

Interreg



Sudoe

KET4F-Gas

Study of Social Acceptance and Social Life Cycle Assessment

Graça Martinho
Pedro Santos

www.ket4f-gas.eu

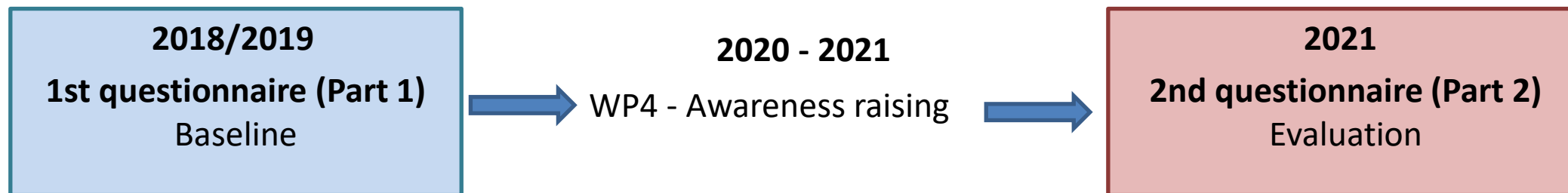
Main goals

- **Behaviors, knowledge, importance and risk perception** face to refrigerant gases:

- Producers
- Consumers
- Technicians
- Waste management operators



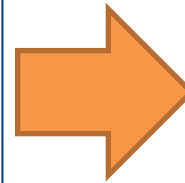
- **Assessment of the impact of awareness actions**



- Implementation of **4 questionnaires** adapted to each group

(1) Consumers

1. Purchase behavior and breakdown behavior of equipments with refrigerant gases
2. Information and knowledge about refrigeration gases
3. Assessment of importance, danger to health and the environment and risk perception to climate change
4. Social and demographic characterization



Questionnaire applied by Toluna company.

Sample characteristics:

- **200 respondents for each country**
- Equal distribution of: gender, age group, educational level and geographical distribution

1st – October to November 2018

2nd – March to May 2021

Methodology

- Implementation of **4 questionnaires** adapted to each group

(2) Producers

(3) Technicians

(4) WM Operators

Company profile Assistance and maintenance	Service and maintenance	Company profile
knowledge, importance and perceived risk attributed to refrigeration gases		
Social and demographic characterization		

Questionnaires applied through online platform of FCT-NOVA (limesurvey)

Questionnaire responses	Technicians	PT	ES	FR
	1 st – February to May 2019	474 (10%)	141 (7%)	351 (5%)
2 nd – April to July 2021	396 (8%)	59 (3%)	131 (2%)	

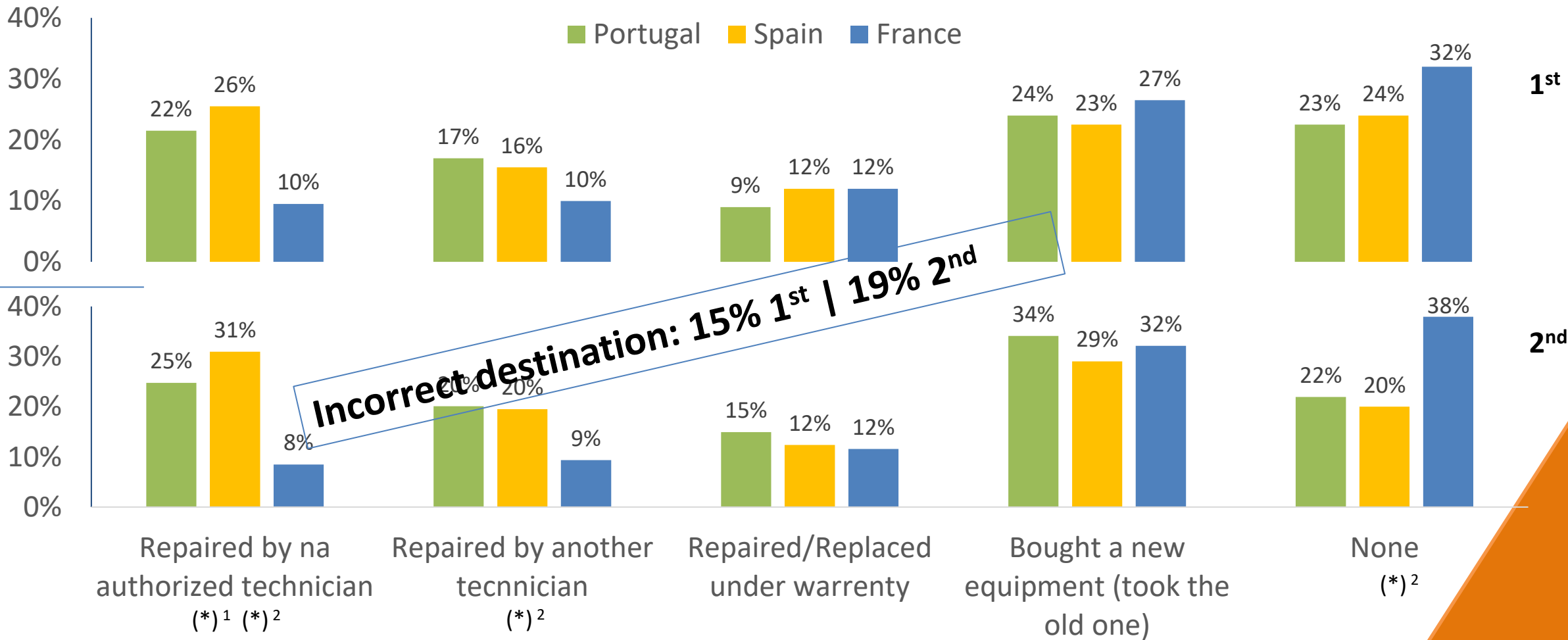
Main results: Consumers

What is the main criteria in the *purchase decision* of a refrigerator, air conditioner, freezer, or heat pump? (max 3 choices)

	Portugal		Spain		France	
	1 st	2 nd	1 st	2 nd	1 st	2 nd
Energy consumption (*) ²	80%	90%	75%	78%	74%	80%
Price (*) ¹ (*) ²	88%	87%	77%	73%	83%	80%
Model Features (*) ¹	31%	35%	43%	40%	36%	40%
Noise	19%	18%	21%	25%	22%	26%
Brand	20%	23%	18%	29%	20%	25%
Type/quantity of refrigerant gases (*) ²	10%	12% ↑	13%	16% ↑	12%	5% ↓
Extended warranty (*) ¹	10%	7%	11%	10%	4%	4%
Opinion of another user (*) ¹	4%	4%	4%	7%	10%	7%

Main results: Consumers

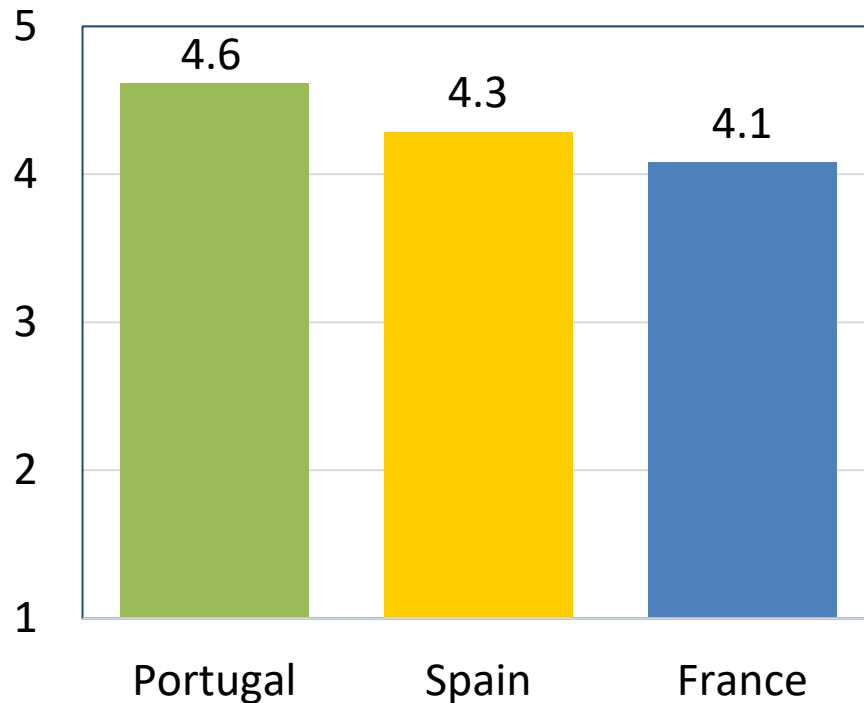
Think about the last equipment containing refrigerant gases that had a **malfunction** in the last 5 years. What did you do when it happened? (max 3 choices)



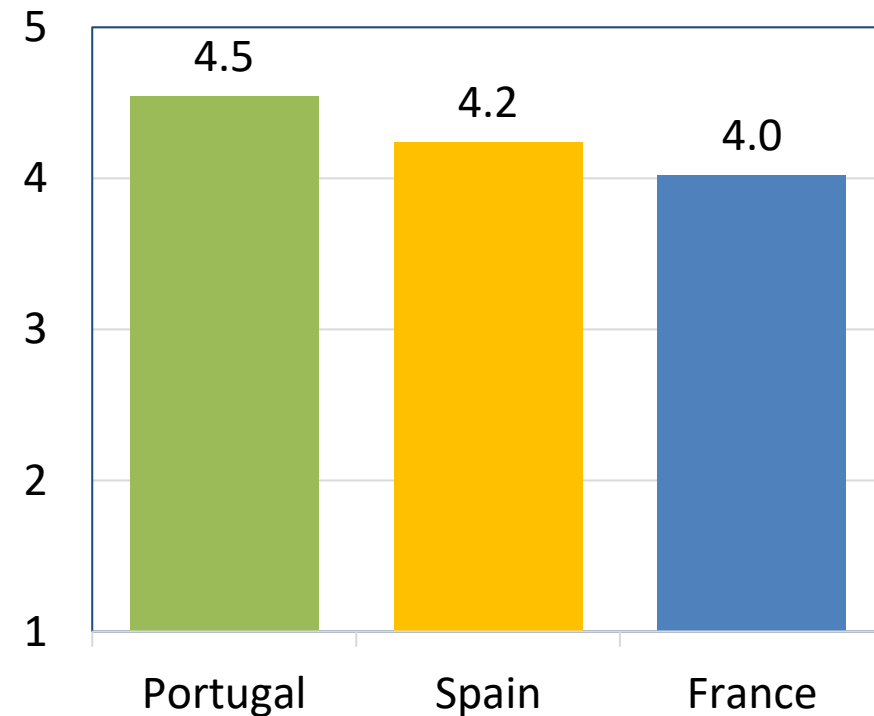
Main results: Consumers

What degree of importance do you attribute to the problem of climate change / global warming?

Very
important



1st (*)

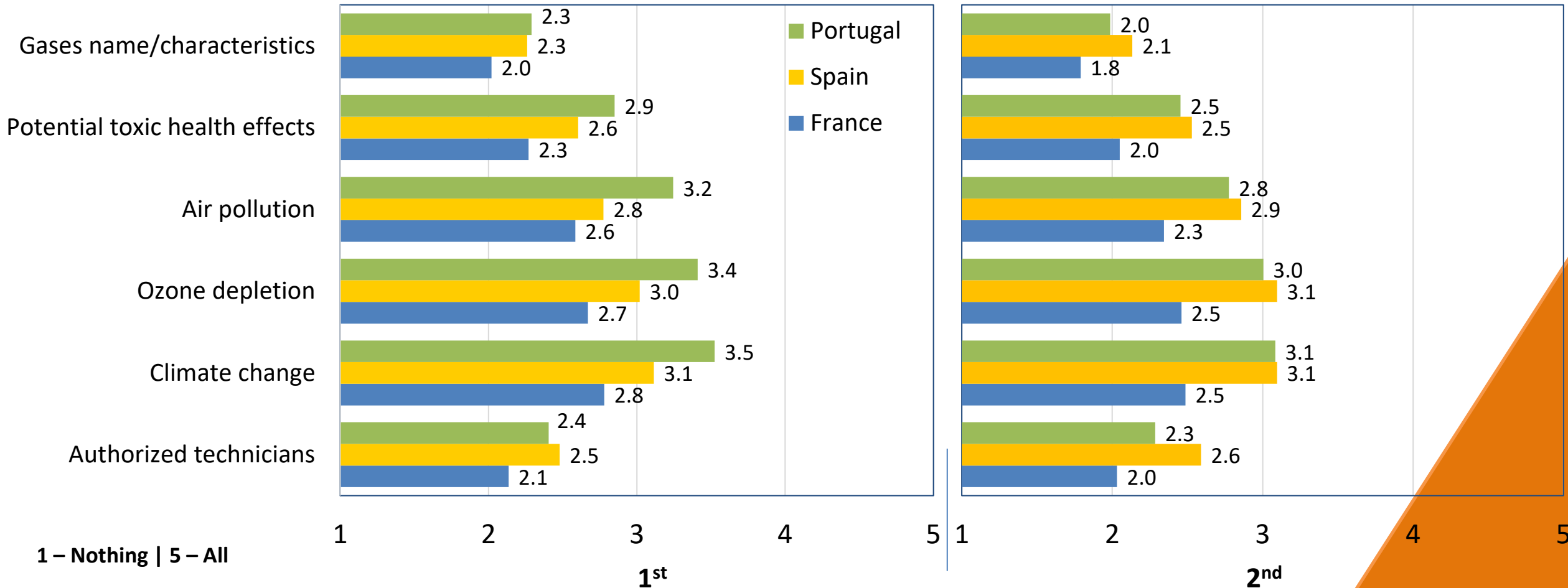


2nd (*)

Not
important

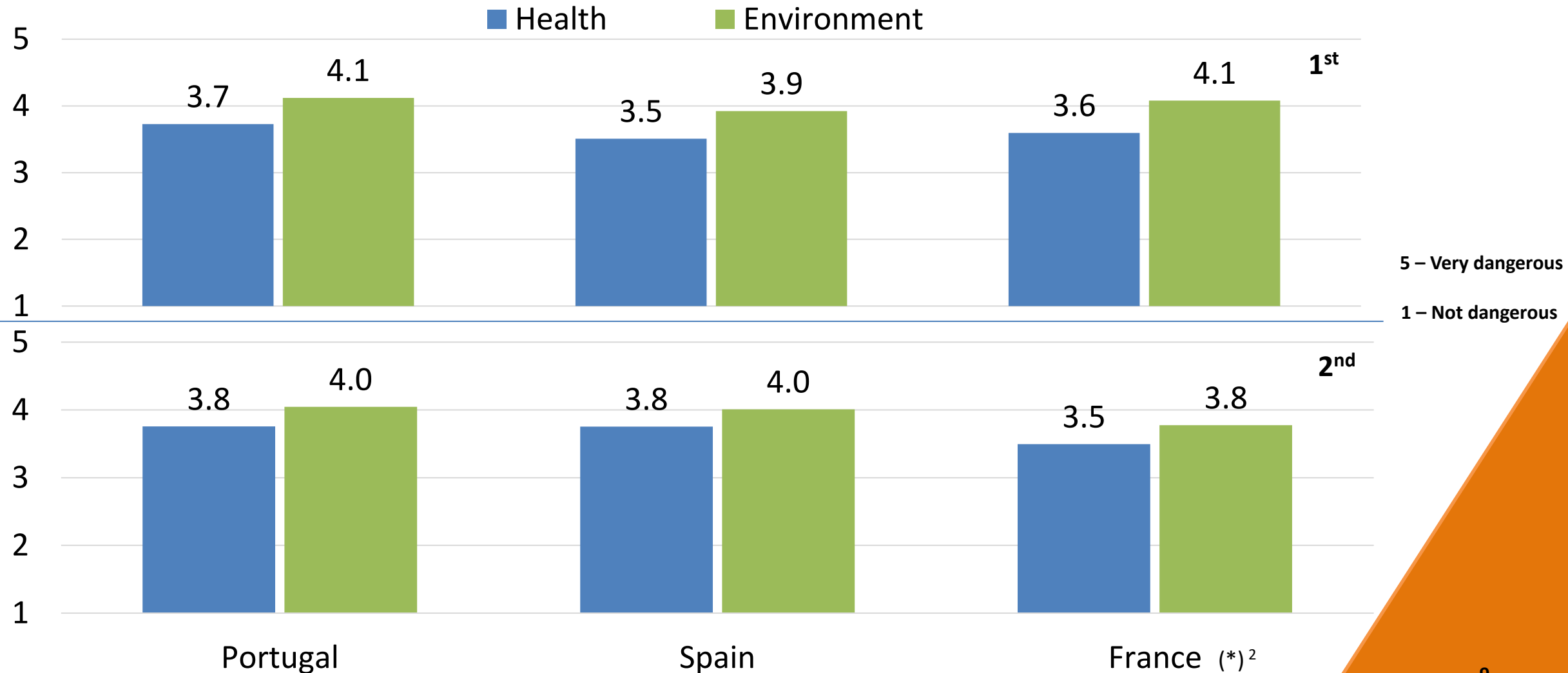
Main results: Consumers

How do you assess your knowledge about the type of gases currently used in your refrigeration equipment? ()¹(*)²*



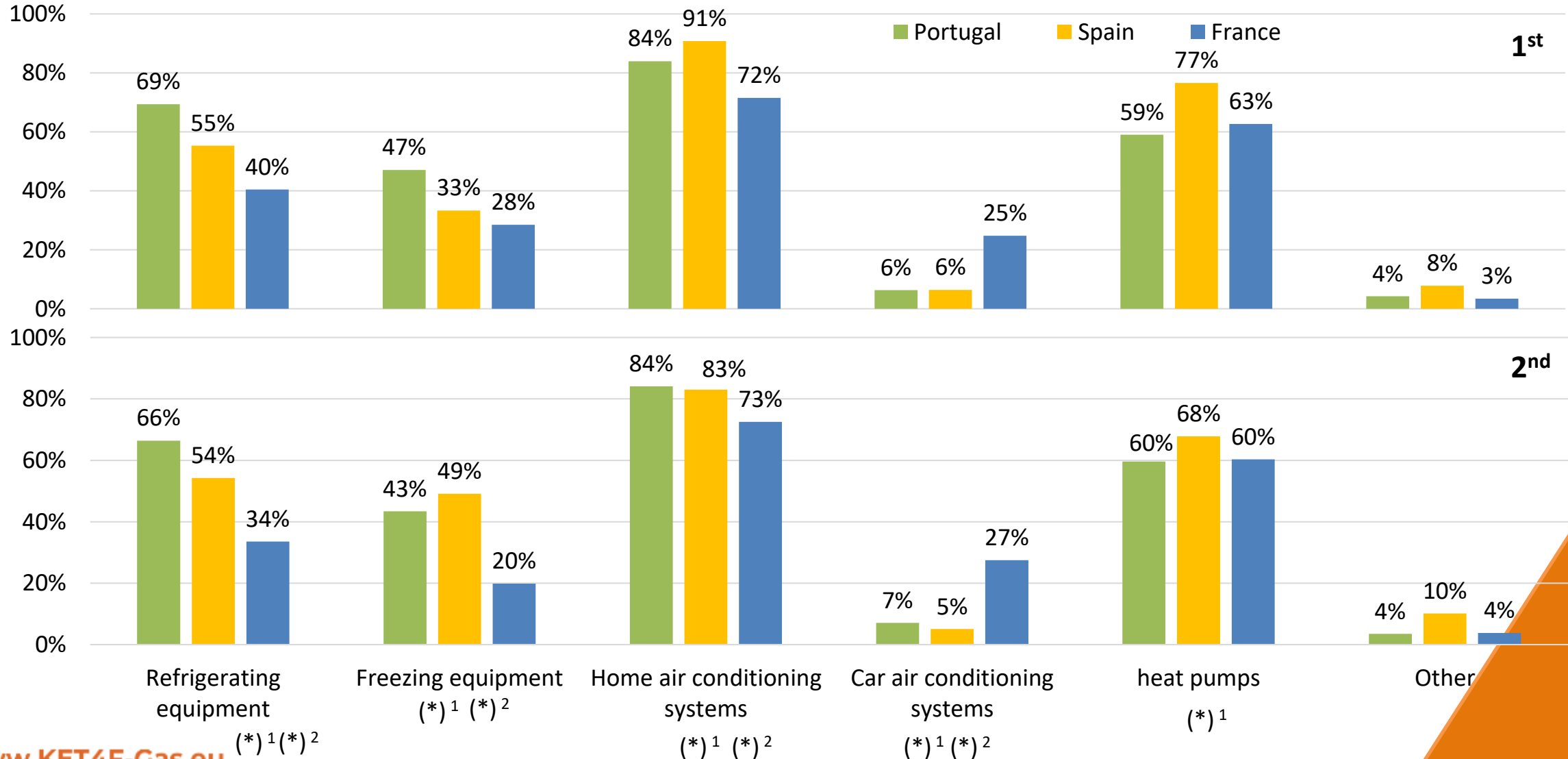
Main results: Consumers

How dangerous do you consider refrigerants gases in your equipment, for health and environment?



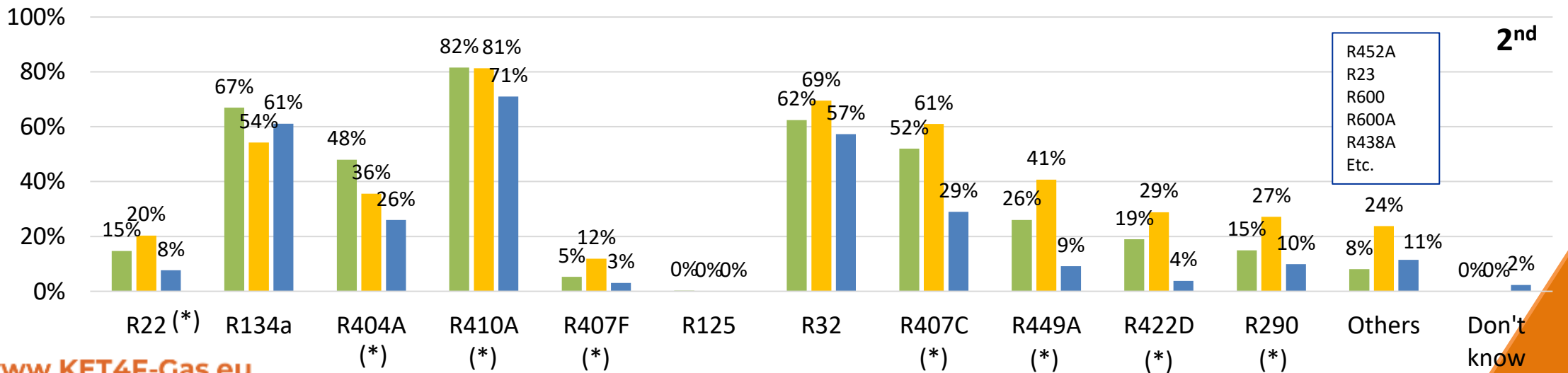
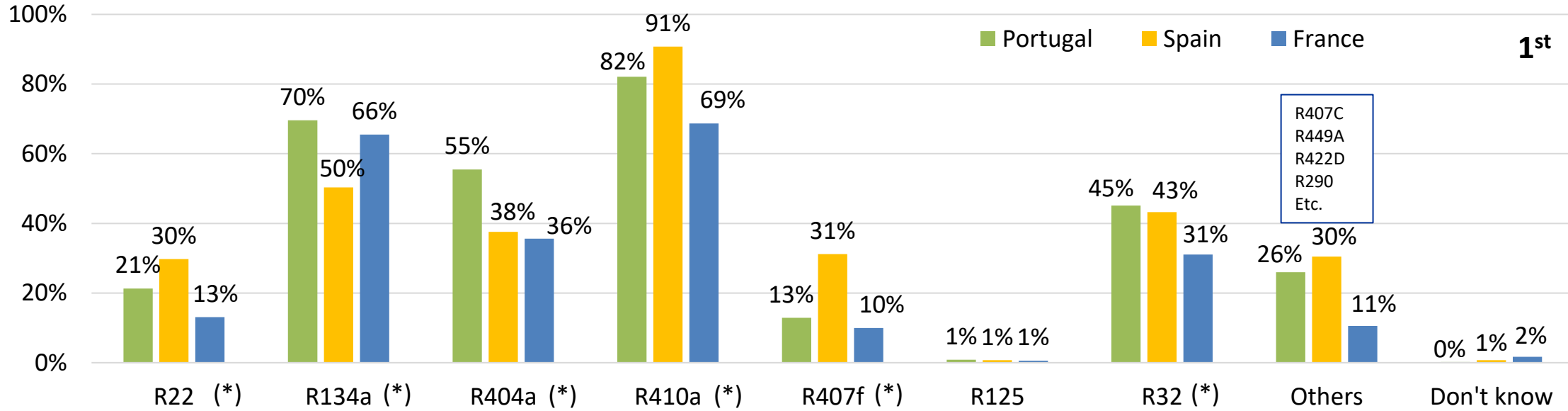
Main results: Technicians

Types of equipment maintenance / repair (all applied)



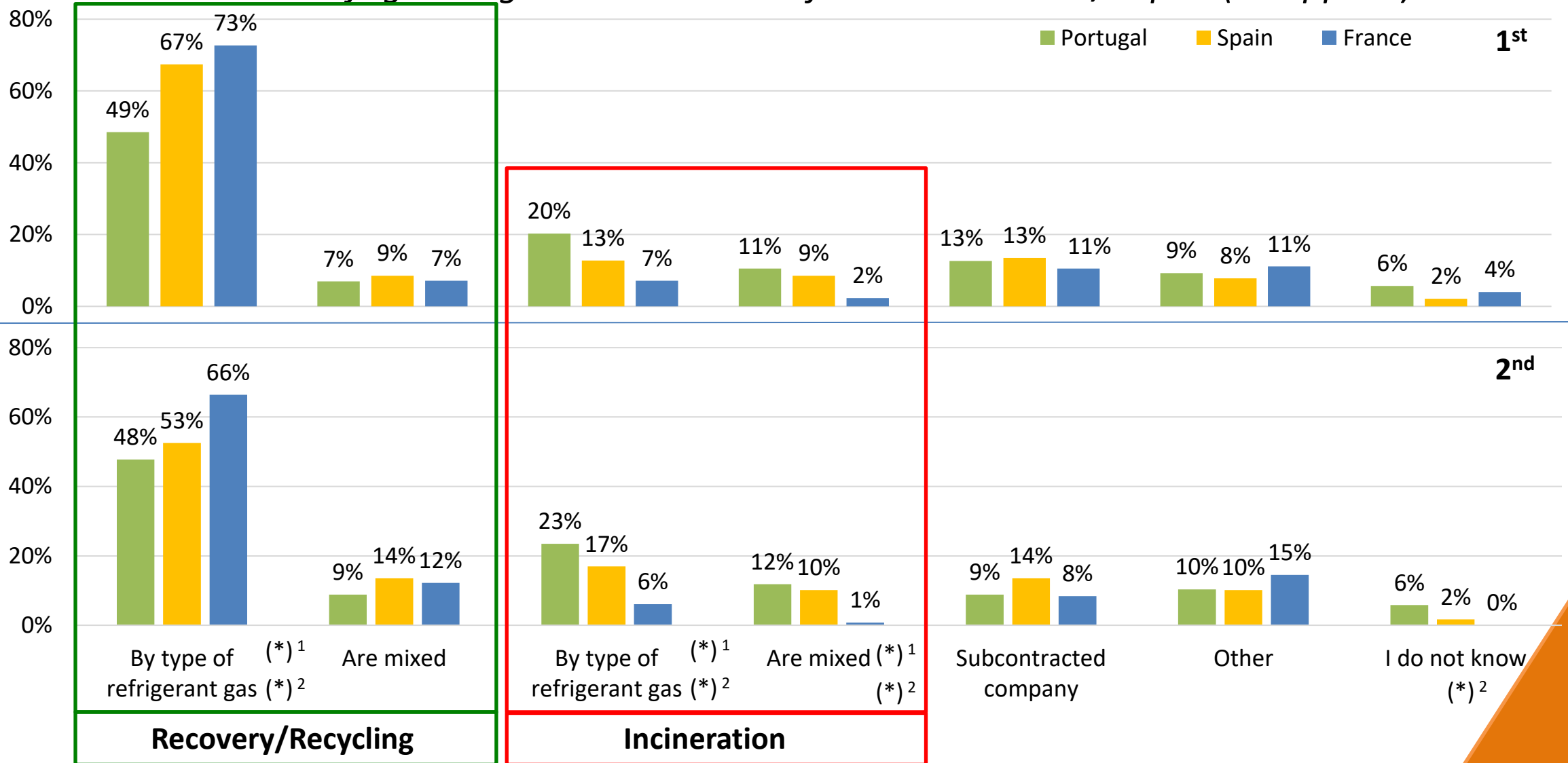
Main results: Technicians

Most frequent gas refrigerant components in repaired equipment (all applied)



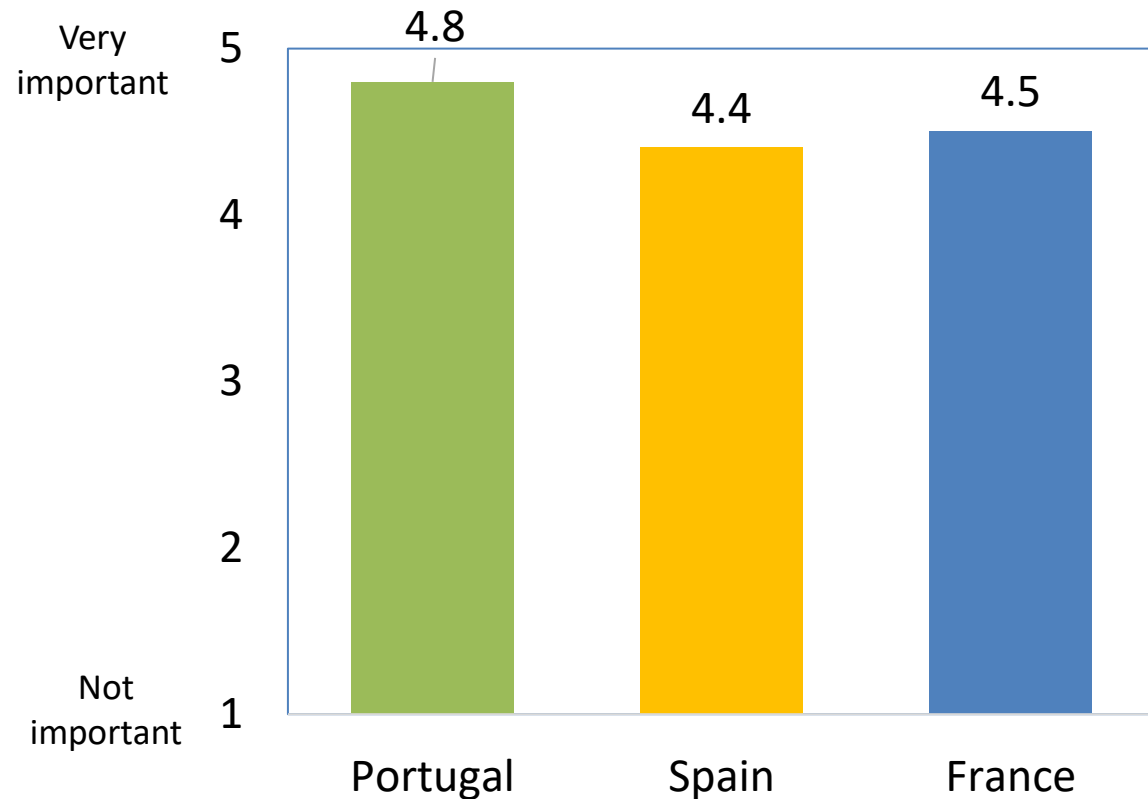
Main results: Technicians

Refrigerant gases destination after maintenance / repair (all applied)

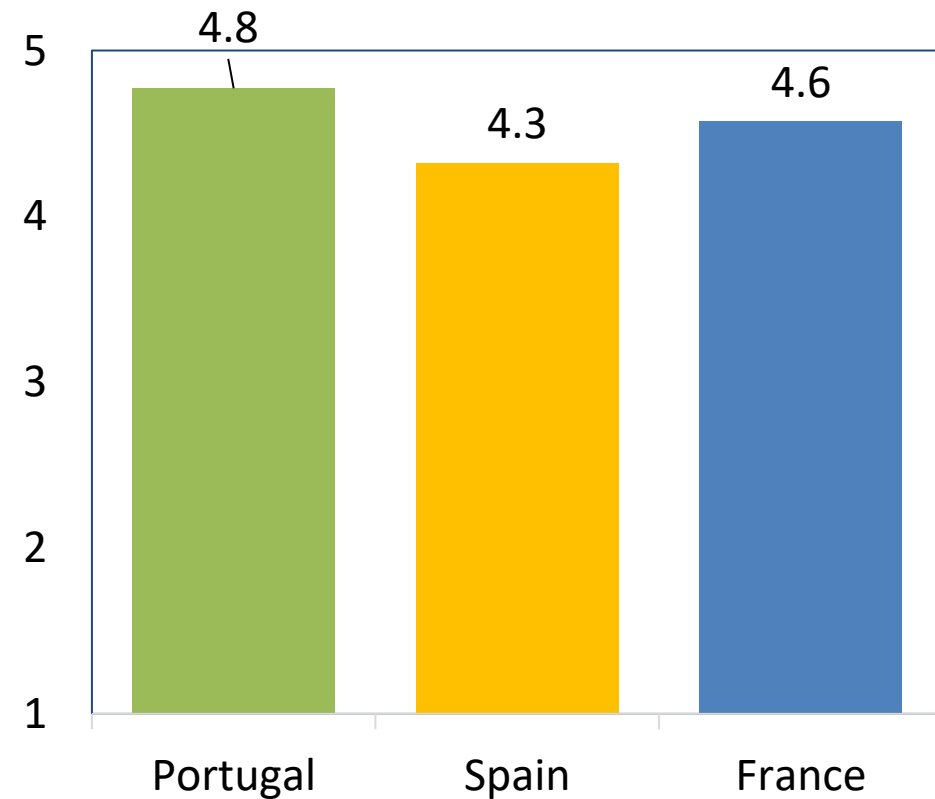


Main results: Technicians

What degree of importance do you attribute to the problem of climate change / global warming?



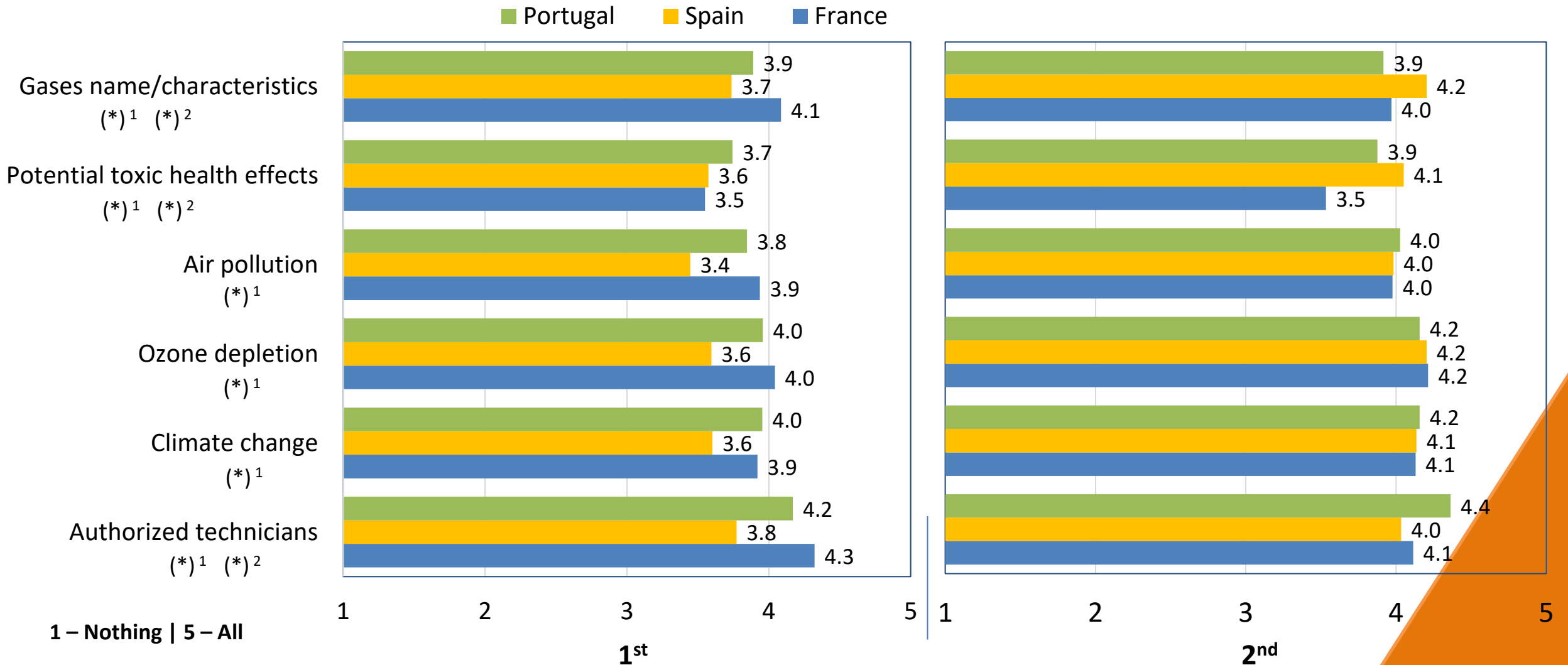
1st (*)



2nd (*)

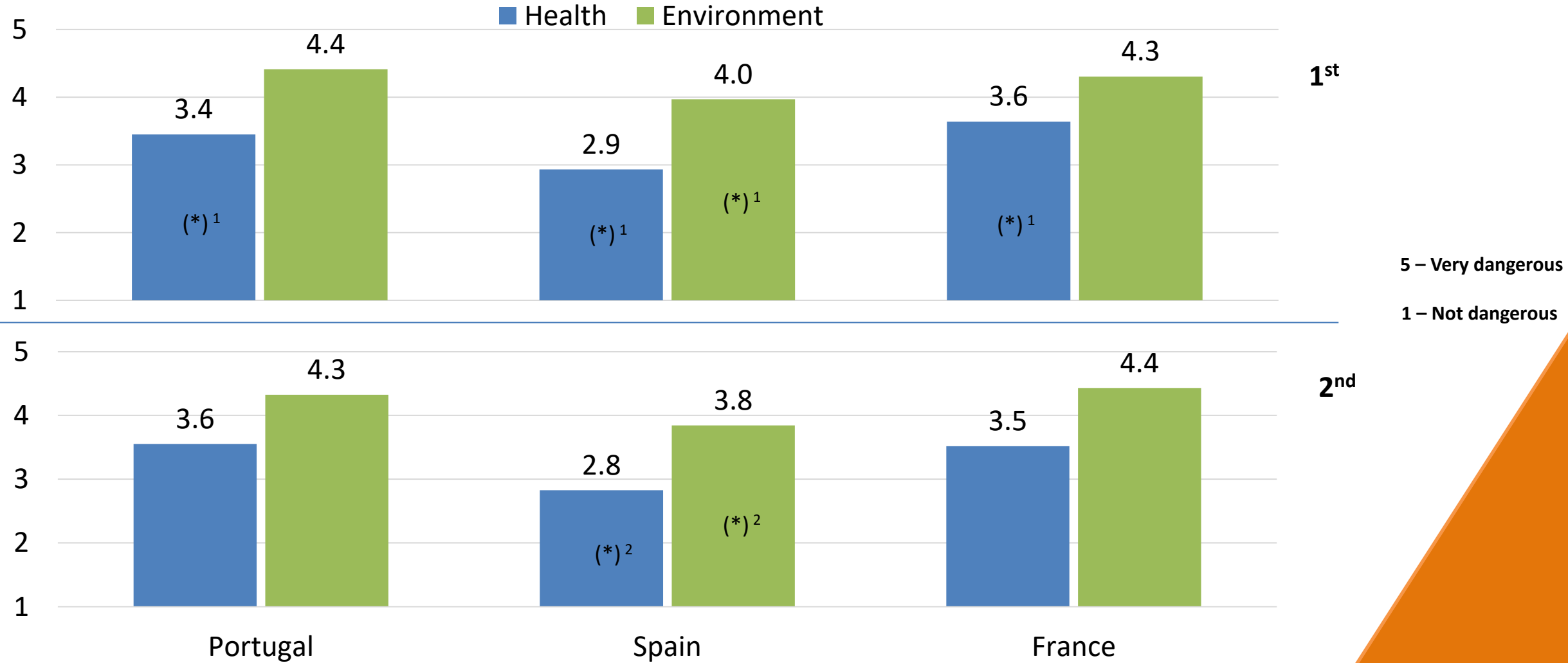
Main results: Technicians

How do you assess your knowledge about the type of gases currently used in refrigeration equipments?



Main results: Technicians

How dangerous do you consider refrigerants gases in equipments, for health and environment?



Main results

Have you read or heard about the problem and importance of fluorinated gases?

Consumers

	Portugal	Spain	France
Yes^(*)	37%	31%	24%

Technicians

	Portugal	Spain	France
Yes^(*)	90%	95%	78%

Other: internet search / internet sites

Conclusions

■ Consumers

- The percentage of those who read or heard about the problem and importance of fluorinated gases is low (about 31%), France being the one with the lowest value (24%)
- The place where they most read or heard this information was in television (30%) or in social networks (17%)
- Refrigerant gases type/quantity are still not an important factor in the purchase decision (slight increase for Portugal and Spain, slight decrease for France)
- When the equipment has a fault there are some consumers (15% 1st questionnaires, 19% 2nd questionnaires) that still give them an incorrect destination
- The importance attributed to climate change is high, but its relationship with refrigerant gases is not very clear
- The risk perception is high, but in general the level of knowledge about the refrigerant gases is low

■ Technicians

- The percentage of those who read or heard about the problem and importance of fluorinated gases is high (about 88%), Spain being the one with the highest value (95%)
- The place where they most read or heard this information was at work (30%) or in events (21%)
- Most frequent refrigerant gas components in repaired equipment:
 - 1st questionnaires: R410A; R134a; R404A; R407F; R32; R22
 - 2nd questionnaires: R410A; R32; R134a; R407c; R404A; R449A
- Refrigerant gases destination after maintenance / repair:
 - Recovery (reuse or recycling) and incineration
- Demonstrate greater knowledge about the type of gases currently used

Thank you for you attention!

If you have any doubt, comment or suggestion,
please do not hesitate to write to:

Graça Martinho (mgm@fct.unl.pt)

Pedro Santos (phas@fct.unl.pt)



INSTITUTO DE INVESTIGACAO E INOVACAO EM ENGINHARIA

SCHOOL OF ENGINEERING



Universidade de Vigo

