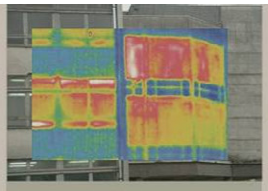
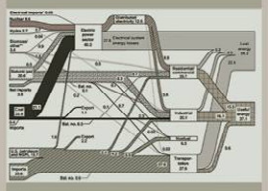

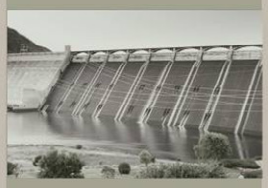





European Commission, Directorate-General for Mobility and Transport

Study on Clean Transport Systems

Project 2010 n. 419-1-Unit Move B4

Multiple Framework Services Contract with reopened competition for Technical Assistance TREN/R1/350-2008-Lot3-COWI

PUBLIC CONSULTATION RESULTS (v1.1)

Submitted by:

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ENERGY AND ENVIRONMENT CONSULTANTS

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and

ECORYS Research and Consulting

November 2011

Clean Transport Systems (CTS) initiative

Results of the Public Consultation

Consultation period: 11 August 2011 – 20 October 2011

Contents

List of Figures

ABBREVIATIONS

List of abbreviations	
BEV	Battery Electric Vehicle
BTL	Biomass To Liquid
CBA	Cost Benefit Analysis
CNG	Compressed Natural Gas
EV	Electric Vehicle
FCV	Fuel Cell Vehicle
GHG	Greenhouse Gas
GTL	Gas-To-Liquid
HDV	High Duty Vehicle
HEV	Hybrid Electric Vehicle
ICT	Information And Communications Technology
IEA	International Energy Agency
ITS	Intelligent Transport Systems
LDV	Light Duty Vehicle
LNG	Liquefied Natural Gas
OEM	Original Equipment Manufacturer
PHEV	Plug-In Hybrid Electric Vehicle
RES	Renewable Energies Sources
SH	Synthetic Hydrocarbons
WTW	Well-To-Wheel

EXECUTIVE SUMMARY OF CONTRIBUTIONS

In line with the targets in its Europe 2020 strategy (smart growth, sustainable growth, inclusive growth), the European Commission has adopted the White Paper 'Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system' and proposes the Flagship Initiative 'Resource efficient Europe'. In this context, the European Commission has initiated the **Clean Transport Systems (CTS) Initiative**, which aims to provide the industry, public and private sector and consumers with a clear and coherent vision to 2050 toward the decarbonisation of transport sector and help to accelerate the use of alternative transport fuels in the EU.

To support the initiative, an open consultation procedure was launched in an electronic form through the interactive policy-making tool of EC from 11/08/2011 until 20/10/2011. In the following paragraphs, the main results of the consultations are briefly summarised. The report comprises a review of the responses (figures and facts) received through the open consultation procedure and does not aim to draw any policy conclusions. The respondents were addressed to answer in a wide range of questions covering technological features, policy measures and express their opinion in terms of the inter-relation of transport sector and alternative fuels.

123 responses were received to the online questionnaire. The respondents can be grouped into the following categories, from the point of view of the capacity they responded under:

- Individual - Personal capacity;
- Private sector companies;
- Industry associations or NGOs;
- Local or regional public authorities; and
- National public authorities

89% of all respondents share the view that there is the need that EU has to steer an **EU-wide market introduction of alternative fuels** through policy actions.

In addition to appropriate standards for CO_2 emissions from vehicles, 65% consider it important to put in place **requirements on energy efficiency addressing all types of propulsion systems** alongside the progressive market penetration of alternative fuels.

57% of the respondents believe that **deployment of new low-CO_2 fuel/vehicle technologies should take precedence over research to improve existing** fuel/vehicle technologies versus 43% who consider the opposite.

The approach to the use of alternative fuels was divided into technology-oriented (further broken down into alternative fuels standards, infrastructure standards, and vehicle technology standards) and performance-oriented (similarly, further broken down into cap on CO_2, differentiated charging based on CO_2 emissions, and energy efficiency standards. 67% of the respondents considered **EU performance-oriented approach as more important than the technology-oriented one** (33%).

On the technology-oriented approach side, 41% of the respondents considered the development of **alternative fuels standards** as more important, 31% gave precedence to the development of **vehicle technology standards** and 28% expressed the view that **infrastructure standards** should be prioritized. On the performance-based approach side, 43% of the respondents considered the **energy efficiency standardisation** as more important, 42% indicated that **differentiated charging** based on CO_2 emissions should take priority and 15% expressed the view that it would be better off establishing a **cap on CO_2**. It is noted that a great number of those respondents commented that **a technically neutral approach** should be promoted.

Respondents were asked to indicate **alternative fuels that EU should include in a long-term strategy,** having the possibility to indicate more than one alternative fuels as well. Mostly indicated fuels included electricity (78.9%), biofuels (64.2%) and hydrogen (61.8%) followed by methane (48.0%), synthetic fuels (46.3%), LPG (22.8%), and other options (17.1%).

Subsequently to this, respondents were also addressed to choose one or more **alternative fuels they believe mostly target each specific transport mode** for 2020, 2030, and 2050 timeframes. Electricity, biofuels and methane-related fuels are mostly suggested for the **urban (short) transport mode,** this being genrerally the case for **medium road-passengers** vehicles, as well; synthetic fuels were also indicated to have a role in the fuel mix. A slight differentiation is noted on **long distance road-passengers** vehicles where biofuels were suggested mostly followed by methane derivatives and synthetic gas. The aforementioned general patterns of responses for the relevance of fuels to the short, medium and long-distance road-passenger vehicles, seem to be repeated for **short-, medium-, and long-distance road freight mode** as well. Electricity is mostly suggested for short distance freight vehicles, whereas biofuels and synthetic fuels for medium- and long-distance freight vehicles. Electricity grid was mostly targeted for **rail transport mode** with negligible portion for the rest of the alternative fuels. When it comes to the **water transport mode**, that is inland, short-sea shipping, and maritime mode, it seems that generally, a similar pattern of fuels are indicated for all modes. Biofuels were indicated by most respondents followed by synthetic fuels and methane LNG. With regard to the **air transport mode**, the majority of preferences are almost equally distributed on biofuels and synthetic fuels, followed by methane LNG.

Regarding actions to **privilege the use of particular fuels in particular transport sectors,** 63% of the respondents stressed the need for such actions, although certain respondents opposed this considering that it can bias market evolution. The vast majority (89%) of respondents considered that there is a need to accompany any potential actions with a coherent **life-cycle approach** for all fuels.

When it comes to **biofuels**, most respondents (58%) indicated that these fuels alone **cannot provide the major share** of the transport energy supply in the long term under EU sustainability criteria. Moreover, 63% indicated that biofuels **cannot deliver the required greenhouse gas reduction** in the horizon 2050.

Respondents were, also, called to address **potential approaches that should get priority given the importance of biofuels** as an alternative long-term option for substituting oil as energy source in transport. Such approaches included faster market development of fungible biofuels (indicated by 46.3% of the respondents),

followed by faster market deployment of flexible fuel vehicles that can accept a much wider range of fuel specifications (indicated by 35.8%), enabling progressively higher blending of bioethanol and biodiesel with conventional fossil fuels (indicated by 30.1%) and faster market development of biofuels (indicated by 26.8%).

Regarding whether the **public sector should intervene in accelerating the deployment of advanced biofuels** technologies for the transport sector, 67% of the respondents do believe so. Proposed actions that should be taken towards this direction included i) research, ii) tax incentives and funding support, and iii) standardization. When it comes to whether **the public sector should intervene in the development of the refuelling/recharging infrastructures**, 77% consented to this idea.

73% of the respondents considered that deployment of alternative fuels is possible through a **better use of currently available instruments** such as large scale demonstration projects, funding and financing, information provision etc and this seems to be the case as well from the standpoint of each respondent type. Of all the respondents, 77% believe that **EU actions should not be limited to ensuring the relevant infrastructure standards** in order to achieve a consistent and significant deployment of alternative fuels.

86% of all the respondents believe that the **voluntary action of industry** alone cannot achieve the development of the refuelling/recharging infrastructures required for travelling across the whole EU on alternative fuels

The participants to the consultation were, also, asked to indicate whether **an EU legislation requiring a certain minimum refueling/recharging infrastructure for certain alternative fuels/energy carriers** should come in place. For road and rail transport modes, the fuels that infrastructure is mostly suggested for are electricity (43.1% and 24.4% respectively), followed by biofuels (indicated by 28.5% and 9.8% respectively). For water and air transport mode, biofuels are indicated mostly (20.3% and 24.4% of the respondents, respectively).

With regard to the **biomethane infrastructure**, 83% of the respondents considered that biomethane should be injected into a single methane grid supplying stationary and mobile consumers rather than a build-up of a parallel dedicated biomethane refuelling infrastructure.

More than two thirds of all respondents (69%) consider that the market introduction of **alternative fuels should be supported by privileged access** of alternative vehicles/transport carriers to transport infrastructure. **Preferred measures** to achieve this target include lowering of charging tariffs for infrastructure use (indicated by 57.7%), privileged access to access restriction zones (indicated by 43.9%); 17.9% believe that other measure should be taken into consideration.

Altogether, the response to the public consultation constitutes an essential part of the basis on which to take the next steps towards realising a decarbonized, eco-friendly, with high potentiality transport sector.

1 OUTLINE OF THE CLEAN TRANSPORT SYSTEMS INITIATIVE

In its Europe 2020 strategy, the European Commission proposes the Flagship Initiative 'Resource efficient Europe'. This states that the European Commission will work to present proposals to modernise and decarbonise the transport sector.

In line with this strategy, the European Commission has recently adopted the White Paper 'Roadmap to a Single European Transport Area –Towards a competitive and resource efficient transport system', which announced that the European Commission will develop "a sustainable alternative fuels strategy including also the appropriate infrastructure".

In this context, the European Commission has initiated the Clean Transport Systems (CTS) initiative presenting a comprehensive long-term alternative fuel strategy for the EU covering the whole transport sector and identifying possible future actions in this area. The strategy should provide the industry, public sector and consumers with a clear and coherent vision, and should help to accelerate the use of alternative transport fuels in the EU. Action at the EU level should facilitate EU-wide circulation of vehicles powered by alternative fuels.

2 BACKGROUND

The consultation was launched in an electronic form through the EC interactive policy-making tool (IPM). Interested parties were invited to submit their comments, suggestions and replies to the questionnaire to the Commission services between 11/08/2011 and 20/10/2011[1]. The invitation was published on the website "Your voice in Europe" and announced to a range of key stakeholders and EU Institutions. The General Principles and Minimum Standards for Consultation of Interested Parties by the Commission were respected in the elaboration and presentation of the consultation questionnaire.

The questions presented covered the following areas:

- The characteristics of the respondents and the specific identification of the participating parties
- The respondents' perception regarding the objectives of the Clean Transport Initiative. In brief, these objectives include, inter alia, the policy of EU in terms of biofuels penetration, electricity infrastructure, synthetic fuels etc. in relation with the type of vehicle or transport mode.
- The preferred approach towards EU legislation in this area and in particular whether binding or non-binding legislation would result in a greater optimization in terms of CO_2 abatement.
- The respondents' perception for the deployment of alternative fuels regarding the need for further funding and financing, large scale demonstration projects and/or information provision.

The respondents were asked to identify, in their view, the most important alternative fuels for each different transport mode (i.e. road vehicles, rail, air) and to express their preferences regarding the portion of private and public involvement in formulating the legislative and financing background of the imminent transition. Furthermore, the respondents were asked to provide additional comments and proposals to each question apart from selecting among the available answering options.

Almost all of the questions were presented in a multiple choice format, facilitating a quantitative review of the responses. Furthermore, most multiple-choice questions comprised a second part allowing for additional proposals and comments in free text format. Subsequently, the analysis in this report builds on this structure. Each one of the following sections, which practically corresponds to a single question includes a quantitative analysis and a summary of the comments submitted. The basic analysis, typically, shows what the preferences of all the respondents and of each respondent type were. When it comes to the consideration of additional feedback to each

[1] The initial deadline of the consultation period was due to 06/10/2011. However, consultation period was extended to 20/10/2011.

question, the comments are grouped together and summarized either in stand-alone paragraphs or in a bulleted form.

This report summarises the contributions received by the respondents. Thus, the report identifies and summarises the main views and issues expressed from the consultation respondents. It does not however aim to draw policy conclusions from the consultation results.

3 FACTS AND FIGURES

123 responses were received to the online questionnaire. The respondents can be grouped into the following categories from the type of respondent (i.e. the capacity he was participating under) point of view:

- Individual - Personal capacity;
- Private sector companies;
- Industry associations or NGOs;
- Local or regional public authorities; and
- National public authorities.

This kind of classification may be helpful in identifying tendencies in each group of respondents.

Figure 3–1 presents the breakdown of respondents in regard with the aforementioned respondent types. The number of respondents was almost equitably distributed to individuals (39 or 31.7%), private sector companies (41 or 33.3%) and industry associations or NGO (36 or 29.3%). A small portion represented local or regional public authorities (5 or 4.1%) and national public authorities (2 or 1.6%).

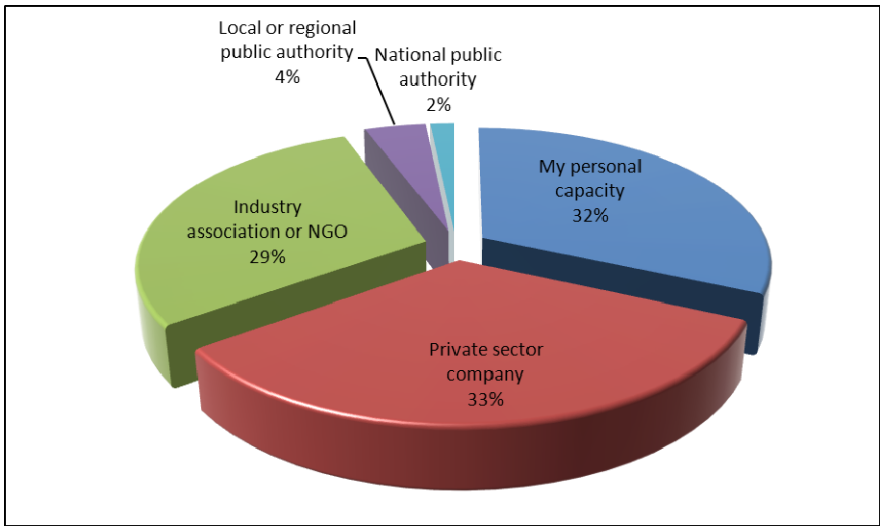

Figure 3–1 Breakdown of responses by respondent type

In terms of geographical distribution, most respondents originate from Belgium (20.3%), Germany (16.3%) and UK (7.3%), followed by France, Netherlands and Spain. Figure 3–2 presents the breakdown of respondents according to country of origin.

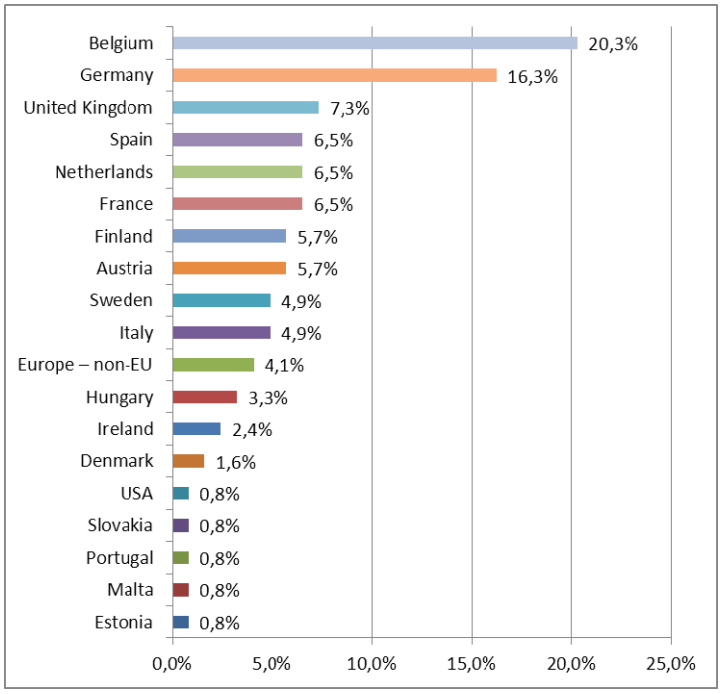

Figure 3–2 Breakdown of respondents by country of origin

4 ANALYSIS OF THE CONSULTATION RESULTS

4.1 EU POLICY ACTIONS AND MARKET INTRODUCTION

Question 1: Should policy actions be taken at the EU level to steer an EU-wide market introduction of alternative fuels?

The large majority of respondents consider that there is a need for the European Union to steer an EU-wide market introduction of alternative fuels through policy actions. Figure 4–1 presents that 89% of all the respondents are in favor of policy actions that should be taken at the EU level; Figure 4–2 shows the corresponding percentages for each respondent type, illustrating that this preference is common to all of them.

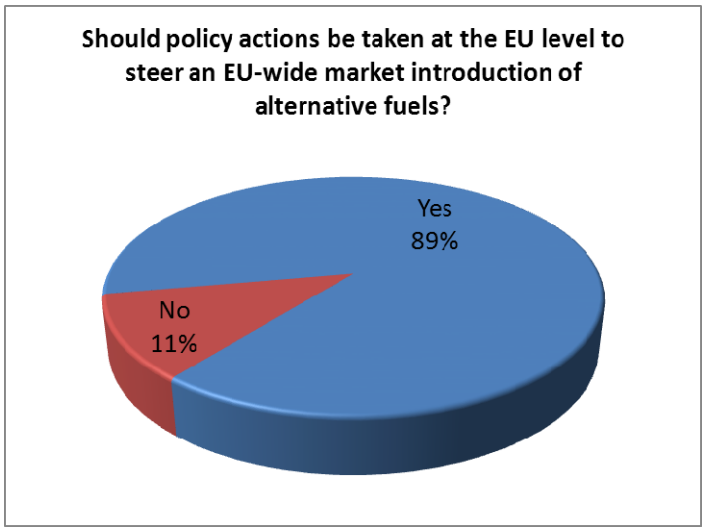

Figure 4–1 EU policy actions and market introduction

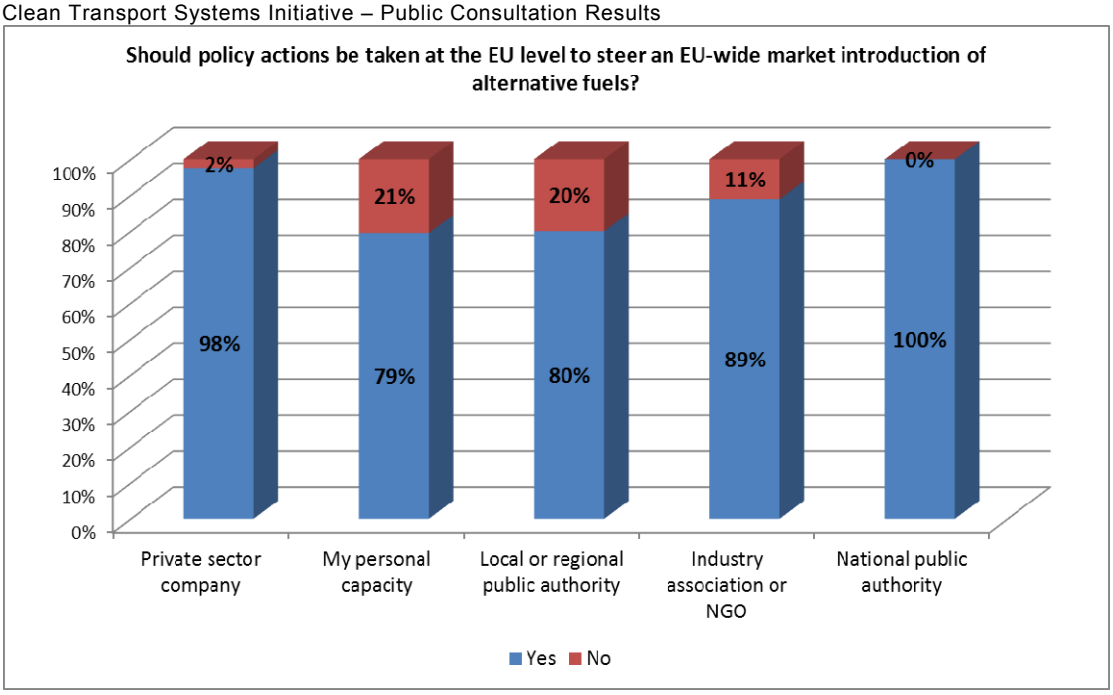

Figure 4–2 EU policy actions and market introduction, by respondent type

Some respondents suggested the whole spectrum of possible measures or actions that EU may undertake whereas others highlighted the importance of only two or three of the measures.

Some respondents suggested actions which should be taken at the EU level. The main points of these suggestions are summarized in the following:

- Support the deployment of refuelling infrastructures via facilitating regulations and standardization measures and via financial support;
- Improve R&D actions and programs on innovative technologies through financial support; progressively reduce subsidies and eventually discontinue when technologies reach commercial maturity
- Help the dissemination and implementation of innovations;
- Enhance public acceptance of new technologies, devices, etc.
- Policy measures should be continued after 2020
- Introduction of alternative energy carriers must be demand-led with full consideration taken of the customer perspective
- Infrastructure mandates by themselves are not the solution and may have negative consequences
- New coalitions between industry and OEMs are required to reach consensus on market entry of new vehicle compatibility and roll out of alternative fuels
- Coordination through government brokering will be essential at both EU and Member State level
- Ensure that the amount of the incentive is based on the greenhouse gas reduction performance of the fuel relative to traditional gasoline and diesel fuels, calculated on a well-to-wheel basis to ensure a level playing field across fuels

4.2 CO_2 STANDARDS, ENERGY EFFICIENCY AND PROGRESSIVE MARKET PENETRATION

Question 2: In addition to appropriate standards for CO_2 emissions from vehicles, do you consider it important to put in place requirements on energy efficiency addressing all types of propulsion systems alongside the progressive market penetration of alternative fuels?

Putting in place requirements on energy efficiency addressing all types of propulsion systems alongside the progressive market penetration of alternative fuels is considered to be important or very important by the majority (80 replies - 65%) of the respondents, as shown in Figure 4–3.

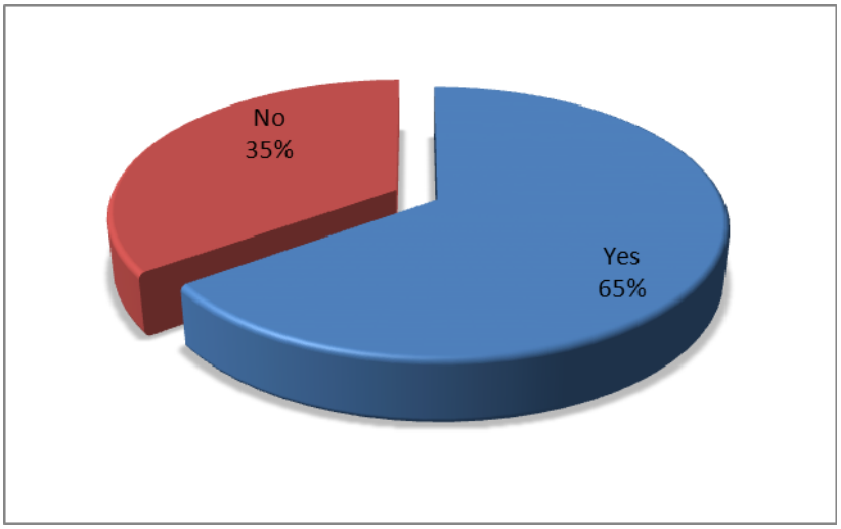

Figure 4–3 Requirements on energy efficiency alongside the progressive market penetration of alternative fuels

Half of the responses submitted by private sector companies (Figure 4–4) recognized the importance of improving energy efficiency across the board in the transport sector, but at the same time stressed that further regulations on energy efficiency may or will result in creating new obstacles for the uptake of alternative fuels. Concerns were expressed that requirements on energy efficiency may eventually be favorable to conventional fuels that already dominate the transport fuel market, which benefit from much larger financial means for introducing the required energy efficiency measures. It was also noted that these requirements should be carefully balanced with the recognized environmental benefits attached to alternative fuels and also be based on primary energy consumption.

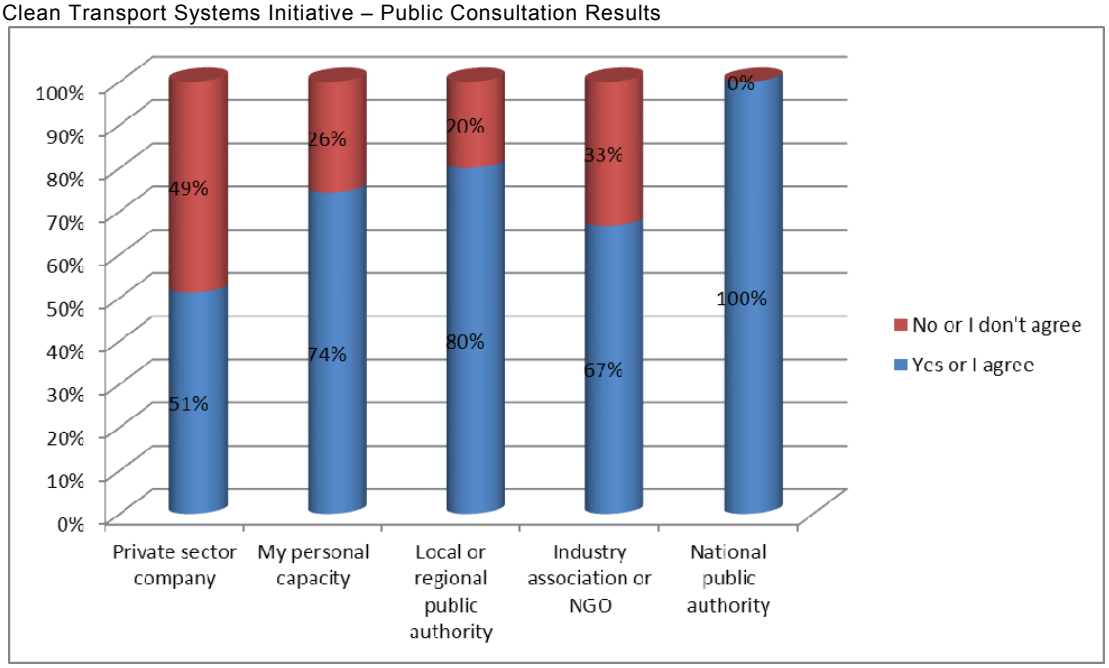

Figure 4–4 Requirements on energy efficiency alongside the progressive market penetration of alternative fuels per respondent type

In all other respondent types the proportionality follows the general pattern where almost two thirds agree on setting regulations regarding the energy efficiency.

Most respondents stressed the need to promote these measures as soon as possible in new vehicles. Of those who answered positively in the principle question (energy efficiency alongside market penetration of alternative fuels) approximately 70% considered that relevant actions should be taken without any further delay either in regulation and standardization field or in industry and manufacturing field.

Some respondents suggested that these actions should be considered in the timeframe between 2016 and 2020 (approx. 14%), whereas only few responded that there is no need for such coupling prior to 2020 (8%).

Another relatively small portion of the submissions (10%) highlighted that such actions cannot be answered without first acknowledging and assessing a number of other parameters (i.e. mode of transportation, common agreement between stakeholders, etc). Some respondents detailed that energy efficiency should be first measured in a transparent, fair and harmonious manner and any measures to be taken must be based on an assessment of their financial impact to avoid competitive distortions.

One respondent commented that efficiency improvements in vehicles, the road transport infrastructure and driver behaviour are necessary and complementary measures to reduce the carbon intensity of transport fuels. It is also stressed that significant improvements in transport efficiency will be lost if governments and industry do not form partnerships to agree pathways for future vehicle and fuel efficiency improvements; furthermore, the contribution concludes that vehicle power trains and fuels are interdependent, and efficiency gains are maximised by a systems approach.

4.3 PRIORITIES REGARDING THE PROLIFERATION OF ALTERNATIVE FUELS

Question 3: In view of the current availability of fuel options with lower CO_2 emissions, what should now receive priority?

As presented in Figure 4–5, 57% of the respondents believe that deployment of new low-CO_2 fuel/vehicle technologies should take precedence over research to improve existing fuel/vehicle technologies versus 43% who consider the opposite.

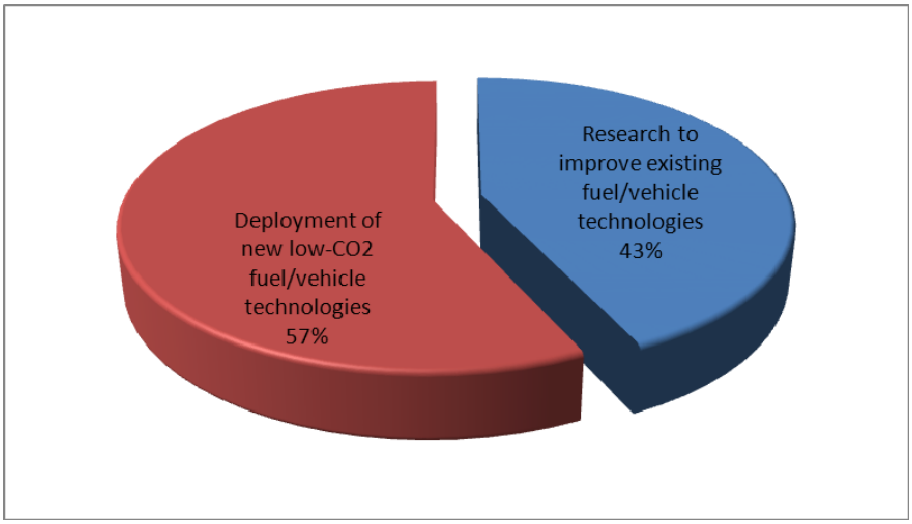

Figure 4–5 Priorities regarding the proliferation of alternative fuels

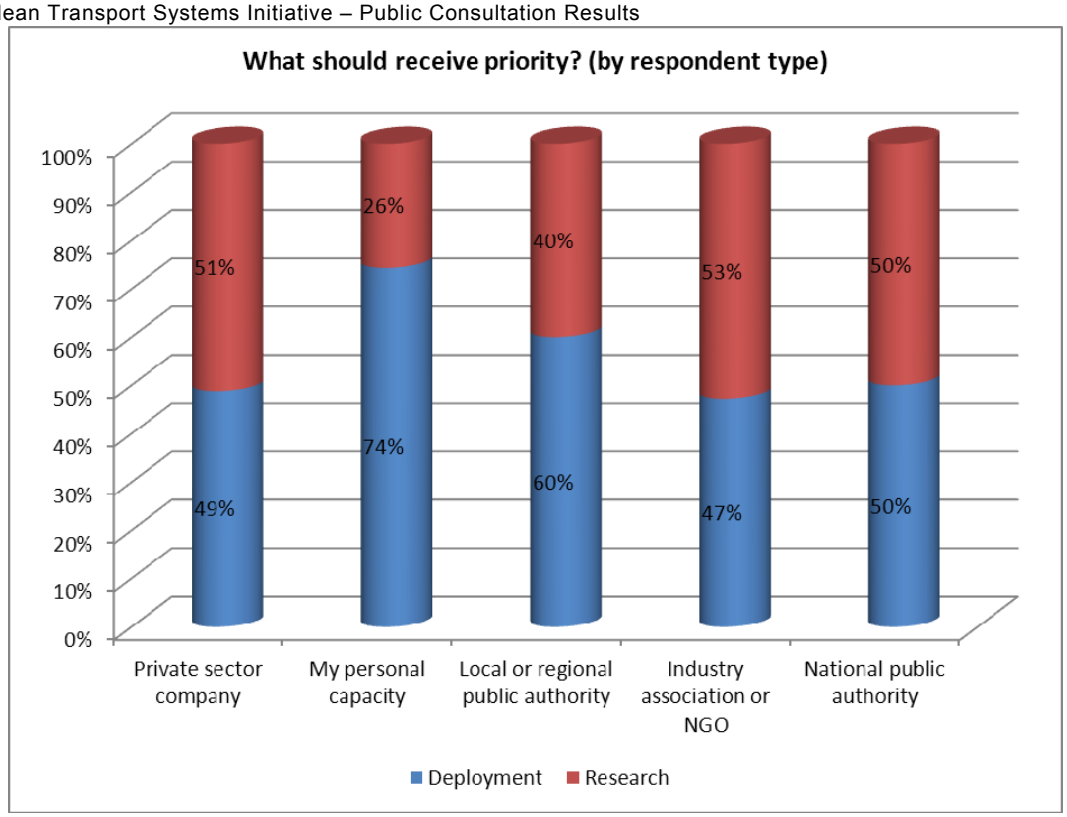

Figure 4–6 Priorities regarding the proliferation of alternative fuels, per respondent type

Figure 4–6 depicts the different proportionality in terms of deployment or research on fuel/vehicle technologies over all respondent types. At first sight, what is evident from this chart is that individual respondents tend to be in favour of deployment taking priority over research. However, for the remaining of the respondent types views are practically shared. It should be noted that due to the small number of authorities (local, regional or national) clear messages cannot be concluded for these categories.

It should also be noted that the vast majority of the respondents underlined both of the options as equally important irrespective of what their initial choice was. This pursuit of research alongside with the deployment of new low-CO_2 fuel/vehicle technologies is shared by all respondent types as well (over 80%).

Many respondents considered that the need for all fuels to meet demand and the GHG challenge entails improvements in existing fuel/vehicle technologies alongside deployment of new low-CO_2 fuel/vehicles technologies following the principles of technical and economic viability plus consumer acceptance.

Currently available biofuels are believed to be the immediate available option to decarbonise the transport sector and this is encountered in several responses.

Most respondents who consider that research should take priority also comment that priority should be given to improve existing fuel technologies over new low-CO_2 vehicle technologies.

According to many replies, further research is vital, especially in the development of fuels and vehicle technologies (i.e. battery technology, heavy vehicles and vehicles that travel long distances, co-optimisation of vehicle engine technology and

advanced biofuel specifications). A typical example, as stated in some comments, is that EU is importing large amount of diesel fuel; thus, research of new generation alternative biodiesel fuels need to be supported. It is also vital, some suggested, to refine alternative fuel technologies in order to improve performance and reduce costs to become ever more competitive with the conventional market.

Emissions of air pollutants are considered on an equal basis to CO_2 emissions in the assessment of new vehicle technologies and alternative fuels. In some cases new vehicle technologies and/or fuels achieve both reduced CO_2 and air pollutant emissions, but in other instances there are conflicts that require careful consideration. Buses, trains, road freight vehicles are the largest transport sources of air pollutants in London. Therefore, further research into alternative fuels and new vehicle technologies for these vehicle types is crucial for both climate change and air quality objectives.

Priority should be put on enforcing better use of current alternative fuels, as some state (i.e. incentives should be in place to foster current biodiesel blending technologies as well as for developing second generations of biodiesel).

4.4 EU APPROACH ON THE PROMOTION OF ALTERNATIVE FUELS

Question 4: What approach should the EU take on the promotion of alternative fuels?

The questionnaire provided two possible answers in this particular question:

- Performance-oriented: linking support to alternative fuels in a technology-neutral way to performance criteria, such as energy efficiency, reduction of CO_2 and pollutant emissions
- Technology-oriented: giving preference to certain fuels and vehicle technologies (based on estimated cost effectiveness, market potential, long-term contribution to oil substitution and decarbonisation)

67% of the respondents consider the performance-oriented approach as more important than the technology-oriented one (33%) as depicted in Figure 4–7. Most of those respondents commented the need and necessity for a technically neutral approach.

This is also illustrated in Figure 4–8 which classifies the responses per respondent type. It should be noted the large portion in favor of performance-oriented approach from private companies and industries associations or NGOs.

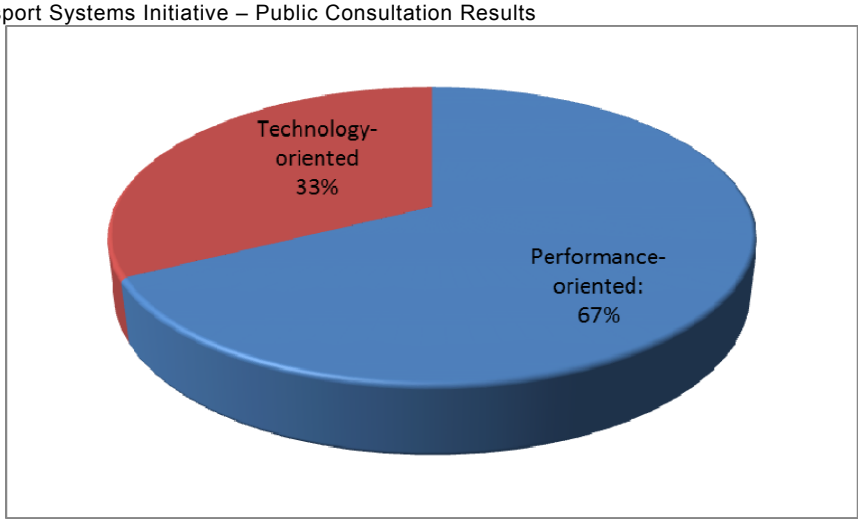

Figure 4–7 EU approach on the promotion of alternative fuels

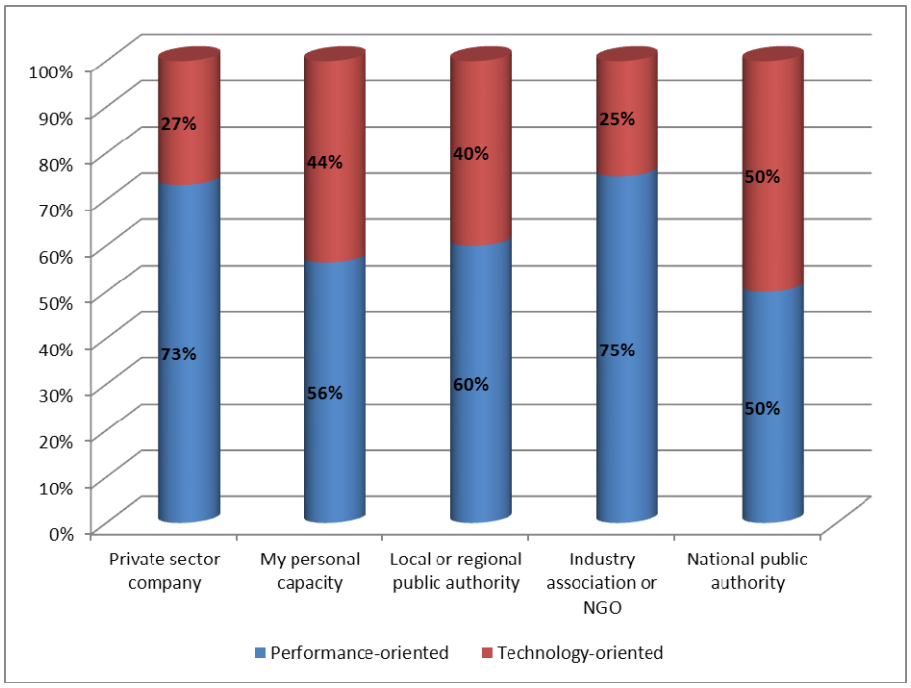

Figure 4–8 EU approach on the promotion of alternative fuels, per respondent type

It was suggested by a small number of respondents that preference should be given to the well–to-wheel rather than certain fuels or technologies. It was argued that the correct method of assessment should not only look at CO_2 emissions but the whole fuel chain from recovery transportation, refining and delivery to market and do the comparison on that basis and also use the benchmark of other pollutant gases along with CO_2 emissions.

One respondent believes that integrated, “smarter mobility” solutions are needed in order to reduce road transport CO_2 emissions, with policy and regulations that drive coordinated action by four key stakeholders groups: fuel providers, vehicle manufacturers, transport planners, and consumers.

A great number of replies considers that a challenge ahead will be to ensure a sustainable production of the most important and promising alternatives, and to

ensure sufficient capacity and accessibility – not just nationally, but throughout the EU. Some focal points to achieve this include:

- Economies of scale and avoid market distortions a harmonization of the main alternative fuels and vehicle types will be necessary.
- Funding and support must be oriented towards efficiency and sustainability. It must be open to different technological approaches.
- Linking support to alternative fuels in a technology-neutral way to performance criteria, such as energy efficiency, reduction of CO_2 and pollutant emissions.
- Other policy initiatives that would facilitate this view is the need for harmonised EU taxes on energy products, and reduced import tariffs on ethanol which help the EU to meet its medium – long term CO_2 reduction targets in road transport.
- Support to each distinct technology which reduces CO_2 according to the technology neutral principle in order to provide opportunities meeting consumers' mobility need.

4.5 PREFERENCES ON A TECHNOLOGY-ORIENTED APPROACH

Question 5: In the technology-oriented approach would you give preference to…

The respondents had to choose one out of three options given that the EU adopts a technology-oriented approach as a wider policy towards cleaner transport systems. These options included:

- Alternative fuels standards;
- Infrastructure standards; and
- Vehicle technology standards

As depicted in Figure 4–9, 41% of the respondents considered the alternative fuels as more important given that technology-oriented approach takes priority. Some of those stressed the need for a well-to-wheel analysis of each fuel type which will be harmonized and accepted within the EU.

Another part of the replies (31%) indicated that standards in terms of vehicle technology should better off be supported and developed. These include standards concerning lighter materials, tyre pressure monitors and an aerodynamic design, top speed, top engine size, top weight, top energy consumption, top hidden energy associated to manufacturing of cars and end of life etc.

28% of the respondents expressed the view that infrastructure standards should be prioritized in the case of an EU technological-oriented approach.

A large number of respondents, though, commented that all three choices are of equal importance and in some way inter-related. This integrated view will result in a more harmonized approach to the development and actual deployment of fuels, technologies and infrastructure that, all of them, must serve the technology orientation, most of the supporters claim.

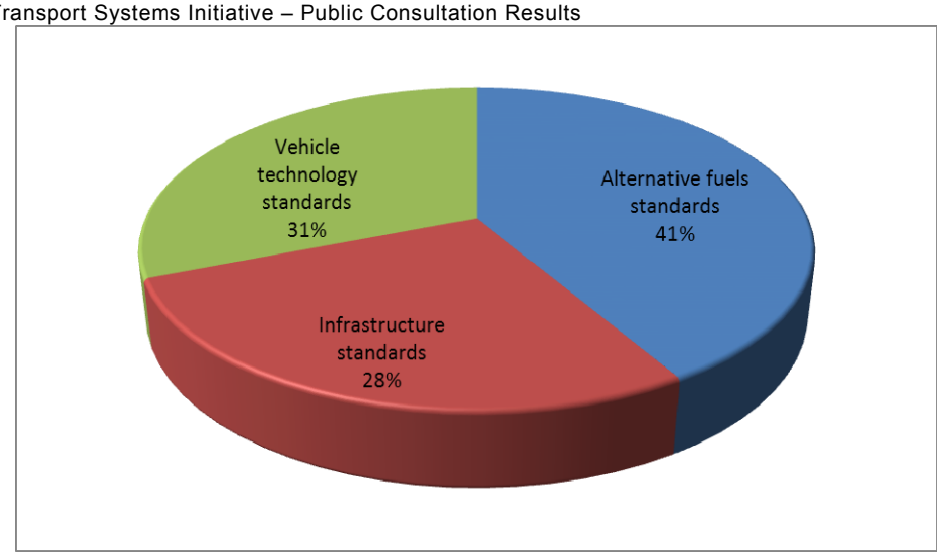

Figure 4–9 Preferences on a technology-oriented approach

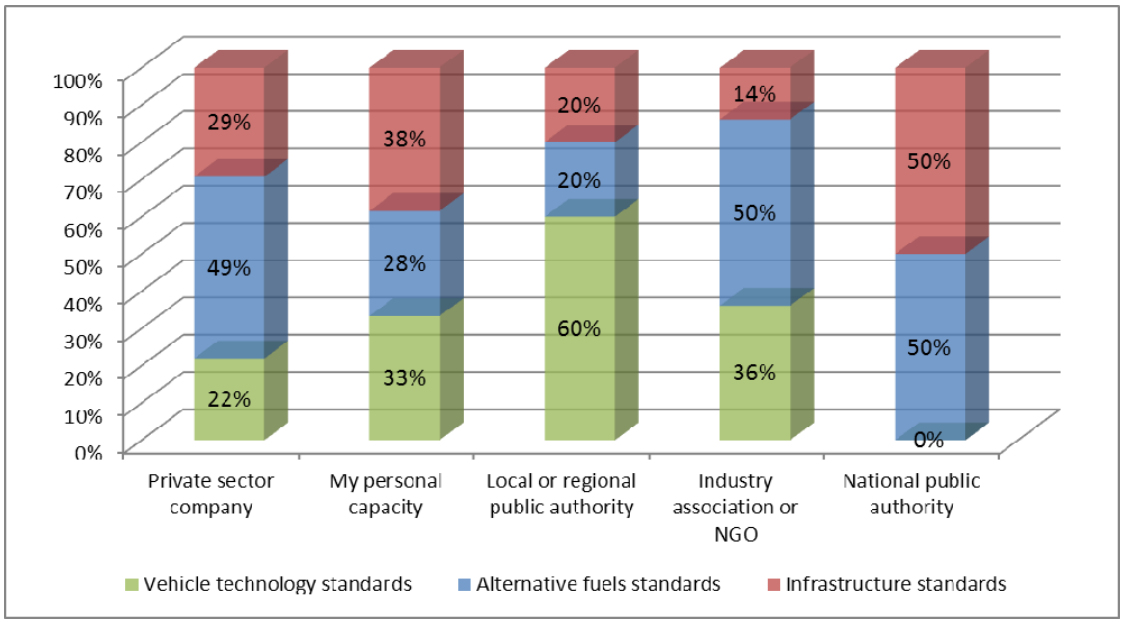

Figure 4–10 Preferences on a technology-oriented approach, per respondent type

Many expressed the view that standards improve quality and reduce costs by allowing manufacturers to make less product adaptations for the wide variety of national standards/codes/regulations that can be found across the international market for vehicles and new fuels. An individual respondent took the opportunity to comment that infrastructure standards are also critical for the development and deployment of the various fuelling infrastructures, and in particular for electric-based technologies. A conclusion of this particular feedback was that standards are also being developed by the International Standards Organization (ISO) i.e. for compressed and liquefied natural gas fuelling stations; this action is of critical importance for quality, performance and safety reasons. Concern on duplication or intersection of standardisation activities was also raised.

4.6 PREFERENCES ON A PERFORMANCE-ORIENTED APPROACH

Question 6: In the performance-oriented approach would you give preference to…

Similarly to the previous question, the respondents had to choose one out of three options given that the EU adopts a performance-oriented approach as a wider policy towards cleaner transport systems. These options include:

- Cap on CO_2;
- Differentiated charging based on CO_2 emissions; and
- Energy efficiency standards

As depicted in Figure 4–11, 43% of the respondents consider the energy efficiency standardisation as more important given that the EU orientation is performance-based. However, many of them commented that this alone will not have the desired result and that other parameters need to be taken into consideration these parameters including, inter alia, the other available options of this question. Few supporters of this option further suggest that incentives must relate to the reduction of greenhouse gas emissions and performance in CO_2 terms should be based on well-to-wheel emissions and, preferably, in the long run, be based on lifecycle emissions.

A similar share of the replies (42%) indicate that differentiated charging should be developed based on CO_2 emissions. Few of them also believe that a differentiated incentive program for CO_2 output reductions will have greater impact than taxes or fees.

Subsequently, 15% of the respondents expressed the view that it would be better off establishing a cap on CO_2 which may eventually have greater impact towards a cleaner transportation (given the performance-oriented approach).

A large number of respondents though commented that all three choices are of equal importance and furthermore inter-related.

Another issue, frequently mentioned, is that CO_2 is not the only pollutant gas; rather, special attention should be drawn to the other gaseous pollutants. Performance in terms of emissions of particulate matters (PM) and NOx of each fuel should also be taken into account, many respondents claim.

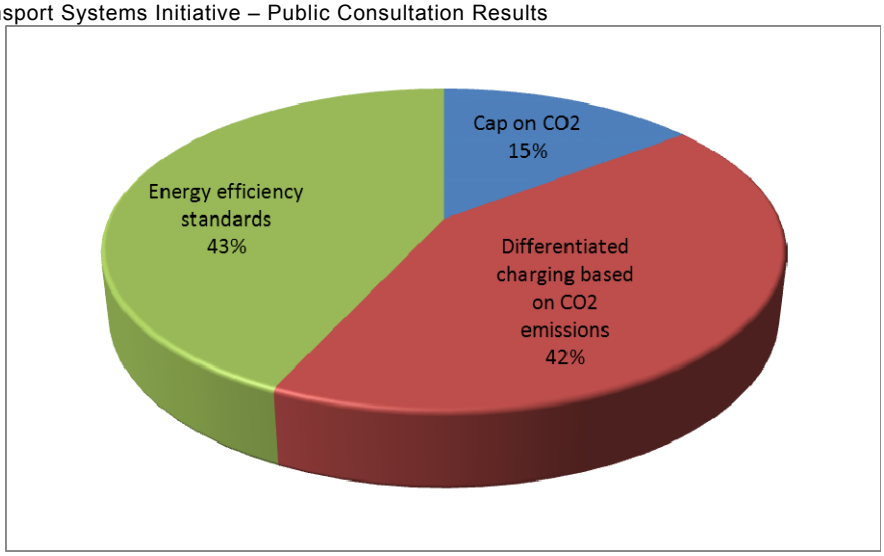

Figure 4–11 Preferences on a performance-oriented approach

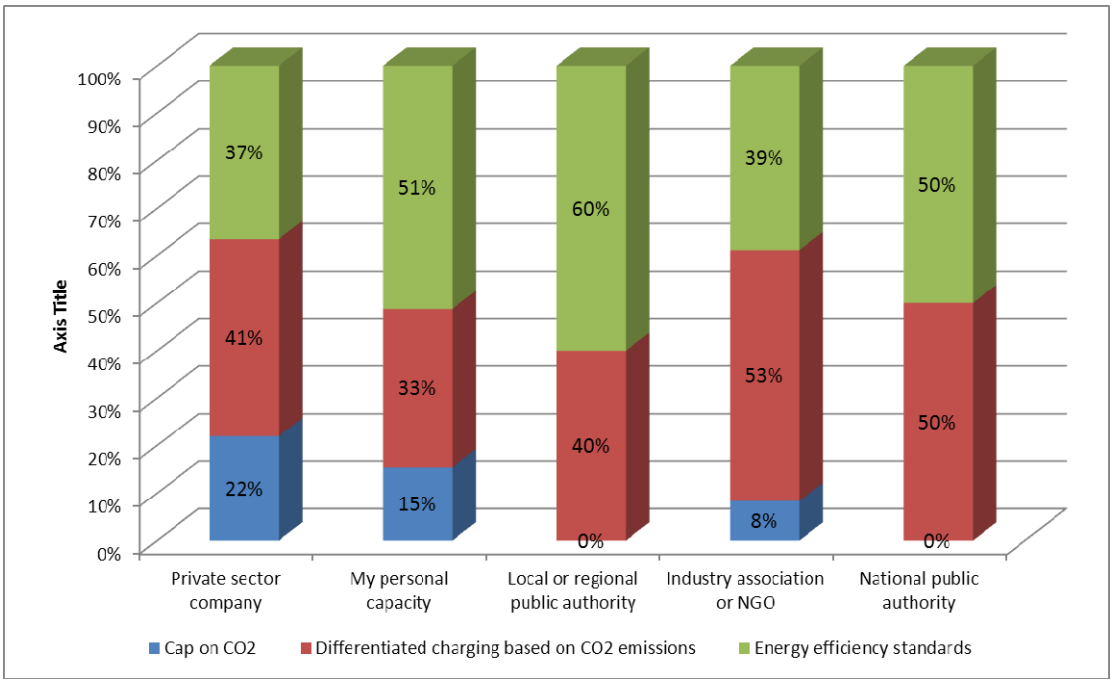

Figure 4–12 Preferences on a performance-oriented approach, per respondent type

One respondent commented that any differentiation in charging which is based on a measure that incorporates emissions of both CO_2 and air pollutants needs to be strong enough to ensure that alternative fuels and vehicle technologies are price competitive with the conventional market. This specific contribution concluded that "whether and how to implement such charging in urban areas ought to be a decision for the cities concerned".

4.7 FUELS IN A LONG-TERM EUROPEAN ALTERNATIVE FUEL STRATEGY

Question 7: What fuels should be included in a long-term European alternative fuel strategy?

In this question, respondents were called to address the alternative fuels that EU should include in a long-term strategy. Respondents were able to indicate more than one alternative fuels. Figure 4–13 depicts the available alternative fuels and the times each fuels was indicated by the respondents. Mostly suggested fuels include electricity (78.9%), biofuels (64.2%) and hydrogen (61.8%) followed by methane (48.0%), synthetic fuels (46.3%), LPG (22.8%), and other options (17.1%). Figure 4–14 through Figure 4–16 depict the same information broken down per respondent type, where a generally similar ranking of different fuels is observed as well.

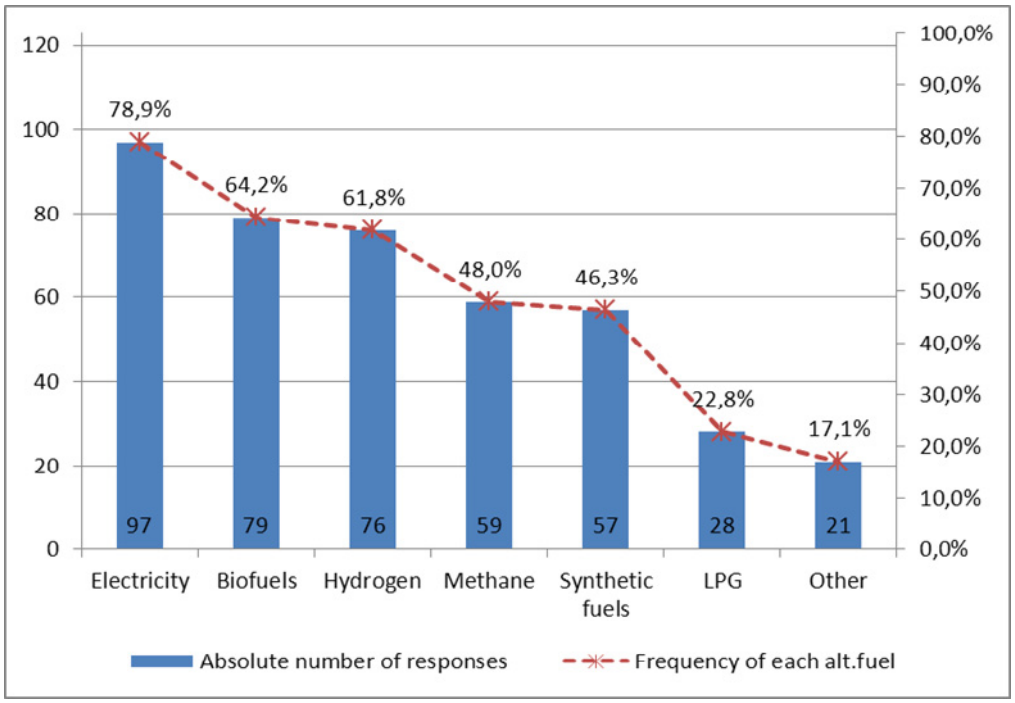

Figure 4–13 Fuels in a long-term European alternative fuel strategy

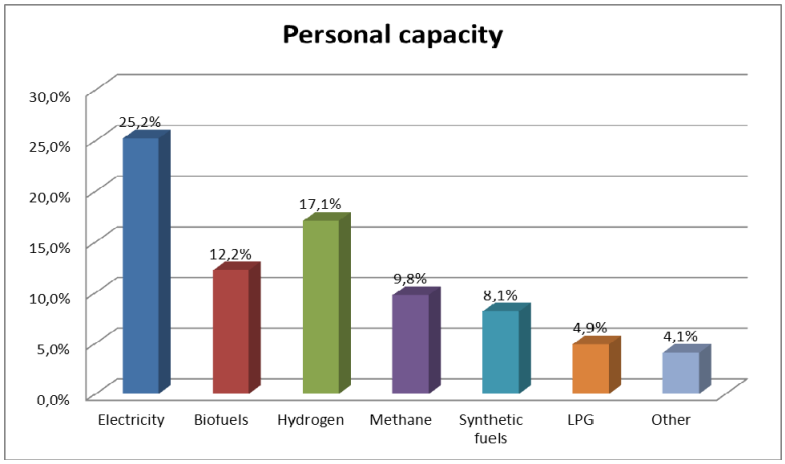

Figure 4–14 Fuels in a long-term European alternative fuel strategy; a personal outlook

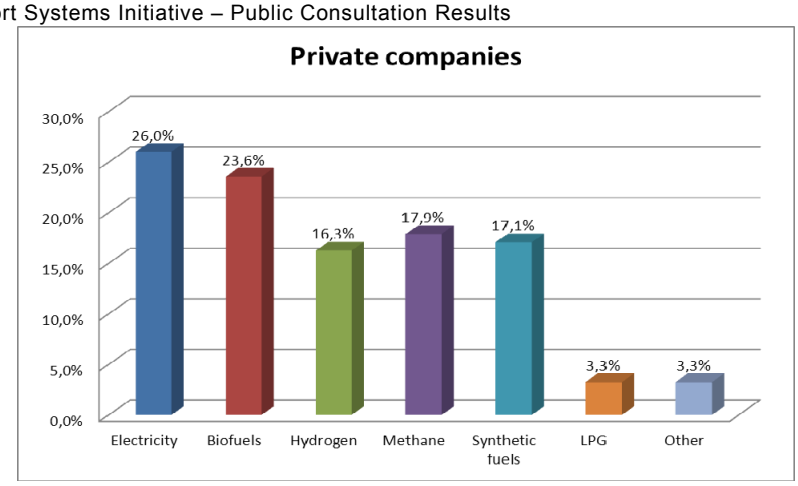

Figure 4–15 Fuels in a long-term European alternative fuel strategy; private companies' outlook

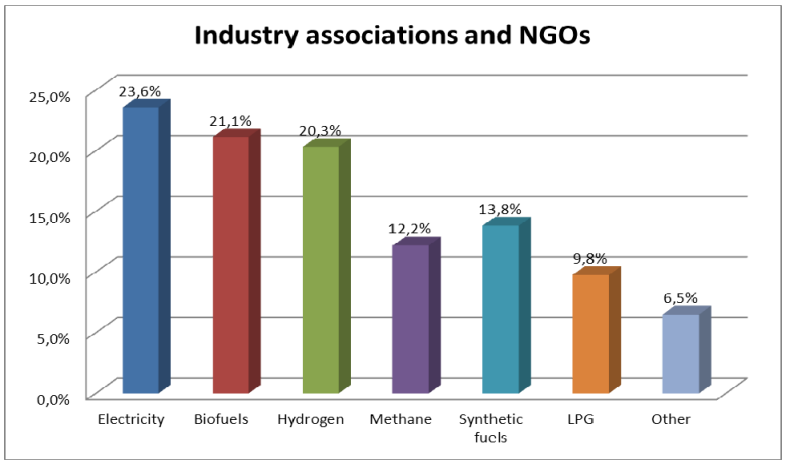

Figure 4–16 Fuels in a long-term European alternative fuel strategy; an industry outlook

Other fuels that respondents suggested include ammonia, biodimethylether, solar energy, bio-methane and hydrotreated vegetable oils (HVO).

Most respondents considered that a combination of more than one technologies will be needed to supplement fossil fuels across the various transport sectors. In the long term, some stated, all the above technologies may be successful and viable and each one will have a role to play in a particular segment.

For certain sectors, certain technologies may become more suitable in the longer term and more work will be needed to understand fuel potentials in different sectors (well-to-wheel energy efficiency), some of those respondents commented.

In the case of biofuels, many respondents suggested that a priority must be given to advanced biofuels, in particular those from waste/residues etc. that deliver high GHG savings compared to fossil fuels. Several alerted to the need to set a stable regulatory environment and a stable base for investors to take the necessary long-term decisions that will make high-GHG reducing biofuels widely available

A few respondents expressed the opinion that throughout the process –of choosing the alternative fuels for consolidating the EU strategy-, it is vital that the most cost

effective and emission-free transition pathways be assessed and selected in the framework of a well-to-wheel approach.

4.8 TRANSPORT MODES IN CONJUNCTION WITH ALTERNATIVE FUELS

Question 8-10: Different transport modes may require different alternative fuels. Indicate which alternative fuels will be relevant for which transport modes on the time horizon 2020, 2030, and 2050.

The respondents were asked to provide an answer in three distinct timeframes, namely up to 2020, 2030, and 2050. The different transport modes available in the question included:

- Short road-passengers (urban)
- Medium road-passengers
- Long road-passengers
- Short road-freight (urban)
- Medium road-freight
- Long road-freight
- Rail
- Inland water
- Short-sea shipping
- Maritime
- Air

The different alternative fuels available in the question include:

- Electric BEV
- Electric HFC
- Electric Grid
- Biofuels (Grid)
- Synthetic fuels
- Methane CNG
- Methane CBG
- Methane LNG
- LPG

Respondents could choose more than one alternative fuel for each separate transportation mode and for every distinct timeframe (2020, 2030, and 2050).

The indicated by the respondents 'transport mode' – 'alternative fuel' pairings can be identified through Figure 4–17 to Figure 4–27. Each of these figures summarises the answers in relation to one transport mode. The different alternative fuels/energy carriers are depicted along the horizontal axis of each figure. Each group of bars in a figure represents the percentage of respondents who considered that the particular alternative fuel/energy carrier will be relevant to the transport mode that the Figure is referring to. Percentages for different timeframes are depicted by blue (2020), red (2030), and green (2050) bars.

Thus, Figure 4–17 depicts the views of the respondents on how each alternative fuel/energy carrier is indicated for **the short (urban) road-passengers transport**

mode. For the 2020 timeframe, BEV (61.0%) is the mostly indicated alternative fuel for urban road-passenger vehicles followed by electric grid (39.0%) and biofuels (34.1%) for the 2020 timeframe. A similar pattern to the 2020 timeframe is identified in the 2030 and 2050 timeframes.

In the case of **medium road-passengers** vehicles (Figure 4–18), electricity (BEV, HFC), biofuels, and methane CNG and CBG are mostly indicated, followed relatively close by electric grid and synthetic fuels. In particular, 40.7% of all the respondents considered liquid biofuels as the mostly indicated fuel for 2020 timeframe, with a reduction to 27.6% and 21.1% for 2030 and 2050 respectively, though. Methane CNG and methane CBG are indicated by 34.1% and 33.3% of the respondents respectively for 2020 timeframe, again falling to lower percentages in 2030 and 2050.

In **long distance road-passengers** vehicles (Figure 4–19) biofuels are indicated mostly as alternative fuel (41.5% for 2020 and half of this percentage for 2050 timeframe), followed by methane derivatives and synthetic gas (25.2%, 26.8% and 26.0% for 2020, 2030, 2050 respectively). Electricity, maintains its presence in the suggested fuels, albeit with less suggestions except electric HFC which seems to gain momentum from 2020 to 2050, becoming actually the mostly indicated fuel in 2050, along with electric BEV.

The aforementioned general patterns of indications for the relevance of fuels to the short, medium and long-distance road-passenger vehicles, seem to be repeated for **short-, medium-, and long-distance road freight mode** as well (Figure 4–20 to Figure 4–22). Electricity is mostly suggested for short distance freight vehicles, whereas biofuels and synthetic fuels for medium- and long-distance freight vehicles, however the preferences on the alternative fuels are more pronounced here as we move from short to long distance freight. For example, for the 2020 timeframe, electric BEV is proposed by 43.1% of the respondents for the short road freight transport dropping to almost 10% for medium-road distances and finally shrinking to 3.3% for long-distance freight transport. Propositions on biofuels on the other hand increase moderately as we move from short-distance (37.4% for 2020) to long-distance (42.3% for 2020) freight vehicles.

In the case of the **rail transport mode** (Figure 4–23) electricity grid is by far the most suggested energy carrier (59.3%, 50.4% and 43.9% for 2020, 2030 and 2050 timeframe, respectively).

Regarding the **water transport mode,** that is inland, short-sea shipping, and maritime mode (Figure 4–24 to Figure 4–26), it seems that generally, a similar pattern of fuels are indicated for all modes. Small variations do exist, but without altering the general pattern. Biofuels were indicated by most respondents followed by synthetic fuels and methane LNG.

With regard to the **air transport mode** (Figure 4–27), the majority of indications are almost equally distributed on biofuels and synthetic fuels, followed by methane LNG; indications on the rest of the alternative fuels/energy carriers are practically negligible. 35.0% and 30.1% of the respondent indicated that biofuels and synthetic fuels respectively will prevail in the aviation sector for the 2020 timeframe. Small variations can be identified for the other two timeframes (2030 and 2050). It is worth noting that preferences on biofuels and synthetic fuels are almost three times those of methane.

Annex I includes the corresponding figures for each respondent type in terms of transport mode and alternative fuels or energy carrier.

Another perspective for the inter-relation of this information is to investigate what the expectations of the respondents are for all transport modes keeping the alternative fuel as a constant. Annex II includes the respective charts, one for each alternative fuel.

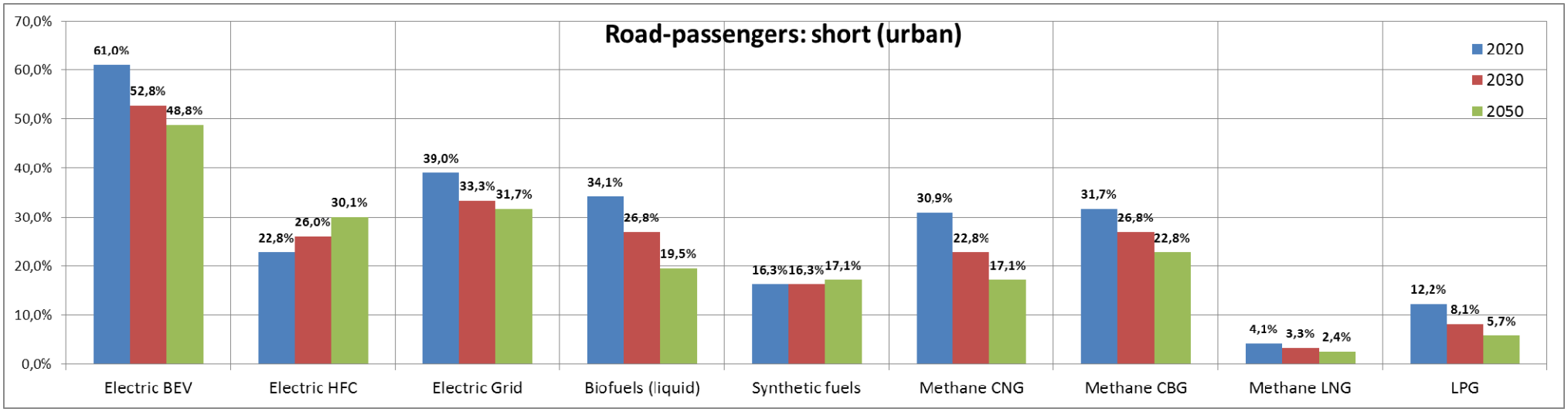

Figure 4–17 Expectation on how each alternative fuel will apply to the short (urban) road-passengers transport mode

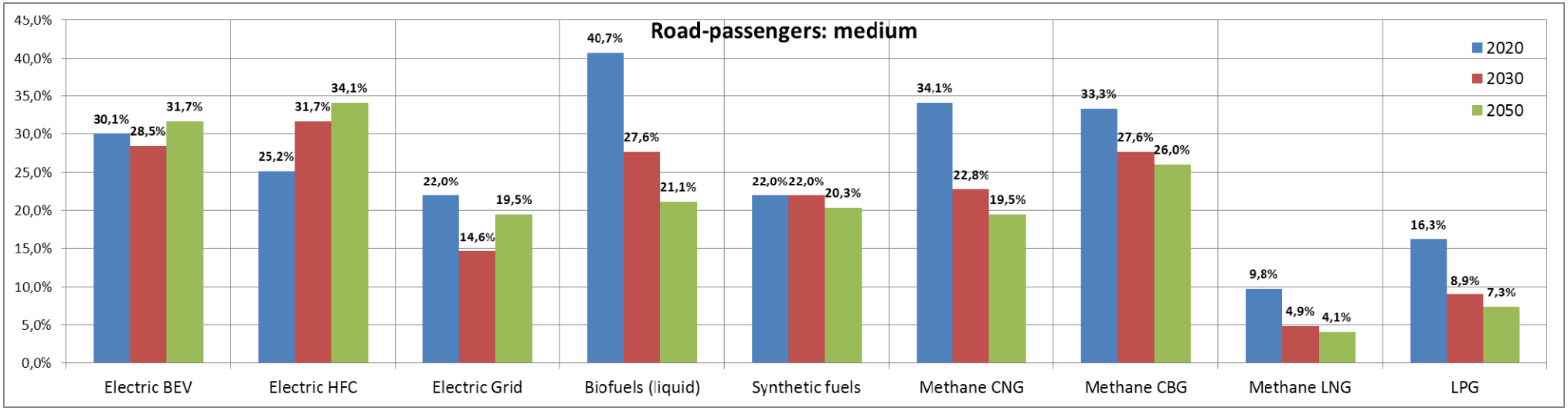

Figure 4–18 Expectation on how each alternative fuel will apply to the medium road-passengers transport mode

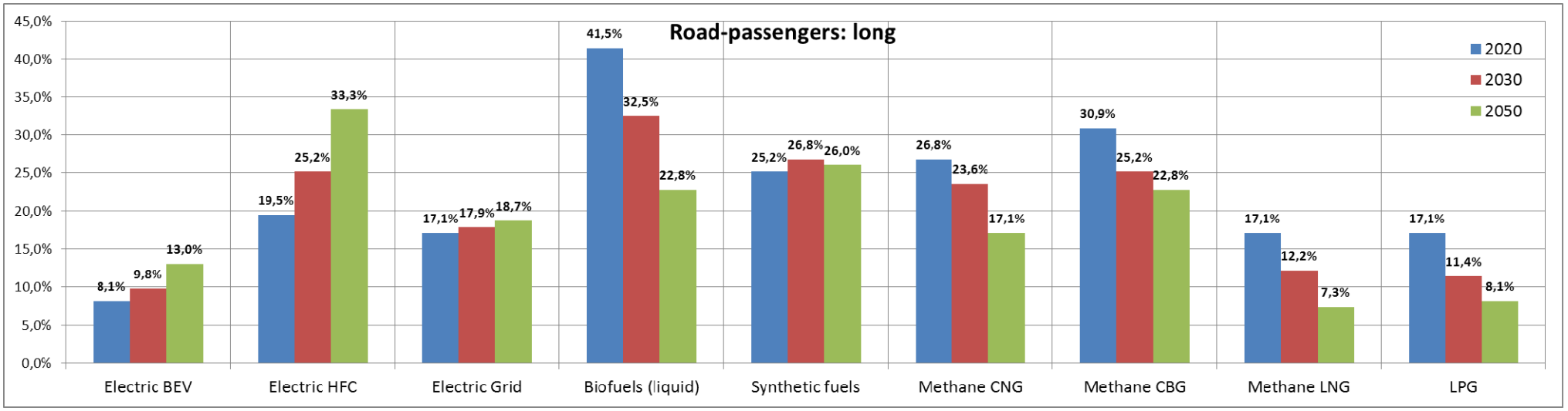

Figure 4–19 Expectation on how each alternative fuel will apply to the long road-passengers transport mode

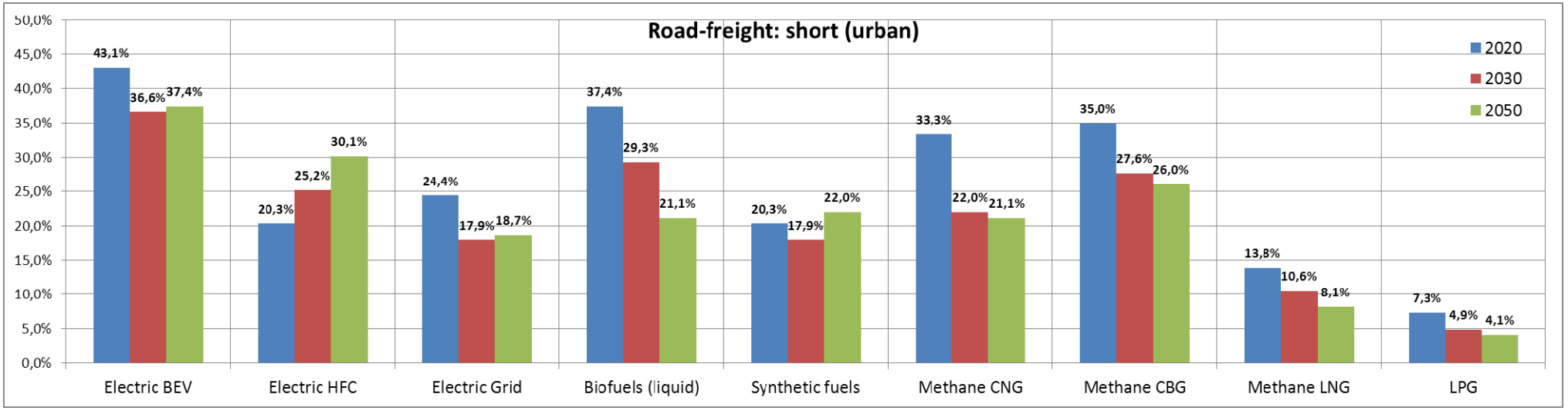

Figure 4–20 Expectation on how each alternative fuel will apply to the short road-freight transport mode

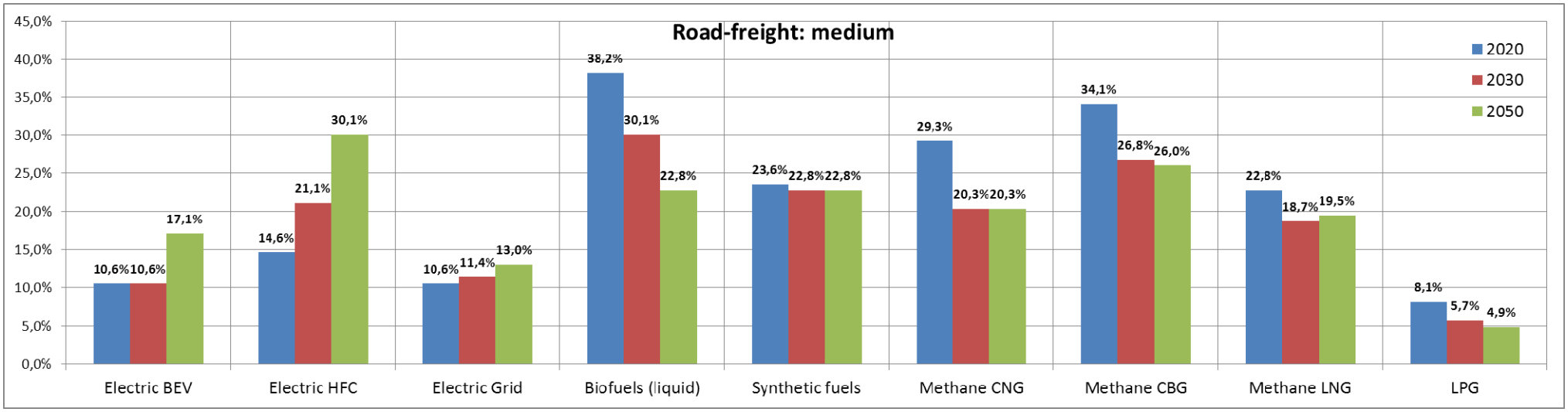

Figure 4–21 Expectation on how each alternative fuel will apply to the medium road-freight transport mode

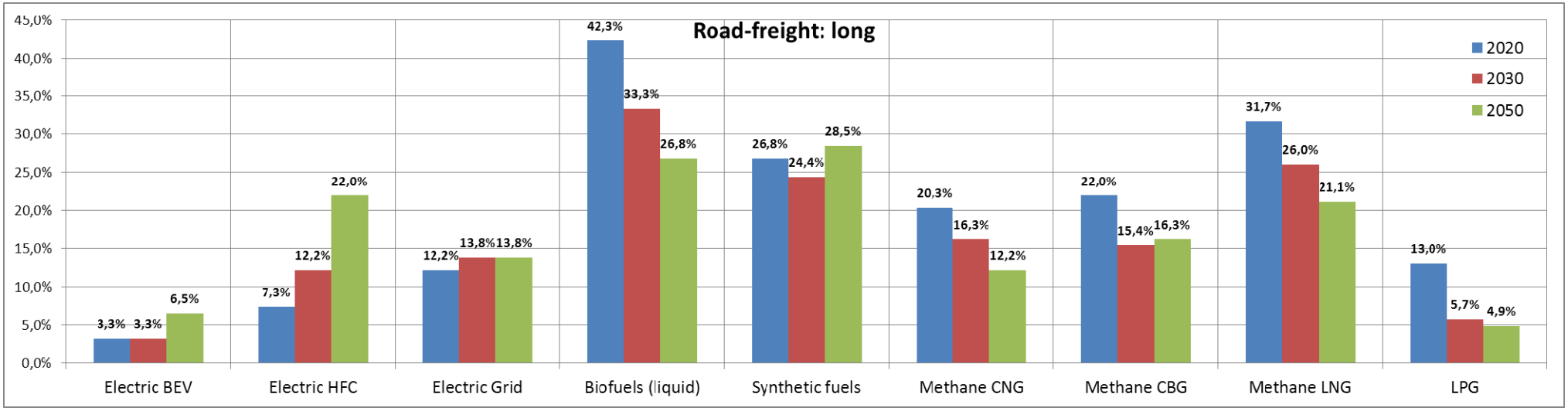

Figure 4–22 Expectation on how each alternative fuel will apply to the long road-freight transport mode

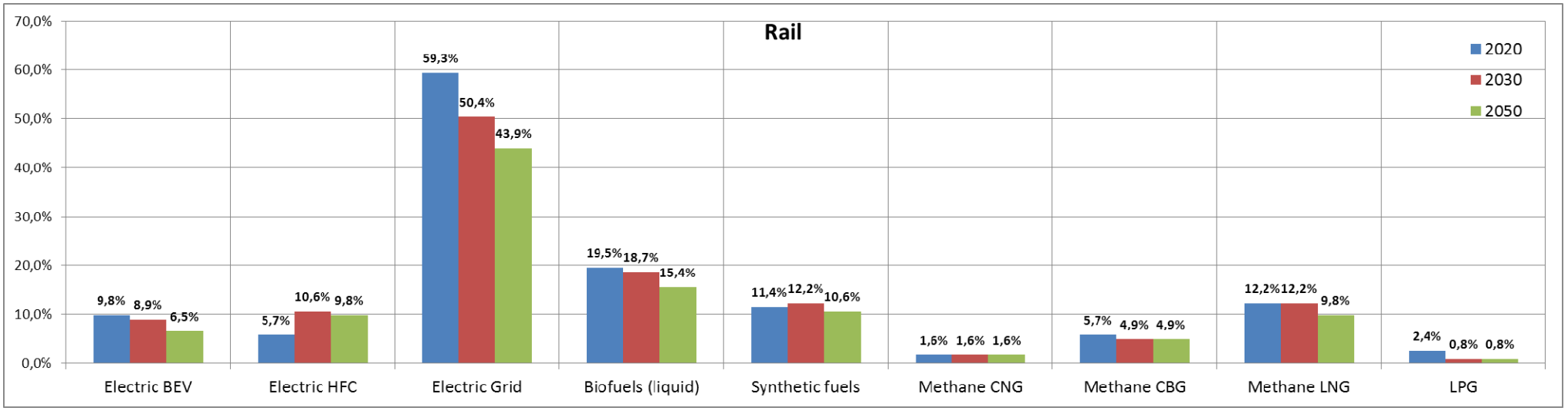

Figure 4–23 Expectation on how each alternative fuel will apply to the rail transport mode

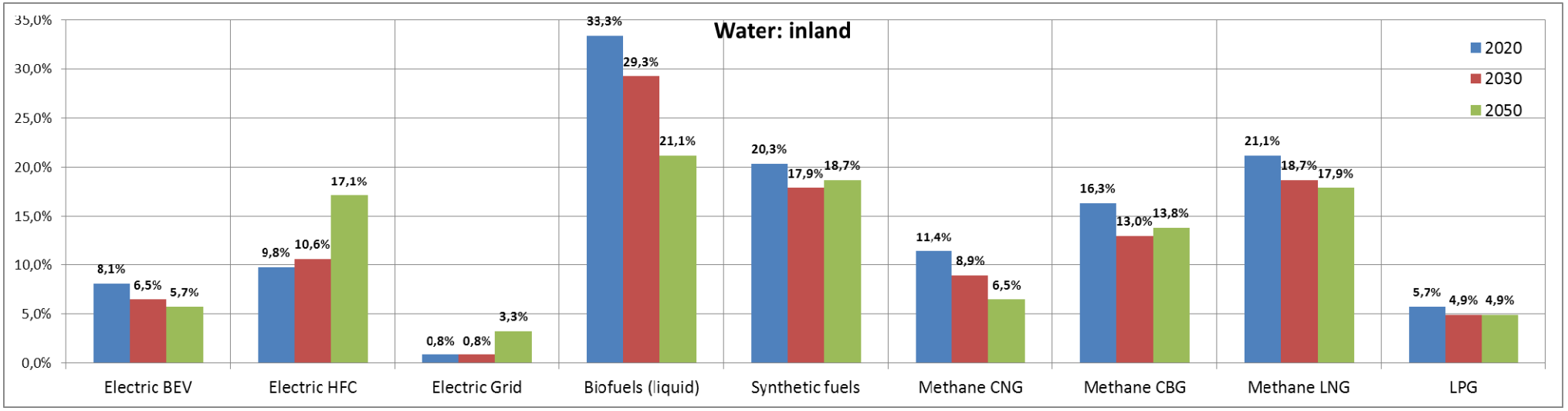

Figure 4–24 Expectation on how each alternative fuel will apply to the inland water transport mode

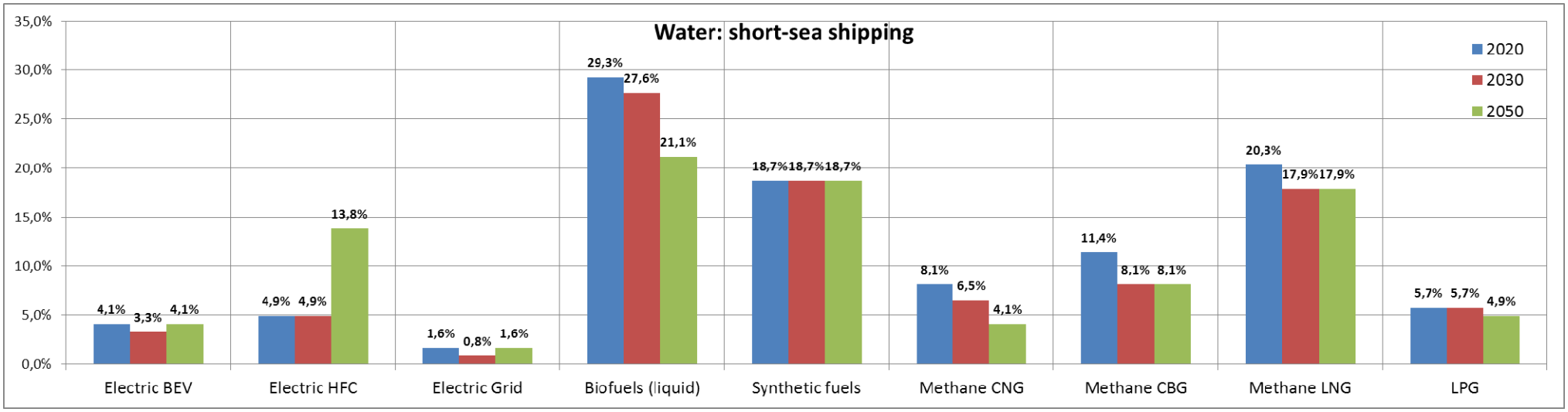

Figure 4–25 Expectation on how each alternative fuel will apply to the short-sea shipping transport mode

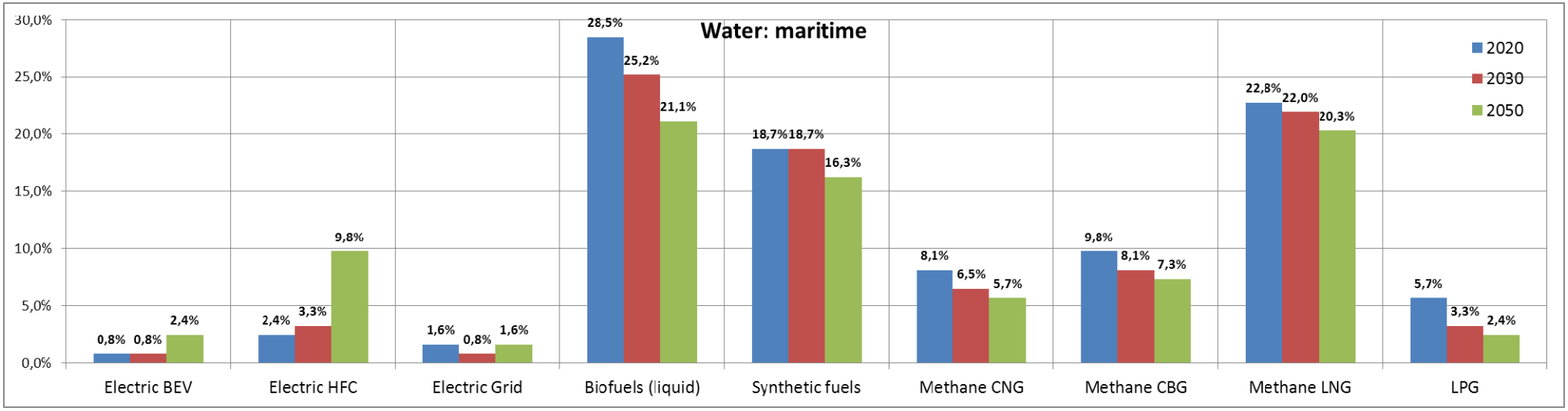

Figure 4–26 Expectation on how each alternative fuel will apply to the maritime transport mode

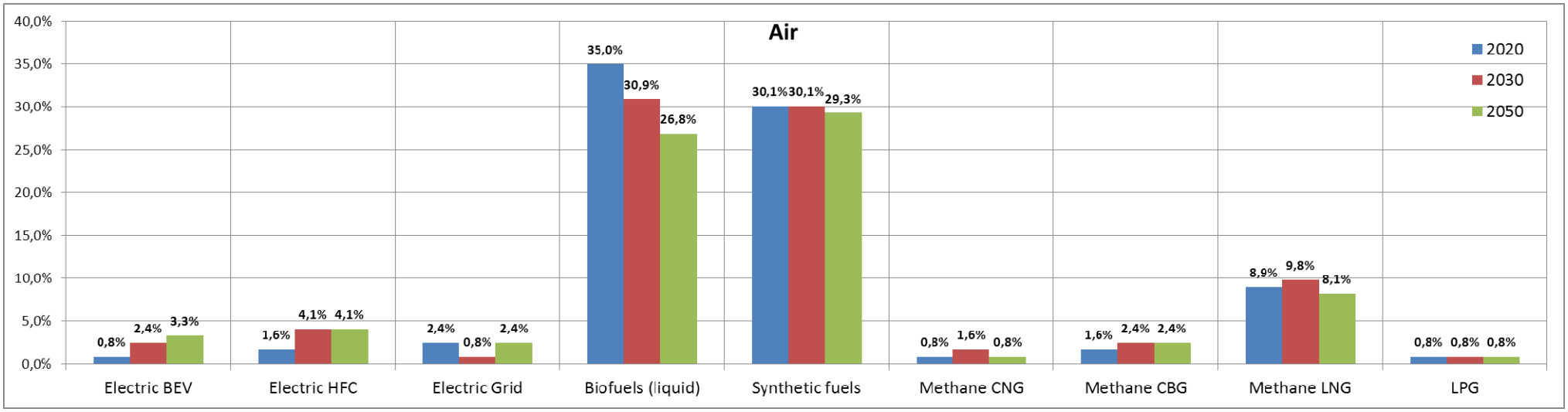

Figure 4–27 Expectation on how each alternative fuel will apply to the transport mode

4.9 USE OF PARTICULAR FUELS IN PARTICULAR TRANSPORT SECTORS

Question 11: Should actions be taken to privilege the use of particular fuels in particular transport sectors?

Figure 4–28 shows that most respondents (78 - 63%) considered that actions should be taken in order to privilege the use of particular fuels in particular transport sectors. The breakdown of the responses per respondent type presents a similar overall view. In particular, private sector companies and industry associations or NGOs considered that such actions should be promoted and supported (59%, 61% respectively). Somewhat larger is the percentage for individuals (69%) who shared this view. (Figure 4–29).

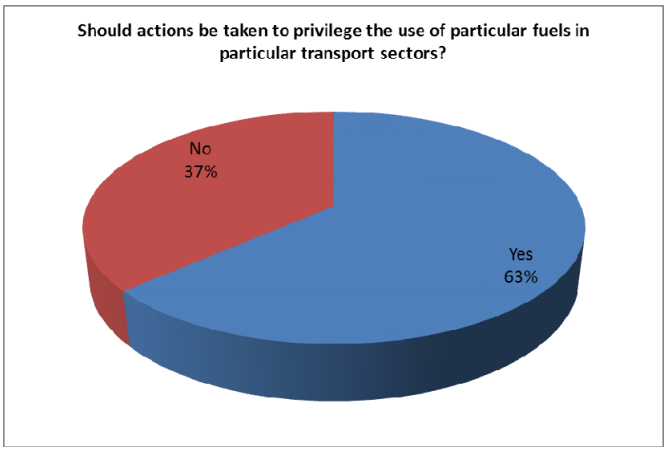

Figure 4–28 Use of particular fuels in particular transport sectors

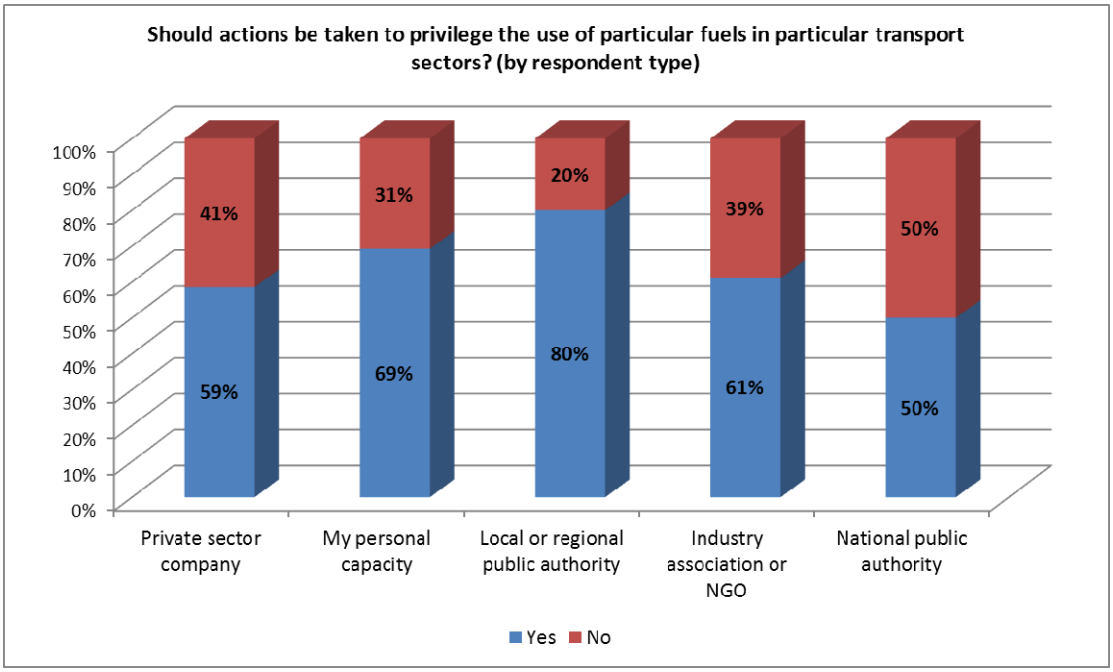

Figure 4–29 Use of particular fuels in particular transport sectors, per respondent type

Suggestions from those who considered that certain actions need to privilege particular fuels and/or technologies can be classified into three categories, that is:

- Tax incentives,
- Standardisation and harmonization, and
- Development of infrastructure in order to promote alternative fuels.

Over half of the respondents shared the view of tax incentives for fuels either by discouraging the use of traditional fuels or by some kind of financial support or rebate for the use of alternative fuels. Of course, this financial support can be applied either to individual-level or enterprise-level, based on the respondent type of the answer.

More specifically, actions proposed so as to privilege particular fuels to particular technologies included:

- Tax incentives for fuels and subsidies
- Free-reserved parking spots for Electric Vehicles in urban areas
- Free/non-taxed charging on public space
- Access to bus/taxi lanes
- Setting a public charging infrastructure that provides people living in urban areas without private garage with access to charging points
- Encourage public sector and in particular public transport by adopting exclusively the use of alternative fuels.
- Restrictions for alternative fuels either based on financial incentives or legislation
- Fleet replace incentives
- Development of infrastructure
- Financial support or rebate for the use of infrastructure
- Development and harmonisation of EU regulations
- Waste derived biodiesel should be incentivised in the transport sector

- Acknowledgement of sustainable biofuels in air transport as zero-emission-fuels in ETS
- Subsidize the production of biofuels
- Encourage research
- In case of road transport mode, promotion of electric vehicles

Another issue raised by the respondents comments regarded the promotion of biofuels especially in certain modes of transport sector. There were frequent comments which stressed that aviation has no other energy choice than liquid fuels, contrary to land transport. For this reason it was claimed that this sector should be privileged for the use of biofuels and at the same time regulations and incentive schemes should direct a sufficient percentage of the available feedstock towards use in aviation.

Most of those respondents who are opposed to the support of privileged actions to particular fuels (50%) believe that there should not be any mandated earmarking of fuels for specific sectors. They emphasize that it is the market that should decide which combination of fuels and drive train technologies is the most viable option for the different transport segment following technical, economic and consumer acceptance considerations. Concerns were expressed that imposed technology solutions would not be cost effective and would distort free markets.

Support to industry-wide research and testing to assess cost and affordability of different solutions should encouraged, some of them believe.

‘Strategies to influence consumer choices will need to be targeted and informative so as to motivate and empower consumers to opt for the cleanest and most efficient vehicles’, a particular industry-association respondent noted.

4.10 THE NEED OF A LIFE-CYCLE APPROACH

Question 12: Do we need to accompany those actions with a coherent life-cycle approach for all fuels?

There is strong support among all respondent types regarding the need to accompany any potential actions with a coherent life-cycle approach for all fuels with 89% of all respondents positively responded to this specific issue. Figure 4–30 and Figure 4–31 depict this message about the LCA of alternative fuels.

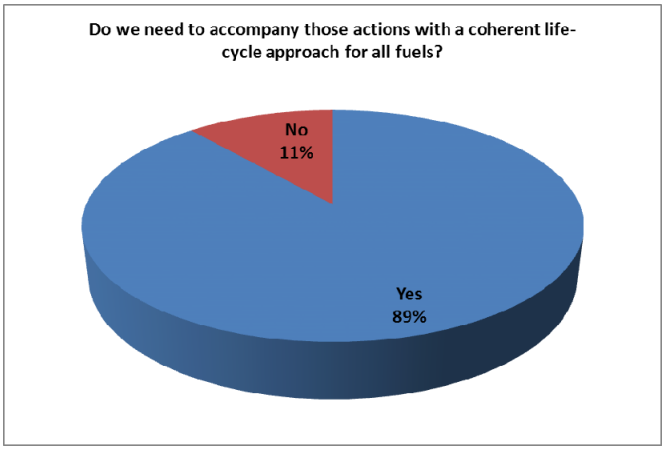

Figure 4–30 Need of a life-cycle approach

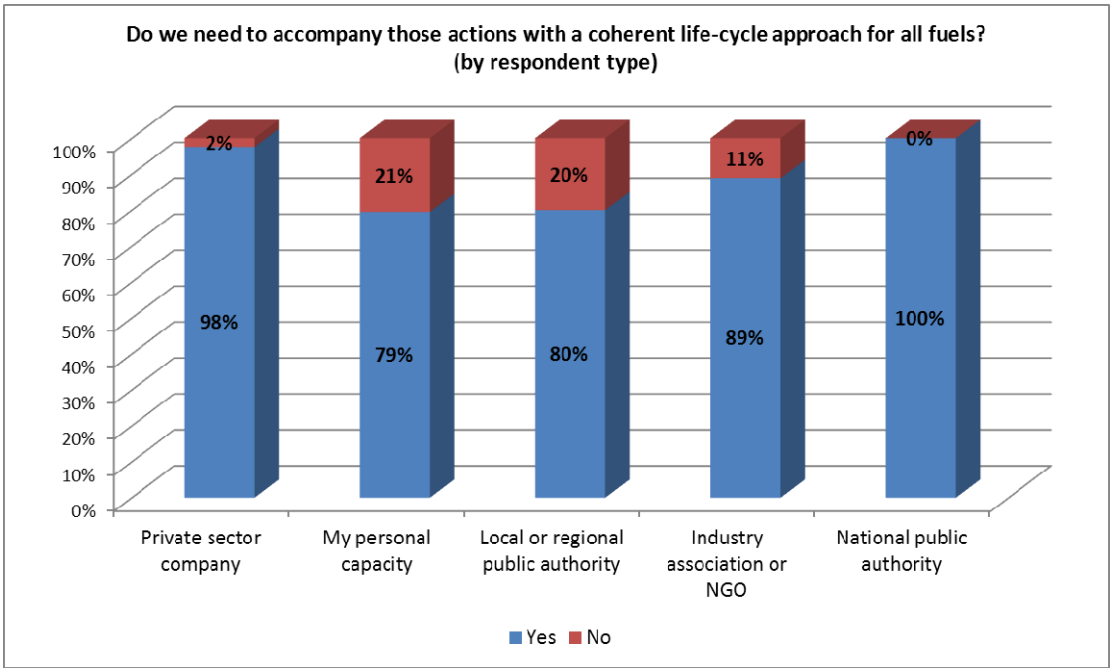

Figure 4–31 Need of a life-cycle approach, per respondent type

It is noted that almost 60% of those who negatively considered the use of privileged actions for particular fuels in particular sections of technology responded negatively in this question, as well.

4.11 SHARE OF BIOFUELS ON TRANSPORT ENERGY SUPPLY

Question 13: Do you think that biofuels meeting the EU sustainability criteria could provide the major share of the transport energy supply in the long term?

Most respondents (58%) indicated that biofuels alone could not provide the major share of the transport energy supply in the long term under EU sustainability criteria.

Figure 4–32 and Figure 4–33 depicts this view both by the whole of the respondents as well as by each respondent type.

Almost all of the respondents, who negatively replied to this issue, acknowledge the fact that biofuels will play a crucial and significant role in the future energy mix of transport sector. However, many raised questions about the economic and environmental sustainability of a projected uptake of biofuels in case this will not be accompanied by strict rules for land use.

Particular reference is made by an individual respondent to a JRC study trying to compose arguments about the difficulty that biofuels can provide the major share and at the same time meet sustainability criteria and not seriously impact food production. According to the referenced study "the uncertainties of the emissions due to indirect effects, much of which would occur outside the EU, mean that it is impossible to say with certainty that the net GHG effects of the biofuels program would be positive."

Some stated that it seems questionable whether there are appropriate sustainability criteria which would make biofuels a sustainable solution and that EU legislation should incorporate more realistic indicators.

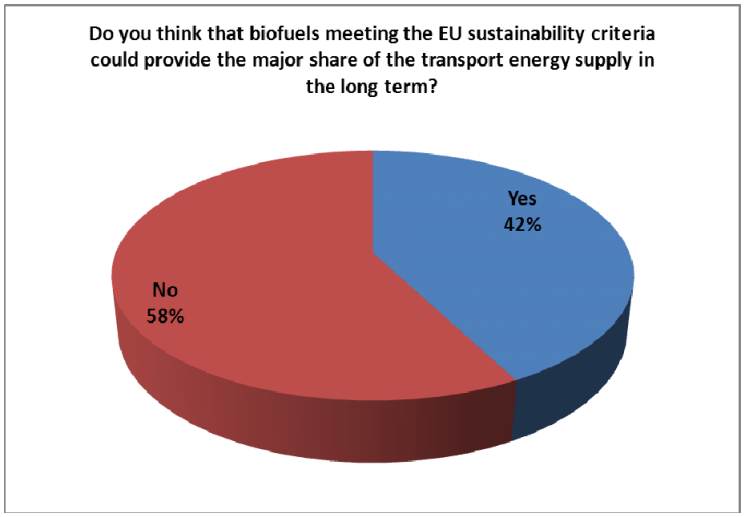

Figure 4–32 Biofuels as a portion of the transport energy supply

Many of the respondents, who consider that biofuels could provide the major share of transport energy supply, also express concern about the factors that must be carefully assessed under this framework. According to these replies, the ability of sustainable aviation biofuels to meet the major share of EU transport energy supply in the long-term will depend upon 1) the scale up of sustainable biofuel supply chain; 2) the environmental contribution and 3) the development of alternative fuel sources that reduce ground transport need for biofuels.

There are some respondents who underline the benefits of biofuels and biodiesel in particular and the fact that it contributes not only to reducing CO_2 emissions but also to solving the challenge of securing energy supply.

There is also reference that biofuels use depends on the transport mode. A typical example is rail which largely relies on electricity.

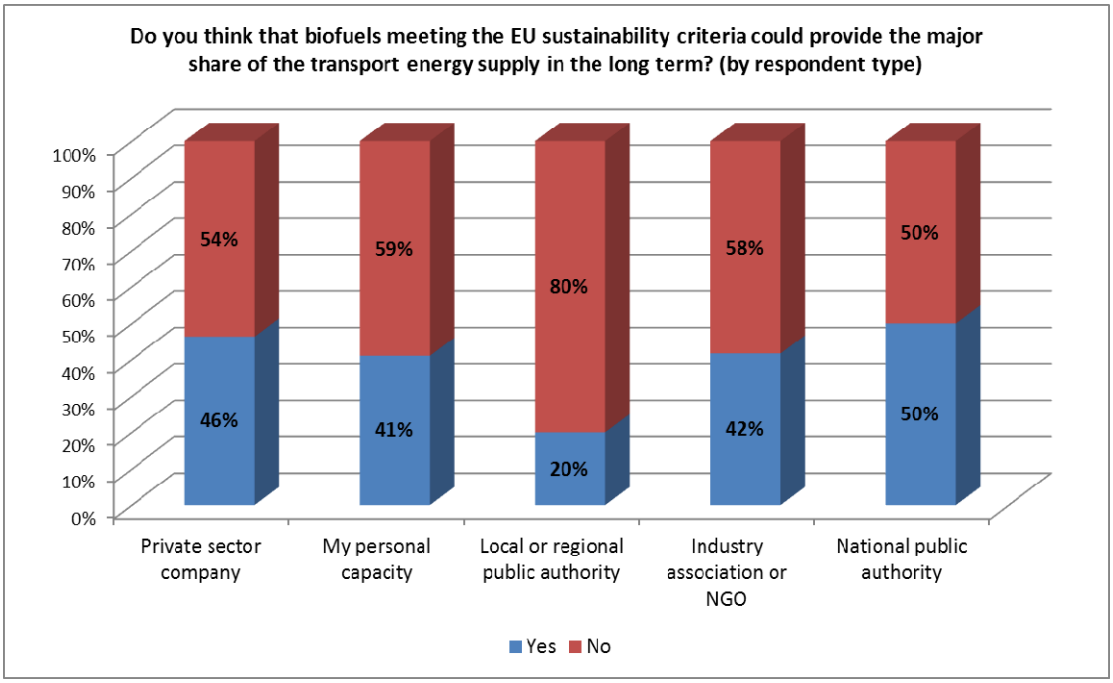

Figure 4–33 Biofuels as a portion of the transport energy supply, per respondent type

Last, many respondents considered that the 'longer term' expression as stated in the question should be further specified as it cannot be interpreted uniquely and without some kind of vagueness.

4.12 BIOFUELS AND GREENHOUSE GAS REDUCTION

Question 14: Do you think that biofuels meeting the EU sustainability criteria could deliver the required greenhouse gas reduction in the horizon 2050?

Both Figure 4–34 and Figure 4–35 clearly express the view of the majority of the respondents (63%) that biofuels meeting the EU sustainability criteria cannot deliver the required greenhouse gas reduction in the horizon 2050.

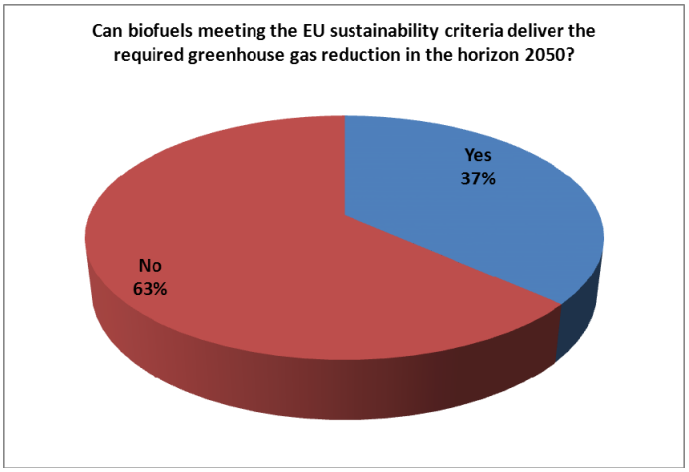

Figure 4–34 Biofuels and greenhouse gas reduction

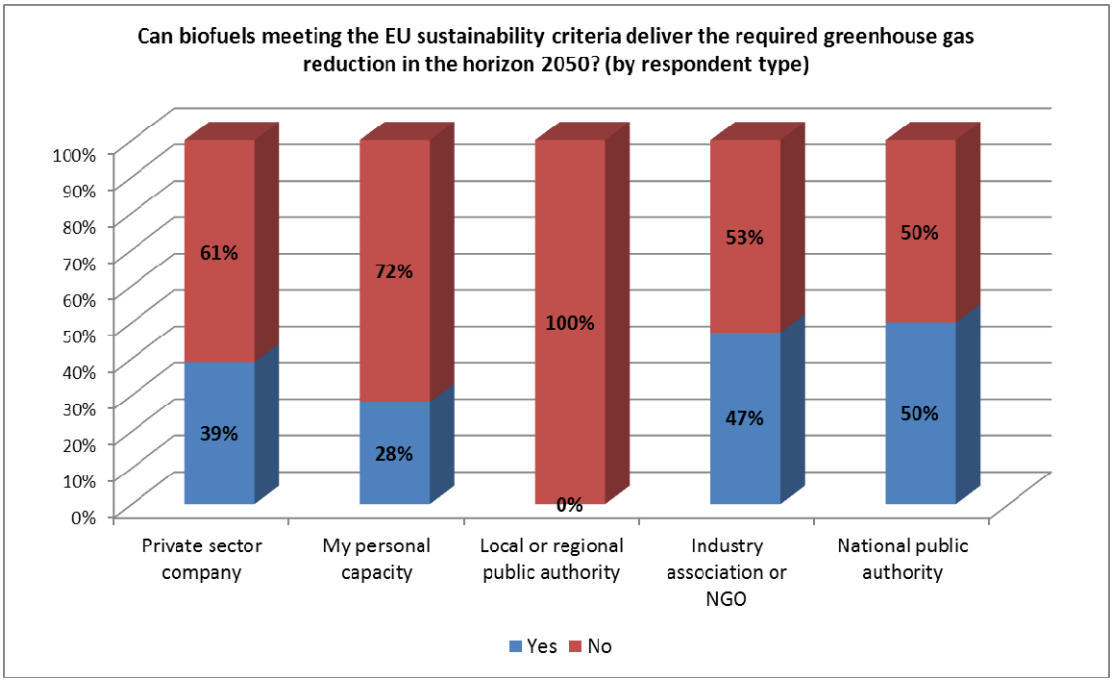

Figure 4–35 Biofuels and greenhouse gas reduction, per respondent type

It is noted that 65.4% of those who positively replied to the very previous question (i.e. whether biofuels could be the major share of alternative fuels in the energy supply in the longer term) also replied a 'yes' to this one. Respectively, 84.5% of those who negatively replied to the very previous question also replied a 'no' to this one.

4.13 PRIORITIES FOR FURTHER MARKET BUILD-UP OF BIOFUELS

Question 15: Biofuels are considered to be an important part of alternative long term options for substituting oil as energy source in transport. Which approach(es) should

get priority for further market build-up of biofuels reaching beyond 2020?

In this particular question, respondents were called to address the potential approaches that should get priority given the importance of biofuels as an alternative long term option for substituting oil as energy source in transport. Respondents were able to indicate more than one alternative approaches that according to their view should get priority for further market build-up of biofuels reaching beyond 2020. The available options included:

- Enabling progressively higher blending of bioethanol and biodiesel with conventional fossil fuels (**Option 1**)
- Faster market deployment of flexible fuel vehicles that can accept a much wider range of fuel specifications (**Option 2**)
- Faster market development of biofuels in transport sectors which are less dependent on fuel specifications than road transport passenger vehicles (**Option 3**)
- Faster market development of fungible biofuels, which can be blended at any ratio with conventional fossil fuels (**Option 4**)

Figure 4–36 depicts the total number that each of the available options was encountered. Option 4 was indicated by most respondents, followed by Option 2, Option 1, and finally Option 3.

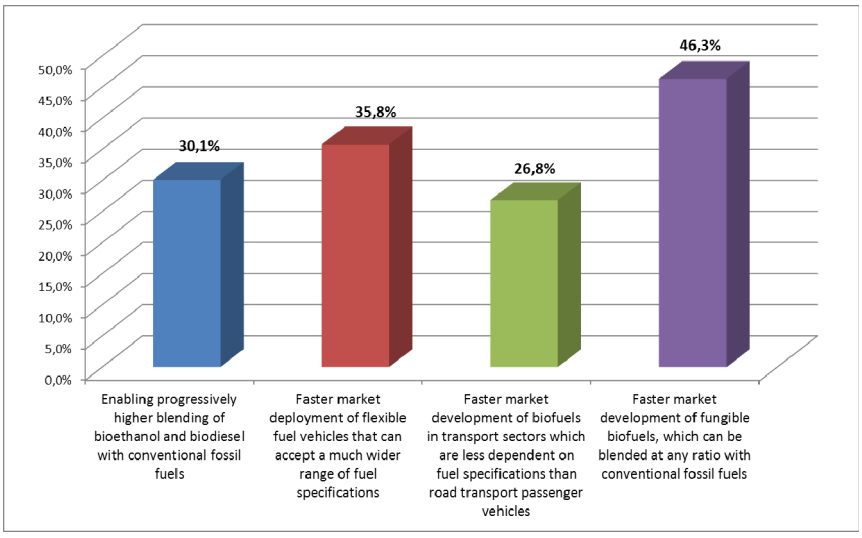

Figure 4–36 Priorities for further market build-up of biofuels

Many respondents underlined that biofuels should not be driven by agricultural policy and that all fossil fuel shouldn't/cannot be replaced with biofuels. They, also, pointed out that electric powertrains are a more valuable solution. Biofuels is considered to contribute to the required GHG reduction in 2050, but also electricity, hydrogen and other sources of energy are considered important.

Some respondents raised concerns about the sustainability of biofuels (and in particular biodiesel) since powertrains with biodiesel as fuels possess reduced engine power.

4.14 ACCELERATING THE DEPLOYMENT OF ADVANCED BIOFUELS – A PUBLIC SECTOR PERSPECTIVE

Question 16: Should the public sector intervene in accelerating the deployment of advanced biofuels technologies for the transport sector?

Most respondents (67%) agreed that the public sector should intervene for accelerating the deployment of advance biofuels technologies for the transport sector. Only one third has doubts or disagrees with this option of public intervention. This is evident from the pie chart as depicted in Figure 4–37.

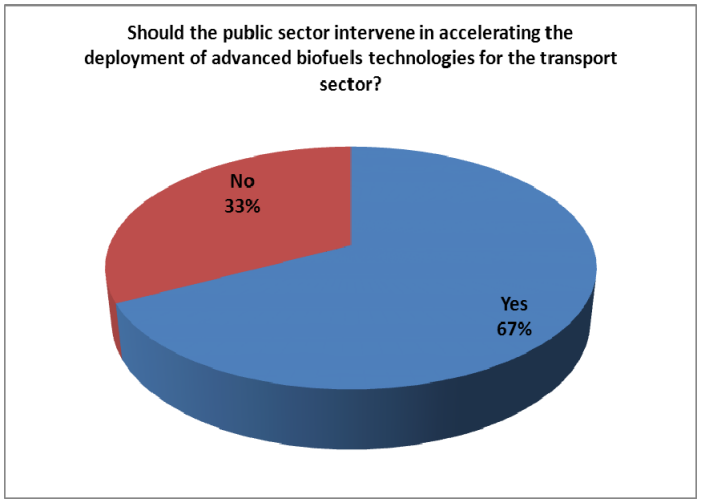

Figure 4–37 Accelerating the deployment of advanced biofuels – a public sector perspective

It seems that this is also the preferred option when it comes to a breakdown by respondent type. Figure 4–38 depicts that the majority of the private sector companies (78%) agrees to the importance of public intervention, followed by 'industry association or NGO' type (64%) while individuals who consider the same amount to 56%.

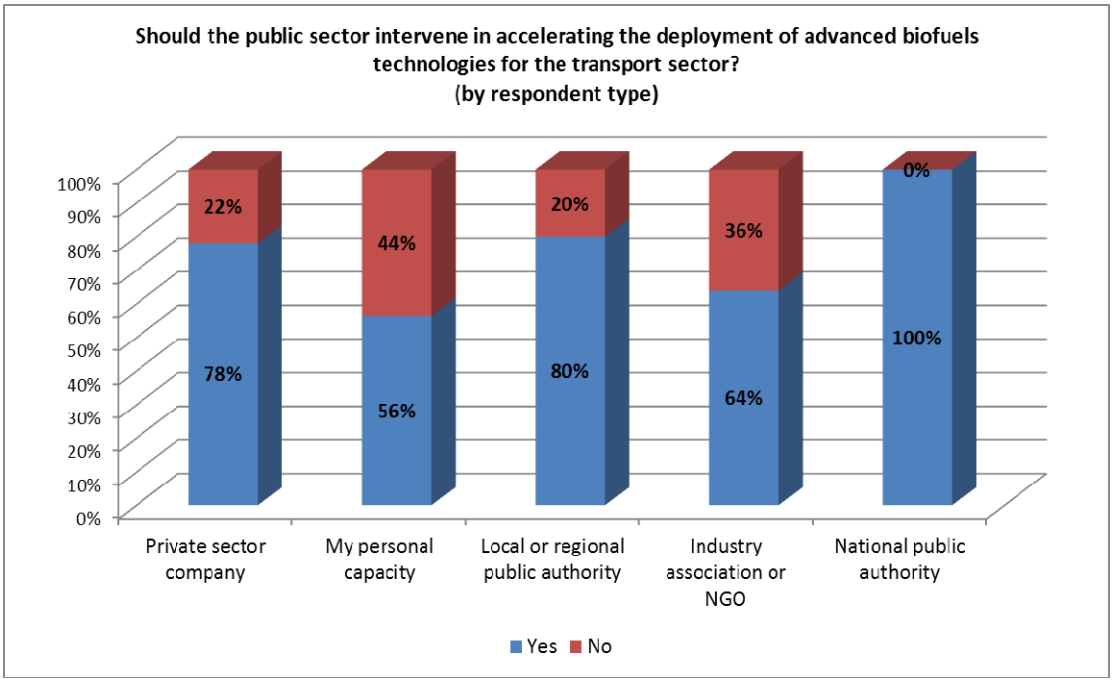

Figure 4–38 Accelerating the deployment of advanced biofuels – a public sector perspective, per respondent type

Three main directions were suggested by the respondents regarding the actions that should be taken towards this direction – i.e. of public sector supporting deployment of advance biofuels technologies. These refer to: i) research, ii) tax incentives and funding support, and iii) standardization.

Most respondents –of those who positively responded to this question- agreed that tax incentives, investment support for the commercialization of biofuels and improved production techniques should be designed for sustainable biofuels to ensure cost competitiveness (preferably an end-user price advantage) with conventional fuels. Few respondents further analyzed the need that government policies should provide some price support, in order for biofuels developers earn target returns on advanced biofuels production, project cost support in the form of loan guarantees and/or direct grants. They also suggested that if subsidies are provided, these should be progressively reduced and eventually discontinued when technologies reach commercial maturity.

Financial support is closely followed by research and development of standards in the preferences of the respondents. These two factors are considered of having equal importance. Many respondents supported the idea of financially supporting research and development programs; R&D is highly appreciated and considered as an important factor for the development of new sustainable biofuels and/or the deployment of alternative fuels in transport sector.

In relation with the standardization procedures, many respondents point out the need that regulators work with industry to create stable, long-term policy frameworks for biofuels to increase investor confidence and allow for the sustainable expansion of biofuel production. Long-term targets and incentives should be implied by this procedure in order to assure market actors that there is a market for renewable

energy in the transport sector. Many claimed that regulations should be harmonized at EU level and efforts must be done to harmonize standards. Apart from this, few considered that public sector either through the development of standards and/or regulations or though other similar actions should contribute to the removal of existing regulatory obstacles.

Some respondents also noted the need for disseminating the benefits of biofuels use and the results of R&D projects. They commented that coherent communication plays an important role in stimulating overall demand and that the EU should bring together all actors, both public and private, in order to stimulate development and market uptake of new technologies and cleaner fuels/ propulsion methods, including:

- Disseminating R&D results
- Stimulating joint projects
- Guaranteeing critical mass
- Uniting markets
- Generating economies of scale.

Some supporters of public intervention (no more that 10%) emphasized the fact that green public procurement should be stimulated to encourage low-emission technologies in urban public transport and road freight. They also stated that in some cases the procurement requirements should contain fuel type of new vehicles, e.g. only biofuels are eligible.

One respondent raised concerns regarding the availability of adequate amounts of biofuels, the certification process of biofuels producers and the role that the public sector will play in this scheme.

4.15 DEVELOPMENT OF THE REFUELLING/RECHARGING INFRASTRUCTURES – A PUBLIC SECTOR PERSPECTIVE

Question 17: Should the public sector intervene in the development of the refuelling/recharging infrastructures?

Three quarters (77%) of the respondents consented to the idea that public sector should intervene in the development of the refuelling/recharging infrastructure (Figure 4–39). The same message is also evident by analysing the replies of each different respondent type (Figure 4–40).

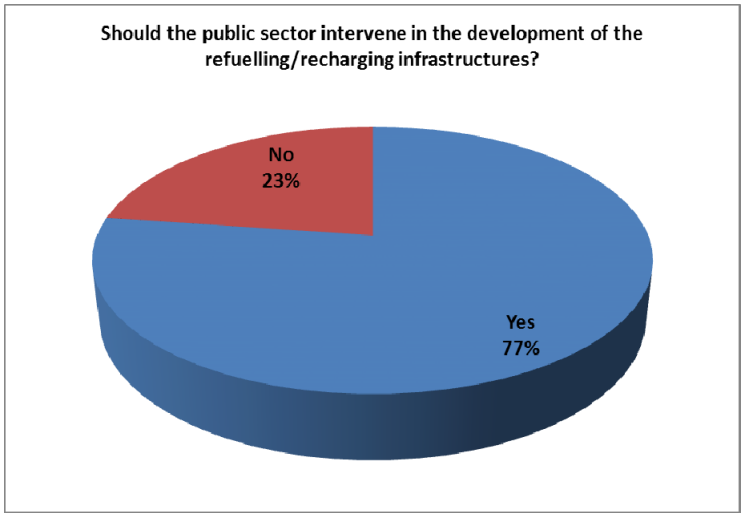

Figure 4–39 Development of the refuelling/recharging infrastructures – a public sector perspective

Most respondents underlined that refueling/recharging infrastructures are a key element to the success of any large scale alternative energy programme. They also believe that the role of the public sector is to assist the private sector in overcoming the first 'funding endeavours' in funding an emerging technology and coordinate the issues inherent in deploying new fuels for new vehicles. Infrastructure mandates by themselves are not the solution and may have negative consequences.

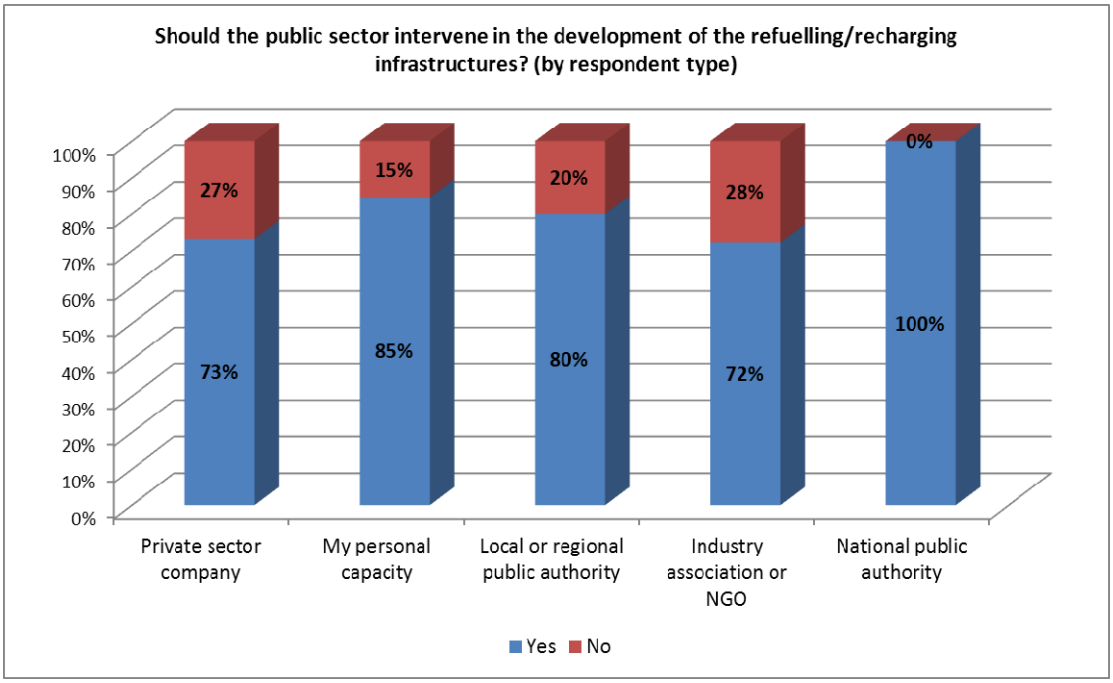

Figure 4–40 Development of the refuelling/recharging infrastructures – a public sector perspective, per respondent type

Some respondents argued that public intervention in terms of infrastructure development is needed in case of electric vehicles; in other cases this is not mandatory, they claimed.

There were more than few respondents who raised the issue of simultaneous development of infrastructure and standardisation in order to support private leverage and funding. They stated that there is work needed on harmonization of standards as well as an efficient EC framework for permitting requirements for hydrogen fuelling stations, electric vehicle recharging points and gas in transport. Many called for EU to take the opportunity to play a major role in driving consistent regulation and standards for fuel/vehicle/infrastructure requirements (including permitting) for all alternative fuel options that will encourage investment and ease implementation.

Few respondents, primarily those who are in close relation with aviation sector, stressed that recharging infrastructure is not applicable to aviation since drop-in fuels are foreseen to be the only viable low-carbon alternative. They claimed that there is no need to adapt the infrastructure for air transport.

The few, indeed, opponents of the public intervention in infrastructures claimed that either this issue should be market-driven or accompanied by clear guidance and planning rules by each State.

An individual respondent alerted for the need that actions be taken as soon as possible since the timescales and costs of installing relevant alternative energy supply infrastructure (refuelling) are not negligible whatsoever.

4.16 DEPLOYMENT OF ALTERNATIVE FUELS USING CURRENTLY AVAILABLE INSTRUMENTS

Question 18: Do you think that achieving a consistent and significant deployment of alternative fuels is possible through a better use of currently available instruments (large scale demonstration projects; funding and financing; information provision)?

The major part of the respondents (73%) considered that deployment of alternative fuels is possible through a better use of currently available instruments such as large scale demonstration projects, funding and financing, information provision etc (Figure 4–41). This seems to be the case as well from the standpoint of each respondent type, as shown in Figure 4–42.

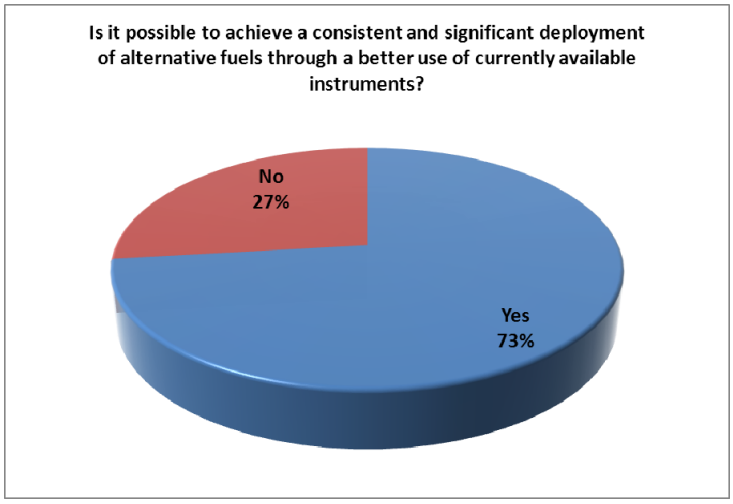

Figure 4–41 Deployment of alternative fuels using currently available instruments

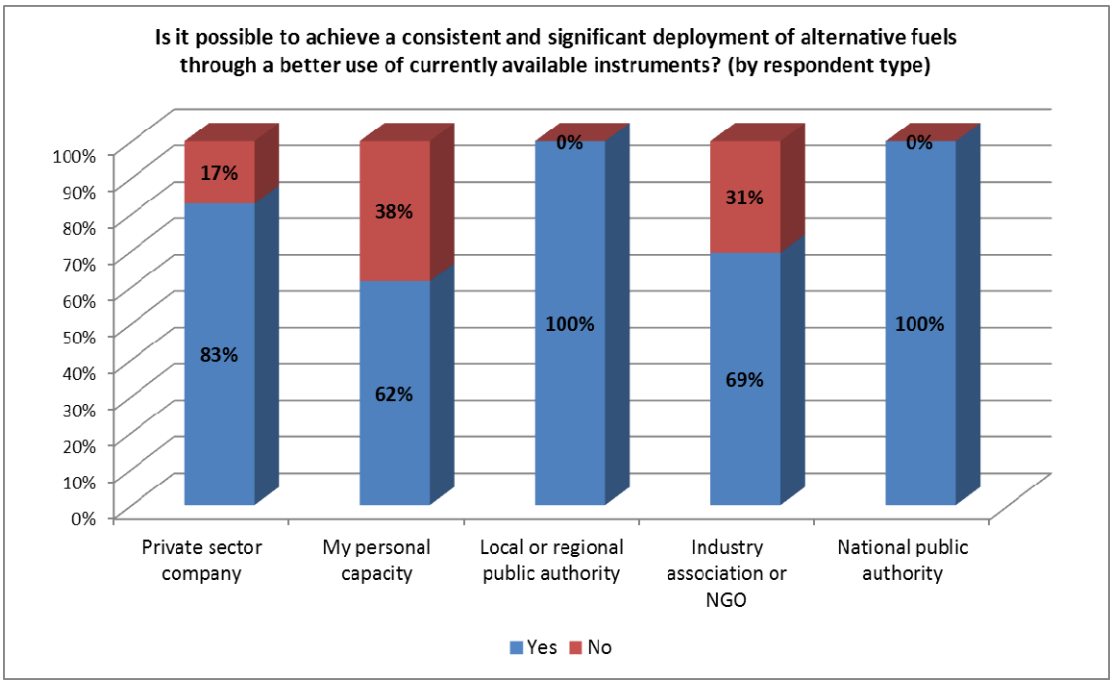

Figure 4–42 Deployment of alternative fuels using currently available instruments, per respondent type

There was a number of suggestions in terms of better use of currently available resources, which include:

- Larger demonstration/trial programmes
- Increase confidence of public to new technologies and fuels
- Harmonization and organisation of network distribution
- Better allocation of grants and incentive programs
- Support for innovation and adoption
- Better coordination at national and EU level
- Prolongation of successful project results

- Fuel taxation that reflect CO_2 and energy contributions
- Support and give priority to projects related with solving market entry barriers
- Dissemination activities to targeted groups and general public
- Reduction of funding to fossil fuel projects or infrastructure

Some respondents underlined that the adequacy of current measures depends on the fuel. More particularly, for some fuels (i.e. LPG) the technology already exists, so the currently available instruments can and have been used to achieve significant development of their deployments (e.g. funding for retrofits or grants for setting up filling stations). However, for many alternative fuels more technological and infrastructure development than currently available instruments is required.

Few of those who support the need for extra effort for the deployment of alternative fuels claimed that as long as the funding for alternative fuels remains in the same order of magnitude the market will determine the timescale of sufficient proliferation.

4.17 DEPLOYMENT OF ALTERNATIVE FUELS ONLY BY ENSURING RELEVANT INFRASTRUCTURE STANDARDS

Question 19: Do you think that, in addition to currently available instruments, EU action to achieve a consistent and significant deployment of alternative fuels should be limited to ensuring the relevant infrastructure standards?

77% of all the respondents believe that EU actions should not be limited to ensuring the relevant infrastructure standards in order to achieve a consistent and significant deployment of alternative fuels (Figure 4–43). This is also the case in each of the respondent types as is also shown in Figure 4–44.

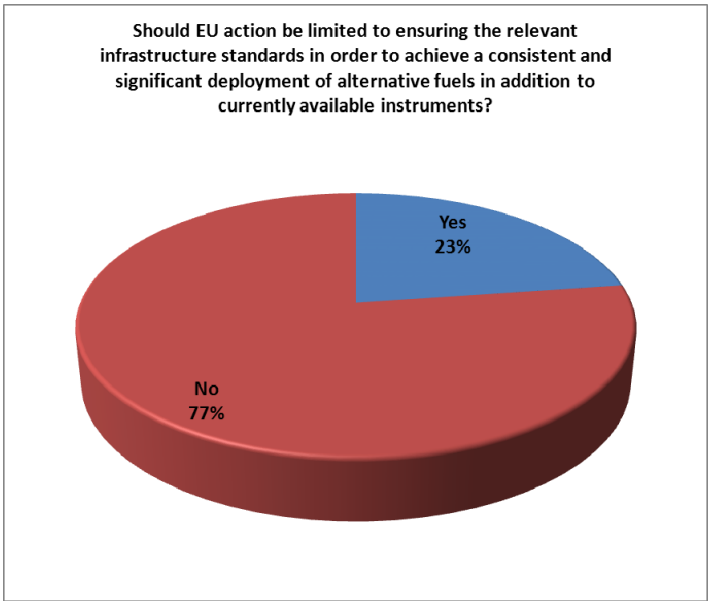

Figure 4–43 Deployment of alternative fuels only by ensuring relevant infrastructure standards

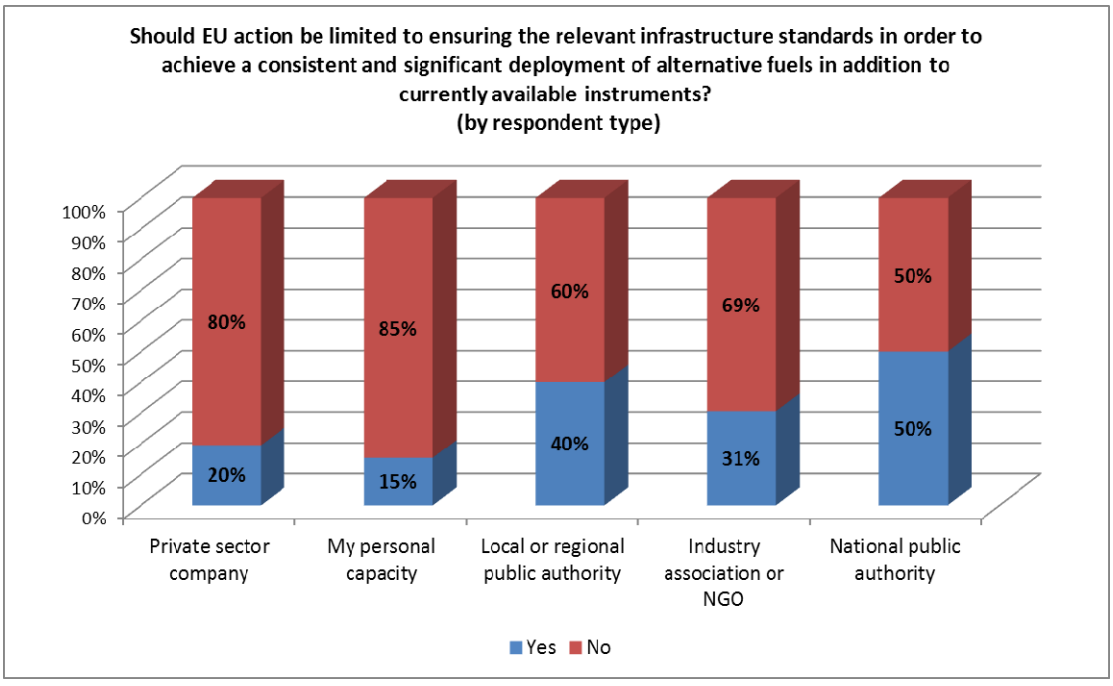

Figure 4–44 Deployment of alternative fuels only by ensuring relevant infrastructure standards, by respondent type

The majority of the respondents who negatively answered to this question agree that ensuring standardization is essential to achieve the deployment of alternative fuels but not sufficient. It is noted that deployment of alternative fuels should also approach all aspects not the least of which is the financial support.

A common view is that fiscal and financial incentives will also need to be maintained/introduced to reach the objective to expand market share of alternative fuels. Most important instrument appears to be an EU wide fuel tax. This should be

used to steer and support long term outlook to enable reaction and adaptation by industry and consumers.

Some replies state that the EU should look towards increased public funding in Public Private Partnership (PPP) projects and at government coordination at European and member state level in order to drive compliance road-mapping between industry groupings/market players.

Another aspect that is referenced by many respondents is that research and innovation are of utmost importance in the regard successfully deploying alternative fuels.

Instruments should also cover harmonization/specification of fuels and biofuel blends all over EU, some reported.

4.18 VOLUNTARY ACTION OF INDUSTRY AND THE DEVELOPMENT OF REFUELLING/RECHARGING INFRASTRUCTURES

Question 20: Do you think that voluntary action of industry alone could achieve the development of the refuelling/recharging infrastructures required for travelling across the whole EU on alternative fuels?

86% of all the respondents believe that the voluntary action of industry alone cannot achieve the development of the refuelling/recharging infrastructures required for travelling across the whole EU on alternative fuels (Figure 4–42).

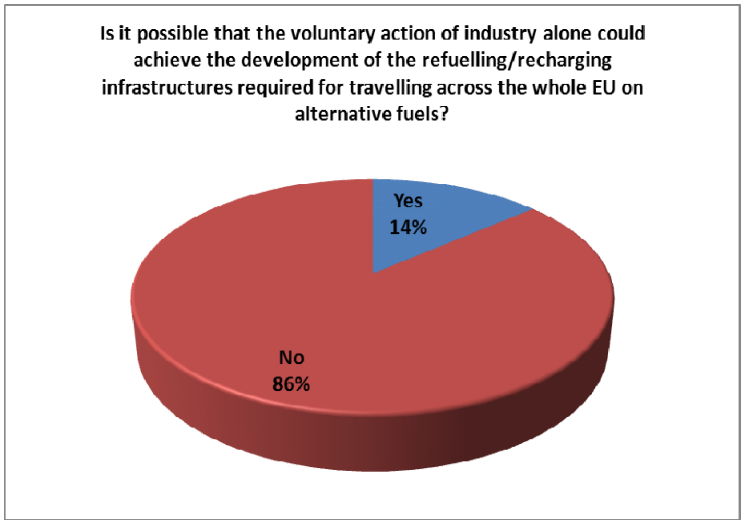

Figure 4–45 Voluntary action of industry and the development of refuelling/recharging infrastructures

It seems to have a similar view, when it comes to the respondent types ().

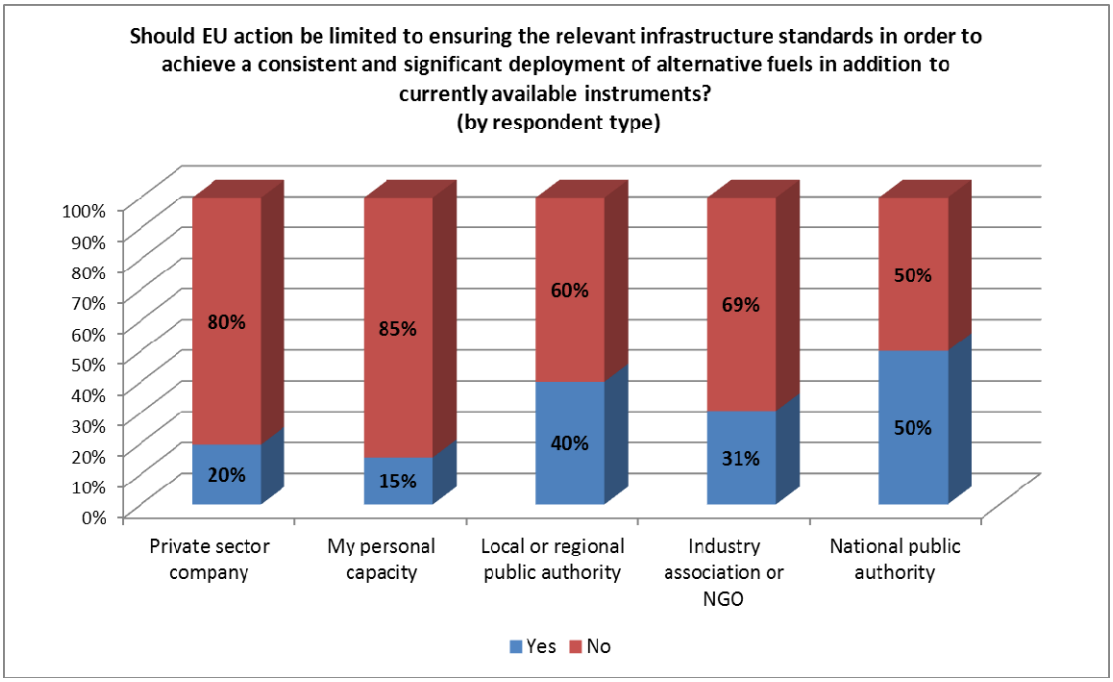

Figure 4–46 Deployment of alternative fuels only by ensuring relevant infrastructure standards, by respondent type

Almost all respondents agree that an EU-wide availability of alternative fuels, combined with vehicle compatibility, will require a concerted policy orchestration involving the EU, member states, vehicle manufacturers and fuel providers. They support that public support is a prerequisite for achieving the necessary development of infrastructure and create favourable market conditions.

Many consider that pushing for a voluntary action will result in a slowdown of the market uptake rather than a quick introduction of existing technologies. As for any new technology introduced in the market the consensus between the different players about the future of the refueling/recharging infrastructure is not possible, also they comment.

Some suggest that these actions have to be monitored at EU level in order to ensure a consistent approach across Europe. They also doubt about the success of the deployment without any EU intervention.

A response from a private sector company suggested that there are already regulations requiring mandatory reductions in GHG and that combining these regulations with voluntary actions on recharging infrastructure will drive forward the necessary infrastructure change in line with fuel developments and consumer uptake. It is also pointed out that online platforms providing information on the growing number of alternative fuel filling stations in the EU would also be practical, whereas corridors in specific customer segments may develop led by industry.

4.19 EU LEGISLATION REGARDING THE MINIMUM REFUELLING/RECHARGING INFRASTRUCTURES

Question 21: Should there be EU legislation requiring a certain minimum refuelling/recharging infrastructure for certain alternative fuels/energy carriers?

The respondents were asked to provide their preference regarding whether an EU legislation requiring a certain minimum refueling/recharging infrastructure for certain alternative fuels/energy carriers should come in place. The respondents could propose several alternative fuels/energy carriers that, according to their view, could be applied to the various transport modes. Available alternative fuels included:

- Electricity
- Hydrogen
- Biofuels
- Synthetic fuels
- Methane
- LPG

Transport modes that the above-mentioned fuels could be applied included:

- Road
- Rail
- Water
- Air

Figure 4–47 summarises the responses received. In particular, Figure 4–47 shows how many times each alternative fuel was encountered in the responses for each transport mode. For example, for road transportation, legislation for electricity was the mostly indicated one (43.1%) followed by methane, biofuels and hydrogen (app. 25-28% each). Electricity (24.2%) was also mostly targeted for Rail, while for water and air, biofuels were mostly considered (20,3% and 24.4% respectively).

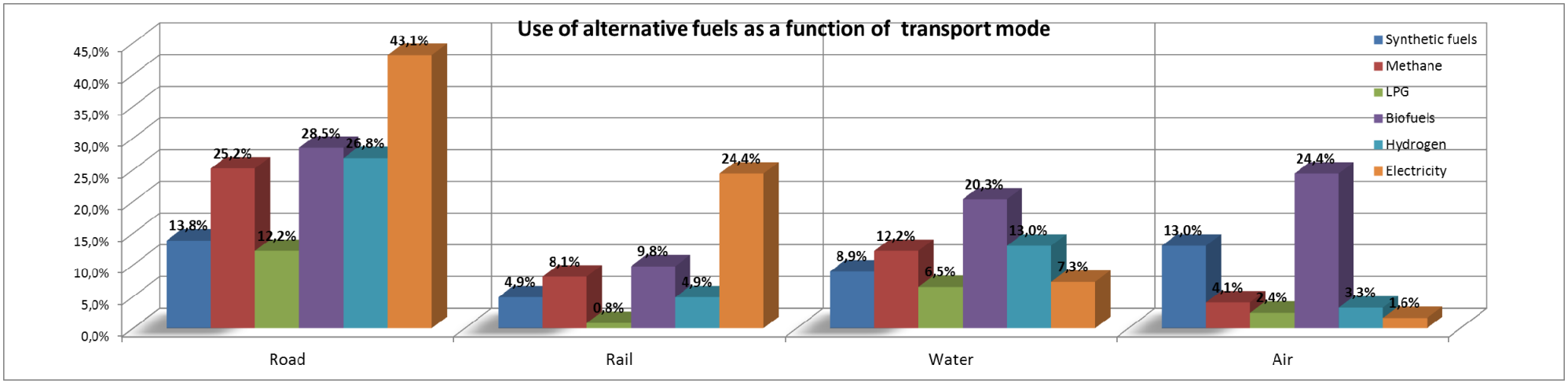

Figure 4–47 Use of alternative fuels as a function of transport mode

Comments from many respondents suggested that while legislation could certainly provide a useful support to the deployment of alternative fuels, it remains unclear how it could be defined, in a cost-effective manner, the necessary methodology for setting the minimum objectives. Incentives should be provided to help overcome infrastructure investment hurdles and other commercial scale implementation costs. Another suggestion is that governments should provide targeted subsides for enabling infrastructure.

4.20 DEDICATED BIO-METHANE INFRASTRUCTURE VS. INJECTION INTO A SINGLE METHANE GRID

Question 22: Should there be a build-up of a parallel dedicated bio-methane refuelling infrastructure or should bio-methane be injected into a single methane grid, supplying stationary and mobile consumers?

83% of the respondents considered that biomethane should be injected into a single methane grid supplying stationary and mobile consumers rather than a build-up of a parallel dedicated biomethane refuelling infrastructure (Figure 4–48). The same view seems to prevail in each of the respondent types; the acceptance of biomethane injected into grid surpasses 79% in all types (Figure 4–46). It is generally acknowledged that biomethane as an additional and renewable energy source promotes indigenous production and supports meeting commitments towards sustainability, diversifies energy sources and contributes to security of supply.

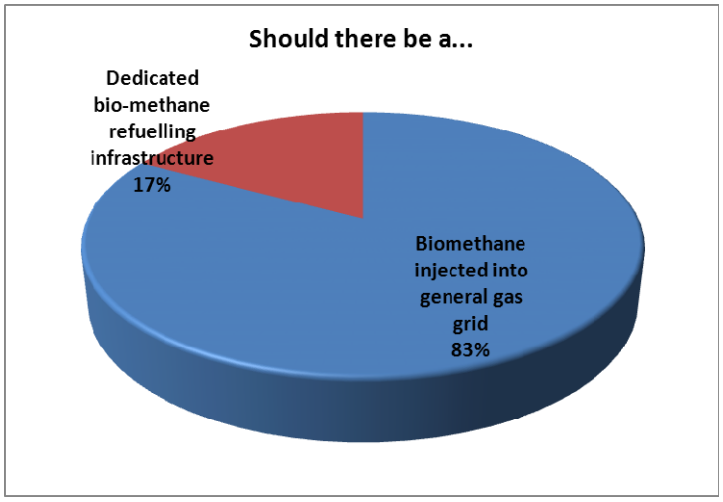

Figure 4–48 Dedicated bio-methane infrastructure vs. injection into a single methane grid

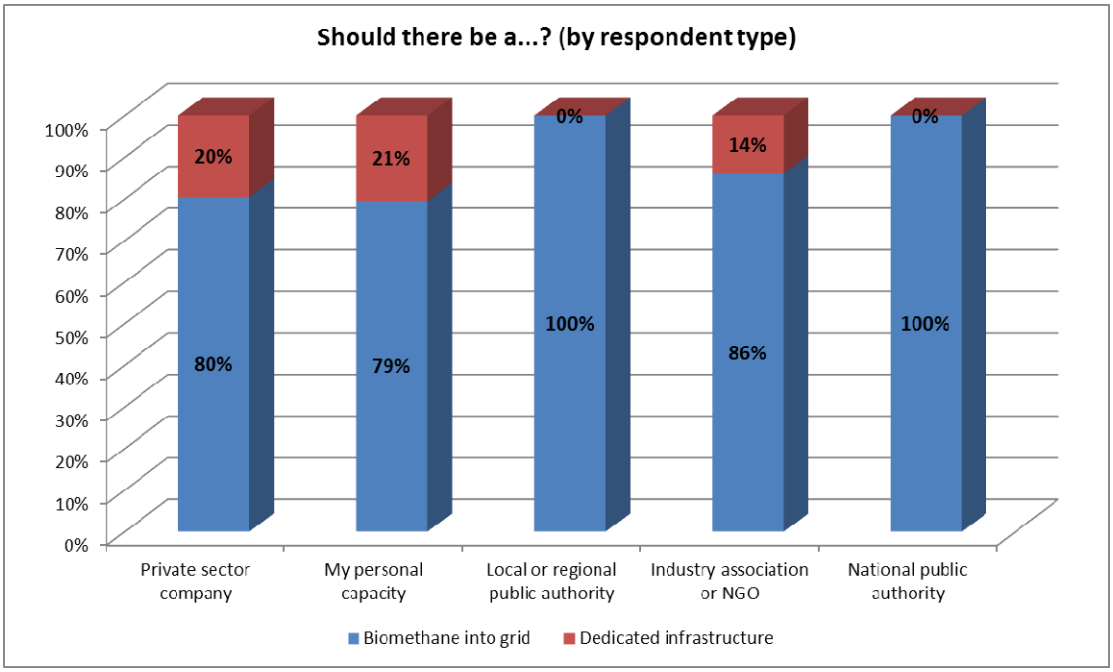

Figure 4–49 Dedicated bio-methane infrastructure vs. injection into a single methane grid, per respondent type

Two main points are identified as comments from many respondents, that is i) cost of infrastructure, and ii) quality standards.

Many commented that the cost of second infrastructure does not seem to be justified ('*similarly no second electricity grid is being built for renewable electricity*'). On the other hand, many expressed their concern regarding the quality of standards and the development of specifications relevant to these actions.

Many underlined that in order to facilitate the use of biogas, the latter has to be injected to natural gas systems, which requires that it is produced, upgraded and purified to the required quality according to the specifications applied for the relevant transmission system. Specific care has to be taken by the biogas producer (or upgrading responsible) in order to safely transport, use and interoperate networks containing also this gas, many respondents stressed.

4.21 PRIVILEGED ATTITUDE REGARDING MARKET INTRODUCTION OF ALTERNATIVE FUELS

Question 23: Should the market introduction of alternative fuels be supported by privileged access of alternative fuel vehicles/transport carriers to transport infrastructure?

More than two thirds of all respondents (69%) consider that the market introduction of alternative fuels should be supported by privileged access of alternative vehicles/transport carriers to transport infrastructure. A similar view applies to all

respondent types except the 'national public authority' one. However the very small number of national authorities does not provide firm ground for a conclusion. Figure 4–50 and Figure 4–51 depict the aforementioned proportionalities in the totality of the respondents and for each separate type respectively.

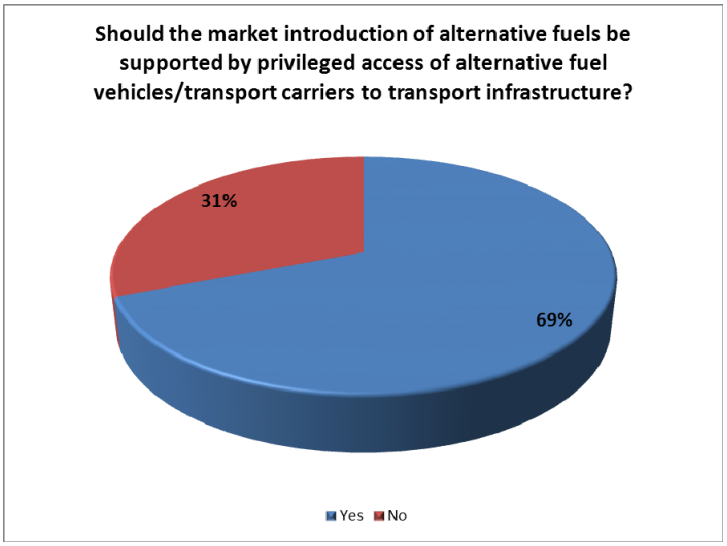

Figure 4–50 Privileged attitude regarding market introduction of alternative fuels

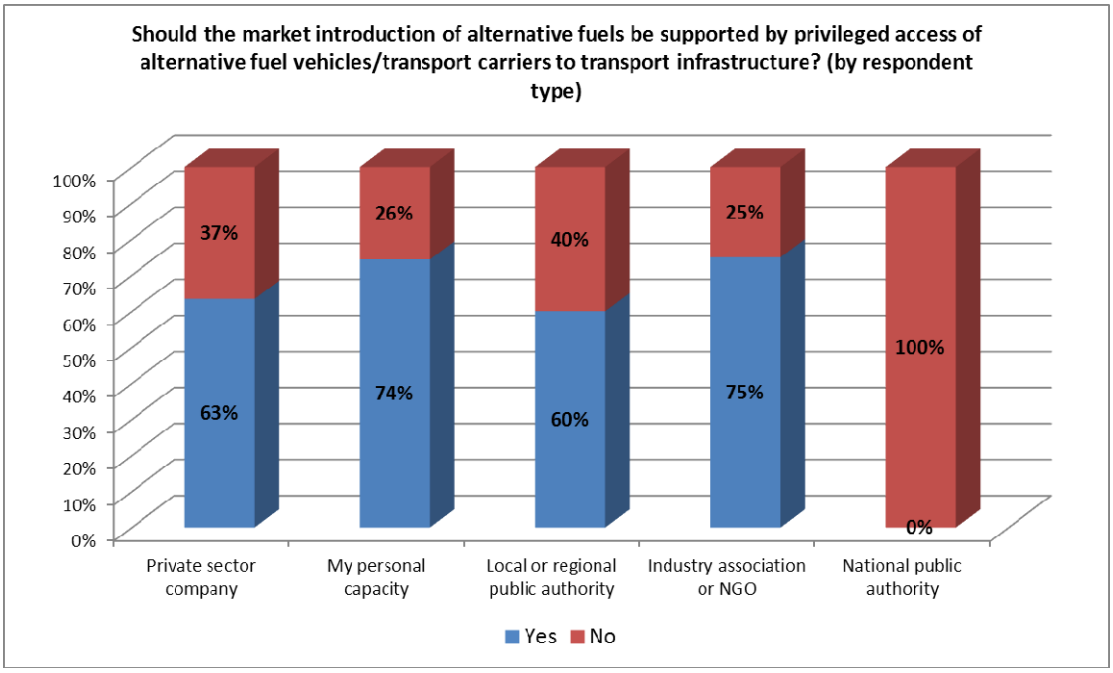

Figure 4–51 Privileged attitude regarding market introduction of alternative fuels, per respondent type

A subsequent part of the question was for the respondents to choose one up to three predefined measures[2]. These preferred measures include:

- Lower charging tariffs for infrastructure use
- Privileged access to access restriction zones
- Other

Figure 4–52 shows that over half of the respondents (57.7%) consider the lowering of charging tariffs for infrastructure as one of the preferred measures, followed by 43.9% for privileged access to restricted zone, and 17.9% for other measures not included therein.

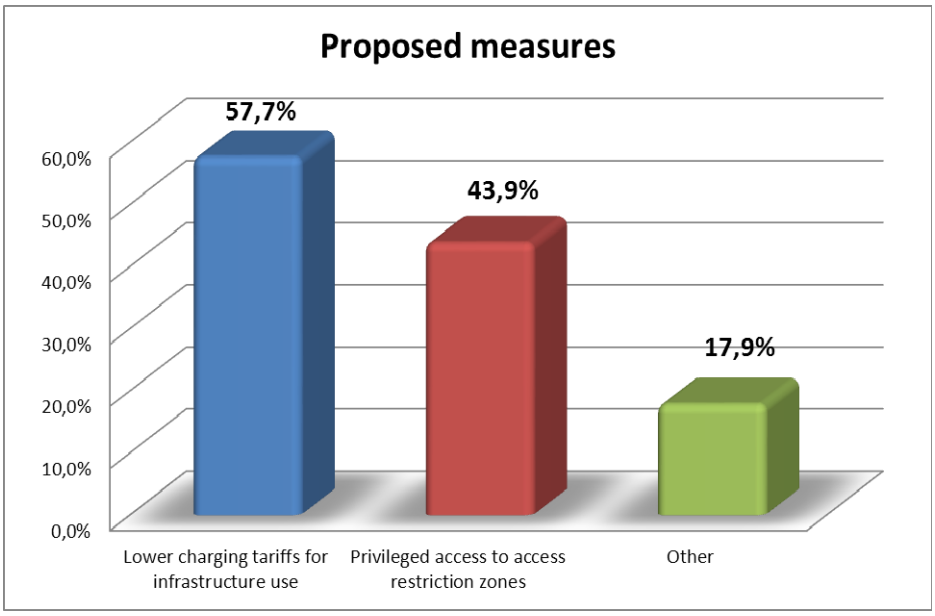

Figure 4–52 Proposed measures by the totality of respondents

Figure 4–50 and Figure 4–51 further break down the same information as above in some of the respondent types (individuals, private sector companies, industry or NGOs)., indicating that the same overall considerations apply as well to each respondent type.

[2] These options were available in case of a positive answer of the respondent regarding the privileged access of alternative fuels and their market introduction.

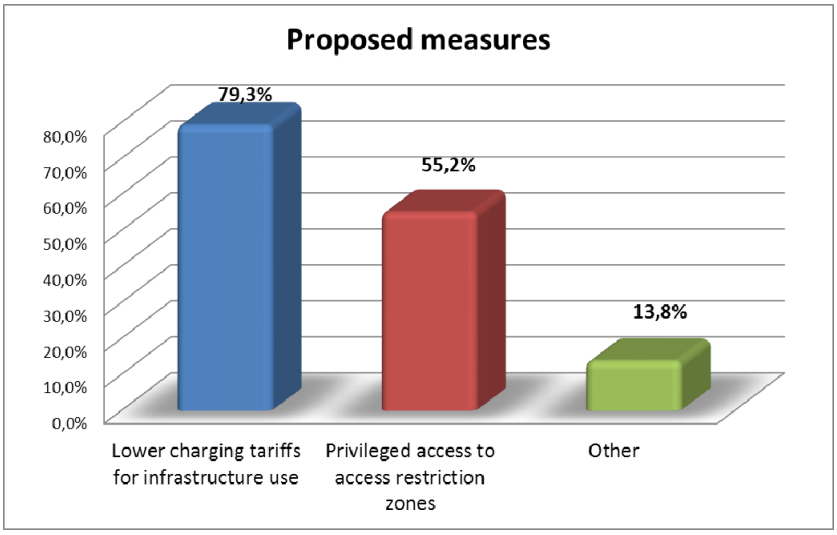

Figure 4–53 Proposed measures; personal capacity

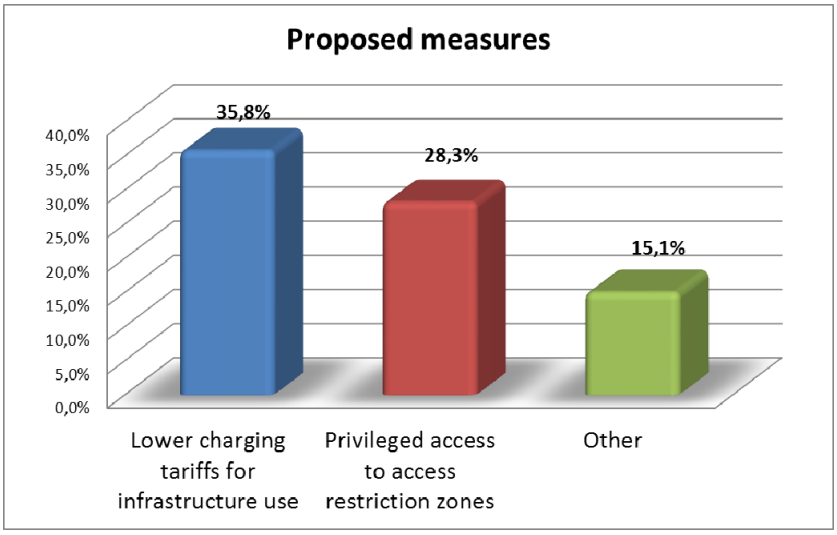

Figure 4–54 Proposed measures; private companies, industry or NGOs

In order to address other aspects that could potentially be used to support market introduction of alternative fuels, many respondents suggested measures other than those of the question by providing free text comments. These measures include:

- Free use of toll roads
- Driving in bus and taxi lanes
- Lower charging tariffs (charging-, parking-, or emissions-related)
- Tax incentives
- Legislation mandates
- Promote integrated multimodal urban mobility
- Depends on each city as to choose the most suitable measure to target to an integrated approach

It should be noted that there were contradictory voices for some of those proposed measures, not the least of which is the allowance for private vehicles to use public transport lanes. Some support that this would reduce commercial speed and regularity of public transport which are major criteria for the attractiveness of public

transport; it could also be counterproductive if passengers will leave public transport and use their car again.

5 ADDITIONAL CONTRIBUTIONS

Supplementary to the above questions, a number of individual contributions were received in response to the open public consultation[3].

General Electric (GE) Transportation is a global technology supplier to the railroad, marine, drilling, wind and mining industries. **GE Aviation** is a producer of jet engines for commercial and military aircraft.. In summary, GE considers that:

- Industry should choose technologies that work with their needs based on fair, open markets that appropriately reflect long term sustainability impact.
- It is not just about technology. Improving operating efficiency is an inherent financial benefit that promotes adoption of new technologies and fuels. Will also lead to reduced CO_2 emissions through reduced fuel consumption as entire rail system is optimised for efficiency.
- Public sector can assist where the economics justify investment that cannot be made by industry or where cross European market barriers need to be addressed
- Alternative fuels and propulsion systems need targeted public sector support. However, the improvement of conventional engines will generate significant efficiency gains and will maintain a fundamental role in the transport sector over the next decades. Alternative fuels and propulsion systems must deliver competitive price and performance to be successful in the market. Change will take place gradually.

The UIRR, short for "**Union internationale des sociétés de transport combiné Rail-Route**" (or: International Union of combined Road-Rail transport companies) is a European organisation promoting intermodal transport, founded in 1970. In summary, UIRR believes that:

- Any support of alternative fuel using technologies (in a fuel-neutral manner) should only be facilitated through providing privileged access to otherwise restricted urban zones if used in short-distance distribution-type traffic.
- Over long-distances in freight transport, and in passenger transport in general, directly supplied (overhead) electric propulsion should be preferred, as this is the only undisputed way of utilising renewable energy sources in transport, which guarantees the greatest marginal benefit for public investment resources.
- Research into on-board electricity storage solutions (not necessarily limited to batteries) should be accelerated.

[3] The submission of a position paper was optional.

- Additional empirical evidence should be gathered on the economy and ecological effects of every known alternative fuels prior to declaring an undisputed choice worthy of public policy preference (over the others). Until then public policy should focus on providing secondary signals to the researching private sector through energy efficiency standards (based on units of energy used and GHG emissions per unit of cargo-km/passenger-km). Research funding should be also provided on grounds of promised returns, but in a technology/solution neutral way.
- Public support for recharging/refuelling infrastructure investment should be held back until an undisputed preference for public policy support can be declared; in the meanwhile resources should be focused on expanding electrification (direct supply of electricity) to those railway lines whose traffic density warrants for this. The number of currents/voltage allowed in overhead rail electricity supply should be reduced, and ideally harmonized to a single standard in time.

The International Association of Public Transport (UITP) and the Association of German Transport Companies – VDV have both submitted the same position paper.

The **International Association of Public Transport (UITP)** is the international network for public transport authorities and operators, policy decision-makers, scientific institutes and the public transport supply and service industry.

The "**Verband Deutscher Verkehrsunternehmen**" (Association of German Transport Companies – VDV) is the organization for Germany's public transport companies and rail freight transport companies.

The position paper titled as "Towards low/zero-carbon urban mobility in Europe" was elaborated by UIPT (International Association of Public Transport) in September 2011, of which VDV is a member, and submitted to the open consultation of Clean Transport Systems. This paper includes recommendations following the Transport White paper 'Roadmap to a Single European Transport Area – Towards a competitive and resource-efficient transport system' by European Commission in 2011.

According to the vision of the paper and based on the white paper by EC, low-carbon mobility in cities requires a **holistic concept** based on a mix of policy, technology and behavioral changes and as characteristically is stated "action is needed…now". **Modal shift towards public transport**, walking and cycling is vital in order to reach the policy targets of the EU. UITP claims that individual **electromobility does not solve congestion**, nor improve traffic efficiency in cities, since replacing cars powered by fossil fuels with electric cars will not resolve the congestion problem but will only contribute to the abatement of CO_2. Further **electrification of public transport** in combination with green electricity will further improve the attempt to resolve the congestion problem and will at the same time offer space-efficient attractive urban mobility. The association believes that any decarbonisation strategy will be expensive requiring to invest billions of currency each year for several decades in order to reach the targets and help mitigate the equally high cost of climate change. UITP believes that in urban areas, **smart integrated mobility concepts should be promoted** (and funded) over private mobility patterns based on car usage and ownership.

The **International Air Transport Association (IATA)** is an international trade body, created over 60 years ago, and represents some 230 airlines comprising 93% of scheduled international air traffic. A position paper titled "Support measures to promote sustainable biofuels in aviation" addresses, in brief, the main concerns of aviation industry and recommends some principle support measures so as sustainable biofuels be promoted. IATA enumerates the essential elements that policymakers should encourage:

- **Adoption of a global sustainability standard**. There is a plethora of regulations, voluntary standards, certification schemes etc in different regions of the world. Obviously, this constitutes an obstacle to the uniform adaptation of a strict and righteous policy towards the aviation industry. For this reason, it is recommended to develop a global standard for sustainable biofuel for aviation that achieves regulatory acceptance (EU/USA) and public/NGO recognition.
- **Adoption of a unified accounting method**. It is recommended to develop a unified "book and claim" accounting method for aviation biofuels based on globally accepted certificates with approval by regulators.
- **Adoption of investment incentives**. There are two focal points where investments incentives should take priority, according to the IATA position paper. First, it is claimed that funding for research and development should encouraged but it is suggested that governments start shifting R&D funding away from biodiesel towards aviation biofuels. Second, there are three recommendations which in terms of financial incentives from the governments and EU point of view. These recommendations include:
- Adoption by the governments of a range of support measures to biofuel suppliers for bringing aviation biofuels to market.
- If aviation biofuels were granted subsidies similar to those enjoyed by biodiesel they could become commercially viable.
- Recognition of sustainable aviation biofuels as a potential RED fuel in the legislative framework by the EU regulators. It is claimed that this way these fuels could become eligible for financial support under the RED Directive.

The **Municipality of Rotterdam** contributed with a report which is the conclusion of the four-year BioEthanol for Sustainable Transport (BEST) project, funded by the 6th EU Framework Programme. The consortium was comprised by ten cities and a university.

BEST was a demonstration project supporting the European Union's strategy to reduce consumption of fossil fuels and greenhouse gas emissions. The project investigated the use of bioethanol in vehicles such as cars and buses as a substitute for petrol and diesel. The project took place from 2006 to 2009. Withing the framework of the project the use of bioethanol from economic, technical, social, environmental and sustainability perspectives were studied.

According to the report, the essential elements that policymakers should support and encourage are summarized:

- **All links in the bioethanol chain must be addressed**. Cooperation with key decision makers and stakeholders is crucial for stimulating the market and for development of effective incentives.
- **In a market development phase monetary incentives** for end users and reliable information become effective tools.
- **Effective implementation of the Renewable Energy Directive** (RED) is likely to depend on the extent to which EU Member States synergise the use of bioethanol from the best-performing supply chains and make optimal use of high-quality imports.
- **More research** is needed to determine the net effect on local emissions of switching from petrol or diesel fuels to ethanol, and the impact this would have on health and the environment.
- **Fuel standards for the different high and low blends** need to be harmonised in the EU. A system for certification of sustainable biofuels must be launched and implemented.
- **Governments must create a level playing field**, can remove barriers to the introduction of clean vehicles and fuels, develop climate change action plans, and adopt clean vehicle strategies.

The **Finnish Biogas Association (FBA)**, contributed with a press release published on December 2010, stresses the fact that the Finnish Parliament decided to take into use an annual surcharge tax, so called motive power tax, for biogas vehicles to discourage the traffic use of the biofuel with the lowest lifecycle greenhouse gas emissions. The document briefly analyses how tax policies and fees are applied to different types of vehicles by setting some examples. The following is an exempt from what Finnish Biogas Association supports.

"*Gaseous renewable fuels offer lower greenhouse gas and other emissions than liquid biofuels and liquid fossil fuels. In addition to compressed biogas, also liquified biogas LBG should be taken into account as well as synthetic biogas SBG, bio-LPG and bio-DME. Solar and wind power based fuels and electricity should be promoted instead of generic hydrogen and generic electricity, since the average EU electricty mix will make both hydrogen and electricity poor environmental choices for traffic energy. Solar/wind power based electricity, hydrogen, methane and compressed air offer almost zero emission motive power with resources sufficient to cover all motorized traffic needs of the world.*

Traffic use offers the highest environmental value for waste based biogas, and a considerable resource base, too. One of the main policies for getting biowaste resources into traffic use is to end centralized composting in the EU. It should be explicitly removed from the best available technologies of biowaste management in the IPPC directive and waste legislation. Energy crop based fuels should not be promoted at all, whether or not they fulfil the sustainability criteria. They are not needed for transforming traffic to 100 % renewable energy use, but they offer substantial environmental and social risks."

"Recommendations regarding the European and Austrian biofuel policy" was submitted by an individual respondent. The document analyses the targets that the

EU and Austria have undertaken and stresses that these goals are inter-related with several other sectors such as food, labour, human rights.

6 CONTRIBUTIONS BY ORGANISATIONAL TYPE

Government/National public authority

Name	Country of origin
Finnish Transport Safety Agency	Finland
Ministry of Infrastructure and the Environment	Netherlands

Local or regional public authorities

Name	Country of origin
Municipality of Rotterdam (Gemeente Rotterdam)	Netherlands
Port of Rotterdam	Netherlands
Transport for London	United Kingdom
Transportes Urbanos de Sevilla SAM (TUSSAM)	Spain
Watwerwegen en Zeekanaal NV	Belgium

Industry association or NGO

Name	Country of origin
AEGPL	Belgium
Alliance for Synthetic Fuels in Europe (ASFE)	Belgium
ASOCIACION ESPAÑOLA DE OPERADORES DE PRODUCTOS PETROLÍFEROS (AOP)	Spain
Asociación Nacional de Transportes Colectivos Urbanos de Viajeros de Superficie (TU) - Spanish Surface Collective Urban Transport Association	Spain

Association of European Airlines	Belgium
Bundesverband der Deutschen Luftverkehrswirtschaft e. V.	Germany
Cefic - European Fuel Oxygenates Association (EFOA)	Belgium
Community of European Railway and Infrastructure Companies (CER) AISBL	Belgium
Deutsches Verkehrsforum	Germany
ECFD	France
European Automobile Manufacturers' Association (ACEA)	Belgium
European Biodiesel Board	Belgium
EurotaxSchwacke GmbH, Global Services Division, Wilhelm-Röntgen-Straße 7, D-63477 Maintal	Germany
Federación Nacional empresarial de Transporte en Autobus (Fenebús) - Spanish Federation of Transport by Bus	Spain
Fédération Inter-Environnement Wallonie	Belgium
FIA, Federatione Internationale de l'Automobile	Belgium
Finnish Biogas Association	Finland
Gas Infrastructure Europe	Belgium
Gatwick Area Conservation Campaign	United Kingdom
Going-Electric	Belgium
International Air Transport Association	Belgium
ITD - International Transport Denmark	Denmark

Natioanl Association of Boat Owners UK	United Kingdom
NGVA Europe (Natural & bio Gas Vehicle Association)	Spain
Oceana	Belgium
Oil Companies International Marine Forum (OCIMF)	United Kingdom
Polis	Belgium
Renewable Energy Association	United Kingdom
Svebio Swedish Bioenergy Association	Sweden
Transport en Logistiek Nederland (TLN)	Netherlands
UIRR International Union of Combined Road-Rail Transport Companies	Belgium
UITP - International Association of Public Transport	Belgium
UK Sustainable Biodiesel Alliance	United Kingdom
UNICA - Brazilian Sugarcane Industry Association	Europe – non-EU
Union zur Förderung von Oel- und Proteinpflnzen e.V. /Union for the Promotion of Oilseeds and Protein Plants reg. Ass. (UFOP)	Germany
VDV	Germany

Private sector companies

Name	Country of origin
ADV	Germany
Agri Energy	United Kingdom
Alstom	Belgium

Austrian Airlines	Austria
Authentic | Energy Management Services	Ireland
AVL List GmbH	Austria
Better Place	France
Carbon Recycling International	Europe – non-EU
Care Products Ireland Limited	Ireland
Centro Ricerche FIAT	Italy
Clean Fuels Consulting	Belgium
Daimler AG	Germany
Deutsche Lufthansa AG	Germany
Deutsche Post DHL Transpar. Reg. Nr. 48544465107-88	Germany
EAA Erdgas Mobil GmbH	Austria
EMTUSA (EMPRESA MUNICIPAL TRANSPORTE URBANO S A) GIJON.	Spain
EVN AG	Austria
Flughafen München GmbH / Munich Airoprt International	Germany
GDF SUEZ (registration number: 96119922103-43)	France
GE Aviation	Belgium
GE Transportation	Belgium
Iveco S.p.A	Italy
Magnus Nilsson Produktion	Sweden
Metanorka	Europe – non-EU
Metropolitan Research Institute, Budapest	Hungary

Neste Oil	Finland
Prizztech Oy, representing a group of companies: Woikoski Oy, Kemira Chemicals Oy, power suppliers, material research units, communities in Satakunta region	Finland
PSA Peugeot Citroën	France
Raufoss Fuel Systems AS	Europe – non-EU
Renault	France
Royal Dutch Shell Plc, 30 Carel van Bylandtlaan, 2596 HR The Hague, The Netherlands; EU Register of Interests Representatives ID: 69545381134-55	Netherlands
Scania	Sweden
Siemens in the function of coordinator of the GreenEmotion project	Germany
SNCF	France
Süd-Chemie AG	Germany
The Boeing Company (Identification number for the EC register of Interest Representatives: 62505293737-81)	Belgium
Volvo Cars Coorporation	Sweden
Westport Innovations	France
WF.Büthker	Netherlands
wienenergie gasnetz gmbh	Austria
Zero-e b.v.	Netherlands

It should be noted that the names of individuals contributing to the CTS consultation have not been individually named in this report for confidentiality reasons.

ANNEX I: TRANSPORT MODES IN CONJUNCTION WITH ALTERNATIVE FUELS PER RESPONDENT TYPE

Different transport modes may require different alternative fuels. Respondents were addressed to indicate which alternative fuels will be relevant for which transport modes on the time horizon 2020, 2030, and 2050.

The following figures represent the expectation of the respondents in terms of the use of alternative fuels for each transport mode. These figures constitute a further breakdown of the basic analysis for each respondent type, as set in section 4.8.

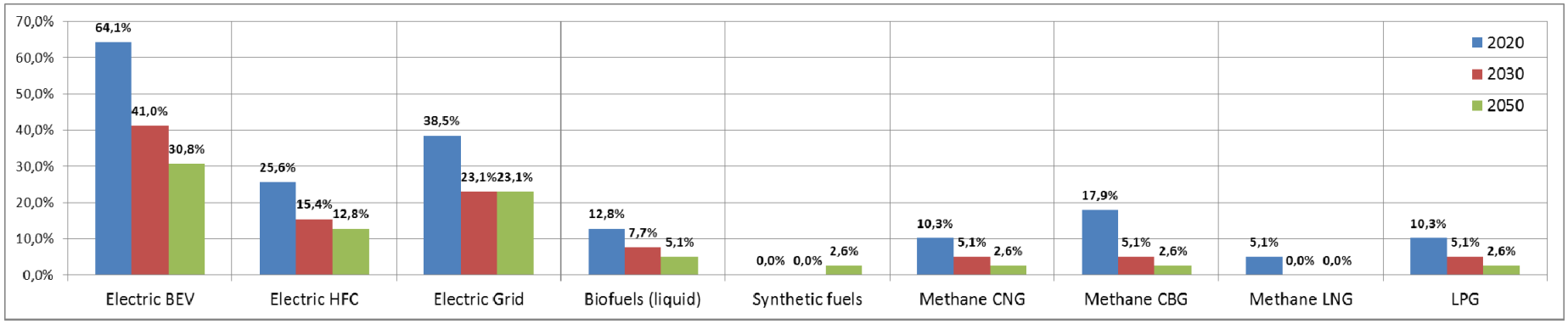

Figure 0–1 Expectation on how each alternative fuel will apply to the short (urban) road-passengers transport mode; personal capacity

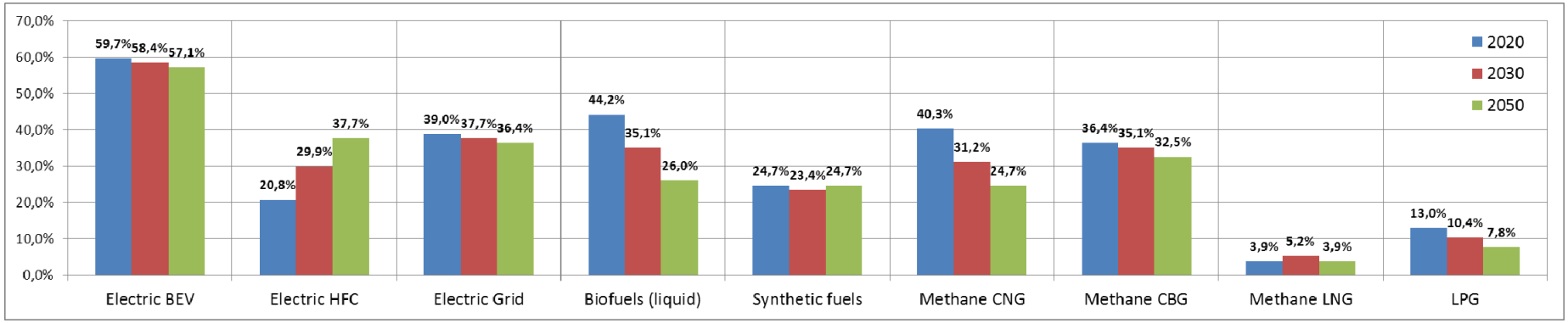

Figure 0–2 Expectation on how each alternative fuel will apply to the short (urban) road-passengers transport mode; private companies, industry or NGOs

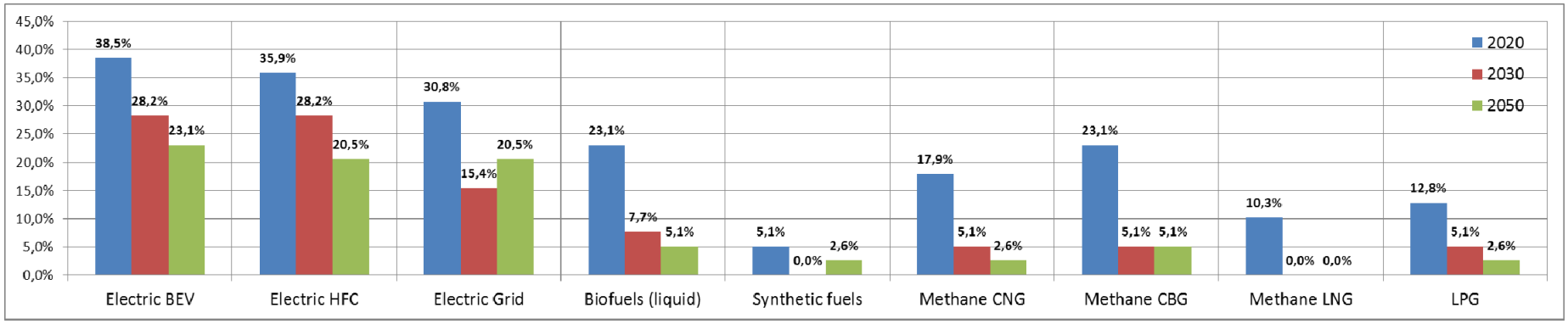

Figure 0–3 Expectation on how each alternative fuel will apply to the medium road-passengers transport mode; personal capacity

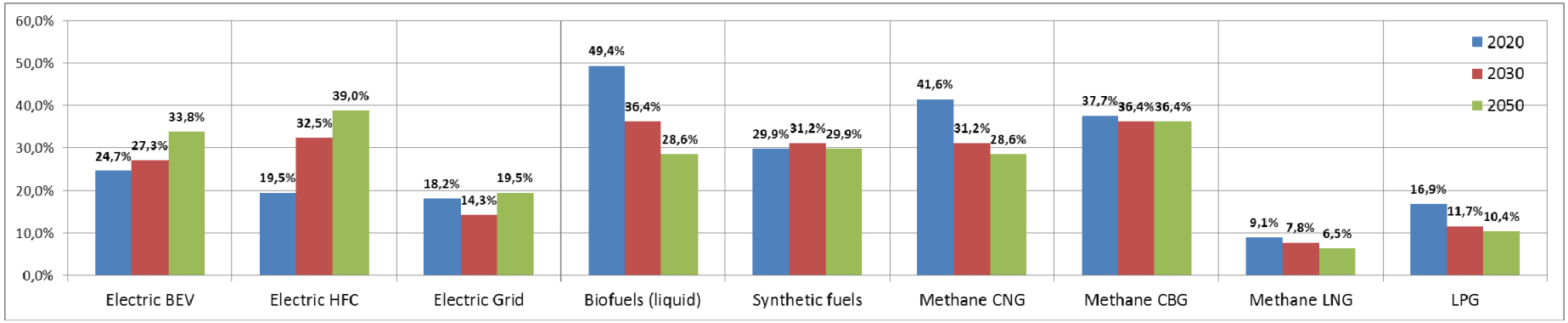

Figure 0–4 Expectation on how each alternative fuel will apply to the medium road-passengers transport mode; private sector, industry or NGOs

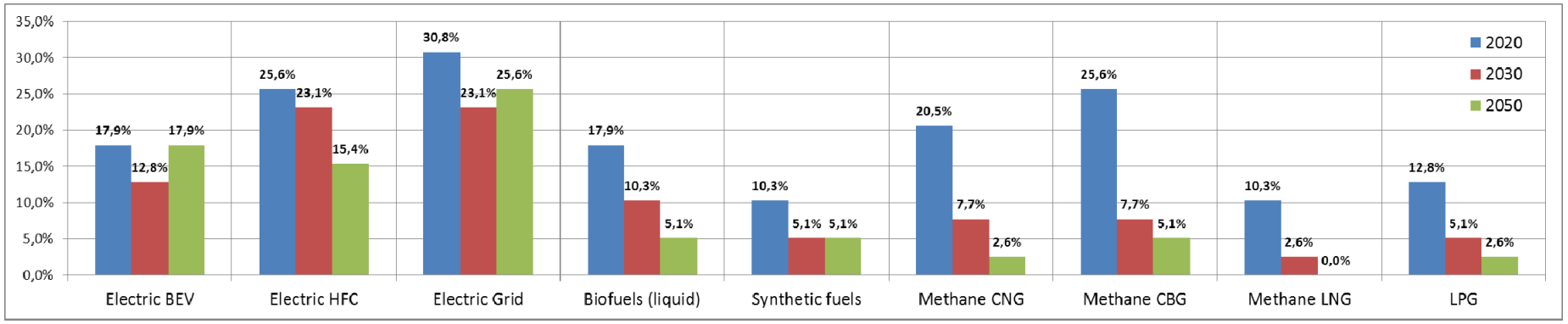

Figure 0–5 Expectation on how each alternative fuel will apply to the long road-passengers transport mode; personal capacity

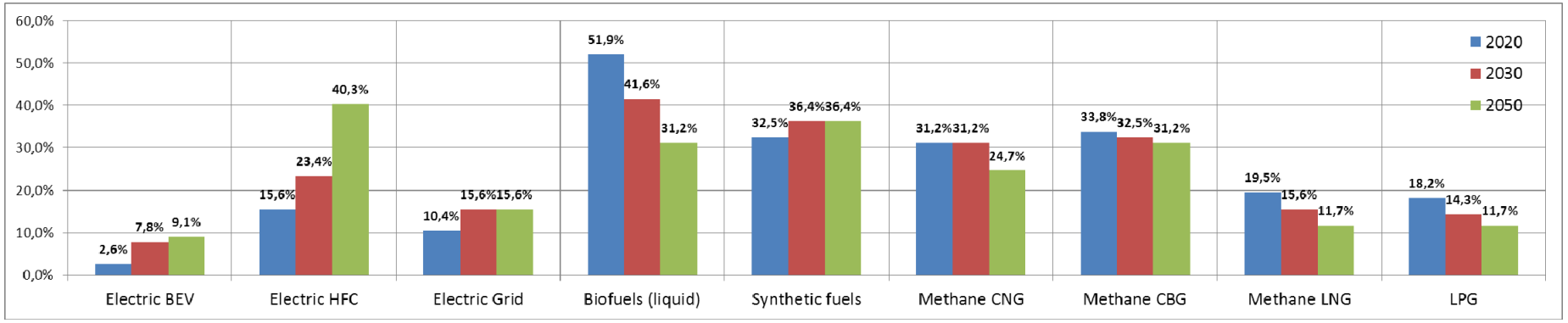

Figure 0–6 Expectation on how each alternative fuel will apply to the long road-passengers transport mode; private sector, industry or NGOs

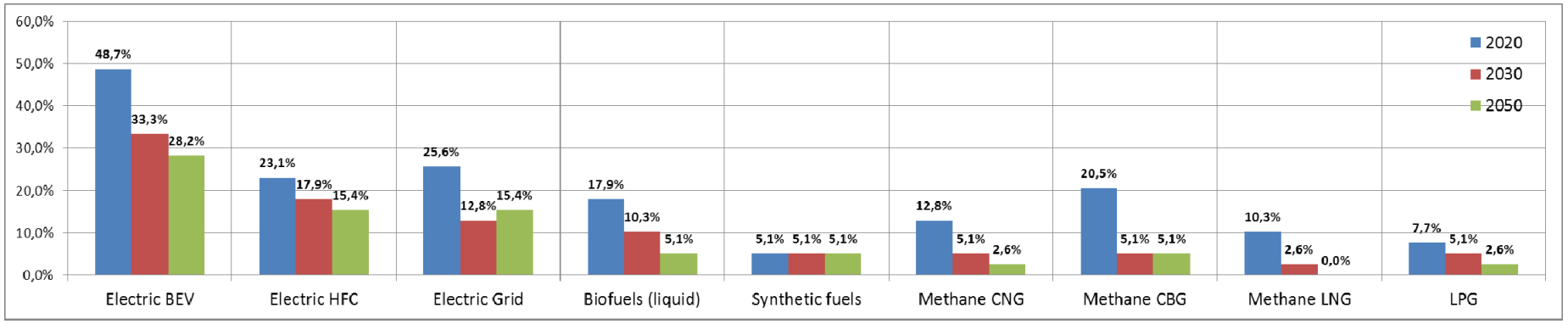

Figure 0–7 Expectation on how each alternative fuel will apply to the short road-freight transport mode; personal capacity

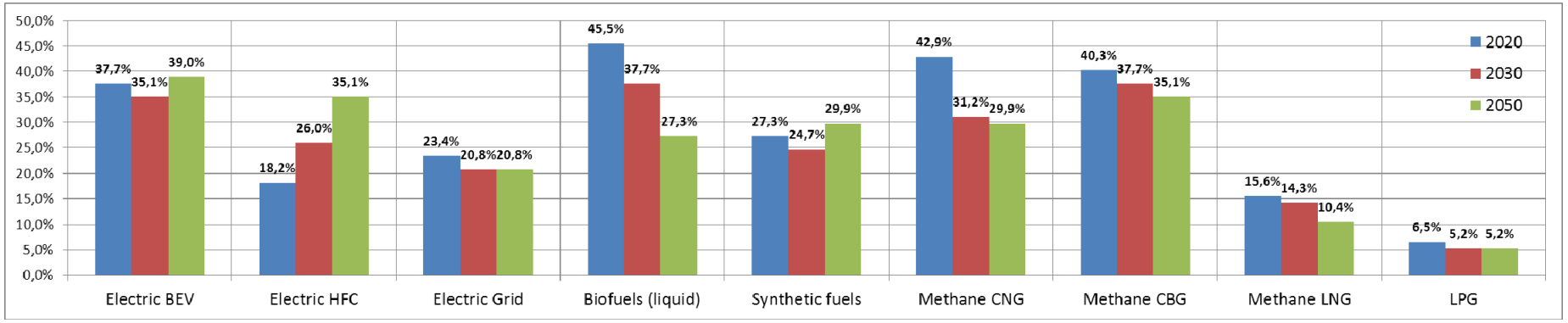

Figure 0–8 Expectation on how each alternative fuel will apply to the short road-freight transport mode; private sector, industry or NGOs

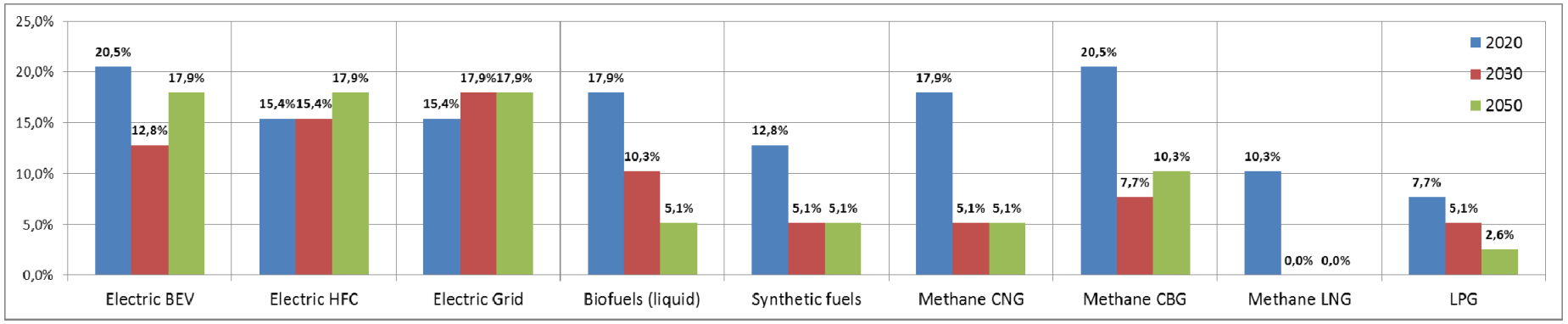

Figure 0–9 Expectation on how each alternative fuel will apply to the medium road-freight transport mode; personal capacity

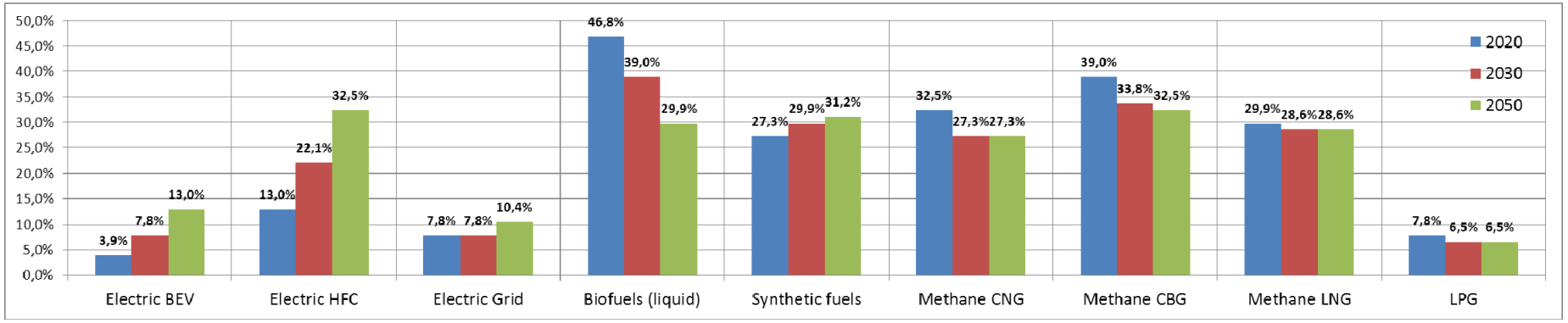

Figure 0–10 Expectation on how each alternative fuel will apply to the medium road-freight transport mode; private sector, industry or NGOs

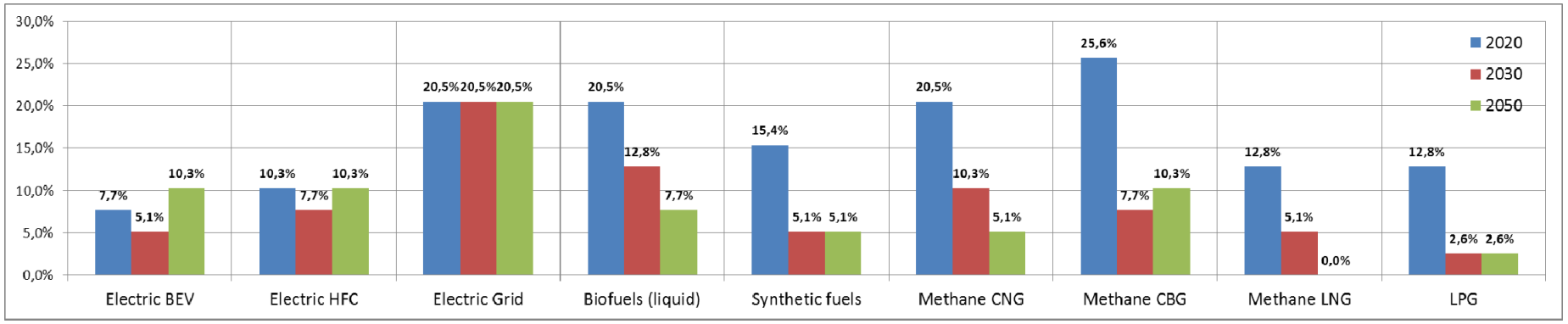

Figure 0–11 Expectation on how each alternative fuel will apply to the long road-freight transport mode; personal capacity

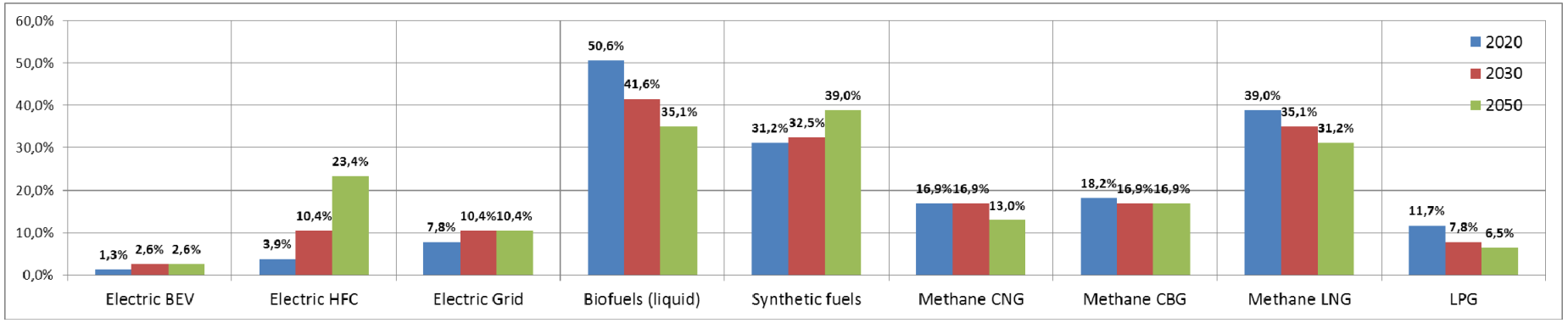

Figure 0–12 Expectation on how each alternative fuel will apply to the long road-freight transport mode; private sector, industry or NGOs

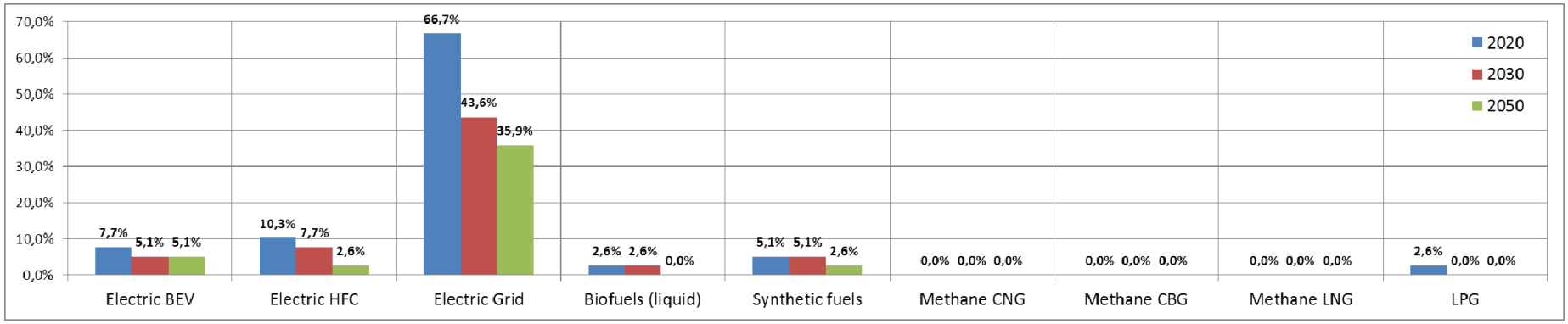

Figure 0–13 Expectation on how each alternative fuel will apply to the rail transport mode; personal capacity

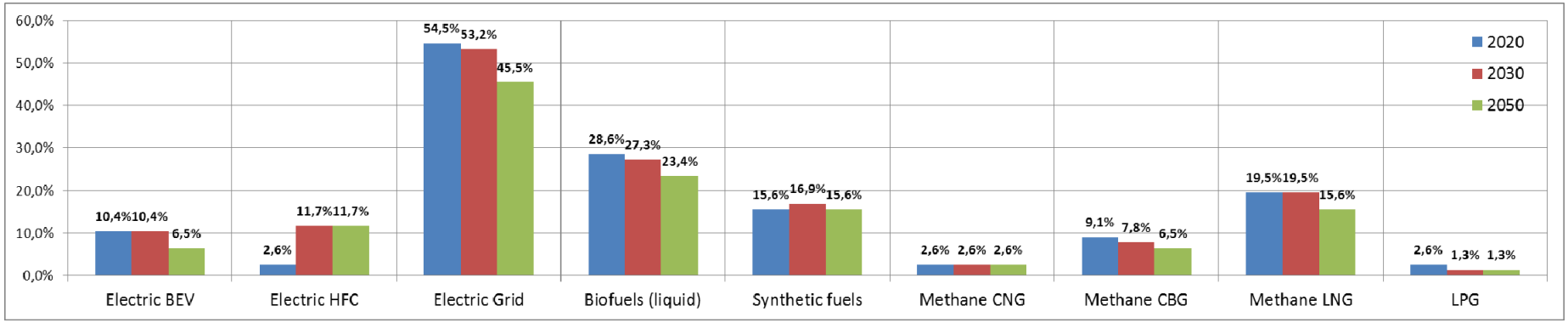

Figure 0–14 Expectation on how each alternative fuel will apply to the rail transport mode; private sector, industry or NGOs

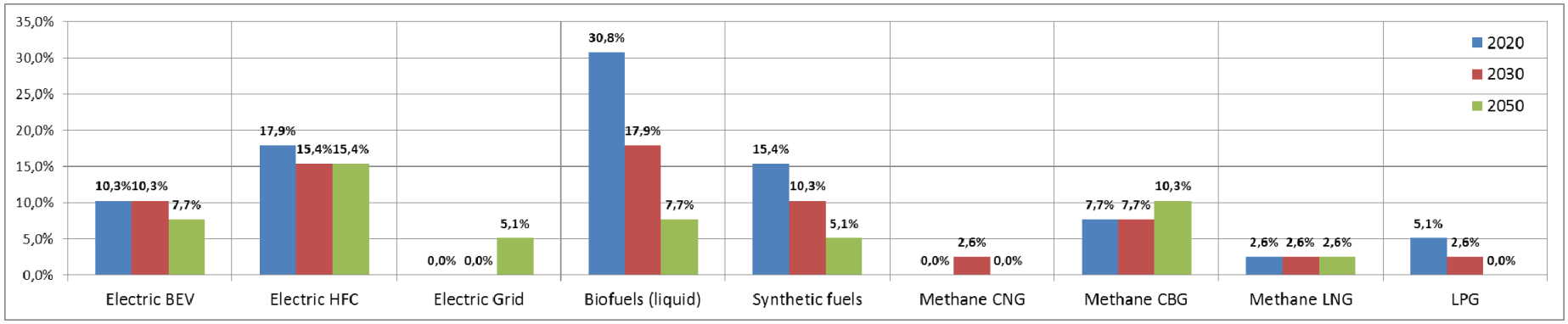

Figure 0–15 Expectation on how each alternative fuel will apply to the inland water transport mode; personal capacity

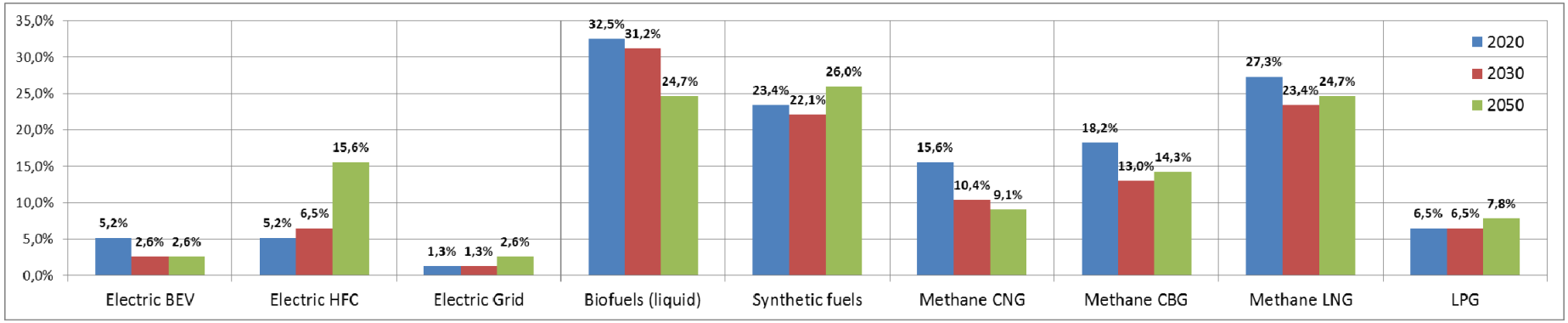

Figure 0–16 Expectation on how each alternative fuel will apply to the inland water transport mode; private sector, industry or NGOs

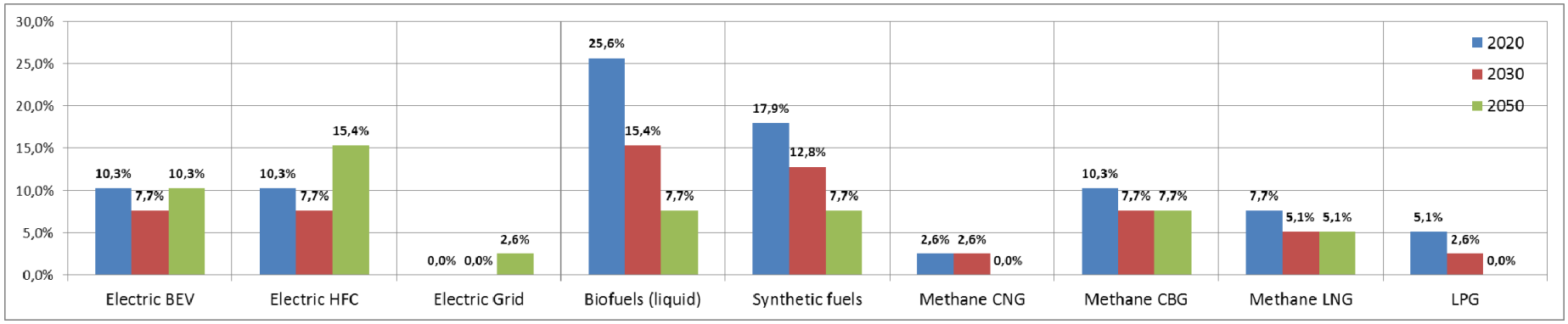

Figure 0–17 Expectation on how each alternative fuel will apply to the short-sea shipping transport mode; personal capacity

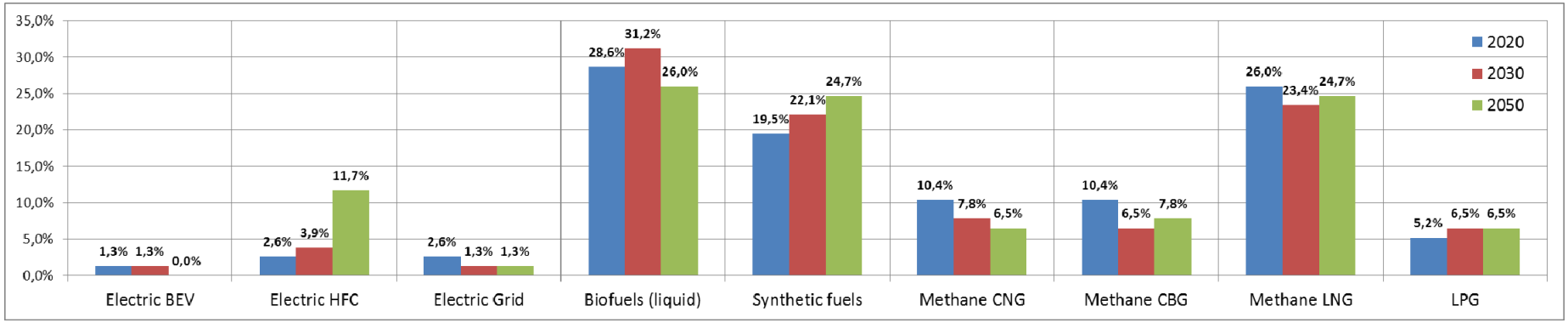

Figure 0–18 Expectation on how each alternative fuel will apply to the short-sea shipping transport mode; private sector, industry or NGOs

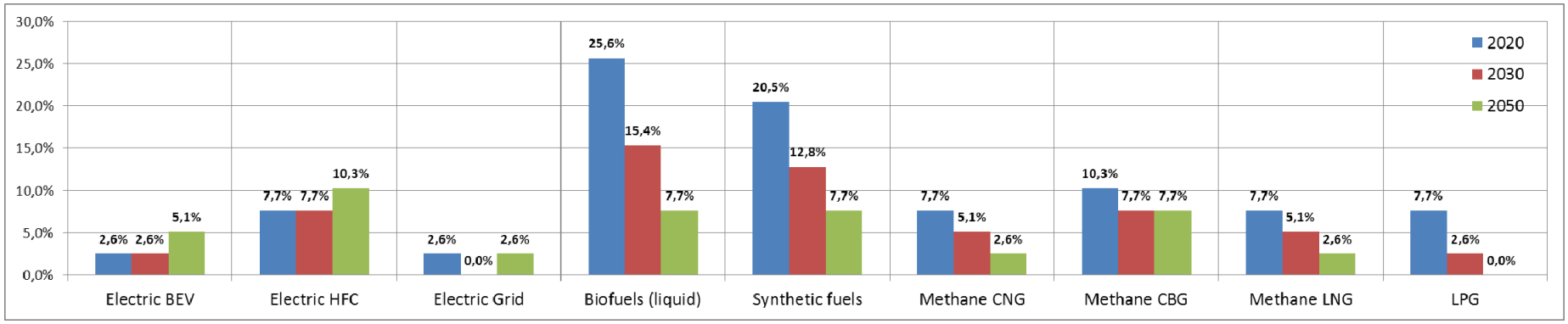

Figure 0–19 Expectation on how each alternative fuel will apply to the maritime transport mode; personal capacity

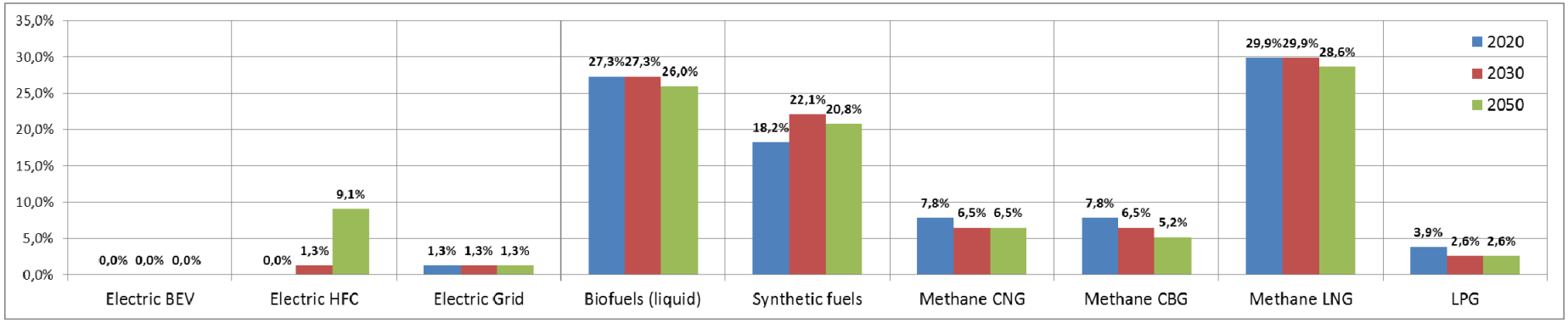

Figure 0–20 Expectation on how each alternative fuel will apply to the maritime transport mode; private sector, industry or NGOs

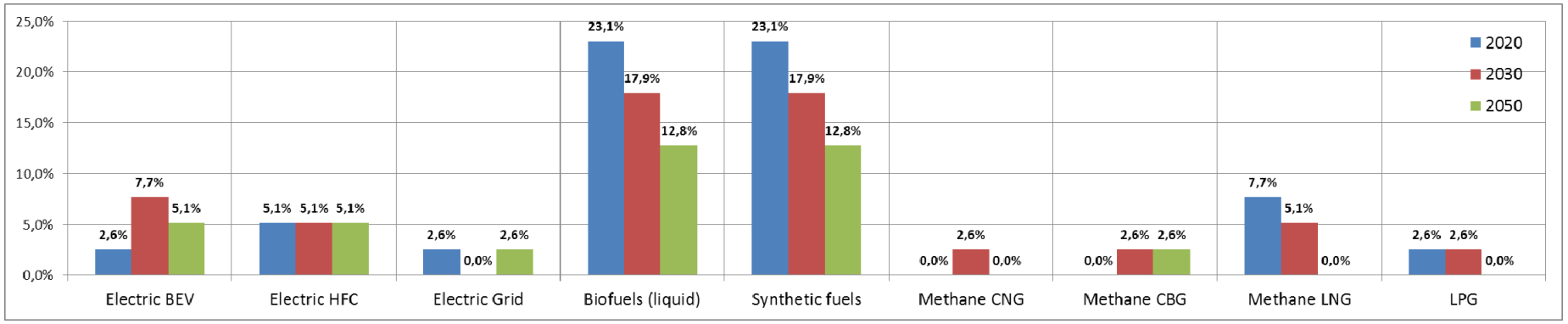

Figure 0–21 Expectation on how each alternative fuel will apply to the maritime transport mode; personal capacity

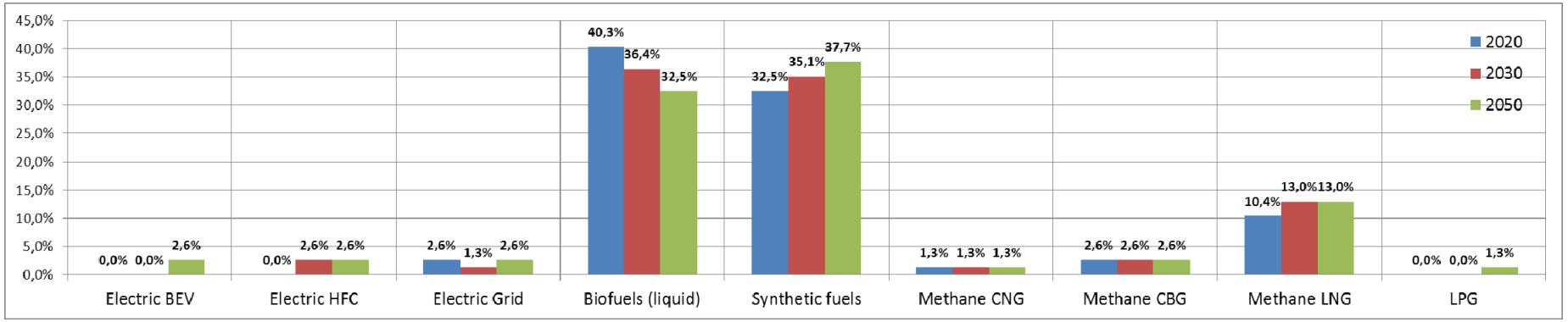

Figure 0–22 Expectation on how each alternative fuel will apply to the maritime transport mode; private sector, industry or NGOs

ANNEX II: ALTERNATIVE FUELS IN CONJUNCTION WITH TRANSPORT MODES

Different transport modes may require different alternative fuels. Respondents were addressed to indicate which alternative fuels will be relevant for which transport modes on the time horizon 2020, 2030, and 2050.

The following figures represent the expectation of the respondents in terms of the transport modes for each alternative fuels (see section 4.8).

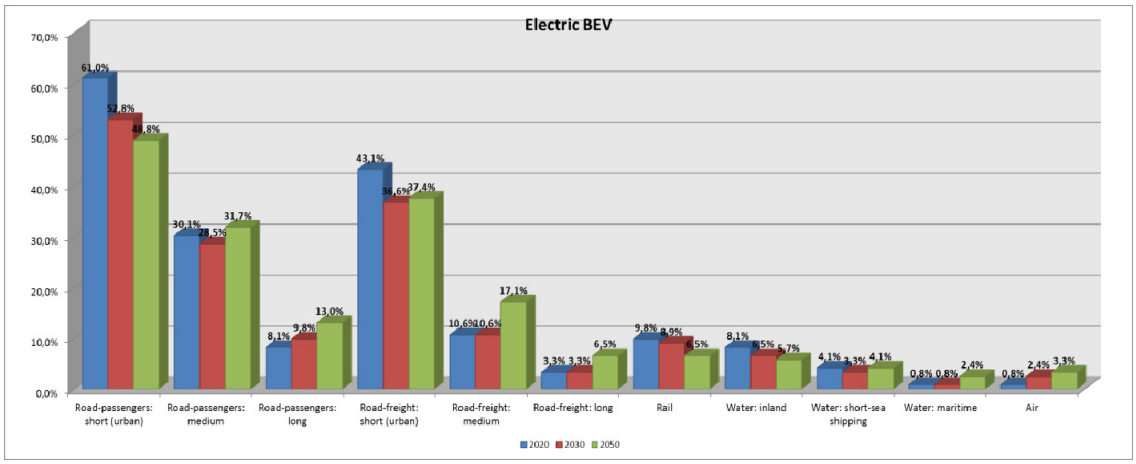

Figure 0–1 Expectation on how Electric BEV will be applied to each transport mode

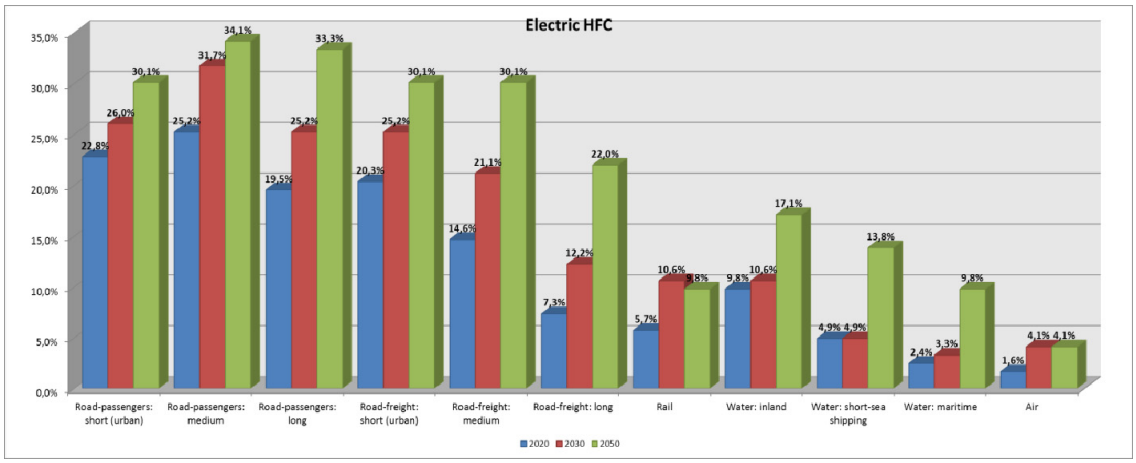

Figure 0–2 Expectation on how Electric HFC will be applied to each transport mode

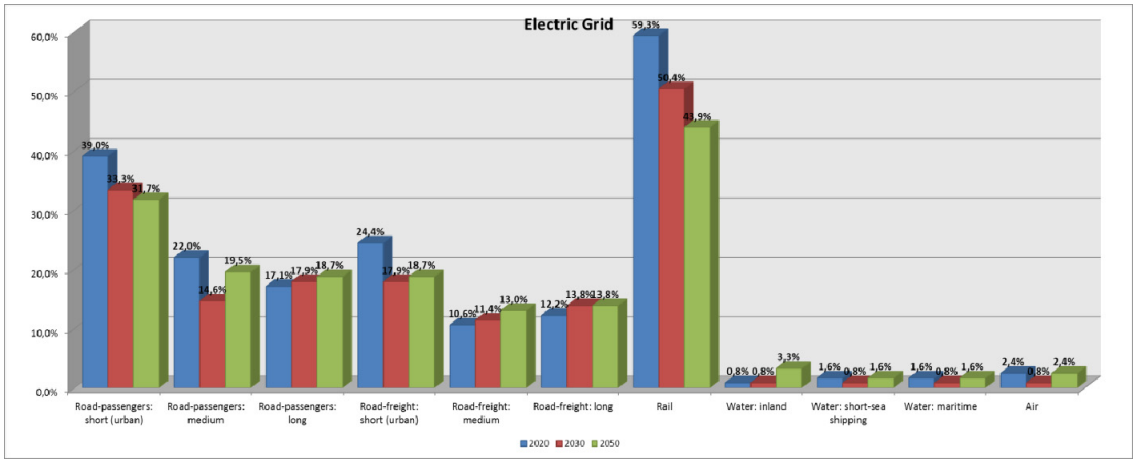

Figure 0–3 Expectation on how electric grid will be applied to each transport mode

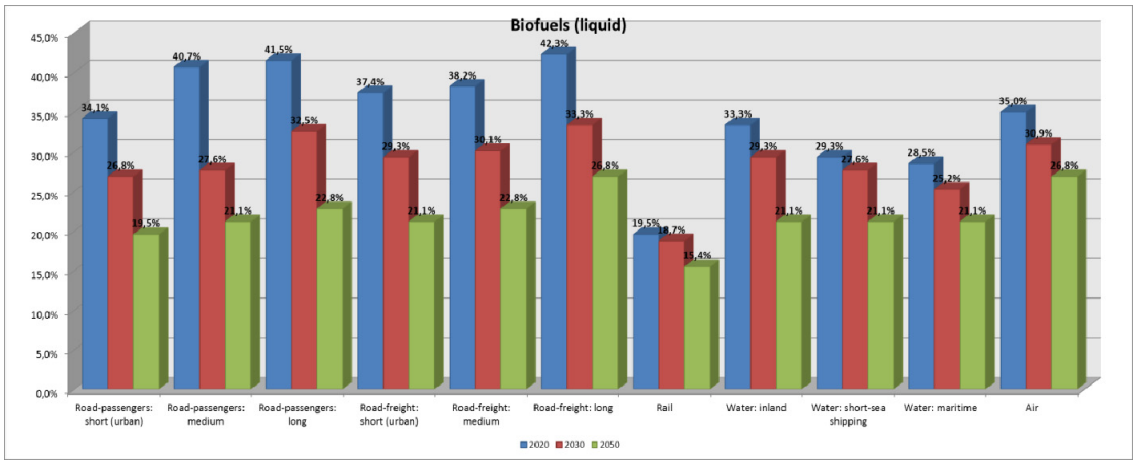

Figure 0–4 Expectation on how liquid biofuels will be applied to each transport mode

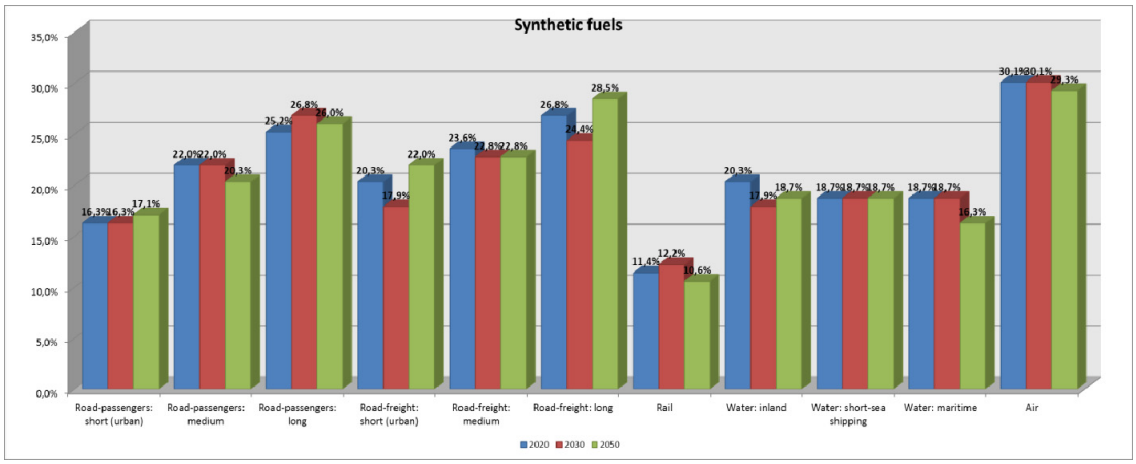

Figure 0–5 Expectation on how synthetic fuels will be applied to each transport mode

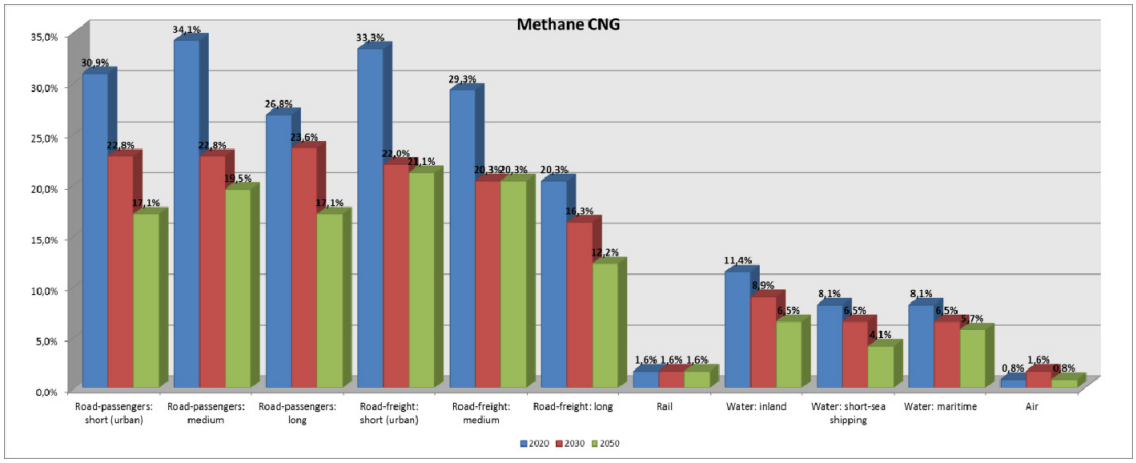

Figure 0–6 Expectation on how Methane CNG will be applied to each transport mode

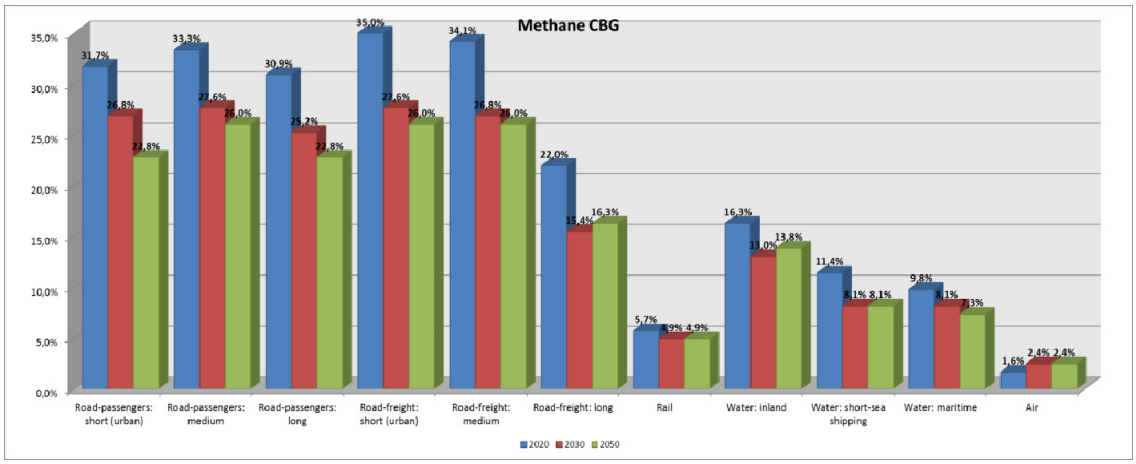

Figure 0–7 Expectation on how Methane CBG will be applied to each transport mode

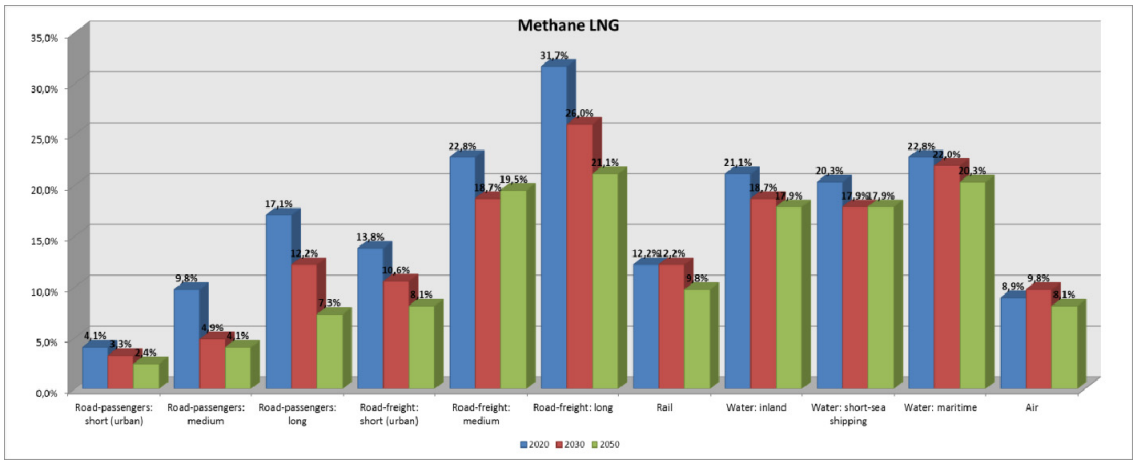

Figure 0–8 Expectation on how Methane LNG will be applied to each transport mode

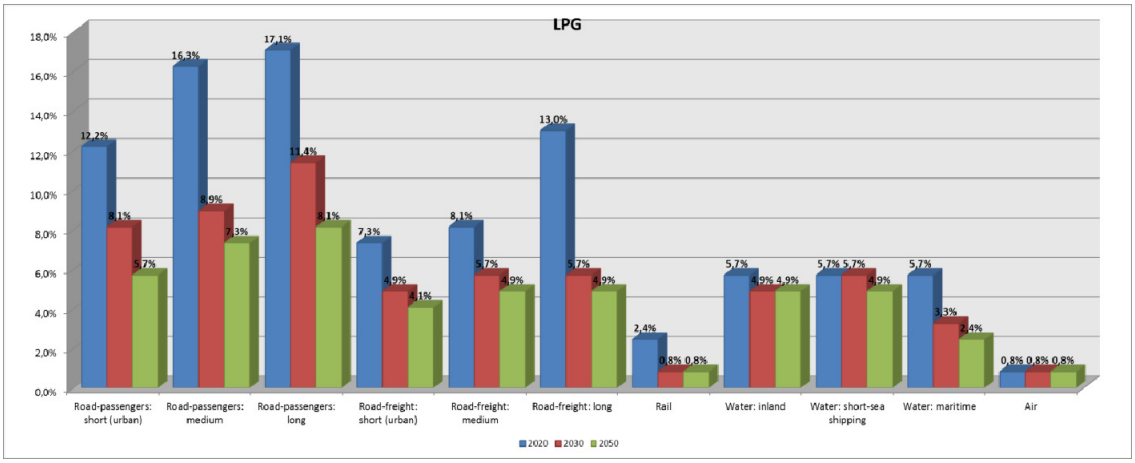

Figure 0–9 Expectation on how LPG will be applied to each transport mode

ANNEX III: QUESTIONNAIRE OF THE OPEN CONSULTATION

Part I: Information about respondents

Q: In what capacity are you completing this questionnaire?

(My personal capacity; Private sector company, Industry association or NGO, Local or regional public authority, National public authority)

Q: Country or region in which you are based.

Part II. The CTS initiative

Q: Should policy actions be taken at the EU level to steer an EU-wide market introduction of alternative fuels?

(Yes / No)

Q: Which ones?

Q: In addition to appropriate standards for CO2 emissions from vehicles, do you consider it important to put in place requirements on energy efficiency addressing all types of propulsion systems alongside the progressive market penetration of alternative fuels

Q: When should such measures be in place?

Q: In view of the current availability of fuel options with lower CO2 emissions, what should now receive priority?

(Research to improve existing fuel/vehicle technologies, Deployment of new low-CO2 fuel/vehicle technologies)

Q: Which approach should the EU take on the promotion of alternative fuels?

- Technology-oriented: giving preference to certain fuels and vehicle technologies (based on estimated cost effectiveness, market potential, long-term contribution to oil substitution and decarbonisation) or
- Performance-oriented: linking support to alternative fuels in a technology-neutral way to performance criteria, such as energy efficiency, reduction of CO2 and pollutant emissions

Q: In the technology-oriented approach would you give preference to:

(Alternative fuels standards / Vehicle technology standards / Infrastructure standards)

Q: In the performance-oriented approach would you give preference to:

(Energy efficiency standards / Cap on CO2 / Differentiated charging based on CO2 emissions)

Q: Which fuels should be included in a long-term European alternative fuel strategy?

(Electricity / Hydrogen / Biofuels / Synthetic fuels / Methane / LPG (Liquefied Petroleum Gas / Other)

Q: Different transport modes may require different alternative fuels. Indicate which alternative fuels will be relevant for which transport modes on the time horizon 2020?

Q: Different transport modes may require different alternative fuels. Indicate which alternative fuels will be relevant for which transport modes on the time horizon 2030?

Q: Different transport modes may require different alternative fuels. Indicate which alternative fuels will be relevant for which transport modes on the time horizon 2050?

	Electric BEV	Electric HFC	Electric Grid	Biofuels (liquid)	Synthetic fuels	Methane CNG	Methane CBG	Methane LNG	LPG
Road-passengers: short(urban)	☐	☐	☐	☐	☐	☐	☐	☐	☐
Road-passengers: medium	☐	☐	☐	☐	☐	☐	☐	☐	☐
Road-passengers: long	☐	☐	☐	☐	☐	☐	☐	☐	☐
short (urban)	☐	☐	☐	☐	☐	☐	☐	☐	☐
Road-freight medium	☐	☐	☐	☐	☐	☐	☐	☐	☐
Road-frei long	☐	☐	☐	☐	☐	☐	☐	☐	☐
Rail	☐	☐	☐	☐	☐	☐	☐	☐	☐

Water: inland	☐	☐	☐	☐	☐	☐	☐	☐	☐
Water: short-sea shipping	☐	☐	☐	☐	☐	☐	☐	☐	☐
Water: maritime	☐	☐	☐	☐	☐	☐	☐	☐	☐
Air	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q: Should actions be taken to privilege the use of particular fuels in particular transport sectors?

(Yes / No)

Q: Which actions should be taken?

Q: Do we need to accompany those actions with a coherent life-cycle approach for all fuels?

(Yes / No)

Q: Do you think that biofuels meeting the EU sustainability criteria could provide the major share of the transport energy supply in the long term?

(Yes / No)

Q: Do you think that biofuels meeting the EU sustainability criteria could deliver the required greenhouse gas reduction in the horizon 2050?

(Yes / No)

Q: Biofuels are considered to be an important part of alternative long term options for substituting oil as energy source in transport. Which approach(es) should get priority for further market build-up of biofuels reaching beyond 2020?

- Enabling progressively higher blending of bioethanol and biodiesel with conventional fossil fuels
- Faster market deployment of flexible fuel vehicles that can accept a much wider range of fuel specifications
- Faster market development of biofuels in transport sectors which are less dependent on fuel specifications than road transport passenger vehicles

- Faster market development of fungible biofuels, which can be blended at any ratio with conventional fossil fuels

Q: Should the public sector intervene in accelerating the deployment of advanced biofuels technologies for the transport sector?

(Yes / No)

Q: Which actions should be taken?

Q: Should the public sector intervene in the development of the refuelling/recharging infrastructures?

(Yes / No)

Q: Do you think that achieving a consistent and significant deployment of alternative fuels is possible through a better use of currently available instruments (large scale demonstration projects; funding and financing; information provision)?

(Yes / No)

Q: Do you think that, in addition to currently available instruments, EU action to achieve a consistent and significant deployment of alternative fuels should be limited to ensuring the relevant infrastructure standards?

(Yes / No)

Q: Do you think that voluntary action of industry alone could achieve the development of the refuelling/recharging infrastructures required for travelling across the whole EU on alternative fuels?

(Yes / No)

Q: Should there be EU legislation requiring a certain minimum refuelling/recharging infrastructure for certain alternative fuels/energy carriers?

	Road	Rail	Water	Air
Electricity	☐	☐	☐	☐
Hydrogen	☐	☐	☐	☐
Biofuels	☐	☐	☐	☐

Synthetic fuels	☐	☐	☐	☐
Methane	☐	☐	☐	☐
LPG (Liquefied Petroleum Gas	☐	☐	☐	☐

Q: Should there be a build-up of a parallel dedicated bio-methane refuelling infrastructure or should bio-methane be injected into a single methane grid, supplying stationary and mobile consumers?

(Dedicated bio-methane refuelling infrastructure / Biomethane injected into general gas grid)

Q: Should the market introduction of alternative fuels be supported by privileged access of alternative fuel vehicles/transport carriers to transport infrastructure?

(Yes / No)

Q: Specify the preferred measures

(Lower charging tariffs for infrastructure use / Privileged access to access restriction zones / Other)