EU-CIRCLE

A pan-European framework for strengthening Critical Infrastructure resilience to climate change

D6.5 Case Study 2 CY Evaluation report

Contractual Delivery Date: 30/09 /2018	**Actual Delivery Date**: 24/10/2018
Type: Report	**Version**: V1.0

Dissemination Level: Public Deliverable

Statement

The EU-CIRCLE project proposes a methodological framework for assessing risk and resilience of climate extreme conditions, climate hazards and climate change scenarios to critical infrastructures and support relative adaptation decisions based on consequences and cost-benefit analysis. This report presents the concrete results from the final workshop of the case study (CS2) of the Vasilikos Area. It completes the Evaluation report of the case study.

EU-CIRCLE is a project that has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 653824. Please see http://www.eu-circle.eu/for more information.

Preparation Slip			
	Name	Partner	Date
From	Louisa Marie Shakou	EUC	24/10/2018
Reviewer	Ilias Gkotsis	KEMEA	24/10/2018
Reviewer	Thanasis Sfetsos	NCSRD	24/10/2018
For delivery	Thanasis Sfetsos	NCSRD	24/10/2018

Document Log			
Issue	Date	Comment	Author / Organization
V0.1	17/10/2018	First draft	Louisa Marie Shakou/EUC
V02	19/10/2018	Comments from NCSRD and KEMEA	Ilias Gkotsis/KEMEA Thanasis Sfetsos/NCSRD Louisa Marie Shakou/EUC
V03	24/10/2018	Comments from internal review KEMEA	Ilias Gkotsis/KEMEA Louisa Marie Shakou/EUC

Executive Summary

This document reports on the academic, policy-maker and CI stakeholder engagement and demonstration event undertaken as part of the Vasilikos Area Case Study for the EU-CIRCLE project. An overview of the results of the workshop is provided and an analysis of the feedback given by the participants, both orally and through completion of the two EU-CIRCLE questionnaires, is presented.

Results of the climate change risk assessment were provided in real-time using CIRP and discussed. A high impact-low probability event in the form of a Medicane was simulated and the potential impacts and response actions were discussed.

Participants were positive about the EU-CIRCLE risk assessment methodology, reporting that the results were in line with their expectations, and participants considered the use of CIRP useful for conducting multi-hazard risk assessments and for unexpected events, such as a high impact-low probability event.

Contents

List of acronyms

ACRONYM	EXPLANATION
CCD	Cyprus Civil Defence
CIRP	Climate Impact Resilience Platform
DLI	Department of Labour Inspection
DoM	Department of Meteorology
EAC	Electricity Authority Cyprus
EWE	Extreme Weather Event
HILP	High impact-low probability
WMO	World Meteorological Organisation

List of Figures

1 Introduction

The Cyprus case-study was conducted within the framework of the EU-CIRCLE project during a period of four months following the 2nd project amendment. The case study concluded with a stakeholder's workshop which was held on 21 September 2018, at the Omega Conference room of the European University Cyprus. The workshop was organised by EUC under the auspices of the Cyprus Civil Defence, which is the national competent authority for National Risk Assessment and Critical Infrastructure Protection. Critical infrastructure operators and the relevant national authorities were invited to participate at the workshop. The participants included:

- Cyprus Civil Defence
- Department of Labour Inspection (responsible for SEVESO installations)
- Department of Meteorology
- Fire Service
- Electricity Authority of Cyprus
- Petrolina Holdings Ltd
- Vasilikos Cement Works Ltd
- Vasilikos Port
- VTT Vasilikos Ltd
- Cyprus Telecommunications Authority
- Cyprus Transmission System Operator

The first part of the event focussed on introductions and study outputs. Results of the climate change risk analysis were presented within the Climate Impact Resilience Platform (CIRP), which ran successfully and were discussed. The second part of the event was a table top exercise (TTX) in which a Medicane was simulated over Cyprus with discussion on the possible impacts, response and recovery actions.

Feedback was gathered in multiple forms, oral and written, individual and collective.

Figure 1: Participants of the Cyprus case study workshop

1 Agenda and operators involved

1.1 Agenda

European University Cyprus

EU-CIRCLE
A pan-European framework for strengthening Critical Infrastructure resilience to climate change

Workshop on Critical Infrastructure Protection in Cyprus	
Friday 21st September 2018	
Location: Omega Conference Room **European University Cyprus**	
08.30 – 09.00	Registration
Welcome Session	
9:00-9:15	Introductory remarks & Welcome speeches European University Cyprus & Cyprus Civil Defence
1st Session : Climate Change Risk Assessment in Vasilikos Infrastructures	
09:15 – 10:30	Conducting Climate Change Risk Assessment
10:30 – 11:15	Assessing the Resilience of Vassilikos Infrastructures to Climate Change
11:15 – 11:45	Coffee Break
2nd Session : Responding to Low probability High Impact Events	
11:45 – 12:00	Overview of the scenario - Medicane
12:00 – 13:15	Table Top Exercise
13:15 – 14:00	Lunch
14:00 – 14:45	Evaluation
14:45 – 15:00	Closing Remarks

1.2 List of participants

	Name	Organisation
1	Efthyvoulos Eftychides	Electricity Authority Cyprus
2	Charalambos Kartakoulis	Electricity Authority Cyprus
3	Charalambos Menelaou	Electricity Authority Cyprus
4	Stavros Panayiotou	Vassiliko Cement Works Public Company Ltd
5	Pagona Liggou	Vassiliko Cement Works Public Company Ltd
6	Marios Averkiou	Vassiliko Cement Works Public Company Ltd
7	Zoe Riga	Vassiliko Cement Works Public Company Ltd
8	Christina Vengli	Vassiliko Cement Works Public Company Ltd
9	Stephanos Christophides	Petrolina/PPT - Vassilikos Terminal
10	Constantinos Savvides	VTT Vassiliko Limited
11	Yiannis Loizou	Fire Department
12	Christos Kokkofitis	Department of Labour Inspection
13	Nicholas Paris	Cyprus Civil Defence
14	George Evaggelou	Cyprus Civil Defence
15	Dr Kleanthis Nicolaides	Cyprus Department of Meteorology
16	Athanasios Sfetsos	NCSRD
17	Ilias Gkotsis	KEMEA
18	George Eytichides	KEMEA
19	Antonis Kostarides	SATWAYS
20	Dimitris Diagourtas	SATWAYS
21	Nicholas Karatarakis	Hellenic National Meteorological Service
22	Christos Dimopoulos	European University Cyprus
23	George Boustras	European University Cyprus
24	Cleo Varianou Mikellidou	European University Cyprus
25	Paris Messios	European University Cyprus
26	Louisa Marie Shakou	European University Cyprus
27	Michael Skitsas	ADITESS
28	Romeo Bratska	ADITESS

2 Results from applying the EU-CIRCLE approach

2.1 Climate Change Risk Assessment results

The results of the climate change risk assessment were presented to the CI operators and national authorities through the CIRP. The CIRP used data from the CI operators which was previously collected by EUC, NCSRD, and ADIT in a series of interviews conducted before the workshop (see D6.4 Case Study 2 CY Implementation Report, Sections 2-5). This was an interactive process that lasted almost three months based on exchange of data, best practices and operational experience from the CI operators in order to identify which climate parameters could influence the operation of CI in the Vasilikos area.

The results presented were obtained from implementation of the EU-CIRCLE climate change risk assessment methodology (from D3.5 Holistic CI Climate Hazard Risk Assessment Framework) through the following steps:

1. Conduction of climate analysis that resulted in understanding the changing nature of hazards and the estimation of return periods.
2. Conduction of exposure analysis, based upon the provision of design and operational thresholds from the CI operators
3. Estimation of likelihood of hazards,
4. Estimation of consequences through impact indicator tables
5. Estimation of risk level

The first part of the workshop discussion entailed discussing the climate analyses and estimation of return periods. The results were considered reasonable by the DoM which helped the discussion, as the participants realised that the projections were realistic. This further provided a validation that the work performed by the project was in the right direction and that the climate projections could be trusted. An important climate parameter that was not included was humidity, which was recommended by the participants that EU-CIRCLE include in its methodology. Humidity is an important factor, which when coupled with temperature can provide reliable indication of the comfort of workers exposed to unfavourable conditions (particularly for work done outside). Furthermore, in Cyprus the Department of Labour Inspection (DLI) has issued guidelines that set limits to the time that workers can work outdoors, which could disrupt the smooth operation of CIs.

The assets which are affected most by high temperatures are: EAC: the Power Station's combined cycle gas turbines and the transmission cables of the network, as high ambient temperatures minimise their efficiency, and the Vasilikos Cement Works rotary kiln and its cooling system. For other CI operators the main impacts were related to their staff and their ability to carry out their work.

In discussions of the return period used by the CI operators, Petrolina and Vasilikos Cement Works do not consider the return periods of climate hazards, whilst VTTV and Vasilikos Port use a 50-year return period and EAC uses a 100-year return period.

The impacts that were discussed were then used to select the relevant impact class from Table 1 below and fed into the CIRP with the results shown in real time.

Table 1: Relevant impacts and their classes used in the risk analysis

IMPACT/CLASS	NEGLIGIBLE	SMALL	MEDIUM	HIGH	SEVERE
% damage of asset	value< 10%	25% > value > 10%	50% > value > 25%	75%> value > 50%	value > 75%
% damage to CI performance	% value < 2%	5% > % value > 2%	15% > % value > 5%	40%> % value > 15%	% value > 40%
Time that CI/asset/ is not able to serve its intended function	value < 0.5 days	1 days > value > 0.5 days	4 days > value > 1 days	7 days > value > 4 days	value > 7 days
Costs of damaged assets	value < 0.5% of total value of CI	0.5% > value > 2% of total value of CI	2% > value > 10% of total value of CI	10% > value > 20% of total value of CI	20% > value > 30% of total value of CI
Loss of total income as a result of not servicing demand	% value < 0,5%	0,5% > % value > 2%	2% > % value > 10%	10% > % value > 30%	30% > % value > 40%

2.2 CIRP results

The data collected in the interviews were ingested into the CIRP and the results showcased in real-time. In the following section are a selection of indicative CIRP results shown at the workshop. For a more detailed discussion of the results of the climate risk assessment and its visualisation see D6.4 (Section 4).

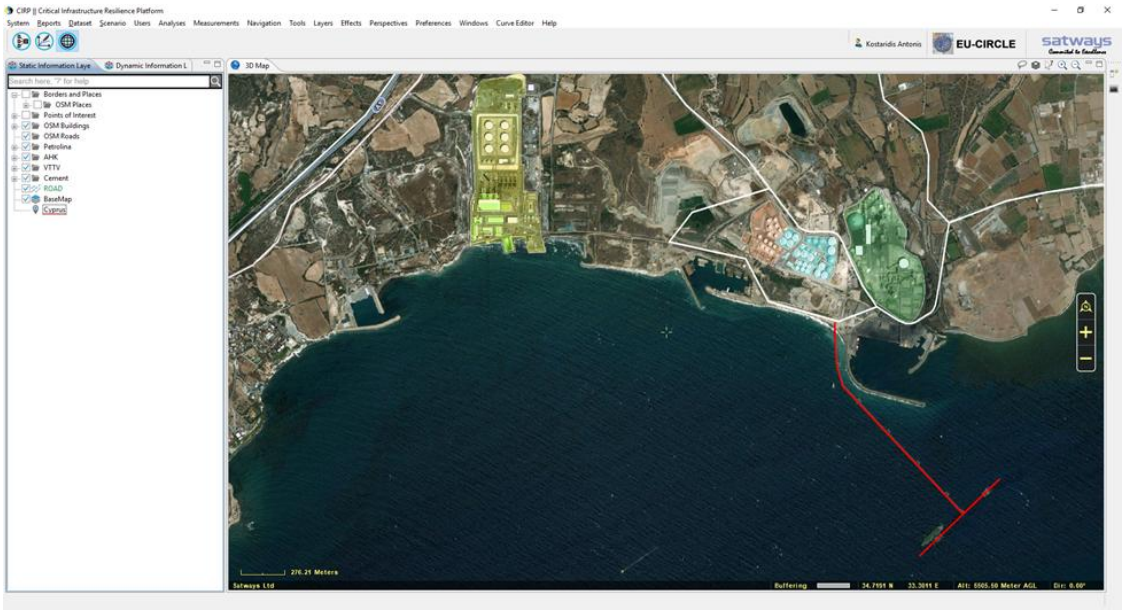


Figure 2: Visualisation of the critical operators in the Vasilikos area

The discussion began with a visualisation of the results of the climate analyses and the probability of exceeding the design thresholds given by the CI operators in the data collection stage, as shown by Figures 3 and 4.

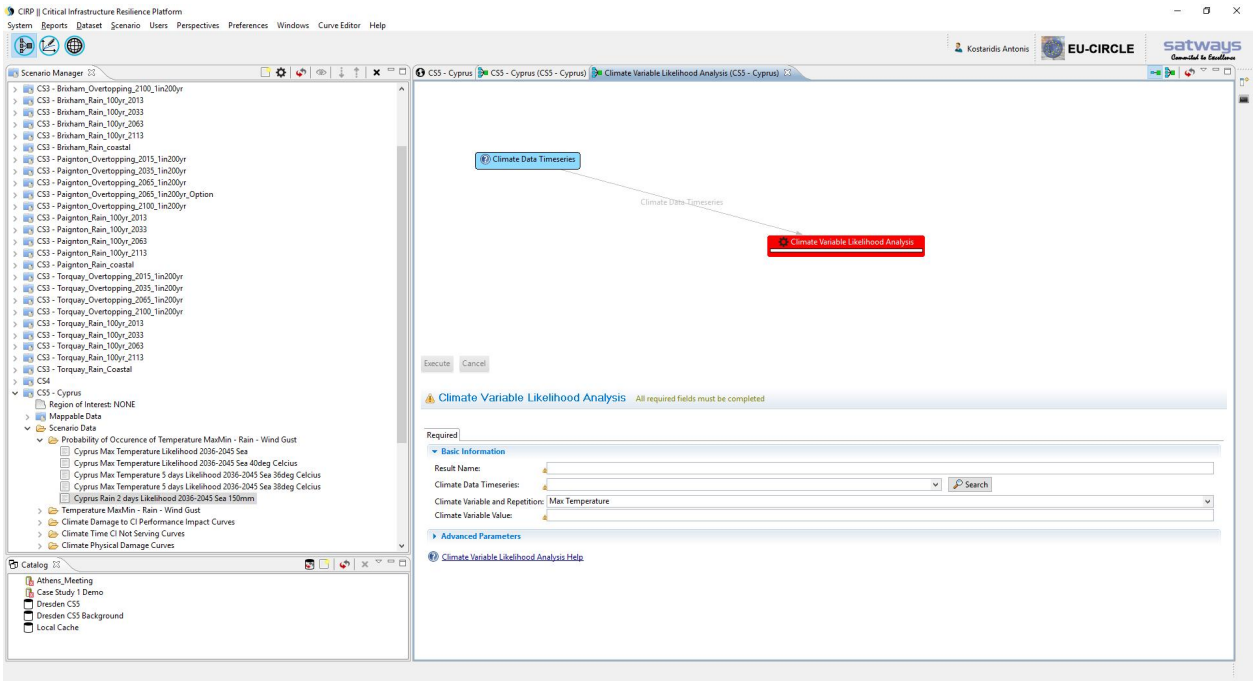


Figure 3: Setup of the Likelihood analysis

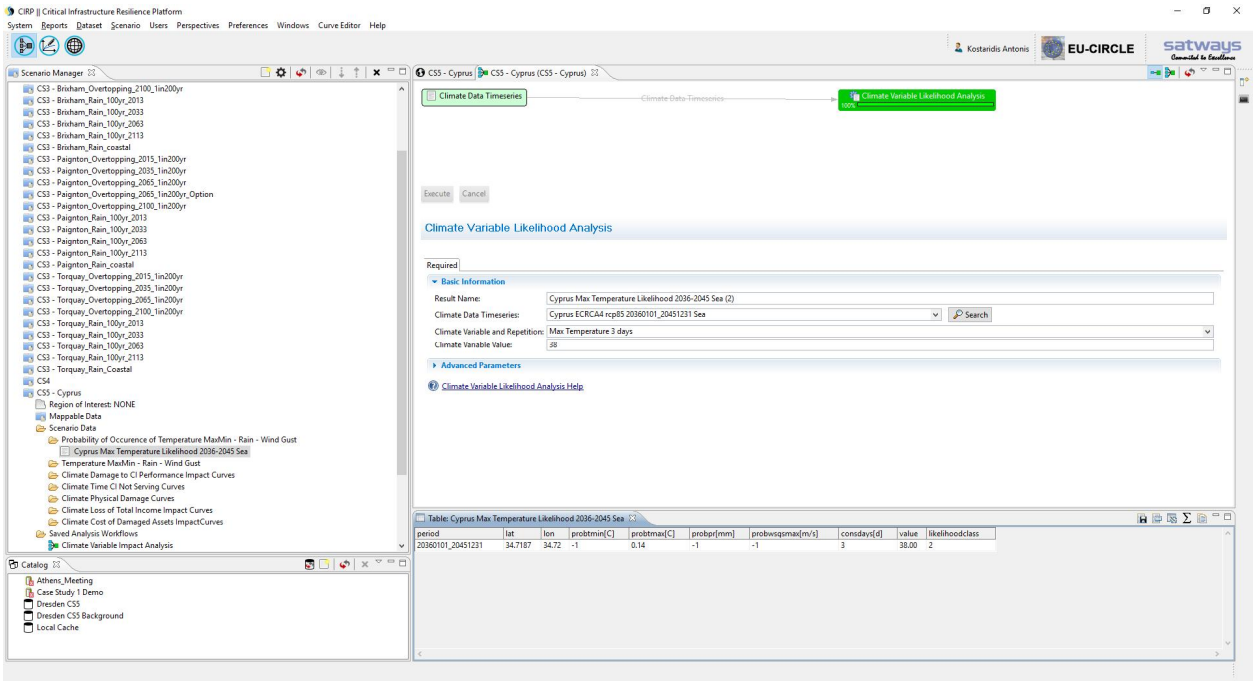


Figure 4: Likelihood result of Max Temp 3 days and 38 degrees Celsius (14%, Likelihood class: 2)

Following the discussion of the climate analyses, the CI operators, with the use of CIRP discussed the impacts to CI assets and facilities from the examined hazards (Figures 5 to 7). Impact curves were

presented in real-time as the discussion unfolded, for a detailed analysis of the results please refer to D6.4 Sections 4.1-4.4.

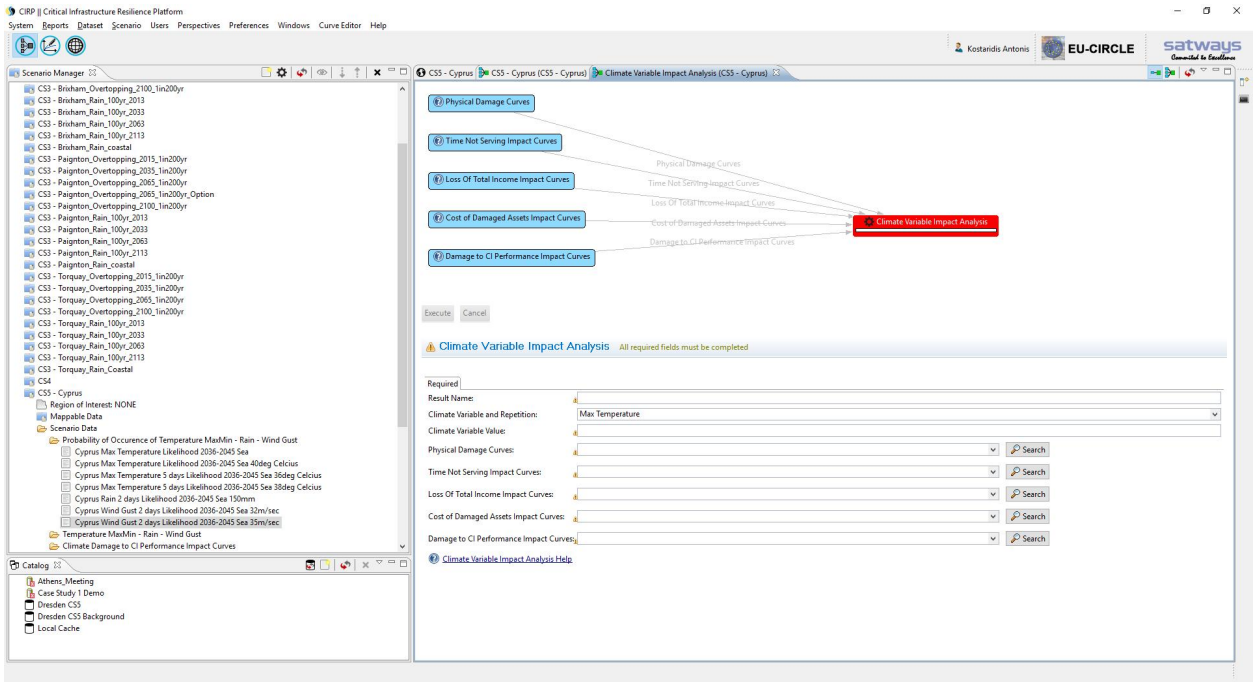


Figure 5: Setup of the Impact analysis

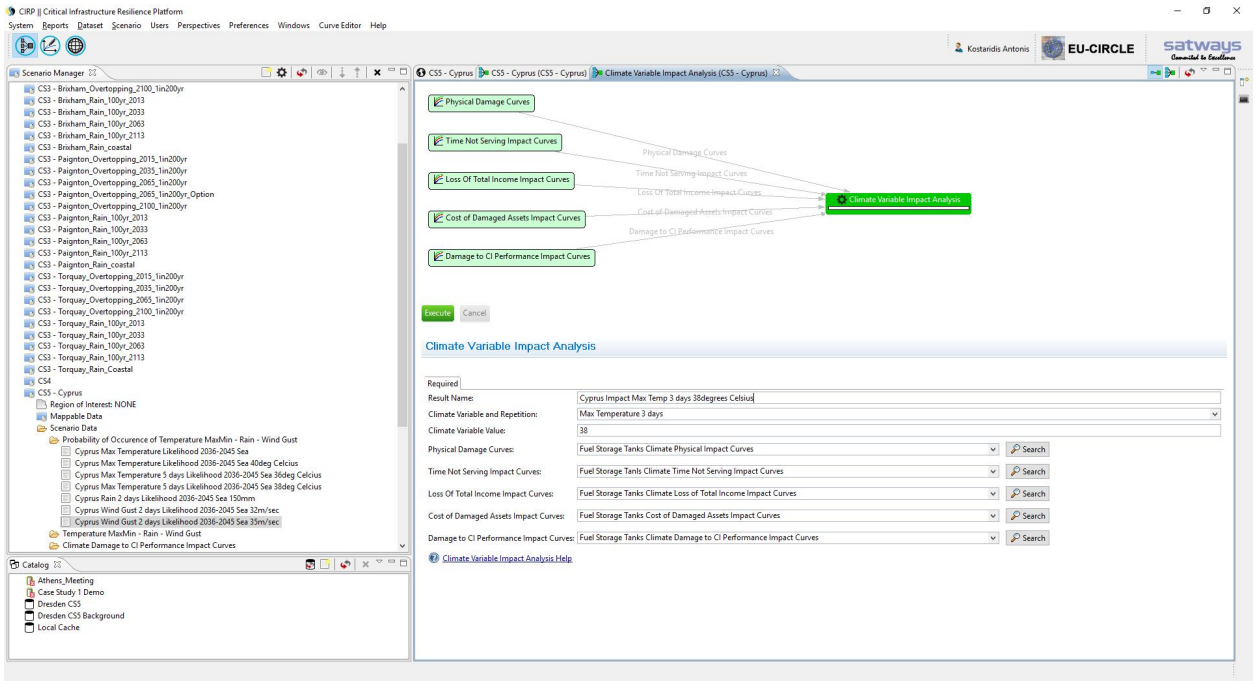


Figure 6: Selection of Fuel Storage Tanks Impact curves and Max Temp 3days climate variable

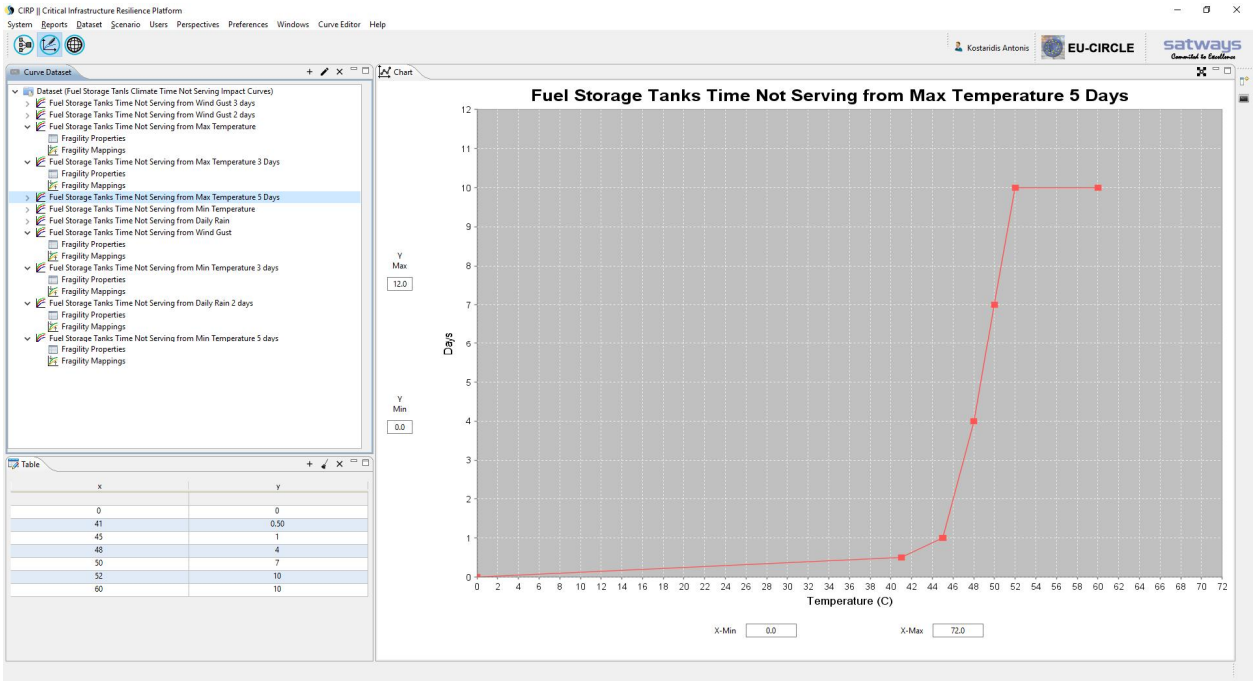


Figure 7: Editing Fuel Storage Tanks climate impact curves

The risk analysis was completed in CIRP through the development of risk matrices in real-time, as shown by Figures 8 to 11.

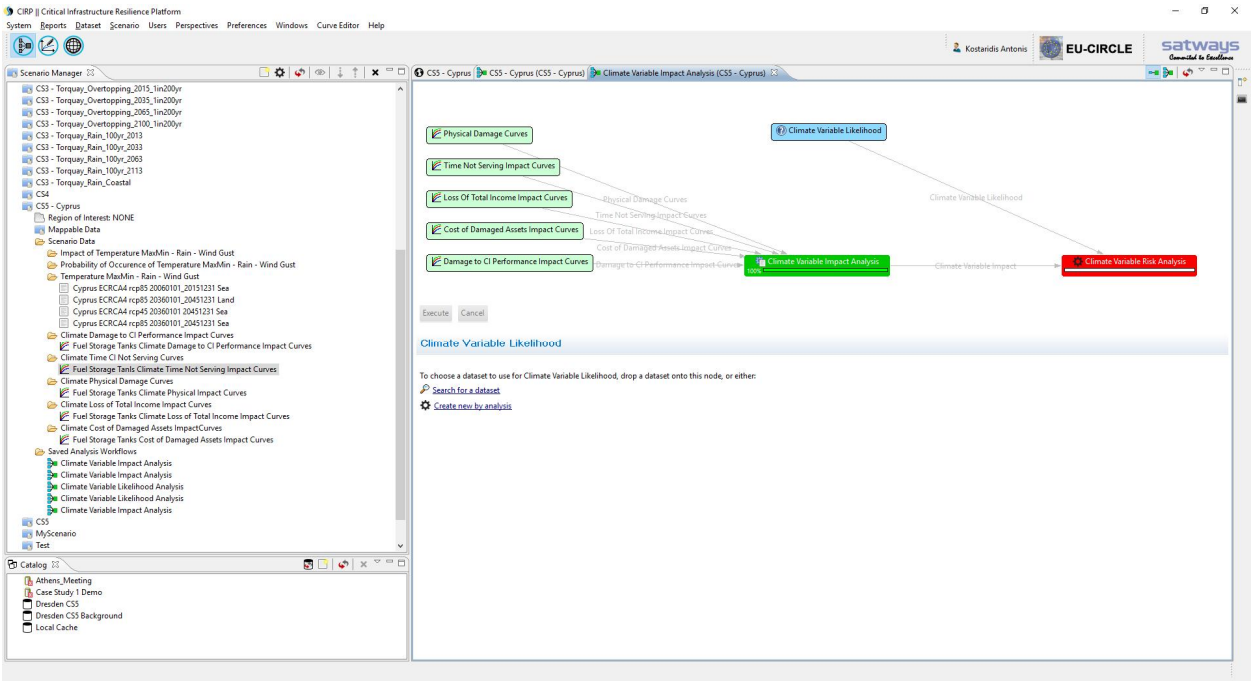


Figure 8: Setup of the Risk analysis (combining likelihood and impact analysis)

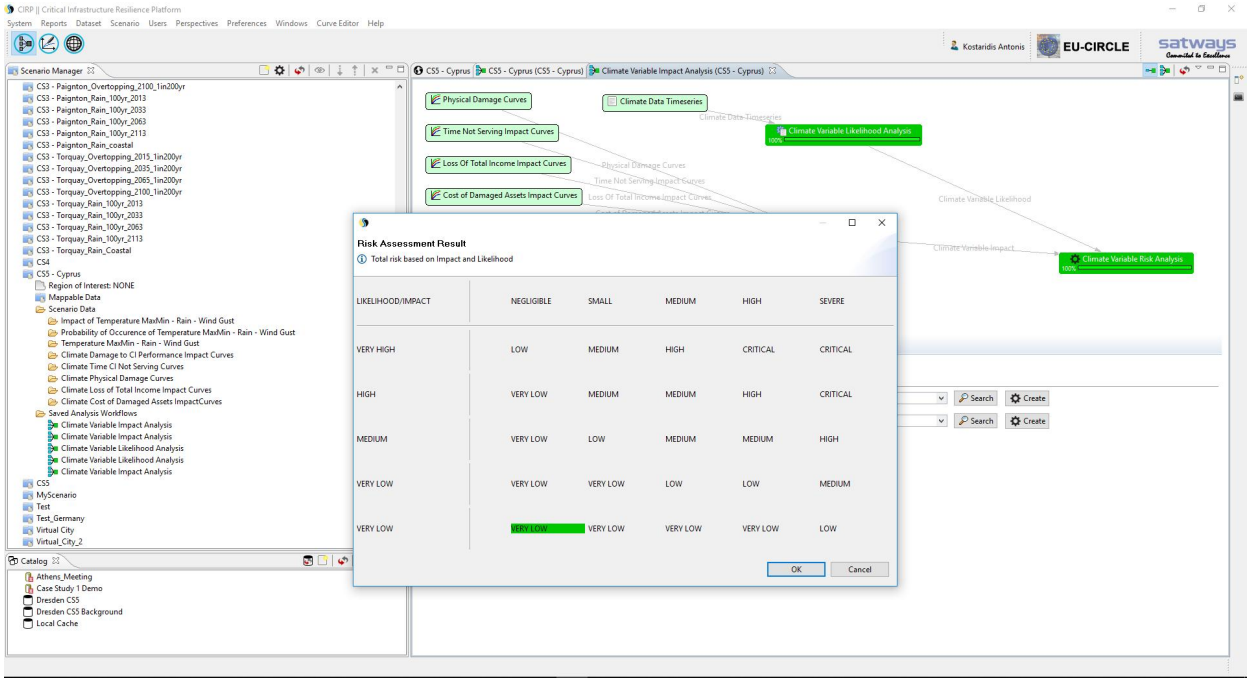


Figure 9: Fuel Storage Tanks Risk results for Max Temp 3 days of 38deg Celsius

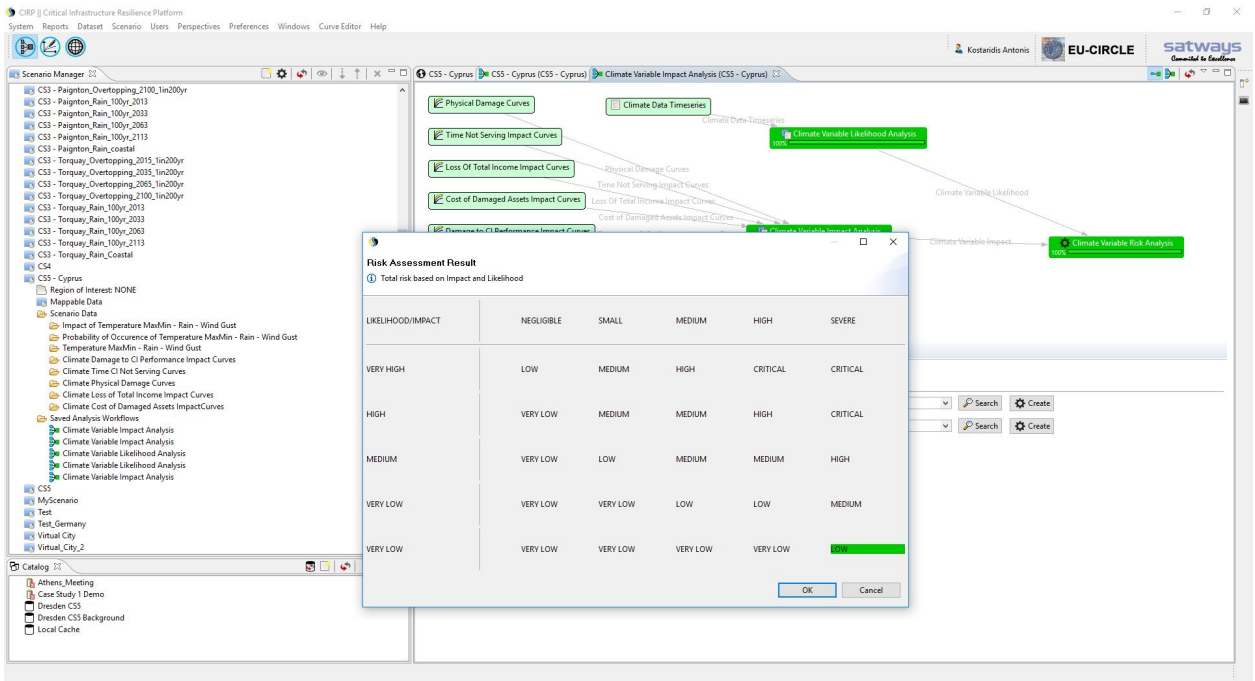


Figure 10: Fuel Storage Tanks Risk results for Rain 2 days of 150mm

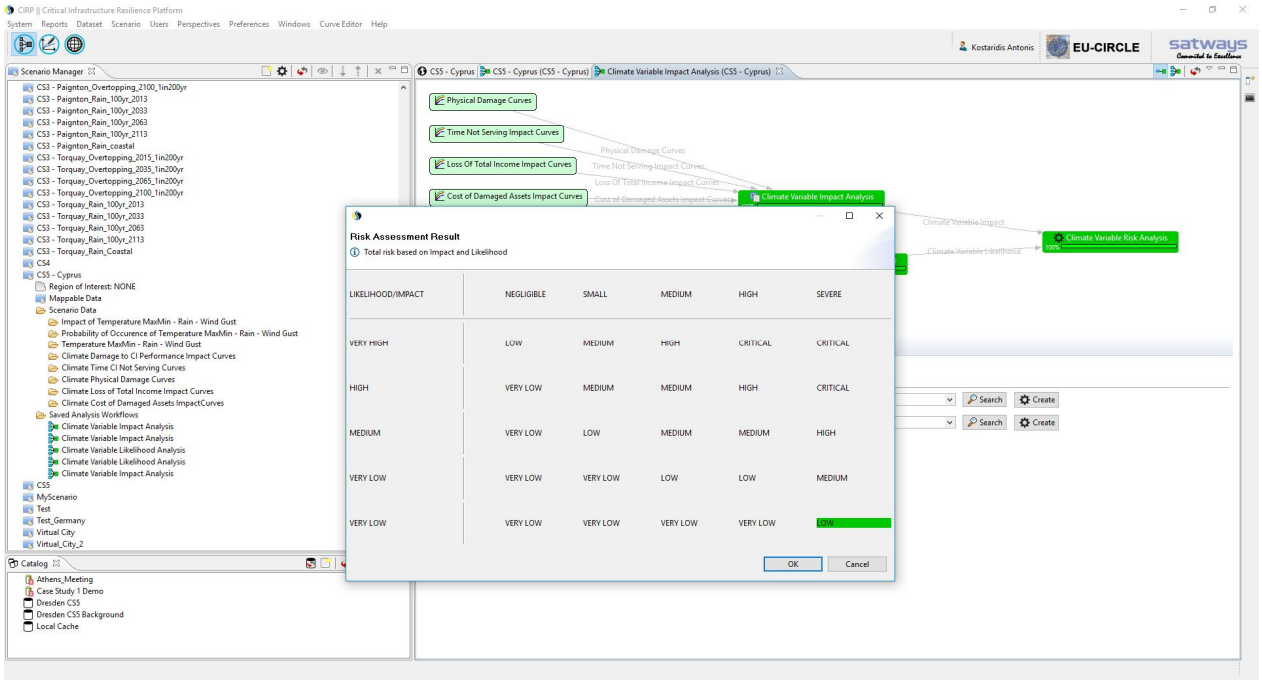


Figure 11: Fuel Storage Tanks Risk results for Wind Gust 2 days of 35m/sec

3 Communication and evaluation

3.1 Communication

3.1.1 Workshop

The first engagement with CI operators and relevant national authorities related to EU-CIRCLE activities and climate change in Cyprus was through a workshop held on 7-8 March 2017 which was co-organised with the CCD, with the participation of the Joint Research Centre and local Critical Infrastructure Operators from the energy, ICT, water and public sectors. In total, 50 stakeholders participated in the workshop, which included presentations on the potential impacts of hydro-meteorological hazards on CI, the changing climate in Cyprus and future climate change predictions as well as the EU-CIRCLE risk assessment and resilience frameworks. The second day of the workshop included a table top exercise, where participants engaged in discussions on climate change risk assessment and on potential response options in interconnected national infrastructures.

All participating operators recognised that meteorological hazards such as wildfires, extreme temperatures and flooding impact their infrastructure, yet only some of them take risk mitigation actions and preventive measures. Furthermore, no CI operator considers climate change and how this can impact the frequency and intensity of extreme events. Through the workshop EU-CIRCLE provided data on future forest fire and meteorological risk based on the RCP 2.6, RCP 4.5 and RCP 8.5 scenarios for the time period 2016 to 2050 in Cyprus (Figure 12), which raised awareness on how climate change will potentially result in increased impacts due to the increase in the frequency and intensity of extreme events.

In discussions on how each CI sector is interconnected and dependent with the other, it became clear that the energy and ICT sectors are the most vital in Cyprus as all CI sectors are dependent on these two. In long-term crises, smooth port-operation becomes critical as entry points of spare parts and equipment. The electricity sector has done the most to build redundancy, with the ICT sector second. All other CI sectors identified that more needs to be done by them to build-in redundancy and that the EU-CIRCLE paradigm of resilience is a useful framework for guiding their efforts.

Dependencies between sectors are likely to be particularly important during a crisis and this is something that CI operators need to explore further.

This workshop was a first successful introduction to the work of the EU-CIRCLE project. Following this first workshop, the CCD asked the project to consider undertaking more detailed work in the Vasilikos area.

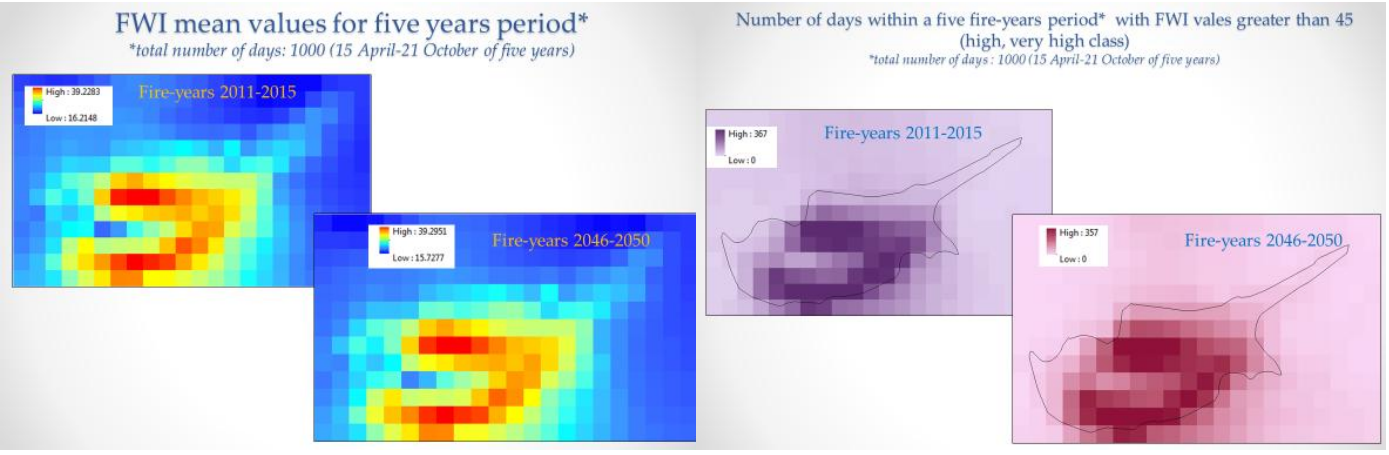


Figure 12: FWI values for Cyprus

Figure 13: Participants in the first Cyprus workshop March 2017

Figure 14: Participants in the first Cyprus workshop March 2017

Workshop on Critical Infrastructure Protection and Climate Change	
Day 1 -Tuesday March 7th 2017	
Room 012, South Block, European University Cyprus	
08.30 – 09.00	Registration
Welcome Session	
9:00-9:10	Introductory remarks & Welcome note – Cyprus Civil Defence (CCD)
9:10-9:20	Welcome Speeches • Cyprus Civil Defence, **Loucas Hadjimichael** • European University of Cyprus, **Dr Georgios Boustras**
9:20-9:30	Presentation of EASME activities – **Dr Irena Gabrielaitiene**
1st Session : An introduction to Critical Infrastructure Protection	
09:30 – 09:50	An overview of Critical Infrastructure (CI) resilience to climate change, **Dr Athanasios Sfetsos, National Centre of Scientific Research "Demokritos"**
09:50 – 10:10	An overview of key concepts and definition of CI protection – **Dr Georgios Giannopoulos & Dr Marianthi Theocharidou, Joint Research Centre**
10:10 – 10:30	Impacts of climate change on CI – **Louisa Marie Shakou, EUC**
10:30 – 10:45	Q&A
10:45 – 11:00	**Coffee Break**
2nd Session : CI risk and resilience assessment methodologies	
11:00 – 11:20	Risk assessment methodologies for CI – **Dr Georgios Giannopoulos & Dr Marianthi Theocharidou, Joint Research Centre**
11:20 – 11:40	Assessing interconnections and interdependencies in CI - **Dr Georgios Giannopoulos & Dr Marianthi Theocharidou, Joint Research Centre**
11:40 – 12:00	Natural hazard impacts on critical infrastructures: Risk assessment and mapping- **Dr Marianthi Theocharidou, Joint Research Centre**
12:00 – 12:20	The EU-CIRCLE risk and resilience framework – **Dr Ralf Hedel Fraunhofer IVI, Hisham Tariq University of Salford**
12:20 – 12:40	Interactive Q&A session
3rd session: Cyprus Climate Change National Risk Assessment (NRA)	
12:40 – 13:00	An overview of Cyprus's Climate Change NRA – **Dr. Theodoulos Mesimeris , Department Of Environment**
13:00 – 14:00	**Lunch**
14:00 – 14:20	Common Alerting Protocol for Multi Hazard Early Warning System. A developing system – **Dr. Kleanthis Nicolaides, Department of Meteorology Cyprus**

4th session: Interaction of CI communities	
14:20 – 14:40	Providing climate change data to CI communities – **Dr. Rasmus E. Benestad, Norwegian Meteorological Institute**
14:40 – 15:00	EU-CIRCLE capabilities, functionality and usability – **Georgios Eftychidis**, **Center for Security Studies (KEMEA)**
15:00 – 15:40	The EU-CIRCLE case studies – **Dr Ralf Hedel Fraunhofer IVI, Dr Bingunath Ingirige University of Huddersfield, Dr Lydia Vamvakeridou-Lyroudia and Dr Albert Chen University of Exeter, Dr Krzysztof kolowrocki Gdynia Maritime University & Midori Million and Catherine Freissinet ARTELIA**
15:40 – 16:00	Q&A
Omega Conference Room, European University Cyprus	
16:15 – 17:30	EU-CIRCLE review meeting (closed only for project)

Day 2 - Wednesday March 8th 2017	
Room 012, South Block, European University Cyprus	
08:30 – 09:00	Welcome and Registration.
Spatial modeling tools for assessing risks and support resilience of CIs	
09:00 – 09:15	Presentation of CIRP – **Dr Antonis Kostaridis, SATWAYS**
09:15 – 09:30	Presentation of GRRASP - **Dr Georgios Giannopoulos & Dr Marianthi Theocharidou, Joint Research Centre**
Table Top eXercise "Strengthen CI resilience planning to climate change and relative risks"	
09:30 – 10:00	Scenarios and participant involvement
10:00 – 13:00	Table – top exercise *(Coffee will be served in parallel)*
13:00 – 14:00	Lunch
Debriefing and evaluating the EU-CIRCLE TTX	
14:00 – 14:30	Table top exercise evaluation
14:30 – 15:00	Round table discussion
15:00 – 15:30	Conclusions – Next Steps

Figure 15: Agenda of Cyprus workshop March 2017

3.1.2 Interviews and data collection

A series of interviews with the CI operators were held, in which data such as the climatic design thresholds used in their facilities, historic events related to climate hazards, exposure of assets and potential impacts were discussed. A total of 12 interviews and site visits were conducted over a three-month period.

There were also three meetings with the CCD, DoM and Fire Service to discuss the scenarios chosen and progress of the case study.

3.2 Evaluation

3.2.1 Analysis of the EU-CIRCLE validation questionnaires

Due to the short nature of the case study, participants had limited exposure to and use of the CIRP, which combined with the fact that the roles in their organisations did not require existing use of decision support systems, participants did not feel knowledgeable enough on the functionality of the CIRP to answer all the questions. As a result, the questionnaires administered during the course of the workshop have many missing values (see Annexes I), and thus some questions related to direct user experience of CIRP have inconclusive results.

Filtering the missing values, it is observed however, that in general the participants consider the CIRP relatively easy to use and not unnecessarily complex. However, due to the nature of climate change risk assessments operators felt that they would need to be better aware of the methodology before being able to use CIRP.

Most participants felt using a platform like CIRP would allow them to assess climate risks and risks to their resilience much faster than their current methodologies. In addition, all participants who replied considered that CIRP is very valuable for allowing them to assess unexpected climate incidents and their likelihoods, and that CIRP was able to do so much better than their current tools. Encouragingly, following the multi-hazard risk assessment, all respondents believed that CIRP was useful to very useful for conducting risk assessment of multiple hazards and for identifying secondary impacts arising from cascading effects. Respondents also considered that the results produced by CIRP were in line with what they expected and what their own risk assessments suggest.

Feedback was also collected orally, particularly with relation to the usefulness of climate change risk assessments and the value of simulating HILP events (see D6.4), and key impressions related to the KEQs were obtained.

3.2.2 EU-CIRCLE key evaluation questions

In addition to the questionnaires distributed and as per the validation plan in D6.1, oral feedback was also collected through a structured group discussion centred around Key Evaluation Questions. The conclusions drawn from the discussion associated with the KEQs include:

a. EU-CIRCLE Concept

i. To what extent does EU-CIRCLE address an existing challenge in CIP and operational planning in order to address climate change impacts?

In discussions throughout the interview sessions and at the workshop, CI operators and national authorities expressed that EU-CIRCLE was useful in providing scientific assessments of risks, which can be used by CI

operators in their discussions with insurance providers and in planning for emergencies in the event of an EWE.

ii. How appropriate is the EU-CIRCLE approach to improve preparedness and response capabilities of CIs?

The simulation of an HILP such as a Medicane is useful for organising and conducting exercises that test response capabilities and coordination amongst CI operators and national authorities. Such simulations can be used to present the scenario and the visualisation gives the operators a much better understanding of the potential impacts and how to respond to them, particularly in the setting of exercises.

iii. Which can be main challenges for applying EU-CIRCLE solution?

The limited availability of data at present limits the extent of EU-CIRCLE applications. In addition, confidentiality issues surrounding sharing of data has proved to be the biggest challenge.

iv. What is considered innovative in EU-CIRCLE solution?

HILP simulations, multiple-hazard risks assessment, and quantitative estimation of damages.

b. Prototype

The real-time processing of data and visual representation of the various analyses during the workshop led to positive feedback from participants, which considered that the CIRP's performance was responsive and fast, and very useful for visualising data, particularly in the context of emergency planning and management. The ability to combine climate analyses and information on consequences and represent it in graphical form (impact curves) and overlaying the climate analyses over the map of Vasilikos is useful for highlighting the risks posed by climate change and the potential impacts in an easy to understand manner.

c. Operational

i. Are stakeholders being reached as required?

The main CI operators of the area were reached and participated. The case study had an extra participation in the form of Vasilikos Cement Works Ltd, which manages the Vasilikos port. In discussions with them about participating through the port, the company also expressed an interest for the cement facilities to also be included in the case study, which was agreed upon by the EU-CIRCLE project partners.

The Transmission System Operator, CYTA and the Water Development Department were also contacted and asked to participate but they were unable to respond in time and so were not included.

ii. How satisfied are EU-CIRCLE stakeholders?

The EU-CIRCLE stakeholders were satisfied. The Fire Service recommended that the results of the case-study are shared more widely and VTTV has expressed interest in co-authoring a paper on the results of the risk assessment conducted for their facility. There will be a joint presentation with VTTV at the Nicosia Risk Forum on 14 November 2018 of the work done in the EU-CIRCLE case study.

iii. How well does EU-CIRCLE align with government and agencies' priorities?

EU-CIRCLE aligns with the CCD's priorities related to CI protection and crisis management. It also aligns with the work done by the DoM under the Common Alerting Protocol for EWEs, which is coordinated by the WMO, which is an international standard format for emergency alerting and public warning.

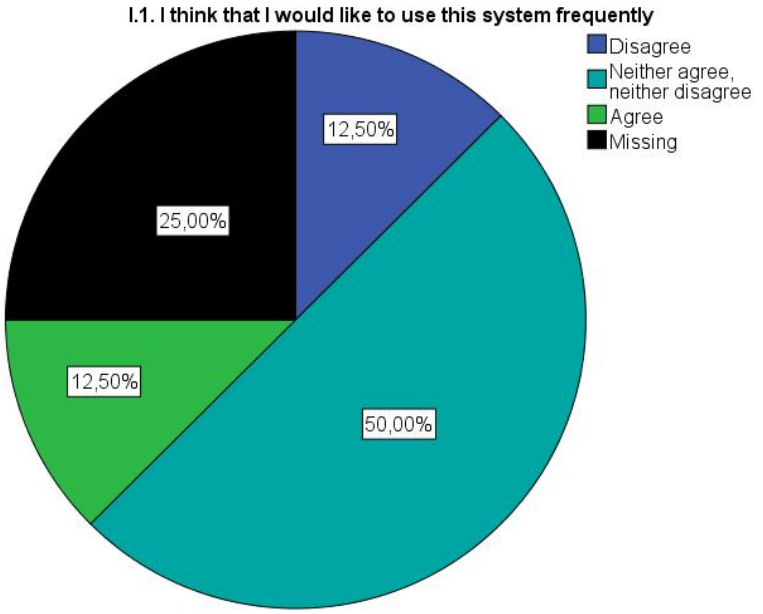
iv. Are there ethical and data privacy issues not addressed by EU-CIRCLE?

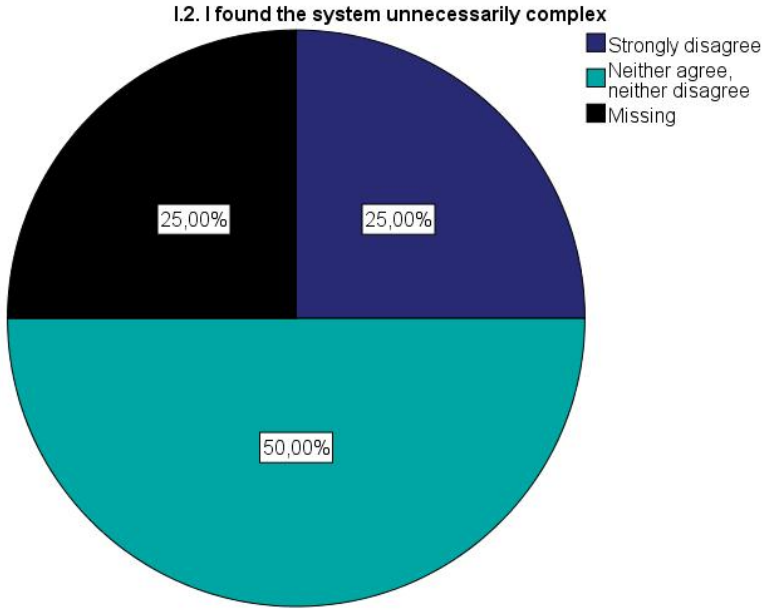
There are issues of security, public-private data sharing and confidentiality. Most CI operators required the signing of non-disclosure agreements and for their data to remain confidential.

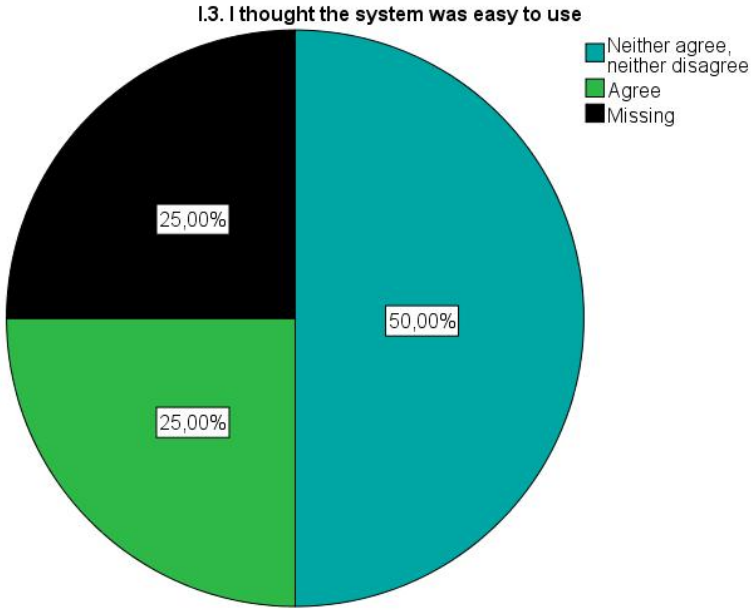
3.3 Twitter screenshots

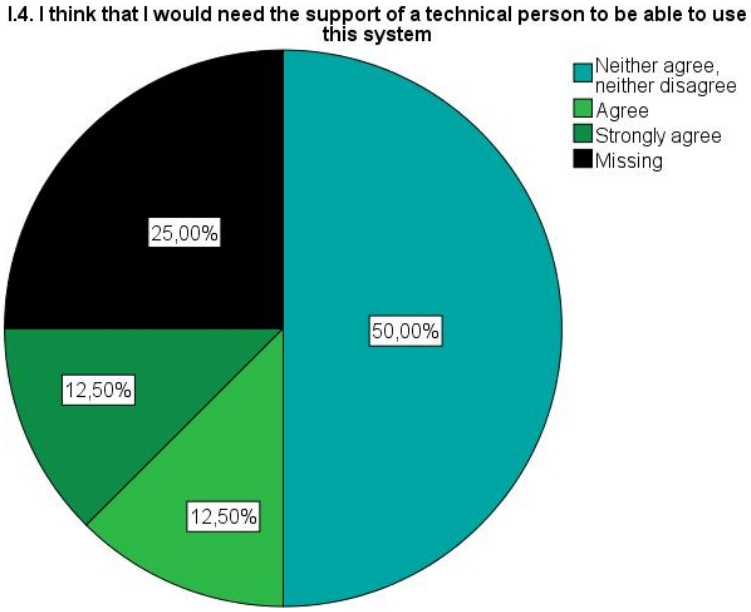
Figure 16: Screenshots of Tweets of the event

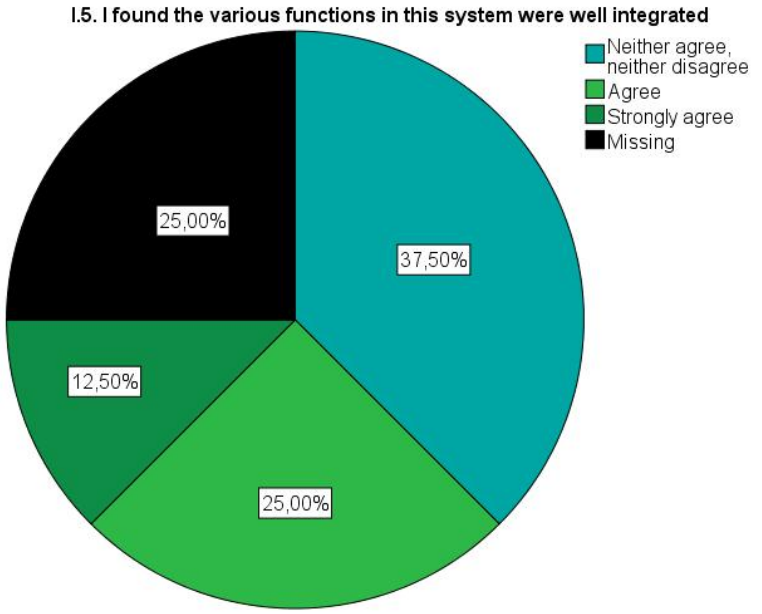
ANNEX I- Analysis of Case Study 2 Questionnaires

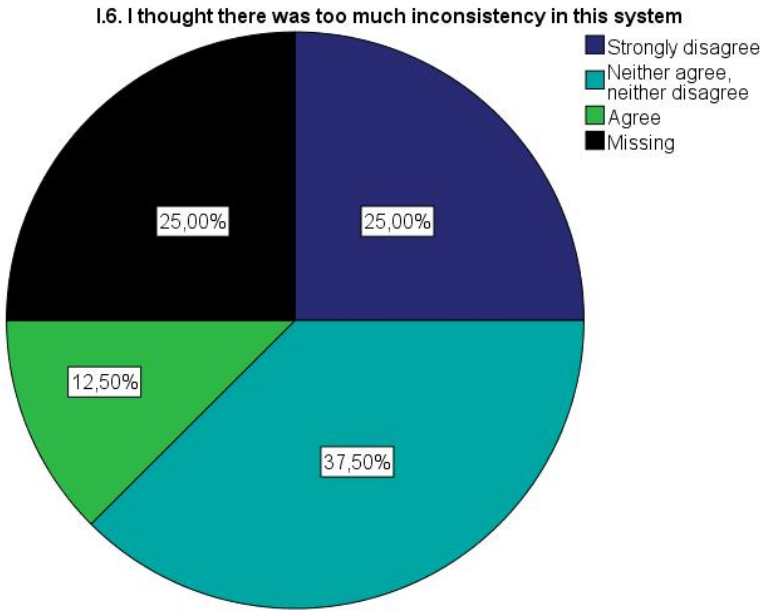


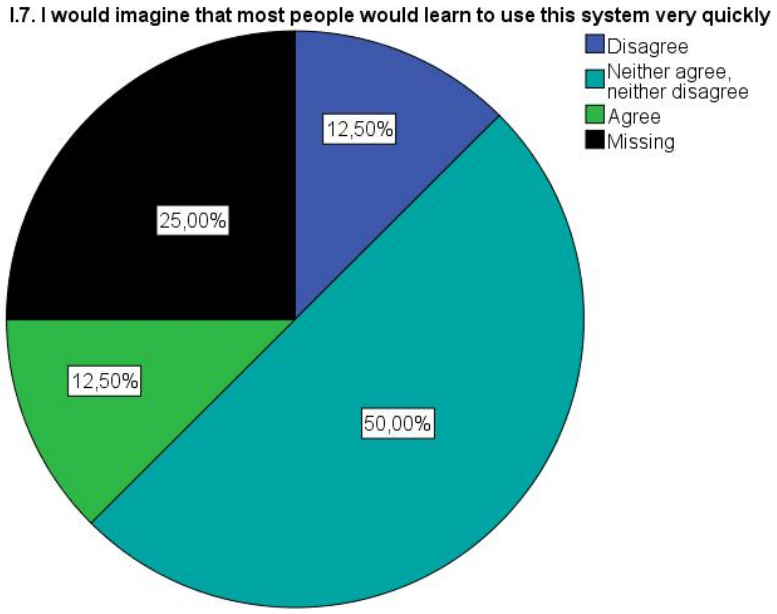


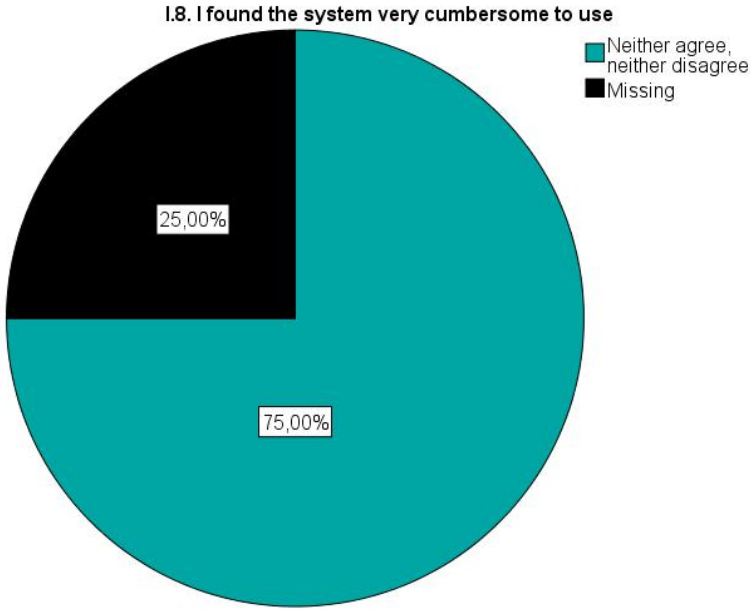

I.3. I thought the system was easy to use
Neither agree, neither disagree
Agree
Missing
25,00%
50,00%
25,00%

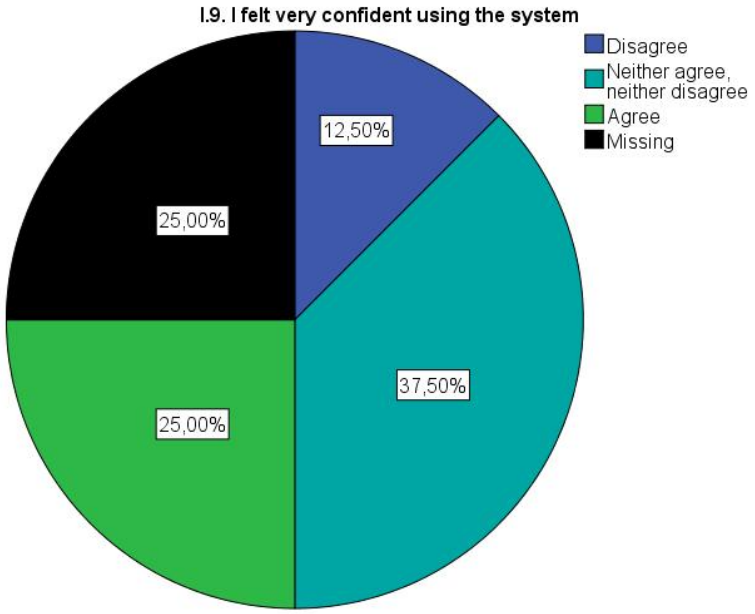

I.4. I think that I would need the support of a technical person to be able to use this system
Neither agree, neither disagree
Agree
Strongly agree
Missing
25,00%
50,00%
12,50%
12,50%

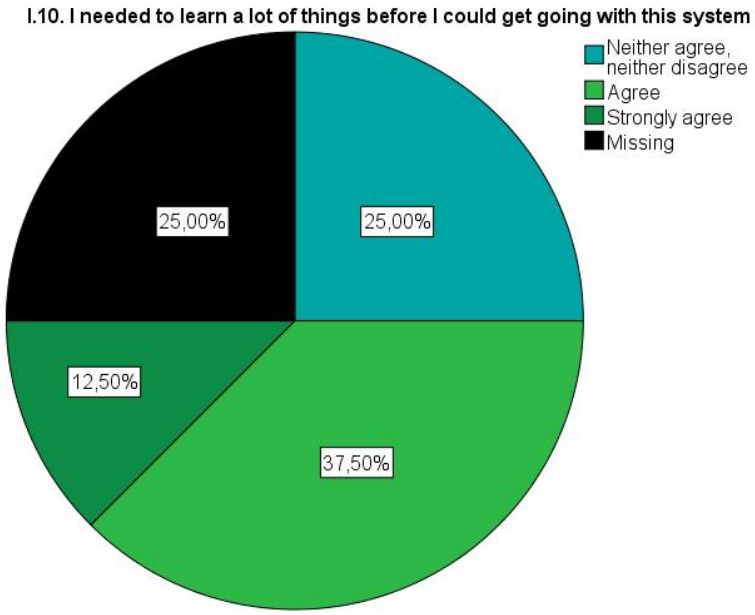

I.5. I found the various functions in this system were well integrated
Neither agree, neither disagree
Agree
Strongly agree
Missing
25,00%
37,50%
12,50%
25,00%


I.6. I thought there was too much inconsistency in this system
Strongly disagree
Neither agree, neither disagree
Agree
Missing
25,00%
25,00%
12,50%
37,50%


I.7. I would imagine that most people would learn to use this system very quickly
Disagree
Neither agree, neither disagree
Agree
Missing
12,50%
25,00%
12,50%
50,00%

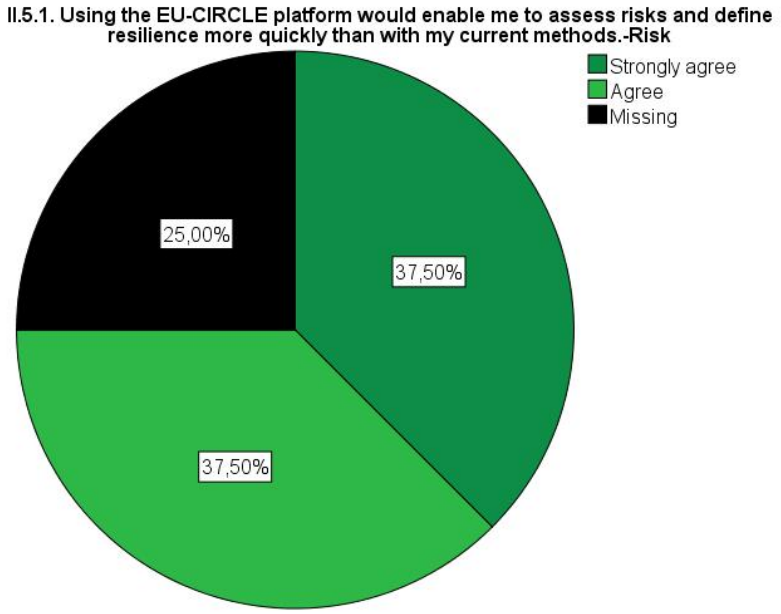

I.8. I found the system very cumbersome to use
Neither agree, neither disagree
Missing
25,00%
75,00%

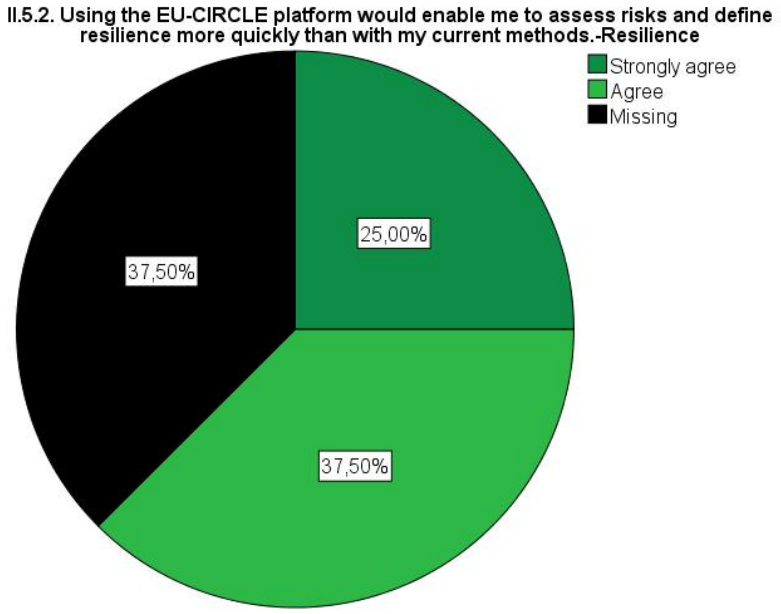

I.9. I felt very confident using the system
Disagree
Neither agree, neither disagree
Agree
Missing
12,50%
37,50%
25,00%
25,00%


I.10. I needed to learn a lot of things before I could get going with this system
Neither agree, neither disagree
Agree
Strongly agree
Missing
25,00%
25,00%
12,50%
37,50%

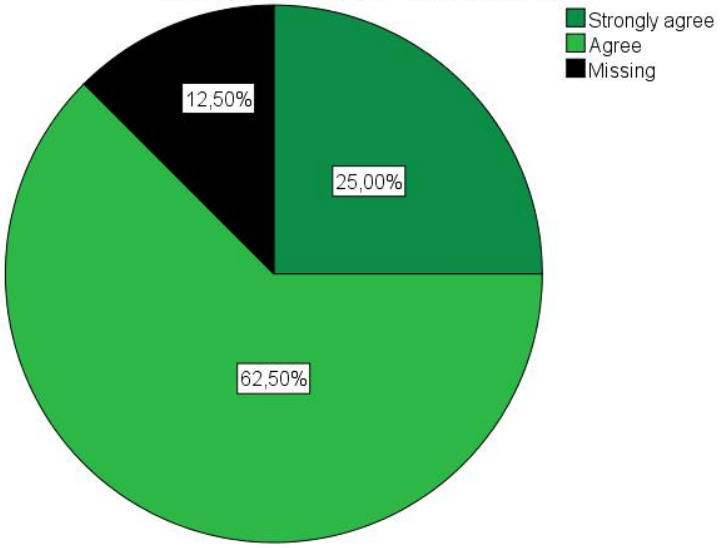
System Usability Scale Means
(Low scores indicate strong average disagreement while high scores indicate strong agreement to the responding statement)

I.10. I needed to learn a lot of things before I could get going with this system	3,83
I.5. I found the various functions in this system were well integrated	3,67
I.4. I think that I would need the support of a technical person to be able to use this system	3,50
I.3. I thought the system was easy to use	3,33
I.9. I felt very confident using the system	3,17
I.1. I think that I would like to use this system frequently	3,00
I.7. I would imagine that most people would learn to use this system very quickly	3,00
I.8. I found the system very cumbersome to use	3,00
I.6. I thought there was too much inconsistency in this system	2,50
I.2. I found the system unnecessarily complex	2,33

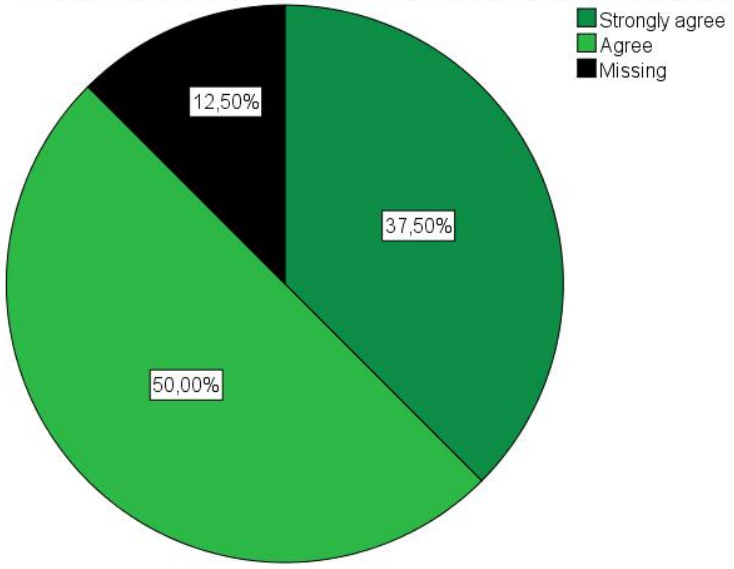

II.5.1. Using the EU-CIRCLE platform would enable me to assess risks and define resilience more quickly than with my current methods.-Risk
Strongly agree
Agree
Missing
25,00%
37,50%
37,50%

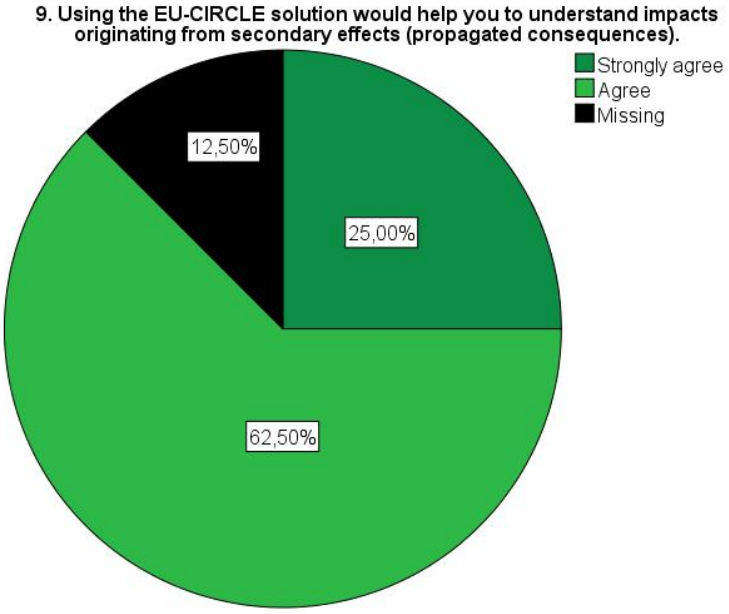

II.5.2. Using the EU-CIRCLE platform would enable me to assess risks and define resilience more quickly than with my current methods.-Resilience
Strongly agree
Agree
Missing
25,00%
37,50%
37,50%

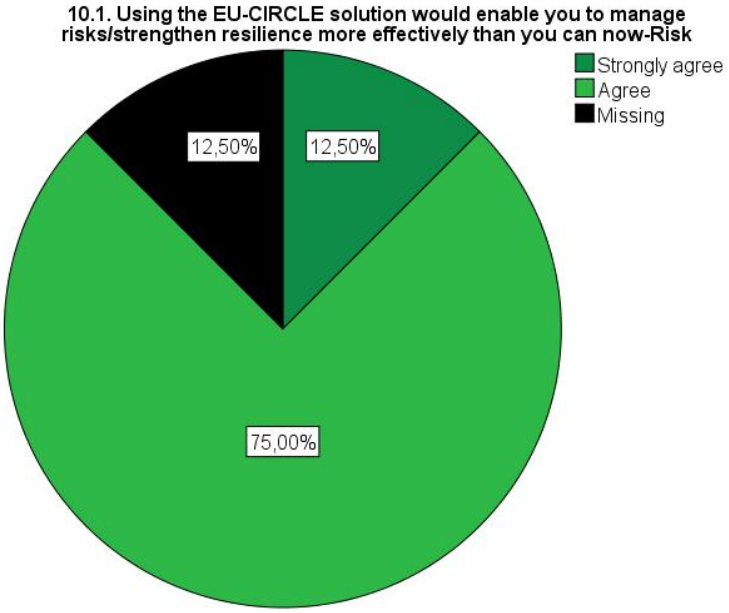
II.7. Using the EU-CIRCLE platform would enable to assess unexpected likelihood/consequences of eventual climate/climate change incidents more accurately than with your current methods?

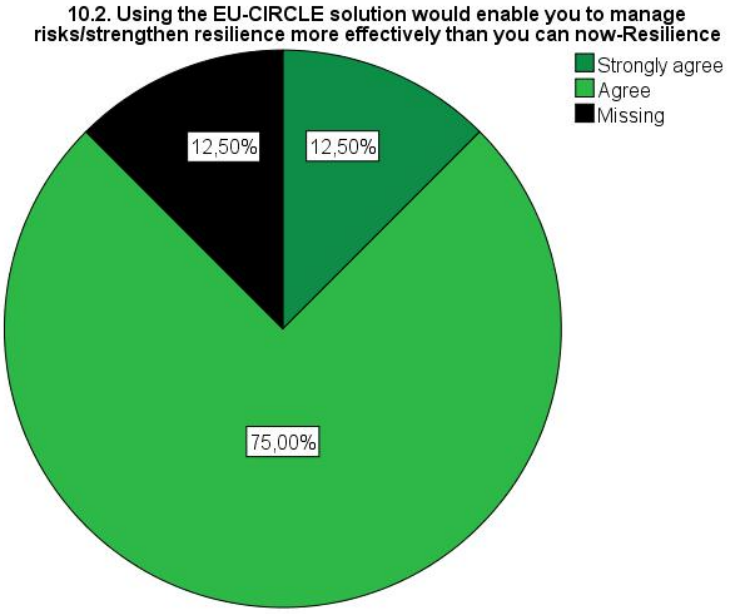


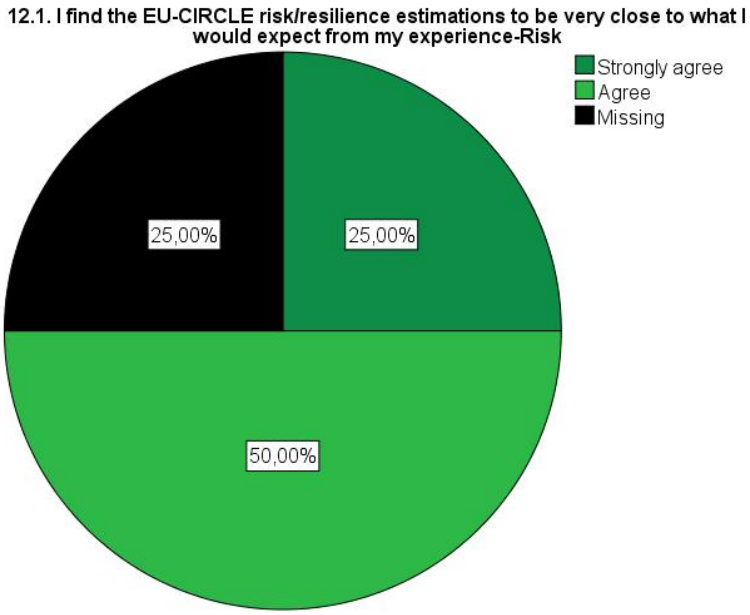
8. Using the EU-CIRCLE solution would enable you to take into account multiple risk scenarios and more threats than currently existing tools/methods allow.

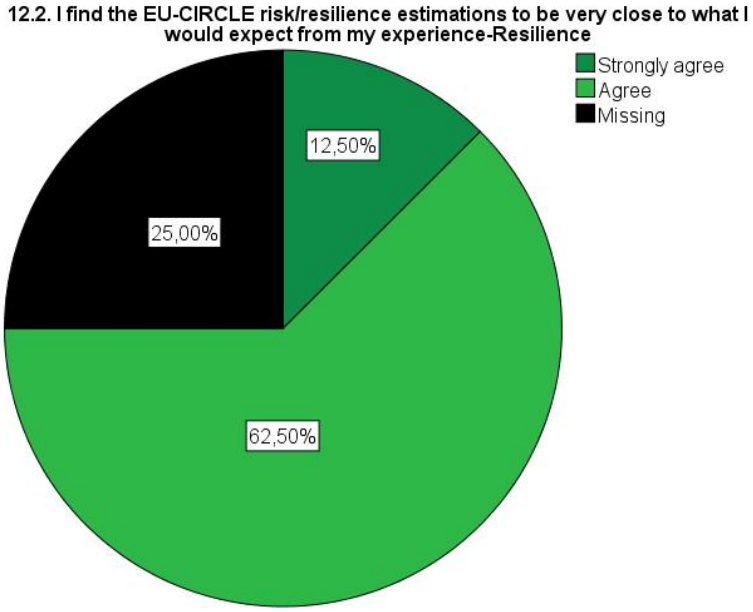


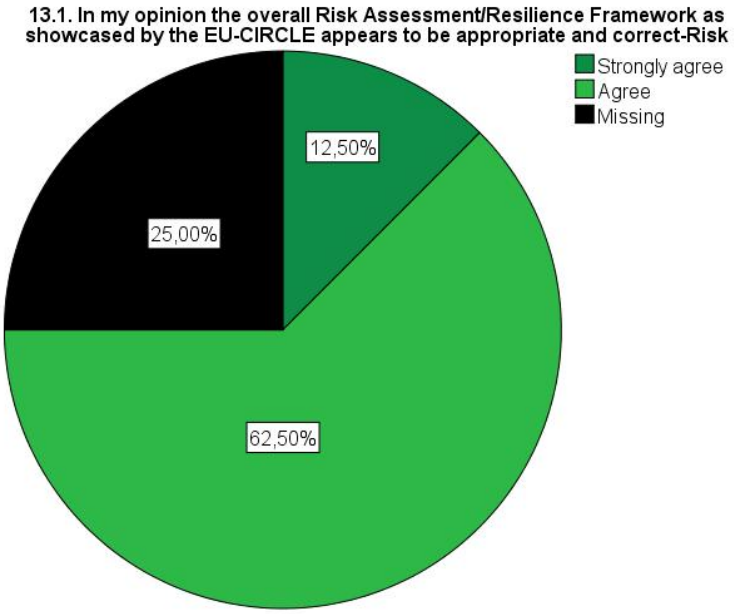

9. Using the EU-CIRCLE solution would help you to understand impacts originating from secondary effects (propagated consequences).
Strongly agree
Agree
Missing
12,50%
25,00%
62,50%

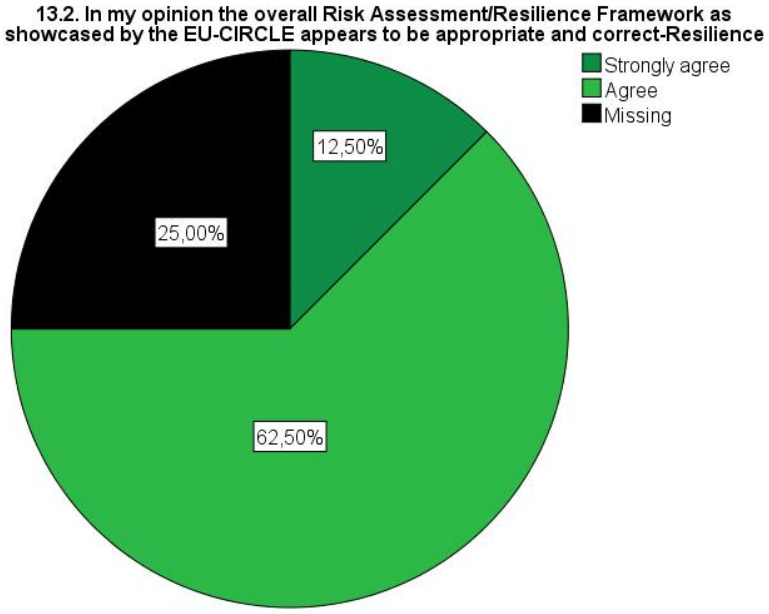

10.1. Using the EU-CIRCLE solution would enable you to manage risks/strengthen resilience more effectively than you can now-Risk
Strongly agree
Agree
Missing
12,50%
12,50%
75,00%

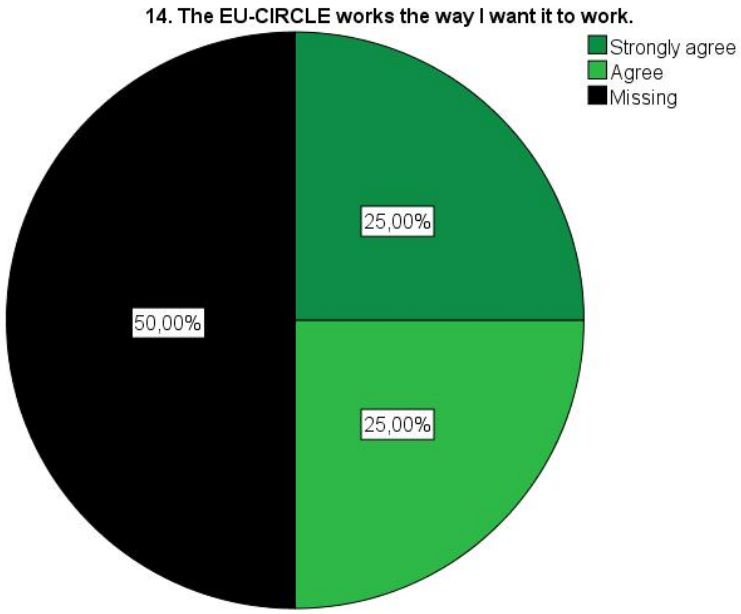

10.2. Using the EU-CIRCLE solution would enable you to manage risks/strengthen resilience more effectively than you can now-Resilience
Strongly agree
Agree
Missing
12,50%
12,50%
75,00%

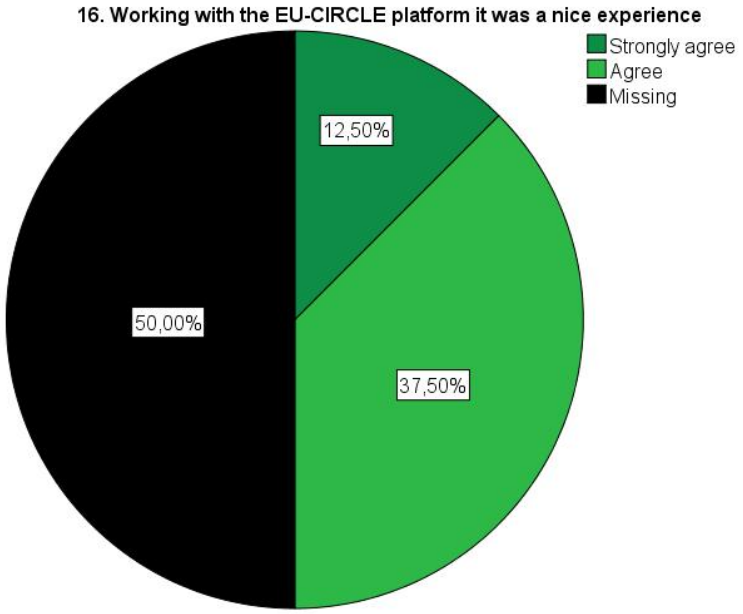

12.1. I find the EU-CIRCLE risk/resilience estimations to be very close to what I would expect from my experience-Risk
Strongly agree
Agree
Missing
25,00%
25,00%
50,00%

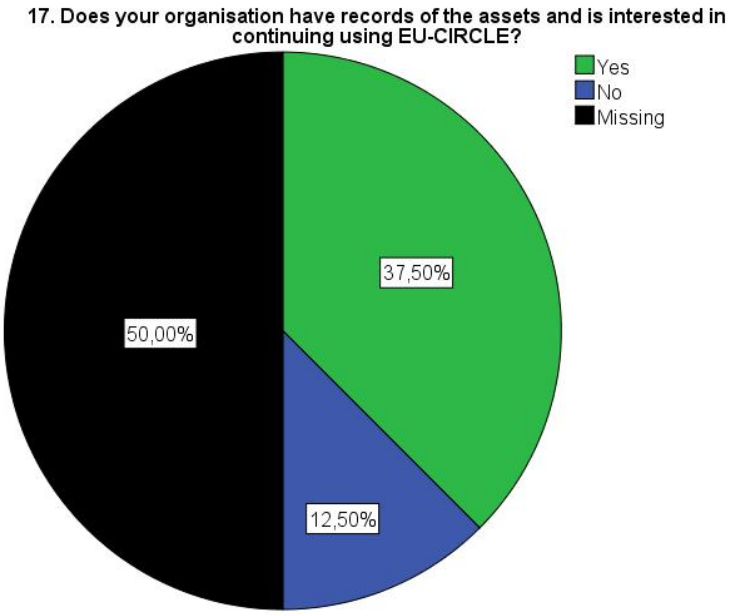

12.2. I find the EU-CIRCLE risk/resilience estimations to be very close to what I would expect from my experience-Resilience
Strongly agree
Agree
Missing
12,50%
25,00%
62,50%


13.1. In my opinion the overall Risk Assessment/Resilience Framework as showcased by the EU-CIRCLE appears to be appropriate and correct-Risk
Strongly agree
Agree
Missing
12,50%
25,00%
62,50%

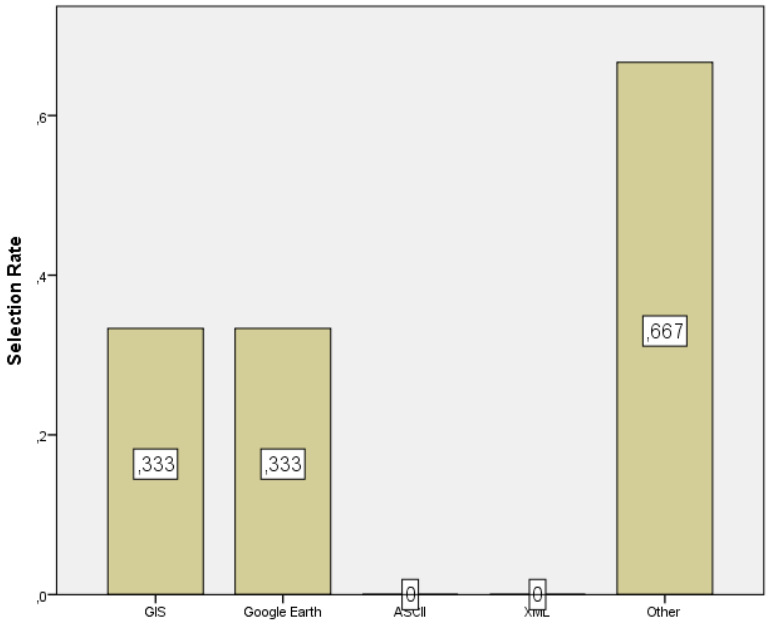

13.2. In my opinion the overall Risk Assessment/Resilience Framework as showcased by the EU-CIRCLE appears to be appropriate and correct-Resilience
Strongly agree
Agree
Missing
12,50%
25,00%
62,50%

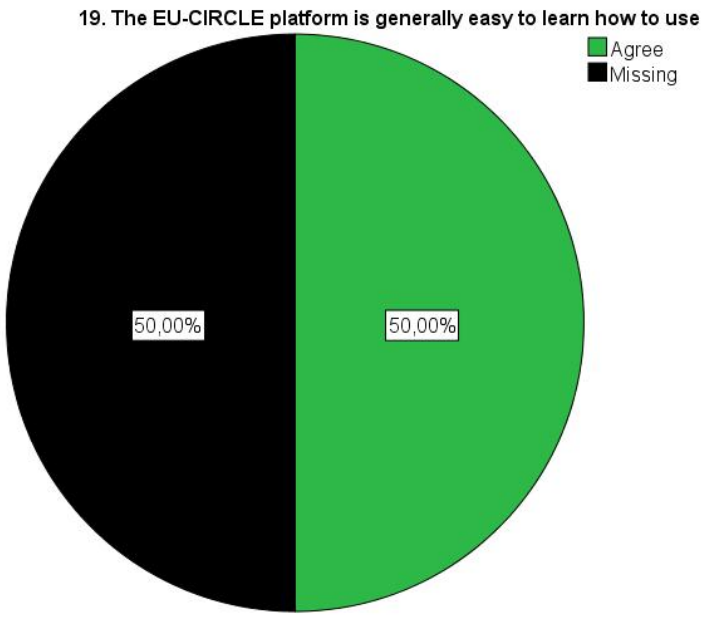

14. The EU-CIRCLE works the way I want it to work.
Strongly agree
Agree
Missing
25,00%
50,00%
25,00%

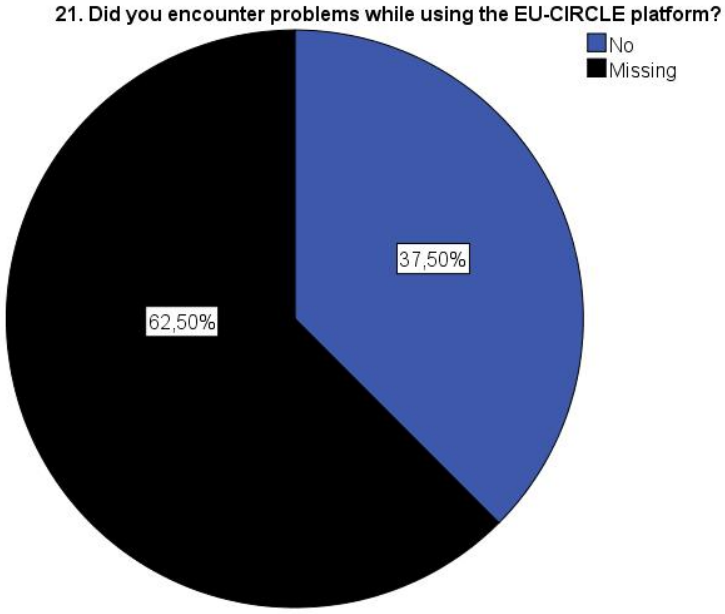

16. Working with the EU-CIRCLE platform it was a nice experience
Strongly agree
Agree
Missing
12,50%
37,50%
50,00%

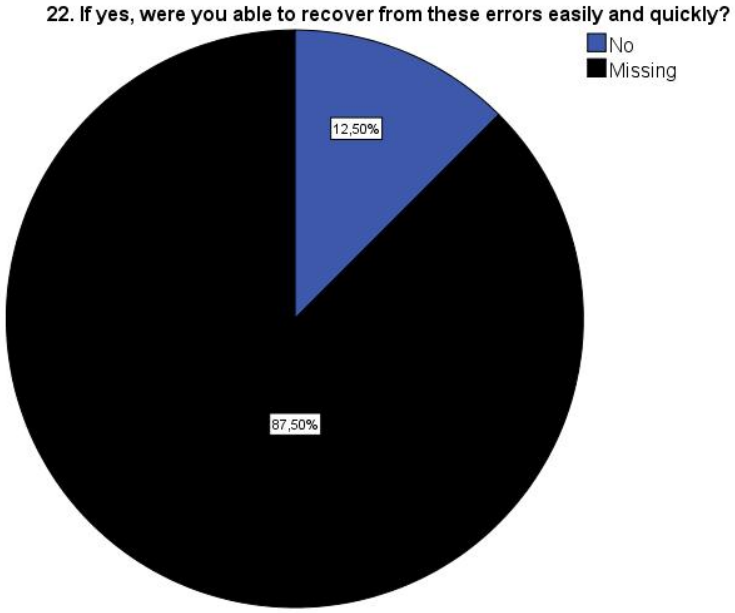

17. Does your organisation have records of the assets and is interested in continuing using EU-CIRCLE?
Yes
No
Missing
37,50%
50,00%
12,50%

18. If yes, in what format is the data available (also consider available conversion tools)?

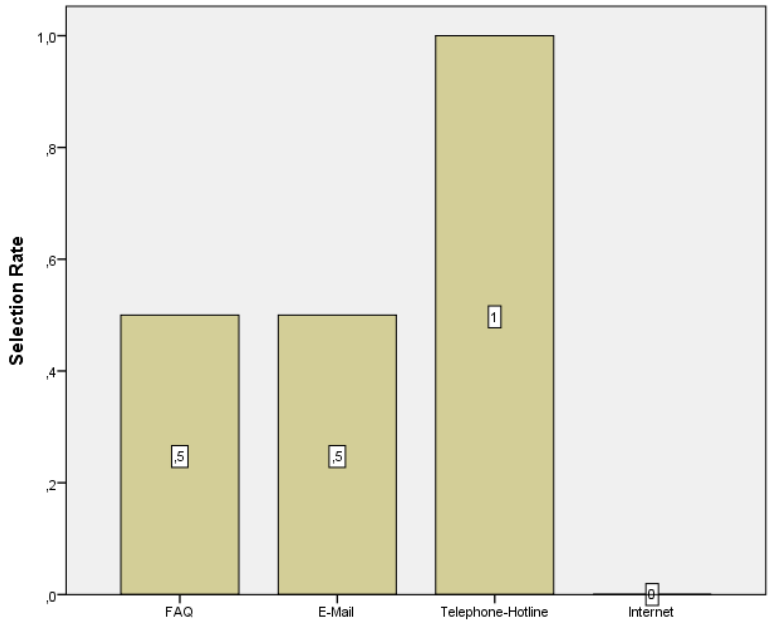


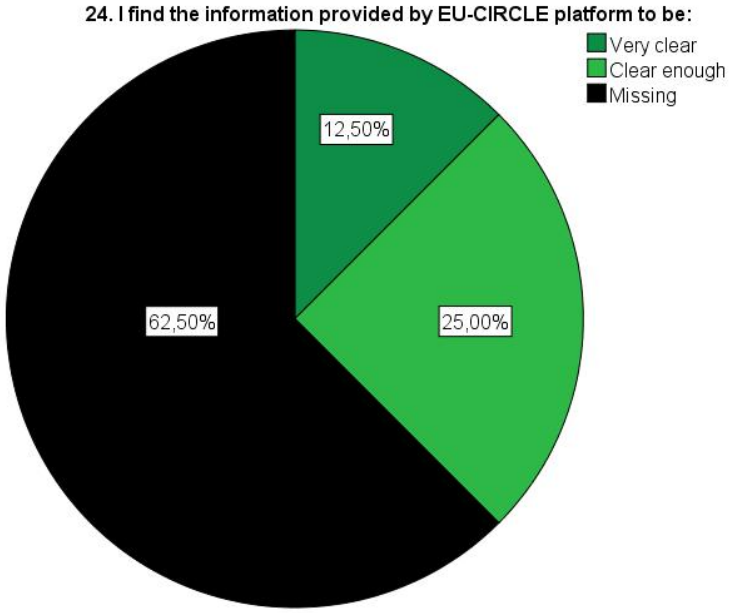



21. Did you encounter problems while using the EU-CIRCLE platform?
No
Missing
37,50%
62,50%

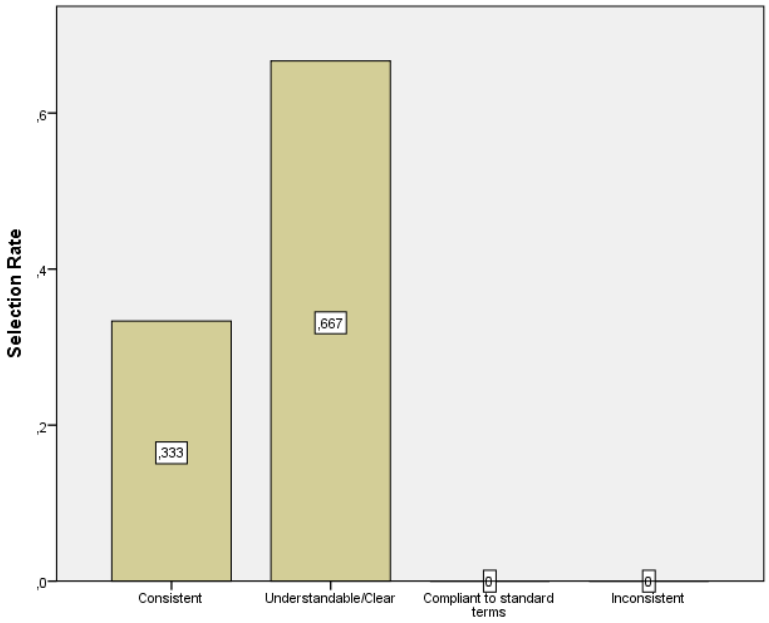

22. If yes, were you able to recover from these errors easily and quickly?
No
Missing
12,50%
87,50%

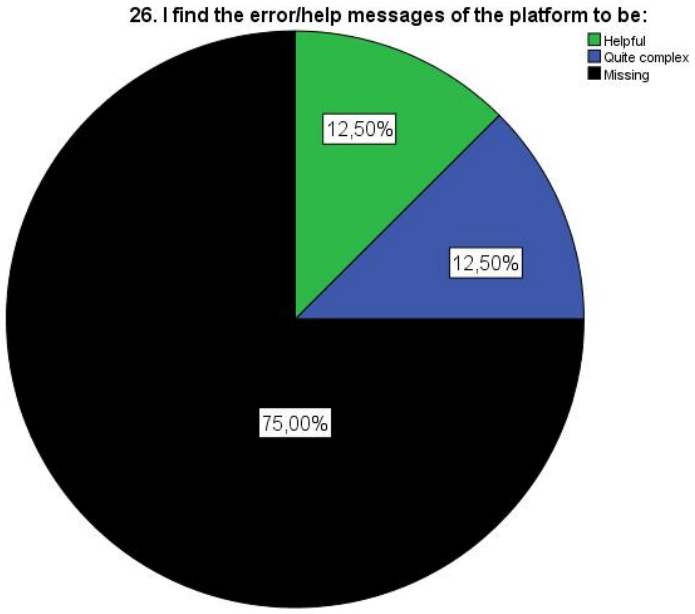
23. In case you would be a formal user, which kind of support do you prefer?



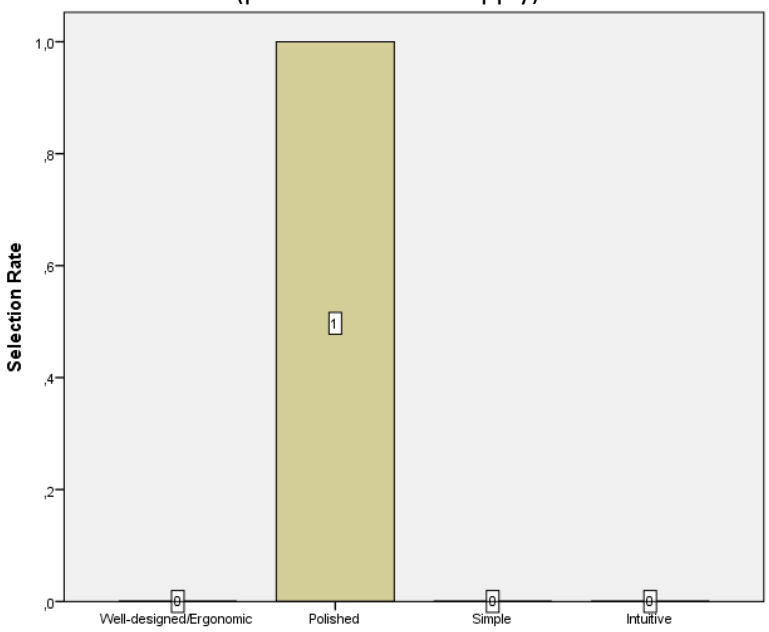


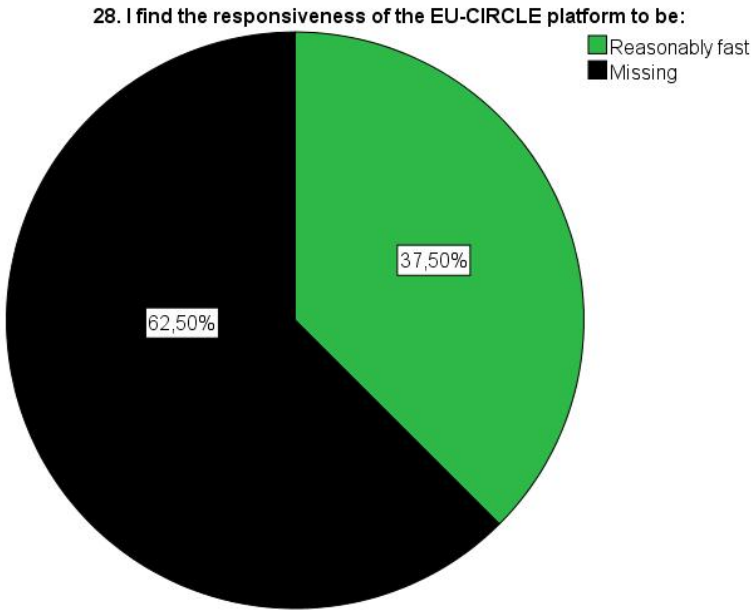
25.1. I find the terminology used in EU-CIRCLE to be (please tick all that apply):

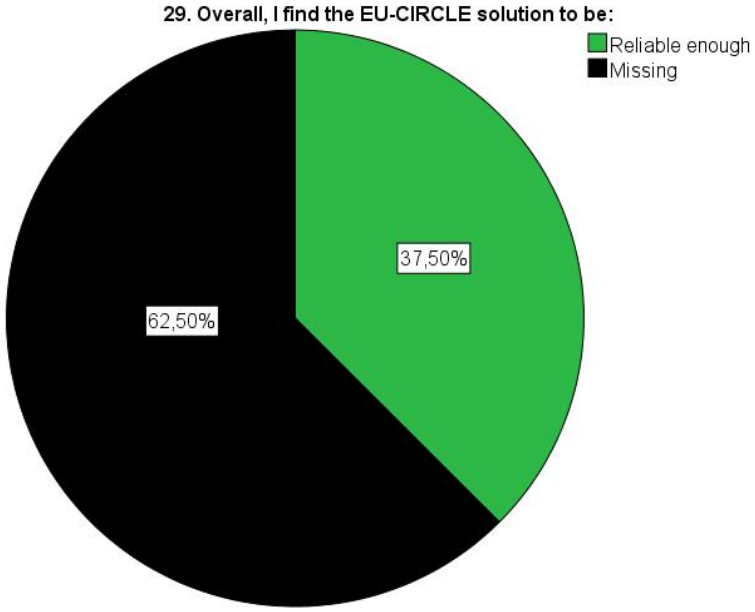


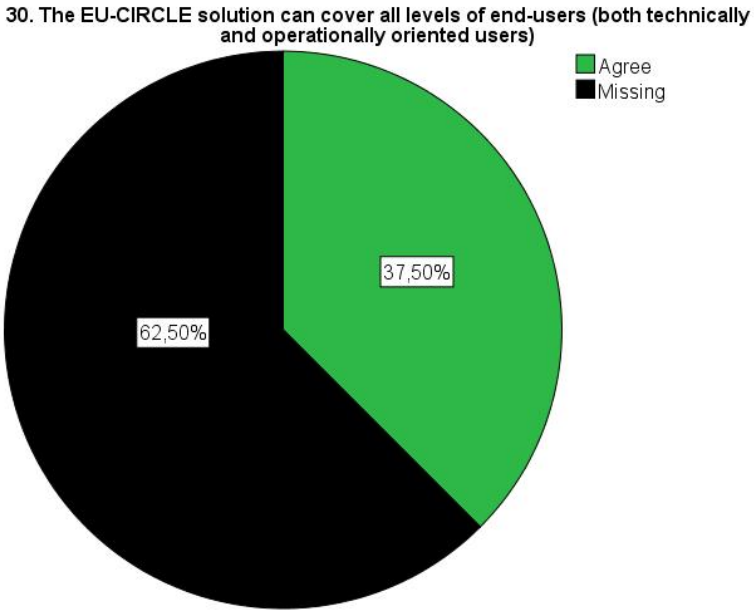


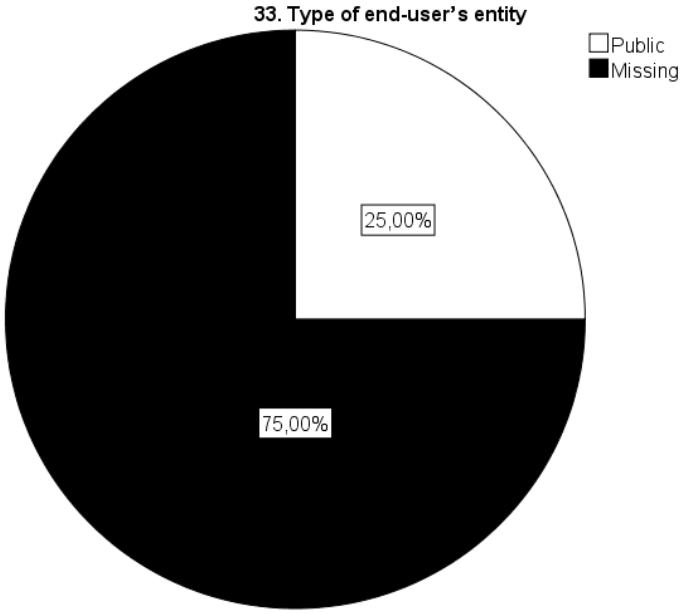
27. I think the platform's user interface is (please tick all that apply):

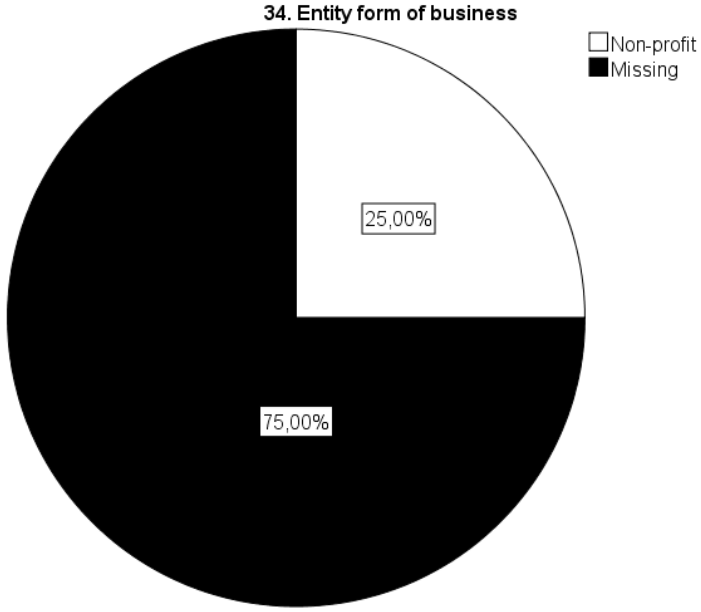


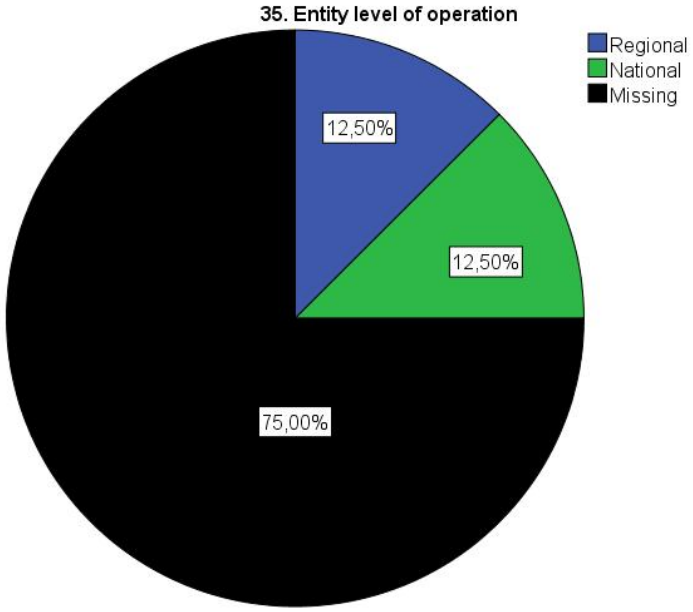


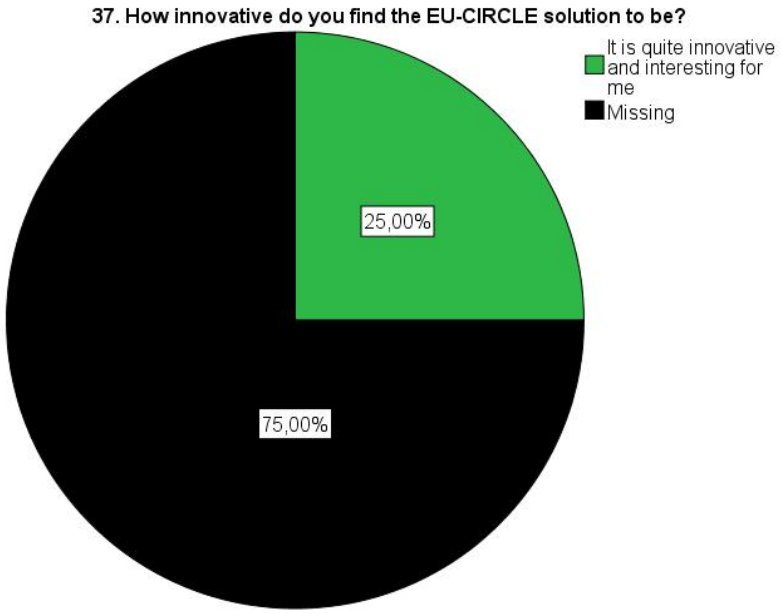

29. Overall, I find the EU-CIRCLE solution to be:
Reliable enough
Missing
37,50%
62,50%

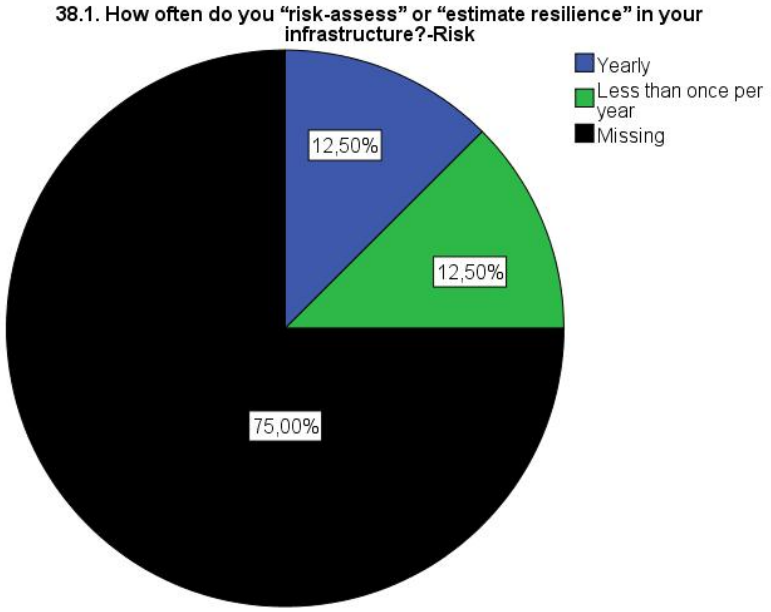

30. The EU-CIRCLE solution can cover all levels of end-users (both technically and operationally oriented users)
Agree
Missing
37,50%
62,50%

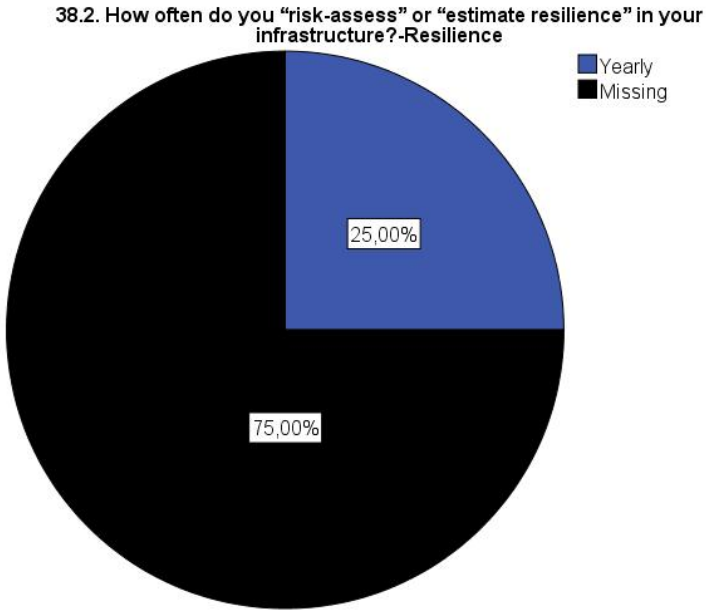

33. Type of end-user's entity
Public
Missing
25,00%
75,00%

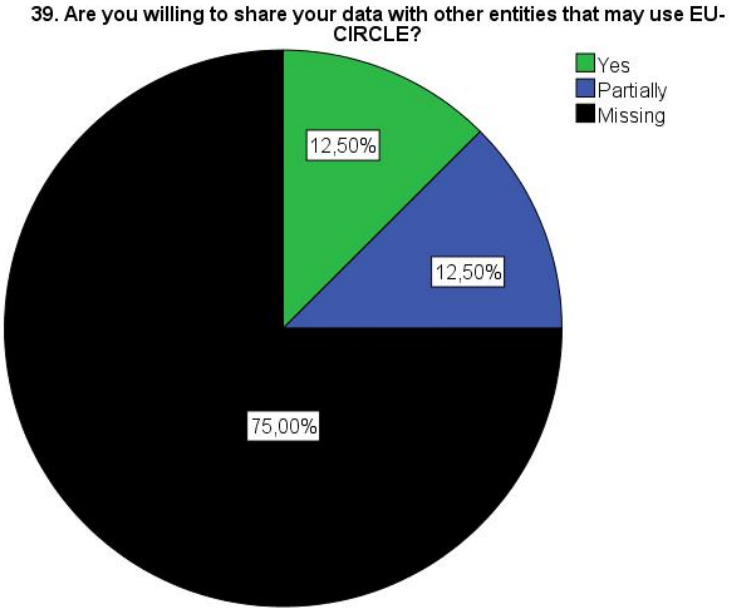

34. Entity form of business
Non-profit
Missing
25,00%
75,00%

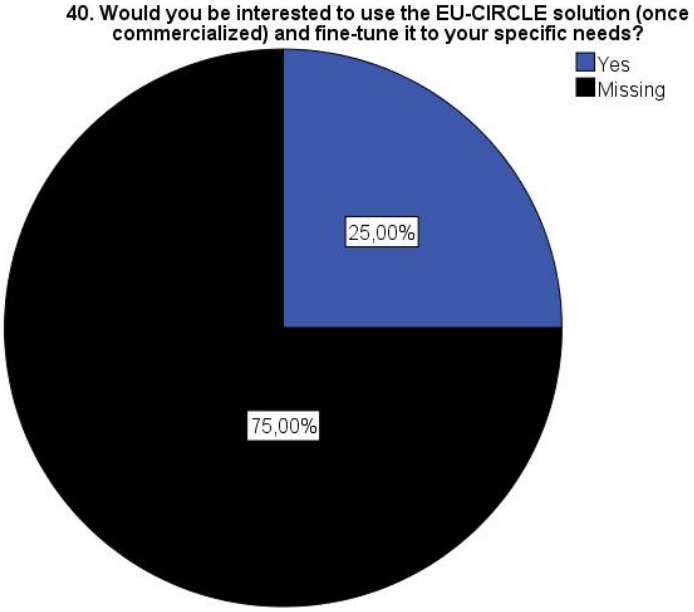

35. Entity level of operation
Regional
National
Missing
12,50%
12,50%
75,00%


37. How innovative do you find the EU-CIRCLE solution to be?
It is quite innovative and interesting for me
Missing
25,00%
75,00%

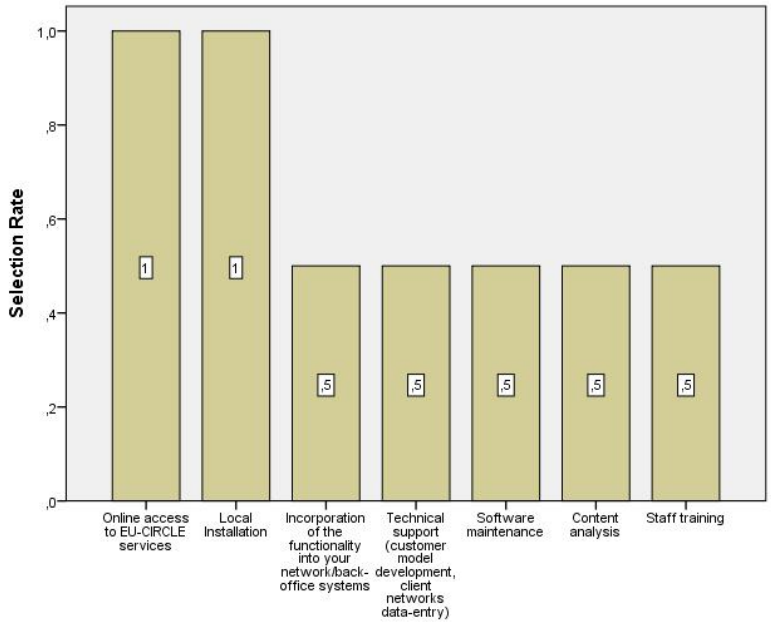

38.1. How often do you "risk-assess" or "estimate resilience" in your infrastructure?-Risk
Yearly
Less than once per year
Missing
12,50%
12,50%
75,00%


38.2. How often do you "risk-assess" or "estimate resilience" in your infrastructure?-Resilience
Yearly
Missing
25,00%
75,00%

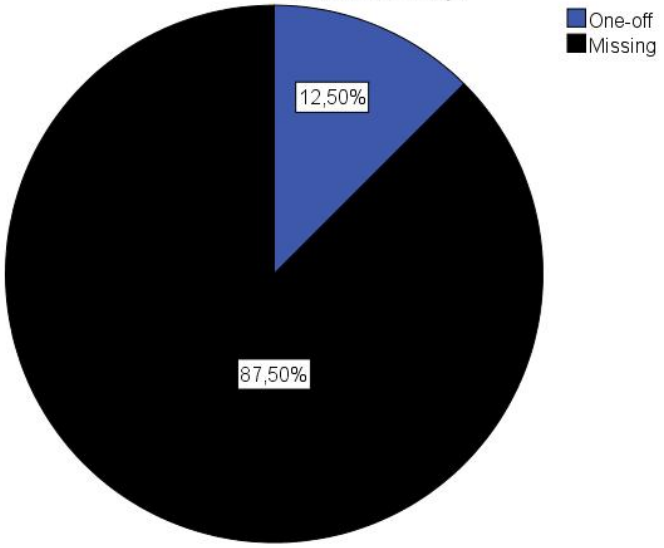

39. Are you willing to share your data with other entities that may use EU-CIRCLE?
Yes
Partially
Missing
12,50%
12,50%
75,00%

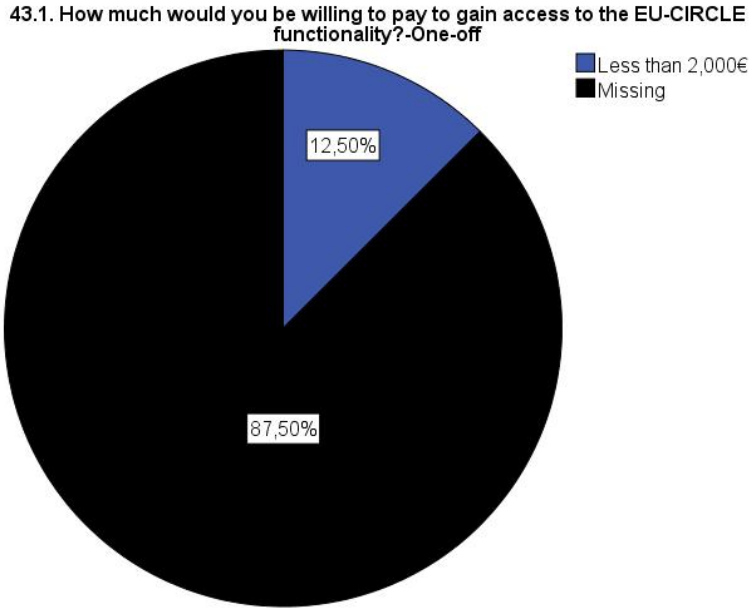

40. Would you be interested to use the EU-CIRCLE solution (once commercialized) and fine-tune it to your specific needs?
Yes
Missing
25,00%
75,00%

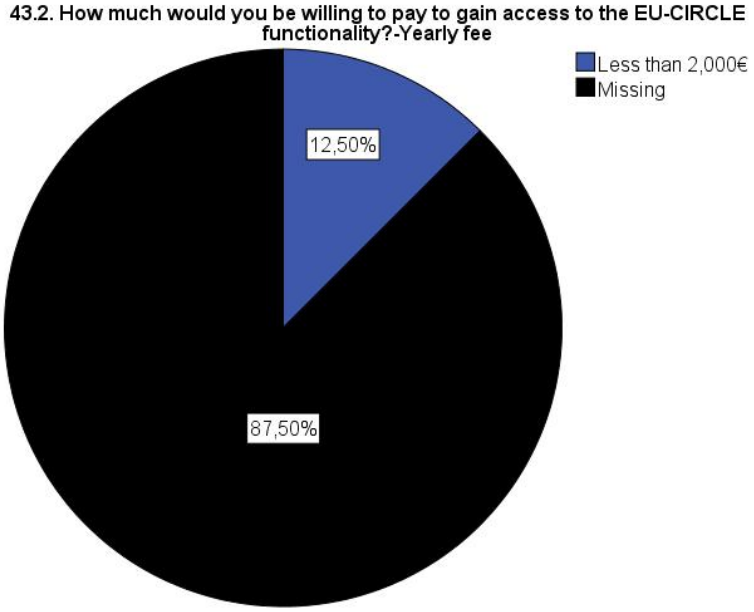
41. If yes, which one of the following services would you be interested in (please tick all that apply):

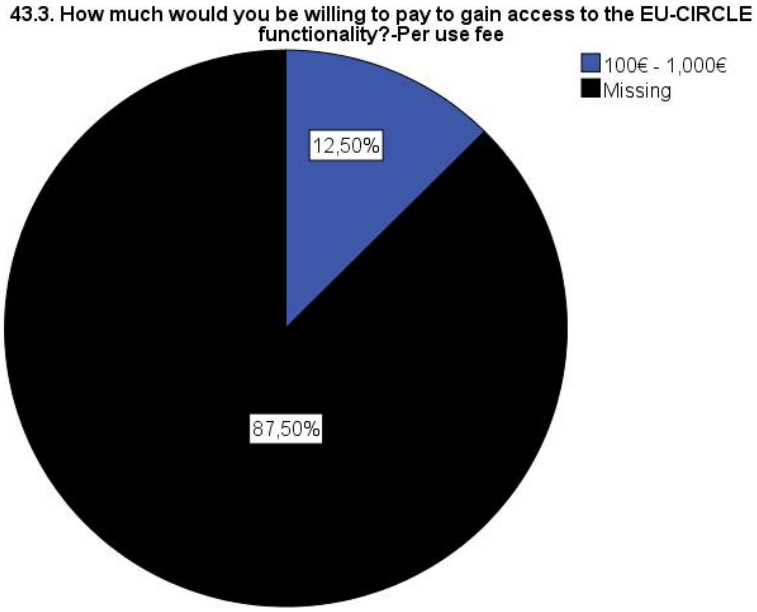


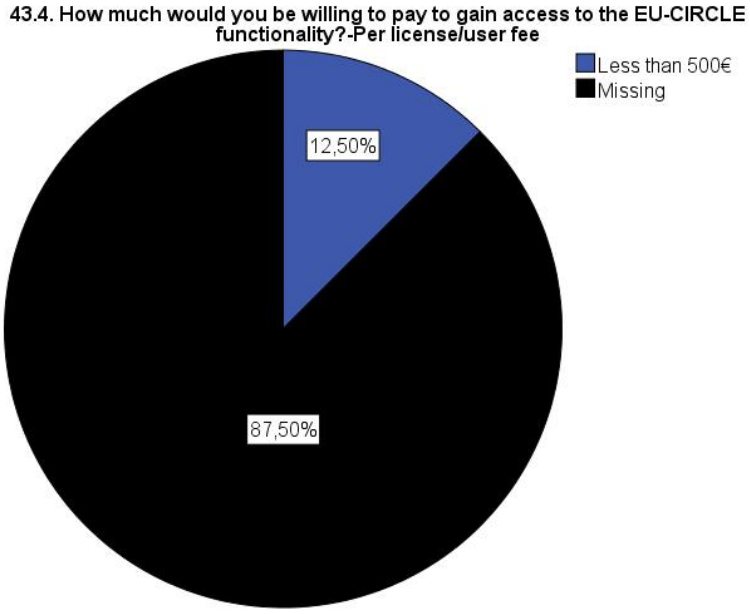
42. Which form of payment would you find convenient for the EU-CIRCLE services (please number in order or convenience – from 1 "most convenient" to 4 "least convenient")?

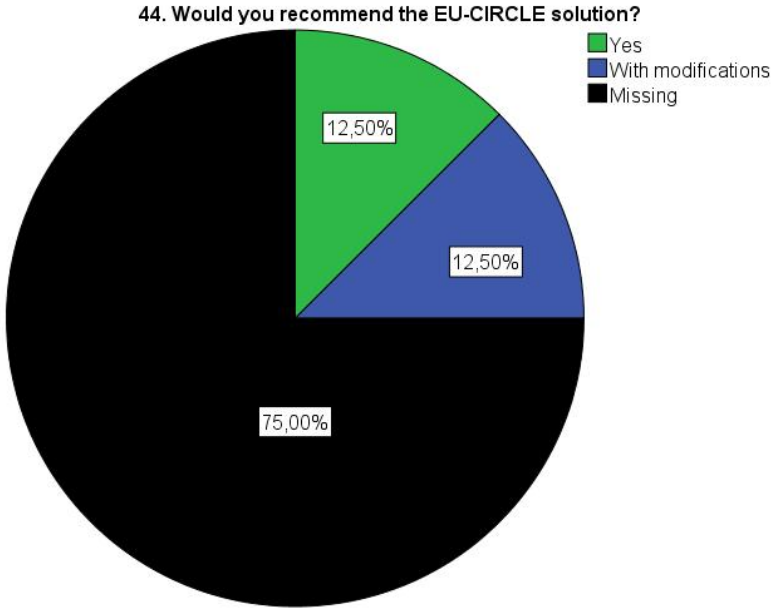



43.1. How much would you be willing to pay to gain access to the EU-CIRCLE functionality?-One-off
Less than 2,000€
Missing
12,50%
87,50%


43.2. How much would you be willing to pay to gain access to the EU-CIRCLE functionality?-Yearly fee
Less than 2,000€
Missing
12,50%
87,50%


43.3. How much would you be willing to pay to gain access to the EU-CIRCLE functionality?-Per use fee
100€ - 1,000€
Missing
12,50%
87,50%


43.4. How much would you be willing to pay to gain access to the EU-CIRCLE functionality?-Per license/user fee
Less than 500€
Missing
12,50%
87,50%


44. Would you recommend the EU-CIRCLE solution?
Yes
With modifications
Missing
12,50%
12,50%
75,00%

Annex II - System Usability Scale Questionnaire (Questionnaire 1)

	Strongly disagree				Strongly agree
1. I think that I would like to use this system frequently	1	2	3	4	5
2. I found the system unnecessarily complex	1	2	3	4	5
3. I thought the system was easy to use	1	2	3	4	5
4. I think that I would need the support of a technical person to be able to use this system	1	2	3	4	5
5. I found the various functions in this system were well integrated	1	2	3	4	5
6. I thought there was too much inconsistency in this system	1	2	3	4	5
7. I would imagine that most people would learn to use this system very quickly	1	2	3	4	5
8. I found the system very cumbersome to use	1	2	3	4	5
9. I felt very confident using the system	1	2	3	4	5
10. I needed to learn a lot of things before I could get going with this system	1	2	3	4	5

Annex III- Questionnaire 2

EU-CIRCLE End-User Test Trial Questionnaire

General Information

1. **Name**

2. **Contact details**

Address:	
Telephone:	
E-mail:	
Website:	

3. **Name of your company/organisation**

4. **Function/Post within company or organisation**

EU-CIRCLE Framework Validation - Intuitiveness

5. **Using the EU-CIRCLE platform would enable me to assess risks and define resilience more quickly than with my current methods.**

(Risk) ☐Strongly agree ☐Agree ☐Disagree ☐Strongly disagree

(Resilience) ☐Strongly agree ☐Agree ☐Disagree ☐Strongly disagree

6. **If you (strongly) agree, which tasks do you think it would be completed in a better or faster way?**

7. **Using the EU-CIRCLE platform would enable to assess unexpected likelihood/consequences of eventual climate/climate change incidents more accurately than with your current methods?**

☐Strongly agree ☐Agree ☐Disagree ☐Strongly disagree

8. **Using the EU-CIRCLE solution would enable you to take into account multiple risk scenarios and more threats than currently existing tools/methods allow.**

☐Strongly agree ☐Agree ☐Disagree ☐Strongly disagree

9. **Using the EU-CIRCLE solution would help you to understand impacts originating from secondary effects (propagated consequences).**

☐Strongly agree ☐Agree ☐Disagree ☐Strongly disagree

10. **Using the EU-CIRCLE solution would enable you to manage risks/strengthen resilience more effectively than you can now.**

(Risk) ☐Strongly agree ☐Agree ☐Disagree ☐Strongly disagree

(Resilience) ☐Strongly agree ☐Agree ☐Disagree ☐Strongly disagree

11. **Please elaborate (e.g. More accurate time management, better resource planning).**

---

12. **I find the EU-CIRCLE risk/resilience estimations to be very close to what I would expect from my experience.**

(Risk) ☐Strongly agree ☐Agree ☐Disagree ☐Strongly disagree

(Resilience) ☐Strongly agree ☐Agree ☐Disagree ☐Strongly disagree

13. **In my opinion the overall Risk Assessment/Resilience Framework as showcased by the EU-CIRCLE appears to be appropriate and correct.**

(Risk) ☐Strongly agree ☐Agree ☐Disagree ☐Strongly disagree

(Resilience) ☐Strongly agree ☐Agree ☐Disagree ☐Strongly disagree

Product Assessment – Usability

14. **The EU-CIRCLE works the way I want it to work.**

☐Strongly agree ☐Agree ☐Disagree ☐Strongly disagree

15. **If you (strongly) disagree which components do you find problematic and why?**

---

16. **Working with the EU-CIRCLE platform it was a nice experience**

☐Strongly agree ☐Agree ☐Disagree ☐Strongly disagree

17. **Does your organisation have records of the assets and is interested in continuing using EU-CIRCLE?**

☐Yes ☐No

18. If yes, in what format is the data available (also consider available conversion tools)?

☐**GIS** ☐**Google Earth** ☐**ASCII** ☐**XML** ☐**Other (specify):**_____

19. The EU-CIRCLE platform is generally easy to learn how to use

☐Strongly agree ☐Agree ☐Disagree ☐Strongly disagree

20. If you (strongly) disagree, which component(s) did you find difficult to use and why?

_____

_____

21. Did you encounter problems while using the EU-CIRCLE platform?

☐Yes ☐No

22. If yes, were you able to recover from these errors easily and quickly?

☐Yes ☐No

23. In case you would be a formal user, which kind of support do you prefer?

☐FAQ ☐E-Mail ☐Telephone-Hotline ☐Internet

24. I find the information provided by EU-CIRCLE platform to be:

☐Very Clear ☐Clear enough ☐A bit confusing ☐Incomprehensible

25. I find the terminology used in EU-CIRCLE to be (please tick all that apply):

☐Consistent ☐Understandable/Clear ☐Compliant to standard terms ☐Inconsistent

26. I find the error/help messages of the platform to be:

☐Helpful ☐Quite complex ☐Not really useful ☐Incomprehensible

27. I think the platform's user interface is (please tick all that apply):

☐Well-designed/Ergonomic ☐Polished ☐Simple ☐Intuitive

28. I find the responsiveness of the EU-CIRCLE platform to be:

☐Very fast ☐Reasonably fast ☐Underwhelming ☐Too slow

29. Overall, I find the EU-CIRCLE solution to be:

☐Very reliable ☐Reliable enough ☐Not very reliable ☐Unreliable

30. The EU-CIRCLE solution can cover all levels of end-users (both technically and operationally oriented users)

☐Strongly agree ☐Agree ☐Disagree ☐Strongly disagree

31. What other information or functionality would you like to see in the EU-CIRCLE platform?

_____

_____

32. Do you have any further comments about the risk/resilience assessment method or the CIRP?

Risk: _____

_____

Resilience: _____

_____

Business Model - Marketability

33. Type of end-user's entity

☐Private ☐Public ☐Other (Specify: _____)

34. Entity form of business

☐Profit ☐Non-profit

35. Entity level of operation

☐Local ☐Regional ☐National ☐International

36. Entity annual turnover: _____€

37. How innovative do you find the EU-CIRCLE solution to be?

☐It's something completely new and exciting for me
☐I am aware of other tools with similar functionality but this is the first time I get to use one
☐I think the EU-CIRCLE is better in comparison to similar products
☐I think the EU--CIRCLE is lacking compared to similar products

38. How often do you "risk-assess" or "estimate resilience" in your infrastructure?

Risk

☐Weekly ☐Monthly ☐At a 6-month interval
☐Yearly ☐Less than once per year

Resilience

☐Weekly ☐Monthly ☐At a 6-month interval
☐Yearly ☐Less than once per year

39. Are you willing to share your data with other entities that may use EU-CIRCLE?

☐Yes ☐No ☐Partially

Please elaborate:

_____

_____

40. Would you be interested to use the EU-CIRCLE solution (once commercialized) and fine-tune it to your specific needs?

☐Yes ☐No

41. If yes, which one of the following services would you be interested in (please tick all that apply):

☐Online access to EU-CIRCLE services
☐Local Installation
☐Incorporation of the functionality into your network/back-office systems
☐Technical support (customer model development, client networks data-entry)
☐Software maintenance
☐Content analysis
☐Staff training

42. Which form of payment would you find convenient for the EU-CIRCLE services (please number in order or convenience – from 1 "most convenient" to 4 "least convenient")?

☐One-off ☐Yearly/Monthly fee ☐Per use fee ☐Per license/user fee

43. How much would you be willing to pay to gain access to the EU-CIRCLE functionality?

		Price Range	
Service provision	One-off	☐Less than 2,000€	☐2,000€ - 4,000€	☐More than 4,000€
	Yearly fee	☐Less than 2,000€	☐2,000€ - 4,000€	☐More than 4,000€
	Per use fee	☐Less than 100€	☐100€ - 1,000€	☐More than 1,000€
	Per license/user fee	☐Less than 500€	☐500€ - 2,000€	☐More than 2,000€

44. Would you recommend the EU-CIRCLE solution?

☐Yes ☐No ☐With modifications

Please elaborate:

_____