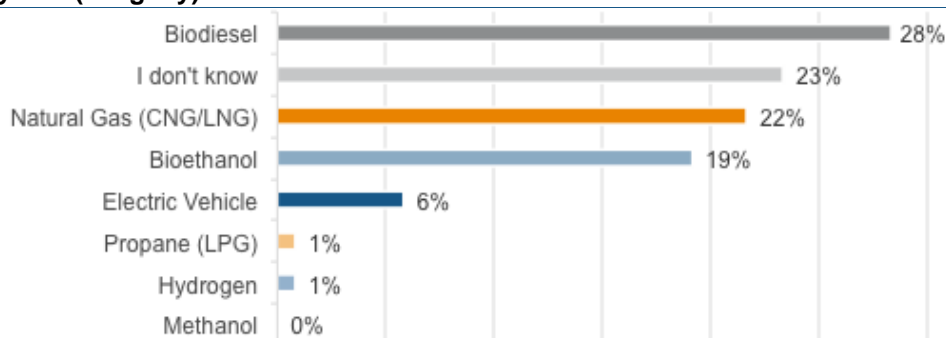


Figure 106 shows biodiesel is projected to be the major contributor to the Uruguayan transportation fuel mix in the next 5-10 years. This may represent perceptions of strong biodiesel policies and high consumer demand.

Conversely, Uruguay has not yet developed a CNG vehicles market because it is a net importer of natural gas. The uncertainty in the continuity of natural gas supply has limited the possibility of venturing in the CNG technology. In 2016, Uruguay will have an own LNG plant, so it is not surprising that 22% of respondents think CNG may be popular in the near future. This gives government scope to investigate and implement the way of uptake this alternative transport fuel.

23% of the respondents are unsure which will be the most important contributor to Uruguayan transportation fuel mix in the next 5-10 years. This, combined with the results in Figure 105, suggests that government may be best placed to inform people about policies, benefits, tax exemptions, and uses of alternative transport fuels.

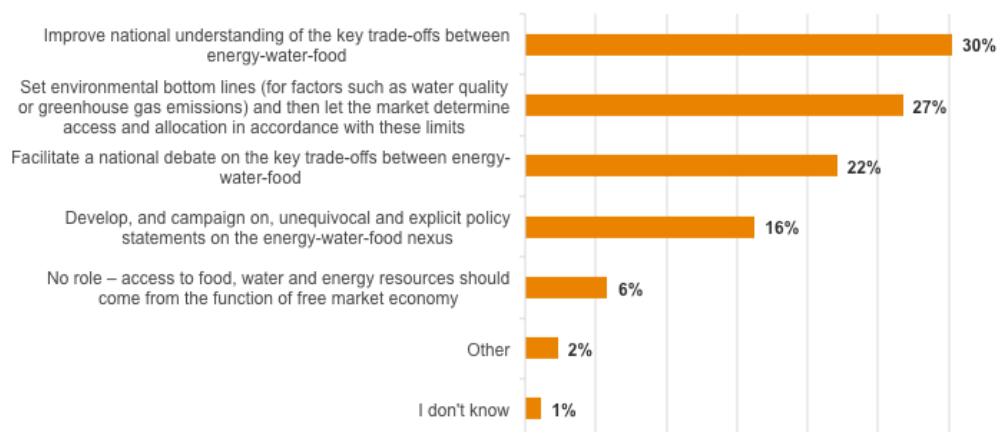
### Consumers are very familiar with the energy-water-food nexus

- ▶ 72% of respondents are familiar with the energy-water-food nexus
- ▶ 30% of respondents consider that the government should improve national understanding of the key trade-offs between energy-water-food
- ▶ 27% of respondents want government to set environmental bottom lines (for factors such as water quality or greenhouse gas emissions) before letting the market determine whether energy projects should proceed

Uruguay generates 10% of its primary energy supply from hydro energy and 29% from biomass (2012). Furthermore, agriculture and livestock form a significant part of the economy. The findings of the energy-water-food nexus questions provide some guidance for decision makers - particularly around better understanding the impact of decisions.

Respondents believe that Government has a strong role to play in decision making around energy projects that have an energy-water-food nexus dimension with 30% wanting government to 'improve national understanding of the key trade-offs'. Equally significantly, 27% of respondents consider government should 'set environmental bottom lines (for factors such as water quality or greenhouse gas emissions) before letting the market determine whether energy projects should proceed'.

**Figure 107: What should the role of government be in managing the energy-water-food nexus (Uruguay)?**



## 5. Conclusions and recommendations

‘The results of the survey show the LAC region is sending a strong signal to decision makers that a transition to an alternative transport fuel future is not only warranted, but desirable.’

### Conclusions

It is clear from the findings of the survey that awareness of alternative transport fuels is high and there is a substantial willingness-to-pay for transport fuels that have better greenhouse gas credentials than conventional transport fuels. These signals are consistent with the goals of the energy trilemma.

Consumers across the LAC region are sending a strong signal to decision makers that a transition to an alternative transport fuel future is not only warranted, but desirable. This signal stands in contrast to the findings of the World Energy Issues Monitor, (which captures the views of around 800 energy leaders, globally. This disconnect, between the perceived priorities of energy leaders and what consumers say they want, may have contributed to the lack of recent penetration of alternative transport fuels in the LAC region. It is hoped that a greater awareness of consumer opinions will create sufficient incentives for action.

While awareness and willingness-to-pay is relatively high, solutions are less well defined: there is no single policy solution that can be universally applied. Demonstrating the level of appetite for policies that promote the uptake of alternative transport fuels in different countries and regions is, however, a necessary step.

Responses to the survey highlight a range of potential actions that could improve the uptake of alternative transport fuels. Options will need to be regionally and nationally tailored and will need to be undertaken by a range of stakeholders including policymakers, vehicle manufacturers, alternative transport fuel providers, urban planners, NGOs and academics.

## Recommendations

It is believed that the following non-exhaustive list of recommendations will help speed-up the necessary transition to an alternative transport fuel future, thereby contributing to energy trilemma goals.

### **Consumers in the LAC region do care about the type of transport fuel they use. They say they are willing to pay more, per month, for fuels with lower greenhouse gas emissions than conventional fuels**

- ▶ Decision makers within public and private institutions, should note the high demand for products, investments and policies that encourage and enable greater uptake of alternative transport fuels
- ▶ The sample bias should be noted - the implications of policies that promote alternative transport fuels must be cognisant of potential impacts on lower socio-economic groups
- ▶ Governments should research and ensure transparency around the true fiscal cost of fossil fuel subsidies, including impacts on alternative transport fuels

### **Consumers in the LAC region are more familiar with the energy–water–food nexus than consumers in other parts of the world, but need more evidence on the quantifiable impacts**

- ▶ There is a clear role for decision makers to work together to inform and communicate to the public the quantifiable impacts of policies or projects that have an energy-water-food nexus dimension
- ▶ There is a need for intelligence and transparency around successful approaches to communicating the impacts of policies and activities with an energy-water-food dimension

### **Consumers in the LAC region do not think that the transition to alternative transport fuels is happening fast enough. A lack of government support is cited as the main reason for this lethargy**

- ▶ There is a clear mandate for governments to introduce policies, deliver investment and develop incentives to promote the uptake of alternative transport fuels. The specific mix of policies, investments and incentives needs to be nationally and regionally tailored
- ▶ Governments should tailor policies, investment and incentives towards fuels that they have a comparative strength in producing
- ▶ Governments should look to remove distortions in the market that discourage the uptake of alternative transport fuels; research and transparency around the true fiscal cost of fossil fuel subsidies is required

### **A plurality of consumers in the LAC region see natural gas as the most significant contributor to the alternative transport fuel mix in 5-10 years**

- ▶ Countries that may look to grow their natural gas demand, such as Trinidad and Tobago, could benefit from best practice around interventions that have assisted the uptake of the domestic consumption of natural gas in other countries

### **LAC respondents show good general awareness of alternative transport fuels, but lack information that might prove beneficial in a practical sense**

- ▶ The automotive industry, alternative transport fuel sector and government should work together to improve consumer knowledge of vehicle capabilities
- ▶ A catalogue of measures to improve alternative transport fuel awareness should be developed. For example, this could include: a section on alternative transport fuels when people sit their drivers' licences; building energy awareness into public education systems; and utilising advertising space on public transport to promote awareness of alternative transport fuels

### **LAC respondents note that their main reasons for travel occurs over short distances (under 50km)**

- ▶ Urban planners and governments are challenged to continue to prioritise urban transportation infrastructure that take cars off the road and reduce fuel use
- ▶ Local governments, urban planners, and public transport operators should continue to prioritise alternative transport fuel use in public transport systems

## 6. Appendices

### Statistical limitations and sample biases

The survey is designed to provide an indication of consumer attitudes towards alternative transport fuels; it is not designed to be fully representative of entire communities. Accordingly, the survey findings should be used as an additional discussion aid for policymakers, urban planners, transport fuel representatives, automotive manufacturers, academics and NGO's.

#### Statistical Limitations

Region	Population (estimates)	Urban Population (estimates)	Sample size
Global	7,240,000,000	3,125,600,000	2,585
LAC	500,000,000	450,000,000	711
Argentina	41,100,000	37,700,000	94
Brazil	198,700,000	160,000,000	115
Colombia	47,700,000	35,100,000	65
Peru	30,800,000	20,300,000	186
Trinidad and Tobago	1,300,000	159,000	77
Uruguay	3,400,000	319,000	121

#### Survey Distribution

Platform: undertaken online and distributed in multiple languages. In some cases, hard-copies of the survey were distributed by some members of the WEC community.

Marketing: marketed directly to FELs and WEC Member Committees in the first instance through email. Representatives were encouraged to circulate to personal and professional networks, as well as to put on pseudo-public forums where possible – for example intranets and social media platforms.

#### Sample Biases

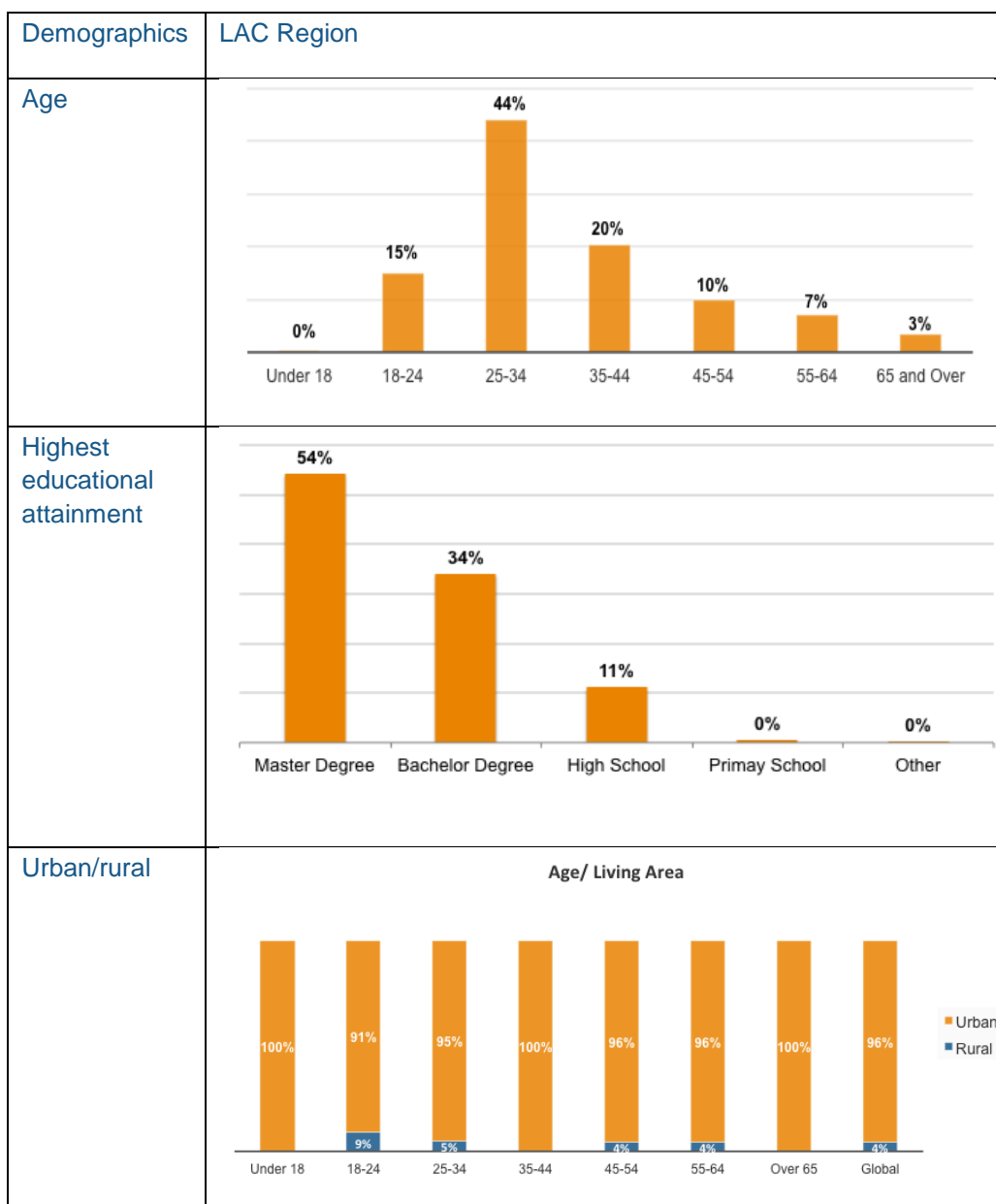
The demographic data shows that there is a clear bias in the sample towards young, educated and urban professionals - at a global, LAC and individual country level.

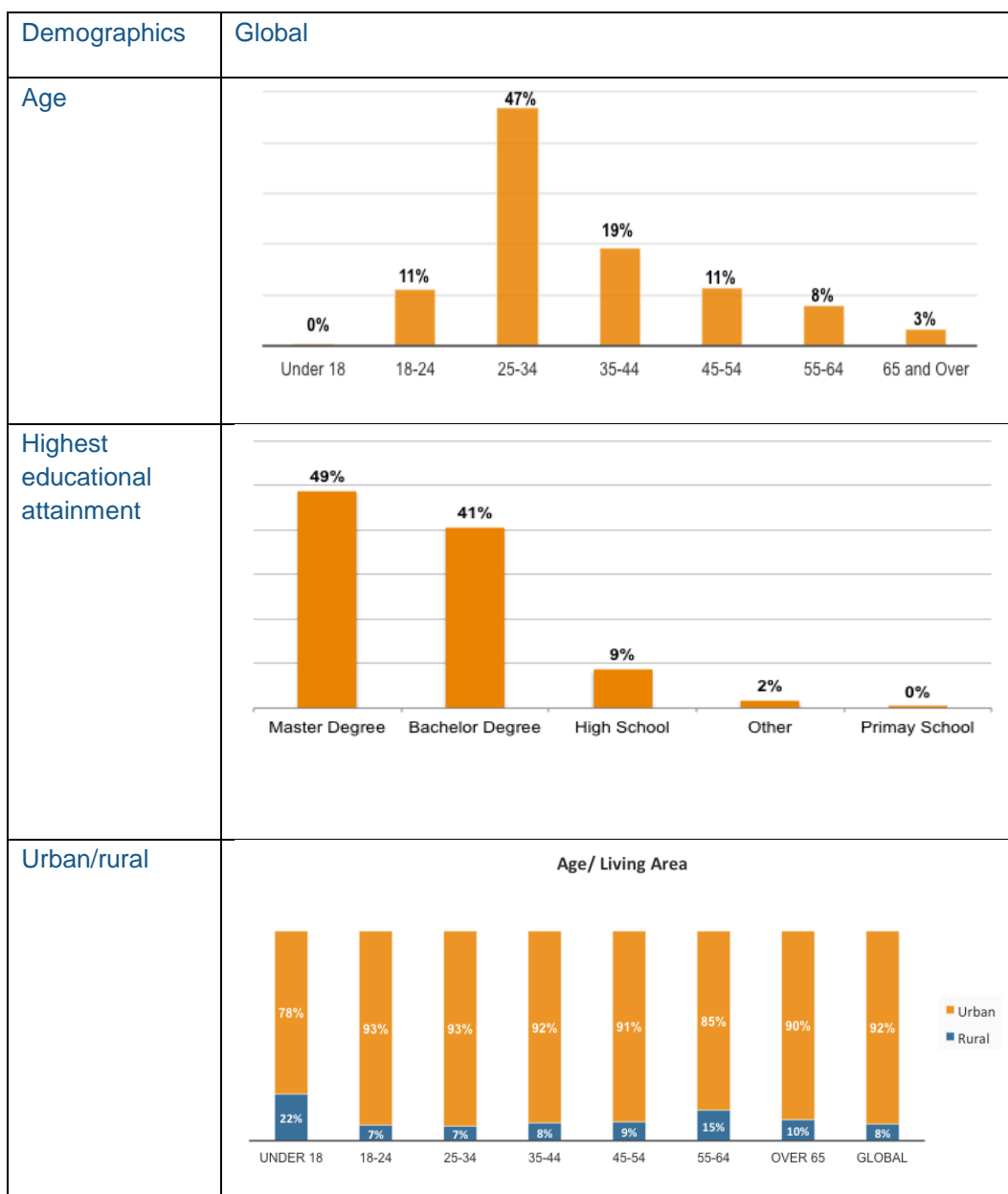


These biases are shown in Figure 108. These biases are not necessarily perceived to be deleterious to the findings of the report. In fact, these may prove to be positive for current and future analysis as it is more representative of future trends – particularly the global trend towards urbanisation.

There is also a clear bias in the sampling technique – as we used an online platform, with WEC members and Future Energy Leaders as the ‘survey champions’.

**Figure 108: Global and LAC region demographics**





## Endnotes

<sup>i</sup> Although there is no standard, globally-acknowledged definition for alternative transport fuels, the Future Energy Leaders' Taskforce: Alternative Transport Fuels have defined alternative transport fuels for this project as substances, or methods, that can be used for powering motor vehicles, and stand in contrast to 'conventional fuels', known as petrol, gasoline or diesel.

<sup>ii</sup> A sub-set of the World Energy Council Future Energy Leaders' Programme.

<sup>iii</sup> Countries from the region that were represented in the survey included: Antigua and Barbuda, Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Panama, Paraguay, Peru, Saint Martin, Trinidad and Tobago, Uruguay, Venezuela.

<sup>iv</sup> The LAC regional data report and the six case-study countries data reports are provided on the WEC website. Raw data is also not provided here as it is too substantial for presentation in this format.

<sup>v</sup> Self-sufficiency in oil means that oil production is equal to or greater than the demand for oil products in terms of volume. It can still require trading oil for oil products, which was Brazil's case.

<sup>vi</sup> Local content policies require that a minimum percentage of the total expenditures on equipment, materials and services take place in the country where the economic activity is located.

<sup>vii</sup> This recommendation is made on the basis that Trinidad and Tobago substitutes natural gas exports for oil exports in such a way that exports of natural gas decreases (even with the increase in domestic consumption) and overall production of oil increases. It would not be advisable to concurrently increase domestic demand for natural gas and continue to export natural gas, when reserves-to-production ratios are falling.



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