

D6.1 EXISTING STANDARDS AND
STANDARDIZATION ACTIVITIES
REPORT.



SMART MATURE RESILIENCE

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REPORT

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EXECUTIVE SUMMARY

The aim of this report is to disseminate knowledge about relevant existing standards and standardization activities amongst project partners and to support the awareness raising of possible missing standards. Thus this document will show the current resilience and Smart City standardization landscape, specifically taken into consideration the security aspects, and will list and briefly assess the standards relevant for this project.

This document is structured into four main parts. Firstly, chapter 2 describes briefly the context in which this document has been developed and explains the methodology used for the analysis of the relevant standards. The next part (Chapter 3) provides with basic information about the current status of the Smart City Standardization Landscape. The results of the standards research are placed in chapter 4, while the final part of the document draws conclusions regarding the general status of the standardization landscape in smart cities and the identified standards lists.

To sum up a great variety of committees and organizations engage themselves in the undertaking of smart cities and relative subjects as risk management or resilience. An extensive list of standards including 276 relevant items have been identified after careful observation of the discussions at all Smart Mature Resilience (SMR) workshops so far, keyword extraction and interchange as well as by a questionnaire and individual assessments by the project partners. The standards search has been conducted by the use of a standards database. An initial priority classification for importance has been executed and thus 95 standards could be highlighted that are to be taken into account within especially the further activities of the SMR Work packages 3, 4 and 5 as well as when generating own standards within the SMR project.

Furthermore, the analysis of the standards has provided an important basis for the forthcoming work in Work package 6, where the main objective is to build on the validated guideline developed in the SMR project and to develop a new standard based on the essential guideline content (Task 6.3). Before the results of this report will be compared with the project needs identified for standardization, to support the identification of standardization potential within SMR and thus to fill the gap in existing standardization (Task 6.2).



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1. INTRODUCTION

1.1. BACKGROUND

The main objective of the Work package 6 of the SMR project is to promote project results and to transfer generated project knowledge into project-related standardization activities. Thus, this Work package will contribute to bridging potential gaps between existing standards in the field of crisis management and urban resilience while it will also support the improvement of EU crisis management: to increase significantly the ability of the European region exposed to hazards 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 (in line with DoA objectives).

The work in the task 6.1 'Analysis of existing standards and standardization activities' consist of a survey and assessment of existing standards, of standards that are currently under development and of other standardization activities in the field of crisis management and urban resilience at national, European and international level (e. g. DIN, CEN, CENELEC, ISO, IEC). The result of this task will be a comprehensive overview of relevant existing standards and current standardization activities.

1.2. OBJECTIVES AND SCOPE

This deliverable D6.1 titled 'A report describing the existing standards and standardization activities' has the objective to collect/gather and disseminate knowledge about relevant existing standards and standardization activities amongst project partners and to support awareness raising regarding potential missing standards. Thus this document will present the current and up-to-date Smart City standardization landscape under which Smart Mature Resilience for cities is to be found, specifically taking into consideration the security aspects (Chapter 3), and will list and briefly assess the standards relevant for the SMR project (Chapter 4). The standards lists will include aspects such as Resilience and Smart Cities or Critical Infrastructures, Social Dynamics and Climate Change, as these are the topics of the requirements gathering workshops in Work package 2 (see D2.1, D2.2 and D2.3 reports). However, the focus of this standards' research is on formal standards established by recognized standard developing organizations, such as ISO at international, CEN at European or for instance DIN at German national level.

This deliverable will support other tasks in this project with regard to the consideration of existing standards and will be the basis for the identification of standardization potential within task 6.2 of the

SMR project, thus supporting the progress of the project and future standardization towards a more resilient city by standardization of the for example the resilience management guidelines and terminologies.

1.3. TYPES OF STANDARDS

A standard is a consensus based document that is approved by a recognized body. It provides rules, guidelines or characteristics for activities or their results, reflecting the state-of-the art. It should be based in the consolidated results of science, technology and experience, aiming at the promotion of the optimum community benefits [1].

European standardization is a widely accepted tool to lower trade barriers. It provides harmonized standards that are a reliable indicator of conformity with relevant EU legislation. In this context the New Approach, as an EU Council resolution to technical harmonization and standardization has to be mentioned. This approach was introduced in 1985 and changed the European standardization landscape. Nowadays about 80% of the published standards are European or international in origin.

On European level different standardization documents are available. Each of this represents a different level of consensus. The European Standard (EN) aims at developing a normative specification reflecting the current state of technology and knowledge. While developed, the standstill policy applies. This means that during work on a European standard and after its publication, CEN/CENELEC Members agree not to publish national standards which are not in line with it. This is done to prevent any situation occurring during the preparation or after publication of a standard which could impair or undermine harmonization. National standards which are in conflict or duplicate EN standards have to be withdrawn. One special type of EN is the mandated European standard (harmonized EN), which is applied in the context of the New Legislative Framework (a.k.a. New Approach) and developed on the basis of a mandate from the European Commission to set out the Essential Requirements for the product or service that are specified in an EC Directive. These Essential Requirements deal in particular with the health and safety of users and other fundamental matters. Harmonized standards do not have a special designation, except from a note in the foreword. Other products of European standardization include European Technical Specifications (CEN/TS) which aim to aid market development and growth for products or methods that are still in the development and/or trial phase, and European Technical Reports (CEN/TR) which provide specifications of a recommendatory and explanatory nature. Special specifications, which are developed with the rapid consensus of expert stakeholders (no full consensus needed), can be found in CEN Workshop Agreements (CWA). All document types differ in their

development procedures and binding forces. In EN 45020 some common types of standards are defined as shown in Table 1.

Table 1 - Types of standards as defined in EN 45020 [1]

| Type of standard | Definition |
|----------------------|---|
| Basic standard | Wide-ranging coverage or contains general provisions for one particular field |
| Terminology standard | Concerned with terms, accompanied by their definitions etc. |
| Testing standard | Concerned with test methods, sometimes supplemented with other provisions related to testing |
| Product standard | Specifies requirements to be fulfilled by product or group of products, to establish its fitness of purpose |
| Process standard | Specifies requirements to be fulfilled by a process, to establish its fitness of purpose |
| Service standard | Specifies requirements to be fulfilled by a service, to establish its fitness of purpose |

reports on national, European and international level have been considered. Especially in the case of national standards due to language barriers mostly those that were providing at least an English title have been considered.

The standard's analysis resulted in an overview of project related standardization activities (see Chapter 3 'Overview of the Smart City Standardization Landscape' – which includes the city resilience topics) and in a comprehensive list of standards. For the latter, an analysis and assessment of the identified standards relevant and important to the SMR project was also implemented, which resulted in dropping about 80 standards from the initial standards list. Additionally, this assessment led to the indication whether a document is of significant importance for the SMR work or not. Finally, the standards have been assigned to the defined categories mentioned above (see chapter 4 'Analysis of relevant standards').

The assessment of the importance of the identified standards was one of the main aspects within this task. The generated, comprehensive list of standards was circulated among the project partners for review and assessment of their importance within the SMR project. Mainly project partners involved in the Work packages 2, 3, 4 and 5 have assessed the identified standards in order to transfer the information on the relevant standards to their respective Work packages for future consideration.

The assessment of identified standards was conducted in two ways: statistical and individual assessment.

1. *Statistical assessment*

Each standard of the database of identified standards has been assessed regarding the existence and amount of a specific keyword mentioned in the standards' scope. Therefore, the keyword of the category to which the standard belongs to was chosen for the calculation. The results of this statistical assessment were considered in conjunction with the results of the individual assessment to identify the most important standards. Then these standards have been highlighted in the beginning of the chapter of each standards table (see chapter 4 'Analysis of relevant standards').

Additionally the list of identified standards is available for the project partners in a database. This supports the possibility for each project partner to search for a specific keyword in the database and thus to consider these results of this search for their project work.

2. *Individual assessment:*

Several project partners have been asked to assess the individual relevance importance of each identified standard with regard to its activities. The project partners which are mainly involved in this task 6.1 (TECNUN, CIEM and ICLEI) indicated the importance of each identified standard by colour code and by classifying their relevance to the project with regard to the four criteria. This has been done through assessing the standards' scope's and contents' overlap with tasks being implemented or foreseen within the SMR project. The partners were asked to initially indicate the importance of each standard with a colour code (green for high importance, yellow for normal importance and grey for low or no importance) in order to easily recognize the most relevant standards in the project internal standards list as well as to mark and drop out the not important ones. After having merged this information, the detailed assessment of the identified standards was conducted with the support of the following four criteria, which were agreed upon:

1. Project relevance
2. Connection to sustainability
3. Impact
4. Effectiveness

Several partners classified each standard individually and the results have been merged in order to receive a broad assessment result. Since there has been three persons assessing the standards regarding the given criteria with a yes-or-no answer, the priority during disagreements on the assessment was given to the majority of yes or no answers. The standards that have been assessed with at least three criteria answered with yes were considered as high important, standards assessed with less than three criteria were considered as less important. Below the selection of these four criteria will be further explained, providing with guiding questions that illustrate how these criteria were used in practice and what effect it could potentially have on the standards classification or identification of standardization potential within the SMR project.

Relevance for the project

This criterion refers to the extent that each standard is interrelated with activities that are peripheral, central or within the project's main themes and priorities, relevant to project research interests or interconnected with existing policies in the different tiers of SMR cities. In particular: When evaluating the relevance of each standard, it was useful to consider a reply to the following questions:

- Do the standards have direct relations to the SMR workshop topics critical infrastructures, climate change and societal issues?
- Is the standard relevant for proper management, maintenance, evolution or use of the tools?
- Could the standard be useful for the evaluation of the resilience policies/guidelines or the maturity model dimensions?
- Are the title, definition and description of each standard related or connected with the expected activities and outputs of the SMR project, as they are stated in the description of work?
- Do the standards help to protect and better manage the city's critical infrastructure and services, especially those that rely heavily on electricity and ICT networks and to improve information security management?
- Do the standards provide a guideline for better, efficient crisis management, emergency response, and operational preparedness including disaster relief operational capacity?

Connection to sustainability

This criterion refers to the relation and direct linkage of each standard with sustainability (social, environmental and economic) and with activities, actions and processes that could fall under the general scope of being environmentally friendly, sustainable and resilient. When evaluating the connection to sustainability and resilience of each standard, it was useful to consider a reply to the following questions:

- What are the major factors or indicators in the standard description that connect each one with sustainability or sustainable and environmental practices?
- Could a standard that seems obviously related to sustainability (according to title or description) influence, define or change the route of a resilience development framework?
- Do the standards provide the best practice that can help a city to plan in the following areas: sustainable city, smart city, intelligent transport, climate change?
- Do the standards provide the best practice that can enhance city's capability toward better organizational resilience, societal resilience, community resilience and risk management?

Impact

This criterion refers the ability of a standard to indicate or measure the positive and negative effects produced by project activities, or by activities that are directly or indirectly connected with the use of the tools that will be developed throughout the SMR project. These effects can be measured with local (city level) or regional (prefecture or region level) social, environmental, economic, socio-economic, or

development indicators. When evaluating the impact of each standard, it was useful to consider a reply to the following questions:

- Could each standard become a driver for anticipating impacts of the project in the future?
- Could a standard play a role in defining, evaluating or predicting the impact of activities that are related with the use of the SMR tools?
- Do the standards provide the best practice of how to identify risks and vulnerability, and to protect citizens from various risks and threats (e.g. natural hazards, human-made hazards, CBRNE hazards, high-risk industries, hazardous materials)?
- Do the standards provide the best practice that can significantly improve crisis communication?
- Do the standards provide the best practice that can enhance city's capability to implement risk assessment and management or to cooperate with stakeholders, define better evacuation plans and mitigate the crisis?

Effectiveness

This criterion refers to the extent that each standard is in the position to evaluate the effectiveness of the project as a whole, or its specific activities or work packages. When evaluating the effectiveness of each standard, it has been useful to consider a reply to the following questions:

- To what extent can each standard evaluate or decide upon, whether the objectives of the project or its specific work packages are (likely) to be achieved?
- Could the standards become the driving force for further engagement of stakeholders?
- Could the standards play a role in reinforcing a multilevel governance approach at EU level?
- Do the standards provide the best practice that can enhance city's management capability to contribute towards better societal security?
- Could the standards be relevant and effective for the development of a European resilience culture?

3. OVERVIEW OF THE SMART CITY STANDARDIZATION LANDSCAPE

3.1. INTRODUCTION

Whilst originally standards were developed for specific objects, devices or services like screws, formats or testing methods now the situation is different for complex and converging topics like Smart Cities. Here, standards must consider a different view: a cross-sectoral approach leaving the silo specific view. Not only the 'smart' part (e. g. ICT tools and services) but especially the integration of all related parts of a city formulates a need to accompany the new cities' approach by standards: not last the different technical 'languages' spoken by city representatives and agents from different specialties formulate the need for standardized terminologies.

Therefore standardization not only reduces the costs of the implementation of the solutions identified by Smart Cities and communities but furthermore, enhances the intercooperation, interoperability and social acceptance of these solutions. As the European Innovation Partnership (EIP) on Smart Cities and Communities states standardization can provide additional confidence in the market as it supports industrialisation of solutions, aligns approaches between city systems and helps to create scaling up processes.

Resilience as a topic of this project is one part of Smart Cities yet not entirely under Smart Cities subsumable. Within the scope of Smart Cities, resilience can be found under security and safety committees as well. In standards we find activities regarding resilience in different technical standards committees:

Standards and specifications are developed by different organizations at different levels (national, European, international) as described in the following chapters. So-called 'interested groups', (companies, commercial enterprises, universities, consumers, skilled trades, testing institutes, authorities, etc.) send their experts to working groups in a standardization organization. The standardization work is organized and carried out in these working groups (WG).

See also Figure 2 for some of the Smart Cities standardization activities by DIN.



Figure 2 - German example - standardization activities on three levels: national, European and international

3.2. INTERNATIONAL STANDARDIZATION ACTIVITIES ON SMART CITIES & RESILIENCE

On international level the following Technical Committees (TC) are the most relevant ones to be considered in context of Smart Cities:

- ISO/TC 268 is responsible for standardization in the field of Sustainable Development in Communities which will include requirements, guidance and supporting techniques and tools to help communities, their related subdivisions and interested parties to become more resilient and sustainable as well as to demonstrate achievements in that regard. It consists of the following sub-committees:
 - ISO/TC 268/CAG 1 Chairman Advisory Group
 - ISO/TC 268/TG 1 Awareness-raising, communication and promotion
 - ISO/TC 268/WG 1 Management System Standards
 - ISO/TC 268/WG 2 City indicators
 - ISO/TC 268/WG 3 Vocabulary

- ISO/TC 268/WG 4 Strategies for smart cities and communities
- ISO/TC 268/SC 1 Smart community infrastructures
- ISO/IEC JTC1: a Study Group on Smart Cities under JTC 1 was established in December 2013. JTC 1 as Joint Technical Committee between ISO and IEC is the standards development environment dealing with Communication Technology (ICT) standards for business and consumer applications. JTC 1 furthermore provides the standards approval environment for integrating ICT technologies.
- ITU-T SG 5: ITU-T "Study Group 5 - Environment and climate change" deals with methodologies regarding ICT effects on climate change and publishing guidelines for using ICTs in an eco-friendly way. It is also responsible for studying design methodologies to reduce ICTs and e-waste's adverse environmental effects. Furthermore it deals with safety of personnel and users of networks against current and voltages used in telecommunication networks and the avoidance of health risks from electromagnetic fields (EMFs) produced by telecommunication devices and installations.
- ISO/TC 292 "Security and resilience" deals with standardization in the field of security to enhance the safety and resilience of society. Working groups (WG) of this TC cover topics such as 'Terminology' (WG 1), 'Continuity and organizational resilience' (WG 2), 'Emergency Management' (WG 3) and 'Community resilience' (WG 5). It does not scope sector-specific security projects developed in other relevant ISO committees and projects as developed e. g. in ISO/TC 262 'Risk management' or ISO/PC 278 'Anti-bribery management systems'.

3.3. EUROPEAN STANDARDIZATION ACTIVITIES ON SMART CITIES & RESILIENCE

On European level the following (Technical) Committees are the most relevant ones to be considered in context of Smart Cities:

- SSCC-CG: the "Smart and Sustainable Cities and Communities Coordination Group" joint by CEN, CENELEC and ETSI is the major committee for smart cities standards and development in the EU.
- SSC-EIP: created by the European Commission the Smart Cities and Communities European Innovation Partnership (SCC-EIP) has established a Smart Cities Stakeholder Platform (with ESO participation) and a High-Level Group advising the Commission. The High-Level Group

released in early 2014 a Strategic Implementation Plan (SIP) that describes a joint vision, a common target, and proposals for implementation, which all contain standardization aspects.

- The EIP – European Innovation Partnership on Smart Cities and Communities – is a stakeholder-driven initiative with the EC taking a facilitating role; bringing together cities, industries and citizens to tackle a key societal challenge through an integrated approach, encompassing the areas of energy, transport, and ICT. The policy goals are the EU 20/20/20 energy and climate targets.

Launched in July 2012, it was set up by three Directorates of the European Commission (DG MOVE, DG ENERGY, and DG CONNECT). The Partnership aims to overcome bottlenecks impeding the changeover to Smart Cities, to co-fund demonstration projects and to help coordinate existing city initiatives and projects, by pooling their resources together. The ultimate goal is to establish strategic partnerships between industry and European cities to develop the urban systems and infrastructures of tomorrow.

- CEN/TC 391 'Societal and Citizen Security' deals with aspects of prevention, response, mitigation, continuity and recovery before, during and after a destabilising or disruptive event. Verification and training will also be considered. Within this TC especially the work conducted in the WG 3 'Crisis management/civil protection' cover the topics relevant for the SMR project.

3.4. NATIONAL STANDARDIZATION ACTIVITIES ON SMART CITIES & RESILIENCE

On national level the following committees are the most relevant ones to be considered in context of Smart Cities:

- German committees of DIN: Aiming to be able to exploit the resulting opportunities for new functions, services and business models, new standardized and automatic communication processes need to be developed for key interfaces between systems and infrastructures within a settlement area. New, more secure types of IT architecture need to be defined in order to combat the risks associated with potential privacy infringement which arise in conjunction with networking. New types of cyber-crime are also giving rise to a new form of vulnerability in the critical infrastructures and institutions. Committees and projects are e. g.
 - Smart Cities Steering Committee
 - NA 043-03-04-01 AK "Nutzeroffene Übergabeeinheit" (parcel boxes)
 - DIN SPEC 91347 Integrated multi-functional street lighting infrastructure

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- British committees of BSI: BSI was commissioned in 2012 to develop a Smart Cities standards strategy to identify where standards are needed to accelerate the rollout of Smart Cities and support UK providers of Smart City solutions. Projects are e. g.
 - Smart city terminology (PAS 180)
 - Smart city framework standard (PAS 181)
 - Data concept model for smart cities (PAS 182)
 - Smart city overview document (PD 8100)
 - Smart city planning guidelines document (PD 8101)

4. ANALYSIS OF RELEVANT STANDARDS

4.1. PREPARATIONS AND MAIN RESULTS

To conduct the standards analysis, the partners of Task 6.1 'Analysis of existing standards and standardization activities' prepared with the support of the literature review activities in WP1 and WP4 a list of relevant search terms. At the same time, the identified words have been assigned to one of the following categories being relevant for the SMR project:

- Crisis,
- Resilience,
- Critical Infrastructures,
- Climate Change,
- Societal Aspects, and
- Smart City.

The categories have been chosen according to the content of the research project; 'Crisis' and 'Resilience' for supporting e. g. a city or community in its preparation in case of (upcoming) disasters; 'Critical Infrastructures', 'Climate Change' and 'Societal Aspects' derived from the topics of the requirement gathering workshops in Work package 2; and 'Smart City' considering all other issues for a sustainable city including new topics such as e-mobility or intelligent transport systems.

The following table shows the collected search terms assigned to one of the above-mentioned categories.

Table 2 - Keyword list with categories

| Category | Search Terms |
|--------------------------|---|
| Crisis | Crisis management, disaster management, emergency management, crisis response, management guideline, risk assessment, civil protection, vulnerability, rigidity, preparedness, adaption, agility, common alerting protocol (CAP), reliability, criticality |
| Resilience | Urban, city, disaster, framework, societal, community, guideline, strategy, indicators, metrics, abilities, lessons learned, poverty, maturity, asset, improving |
| Critical Infrastructures | Health, water, sanitation and hygiene, energy, transportation, food, banking and finance, ICT, governance, education, interdependence, dependence, breakdown, disruption, cascading effects, indirect consequence, economic consequence, risk, vulnerability |
| Climate Change | Adaption, impact, policy, urbanization, environmental risks, flood, drought, hurricane, heat wave, heat, preparedness, storm, adaption, extreme weather events, changing climate |
| Societal Aspects | Community engagement, subjective resilience, society, citizens, communication, ICT tools, apps, social media, refugee, education, wealth, poverty, public private partnership (PPP), social support, civil protection, livelihood, governance, connectedness / access |
| Smart City | Sustainable, mobility, logistics, buildings, construction, urban processes, digital city, industry 4.0, services, internet of things, tracking, car, monitoring, e-mobility, wearable device |

With the support of the above search terms in Table 2, the identification of existing standards and ongoing standardization activities resulted in a list of 276 standards and other technical documents, regulations and reports on national, European and international level which all are to a certain extent important for the SMR project. The results are listed in the following subchapters, which are based on the categories in Table 2.

As a first filtering process, these 276 identified standards have been initially assessed by the partners of task 6.1 in terms of their importance to the SMR project (see chapter 2 'Context and methodology' for the assessment procedure). The standards that have been assessed as more important are marked in orange colour (see column 'Document No.' within the following standards tables) and some of them that need necessarily be considered by the project are mentioned at the beginning of the following subchapters. Furthermore, the relevance of the identified standards will be further assessed within the upcoming task 6.2 'Identification of Standardization Potential'.

Figure 3 shows the distribution of identified standards per category in percentage.

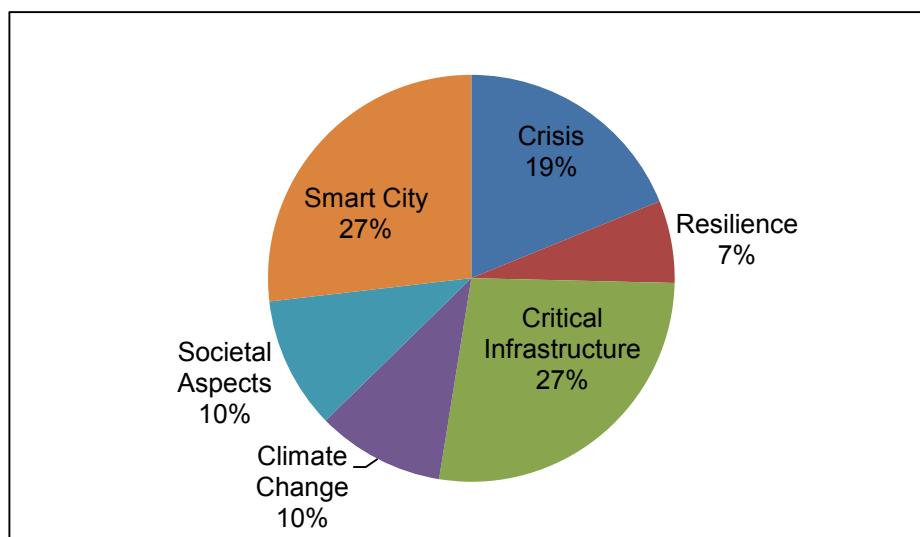


Figure 3 - Identified standards per category

The amount of identified standards per category is as follows (including the number of standards assessed initially with a significant importance for SMR):

- *Crisis*: 52 standards in total, with 33 standards initially assessed to be more relevant
- *Resilience*: 18 standards in total, with 12 standards initially assessed to be more relevant
- *Critical Infrastructures*: 75 standards in total, with 17 standards initially assessed to be more relevant
- *Climate Change*: 28 standards in total, with 9 standards initially assessed to be more relevant
- *Societal Aspects*: 29 standards in total, with 8 standards initially assessed to be more relevant
- *Smart City*: 74 standards in total, with 16 standards initially assessed to be more relevant

The chart in Figure 3 shows that there are quite a lot of standards and standardization activities within the categories of 'Crisis', 'Critical Infrastructures' and 'Smart City'. The reason for that could be that these

topics have drawn high attention within industry and research and also in general in standardization in the last couple of years. On the other hand, 'Resilience', 'Climate Change' as well as 'Societal Aspects' are somehow more recent themes in which further standardization might take place in near future.

Additionally the initial assessment regarding the classification criteria resulted that the amount of identified standards has been assessed to one of the four criteria as follows:

- Relevance to the project: 205 standards in total
- Connection to sustainability: 171 standards in total
- Impact: 157 standards in total
- Effectiveness: 162 standards in total

The overview of relevant standardization documents and current standardization activities in section 4.2 to 4.7 is structured as follows: Number of document (Document No.), Title of document (Title), abstract/summary of the document in English (Abstract) if available, publication date of the document (Date of publication), the terms used for the standards analysis (Keywords) and the specific classification criteria (Relevance criteria).¹

Furthermore, within the standards analysis also withdrawn standards have been taken into account. Only standards that were not transferred into a new one have been considered. With this regard, only a few Austrian standards² were identified as interesting for further assessment in the project lifespan. However, the main issue of withdrawn standards is that these are not reflecting the state of the art and that their contents might not anymore be correct, that these were integrated into other standards and often are not anymore publicly available.

¹ The relevance criteria are listed in chapter 2 'Context and methodology'. These are Project relevance, Connection to sustainability, Impact and Effectiveness. This column is only an indication of whether a standard has relevance to disaster resilience or the project topics in general and should initially not influence the further consideration or use of all identified standards of these tables. The further assessment for the importance of each of these standards will be done by the project partners during the development of the SMR tools as well as in general through the consideration of these standards as support for conducting SMR tasks. This is enabled through the availability of the standards database for all project partners. In the end the aim is to uptake the relevant standards together with the most common practices identified in WP1 for the development of the Resilience Management Guideline as well as the corresponding tools. Additionally these standard tables could be in the future updated and be reviewed by different stakeholders (e.g. national standardization committees, EC resilience responsables, and other research projects).

² E.g. OENORM S 2300 (Risk, security and crisis management – Concepts), OENORM S 2310 (Risk, security and crisis management - Selection and verification criteria for persons appointed for crisis management) and ONR 192320 (Crisis and disaster management - Integrated operation control with particular consideration of different management methods).



4.2. LIST OF IDENTIFIED STANDARDS – CATEGORY 'CRISIS'

In total 52 standards have been found that are related to the category 'Crisis'. Basic information about these standards can be found in the following table. Standards that might have particular relevance for the SMR project (in total 32, see Document No. column, marked in orange colour) are e. g. the CWA 15391-1 'Disaster and emergency management - Shared situation awareness - Part 1: Message structure', that assists the information sharing process for organizations involved in disaster and emergency management; or the ISO 22300 series on 'Societal security' (EN ISO 22301, EN ISO 22313, ISO 22315, ISO 22320, ISO 22322, ISO 22324, ISO/DIS 22325), dealing with topics such as terminology, mass evacuations, and public warning.

Table 3 - List of identified 'Crisis' standards

| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|--------------------|---|--|---------------------|-------------------------|--|
| ANSI N 42.49B | Performance Criteria for Non-alarming Personal Emergency Radiation Detectors (PERDs) for Exposure Control | The scope of this standard is to establish minimum performance criteria and test requirements for non-alarming radiation detectors used to manage the exposure of emergency responders to photon radiation. The detectors shall provide rapid and clear indication of the level of radiation exposure. Emergency responders include fire services, law enforcement and medical services. Other possible users include Critical Infrastructure Key Resources (CIKR) such as heavy equipment, transportation, and utilities personnel and members of the public who may be involved in emergency situations. | 2013-00-00 | critical infrastructure | Project relevance, sustainability |
| ANSI/EMAP EMS 2013 | Emergency Management Standard | The standard will outline 16 programmatic areas with standards underneath that outline the necessary components of a comprehensive emergency management and homeland security program at the governmental level. The standards will include all phases of emergency management to include prevention, preparedness, mitigation, response and recovery activities. The 16 programmatic areas will include such things as Program Management, Administration & Finance, Laws & Authorities, Planning, | 2013-00-00 | finance, security | Project relevance, sustainability, impact, effectiveness |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|---------------------|--|--|---------------------|------------------------------------|--|
| | | Hazard Identification and Risk Assessment, Hazard Mitigation, etc. The standard will not be considered an an ISO standard. | | | |
| ARP 6:2010 | Guidelines for the management of drinking water utilities under crisis conditions | Identifies and charts the critical elements that are of great significance to drinking water security. Sets in motion a continuous process for the establishment of guidelines on management systems for drinking water utilities under crisis conditions. Provides the guidelines for a water utility, or any body responsible for the management of parts of the water supply system, to be prepared and ready to manage a water crisis. Provides a roadmap for possible relevant international standards that could be useful and could be developed. | 2010-07-28 | crisis, management, criticality | Project relevance, sustainability, impact, effectiveness |
| ASTM E 2541 | Standard Guide for Stakeholder-Focused, Consensus-Based Disaster Restoration Process for Contaminated Assets | To ensure a publicly acceptable and timely restoration of an asset contaminated as a result of a natural or man-made disaster, including a terrorist event, it is essential to have a pre-planned strategy developed and tailored at the community level and facilitated by the government which advocates the support and involvement of the affected community during such a crisis period. This pre-planned strategy for restoration will need to be seamlessly incorporated into the overall emergency management process within the community. This guide presents a framework (that is, strategy) for involving the public in a stakeholder-focused, consensus-based event restoration process, for those situations where such involvement is essential to move a stalled (due to stakeholder issues) restoration process forward. This framework is designed to be an event-specific, community-specific process to help prioritize and consider actions necessary to optimize the restoration of an asset contaminated as the result of a disaster. | 2010-00-00 | crisis, response | Project relevance, impact |
| ASTM E 2831/E 2831M | Standard Guide for Deployment of Blast Resistant Trash Receptacles in Crowded Places | This guide identifies the key factors that should be considered prior to the deployment of blast resistant trash receptacles (BTRTs) in crowded places. Guidance is included for their deployment at interior and exterior locations associated with the crowded places. | 2011-00-00 | education, security, vulnerability | Project relevance, sustainability, impact, effectiveness |
| ASTM F 1655 | Standard Guide for Training First Responders Who | This guide covers minimum training standards for first responders who may care for sick or injured persons in the specialized pre-hospital situations of the wilderness, delayed, or prolonged transport | 1995-00-00 | education, society | Project relevance, impact |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|--------------|--|--|---------------------|---|--|
| | Practice in Wilderness, Delayed, or Prolonged Transport Settings | settings, including catastrophic disasters. This guide establishes supplemental or continuing education programs that will be taught to individuals trained to the first responder level by an appropriate authority. | | | |
| BS 11200 | Crisis management. Guidance and good practice | Guidance and good practice which offers guidance to help management plan, establish, operate, maintain and improve their organizations crisis management capability. | 2014-05-31 | crisis, management | Project relevance, sustainability, impact, effectiveness |
| CEA-CEB25 | Best Practices for Implementing Common Alerting Protocol (CAP) based Alerts for Consumer Electronics Devices | This document provides recommended practices, independent of delivery method, for CAP-encoded data usage among various consumer electronics devices that process CAP-encoded data. The document includes guidelines for filtering and device response. The document does not address the usage of CAP-encoded data that is converted by the delivering source into its regular ('native') format, as it may be perceived by the devices as regular format content. This bulletin focuses on the device behavior associated with the receipt and processing of the alert messages on compliant devices. | 2011-10-00 | CAP | Project relevance, impact |
| CEN/TS 16595 | CBRN - Vulnerability Assessment and Protection of People at Risk | This Technical Specification is based on an all-hazards approach, with a specific focus on terrorism and other security related risks. Looking at the combination of threats, vulnerabilities and values to be protected, threats may be terrorist attacks with chemical, explosive and biological agents, or nuclear waste materials, or with conventional means on CBRN plants, causing a similar devastating effect on a potentially large scale. Major CBRN incidents may jeopardise critical infrastructure, while emergency services may have great difficulty performing their response tasks. The scope excludes the vulnerability assessment of some specific systems that comply, at the European and Member State level, with existing sets of legal measures: network for drinking water distribution, food chain supply and cosmetics and pharmaceutical products production and distribution chains. The objective of this Technical Specification is to strengthen common understanding and a common frame of reference for all organisations with an interest and involvement in CBRN. | 2013-09-00 | critical infrastructure, health, water, risk, governance, food, security, societal, citizen, consequence, vulnerability | Project relevance, sustainability, impact, effectiveness |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|--------------|---|---|---------------------|----------------------|--|
| CWA 15537 | Network Enabled Abilities - Service-Oriented Architecture for civilian and military crisis management | This CWA specifies services and other items mandatory or optional for a Network Enabled Abilities environment. It also includes an inventory of standards and standard-like specifications applicable to each such item. These items include recommended general principles and framework for system design, overall architectures, generic functionality to be considered, concepts, conventions, and terminology in order to ensure an optimum multi-purpose interoperability, in particular of national and multi-national military and civil operations. This CWA is applicable to the full life cycle of information system abilities for network centric operations, including specification, development, deployment, registration, and execution. | 2006-04-01 | crisis, management | Project relevance, sustainability, impact, effectiveness |
| CWA 15931-1 | Disaster and emergency management - Shared situation awareness - Part 1: Message structure | The context of this CEN Workshop Agreement (CWA) is disaster and emergency management, and it aims to assist organizations involved by providing a message structure for the transfer of information between computer based systems in such a way that it can be reliably decoded. This is done by encoding the information in an XML Schema. | 2009-02-01 | crisis, disaster | Project relevance, sustainability, impact, effectiveness |
| CWA 16106 | PPE for Chemical, Biological, Radiological and Nuclear, (CBRN) Hazards | This CEN Workshop Agreement aims at increasing the protection of those initially and primarily involved with any CBRN incident. This will cover Emergency Responders, Duty Holders, and Responsible Persons, Employers and Victims or potential victims. All of these people are potentially at risk from a CBRN incident. This CWA provides both general guidance and codes of practice and requirements, testing, marking and certification of PPE to be applied in CBRN situations. This CWA gives guidance on selection, as well as safety and effectiveness of PPE for CBRN scenarios. | 2010-03-00 | risk, infrastructure | Project relevance, sustainability, impact, effectiveness |
| CWA 16107 | Emergency Services Capability Framework | This document provides guidance for Emergency Service Management when considering integrated operational response to a major emergency. This guidance will enhance an organisation's ability to determine their existing operational capabilities for being able to respond to a major emergency. The ability for the emergency services to provide a co-ordinated, effective and sustained response to major emergencies, providing acceptable levels of protection for both | 2010-03-00 | risk, infrastructure | Project relevance, effectiveness |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|-------------------|--|---|---------------------|--|--|
| | | emergency responders and the citizen is directly dependent upon the level of capability and preparedness within individual organisations. | | | |
| DIN EN 15975-1 | Security of drinking water supply - Guidelines for risk and crisis management - Part 1: Crisis management; German version EN 15975-1:2011 | This European standard describes good practice principles of drinking water supply management in the event of a crisis, including preparatory and follow-up measures. | 2011-06-00 | food, security, crisis, management | Project relevance, sustainability, impact, effectiveness |
| DIN EN 15975-1/A1 | Security of drinking water supply - Guidelines for risk and crisis management - Part 1: Crisis management; German and English version EN 15975-1:2011/FprA1:2015 | see scope EN 15975-1 | 2015-05-00 | crisis, management | Project relevance, sustainability, impact, effectiveness |
| DIN EN 15975-2 | Security of drinking water supply - Guidelines for risk and crisis management - Part 2: Risk management; German version EN 15975-2:2013 | This document specifies the good practice principles of risk management within the corporate drinking water supply management to improve the security of drinking water supply and to reduce possible effects from hazards. | 2013-12-00 | food, security, crisis, management | Project relevance, sustainability, impact, effectiveness |
| DVGW G 1002 | <i>Only in German:</i> Security in Gas Supply; Organisation and Management in Crisis | N/A | 2015-02-00 | risk, infrastructure, crisis, disaster | Project relevance, sustainability |
| DWA-M 553 | <i>Only in German:</i> Hochwasserangepasstes Planen und Bauen | N/A | 2014-11-00 | risk, infrastructure | Project relevance, sustainability |
| EN 16352 | Logistics - Specifications for reporting crime incidents | This European Standard specifies a model for reporting crime incidents related to transport services. This European Standard specifies common rules for incident reporting data, data collection and | 2013-03-00 | transportation, security | impact, effectiveness |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|--------------|--|--|---------------------|---|--|
| | | securing process independently whether the reporter/collector is a private company, association or public authority. | | | |
| EN ISO 22301 | Societal security - Business continuity management systems - Requirements (ISO 22301:2012) | This International Standard for business continuity management specifies requirements to plan, establish, implement, operate, monitor, review, maintain and continually improve a documented management system to protect against, reduce the likelihood of occurrence, prepare for, respond to, and recover from disruptive incidents when they arise. The requirements specified in this International Standard are generic and intended to be applicable to all organizations, or parts thereof, regardless of type, size and nature of the organization. | 2014-07-00 | societal, community, society, citizen, governance, application, communication | Project relevance, sustainability, impact, effectiveness |
| EN ISO 22313 | Societal security - Business continuity management systems - Guidance (ISO 22313:2012) | This International Standard for business continuity management systems provides guidance based on good international practice for planning, establishing, implementing, operating, monitoring, reviewing, maintaining and continually improving a documented management system that enables organizations to prepare for, respond to and recover from disruptive incidents when they arise. | 2014-11-00 | societal, citizen, society, community, social support, governance | Project relevance, sustainability, impact, effectiveness |
| GOST R 55899 | <i>Only in Russian:</i> Guidelines for the justification and development of crisis management system standards | N/A | 2013-00-00 | crisis, emergency | Project relevance, sustainability, impact, effectiveness |
| IEC/TR 62210 | Power system control and associated communications - Data and communication security | Applies to computerised supervision, control, metering, and protection systems in electrical utilities. Deals with security aspects related to communication protocols used within and between such systems, the access to, and use of the systems. Discusses realistic threats to the system and its operation, the vulnerability and the consequences of intrusion, actions and countermeasures to improve the current situation. | 2003-05-00 | vulnerability | Project relevance, sustainability |
| IEEE 1716 | IEEE Recommended Practice for Managing Natural Disaster Impact on Key Electrical Systems and Installations | New IEEE Standard - Active. Recommendations and guidelines for managing natural disaster impact on key electrical facilities and systems in petroleum and chemical facilities are provided in order to minimize economic damage by pre-assessment risk evaluation of electrical facilities, by identification of mitigation techniques and | 2014-00-00 | risk, infrastructure | Project relevance, sustainability, impact, effectiveness |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|--------------|--|--|---------------------|--|--|
| | in Petroleum and Chemical Facilities | system designs to minimize impact, and by outlining procedures for faster recovery of electrical systems after a natural disaster. | | | |
| ISO 18788 | Management system for private security operations - Requirements with guidance for use | ISO 18788:2015 provides a framework for establishing, implementing, operating, monitoring, reviewing, maintaining and improving the management of security operations. It provides the principles and requirements for a security operations management system (SOMS). | 2015-09-00 | security | Project relevance, impact |
| ISO 22315 | Societal security - Mass evacuation - Guidelines for planning | ISO 22315:2014 provides guidelines for mass evacuation planning in terms of establishing, implementing, monitoring, evaluating, reviewing, and improving preparedness. It establishes a framework for each activity in mass evacuation planning for all identified hazards. It will help organizations to develop plans that are evidence-based and that can be evaluated for effectiveness. ISO 22315:2014 is intended for use by organizations with responsibility for, or involvement in, part or all of the planning for mass evacuation. | 2014-12-00 | societal, governance, communication, society | Project relevance, sustainability, impact, effectiveness |
| ISO 22320 | Societal security - Emergency management - Requirements for incident response | This International Standard specifies minimum requirements for effective incident response and provides the basics for command and control, operational information, coordination and cooperation within an incident response organization. It includes command and control organizational structures and procedures, decision support, traceability, information management, and interoperability. It establishes requirements for operational information for incident response which specifies processes, systems of work, data capture and management in order to produce timely, relevant and accurate information. It supports the process of command and control as well as coordination and cooperation, internally within the organization and externally with other involved parties, and specifies requirements for coordination and cooperation between organizations. | 2011-11-00 | societal, resilience, communication, governance, society, disaster | Project relevance, sustainability, impact, effectiveness |
| ISO 22322 | Societal security - Emergency management - Guidelines for public warning | ISO 22322:2015 provides guidelines for developing, managing, and implementing public warning before, during, and after incidents. This International Standard is applicable to any organization responsible for public warning. It is applicable at all levels, from local up to international. Before planning and implementing the public warning | 2015-05-00 | governance, societal, society | Project relevance, sustainability, impact, effectiveness |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|--------------|--|--|---------------------|----------------------|--|
| | | system, risks and consequences of potential hazards are assessed. This process is not part of this International Standard. | | | |
| ISO 22324 | Societal security - Emergency management - Guidelines for colour-coded alerts | ISO 22324:2015 provides guidelines for the use of colour codes to inform people at risk as well as first response personnel about danger and to express the severity of a situation. It is applicable to all types of hazard in any location. This International Standard does not cover the method for displaying colour codes, detailed ergonomic considerations related with viewing displays, or safety signs covered by ISO 3864-1. | 2015-06-00 | governance, societal | Project relevance, sustainability, impact, effectiveness |
| ISO 24518 | Activities relating to drinking water and wastewater services - Crisis management of water utilities | ISO 24518 provides general guidance to water utilities to develop and implement a crisis management system. This International Standard may be applicable to all sizes of public or private water utilities that want to prepare, respond, and recover from a crisis. | 2015-08-00 | crisis, management | Project relevance, sustainability |
| ISO 31000 | Risk Management - Principles and guidelines | This International Standard provides principles and generic guidelines on risk management. This International Standard can be used by any public, private or community enterprise, association, group or individual. Therefore, this International Standard is not specific to any industry or sector. This International Standard can be applied throughout the life of an organization, and to a wide range of activities, including strategies and decisions, operations, processes, functions, projects, products, services and assets. This International Standard can be applied to any type of risk, whatever its nature, whether having positive or negative consequences. This International Standard is not intended for the purpose of certification. | 2009-11-00 | societal, community | Project relevance, sustainability, impact, effectiveness |
| ISO Guide 73 | Risk management - Vocabulary | This guide provides the definitions of generic terms related to risk management. It aims to encourage a mutual and consistent understanding of, and a coherent approach to, the description of activities relating to the management of risk, and the use of uniform risk management terminology in processes and frameworks dealing with the management of risk. This Guide is intended to be used by:- those engaged in managing risks,- those who are involved in activities of ISO and IEC, and- developers of national or sector-specific | 2009-11-00 | risk, management | Project relevance, sustainability, impact, effectiveness |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|------------------|---|---|--------------------------|----------------------------------|--|
| | | standards, guides, procedures and codes of practice relating to the management of risk. | | | |
| ISO/DIS 22325 | Societal security - Emergency management - Guidelines for emergency management capability assessment | This International Standard provides guidelines to perform an emergency management capability assessment. | <i>Under development</i> | societal, communication, society | Project relevance, sustainability, impact, effectiveness |
| ISO/IEC 29147 | Information technology - Security techniques - Vulnerability disclosure | This International Standard gives guidelines for the disclosure of potential vulnerabilities in products and online services. It details the methods a vendor should use to address issues related to vulnerability disclosure. | 2014-02-00 | vulnerability | Project relevance, sustainability, impact, effectiveness |
| ISO/IEC 30111 | Information technology - Security techniques - Vulnerability handling processes | This International Standard gives guidelines for how to process and resolve potential vulnerability information in a product or online service. This International Standard is applicable to vendors involved in handling vulnerabilities. | 2013-11-00 | vulnerability | Project relevance, sustainability, impact, effectiveness |
| ISO/IEC 31010 | Risk management - Risk assessment techniques | This Standard is a supporting standard for ISO 31000 and provides guidance on selection and application of systematic techniques for risk assessment. Risk assessment carried out in accordance with this standard contributes to other risk management activities. The application of a range of techniques is introduced, with specific references to other international standards where the concept and application of techniques are describes in greater detail. | 2009-11-00 | risk, management, assessment | Project relevance, sustainability, impact, effectiveness |
| ISO/IEC TR 20004 | Information technology - Security techniques - Refining software vulnerability analysis under ISO/IEC 15408 and ISO/IEC 18045 | This Technical Report refines the AVA_VAN assurance family activities defined in ISO/IEC 18045:2008 and provides more specific guidance on the identification, selection and assessment of relevant potential vulnerabilities in order to conduct an ISO/IEC 15408 evaluation of a software target of evaluation. This Technical Report leverages the Common Weakness Enumeration (CWE) and the Common Attack Pattern Enumeration and Classification (CAPEC) to support the method of scoping and implementing ISO/IEC 18045:2008 vulnerability analysis activities. This Technical Report does not define evaluator actions for certain high assurance ISO/IEC 15408 components, where there is as yet no generally agreed guidance. | 2015-12-00 | vulnerability | Project relevance, sustainability, effectiveness |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|--------------|--|--|---------------------|-------------------------------------|--|
| ISO/TR 31004 | Risk management - Guidance for the implementation of ISO 31000 | This Technical Report provides guidance for organizations on managing risk effectively by implementing ISO 31000:2009. It provides: This Technical Report can be used by any public, private or community enterprise, association, group or individual. This Technical Report is not specific to any industry or sector, or to any particular type of risk, and can be applied to all activities and to all parts of organizations. | 2013-10-00 | risk, management | Project relevance, sustainability, impact, effectiveness |
| ISO/TS 22317 | Societal security - Business continuity management systems - Guidelines for business impact analysis (BIA) | ISO/TS 22317:2015 provides guidance for an organization to establish, implement, and maintain a formal and documented business impact analysis (BIA) process. This Technical Specification does not prescribe a uniform process for performing a BIA, but will assist an organization to design a BIA process that is appropriate to its needs. | 2015-09-00 | civil protection, societal, society | Project relevance, effectiveness |
| ISO/TS 22318 | Societal security - Business continuity management systems - Guidelines for supply chain continuity | ISO/TS 22318:2015 gives guidance on methods for understanding and extending the principles of BCM embodied in ISO 22301 and ISO 22313 to the management of supplier relationships. This Technical Specification is generic and applicable to all organizations (or parts thereof), regardless of type, size and nature of business. It is applicable to the supply of products and services, both internally and externally. The extent of application of this Technical Specification depends on the organization's operating environment and complexity. | 2015-09-00 | civil protection, societal, society | Project relevance, effectiveness |
| ITU-T E.106 | International Emergency Preference Scheme (IEPS) for disaster relief operations | This Recommendation describes an international preference scheme for the use of public telecommunications by national authorities for emergency and disaster relief operations. The International Emergency Preference Scheme for Disaster Relief Operations (IEPS) is needed when there is a crisis situation causing an increased demand for telecommunications when use of the International Telephone Service may be restricted due to damage, reduced capacity, congestion or faults. In crisis situations there is a requirement for IEPS users of public telecommunications to have preferential treatment. | 2003-10-00 | crisis, disaster | Project relevance, sustainability, impact, effectiveness |
| ITU-T E.409 | Incident organization and security incident handling: Guidelines for | The purpose of this Recommendation is to analyse, structure and suggest a method for establishing an incident management organization within a telecommunication organization involved in the | 2004-05-00 | crisis, emergency | Project relevance, sustainability, |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|-----------------|-------------------------------------|---|---------------------|---------------|----------------------------------|
| | telecommunication organizations | provision of international telecommunications, where the flow and structure of an incident are focused. The flow and the handling are useful in determining whether an event is to be classified as an event, an incident, a security incident or a crisis. The flow also covers the critical first decisions that have to be made. | | | impact, effectiveness |
| ITU-T X.1303 | Common alerting protocol (CAP 1.1) | The common alerting protocol (CAP) is a simple but general format for exchanging all-hazard emergency alerts and public warnings over all kinds of networks. CAP allows a consistent warning message to be disseminated simultaneously over many different warning systems, thus increasing warning effectiveness while simplifying the warning task. CAP also facilitates the detection of emerging patterns in local warnings of various kinds, such as might indicate an undetected hazard or hostile act. CAP also provides a template for effective warning messages based on best practices identified in academic research and real-world experience. ITU-T Recommendation X.1303 also provides both an XSD specification and an equivalent ASN.1 specification (that permits a compact binary encoding) and allows the use of ASN.1 as well as XSD tools for the generation and processing of CAP messages. This Recommendation enables existing systems, such as H.323 systems, to more readily encode, transport and decode CAP messages. | 2007-09-00 | CAP | Project relevance, effectiveness |
| ITU-T X.1303bis | Common alerting protocol (CAP 1.2) | See ITU-T X.1303. Recommendation ITU-T X.1303 bis also provides both an XML schema definition (XSD) specification and an equivalent ASN.1 specification (which permits a compact binary encoding) and allows the use of abstract syntax notation one (ASN.1) as well as XSD tools for the generation and processing of CAP messages. This Recommendation enables existing systems, such as ITU-T H.323 systems, to more readily encode, transport and decode CAP messages. | 2014-03-00 | CAP | Project relevance, effectiveness |
| ITU-T X.1521 | Common vulnerability scoring system | Recommendation ITU-T X.1521 on the common vulnerability scoring system (CVSS) provides an open framework for communicating the characteristics and impacts of information and communication technologies (ICT) vulnerabilities in the commercial or open source | 2011-04-00 | vulnerability | Project relevance, effectiveness |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|--------------|---|--|---------------------|-------------------------------------|--|
| | | software used in communications networks, end user devices, or any of the other types of ICT capable of running software. The goal of the Recommendation is to enable ICT managers, vulnerability bulletin providers, security vendors, application vendors and researchers to speak from a common language of scoring ICT vulnerabilities. | | | |
| NEN 7131 | Societal security - Security, preparedness and continuity management systems - Requirements with guidance for use | This standard of best practices specifies requirements for a security, preparedness and continuity (SPC) management system to enable an organization to develop and implement a policy, objectives and programmes taking into account legal requirements and other requirements to which the organization subscribes and information about significant hazards and threats that might impact it, and its stakeholders, critical assets (physical, intangible, environmental and human). It applies to risks and/or their impacts that the organization identifies as those it can control and those which it can influence or reduce their impact. | 2010-01-01 | governance, societal | Project relevance, sustainability, impact, effectiveness |
| NEN 7132 | Societal security - Guidelines for auditing security, preparedness, and continuity management systems with guidance for use | This Guidance Standard provides guidance on the principles of auditing, managing audit programmes, conducting audits of security, preparedness, and continuity management system, as well as guidance on the competence of security, preparedness, continuity, and emergency management system auditors. It is applicable to all organizations needing to conduct internal or external audits of security, preparedness, and continuity management systems or to manage an audit programme. | 2008-10-01 | societal, application, governance | Project relevance, sustainability, impact, effectiveness |
| NF X52-121 | <i>Only in French:</i> Security and protection of citizens - CBRN - Use of portable nuclear and radiological detection and identification equipment in the field of global security | N/A | 2015-05-15 | education, security, transportation | Project relevance, effectiveness |
| NS 5814 | <i>Only in Norwegian:</i> Requirements for risk assessment | N/A | 2008-07-01 | risk assessment | Project relevance, effectiveness |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|--------------|--|--|---------------------|--|--|
| ONR 49002-3 | <i>Only in German:</i> Risk Management for Organizations and Systems - Part 3: Guidelines for emergency, crisis and business continuity management - Implementation of ISO 31000 | N/A | 2014-01-01 | crisis, emergency | Project relevance, sustainability, impact, effectiveness |
| SANS 25777 | Information and communications technology continuity management - Code of practice | Gives recommendations for information and communications technology (ICT) continuity management within the framework of business continuity management provided by BS 25999. | 2010-05-19 | resilience, framework | Project relevance, sustainability |
| VDI 4055 | Operational safety management | Company-specific interpretation of laws, regulations and standards becomes more and more relevant for businessmen. The application of an operational safety management allows for a more sustainable and process-oriented company-specific interpretation and which is thus kept up-to-date. The requirements set out in this standard allow to identify the components of the operational safety in an appropriate and systematic manner. | 2015-11-00 | energy, security, risk, infrastructure | Project relevance, effectiveness |

4.3. LIST OF IDENTIFIED STANDARDS – CATEGORY 'RESILIENCE'

The analysis of existing standards for the category 'Resilience' resulted in the identification of 18 standards, which are listed in the following table. Identified standards that are of high importance for the work in SMR (in total 12, see Document No. column, marked in orange colour) are e. g. the ANSI/ASIS series of resilience standards (ANSI/ASIS SPC.1 to SPC.5) to address the risks of disruptive events, and the ISO/DTR 37121

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'Inventory and review of existing indicators on sustainable development and resilience in cities' which is currently under development by the standardization committee *ISO/TC 268 Sustainable development in communities*.

Table 4 - List of identified 'Resilience' standards

| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|-----------------|--|--|--------------------------|------------------------------------|--|
| ANSI/ASIS SPC.1 | Organizational Resilience: Security, Preparedness and Continuity Management Systems - Requirements with Guidance for Use | This standard specifies requirements for an organizational resilience (OR) management system to enable an organization to develop and implement policies, objectives, and programs taking into account legal requirements and other requirements to which the organization subscribes, information about significant hazards and threats that might impact it and its stakeholders', and protection of critical assets (physical, intangible, environment, and human). This standard applies to risks and/or their impacts that the organization identifies as those it can control, influence, or reduce. It does not itself state specific performance criteria. | 2009-00-00 | resilience, security, preparedness | Project relevance, sustainability, impact, effectiveness |
| ANSI/ASIS SPC.2 | Auditing Management Systems - Risk, Resilience, Security and Continuity - Guidance for Application | This Standard provides guidance for conducting resilience, security, crisis, continuity and other risk-based audits within the context of management systems and includes practical advice on conducting audits. It will provide guidance on the management of audit programs, conduct of internal or external audits of risk and resilience based management systems such as security, crisis, continuity, and emergency management, including the competence and evaluation of auditors. | 2014-00-00 | crisis, management | Project relevance, sustainability, impact, effectiveness |
| ANSI/ASIS SPC.3 | Resilience in the Supply Chain | Complements the ANSI/ASIS Organizational Resilience Standard by providing a framework for evaluating the internal and external context of the organization with regard to its supply chain enabling it to develop comprehensive, balanced strategy reduces the likelihood and consequences of a disruptive event. It also offers auditable criteria to prevent, prepare for, respond to, and recover from a disruptive event. | <i>Under development</i> | resilience, supply chain | Project relevance, sustainability, effectiveness |
| ANSI/ASIS SPC.4 | Maturity Model for the Phased Implementation of the | Provides guidance for the use of a maturity model for the phased implementation of ANSI/ASIS SPC.1-2009, as a series of steps | 2012-00-00 | resilience, maturity | Project relevance, sustainability, |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|-----------------|---|---|--------------------------|---|--|
| | Organizational Resilience Management System | designed to help organizations evaluate where they currently are with regards to resilience management and preparedness; set goals for where they want to go; and plot a business/mission appropriate path to get there. | | | impact, effectiveness |
| ANSI/ASIS SPC.5 | Community Resilience: Guidance on Capacity Building and Public-Private Partnerships | Provides guidance to facilitate capacity sharing to enhance resilience through public-private partnerships between individuals, organizations, and communities. Using the Plan-Do-Check-Act model, it will address community risk and resilience management through capacity identification, assessment, and sharing in order to help communities better prevent, prepare for, respond to and recover from disruptions. | <i>Under development</i> | community, resilience, PPP | Project relevance, sustainability, impact, effectiveness |
| ARP 22399 | Societal security - Guideline for incident preparedness and operational continuity management | Provides general guidance for an organization - private, governmental, and non-governmental organizations - to develop its own specific performance criteria for incident preparedness and operational continuity, and to design an appropriate management system. Provides a basis for understanding, developing and implementing continuity of operations and services within an organization, and confidence in business, community, customer, first responder and organizational interactions. Also enables the organization to measure its resilience in a consistent and recognized manner. | 2008-06-25 | societal, resilience, guideline, society, community | Project relevance, sustainability, impact, effectiveness |
| ASTM E 2495 | Standard Practice for Prioritizing Asset Resources in Acquisition, Utilization, and Disposition | The asset priority index (API) establishes a quantitative process for prioritizing asset resources in acquisition, utilization, and disposition to provide entities with a proven methodology to prioritize asset resources. The API is a metric used to communicate the relative importance of equipment in terms of mission criticality, security, or other measures important to the business entity. It offers a method for ranking assets based on judgment/importance factors defined by the organization, creating information to justify compelling arguments for investment, security strategies, and disposition plans. | 2013-00-00 | education, security | Project relevance, sustainability |
| BS 65000 | Guidance on organizational resilience | BS 65000 defines organizational resilience as the ability to anticipate, prepare for, respond and adapt to events – both | 2014-11-30 | resilience, security | Project relevance, sustainability, |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|--------------|---|--|---------------------|---|--|
| | | sudden shocks and gradual change. That means being adaptable, competitive, agile and robust. | | | impact, effectiveness |
| DS 3001 | Organizational resilience: Security, preparedness, and continuity management systems - Requirements with guidance for use | This Standard specifies requirements for an organizational resilience (OR) management system to enable an organization to develop and implement policies, objectives, and programs taking into account legal requirements and other requirements to which the organization subscribes, information about significant hazards and threats that might impact it and its stakeholders', and protection of critical assets (physical, intangible, environmental, and human). | 2009-10-24 | resilience, security, crisis, management | Project relevance, sustainability, impact, effectiveness |
| ISO 28002 | Security management systems for the supply chain - Development of resilience in the supply chain - Requirements with guidance for use | This Standard specifies requirements for a resilience management policy in the supply chain to enable an organization to develop and implement policies, objectives, and programs taking into account: Legal, regulatory and other requirements to which the organization subscribes, information about significant risks, hazards and threats that may have consequences to the organization, its stakeholders, and on its supply chain; protection of its assets and processes; and management of disruptive incidents. This Standard applies to risks that the organization identifies as those it can control, influence, or reduce, as well as those it cannot anticipate. It does not itself state specific performance criteria. This Standard provides guidance for organizations to develop their own specific performance criteria, enabling the organization to tailor and implement a resilience management system appropriate to its needs and those of its stakeholders. | 2011-08-00 | transportation, security, resilience, framework, crisis, preparedness | Project relevance, effectiveness |
| ISO 55000 | Asset management - Overview, principles and terminology | ISO 55000:2014 provides an overview of asset management, its principles and terminology, and the expected benefits from adopting asset management. ISO 55000:2014 can be applied to all types of assets and by all types and sizes of organizations. | 2014-01-00 | asset | impact, effectiveness |
| ISO 55001 | Asset management - Management systems - Requirements | ISO 55001:2014 specifies requirements for an asset management system within the context of the organization. ISO 55001:2014 can be applied to all types of assets and by all types and sizes of organizations. | 2014-01-00 | asset | impact, effectiveness |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|---------------|---|--|--------------------------|---|--|
| ISO 55002 | Asset management - Management systems - Guidelines for the application of ISO 55001 | ISO 55002:2014 provides guidance for the application of an asset management system, in accordance with the requirements of ISO 55001. ISO 55002:2014 can be applied to all types of assets and by all types and sizes of organizations. | 2014-01-00 | asset | impact, effectiveness |
| ISO/DIS 37101 | Sustainable development of communities - Management systems - Requirements with guidance for resilience and smartness | Under development - by ISO/TC 268 - Sustainable development in communities | <i>Under development</i> | finance, security, smart city, sustainable, urban, services | Project relevance, sustainability, impact, effectiveness |
| ISO/DIS 37102 | Sustainable development and resilience of communities - Vocabulary | Under development - by ISO/TC 268 - Sustainable development in communities | <i>Under development</i> | Sustainable, resilience, community | Project relevance, sustainability, impact, effectiveness |
| ISO/DTR 37121 | Inventory and review of existing indicators on sustainable development and resilience in cities | Under development - by ISO/TC 268 - Sustainable development in communities | <i>Under development</i> | smart cities, sustainable, city | Project relevance, sustainability, impact, effectiveness |
| PAS 2015 | Framework for health services resilience | Publicly Available Specification (PAS) 2015 recommends techniques for improving and maintaining resilience for NHS-funded organizations that build on the activities that are already in progress within the organization. | 2010-10-21 | resilience, framework | Project relevance, sustainability, impact, effectiveness |
| UNI 11613 | Business complexity assessment (BCA) - Guidelines | This Standard provides guidance to any organizations for planning, establishing, implementing, operating, monitoring and reviewing a process of Business complexity assessment (BCA) of its system in order to identify and classify the critical situations and improve the resilience of the organization itself. This Standard is applicable to all size and type of organizations, regardless their business and operating in public or private sectors, including not-for-profit and NGO organizations. | 2015-12-10 | societal, resilience | Project relevance, impact |



4.4. LIST OF IDENTIFIED STANDARDS – CATEGORY 'CRITICAL INFRASTRUCTURES'

In sum 75 standards have been identified that are related to the category 'Critical Infrastructures'. More information about these standards is described in the table below. Examples of standards within this category that might be more relevant for the SMR project (in total 17, see Document No. column, marked in orange colour) are the DIN SPEC 91330 'Terminology relating to events in pipeline- and cable-based infrastructures' that defines important terms with regard to events occurring in critical infrastructures; the standards series of ISO 28000 covering the topic of security management systems for the supply chain; and the ISO/IEC 27000 standard series about 'Information technology - Security techniques'.

Table 5 - List of identified 'Critical Infrastructures' standards

| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|--------------------|---|--|---------------------|--------------------------|-----------------------------------|
| ANSI X 9.79 Part 4 | Public Key Infrastructure (PKI) - Part 4: Asymmetric Key Management | PKI technology has become a significant security control within the financial services industry for both internal operations and for external customer facing payment systems over the past decade. The usability and versatility of PKI has become such a critical infrastructure component that its proper management and auditability has become even more important than ever before. The expansion of X9.79 with Parts 3 and 4 consolidates PKI management and security requirements into a single ANS. | 2013-00-00 | critical infrastructure | Project relevance, sustainability |
| ANSI/API RP 1173 | Pipeline Safety Management Systems | This recommended practice (RP) establishes a framework of pipeline safety management systems for organizations that operate hazardous liquids and gas pipelines jurisdictional to the US DOT. This RP provides pipeline operators with safety management system requirements that when applied provide a framework to reveal and manage risk, promote a learning environment, and continuously improve pipeline safety and | 2015-00-00 | transportation, security | sustainability |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|----------------|---|--|---------------------|---|-----------------------------------|
| | | integrity. This RP provides a comprehensive framework and defines the elements needed to identify and address safety for a pipeline's lifecycle. | | | |
| ANSI/IEEE 1686 | Standard for Substation Intelligent Electronic Devices (IED) Cyber Security Capabilities | The standard defines the functions and features to be provided in substation intelligent electronic devices (IEDs) to accommodate critical infrastructure protection programs. The standard addresses security regarding the access, operation, configuration, firmware revision and data retrieval from an IED. Encryption for the secure transmission of data both within and external to the substation is not part of this standard. | 2008-00-00 | critical infrastructure | Project relevance |
| API STD 780 | Security Risk Assessment Methodology for the Petroleum and Petrochemical Industries | This Standard was prepared by a security risk assessment (SRA) committee of API to assist the petroleum and petrochemical industries in understanding conducting SRAs. The standard describes the recommended approach for assessing security risk widely applicable to the types of facilities operated by the industry and the security issues the industry faces. The standard is intended for those responsible for conducting SRAs and managing security at these facilities. The method described in this standard is widely applicable to a full spectrum of security issues from theft to insider sabotage to terrorism. | 2013-05-00 | critical infrastructure | Project relevance, sustainability |
| ASTM D 6030 | Standard Guide for Selection of Methods for Assessing Groundwater or Aquifer Sensitivity and Vulnerability | This guide covers information needed to select one or more methods for assessing the sensitivity of groundwater or aquifers and the vulnerability of groundwater or aquifers to water-quality degradation by specific contaminants. This guide is to be used for evaluating sensitivity and vulnerability methods for purposes of land-use management, water-use management, groundwater protection, government regulation, and education. This guide incorporates descriptions of general classes of methods and selected examples within these classes but does not advocate a particular method. | 2015-00-00 | vulnerability | Project relevance, sustainability |
| ASTM E 2506 | Standard Guide for Developing a Cost-Effective Risk Mitigation Plan for New and Existing Constructed Facilities | This guide describes a generic framework for developing a cost-effective risk mitigation plan for new and existing constructed facilities-buildings, industrial facilities, and other critical infrastructure. This guide provides owners and managers of | 2015-00-00 | critical infrastructure, health, risk, infrastructure | Project relevance, impact |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|-----------------|---|---|---------------------|---------------------------------|--|
| | | constructed facilities, architects, engineers, constructors, other providers of professional services for constructed facilities, and researchers an approach for formulating and evaluating combinations of risk mitigation strategies. | | | |
| CAN/CGSB-133.1 | Security Officers and Security Officer Supervisors | This standard sets out minimum requirements to be used when selecting uniformed security officers and supervisors to protect people, property and information. It provides a "Security Officers Basic (Pre-assignment) Training Program" (Appendix A), a "Security Officer Supervisors (Pre-assignment) Training Program" (Appendix B) and "Performance Guidelines for Suppliers of Training for Security Officers and Supervisors" (Appendix C). | 2008-03-01 | critical infrastructure, health | Project relevance, sustainability, impact, effectiveness |
| CAN/ULC-S316-14 | Standard for performance of video surveillance systems | This standard provides minimum acceptable performance parameters for video surveillance systems. The system stakeholder determines the video surveillance system operational requirements. | 2014-12-01 | critical infrastructure | Project relevance, sustainability, impact, effectiveness |
| CEN/TR 16388 | Gas-Specific Environmental Document - Guideline for incorporating within standards to minimize the environmental impact of gas infrastructure across the whole life cycle | The gas supply companies, in the widest sense of their activities (production, transport, distribution), have a long tradition in ensuring that networks and facilities are operated according to well-defined procedures. These procedures are the centrepiece of quality management systems. They are based on the general criteria of the series ISO 9000 and are currently being developed gas-specifically as EQAS (European Quality Assurance System) in CEN/TC 234 in order to adhere more efficiently to the procedures peculiar to the gas activities. Companies are more and more inclined to take into account environmental aspects since the series ISO 14000 resulting in EMAS (Environment Management System). | 2012-08-00 | risk, infrastructure | Project relevance, sustainability |
| CEN/TR 16670 | Information technology - RFID threat and vulnerability analysis | The scope of the Technical Report is to consider the threats and vulnerabilities associated with specific characteristics of RFID technology in a system comprising: - the air interface protocol covering all the common frequencies; - the tag including model variants within a technology; - the interrogator features for processing the air interface; - the interrogator interface to the | 2014-06-00 | vulnerability | Project relevance, sustainability, impact, effectiveness |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|-----------------|---|--|---------------------|--|--|
| | | application. The Technical Report addresses specific RFID technologies as defined by their air interface specifications. | | | |
| CEN/TR 16671 | Information technology - Authorization of mobile phones when used as RFID interrogators | The scope of this Technical Report is to explore developments in the use of mobile phones as RFID interrogators. It uses as a datum the communication protocols developed for near field communication, which have a defined level of security. This Technical Report will explore known developments in the use of mobile phones as RFID interrogators including (but not limited to):- extending NFC phone capabilities to read RFID tags compliant with ISO/IEC 15693 and ISO/IEC 18000-3 Mode 1; - using mobile phones as interrogators for UHF tags based on ISO/IEC 18000-6 Type C; - the development of multi-protocol readers capable of switching between high frequency and UHF. | 2014-06-00 | internet of things | Project relevance, sustainability, impact, effectiveness |
| CEN/TS 16850 | Societal and Citizen Security. Guidance for managing security in healthcare facilities | The standard will specify requirements for planning, establishing, implementing, operating, monitoring, reviewing, maintaining and continually improving a documented security management system in healthcare facilities. | 2015-11-27 | societal, citizen, communication, governance | Project relevance, sustainability, impact, effectiveness |
| CSN P 73 4450-1 | <i>Only in Czech:</i> Physical protection of the object of critical infrastructure - Part 1: General requirements | N/A | 2013-11-01 | critical infrastructure | Project relevance, effectiveness |
| CWA 15929 | Best Practices for the Design and Development of Critical Information Systems | The purpose of the Workshop is to develop a first level European agreement on best practices for market players to ensure quality in designing, developing, maintaining and operating critical information systems, including both applications and infrastructure. | 2009-02-01 | critical infrastructure | Project relevance, impact |
| CWA 16505 | Container Security and Tracking Devices - Technical Specifications and Communication Standards | The CEN Workshop Agreement is a part of the SMART-CM project, with one objective being to develop an ICT platform that enables neutral secure and interoperable B2B and B2A data exchange in global door-to-door container management. | 2012-09-00 | transportation, security | |
| DIN EN 13200-8 | Spectator facilities - Part 8: Safety Management | This European standard specifies general characteristics regarding infrastructure and safety management in spectator facilities. It specifies the layout and the planning of the management, the criteria to maintain this planning before, during | 2015-02-00 | risk, infrastructure, governance | Project relevance, sustainability, impact, effectiveness |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|------------------|--|--|---------------------|------------------|-----------------------------------|
| | | and after any event. It covers the following: - the safety personnel; - Safety Policy - A document developed, reviewed and monitored by the event organiser or senior management; - Safety Procedures - An operational and emergency plan, containing roles and responsibilities, staffing levels, risk assessments, medical provisions and contingencies. | | | |
| DIN EN 62351-7 | Power systems management and associated information exchange - Data and communications security - Part 7: Network and system management (NSM) data object models (IEC 57/1542/CD:2015) | This International Standard defines network and system management (NSM) data object models that are specific to power system operations. These NSM data objects will be used to monitor the health of networks and systems, to detect possible security intrusions, and to manage the performance and reliability of the information infrastructure. The goal is to define a set of Abstract Objects that will allow the remote monitoring of the health and condition of IEDs, RTUs, DER systems and other systems that are important to the power system operations. | 2016-01-00 | energy, security | Project relevance, sustainability |
| DIN EN ISO 13940 | Health informatics - System of concepts to support continuity of care (ISO/DIS 13940:2012) | This International Standard seeks to identify and define those processes which relate to co-operation between all parties involved in health care provided to human beings (to the exclusion of other living subjects). Given the definition of health as agreed by WHO, this International Standard will include those aspects of health care that rely on the acts of other actors than simply health care professionals. This International standard specifically addresses aspects of sharing information related to a subject of care that is needed in the process of health care. | 2013-01-00 | social support | Project relevance, effectiveness |
| DIN EN ISO 17261 | Intelligent transport systems - Automatic vehicle and equipment identification - Intermodal goods transport architecture and terminology (ISO 17261:2012) | This Standard describes the conceptual and logical architecture for automatic vehicle and Equipment identification (AVI/AEI) and supporting services in an intermodal/multimodal environment. This Standard presents a high level view of AEI intermodal and multimodal system Architecture. The Standard describes the key sub systems, their associated interfaces and interactions and how they fit into System wide functions such as Management, Security and Information Flow. | 2012-12-00 | food, security | impact |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|------------------|---|---|---------------------|--------------------------|-----------------------------------|
| DIN EN ISO 19141 | Geographic information - Schema for moving features (ISO 19141:2008) | This Standard defines a method to describe the geometry of a feature that moves as a rigid body. | 2009-12-00 | refugee | sustainability, impact, |
| DIN IEC 62351-11 | Power systems management and associated information exchange - Data and communications security - Part 11: Security for XML Files (IEC 57/1496/CD:2014) | This part of IEC 62351 specifies schema, procedures, and algorithms for securing XML documents that are used within the scope of IEC TC57 as well as documents in other domains (e. g. IEEE, proprietary, etc.). This specification applies to at least the standards IEC 61850-6 and IEC 61970-552. The initial audience for this specification is intended to be the members of the working groups developing or making use of the standards IEC 61850-6 and IEC 61970-552. For the measures described in this specification to take effect, they must be accepted and referenced by the specifications themselves. | 2015-02-00 | energy, security | Project relevance, sustainability |
| DIN IEC 62351-9 | Power systems management and associated information exchange - Data and communications security - Part 9: Cyber security key management for power system equipment (IEC 57/1388A/CD:2013) | This part 9 of the IEC 62351 series specifies how to generate, distribute, revoke and handle digital certificates, cryptographic keys to protect digital data and communication. Included in the scope is the handling of asymmetric keys (e. g. private keys and X.509 certificates), as well as symmetric keys (e. g. session keys). | 2014-09-00 | energy, security | Project relevance, sustainability |
| DIN ISO 24516-1 | Guidelines for Management of Assets of water supply and wastewater systems - Part 1: Drinking water distribution networks (ISO/DIS 24516-1:2015) | This International Standard specifies guidelines for technical aspects, tools and good practices for the management of assets of the pipe network elements of drinking water distribution networks to realize value from existing assets. This International Standard does not apply for the management of assets of drinking water pumping stations and storage in the network which are also physically part of the drinking water distribution system and also influence the management of assets of the pipe network. | 2015-05-00 | risk, infrastructure | Project relevance, sustainability |
| DIN SPEC 91282 | Terminology for security management transport infrastructures | The DIN SPEC by PAS procedure provides the terminology for security management applications in public transport infrastructures. | 2012-11-00 | transportation, security | Project relevance |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|----------------|---|--|---------------------|---|--|
| DIN SPEC 91291 | Emergency concept for the protection of sensitive logistics hubs - Configuration, simulation and implementation | The underlying security scenario of the project assumes a disturbance of a logistics agglomeration caused by terrorist acts or other unforeseen disasters. Subject of the DIN SPEC (PAS) is the configuration, simulation and implementation of an emergency logistics concept for sensitive urban areas (such as cargo transport centres, logistics parks, etc.) to maintain the flow of goods in the best possible manner - even in the event of major disruption. Using this emergency concept an emergency operation should be immediately enabled after damage has occurred. | 2013-12-00 | disruption, infrastructure | Project relevance, sustainability |
| DIN SPEC 91296 | Classification of threats to buildings by acts of terrorism | The aim of this DIN SPEC by the PAS procedure is to analyze the threat to critical infrastructures and to give orientation to clients for identification of the thread and for deriving protection measures. The threats dealt are limited to terrorism, as all other events are largely covered by existing standards. | 2013-06-00 | critical infrastructure, risk | Project relevance, sustainability |
| DIN SPEC 91312 | Interface specification for a standardized data exchange between software applications in the field of renewable resources plants | The aim of this DIN SPEC is the standardized presentation of the communication content enabling the integration of the relevant communication participants in the EUMONIS-platform. This DIN SPEC does not take into account information contents and data models. If applicable, existing standards such as DIN EN 61850-7 and DIN EN 61400-25 for operating data of wind turbines or reference designation system for component data will be used and possibly extended with appropriate additional information. This DIN SPEC is geared towards producers of power plants, energy supply companies, power grid operators, energy park operators and service provider involved in the operation of power plants with appropriate IT-infrastructure (e. g. in the area of technical management, maintenance, condition monitoring, data analysis, metrology, data archiving). | 2015-09-00 | education, infrastructure | impact, effectiveness |
| DIN SPEC 91330 | Terminology relating to events in pipeline- and cable-based infrastructures | This DIN SPEC defines concepts to describe, prepare for and deal with events occurring in gas, water, waste water and district heating networks. The definitions are intended first and foremost to provide the basis for communication between system operators in the same utility sector and in different sectors. | 2015-08-00 | energy, security, breakdown, infrastructure, risk | Project relevance, sustainability, impact, effectiveness |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|----------------|--|---|---------------------|----------------------|-----------------------------------|
| DIN SPEC 91331 | Classification of risks for international large-scale projects | The purpose of this DIN SPEC is to list and classify the potential risks involved in large-scale international projects. These can occur, for example, when financing large-scale energy, infrastructure and construction projects. | 2015-11-00 | risk, infrastructure | Project relevance, sustainability |
| DVGW G 1001 | <i>Only in German:</i> Security of gas supply - Risk management of gas infrastructures under operational conditions | N/A | 2015-03-00 | risk, infrastructure | Project relevance, sustainability |
| EN 15273-3 | Railway applications - Gauges - Part 3: Structure gauges | This standard defines the various profiles needed to install, verify and maintain the various structures near the structure gauge; lists the various phenomena to be taken into account to determine the structure gauge; defines a methodology that may be used to calculate the various profiles from these phenomena; lists the rules to determine the distance between the track centres; lists the rules to be complied with when building the platforms; lists the rules to determine the pantograph gauge; lists the formulae needed to calculate the structure gauges in the catalogue. | 2013-05-00 | risk, infrastructure | impact, effectiveness |
| EN 16082 | Airport and aviation security services | This European Standard specifies service requirements for quality in organisation, processes, personnel and management of a security service provider and/or its independent branches and establishments under commercial law and trade as a provider with regard to civil aviation security services. It lays down quality criteria for the delivery of civil aviation security services requested by public and private clients or buyers. This European Standard is suitable for the selection, attribution, awarding and reviewing of the most suitable provider of civil aviation security services. | 2011-08-00 | education, security | Project relevance, effectiveness |
| EN 16348 | Gas infrastructure - Safety Management System (SMS) for gas transmission infrastructure and Pipeline Integrity Management System (PIMS) for gas transmission | This European Standard specifies requirements which enable a Transmission System Operator (TSO) to develop and implement a safety management system including an integrity management system specifically for pipelines. The SMS is applicable to infrastructure for the transmission of processed, non-toxic and non-corrosive natural gas according to EN ISO 13686 and | 2013-06-00 | energy, security | sustainability, effectiveness |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|---------------------|---|---|---------------------|----------------------------|--|
| | pipelines - Functional requirements | injected bio methane, where: - the pipeline elements are made of unalloyed or low-alloyed carbon steel; - the pipeline elements are joined by welds, flanges or mechanical joints. | | | |
| EN 16747 | Maritime and port security services | This European Standard is a service standard that specifies requirements for quality in organization, processes, staff and management of a security services provider and/or its independent branches and establishments under commercial law and trade as a provider with regard to port and maritime security services. | 2015-09-00 | education, security | Project relevance, sustainability, impact, effectiveness |
| EN 302637-3 V 1.2.2 | Intelligent transport systems (ITS) - Vehicular communications - Basic set of applications - Part 3 : specifications of decentralized environmental notification basic service (V1.2.2) | Revision of the TS 102637 - 3 according to ETSI TC ITS work progression, harmonization as far as possible with other standardization work and received change requests before proposing it as an EN in conformity with M/453 mandate. | 2014-11-00 | governance, infrastructure | sustainability, impact, effectiveness |
| EN 50600-1 | Information technology - Data centre facilities and infrastructures - Part 1: General concepts | This European Standard: a) details the issues to be addressed in a business risk and operating cost analysis enabling application of an appropriate classification of the data centre, b) defines the common aspects of data centres including terminology, parameters and reference models (functional elements and their accommodation) addressing both the size and complexity of their intended purpose, c) describes general aspects of the facilities and infrastructures required to support effective operation of telecommunications within data centres, d) specifies a classification system, based upon the key criteria of "availability", "security" and "energy-efficiency" over the planned lifetime of the data centre, for the provision of effective facilities and infrastructure, e) describes the general design principles for data centres upon which the requirements of the EN 50600 series are based including symbols, labels, coding in drawings, quality assurance and education. | 2012-11-00 | education, security | Project relevance |
| EN 61918 | Industrial communication networks - Installation of | This International Standard specifies basic requirements for the installation of media for communication networks in industrial | 2013-12-00 | critical infrastructure | Project relevance, effectiveness |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|------------------------|---|--|---------------------|--------------------------|--|
| | communication networks in industrial premises (IEC 61918:2013, modified) | premises and within and between the automation islands, of industrial sites. This standard covers balanced and optical fibre cabling. It also covers the cabling infrastructure for wireless media, but not the wireless media itself. | | | |
| EN ISO 22600-3 | Health informatics - Privilege management and access control - Part 3: Implementations | This multi part International Standard defines privilege management and access control services required for communication and use of distributed health information over domain and security borders. The document introduces principles and specifies services needed for managing privileges and access control. | 2014-10-00 | social support | Project relevance, impact |
| EN ISO 24978 | Intelligent transport systems - ITS Safety and emergency messages using any available wireless media - Data registry procedures (ISO 24978:2009) | This International Standard provides a standardized set of protocols, parameters, and a method of management of an updateable "Data Registry" to provide application layers for "ITS Safety messages" using any available wireless media. | 2009-10-00 | transportation, security | Project relevance, sustainability, impact, effectiveness |
| ETSI TR 103229 V 1.1.1 | Environmental Engineering (EE) - Safety Extra Low Voltage (SELV) DC power supply network for ICT devices with energy storage and grid or renewable energy sources options | Specification of a Safety Extra Low Voltage DC power supply unit for powering at home or in public area (stores, hotels, railway stations, etc.) any ICT devices equipped with DC input. | 2014-07-00 | crisis, reliability | Project relevance, sustainability |
| IEC/TR 62325-101 | Framework for energy market communications - Part 101: General guidelines | Gives technology independent general guidelines applicable for e-business in energy markets based on Internet technologies providing: a description of the energy market specific environment; a description of the energy market specific requirements for e-business; an example of the energy market structure; an introduction to the modelling methodology; network configuration examples; a general assessment of communication security. | 2005-02-00 | energy, security | Project relevance, sustainability |
| IEC/TR 62325-501 | Framework for energy market communications - Part 501: General guidelines for use of ebXML | Provides general guidelines how to use the ebXML technology and architecture in energy markets based on the ISO 15000 series "Electronic business eXtensible Markup Language (ebXML)" together with migration scenarios and an | 2005-02-00 | energy, security | Project relevance, sustainability |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|------------------|--|---|---------------------|-------------------------|--|
| | | implementation example. Recommended profiles are covered in IEC 62325-502. | | | |
| IEC/TS 62325-502 | Framework for energy market communications - Part 502: Profile of ebXML | Specifies an energy market specific messaging profile based on the ISO 15000 series. The profile is intended to provide the basis for system configuration. | 2005-02-00 | energy, security | Project relevance, sustainability |
| IEC/TS 62325-504 | Framework for energy market communications - Part 504: Utilization of web services for electronic data interchanges on the European energy market for electricity | IEC TS 62325-504:2015(E) defines the services needed to support the electronic data interchanges between different actors on the European Energy Market for Electricity (EME) in a fast (near-real-time), and secure way. At the same time, this Technical Specification can also be applied to integration problems outside the scope of IEC 62325-451, such as to the integration of gas market systems or general enterprise integration. Web Services (in WSDL) will be specified for the defined services, applying the Basic Web Service Pattern implementation profile from IEC 61968-100. | 2015-05-00 | energy, security | Project relevance, sustainability |
| IEEE 1686 | IEEE Standard for Intelligent Electronic Devices Cyber Security Capabilities | Revision Standard - Active. The functions and features to be provided in intelligent electronic devices (IEDs) to accommodate critical infrastructure protection programs are defined in this standard. Security regarding the access, operation, configuration, firmware revision and data retrieval from an IED are addressed. Communications for the purpose of power system protection (teleprotection) are not addressed in this standard. | 2013-00-00 | critical infrastructure | Project relevance, sustainability, impact, effectiveness |
| IEEE 802.15.4k | IEEE Standard for Local and metropolitan area networks Part 15.4: Low-Rate Wireless Personal Area Networks (LR-WPANs); Amendment 5: Physical Layer Specifications for Low Energy, Critical Infrastructure Monitoring Networks. | Amendment Standard - Active. Two PHYs (DSSS and FSK) that support critical infrastructure monitoring applications are provided in this amendment to IEEE Std 802.15.4TM-2011. In addition, only those MAC modifications needed to support the implementation of the two PHYs are described in this amendment. | 2013-00-00 | critical infrastructure | Project relevance, impact |
| IEEE C 37.240 | IEEE Standard Cybersecurity Requirements for Substation | New IEEE Standard - Active. Cybersecurity measures require that a balance be achieved between technical feasibility and | 2014-00-00 | risk, infrastructure | Project relevance, sustainability, |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|--------------|---|--|---------------------|--------------------------|--|
| | Automation, Protection, and Control Systems | economic feasibility and that this balance addresses the risks expected to be present at a substation. Further, cybersecurity measures must be designed and implemented in such a manner that access and operation to legitimate activities is not impeded, particularly during times of emergency or restoration activity. This standard presents a balance of the above factors. | | | impact, effectiveness |
| ISO 18185-1 | Freight containers - Electronic seals - Part 1: Communication protocol | This International Standard provides a system for the identification and presentation of information about freight container electronic seals. The identification system provides an unambiguous unique identification of the container seal, its status, and related information. | 2007-05-00 | transportation, security | impact, effectiveness |
| ISO 24510 | Activities relating to drinking water and wastewater services - Guidelines for the assessment and for the improvement of the service to users | This Standard specifies the elements of drinking water and wastewater services of relevance and interest to users. It also provides guidance on how to identify users- needs and expectations and how to assess whether they are being met. | 2007-12-00 | water, sanitation | sustainability, effectiveness |
| ISO 24511 | Activities relating to drinking water and wastewater services - Guidelines for the management of wastewater utilities and for the assessment of wastewater services | This Standard provides guidelines for the management of wastewater utilities and for the assessment of wastewater services. This Standard is applicable to publicly and privately owned and operated wastewater utilities, but does not favour any particular ownership or operational model. | 2007-12-00 | water, sanitation | sustainability |
| ISO 24512 | Activities relating to drinking water and wastewater services - Guidelines for the management of drinking water Utilities and for the assessment of drinking water services | This Standard provides guidelines for the management of drinking water utilities and for the assessment of drinking water services. This Standard is applicable to publicly and privately owned and operated water utilities. It does not favour any particular ownership or operating model. | 2007-12-00 | water, sanitation | sustainability, impact |
| ISO 28000 | Specification for security management systems for the supply chain | This International Standard specifies the requirements for a security management system, including those aspects critical to security assurance of the supply chain. Security management is linked to many other aspects of business management. Aspects | 2007-09-00 | transportation, security | Project relevance, sustainability, impact, effectiveness |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|-------------------------------------|---|--|---------------------|--------------------------|----------------------------------|
| | | include all activities controlled or influenced by organizations that impact on supply chain security. | | | |
| ISO 28001 | Security management systems for the supply chain - Best practices for implementing supply chain security, assessments and plans - Requirements and guidance | This International Standard provides requirements and guidance for organizations in international supply chains to develop and implement supply chain security processes; establish and document a minimum level of security within a supply chain(s) or segment of a supply chain; assist in meeting the applicable authorized economic operator (AEO) criteria set forth in the World Customs Organization Framework of Standards and conforming national supply chain security programmes. | 2007-10-00 | transportation, security | Project relevance, effectiveness |
| ISO 28003 | Security management systems for the supply chain - Requirements for bodies providing audit and certification of supply chain security management systems | This Standard contains principles and requirements for bodies providing the audit and certification of supply chain security management systems according to management system specifications and standards such as ISO/PAS 28000. Certification of supply chain security management systems (named in this ISO/PAS 'certification') is a third party conformity assessment activity (see clause 5.5. of ISO/IEC 17000). | 2007-08-00 | security, supply chain | Project relevance, effectiveness |
| ISO 28004-1 | Security management systems for the supply chain - Guidelines for the implementation of ISO 28000 | ISO 28004:2007 provides generic advice on the application of ISO 28000:2007, Specification for security management systems for the supply chain. It explains the underlying principles of ISO 28000 and describes the intent, typical inputs, processes and typical outputs for each requirement of ISO 28000. This is to aid the understanding and implementation of ISO 28000. ISO 28004:2007 does not create additional requirements to those specified in ISO 28000, nor does it prescribe mandatory approaches to the implementation of ISO 28000 | 2007-10-00 | transportation, security | Project relevance |
| ISO 28004-1 Technical Corrigendum 1 | Security management systems for the supply chain - Guidelines for the implementation of ISO 28000 - Part 1: General principles; Technical Corrigendum 1 | See ISO 28004-1 | 2012-08-00 | transportation, security | Project relevance |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|-----------------|--|--|--------------------------|--------------------------|----------------------------------|
| ISO 28004-2 | Security management systems for the supply chain - Guidelines for the implementation of ISO 28000 - Part 2: Guidelines for adopting ISO 28000 for use in medium and small seaport operations | ISO 28004-2:2014 identifies supply chain risk and threat scenarios, procedures for conducting risks/threat assessments, and evaluation criteria for measuring conformance and effectiveness of the documented security plans in accordance with ISO 28000 and the ISO 28004 series implementation guidelines. An output of this effort will be a level of confidence rating system based on the quality of the security management plans and procedures implemented by the seaport to safeguard the security and ensure continuity of operations of the supply chain cargo being processed by the seaport. | 2014-02-00 | transportation, security | Project relevance, effectiveness |
| ISO 28004-3 | Security management systems for the supply chain - Guidelines for the implementation of ISO 28000 - Part 3: Additional specific guidance for adopting ISO 28000 for use by medium and small businesses (other than marine ports) | ISO 28004-3:2014 has been developed to supplement ISO 28004-1 by providing additional guidance to medium and small businesses (other than marine ports) that wish to adopt ISO 28000. The additional guidance in ISO 28004-3:2014, while amplifying the general guidance provided in the main body of ISO 28004-1, does not conflict with the general guidance, nor does it amend ISO 28000. | 2014-02-00 | transportation, security | effectiveness |
| ISO 28004-4 | Security management systems for the supply chain - Guidelines for the implementation of ISO 28000 - Part 4: Additional specific guidance on implementing ISO 28000 if compliance with ISO 28001 is a management objective | ISO 28004-4:2014 provides additional guidance for organizations adopting ISO 28000 that also wish to incorporate the Best Practices identified in ISO 28001 as a management objective on their international supply chains. The Best Practices in ISO 28001 both help organizations establish and document levels of security within an international supply chain and facilitate validation in national Authorized Economic Operator (AEO) programmes that are designed in accordance with the World Customs Organization (WCO) Framework of Standards. | 2014-02-00 | transportation, security | effectiveness |
| ISO/DIS 24516-1 | Guidelines for Management of Assets of water supply and wastewater systems - Part 1: Drinking water distribution networks | N/A | <i>Under development</i> | risk, infrastructure | Project relevance, impact |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|-----------------|---|--|---------------------|-------------------------|--|
| ISO/IEC 20006-1 | Information technology for learning, education and training - Information model for competency - Part 1: Competency general framework and information model | This part of ISO/IEC 20006 provides: - a general framework for dealing with competency information in information technology for learning, education, and training (ITLET) contexts; - a system architecture for managing and exchanging competency information and its related objects; - an information model for expressing competency and its related objects that includes an introduction to the composition of competency; - use cases used to support the development of the general framework and competency information model. | 2014-07-00 | education, security | Project relevance, effectiveness |
| ISO/IEC 23988 | Information Technology - A code of practice for the use of information technology (IT) in the delivery of assessments | Growth in the power and capabilities of information technology (IT) has led to the increasing use of IT to deliver, score and record responses of tests and assessments in a wide range of educational and other contexts. Suitably used, IT delivery offers advantages of speed and efficiency, better feedback and improvements in validity and reliability, but its increased use has raised issues about the security and fairness of IT-delivered assessments, as well as resulting in a wide range of different practices. | 2007-02-00 | education, security | Project relevance, effectiveness |
| ISO/IEC 27000 | Information technology - Security techniques - Information security management systems - Overview and vocabulary | This International Standard provides the overview of information security management systems, and terms and definitions commonly used in the ISMS family of standards. This International Standard is applicable to all types and sizes of organization (e.g. commercial enterprises, government agencies, not-for-profit organizations). | 2014-01-00 | security | Project relevance, sustainability, impact, effectiveness |
| ISO/IEC 27010 | Information technology - Security techniques - Information security management for inter-sector and inter-organizational communications | This International Standard provides guidelines in addition to guidance given in the ISO/IEC 27000 family of standards for implementing information security management within information sharing communities. This International Standard provides controls and guidance specifically relating to initiating, implementing, maintaining, and improving information security in inter-organizational and inter-sector communications. | 2015-11-00 | critical infrastructure | Project relevance, sustainability, impact, effectiveness |
| ISO/IEC 27031 | Information technology - Security techniques - Guidelines for information and | ISO/IEC 27031:2010 describes the concepts and principles of information and communication technology (ICT) readiness for business continuity, and provides a framework of methods and | 2011-03-00 | critical infrastructure | Project relevance, sustainability, |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|------------------|--|---|---------------------|--------------------------|--|
| | communication technology readiness for business continuity | processes to identify and specify all aspects (such as performance criteria, design, and implementation) for improving an organization's ICT readiness to ensure business continuity. | | | impact, effectiveness |
| ISO/IEC 27032 | Information technology - Security techniques - Guidelines for cybersecurity | This International Standard provides guidance for improving the state of Cybersecurity, drawing out the unique aspects of that activity and its dependencies on other security domains, in particular:- information security,- network security,- internet security, and- critical information infrastructure protection (CIIP). It covers the baseline security practices for stakeholders in the Cyberspace. | 2012-07-00 | critical infrastructure | Project relevance, sustainability, impact, effectiveness |
| ISO/IEC TR 27019 | Information technology - Security techniques - Information security management guidelines based on ISO/IEC 27002 for process control systems specific to the energy utility industry | The scope of this guideline covers process control systems used by the energy utility industry for controlling and monitoring the generation, transmission, storage and distribution of electric power, gas and heat in combination with the control of supporting processes. | 2013-07-00 | monitoring, smart | Project relevance, effectiveness |
| ISO/PAS 16917 | Ships and marine technology - Data transfer standard for maritime and intermodal transportation and security | This Publicly Available Specification specifies a representation of information associated with the surface (marine, highway, rail) transportation of cargo and personnel. | 2002-12-00 | transportation, security | Project relevance |
| ISO/TR 11766 | Intelligent transport systems - Communications access for land mobiles (CALM) - Security considerations for lawful interception | This Technical Report reviews the ITS landscape and the provisions of lawful interception to ITS deployments. In particular it considers the CALM environment and the services offered in the IPv6 domain served by CALM and ITS in general. | 2010-04-00 | transportation, security | Project relevance, effectiveness |
| ISO/TR 22221 | Health informatics - Good principles and practices for a clinical data warehouse | The focus of this Technical Report is clinical databases or other computational services, hereafter referred to as a clinical data warehouse (CDW), which maintain or access clinical data for secondary use purposes. The goal is to define principles and practices in the creation, use, maintenance and protection of a CDW, including meeting ethical and data protection requirements and recommendations for policies for information governance and security. | 2006-11-00 | education, security | Project relevance, effectiveness |



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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|----------------|--|---|---------------------|--------------------------------|-------------------------------|
| ISO/TS 22002-1 | Prerequisite programmes on food safety. Food manufacturing | This Technical Specification specifies requirements for establishing, implementing and maintaining prerequisite programmes (PRP) to assist in controlling food safety hazards. | 2009-12-00 | transportation, security, food | sustainability, impact |
| ISO/TS 22002-2 | Prerequisite programmes on food safety - Part 2: Catering | This part of ISO/TS 22002 specifies the requirements for the design, implementation, and maintenance of prerequisite programmes (PRPs) to assist in controlling food safety hazards in catering. | 2013-01-00 | transportation, security, food | sustainability, effectiveness |
| ISO/TS 22002-3 | Prerequisite programmes on food safety. Farming | This part of ISO 22002 specifies requirements and guidelines for the design, implementation, and documentation of prerequisite programmes (PRPs) that maintain a hygienic environment and assist in controlling food safety hazards in the food chain. | 2011-12-00 | transportation, security, food | sustainability, impact |
| ISO/TS 22002-4 | Prerequisite programmes on food safety. Food packaging manufacturing | ISO/TS 22002-4:2014 specifies requirements for establishing, implementing and maintaining prerequisite programmes (PRPs) to assist in controlling food safety hazards in the manufacture of food packaging. | 2013-12-00 | food, security | sustainability |
| SAE AS 5710A | JAUS Core Service Set | This document defines a set of standard application layer interfaces called JAUS Core Services. JAUS Services provide the means for software entities in an unmanned system or system of unmanned systems to communicate and coordinate their activities. | 2010-08-26 | critical infrastructure | impact |

4.5. LIST OF IDENTIFIED STANDARDS – CATEGORY 'CLIMATE CHANGE'

The standards analysis for the category 'Climate Change' resulted in a list of 28 standards that can be found in the following table. Identified standards that might be relevant for the project work (in total 9, see Document No. column, marked in orange colour) are e. g. the BIP 2178 'Climate change adaptation' that is giving support to the adaptation to climate risks using different (management) standards; and the DIN specifications covering different topics with regard to climate change (DIN SPEC 35220 'Adaption to climate change - Projections on climate

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change and ways for handling uncertainties', DIN SPEC 35810 'Stakeholder Engagement - Guidelines for decision making processes dealing with climate change' and DIN SPEC 35811 'Scenario Planning - Guidelines for decision making processes dealing with climate change').

Table 6 - List of identified 'Climate Change' standards

| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|-----------------------|---|---|---------------------|------------------------------------|--|
| ASTM E 2725 | Standard Guide for Basic Assessment and Management of Greenhouse Gases | This guide presents a generalized systematic approach to voluntary assessment and management of the causes and impacts of GHGs. It includes actions, both institutional (legal) and engineering (physical) controls for GHG reductions, impacts, and adaptations. | 2010-00-00 | climate change, impact | sustainability, impact |
| BIP 2105 | Environmental Management Report : Focus on climate change | Gives a detailed insight into what climate change actually is, and explains the related policies in real terms. The report analyses what effect these policies will have on businesses and shows what steps can be taken to stay in line with the legislation. Examples are taken from leading businesses in order to give ideas on how to develop an action plan to help manage the impact of climate change on your business. | 2006-08-01 | climate change, impact | Project relevance, sustainability |
| BIP 2178 | Climate change adaptation | Adapting to climate risks using ISO 9001, ISO 14001, BS 25999 and BS 31100 | 2014-03-10 | climate change, environmental risk | Project relevance, sustainability, impact, effectiveness |
| ChemKlimaschutz VDBBw | <i>Only in German: Durchführungsbestimmungen für die Bundeswehr zur Verordnung zum Schutz des Klimas vor Veränderungen durch den Eintrag bestimmter fluorierte Treibhausgase (DBBwChemKlimaschutzV)</i> | N/A | 2010-11-22 | climate change, heat | Project relevance, sustainability, effectiveness |
| CWA 16768 | Framework for Sustainable Value Creation in Manufacturing Network | The CEN Workshop Agreement (CWA) "Framework for Sustainable Value Creation in Manufacturing Networks" covers Good-practices for developing business models, governance | 2014-05-01 | climate change, impact | sustainability, effectiveness |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|----------------------|--|--|---------------------|------------------------|-----------------------------------|
| | | models, sustainable solutions and performance management for existing and new sustainable production and service networks. | | | |
| DIN CEN ISO/TS 14067 | Greenhouse gases - Carbon footprint of products - Requirements and guidelines for quantification and communication (ISO/TS 14067:2013) | This Technical Specification specifies principles, requirements and guidelines for the quantification and communication of the carbon footprint of a product (CFP), based on International Standards on life cycle assessment (ISO 14040 and ISO 14044) for quantification and on environmental labels and declarations (ISO 14020, ISO 14024 and ISO 14025) for communication. Requirements and guidelines for the quantification and communication of a partial carbon footprint of a product (partial CFP) are also provided. | 2014-09-00 | climate change, impact | sustainability, impact |
| DIN EN 1170-8 | Test method for glass-fibre reinforced cement - Part 8: Cyclic weathering type test | This European standard specifies a test method for identifying, for a given GRC formula (components and their ratio in the formula), the effect of environmental factors such as water and temperature on the change of mechanical characteristics. | 2009-05-00 | climate change, heat | sustainability, effectiveness |
| DIN EN 16789 | Ambient air - Biomonitoring with Higher Plants - Method of the standardised tobacco exposure | This European Standard applies to the determination of the impact of ground-level ozone on a bioindicator plant species in a given environment. The present document specifies the procedure for the setting-up and use of a system designed to expose these plants to ambient air. It also describes the procedure of leaf injury assessment. The results of the standardised tobacco exposure indicate ozone-caused injury of the exposed bioindicators and thus enable a spatial and temporal distribution of the impact of ozone on plants to be determined. | 2014-11-00 | climate change, impact | sustainability, impact |
| DIN EN 60721-3-7 | Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Section 7: Portable and non-stationary use (IEC 60721-3-7:1995) | This document classifies groups of environmental parameters and their severities to which products are subjected during portable and non-stationary use, including periods of transfer, down time, maintenance and repair. The environmental conditions covered by these groups include: the environmental conditions are locations where the product may be placed or used temporarily; the change of environmental parameters due to change of location; the environmental conditions related to transfer of the product between different locations. | 1995-09-00 | climate change, impact | Project relevance, sustainability |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|------------------|---|--|---------------------|--|--|
| DIN EN ISO 14046 | Environmental management - Water footprint - Principles, requirements and guidelines (ISO 14046:2014) | This International Standard specifies principles, requirements and guidelines related to water footprint assessment of products, processes and organizations based on life cycle assessment (LCA). This International Standard provides principles, requirements and guidelines for conducting and reporting a water footprint assessment as a stand-alone assessment, or as part of a more comprehensive environmental assessment. Only air and soil emissions that impact water quality are included in the assessment, and not all air and soil emissions are included. | 2015-11-00 | climate change, impact | sustainability, impact |
| DIN ISO 13065 | Sustainability criteria for bioenergy (ISO/DIS 13065:2014) | This International Standard specifies sustainability principles, criteria and indicators for the bioenergy supply chain to facilitate assessment of environmental, social and economic aspects of sustainability. This International Standard is applicable to the whole supply chain, parts of a supply chain or a single process in the supply chain. This International Standard applies to all forms of bioenergy, irrespective of raw material, geographical location, technology or end use. | 2014-10-00 | energy, security | sustainability |
| DIN SPEC 35220 | Adaption to climate change - Projections on climate change and ways for handling uncertainties | This specification should encourage and support the discussion about climate protection and adaptation to climate change as one of the major challenge for all social circles. | 2015-11-00 | social support, climate change, adaption | Project relevance, sustainability, impact, effectiveness |
| DIN SPEC 35810 | Stakeholder Engagement - Guidelines for decision making processes dealing with climate change | This DIN SPEC (PAS) provides guidance and recommendations in stakeholder engagement in climate change decision-making. This DIN SPEC is applicable to organisations from the public and private sectors, including federal and local governmental agencies, companies, firms, industries, communities and non-governmental organisations. It is developed in a user-friendly manner, setting out principles and instructions in a straightforward step-by-step guide with which organisations can engage stakeholders in the decision-making process. | 2014-11-00 | climate change, impact | Project relevance, sustainability, impact, effectiveness |
| DIN SPEC 35811 | Scenario Planning - Guidelines for decision making processes dealing with climate change | DIN SPEC 35811 will assist (small and medium sized) enterprises from all fields to adapt to future challenges. It is applicable to companies, industries, and private and public sector organizations. Companies without a strategy department | 2014-08-00 | climate change, impact | Project relevance, sustainability, impact, effectiveness |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|--|---|---|---------------------|------------------------|--|
| | | are especially set to benefit from the application. Within a scenario process companies identify future challenges that might shape their business, such as climate change, demographic change, or technological change. They develop possible pictures of the future, based on these, derive potential adaptation measures. In this multistep process, the companies are optionally accompanied by consultants. The process itself can be implemented either individually or within a group of companies. Furthermore, the PAS is related to the ISO 14000 Standard series on environmental management systems, especially DIN EN ISO 14001. | | | |
| DWA-Themen Klimawandel, DWA-Themen KoG-WaWiK | <i>Only in German: Klimawandel - Herausforderungen und Lösungsansätze für die deutsche Wasserwirtschaft</i> | N/A | 2010-05-00 | climate change, impact | Project relevance, sustainability |
| DWA-Themen Stauanlagen, Klimawandel T2/2014 | <i>Only in German: Anpassungsstrategien für Stauanlagen an den Klimawandel</i> | N/A | 2014-06-00 | climate change, flood | Project relevance, sustainability |
| ICT Protocol, Version 1 | ICT Greenhouse Gas Reduction Project Protocol: Quantification and Reporting Version 1 | Recognizing the impact of ICT on the environment and the increasing attention being placed on sourcing ICT with a low environmental footprint, CANARIE funded a project to initiate a consortium of industrial and commercial enterprises, universities, and government agencies with the common goal of reducing GHG emissions associated with ICT services. Part of this project included the development of a Protocol involving the quantification of emission reductions achieved by reducing greenhouse gas emissions associated with ICT services, either by moving to a lower carbon environment or by improving workload efficiency. The protocol was intended specifically to help in the potential creation of certified, and eventually verified, emission reductions resulting from the delivery of low or zero greenhouse gas emissions associated with ICT services. | 2012-01-01 | climate change, impact | Project relevance, sustainability, impact, effectiveness |



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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|-----------------------|--|--|---------------------|------------------------------|--|
| ITU-T F.747.2 | Deployment guidelines for ubiquitous sensor network applications and services for mitigating climate change | Recommendation ITU-T F.747.2 provides deployment guidelines for ubiquitous sensor network (USN) applications and services for mitigating climate change. | 2012-06-00 | climate change, impact | Project relevance, sustainability, impact, effectiveness |
| ITU-T L.1500 | Framework for information and communication technologies and adaptation to the effects of climate change | Recommendation ITU-T L.1500 describes a framework for information and communication technologies (ICTs) and adaptation to the effects of climate change. | 2014-06-00 | climate change, impact | Project relevance, sustainability, impact, effectiveness |
| ITU-T L.1501 | Best practices on how countries can utilize ICTs to adapt to the effects of climate change | Recommendation ITU-T L.1501 provides guidance on how information and communication technologies (ICTs) can help countries to adapt to the effect of climate change. It also provides a framework and a checklist for countries to integrate ICTs in their national climate change adaptation strategies. | 2014-12-00 | climate change, impact | Project relevance, sustainability, impact, effectiveness |
| KlimaSchFoerdG | <i>Only in German: Gesetz zur Förderung des Klimaschutzes bei der Entwicklung in den Städten und Gemeinden (Artikel 1 Änderung des Baugesetzbuches; Artikel 2 Änderung der Planzeichenverordnung 1990)</i> | N/A | 2011-07-22 | climate change, heat | Project relevance |
| LANUV-Arbeitsblatt 29 | <i>Only in German: Kühlleistung von Böden - Leitfaden zur Einbindung in stadtklimatische Konzepte in NRW</i> | N/A | 2015-00-00 | climate change, heat | sustainability |
| LANUV-Fachbericht 27 | <i>Only in German: Klima und Klimawandel in Nordrhein-Westfalen - Daten und Hintergründe</i> | N/A | 2010-00-00 | climate change, impact | Project relevance, sustainability |
| LANUV-Fachbericht 50 | <i>Only in German: Klimawandelgerechte Metropole Köln - Abschlussbericht</i> | N/A | 2013-00-00 | climate change, impact, heat | Project relevance, sustainability |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|----------------------|---|---|---------------------|---|-----------------------------------|
| MBauGBAendG2 011EErl | <i>Only in German: Muster-Einführungserlass zum Gesetz zur Förderung des Klimaschutzes bei der Entwicklung in den Städten und Gemeinden</i> | N/A | 2011-12-16 | climate change, heat | sustainability |
| PLUS 4011-10 | Technical guide - Infrastructure in permafrost: A guideline for climate change adaptation | This Guideline supports the appropriate consideration of climate-change-related factors during the planning, design, and management of a range of community infrastructure in permafrost regions. In particular, it sets out to: 1. Provide an understanding of permafrost as an environmental variable, with a focus on how permafrost responds to climate and other environmental change; 2. Provide a general assessment of trends in climatic and permafrost conditions across northern Canada; 3. Describe the most common foundation types used for community infrastructure in permafrost environments; and 4. Outline a process for ensuring that the effects of climate change are incorporated, as appropriate, into the siting of community infrastructure projects and the design of their foundations. | 2010-06-01 | critical infrastructure, health, social support, climate change, environmental risk | sustainability, effectiveness |
| PLUS 4013-12 | Technical guide - Development, interpretation, and use of rainfall intensity-duration-frequency (IDF) information: Guideline for Canadian water resources practitioners | The guideline provides the guidance necessary to ensure that the derivation and use of IDF information across all Canadian localities is as consistent and scientifically defensible as possible. It provides some of the first formal evidence and advice for the incorporation of forward-looking information into IDF values and related design activities, such that the effects of climate change can be better considered. | 2012-03-01 | critical infrastructure, health, water, climate change, storm | sustainability |
| VDI 4710 Blatt 3 | Meteorological data for the building services - t,x correlations from 1991 to 2005 for 15 climatic zones in Germany | Since 1979, it has been common practice, particularly in DIN 4710, to compile the basic data of outdoor-air temperature (t) and water vapour content (x) in the form of t-x correlations. Initially, the data from 1951 to 1970 served as the basis for West Germany. When the standard was revised in 2003, in cooperation with the DWD (German Meteorological Service), the data gathered at 15 stations between 1961 and 1990 were published. The concept for the compilation of the correlation | 2011-03-00 | climate change, heat | Project relevance, sustainability |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|--------------|-------|---|---------------------|----------|--------------------|
| | | tables of air temperature and water vapour content in air, the so-called t-x correlations, so far consisted in using the respective hourly values measured over the 30 years of the currently completed climate normal period, i. e. presently from 1961 to 1990. Since the end of the nineteen-eighties, the air temperature has kept rising. To give better consideration to the obvious climate change in the air-temperature regime when planning building services, the t-x correlations have been re-calculated, and published in this VDI guideline, for the 15-year period from 1991 to 2005, which corresponds to half of the current climate normal period. | | | |

4.6. LIST OF IDENTIFIED STANDARDS – CATEGORY 'SOCIETAL ASPECTS'

In total 29 standards have been identified that are related to the category 'Societal Aspects'. The list of standards can be found in the table below. Particularly to be mentioned standards that might be of importance for the SMR project (in total 8, see Document No. column, marked in orange colour) are e. g. EN ISO 22300 'Societal security – Terminology' that defines terms applicable to societal security for supporting a common understanding; ISO 22398 'Societal security - Guidelines for exercises' which recommends good practice and guidelines for exercise projects in organizations; and ONR 192400 'Business Continuity and Corporate Security Management - Requirements for the qualification of the Business Continuity and Security Manager'.

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Table 7 - List of identified 'Societal Aspects' standards

| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|-------------------------|--|--|---------------------|----------------------|--|
| ANSI/APCO 1.112.1 | Best Practices for the Use of Social Media by Public Safety Communications | Social media is a common form of communication used by agencies and agency employees. This standard provides guidance on the use of social media for developing specific local procedures (ex: Facebook, Twitter, Instagram, Google+, etc.). | 2014-00-00 | social media | Project relevance, impact, effectiveness |
| ANSI/API BULLETIN 100-3 | Community Engagement Guidelines | These guidelines outline what communities can expect from operators. It is designed to acknowledge challenges and impacts that occur during the industry's presence in a given region. It provides flexible and adaptable strategies, recognizing that application will vary from operator to operator and community to community. | 2014-00-00 | community engagement | Project relevance, impact |
| CEN/TS 16555-5 | Innovation management - Part 5: Collaboration management | This Technical Specification provides guidance for the management of collaboration and productive interaction between individuals, departments, divisions and third party organizations engaged in innovation. It applies to all types of organization including manufacturing and services industries, voluntary organizations, governmental and social enterprise but with a particular focus on small and medium-sized enterprises (SMEs). | 2014-12-00 | social support | Project relevance, effectiveness |
| CEN/TS 16555-6 | Innovation management - Part 6: Creativity management | This Technical Specification provides guidance for managing the process of originating new ideas from which innovations may be developed. It is applicable to all types of organization including manufacturing and services industries, the voluntary sector, governmental and social enterprise but with a particular focus on small- and medium-sized enterprises (SMEs). The guidance in this TS covers issues to be considered by those responsible for managing innovation, in particular during the creative phase, and the sourcing of ideas from within and outside the organization. | 2014-12-00 | social support | impact, effectiveness |
| CWA 16814 | Nutritionally correct low-cost food for people at risk of poverty. General, specific requirements and labelling of CHANCE food | This document specifies the general, specific requirements and labelling criteria of CHANCE food. It provides specific (as described below) requirements relevant to raw and functional ingredients, food design and formulation, production process, packaging design and analytical approach for fruit, vegetables and animal origin based CHANCE food and ready-to-eat | 2014-10-15 | poverty | Project relevance, impact |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|------------------|---|--|---------------------|----------------------------|-----------------------------------|
| | | CHANCE pizza. Moreover, it provides general labelling requirements for CHANCE food. | | | |
| DIN EN 16309 | Sustainability of construction works - Assessment of social performance of buildings - Calculation methodology | This document includes amendment A1. This European Standard provides the specific methods and requirements for the assessments of social performance of a building while taking into account the building's functionality and technical characteristics. This European Standard applies to all types of buildings, both new and existing. The assessment of social performance of a building, in this first generation of the standard, concentrates on measures related to a building's occupants and other users. This European Standard is intended to support the decision making process and documentation of the assessment of the social performance of a building. | 2014-12-00 | social support | Project relevance, sustainability |
| DIN EN ISO 12894 | Ergonomics of the thermal environment - Medical supervision of individuals exposed to extreme hot or cold environments (ISO 12894:2001) | The document provides guidance to those concerned with the safety of human exposures to extreme hot or cold thermal environments, about the medical fitness assessment and health monitoring which may be appropriate prior to and during such exposures. It is intended to assist those with responsibility for such exposures to reach decisions about the appropriate level of medical supervision in different situations. The document presents guidance which should be read and used in context of other guidance and legislation applying to each particular situation. | 2002-08-00 | climate change, heat | Project relevance, sustainability |
| DIN SPEC 77002 | Ambient Assisted Living (AAL) - Requirements for AAL services | This Specification defines requirements for AAL services. | 2013-04-00 | social media, support | sustainability, impact |
| EN 60300-3-4 | Dependability management - Part 3-4: Application guide - Guide to the specification of dependability requirements | This part of IEC 60300 gives guidance on specifying the required dependability characteristics in specifications, together with specifications of procedures and criteria for verification and validation. The guidance provided includes the following: - advice on specifying quantitative and qualitative reliability, maintainability, availability and maintenance support requirements; - advice to purchasers of a system on how to ensure that the specified requirements will be fulfilled by | 2008-01-00 | public private partnership | effectiveness |



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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|------------------------|---|--|---------------------|--|--|
| | | suppliers; - advice to suppliers to help them to meet purchaser requirements. | | | |
| EN ISO 22300 | Societal security - Terminology (ISO 22300:2012) | Terms and definitions applicable to societal security to establish common understanding so that consistent terms are used. | 2014-07-00 | societal, society, community, citizen, civil protection, communication | Project relevance, sustainability, impact, effectiveness |
| EN ISO 22311 | Societal security - Video-surveillance - Export interoperability (ISO 22311:2012) | This International Standard is mainly for societal security purposes and specifies a common output file format that can be extracted from the video-surveillance contents collection systems (stand-alone machines or large scale systems) by an exchangeable data storage media or through a network to allow end-users to access digital video-surveillance contents and perform their necessary processing. | 2014-11-00 | societal, society, community, citizen, access, social media | Project relevance, sustainability, impact, effectiveness |
| ETSI TR 102133 V 1.1.1 | Human Factors (HF) - Access to ICT by young people: issues and guidelines | This work item will review the human interaction issues for access to ICT by children and provide guidance on how these should be dealt with by ETSI. This will include the ethical issues of security for vulnerable children accessing public communications spaces. | 2003-04-00 | ICT, security | Project relevance, impact |
| FD X30-028 | <i>Only in French:</i> Social responsibility - Guide for using ISO 26000 in the communication sector | N/A | 2012-05-01 | social support | sustainability, impact |
| GOST R 52884 | <i>Only in Russian:</i> Social service of the population. The order and conditions of granting the social services to elderly age citizens and invalids | N/A | 2007-00-00 | social support | sustainability, impact |
| GOST R 54343 | <i>Only in Russian:</i> Social service of the population. The order and conditions of granting of social services to children | N/A | 2011-00-00 | social support | Project relevance |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|---------------------|---|---|---------------------|--|--|
| ISO 22397 | Societal security - Guidelines for establishing partnering arrangements | ISO 22397:2014 provides guidelines for establishing partnering arrangements among organizations to manage multiple relationships for events impacting on societal security. It incorporates principles and describes the process for planning, developing, implementing and reviewing partnering arrangements. | 2014-07-00 | societal, communication, governance, society | Project relevance, sustainability, impact, effectiveness |
| ISO 22398 | Societal security - Guidelines for exercises | This International Standard recommends good practice and guidelines for an organization to plan, conduct and improve its exercise projects which may be organized within an exercise programme. | 2013-09-00 | governance, societal, communication | Project relevance, sustainability, impact, effectiveness |
| ISO 26000 | Guidance on social responsibility | This International Standard is intended to assist organizations in contributing to sustainable development. It is intended to encourage them to go beyond legal compliance, recognizing that compliance with law is a fundamental duty of any organization and an essential part of their social responsibility. | 2010-11-00 | societal, communication, society, community engagement | impact, effectiveness |
| ISO/IEC 24703 | Information technology - Participant identifiers | This International Standard specifies the datatype of participant identifiers in learning, education and training. Security and protection of personal data associated with the use of a participant identifier is not addressed in this standard. | 2004-05-00 | education, security | impact |
| ISO/IEC 24779-9 | Information technology - Cross-jurisdictional and societal aspects of implementation of biometric technologies - Pictograms, icons and symbols for use with biometric systems - Part 9: Vascular applications | ISO/IEC 24779-9 specifies the symbols and icons to be used in conjunction with vascular image recognition. This International Standard specifies a family of symbols and icons used in association with devices for biometric enrolment, verification, and/or identification. Icons are for display on visual display screens. Symbols are printed on signs and printed documents including user documents, hand outs, training material, installation/maintenance manuals, and on case or key tops and buttons of devices. | 2015-11-00 | societal, communication | Project relevance, effectiveness |
| ISO/IEC DIS 24779-1 | Information technology - Cross jurisdictional and societal aspects of implementation of biometric technologies - Pictograms, icons and symbols for use with biometric | The ISO/IEC 24779 multipart standard specifies a family of icons and symbols used in association with devices for biometric enrolment, verification and/or identification. Part 1 describes the approach used in specifying icons and the range of biometric technologies for which icon and symbol development is considered. The symbols and icons are intended to show the | 2013-09-00 | societal, application, communication | effectiveness |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|--------------|--|--|---------------------|--|--|
| | systems - Part 1: General principles | modality of biometrics and to advise the necessity of appropriate preparation for and behaviour required when using the biometric systems. | | | |
| ISO/TR 22312 | Societal security - Technological capabilities | The purpose of this Technical Report is to document the knowledge accumulated in the six-month study period conducted by ISO/TC 223/Ad-hoc group 1 (AHG1), in which AHG1 examined the different existing available technologies which would be relevant to standardize within the field of societal security. | 2011-07-00 | civil protection, societal, society | Project relevance, impact |
| ISO/TR 22351 | Societal security - Emergency management - Message structure for exchange of information | ISO/TR 22351:2015 describes a message structure for the exchange of information between organizations involved in emergency management. An organization can ingest the received information, based on the message structure, in its own operational picture. The structured message is called Emergency Management Shared Information (EMSI). | 2015-09-00 | societal, community, society, civil protection | Project relevance, sustainability, impact, effectiveness |
| IWA 12 | Guidelines on the application of ISO 9001:2008 in policing organizations | IWA 12:2013 provides guidelines to help policing organizations apply the requirements of ISO 9001:2008. IWA 12:2013 explains how ISO 9001:2008 applies to policing organizations, and how it supports the objectives of enhancing customer satisfaction and maintaining security and safety, by providing products and services that are consistent with the needs of customers, as well as with applicable regulatory requirements. | 2013-12-00 | education, infrastructure | Project relevance, impact |
| ONR 192400 | Business Continuity and Corporate Security Management - Requirements for the qualification of the Business Continuity and Security Manager | Specifies the requirements for the qualification of the Business Continuity and Security Manager. | 2009-11-15 | education, security | Project relevance, sustainability, impact, effectiveness |
| ONR 49003 | <i>Only in German:</i> Risk Management for Organizations and Systems - Requirements for the qualification of the Risk | N/A | 2014-01-01 | education, security | Project relevance, sustainability, impact, effectiveness |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|--------------|--|---|---------------------|--|----------------------------------|
| | Manager - Implementation of ISO 31000 | | | | |
| SANS 21500 | Guidance on project management | Provides guidance for project management and can be used by any type of organization, including public, private or community organizations, and for any type of project, irrespective of complexity, size or duration. Provides high-level description of concepts and processes that are considered to form good practice in project management. | 2014-03-11 | community engagement | Project relevance, effectiveness |
| UNI 11500 | Societal security - Public private partnerships - Guidelines for establishing partnership agreements | This International Standard provides generic guidelines to establish partnership agreements between any organizations to enhance coordination, collaboration and cooperation before, during and after destabilizing events. This guideline addresses principles, planning and development of partnership agreements with the objective of managing relations among relevant organizations, promoting interoperability, enabling governance and fulfilling of the agreement. | 2013-09-12 | public private partnership, governance, societal | Project relevance, impact |
| VDI 2807 | Team work - Application in value analysis/value management projects | This VDI Guideline is universally applicable in all areas of economics, sciences and administration. It supports the managing directors and project leaders of value analysis/value management projects in the overcoming of daily management and project-management tasks and provides information from the above-mentioned practical experience for the practice of teamwork. | 2013-07-00 | wealth | Project relevance, effectiveness |

4.7. LIST OF IDENTIFIED STANDARDS – CATEGORY 'SMART CITY'

The standards analysis for the category 'Smart City' resulted in the following list of 74 standards. Identified standards within this topic that might need special attention in the SMR project work (in total 16, see Document No. column, marked in orange colour) are e. g. the ISO 37000 standards series about 'Sustainable development of communities' such as ISO 37120 'Sustainable development of communities - Indicators for city services and quality of life' or ISO/NP 37123 'Sustainable Development in Communities - Indicators for Resilient Cities' (currently under

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development); and about ' Smart community infrastructures' including e. g. 'ISO/TR 37150 'Smart community infrastructures - Review of existing activities relevant to metrics'.

Table 8 - List of identified 'Smart City' standards

| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|--------------|--|--|---------------------|-----------------------------------|--|
| ASTM E 2432 | Standard Guide for General Principles of Sustainability Relative to Buildings | Sustainability has three types of general principles: environmental, economic, and social. This guide covers the fundamental concepts and associated building characteristics for each of the general principles of sustainability. | 2011-00-00 | education, infrastructure | Project relevance, sustainability |
| ASTM E 2741 | Standard Specification for Evaluation and Selection of Destinations for Environmentally Sustainable Meetings, Events, Trade Shows, and Conferences | This specification delineates procedural requirements for destination selection for meetings, events, trade shows, or conferences (hereafter, referred to as events). Destination selection is the practice of researching, evaluating, and choosing the location for an event. Destination selection is a core activity to plan an event and bring it to fruition. | 2011-00-00 | social support, sustainable, city | Project relevance |
| ASTM E 2742 | Standard Specification for Evaluation and Selection of Exhibits for Environmentally Sustainable Meetings, Events, Trade Shows, and Conferences | This specification delineates procedural requirements for exhibits and expositions for meetings, events, trade shows, or conferences (hereafter, referred to as events). This includes the set up and dismantling of trade shows and the exhibits that are built within the event floor. This specification identifies environmental sustainability criteria to be included in exhibits and expositions by planners, general service contractors, exhibitors, exhibit builders, and exhibitor-appointed contractors. | 2011-00-00 | social support | Project relevance |
| ASTM E 2743 | Standard Specification for Evaluation and Selection of Transportation for Environmentally Sustainable Meetings, Events, Trade Shows, and Conferences | This specification delineates procedural requirements for evaluating and selecting transportation for use in meetings, events, trade shows, and conferences (hereafter referred to as events). Transportation for events includes, but is not limited to, the following activities: transporting participants to/from conference related events, transporting participants between conference facilities and hotels, and transportation of materials. This specification focuses primarily on the reduction of carbon emissions from transport-related activity arising from events. | 2011-00-00 | social support | Project relevance, sustainability, impact, effectiveness |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|--------------|---|--|---------------------|-----------------------|--------------------|
| ASTM E 2745 | Standard Specification for Evaluation and Selection of Audio Visual (AV) and Production for Environmentally Sustainable Meetings, Events, Trade Shows, and Conferences | This specification delineates procedural requirements for the audio visual and production services associated with meetings, events, trade shows, or conferences (hereafter, referred to as events). Audio visual (AV) and production services encompass the range of services required to provide staging, scenic elements, audio, video, lighting, and technical production. | 2011-00-00 | social support | Project relevance |
| ASTM E 2746 | Standard Specification for Evaluation and Selection of Communication and Marketing Materials for Environmentally Sustainable Meetings, Events, Trade Shows, and Conferences | This specification delineates procedural requirements for communications and marketing for a meeting, event, trade show, or conference (hereafter, referred to as events). Communications materials for events related to the marketing and communications associated with an event include, but are not limited to: paper, printed materials, giveaways and promotional items, signage, educational materials, written pre- and post-event instructions to each exhibitor, registration area apparatus, forms, organizers, and packaging, surveys, exhibitor advertising leaflets, event guides and maps, badges, holders, stickers, ribbons, writing pads, pens, pencils, bags, totes, and lanyards. | 2011-00-00 | social media, support | Project relevance |
| ASTM E 2747 | Standard Specification for Evaluation and Selection of Onsite Offices for Environmentally Sustainable Meetings, Events, Trade Shows, and Conferences | This specification delineates procedural requirements for establishing onsite offices in conjunction with meetings, events, trade shows, or conferences (hereafter, referred to as events) by planners and suppliers. Establishing an onsite office is the practice of procuring and equipping planner event or working spaces used for operational purposes, within or nearby the venues. This specification pertains to onsite offices established by the event organizers for use by the event ' s planner, staff, volunteers, sponsors, or vendors requiring temporary offices. | 2011-00-00 | social support | Project relevance |
| ASTM E 2773 | Standard Specification for Evaluation and Selection of Food and Beverage for Environmentally Sustainable Meetings, Events, Trade Shows, and Conferences | This specification delineates procedural requirements for the evaluation and selection of food and beverage for meetings, events, trade shows, and conferences (hereafter, referred to as events). Food and beverage evaluation and selection is the practice of specifying, selecting, and procuring, food, beverage, and non-consumable food- or beverage-related items. This | 2011-00-00 | social support | Project relevance |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|--------------------|---|--|---------------------|--------------------------|--|
| | | specification includes all aspects of waste management, energy and water related practices, and associated training related to provision of food and beverage. Equipment required in the preparation and service of food and beverage is included in this specification. | | | |
| ASTM E 2777 | Standard Guide for Vegetative (Green) Roof Systems | This guide identifies terminology, principles and fundamental concepts including those related to sustainability, technical requirements of construction, and types of vegetative (green) roof systems used on buildings. | 2014-00-00 | social media | Project relevance, sustainability |
| ASTM E 2921 | Standard Practice for Minimum Criteria for Comparing Whole Building Life Cycle Assessments for Use with Building Codes and Rating Systems | This practice provides criteria to be applied irrespective of the assessment (LCA) tool that is used when LCA is undertaken at the whole building level to compare a final whole building design to a reference building design. The purpose of this practice is to support the use of whole building Life Cycle Assessment (LCA) in building codes and building rating systems by ensuring that comparative assessments of final whole building designs relative to reference building designs take account of the relevant building features, life cycle stages, and related activities in similar fashion for both the reference and final building designs of the same building. | 2013-00-00 | social support | Project relevance, impact |
| ASTM E 2986 | Standard Guide for Evaluation of Environmental Aspects of Sustainability of Manufacturing Processes | This guide provides guidance to develop manufacturer-specific procedures for evaluating the environmental sustainability performance of manufacturing processes. This guide introduces decision support methods that can be used to improve sustainability performance. | 2015-00-00 | social support | Project relevance, sustainability, impact, effectiveness |
| BASI/TR 03109 | <i>Only in German: Technische Richtlinie BSI TR-03109 - Smart Metering/Smart Energy; Version 1.0</i> | N/A | 2013-03-18 | energy, security | Project relevance, sustainability |
| CEN ISO/TR 24014-2 | Public transport. Interoperable fare management system. Business practices | This Technical Report (TR) introduces a generic conceptual framework that can be applied to all Interoperable Fare Management System (hereafter IFMS) compliant with ISO24014-1, as the basis for business practices relating to the | 2013-10-04 | transportation, security | Project relevance |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|--------------------|--|---|---------------------|--|-----------------------------------|
| | | conceptual framework for an IFMS, which is described in ISO 24014-1. | | | |
| CEN ISO/TR 24014-3 | Public transport. Interoperable fare management system. Complementary concepts to Part 1 for multi-application media | Multi Application media open new possibilities for separate IFM applications to be loaded and operated separately on the same media. This enables a customer oriented interoperability of ticketing applications with the possibility for the customer to use the same media in different IFMS independently of the fare policies and specific local systems. Part 3 will complement the role model of part 1. It describes new functional entities and new use cases which are not described in part 1 but are necessary in such a multi application environment for the management of the media and the applications. It will describe practices for migrations - From dedicated media of independent Fare Management Systems to the usage of common multi-application media - For independent Fare Management Systems to develop a complementary application for a progressive integration | 2013-06-07 | transportation, security | Project relevance, sustainability |
| CEN/TR 14383-2 | Prevention of crime - Urban planning and building design - Part 2: Urban planning | This Technical Report gives guidelines on methods for assessing the risk of crime and/ or fear of crime and measures, procedures and processes aimed at reducing these risks. Design guidelines are given for specific types of environments to prevent or counteract different crime problems consistently with the urban planning documents. | 2007-10-00 | buildings, city, urban process, construction | Project relevance, impact |
| CEN/TR 16427 | Intelligent transport systems - Public transport - Traveller Information for Visually Impaired People (TI-VIP) | This Technical Report is based on work undertaken to define the scope for a possible Technical Specification that would specify the information needed by blind and visually impaired people (VIP) when they are travelling. This information is primarily intended for users of road-based transport like buses, trolleybuses and trams, but it can also be used for subway, regional and inter-city trains. | 2013-01-00 | services, city | sustainability, impact |
| CWA 16030 | Code of practice for implementing quality in mobility management in small and medium sized cities | This document provides a code of practice for defining, implementing and continually improving quality in mobility management in small and medium sized cities. Small and medium sized cities are cities with 20,000 to 200,000 inhabitants. However, the same QM-scheme could be | 2009-10-00 | mobility, city | Project relevance, sustainability |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|-----------------|---|--|---------------------|--------------------------------|-----------------------------------|
| | | implemented by any city or municipality investing in mobility management irrespective of its size. The QMSMM presented could also aid private entities, agencies or companies - in this document called organisations - in defining a Mobility Management Policy. | | | |
| CWA 16267 | Guidelines for Sustainable Development of Historic and Cultural Cities - Qualities | The present referent document describes the commitments of the local authority in term of sustainable management of cultural (tangible and intangible) and natural heritages. Although it is systematically clarified in the text, all the described commitments are to be considered under the heritage point of view only. | 2011-02-00 | sustainable, buildings, city | Project relevance, sustainability |
| DIN EN 15643-5 | Sustainability of construction works - Sustainability assessment of buildings and civil engineering works - Part 5: Framework for the assessment of sustainability performance of civil engineering works | This European Standard provides specific principles and requirements for the assessment of environmental, social and economic performance of civil engineering works taking into account its technical characteristics and functionality. Assessments of environmental, social and economic performance are the three aspects of sustainability assessment of civil engineering works. The framework applies to all types of civil engineering works, both new and existing, and it is relevant for the assessment of the environmental, social and economic performance of new civil engineering works over their entire life cycle, and of existing civil engineering works over their remaining service life and end of life stage. | 2016-03-00 | risk, infrastructure | sustainability, impact |
| DIN EN 50491-11 | General requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS) - Part 11: Smart Metering - Application Specifications - Simple External Consumer Display | This European Standard specifies a data model to abstract the metering world towards a simple external consumer display. The data model, as described by means of functional blocks contained in this European Standard, lays down the format of metering data accessible by a simple external consumer display. The document takes into account the existing European standards like the EN 13757 and the EN 62056 series for the definition of the data model. | 2016-02-00 | buildings, smart, construction | impact |
| DIN EN 50491-12 | General requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control | The negotiation between the Smart Grid and the customer and or equipment may be realised by means of a control system called "Customer Energy Manager (CEM)". This standard specifies the data model, to be used above the Application Layer | 2015-02-00 | buildings, smart, construction | impact |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|--------------------|---|---|---------------------|--------------------------------|------------------------|
| | Systems (BACS) - Part 12: Smart grid - Application specification - Interface and framework for customer | by the interface between the Customer Energy Manager (CEM) and the mappings. The standard covers technology independent data structure to be used to exchange information by XML schema definitions. It applies for public or private building / home, industrial areas are excluded. | | | |
| DIN EN 62786 | Smart Grid User Interface - Demand Side Energy Resources Interconnection with the Grid (IEC 8/1366/CD:2014) | This standard provides principles and technical requirements for demand side energy resources interconnected to the distribution network. It applies to the planning, construction, operation and reinforcement of demand side energy resources interconnected to distribution networks. Demand side energy resources refer to small Distributed Resources (DRs) connected to the medium or low voltage distribution network at the vicinity of demand in the form of synchronous motor, asynchronous motor, converters, etc. They include distributed generation and energy storage. It includes distributed generation and energy storage. | 2014-12-00 | buildings, smart, construction | sustainability |
| DIN IEC 62746-10-1 | Systems interface between customer energy management system and the power management system - Part 10-1: Open Automated Demand Response (OpenADR 2.0b Profile Specification) (IEC 118/47/CD:2015) | The OpenADR 2.0 profile specification is a flexible data model to facilitate common information exchange between electricity service providers, aggregators, and end users. The concept of an open specification is intended to allow anyone to implement the two-way signaling systems, providing the servers, which publish information (Virtual Top Nodes or VTNs) to the automated clients, which subscribe the information (Virtual End Nodes, or VENs). This OpenADR 2.0 profile specification covers the signalling data models between VTN and VEN (or VTN/VEN pairs) and does include information related to specific DR electric reduction or 137 shifting strategies, which are taken at the facility. | 2016-01-00 | buildings, smart | sustainability |
| DIN IEC 62746-3 | Systems interface between customer energy management system and the power management system - Part 3: Architecture (IEC 57/1462/CD:2014) | This International Standard establishes an architecture that is supportive of interfaces and protocol profiles relevant to systems connected to the electrical grid. | 2014-11-00 | buildings, smart | sustainability, impact |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|----------------|---|---|--------------------------|---|--|
| DIN SPEC 33440 | Ergonomic design of user-interfaces and products for Smart Grid and Electromobility | This document describes fundamental ergonomic design requirements of user-interfaces and products for Smart Grid and Electromobility. | 2013-05-00 | mobility, construction, smart | sustainability |
| DIN SPEC 91297 | Attribution of a certificate based on a specific role model for the Internet of energy (energy security services) | The objective of this public available specification (DIN SPEC) is an energy sector specific security token. Necessary for the data traffic is a security concept which includes the aspects confidentiality, integrity and authenticity. For both encoding and signature of messages known security standards are used. On the contrary the security token needs an extension which considers the specific aspects of the electricity market and allows an identification control. The focus is on the release of energy industry relevant information objects and processes between actors based on existing processes and their expandability's. | 2013-12-00 | industry, smart | Project relevance, impact |
| DIN SPEC 91324 | E-mobility data set for an open service cloud for OEM and third-party services | This DIN SPEC contains a data set for an open service cloud for the development of OEM and third-party services in the e-mobility sector. Because its users will come from diverse areas, this DIN SPEC will make it possible to record and process data from different sources in a uniform manner. | 2015-04-00 | mobility, industry, smart | sustainability, impact |
| DIN SPEC 91340 | Terminology of intelligent individual urban mobility | N/A | <i>Under development</i> | smart city, mobility | Project relevance, sustainability, effectiveness |
| DIN SPEC 91347 | Humble Lamppost - Integration of smart technologies into existing urban infrastructures | N/A | <i>Under development</i> | smart city, infrastructures | Project relevance, sustainability, impact, effectiveness |
| EN 14892 | Transport service - City logistics - Guideline for the definition of limited access to city centers | This European Standard establishes a code of best practice for the definition and application of measures designed to ensure the efficient and the environmentally acceptable movement of transport in cities. | 2005-11-00 | logistics, city, services, construction | Project relevance, sustainability, impact, effectiveness |
| EN 15531-2 | Public transport - Service interface for real-time information relating to public | SIRI uses a consistent set of general communication protocols to exchange information between client and server. The same pattern of message exchange may be used to implement different specific functional interfaces as sets of concrete | 2015-08-00 | governance, infrastructure | impact, effectiveness |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|------------------------|---|--|---------------------|-------------------------------------|--|
| | transport operations - Part 2 : communications | message content types. Two well-known specific patterns of client-server interaction are used for data exchange in SIRI: Request/Response and Publish/Subscribe. | | | |
| ETSI TR 102893 V 1.1.1 | Intelligent Transport Systems (ITS) - Security - Threat, Vulnerability and Risk Analysis (TVRA) | Preparation of a full TVRA (using guidelines from ISO 15408 and TS 102 165-1) for ITS covering Vehicle to vehicle, Vehicle to roadside infrastructure (network), Vehicle to roadside standalone unit and ITS integration with Internet communication scenarios. This work shall consider the existing output from ongoing studies (eSAFETY, SEVECOM and others) and also from other standards groups including IEEE 1609.2 and ISO TC204 (CALM). | 2010-03-00 | risk, vulnerability, infrastructure | Project relevance, sustainability, impact, effectiveness |
| ETSI TR 103290 V 1.1.1 | Machine-to-Machine communications (M2M) - Impact of Smart City Activity on IoT Environment | Smart City study would undertake compilation and review of activities taking place in the area of SMART City in Europe, Asia, and US. It will analyse the relevance of Smart City applications, and possible underlying network architecture. The report will describe use case descriptions for Smart City applications in context of but not limited to IoT communications. | 2015-04-00 | smart city | impact, effectiveness |
| IEC/TS 62898-1, Ed. 1 | Guidelines for general planning and design of microgrids | | 2016-03-00 | construction, smart | impact, effectiveness |
| IEEE 1888 | IEEE Standard for Ubiquitous Green Community Control Network Protocol | The standard identifies gateways for field-bus networks, data storage for archiving and developing data sharing platforms, and application units as important system components for developing digital communities, i.e., building-scale and city-wide ubiquitous facility networking infrastructure. The standard defines a data exchange protocol that generalizes and interconnects these components (gateways, storage, application units) over the IPv4/v6-based networks. This enables integration of multiple facilities, data storage, application services such as central management, energy saving, environmental monitoring, and alarm notification systems. | 2014-00-00 | digital, city | sustainability, impact |
| ISO 15638-11 | Intelligent transport systems - Framework for cooperative telematics applications for | ISO 15638-11 addresses the provision of 'Driver Work Records' (DWR) and specifies the form and content of such data required to support such systems, and access methods to that data. The | 2014-07-00 | transportation, security | impact, effectiveness |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|--------------|--|--|---------------------|--------------------------|-----------------------|
| | regulated vehicles (TARV) - Part 11: Driver work records | scope of this part of ISO 15638 is to provide specifications for common communications and data exchange aspects of the application service driver work records that a regulator can elect to require or support as an option. | | | |
| ISO 15638-12 | Intelligent transport systems - Framework for cooperative telematics applications for regulated vehicles (TARV) - Part 12: Vehicle mass monitoring | ISO 15638-12 addresses the provision of vehicle mass monitoring (VMM) and specifies the form and content of such data required to support such systems, and access methods to that data. The scope of this part of ISO 15638 is to provide specifications for common communications and data exchange aspects of the application service VMM that a regulator can elect to require or support as an option. | 2014-07-00 | transportation, security | impact, effectiveness |
| ISO 15638-14 | Intelligent transport systems - Framework for cooperative telematics applications for regulated vehicles (TARV) - Part 14: Vehicle access control | ISO 15638-14 addresses the provision of "vehicle access control" and specifies the form and content of such data required to support such systems, and access methods to that data. The scope of this part of ISO 15638 is to provide specifications for common communications and data exchange aspects of the application service vehicle access control that a regulator may elect to require or support as an option. | 2014-07-00 | transportation, security | impact, effectiveness |
| ISO 15638-15 | Intelligent transport systems - Framework for cooperative telematics applications for regulated vehicles (TARV) - Part 15: Vehicle location monitoring | ISO 15638-15 addresses the provision of 'vehicle location monitoring' and specifies the form and content of such data required to support such systems and access methods to that data. The scope of this part of ISO 15638 is to provide specifications for common communications and data exchange aspects of the application service vehicle location monitoring that a regulator may elect to require or support as an option. | 2014-07-00 | transportation, security | impact, effectiveness |
| ISO 15638-16 | Intelligent transport systems - Framework for cooperative telematics applications for regulated vehicles (TARV) - Part 16: Vehicle speed monitoring | ISO 15638-16 addresses the provision of 'vehicle speed monitoring' and specifies the form and content of such data required to support such systems, and access methods to that data. The scope of this part of ISO 15638 is to provide specifications for common communications and data exchange aspects of the application service vehicle speed monitoring that a regulator can elect to require or support as an option. | 2014-07-00 | transportation, security | impact, effectiveness |
| ISO 15638-17 | Intelligent transport systems - Framework for cooperative | ISO 15638-17 addresses the provision of "consignment and location monitoring" and specifies the form and content of such | 2014-07-00 | transportation, security | impact, effectiveness |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|---------------|---|---|--------------------------|---|--|
| | telematics applications for regulated vehicles (TARV) - Part 17: Consignment and location monitoring | data required to support such systems, and access methods to that data. The scope of this part of ISO 15638 is to provide specifications for common communications and data exchange aspects of the application service consignment and location monitoring that a regulator can elect to require or support as an option. | | | |
| ISO 15638-6 | Intelligent transport systems - Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) - Part 6: Regulated applications | ISO 15638-6 specifies the common roles and responsibilities of actors providing regulated application systems which use TARV to provide regulated application services for regulated commercial freight vehicles and the interoperability of key operational steps and actions required to support all TARV regulated application service systems. | 2014-07-00 | transportation, security | impact, effectiveness |
| ISO 15638-8 | Intelligent transport systems - Framework for cooperative telematics applications for regulated vehicles (TARV) - Part 8: Vehicle access management | ISO 15638-8 addresses the provision of "vehicle access management" (and monitoring) and specifies the form and content of such data required to support such systems, and access methods to that data. The scope of this part of ISO 15638 is to provide specifications for common communications and data exchange aspects of the application service vehicle access monitoring that a regulator may elect to require or support as an option. | 2014-07-00 | transportation, security | impact, effectiveness |
| ISO 37120 | Sustainable development of communities - Indicators for city services and quality of life | ISO 37120:2014 defines and establishes methodologies for a set of indicators to steer and measure the performance of city services and quality of life. ISO 37120:2014 is applicable to any city, municipality or local government that undertakes to measure its performance in a comparable and verifiable manner, irrespective of size and location. | 2014-05-00 | smart city, sustainable, services, buildings, city, urban, resilience, indicators | Project relevance, sustainability, impact, effectiveness |
| ISO/AWI 37104 | Sustainable development in communities - Guide to establishing strategies for smart cities and communities | Under development - by ISO/TC 268 - Sustainable development in communities | <i>Under development</i> | sustainable, smart, city, community | Project relevance, sustainability, impact, effectiveness |
| ISO/CD 37154 | Smart community infrastructures - Best practice guidelines for transportation | Under development - by ISO/TC 268 - Sustainable development in communities | <i>Under development</i> | transportation, smart, | Project relevance, sustainability, |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|-------------------|---|--|--------------------------|--|--|
| | | | | communi-ty, infrastructure | impact, effectiveness |
| ISO/DTR 37152 | Smart community infrastructures - Common framework for development and operation -- Ad hoc group report | Under development - by ISO/TC 268 - Sustainable development in communities | <i>Under development</i> | infrastructure, smart, city, community | Project relevance, sustainability, impact, effectiveness |
| ISO/IEC 19395 | Information technology - Sustainability for and by information technology - Smart data centre resource monitoring and control | ISO/IEC 19395: in the Smart Data Centre, Management Functions monitor and control Resources. Resources model IT and facility equipment, systems and components in a data centre. | 2015-01-00 | monitoring, smart | Project relevance, sustainability |
| ISO/IEC DIS 29161 | Information technology - Data structure - Unique identification for lot | This International Standard establishes a unique identification scheme for the Internet of Things (IoT), based on existing and evolving data structures. This International Standard specifies the common rules applicable for unique identification that are required to ensure full compatibility across different identities. | 2015-06-00 | internet of things | Project relevance, effectiveness |
| ISO/NP 37122 | Sustainable development in communities - Indicators for Smart Cities | Under development - by ISO/TC 268 - Sustainable development in communities | <i>Under development</i> | sustainable, community, city, smart | Project relevance, sustainability, impact, effectiveness |
| ISO/NP 37123 | Sustainable Development in Communities -- Indicators for Resilient Cities | Under development - by ISO/TC 268 - Sustainable development in communities | <i>Under development</i> | smart cities, resilience, indicators | Project relevance, sustainability, impact, effectiveness |
| ISO/TR 37150 | Smart community infrastructures - Review of existing activities relevant to metrics | ISO/TR 37150:2014 provides a review of existing activities relevant to metrics for smart community infrastructures. In ISO/TR 37150:2014, the concept of smartness is addressed in terms of performance relevant to technologically implementable solutions, in accordance with sustainable development and resilience of communities, as defined in ISO/TC 268. ISO/TR 37150:2014 addresses community infrastructures such as energy, water, transportation, waste and information and communications technology (ICT). It focuses on the technical | 2014-02-00 | smart city, sustainable, societal, resilience, community, ICT, metrics | Project relevance, sustainability, impact, effectiveness |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|-----------------------|---|--|---------------------|--|--|
| | | aspects of existing activities which have been published, implemented or discussed. Economic, political or societal aspects are not analyzed in ISO/TR 37150:2014. | | | |
| ISO/TS 37151 | Smart community infrastructures - Principles and requirements for performance metrics | ISO/TS 37151:2015 gives principles and specifies requirements for the definition, identification, optimization, and harmonization of community infrastructure performance metrics, and gives recommendations for analysis, including smartness, interoperability, synergy, resilience, safety, and security of community infrastructures. Community infrastructures include, but are not limited to, energy, water, transportation, waste, and ICT. | 2015-05-00 | energy, security, transportation, finance, smart city, sustainable, urban, services, resilience, metrics | Project relevance, sustainability, impact, effectiveness |
| ITU-T L Supplement 17 | ITU-T L.1600 - Definition for smart sustainable city | Supplement 17 to ITU-T L-series Recommendations provides a definition for smart sustainable city (SSC). It was developed by the Focus Group on Smart sustainable Cities (FG-SSC) that carried out an analysis of definitions for smart sustainable cities (see Technical Report "ITU-T TR SSC Def") following the adoption of the UN General Assembly 66 Resolution 288 (see "UN Resolution 288"). This Supplement has been developed with input from UNECE, UNFCCC, UNESCO, UN-Habitat, other UN agencies and stakeholders. | 2015-10-00 | smart city, sustainable | Project relevance, sustainability |
| ITU-T Y.2065 | Service and capability requirements for e-health monitoring services | Recommendation ITU-T Y.2065 provides service and capability requirements for e-health monitoring services. Three classes of e-health monitoring services, including their general and specific characteristics, are described. Service requirements for the support of e-health monitoring services are also described, and based on the identified service requirements, the capability requirements are specified. | 2014-03-00 | internet of things | impact |
| ITU-T Y.2066 | Common requirements of the Internet of things | Recommendation ITU-T Y.2066 provides the common requirements of the Internet of things (IoT). These requirements are based on general use cases of the IoT and IoT actors, which are built from the definition of IoT contained in Recommendation | 2014-06-00 | internet of things | impact |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|--------------|---|---|---------------------|---------------------------|----------------------------------|
| | | ITU-T Y.2060. The common requirements of the IoT are independent of any specific application domain, which refer to the areas of knowledge or activity applied for one specific economic, commercial, social or administrative scope, such as transport application domain and health application domain. | | | |
| ITU-T Y.2067 | Common requirements and capabilities of a gateway for Internet of things applications | Recommendation ITU-T Y.2067 provides the common requirements and capabilities of a gateway for Internet of things (IoT) applications. The provided common requirements and capabilities are intended to be generally applicable in gateway application scenarios. | 2014-06-00 | internet of things | impact, effectiveness |
| ITU-T Y.2068 | Functional framework and capabilities of the Internet of things | Recommendation ITU-T Y.2068 provides a description of the basic capabilities of the Internet of things (IoT), based on the functional view, the implementation view and the deployment view of the IoT functional framework described in this Recommendation, in order to fulfil the IoT common requirements specified in Recommendation ITU-T Y.2066. This Recommendation also describes additional capabilities of the IoT for the integration of cloud computing and big data technologies with the IoT. | 2015-03-00 | internet of things | Project relevance, impact |
| ITU-T Y.2074 | Requirements for Internet of things devices and operation of Internet of things applications during disasters | Recommendation ITU-T Y.2074 provides requirements for Internet of things (IoT) devices used for operation of IoT applications in the context of disaster in addition to the common requirements of IoT in ITU-T Y.2066. It also provides requirements for the operation of IoT applications during disaster. | 2015-01-00 | internet of things | Project relevance, effectiveness |
| PAS 1192-5 | Specification for security-minded building information modelling, digital built environments and smart asset management | PAS 1192-5 specifies requirements for cyber-security minded BIM. It outlines the cyber-security vulnerabilities to hostile attack when using BIM and provides an assessment process to determine the levels of cyber-security for BIM collaboration which should be applied during all phases of the site and building lifecycle. | 2015-05-31 | buildings, smart | effectiveness |
| PAS 180 | Smart cities. Vocabulary | To help build a strong foundation for future standardization and good practices, PAS 180 provides industry-agreed | 2014-02-28 | education, infrastructure | Project relevance, effectiveness |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|--------------|---|--|---------------------|---|--|
| | | <p>understanding of smart city terms and definitions to be used in the UK.</p> <p>The PAS defines terms for smart cities, including smart city concepts across different infrastructure and systems' elements and used across all service delivery channels. It covers materials, processes, methodologies and applications. The PAS is intended for city authorities and planners, buyers of smart city services and solutions, as well as product and service providers.</p> | | | |
| PAS 181 | Smart city Framework. Guide to establishing strategies for smart cities and communities | This PAS establishes a good practice framework for city leaders to develop, agree and deliver smart city strategies that can help transform their city's ability to meet its future challenges and deliver its future aspirations. | 2014-02-28 | education, infrastructure, smart city, services | Project relevance, effectiveness |
| PAS 182 | Smart city concept model. Guide to establishing a model for data interoperability | <p>PAS 182:2014 gives guidance on how to apply a data concept model to promote data sharing across sectors in a city and help bridge the differences in data analysis between sectors like health, education and transport.</p> <p>It is intended to facilitate discussions between decision-makers and the specialists who build and design the systems and services that enable a city to function.</p> <p>The guidance in PAS 182:2014 addresses the fact that service providers do not always have the expertise to analyse the data they accumulate, that different sectors use a different language when describing data and offers a model that can be used by a variety of sectors.</p> <p>PAS 182:2014 is aimed at service providers such as national and local government departments, utilities, healthcare providers, transport, construction companies, ICT solution providers, city planners and developers.</p> | 2014-10-31 | education, infrastructure, smart city, services | Project relevance, sustainability, impact, effectiveness |
| PD 8100 | Smart cities overview. Guide | <p>PD 8100 gives guidance on how to adopt and implement smart city products and services in order to facilitate the rapid development of an effective smart city.</p> <p>It describes in detail the potential benefit of smart city strategies, provides recommendations on how to identify the first steps towards making the city smarter and covers the role of</p> | 2015-02-27 | education, infrastructure, urban, smart | Project relevance, sustainability |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|--------------|--|---|---------------------|---------------------------|----------------------------------|
| | | <p>technology and data in providing the tools in this process. The guide is part of the smart cities suite of documents. PD 8100:2015 is a guide for city leaders in the public, private or community sectors and is intended to help them find the standards that are related to what they are doing. It is particularly relevant to national and local government departments, utility companies, healthcare providers, transport service providers, construction companies, network companies, city planners and developers, designers, and vendors of ICT solutions be they big players, SMEs, or their clients.</p> | | | |
| PD 8101 | Smart cities. Guide to the role of the planning and development process | <p>PD 8101:2014 provides guidance on how the planning and implementation of developments and infrastructure projects can equip cities to benefit from smart technologies. The guide is relevant to major developments, infrastructure projects, refurbishment programmes and improvements to public spaces. It considers how each stage of the planning and development process could support smart city opportunities and sets out what needs to be done at each stage. PD 8101:2014 is intended for the use of those involved in the planning and implementation of developments and infrastructure projects, including city leadership, planning policy makers, planning case officers, regeneration officers and developers and the consultants who work with them.</p> | 2014-10-31 | education, infrastructure | Project relevance, effectiveness |
| SAE J 1711 | Recommended Practice for Measuring the Exhaust Emissions and Fuel Economy of Hybrid-Electric Vehicles, Including Plug-In Hybrid Vehicles | <p>This Society of Automotive Engineers (SAE) Recommended Practice establishes uniform chassis dynamometer test procedures for hybrid-electric vehicles (HEVs) that are designed to be driven on public roads. The procedure provides instructions for measuring and calculating the exhaust emissions and fuel economy of HEVs driven on the Urban Dynamometer Driving Schedule (UDDS) and the Highway Fuel Economy Driving Schedule (HFEDS), as well as the exhaust emissions of HEVs driven on the US06 Driving Schedule (US06) and the SC03 Driving Schedule (SC03).</p> | 2010-06-08 | mobility, smart | sustainability, impact |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|--------------|--|--|---------------------|-----------------|--|
| SAE J 2293/1 | Energy Transfer System for Electric Vehicles - Part 1: Functional Requirements and System Architectures | SAE J2293 establishes requirements for Electric Vehicles (EV) and the off-board Electric Vehicle Supply Equipment (EVSE) used to transfer electrical energy to an EV from an Electric Utility Power System (Utility) in North America. This document defines, either directly or by reference, all characteristics of the total EV Energy Transfer System (EV-ETS) necessary to insure the functional interoperability of an EV and EVSE of the same physical system architecture. | 2014-02-26 | mobility, smart | sustainability, effectiveness |
| SAE J 2293/2 | Energy Transfer System for Electric Vehicles - Part 2: Communication Requirements and Network Architecture | See SAE J2293/1 | 2014-02-26 | mobility, smart | sustainability |
| SAE J 2344 | Guidelines for Electric Vehicle Safety | This SAE Information Report identifies and defines the preferred technical guidelines relating to safety for vehicles that contain High Voltage (HV), such as Electric Vehicles (EV), Hybrid Electric Vehicles (HEV), Plug-In Hybrid Electric Vehicle (PHEV), fuel Cell Vehicles (FCV) and Plug-In fuel Cell Vehicles (PFCV) during normal operation and charging, as applicable. Guidelines in this document do not necessarily address maintenance, repair, or assembly safety issues. | 2010-03-05 | mobility, smart | Project relevance, sustainability |
| UNE 178102-1 | Smart cities. Infrastructures. Telecommunication systems. Part 1: Multiservice city networks. | This standard defines a telecommunication network to support critical infrastructures and municipal services. | 2015-10-07 | smart city | Project relevance, effectiveness |
| UNE 178104 | Smart cities. Infrastructures. Comprehensive systems for a Smart City management | This standard has as objective to identify the capacities that a city platform should have, to structure those capacities into a model and to identify components needed. | 2015-10-07 | smart city | Project relevance, effectiveness |
| UNE 178303 | Smart Cities. Asset management of the city. Specifications. | This standard specifies the requirements to establish, implement, maintain and improve a municipal management system. | 2015-05-27 | smart city | impact, effectiveness |
| UNE 66182 | Guide for comprehensive assessment of local government and transformation into a smart city. | This standard provides an evaluation tool that includes all municipal activities; it is the basis of a comprehensive quality management, and helps to strengthen the confidence of citizens in the management of the local administration. | 2015-12-29 | smart city | Project relevance, impact, effectiveness |

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| Document No. | Title | Abstract | Date of publication | Keywords | Relevance criteria |
|-------------------------------|---|----------|---------------------|---------------------|------------------------------------|
| VDE-ITG-Richtlinie ITG 2.1-02 | <i>Only in German:</i> Messung und Bewertung der Usability in Smart Home-Umgebungen | N/A | 2014-11-00 | construction, smart | Project relevance, sustainability, |

5. SUMMARY AND CONCLUSIONS

This report is pointing out that there lots of standards exist and a great variety of standardization activities take place especially on European and International level that cover the topics of crisis management, urban resilience and smart cities and thus are relevant for the SMR project. The comprehensive list of 276 standards – from which have been 95 initially assessed to be of significant importance for SMR – show that the relevant standardization activities are horizontally spread and that there exists an interconnection between several topics. To sum up, the result of the standards analysis regarding city resilience profits from a wide range of standards involving different aspects and crosslinks. Notable as well is the fact that there exist currently more standards on the topics 'Crisis', 'Critical Infrastructures' and 'Smart City' than on 'Resilience', 'Climate Change' and 'Societal Aspects'. However, the standards on resilience which are currently under development as well as the increasing efforts in the standardization of these topics show that there is a need for these standards and that standards developing organizations (SDOs) are taking care on this issue.

Through the work conducted within the task 6.1, the SMR partners and project affiliates recognized the importance of standards, policies, and safety procedures and acknowledged their rationale and need for further dissemination and awareness raising regarding standardization activities, mainly in the fields of resilience, crisis management and vulnerability assessment. Any standardization efforts regarding enhancing resilience in cities can provide with modest to important benefits in reducing climate hazards and adverse events. What really matters is not merely the existence of procedures and training systems, but also their implementation at municipality or city level. The city representatives need to be informed and to be aware of any existing standards in relation to main challenges and problematic issues their cities may face.

The results in this deliverable will be mainly used for task 6.2 the 'Identification of standardization potential'. Additionally the Work package 6 representatives such as DIN will attend most of the upcoming SMR meetings within other Work packages to gather information that will feed into the ongoing standardization process, to spread awareness regarding SMR standardization activities and to provide additional input in the tools development processes within Work packages 3 to 5. The standards and standardization activities of this report will also be further observed, extended and analysed throughout the project's lifespan in order to support the future standardization activities within SMR. It is of great

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importance to reflect the state of the art standards and to incorporate the essence of the SMR project into the European standards landscape.

6. REFERENCES

[1] CEN/CENELEC, „EN 45020:2006: Standardization and related activities - General vocabulary,“ 2006.

[2] <http://www.beuth.de/de/normenverwaltung/perinorm>

7. ABBREVIATIONS

Table 9 - List of abbreviations

| Abbreviation | Definition or Organization/Publisher |
|--------------|---|
| ANSI | American National Standards Institute |
| API | American Petroleum Institute |
| ARP | SABS STANDARDS DIVISION - South Africa |
| ASTM | American Society for Testing and Materials |
| AWWA | American Water Works Association |
| BASI | Federal Office for Information Security |
| BIP | British Standards Institution |
| BS | British Standards Institution |
| CAN | Canadian Standards Association |
| CAP | Common alerting protocol |
| CEA | Consumer Electronics Association |
| CEN | European Committee for Standardization |
| CENELEC | European Committee for Electrotechnical Standardization |
| CSN | Czech Standards Institute |
| CWA | CEN Workshop Agreement |
| DIN | German Institute for Standardization |
| DoA | Description of Action |
| DS | Danish Standards Foundation |
| DWA | German Association for Water, Wastewater and Waste |
| DVGW | German Technical and Scientific Association for Gas and Water |
| EN | European Standard |

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| Abbreviation | Definition or Organization/Publisher |
|--------------|---|
| ETSI | European Telecommunications Standards Institute |
| FD | AFNOR French national organization for standardization |
| GOST | Federal Agency on Technical Regulating and Metrology (GOST) - Russia |
| IEC | International Electrotechnical Commission |
| IEEE | The Institute of Electrical and Electronics Engineers, Inc. |
| ISO | International Organization for Standardization |
| ITU | International Telecommunication Union |
| IWA | International Workshop Agreement - ISO |
| JTC | Joint Technical Committee |
| LANUV | State Agency for Nature, Environment and Consumer Protection North Rhine-Westphalia |
| NA | Standards Committee at DIN |
| NEN | The Netherlands Standardization Institute |
| NF | AFNOR French national organization for standardization |
| NS | Norwegian Standard |
| ONR | ASI Austrian Standards Institute |
| PAS | Publicly Available Specification |
| PD | British Standards Institution |
| PLUS | Canadian Standards Association |
| PPP | Public private partnership |
| SAE | Society of Automotive Engineers, Inc. |
| SANS | SABS Standards Division - South Africa |
| SDO | Standards Developing Organization |
| SG | Study Group |
| TC | Technical Committee |
| UNE | AENOR Spanish Association for Standardisation and Certification |
| UNI | Italian National Unification |
| VDE | Association for Electrical, Electronic & Information Technologies |
| VDI | The Association of German Engineers |
| WG | Working Group |