



# EU-CIRCLE

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

## D9.8 DATA MANAGEMENT PLAN

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### *Statement*

The Deliverable aims to describe the Data Management Plan (DMP) and data management policy that will be used throughout and after the EU-CIRCLE research project.

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## Executive Summary

Through the Data Management Planning (DMP), the Horizon 2020 projects need to describe in detail what data the project will generate, whether and how it will be exploited or made accessible for verification and re-use, and how it will be curated and preserved. The present Data Management Plan (DMP) concerns data management and intellectual property rights with respect to the EC Horizon 2020 Project EU-CIRCLE (Grant Agreement No. 653824).

EU-CIRCLE is participating in the EU Open Research Data Pilot. The goal of Open Research Data Pilot is to make the research data generated by selected Horizon 2020 projects accessible with as few restrictions as possible, while at the same time protecting sensitive data from inappropriate access. EU-CIRCLE adopts those objectives and in addition to this, the datasets generated will follow the EU policy and JPI approach guidelines. Four types of datasets will be generated: infrastructure asset description and characteristics (including interconnections) data, climate data, climate impacts to infrastructures data, resilience / adaptation models and approaches data.

Moreover, part of EU-CIRCLE Data Management Plan is to make all deliverables freely available (at least, electronically) to anyone who wants a copy. However, we will use either a CC-BY or CC-0 license for all of our project products in order to ensure that they are shared with minimal restrictions, aside from attribution to the authors or creators. All user-generated data created by the public will remain the copyright and intellectual property of the data providers (the organisations or service providers) or data creators (the users) in compliance with the data providers own terms and conditions. The project will make use of different possibilities for open access provision, depending upon what is most appropriate for the publications selected, the article itself and the partners that have produced the material.

In order to establish a common “language” between datasets from different sources, a standardization of format and metadata processes is under evaluation. The goal is to use already well-established data format and metadata processes, make enhancements or create a basis for new ones whereas standards don’t exist or don’t fill EU-CIRCLE project’s requirements. A prevision concerning data loss is taking into account according to the Joint Research Centre technical recommendations.

At the last stages of EU-CIRCLE research project, a Reference Simulated Network of Interconnected Critical Infrastructures (SimICI) tool will produced. This reference network will serve as the virtual case for test and validate the methodology that will be developed at the final stages of the project. The cumulative knowledge and data generated and collected will be used in the SimICI product, which will be available via a web-GUI.



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## 1 Introduction

Climate data are useful to everything from design standards for homes, commercial buildings and infrastructure to business structuring and financing. Moreover, they are essential inputs for government officials responsible for the management of public finances, assets, such as electricity grids, government buildings and roads, and services such as emergency response and assistance. EU-CIRCLE aims to utilize climate data and critical infrastructure description and characteristics in order to determine the safety, security and structural integrity of the infrastructures and how they interconnect. A big amount of datasets will be generated, making the Data Management planning essential to achieve the project's goal.

The purpose of the Data Management Plan (DMP) is to provide an analysis of the main elements of the data management policy that will be used with regards to all datasets that will be generated by the EU-CIRCLE research project. The type of data that is expected to be generated can be categorized as such:

- Infrastructure asset description and characteristics (including interconnections)
- climate data,
- climate impacts to infrastructures
- resilience / adaptation models and approaches

Moreover, the DMP describes how research data will be handled during the project, and even after the project is completed. It contains the type of data that will be collected, processed and generated, methodology and standards in use, whether and how the data will be shared and be accessible, and how they will be curated and preserved.

The benefits of a DMP are not only concern the way data will be treated but also the successful outcome of the project itself. It is intuitive that planned activities stand a better chance of meeting their goals than unplanned ones. The process of planning is also a process of communication, increasingly important in multi-partner research. The characteristics of collaboration should be harmonised if project partners (in industry, other universities, other countries, etc.) are in accordance. DMP also provides an ideal opportunity to engender good practice with regard to (e.g.) file formats, metadata standards, storage and risk management practices, leading to greater longevity of data and higher quality standards.

Ultimately, a DMP should engage researchers in conversations with those providing [supporting] services. In this context, a DMP becomes a document of relationships that should be shared, edited, and monitored among those contributing to a project. From this viewpoint, a DMP functions as a dynamic document of agreements. To serve the multiple purposes just described, DMPs should be designed for easy digital exchange across a variety of applications. The best way to approach this in today's complex world of information technology is through a metadata standard describing a data model of elements constituting a DMP.

### 1.1 EU policies

From 2014, EU tries to establish an open access policy for research data. In order to accomplish that, it calls for a Data Management Plan report from the Horizon 2020 participants. The Data Management Plans (DMP) are required for 'key areas' of the Horizon 2020 programme, covered by the Open Data Pilot. These include several technology-oriented strands and others addressing 'societal challenges'. Guidelines on Open Access to Scientific Publications and Research Data in Horizon 2020 [1]. These guidelines echo the G8 Science Ministers' statement (2013) [2], which offered similar good practice principles.

According to the EU guidelines, the DMP should content some key issues of data management, as described in the following sections of this document. It should state if the data and associated software produced and/or used in the project are identifiable by means of a standard identification. The accessibility



of software and data in use during the implementation of the project (e.g. licencing framework for research and education, embargo periods, commercial exploitation, etc.), the usability of the stored data by third parties, the data exchange between researchers, institutions, organisations, countries, etc., as well as the description of quality requirements, should be described in a DMP according to EU policies.

### 1.1.1 JPI-climate approach

The EU JPI-Climate initiative<sup>1</sup>, adopted the so-called "transparency principle", committing itself with the growing demand on more openness in many aspects of public life (politics, economics, culture, and also science and research). The Guidelines on Open Knowledge [3] contribute to increase climate (change) research activities' societal impact and credibility by making them more transparent. They establish a set of recommendations to boost a more effective climate knowledge management policy in terms of openness (and particularly accessibility). These recommendations are thought for the JPI community in its widest sense. In summary these are:

1. Internal accessibility.
2. Open licensing, based on the use of the Creative Commons (CC) "public domain" license (CC0)
3. Open formats.
4. Open Access publishing.
5. Open Data.
6. Publishing costs.

## 1.2 Open Research Data Pilot

Open data is data that is free to access, reuse, repurpose, and redistribute. The Open Research Data Pilot<sup>2</sup> aims to make the research data generated by selected Horizon 2020 projects accessible with as few restrictions as possible, while at the same time protecting sensitive data from inappropriate access. EU-CIRCLE is participating in the EU Open Research Data Pilot.

The types of data concerned are:

- Data (including associated metadata) needed to validate the results presented in scientific publications ("underlying data")
- Other data (including associated metadata) as specified in data management plan

The beneficiaries participating in the Pilot will:

- Deposit this data in a research data repository of their choice
- Take measures to make it possible to access, mine, exploit, reproduce and disseminate free of charge (using e.g. Creative Commons licences)
- Provide information about tools and instruments at the disposal of the beneficiaries and necessary for validating the results (where possible, provide the tools and instruments themselves)

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<sup>1</sup> <http://www.jpi-climate.eu>

<sup>2</sup> <https://www.openaire.eu/opendatapilot>



## 2 EU-CIRCLE Data Management Plan (DMP)

The intention of the EU-CIRCLE project is not to protect findings, results and deliverables. Rather the intention is to give them the widest possible currency, via the project's website, direct e-mailings, publications, etc.

### 2.1 Licencing

We intend to make all deliverables that are marked by [PUBLIC] available electronically to anyone who wants a copy, as has been identified in the DoA. However, we will use either a CC-BY or CC-0 license for all of our project products in order to ensure that they are shared with minimal restrictions, aside from attribution to the authors or creators. In relation to any software we produce, all of the programming code, interface components, documentation and other assets (if applicable) will be the IP and copyright of the organisation(s) that produced it. However, these organisations will be encouraged to make the software open source via an open software license, which is essential for the pilots that will focus on user collaboration and co-production, specifically the energy pilot, the transport pilot and the local services pilot.

### 2.2 Publications

All user-generated data created by the public will remain the copyright and intellectual property of the data providers (the organisations or service providers) or data creators (the users) in compliance with the data providers own terms and conditions. The project will make use of three different possibilities for open access provision, depending upon what is most appropriate for the publications selected, the article itself and the partners that have produced the material.

1. Publication in open access (journal) papers – papers that provide open access immediately by default.
2. Publication via the “gold” route, whereby authors pay a fee to publish the material as open access immediately. Most high-level journals offer this option.
3. Publication via the “green” route, whereby authors archive the material in a disciplinary, institutional or public repository.

EU-CIRCLE Data Management will follow the Guidelines on Open Access to Scientific Publications and Research data in Horizon H2020 (accompanying image). Simulation tool libraries will use open standards and follow a GREEN data management path (widely available free of use). Aspects related to the multi-agent and multi-scale modelling and optimization will follow are RED data management path (restricted). Project publications will employ a GREEN strategy and the treatment of data used to generate those publications outlined in a data management plan as appendix to the consortium agreement. Also the EU-CIRCLE aspires to participate in the EU initiative on Open Data Pilot.

EU-CIRCLE has included in the partner's allocated funding, costs related to open access data managing and research results publication, including the so-called Author Processing Charges (APCs), if any.

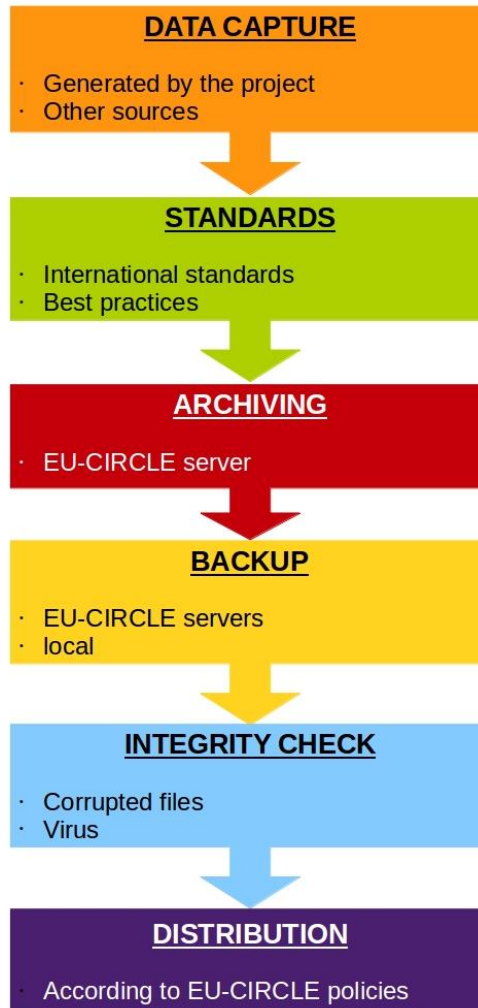
### 2.3 Generated data

The EU-CIRCLE research project is expecting to produce a huge amount of climate data and secondary results (see Section 3). The management of those datasets is essential in order to achieve the goal of EU-



CIRCLE project. After the data are captured, they need to be post-processed via a metadata conversion function. The resulted file will meet international standards and best practices in order to be readable from different platforms, programs, codes etc. Thus, the metadata processing will create a generic data management framework (see Section 4).

Figure 1: Data Management Workflow



The data will be screened and all the essential and necessary datasets will be archived. The archived data will be available to partners, according to EU-CIRCLE Grant Agreement, for research purposes and accomplishing the project's goal. In order to insure the continuity of the project, a backup and integrity check processing will be in place. The insurance effort can be categorized in three steps:

- **Detecting Data Corruption in Back-ups:** Data back-up software and systems focus on accurately restoring data as originally stored. This approach is effective for data that is known to be 100% error free and un-corrupted. These systems generally do not provide a retroactive data testing scheme to test data for corruption by insiders or malicious applications while in storage.
- **Detecting malware in back-up data:** Data back-up software and systems generally do not have manual or automated testing capabilities to identify and remediate malware in backed up data. Malware detection is typically done at runtime in operational systems by anti-virus/anti-malware software. In addition the software is not designed to test data in non-realtime. Malware that is designed to be dormant for periods of time may not be detectable until active with current anti-virus/anti-malware software. A time-shifting, self-contained testing environment that can emulate the passage of time may be able to detect time-sensitive or time-delayed malware activity in





addition to malware with signatures for activity monitoring that was unknown at the time the backup was completed.

- **Automation of Backup Data Testing:** Back-up data testing is typically used to verify that back-up data can be used to restore systems to operational readiness. Data back-up software and systems generally do not offer automated backup data integrity or malware testing capabilities.

At the end, after every dataset is checked out, the data will be distributed according to EU-CIRCLE policies.

## 2.4 Climate Infrastructure Resilience Platform (CIRP)

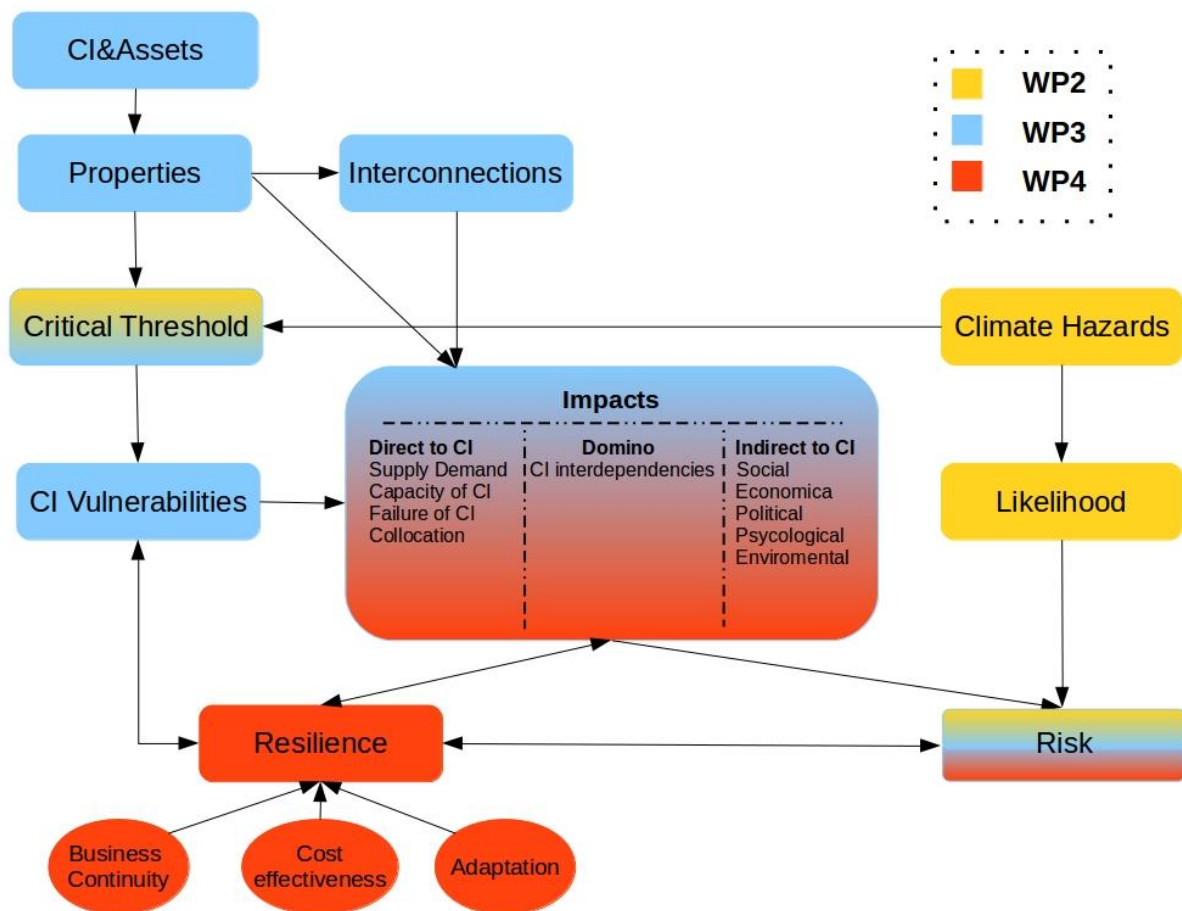
The EU-CIRCLE project aims to create an innovative framework for supporting the interconnected European Infrastructure's resilience to climate pressures. The Climate Infrastructure Resilience Platform (CIRP) will be established as an end-to-end modelling environment where new analyses can be added anywhere along the analysis workflow and where multiple scientific disciplines can work together to understand interdependencies, validate results, and present findings in a unified manner providing an efficient - Best of Breeds solution integrating existing modelling tools and data into a holistic resilience model in a standardised fashion.

The Climate Infrastructure Resilience Platform will be established as an open source framework and modelling environment where new analyses can be rapidly created by leveraging existing analyses as building blocks. The framework provides a clearly defined plug-in mechanism where new analyses can be added anywhere along the analysis workflow enabling scientists to create new end-to-end analyses or to enhance existing analyses. CIRP provides a modelling environment where multiple scientific disciplines can work together to understand interdependencies, validate results, and present findings in a unified manner. CIRP provides an extensible software platform and helps bridge the time-from-discovery gap between researchers, practitioners and decision makers.

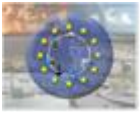
### 3 Data set reference & description

The EU-CIRCLE research project is aiming to determine climate related hazards impacts on the status and operational capacity of European critical infrastructures and society as a whole. In order to accomplish that, it is necessary to evaluate the status and capabilities of simulation models that will be used, and determine the climate hazards according to the predictions of the simulation models (Task 2.1). The produced climate data will be used to as initial driving conditions for the secondary effects on critical infrastructures (Task 2.2). During the project, it essential to define and classify the critical infrastructure and networks (Task 3.1) in order to build a virtual case before the study of real ones (WP 6, 7).

Figure 2: Data interconnection



The amount of data and the different type of formats arise the problem of creating a data management plan. Part of EU-CIRCLE Data Management Plan is the metadata processes, the tools used to post-process the simulation results and the intermediate data (Task 2.3) as well as the archiving and sharing process (WP 5). Moreover, the standardization requirements need to be established according to existing formats and protocols, such as ACORD, CF, OGC, etc. (Tasks 2.4, 3.6, 4.6, 8.8). The EU-CIRCLE project is participating in Open Research Data Pilot and it will comply accordingly. Analytically, EU-CIRCLE plan is to deposit data in a research data repository, make it possible to access and disseminate the data free of charge and provide information about tools and instruments that are necessary for validating the results.



### 3.1 Climate data

The climate simulation data produced during the EU-CIRCLE project, will be the result of Global and Regional Climate Models, such as CMIP5 initiative. These simulation programs can ingest multiple data formats such as (but not limited to) GRIB1/2, netCDF formats. The netCDF format is the most common simulation format for large file and array-oriented scientific data. It permits the fast read, edit, access and sharing of scientific data in compressed form. This is important due to the amount of information that a Climate simulation produces. Without the use of a compressed a flexible file format, it would be hard to archive and access the scientific data necessary to accomplish the goal of EU-CIRCLE project.

### 3.2 Critical Infrastructure characteristics and properties

A key element of EU-CIRCLE is to describe in a modelling compatible language the properties of critical infrastructures that are most exposed and highly vulnerable to climate hazards. The nature of the examined critical infrastructures are by definition of spatial extend and their properties and characteristics affected by ageing. The proposed work within EU-CIRCLE will define GIS based data of different CI with specified attributed by type of infrastructure, depending on the impacts by climate hazards. Thus vulnerable components and assets of the interconnected CI will be defined in a homogeneous way.

### 3.3 Climate Impacts to infrastructure

The production of climate prediction data will help to track down the major and more probable weather changes that will take place. This information will enable us to establish the new necessary operational thresholds of critical infrastructures and networks. As a result, a second set of simulation data that will describe the secondary effects of climate changes on European critical infrastructure and society as a whole will be produced. The models, which will be used, are impact assessment models and their output will enable us to construct fragility curves. The fragility curve is a statistical tool representing the probability of exceeding a given damage state (or performance) as a function of an engineering demand parameter. It is the necessary information in order to run the resilience and adaptation models.

### 3.4 Resilience / adaptation models data

Resilience is the system's capacity to absorb disturbance and reorganize during change so as to retain function, structure, identity, and feedbacks. In the other hand, when a system fails, adaptation is the minimum time that the system needs in order to be functional again. Resilience / adaptation models data will be used in order to introduce a detailed model and concept of operations in interconnected CI that will allow for the determination and validation of Business Continuity Plans following ISO 22301.

### 3.5 Tools and metadata processing

Besides the main scientific codes and programs, an amount of tools and post-process routines will be used in order to create a generic data management platform. This will enable us to interface different scientific programs, unify data outputs, in order to process the huge amount of scientific data more productively and efficiently. The unification of data will be accomplished through a metadata process that convert the produced scientific information to a predefine format. The ingestion of real data, the post-process routines for climate simulation results will be among the tools and metadata routines.



## 4 Standardization and metadata

The standardization of format and metadata processes is under evaluation due to the early stages of the project. Regardless, the goal is to use already well-established data format and metadata processes, make enhancements or create a basis for new ones whereas standards don't exist or don't fill EU-CIRCLE project's requirements.

Examples of well-established formats and protocols that may be used during EU-CIRCLE project are OGC (Open Geospatial Consortium), CF (Climate Format), WMO-TD No 1186, OASIS etc. From our perspective a great effort is necessary in order to define standardization requirements for disaster resilience problems and at the harmonization of the output data of Critical Infrastructure and risk elements.

- OGC<sup>3</sup>: Standards that are made through a consensus process and are freely available for anyone to use to improve sharing of the world's geospatial data. They are used in a wide variety of domains including Environment, Defense, Health, Agriculture, Meteorology, Sustainable Development and many more.
- CF<sup>4</sup>: Originally framed as a standard for data written in netCDF format, with model-generated climate forecast data particularly in mind. However, it is equally applicable to observational datasets, and can be used to describe other formats. It is a standard for "use metadata" that aims both to distinguish quantities (such as physical description, units, and prior processing) and to locate the data in space-time
- WMO-TD No 1186<sup>5</sup>: Document provides a series of guidelines on climate metadata and homogenization
- OASIS<sup>6</sup>: OASIS promotes industry consensus and produces worldwide standards for security, Internet of Things, cloud computing, energy, content technologies, emergency management, and other areas. OASIS open standards offer the potential to lower cost, stimulate innovation, grow global markets, and protect the right of free choice of technology
- FP7-CHARMe project<sup>7</sup>: CHARMe system provides links between datasets and citations and other commentary information using open standards such as Open Annotation. This approach is highly flexible and can adapt to changing user needs as the system grows.
- ACORD<sup>8</sup>: It is the insurance industry's non-profit standards developer, a resource for information about object technology, EDI, XML and electronic commerce in the United States and abroad.

### 4.1 Loss data management

In a study commissioned by Directorate General Humanitarian Aid and Civil Protection of the European Commission, the Joint Research Centre formulates technical recommendations for a European approach to standardize loss databases [4]. The recommendations drawn from the analysis can be summarized as follows:

- The role and utility of loss data should be discussed across all partners (local to national). High Level requirements should be informed by public and private needs across sectors.

<sup>3</sup> <http://www.opengeospatial.org/>

<sup>4</sup> <http://www.dcc.ac.uk/resources/metadata-standards/cf-climate-and-forecast-metadata-conventions#sthash.wree7Uhu.dpuf>

<sup>5</sup> [http://www.wmo.int/pages/prog/wcp/wcdmp/wcdmp\\_series/documents/WCDMP-53.pdf](http://www.wmo.int/pages/prog/wcp/wcdmp/wcdmp_series/documents/WCDMP-53.pdf)

<sup>6</sup> <https://www.oasis-open.org/>

<sup>7</sup> <http://charme.org.uk/>

<sup>8</sup> <https://www.acord.org/standards/downloads/Pages/default.aspx>



Implementation might be embedded in a Public - Public Partnership (PUP) and/or Public Private Partnership (PPP) to ensure participation and ownership of all stakeholders.

- Loss data should be recorded in advanced (distributed) IT systems, implementing an appropriate data model (linked to or integrated with other databases) and supporting user - friendly data visualization and sharing options for a wide range of users.
- Summary or aggregate statistics should be shared using an open data policy in a common data standard to support trans-boundary and international risk reduction processes. Minimum requirements for a data-sharing standard aligned with current practices are proposed in this document.

## 4.2 Standardization in risk and resilience

Presently there are numerous standardization activities pertaining to resilience and business continuity on an administrative / operational level. Within them risk assessment and protection of a high level of services, although sometimes optional, is considered integrated in the entire operational process.

ISO 22301<sup>9</sup> Guidance for Organizational Resilience: This landmark standard provides an overview of resilience, describing the foundations required and explaining how to build resilience. It therefore deals with an organization's capacity to anticipate, respond and adapt - which could be crucial to its survival. Business Continuity Management includes methods for dealing with potential and actual disruptive events as well as a remit to access and relate to all areas of the business. It is therefore well placed to incorporate efforts to manage climate risks, which require cross-cutting action and are often disruptive in nature.

Other related Standards include:

- ISO 9001:2015 provides an integrated approach to quality management - putting quality at the heart of business, touching on business resilience
- ISO 28002 for resilience in the supply chain, introducing a single approach for organizations to manage the risks of disruptive events
- ISO/IEC 27001 is an internationally recognized best practice framework for an information security management system. It helps you identify the risks to your important information and put in place the appropriate controls to help reduce the risk.
- ISO 37101: On Sustainable development of communities -- Management systems -- Requirements with guidance for resilience and smartness
- ISO/TR 37150:2014 Smart community infrastructures -- Review of existing activities relevant to metrics. addresses community infrastructures such as energy, water, transportation, waste and information and communications technology (ICT), focuses on the technical aspects of existing activities which have been published, implemented or discussed. Economic, political or societal aspects are not analysed.

## 4.3 Standardization of sharing data

Presently there is an international lagging of data exchange formats for transferring risk and resilience information between different parties. A thorough investigation has revealed a lack of common data exchange formats to exchange related information and this is a major objective that EU-CIRCLE aspires to cover in a comprehensive manner (Task 2.4 & 8.3)

<sup>9</sup> <http://shop.bsigroup.com/ProductDetail/?pid=000000000030258792>



The specific objective of CIWIN is to enable co-ordination and co-operation concerning the information on the protection of critical infrastructure at EU level. The CIWIN highly secured exchange of data between members of the platforms is done through interactive forms and no standard format has been decided upon.

The Emergency Events Database (EM-DAT), is maintained by Centre for Research on the Epidemiology of Disasters (CRED) serving the purposes of humanitarian action at national and international levels. It is an initiative aimed to rationalise decision making for disaster preparedness, as well as providing an objective base for vulnerability assessment and priority setting.

GDACS is a web-based platform that combines existing web-based disaster information management systems with the aim to alert the international community in case of major sudden-onset disasters and to facilitate the coordination of international response during the relief phase of the disaster.

CLASIC/2(tm) is the premier interactive desktop underwriting system for the assessment and management of catastrophe risk. Its flexible, intuitive software interface, the ability to support a wide variety of detailed risk information, and extensive detailed output combine to make CLASIC/2 the tool of choice for companies who need to accurately assess risk down to the individual location level.

Regarding implementation of EU legislation, in the area of analysis of incident reporting, supporting EU Cyber Security Strategy, Article 13a of the revised Framework Directive on electronic communications and Articles 4 of the ePrivacy Directive, ENISA continued collecting and analysing national reports of security breaches from National Regulatory Authorities (NRAs) in accordance with Article 13a of the Framework Directive on electronic communication. The Technical Guidance on the Incident Reporting in Article 13a[5] is being used by all MS NRAs in their annual reporting and several MS and EU Electronic Communications Providers use directly or refer to the ENISA Technical Guideline on Security Measures[6]. For 2016, the envisioned Agency's actions towards the same direction pertain facilitation of voluntary information sharing techniques to enhance quality of collection, assessment and validation of threat and risk information and establish mutual interactions with stakeholders in the area of information sharing and threat analysis, and to this action RIE will follow activities and make necessary interventions.

#### 4.4 Table template of DMP

After each dataset is produced, the consortium will assign a metadata descriptor according to the template found in Table 1. The template contains all the necessary information for every dataset used or produced during the EU-CIRCLE project and how it can be obtained.

Table 1. Data Description

Data Management Information					
Name of Dataset	Dataset Origin	Dataset History	Dataset Properties	Dataset repository	Dataset Access Policy

This table may be alternated depending on the current progress and property of the generated data.



## 5 Archiving and sharing platform

EU-CIRCLE will establish a reference virtual environment for assessing the resilience of infrastructures to climate pressures. This will serve as the primary enabler for an outreach programme intended to maximise awareness and to increase exploitation and ecosystem-led extension in the open-source community. The virtual case data results and methodology will be available through a web-GUI tool. The interactive web-based front-end will be developed according to the CIRP architecture and design specifications of Task 5.1. It will serve as an access point for the results of EU-CIRCLE project as well as a tool for run real case simulations.

In addition, part of the data will be shared when the related deliverable or paper has been made available at an open access repository according to Open Research Data Pilot requirements. The Open Research Data Pilot aims to make the research data generated by selected Horizon 2020 projects accessible with as few restrictions as possible, while at the same time protecting sensitive data from inappropriate access. Publications or any other use of web-GUI tool and data outputs should reference the EU-CIRCLE project in accordance to EC Grant rules and the respective deliverable – report.

### 5.1 SimICI - Reference Simulated Network of Interconnected Critical Infrastructures

An outcome of EU-CIRCLE research project will be a Reference Simulated Network of Interconnected Critical Infrastructures (SimICI) as it is mentioned at WP7. This reference network will serve as the virtual case for test and validate the methodology that will be developed at the final stages of the project. Specifically, the goal of SimICI is to:

- establish a controlled test-bed environment (SimICI) for Simulating Interconnected (Critical) Infrastructures, Climate Hazards, Effects, and Risk/Impact Propagation
- leverage open-source software and open-standards/data formats to maximise the application space for SimICI and to provide maximum flexibility and extensibility in the capability provided for use within and beyond SimICI
- serve as the primary enabler for an outreach programme aimed at maximising awareness, exploitation, and ecosystem-led extension in the open-source community

The SimICI will be publicly available through the web-GUI tool.



## 6 References

- [1] Guidelines on Open Access to Scientific Publications and Research Data in Horizon 2020, version 1.0, pages 8-11, 11 December 2013
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