



# RESIN

SUPPORTING DECISION –  
MAKING FOR RESILIENT CITIES

## RESIN Glossary

Work Package 1

Dissemination Level: PU

Lead Partner The University of Manchester

Due Date: 31 January 2016

Submission Date: 31 January 2016

<b>Deliverable No.</b>	Deliverable No. 1.2
<b>Work Package</b>	1
<b>Dissemination Level</b>	PU
<b>Author(s)</b>	Carter, J and Connelly, A University of Manchester
<b>Co-Author(s)</b>	Insert all SOTA partners
<b>Date</b>	30/01/2016
<b>File Name</b>	D1_2_Glossary_UNIMAN_2015-01-30
<b>Status</b>	
<b>Revision</b>	
<b>Reviewed by (if applicable)</b>	

This document has been prepared in the framework of the European project RESIN – Climate Resilient Cities and Infrastructures. This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement no. 653522.

The sole responsibility for the content of this publication lies with the authors. It does not necessarily represent the opinion of the European Union. Neither the EASME nor the European Commission are responsible for any use that may be made of the information contained therein.

**CONTACT:**

**Email:** [resin@tno.nl](mailto:resin@tno.nl)  
**Website:** [www.resin-cities.eu](http://www.resin-cities.eu)



<b>1. Introduction .....</b>	<b>5</b>
<b>2. Main core of deliverable .....</b>	<b>7</b>
<b>2.1. Background .....</b>	<b>7</b>
<b>2.2. Compilation Procedure .....</b>	<b>7</b>
<b>2.2.1. First step of procedures .....</b>	<b>7</b>
<b>2.2.2. Second step of procedures .....</b>	<b>7</b>
<b>3. Results and Conclusions .....</b>	<b>8</b>
<b>4. References.....</b>	<b>17</b>

## Executive Summary

This document outlines the definitions for various terms that will be employed throughout the RESIN project.

The definitions stem directly from RESIN's State of the Art reports (Deliverable 1.1) with some minor modifications to harmonize with the Intergovernmental Panel on Climate Change (IPCC) definitions outlined in their most recent assessment report (AR5) (IPCC 2014a). This deliverable is strongly linked to the RESIN Conceptual Framework (Deliverable 1.3).

This document is a living document, and the definitions will be refined and adapted as the RESIN project progresses.

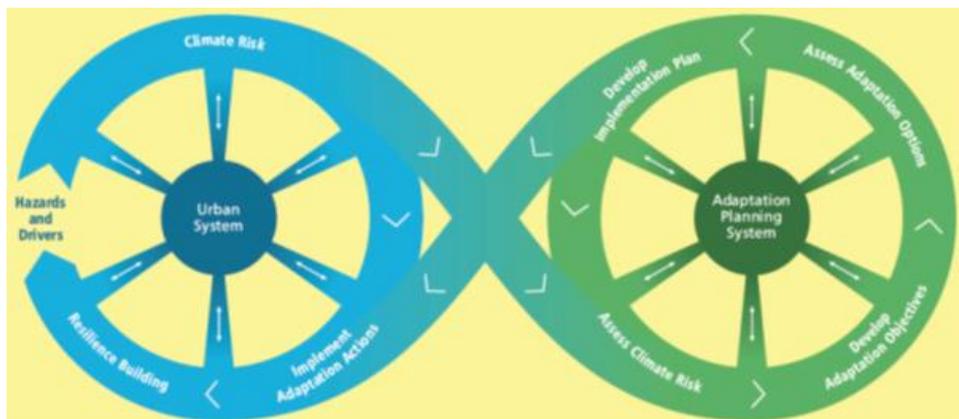
# 1. Introduction

This document outlines the definitions for various terms that will be employed throughout the RESIN project. This deliverable is strongly linked to the RESIN Conceptual Framework (Deliverable 1.3; Fig. 1). The definitions stem directly from RESIN's six State of the Art reports (Deliverable 1.1) as follows:

- [Urban Critical Infrastructure Systems](#) (Rome et al., 2015)
- [Adaptation, Resilience and Disaster Risk Reduction: Concepts, Definitions and Application](#) (Nassopoulos et al., 2015)
- [Weather and climate hazards facing European cities](#) (Carter et al., 2015)
- [Vulnerability Assessment: Definitions, Indicators and Existing Assessment Methods](#) (Connelly et al., 2015)
- [Adaptation Approaches: Characterizing, assessing and prioritizing towards implementation.](#) (Abajo et al., 2015)
- [Decision Support](#) (Wijnmalen et al., 2015).

The RESIN project is adopting a risk-based approach, as suggested by the Intergovernmental Panel on Climate Change (IPCC). The IPCC have recently revised their approach to harmonize the work in disaster risk reduction with climate change adaptation (IPCC 2012). This has particular implications for the concept of 'vulnerability' and the relationship of 'exposure' to other concepts (Nassopoulos et al 2015; Connelly et al 2015). Consequently, this means that there will be significant differences between the approach adopted by many earlier European projects which follow the IPCC's former definition.

As RESIN is seeking to connect different research traditions across disaster risk reduction, critical infrastructure protection and climate change adaptation, this document is a key resource to ensure that the work remains consistent across all partners and work packages.



**Fig. 1: The RESIN Conceptual Framework.**

The glossary is a living document, and the definitions may be refined through the RESIN project depending on the outcomes of the various work packages.

## 2. Main core of deliverable

This section outlines the definitions. In some cases, there are several definitions available. Following the experience of CIPedia© (2015), it was decided to document competing definitions, but to indicate the *preferred* definition for RESIN.

### 2.1. Background

The purpose of the glossary is to support the RESIN conceptual framework by providing partners, from different disciplines, with easy access to the preferred definitions for terms used throughout the project. The glossary will also help partners to clearly communicate their work to audiences beyond RESIN.

### 2.2. Compilation Procedure

#### 2.2.1. First step of procedures

The RESIN [State of the Art](#) reports provided guidance on the key definitions as part of Deliverable 1.1. These were combined and checked against one another for consistency and to identify potential divergences from the developing conceptual framework. The reports were also scanned to get a sense if any terms may be missing; however, none were found.

Climate change adaptation words were checked against the current version of the IPCC glossary (IPCC 2014a). This meant some slight changes to the definitional terms associated with ‘adaptation to climate change’ to include ‘autonomous’, ‘evolutionary’, ‘incremental’, and ‘transformative’ adaptation. In addition, terms such as ‘urban’ are very hard to define and often depend on the data available. Therefore, an official EU/OECD definition for the term ‘urban’ was added.

#### 2.2.2. Second step of procedures

RESIN partners were provided a draft of the glossary to comment on whether there were any terms missing or definitions that they felt uncomfortable with. The questions posed were:

- In some cases, some words have slightly different definitions depending on the discipline. CIPedia© has adopted the approach of gathering together all definitions.
  - (a) Do you think that the same approach should be adopted for RESIN?
  - (b) Could you please explain the major benefits or drawbacks, in terms of furthering your work, if this approach was adopted?
- Please read through the definitions. They have been identified through the State of the Art reviews or else selected to harmonise with the IPCC 2014a.
  - (a) Are there any definitions that you feel uncomfortable with? If so, please suggest an alternative definition.
  - (b) Are there any words that are missing from your point of view?

### 3. Results and Conclusions

Below, the list of definitions and terms is adopted. This deliverable should be considered as a living document with terms clarified over the course of the RESIN project.

Term	Definition	Source
Adaptation (to climate change)	The process of adjustment to actual or expected <b>climate</b> , and its effects. See also Autonomous Adaptation, Evolutionary Adaptation, Incremental Adaptation and Transformative Adaptation	IPCC 2014a
Adaptation Assessment	The practice of identifying options to adapt to climate change and evaluating them, in terms of criteria such as availability, <b>(co-) benefits</b> , costs, <b>effectiveness</b> , <b>efficiency</b> and feasibility.	Adapted from IPCC 2014a
Adaptation Options	The array of <b>strategies</b> and measures that are available and appropriate for addressing <b>adaptation</b> needs. They include a wide range of actions that can be categorized as structural, institutional, or social.	IPCC 2014a
Adaptation Strategies	[Adaptation Strategies] include a mix of policies and measures with the overarching objective of reducing <b>vulnerability</b> . Depending on the circumstances, the strategy can be set at a national level, addressing <b>adaptation</b> across sectors, regions and vulnerable populations, or it can be more limited, focusing on just one or two sectors or regions.	IPCC 2014a
Adaptive capacity (or adaptability)	The ability of systems, institutions, humans, and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to <b>consequences</b> .	IPCC 2014a
Autonomous Adaptation	Adaptation in response to experienced <b>climate</b> and its effects, without planning explicitly or consciously focused on addressing climate change. Also referred to as spontaneous adaptation.	IPCC 2014a
Blue Infrastructure	See <b>Green Infrastructure</b>	
Cascading Effects	A sequence of events in which each one produces the circumstances necessary for the initiation of the next. See also <b>Consequence Analysis</b>	Allaby 2004
	A sequence of <b>events</b> in which each individual event is the cause of the following <b>event</b> ; all the <b>events</b> can be traced back to one and the same initial event.	Rome et al. 2015
Climate	Climate in a narrow sense is usually defined as the average weather, or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands or millions of years. The classical period for averaging these variables is 30 years, as defined by the World Meteorological Organization.	IPCC 2013
Climate Change	Climate change refers to a change in the state of the <b>climate</b> that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for	IPCC 2013

Term	Definition	Source
	an extended period, typically decades or longer.	
Climate Projection	A climate projection is the simulated response of the <b>climate system</b> to a scenario of future emission or concentration of greenhouse gases and aerosols, generally derived using <b>climate models</b> .	IPCC 2013
Climate Model	A numerical representation of the <b>climate system</b> based on the physical, chemical and biological properties of its components, their interactions and feedback processes, and accounting for some of its known properties.	IPCC 2013
Climate System	The climate system is the highly complex system consisting of five major components: the atmosphere, the hydrosphere, the cryosphere, the lithosphere and the biosphere, and the interactions between them.	IPCC 2013
Co-benefits	The positive effects that a policy or measure aimed at one objective might have on other objectives, irrespective of the net effect on overall social welfare. Co-benefits are often subject to <b>uncertainty</b> and depend on local circumstances and implementation practices, among other factors. Co-benefits are also referred to as ancillary benefits	Allaby 2004
Consequence	The outcome of an event affecting <b>objectives</b>	ISO/IEC 27000: 2014 and ISO 31000: 2009
Consequence Analysis	<b>Consequence</b> Analysis is estimation of the effect of potential <b>hazardous</b> events	Australian Emergency Management Glossary (1998)
Contextual Vulnerability	A present inability to cope with external pressures or changes, such as changing <b>climate</b> conditions. Contextual vulnerability is a characteristic of social and ecological systems generated by multiple factors and processes.	IPCC 2014a
Coping Capacity	The ability of people, institutions, organizations, and systems, using available skills, values, beliefs, resources, and opportunities, to address, manage, and overcome adverse conditions in the short to medium term.	IPCC 2014a
	The ability of people, organizations and systems, using available skills and resources, to face and manage adverse conditions, emergencies or disasters.	UNISDR 2009
Critical Infrastructure (CI)	An asset, system or part thereof located in Member States which is essential for the maintenance of vital societal functions, health, safety, security, economic or social well-being of people, and the disruption or destruction of which would have a significant <b>impact</b> in a Member State as a result of the failure to maintain those functions.	European Commission: Council Directive 2008/114/EC

Term	Definition	Source
	Organizations and facilities that are essential for the functioning of society and the economy as a whole.	ISO/IEC TR 27019:2013
<b>Critical Infrastructure (CI) Dependency</b>	CI dependency is the relationship between two ( <b>critical infrastructure</b> ) products or services in which one product or service is required for the generation of the other product or service.	Rome et al 2015
<b>Critical Infrastructure (CI) Element</b>	Part of a CI. Can have sub-elements	Rome et al 2015
<b>Critical Information Infrastructure (CII)</b>	Critical information infrastructures ('CII') should be understood as referring to those interconnected information systems and networks, the disruption or destruction of which would have serious impact on the health, safety, security, or economic well-being of citizens, or on the effective functioning of government or the economy.	OECD Recommendation of the Council on the Protection of Critical Information Infrastructures C(2008)35
<b>Critical Infrastructure (CI) Interdependency</b>	The mutual dependency of products or services.	ACIP 2003.
<b>Critical Infrastructure Protection (CIP)</b>	All activities aimed at ensuring the functionality, continuity and integrity of critical infrastructures in order to deter, mitigate and neutralise a threat, <b>risk</b> or <b>vulnerability</b> .	Council Directive 2008/114/EC
<b>Critical Infrastructure (CI) Sector</b>	Economic sectors considered critical	Rome et al. 2015
<b>Cyber Security</b>	Cyber-security commonly refers to the safeguards and actions that can be used to protect the cyber domain, both in the civilian and military fields, from those threats that are associated with or that may harm its interdependent networks and information infrastructure. Cyber-security strives to preserve the availability and integrity of the networks and <b>infrastructure</b> and the confidentiality of the information contained therein	EC 2013a
<b>Damage</b>	Damage classification is the evaluation and recording of damage to structures, facilities, or objects according to three (or more) categories.	UN Department of Humanitarian Affairs, 1992
<b>Decision</b>	The result of making up one's mind regarding a choice between alternatives	Wijnmalen et al 2015
<b>Decision Support</b>	The structure process of activities that support decision makers and other <b>stakeholders</b> in coping with and resolving problems they are faced with.	Wijnmalen et al 2015

Term	Definition	Source
Disruption	Incident, whether anticipated (e.g. hurricane) or unanticipated (e.g. a blackout or earthquake) which disrupts the normal course of operations at an organization location.	ISO/PAS 22399:2007 Societal security - Guideline for incident preparedness and operational continuity management.
Drivers	<p>Drivers are aspects which change a given system. They can be short term, but are mainly long term. Changes in both the climate system and socioeconomic processes including adaptation and mitigation are drivers of hazards, exposure, and vulnerability. Drivers can, thus, be climatic or non-climatic. Climatic drivers include: warming trend, drying trend, extreme temperature, extreme precipitation, precipitation, snow cover, damaging cyclone, sea level, ocean acidification, carbon dioxide fertilisation. Non-climatic drivers include land use change, migration, population and demographic change, economic development.</p> <p>In the RESIN project, we will refer to drivers as climatic drivers and non-climatic drivers as <b>stressors</b>.</p>	Based on IPCC 2014b (SPM)
Ecosystem-based Adaptation (EbA)	The use of biodiversity and ecosystem services as part of an overall <b>adaptation strategy</b> to help people to adapt to the adverse effects of <b>climate change</b> .	Adapted from Abajo et al. 2015
Ecosystem Service Planning	A place-based approach that focuses on the creation, restoration and conservation of ecological structures to provide society with specific services from nature.	Wamsler et al. 2014
Efficiency	The good use of time and energy in a way that does not waste any.	<a href="http://dictionary.cambridge.org/dictionary/english/efficiency">http://dictionary.cambridge.org/dictionary/english/efficiency</a>
Effectiveness	The ability to be successful and produce the intended results:	<a href="http://dictionary.cambridge.org/dictionary/english/effectiveness">http://dictionary.cambridge.org/dictionary/english/effectiveness</a>
Ensemble	A collection of model simulations characterizing a climate prediction <b>or [climate] projection</b> .	IPCC 2013
European Critical Infrastructure	<b>Critical infrastructure</b> located in Member States the disruption or destruction of which would have a significant <b>impact</b> on at least two Member States. The significance of the <b>impact</b> shall be assessed in terms of cross-cutting criteria. This includes effects resulting from cross-sector <b>dependencies</b> on other types of	Council Directive 2008/114/EC

Term	Definition	Source
	infrastructure.	
Event	<p>Occurrence or change of a particular set of circumstances.</p> <ul style="list-style-type: none"> <li>• An event can be one or more occurrences, and can have several causes.</li> <li>• An event can consist of something not happening.</li> <li>• An event can sometimes be referred to as an "incident" or "accident".</li> </ul>	CIPedia© 2015 based on ISO/PAS 22399:2007 and ISO/IEC 27000:2014
Evolutionary Adaptation	For a population or species, change in functional characteristics as a result of selection acting on heritable traits. The rate of evolutionary adaptation depends on factors such as the strength of selection, generation turnover time, and degree of outcrossing (as opposed to inbreeding).	IPCC 2014a
Exposure	The presence of people, livelihoods, species or ecosystems, environmental services and resources, infrastructure, or economic, social, or cultural assets in places that could be adversely affected	IPCC 2014a
Extreme Weather Event	An extreme weather event is an event that is rare at a particular place and time of year.	IPCC 2013
Green Infrastructure	<p>Broadly defined as a strategically planned network of high quality natural and semi-natural areas with other environmental features, which is designed and managed to deliver a wide range of ecosystem services and protect biodiversity in both rural and urban settings.</p> <p><b>Note:</b> Green infrastructure may incorporate both landscape and water features, the latter of which may be termed 'blue infrastructure'. Other terms include 'green-blue infrastructure' and 'green and blue infrastructure'</p>	European Commission 2013b.
Grey Infrastructure	Familiar urban infrastructure such as roads, sewer systems and storm drains is known as 'grey infrastructure'. Such conventional infrastructure often uses engineered solutions typically designed for a single function.	Parliamentary Office of Science & Technology 2013
Hazard	The potential occurrence of a natural or human-induced physical event or trend, or physical impact, that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, and environmental resources...the term hazard usually refers to climate-related physical events or trends or their physical impacts.	IPCC 2014a
Impact Chains	Impact chains permit the structuring of cause - effect relationships between drivers and/or inhibitors affecting the	BMZ 2014

Term	Definition	Source
	<p>vulnerability of a system.</p> <p>Impact chains allow for a visualization of interrelations and feedbacks, help to identify the key impacts, on which level they occur and allow visualising which climate signals may lead to them. They further help to clarify and/or validate the objectives and the scope of the vulnerability assessment and are a useful tool to involve stakeholders.</p>	
Impact	<p>Effects on natural and human systems (...) the term impact is used primarily to refer to the effects on natural and human systems of extreme weather and events and of climate change. Impacts generally refer to effects on lives, livelihoods, health, ecosystems, economies, societies, cultures, services and infrastructure due to the interaction of climate changes of hazardous climate events occurring within a specific time period and the vulnerability of an exposed society or system.</p> <p>Note: Impacts are also referred to as consequences and outcomes</p>	Adapted from IPCC 2014a
	The direct outcome of an event	CIPedia® 2015
Incident	Event that might be, or could lead to, an operational interruption, disruption, loss, emergency or crisis.	ISO/PAS 22399: 2007
Incremental Adaptation	Adaptation actions where the central aim is to maintain the essence and integrity of a system or process at a given scale.	IPCC 2014a
Infrastructure	<p>Infrastructure refers to all public and private facilities which are considered to be necessary for adequate public services and economic development. In most cases, the infrastructure is divided into technical infrastructure (e.g. transport and communications facilities, energy and water supply or wastewater disposal) and social infrastructure (e.g. schools, hospitals, shopping or cultural facilities).<sup>1</sup></p> <p><sup>1</sup> The definition of social infrastructure can vary as described in the social infrastructure entry which is divided into physical social infrastructure and institutional social infrastructure.</p>	<p>Translated from:</p> <p>Bundesamt für Sicherheit in der Informationstechnik, Bundesamt für Bevölkerungsschutz und Katastrophenhilfe (2013)</p> <p><a href="http://www.kritis.bund.de/SubSites/Kritis/DE/Servicefunktionen/Glossar/Functions/glossar.html">http://www.kritis.bund.de/SubSites/Kritis/DE/Servicefunktionen/Glossar/Functions/glossar.html</a></p>
Inoperability	The degree of function loss of an object	Rome et al 2015
Intensity	<p>The quality of being intense.</p> <p>The measurable amount of a property, such as force, brightness, or a magnetic field.</p>	Oxford English Dictionaries <a href="https://en.oxforddictionaries.com/definition/intensity">https://en.oxforddictionaries.com/definition/intensity</a>

Term	Definition	Source
	The measurable amount of a property, such as force, brightness, or a magnetic field.	Oxford English Dictionaries <a href="https://en.oxforddictionaries.com/definition/intensity">https://en.oxforddictionaries.com/definition/intensity</a>
Likelihood	The chance of a specific outcome occurring, where this might be estimated probabilistically.	IPCC 2014a
Maladaptation	Actions that may lead to increased risk of adverse climate-related outcomes, increased vulnerability to climate change, or diminished welfare, now or in the future.	IPCC 2014a
Mainstreaming	Deliberate perturbation in the natural order of the things and undermines the status quo to radically expand and enhance the topic under consideration.	Wamsler et al 2014
Passive Measure	It is a type of measure which does not use energy once it has been implemented. It is normally refers to adaptation measures for buildings indoor environments.	Van Hoof et al 2014
Probability	Measure of the chance of occurrence expressed as a number between 0 and 1 where 0 is impossibility and 1 is absolute certainty.	ISO Guide 73:2009
	The likelihood of a specific outcome, measured by the ratio of specific outcomes to the total number of possible outcomes. Probability is expressed as a number between 0 and 1, with 0 indicating an impossible outcome and 1 indicating an outcome is certain.	The Australian Emergency Management Glossary
Probabilistic Climate Projections	These are projections of future absolute climate that assign a probability level to different climate outcomes. This projection provides an absolute value for the future climate (as opposed to giving values that are relative to a baseline period) that assign a probability level to different climate outcomes.	Adapted from the UK Met Office 2014
Outcome Vulnerability	Vulnerability as the end point of a sequence of analyses beginning with projections of future emission trends, moving on to the development of climate scenarios, and concluding with biophysical impact studies and the identification of adaptive options. Any residual consequences that remain after adaptation has taken place define the levels of vulnerability.	IPCC 2014a
Recovery	The restoration, and improvement where appropriate, of facilities, livelihoods and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors	UNISDR 2009
Reliability	Property of consistent intended behaviour and results	ISO/IEC 27000:2014
Resilience	The capacity of a social-ecological system to cope with a hazardous event or disturbance, responding or reorganizing in	IPCC 2014a

Term	Definition	Source
	ways that maintain its essential function, identity, and structure, while also maintaining the capacity for <b>adaptation</b> , learning, and transformation (Arctic Council, 2013).	
	The ability to function, survive, and thrive no matter what stresses happen and to skilfully prepare for, respond to, and manage a crisis. Finally, it should include the ability to return to normal operations as quickly as possible after a <b>disruption</b> .	NIAC 2009
	The ability of a system, community or society exposed to <b>hazards</b> to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions.	UNISDR 2009
Risk	The potential for <b>consequences</b> where something of value is at stake and where the outcome is <b>uncertain</b> , recognizing the diversity of values. Risk is often represented as probability of occurrence of hazardous events or trends multiplied by the impacts if these events or trends occur. Risk results from the interaction of <b>vulnerability</b> , <b>exposure</b> , and <b>hazard</b> .	IPCC 2014a
Scenario	A plausible description of how the future may develop based on a coherent and internally consistent set of assumptions about key driving forces (e.g. rate of technological change, prices) and relationships.	IPCC 2013
Sensitivity	The degree to which a system or species is affected, either adversely or beneficially, by climate variability or change. The effect may be direct ... or indirect.	Adapted from IPCC 2014a
Social Infrastructure (Institutional)	The social infrastructure includes the humans, organizations and governments that make decisions and form our economy as well as our institutions and policies.	Chappin and van der Lei 2014
Social Infrastructure (Physical)	Schools, hospitals, shopping or cultural facilities	Unpublished working glossary of UP KRITIS and BSI, 2014
Stakeholder	Person or organization that can affect, be affected by, or perceive themselves to be affected by a decision or activity <b>Note:</b> A decision maker can be a stakeholder.	Adapted from: ISO 31000:2009
Stressors	Events and trends, often not climate-related, that have an important effect on the system exposed and can increase ... climate related risk.	Adapted from Oppenheimer et al. 2014: p. 1048.
Transformative Adaptation	Adaptation that changes the fundamental attributes of a system in response to climate and its effects.	IPCC 2014a

Term	Definition	Source
Uncertainty	A state of incomplete knowledge that can result from a lack of information or from disagreement about what is known or even knowable	IPCC 2014a
Urban (Urban Area)	Urban 'is a function of (1) sheer population size, (2) space (land area), (3) the ratio of population to space (density or concentration), and (4) economic and social organization.'	Weeks 2010
	The OECD-EU classification identifies functional urban areas beyond city boundaries, to reflect the economic geography of where people live and work... Defining urban areas as functional economic units can better guide the way national and city governments plan infrastructure, transportation, housing and schools, space for culture and recreation. Improved planning will	OECD 2012
Urban Critical Infrastructure	An asset, system or part thereof located in an <b>urban</b> area which is essential for the maintenance of vital societal functions, health, safety, security, economic or social well-being of people, and the disruption or destruction of which would have a significant <b>impact</b> in an <b>urban</b> area as a result of the failure to maintain those functions	Adapted from Council Directive 2008/114/EC
Urban Critical Infrastructure System	<b>Urban critical infrastructure</b> from a systemic viewpoint. It is part of the <b>urban system</b> and simultaneously part of the national critical infrastructure system.	Rome et al 2015
Urban System	System of urban areas (Urban settlements from a systemic viewpoint)	Rome et al 2015
Vulnerability	The propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts including <b>sensitivity</b> or susceptibility to harm and lack of <b>capacity to cope</b> and adapt. Note: Please see <b>contextual vulnerability</b> and <b>outcome vulnerability</b>	IPCC 2014a
	Intrinsic properties of something resulting in susceptibility to a risk source that can lead to an event with a consequence	CIPedia© 2015
	Weakness of an asset or control that can be exploited by one or more threats	ISO/IEC 27000: 2014
Vulnerability Index	A metric characterizing the <b>vulnerability</b> of a system. A <b>climate</b> vulnerability index is typically derived by combining, with or without weighting, several indicators assumed to represent <b>vulnerability</b>	IPCC 2014a
Wicked Problem	A problem that is categorized by a great number of <b>uncertainties</b> . These include: on the <b>stakeholders</b> involved, the boundaries of the problem, long term organisational developments and responsibilities, amongst others.	Adapted from Wijnmalen et al 2015. Please also see Rittel and Webber 1973.

## 4. References

Abajo, B., García-Blanco, G., Gutierrez, L., Martínez, J.A., Mendizabal, M., Nassopolous, H., Ehret, M., 2015. Adaptation approaches: characterising, assessing and prioritizing towards implementation (State of the Art report 5, The RESIN Project).

ACIP 2003 consortium, Analysis and Assessment for Critical Infrastructure Protection (ACIP) final report, EU/DG Information Society and Media, Brussels, Belgium, 2003

Australian Government, Attorney General's Department. 1998. Australian Emergency Management Glossary, Australian Emergency Manuals, no. 3. Available at: <https://www.ag.gov.au/EmergencyManagement/Tools-and-resources/Publications/Documents/Manual-series/manual-3-australian-emergency-glossary.pdf>

Allaby, M., 2004. A Dictionary of Ecology. OUP Oxford.

BMZ (Federal Ministry for Economic Cooperation and Development). 2014. The Vulnerability Sourcebook. Concept and guidelines for standardised vulnerability assessments. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, Bonn and Eschborn. Available at: [https://gc21.giz.de/ibt/var/app/wp342deP/1443/wp-content/uploads/filebase/va/vulnerability-guides-manuals-reports/Vulnerability Sourcebook - Guidelines for Assessments - GIZ 2014.pdf](https://gc21.giz.de/ibt/var/app/wp342deP/1443/wp-content/uploads/filebase/va/vulnerability-guides-manuals-reports/Vulnerability_Sourcebook_-_Guidelines_for_Assessments_-_GIZ_2014.pdf)

Carter, J.G., Handley, J., Connelly, A., 2015. Weather and climate hazards facing European cities (State of the art report 3, the RESIN project.).

Chappin, E.J.L.; van der Lei, T. 2014. Adaptation of interconnected infrastructures to climate change: A socio-technical systems perspective. In: Utilities Policy 31, pp. 10 – 17

Connelly, A., Carter, J., Handley, J., Rome, E., Worst, R., Voß, N., 2015. Vulnerability assessments: definitions, indicators and assessments. State of the art report (4), The RESIN project.

European Commission (EC). 2006. Communication from the Commission of 12 December 2006 on a European Programme for Critical Infrastructure Protection, COM (2006) 786 final – Official Journal C 126 of 7.6.2007

EC, 2008. EC Council directive 2008/114/EC of 8 December 2008 on the identification and designation of European critical infrastructures and the assessment of the need to improve their protection. OJEU, European Commission.

EC. 2013a. Joint Communication to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Cybersecurity Strategy of the European Union: An Open, Safe and Secure Cyberspace, JOIN(2013) 1 final. Available at: [http://eeas.europa.eu/policies/eu-cyber-security/cybsec\\_comm\\_en.pdf](http://eeas.europa.eu/policies/eu-cyber-security/cybsec_comm_en.pdf)

EC, 2013b. European Commission. 2013. Building a Green Infrastructure for Europe. European Union: Brussels. doi: 10.2779/54125

IPCC, 2012. Managing the risks of extreme events and disasters to advance climate change adaptation. A special report of Working Groups I and II of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge.

IPCC, 2013: Annex III: Glossary [Planton, S. (ed.)]. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel

on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

IPCC, 2014a: Annex II: Glossary [Mach, K.J., S. Planton and C. von Stechow (eds.)]. In: *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, pp. 117-130.

IPCC, 2014b: Summary for policymakers. In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1-32.

ISO/PAS 22399:2007. Societal security - Guideline for incident preparedness and operational continuity management.

ISO 31000:2009(en). Risk management — Principles and guidelines

ISO/IEC 27000:2014(en). Information technology

Nassopoulos, H., Ehret, M., Vuillet, M., Cariolet, J.M., Colomobert, M., Diab, Y., 2015. Resilience, Adaptation and Disaster Risk Reduction concepts, definitions and application (State of the art report 2, the RESIN Project).

National Infrastructure Advisory Council (NIAC). 2009. Critical infrastructure resilience: final report and recommendations, Department of Homeland Security (US). Available at: [http://www.dhs.gov/xlibrary/assets/niac/niac\\_critical\\_infrastructure\\_resilience.pdf](http://www.dhs.gov/xlibrary/assets/niac/niac_critical_infrastructure_resilience.pdf)

Oppenheimer, M., M. Campos, R. Warren, J. Birkmann, G. Luber, B.C. O'Neill, and K. Takahashi, 2014: Emergent risks and key vulnerabilities. In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1039-1099.

Organisation for Economic Cooperation and Development (OECD). 2012. Redefining Urban: A New Way to Measure Metropolitan Areas, OECD Publishing, Paris.

Parliamentary Office of Science & Technology, Houses of Parliament [UK]. 2013. Urban Green Infrastructure, Postnote, no. 448. Available at: <http://www.parliament.uk/briefing-papers/POST-PN-448.pdf>

Rittel, Horst W. J.; Melvin M. Webber 1973. Dilemmas in a General Theory of Planning Policy Sciences 4, pp. 155–169.

Rome, E., Voss, N., Connelly, A., Carter, J.G., Handley, J.F., 2015. Urban Critical Infrastructure Systems (State of the art report 1, The Resin Project).

UK Met Office. 2014. UK Climate Projections: probabilistic climate projection. Available at: <http://ukclimateprojections.metoffice.gov.uk/23210>

United Nations (UN) Department of Humanitarian Affairs (DHA), 1992. Internationally agreed glossary of basic terms related to Disaster Management, DHA, Geneva. Available at: <http://reliefweb.int/sites/reliefweb.int/files/resources/004DFD3E15B69A67C1256C4C006225C2-dha-glossary-1992.pdf>

United Nations Office for Disaster Risk Reduction (UNISDR), 2009. Terminology on disaster risk reduction, UNISDR, Geneva. Available at: <http://www.unisdr.org/we/inform/terminology>

Van Hooff, T., Blocker, B., Hensen, J.L.M., Timmermans, H. J. 2014. On the predicted effectiveness of climate adaptation measures for residential buildings. *Building and Environment*, 82, 300–316.

Wamsler, C., Luederitz, C., & Brink, E. 2014. Local levers for change : Mainstreaming ecosystem-based adaptation into municipal planning to foster sustainability transitions. *Global Environmental Change*, 29, 189–201. doi:10.1016/j.gloenvcha.2014.09.008.

Weeks, John R., 2010. Defining Urban Areas. In: Tarek Rashed und Carsten Jürgens (Hg.): *Remote Sensing of Urban and Suburban Areas*, Bd. 10. Dordrecht: Springer Netherlands (*Remote Sensing and Digital Image Processing*), p. 33–45.

Wijnmalen, D., Kamphuis, V., Willems, R., 2015. Decision support (State of the art report 6, The RESIN project).