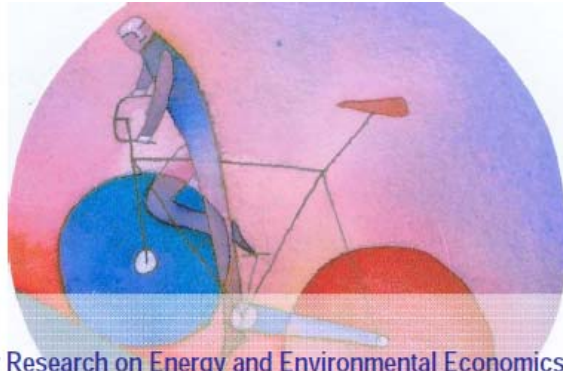


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**SYNTHESIS REPORT ON THE OUTCOMES OF THE  
QUESTIONNAIRE SURVEY ON BARRIERS TO ENERGY  
EFFICIENCY IN THE BUILDING AND TRANSPORT  
SECTORS IN HERON PARTNER COUNTRIES**

*Edoardo Croci, Tania Molteni and Alessandro Palma*

Research Report n. 24  
April 2016

Report developed within HERON project - "Forward-looking socio-economic research on Energy Efficiency in EU countries", which received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 649690

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**HERON (No: 649690): Deliverable 2.5.**

# **SYNTHESIS REPORT ON THE OUTCOMES OF THE QUESTIONNAIRE SURVEY**

**APRIL 2016**

**Partner: Università Commerciale Luigi Bocconi (UB)**



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*<sup>(1)</sup> The Steering Committee members have the responsibility for ensuring the quality of the report.*

**HERON: Forward – looking socio-economic research on Energy Efficiency in EU countries**

*This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 649690. The content of this document reflects only the authors’ views and the EASME is not responsible for any use that may be made of the information it contains.*



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## ACKNOWLEDGEMENTS

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HERON partners would like to thank all the respondents that took part in the questionnaire-based survey for their contribution to the project.





## CONTRIBUTORS

All HERON partners contributed to the elaboration of the questionnaire, to the translation of the questionnaire and of open answers into their country language and to the dissemination of the questionnaire to potential respondents, making possible the implementation of the survey. HERON partners are:

- National and Kapodistrian University of Athens (UoA-KEPA, Greece);
- Università Commerciale “Luigi Bocconi” (UB, Italy);
- Black Sea Energy Research Centre (BSERC, Bulgaria);
- Oxford Brookes University (OBU, United Kingdom);
- University of Antwerp (UA, Belgium);
- Wuppertal Institut für Klima, Umwelt, Energie GMBH (WI, Germany);
- University of Belgrade - Faculty of Mining and Geology (UB-FMG, Serbia);
- Estonian Institute for Sustainable Development, Stockholm Environment Institute Tallinn Center (SEI T, Estonia).



## GLOSSARY

*Energy efficiency policy:* a government led course of action aimed at facilitating the adoption of energy efficiency technologies. Policies are the set of available legal means, instruments, approaches, rules and incentives, that a government has at its disposal to persuade, coerce or encourage certain social, productive and economic groups to participate and help tackle the problem. Policies refer to objectives, together with the means of implementation.

*Policy measures:* are focused actions aimed at specific issues. They are individual interventions or packages of related measures. Specific measures might include actions which promote the chosen policy direction (Niang-Diop, I., Bosch, H., 2005).

*Policy instruments:* are defined as the set of all techniques (steps, mechanisms, approaches, tactics), which a government has to implement the objectives of a selected policy (Jordan A. et. Al. (2000)). They contain all the necessary details for the framework under which a policy or measure will be implemented. The policy instruments that are used for the implementation of national policies are classified into four main categories:

1. Regulatory policy instruments ('command and control' instruments, environmental standards, regulatory standards, technological or design standards, functional or efficiency standards);
2. Voluntary approaches (unilateral commitments, voluntary agreements or initiatives, public voluntary schemes (eco-labels, voluntary action plans, negotiated agreements));
3. Economic policy instruments (tradable permits, certificates, subsidies, liability payments, non-compliance penalties, deposit refund systems, emission charge, taxes);
4. Dissemination measures (public awareness, promotion of research and technology, environmental education).

*Driver:* an element that positively induces individuals to invest in energy efficiency. Energy efficiency policies are an example.

*Barrier:* an element that limits the individuals' willingness to invest in energy efficiency. For instance, difficulties in trusting new technologies or lack of information about potential energy efficiency benefits are considered barriers.

*Split incentive:* a 'circumstance in which the flow of investments and benefits are not properly rationed among the parties to a transaction or exchange' (Bird and Hernandez, 2012), and can act as a barrier to the deployment of energy efficiency measures. An example of this is when the tenant is responsible for the energy/utility bills, there is little or no incentive for the landlord to increase his or her own expense to acquire efficient equipment (e.g., refrigerators, heaters, and light bulbs) because the landlord does not bear the burden of the operating costs and will not reap the benefits of reducing those costs.

*Building Energy Management System (BEMS):* computer-based control system installed in buildings that controls and monitors the building's mechanical and electrical equipment such as ventilation, lighting, power systems, fire systems, and security systems.

*Building fabric upgrades:* energy efficiency measures to upgrade the physical fabric of a dwelling (e.g. draught-proofing, double glazing, loft insulation, cavity/solid wall insulation).

*LEDs:* A light-emitting diode (LED) is a two-lead semiconductor light source that has rapidly superseded the traditional bulb lights. LEDs have many advantages over incandescent light sources including lower energy consumption, longer lifetime, improved physical robustness, smaller size, and faster switching.

*Energy class (A+, A++):* energy classes show how an appliance ranks on a scale from A to G according to its energy consumption. Class A (green) is the most energy efficient and Class G (red) the least. Once most appliances of a given type reach Class A, up to 3 further classes can be added to the scale: A+, A++ and A+++.

## ACRONYMS

**BEMS: Building Energy Management System**

**EE: Energy Efficiency**

**LED: light-emitting diode**

## EXECUTIVE SUMMARY

Barriers to energy efficiency are vast and complex and overcoming them is a key challenge for an effective implementation of energy efficiency policies. The HERON project focuses in particular on energy efficiency policies in the building and transport sectors, which are characterized by relevant energy uses and a great potential for energy efficiency, in Europe and in the eight partner countries. In the previous activities of the project, partners identified and cross-analysed social, economic, cultural, institutional and educational barriers to implementation of energy efficiency in the building and transport sectors for all eight HERON partner countries, through a literature review and expert views, in order to assess country-specific barriers associated with different policy measures and technologies. Subsequently, partners launched a questionnaire-based online survey to gather further inputs from experts and stakeholders regarding the relevance of these barriers in their respective country.

The aims of the survey were:

- to collect experts' and stakeholders' opinions on the relevance of each barrier in each country, rating the relevance of the different barriers in influencing the degree of implementation of the energy efficiency policy instrument, technology or practice, as well as the interaction between the barriers;
- to suggest possible ways to overcome them,
- if necessary, to map additional barriers which had not been considered.

The survey also aimed to rate the importance of different driving factors of energy efficiency policies, identified in the previous activities of the project.

The questionnaire was structured into two main parts (buildings, transport). Each part included general questions about the relevance of a set of barriers to the implementation of energy efficiency (EE) policies in the specific sector (building, transport), followed by a set of questions regarding specific types of interventions or technologies (for buildings: building fabric upgrade; heat pumps; LEDs; more efficient appliances; Building Energy Management System (BEMS) and building automation systems); (for transport: electric and hybrid vehicles; more sustainable and efficient modes of transport for individuals; more sustainable and efficient modes for freight transport).

The questionnaire comprised both closed and open questions. The closed questions were mainly aimed to obtain a rating of the barriers. The open questions were aimed to collect suggestions on additional barriers, their importance and possible ways to overcome them.

This report presents the key findings of the survey.

The survey was open from 2 February 2016 until 7 March 2016. It was disseminated to about 370 organizations spread in the partner countries, representative of key target groups and stakeholders of energy efficiency policies, in particular experts and policy makers.

Overall, 174 responses from target groups of the building sector were collected, 139 from the transport sector and 128 from respondents with expertise in both sectors. The majority of respondents were reluctant to declare their level of experience (about 35% in the building sector, about 40% in the transport sector). For those who declared it, about 46% for the buildings and 67% for the transport sector respectively have an experience of more than 5 years.

When disaggregating by type of organization, the pattern is consistent across the two sectors. The majority of respondents do not belong to any specific type of organization included in the options, the category of “Other” involving about one third of respondents in each of the two sector (28% in building and 34 % in transport) and when respondents belong to both building and transport sectors (34%). In the building sector, the categories involved in order of importance are government institutions (23%), universities and research centers (11%), non-profit organisations (9%), energy utilities (6%) and consumer associations (only 1%), while a 21% of respondents prefer not to indicate their type of organization. In the transport sector, the shares are similar, respectively government institutions (26%), universities and research centers (14%), non-profit organisations (10%), energy utilities (6%). The share of respondents preferring not to declare their type of organization is about 10%.

Given that the HERON survey is not based on a randomized and representative sample design, it is not possible to infer correlation neither causal implications between respondent groups and the different EE barriers listed in the questionnaire.

However, in order to identify the most important barriers in each sector as a whole, those barriers rated only as of “high relevance” were selected and summed to obtain the total number of respondents in all the eight countries for each question’s option in each sector. Then, a share for each answer’s option was calculated.

Based on this approach, the two most important barriers in the **building sector** are constituted by:

- Socio-economic status of building users, which represents 11,7% of the total grade options chosen;
- Lack of funds or access to finance, lack of financial incentives, high capital costs and financial risk, which represents a 10% of the total grade options chosen.

For the **transport sector**, the two most important barriers are constituted by:

- Lack of finance for new vehicles/ultra-low-emission vehicles/public transport, which corresponds to 8,20% of the total grade options chosen;
- Limited infrastructure investment, which covers the 8,10% of the total grade options chosen.

The lack of finance therefore is confirmed as a key barrier to an effective implementation of energy efficiency policies in both sectors across all the HERON partner countries.

## INTRODUCTION

WP2 of the HERON project sought to identify the main **barriers** (social, economic, cultural, educational and institutional) which hamper the **implementation of energy efficiency policy instruments, technologies and practices** in the **buildings** and **transport** sectors at the **national, regional** and **local level** in the **eight partner countries** (Belgium, Bulgaria, Estonia, Germany, Greece, Italy, Serbia, United Kingdom), and to provide a qualitative assessment of the key barriers for each country. To this purpose WP2 relied on a literature review (Tasks 2.1., 2.2., 2.3) and on primary research with experts, to be implemented through a questionnaire-based survey (Tasks 2.4, 2.5, 2.6, 2.7).

This report refers to Task 2.7. “Collection and analysis of results” - Deliverable 2.5. - “Synthesis report on the outcomes of the questionnaire survey”, and includes the elaboration of the main results obtained from the questionnaire-based survey.

The **questionnaire** was structured in relation to the **different typologies of barriers** identified in Tasks 2.1, 2.2 and in relation to the **main features** that characterize each barrier, with a combination of open and closed questions.

The **aims** of the **survey** were:

- to collect experts’ and stakeholders’ opinions on the **relevance** of **each barrier** in **each country**, rating the relevance of the different barriers in influencing the degree of implementation of the energy efficiency policy instrument, technology or practice, as well as the **interaction** between the barriers;
- to suggest **possible ways to overcome** them,
- if necessary, to **map additional barriers** which had not been considered.

Moreover, the survey also aims to rate the **importance** of different **driving factors** of energy efficiency policies, identified in the desk research of Task 2.3 and of WP1.

The report is structured in the following sections:

1. Overview of the questionnaire and questionnaire dissemination
2. Summary statistics and descriptive statistics
3. Cross-country analysis
  - 3.1. Building sector
  - 3.2. Transport Sector
4. Key Findings.

The detailed analysis of responses for each question is reported as Appendix 1 to this report.





# 1. OVERVIEW OF THE QUESTIONNAIRE AND QUESTIONNAIRE DISSEMINATION

## Overview of the questionnaire

The HERON questionnaire was structured in four main parts:

1. **Introduction and purpose of the survey**, with key information on the expected compilation time, data management and ethical principles to be followed by Heron partners within the survey, future use of the data, funding of the Heron project, contacts for further information, glossary of terms used in the questionnaire;
2. Questions on barriers to energy efficiency in the **building** sector, structured in:
  - a. General questions;
  - b. Barriers limiting interventions for building fabric upgrade;
  - c. Barriers limiting the adoption of heat pumps;
  - d. Barriers limiting the adoption of LEDs;
  - e. Barriers limiting the adoption of more efficient appliances (with energy class A+++ and A++);
  - f. Barriers limiting the adoption of Building Energy Management System (BEMS) and building automation systems.
3. Questions on barriers to energy efficiency in the **transport** sector, structured in:
  - a. General questions;
  - b. Barriers limiting the adoption of electric and hybrid vehicles;
  - c. Barriers limiting the choice of using more sustainable and efficient modes of transport for individuals;
  - d. Barriers limiting the choice of using more sustainable and efficient modes for freight transport;
4. Questions aimed to depict the **profile of the respondent** and **thank you** section.

For the complete text of the questionnaire in the eight project languages (English, Belgian, Bulgarian, Estonian, German, Greek, Italian and Serbian), please refer to Heron Deliverable 2.4. – “Questionnaire template on barriers and driving factors and 7 translated versions of the questionnaire”.

## Questionnaire dissemination

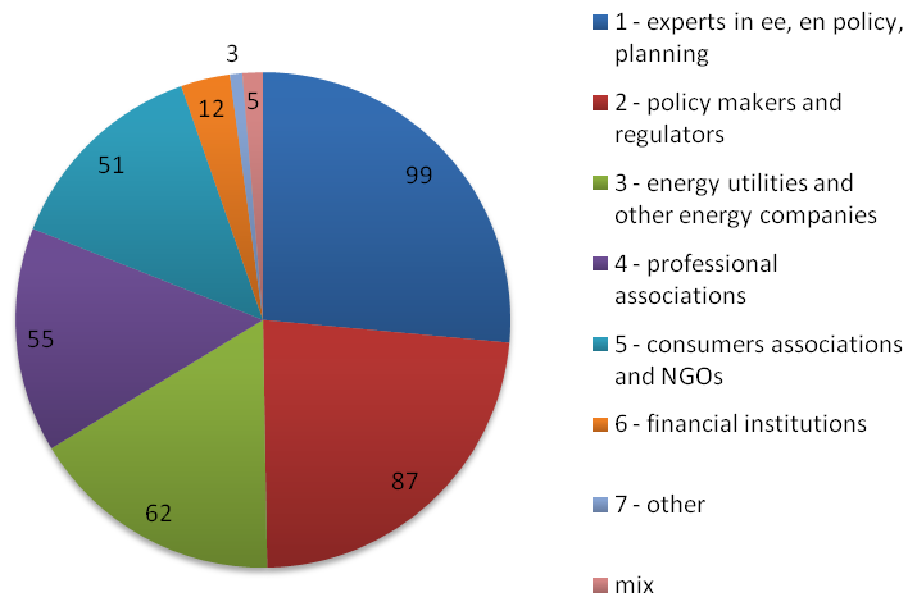
The questionnaire in its eight language versions was uploaded on the web-platform “Qualtrics”, which was chosen for its flexibility and functionalities. The questionnaire was available online from **2 February 2016** until **7 March 2016**. Each partner was responsible for inviting recipients from his/her country to respond to the survey by sending an invitation email. The questionnaire was disseminated to the target groups identified by partners during Task 2.4 “Identification of the survey’s target groups”. Overall, 374 organizations were identified by partners as potential recipients of the WP2 survey questionnaire, distributed among partner countries as displayed in the following table:

**Table 1: Number of organizations identified per country**

<b>n. organizations per country</b>	
Belgium	26
Bulgaria	41
Estonia	46
Germany	51
Greece	44
Italy	101
Serbia	38
United Kingdom	25
Other (i.e. EU)	2
<b>TOTAL</b>	<b>374</b>

Two partners identified potential recipients also outside of their country, namely in Slovenia and an EU- organization based in Italy.

As far as the typologies of target groups are concerned, actors and organizations included in the recipients list were spread among several typologies, as shown in the following graph:

**Graph 1: number of organizations identified per typology**

Most represented typologies were 1 (experts in the domain of energy efficiency and energy policy, as well as of regional/local planning and/or mobility planning), 2 (policy makers and regulators) and 3 (energy utilities and other energy companies).

For a more detailed overview of sub-typologies and of typologies per country, and for the complete lists of organizations contacted, please refer to Deliverable 2.3. "National list of actors and organizations to be surveyed".

## 2. SUMMARY STATISTICS AND DESCRIPTIVE ANALYSIS

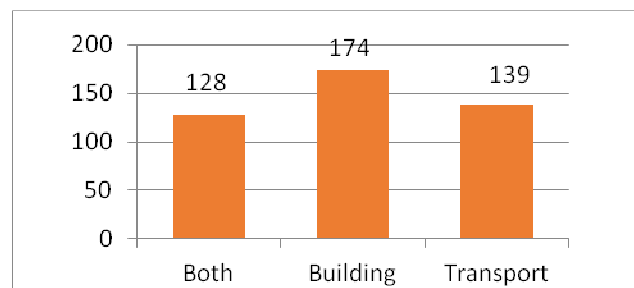
### Respondents by sector

As shown in Table 2, the sample is constituted by 174 respondents belonging to the building sector, 139 respondents belonging to the transport sector and by 128 respondents which respond to questions of both the building and transport sector.

**Table 2: Respondents<sup>1</sup> by sector**

Sector	N
Building	174
Transport	139
Both	128

**Graph 2: Respondents by sector**



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<sup>1</sup> Calculated by considering responses to at least one question.

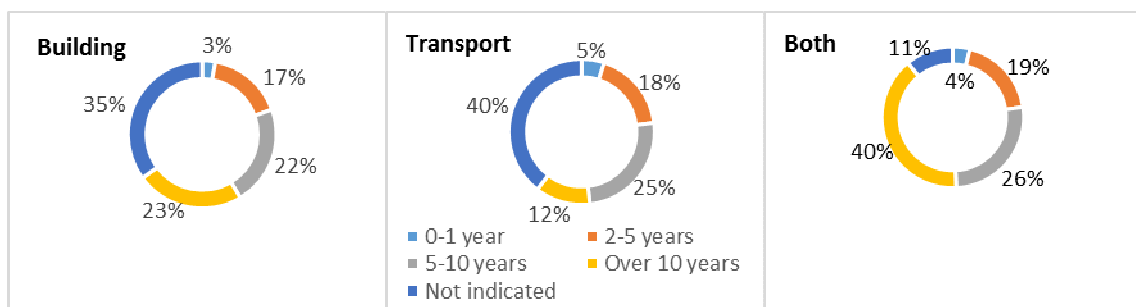
## Respondents by experience

The disaggregation by years of experience shows that the majority of respondents are reluctant to declare their level of experience (about 35% in the building sector, about 40% in the transport sector). In the building sector, about 24% of respondents declare an experience of over 10 years, about 22% declare between 5 and 10 years, 17% declare between 2 and 5 years and only a 2.8% are stakeholders with less than one year of experience. For transport, the pattern is quite similar. In detail, about 40% of respondents declare an experience of over 10 years, about 27% declare between 5 and 10 years, 19% declare between 2 and 5 years and a 4% is represented by stakeholders with less than one year of experience.

**Table 3: Experience of respondents, by sector**

Level of experience	Building		Transport		Both	
	N	%	N	%	N	%
0-1 year	5	2,87	7	5,04	5	3.91
2-5 years	29	16,67	25	17,99	24	18.75
5-10 years	38	21,84	35	25,18	34	26.56
Over 10 years	41	23,56	17	12,23	51	39.84
Not indicated	61	35,06	55	39,57	14	10.94
Total	174	100	139	100	128	100

**Graph 3: Experience of respondents, by sector**



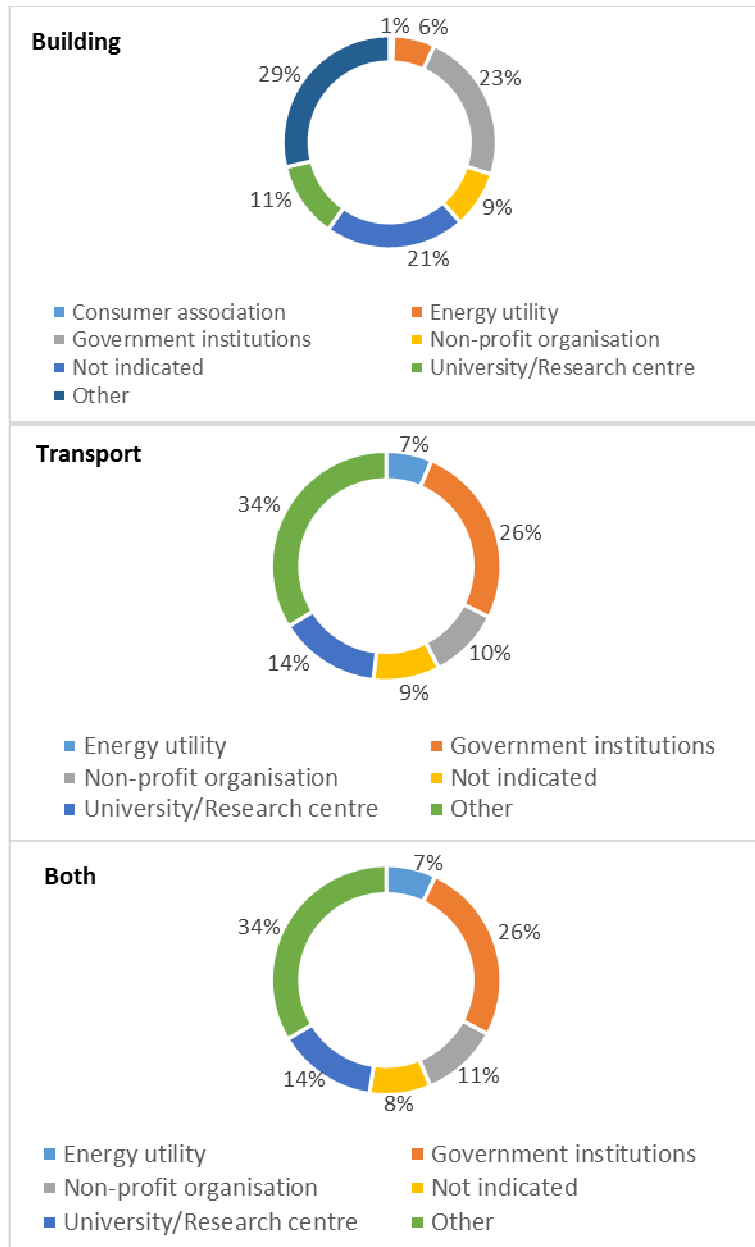
## Respondents by type of organization

When disaggregating by type of organization, the pattern is consistent across the two sectors. The majority of respondents do not belong to any specific type of organization included in the options, the category of “Other” involving about one third of respondents in each of the two sector (28% in building and 34 % in transport) and when respondents belong to both building and transport sectors (34%). In the building sector, the categories involved in order of importance are government institutions (23%), universities and research centers (11 %), non-profit organisations (9%), energy utilities (6%) and consumer associations (only 1%), while a 21% of respondents prefer not to indicate their type of organization. In the transport sector, the shares are similar, respectively government institutions (26%), universities and research centers (14 %), non-profit organisations (10%), energy utilities (6%). The share of respondents preferring not to declare their type of organization is about 10%.

**Table 4: Type of organization of respondents, by sector**

Type of organization	Building		Transport		Both	
	N	%	N	%	N	%
Consumer association	1	0.57	0	0	0	0
Energy utility	11	6.32	9	6.47	9	7.03
Government institutions	40	22.99	36	25.90	33	25.78
Non-profit organisation	15	8.62	14	10.07	14	10.94
University/Research centre	20	11.49	20	14.39	18	14.06
Other	50	28.74	47	33.81	43	33.59
Not indicated	37	21.26	13	9.35	11	8.59
Total	174	100	139	100	128	100

**Graph 4: Type of organization of respondents.**



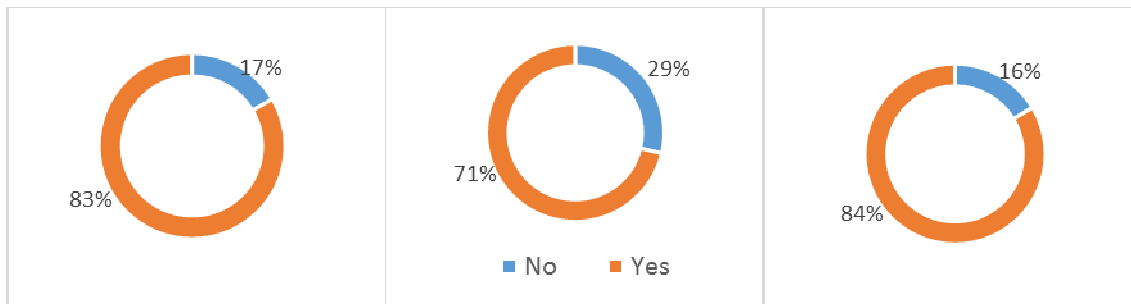
## Respondents by interest for receiving the final report

Respondents show a clear interest in receiving the final survey report. In building sector, more than 70% of the sample declares to be interested in receiving a digital copy of the final report. In the transport sector, the interest is even higher and involves more than 80% of respondents. The same pattern is found for respondents belonging to both building and transport sectors. This is a relevant indicator of the high level of interest that the topic of energy efficiency currently has in the partner countries.

**Table 5: Respondents interested in receiving the final survey report**

	Building		Transport		Both	
	N	%	N	%	N	%
No	50	28.74	23	16.55	21	16.41
Yes	124	71.26	116	83.45	107	83.59
Total	174	100	139	100	128	100

**Graph 5: Respondents interested in receiving the final survey report.**





## 3. CROSS-COUNTRY ANALYSIS

### 3.1. BUILDING SECTOR

#### High relevance barriers to EE in the building sector in each partner country

The following paragraph highlights the barriers rated by respondents as highly relevant for each country<sup>2</sup> for the implementation of EE policies in the buildings sector. The results are displayed also in the table below.

The socio-economic factors appear to be highly relevant across several partner countries. In fact all of them and almost all of them (7 out of 8) respectively, identified the social economic status of building users and the lack of funds as a high relevance barrier concerning the implementation of EE policies in the building sector. Also the limited payback expectations and investments horizons, which are also connected to the economic dimension of the investment, were rated as high in several countries (5 out of 8).

Cultural and behavioural aspects, such as the lack of interest in energy efficiency and customs and habits, were rated as highly important in half partner countries, together with educational barriers such as the lack of trusted information and experience.

Also institutional barriers like the complexity of regulatory procedures emerged as highly important in half partner countries.

Other barriers of educational type, like the lack of awareness on energy savings potentials, and of institutional type, like the building stock characteristics and the split incentive, were rated high in a smaller number of countries, only 3 out of 8.

Other barriers of economic type, like uncertainty on investments, was rated as highly relevant only in 2 out of 8 countries.

The specific educational issue linked to training and skills of professionals seems highly important only in one country. The difficulties in using new EE technologies as well as social group interactions do not emerge as a highly relevant barriers in any of the partner countries.

Looking at the rating for specific EE intervention types or technologies applicable to the building sector, the situation changes according to the specific intervention/technology.

For interventions on **building fabric upgrades**, all partner countries identified highly relevant barriers, mainly of economic and institutional type. The difficulties of their implementation mainly relies in the lack of funding to realize these interventions or the institutional factors linked for example to the lack of incentives in the country's policies, specific obstacles in the legislation, the split incentives issue, to cite some examples.

For **heat pumps**, only 3 countries identified barriers of high relevance for their adoption, mainly of economic and educational type. The open answers provided by respondents for

---

<sup>2</sup> A barrier is considered here of high relevance if at least 50% of the country respondents rated its relevance as "high".

this technology highlighted economic factors such as the high costs of this technology, and educational factors linked to the expertise of professionals as important elements.

For **LEDs**, half of partner countries identified barriers of high relevance, mainly of economic and cultural type. This may be due to the high purchase costs of this technology in comparison to other options, and to some technical features of LEDs which are perceived in a negative way by consumers, as highlighted in the open answers (e.g. light colour and intensity...).

Also for **more efficient appliances**, 5 out of 8 partner countries identified highly relevant barriers of economic and cultural type. This may be due to the higher purchase costs of these appliances in comparison to less efficient ones, and to price policies of the vendors, as well as from cultural patterns that lead to substitute the appliance in case of breakdown, and not for energy efficiency purposes, as reported in the open answers.

For **BEMS**, all partner countries identified high relevance barriers, mainly of educational, socio-cultural and economic types. Educational aspects may be linked to the lack of qualification regarding this technology in the professional sectors, and also from the end-users, which have difficulties in familiarizing with it due to its complexity. The economic aspects may be linked to the high purchase costs and lack of finance for the adoption of this technology.



**Table 6: High relevance barriers to EE in the building sector in the partner countries based on the survey results**

	Bulgaria	Germany	Greece	United Kingdom	Estonia	Italy	Belgium	Serbia
<b>Barriers to the implementation of EE policies in the buildings sector rated as “highly relevant”</b>								
1.1 Lack of interest and undervaluing energy efficiency (individuals may pay scarce attention to energy saving and its benefits)			X	X		X		X
1.2 Social group interactions (some individuals may negatively affect other consumers that are willing to invest in new EE technologies)								
1.3 Socio-economic status of building users (some statuses, such as unemployment, affect the individual capacity to invest in EE. In general, individuals with negative economic conditions have fewer possibilities to sustain EE investments)	X	X	X	X	X	X	X	X
1.4 Lack of funds or access to finance, lack of financial incentives, high capital costs and financial risk (individuals with more risk aversion may be less prone to invest in EE).	X	X	X	X	X	X		X
1.5 Limited payback expectations and investment horizons (individual may think that the payback period for a given EE investment is too long and uncertain)		X		X	X	X	X	
1.6 Uncertainty on investment (individuals may be more or less sensitive to the uncertainty due to the return on their EE investments)				X		X		
1.7 Lack of trusted information and experience (individuals may not trust who provides them with information on energy savings)	X		X	X		X		
1.8 Lack of awareness on saving potentials (individuals may misperceive the benefits deriving from EE)			X			X		X
1.9 Difficulties in using new EE technologies (when EE technologies are								



provided with few user information, some individuals may be less capable to deal with them)								
1.10 Training and skills of professionals (professionals and sellers of EE goods may have poor expertise)			x					
1.11 Customs, habits, and relevant behavioural aspects (i.e. it may be difficult to change consumer’s habits such as keeping the windows open when the heating is on or sleeping with TV left on)		x		x			x	x
1.12 Lack of relevant legislation (legislation may not be sufficiently developed to support the adoption of EE technologies)			x	x				
1.13 Building stock characteristics (there may be some technical difficulties in installing EE technologies, due to the characteristics of different buildings, including building age)				x			x	x
1.14 Split incentive (landlords may not invest in energy efficiency because their tenants pay the energy bills, or conversely tenants have no incentive to reduce their energy use as their landlord pays the bill)			x	x			x	
1.15 Complex/inadequate regulatory procedures (individuals who want to benefit from EE investments may find bureaucratic procedures too complicated)	x		x			x		x
<b>Barriers limiting interventions for building fabric upgrade rated as “highly relevant”</b>								
2.1.Lack of interest and undervaluing energy efficiency benefits; social group interactions (some individuals may negatively affect consumers that are willing to invest in new EE technologies).				x		x		
2.2.Lack of funds or access to finance, lack of financial incentives, high capital costs and financial risk.	x		x	x	x	x	x	x
2.3.Lack of trusted information and experience (individuals may not trust who provide them with information on energy savings); difficulties in knowing new EE technologies; lack of expertise for		x						

professionals and technicians.								
2.4. Customs, habits, and relevant behavioural aspects (it may be difficult to change consumer’s habits such as leaving the windows open when the heating is on).		x						
2.5. Lack of specific legislation; aged building stock and difficulties in installing EE technologies; split incentive (landlords may not invest in energy efficiency because their tenants pay the energy bills)			x	x			x	x
<b>Barriers limiting the adoption of heat pumps rated as “highly relevant”</b>								
3.1 Lack of interest and undervaluing energy efficiency benefits; social group interactions (some individuals may negatively affect consumers that are willing to invest in new EE technologies).								
3.2 Lack of funds or access to finance, lack of financial incentives, high capital costs and financial risk.			x					x
3.3 Lack of trusted information and experience (individuals may not trust who provides them with information on energy savings); difficulties in using new EE technologies; lack of expertise for professionals.				x				x
3.4 Customs, habits, and relevant behavioural aspects (i.e. it may be difficult to change consumer’s habits such as keeping the the windows open whilst the heating is on).								
3.5 Lack of specific legislation; aged building stock and difficulties in installing EE technologies; split incentive (landlords may not invest in energy efficiency because their tenants pay the energy bills).								
<b>Barriers limiting the adoption of LEDs rated as “highly relevant”</b>								
4.1 Lack of interest and undervaluing energy efficiency benefits; social group interactions (some individuals may negatively affect consumers that are willing to invest in new EE technologies).								
4.2 Lack of funds or access to finance, lack of financial incentives, high			x		x			x

capital costs and financial risk.								
4.3 Lack of trusted information and experience (individuals may not trust who provides them with information on energy savings); difficulties in using new EE technologies; lack of expertise for professionals and technicians.								
4.4 Customs, habits, and relevant behavioural aspects (it may be difficult to change consumer’s habits such as leaving the lights on when not in the room).				x				
4.5 Lack of specific legislation; aged building stock and difficulties in installing EE technologies; split incentive (landlords may not invest in energy efficiency because their tenants pay the energy bills).								
<b>Barriers limiting the adoption of more efficient appliances rated as “highly relevant”</b>								
5.1 Lack of interest and undervaluing energy efficiency benefits; social group interactions (some individuals may negatively affect consumers that are willing to invest in new EE technologies).			x	x				
5.2 Lack of funds or access to finance, lack of financial incentives, high capital costs and financial risk.	x		x		x			x
5.3 Lack of trusted information and experience (individuals may not trust who provide them with information on energy savings); difficulties in using new EE technologies; lack of expertise for professionals and technicians.								
5.4 Customs, habits, and relevant behavioural aspects (it may be difficult to change consumer’s habits such as sleeping with TV on).								
5.5 Lack of specific legislation; split incentive (landlords may not invest in energy efficiency because their tenants pay the energy bills).								
<b>Barriers limiting the adoption of BEMS and building automation systems rated as “highly relevant”</b>								
6.1 Lack of interest and undervaluing energy efficiency benefits; social group interactions (some individuals may negatively affect	x		x			x		x

consumers that are willing to invest in new EE technologies).								
6.2 Lack of funds or access to finance, lack of financial incentives, high capital costs and financial risk.	x		x		x		x	x
6.3 Lack of trusted information and experience (individuals may not trust who provide them with information on energy savings); difficulties in using new EE technologies; lack of expertise for professionals and technicians.	x	x	x	x		x	x	x
6.4 Customs, habits, and relevant behavioural aspects (it may be difficult to change consumer’s habits such as sleeping with TV on).						x		
6.5 Lack of specific legislation; aged building stock and difficulties in installing EE technologies; split incentive (landlords may not invest in energy efficiency because their tenants pay the energy bills).			x					

## 3.2. TRANSPORT SECTOR

### High relevance barriers to EE in the transport sector in each partner country

The following paragraph highlights the barriers rated by respondents as highly relevant for each country<sup>3</sup> for the implementation of EE policies in the transport sector. The results are displayed also in the table below.

Economic and institutional factors, such as limited infrastructure investment and inefficient transport infrastructure and planning, are identified as highly relevant barriers to EE in the transport sectors in all partner countries, together with the insufficient development of cycling/walking infrastructure which has been reported in almost all countries (7 out of 8).

Further economic and institutional factors rated as highly relevant barriers and quite widespread among partner countries (in 6 out of 8 of them) are the lack of finance for new vehicles/ultra-low-emission vehicles and public transport, the low purchasing power of consumers/financial crisis, the lack of integrated governance, a lack of EE for transport on the Government agenda, a lack of support for rail transportation/Limited rail infrastructure, a lack of a national strategy for sustainable urban mobility, and not developed infrastructure for recharging of electric vehicles. Some of these factors are also linked to the low satisfaction with public transport/lack of trust, which were also rated as high in several countries (6 out of 8).

Barriers more linked to cultural, educational and social aspects emerge as highly relevant in a smaller number of partner countries. These include environmental concern/low priority, recognized as highly relevant in half of partner countries; habit and social norm of driving and car ownership, in 3 of them; car as status symbol and as a driver of group influence, in 2; and the lack of knowledge and information about energy efficient vehicles only in 1 country.

Looking at the specific technology of **electric and hybrid vehicles**, almost all countries (7 out of 8) identified high-relevance barriers. The most widespread barriers seem of economic type, namely the lack of finance, the limited infrastructure investment and the reduced purchasing power of citizens due to financial crisis, as well as of institutional type, namely the fragmentation of responsibility between different public authorities and contradictions in policy goals; inefficient public transport infrastructure; not developed infrastructure for recharging of electric vehicles. These have been rated as highly relevant respectively by almost all partner countries (7 out of 8) and by 5 of them. Cultural and educational barriers emerge as relevant only in 1 country respectively.

Looking at the barriers limiting the choice of using **more sustainable and efficient modes of transport for individuals**, all partner countries identified high-relevance barriers. All countries agree on institutional factors such as the lack of infrastructures and planning to be a highly relevant barrier, followed by more social and cultural factors such as the low satisfaction with public transport (rated high in 6 out of 8 countries) and habit and social norm of using traditional less efficient transport means (4 out of 8). Economic aspects like low purchasing power of consumers/financial crisis are recognized as highly relevant for energy efficiency of individual transport only in 3 countries.

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<sup>3</sup> A barrier is considered here of high relevance if at least 50% of the country respondents rated its relevance as “high”.



Finally, looking at the barriers limiting the choice of using **more sustainable and efficient modes for freight transport**, 6 out of 8 countries identified high relevance barriers. Several countries (5 out of 8) recognize the impact of the economic crisis (Reduced economic returns/financial crisis), rating it as a highly relevant barrier, followed by more institutional and infrastructural elements (Lack of support for more sustainable and efficient transport means/Limited infrastructure). Social, educational and cultural elements are rated as highly relevant only in 1 country respectively.



**Table 7: High relevance barriers to EE in the transport sector in the partner countries based on the survey results**

	Bulgaria	Germany	Greece	United Kingdom	Estonia	Italy	Belgium	Serbia
<b>Barriers to the implementation of EE policies in the transport sector rated as “highly relevant”</b>								
1.1 Low satisfaction with public transport/lack of trust (Individuals may be dissatisfied with public transport and perceive it as more time consuming and less flexible than private means of transport).	X	X		X	X		X	X
1.2 Hesitation to trust new technologies (Individuals may not trust new efficient vehicles (e.g. electric vehicles) and consider them less reliable than “known” technologies).					X			
1.3 Lack of finance for new vehicles/ultra-low-emission vehicles/public transport (Individuals may lack economic resources to buy new efficient vehicles or to use public transport).	X		X	X	X	X		X
1.4 Limited infrastructure investment (Public investments in public transport or in infrastructures for energy efficient vehicles (e.g. electric vehicles) may be limited due to lack of resources).	X	X	X	X	X	X	X	X
1.5 Low purchasing power of consumers/financial crisis (individuals may be reluctant to invest in energy efficient vehicles because of the lowering effect of the economic crisis on their purchasing power).	X		X	X	X	X		X
1.6 Individuals may lack knowledge and information about energy efficient vehicles such as electric vehicles and ultra-low emission vehicles, e.g. information about running costs, variations in vehicle technology, charging routines etc.).				X				
1.7 Car as status symbol and as a driver of group influence (individuals may consider owning and driving a private car as a symbol of status and good lifestyle).					X		X	
1.8 Habit and social norm of driving and car ownership (owning and driving a private car may be a deeply-rooted habit and tradition).				X	X		X	



1.9 Environmental concern/low priority (Environmental impact of vehicles and/or of travelling may have a low priority for individuals when they purchase a new car or when they decide which ways of travelling they should use).				X	X		X	X
1.10 Lack of integrated governance (transport governance may be affected by a lack of integration, deriving i.e. from a fragmentation of responsibility between different public authorities and contradictions in policy goals).	X	X		X	X		X	X
1.11 Transport EE on the Government agenda lacking/underrepresented (energy efficiency in the transport sector may have low priority in the governmental agenda).		X	X	X	X		X	X
1.12 Inefficient transport infrastructure and planning (available transport infrastructure and further infrastructure planning may be inefficient and/or ineffective in displacing car dominance and promoting energy efficient transport).	X	X	X	X	X	X	X	X
1.13 Insufficient development of cycling/walking infrastructure (cycling/walking infrastructure (e.g. cycling routes, bicycle parking facilities) may be lacking or not sufficiently developed).	X	X	X	X		X	X	X
1.14 Lack of support for rail transportation/Limited rail infrastructure (Rail infrastructure may be lacking or not sufficiently developed).	X		X	X		X	X	X
1.15 Lack of a national strategy for sustainable urban mobility.		X	X		X	X	X	X
1.16 Not developed infrastructure for recharging of electric vehicles (electric vehicles recharging infrastructure may be lacking or not sufficiently developed).	X		X	X		X	X	X
<b>Barriers limiting the adoption of electric and hybrid vehicles rated as “highly relevant”</b>								
2.1 Hesitation to trust technologies (individuals may not trust electric and hybrid vehicles and consider them less reliable than ‘known’								

traditional technologies).								
2.2 Lack of finance (individuals may lack economic resources to buy new efficient vehicles); limited infrastructure investment; reduced purchasing power of citizens due to financial crisis.	x		x	x	x	x	x	x
2.3 Individuals may lack knowledge and information about energy efficient vehicles such as electric vehicles and ultra-low emission vehicles, e.g. information about running costs, variations in vehicle technology, charging routines).				x				
2.4 Car as status symbol and as a driver of group influence; private car characterized by deeply-rooted habits and traditions.							x	
2.5 Fragmentation of responsibility between different public authorities and contradictions in policy goals; inefficient public transport infrastructure; not developed infrastructure for recharging of electric vehicles.			x	x	x		x	x
<b>Barriers limiting the choice of using more sustainable and efficient modes of transport for individuals rated as “highly relevant”</b>								
3.1 Low satisfaction with public transport (individuals may be dissatisfied with public transport and other more sustainable transport means and perceive them as more time consuming and less flexible).	x		x	x	x	x	x	
3.2 Low purchasing power of consumers/financial crisis (individuals may be reluctant to adopt energy saving transport modes because of the lowering effect of the economic crisis on their purchasing power).	x		x					x
3.3 Individuals may lack knowledge and information about energy saving transport means such as electric vehicles and ultra-low emission vehicles (e.g. information about running costs, variations in vehicle technology, etc.).								
3.4 Habit and social norm of using traditional less efficient transport means (owning and driving a private car may be a deeply-rooted	x	x		x			x	

habit and tradition).								
3.5 Lack of infrastructures and planning (available transport infrastructure and further infrastructure planning may be inefficient and/or ineffective in promoting energy efficient and more sustainable transport).	x	x	x	x	x	x	x	x
<b>Barriers limiting the choice of using more sustainable and efficient modes for freight transport rated as “highly relevant”</b>								
4.1 Hesitation to trust new technologies (companies may not trust new efficient vehicles (e.g. electric vehicles) and consider them less reliable than “known” technologies).		x						
4.2 Reduced economic returns/financial crisis (companies may be reluctant to invest in more sustainable and efficient transport modes because of the lowering effect of the economic crisis on their budget).	x	x	x			x		x
4.3 Companies may lack knowledge and information about energy efficient vehicles such as electric vehicles and ultra-low emission vehicles (e.g. information about running costs, variations in vehicle technology, charging routines).		x						
4.4 Habit, social norm and lack of environmental awareness (using traditional transport means may be a deeply-rooted habit and tradition).		x						
4.5 Lack of support for more sustainable and efficient transport means/Limited infrastructure (Rail infrastructure may be lacking or not sufficiently developed).	x	x	x		x			

## KEY FINDINGS

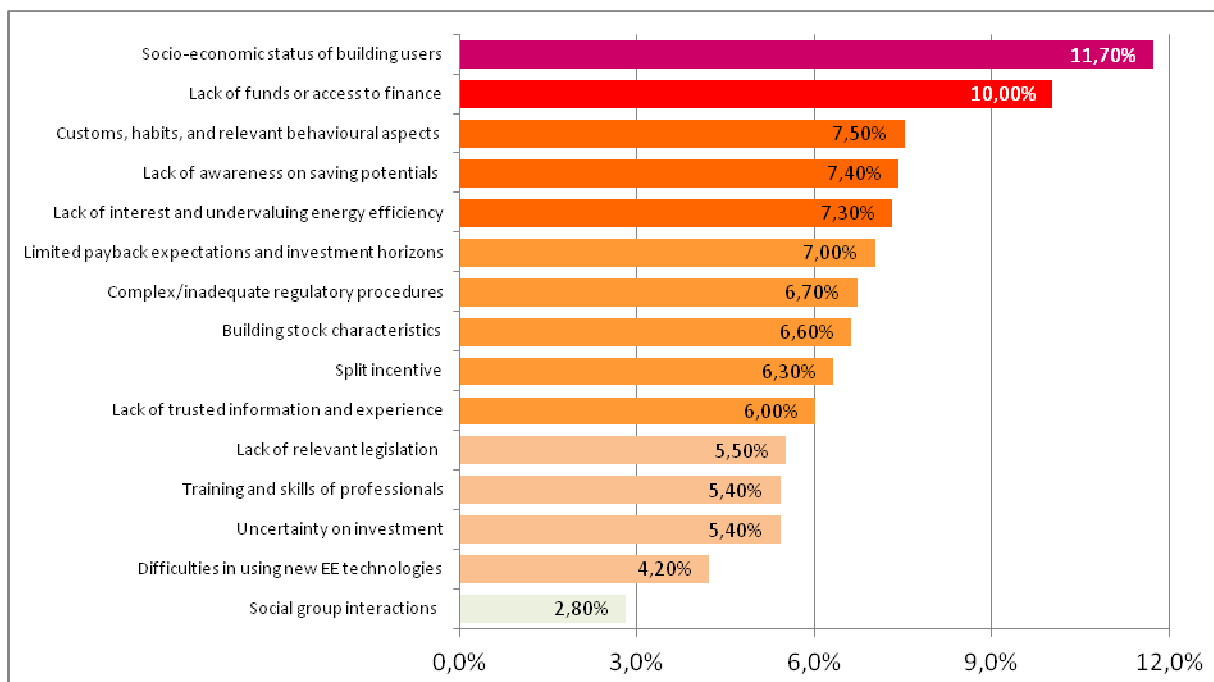
Given that the HERON survey is not based on a randomized and representative sample design, we cannot infer correlation neither causal implications between respondent groups and the different EE barriers listed in the questionnaire.

However, in order to identify the most important barriers in each sector as a whole, those barriers rated only as of “high relevance” were selected and summed to obtain the total number of respondents in all the eight countries for each question’s option in each sector. Then, a share for each answer’s option was calculated.

Table 8 reports the shares of “high relevance” choices in each question’s option. Accordingly, the two most important barriers in the building sector are constituted by:

- Socio-economic status of building users, which represents 11,7% of the total grade options chosen;
- Lack of funds or access to finance, lack of financial incentives, high capital costs and financial risk, which represents a 10% of the total grade options chosen.

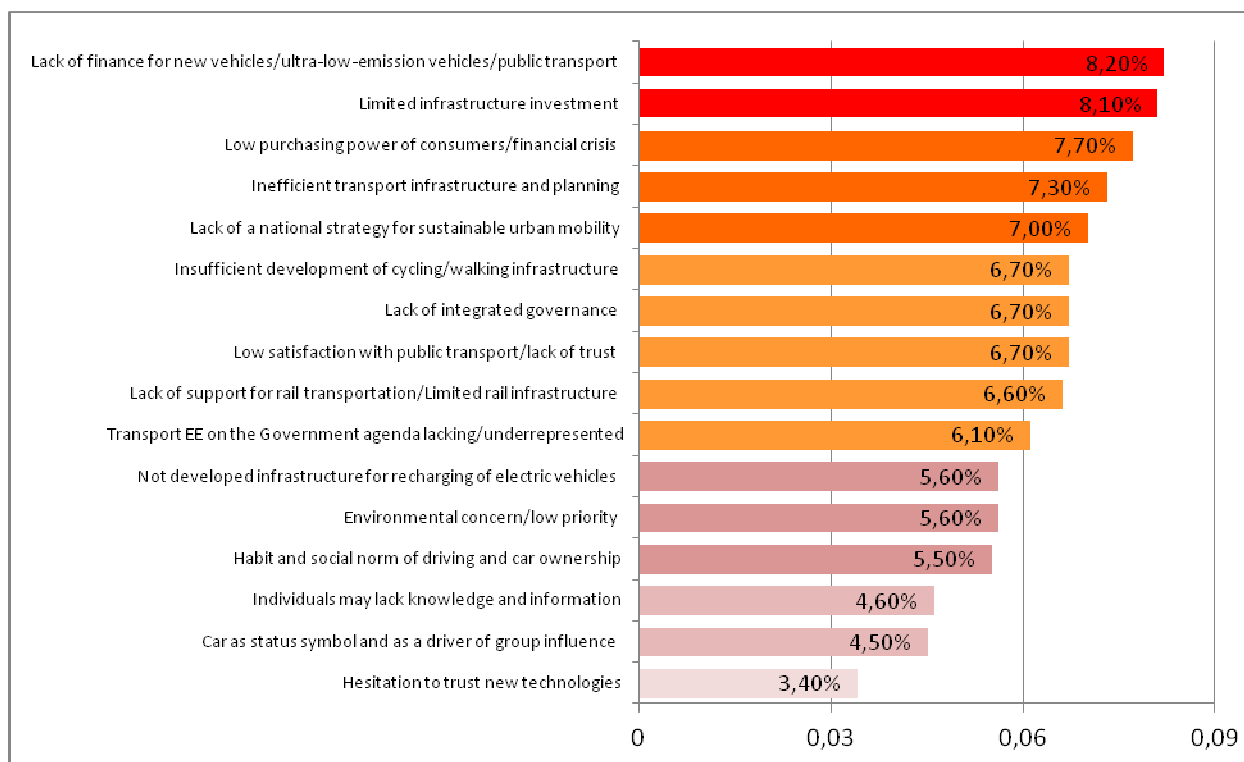
**Table 8: Share of "high relevance" choices in each question's option in the building sector**



For the transport sector, Table 9 reports the shares of “high relevance” choices in each question’s option. Accordingly, the two most important barriers are constituted by:

- Lack of finance for new vehicles/ultra-low-emission vehicles/public transport, which corresponds to 8,20% of the total grade options choosen;
- Limited infrastructure investment, which covers the 8,10% of the total grade options choosen.

**Table 9: Share of "high relevance" choices in each question's option in the transport sector**



The lack of finance therefore is confirmed as a key barrier to an effective implementation of energy efficiency policies in both sectors across all the HERON partner countries.

## CONCLUSIONS

This report presents the key results from the questionnaire-based online survey performed by HERON partners to obtain from experts and stakeholders a rating of barriers to energy efficiency policies in the building and transport sectors in their respective countries and policy recommendations to overcome them.

While the detailed pictures for the rating obtained by each barrier across all HERON partner countries and in each country are included in Appendix I, this last paragraph highlights the main conclusions of the overall analysis.

The economic aspects, related to the lack of funding, access to finance, lack of financial incentives, high capital costs and financial risk, emerge as a key barrier to both sectors in all partner countries. Socio-cultural and behavioural aspects seem of greater importance in the building rather than in the transport sector. For transport, other key barriers refer mainly to institutional, governance and planning dimensions.

It is not in the scope of this report to present a systematic and statistically representative mapping of the most important barriers, nor to provide country-specific recommendations on policies that could be implemented to overcome these barriers. Nevertheless general suggestions for the building sector, also based on inputs provided by respondents, may call for more ambitious policies and mandatory requirements for energy efficiency in this sector, to be accompanied by specific legislative and financial support as well as educational and awareness policies for all actors involved, from the building owners to tenants to professionals.

For the transport sector, general policy recommendations may call for a more integrated approach to planning, that should take into account several transport modes and their specificities and deliver an overall sustainable mobility strategy backed by clear priorities. Also an increased attention to the overall costs and benefits of different transport modes – not only private but also social and environmental ones – should be further provided, as a knowledge base to better orientate policies and behaviours of travellers and logistics operators.

In general, the results of the survey call upon the need to further explore the behavioural and cultural dimensions of EE policies both in the building and the transport sector, also by targeting specifically consumers through dedicated surveys. The access to information related to incentive programs, new infrastructures and transport modes, and in general, to the existent policy tools aimed at promoting EE seems crucial for achieving more ambitious policy targets.





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## APPENDIX 1

### BUILDING SECTOR: ANALYSIS OF RESPONSES FOR EACH QUESTION

The following appendix includes the analysis of responses obtained from the questionnaire across the eight project countries for the building sector. Results are presented in the following way:

- **Text of the closed question** (aimed to obtain the rating of the barrier) in bold and list of barriers to be rated;
- **Answers to the closed question**, presented for each rated barrier by two spider graphs: the first graph presenting for each country the percentage of respondents providing a specific rating (high relevance, medium relevance, low relevance, no relevance, don't know); the second graph presenting the aggregated percentage per rating; the graphs are followed by a brief written comment;
- **Text of the open question** (aimed to map additional barriers for the specific sector/type of intervention/technology and ways to overcome them) in bold;
- **Answers to the open question**, presented by a written text.

This format is followed for all the sub-sections of the building sector section of the questionnaire:

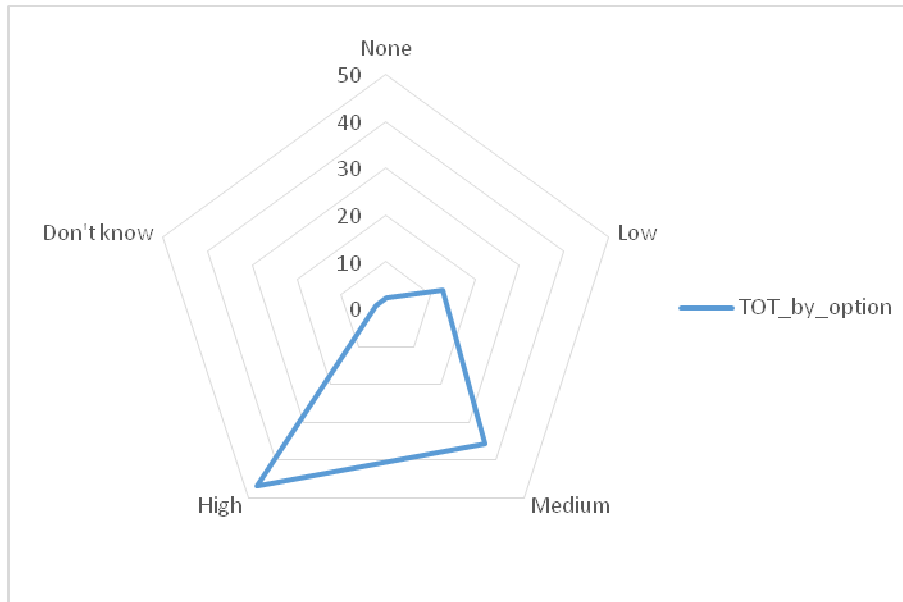
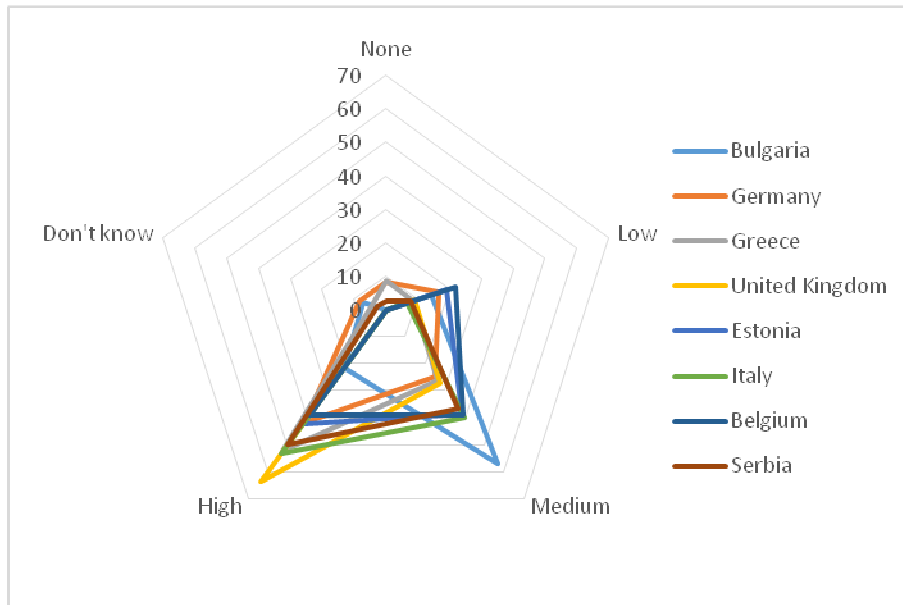
- a. **General questions (referred to the buildings sector in general);**
- b. **Barriers limiting interventions for building fabric upgrade;**
- c. **Barriers limiting the adoption of heat pumps;**
- d. **Barriers limiting the adoption of LEDs;**
- e. **Barriers limiting the adoption of more efficient appliances (with energy class A+++ and A++);**
- f. **Barriers limiting the adoption of Building Energy Management System (BEMS) and building automation systems.**

**Question 1: Please rate the importance of the following barriers to the implementation of energy efficiency (EE) policies in the building sector of your country:**

- 1.16 Lack of interest and undervaluing energy efficiency (individuals may pay scarce attention to energy saving and its benefits)
- 1.17 Social group interactions (some individuals may negatively affect other consumers that are willing to invest in new EE technologies)
- 1.18 Socio-economic status of building users (some statuses, such as unemployment, affect the individual capacity to invest in EE. In general, individuals with negative economic conditions have fewer possibilities to sustain EE investments)
- 1.19 Lack of funds or access to finance, lack of financial incentives, high capital costs and financial risk (individuals with more risk aversion may be less prone to invest in EE).
- 1.20 Limited payback expectations and investment horizons (individual may think that the payback period for a given EE investment is too long and uncertain)
- 1.21 Uncertainty on investment (individuals may be more or less sensitive to the uncertainty due to the return on their EE investments)
- 1.22 Lack of trusted information and experience (individuals may not trust who provides them with information on energy savings)
- 1.23 Lack of awareness on saving potentials (individuals may misperceive the benefits deriving from EE)
- 1.24 Difficulties in using new EE technologies (when EE technologies are provided with few user information, some individuals may be less capable to deal with them)
- 1.25 Training and skills of professionals (professionals and sellers of EE goods may have poor expertise)
- 1.26 Customs, habits, and relevant behavioural aspects (i.e. it may be difficult to change consumer's habits such as keeping the windows open when the heating is on or sleeping with TV left on)
- 1.27 Lack of relevant legislation (legislation may not be sufficiently developed to support the adoption of EE technologies)
- 1.28 Building stock characteristics (there may be some technical difficulties in installing EE technologies, due to the characteristics of different buildings, including building age)
- 1.29 Split incentive (landlords may not invest in energy efficiency because their tenants pay the energy bills, or conversely tenants have no incentive to reduce their energy use as their landlord pays the bill)
- 1.30 Complex/inadequate regulatory procedures (individuals who want to benefit from EE investments may find bureaucratic procedures too complicated)

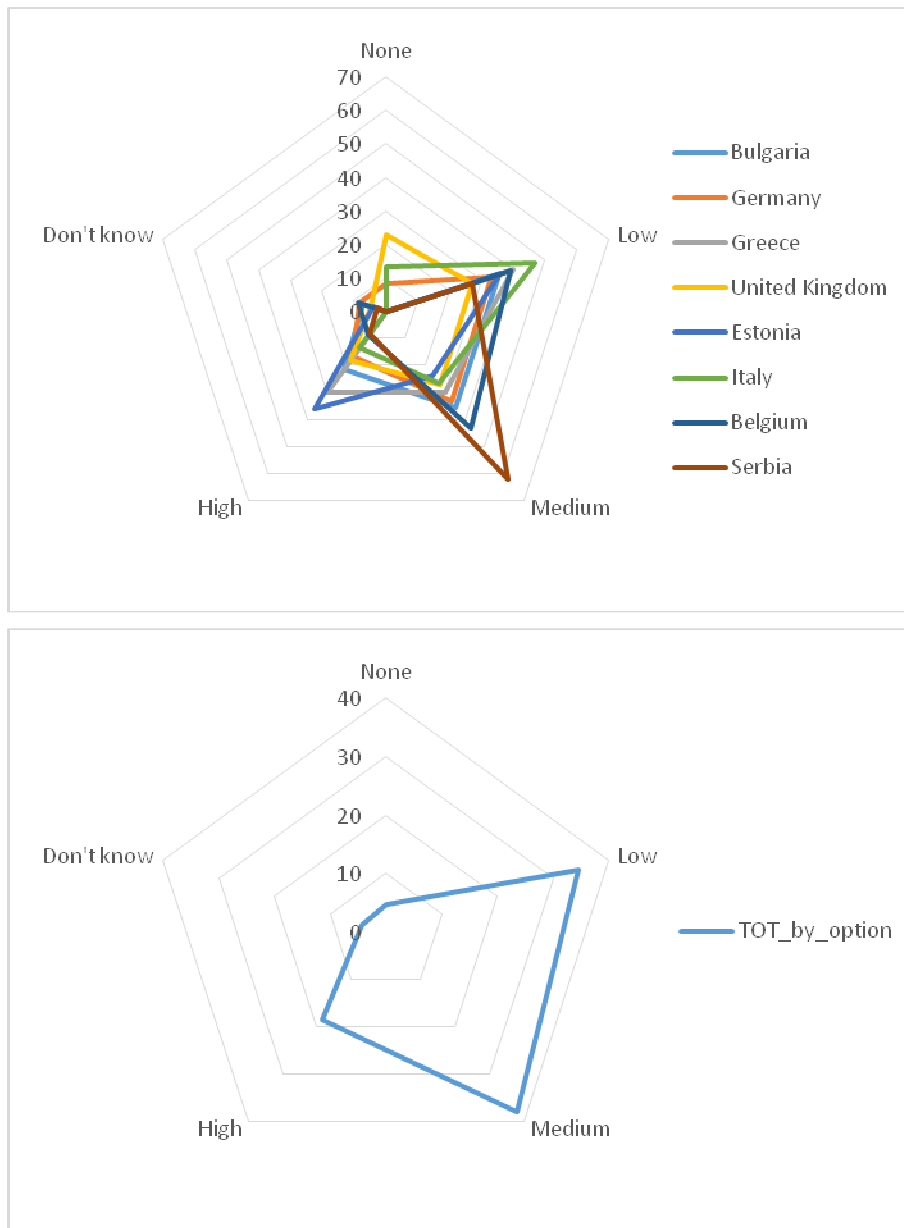
**Question 1: Please rate the importance of the following barriers to the implementation of energy efficiency (EE) policies in the building sector of your country.**

1.1 Lack of interest and undervaluing energy efficiency (individuals may pay scarce attention to energy saving and its benefits)



Lack of interest and undervaluing EE are rated as barriers of high-medium importance by respondents. They are rated as being of high importance by a relevant percentage of respondents from United Kingdom, Italy, Greece, Serbia, Estonia, Germany (over 40%), and as being of medium importance by a relevant percentage of respondents from Bulgaria, Italy, Belgium, Estonia and Serbia (over 35%). Only in one country, Belgium, the barrier is rated as low by more than 20% of respondents.

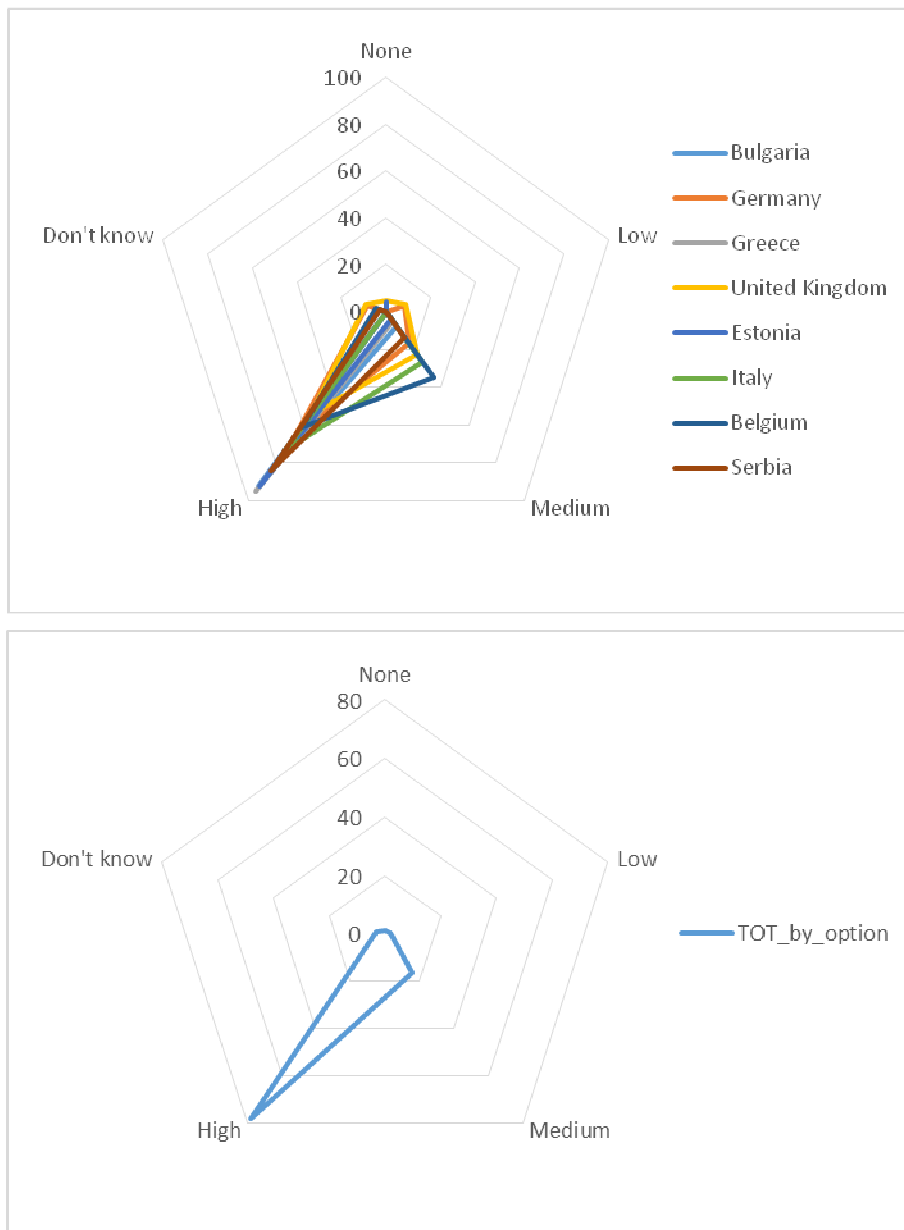
1.2 Social group interactions (some individuals may negatively affect other consumers that are willing to invest in new EE technologies).



Social group interactions are rated as barriers of medium-low importance by respondents. They are rated as being of medium importance by a relevant percentage of respondents from Bulgaria, Germany, Greece, Belgium and Serbia (over 30%) and as being of low importance by a relevant percentage of respondents from Bulgaria, Germany, Greece, Estonia, Italy and Belgium (over 30%). For United Kingdom, more than 20% of respondents believe this barrier has no relevance at all.

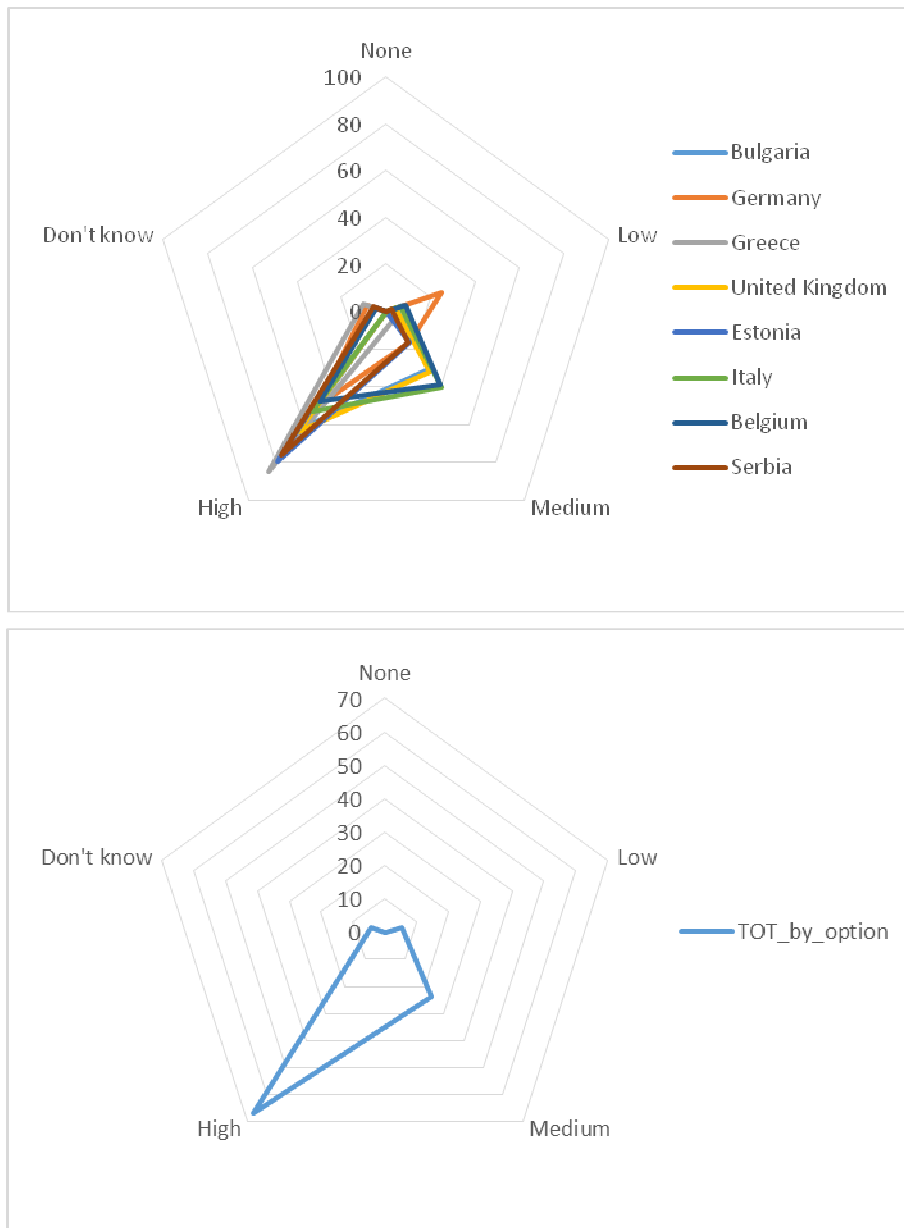
Only in three countries (Bulgaria, Greece, Estonia), the barrier is rated of high importance by more than 20% of respondents.

1.3 Socio-economic status of building users (some statuses, such as unemployment, affect the individual capacity to invest in EE. In general, individuals with negative economic conditions have fewer possibilities to sustain EE investments)



Socio-economic status of building users is rated as a barrier of high importance by respondents. It is rated as being of high importance by at least 50% of respondents for all countries, and for some countries (Bulgaria, Greece, Estonia, Serbia) by over 80% of respondents. For some countries (United Kingdom, Italy, Belgium), it is rated as of medium importance by at least 20% of respondents.

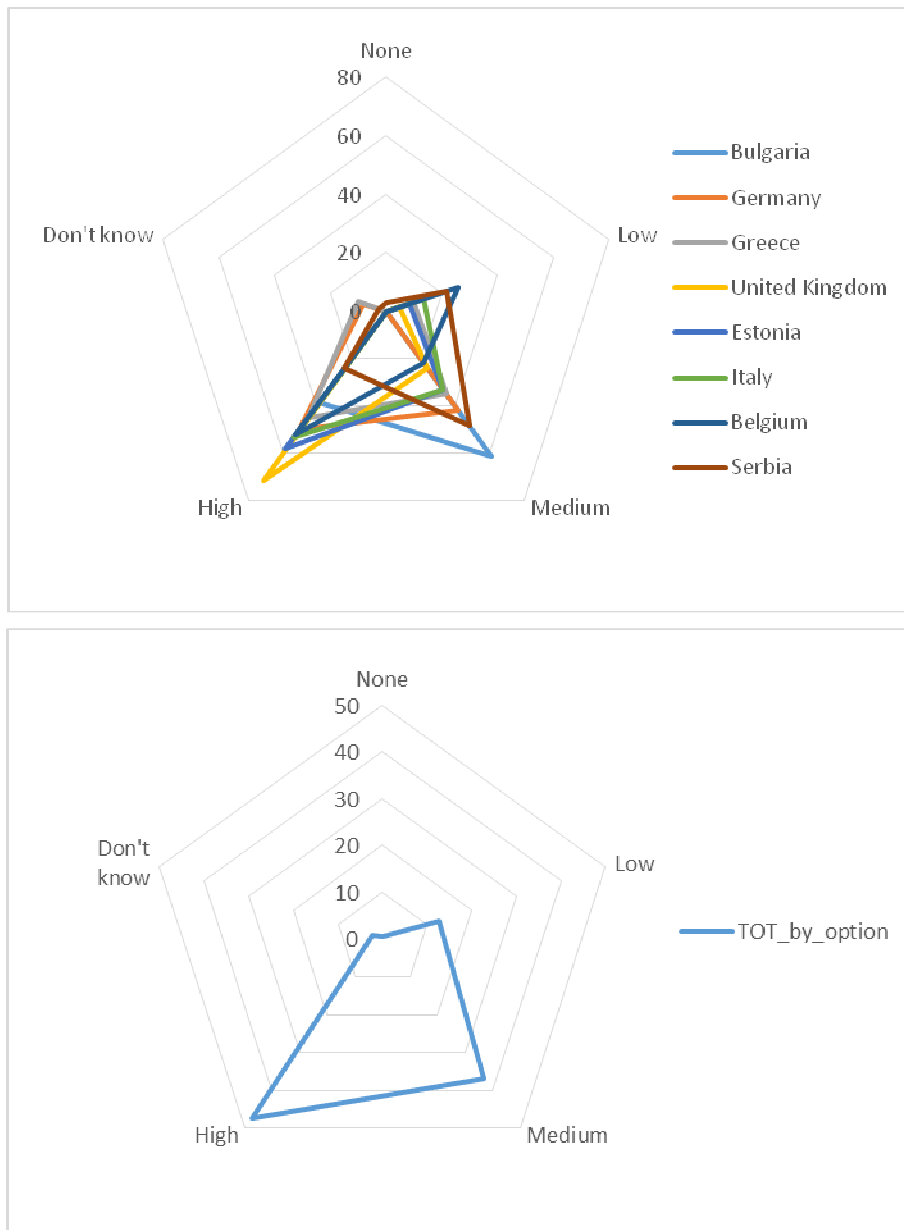
1.4 Lack of funds or access to finance, lack of financial incentives, high capital costs and financial risk (individuals with more risk aversion may be less prone to invest in EE).



Lack of funds and other funding-related factors are rated as barriers of high importance by respondents. They are rated as being of high importance by at least 50% of respondents for almost all countries (except Belgium) and for some countries (Greece, Estonia, Serbia) by over 70% of respondents. For some countries (Bulgaria, United Kingdom, Italy, Belgium), they are rated as of medium importance by at least 30% of respondents. For Germany only, they are rated of low importance by 25% of respondents.



1.5 Limited payback expectations and investment horizons (individual may think that the payback period for a given EE investment is too long and uncertain).

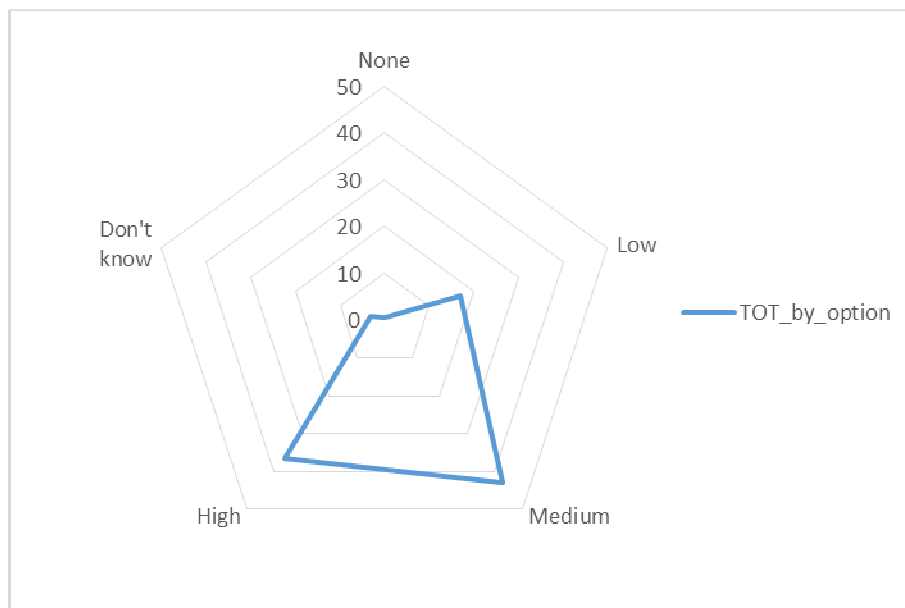
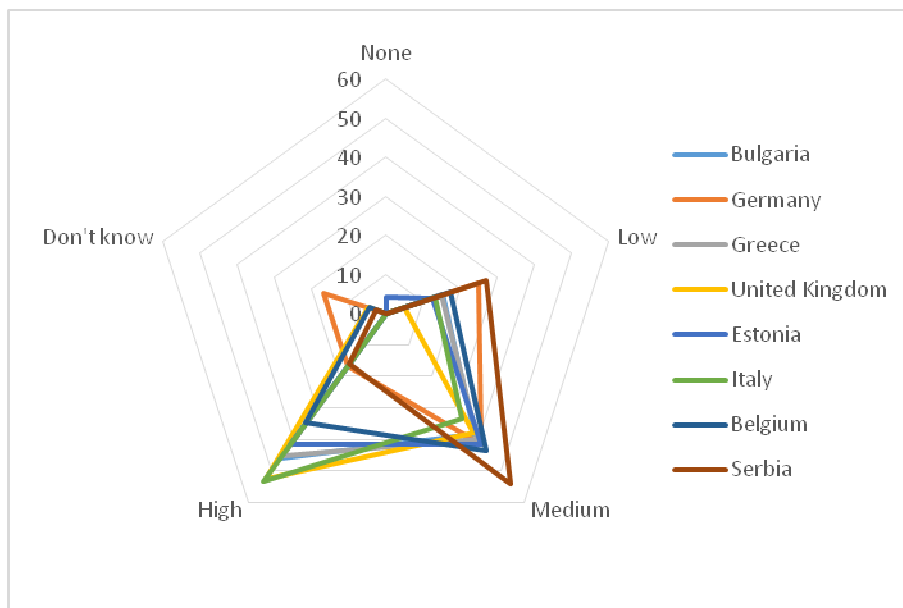


Limited payback expectations and investment horizons are rated as barriers of high-medium importance by respondents. They are rated as being of high importance by at least 50% of respondents for several countries (Germany, United Kingdom, Estonia, Italy, Belgium), and for United Kingdom by over 70% of respondents.

For some countries (Bulgaria, Germany, Serbia), they are rated as of medium importance by at least 40% of respondents (for Bulgaria, 61%).

For Belgium and Serbia only, they are rated of low importance by at least 20% of respondents.

1.6 Uncertainty on investment (individuals may be more or less sensitive to the uncertainty due to the return on their EE investments).

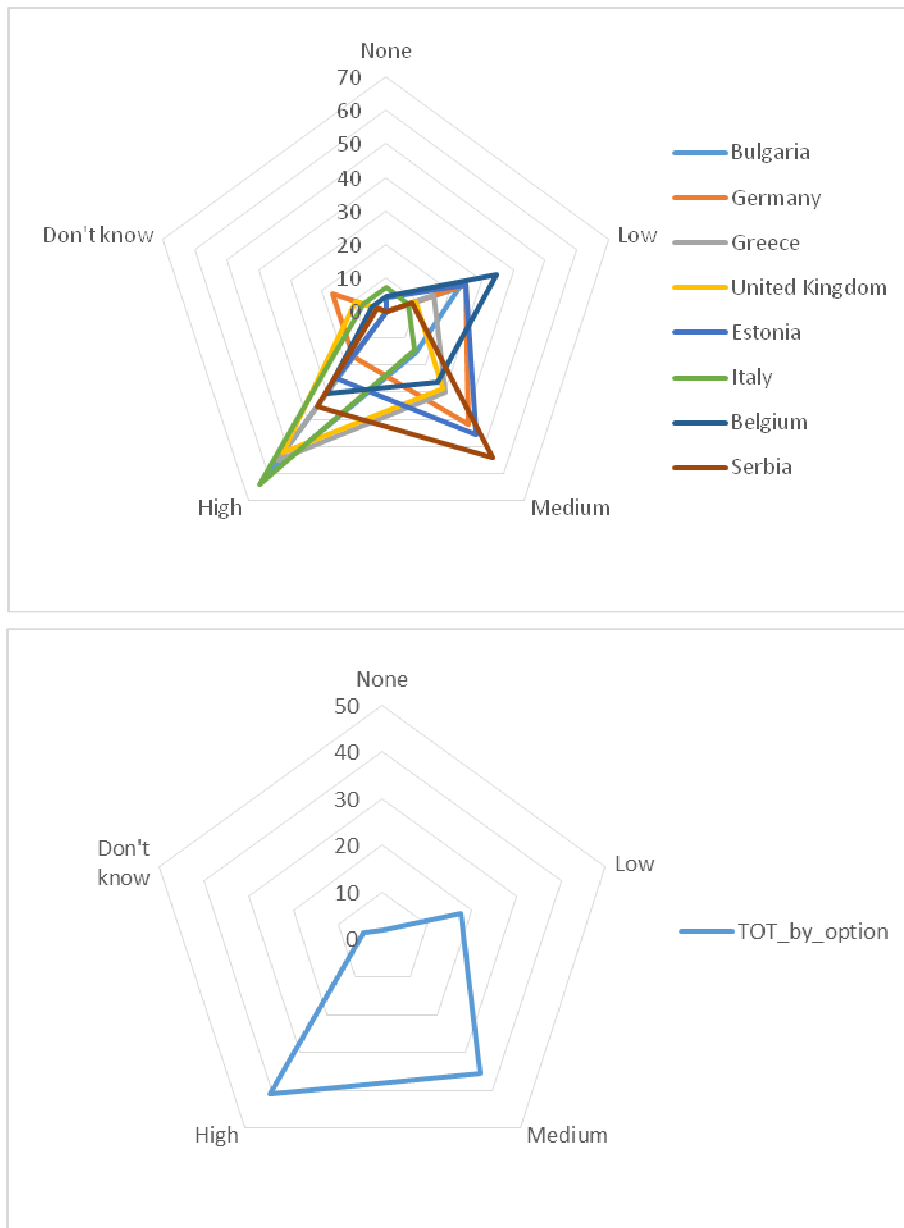


Uncertainty on investment is rated as a barrier of medium-high importance by respondents.

It is rated as being of medium importance by at least 40% of respondents for several countries (Germany, Greece, Estonia, Belgium, Serbia) and it is rated as high importance by at least 40% for Bulgaria, United Kingdom, Estonia, Italy.

For Germany and Serbia only, it is rated of low importance by at least 25% of respondents.

1.7 Lack of trusted information and experience (individuals may not trust who provides them with information on energy savings).

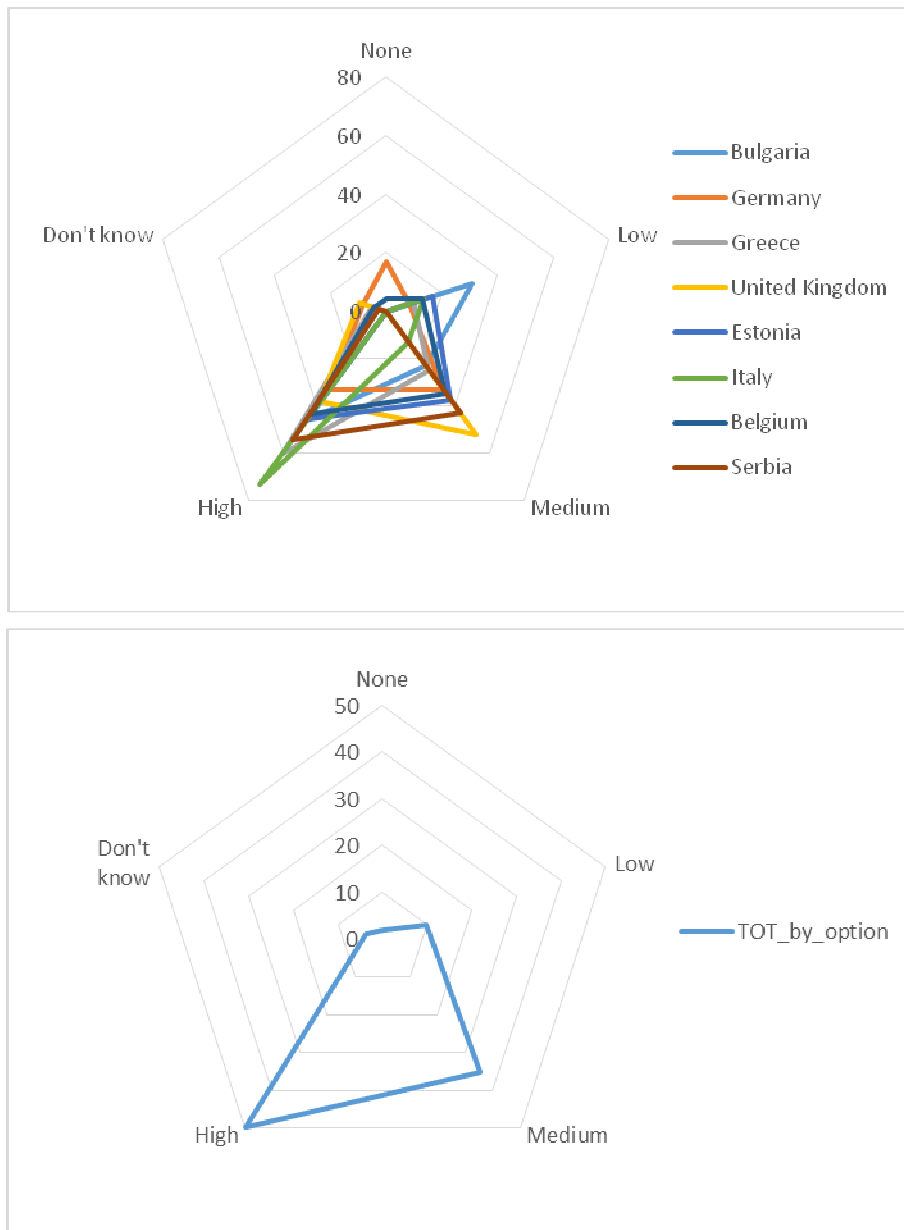


Lack of trusted information and experience is rated as a barrier of high-medium importance by respondents.

It is rated as being of high importance by at least 50% of respondents for several countries (Bulgaria, Greece, United Kingdom, Italy), and it is rated as medium importance by at least 40% for Germany, Estonia and Serbia.

For several countries also (Bulgaria, Germany, Estonia, Belgium), it is rated of low importance by at least 20% of respondents (35% for Belgium).

1.8 Lack of awareness on saving potentials (individuals may misperceive the benefits deriving from EE).

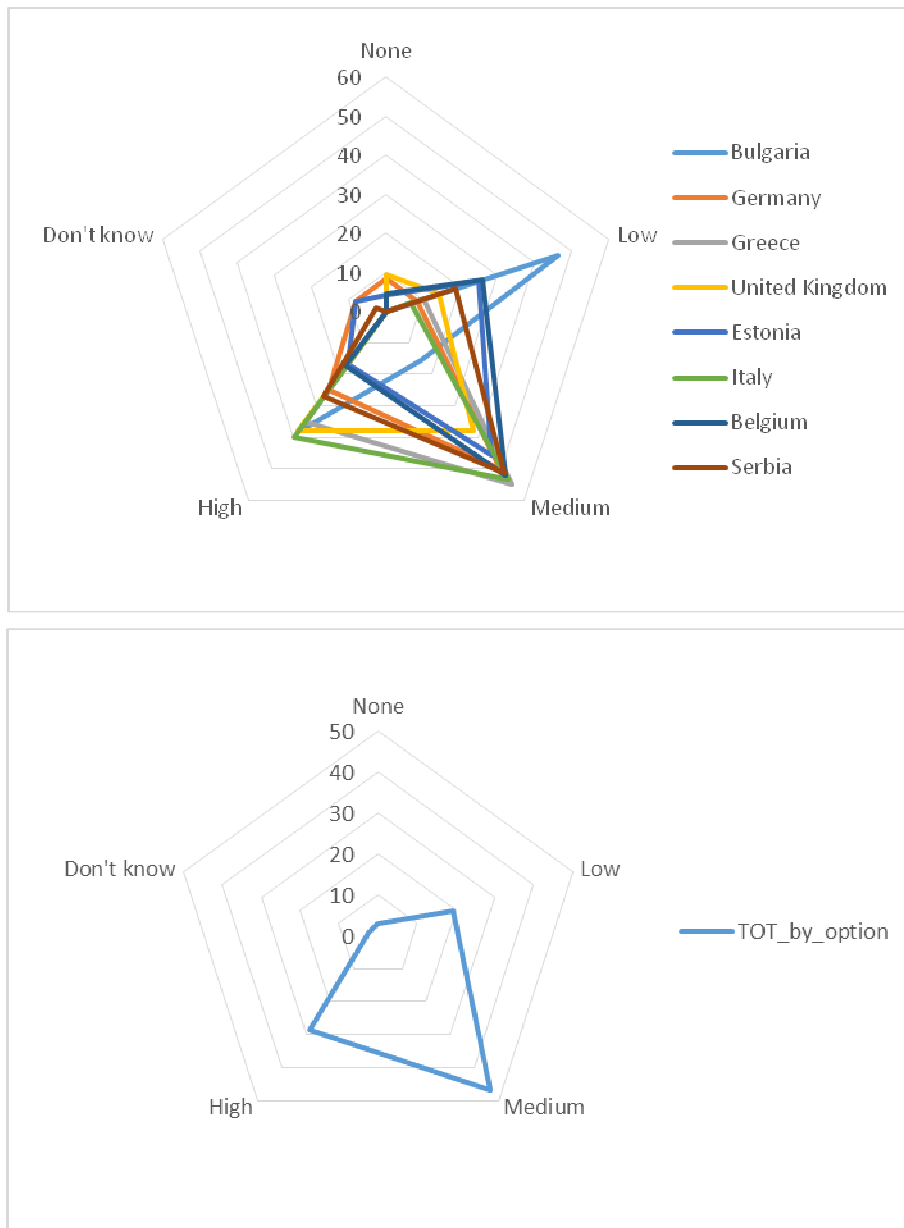


Lack of awareness on savings potential is rated as a barrier of high-medium importance by respondents.

It is rated as being of high importance by at least 40% of respondents for several countries (Bulgaria, Greece, Estonia, Italy, Belgium, Serbia), for Italy over 73%, and it is rated as medium importance by at least 30% for Germany, United Kingdom, Estonia, Belgium, Serbia.

For Bulgaria only, it is rated of low importance by 30% of respondents.

1.9 Difficulties in using new EE technologies (when EE technologies are provided with few user information, some individuals may be less capable to deal with them).

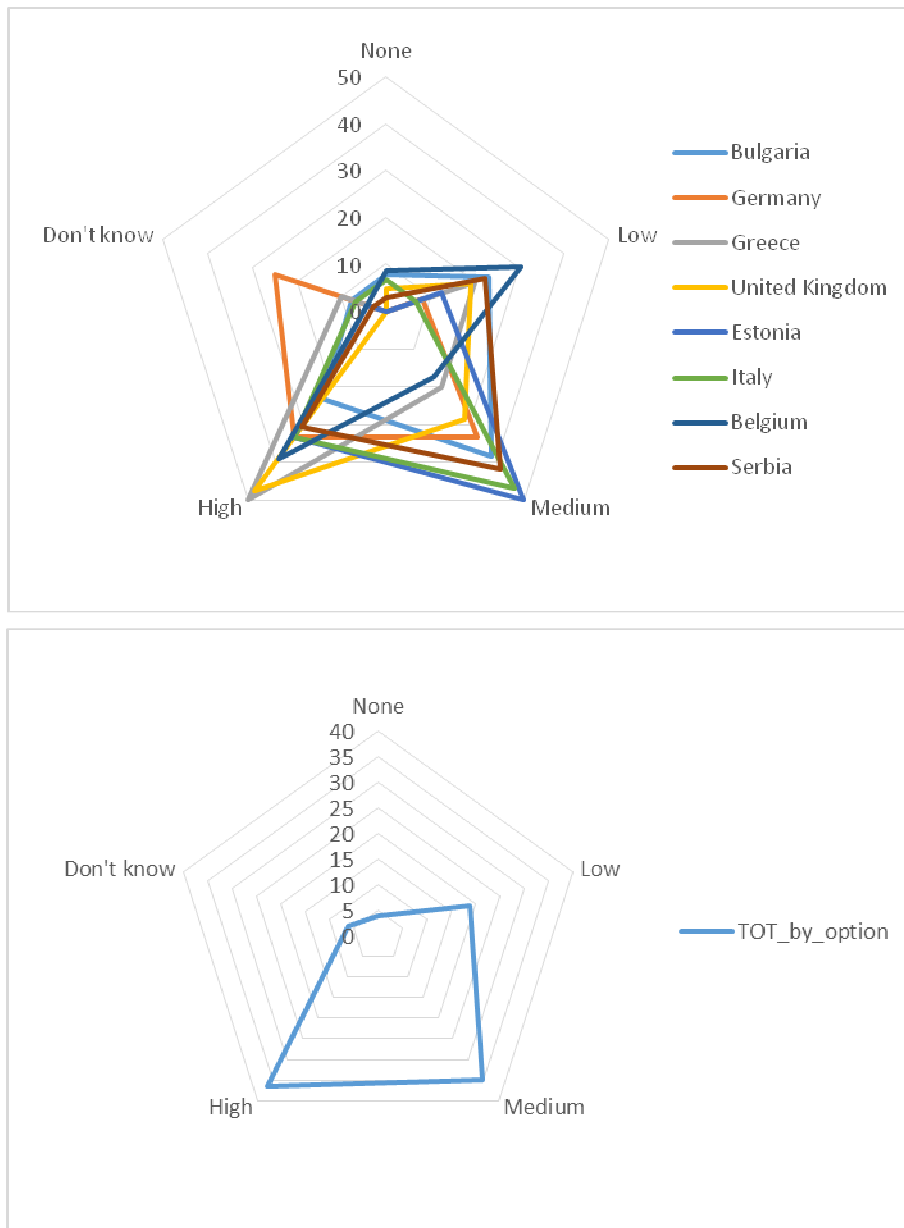


Difficulties in using new EE technologies are rated as a barrier of medium importance by respondents.

They are rated as being of medium importance by at least 50% of respondents for several countries (Germany, Greece, Italy, Belgium, Serbia) and it is rated as high importance by at least 35% for Bulgaria, Greece, United Kingdom, Italy.

For Bulgaria and Belgium only, it is rated of low importance by at least 25% of respondents (for Bulgaria by 46%).

1.10 Training and skills of professionals (professionals and sellers of EE goods may have poor expertise).



Training and skills of professionals are rated as a barrier of high-medium importance by respondents, even if several peculiarities emerge at country level.

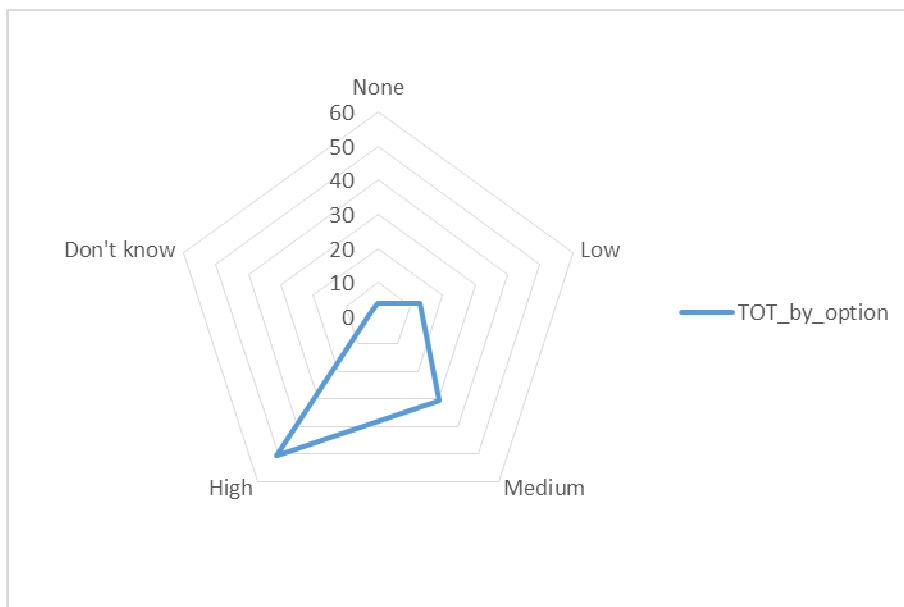
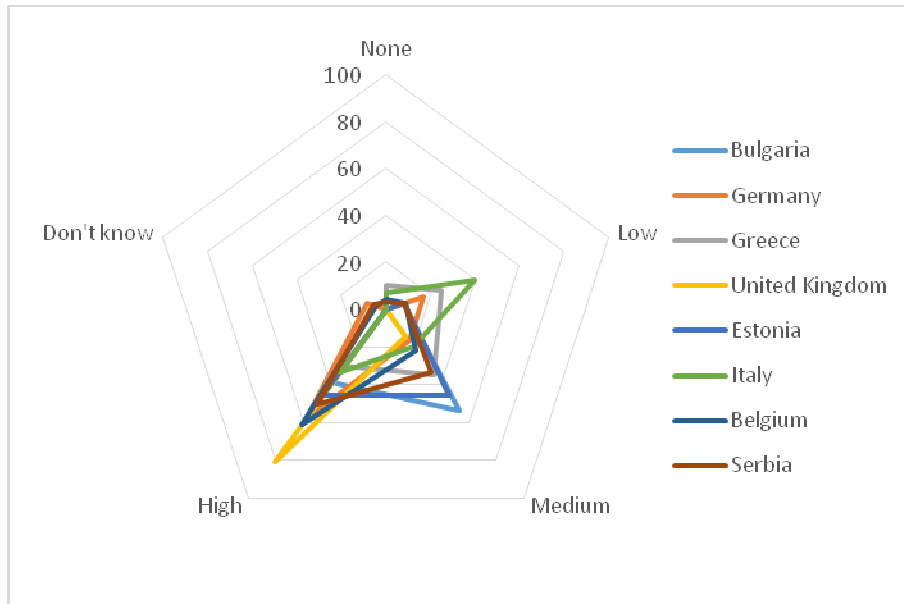
They are rated as being of high importance by at least 40% of respondents only for two countries (Greece, United Kingdom) and by at least 30% for Germany, Estonia, Italy, Belgium and Serbia.

They are rated as medium importance by at least 40% for Estonia, Italy and Serbia.

They are rated as low importance by at least 20% for several countries (Bulgaria, Greece, Belgium, Serbia), and for Belgium in particular by 30%.

For Germany only, 25% of respondents are not able to provide an answer to this question.

1.11 Customs, habits, and relevant behavioural aspects (i.e. it may be difficult to change consumer’s habits such as keeping the windows open when the heating is on or sleeping with TV left on).



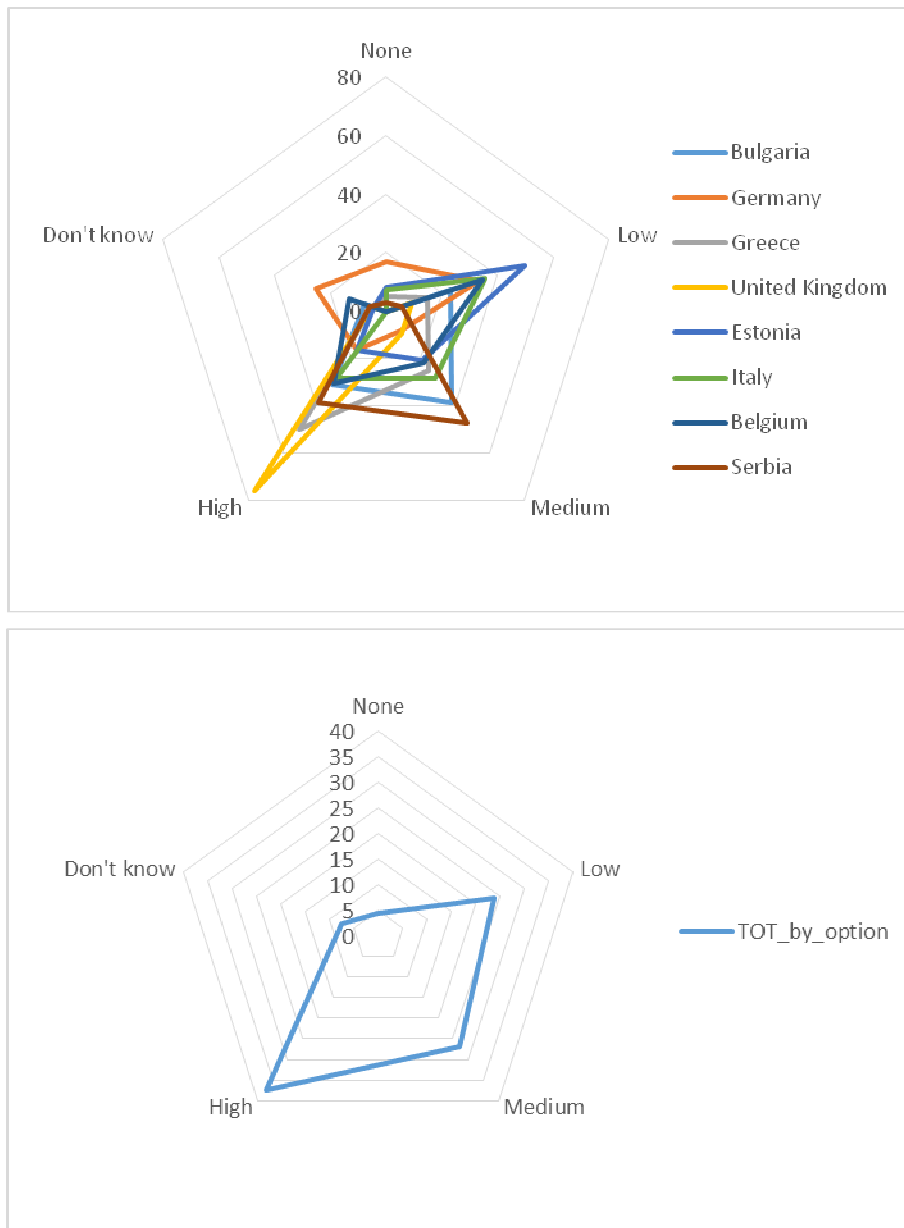
Customs, habits, and relevant behavioural aspects are rated as a barrier of high importance by respondents, even if several peculiarities emerge at country level.

They are rated as being of high importance by at least 50% of respondents for half of partner countries (Germany, United Kingdom, Belgium, Serbia), and for United Kingdom in particular by 81%.

They are rated as medium importance by at least 30% also for half of countries (Bulgaria, Greece, Estonia, Serbia), and for Bulgaria in particular by 53%.

They are rated as low importance by at least 25% for Greece and Italy (40% for Italy).

1.12 Lack of relevant legislation (legislation may not be sufficiently developed to support the adoption of EE technologies).



Lack of relevant legislation is rated as a barrier of high importance by respondents, even if several peculiarities emerge at country level.

It is rated as being of high importance at least by 50% by only two countries (Greece, United Kingdom), and in particular by 76% for United Kingdom.

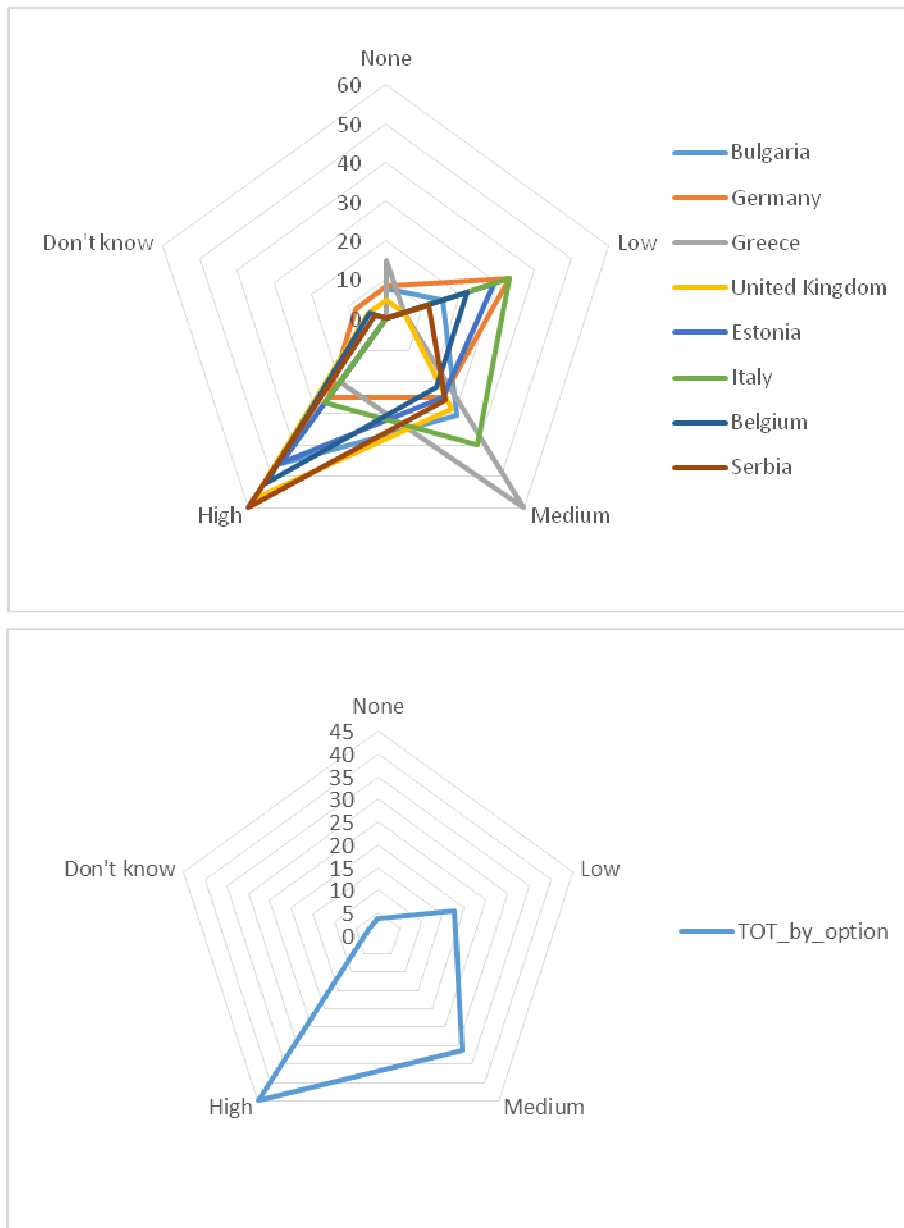
They are rated as medium importance by at least 35% of respondents by only two countries (Bulgaria, Serbia), and by at least 20% by several (Greece, Estonia, Italy, Belgium).

They are rated as low importance by at least 30% in half of partner countries (Germany, Estonia, Italy, Belgium).

For Germany only, 25% of respondents are not able to provide an answer to this question.



1.13 Building stock characteristics (there may be some technical difficulties in installing EE technologies, due to the characteristics of different buildings, including building age).



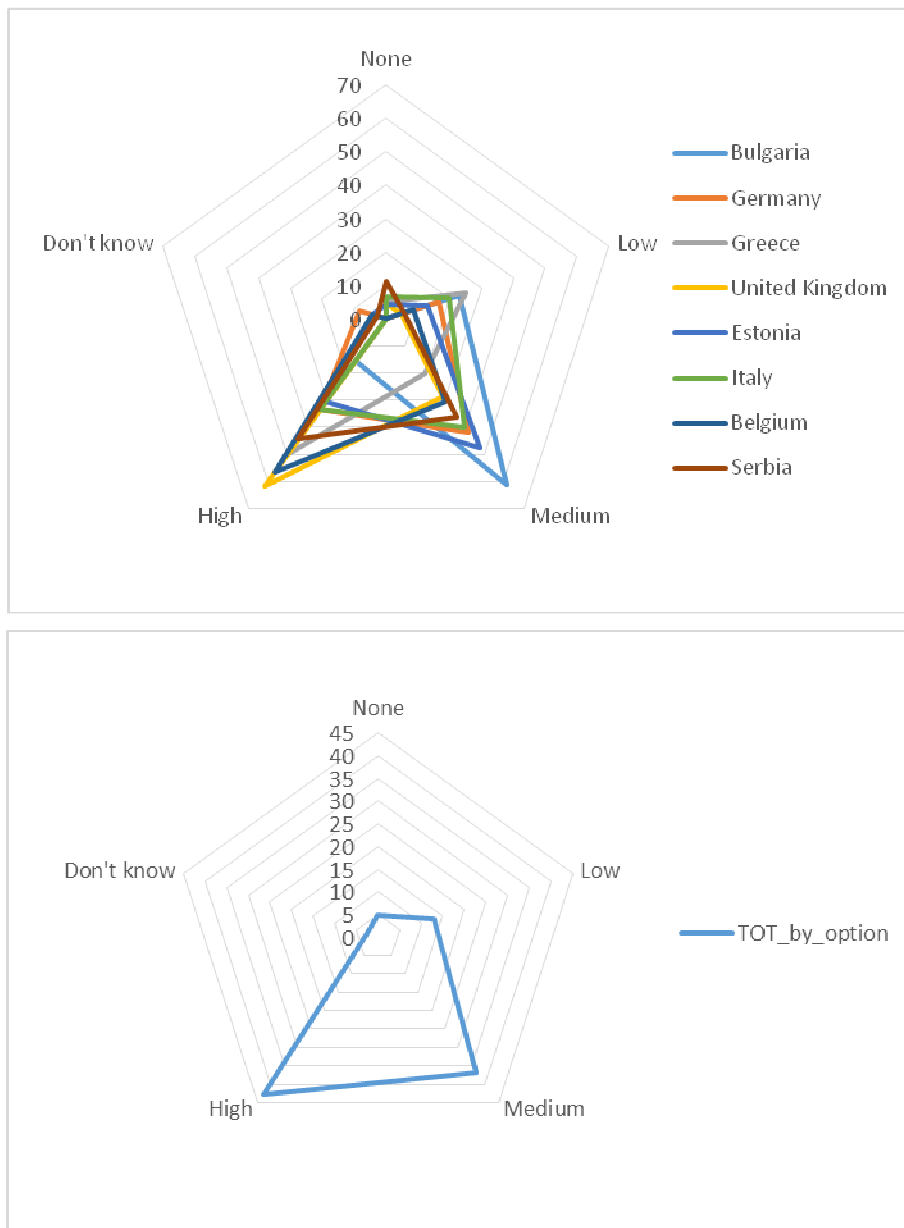
Building stock characteristics are rated as a barrier of high importance by respondents, even if relevant peculiarities emerge at country level.

It is rated as being of high importance at least by 45% of respondents by several countries (Bulgaria, United Kingdom, Estonia, Belgium, Serbia).

They are rated as medium importance by 40% and 60% of respondents respectively of Italy and Greece, and by at least 25% of several countries (Bulgaria, Germany, Estonia and Serbia).

They are rated as low importance by at least 20% in half of partner countries (Germany, Estonia, Italy, Belgium).

1.14 Split incentive (landlords may not invest in energy efficiency because their tenants pay the energy bills, or conversely tenants have no incentive to reduce their energy use as their landlord pays the bill).

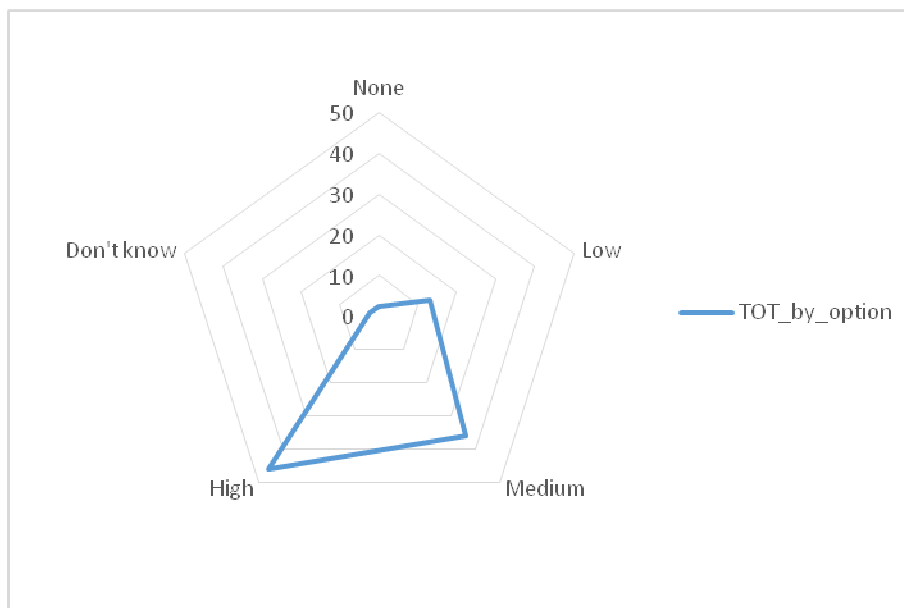
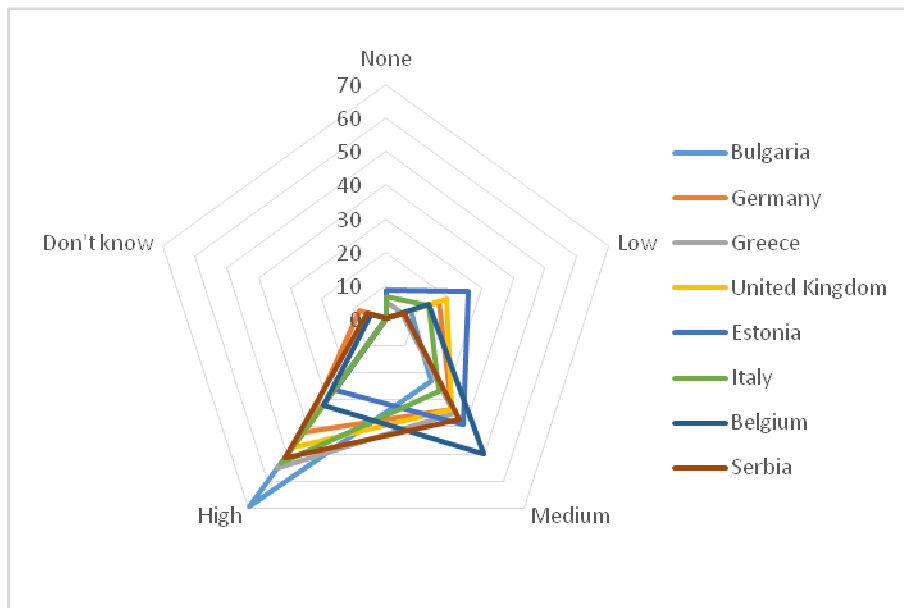


Split incentives are rated as a barrier of high-medium importance by respondents, even if relevant peculiarities emerge at country level.

They is rated as being of high importance by at least 45% of half partner countries (Greece, United Kingdom, Belgium, Serbia), and as medium importance by at least 40% for also half of partner countries (Bulgaria, Germany, Estonia, Italy).

They are rated as low importance by at least 20% in three partner countries (Bulgaria, Greece, Italy).

1.15 Complex/inadequate regulatory procedures (individuals who want to benefit from EE investments may find bureaucratic procedures too complicated).



Complex/inadequate regulatory procedures are rated as a barrier of high-medium importance by respondents, even if relevant peculiarities emerge at country level.

They are rated as being of high importance by at least 50% of respondents for half of partner countries (Bulgaria, Greece, Italy, Serbia), in particular for Bulgaria by 69%.

They are rated as medium importance by at least 30% for several partner countries (Germany, United Kingdom, Estonia, Belgium, Serbia), in particular for Belgium by 50%.

They are rated as low importance by at least 20% in United Kingdom and Estonia.

**Open question B1: To the best of your knowledge, what are the other barrier/s that negatively affect the implementation of EE policies in the building sector? And in what ways?**

In their open answers, almost half of respondents mentioned **institutional** barriers as relevant factors affecting the implementation of EE policies in the building sector. These barriers mainly referred to: coordination problems among involved actors and institutions; lack and defaults in existing policies and regulations, including combinations of contradictory actions into policy packages or calculation methodologies in place which do not effectively push towards energy efficiency; lack of leadership or vision by the Government. For Belgium, a respondent highlighted that the current framework for spatial planning does not include specific incentives for very energy efficient new buildings or retrofits. For Estonia, a respondent reported a lack of an effort to “lead by example” from public institutions (from the European to the local ones) in adopting virtuous energy efficiency actions. For UK, two respondents highlighted the lobbying influence from industries in conflict with EE policies implementation.

Looking at the **economic** barriers, several respondents highlighted the key role played by the lack of incentives; the high costs of interventions; difficulties to access capital. For Serbia in particular, a respondent highlighted the relevance of energy poverty in the country, which is higher than Western European countries and is expected to grow in the future.

**Educational** aspects mainly referred to the lack of sufficient communication and information to citizens, as well as the lack of training and competences in professionals figures involved in EE. For UK, a respondent reported in particular a low awareness about the role of EPC/ESCOs. For Estonia, the participation of scientists which are not in favour of innovative RE solutions in public presentations on the topic is seen as acting a negative influence in the perception of these solutions by the public. For Belgium, a critical aspect in the training programs is reported, since traditional building techniques rather than new techniques are still being taught.

**Cultural** aspects mainly regarded low environmental awareness and low priority assigned to EE in investment decisions and low trust in EE professionals. For Italy, a respondent reported that some subjects that relate with owners (e.g. building administrators, small plants management companies) have scarcely transparent commercial/management policies.

Finally, **social** aspects mainly referred to the complex decision-making procedures in condominiums and the low income of old-aged people.

Some respondents also suggested **policies** to address these barriers and advance with the implementation of EE policies in the building sector. These are listed below:

- Transfer of ownership of housing to younger people could induce an improvement in the energy performance of properties (Belgium);
- Increasing legislative support of policies, namely making some provisions mandatory (UK);
- The government has to make sure that the need for energy efficiency reaches home owners more clearly and more effectively (Belgium);

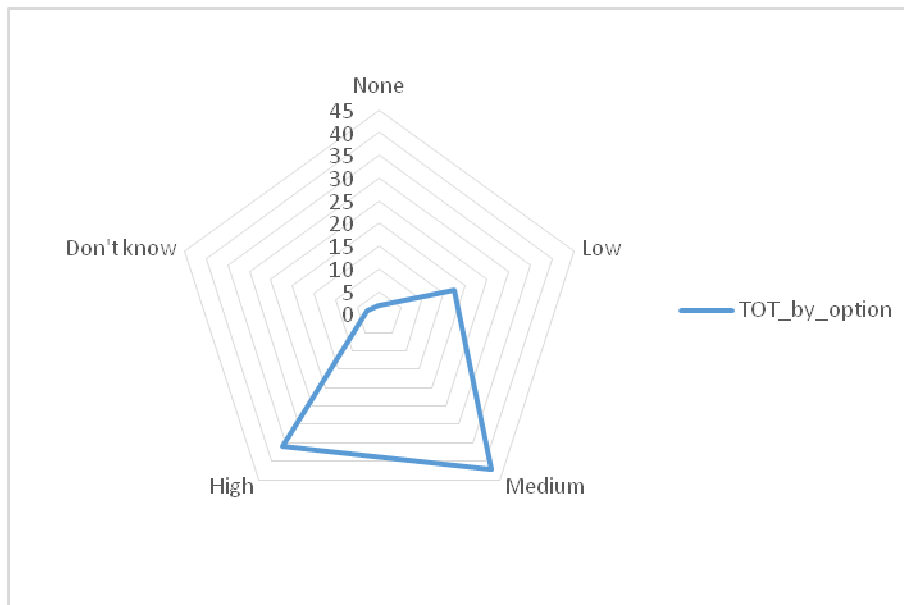
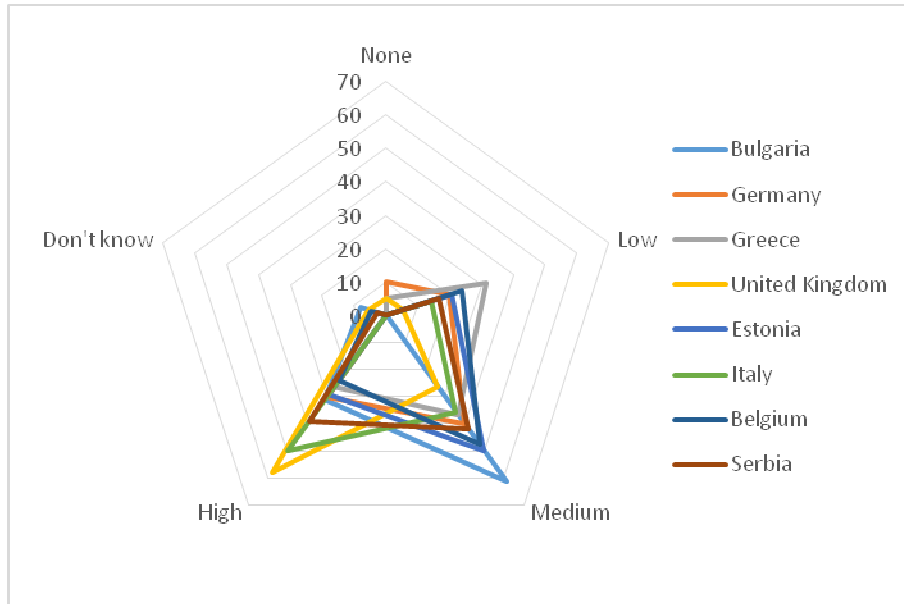
- Define a clear path with support but also obligations for existing buildings; raise the level and depth of renovations (Belgium);
- Make more promotion and presentation of the positive effects of EE measures in order to reach the awareness of citizens, and to increase the percentage of implementation of measures in accordance with the possibilities of the population which depends of other conditions in society (state policy, legislation, etc.). (Serbia);
- Provide more incentives for renovations (Serbia);
- Foresee specific educational profiles with competences on EE in the educational system (Serbia).

**Question 2: According to your expertise, to what extent are the following barriers relevant in limiting interventions for building fabric upgrade?**

- 2.6. Lack of interest and undervaluing energy efficiency benefits; social group interactions (some individuals may negatively affect consumers that are willing to invest in new EE technologies).
- 2.7. Lack of funds or access to finance, lack of financial incentives, high capital costs and financial risk.
- 2.8. Lack of trusted information and experience (individuals may not trust who provide them with information on energy savings); difficulties in knowing new EE technologies; lack of expertise for professionals and technicians.
- 2.9. Customs, habits, and relevant behavioural aspects (it may be difficult to change consumer's habits such as leaving the windows open when the heating is on).
- 2.10. Lack of specific legislation; aged building stock and difficulties in installing EE technologies; split incentive (landlords may not invest in energy efficiency because their tenants pay the energy bills)

**Question 2: According to your expertise, to what extent are the following barriers relevant in limiting interventions for building fabric upgrade?**

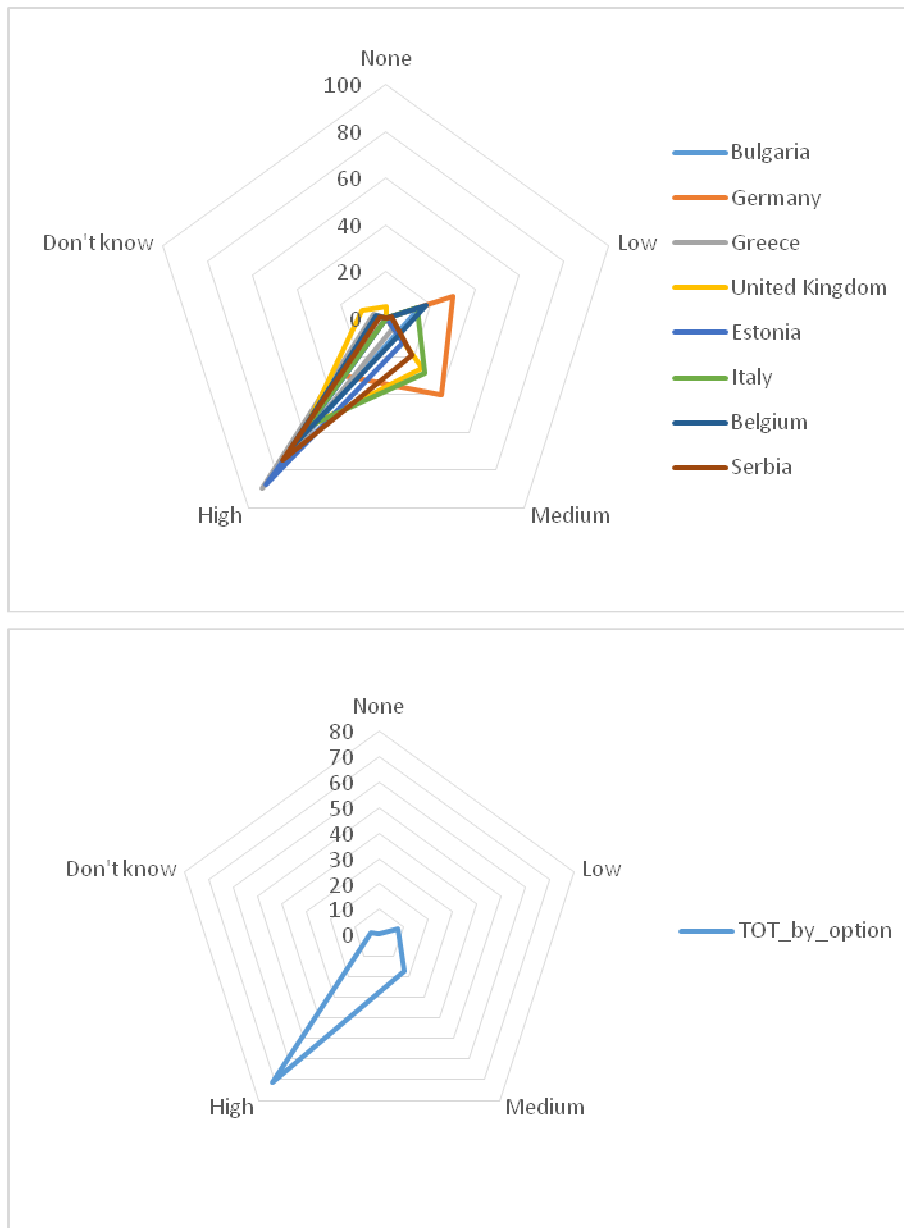
2.1 Lack of interest and undervaluing energy efficiency benefits; social group interactions (some individuals may negatively affect consumers that are willing to invest in new EE technologies).



This group of barriers is rated of medium-high importance by respondents concerning building fabric upgrades, even if relevant peculiarities emerge at country level.

It is rated as being of high importance by at least 50% of respondents only in two countries (United Kingdom, Italy) and by at least 30% in four partner countries (Bulgaria, Germany, Estonia, Serbia). It is rated as being of medium importance by at least 40% of respondents in several partner countries (Bulgaria, Germany, Estonia, Belgium, Serbia), in particular by 61% for Bulgaria. It is rated as low importance by at least 20% in half partner countries (Germany, Greece, Estonia, Belgium).

2.2 Lack of funds or access to finance, lack of financial incentives, high capital costs and financial risk.



This group of barriers is rated of high importance by respondents concerning building fabric upgrades.

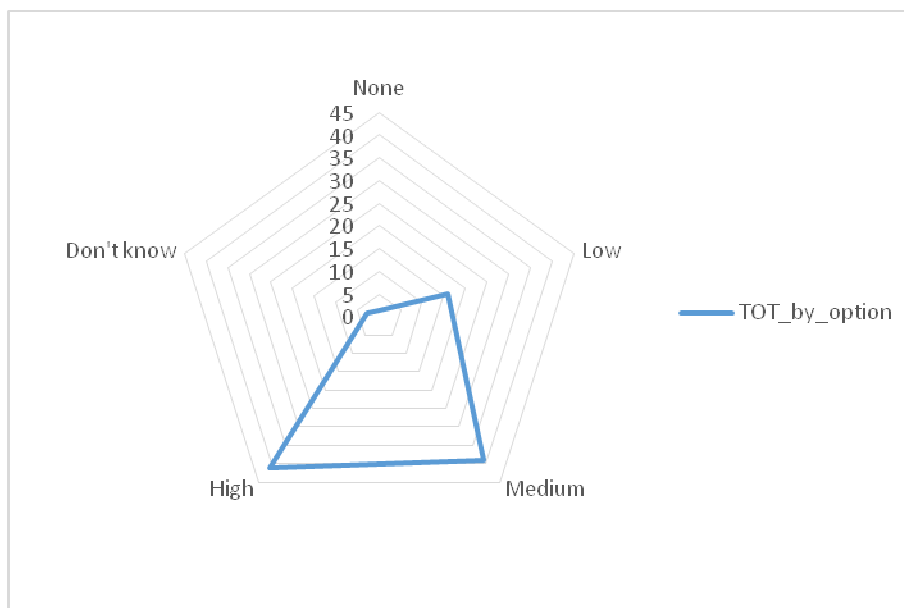
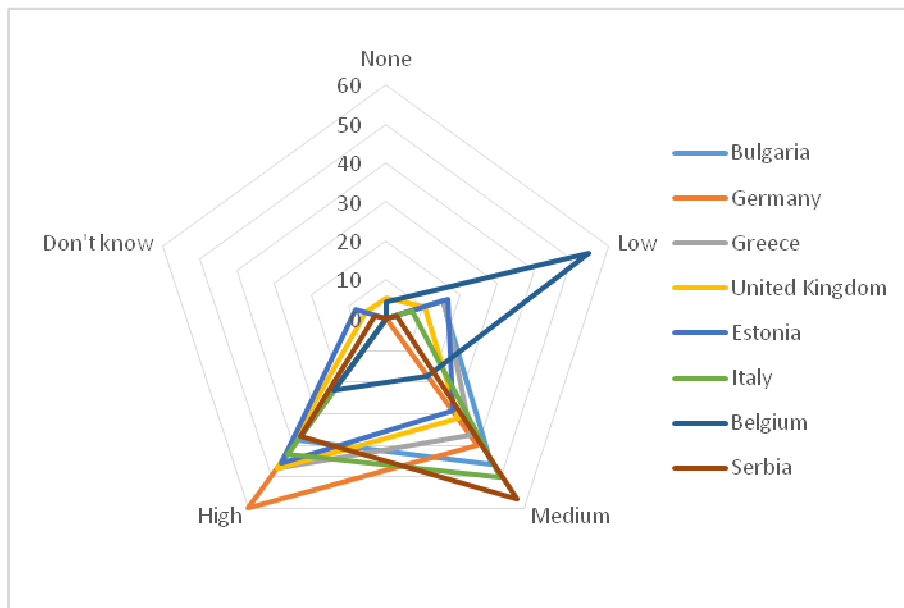
It is rated as being of high importance by at least 65% of respondents in several partner countries (Bulgaria, Greece, Estonia, Belgium, Serbia), with Greece and Estonia over 85%.

It is rated as being of medium importance by 40% of respondents in Germany and by at least 25% in United Kingdom and Italy.

Only in Germany, it is rated as low importance by 30% of respondents.



2.3 Lack of trusted information and experience (individuals may not trust who provide them with information on energy savings); difficulties in knowing new EE technologies; lack of expertise for professionals and technicians.



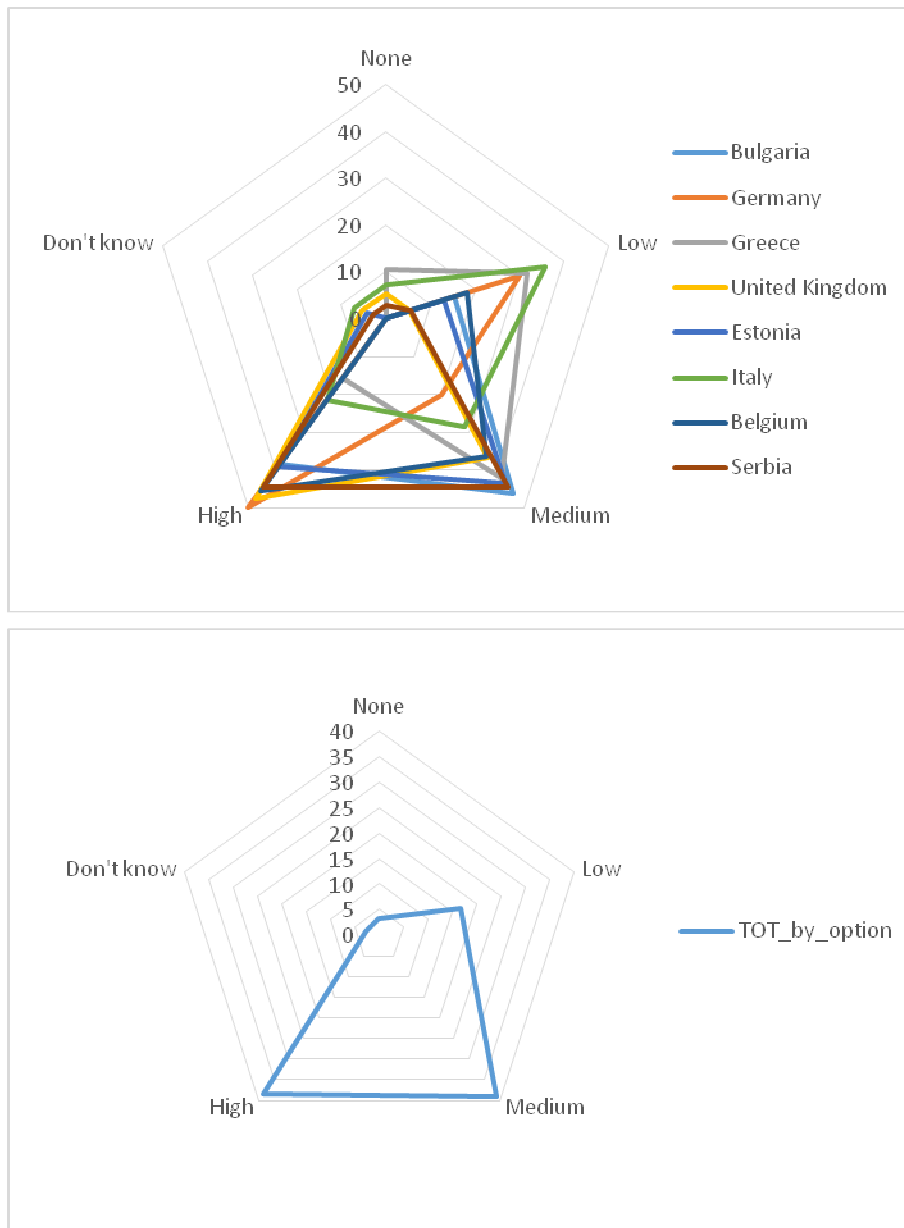
This group of barriers is rated of high-medium importance by respondents concerning building fabric upgrades, even if relevant peculiarities emerge at country level.

It is rated as being of high importance by 60% of respondents from Germany and by at least 40% of respondents from half partner countries (Greece, United Kingdom, Estonia, Italy).

It is rated as being of medium importance by at least 40% of respondents of half partner countries (Bulgaria, Germany, Italy, Serbia), with Italy and Serbia over 50%.

Only in Belgium, it is rated as low importance by 54% of respondents.

2.4 Customs, habits, and relevant behavioural aspects (it may be difficult to change consumer’s habits such as leaving the windows open when the heating is on).

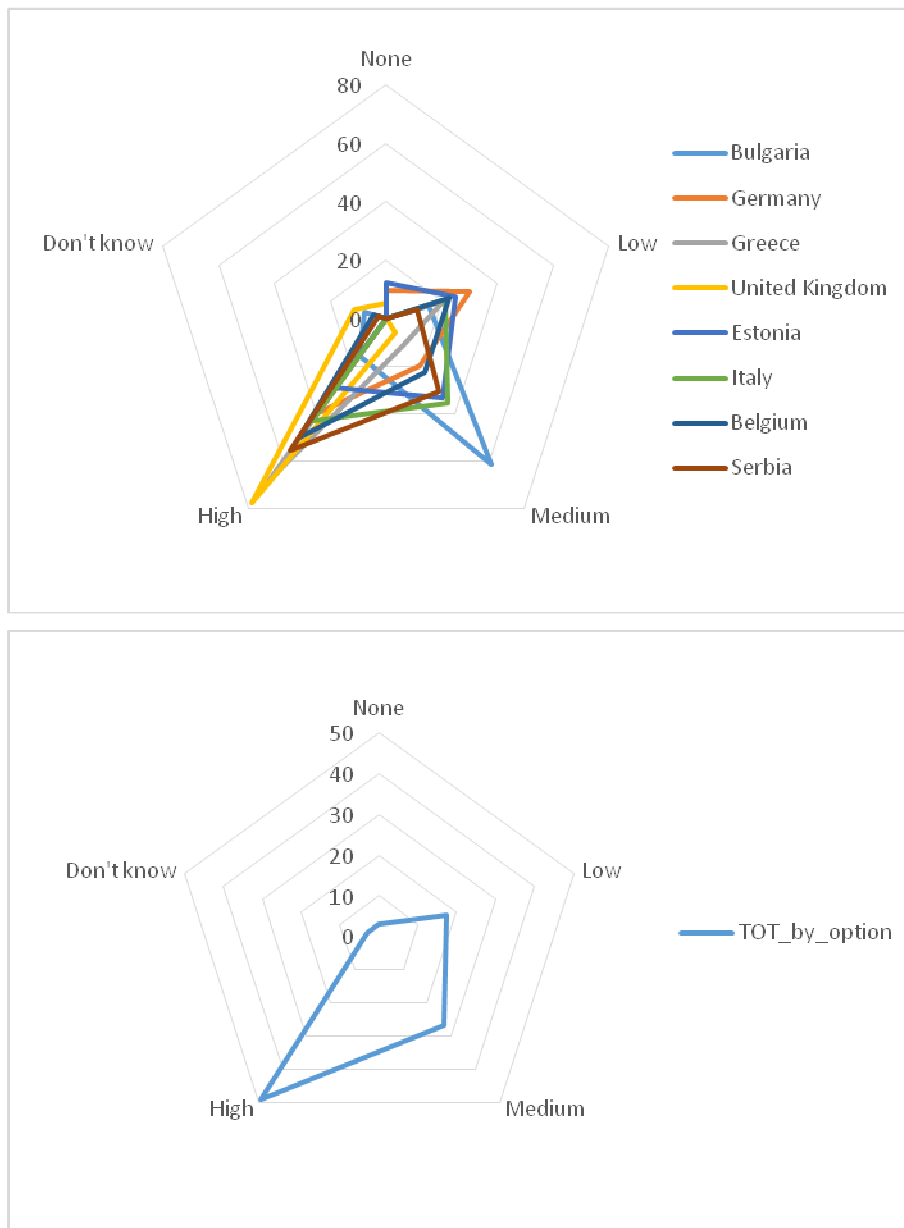


This group of barriers is rated of medium-high importance by respondents concerning building fabric upgrades, even if relevant peculiarities emerge at country level.

It is rated as being of medium importance by at least 40% of respondents from half partner countries (Bulgaria, Greece, Estonia, Serbia), and of high importance by at least 45% from half partner countries (Germany, United Kingdom, Belgium, Serbia).

In three partner countries, at least 30% rate it as low importance (Germany, Greece, Italy).

2.5 Lack of specific legislation; aged building stock and difficulties in installing EE technologies; split incentive (landlords may not invest in energy efficiency because their tenants pay the energy bills).



This group of barriers is rated of high importance by respondents concerning building fabric upgrades, even if some peculiarities emerge at country level.

It is rated as being of high importance by at least 50% of respondents from half partner countries (Greece, United Kingdom, Belgium, Serbia), in particular 68% in Greece and 78% in United Kingdom.

It is rated as being of medium importance by 61% of respondents in Bulgaria, and by at least 30% in three partner countries (Estonia, Italy, Serbia).

It is rated as being of low importance by 30% of respondents in Germany, and by at least 20% in four partner countries (Greece, Estonia, Italy, Belgium).

**Open question B2: Can you identify any other specific barrier/s that limits building fabric upgrades? If yes, specify and give a relevance grade (Low, Medium, High).**

Also for specific barriers limiting building fabric upgrades, almost half of open answers mentioned **institutional** factors. These partially overlapped with factors identified as barriers for the buildings sector in general. Additional elements regarded: the specific technical difficulties which characterize these types of interventions (e.g. insulating the outer shell of terraced houses; eliminating thermal bridges in the corners) (Belgium); specific provisions included in the current regulations, which limit these types of interventions (e.g. cultural heritage protection regulation, UK); complexity and long times of bureaucracy to obtain the needed documentation and permissions to carry out the interventions (Serbia); the existing link with other construction works (e.g. breaking up the floor for insulation will not happen if the floor is still considered to be in a good condition) (Belgium).

Looking at **educational** aspects, key identified barriers were: the lack of adequate qualification for insulation (Germany, Italy, Serbia) and on economic aspects of these interventions (Estonia); lack of awareness on EE benefits (Italy) and lack of indicators to measure them (UK); lack of knowledge (Belgium) and of information campaigns for the public (Estonia).

Concerning **economic** barriers, the high costs of interventions was frequently mentioned (Italy), also in relation to the sale price of homes (Belgium); the low economic viability of interventions (UK); the difficulty to anticipate the expenses and to afford the costs of interventions (Italy); the lack of incentives (Greece).

For the **cultural** aspects, a low interest or priority assigned to EE was frequently reported (Belgium Estonia, UK), and the impact of the insulation on the aesthetical appearance of houses, where a traditional look is more appreciated (UK). Also, the fear of not finding good contractors was mentioned as a factor hindering such investments (Belgium).

For the **social** aspects, again reaching an agreement between families in multi-stories was mentioned as key barrier (Serbia).

Some respondents also suggested **policies** to address these barriers and promote building fabric upgrades. These are listed below:

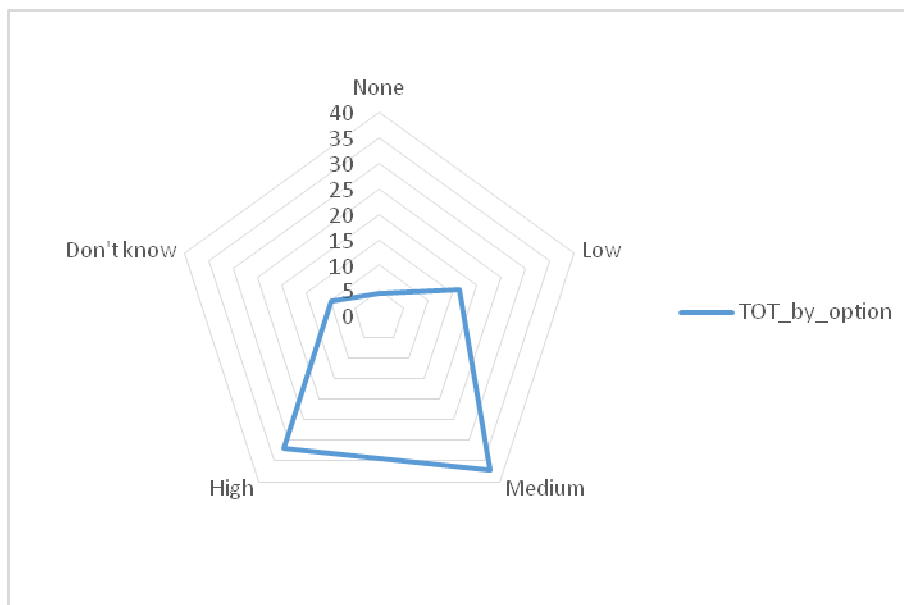
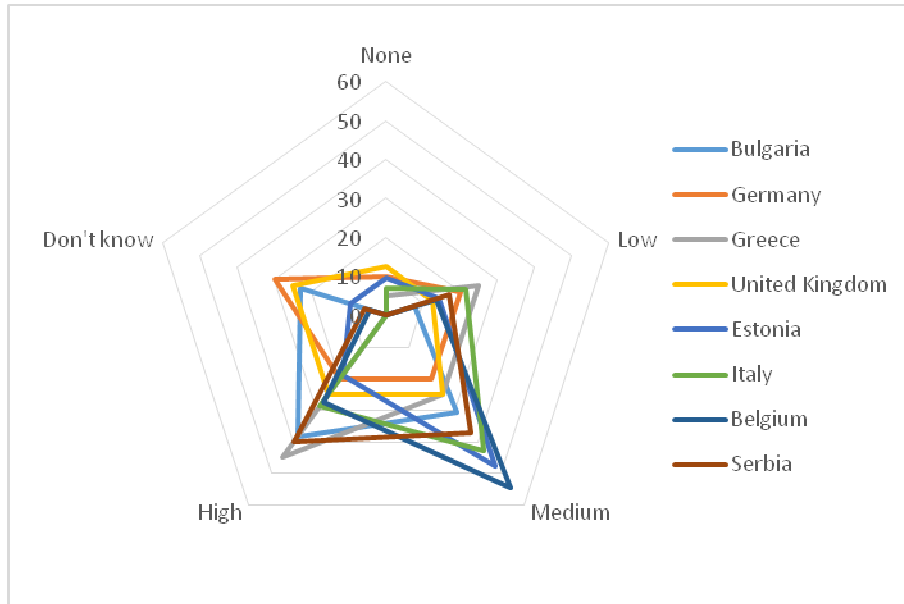
- Provide accessible, tailored advice (Belgium);
- Unburdening consumers of the potential hassle connected with these interventions (Belgium).

**Question 3: According to your expertise, to what extent are the following barriers relevant in limiting the adoption of heat pumps?**

- 3.6 Lack of interest and undervaluing energy efficiency benefits; social group interactions (some individuals may negatively affect consumers that are willing to invest in new EE technologies).
- 3.7 Lack of funds or access to finance, lack of financial incentives, high capital costs and financial risk.
- 3.8 Lack of trusted information and experience (individuals may not trust who provides them with information on energy savings); difficulties in using new EE technologies; lack of expertise for professionals.
- 3.9 Customs, habits, and relevant behavioural aspects (i.e. it may be difficult to change consumer's habits such as keeping the the windows open whilst the heating is on).
- 3.10 Lack of specific legislation; aged building stock and difficulties in installing EE technologies; split incentive (landlords may not invest in energy efficiency because their tenants pay the energy bills).

**Question 3: According to your expertise, to what extent are the following barriers relevant in limiting the adoption of heat pumps?**

3.1 Lack of interest and undervaluing energy efficiency benefits; social group interactions (some individuals may negatively affect consumers that are willing to invest in new EE technologies).

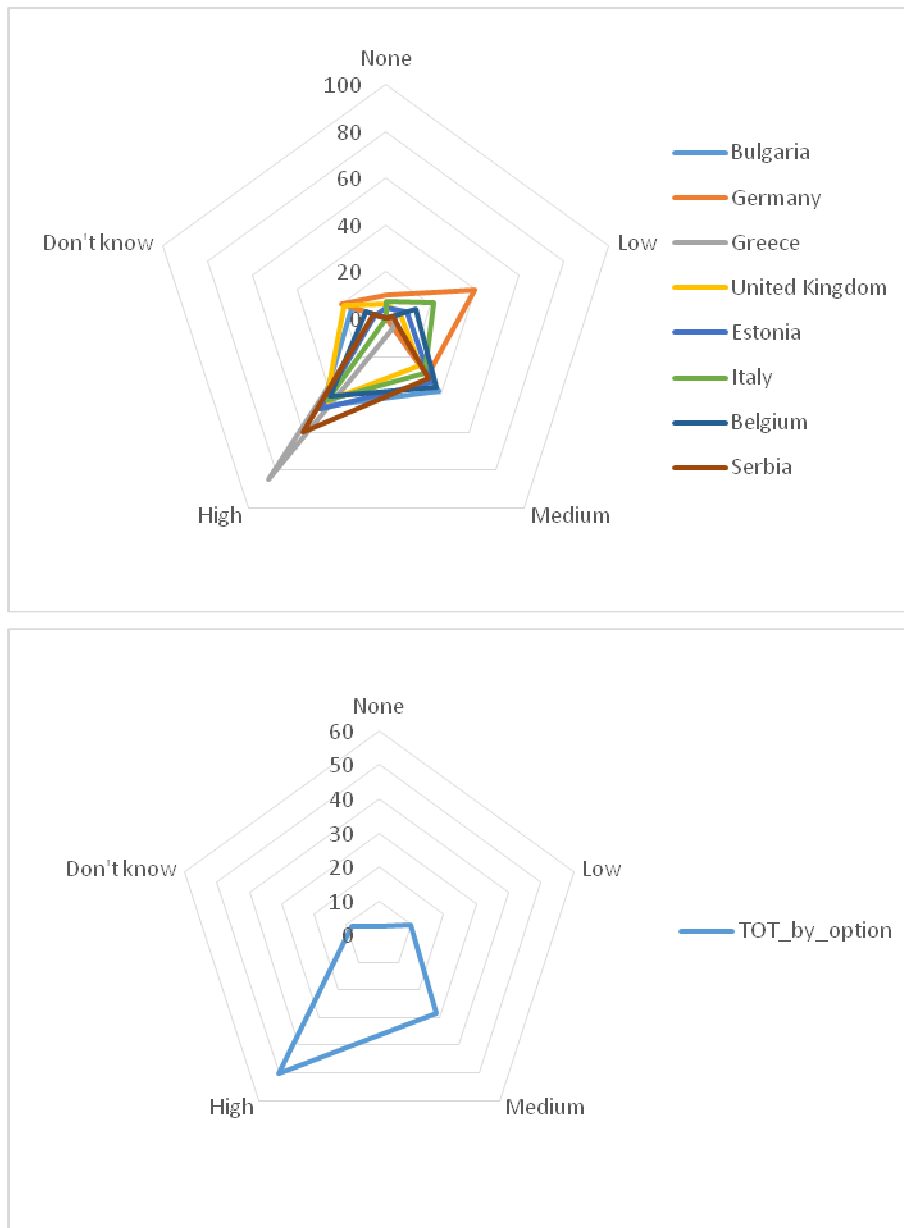


This group of barriers is rated of medium-high importance by respondents concerning the adoption of heat pumps, even if relevant peculiarities emerge at country level.

It is rated as being of medium importance by at least 40% of respondents from three countries (Estonia, Italy, Belgium) and by at least 30% of Bulgaria and Serbia. It is rated as being of high importance by at least 35% in three countries (Bulgaria, Greece, Serbia). It is rated as being of low importance by at least 20% in three countries (Germany, Greece, Italy).

For Bulgaria, Germany and United Kingdom, at least 20% of respondents are not able to provide an answer to this question.

3.2 Lack of funds or access to finance, lack of financial incentives, high capital costs and financial risk.



This group of barriers is rated of high importance by respondents concerning the adoption of heat pumps, even if relevant peculiarities emerge at country level.

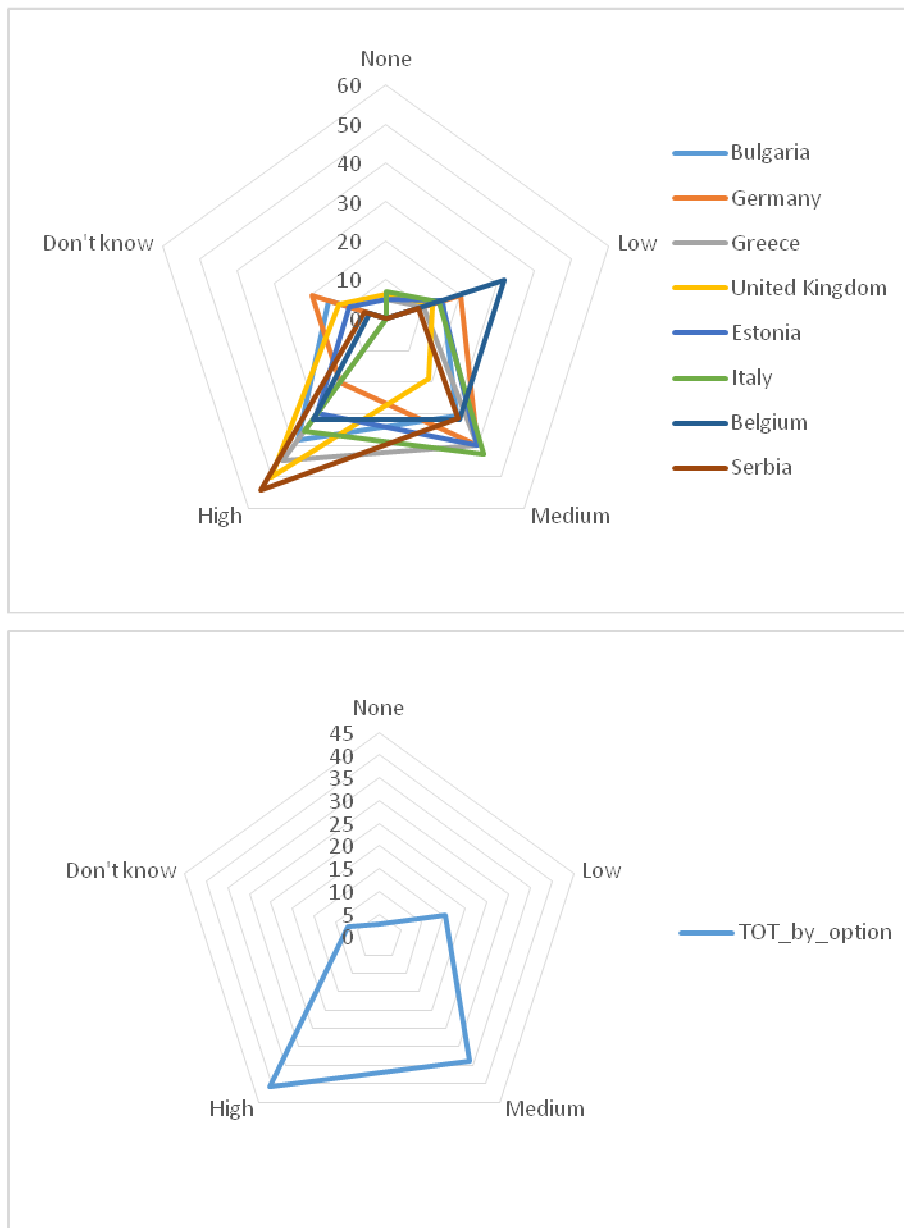
It is rated as being of high importance by at least 40% of respondents from almost all partner countries (except Germany), in particular in Greece by 80% and in Serbia by 60%.

It is rated as being of medium importance by at least 30% in several countries (Bulgaria, Germany, Estonia, Belgium, Serbia).

Notably, it is rated as being of low importance by 40% of respondents in Germany and 21% in Italy.

For Germany only, 20% of respondents are not able to provide an answer to this question.

3.3 Lack of trusted information and experience (individuals may not trust who provides them with information on energy savings); difficulties in using new EE technologies; lack of expertise for professionals.



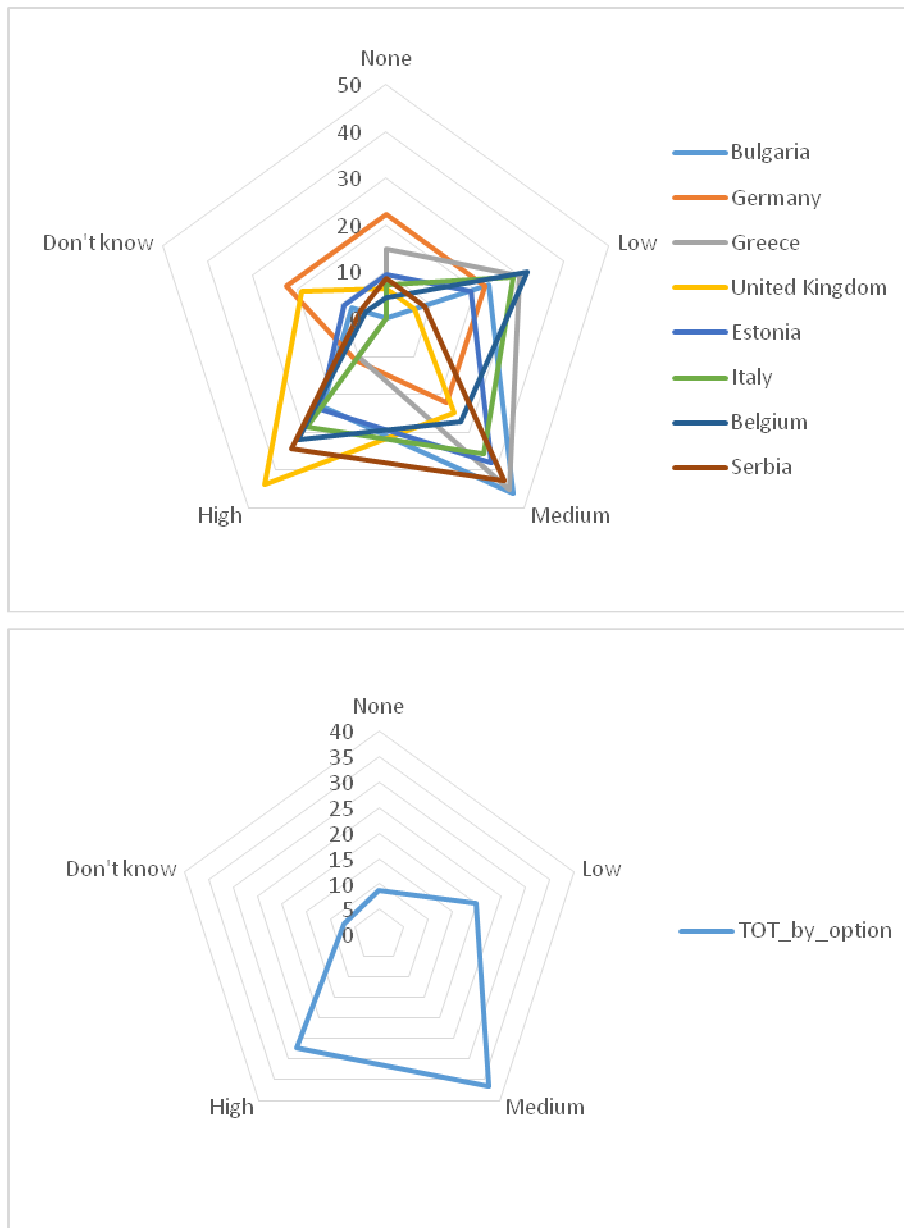
This group of barriers is rated of high-medium importance by respondents concerning the adoption of heat pumps, even if relevant peculiarities emerge at country level.

It is rated as being of high importance by at least 45% of respondents from three partner countries (Greece, United Kingdom, Serbia) and by at least 30% in Bulgaria, Estonia, Italy and Belgium. It is rated as being of medium importance by at least 40% in half of partner countries (Germany, Greece, Estonia, Italy), and by at least 30% in Bulgaria, Belgium and Serbia. It is rated as being of low importance by 31% of respondents in Belgium and 20% in Germany.

For Germany only, 20% of respondents are not able to provide an answer to this question.



3.4 Customs, habits, and relevant behavioural aspects (i.e. it may be difficult to change consumer’s habits such as keeping the windows open whilst the heating is on).



This group of barriers is rated of medium importance by respondents concerning the adoption of heat pumps, even if relevant peculiarities emerge at country level.

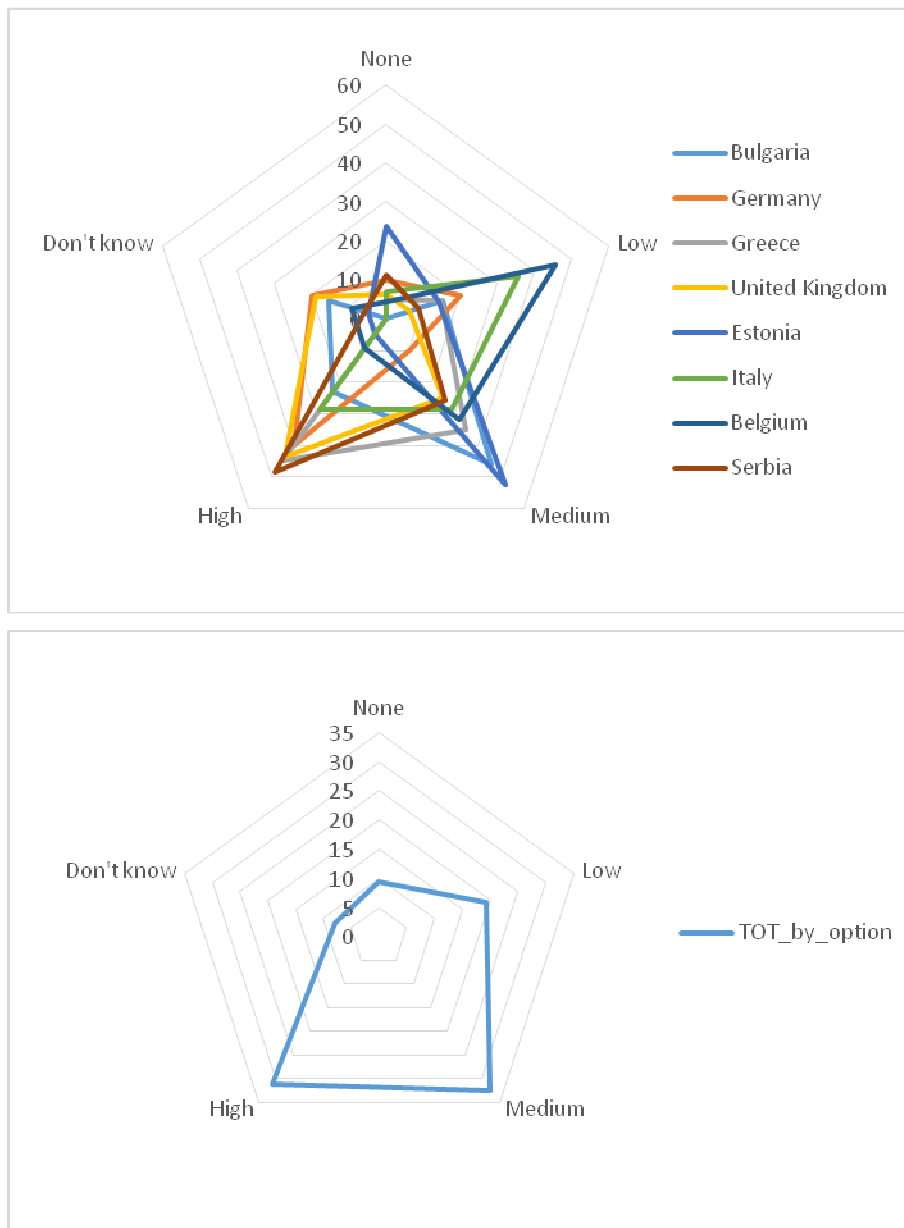
It is rated as being of medium importance by at least 40% of respondents of three partner countries (Bulgaria, Greece, Serbia), and at least 35% of Estonia and Italy.

It is rated as being of high importance by 43% of respondents from United Kingdom, by at least 30% from Belgium and Serbia and at least 20% from Bulgaria, Estonia and Italy.

It is rated as being of low importance by at least 30% of respondents in Greece and Belgium and at least 20% in Bulgaria, Germany and Italy.

For Germany only, 22% of respondents believe that this group of barriers has no relevance at all and 22% of respondents are not able to provide an answer to this question.

3.5 Lack of specific legislation; aged building stock and difficulties in installing EE technologies; split incentive (landlords may not invest in energy efficiency because their tenants pay the energy bills).



This group of barriers is rated of medium-high importance by respondents concerning the adoption of heat pumps, even if relevant peculiarities emerge at country level.

It is rated as being of medium importance by at least 40% of respondents of three partner countries (Bulgaria, Greece, Serbia), and at least 35% of Estonia and Italy. It is rated as being of high importance by 43% of respondents from United Kingdom, by at least 30% from Belgium and Serbia and at least 20% from Bulgaria, Estonia and Italy. It is rated as being of low importance by at least 30% of respondents in Greece and Belgium and at least 20% in Bulgaria, Germany and Italy.

For Germany and United Kingdom, 20% of respondents are not able to provide an answer to this question.

**Open question B3: Can you identify any other specific barrier/s that limits the diffusion of heat pumps? If yes, specify and give a relevance grade (Low, Medium, High).**

Also for heat pumps, **institutional** factors were frequently mentioned among the reported barriers. This broad category involves several barriers related to the **technical features** of this technology, its performances and its quality, which are often perceived in a negative way by consumers (therefore, these elements can also be linked to more cultural factors and to consumer preferences). Technical features of heat pumps which are perceived in a negative way are noise (Belgium, Estonia, Germany, UK), visual impact (Estonia, UK), disruptions for ground source excavations (UK), need of new plumbing work for the installation (Greece), and a perceived (and possibly actual) disappointing performance of installations (UK). Several respondents highlighted that this type of technology is more suitable for specific typologies of buildings, namely new energy efficient buildings since they provide low temperature (Germany) and its implementation usually only can occur as part of major re-servicing due to differing heat regimes generated (UK). Other respondents mentioned among the institutional factors the lack of government will and support (UK) and the lack of a specific legislation (UK).

For the **economic** factors, the high costs of this technology were highlighted (Belgium, Bulgaria, UK, Serbia); a life duration which is shorter than declared (Estonia); the lack of incentives (Serbia) and also the decline of gas and oil prices (Greece, Serbia). Several respondents highlighted also the link with electricity prices, which determine the business case for this technology. A Serbian respondent reports that the market in the country is currently underdeveloped.

For **educational** aspects, reported barriers were: insufficient qualification of professionals regarding the appropriate dimensioning of the system (Germany) and regarding installation of heat pumps, in particular for installers which are more acquainted with other systems (Italy); consumers' lack of knowledge and information on this technology (Belgium, Greece, Italy) and of knowledge on how to operate these systems (UK). Also the lack of long term positive experiences which can demonstrate the validity of this technology was identified (Estonia).

**Cultural** elements were mainly identified in the disappointment towards the technology, deriving from an excess of trust in it as being able to solve all the energy efficiency problems of the house, whereas instead it needs to be coupled with an envelope renovation (Estonia); and a negative public perception of this technology, stimulated – according to the respondent – by the media (Estonia). A respondent highlights how heat pumps are indeed a less popular option than others, for example solar panels (Belgium).

**Social** aspects mainly referred to the socio-economic status of tenants.

Some respondents also suggested **policies** to address these barriers and promote the diffusion of heat pumps. These are listed below:

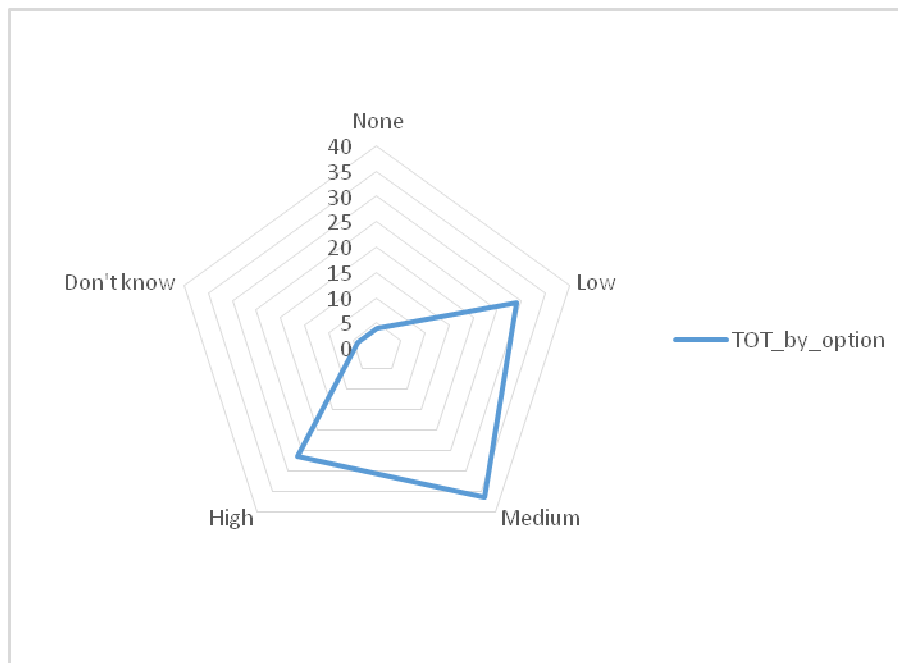
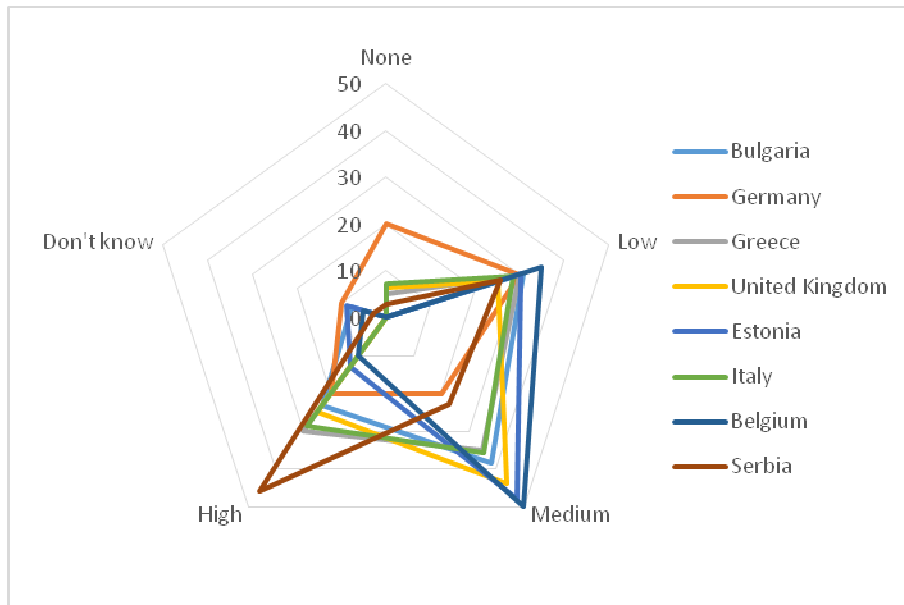
- providing price signals, e.g. displaying all costs in the electricity bills (Belgium).

***Question 4: According to your expertise, to what extent are the following barriers relevant in limiting the adoption of LEDs?***

- 4.6 Lack of interest and undervaluing energy efficiency benefits; social group interactions (some individuals may negatively affect consumers that are willing to invest in new EE technologies).
- 4.7 Lack of funds or access to finance, lack of financial incentives, high capital costs and financial risk.
- 4.8 Lack of trusted information and experience (individuals may not trust who provides them with information on energy savings); difficulties in using new EE technologies; lack of expertise for professionals and technicians.
- 4.9 Customs, habits, and relevant behavioural aspects (it may be difficult to change consumer's habits such as leaving the lights on when not in the room).
- 4.10 Lack of specific legislation; aged building stock and difficulties in installing EE technologies; split incentive (landlords may not invest in energy efficiency because their tenants pay the energy bills).

**Question 4: According to your expertise, to what extent are the following barriers relevant in limiting the adoption of LEDs?**

4.1 Lack of interest and undervaluing energy efficiency benefits; social group interactions (some individuals may negatively affect consumers that are willing to invest in new EE technologies).



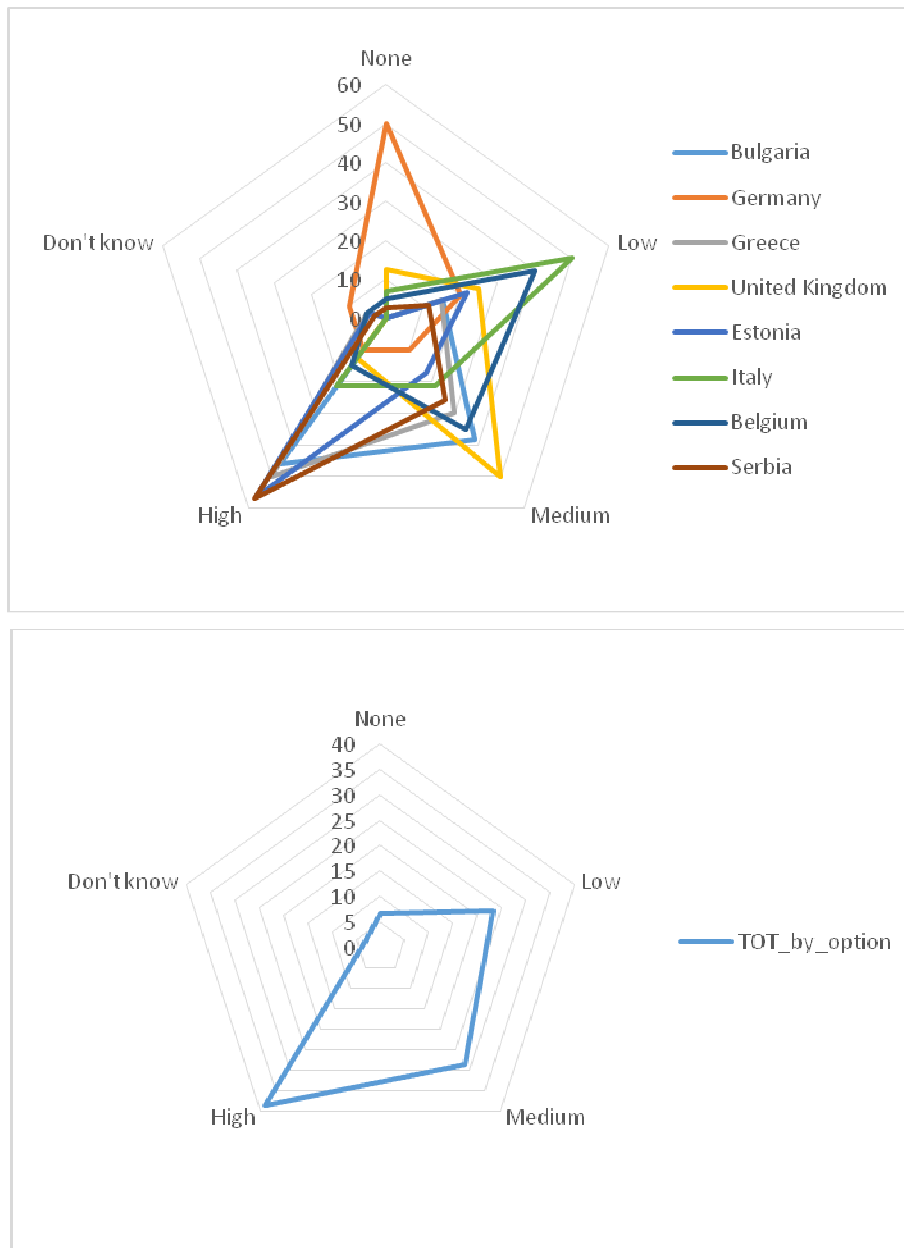
This group of barriers is rated of medium-low importance by respondents concerning the adoption of LEDs, even if relevant peculiarities emerge at country level.

It is rated as being of medium importance by at least 40% of respondents of three partner countries (United Kingdom, Estonia, Belgium) and by at least 35% of three of other three countries (Bulgaria, Greece, Italy). It is rated as being of high importance by 45% of

respondents from Serbia and by at least 20% of Bulgaria, Greece, Italy. It is rated as being of low importance by at least 30% of respondents from several partner countries (Bulgaria, Germany, Greece, Estonia, Belgium).

For Germany only, 20 % of respondents believe this group of barriers has no relevance at all on the diffusion of LEDs.

4.2 Lack of funds or access to finance, lack of financial incentives, high capital costs and financial risk



This group of barriers is rated of high-medium importance by respondents concerning the adoption of LEDs, even if deep differences emerge among countries.

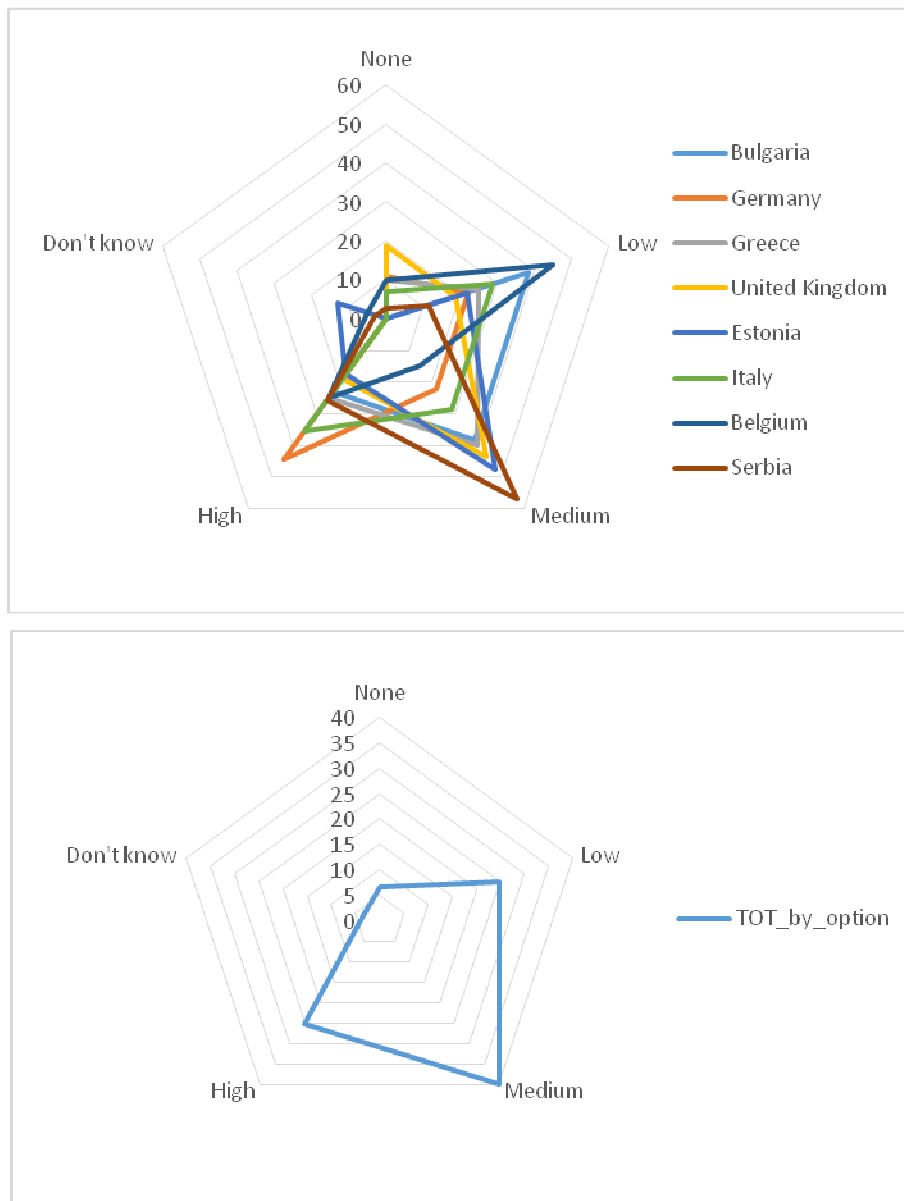
It is rated as being of high importance by at least 50% of respondents from Greece, Estonia and Serbia, and 46% of Bulgaria.

It is rated as being of medium importance by 50% of respondents from United Kingdom, by at least 35% of Bulgaria and Belgium, 30% by Greece and at least 20% by Italy and Serbia.

It is rated as being of low importance by 50% and 40% of respondents from Italy and Belgium respectively, and by at least 20% from Germany, United Kingdom and Estonia.

For Germany only, notably 50 % of respondents believe this group of barriers has no relevance at all on the diffusion of LEDs.

4.3 Lack of trusted information and experience (individuals may not trust who provide them with information on energy savings); difficulties in using new EE technologies; lack of expertise for professionals and technicians.



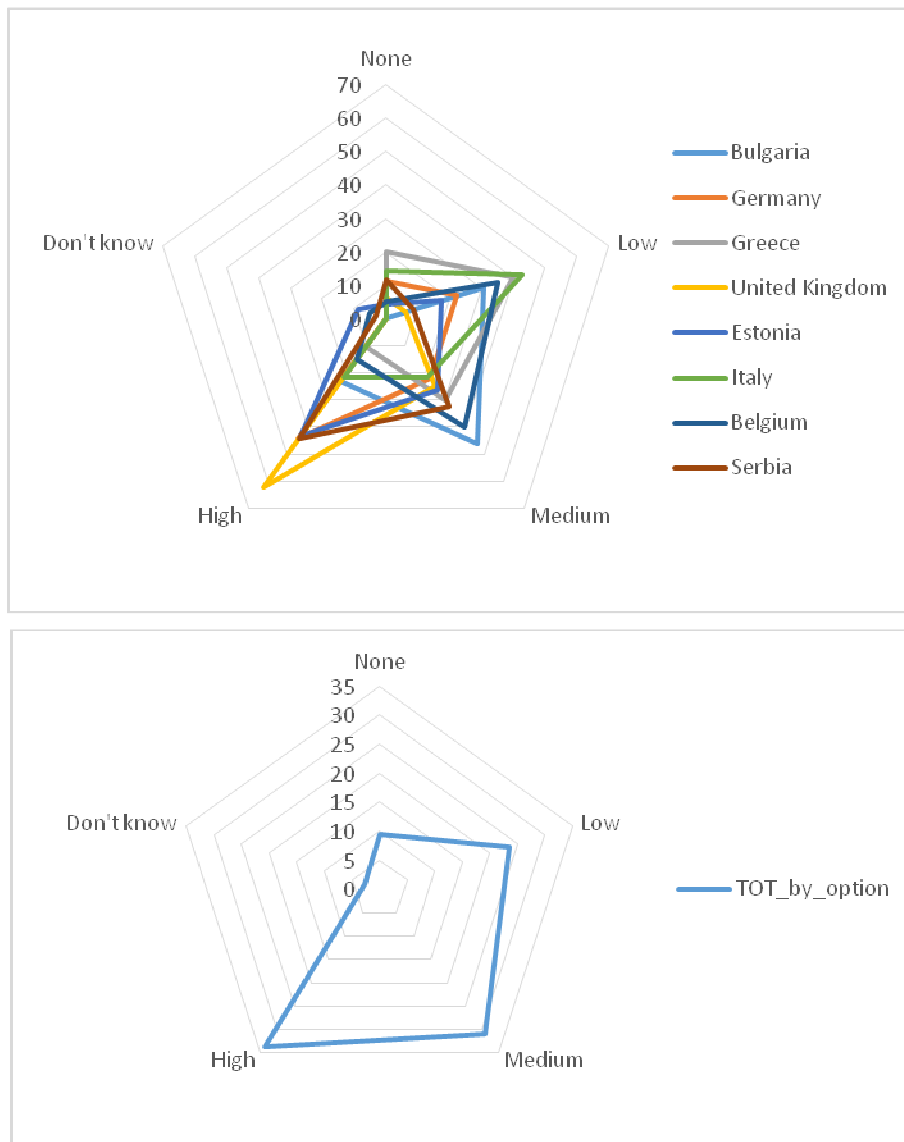
This group of barriers is rated of medium importance by respondents concerning the adoption of LEDs, even if peculiarities emerge among countries.

It is rated as being of medium importance by 57% from Serbia and at least 40% of Greece, United Kingdom and Estonia. It is rated as being of high importance by 44% of respondents from Germany and 35% of Italy, and by at least 25% of Greece, Belgium and Serbia. Notably, It is rated as being of low importance by 45% of Belgium and 38,5% of Bulgaria.

For United Kingdom only, for almost 20% of respondents this group of barriers has no relevance at all on the diffusion of LEDs.



4.4 Customs, habits, and relevant behavioural aspects (it may be difficult to change consumer’s habits such as sleeping with TV on).



This group of barriers is rated of high-medium importance by respondents concerning the adoption of LEDs, even if peculiarities emerge among countries.

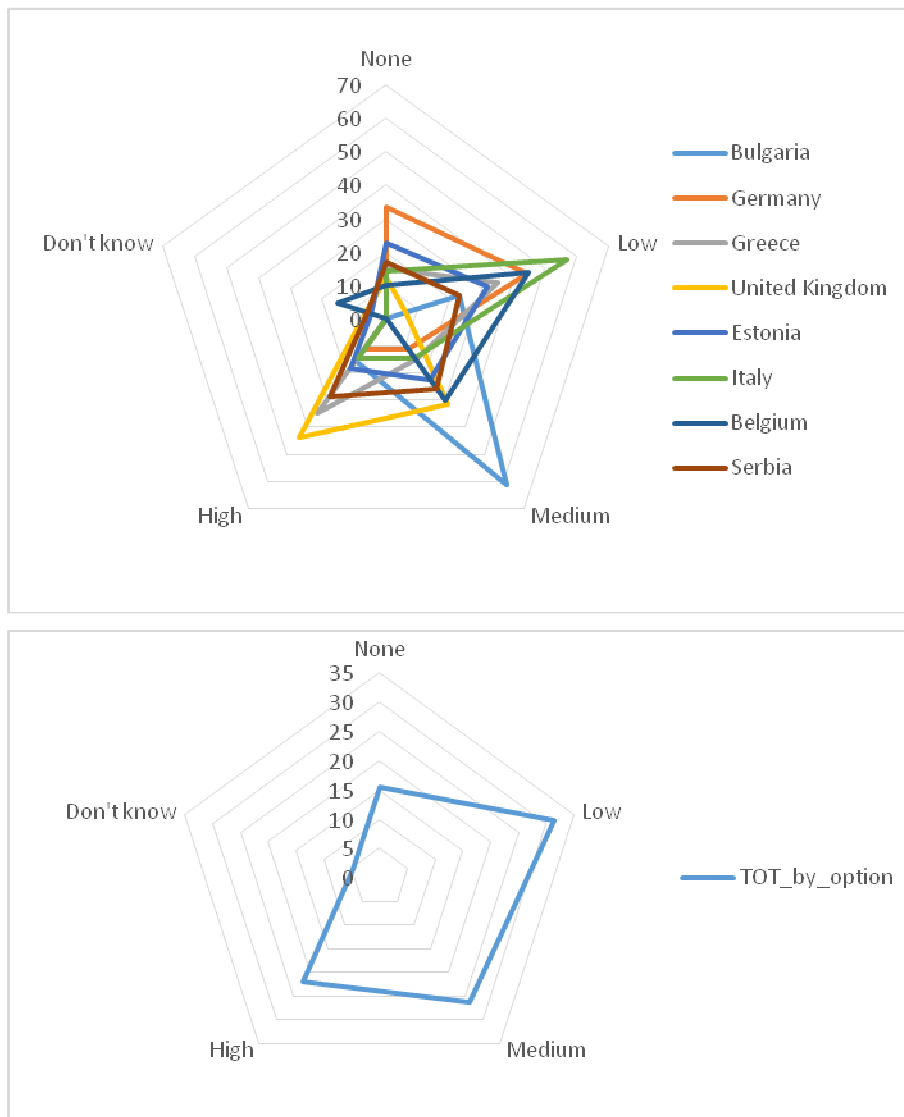
It is rated as being of high importance by 62% of respondents from United Kingdom, and by at least 40% of Germany, Estonia and Serbia.

It is rated as being of medium importance by at least 40% of respondents from Bulgaria and Belgium and at least 30% from Greece and Serbia.

It is rated as being of low importance by at least 40% of respondents from Greece and Italy and by at least 30% of Bulgaria and Belgium.

For Greece only, 20% of respondents believe this group of barriers has no relevance at all on the diffusion of LEDs.

4.5 Lack of specific legislation; aged building stock and difficulties in installing EE technologies; split incentive (landlords may not invest in energy efficiency because their tenants pay the energy bills).



This group of barriers is rated of low importance by respondents concerning the adoption of LEDs, even if peculiarities emerge among countries.

It is rated as being of low importance by at least 45% of respondents from Germany, Italy and Belgium (Italy in particular 57%).

It is rated as being of medium importance by 61% of Bulgaria and at least 30% of United Kingdom and Belgium.

It is rated as being of high importance by 44% of respondents from United Kingdom, and by 35% of Greece.

Notably, for Germany and Estonia, 33% and 22% of respondents respectively believe this group of barriers has no relevance at all on the diffusion of LEDs.

**Open question B4: Can you identify any other specific barrier/s that limits the diffusion of LEDs? If yes, specify and give a relevance grade (Low, Medium, High).**

As for heat pumps, **institutional** factors were frequently mentioned among the reported barriers for the diffusion of LEDs and this barrier category involves several ones related to the **technical features** of this technology, its performances and its quality, which are often perceived in a negative way by consumers (therefore, these elements can also be linked to more cultural factors and to consumer preferences). Technical features of LEDs which are perceived in a negative way, or that potentially generate disappointment in consumers, are: the apparent equal value of the different solutions available on the market, which in reality hides very different performances (Belgium, Bulgaria, Estonia, Greece); shorter life time than the one declared in the technical specifications (Bulgaria, Estonia); poor light output (Bulgaria, Greece, UK); dislike of the light colour (Belgium, Bulgaria, Germany, UK); fear of harmful effects on health (Serbia); the compatibility of existing light fittings only with certain lamps (UK).

Institutional barriers mentioned by respondents included the lack of policy incentives for relighting (communication, financial incentives...) (Belgium); the lack of interest in the public sector for the replacement of lamps (Serbia); the current framework of public tender procedures and budgetary arrangements, that cause missing opportunities for energy saving contracting (Germany). Respondents also noted the lack of long term experiences that demonstrate the cost-efficiency of this technology (Estonia).

Looking at **economic** barriers, respondents most frequently mentioned the high purchase costs of LEDs compared to other technologies (Belgium, Estonia, Greece, Italy, Serbia, UK), which some respondents noted is something which is recently changing. For Serbia, respondents noted that the low price of electricity is a key barrier in limiting the diffusion of this technology.

The **educational** barriers mainly referred to the lack of a total-cost or life-cycle calculation approach in evaluating these technologies and thus of full information on the costs and benefits (Belgium, Bulgaria, Germany) and of saving possibilities (Italy).

**Social** aspects mainly referred to the socio-economic status of tenants, in particular for retired people (UK).

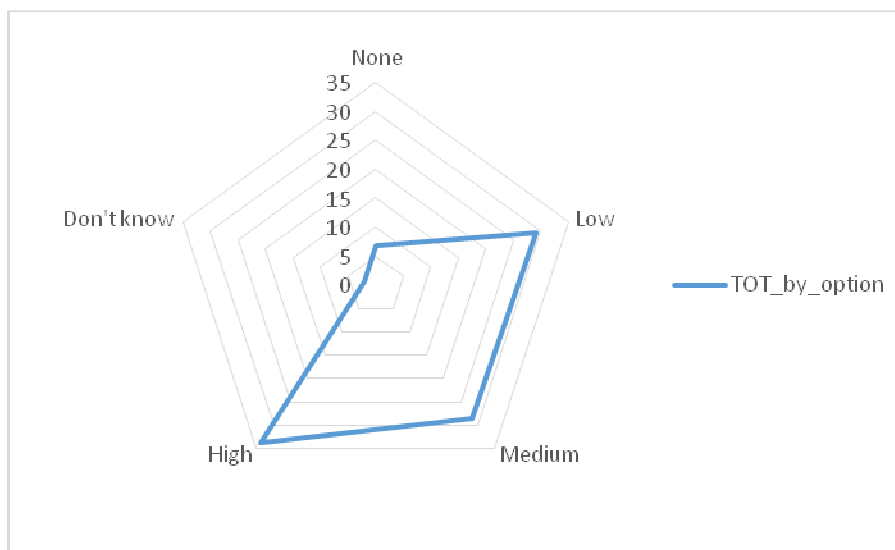
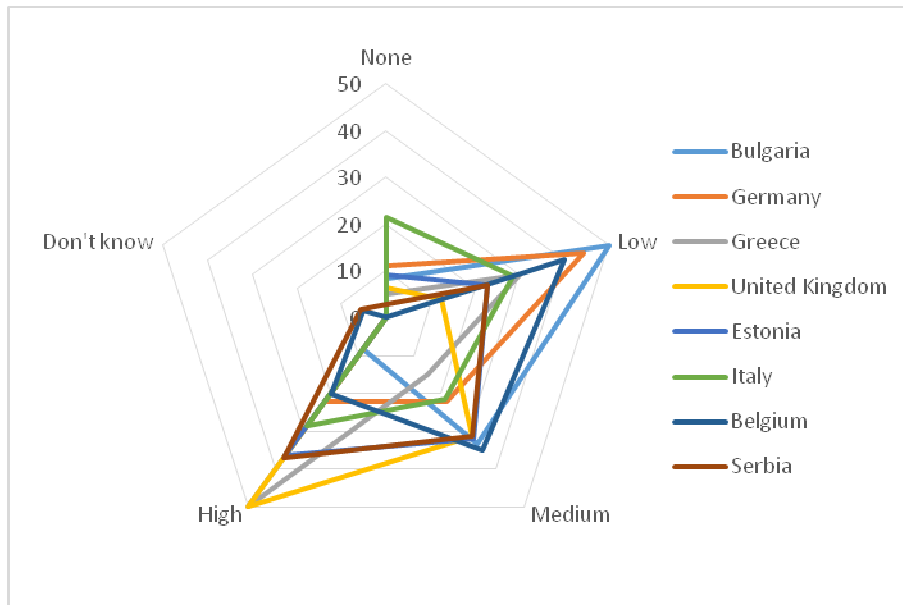
**Cultural** aspects referred to the preference of consumers for the heat created by conventional lights, which is appreciated in colder climates (UK), and the habits linked to applying the conventional lights (Serbia).

**Question 5: According to your expertise, to what extent are the following barriers relevant in limiting the adoption of more efficient appliances (with energy class A+++ and A++)?**

- 5.6 Lack of interest and undervaluing energy efficiency benefits; social group interactions (some individuals may negatively affect consumers that are willing to invest in new EE technologies).
- 5.7 Lack of funds or access to finance, lack of financial incentives, high capital costs and financial risk.
- 5.8 Lack of trusted information and experience (individuals may not trust who provide them with information on energy savings); difficulties in using new EE technologies; lack of expertise for professionals and technicians.
- 5.9 Customs, habits, and relevant behavioural aspects (it may be difficult to change consumer's habits such as sleeping with TV on).
- 5.10 Lack of specific legislation; split incentive (landlords may not invest in energy efficiency because their tenants pay the energy bills).

**Question 5: According to your expertise, to what extent are the following barriers relevant in limiting the adoption of more efficient appliances (with energy class A+++ and A++)?**

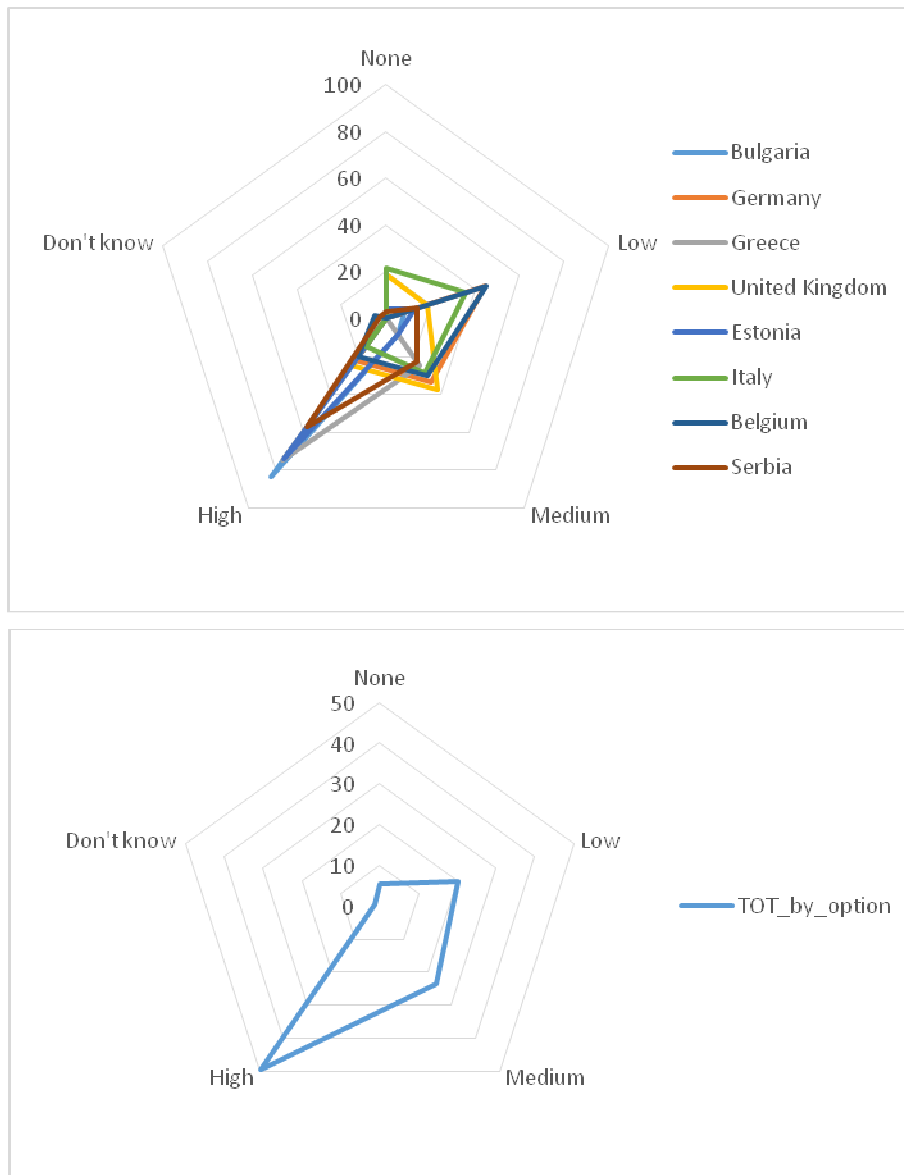
5.1 Lack of interest and undervaluing energy efficiency benefits; social group interactions (some individuals may negatively affect consumers that are willing to invest in new EE technologies).



This group of barriers is rated of high-medium importance by respondents concerning the adoption of more efficient appliances, even if peculiarities emerge among countries.

It is rated as being of high importance by at 50% of respondents from Greece and United Kingdom, and by at least 35% of Estonia and Serbia. It is rated as being of medium importance by at least 30% of Bulgaria, United Kingdom, Estonia, Belgium, Serbia. It is rated as being of low importance by 50% of respondents from Bulgaria and at least 40% from Germany and Belgium. Notably, for Italy only, 21% of respondents believe this group of barriers has no relevance at all on the diffusion of more efficient appliances.

5.2 Lack of funds or access to finance, lack of financial incentives, high capital costs and financial risk.

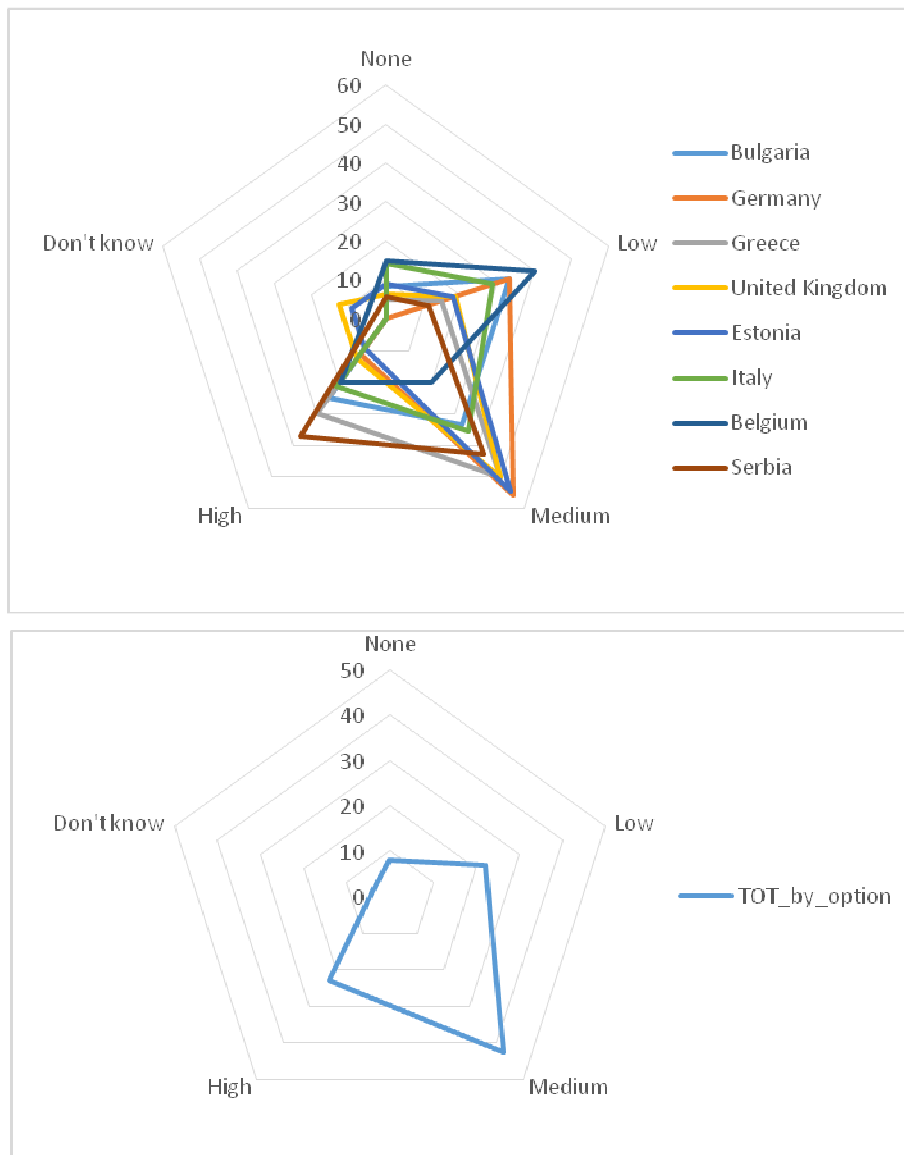


This group of barriers is rated of high importance by respondents concerning the adoption of more efficient appliances, even if some peculiarities emerge for some countries.

It is rated as being of high importance by at least 70% of respondents from three countries (Bulgaria, Greece and Estonia, 83% in particular for Bulgaria). It is rated as being of medium importance by at least 30% in Germany, United Kingdom and Belgium. It is rated as being of low importance by at least 35% of respondents from Germany, Italy and Belgium.

Notably, for Italy only, 21% of respondents believe this group of barriers has no relevance at all on the diffusion of more efficient appliances.

5.3 Lack of trusted information and experience (individuals may not trust who provide them with information on energy savings); difficulties in using new EE technologies; lack of expertise for professionals and technicians.

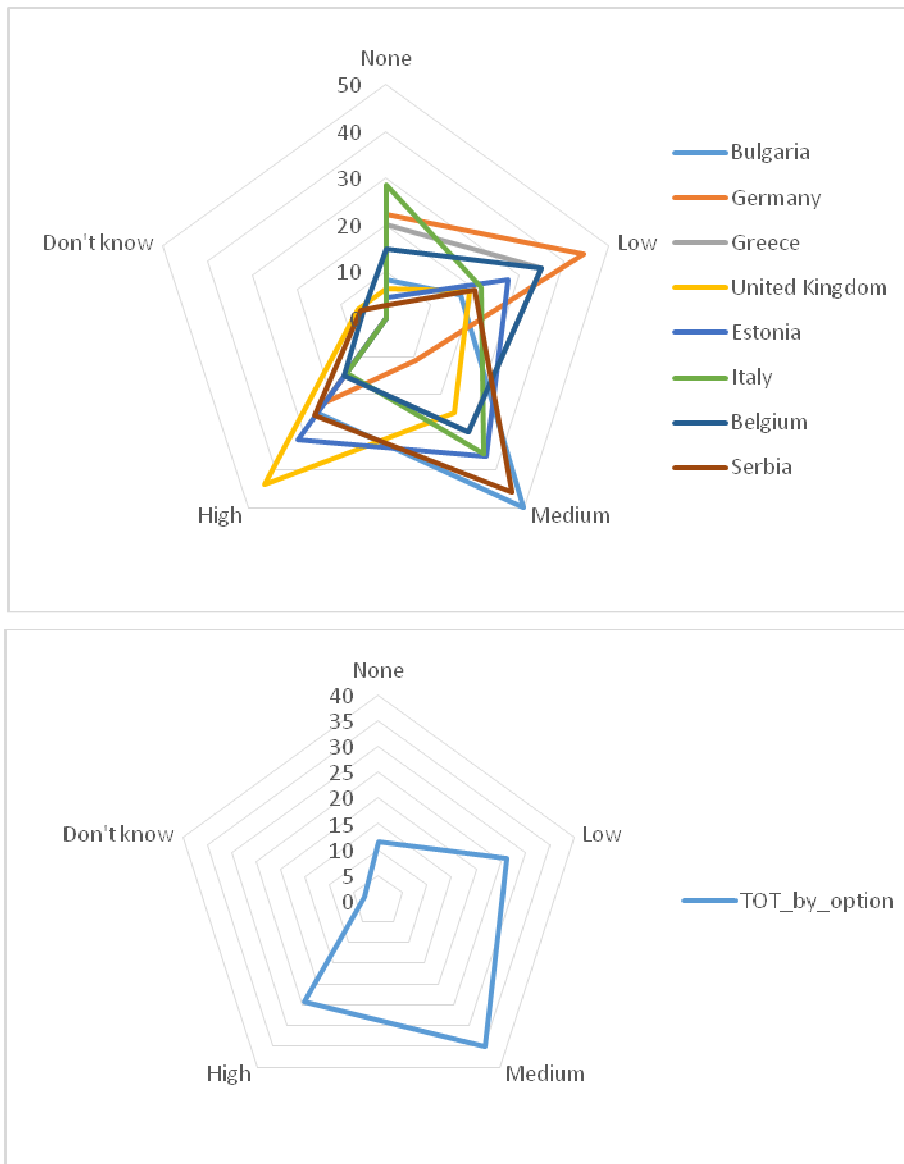


This group of barriers is rated of medium importance by respondents concerning the adoption of more efficient appliances, even if some peculiarities emerge for some countries.

It is rated as being of medium importance by at least 50% of respondents from Germany, Greece, United Kingdom and Estonia. It is rated as being of high importance by at least 30% in Greece and Serbia and at least 20% in Bulgaria, Italy and Belgium.

It is rated as being of low importance by at least 30% of respondents from Bulgaria, Germany and Belgium (40% for Germany).

5.4 Customs, habits, and relevant behavioural aspects (it may be difficult to change consumer’s habits such as sleeping with TV on).



This group of barriers is rated of medium-low importance by respondents concerning the adoption of more efficient appliances, even if relevant peculiarities emerge among countries.

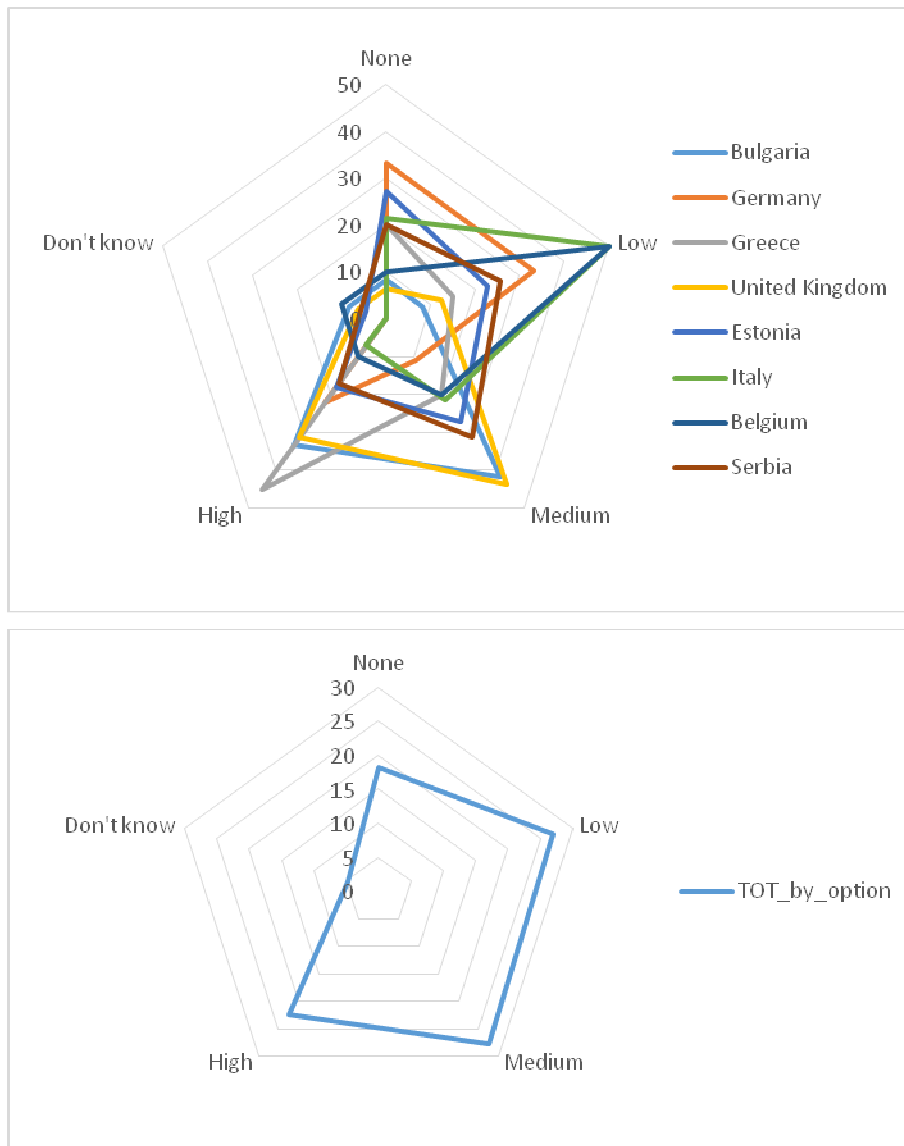
It is rated as being of medium importance by 50% of respondents from Bulgaria and 45% from Serbia, and by at least 30% from Greece, Estonia, Italy and Belgium. It is rated as being of low importance by 44% in Germany and by at least 35% in Greece and Belgium.

It is rated as being of low importance by 44% of respondents from United Kingdom, and at least 20% from Bulgaria, Germany and Serbia.

Notably, for three countries (Germany, Greece and Italy), at least 20% of respondents believe that this group of barriers has no relevance at all on the diffusion of more efficient appliances.



5.5 Lack of specific legislation; split incentive (landlords may not invest in energy efficiency because their tenants pay the energy bills).



This group of barriers is rated of medium-low importance by respondents concerning the adoption of more efficient appliances, even if relevant peculiarities emerge among countries.

It is rated as being of medium importance by at least 40% of respondents from Bulgaria and United Kingdom, 31% from Serbia and at least 20% from Greece, Estonia, Italy and Belgium. It is rated as being of high importance by 45% in Greece and by at least 30% in Bulgaria and United Kingdom. It is rated as being of low importance by 50% of respondents from Italy and Belgium, and at least 20% in Germany, Estonia and Serbia.

Notably, for several countries, a relevant percentage of respondents believe that this group of barriers has no relevance at all on the diffusion of more efficient appliances (at least 20% in Greece, Italy and Serbia, 27% in Estonia and 33% in Germany).

**Open question B5: Can you identify any other specific barrier/s that limits the adoption of more efficient appliances (with energy class A+++ and A++)? If yes, specify and give a relevance grade (Low, Medium, High).**

For the adoption of more efficient appliances, **economic** barriers are the most frequently mentioned by respondents in their open answers, namely the higher purchase costs of more efficient appliances compared to less efficient ones (Bulgaria, Italy, Serbia, UK). Some respondents mentioned that retailers or big chains stores tend not to stock enough energy efficient appliances (UK) or tend to make very good prices on less efficient appliances (Italy), favouring their purchase by consumers. For Serbia, several respondents noted that the low price of electricity is a key barrier in limiting the diffusion of more efficient appliances, as well as the lack of incentives from the state.

**Institutional** barriers mainly referred to the insufficient clarity of the energy labels and related performances, as well as the aging of the label categories (only appliances higher than A+ on the market) (Belgium, Estonia, Germany, UK), which confuse consumers. For Serbia, a lack of high-quality energy efficient appliances on the market was mentioned. On the policy side, a lack of promotion of these technologies has been mentioned for Belgium. A lack of practical experiences and feedbacks was mentioned for Estonia. Looking at the technical features of these appliances, for Germany the uncertainty concerning the life span of appliances (and consequently their amortisation) was mentioned.

Regarding **educational** aspects, as for LEDs, also for energy efficient appliances the mentioned barriers mainly referred to the lack of a total-cost or life-cycle calculation approach in evaluating these technologies and thus of full information on the costs and benefits (Belgium, Germany). A low level of knowledge of consumers was identified for Serbia.

Regarding **cultural** barriers, they mainly referred to the conditions in which the changing of appliances takes places, namely in case of breakdown, not for energy efficiency purposes (Italy, UK). For Serbia, a distrust in the declared technical characteristics of appliances was highlighted.

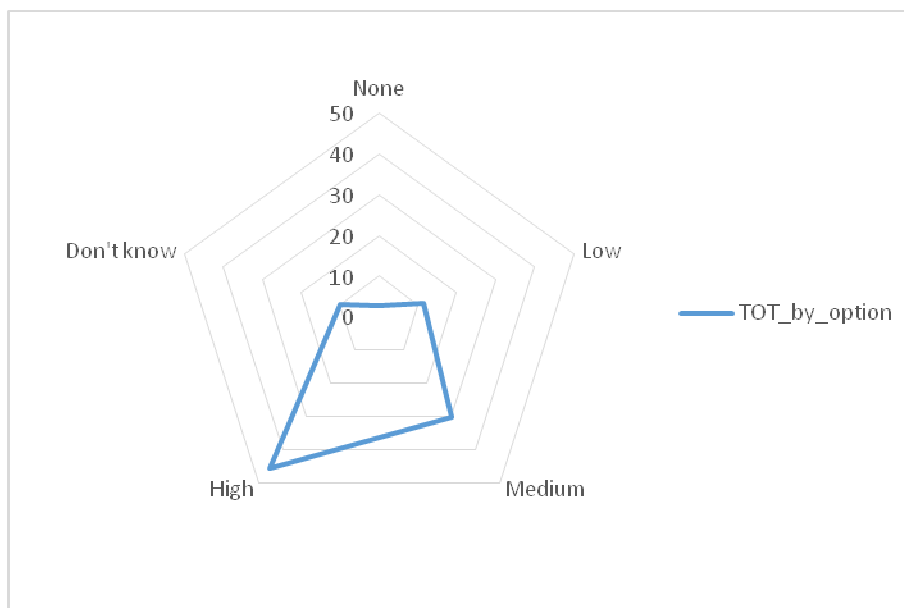
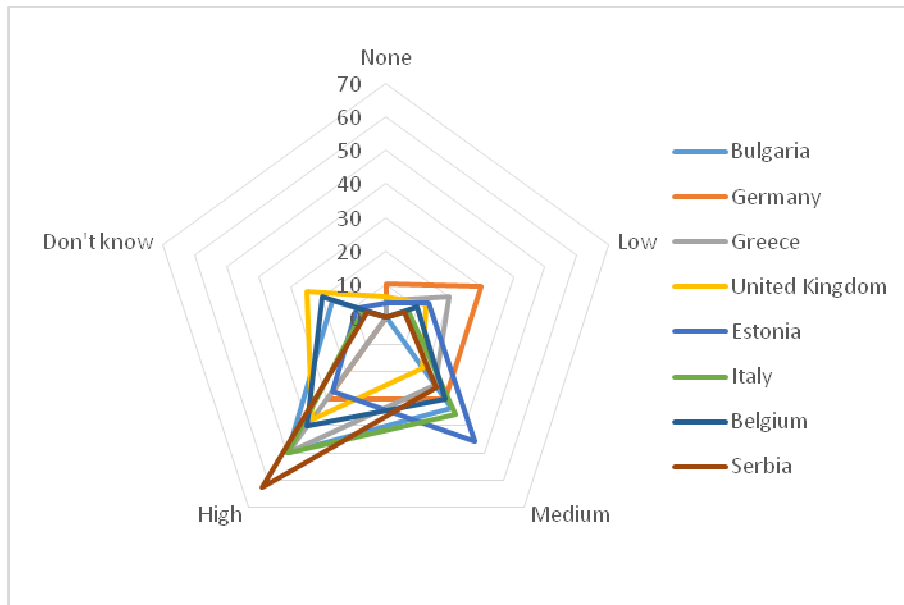
**Social** aspects mainly referred to the socio-economic status of tenants.

**Question 6: According to your expertise, to what extent are the following barriers relevant in limiting the adoption of Building Energy Management System (BEMS) and building automation systems?**

- 6.6 Lack of interest and undervaluing energy efficiency benefits; social group interactions (some individuals may negatively affect consumers that are willing to invest in new EE technologies).
- 6.7 Lack of funds or access to finance, lack of financial incentives, high capital costs and financial risk.
- 6.8 Lack of trusted information and experience (individuals may not trust who provide them with information on energy savings); difficulties in using new EE technologies; lack of expertise for professionals and technicians.
- 6.9 Customs, habits, and relevant behavioural aspects (it may be difficult to change consumer's habits such as sleeping with TV on).
- 6.10 Lack of specific legislation; aged building stock and difficulties in installing EE technologies; split incentive (landlords may not invest in energy efficiency because their tenants pay the energy bills).

**Question 6: According to your expertise, to what extent are the following barriers relevant in limiting the adoption of Building Energy Management System (BEMS) and building automation systems?**

6.1 Lack of interest and undervaluing energy efficiency benefits; social group interactions (some individuals may negatively affect consumers that are willing to invest in new EE technologies).

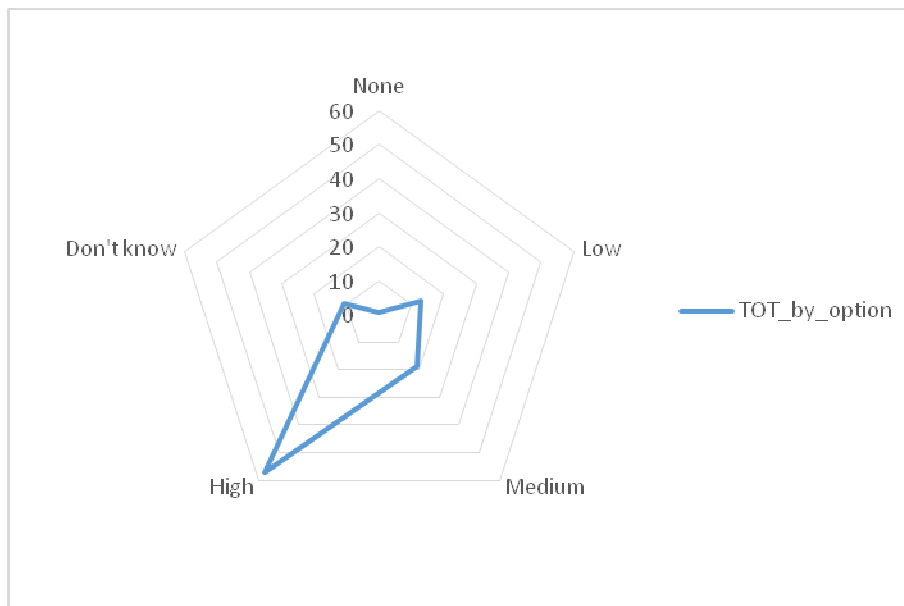
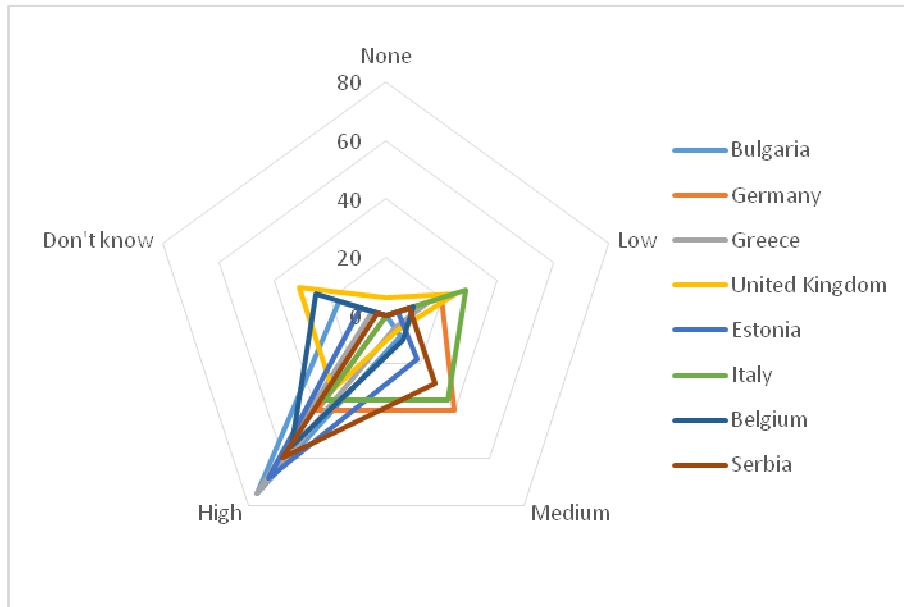


This group of barriers is rated of high-medium importance by respondents concerning the adoption of BEMS and building automation systems, even if relevant peculiarities emerge among countries.

It is rated as being of high importance by at least 50% of respondents from Bulgaria, Greece, Italy and Serbia (Serbia in particular 62%). It is rated as being of medium importance by 45% in Estonia and by at least 30% in Bulgaria, Germany, Italy and Belgium. It is rated as being of low importance by 30% of respondents from Germany and 20% from Greece. Notably, for at

least 20% of respondents of United Kingdom and Belgium this group of barriers has no relevance at all in limiting BEMS and building automation systems.

6.2 Lack of funds or access to finance, lack of financial incentives, high capital costs and financial risk.

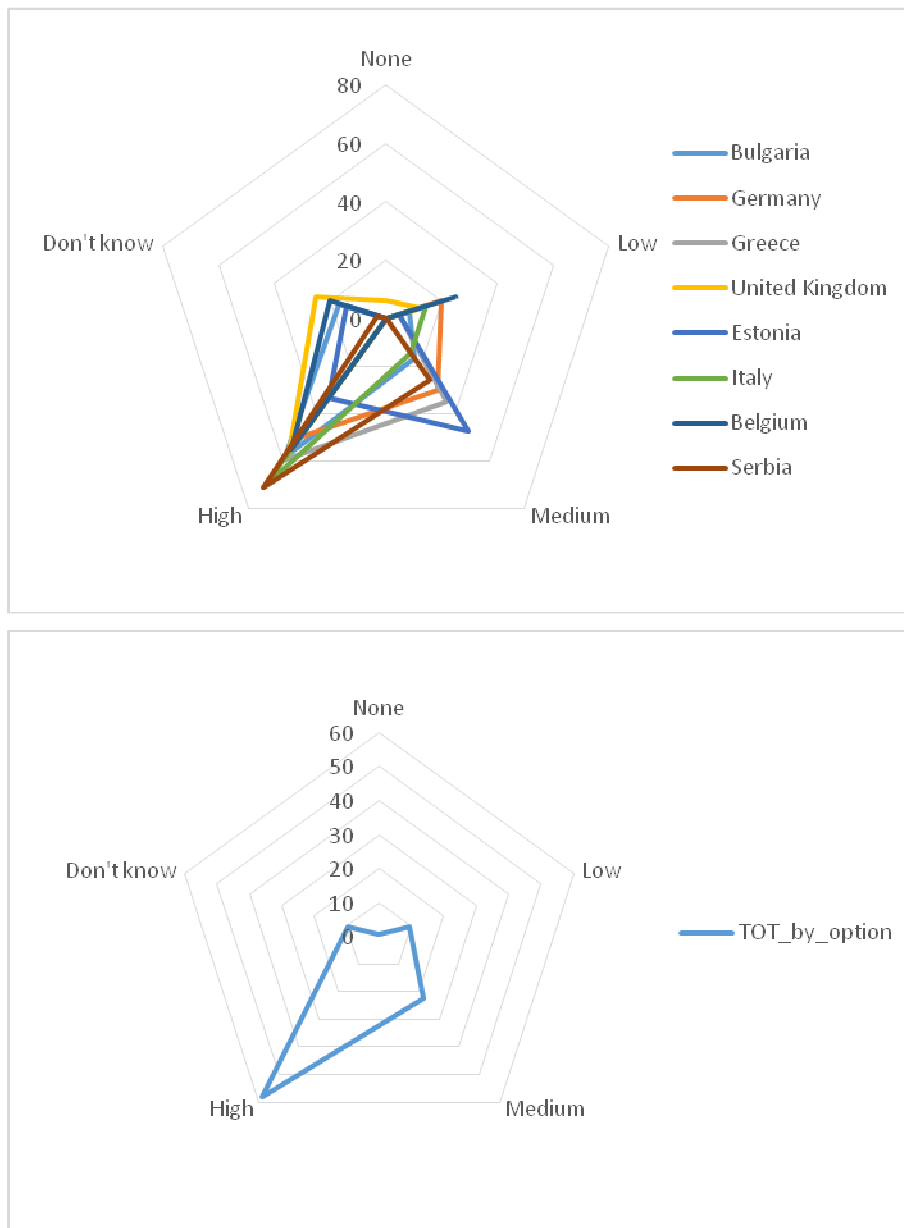


This group of barriers is rated of high importance by respondents concerning the adoption of BEMS and building automation systems, even if some peculiarities emerge for some countries.

It is rated as being of high importance by at least 75% of respondents from Bulgaria and Greece, 68% and 60% from Estonia and Serbia. It is rated as being of medium importance by 40% in Germany and 35% in Italy. It is rated as being of low importance by at least 20% of respondents from Germany, United Kingdom and Italy.

Only for United Kingdom, 31% of respondents are not able to answer this question.

6.3 Lack of trusted information and experience (individuals may not trust who provide them with information on energy savings); difficulties in using new EE technologies; lack of expertise for professionals and technicians.

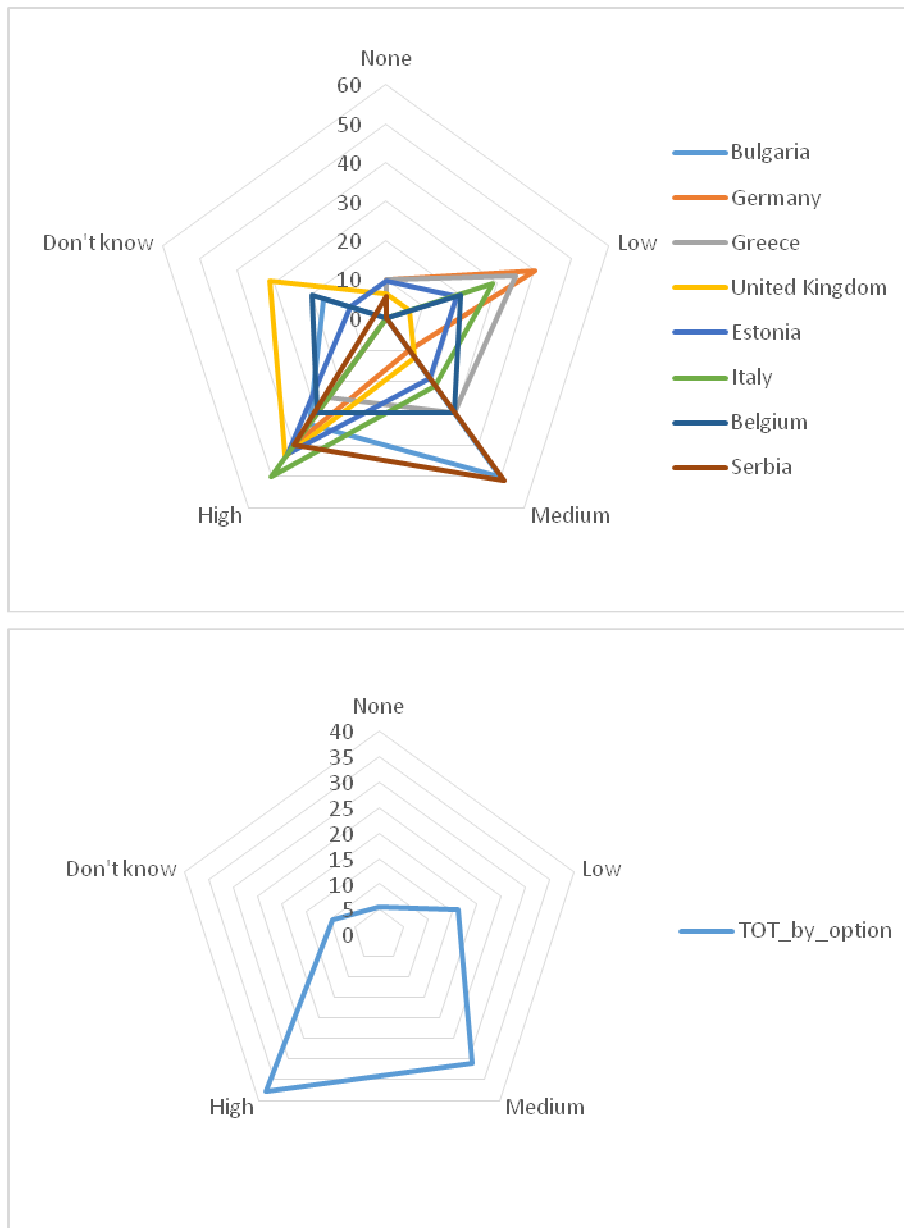


This group of barriers is rated of high importance by respondents concerning the adoption of BEMS and building automation systems, even if some peculiarities emerge for some countries.

It is rated as being of high importance by at least 50% of respondents from almost all countries, except for Estonia, and more than 70% in particular for Italy and Serbia. It is rated as being of medium importance by 47% of respondents from Estonia and at least 30% from Germany and Greece. It is rated as being of low importance by at least 20% of respondents from Germany and Belgium.

For United Kingdom and Belgium only, at least 20% of respondents are not able to answer this question.

6.4 Customs, habits, and relevant behavioural aspects (it may be difficult to change consumer’s habits such as sleeping with TV on).

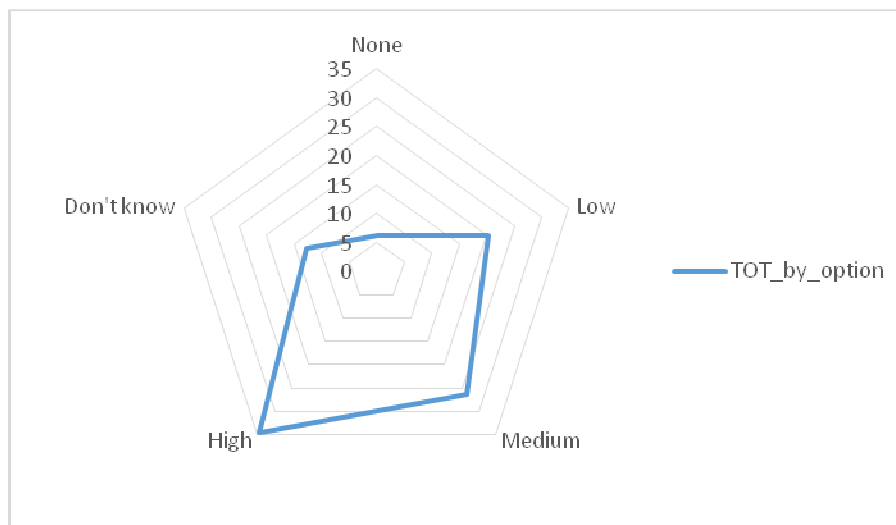
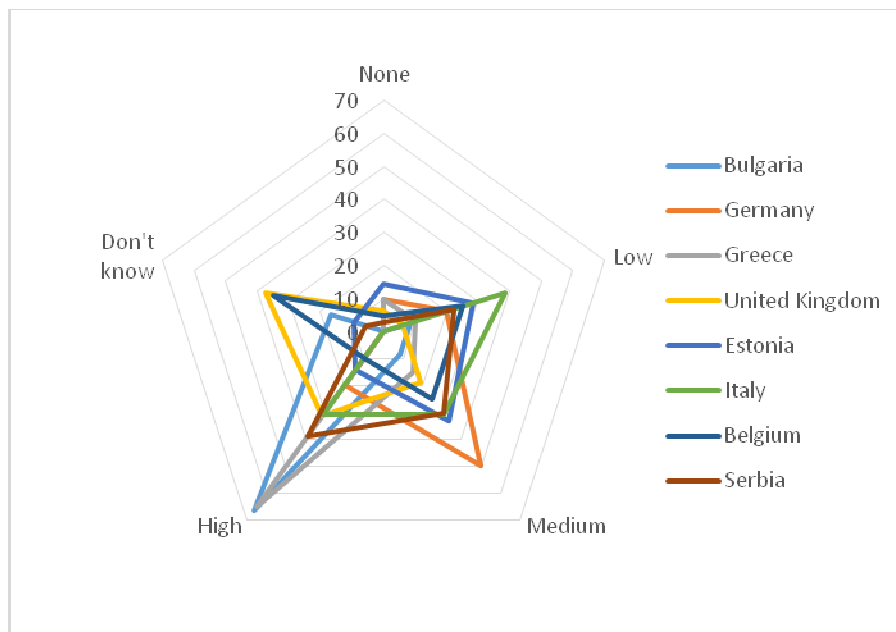


This group of barriers is rated of high-medium importance by respondents concerning the adoption of BEMS and building automation systems, even if relevant peculiarities emerge for some countries.

It is rated as being of high importance by at least 40% of respondents from several partner countries (Germany, United Kingdom, Estonia, Italy, Serbia), in particular 50% for Italy. It is rated as being of medium importance by at least 50% of respondents from Bulgaria and Serbia. It is rated as being of low importance by 40% in Germany and 35% in Greece.

For United Kingdom and Belgium only, 31% and 20% of respondents respectively are not able to answer this question.

6.5 Lack of specific legislation; aged building stock and difficulties in installing EE technologies; split incentive (landlords may not invest in energy efficiency because their tenants pay the energy bills).



This group of barriers is rated of high-medium importance by respondents concerning the adoption of BEMS and building automation systems, even if relevant peculiarities emerge for some countries and by at least 30% of respondents from United Kingdom, Italy and Serbia.

It is rated as being of medium importance by 50% of respondents from Germany and by at least 30% of Estonia, Italy and Serbia.

It is rated as being of low importance by 38% in Italy and by at least 20% in Germany, Estonia and Serbia.

For United Kingdom and Belgium only, 37% and 35% of respondents respectively are not able to answer this question.



**Open question B6: Can you identify any other specific barrier/s that limits the diffusion of Building Energy Management System (BEMS) and building automation systems? If yes, specify and give a relevance grade (Low, Medium, High).**

As for heat pumps and LEDs, **institutional** factors were frequently mentioned among the reported barriers for the diffusion of BEMS and building automation systems, making frequent references to the **technical features** of these technologies. These barriers mainly refer to the fact that this type of technology is suitable and effective mainly for certain typologies of buildings, namely non-residential ones (Belgium Germany, UK), which limits their diffusion in the residential sector. Several respondents highlighted the complexity of these systems (Germany, UK) and the (perceived) disappointing performances (UK), as well its rapid obsolescence (UK). On the policy side, for Serbia a lack of support from the state to local initiatives and good practices regarding these technologies was mentioned, as well as the need to determine which staff of the public sector is working on this topic.

Regarding **educational** barriers, these were mainly identified as the lack of qualification of planners, architects, decision makers (Germany), of competent companies to support end-users (Greece), of public officers inside public administrations (Serbia, UK). Respondents reported a difficulty of familiarization from the end-users with these technologies, also due to their complexity (Belgium, Greece, Estonia). A lack of knowledge and awareness of benefits was also mentioned (Italy).

**Economic** aspects were mainly related to the high costs of these technologies (Estonia) and lack of funding to run finance their use (UK). For Serbia, an issue related to the underpayment of competent professionals was mentioned.

**Social** aspects mainly regarded the lack of housing associations in smaller settlements (Estonia), the complexity of deciding about the use of these technologies in condominiums (Serbia) and the socio-economic status of tenants.

No specifically **cultural** barriers were mentioned



## TRANSPORT SECTOR: ANALYSIS OF RESPONSES FOR EACH QUESTION

The following appendix includes the analysis of responses obtained from the questionnaire across the eight project countries for the transport sector. Results are presented in the following way:

- **Text of the closed question** (aimed to obtain the rating of the barrier) in bold and list of barriers to be rated;
- **Answers to the closed question**, presented for each rated barrier by two spider graphs: the first graph presenting for each country the percentage of respondents providing a specific rating (high relevance, medium relevance, low relevance, no relevance, don't know); the second graph presenting the aggregated percentage per rating; the graphs are followed by a brief written comment;
- **Text of the open question** (aimed to map additional barriers for the specific sector/type of intervention/technology and ways to overcome them) in bold;
- **Answers to the open question**, presented by a written text.

This format is followed for all the sub-sections of the transport sector section of the questionnaire:

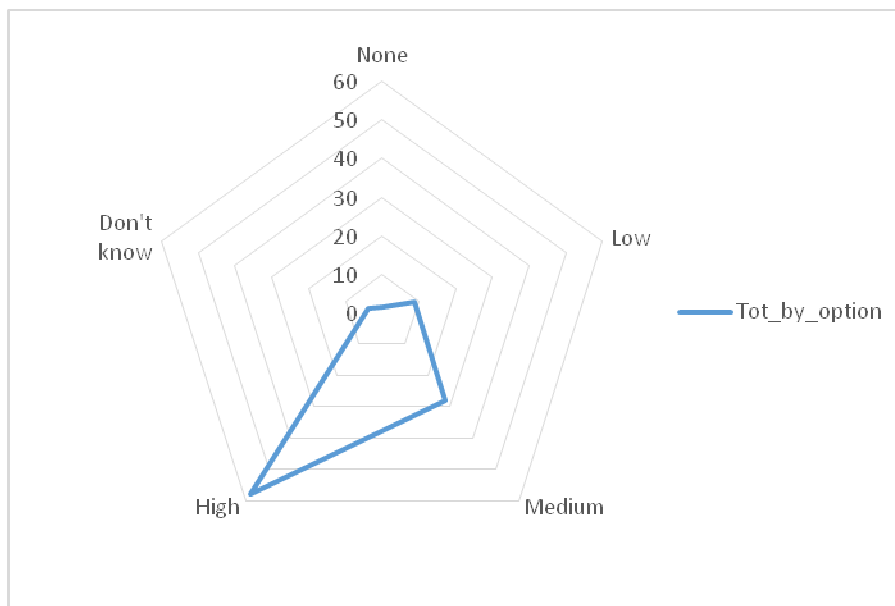
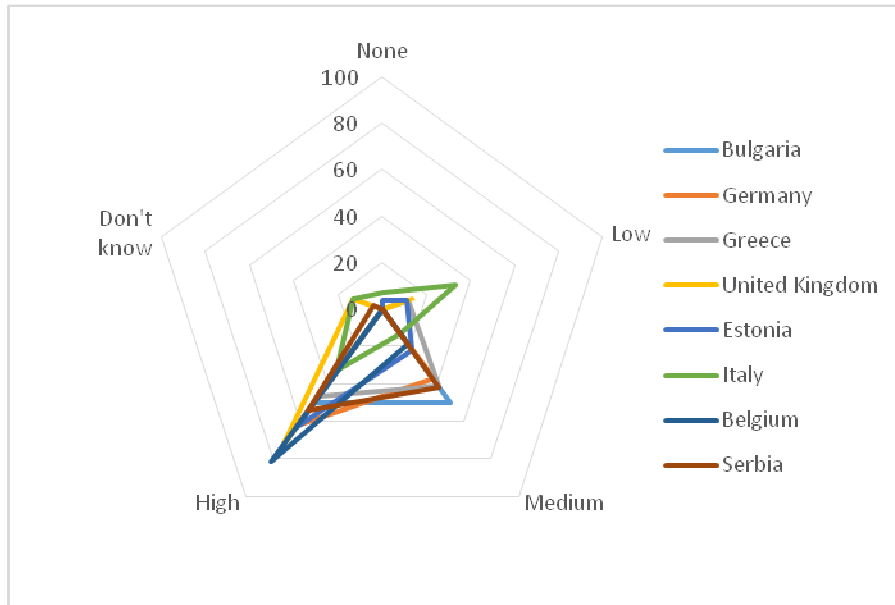
- General questions (referred to the transport sector in general);**
- Barriers limiting the adoption of electric and hybrid vehicles;**
- Barriers limiting the choice of using more sustainable and efficient modes of transport for individuals;**
- Barriers limiting the choice of using more sustainable and efficient modes for freight transport;**

**Question 1: Please rate the relevance of the following barriers to the implementation of energy efficiency (EE) policies in the building sector of your country.**

- 1.17 Low satisfaction with public transport/lack of trust (Individuals may be dissatisfied with public transport and perceive it as more time consuming and less flexible than private means of transport).
- 1.18 Hesitation to trust new technologies (Individuals may not trust new efficient vehicles (e.g. electric vehicles) and consider them less reliable than “known” technologies).
- 1.19 Lack of finance for new vehicles/ultra-low-emission vehicles/public transport (Individuals may lack economic resources to buy new efficient vehicles or to use public transport).
- 1.20 Limited infrastructure investment (Public investments in public transport or in infrastructures for energy efficient vehicles (e.g. electric vehicles) may be limited due to lack of resources).
- 1.21 Low purchasing power of consumers/financial crisis (individuals may be reluctant to invest in energy efficient vehicles because of the lowering effect of the economic crisis on their purchasing power).
- 1.22 Individuals may lack knowledge and information about energy efficient vehicles such as electric vehicles and ultra-low emission vehicles, e.g. information about running costs, variations in vehicle technology, charging routines etc.).
- 1.23 Car as status symbol and as a driver of group influence (individuals may consider owning and driving a private car as a symbol of status and good lifestyle).
- 1.24 Habit and social norm of driving and car ownership (owning and driving a private car may be a deeply-rooted habit and tradition).
- 1.25 Environmental concern/low priority (Environmental impact of vehicles and/or of travelling may have a low priority for individuals when they purchase a new car or when they decide which ways of travelling they should use).
- 1.26 Lack of integrated governance (transport governance may be affected by a lack of integration, deriving i.e. from a fragmentation of responsibility between different public authorities and contradictions in policy goals).
- 1.27 Transport EE on the Government agenda lacking/underrepresented (energy efficiency in the transport sector may have low priority in the governmental agenda).
- 1.28 Inefficient transport infrastructure and planning (available transport infrastructure and further infrastructure planning may be inefficient and/or ineffective in displacing car dominance and promoting energy efficient transport).
- 1.29 Insufficient development of cycling/walking infrastructure (cycling/walking infrastructure (e.g. cycling routes, bicycle parking facilities) may be lacking or not sufficiently developed).
- 1.30 Lack of support for rail transportation/Limited rail infrastructure (Rail infrastructure may be lacking or not sufficiently developed).
- 1.31 Lack of a national strategy for sustainable urban mobility.
- 1.32 Not developed infrastructure for recharging of electric vehicles (electric vehicles recharging infrastructure may be lacking or not sufficiently developed).

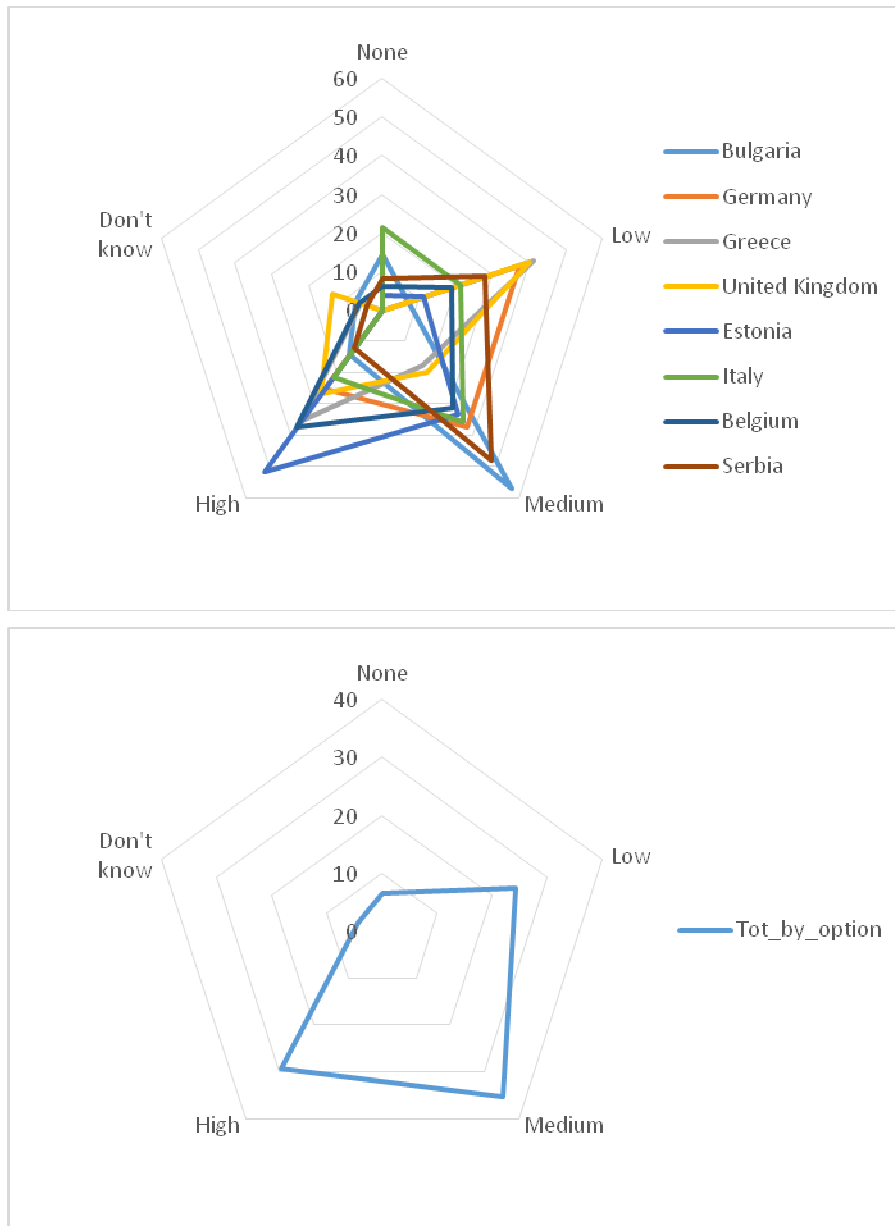
**Question 1: Please rate the relevance of the following barriers to the implementation of energy efficiency (EE) policies in the building sector of your country.**

1.1 Low satisfaction with public transport/lack of trust (Individuals may be dissatisfied with public transport and perceive it as more time consuming and less flexible than private means of transport).



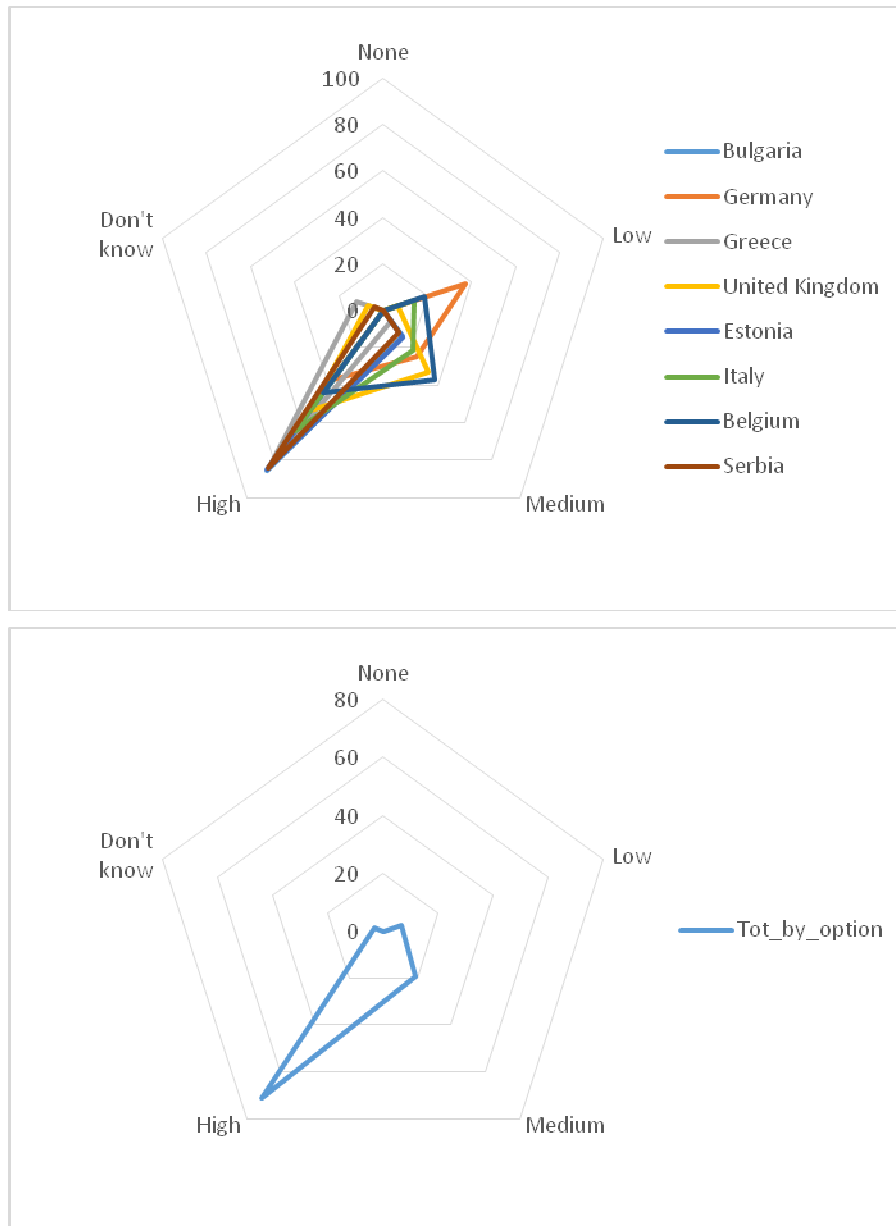
The low satisfaction with public transport is rated as a barrier of high-medium relevance by respondents. They are rated as being of high relevance by a relevant percentage of respondents from Estonia, Belgium, United Kingdom while in other countries such as in Germany, Greece, Serbia and Bulgaria this barrier assumes also a medium relevance. A little share of Italian respondents signals even a low relevance.

1.2 Hesitation to trust new technologies (Individuals may not trust new efficient vehicles (e.g. electric vehicles) and consider them less reliable than “known” technologies).



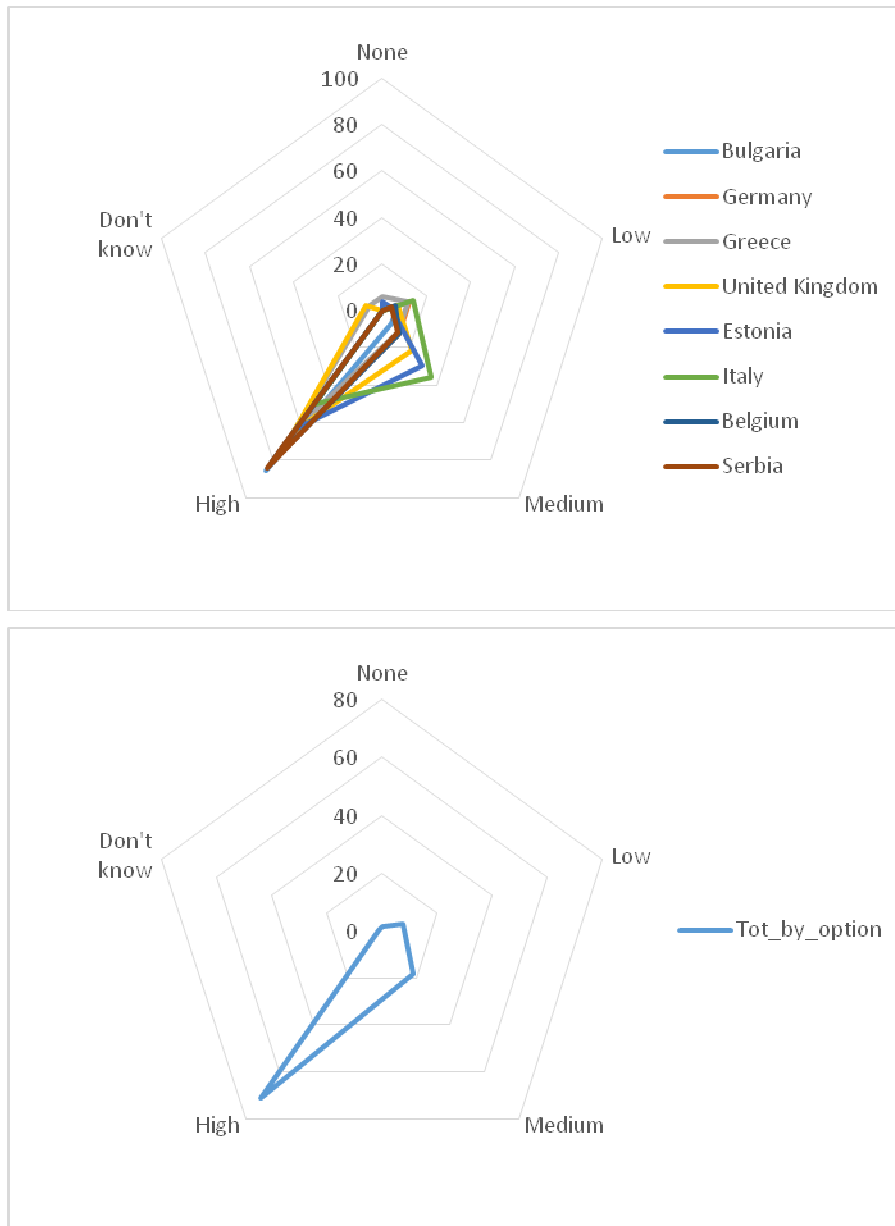
The hesitation to trust new technologies constitutes a heterogeneous barrier across the eight countries analysed. Some convergence is found for respondents from Bulgaria, Serbia and Germany, who declared a medium relevance of this barrier. On the other hand, respondents from Belgium, Estonia, Italy and Greece signals a high relevance. Respondents from United Kingdom declare a low relevance.

1.3 Lack of finance for new vehicles/ultra-low-emission vehicles/public transport (Individuals may lack economic resources to buy new efficient vehicles or to use public transport).



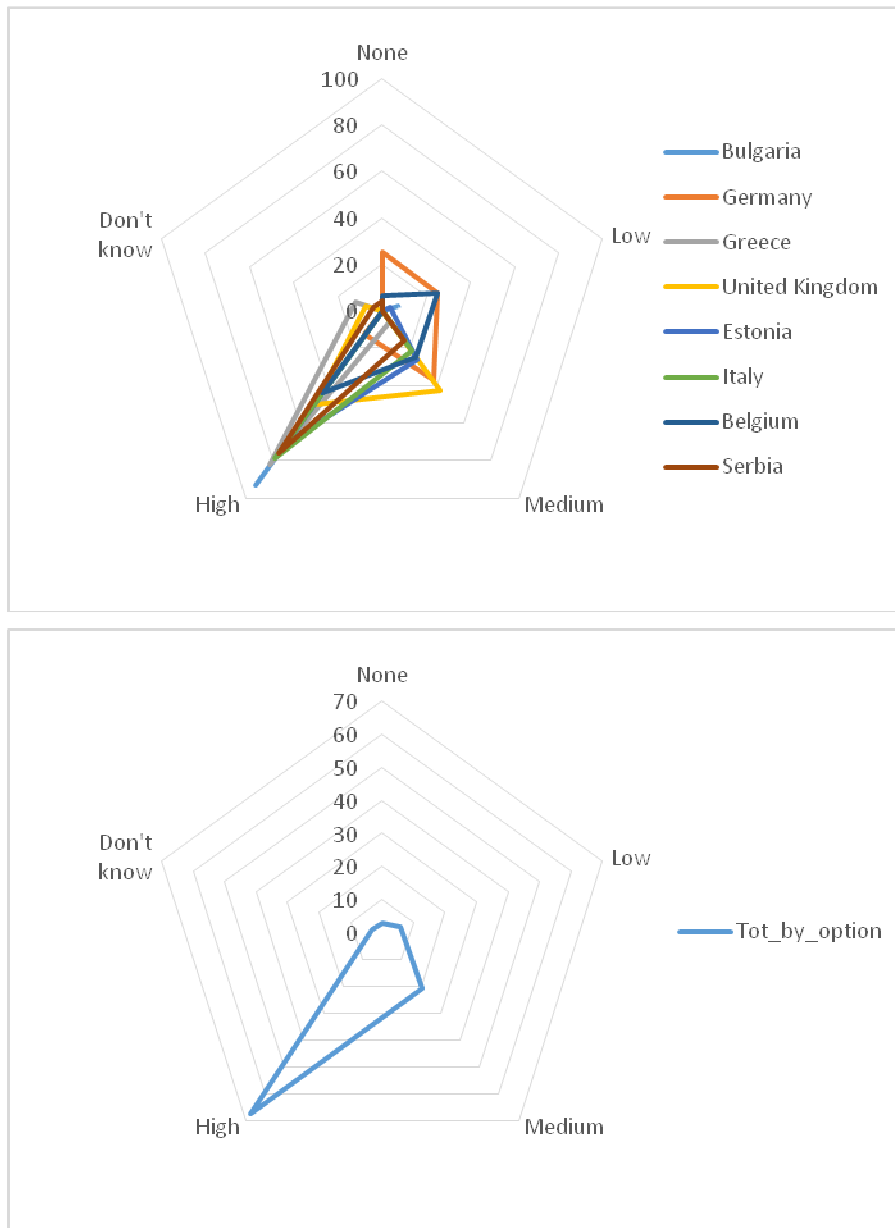
The barrier of lack of finance for more efficient and low-emission vehicles and for public transport shows, overall, a convergence toward a high level of relevance. A very consistent pattern can be found for respondents from Serbia, Estonia, Greece, Italy, Bulgaria and United Kingdom, these latter declaring that this barrier assumes a high relevance. However, a 40% of respondents from Germany declare a low relevance, together to a smaller share (about 20%) in Belgium and United Kingdom.

1.4 Limited infrastructure investment (Public investments in public transport or in infrastructures for energy efficient vehicles (e.g. electric vehicles) may be limited due to lack of resources).



The barrier of limited infrastructures for public transport and for energy efficient vehicles (e.g. electric vehicles) shows a sharp pattern. The majority of respondents from all the eight countries declares this barrier as of high relevance (up to about 90% in the case of Serbia and Bulgaria). Only a lower share of respondents from Italy and Estonia are more oriented to declare a medium relevance (about 30%) and none of respondents declare a low relevance.

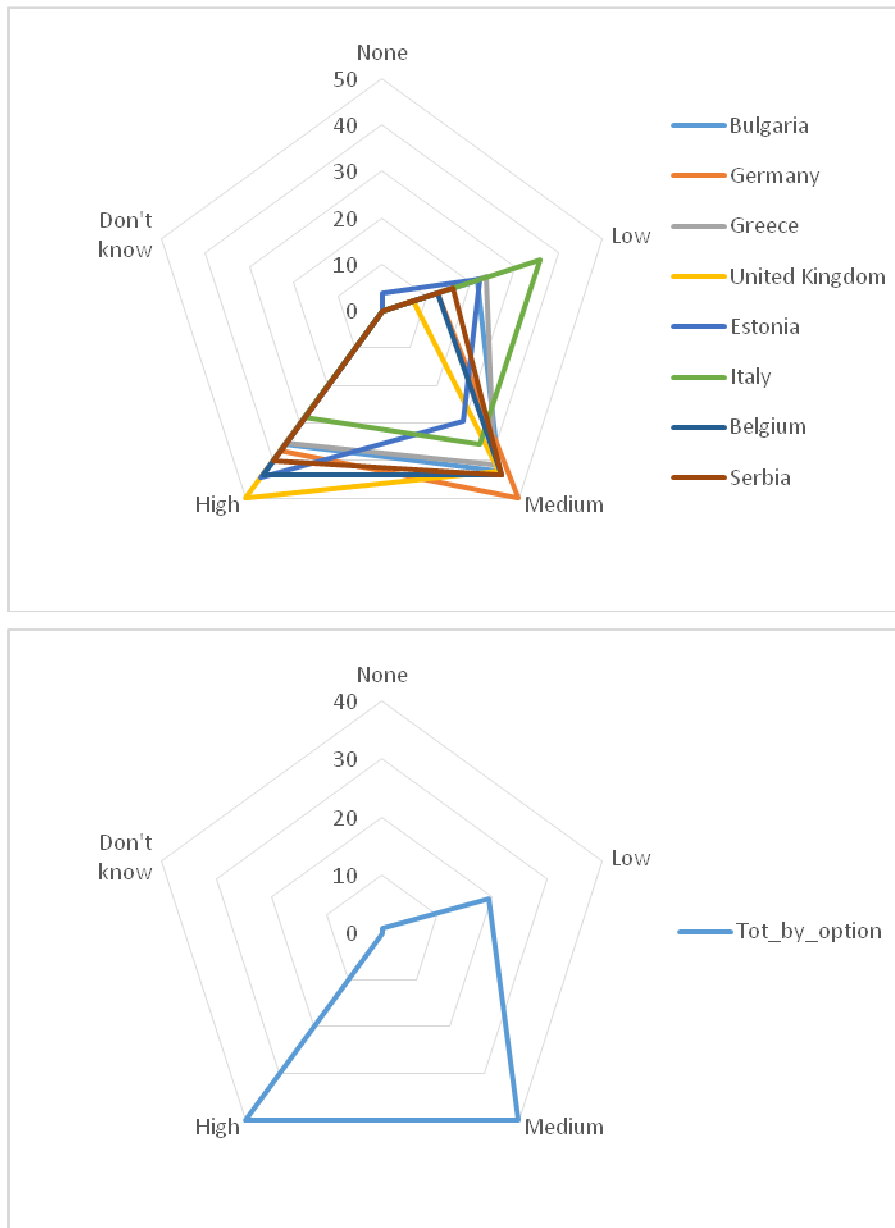
1.5 Low purchasing power of consumers/financial crisis (individuals may be reluctant to invest in energy efficient vehicles because of the lowering effect of the economic crisis on their purchasing power).



Low purchasing power of consumers and the effect of financial crisis is perceived by respondents as highly relevant barrier, especially Estonian respondents (about 90%) . With the exception of respondents from Germany, Belgium and United Kingdom who signal a medium relevance, all the respondents from other countries declare a high relevance. For 30% of German respondents declare that this barrier has no relevance.

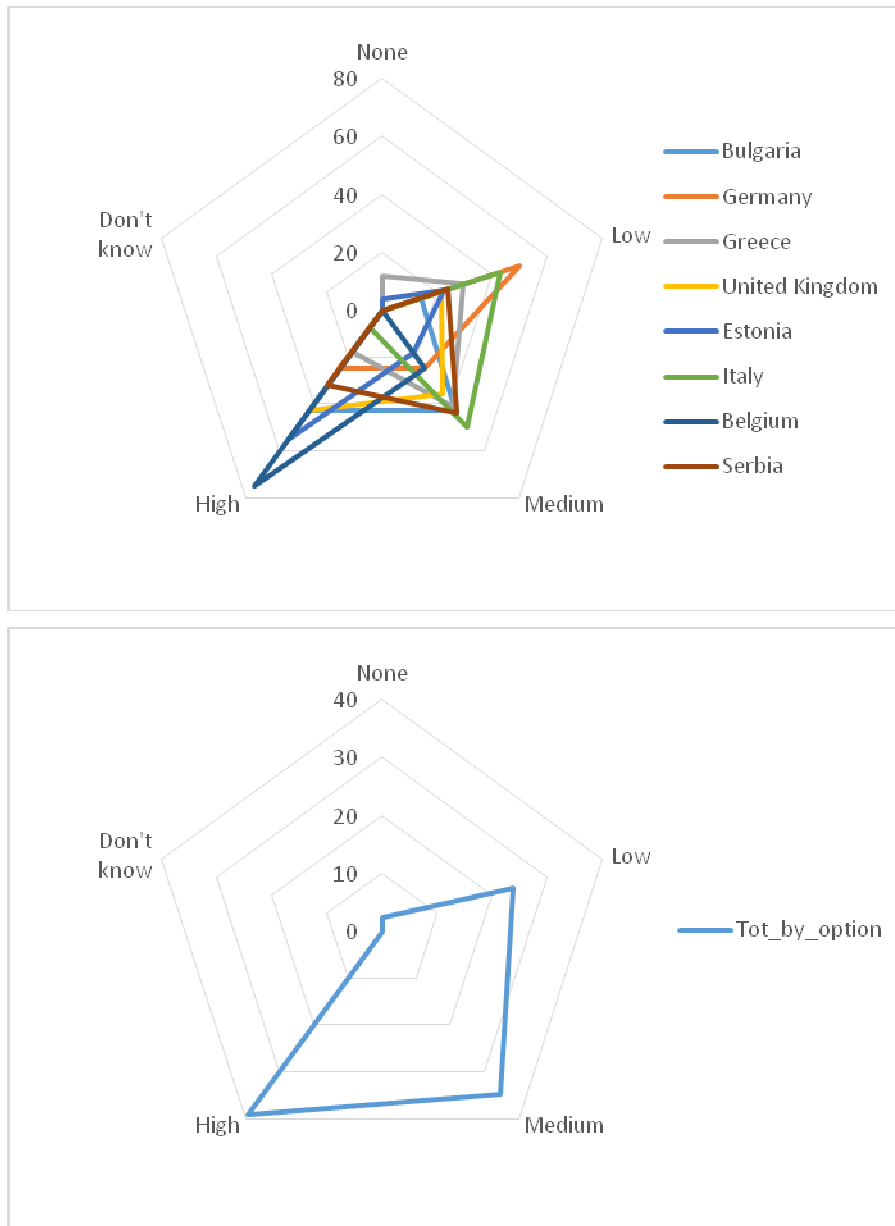


1.6 Individuals may lack knowledge and information about energy efficient vehicles such as electric vehicles and ultra-low emission vehicles (e.g. information about running costs, variations in vehicle technology, charging routines etc.).



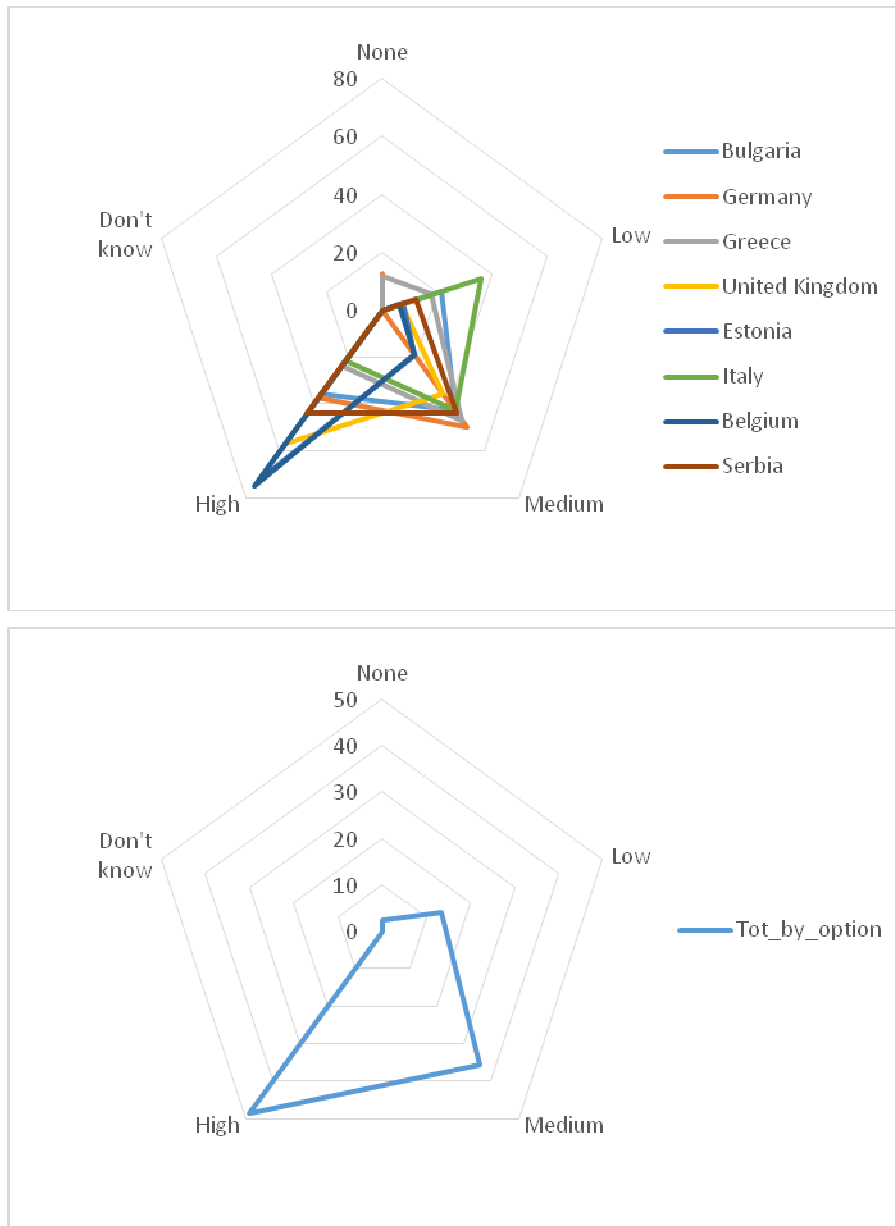
The barrier constituted by lack of knowledge and information about more efficient vehicles shows a heterogeneous pattern. Most of respondents' answers signal a high and medium relevance in all countries together to a smaller share declaring a low relevance. Italy constitutes an exception, since most of respondents declare a medium-low relevance for this barrier.

1.7 Car as status symbol and as a driver of group influence (individuals may consider owning and driving a private car as a symbol of status and good lifestyle).



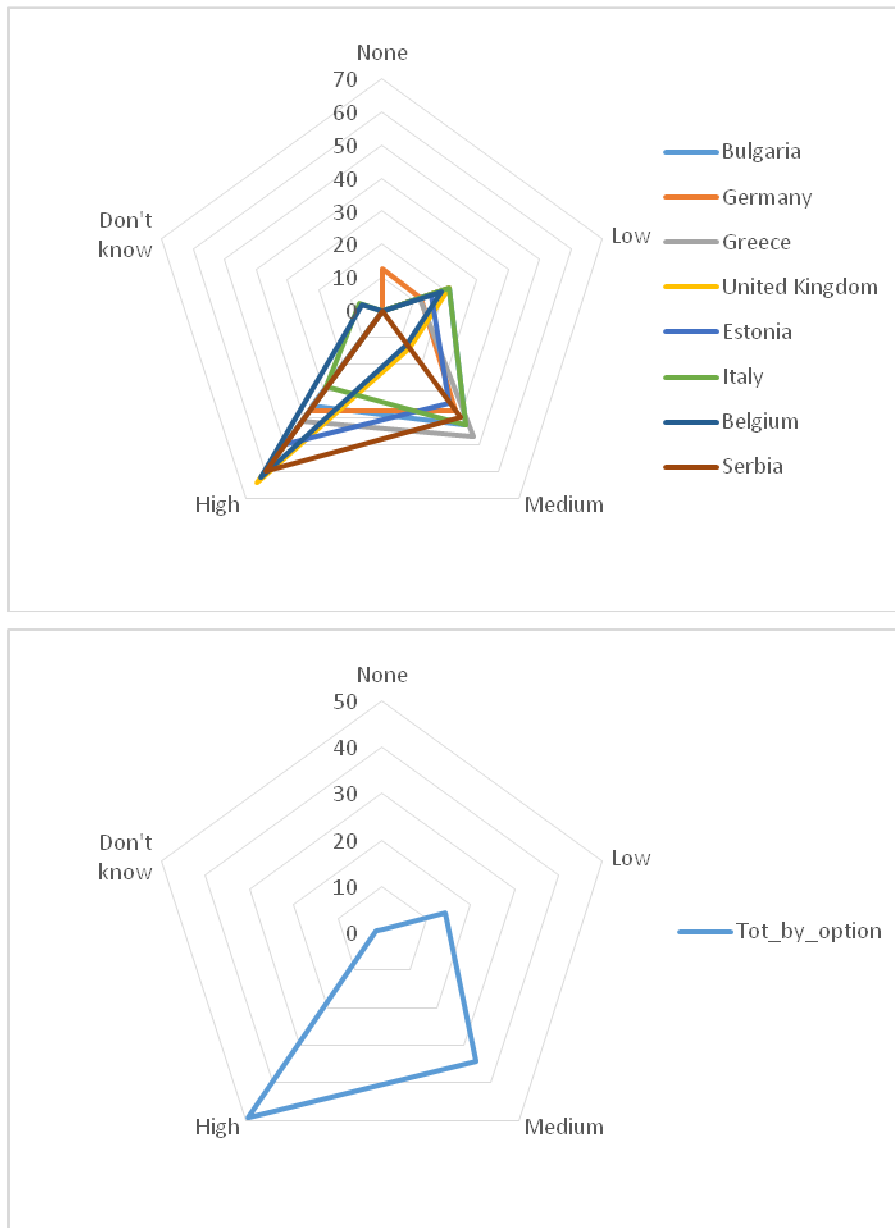
Car as status symbol and as a driver of group influence do not show a consistent pattern across the eight countries. The largest shares of respondents concentrate in declaring a high relevance in Belgium and Estonia, a low relevance in Germany and a medium-low relevance in Italy. Respondents from other countries do not assign extreme values when grading the relevance of this barrier.

1.8 Habit and social norm of driving and car ownership (owning and driving a private car may be a deeply-rooted habit and tradition).



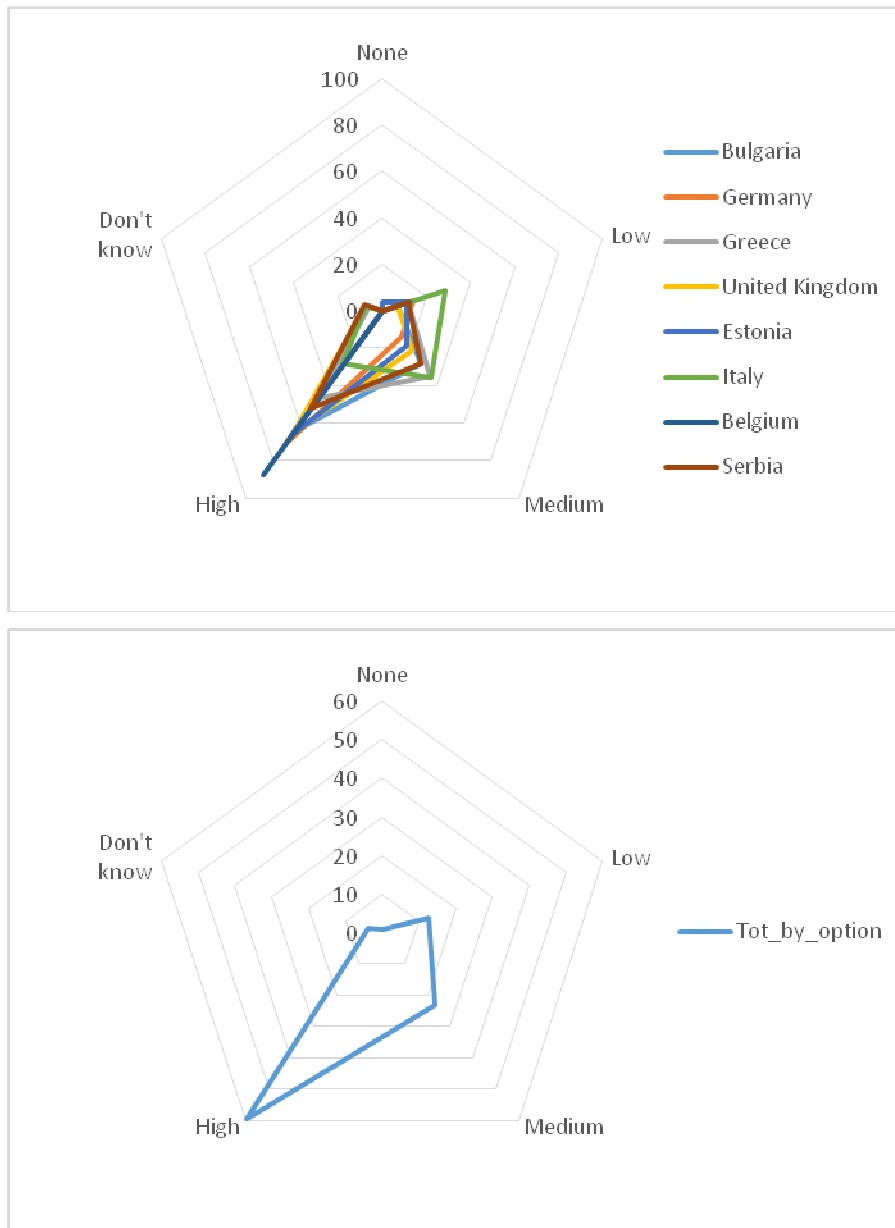
Habit and social norm of driving and car ownership constitute, overall a barrier of high-medium relevance. Specifically, respondents from Belgium and United Kingdom assign to this barrier a high relevance and in the other countries this barrier assumes medium relevance. An exception is constituted by a 40% of Italian respondents, who perceive this barrier as of low relevance.

1.9 Environmental concern/low priority (Environmental impact of vehicles and/or of travelling may have a low priority for individuals when they purchase a new car or when they decide which ways of travelling they should use).



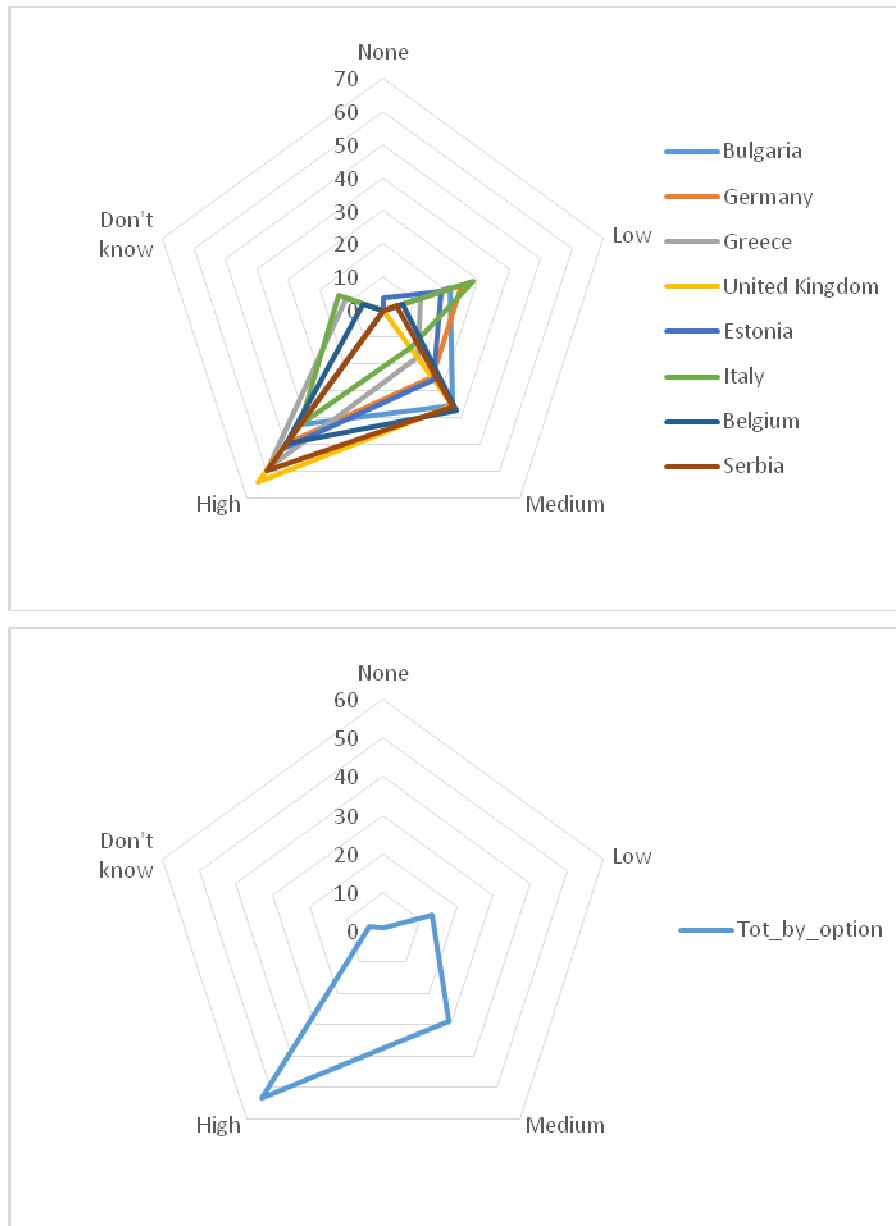
The barrier of environmental concern and low priority when considering the environmental pollution constitutes a barrier of high and medium relevance. There are no exceptions in indicating other extreme values in the sample of respondents from all other countries.

1.10 Lack of integrated governance (transport governance may be affected by a lack of integration, deriving i.e. from a fragmentation of responsibility between different public authorities and contradictions in policy goals).



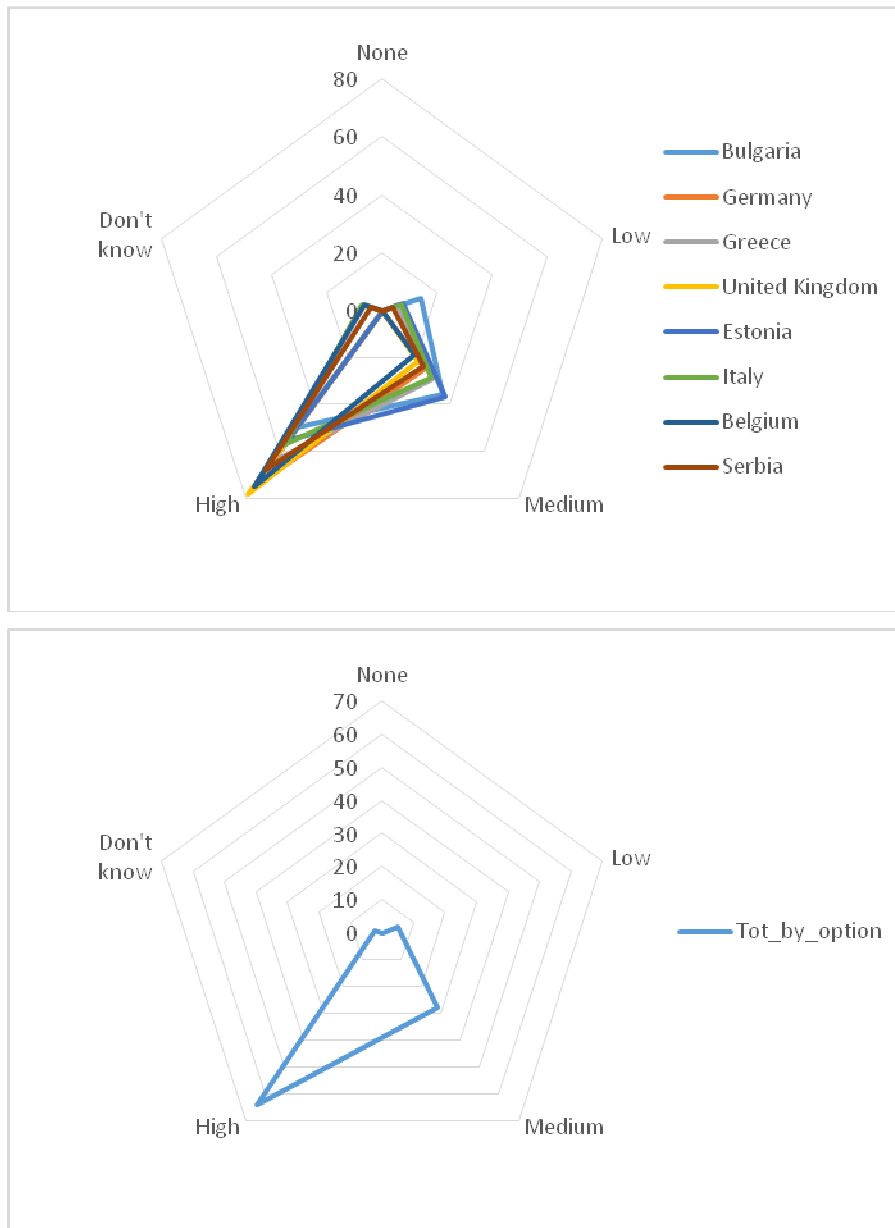
The lack of integrated governance appears as a highly relevant barrier, with only small shares of respondents indicating a medium and low relevance. This pattern is consistent across the eight countries. Only in the case of Italy a slightly larger share (30%) of respondents declare a low relevance.

1.11 Transport EE on the Government agenda lacking/underrepresented (energy efficiency in the transport sector may have low priority in the governmental agenda).



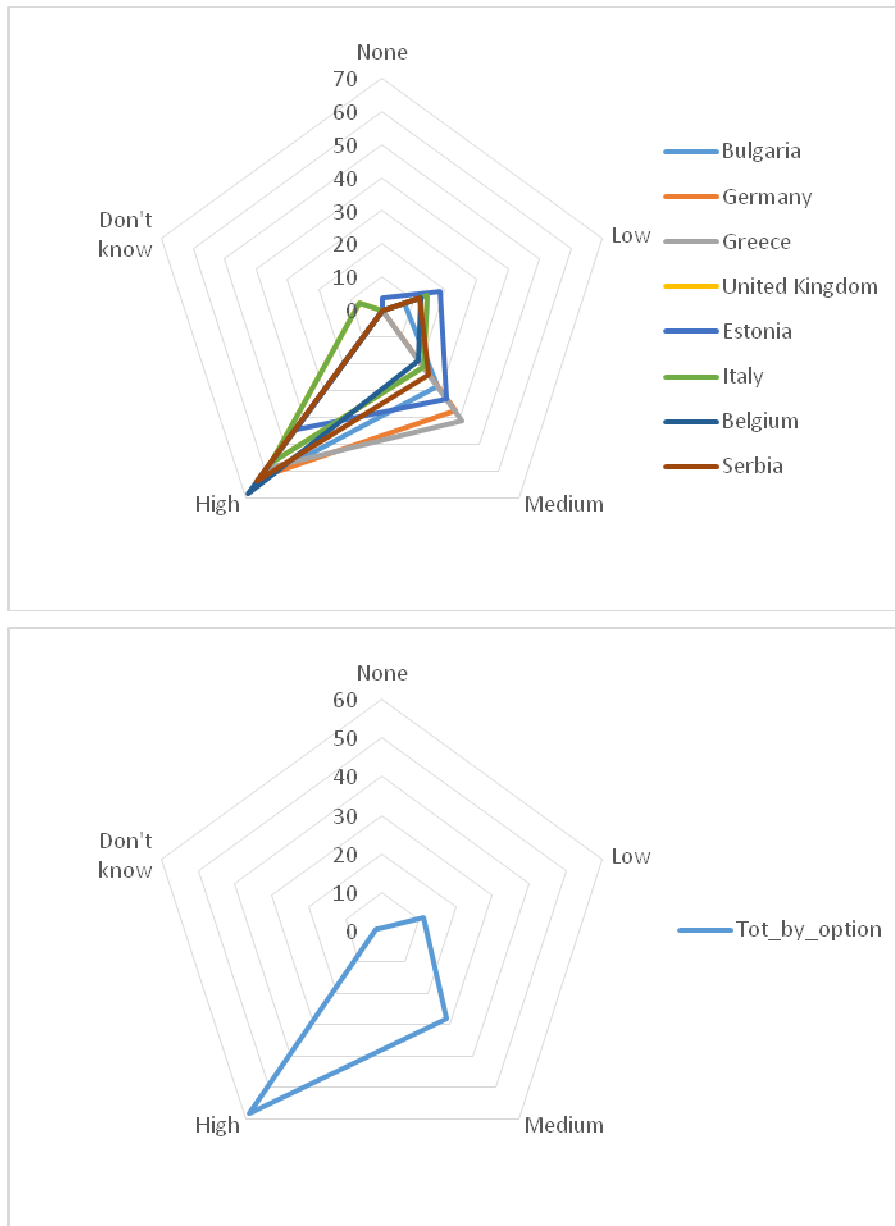
Transport EE on the Government agenda lacking or underrepresented represents, overall, a barrier of high and medium relevance. However, there are smaller shares of respondents from Italy and Greece who do not know how to grade the relevance of this barrier. In Italy, Germany, Bulgaria and Estonia, up to 30% of respondents assign a low relevance.

1.12 Inefficient transport infrastructure and planning (available transport infrastructure and further infrastructure planning may be inefficient and/or ineffective in displacing car dominance and promoting energy efficient transport).



Inefficient transport infrastructure and planning is perceived as a barrier of high relevance when looking at the total answers from all countries. Smaller shares of respondents declare also a medium relevance, especially respondents from Bulgaria and Estonia (up to 40%). Only about 10% of respondents from Bulgaria declare a low relevance.

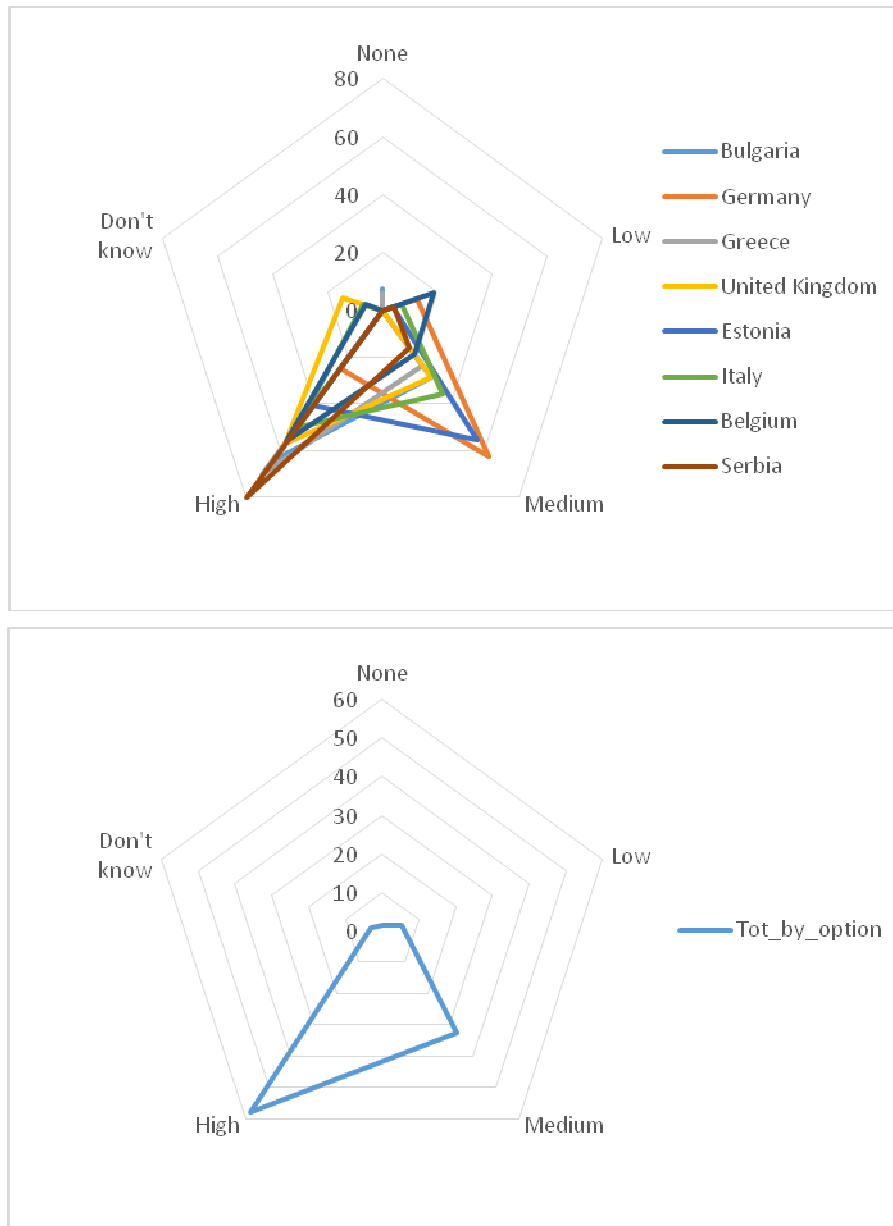
1.13 Insufficient development of cycling/walking infrastructure (cycling/walking infrastructure (e.g. cycling routes, bicycle parking facilities) may be lacking or not sufficiently developed).



The barrier of insufficient development of cycling/walking infrastructure, overall, is perceived as a highly relevant barrier for about 60%, while the remaining respondents declare a medium relevance. In Estonia, a 20% declares that this barrier assumes a low relevance. The same grade interests a smaller share (15%) of respondents from Italy and Serbia.

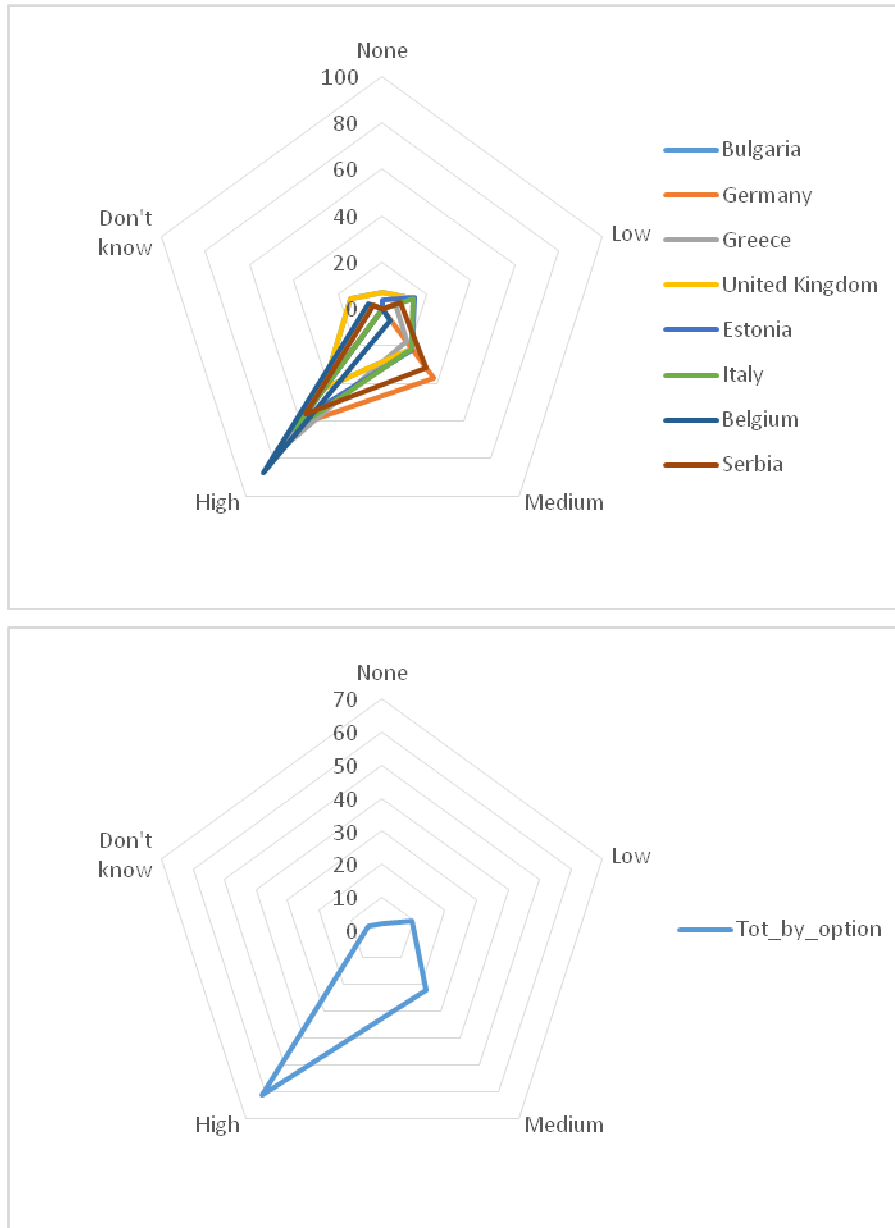


1.14 Lack of support for rail transportation/Limited rail infrastructure (Rail infrastructure may be lacking or not sufficiently developed).



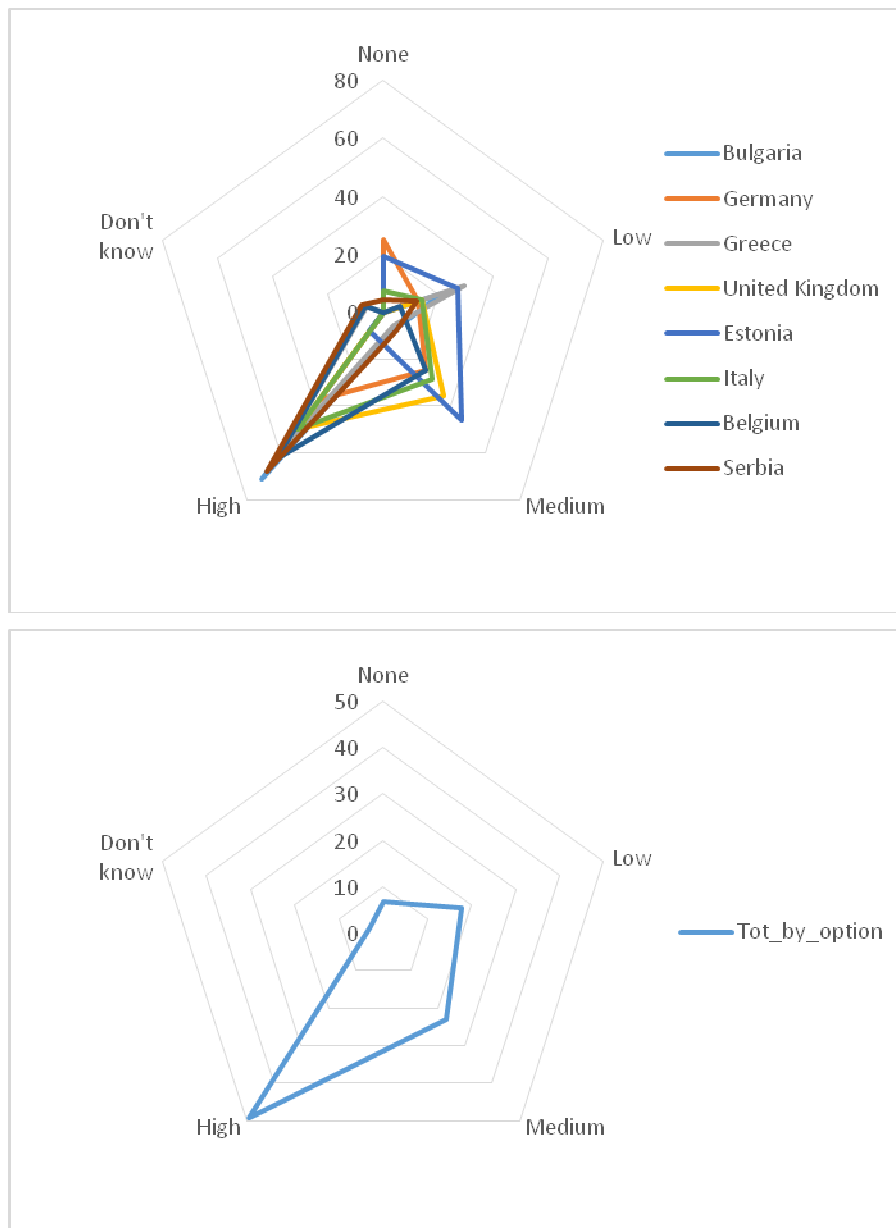
Lack of support for rail transportation and limited rail infrastructure shows a dual pattern. It constitutes a barrier of high relevance for respondents from Serbia, United Kingdom, Belgium, Bulgaria and Greece. On the other hand, respondents from Germany, Estonia and, in smaller part from Italy, declare that this barrier assumes a medium relevance.

1.15 Lack of a national strategy for sustainable urban mobility.



A very sharp pattern appears in the case of lack of a national strategy for sustainable urban mobility. Most of respondents from all the countries declare that this barrier constitutes a high relevant one. However, when disaggregating the answers by country, about 40% of respondents from Serbia and Germany declare a medium relevance.

1.16 Not developed infrastructure for recharging of electric vehicles (electric vehicles recharging infrastructure may be lacking or not sufficiently developed).



Not developed infrastructure for recharging of electric vehicles is declared being a barrier of high relevance for respondents from Italy, Serbia, Belgium and Bulgaria. A medium relevance for this barrier is declared by respondents from Estonia (50%) and United Kingdom (40%). Low relevance is declared by a 30% of respondents from Greece and Estonia. It is also worth noting that about a 30% of respondents from Germany and a 20% from Estonia declare that this barrier does not assume any relevance.

**Open question T1: To the best of your knowledge, what are the other barrier/s, which negatively affect the implementation of EE policies in the transport sector? And in what ways / why?**

In their open answers, more than half of respondents mentioned **institutional** barriers as relevant factors affecting the implementation of EE policies in the transport sector in their country. On the policy side, several respondents highlighted for UK the lack of a governmental policy and long term vision, lack of coordination between public authorities at different levels, of policies to make public transport reliable and convenient, and a too strong focus on private cars. Also for Serbia, a lack of clear priorities and a comprehensive strategy on sustainable and efficient transport was reported (Serbia). For Germany, institutional barriers are a too strong focus on electrical mobility and too scarce focus on energy efficiency of conventional vehicles, and a lack of a transparent information and ticket structure in public transport. For Italy, a lack of economic and regulatory incentives in policies was reported. For Estonia, an uncertainty of the government policies in this sector, in particular regarding fuels taxation. On the planning side, a lack of coherent spatial planning (UK) and a missing integration between public transport and long distances, regional and city traffic was reported (Germany). A key issue highlighted for Italy and UK is the unreliability of public transport, which obliges people to opt for other more polluting transport modes. Looking at the governance and management of the services, for Serbia the monopolization of public transport by inefficient public companies was highlighted; in Italy, energy efficiency competences are placed in external entities to the operator company, which does favour the roll out of EE interventions. On the company side, for Belgium a still strong focus and promotion of company cars was reported.

Looking at **economic** barriers, the higher cost of public transport in comparison with private cars (UK) and the high prices of electric or ultra-low impact vehicles (Italy) were highlighted. For Italy, several respondents reported factors that limit the investments in low transport modes, such as the lack of incentives and the reliance of investments to renovate the rail fleet and to realize new infrastructures on funding at national or regional level, which makes the definition of the planning of interventions very complex.

Regarding **educational** barriers, they mainly referred to: energy efficiency of mobility as an unclear issue, often interpreted only as electric mobility (Germany); an overestimation of public transport costs in comparison with private cars, performed by travelers (Belgium); a lack of interest from researchers to the bicycle as energy efficient transport mode (Belgium); and an insufficient knowledge of policy makers on these topics (Estonia).

Among the **cultural** factors, a too aggressive behavior of “green thinkers” (people with strong environmental awareness) was reported as an element that is proving to be counterproductive, since instead of sensitizing people to act in a more sustainable friendly way it is pushing away them from sustainable behaviours (Estonia).

Two additional barrier categories to EE transport policies have been identified through the open answers provided by the survey: **infrastructural** barriers, that mainly refer to the insufficient public transport network, lack of adequate infrastructures for sustainable mobility (Estonia, UK) and the lack of alternatives to more polluting modes (Italy); and **morphological** elements, such as the city structure and planning history, which can influence the possibility to implement sustainable transports infrastructures (UK).

Some respondents also suggested **policies** to address these barriers and advance with the implementation of EE policies in the transport sector. These are listed below:

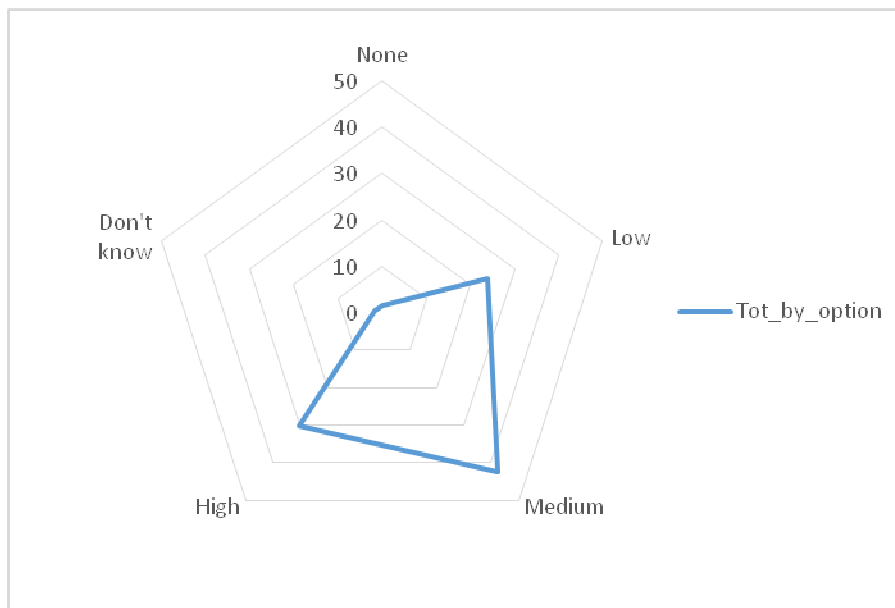
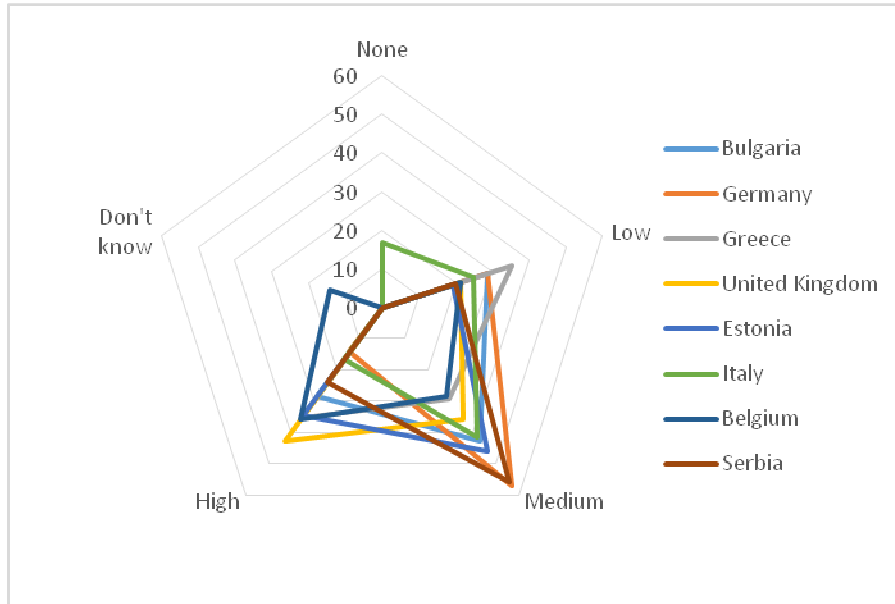
- A more integrated planning approach to transportation (Bulgaria);
- Flexible working hours (e.g. possibility to avoid travelling in peak hours) and telework, to support a wider use of public transport (UK);
- Inclusion of requirements for electrical buses or gas buses in public procurement (Estonia)
- A wider and timely application of Life-Cycle Costing analysis for transport investments (Italy);
- Promoting reconversion of existing fueling stations, instead of creating new several charging stations (Belgium);
- Promote a comprehensive strategy on sustainable and efficient transport with clear priorities, that should include different types of financial incentives and education to raise awareness (Serbia).

***Question 2: According to your expertise, to what extent are the following barriers relevant in limiting the adoption of electric and hybrid vehicles?***

- 2.6 Hesitation to trust technologies (individuals may not trust electric and hybrid vehicles and consider them less reliable than 'known' traditional technologies).
- 2.7 Lack of finance (individuals may lack economic resources to buy new efficient vehicles); limited infrastructure investment; reduced purchasing power of citizens due to financial crisis.
- 2.8 Individuals may lack knowledge and information about energy efficient vehicles such as electric vehicles and ultra-low emission vehicles, e.g. information about running costs, variations in vehicle technology, charging routines).
- 2.9 Car as status symbol and as a driver of group influence; private car characterized by deeply-rooted habits and traditions.
- 2.10 Fragmentation of responsibility between different public authorities and contradictions in policy goals; inefficient public transport infrastructure; not developed infrastructure for recharging of electric vehicles.

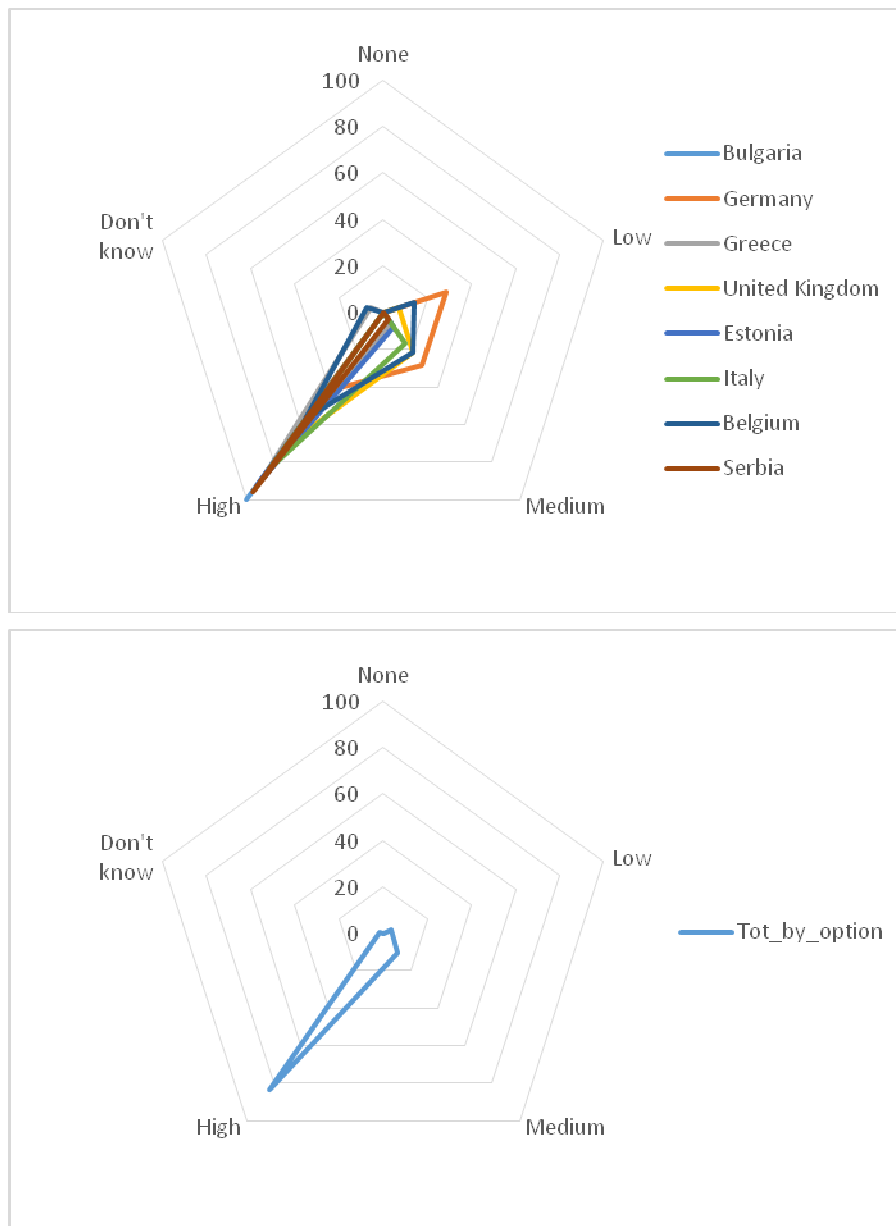
**Question 2: According to your expertise, to what extent are the following barriers relevant in limiting the adoption of electric and hybrid vehicles?**

2.1 Hesitation to trust technologies (individuals may not trust electric and hybrid vehicles and consider them less reliable than ‘known’ traditional technologies).



Hesitation to trust technologies can be defined, overall, a barrier of medium relevance. With the exception of respondents from United Kingdom and Belgium, whose majority declare that this barrier is of high relevance, the highest shares of respondents from other countries declare a medium relevance. A further exception is constituted by Greek respondents, since the majority of these latter declare a low relevance. About a 20% of respondents from Italy declare not to know the relevance and a 20 % from Belgium does not assign any relevance to this specific barrier.

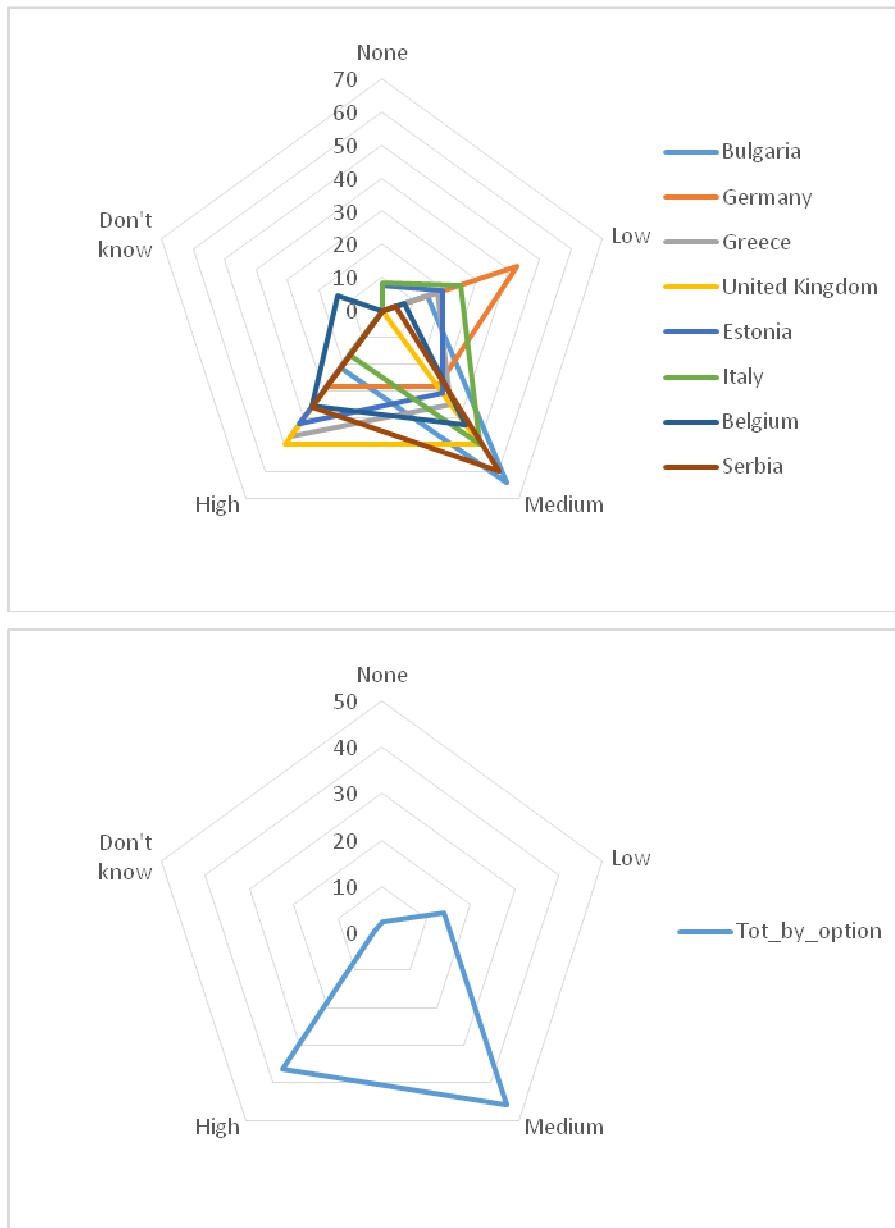
2.2 Lack of finance (individuals may lack economic resources to buy new efficient vehicles); limited infrastructure investment; reduced purchasing power of citizens due to financial crisis.



The rating of lack of finance as a barrier of high relevance is consistent across the respondents of all the eight countries, with the exception of Germany, since about 20% of German respondents declare a low relevance.

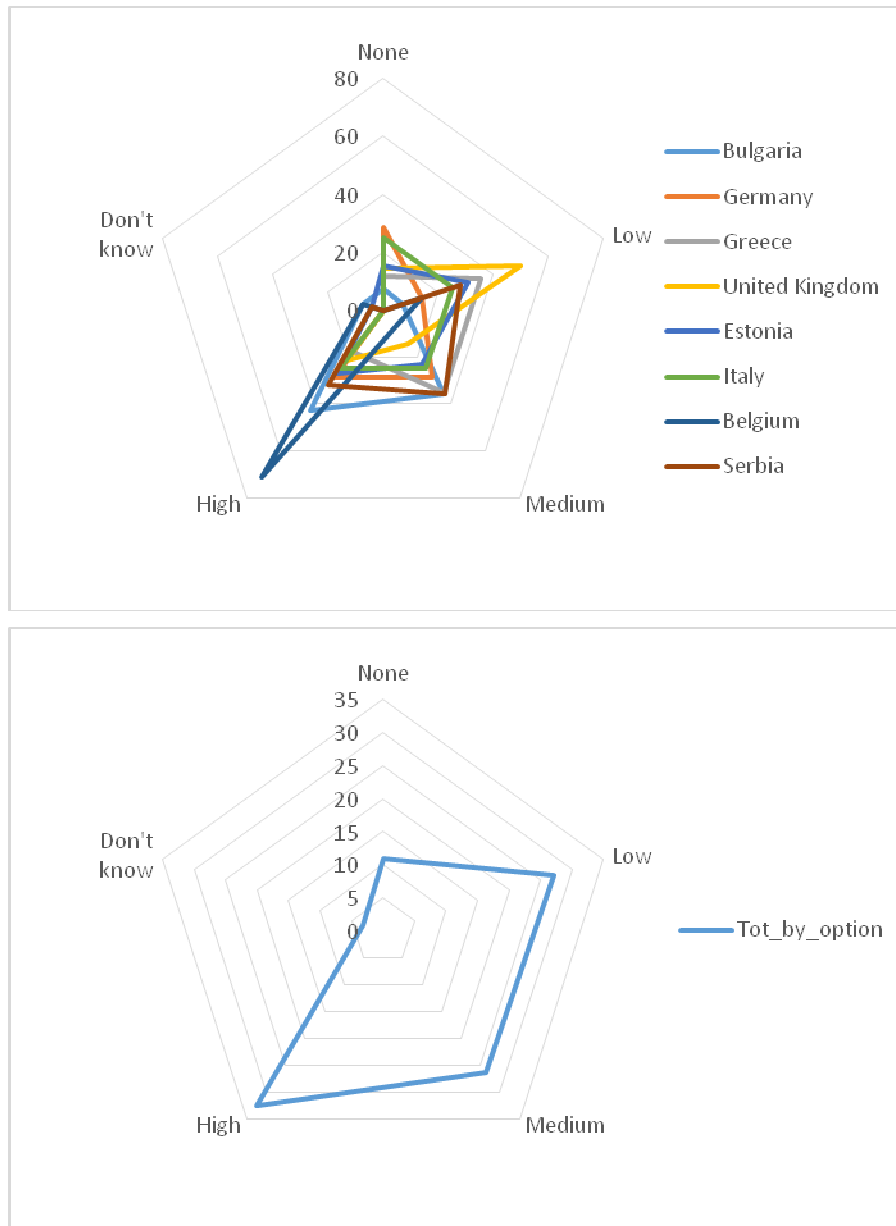


2.3 Individuals may lack knowledge and information about energy efficient vehicles such as electric vehicles and ultra-low emission vehicles (e.g. information about running costs, variations in vehicle technology, charging routines).



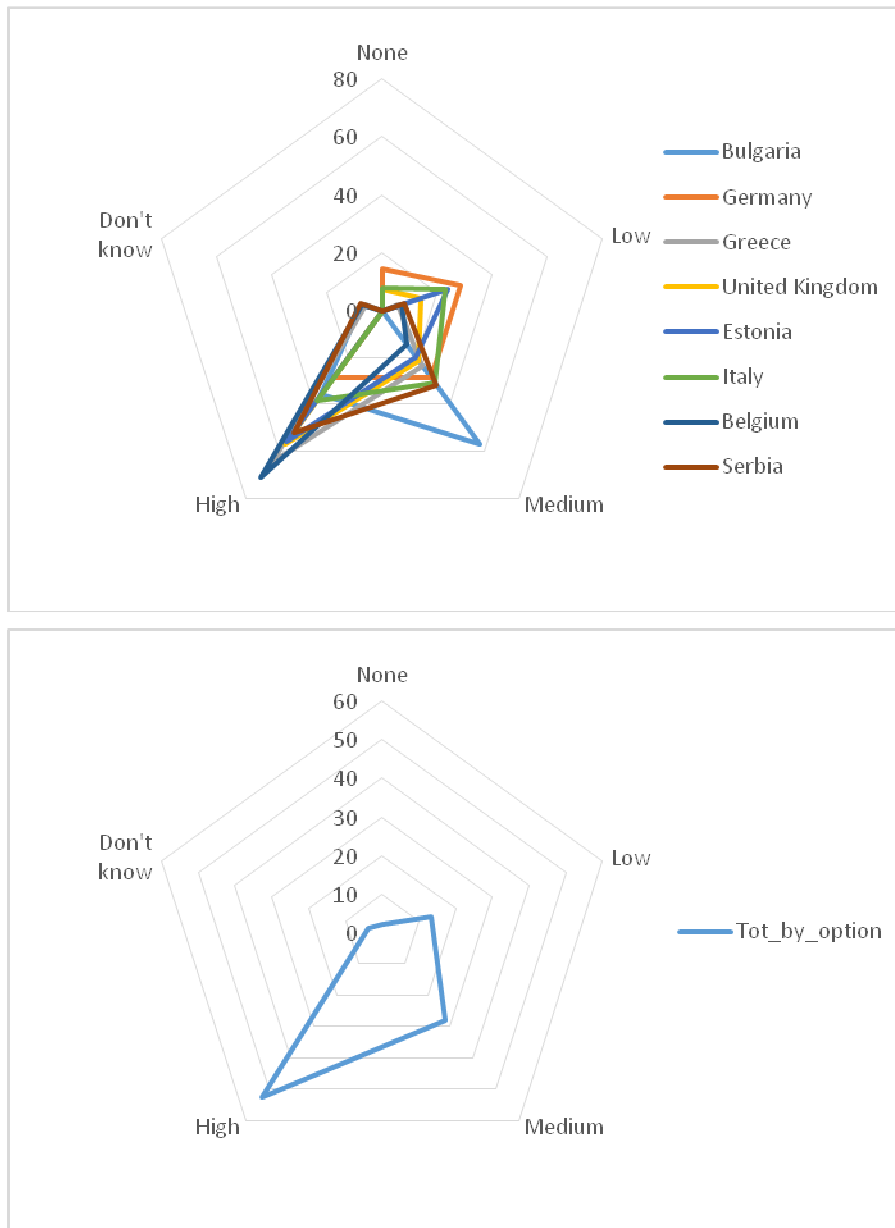
Lack of knowledge and information about energy efficient vehicles shows a differentiated pattern. Most of respondents from United Kingdom, Belgium, Greece and Estonia declare both a medium and high relevance, while larger shares in Bulgaria and Serbia (up to 65%). The majority of respondents from Germany indicate a low relevance (35%) and a low share of respondents from Belgium (15%) do not know the relevance of this barrier.

2.4 Car as status symbol and as a driver of group influence; private car characterized by deeply-rooted habits and traditions.



Car as status symbol and as a driver of group influence assumes high relevance only for the majority of respondents from Belgium (about 70%), and for a lower share from Bulgaria (40%). Respondents from other countries show a consistent pattern oriented toward medium and low relevance. A further exception is given by a 50% of respondents from United Kingdom declaring a low relevance.

2.5 Fragmentation of responsibility between different public authorities and contradictions in policy goals; inefficient public transport infrastructure; not developed infrastructure for recharging of electric vehicles.



Fragmentation of responsibility between different public authorities and contradictions in policy goals is, overall, a barrier whose relevance is high for the majority of respondents from Belgium, Serbia, Greece, Estonia and United Kingdom, and for a lower part from Italy. On the other hand, a low relevance is declared by the majority of respondents from Germany. Also, almost a 20% of German respondents declare that this barrier has no relevance.

**Open question T2: Can you identify any other specific barrier that limit the diffusion of electric and hybrid vehicles? If yes, specify and give a relevance grade (Low, Medium, High).**

For specific barriers limiting the diffusion of electric and hybrid vehicles, almost half of open answers mentioned **institutional** factors. These include technical features of these vehicles, which may be perceived in a negative way by consumers, such as: short battery duration (Estonia), vehicle performance (Italy), low comfortableness in winter time (Estonia), aesthetic appeal (Italy). On the policy and planning side, for Belgium a respondent highlighted that poor spatial planning and weakly developed and badly coordinated public transport the use of a (private) car is all too often a must. Current tax incentives also encourage the ownership and use of cars (company cars) and not of the alternatives. Also for Estonia, the lack of a car tax for fossil-fuelled vehicles was mentioned as barrier. A specific issue regards Greece, where insurance companies do not recognize the continuation of the guarantee of a hybrid or electric car after a crash – even a small one. For UK, the failure to promote other forms of access to these vehicles is reported as a potential limiting factor (e.g. not only owning or renting but also cars-without-drivers forms).

Regarding **economic** barriers, these mainly referred to: high costs of batteries (Germany), high purchase costs of vehicles (Estonia, Greece); a respondent from Estonia notes in particular that the price of hybrid vehicles and diesel vehicles are the same for consumers, but diesel is less complicated to repair; and lack of incentives (Serbia).

Regarding **educational** barriers, these mainly referred to the lack of knowledge of the advantages associated with these typologies of vehicles (UK) and hostile campaigns carried out by motoring journalists and automotive engineers (UK), even if this is reported to be changing rapidly.

No additional cultural and social barriers were reported by respondents.

A respondent also made a suggestion for **policies** to address these barriers and further diffuse electric and hybrid vehicles. This is listed below:

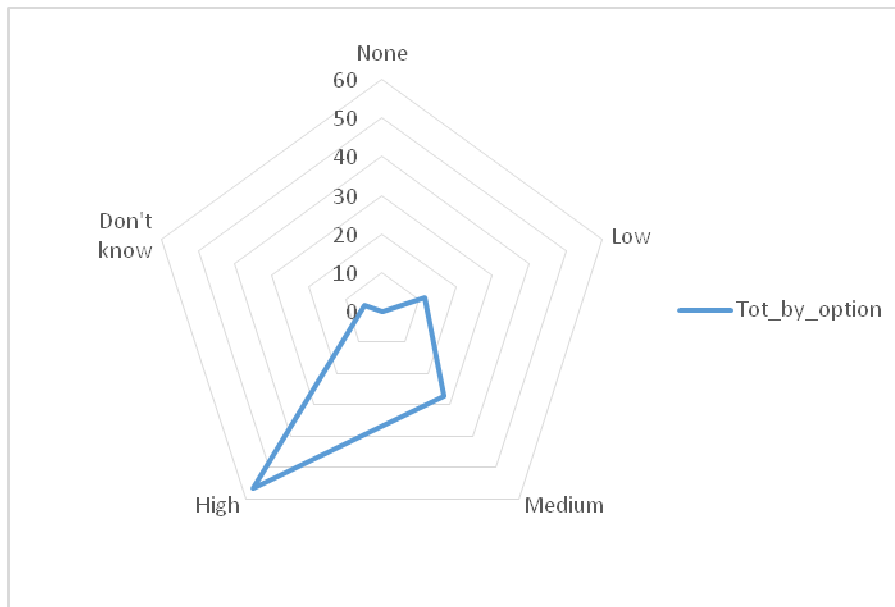
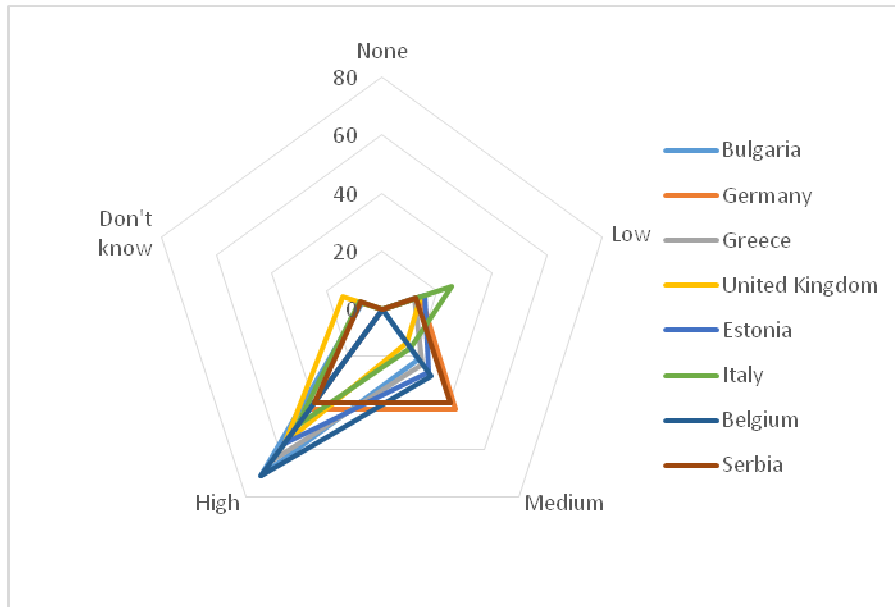
- More research, rather than direct funding of electric vehicles, addressing specifically battery solutions which is a key feature deeply influencing their total life cycle costs (Germany).

***Question 3: According to your expertise, to what extent are the following barriers relevant in limiting the choice of using more sustainable and efficient modes of transport for individuals?***

- 3.6 Low satisfaction with public transport (individuals may be dissatisfied with public transport and other more sustainable transport means and perceive them as more time consuming and less flexible).
- 3.7 Low purchasing power of consumers/financial crisis (individuals may be reluctant to adopt energy saving transport modes because of the lowering effect of the economic crisis on their purchasing power).
- 3.8 Individuals may lack knowledge and information about energy saving transport means such as electric vehicles and ultra-low emission vehicles (e.g. information about running costs, variations in vehicle technology, etc.).
- 3.9 Habit and social norm of using traditional less efficient transport means (owning and driving a private car may be a deeply-rooted habit and tradition).
- 3.10 Lack of infrastructures and planning (available transport infrastructure and further infrastructure planning may be inefficient and/or ineffective in promoting energy efficient and more sustainable transport).

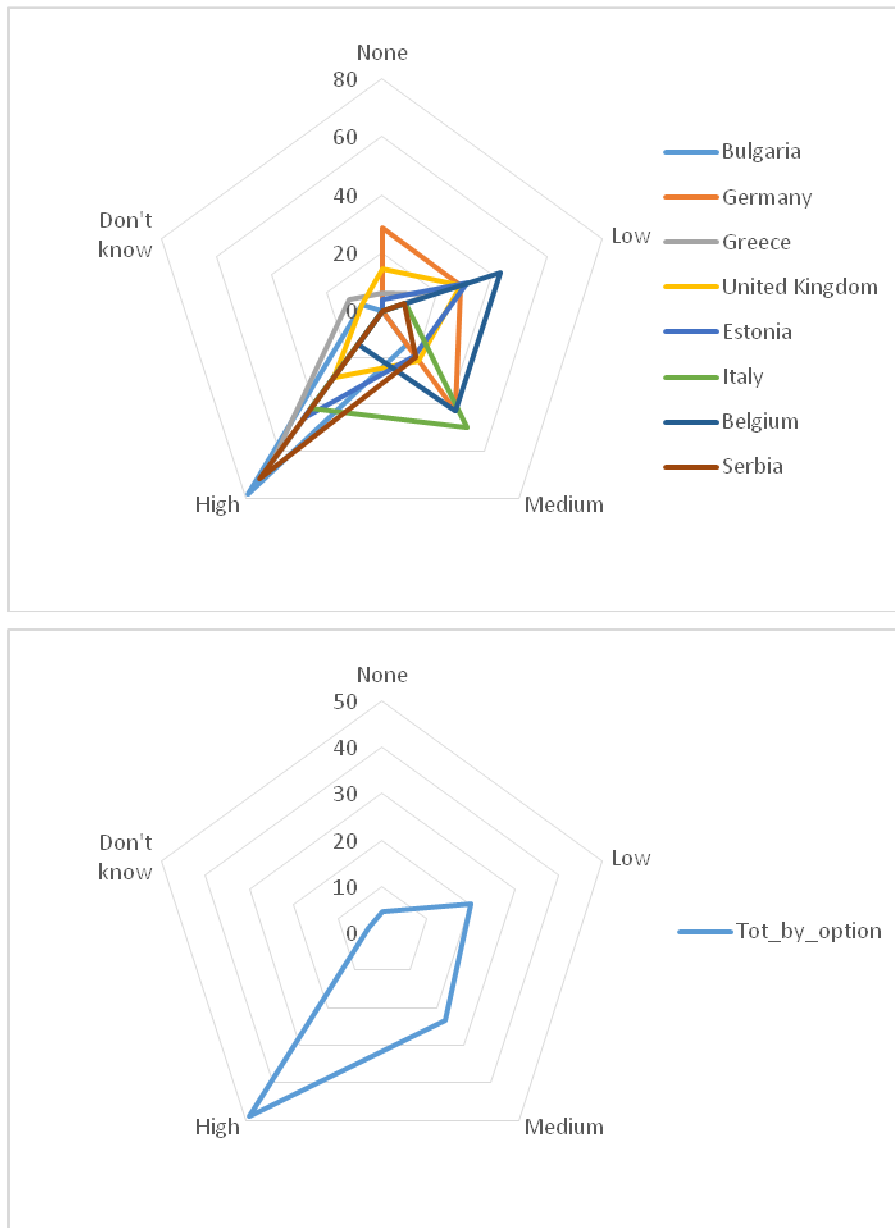
**Question 3: According to your expertise, to what extent are the following barriers relevant in limiting the choice of using more sustainable and efficient modes of transport for individuals?**

3.1 Low satisfaction with public transport (individuals may be dissatisfied with public transport and other more sustainable transport means and perceive them as more time consuming and less flexible).



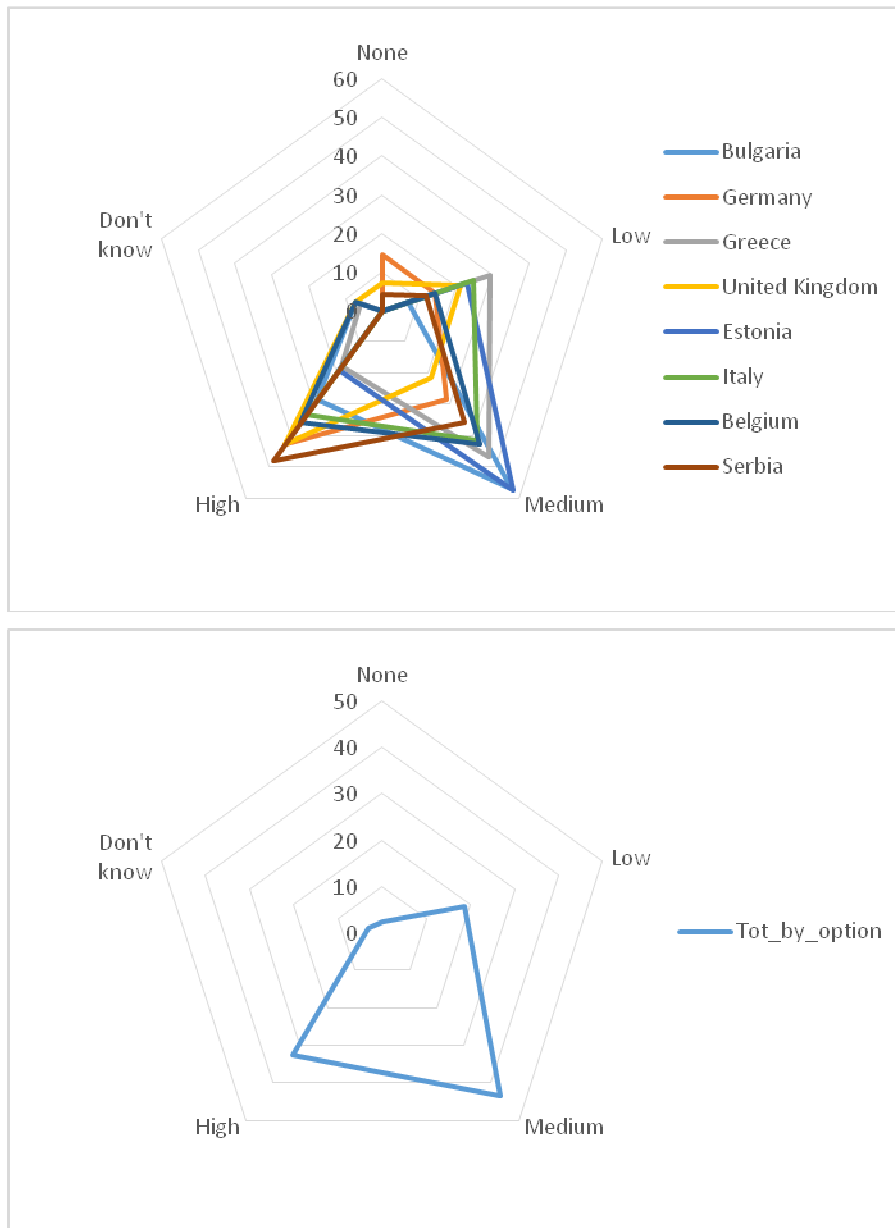
Low satisfaction with public transport is rate by the majority of respondents as a barrier of high relevance. Exceptions are constituted by Germany and Serbia, whose highest shares of respondents declare a medium relevance. About a 30% of Italian respondents rate this barrier as of low relevance and a very small share of respondents from United Kingdom (about 10%) do not know how to assign a grade.

3.2 Low purchasing power of consumers/financial crisis (individuals may be reluctant to adopt energy saving transport modes because of the lowering effect of the economic crisis on their purchasing power).



The barrier of low purchasing power of consumers and the effect of financial crisis is perceived by respondents from Bulgaria, Serbia and Greece as highly relevant. Almost 50% of respondents from Belgium rate this barrier as of low relevance. 30% and 10% of respondents from Germany and United Kingdom respectively, declare that this barrier has no relevance. In Italy, the highest share of respondents (about 50%) declares a medium relevance.

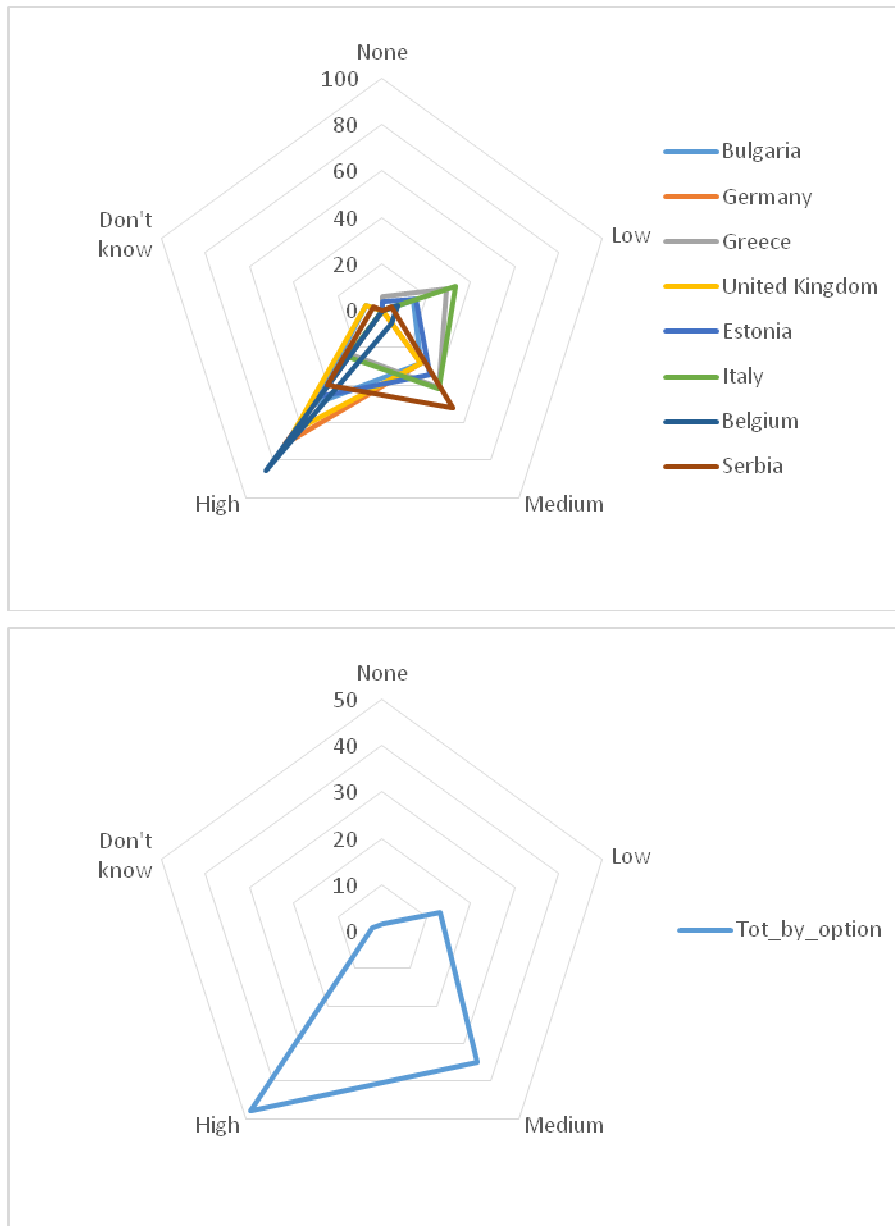
3.3 Individuals may lack knowledge and information about energy saving transport means such as electric vehicles and ultra-low emission vehicles (e.g. information about running costs, variations in vehicle technology, etc.).



The lack knowledge and information about energy saving transport means tend to be, overall, a barrier of medium relevance, although there are respondents from countries such as Serbia, United Kingdom, Germany and Belgium who declare a high relevance. In Germany, a small share of respondents (10%) declares no relevance. Respondents from Estonia, Greece, Italy, Bulgaria are consistent in indicating a medium relevance.

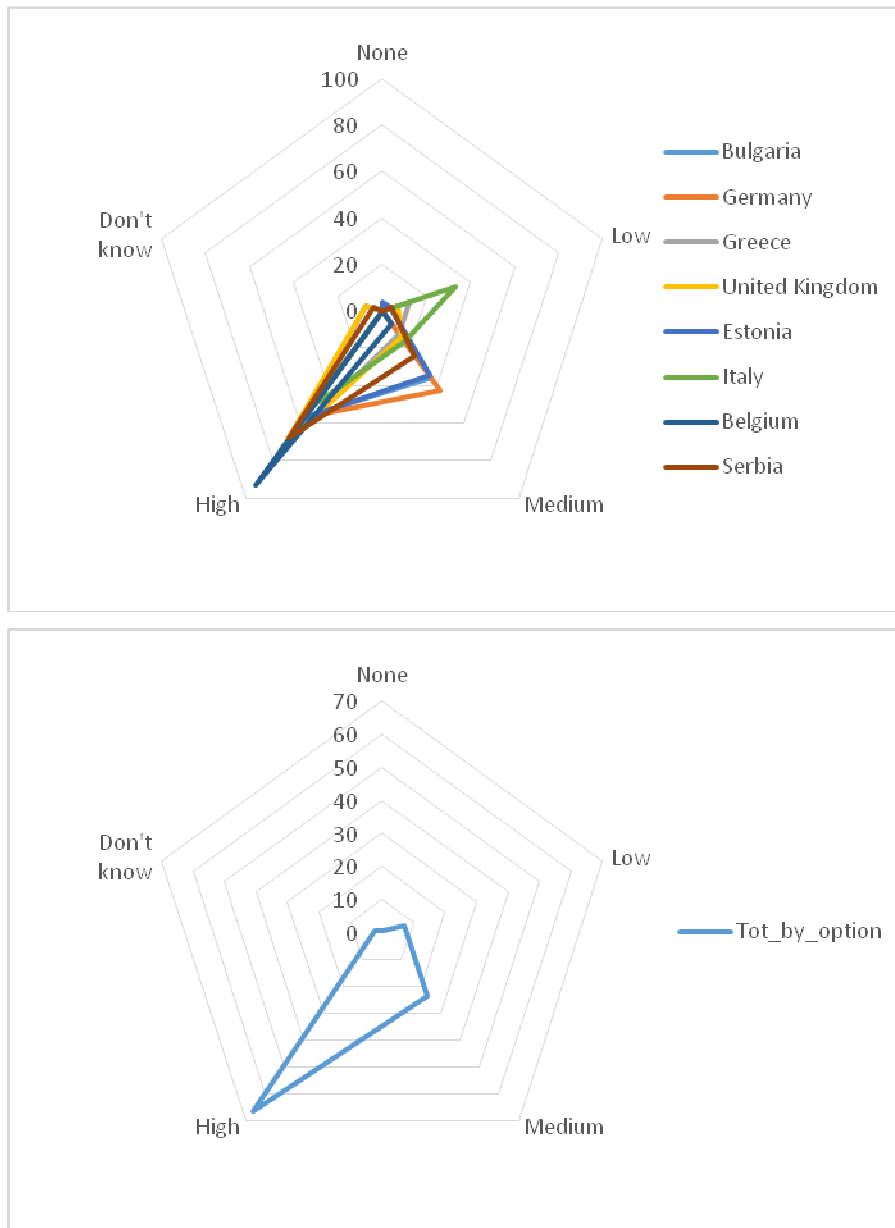


3.4 Habit and social norm of using traditional less efficient transport means (owning and driving a private car may be a deeply-rooted habit and tradition).



The relevance of the barrier constituted by the habit and social norm of using traditional less efficient transport means is rated as of high relevance in United Kingdom, Germany and Belgium (from 60% to 80%). The same dominance for a high relevance can be seen in respondents from Estonia and Bulgaria, but with lower shares (about 30%). The majority of Italian and Greek respondents declare a low relevance for this barrier, and respondents from Serbia are more oriented to a medium relevance.

3.5 Lack of infrastructures and planning (available transport infrastructure and further infrastructure planning may be inefficient and/or ineffective in promoting energy efficient and more sustainable transport).



Lack of infrastructures and planning shows a consistent pattern, which concentrates on a high relevance. However, Germany Estonia and Bulgaria show also relevant shares respondents indicating a medium relevance (up to 40% in the case of Germany). In Italy the majority of respondents still declare a high relevance, but there is a 40% which indicates a low relevance.

**Open question T3: Can you identify any other specific barrier/s that limits the diffusion of new generation more sustainable transport modes for individuals? If yes, specify and give a relevance grade (Low, Medium, High).**

For specific barriers limiting the diffusion of more sustainable transport modes for individuals, several open answers mentioned **institutional** factors, namely the lack of government policies on sustainable mobility (UK), unreliability and inefficiency of public transport (UK).

Also several **cultural** barriers were mentioned, such as safety concerns of some transport modes (e.g. cycling on roads, public transport late at night) (UK), and the individuality and freedom (independence) guaranteed by personal motorized modes, which are deemed by travelers as more important than cost-effectiveness of other more sustainable modes (Germany). A respondent of Germany also highlighted that some procedures connected with sustainable transport modes (several subscriptions and passwords needed) may discourage travellers from their use.

**Economic** factors mainly referred to the fact that owning a car implies having already sustained its costs, therefore discouraging the owner from spending other money for other transport modes (UK).

Some **morphological** barriers were mentioned, which refer to the viability of public transport in settlements such as in Estonia, where there is a dispersed living and a concentration of working areas, which make individual transportation more practical; or the concentration of public transport in specific areas, that is taking place in bigger settlements, which also makes it less practical than private transport. For Estonia, also the situation of rural areas was highlighted, where there are only few places only where it would be possible to implement public transport systems which would be feasible to society and individual and secure the acceptable service level.

No additional social and educational barriers were reported by respondents.

Some respondents also suggested **policies** to address these barriers and further diffuse more sustainable transport modes for individuals. These are listed below:

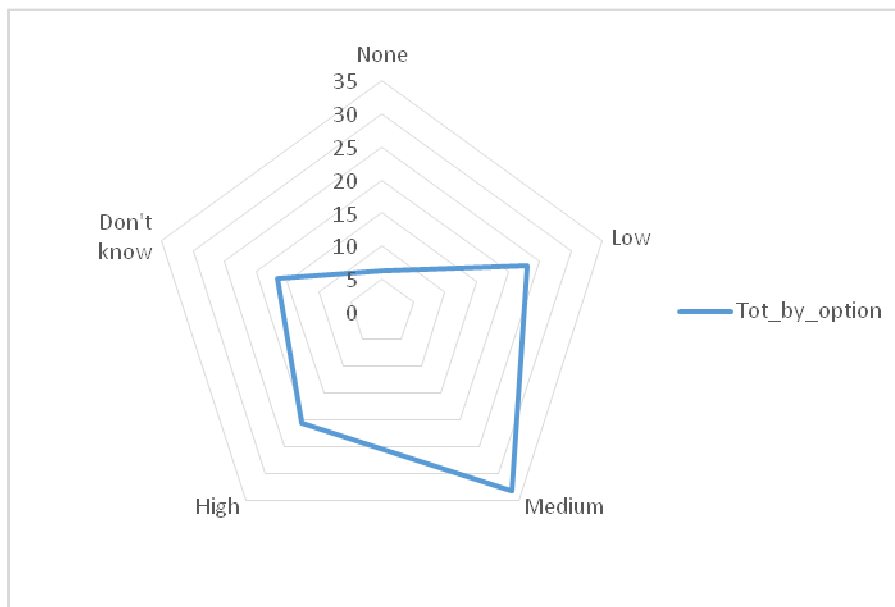
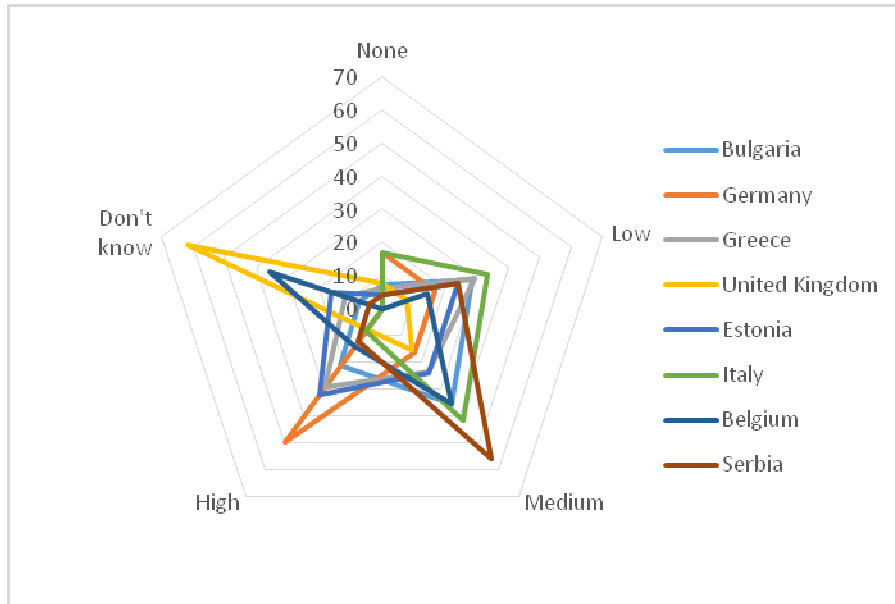
- Better ticketing systems that would encourage multi-staged trips on one ticket, taking inspiration from successful experiences of other European cities (UK);
- Promotion of alternative technologies (e.g. smart pods) (UK);
- Intermodality, which however is not always feasible when a centre influence are has a too low number of inhabitants (Estonia).

**Question 4: According to your expertise, to what extent are the following barriers relevant in limiting the choice of using more sustainable and efficient modes for freight transport?**

- 4.6 Hesitation to trust new technologies (companies may not trust new efficient vehicles (e.g. electric vehicles) and consider them less reliable than “known” technologies).
- 4.7 Reduced economic returns/financial crisis (companies may be reluctant to invest in more sustainable and efficient transport modes because of the lowering effect of the economic crisis on their budget).
- 4.8 Companies may lack knowledge and information about energy efficient vehicles such as electric vehicles and ultra-low emission vehicles (e.g. information about running costs, variations in vehicle technology, charging routines).
- 4.9 Habit, social norm and lack of environmental awareness (using traditional transport means may be a deeply-rooted habit and tradition).
- 4.10 Lack of support for more sustainable and efficient transport means/Limited infrastructure (Rail infrastructure may be lacking or not sufficiently developed).

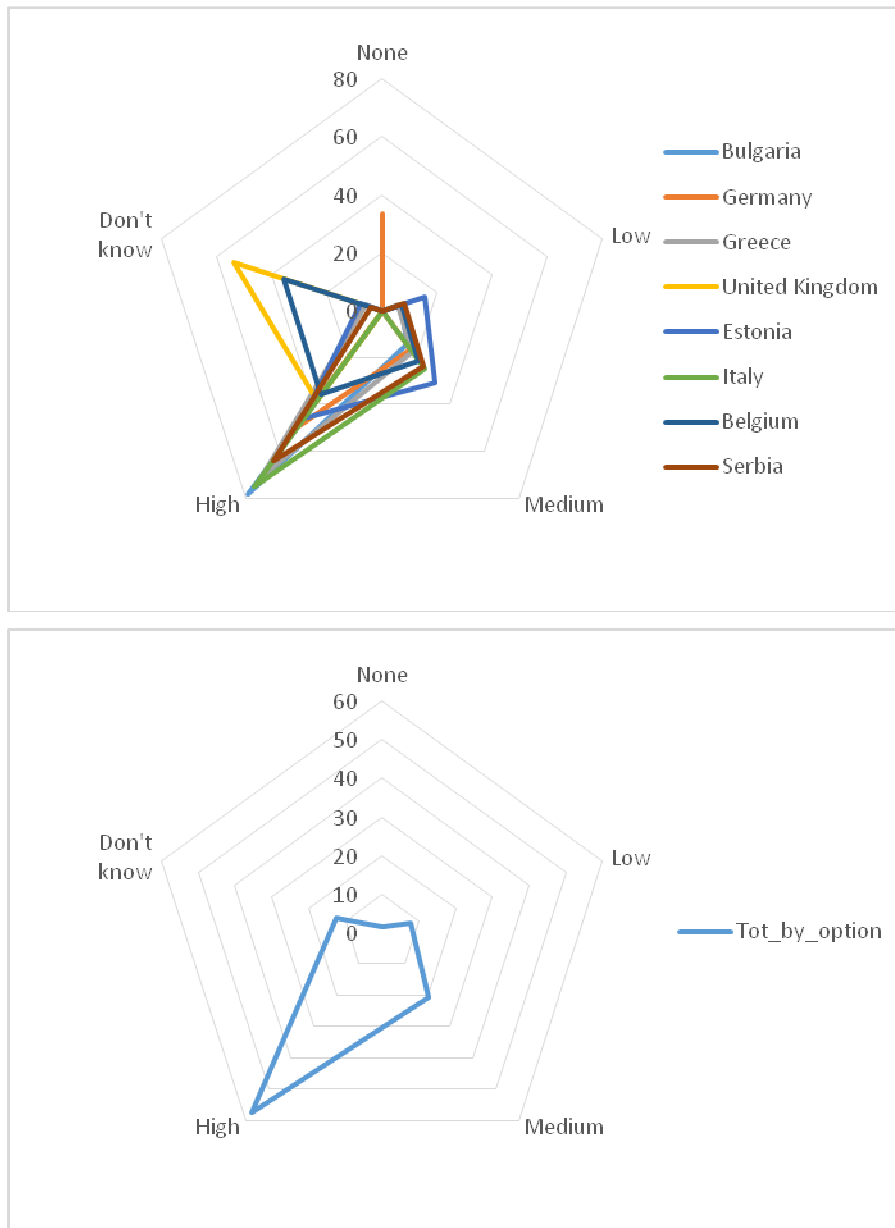
**Question 4: According to your expertise, to what extent are the following barriers relevant in limiting the choice of using more sustainable and efficient modes for freight transport?**

4.1 Hesitation to trust new technologies (companies may not trust new efficient vehicles (e.g. electric vehicles) and consider them less reliable than “known” technologies).



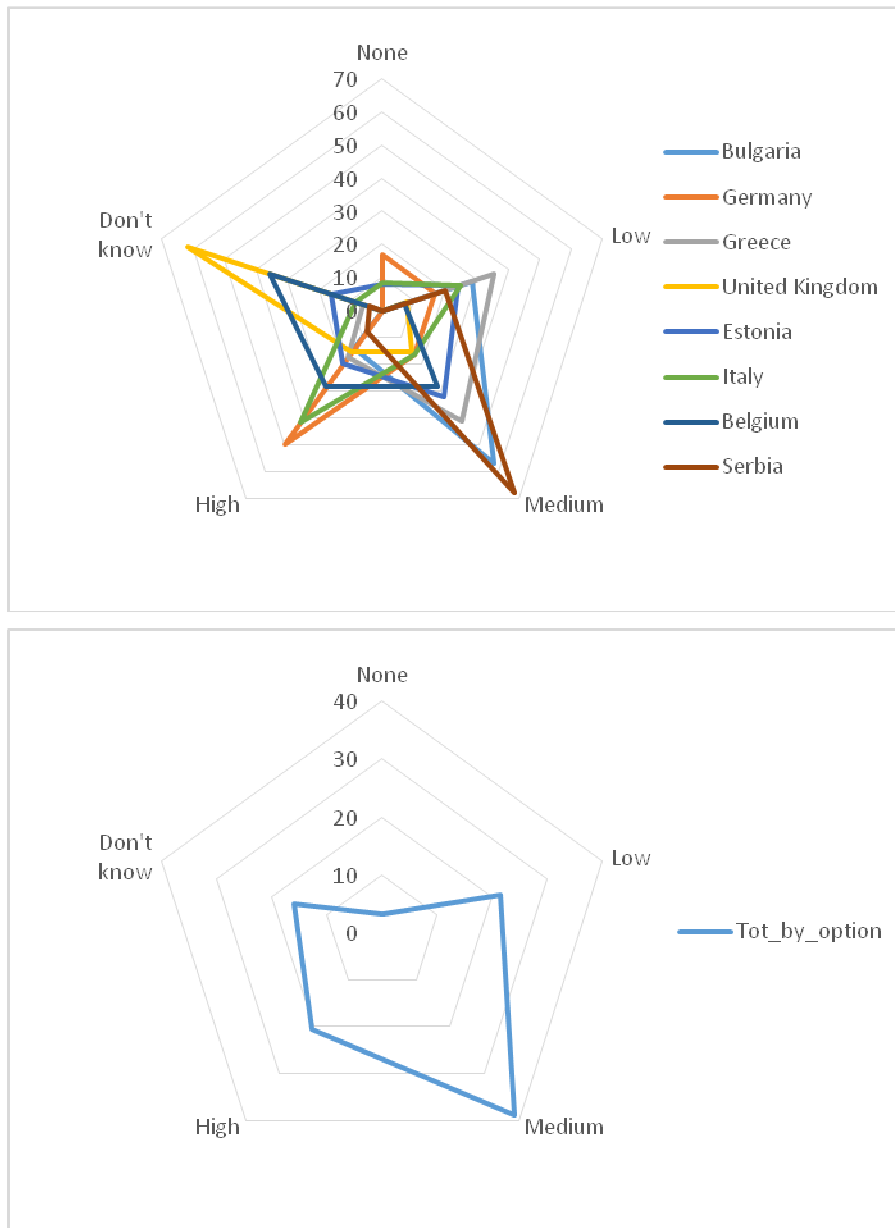
Hesitation to trust new technologies appears as a barrier of heterogeneous relevance across the different countries. In United Kingdom, the majority of respondents (about 65%) do not know the relevance grade. Other sharp patterns derive from respondents from Germany and Belgium, whose majority indicates a high relevance (50% and 35% respectively), and from Serbia, whose majority assign to this barrier a medium relevance. Respondents from other countries do not concentrate on any particular grade and declare a relevance ranging from high to low.

4.2 Reduced economic returns/financial crisis (companies may be reluctant to invest in more sustainable and efficient transport modes because of the lowering effect of the economic crisis on their budget).



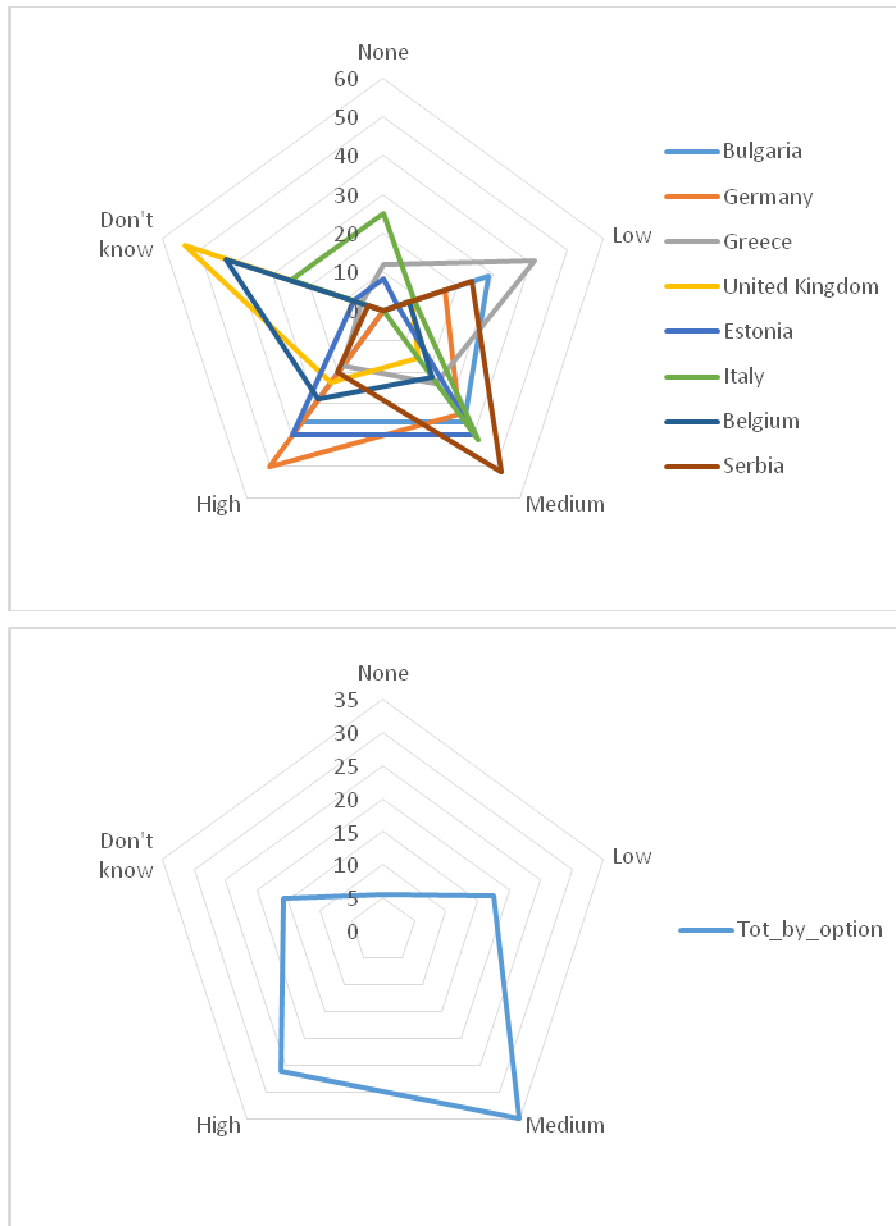
Reduced economic returns and financial crisis is a barrier of high relevance for most of respondents from Bulgaria, Italy, Serbia, Estonia, Greece and Germany. The majority of respondents from Belgium and United Kingdom do not assign any grade to this barrier, while about 40% of respondents from Germany declare no relevance.

4.3 Companies may lack knowledge and information about energy efficient vehicles such as electric vehicles and ultra-low emission vehicles (e.g. information about running costs, variations in vehicle technology, charging routines).



The lack of knowledge and information about energy efficient vehicles is a barrier characterised by a very heterogeneous pattern. Almost the entire sample of respondents from United Kingdom (65%) and a large share from Belgium (25%) do not know the relevance of this barrier. The majority of respondents from Serbia, Bulgaria and Greece are consistent in indicating a medium importance. About a 20% of respondents from Germany declare that this barrier assumes no relevance.

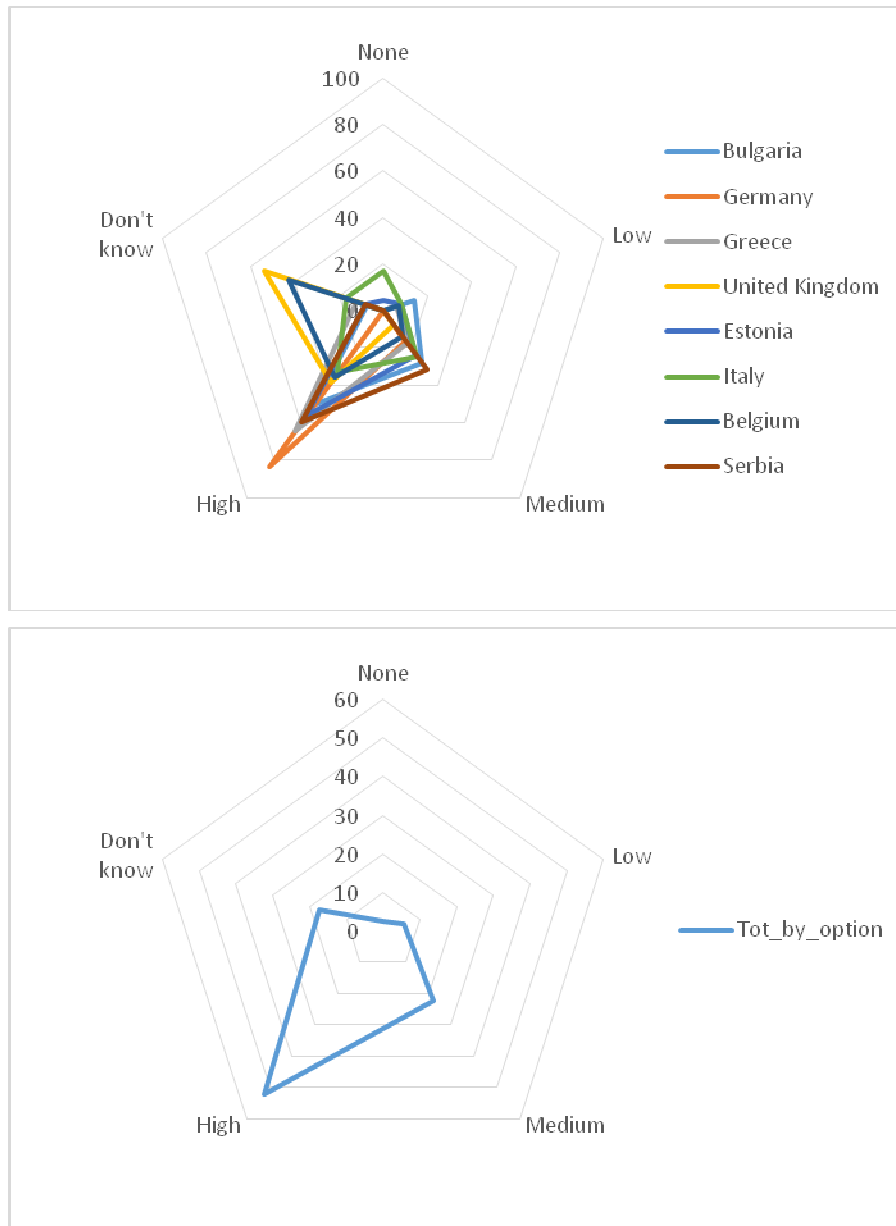
4.4 Habit, social norm and lack of environmental awareness (using traditional transport means may be a deeply-rooted habit and tradition).



The barrier constituted by habit, social norm and lack of environmental awareness shows a differentiated relevance pattern. A clear response, given by about 50% of respondents, emerges in the case of Serbia (dominance of medium relevance) and Germany (dominance of high relevance). About 55% of respondents from United Kingdom, about 35% from Belgium declare that this barrier assumes no relevance. Respondents from Italy declare, for the same share of 25%, that this barrier has no relevance or unknown relevance. In the case of Greece, more than 40% of respondents indicate a low relevance.



4.5 Lack of support for more sustainable and efficient transport means/Limited infrastructure (Rail infrastructure may be lacking or not sufficiently developed).



Lack of support for more sustainable and efficient transport means and limited infrastructure is a barrier of high relevance for most of respondents from Germany, Serbia, Estonia, Greece and Bulgaria. The majority of respondents from United Kingdom and Belgium (about 40% and 50% respectively) do not assign any grade to this barrier, while about 20% of respondents from Italy declare no relevance.

**Open question T4: Can you identify any other specific barrier/s that limits the diffusion of more sustainable and efficient modes for freight transport? If yes, specify and give a relevance grade (Low, Medium, High).**

For specific barriers limiting the diffusion of more sustainable and efficient modes for freight transport, half of open answers mentioned **economic** barriers, which comprised: missing economic efficiency, because of low oil prices (Germany); for rail specifically, the link between economic efficiency and big volumes of goods (Estonia); Local Government cuts in transport budgets due to government austerity policy (UK); and the low capacity to renovate the fleet and optimize the logistics carried out with own vehicles (Italy).

Regarding **institutional** barriers, these mainly referred to the lack of a national policy (Estonia); and the management of infrastructure managed by inefficient public companies (Serbia).

Concerning **educational** barriers, a lack of engineers in companies dealing with these issues was reported for Serbia.

For **infrastructural** barriers, a lack of rail infrastructure was identified for Germany.

No additional social and cultural barriers were reported by respondents.

Some respondents also suggested **policies** to address these barriers and further diffuse more sustainable transport modes for freight transport. These are listed below:

- Spreading new technologies and ensure a compatible technical support (Greece);
- Public regulations imposing more virtuous behaviours (Italy).





## APPENDIX 2

**TABLE A1 – BUILDING SECTOR: LIST OF RESPONSES FOR CLOSED-ANSWERS**

Question ID	Ref. to questionnaire	Relevance grade	Country							
			BU	DE	GR	UK	EN	IT	BE	RS
1	3.1	None	0	1	2	0	0	0	0	1
		Low	2	2	2	2	5	1	5	3
		Medium	8	3	6	6	10	6	9	14
		High	3	5	12	14	11	8	9	19
		Don't know	1	1	1	0	0	0	0	1
2	3.2	None	0	1	0	5	0	2	0	0
		Low	5	4	8	6	9	7	9	10
		Medium	5	4	6	6	6	4	10	23
		High	3	2	6	4	9	2	2	3
		Don't know	1	1	0	1	1	0	2	1
3	3.3	None	0	0	0	1	1	0	0	0
		Low	0	1	0	2	0	0	0	0
		Medium	1	2	1	5	1	4	8	5
		High	12	8	19	12	23	11	14	31
		Don't know	0	1	0	2	0	0	1	1
4	3.4	None	0	0	0	0	0	0	0	0
		Low	1	3	0	1	0	1	2	1
		Medium	4	2	1	7	4	6	9	6
		High	8	6	17	14	19	8	11	28
		Don't know	0	1	2	0	1	0	1	2
5	3.5	None	0	0	0	0	0	0	0	1
		Low	0	0	2	1	2	2	6	8
		Medium	8	5	7	5	8	5	5	18
		High	5	6	9	15	14	8	12	9
		Don't know	0	1	2	0	0	0	0	1
6	3.6	None	0	0	0	0	1	0	0	0
		Low	2	3	3	1	3	2	4	10
		Medium	5	5	8	8	10	5	10	20
		High	6	2	9	11	10	8	8	6
		Don't know	0	2	0	1	0	0	1	1
7	3.7	None	0	0	0	0	1	1	1	0
		Low	3	3	3	2	6	1	8	3
		Medium	2	5	6	6	11	2	6	20
		High	8	2	11	11	6	9	7	13
		Don't know	0	2	0	2	0	1	1	1

8	3.8	None	0	2	0	0	0	0	1	0
		Low	4	1	2	0	4	2	3	0
		Medium	3	4	5	11	9	2	8	16
		High	6	4	12	8	11	11	10	20
		Don't know	0	1	1	2	0	0	1	1
9	3.9	None	0	1	0	2	1	0	1	0
		Low	6	1	2	3	6	1	6	7
		Medium	2	6	11	8	11	8	12	19
		High	5	3	7	8	4	6	4	10
		Don't know	0	1	0	0	2	0	0	1
10	3.10	None	1	0	0	1	0	1	2	1
		Low	3	1	4	4	3	1	7	8
		Medium	5	4	4	6	12	7	4	15
		High	3	4	10	10	8	5	9	11
		Don't know	1	3	2	0	1	1	1	1
11	3.11	None	0	0	2	1	0	1	1	1
		Low	1	2	5	0	2	6	2	3
		Medium	7	2	7	3	11	3	5	12
		High	5	7	6	17	11	5	14	18
		Don't know	0	1	0	0	0	0	1	2
12	3.12	None	0	2	1	0	2	1	0	1
		Low	3	4	3	2	12	5	8	2
		Medium	5	1	5	2	5	4	5	17
		High	4	2	10	16	4	4	7	14
		Don't know	1	3	1	1	1	0	3	2
13	3.13	None	1	1	3	1	0	0	0	0
		Low	2	4	1	1	7	5	5	4
		Medium	4	3	12	6	6	6	5	9
		High	6	3	4	12	11	4	12	21
		Don't know	0	1	0	1	0	0	1	1
14	3.14	None	0	0	1	1	1	1	0	4
		Low	3	2	5	1	3	3	2	2
		Medium	8	5	4	6	11	6	7	13
		High	2	4	10	13	7	5	13	16
		Don't know	0	1	0	0	1	0	1	1
15	3.15	None	0	0	1	0	2	1	0	0
		Low	1	2	1	4	6	2	3	2
		Medium	3	4	7	7	9	4	11	13
		High	9	5	11	10	6	8	7	18
		Don't know	0	1	0	0	0	0	1	2
16	3.17	None	0	1	1	1	0	0	0	0
		Low	0	2	6	1	5	2	5	6
		Medium	8	4	7	5	12	5	10	15
		High	4	3	5	11	7	7	5	14
		Don't know	1	0	0	1	0	0	1	1

17	3.18	None	0	0	0	1	0	0	0	0
		Low	2	3	0	0	0	2	4	1
		Medium	1	4	1	5	3	4	2	7
		High	10	3	17	11	21	8	15	27
		Don't know	0	0	1	2	0	0	1	1
18	3.19	None	0	0	0	1	0	0	1	0
		Low	2	0	3	2	4	1	12	1
		Medium	6	4	7	6	7	7	4	20
		High	5	6	9	9	11	6	5	13
		Don't know	0	0	0	1	2	0	0	1
19	3.20	None	0	0	2	1	0	1	0	1
		Low	2	3	6	1	3	5	4	2
		Medium	6	2	8	7	10	4	8	16
		High	5	5	3	9	9	3	10	16
		Don't know	0	0	0	1	1	1	0	1
20	3.21	None	0	1	0	1	3	0	0	0
		Low	2	3	4	0	6	3	5	4
		Medium	8	2	2	1	8	5	5	11
		High	2	4	13	14	7	6	11	20
		Don't know	1	0	0	2	0	0	1	1
21	3.23	None	0	1	1	2	2	1	0	0
		Low	1	2	5	2	3	3	3	6
		Medium	4	2	5	4	10	6	12	13
		High	5	2	9	4	4	4	6	14
		Don't know	3	3	0	4	2	0	1	2
22	3.24	None	0	1	0	1	1	1	0	0
		Low	0	4	1	1	2	3	3	1
		Medium	5	3	1	4	7	4	8	11
		High	6	0	17	7	10	6	9	21
		Don't know	2	2	1	3	1	0	2	2
23	3.25	None	0	0	1	1	1	1	0	0
		Low	2	2	2	2	3	2	7	3
		Medium	4	4	8	3	8	6	7	11
		High	5	2	9	8	6	5	7	19
		Don't know	2	2	0	2	2	0	1	2
24	3.26	None	0	2	3	1	2	1	1	3
		Low	3	2	6	1	4	4	7	3
		Medium	6	2	9	4	8	5	6	15
		High	3	1	2	7	5	4	7	12
		Don't know	1	2	0	3	2	0	1	2
25	3.27	None	0	1	1	1	5	1	1	4
		Low	2	2	3	1	3	5	10	3
		Medium	6	1	7	4	11	4	7	9
		High	3	4	9	7	1	4	2	17
		Don't know	2	2	0	3	1	0	2	2

26	3.29	None	0	2	1	1	0	1	0	1
		Low	4	3	6	4	7	4	7	9
		Medium	5	2	7	7	11	5	10	8
		High	3	2	6	4	3	4	2	16
		Don't know	1	1	0	0	2	0	1	1
27	3.30	None	0	5	0	2	0	1	1	1
		Low	2	2	3	4	5	7	8	4
		Medium	5	1	6	8	4	3	7	9
		High	6	1	10	2	13	3	3	20
		Don't know	0	1	1	0	1	0	1	1
28	3.31	None	0	1	2	3	0	1	2	1
		Low	5	2	5	3	5	4	9	4
		Medium	5	2	8	7	11	4	3	20
		High	3	4	5	3	4	5	5	9
		Don't know	0	0	0	0	3	0	1	1
29	3.32	None	0	1	4	1	1	2	1	4
		Low	4	2	8	1	4	6	7	3
		Medium	6	2	6	4	6	3	8	11
		High	3	4	2	10	10	3	3	15
		Don't know	0	0	0	0	2	0	1	1
30	3.33	None	0	3	3	2	5	2	2	6
		Low	3	4	7	1	7	8	9	8
		Medium	8	1	3	5	5	2	6	9
		High	2	1	7	7	4	2	0	10
		Don't know	0	0	0	1	1	0	3	2
31	3.35	None	1	1	1	1	2	3	0	1
		Low	6	4	6	2	5	4	8	8
		Medium	4	2	3	5	7	3	7	11
		High	1	2	10	8	8	4	4	13
		Don't know	0	0	0	0	0	0	1	2
32	3.36	None	0	0	0	3	1	3	0	1
		Low	1	4	0	3	3	5	9	5
		Medium	1	3	5	6	2	4	6	8
		High	10	2	15	4	17	2	4	20
		Don't know	0	0	0	0	0	0	1	1
33	3.37	None	1	0	1	1	2	2	3	2
		Low	4	3	3	3	4	4	8	4
		Medium	4	5	10	8	12	5	4	15
		High	3	1	6	2	2	3	4	13
		Don't know	0	0	0	2	2	0	1	1
34	3.38	None	1	2	4	1	1	4	3	1
		Low	2	4	7	3	6	3	7	7
		Medium	6	1	6	4	8	5	6	16
		High	3	2	3	7	7	2	3	9
		Don't know	0	0	0	1	0	0	1	2

35	3.39	None	1	3	4	1	6	3	2	7
		Low	1	3	3	2	5	7	10	9
		Medium	5	1	4	7	6	3	4	11
		High	4	2	9	5	4	1	2	6
		Don't know	1	0	0	1	1	0	2	2
36	3.41	None	0	1	1	1	1	0	0	0
		Low	0	3	4	2	3	1	2	2
		Medium	4	3	5	3	10	5	6	9
		High	6	3	10	6	6	7	8	22
		Don't know	2	0	0	4	2	1	4	2
37	3.42	None	0	0	0	1	0	0	0	0
		Low	0	2	3	4	1	4	2	3
		Medium	1	4	1	1	4	5	2	10
		High	9	4	15	5	15	5	11	21
		Don't know	2	0	1	5	2	0	5	1
38	3.43	None	0	0	0	1	0	0	0	0
		Low	1	2	1	2	1	2	5	0
		Medium	2	3	7	0	10	2	0	9
		High	7	5	12	9	7	10	11	25
		Don't know	2	0	0	4	3	0	4	1
39	3.44	None	0	1	2	1	2	0	0	2
		Low	0	4	7	1	4	4	4	0
		Medium	6	1	6	2	4	3	6	18
		High	4	4	5	7	9	7	6	14
		Don't know	2	0	0	5	2	0	4	1
40	3.45	None	0	1	2	1	3	0	1	1
		Low	1	2	2	1	6	5	5	8
		Medium	1	5	3	3	7	4	5	11
		High	8	2	13	5	3	4	2	14
		Don't know	2	0	0	6	2	0	7	2



**TABLE A2 – TRANSPORT SECTOR: LIST OF RESPONSES FOR CLOSED-ANSWERS**

Question ID	Ref. to questionnaire	Relevance grade	Country							
			BU	DE	GR	UK	EN	IT	BE	RS
1	4.1	None	0	0	0	0	1	1	0	0
		Low	0	0	2	2	3	5	0	0
		Medium	7	3	7	0	6	2	3	10
		High	7	5	8	11	17	5	13	13
		Don't know	0	0	0	2	0	2	0	1
2	4.2	None	2	0	0	0	1	3	1	2
		Low	1	3	7	6	3	3	3	7
		Medium	8	3	3	3	9	5	5	12
		High	2	2	6	4	14	3	6	3
		Don't know	1	0	1	2	0	0	1	1
3	4.3	None	0	0	0	0	0	0	0	0
		Low	0	3	0	1	0	2	3	0
		Medium	2	2	1	5	4	3	6	3
		High	12	3	14	8	23	9	7	21
		Don't know	0	0	2	1	0	0	0	1
4	4.4	None	0	0	1	0	1	0	0	0
		Low	1	1	2	1	1	2	1	1
		Medium	1	1	2	3	8	5	2	3
		High	12	6	11	9	17	7	13	21
		Don't know	0	0	1	1	0	0	0	0
5	4.5	None	0	2	0	0	0	0	1	1
		Low	1	2	0	0	1	0	4	0
		Medium	0	3	1	6	7	3	4	4
		High	13	1	14	7	19	11	7	19
		Don't know	0	0	2	1	0	0	0	1
6	4.6	None	0	0	0	0	1	0	0	0
		Low	3	1	4	1	6	5	2	4
		Medium	6	4	7	6	8	5	7	11
		High	5	3	6	7	12	4	7	10
		Don't know	0	0	0	0	0	0	0	0
7	4.7	None	0	0	2	0	1	0	0	0
		Low	2	4	5	3	6	6	0	6
		Medium	6	2	7	5	5	7	4	11
		High	6	2	3	6	15	1	12	8
		Don't know	0	0	0	0	0	0	0	0
8	4.8	None	0	1	2	0	0	0	0	0
		Low	3	0	3	1	2	5	1	3
		Medium	6	4	8	5	5	6	3	11
		High	5	3	4	8	19	3	12	11

		Don't know	0	0	0	0	0	0	0	0
9	4.9	None	0	1	0	0	0	0	0	0
		Low	3	1	2	3	4	3	3	0
		Medium	6	3	8	2	9	6	2	10
		High	5	3	7	9	13	4	10	15
		Don't know	0	0	0	0	0	1	1	0
10	4.10	None	0	0	0	0	1	0	0	0
		Low	1	1	2	1	3	4	2	3
		Medium	4	1	6	3	5	5	0	7
		High	9	5	8	9	18	4	14	13
		Don't know	0	0	1	1	0	1	0	2
11	4.11	None	0	0	0	0	1	0	0	0
		Low	3	2	2	0	5	4	1	1
		Medium	5	2	3	5	7	2	6	9
		High	6	4	10	9	14	6	8	15
		Don't know	0	0	2	0	0	2	1	0
12	4.12	None	0	0	0	0	0	0	0	0
		Low	2	0	1	0	2	1	0	1
		Medium	5	2	5	3	10	4	3	6
		High	7	6	11	11	15	8	12	17
		Don't know	0	0	0	0	0	1	1	1
13	4.13	None	0	0	0	0	1	0	0	0
		Low	1	0	0	2	5	2	2	3
		Medium	4	3	7	3	9	3	3	6
		High	9	5	10	8	12	8	11	16
		Don't know	0	0	0	1	0	1	0	0
14	4.14	None	1	0	1	0	0	0	0	0
		Low	0	1	0	0	1	1	3	1
		Medium	4	5	4	4	15	5	3	4
		High	9	2	12	8	11	7	9	20
		Don't know	0	0	0	2	0	1	1	0
15	4.15	None	1	0	0	1	1	0	0	0
		Low	2	0	1	2	4	2	0	2
		Medium	3	3	3	3	6	3	1	8
		High	6	5	13	6	16	9	14	14
		Don't know	2	0	0	2	0	0	1	1
16	4.16	None	0	2	0	0	5	1	0	1
		Low	3	1	5	2	7	2	1	3
		Medium	1	2	1	5	12	4	4	2
		High	10	3	10	7	2	7	10	17
		Don't know	0	0	1	0	0	0	1	2
17	4.18	None	0	0	0	0	0	2	0	0
		Low	4	2	6	3	5	3	3	5
		Medium	6	4	5	5	12	5	4	14
		High	4	1	6	6	9	2	5	6

		Don't know	0	0	0	0	0	0	2	0
18	4.19	None	0	0	0	0	0	0	0	0
		Low	0	2	0	1	0	0	2	0
		Medium	0	2	1	3	2	2	3	1
		High	14	3	15	10	24	10	8	24
		Don't know	0	0	1	0	0	0	1	0
19	4.20	None	0	0	0	0	2	1	0	0
		Low	2	3	3	0	5	3	1	1
		Medium	9	2	6	7	8	6	6	15
		High	3	2	8	7	11	2	5	9
		Don't know	0	0	0	0	0	0	2	0
20	4.21	None	1	2	2	2	4	3	0	0
		Low	1	1	6	7	8	3	2	7
		Medium	5	2	6	2	6	3	1	9
		High	6	2	3	3	7	3	10	8
		Don't know	1	0	0	0	1	0	1	1
21	4.22	None	0	1	0	1	0	1	0	0
		Low	0	2	1	2	6	3	1	2
		Medium	8	2	4	3	5	4	2	8
		High	5	2	11	8	14	5	10	13
		Don't know	1	0	1	0	0	0	1	2
22	4.24	None	0	0	0	0	0	0	0	0
		Low	0	1	2	2	4	3	0	3
		Medium	3	3	4	2	7	2	4	10
		High	10	3	11	8	15	6	10	10
		Don't know	1	0	0	2	0	1	0	2
23	4.25	None	0	2	1	2	1	0	0	0
		Low	0	2	3	4	8	1	6	2
		Medium	2	3	0	3	5	6	6	5
		High	11	0	11	4	12	5	2	18
		Don't know	1	0	2	1	0	0	0	0
24	4.26	None	0	1	0	1	0	0	0	1
		Low	1	1	5	3	6	3	2	3
		Medium	8	2	8	3	15	5	6	9
		High	4	3	3	6	5	4	5	12
		Don't know	1	0	1	1	0	0	1	0
25	4.27	None	0	0	1	0	1	0	0	0
		Low	2	0	5	0	4	4	1	1
		Medium	4	2	7	4	9	5	1	13
		High	7	5	4	9	12	3	12	10
		Don't know	1	0	0	1	0	0	0	1
26	4.28	None	0	0	0	0	1	0	0	0
		Low	0	0	2	1	1	4	0	1
		Medium	5	3	2	2	9	2	1	6
		High	8	4	12	10	15	6	13	17

		Don't know	1	0	0	1	0	0	0	1
27	4.30	None	1	1	1	1	1	2	0	1
		Low	4	1	5	1	6	4	2	6
		Medium	5	1	4	2	6	5	5	14
		High	3	3	5	1	8	1	2	3
		Don't know	1	0	2	8	4	0	5	1
28	4.31	None	0	2	0	0	0	0	0	0
		Low	1	0	1	1	4	0	1	2
		Medium	2	1	3	0	8	3	3	6
		High	11	3	12	5	12	9	5	16
		Don't know	0	0	1	7	2	0	5	1
29	4.32	None	0	1	0	0	2	1	0	0
		Low	4	1	6	1	6	3	1	5
		Medium	8	1	7	2	8	2	4	17
		High	2	3	3	2	5	5	4	2
		Don't know	0	0	1	8	4	1	5	1
30	4.33	None	0	0	2	0	2	3	0	0
		Low	4	1	7	1	1	1	1	6
		Medium	5	2	4	2	10	5	3	13
		High	5	3	3	3	10	0	4	5
		Don't know	0	0	1	7	2	3	6	1
31	4.34	None	0	0	0	0	1	2	0	0
		Low	2	0	1	0	2	1	1	0
		Medium	4	1	3	1	6	3	2	8
		High	7	5	11	5	14	4	5	15
		Don't know	1	0	2	7	2	2	6	2