E²STORMED Transition Manual
Old Royal Capital Cetinje

E²STORMED PROJECT
Improvement of energy efficiency in the water cycle by the use of innovative storm water management in smart Mediterranean cities
www.eZstormed.eu
Main Authors

Sara Perales Momparler  Green Blue Management
Alison Duffy  Abertay University
Adrián Morales Torres  IIAMA – Universitat Politècnica de València
Nikola Radunović  Prijestonica Cetinje

Contributors

Ignacio Escuder Bueno  IIAMA – Universitat Politècnica de València
Ignacio Andrés Doménech  IIAMA – Universitat Politècnica de València
Ángel Pérez-Navarro Gómez  IIE- Universitat Politècnica de València
Elisa Peñalvo López  IIE – Universitat Politècnica de València
David Alfonso Solar  IIE – Universitat Politècnica de València
Rebecca Wade  Abertay University
Chris Jefferies  Abertay University
Neil Berwick  Abertay University
Gonzalo Valls Benavides  Planifica Urbanismo Y Gestión

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1. **INTRODUCTION**

Cities around the world are facing a range of pressures including rapid urbanisation and urban sprawl, industrialisation and climate change. The ecological ‘footprints’ of cities are ever expanding through continued exploitation of available resources – land, water, energy, food, building materials, finance – while also producing large volumes of waste (solid, gaseous, liquid) which contaminate soils, air and water. Conventional water and energy management meanwhile, struggles to manage ever scarcer water and energy resources, to deliver services without adversely impacting the quality of life of urban populations and the environment.

The central theme of E²STORMED (www.e2stormed.eu) - saving energy through better control of stormwater - may seem a strange idea for some people. Many Mediterranean countries are not rich in energy, nor water, so combining stormwater and energy efficient practices should not be thought of as strange, just a different way of thinking - this is known a Paradigm Shift.

On the other hand, local governments frequently have fragmented sectors (urban planning, water supply, wastewater, waste, energy, etc.), with parallel planning and implementation processes that are not always aligned with strategies at regional, national and European level. In addition, innovation and research outcomes are rarely consolidated into policy and practical applications. The challenge to finding sustainable solutions - economic, environmental, social and institutional - is beyond the realm of conventional research approaches, and requires a new paradigm.

Transition Management provides an opportunity to engage multiple stakeholders and bring together diverse perspectives on a ‘wicked’ problem, potential solutions, and enabling new ways of working to emerge. E²STORMED project partnership allows the combination of research outputs with practical implementation at local level in six pilot urban areas: Benaguasil (Spain), Cetinje (Montenegro), Pisa (Italy), Hersonissos (Greece), Zagreb (Croatia) and Haż-Żabbar (Malta).

This Transition Manual presents a coherent and holistic methodology to guide the desired paradigm shift. It is intended for decision makers at the local level (in areas of urban water, energy, urban planning, etc.), water utilities and practitioners. It contains three main sections: a summary on the concept of sustainable stormwater management; an explanation of the E²STORMED Transition Management Wheel and key activities to successfully manage a paradigm shift; and the case study of Benaguasil, illustrating how they progressed during the E²STORMED project. Hence, this Manual is intended to enlighten Benaguasil as it continues its journey towards a more sustainable future, but also serves as an inspirational guide for other Mediterranean regions that aspire for a better future.

The authors acknowledge that the Transition Framework and the explanation contained herein are based on outputs from the EU Funded SWITCH research project. Several concepts have been re-worked to better fit E²STORMED and the pilot partners’ local situation. SWITCH was predominantly concerned with the water cycle and its inputs and outputs. What is new in E²STORMED is that it links sustainable drainage and energy, thus a more energy efficient environment is gained.
2. SUSTAINABLE STORMWATER MANAGEMENT

WHY SUSTAINABLE STORMWATER MANAGEMENT?

When land is developed, the natural cycle of water is altered. In general, urban development removes vegetation and increases impervious surfaces (roofs, roads). These changes produce less evapotranspiration, less infiltration and more runoff.

Conventional drainage systems (drains, pipelines, drainage channels, etc.) are the most common approach to managing stormwater in urban areas. These systems have generally been designed to remove rainfall from the urban environment as rapidly as possible. This results in the following problems (Philip, 2011):

- **Combined sewer overflows:** Heavy rainfall causes combined sewers to exceed capacity, resulting in overflow of untreated wastewater being released to the environment.
- **Diffuse pollution:** Non-point source pollutants in the form of heavy metals, oils, nutrients and pesticides are dispersed by runoff into receiving water bodies.
- **Decreased base flow in rivers and streams:** Increases in impervious surfaces decreases groundwater recharge.
- **Downstream flooding:** The rapid collection and disposal of stormwater into receiving water bodies increases the risk of downstream flooding.

Furthermore, these problems may worsen due to climate change and larger urban developments. In order to solve these problems, urban drainage should move towards more flexible and adaptive approaches.

In comparison to conventional stormwater management, a sustainable approach focuses on both managing the risks resulting from urban runoff and its contribution to environmental and landscape improvement. Sustainable Drainage Systems (SuDS) objectives are to minimize the impacts from urban developments with regards to stormwater quantity (flooding) and quality (pollution) and maximize amenity and biodiversity opportunities (Woods-Ballard et al., 2007). SuDS can help to solve the problems associated with conventional drainage by contributing to flood control, pollution control and can also provide an alternative source of water for non-potable uses.
Key differences between a conventional and a sustainable approach to stormwater management. 
Adapted from (Philip, 2011).

**SUSTAINABLE DRAINAGE SYSTEMS**

Sustainable Drainage Systems (SuDS), also known as Best Management Practices (BMPs), Low Impact Developments (LIDs), Water Sensitive Urban Design (WSUD) or Green Infrastructure (GI), are designed to manage stormwater following natural hydrologic processes. The basic principle is to decentralize retention: to infiltrate and reuse at source as much rainwater as possible both in public and private spaces.

SuDS make use of common sense and simple technologies, embracing a broad range of typologies such as rain gardens, rain barrels, green roofs, swales and porous surfaces for car parking and roads (USEPA, 2014), (Woods-Ballard et al., 2007). Some examples are shown in the following pictures.

![Sustainable Drainage Systems in the urban water cycle. Adapted from(Perales-Monparler and Valls-Benavides, 2013).](image-url)
Examples of Sustainable Drainage Systems.

1. Water butt
2. Filter strip to a swale
3. Detention basins (3)
4. Green roof
5. Pervious pavement
6. Infiltration basin
7. Constructed wetland
8. Filter drain
Sustainable Drainage Systems are now broadly accepted in many countries particularly the US, Australia and northern Europe. Evidence is now available that SuDS are a viable option in Mediterranean regions as well (Perales-Momparler et al., 2014). However, understanding of the concept is still developing, with implementation limited due to lack of knowledge and expertise throughout the region.

**STORMWATER MANAGEMENT AND ENERGY**

Water and wastewater facilities frequently represent the largest and most energy-intensive burden for water utilities, representing up to 35% of municipal energy use (NRDC, 2009). Using a sustainable approach for stormwater management can potentially reduce energy consumption in the urban water cycle, as follows:

- Reducing potable water use reduces energy consumed in acquiring and treating drinking water.
- Reducing stormwater inflows to sewer systems reduces energy consumed in pumping and treating wastewater.
- Improving stormwater quality results in less treatment required before release into the environment.
- Reducing local temperatures and improving buildings’ insulation (with green roofs) reduces cooling and heating demand for buildings, reducing energy needs and decreasing emissions from power plants.

![Improvement of energy efficiency with Sustainable Drainage Systems.](image)

*Left: Wastewater treatment in Zagreb (Croatia). Right: Reverse Osmosis Plant in Ghar Lapsi (Malta).*
3. **Transition Management Wheel**

A radical change is required in culture as well as institutions towards sustainable urban built environments (clean local watercourses for citizens to enjoy, pleasant greener streets, flood resilient properties and infrastructure, etc.). Transition management has emerged as a sound governance approach that can accelerate progress for implementing innovative urban water technologies and practices such as sustainable drainage systems and improve energy efficiencies in the water cycle. Transition management does not aim to control the future; it attempts to influence ongoing processes of changes in society by systematically reflecting on the future and developing shared notions for desired sustainable urban environments.

The E²STORMED Transition Management Wheel as shown below, is a simple cyclical road map illustrating the pathways and tools available to manage the change from traditional types of drainage infrastructure such as stormwater sewers to more sustainable practices such as green roofs and basins, with a holistic view focused on the local situation, in accordance with the well-known slogan “think global, act local”.

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*E²STORMED Transition Management Wheel. Adapted from the SWITCH Transition Framework (Duffy and Jefferies, 2011).*

Transitioning is a cyclical process; the desired change will not happen overnight and it is expected that multiple cycles will have to be completed, repeating the above group of activities again and again. Completion of each cycle is referred herein as one “turn” of the
Wheel. Not all transition activities need to be undertaken in one cycle to consider that one “turn” has occurred.

The Wheel consists of ten activities that take place at three management levels:

- **Strategic Level (envisaging the desired future):** The focus is on the long-term aspirations and goals towards sustainable urban built environments, requiring strategic thinkers open to innovation and not afraid of change.

- **Tactical Level (working together for the future):** The focus is on development of strategies, networks, coalitions that bring attention to sustainability objectives and gain societal support to achieve short/mid-term goals, overcoming socio-institutional barriers to innovation/change.

- **Operational Level (innovating for the future):** The focus is on short-term actions, experimenting with innovations that have the potential to materialize the vision.

Different types of actors are involved in each level, requiring a range of diverse skills and competencies. All are important; hence the levels do not represent any hierarchy.

For a clearer understanding of the process at first sight, the ten activities are grouped into four clusters in the inner circle (Arena, Agenda, Experiments and Monitoring), while the icons in the outer circle highlight the core Wheel activities, which can be customized for each city depending on their local situation.

In the context of E²STORMED, “steering” the Wheel is initiated by each Municipality through the organization of a Regional Working Group focused on issues of Energy Efficiency (RWGEE) in the Urban Water Cycle, engaging people who can influence, guide and structure governance activities, and who are able to sustain and develop the process over time. The starting point for each pilot urban area was different as it was subject to historical, cultural and political backgrounds. E²STORMED helped guide partners through the process to develop their weaker strengths during the project which will prepare them for continuing beyond the project and into the next round of transition (or “turn” of the Wheel).

### 3.1 Establish Subject Focus and Identify Stakeholders

The term stakeholders refers to individuals, groups or organisations, who have an interest in, influence over, or may be affected by the issues in question and the desire to address the issues. The involvement of all stakeholders ensures that the particular needs, goals, limitations, etc. are considered, defended and negotiated.

In the frame of E²STORMED, each pilot partner is in charge of identifying and engaging relevant stakeholders. As with any
group activity, momentum for a new enterprise is often provided by one or two key individuals, with backing from their superiors and/or organisation/s. To set up a RWGEE a coordinator to champion the alliance and a team of enthusiastic co-workers is required.

Saving energy through better management of stormwater at the local level is the subject focus of E²STORMED; hence, each RWGEE should include a good mix of relevant key stakeholders that make decisions or can effect changes in policy and practice in urban water practices, energy supply, urban planning, service-providers and other stakeholders who can directly influence decisions in related sectors at all levels (industry, regulatory bodies, universities, volunteers, etc.).

Some RWGEE groups may also include, at the appropriate time: water and energy user groups; local champions working to address environment issues; training and research organisations; financial organisations and the press/media, which provides a means by which the RWGEE can reach the public.

The RWGEEE size depends on each city and the stakeholders involved in each case; as guidance, an appropriate size may be between 8 and 15 members.

Whether the RWGEE is sustained after the end of E²STORMED is an important question. Municipalities and the rest of the stakeholders will have to find ways for the activities to be funded, and agree on how costs and benefits are going to be shared.

### 3.2 ORGANISE/FACILITATE STAKEHOLDERS

To kick off the RWGEE, the coordinator and co-workers should identify the different stakeholder interests in water and energy management, and make initial contact with them. Stakeholders should understand why their participation is relevant also for their own organisation.

It is important at the early stage that local buy-in and ownership of the process is. Caution should be taken to avoid ‘hijacking’ of the process by an elite group resulting in the establishment of a cartel. The RWGEE should be all inclusive if it is to be successful.
Meetings should take place on a regular basis so that momentum is not lost. It is recommended that stakeholders are informed in advance of issues to be discussed during each meeting to allow for them to properly prepare it.

The main tasks for the RWGEE during E²STORMED were (but not restricted to):

- Compiling local (Mediterranean based) data for development of the Decision Support Tool (DST).
- Evaluating and commenting on the application of the DST in the Pilot City and the E²STORMED Transition Manual.
- Developing a Strategic Action Plan.
- Learning and disseminating results and conclusions from E²STORMED within their organisations and to external stakeholders about using SuDS to deliver energy efficiency gains that mitigate and adapt to climate change impacts.

Additional/complementary activities can include: bilateral meetings focused on developing trust and gaining understanding; workshops and training sessions on energy efficient stormwater management; organizing joint activities (i.e. school art competitions); etc.

3.3 IDENTIFY PROBLEMS AND ISSUES

RWGEEs provide a means to jointly solve difficult problems. Based on local knowledge, studies and analysis, stakeholders can identify stormwater and energy issues, at technical and management levels, including governance and regulatory aspects.

Each stakeholder will have their own issues and potential solutions and there will be reasons (e.g. responsibilities, mandates, potential benefits) for each to want to seek resolution to the problem(s). It is only through the process of working together that an understanding of each other’s long-term ambitions and aspirations can be appreciated and shared solutions negotiated.

**TIP:** This activity offers a good point in time to assess RWGEE composition and decide whether to invite additional stakeholders or if an existing stakeholder’s contribution is no longer required.
3.4 Develop the long-term integrated vision

A vision is a concise description of the desired future state. RWGEE members are a diverse group of stakeholders with different visions of what future urban water services and the environment should be. What are RWGEE long-term aspirations? The aim is to develop a consensus amongst the group and a commitment to work towards achieving a shared vision.

This activity might start from scratch or build upon an existing vision for the urban area that is set by EU, national or local legislation. The vision for a city must be exciting to inspire organisations and the public, using a mixture of descriptive narrative and numerical targets if appropriate (inspiration can also be gained by reviewing other cities’ visions). Consistency with visions at different spatial and temporal scales is required so as to secure political support and increase the probability of funding for strategies and plans aimed at achieving the vision. It is recommended that wording includes “sustainable drainage” and “energy efficiency”, key objectives of the project.

**Hersonissos long-term integrated vision**

“A vital urban environment and tourist destination where water resources are managed in a sustainable manner, thus rainwater is collected and reused to cover irrigation needs while localised flooding is essentially reduced, and, in which there is space and provision for new developments through the implementation of energy efficient solutions, such as SUDS. In a city like this professionals, stakeholders and citizens, are welcome to be informed, educated and involved in decision making regarding sustainable water management and conservation planning.”

Long-term integrated vision for Hersonissos (Greece).
3.5 DEVELOP THE STRATEGIC ACTION PLAN

A strategy is a medium to long-term planning framework within which specific activities are described and plans implemented. Over time, an effective strategy should lead to the realisation of a vision.

This activity could start by brainstorming and listing practical options and opportunities that could become components of an overall strategy, then assessing the social, technical, political, economic and environmental viability and acceptability of each item. Grouping strategy components to relevant parts of the vision will help to identify whether anything is missing to achieve the vision. Although relative costs, benefits, merits and trade-offs of the strategies need to be considered, it is important not to get drawn into too much detail.

Based on a literature review, the academic partners of E²STORMED have compiled a set of actions that pilot partners can use as a starting point for the preparation of Strategic Action Plans. They include communication, legal and technical actions that could be used to improve energy efficiency in stormwater management at the local level. Caution should be used when assessing strategy components for a particular urban area, as there is not “one size fits all” Plan.

Strategic Action Plan development session in Benaguasil (Spain).

3.6 CARRY OUT PILOT/Demonstration ACTIVITIES

This activity provides a ‘protected’ space for experimenting with activities that are aligned with the vision so that they can mature and become embedded into the existing culture. Pilot/demonstrations activities (also referred to as transition experiments) come in all shapes and sizes and by their very nature, open doors to new options.

E²STORMED transition experiments consisted of application of the Decision Support Tool (DST) to local sites. The DST compares and evaluates different scenarios of conventional drainage solutions and SuDS in both, developed and undeveloped parts of each pilot urban area. To assist the process of informed decision making, different options are compared in
terms of CO₂ emissions, energy consumption and financial savings (amongst other parameters) using a multi-criteria analysis. Application of the DST was undertaken by specialists, with the RWGEE providing local datasets, multi-criteria weightings and constructive recommendations on how to improve the DST so that it is a useful tool. This activity increased RWGEE knowledge on SuDS and their relation to energy efficiency by providing examples of different end uses and how they compared with conventional systems.

A unique demonstration activity amongst the E²STORMED partners has taken place in Benaguasil. This demonstration has been constructed and was monitored within the timeframe of the project: a green roof retrofitted at the Benaguasil Social Centre that was monitored over 20 months. This type of experiment is important as it proves the value of innovative methodologies by providing exemplars to practitioners and the public and as the saying goes: “seeing is believing”.

### 3.7 IDENTIFY AND ENGAGE ADDITIONAL PARTIES

The RWGEE should realise the benefits of involving other parties (community, civil society groups, business, media), and decide who and at what stage of the process they should be invited to join. They can be involved in multiples ways such as participation in meetings, special conferences, guided tours to SuDS sites, etc.

Involving the Media is crucial as they can get the message out to a wider audience. Media can raise awareness of issues and sustainable solutions available by communicating technical, institutional and economic issues using non-technical language.
In addition, frontrunners who are innovative individuals (not necessarily from institutions) could be invited as they are generally powerful actors with strategic capabilities in the business sector, the policy domain, academia or society.

It is also beneficial to identify possible synergies and alignments with other agendas (i.e. the green agenda) as this can increase the likelihood of success through taking advantage of joint funding opportunities.

### 3.8 PROCESS DOCUMENTATION AND BUILD CAPACITY

Process documentation captures and tracks what happens during a process of change and how it happened. Good process documentation enables stakeholders to reflect and analyse why changes happened and to organise and disseminate the findings. Meeting minutes, photographs, voice recordings, videos, etc. are some of the ways that information can be captured, and this should be processed and stored in a way that changes can be tracked.

In terms of capacity building, training sessions and workshops which empower middle management / operatives / community, etc. will encourage a change in mind-set and ensure engagement with new technologies / techniques.

RWGEE meetings are a good platform to conduct training activities (e.g. inform members about the performance of built sustainable drainage infrastructures in Mediterranean cities such those in Benaguasil).

### 3.9 EVALUATE AND LEARN

The starting point for each pilot partner at the beginning of E\(^2\)STORMED was different and dependant on its own background, with transition strengths already developed in some of the activities. During the project, progress was represented by colour coding transition management activities in accordance with strengths developed as the project advanced. Dark green signifies that an activity is completed; light green signifies that the activity is underway whilst blue signifies that the activity is still to be considered.
The transition management cycle is almost complete by this stage, but the journey towards the desired future is far from over. In the image of the Transition Management Diagram, the Wheel has turned once during E²STORMED.

Sustainability should be thought of as a journey of discovery rather than a fixed goal that can be worked towards. The quest for sustainable outcomes will generate new knowledge areas as well as identifying gaps where knowledge does not exist. The next round of transitioning will begin after E²STORMED has finished where gaps will have been identified and the vision readjusted if required. New visions may be required, and new actors may need to be found who are ready to become the champions of the future.

Throughout the process, the RWGEE is seeking more sustainable solutions and this can only be achieved by turning the Wheel again... and again... and again!
4. **TRANSITION IN E²STORMED URBAN AREAS**

This chapter presents a summary of the transition activities undertaken by the six E²STORMED pilot partners, in order to move towards a more sustainable future for managing its resources.

Strengths developed by each pilot partner are depicted using the following colour code: dark green signifies that an activity had been completed; light green signifies that the activity is underway whilst blue signifies that the activity is still to be considered. For clarity, only numbers are used to refer to each activity; these correlate to the following activities:

1. Establish subject focus and identify stakeholders
2. Organise/facilitate stakeholders
3. Identify problems and issues
4. Develop the long-term integrated vision
5. Develop the Strategic Action Plan
6. Carry out pilot/demonstration activities
7. Identify and engage additional parties
8. Process documentation and build capacity
9. Evaluate and Learn
10. Prepare the next turn of the Wheel

### Municipality of Benaguasil (Spain)

The most remarkable achievement in Benaguasil during this Turn of the Transition Wheel has been the formation and work undertaken by the Regional Working Group, formed by the main regional actors involved in stormwater management. In addition, E²STORMED project has boosted understanding and dissemination of the benefits that SuDS bring, contributing to enhanced urban environments from the energetic, environmental and social points of view.

### Municipality of Pisa (Italy)

Pisa Regional Working Groups on Energy Efficiency (RWGEE) has created an opportunity to bring together the main regional actors related to energy, water and urban development, public as well as private. Transition management has been gradually introduced and explained in all meetings, together with an update on project progress and activities. During the meetings the main problems of storm water management in the city of Pisa were identified and a vision for the future of the city has been shared. These are the most relevant results including, a proposed Strategic Action Plan. Through the Italian
Municipalities Association (ANCI) the experience developed by the Municipality of Pisa within E2stormed project will be spread at national level.

Local Government Association (Malta)

In Malta the transition process in relation to the E2STORMED project was very interesting and engaging both for Local Government Association (LCA) as a partner and for the main stakeholders. Malta is new to SuDS, therefore, one cannot simply implement SuDS straight away. Their transition is aimed at a gradual transition from the solution used today to the implementation of SuDS. Issues and problems were identified and these helped in the development of a long-term strategy which complements the government’s vision for sustainable drainage management in Malta. All main stakeholders agreed that the way forward is by using SuDS and by means of this project LCA also had the opportunity to hold lectures for students attending the University of Malta in order to introduce them to SuDS. The next step is the actual implementation of a pilot project so as to assess the impact of SuDS in Malta and this will be done with the cooperation of the Ministry of Energy and Health.

Municipality of Hersonissos (Greece)

The E2STORMED experience in Hersonissos has been particularly interesting. It has proved to be a valuable tool towards improving stormwater management in the region. With the assistance of local stakeholders, who were identified at the very early stages of the project, problems and issues were mapped and scenarios tested. The transition process has been driven and informed at the same time by the vision developed in the early stages of the project, to develop a vital urban environment with sustainability, energy efficiency, and improved stormwater management, while actively involving local stakeholders and the public. This vision has contributed towards developing a concrete Strategic Action Plan and enriching the CoM with future sustainable stormwater management activities, including dissemination of project outcomes to the local society and especially to young students. Overall, the transition process in the Municipality of Hersonissos can be characterised as an important tool, and the experiences gained by its use could be utilised in future applications.
Old Royal Capital Cetinje (Montenegro)

Cetinje is one of the cities with the highest rainfall in Europe. Project E²STORMED brought to Old Royal Capital Cetinje a new philosophy regarding stormwater and its connection with energy efficiency. Old Royal Capital Cetinje has learned that the large quantities of stormwater should be considered as a valuable resource that can benefit it in many ways, and especially to contribute to significant savings in electricity consumption. With SuDS solutions Old Royal Capital Cetinje will be able to have at the same time flood protection, energy savings and new interesting landscapes. Reusing a large quantity of stormwater will provide the opportunity for Old Royal Capital Cetinje to have a potable water during the whole year without the usual restrictions.

City of Zagreb (Croatia)

City of Zagreb has undertaken most of the transition activities in the transitioning wheel. Subject focus was identified (improvement of stormwater management practices) and most of the relevant stakeholders have attended RGWEE meetings. During the meetings problems and issues were identified and members of the RGWEE agreed on a vision. A Strategic Action Plan was also developed, with regards to the Sustainable energy action plan of the City of Zagreb. Pilot activities have been conducted using the DST software on two areas within the city.

Future transitioning activities (in the next “turn of the wheel”) should involve additional parties, especially ones able to influence the national and local legislature regarding stormwater management.
5. TRANSITION IN CETINJE

Territory and population Municipality of Cetinje encompasses an area of 910 km², or 6.6% of the total area of Montenegro (13,812 km²). The town itself occupies area of approximately 7 km². According to the census from 2011, in the municipality of Cetinje live 16,757 inhabitants, while in the town itself there are 13,991 inhabitants.

Geographic position It is situated in the karst field (Cetinje field), with average height above sea level of 671 m. It is 15 km away from Skadar Lake and 12 km from the airline on the Adriatic Sea.

Climate Cetinje has middling continental climate, with dry and warm summers, temperature of approximately 20° C, and mild and wet winters with temperature of approximately 2.1° C. Average temperature on the yearly basis is about 11° C, with yearly amplitude of 20.1° C. Cetinje is well known for plentiful precipitations during spring and autumn, and it is one of the rainiest towns in Europe. Even beside enormous precipitations, Cetinje field and its surrounding do not have water flows on the surface and it has rare water sources. This is the consequence of karst configuration and geologic structure.

Rainfall 4000 mm/year, in average (maximum was 428.3 mm/day).

Natural characteristics Cetinje field was formed in the east karst-continental foothill of the mountain Lovćen, from all sides, defoliated limestone slopes close view. Extremely karst field conditioned forming a couple of caves. Their channels length, number of rooms and halls and cave decorations make them very attractive.

Water related issues and challenges For the consumers in Cetinje it is produced 5,279,335.40 m³ of water, while the amount of water that citizens consume (invoiced amount of water) per annum is 806,455.00 m³, so the losses (technical + commercial) are approximately at the ratio of 85%. Monthly cost for water pumping in Cetinje is approximately 60,000 €, because Height Differences Range is 649 m and Pumping Distance Range is 8,396 m. If we succeed in reducing water losses from the source to
the city by 50% (including city area), we would have savings around 30,000 € on a monthly basis spent on electrical energy. The consequences of the enormous water losses are regular water supply cuts during the day, usually from 00:00 to 05:00 in the winter, and from 23:00 to 05:00 during the summer.

At the same time, annual average of rainfall is 4,000 mm, so we have severe floods from time to time since all stormwater from the hills around Cetinje runoff to the city area, and Cetinje is planning to build a tunnel under one of the hills, in order to collect all storm water and wastewater. We are trying to find a solution which would enable us to reduce floods in the nearby villages, and at the same time use some storm water to improve water supply and reduce monthly costs for water pumping.

After the great flood in 1986, Cetinje started to deal with the problems in water supply, constantly trying to come up with the solutions for problems with water supply, sewerage, wastewater, storm water, etc. Numerous extensive hydrological and geological studies have been done with participation of distinguished specialist and professors. Currently, the ongoing projects are dealing with separation of sewage and atmospheric sewer, and construction of waste water treatment plant.

Looking at the transition back-analysis, it could be said that the above mentioned comprised the first “Turn of the Wheel” for the Old Royal Capital Cetinje towards better stormwater management. In 2013 the Old Royal Capital Cetinje expressed its willingness on collaborating with the relevant partners in the E²STORMED project that started in January 2013.

The following sections explain how Cetinje has progressed in each one of the transition activities during the E²STORMED “Turn of the Wheel”.
5.1 Establish Subject Focus and Identify Stakeholders

The first meeting of the E²STORMED project took place in Valencia (Spain) in March 2013, and there each partner got the instructions from the Lead Partner on how to select RWGEE members, with the most relevant stakeholders. We needed to identify the different types of stakeholders interested in water and energy management, where stakeholders could be perceived as individuals, groups or organisations, whomever have an interest in, influence over or are affected by the issues in question and is willing to address it.

With regard to the need that the RWGEE members should be working with enthusiasm, the group members were elected in a way that we believed they will be genuinely committed to find solutions for water related problems in the city.

The identification of the desired members was carried out by Pilot Committee member, where 10 institutions (or Civil society representatives) were invited to be part of the RWGEE, and all of them have participated to a certain extent, as shown in the table in Annex 1.

5.2 Organise/Facilitate Stakeholders

The facilitator of Cetinje RWGEE has been the Municipality’s technical assistant within E²STORMED - Pilot Committee member, an electrical engineer with broad experience in energy related issues, but without previous knowledge on urban water management (SuDS in particular). After careful analysis, and in order to gain attention and receive a positive response, representatives from the administrative bodies and some local champions that during the decades gave their best to provide the new ideas that affect water treatment in the city, were invited for the first meeting. Each time, the RWGEE members have discussed about the next steps and have proposed many ideas about the way the project should be promoted and how we can strengthen capacities for the future strategy development of the city, having in mind solutions offered by SuDS. RWGEE members agreed that, first of all, there must exist a clear vision of the city in which direction it is preferred to be developed.

Transition management was gradually introduced in all meetings, together with an update on the project progress and activities and some “educational” sections about Sustainable Drainage Systems (including information about site visits in Spain and Scotland, and information on results obtained by the experts with regard to Cetinje).
Main particular outcomes of each one of the meetings are shown in the table in Annex 2.

5.3 IDENTIFY PROBLEMS AND ISSUES

The main problems related to the stormwater management in the city of Cetinje have been identified by the RWGEE as follows:

- Potable water losses are approximately 85%
- Relatively old water infrastructure
- Underdeveloped sewerage infrastructure
- Floods, a lot of rainfall

Key energy efficiency issues identified by the RWGEE:

If we succeed to reduce water losses from the source to the city for 50% (and in the city as well), we would save 30.000 € per month for pumping.
5.4 **DEVELOP THE LONG-TERM INTEGRATED VISION**

During the meetings, RWGEE members agreed that the main objectives are:

- Reducing Combined Sewer Overflows.
- Improvement of the water supply system.
- Landscaping integration of infrastructures.
- Aquifer recharge.
- Optimization of usage of drinking water.
- Reducing energy consumption in urban water management.

In spite of the ongoing projects regarding the detailed design of the tunnel to drain stormwater, as well as separation of fecal and stormwater sewers, we find that the long-term integrated vision should be developed with strong interest for SuDS. In order to deal with major sanitary issues and stabilization of water supply, we believe that we should be developing a long-term integrated high level vision - 20 yrs into the future, and introduce a SuDS solution to help mitigate flooding and reduce pumping costs. RWGEE was pointed out that in the future for the city plans and projects, we should try to find a scope for action in local legislation on stormwater drainage and other similar acts.

Cetinje’s vision is based on the fact that learning from the best practices will enable us to avoid the mistakes, and to immediately accept the best solutions. Accordingly, our vision can be described as a statement:

> “A cultural and historical energy efficient destination where water resources are managed in a sustainable way, with stormwater collected and reused in order to reduce flooding in the area and to have potable water without huge electricity costs.”

**Stormwater! We have it, so let’s use it!**

**Beside a lot of rainfall, Cetinje is also known for a big snows as well.**
5.5 DEVELOP THE STRATEGIC ACTION PLAN

A Strategic Action Plan (SAP) is finished in May 2015, and it is finalized with the help of company Planifica from Spain, which represents the external support for Old Royal Capital Cetinje in E²STORMED project. According to results obtained by using of DST, as well as of the inputs from the RWGEE and willingness of the Municipality to improve energy efficiency in the city, SAP contain every aspect of one modern and sustainable development concept.

On the occasion of the UN Secretary-General’s Climate Summit on September 23, 2014, Old Royal Capital Cetinje, together with many partners from the private sector, finance institutions and international and civil society organizations, announced our commitment to participate in and contribute to the Sustainable Energy for All Global Energy Efficiency Accelerator Platform. The Platform gives countries the opportunity to assess their needs and priorities, in order to select those accelerator(s). These national and municipal partners include: Lima (Peru), Leon (Mexico), Rio de Janeiro (Brazil), Almaty and Astana (Kazakhstan), Ulan Bator (Mongolia), Cetinje (Montenegro), Warsaw (Poland), Thimphu City (Bhutan), the Metropolitan Area of Manila (Philippines), Jinan City (China)...

With this regard, the objectives of the Strategic Action Plan include the following:

- **Short Term (1-3 years);** Build and calibrate flood and stormwater models; 1D and 2D. Collecting data for model calibration; topography and hydrology parameters, design storm for Cetinje (for several return periods), flow rate measurements, water quality measurements, geotechnical site investigations for better knowledge of quaternary material behavior, changes in the urban city planning to allow SuDS designs, etc...

- **Medium term (1-10 years);** Prepare tenders for SuDS projects and its construction.

- **Long Term (1-25 years);** Introduce SuDS philosophy for stormwater design; flood control, water quality, ecosystem services, etc... Dissemination and educational activities:
  - Educate private sector and schooling system, professionals and the public in sustainable water management.
  - Provide capacity for new developments to go ahead through implementation of SuDS.
  - Introduce SuDS practices in other cities and try to mention SuDS in national water and energy regulations.
5.6 Carry out pilot/demonstration activities

Transition experiments in the context of E²STORMED included the preliminary analysis of outputs delivered by the first version of DST at two sites: a retrofit and a new development situation. Two stormwater management scenarios have been compared for each location, one using conventional stormwater systems and one with an appropriate SuDS solution proposed by the external experts from Planifica.

<table>
<thead>
<tr>
<th>RETROFIT CASE STUDY (developed area near the historic center)</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Image" /> Conventional solution; new stormwater pipeline under Central garden in Boulevard of Montenegrin Heroes.</td>
</tr>
<tr>
<td><img src="image2" alt="Image" /> SuDS solution for central garden in Crnogorskih junaka Boulevard with benefits on water quality, environmental issues and ecosystem services.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NEW DEVELOPMENT CASE STUDY (half developed area at Donje Polje)</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image3" alt="Image" /> Conventional solution; new stormwater pipeline under standard pavement.</td>
</tr>
<tr>
<td><img src="image4" alt="Image" /> SuDS solution; permeable pavement and filter drains.</td>
</tr>
</tbody>
</table>

After the first analysis, external experts have proposed to change one of the case studies, and to put on the table the overall problems of whole Cetinje city (floods and water supply). Since the leading partner in E²STORMED have accepted that proposal, in May 2015 we used the final DST and we got the new results with it. So, taking in account the particularities of Cetinje, it has been decided to include an especial case study to cope with main water city problems at city scale and for high return period (between 100 and 500 years); energy cost in water supply system and flood protection.
Having in mind that Cetinje lacks of a complete hydrology and groundwater study of their whole catchment which would allow an overview of the problem, it is almost impossible to analyze in details the implications of SuDS solutions in small pilot areas onto the city problems.

However, with the data collected until now, we have obtained some indicative preliminary results for costs and benefits provided by SuDS. Final decision criteria and weights were chosen by RWGEE members during the last RWGEE, which took place on 13th May 2015.

5.7 IDENTIFY AND ENGAGE ADDITIONAL PARTIES

Municipal board members and Counsel of Mayor members are invited at the final RWGEE meeting and to presentation of the final results of DST.
Also, some University professors, EU project managers, citizens and media are invited to workshop where DST results are presented.

5.8 PROCESS DOCUMENTATION AND BUILD CAPACITY

**Process Documentation:** Process Documentation was progressing process throughout the project. The minutes, following each meeting, tracked the process of change were allowing RWGEE to monitor progress with transitioning activities. The transition case studies and evaluation of each activity were also a process document.

**Capacity Building:** Capacity Building SuDS training workshop was followed 2nd Open day in Cetinje. Also experts from Scotland and Spain visited Cetinje for 3 days in May 2014, and talked with the local employees and people from RWGEE. Committee members from Cetinje visited several SuDS sites in Spain and Scotland and disseminated documents and information among the Municipality employees. During the 2015, the expert from *Planifica* company have visited Cetinje two times, and have had a meetings with the local staff in order to explain SuDS solutions and proposals for future development of Cetinje.
5.9 EVALUATE AND LEARN

The analysis was especially carried out during the last 6 months of the project. Based on reflection of the process documents, in January 2015 we decided to change one of the city’s sites, with the whole town Cetinje representing case study for the DST, and after that we succeeded to make appropriate changes and adjustments. We are close to succeed to fulfill completely the first turn of Transition Management Wheel. A very positive outcome from the final RWGEE meeting is that members agree that this is one of the most important projects that could lead to major changes for the future sustainable development in Cetinje.

Analysis is roughly presented on the table in Annex 4 and depicted in the figure herein.

5.10 PREPARE THE NEXT TURN OF THE WHEEL
The next turn of the wheel will start after the end of the project, in June 2015.

We finished the Strategic Action Plan in May 2015, and according to it, we are starting to think how can we overcome any gaps in urban planning identified and how to use new knowledge available in order to fulfill our vision.
6. REFERENCES AND FURTHER INFORMATION


## ANNEX 1. INSTITUTIONS PARTICIPATING IN RWGEE

<table>
<thead>
<tr>
<th>Type of Stakeholder</th>
<th>Stakeholders invited to the RWGEE</th>
<th>Participation in Meetings*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td><strong>Regional public authority</strong></td>
<td>Public Enterprise Regional water supply</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>EPCG (Power supply company of Montenegro)</td>
<td>Y</td>
</tr>
<tr>
<td><strong>Local public authority of Old Royal Capital Cetinje</strong></td>
<td>Secretariat of Spatial Planning and Environment Protection</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>Secretariat for Utilities and Transport</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>Center of information system/Pilot Committee member</td>
<td>Y</td>
</tr>
<tr>
<td><strong>Local public authority</strong></td>
<td>PE “Water supply and sewage”- Cetinje</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>Directorate of investment and development</td>
<td>Y</td>
</tr>
<tr>
<td><strong>Civil society / community groups</strong></td>
<td>Citizen/affect by the floods</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>Citizen/ threatened by sewage</td>
<td>Y</td>
</tr>
<tr>
<td><strong>NGO</strong></td>
<td>Cetinje my town/founder</td>
<td>Y</td>
</tr>
<tr>
<td><strong>Media</strong></td>
<td>Journalists of daily newspapers</td>
<td>-</td>
</tr>
<tr>
<td><strong>University</strong></td>
<td>Professors who are working on water related issues</td>
<td>-</td>
</tr>
<tr>
<td><strong>Delegation of the European Union to Montenegro</strong></td>
<td>Manager for water and sewerage</td>
<td>-</td>
</tr>
</tbody>
</table>

| Nº of Institutions invited to each meeting | 9 | 9 | 9 | 10 | 10 | 13 |
| Nº of Institutions participating in each meeting | 9 | 9 | 9 | 10 | 10 | 13 |

*Y*: The institution was invited to the meeting and attended.
*N*: The institution was invited to the meeting but did not attended.
*-*: The institution was not invited to the meeting.
*:* The institution was invited; it was not present during the meeting although sent the requested information to be presented during the meeting and/or had a follow up meeting with Old Royal Capital Cetinje. It counts as participant in the meeting.
## ANNEX 2. MAIN OUTCOMES OF RWGEE MEETINGS

<table>
<thead>
<tr>
<th>Meeting No.</th>
<th>Date</th>
<th>Main outcome of the meeting</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>24-05-2013</td>
<td>We have explained purpose of the project, and every member had given some of the possible ideas for implementation.</td>
</tr>
<tr>
<td>2</td>
<td>14-11-2013</td>
<td>RWGEE members have been informed about DST and its function. We concluded that our first choice for case study would be Borovik hill.</td>
</tr>
<tr>
<td>3</td>
<td>05-05-2014</td>
<td>It is proposed to send the short notification/letter of RWGEE to all responsible officials in the city.</td>
</tr>
<tr>
<td>4</td>
<td>30-10-2014</td>
<td>Talk about the new locations for the E’STORMED case study SUEDS sites were found, and about preliminary DST results. It was concluded that the practice until now has shown that the planning was a compromise of interests and never presented the real needs of the city. It was concluded that the RWGEE members should make mutual initiative document to initiate making of decisions that would contain some solutions of SUEDS, such as permeable pavements, water tanks and the like. The letter should be referred to the relevant addresses in the city and the state level as well.</td>
</tr>
<tr>
<td>5</td>
<td>25-02-2015</td>
<td>Draft of the letter to the relevant addressee discussed and demonstration of the new results of DST. Strategic Action Plan discussion and Identification of additional parties to be invited.</td>
</tr>
<tr>
<td>6</td>
<td>13-05-2015</td>
<td>Presentation of final SAP and final DST results in front of RWGEE members and the additional invited parties. Dissemination. Capacity building and preparation of the next turn of the wheel.</td>
</tr>
</tbody>
</table>

*Main outcomes of RWGEE meetings.*
## ANNEX 3. RWGEE MEETINGS’ ATTENDEES

<table>
<thead>
<tr>
<th>Stakeholders invited to the RWGEE</th>
<th>Members</th>
<th>Nº Attendees per Meeting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Public Enterprise Regional water supply</td>
<td>Ivan Špadijer</td>
<td></td>
</tr>
<tr>
<td>EPCG (Power supply company of Montenegro)</td>
<td>Miloš Bulatović, Filip Asanović</td>
<td>1</td>
</tr>
<tr>
<td>Secretariat of Spatial Planning and Environment Protection</td>
<td>Tatjana Stanković, Petar Martinović, (Đorđe Belada, Aleksandar Dajković, Milena Latković, Elena Lipovina, Radojka Radulović)</td>
<td>1</td>
</tr>
<tr>
<td>Secretariat for Utilities and Transport</td>
<td>Jovan Ivanisjević, Marija Vujović, (Sanja Kasom)</td>
<td>1</td>
</tr>
<tr>
<td>Center of information system/Pilot Committee member</td>
<td>Nikola Radunović (Željko Radunović, Davor Dragojević, Slavica Lipovina, Duško Mijanović)</td>
<td>1</td>
</tr>
<tr>
<td>PE “Water supply and sewage”- Cetinje</td>
<td>Predrag Ratković, Nikola Pejaković (Mihailo Ražnatović, Jošo Otašević, Vesko Lagator)</td>
<td>1</td>
</tr>
<tr>
<td>Directorate of investment and development</td>
<td>Mladen Muhadinović, Božidar Božović, (Vasko Koljević, Magdalena Krstitièvić, Milica Duškanović)</td>
<td>-</td>
</tr>
<tr>
<td>Citizen/affected by the floods</td>
<td>Ljubo Roganović</td>
<td>1</td>
</tr>
<tr>
<td>Citizen/threatened by sewage</td>
<td>Milorad Latković</td>
<td>1</td>
</tr>
<tr>
<td>Cetinje my town/founder</td>
<td>Vesko Pejović</td>
<td>1</td>
</tr>
<tr>
<td>Deputy Mayor for Social Policy and Utilities</td>
<td>Njegosava Vujanović</td>
<td>-</td>
</tr>
<tr>
<td>Committee member of parliament</td>
<td>Vesna Tomanović</td>
<td>-</td>
</tr>
<tr>
<td>University professors</td>
<td>Uroš Karadžić, Radoje Vujadinović (and 2 professors from Serbia were on 6th RWGEE meeting)</td>
<td>-</td>
</tr>
<tr>
<td>Delegation of the European Union to Montenegro</td>
<td>Ivan Lagator</td>
<td>-</td>
</tr>
<tr>
<td>Mayor’s Cabinet/Steering committee member</td>
<td>Nikola Veljović, (Miloš Ivaníševiç)</td>
<td>-</td>
</tr>
<tr>
<td>External Experts</td>
<td>Gonzalo Valls Benavides, (Slađana Lazareviç)</td>
<td>-</td>
</tr>
<tr>
<td>Media</td>
<td>Journalist of two different newspapers</td>
<td>-</td>
</tr>
</tbody>
</table>

**Nº of Attendees per Meeting**  
9 10 6 11 15 30

*Attendees in Cetinje RWGEE meetings.

*This entity was not present during the meeting although sent the requested information to be presented during the meeting and/or had a follow up meeting with Old Royal Capital Cetinje. It counts as participant in the meeting but not as attendee to the meeting.

**At the 6th RWGEE meeting, total number of participants was 30 because some University professors, media, EU representatives for water planning in Montenegro, as well as citizens and other parties have been invited.

*This was the short term expert only for preparation of tender procedure for election of external experts.
## ANNEX 4. EVALUATION TABLE

<table>
<thead>
<tr>
<th>Activities, desirable outcomes, indicators and metrics</th>
<th>Metric</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Establish subject focus and identify stakeholders</strong></td>
<td>Activity 1*</td>
</tr>
<tr>
<td><strong>Outcome:</strong> Identification of a well-functioning RWGEE with key stakeholders in the area of focus involved</td>
<td></td>
</tr>
<tr>
<td><strong>Indicator:</strong> Whether the key stakeholders in the area of focus have been properly identified</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Metrics</strong></td>
<td>Yes/No/Work In Progress (WIP)</td>
</tr>
<tr>
<td><strong>2. Organise/facilitate stakeholders</strong></td>
<td>Activity 2*</td>
</tr>
<tr>
<td><strong>Outcome:</strong> Positive involvement of key stakeholders</td>
<td></td>
</tr>
<tr>
<td><strong>Indicator:</strong> Percentage of invited stakeholders attending/participating in each meeting**</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Metrics</strong></td>
<td>Num. Participants/Num. Invitedx100 (%)</td>
</tr>
<tr>
<td><strong>3. Identify problems and issues</strong></td>
<td>Activity 3*</td>
</tr>
<tr>
<td><strong>Outcome:</strong> Positive involvement of key stakeholders</td>
<td></td>
</tr>
<tr>
<td><strong>Indicator:</strong> Whether the urban water related problems have been identified and stakeholders have provided supporting data</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Metrics</strong></td>
<td>Yes/No/WIP</td>
</tr>
<tr>
<td><strong>4. Develop the long term integrated vision</strong></td>
<td>Activity 4*</td>
</tr>
<tr>
<td><strong>Outcome:</strong> A concise integrated vision that includes RWGEE aspirations is formalised</td>
<td></td>
</tr>
<tr>
<td><strong>Indicator:</strong> Whether the concise statement is in place</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Metrics</strong></td>
<td>Yes/No/WIP</td>
</tr>
<tr>
<td><strong>5. Develop the strategic action plan</strong></td>
<td>Activity 5*</td>
</tr>
<tr>
<td><strong>Outcome:</strong> A strategic action plan is completed in consensus with the RWGEE</td>
<td></td>
</tr>
<tr>
<td><strong>Indicator:</strong> Whether the strategic action plan is completed</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Metrics</strong></td>
<td>Yes/No/WIP</td>
</tr>
<tr>
<td><strong>6. Carry out pilot/demonstration activities</strong></td>
<td>Activity 6*</td>
</tr>
<tr>
<td><strong>Outcome:</strong> E-STORMED Decision Support Tool (DST) has been applied to local sites</td>
<td></td>
</tr>
<tr>
<td><strong>Indicator:</strong> Whether the DST has been applied to local sites</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Metrics</strong></td>
<td>Yes/No/WIP</td>
</tr>
<tr>
<td><strong>7. Identify and engage additional parties</strong></td>
<td>Activity 7*</td>
</tr>
<tr>
<td><strong>Outcome:</strong> Positive involvement of additional parties</td>
<td></td>
</tr>
<tr>
<td><strong>Indicator:</strong> Percentage of invited additional parties attending/participating in the proposed activities</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Metrics</strong></td>
<td>Num. Attendees/Num. Invitedx100 (%)</td>
</tr>
<tr>
<td><strong>8. Process documentation and build capacity</strong></td>
<td>Activity 8*</td>
</tr>
<tr>
<td><strong>Outcome:</strong> A procedure is in place and being used to capture and track changes in the transition process</td>
<td></td>
</tr>
<tr>
<td><strong>Indicator:</strong> Whether the procedure is in place and being used</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Metrics</strong></td>
<td>Yes/No/WIP</td>
</tr>
<tr>
<td><strong>Outcome:</strong> Capacity building is taking place</td>
<td></td>
</tr>
<tr>
<td><strong>Indicator:</strong> Number of people trained/assistants to workshops/etc.</td>
<td>20</td>
</tr>
<tr>
<td><strong>Metrics</strong></td>
<td>Number</td>
</tr>
<tr>
<td><strong>9. Evaluate and learn</strong></td>
<td>Activity 9*</td>
</tr>
<tr>
<td><strong>Outcome:</strong> Evaluation at various stages in the project takes place and guides the activities that follow</td>
<td></td>
</tr>
<tr>
<td><strong>Indicator:</strong> Number of evaluations undertaken</td>
<td>2</td>
</tr>
<tr>
<td><strong>Metrics</strong></td>
<td>Number</td>
</tr>
<tr>
<td><strong>10. Prepare the next turn of the Wheel</strong></td>
<td>Activity 10*</td>
</tr>
<tr>
<td><strong>Outcome:</strong> Gaps have been identified and there is will to continuing turning the Wheel</td>
<td></td>
</tr>
<tr>
<td><strong>Indicator:</strong> Whether gaps have been identified and there is will to continuing turning the Wheel</td>
<td>WIP</td>
</tr>
<tr>
<td><strong>Metrics</strong></td>
<td>Yes/No/WIP</td>
</tr>
</tbody>
</table>

*Boxes are color-coded as follows: Dark green signifies that an activity had been completed; light green signifies that the activity is underway whilst blue signifies that the activity is still to be considered.

**Those stakeholders which have justified their absence but provide information and show interest in meeting outcomes can be considered to have participated in it.
E²STORMED PROJECT
Improvement of energy efficiency in the water cycle by the use of innovative storm water management in smart Mediterranean cities
www.e2stormed.eu

PROJECT PARTNERS

UNIVERSITAT POLITÈCNICA
DE VALÈNCIA (E)

GRANA AND MAIRA VALLEYS
MOUNTAIN COMMUNITY (I)

Comunità Montana
VALLI GRANA E MAIRA

MUNICIPALITY OF
BENAGUASIL (E)

MUNICIPALITY OF
pisa (I)

LOCAL COUNCILS’
ASSOCIATION (MLT)

MUNICIPALITY OF
HERSONISSOS (GRE)

UNIVERSITY OF ABERTAY
DUNDEE (UK)

OLD ROYAL
CAPITAL CETINJE (MNE)

CITY OF
ZAGREB (CRO)