



RESIN

SUPPORTING DECISION –
MAKING FOR RESILIENT CITIES

POLICY BRIEF

STANDARDISATION IN LOCAL CLIMATE CHANGE ADAPTATION: BENEFITS, MYTHS AND RECOMMENDATIONS

INTRODUCTION

Standards can play an essential role in helping local governments to adapt to the impacts of climate change. They serve as a reliable reference and guide by describing proven approaches to adaptation measures and processes, which can then ensure a high level of performance upon implementation.

Recognising this potential, the European Commission requested that the European Committee for Standardisation (CEN) develop “guidance tools which ensure climate adaptation is embedded in all future European standardisation activities” (CEN-CENELEC, 2016)¹. However, local governments continue to face certain barriers to adopting standards for climate change adaptation.

In response, this policy brief provides an outline of the urban standardisation landscape in Europe, covering the benefits of (and barriers to) using standards for local climate change adaptation, outlining existing relevant standards for local governments, busting persistent myths about using them, and concluding with a set of recommendations for local governments and creators of standards – aimed at improving the impact of standardisation on climate change adaptation efforts. It was produced as part of the project RESIN – Climate Resilient Cities and Infrastructures, and also describes relevant work undertaken by the project team in regard to standardisation.

CEN defines a standard as “a set of recommendations or preferences recommended by a featured user group.” In particular, according to EN 45020:2006 (ISO/IEC Guide 2:2004), a standard is “a document, established by consensus and approved by a recognized body, that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context.”

Globally, standards are published by both ‘formal’ (national, regional or international) and ‘informal’ (e.g. ASTM International, SAE, SEMI, TAPPI) Standards Development Organisations (SDOs) (Hatto, 2010). The difference between formal and informal standards is in the representation of those involved in the development and approval processes: for formal standards, the process operates through national representation assigned by CEN or ISO, or through national standardisation bodies, whereas informal standards are developed through organisational or individual representation (Hatto, 2010).

¹ This request supports the implementation of the EU Strategy on Adaptation to Climate Change (2013), which lays out priorities and actions for climate change adaptation in Europe.

EXISTING STANDARDS AND STANDARDISED METHODS RELEVANT TO CLIMATE CHANGE ADAPTATION

Various standards related to adaptation and resilience are currently under development or exist already. Some of the most relevant ones are listed in the following table.

STANDARD (published/under development)	DESCRIPTION
ISO 37101:2016 — Sustainable development in communities — Management system for sustainable development ²	Presents a coherent, community-based management approach which aims at helping cities and communities to better coordinate participatory development and implement local sustainability programmes.
ISO/DIS ³ 37104 Sustainable cities and communities — Transforming our cities — Guidance for practical local implementation of ISO 37101 ¹	Currently in draft form, will be published late 2018 or early 2019. It focuses on the practical implementation of sustainable management in cities based on the ISO 37101 principles (NEN, 2018).
ISO 37120:2018 – Sustainable development of communities – Indicators for city services and quality of life ¹	Outlines methodologies for a set of indicators to direct and measure the performance of city services and quality of life (ISO, 2018).
ISO/WD ⁴ 37123 Sustainable development in Cities and communities – Indicators for resilient cities ¹	Currently under development, will establish definitions and methodologies for a set of indicators on resilience in cities.
ISO/WD ² 14050 (2018-06-30) Environmental Management – Vocabulary ³	Currently under development. This fourth edition replaces the third edition (ISO 14050:2009), which has been technically revised.
ISO/DIS 14090 – Adaptation to climate change – Principles, requirements and guidelines ⁶	Currently under development (ISO, 2018), will support organisations to put in place a structure to prepare for changing weather patterns and extremes and implement adaptation measures.
ISO/CD ⁷ 14091 – Adaptation to climate change – Vulnerability, impacts and risk assessment ⁵	Currently under development (ISO, 2018), will provide guidance for assessing risks related to the impacts of climate change.
ISO/AWI ⁹ TS ¹⁰ 14092 GHG Management & related activities: requirement & guidance of adaptation planning for organisations including local governments and communities ⁵	Currently under development (ISO, 2018), will specify requirements and offer guidance on adaptation planning, including how to analyse climate vulnerability, risk and adaptive capacity; set priorities with stakeholders; and develop and iteratively update adaptation plans.
ISO/NP ¹¹ 14097 – Framework and principles for assessing and reporting investments and financing activities related to climate change ⁵	Currently under development (ISO, 2018), will specify a general framework, including principles, requirements and guidance.

Key relevant standards that the RESIN project has identified

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| <p>2 Developed by the technical committee ISO TC268 'Sustainable Cities and Communities'.</p> <p>3 Draft International Standard.</p> <p>4 Working Draft.</p> <p>5 Developed by the technical committee ISO/TC 207 'Environmental management'.</p> | <p>6 Developed by the technical committee ISO/TC 207/SC 7 'Greenhouse gas management and related activities'.</p> <p>7 Committee Draft.</p> <p>8 It will consist of four parts: Concept of risk assessment; Preparing a risk assessment; Executing a risk assessment; Reporting a risk assessment.</p> <p>9 Applied Work Item.</p> <p>10 Technical Subject.</p> <p>11 New Work Item Proposal.</p> |
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In addition, local government practitioners involved in climate change adaptation often already access informal standards of a kind in their day-to-day work. Many have already committed to act on initiatives such as the Global Covenant of Mayors for Climate and Energy, which defines a common framework for action (Jong, de Buck, & Bogen, 2018). The adoption of such commitments, as well as the use of guidance (such as the European Commission's Urban Adaptation Support Tool) and other initiatives to benchmark, monitor and report progress according to indicators can be considered 'informal' standards¹². Cities can build on these informal standards, and channel them into relevant standardisation activities at national or international level to influence the development of formal standards.

ROLE OF STANDARDISATION IN CLIMATE CHANGE ADAPTATION

Severe weather events as part of a changing climate can have drastic effects on health, infrastructure and supply chains (CEN-CENELEC, 2016; IPCC, 2014). Examples of these impacts occurred in summer 2018 as a result of extreme flooding, drought and heat waves across Europe. Effective adaptation measures must be planned and implemented in order to anticipate and to prepare for these trends.

Measures can range from technological solutions and management procedures to strategic responses. Various types of standards exist and can describe different aspects of adaptation processes and measures, outlined as follows, according to the CEN-CENELEC Guide 32 (2016) and the EN 45020¹³ (Lindner & Kempen, 2016):

- ▶ Goods/products and infrastructure standards;
- ▶ Testing standards;
- ▶ Service standards;
- ▶ Basic standards¹⁴;
- ▶ Terminology standards;
- ▶ Process standards;
- ▶ Management system standards.

12 Further monitoring initiatives and indicators for cities include: European Common Indicators Initiative, EU Urban Audit, 100 Resilient Cities, Reference Framework for Sustainable Cities, and the EMAS Environmental Management System certification for cities and companies.

13 A European standard that provides general terms and definitions concerning standardisation and related activities.

14 These have "wide-ranging coverage or contains general provisions for one particular field" (Lindner & Kempen, 2016).

As an example of a standard for products or goods relevant to adaptation, take flood barriers. To address the changing intensity and frequency of floods, changes must be made to the product itself by adjusting the standard, for example, amending the material and structural composition of the flood barrier to make it more durable and suited for the modified end use (CEN-CENELEC, 2016).

Testing methods can make provisions for adaptation. An example is modifying a standard for road materials by taking into account increasing temperatures and possibility of heat waves when testing the materials' suitability. Another example would be 'adapting' climatic simulation models (CEN-CENELEC, 2016).

These examples illustrate that standards are important instruments to support local governments in their adaptation actions as well as to help them achieve tangible improvements in sustainability. They do so by (Jong, de Buck, & Bogen, 2018):

- ▶ helping local authorities identify which procedures to implement and tools to use;
- ▶ facilitating the integration of climate adaptation into planning and policymaking of other departments and sectors;
- ▶ providing reliable guidance when embarking on unknown/new processes and procedures;
- ▶ easing comparability and peer-to-peer learning by providing a common point of reference;
- ▶ establishing process and progress benchmarks.

THE RESIN PROJECT'S WORK ON STANDARDISATION

The RESIN project – through involvement of representatives from local governments, research and business – has contributed to on-going European and international developments on standardisation in the field of climate change adaptation including (Jong, de Buck, & Bogen, 2018):

Urban adaptation products with potential for standardisation

RESIN has developed both information and tools to support climate change adaptation which have the potential to become formally and/or informally standardised. These are described below. Through the project team's engagement with the Global Covenant of Mayors and the European Environment Agency, it is anticipated that some of these results will be incorporated into a key informal European standard, the Climate-ADAPT¹⁵ platform, either through referencing or direct incorporation of content (such as risk indicators and evaluation of existing methods and tools).

► 1. An adaptation options library:

Standardisation needs for certain adaptation measures were investigated through a comprehensive review of existing European infrastructure standards¹⁶. The results have been included in the Library, providing a clear view of available standards and gaps.

Formal standards on European or national levels appear to be lacking for almost all of the selected measures. Technical specifications do, however, exist in several cases on a national level and appear to cover the key issues. Examples are the British PAS-standards

(preliminary standards) for temporary flood barriers and the Austrian specifications for green roofs. However, local governments across Europe are often unaware of the existence of these national specifications. Transfer of the specifications to European-accepted standards would allow broader and easier uptake of the adaptation measures they support. The Library is available at: www.resin-cities.eu/resources/library

► 2. A standardised risk-based impact and vulnerability assessment methodology (IVAVIA):

The IVAVIA method is composed of seven modules that cover qualitative and quantitative assessment methods and recommendations for presenting outcomes. The method is based on the GIZ's Vulnerability Sourcebook¹⁷, but goes a step further by operationalising its approach to risk assessment, and is especially suited for urban systems. It has been developed and tested in four city case studies. Cities can use the tool in support of the assessment of their specific vulnerabilities and to derive priorities for their adaptation strategy. See more at: www.resin-cities.eu/resources/ivavia

► 3. A European Climate Risk typology:

The European Climate Risk Typology is an innovative map-based information system that can enhance understanding of, and response, to climate risk. It provides a two-tier classification of European cities and regions, clustered according to their climate risk characteristics, including exposure and vulnerability to hazards. A wide range of indicator data underpins the typology, developed using consistent methods, and as such can be understood as an (informally) standardised set of climate risk indicators for Europe. See more at: www.resin-cities.eu/resources/risk-typology

¹⁵ <https://climate-adapt.eea.europa.eu>

¹⁶ This inventory resulted in 23 of the Library's concrete adaptation measures being selected and divided into six categories (temporary/permanent flood protection, infiltration techniques, cool materials, cooling, and green infrastructures). A survey was then conducted to score existing standards according to coverage (does the standard cover all relevant issues regarding quality and performance of the measure?), status (is it a formal/informal national/international standard?), and societal relevance. Based on the results, standards were prioritised in terms of need for further development. The inventory and results of the survey are recorded in RESIN report D5.1/D2.2 Standardising methods study.

¹⁷ www.adaptationcommunity.net/?wpfb_dl=203

Involvement in national¹⁸, European and international standardisation processes and committees

Various partners in RESIN are involved in national and international standardisation committees where they bring in the project's results and advocate for their standardisation potential:

- ▶ *ISO 37101* 'Sustainable cities and communities – Management System Standards';
- ▶ *ISO 37120* 'Sustainable cities and communities – City Indicators', *ISO 37122* 'Indicators for Smart Cities', and *ISO 37123* 'Indicators for Resilient Cities' (the latter both still at draft stage);
- ▶ *ISO 14091* 'Adaptation to climate change – Vulnerability, impacts and risk assessment'. Vulnerability is presented conceptually here using a simplified scheme derived from RESIN's climate risk assessment work. As a result of the RESIN-based input, the fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC AR5)¹⁹ was taken as the basic risk and vulnerability assessment scheme for this standard.²⁰
- ▶ *ISO 14092* 'Adaptation to climate change - Requirements and guidance on adaptation planning for organisations including local governments and communities'. As a result of the RESIN-based input, IPCC AR 5 was taken as the basic risk and vulnerability assessment scheme for this standard.
- ▶ *ISO/WD2 14050* (2018-06-30) 'Environmental Management – Vocabulary'. RESIN research partner Fraunhofer is a member of the ISO/TC 207/TCG (Terminology Coordination Group) in charge of rewriting ISO 14050. This has included introducing input from the RESIN glossary²¹ to the new ISO 14050.

¹⁸ NEN, the Dutch standardisation agency, is a project partner in RESIN. Other partners are also members in national mirror committees (for e.g. the German and Spanish ones).

¹⁹ www.ipcc.ch/report/ar5

²⁰ The relationship between the main components of the risk concept in ISO 14091 is also a result of discussions with Fraunhofer – a RESIN research partner - on the vulnerability and risk assessment developed in the RESIN IVAVIA methodology.

²¹ www.resin-cities.eu/resources/tools/online-glossary

BARRIERS TO APPLYING STANDARDS TO LOCAL CLIMATE CHANGE ADAPTATION WORK

Despite the important role standards can play in supporting local adaptation work, standardisation in this field and at this level remains the exception rather than the rule.

A survey of local government practitioners²² conducted by NEN within the RESIN project identified barriers to uptake, including:

- ▶ Lack of knowledge of, or access to, standards;
- ▶ Reluctance to use, due to perceived difficulty in adapting a uniform approach to varying local situations;
- ▶ Lack of resources or political commitment;
- ▶ Complex political and regulatory frameworks.

The interviewees further indicated the potential for standardisation to support implementation of key approaches and concepts in climate adaptation. For example, cities expressed interest in applying nature-based solutions (NBS) for climate adaptation and noted shortcomings in their current coverage by standards. Some of the issues raised, including uncertainty regarding the effectiveness and expected long-term performance of NBS measures, as well as ambiguous maintenance costs, could be mitigated through the development of coherent standards.

The survey also revealed a strong need for standardised processes for enhancing urban adaptation and resilience. While some cities have adaptation plans or measures in place, the potential for standardisation bodies to utilise these practical experiences and channel them into standardised processes (by including them in technical specifications or process design, for example), is yet to be exploited.

These barriers demonstrate both that certain misconceptions persist regarding what standards offer, but also that work is needed to improve the availability and accessibility of standards, and to make sure they address local authorities' needs and knowledge gaps for adapting to climate change. Recommendations to address these issues are provided in the next section.

MYTH-BUSTERS

My local context is unique! It's too hard to adapt a uniform standard to it.

Standards do not provide rigid prescriptions of outcomes – they are voluntary instruments that recommend 'ingredients' to facilitate an adaptation process according to good practices. These can be flexibly applied and adapted to unique local contexts.

Standards are too expensive.

Every adaptation process will have its costs. Also those implemented according to standards may require an initial financial investment, but their 'return value' can be much greater than the outlay. Also, since standards are scientifically and technically reliable, internationally recognised, and regularly updated, using them can demonstrate credibility to financing bodies, thereby improving access to funds for the development and implementation of adaptation measures.

We don't have political commitment for climate change adaptation here. It's impossible to adopt a new standard without it.

The credibility and international recognition of standards can be used as a powerful tool to mobilise political commitment. It establishes trust in policymakers and allows for accountability.

Our existing policy/regulatory framework is already too complex.

Standards can help support the complexity of political and regulatory frameworks. They offer high-quality, up-to-date, and credible information, on how to effectively implement adaptation processes within the given context and conditions.

RECOMMENDATIONS

As demonstrated, standards for adaptation and resilience-building can be a powerful instrument to inform decision-making across a range of sectors and governance levels in order to adapt to climate change. To facilitate their wider application, some practical recommendations follow.

For local government leaders and practitioners:

- ▶ **Address** this challenge by reaching out to national governments and national standardisation bodies;
- ▶ **Use** formal and informal standards as reference and guidance in developing new climate adaptation policies. An effective use of standards at municipal levels can systemise and ease urban climate adaptation, provide a reliable framework for communication with all relevant stakeholders, improve outcomes and effectively enhance urban resilience;
- ▶ **Use** the tools developed by RESIN: Whereas the tools are not yet standardised, they do provide uniform frameworks that address adaptation, risks and vulnerabilities. They allow for the incorporation of climatic changes and their impacts, along with adaptation measures into a city's operations and management strategies;
- ▶ **Engage** in standardisation work through participation in technical committees or through projects involving standardisation bodies;
- ▶ **Share good practices** on the use of standards at city or regional level. City twinning activities can also ensure that representatives from smaller cities are brought up to speed with current development on standards.

For national and international standardisation bodies:

- ▶ **Raise awareness** among city leaders and practitioners of existing technical standards by involving staff at different government levels and their stakeholders in educational seminars;
- ▶ **Seek to involve** city officials, practitioners and citizens from various sectors and across a variety of disciplines in relevant on-going standardisation work, such as technical committees.
- ▶ **Consider** including purchase of relevant standards as in budget planning and when shaping implementation and monitoring activities.

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ABOUT THE RESIN PROJECT

RESIN is an interdisciplinary research project investigating climate resilience in European cities, funded by the Horizon 2020 programme of the European Union. The consortium includes core cities (Greater Manchester, Bratislava, Bilbao and Paris) and research institutions (TNO, Fraunhofer IAIS, EIVP Paris, the University of Manchester, BC3, Comenius University of Bratislava and Tecalia, as well as ICLEI – Local Governments for Sustainability, Arcadis Nederland, ITTI Sp. z o.o. and Siemens). The research institutions are working closely with the cities to develop tools to support cities in designing and implementing climate adaptation strategies for their local contexts. This cooperation has taken place in a cycle of co-development, pilot trials and evaluation. Dutch standardisation organisation NEN is also a consortium member, leading the project's outputs towards possible formal standardisation.

Some main outcomes of the RESIN project upon completion will be a methodology for standardised vulnerability and risk analysis, a library of adaptation options with standardised effectiveness information, a climate risk typology for European cities and an online e-Guide providing decision support for climate adaptation planning.

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