

# E<sup>2</sup>STORMED Transition Manual

## Municipality of Hersonissos



**E<sup>2</sup>STORMED PROJECT**  
Improvement of energy efficiency in the  
water cycle by the use of innovative  
storm water management in smart  
Mediterranean cities  
[www.e2stormed.eu](http://www.e2stormed.eu)



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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 E<sup>2</sup>STORMED ([www.e2stormed.eu](http://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. E<sup>2</sup>STORMED 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 Ħaż-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 E<sup>2</sup>STORMED Transition Management Wheel and key activities to successfully manage a paradigm shift; and the case study of *Hersonissos*, illustrating how they progressed during the E<sup>2</sup>STORMED project. Hence, this Manual is intended to enlighten the *Municipality of Hersonissos* 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 E<sup>2</sup>STORMED and the pilot partners’ local situation. SWITCH was predominantly concerned with the water cycle and its inputs and outputs. What is new in E<sup>2</sup>STORMED is that it links sustainable drainage and energy, thus a more energy efficient environment is gained.

## 2. SUSTAINABLE STORMWATER MANAGEMENT

### WHY SUSTAINABLE STORMWATER MANAGEMENT?

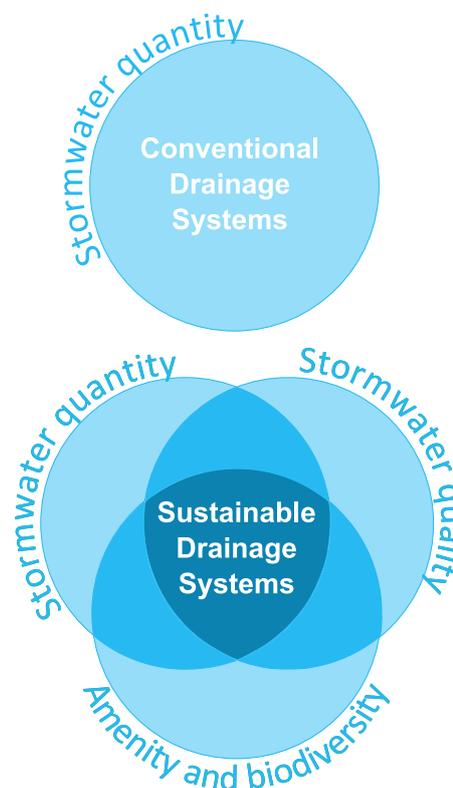
When land is developed, the natural cycle of water is altered. In general, urban development removes vegetation and increases impervious surfaces (roofs, roads). These changes produce less evapotranspiration, less infiltration and more runoff.

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.



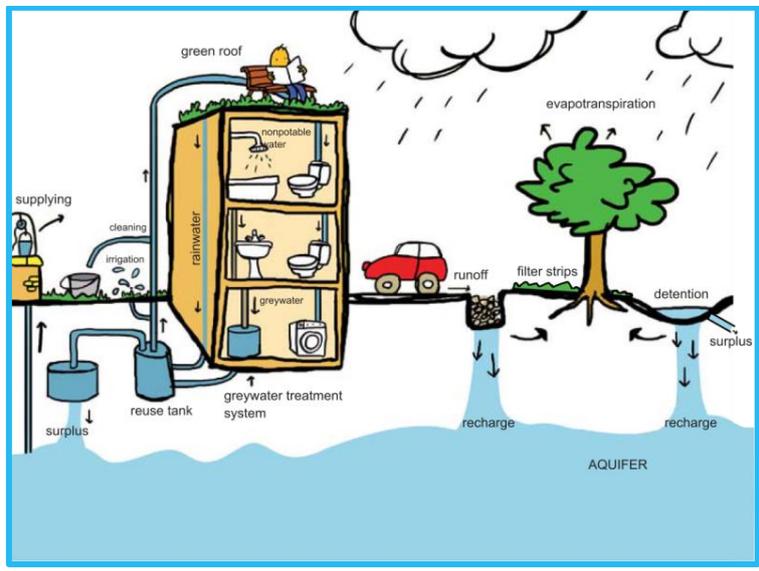
*Objectives of Conventional and Sustainable Drainage Systems*

	Conventional approach: Stormwater as a 'nuisance'	Sustainable approach: Stormwater as a 'resource'
<b>Stormwater quantity</b>	Stormwater is conveyed away from urban areas as rapidly as possible	Stormwater is attenuated and retained at source
<b>Stormwater quality</b>	Stormwater is treated together with human waste at centralised wastewater treatment plants or discharged untreated in receiving water bodies	Stormwater is treated as close to the source as possible using decentralised natural systems that may combine soils, vegetation and permanent water bodies
<b>Recreation and amenity value</b>	Not considered	Infrastructures are designed to enhance the landscape and provide recreational opportunities
<b>Biodiversity</b>	Not considered	Urban ecosystems are restored and protected
<b>Potential resource</b>	Eventually considered for reuse from wastewater treatment plants	Stormwater is harvested for non-potable water supply uses and infiltrated to aquifers

*Key differences between a conventional and a sustainable approach to stormwater management. Adapted from (Philip, 2011).*

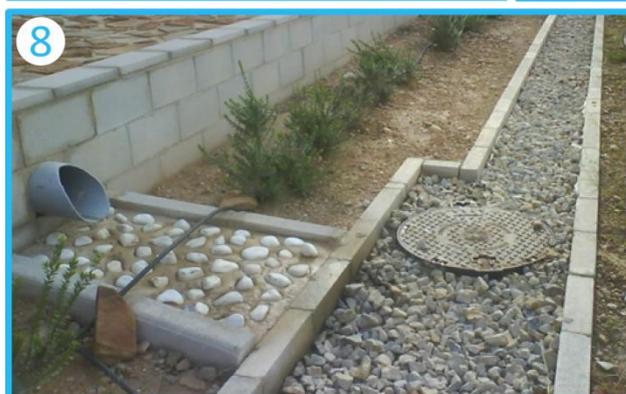
## SUSTAINABLE DRAINAGE SYSTEMS

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.



*Sustainable Drainage Systems in the urban water cycle. Adapted from (Perales-Momparler and Valls-Benavides, 2013).*

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.



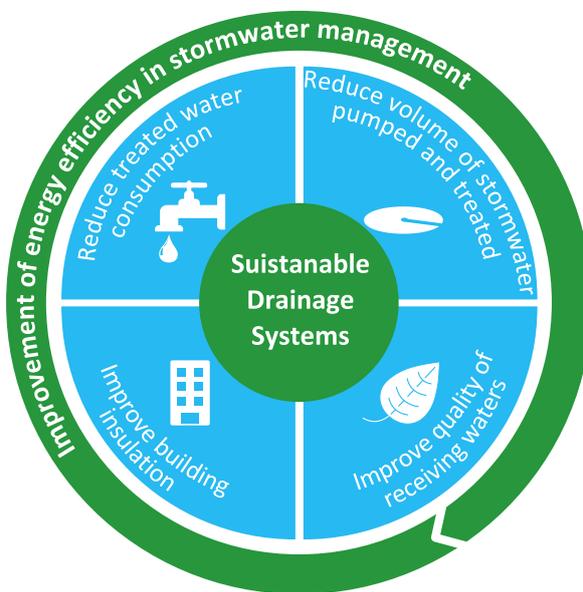
1. Water butt
2. Filter strip to a swale
3. Detention basins (3)
4. Green roof
5. Pervious pavement
6. Infiltration basin
7. Constructed wetland
8. Filter drain

Examples of Sustainable Drainage Systems.

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:



*Improvement of energy efficiency with Sustainable Drainage Systems.*

- 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.

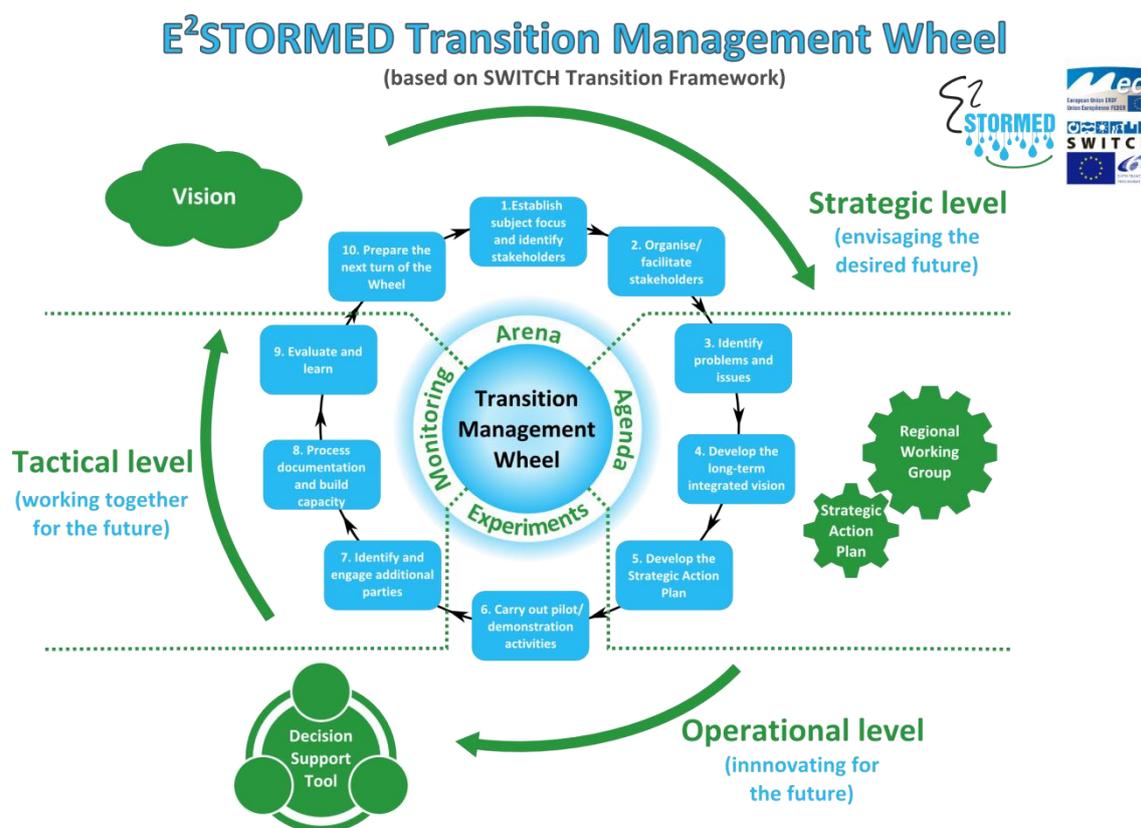


*Leftt: Wastewater treatment in Zagreb (Croatia). Right: Reverse Osmosis Plant in Ghar Lapsi (Malta).*

### 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 E<sup>2</sup>STORMED 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 focussed on the local situation, in accordance with the well-known slogan “think global, act local”.



*E<sup>2</sup>STORMED 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:

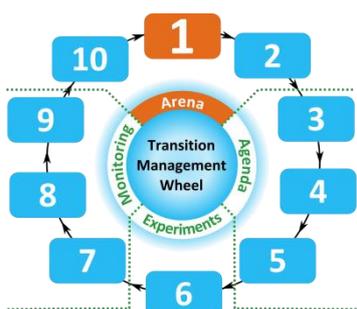
- **Strategic Level (envisaging the desired future):** The focus is on the long-term aspirations and goals towards sustainable urban built environments, requiring strategic thinkers open to innovation and not afraid of change.
- **Tactical Level (working together for the future):** The focus is on development 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 E<sup>2</sup>STORMED, “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. E<sup>2</sup>STORMED 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 E<sup>2</sup>STORMED, 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 E<sup>2</sup>STORMED; 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.).

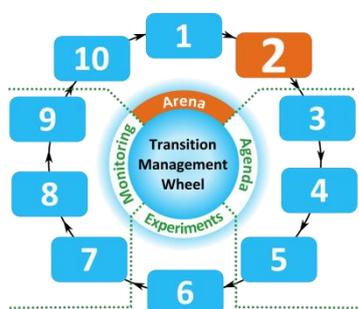
Some RWGEE groups may also include, at the appropriate time: water and energy user groups; local champions working to address environment issues; training and research organisations; financial organisations and the press/media, which provides a means by which the RWGEE can reach the public.



The RWGEE 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 E<sup>2</sup>STORMED 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 E<sup>2</sup>STORMED 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 E<sup>2</sup>STORMED Transition Manual.



*RWGEE meeting in Cetinje (Montenegro).*

- Developing a Strategic Action Plan.
- Learning and disseminating results and conclusions from E<sup>2</sup>STORMED 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.

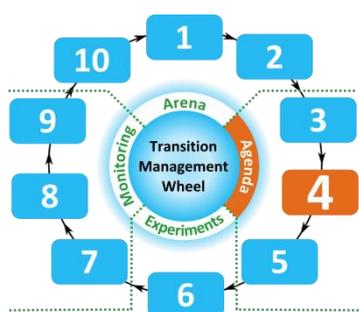
Each stakeholder will have their own issues and potential solutions and there will be reasons (e.g. responsibilities, mandates, potential benefits) for each to want to seek resolution to the problem(s). It is only through the process of working together that an understanding of each other's long-term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



What causes high energy consumption for stormwater management in Pisa? The topography that requires pumping stations on the left, or the high density urban area on the right?

### 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.



*Strategic Action Plan development session in Benaguasil (Spain).*

Based on a literature review, the academic partners of E<sup>2</sup>STORMED 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.

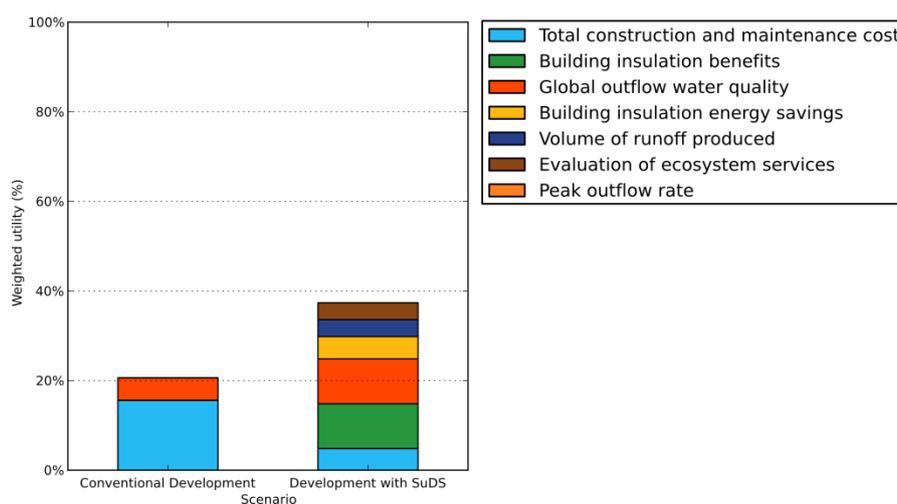
### 3.6 CARRY OUT PILOT/DEMONSTRATION ACTIVITIES



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.

E<sup>2</sup>STORMED 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 CO<sub>2</sub> 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.



*Multicriteria analysis results comparing two options for drainage (conventional/SuDS) for a new development in Zagreb (Croatia).*

A unique demonstration activity amongst the E<sup>2</sup>STORMED 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.

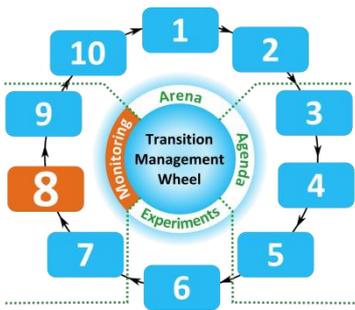


Group of schoolchildren visiting the green roof in Benaguasil (Spain).

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

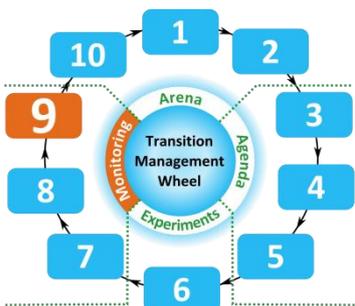


Process documentation captures and tracks what happens during a process of change and how it happened. Good process documentation enables stakeholders to reflect and analyse why changes happened and to organise and disseminate the findings. Meeting minutes, photographs, voice recordings, videos, etc. 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.

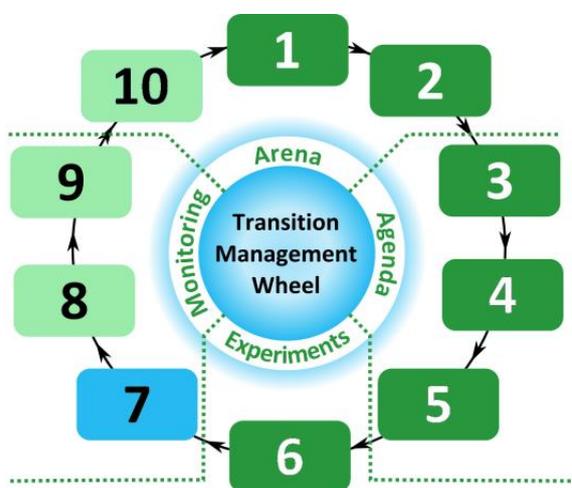
RWGEE meetings are a good platform to conduct training activities (e.g. inform members about the performance of built sustainable drainage infrastructures in Mediterranean cities such those in Benaguasil).

### 3.9 EVALUATE AND LEARN



The starting point for each pilot partner at the beginning of E<sup>2</sup>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.



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

*Evaluation of transition strengths in Zagreb (Croatia).*

### 3.10 PREPARE THE NEXT TURN OF THE WHEEL



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 E<sup>2</sup>STORMED.

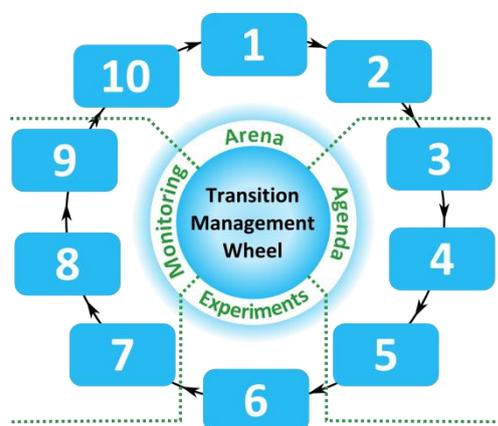
Sustainability should be thought of as a journey of discovery rather than a fixed goal that can be worked towards. The quest for sustainable outcomes will generate new knowledge areas as well as identifying gaps where knowledge does not exist. The next round of transitioning will begin after E<sup>2</sup>STORMED has finished where n 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 E<sup>2</sup>STORMED URBAN AREAS

This chapter presents a summary of the transition activities undertaken by the six E<sup>2</sup>STORMED pilot partners, in order to move towards a more sustainable future for managing its resources.

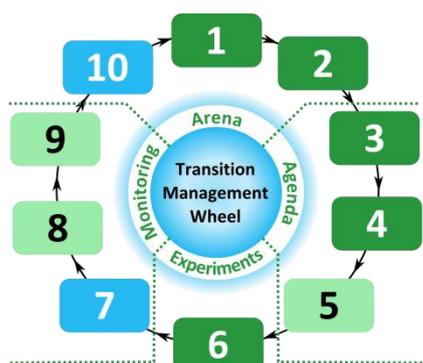
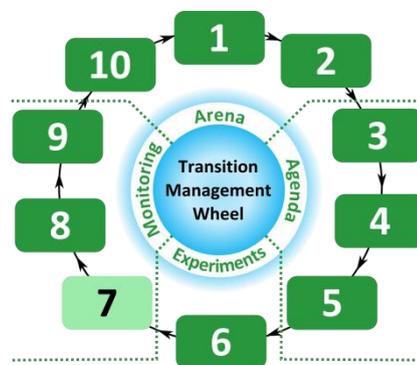
Strengths developed by each pilot partner are depicted using the following colour code: dark green signifies that an activity had been completed; light green signifies that the activity is underway whilst blue signifies that the activity is still to be considered. For clarity, only numbers are used to 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, E<sup>2</sup>STORMED 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.



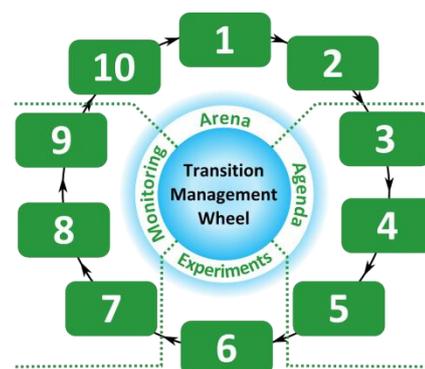
### Municipality of Pisa (Italy)

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

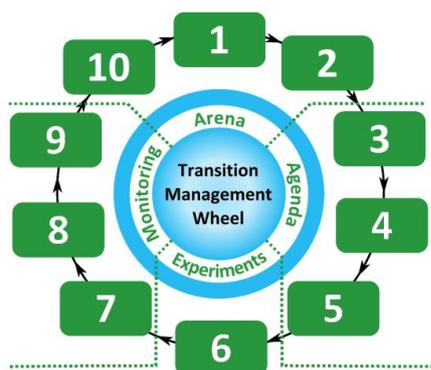
city of Pisa were identified and a vision for the future of the city has been shared. These are the most relevant results including, a proposed Strategic Action Plan. Through the Italian Municipalities Association (ANCI) the experience developed by the Municipality of Pisa within E2stormed project will be spread at national level.

### Local Government Association (Malta)

In Malta the transition process in relation to the E<sup>2</sup>STORMED 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.

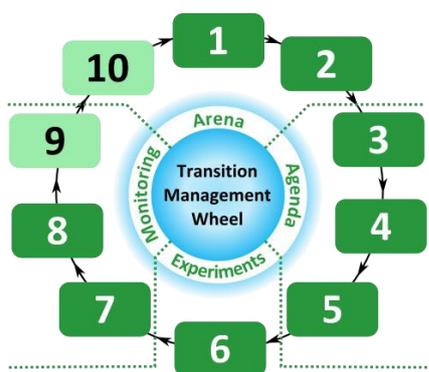


### Municipality of Hersonissos (Greece)



The E<sup>2</sup>STORMED 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.



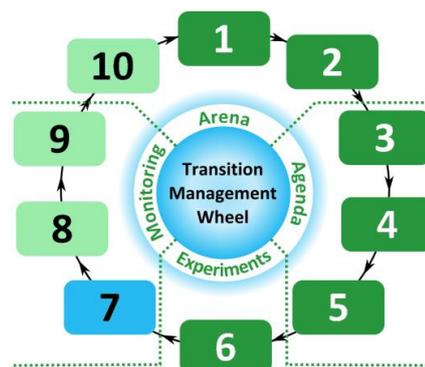
### Old Royal Capital Cetinje (Montenegro)

Cetinje is one of the cities with the highest rainfall in Europe. Project E<sup>2</sup>STORMED 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.

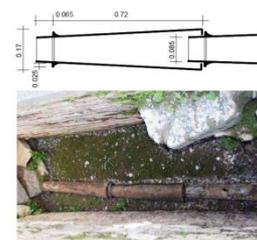
## 5. TRANSITION IN HERSONISSOS

The Municipality of Hersonissos is located centrally on the north coast of the Island of Crete. It is adjacent to the Municipality of Heraklion and has been formed by the unification of the former Municipalities of Gouves, Hersonissos, Malia and Episkopia. Hersonissos is a popular tourist destination whereby the residential population increases from 25257 to 53337 inhabitants during the tourist season. This constitutes 24,7% of Cretan hotels with 36% of Heraklion's airport arrivals holidaying in Hersonissos which is 7% of the total of Greece's arrivals.

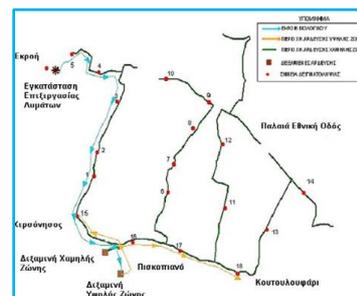
Hersonissos has a temperature Mediterranean climate, with temperatures fluctuating between 21-28.7°C in summer and 9-15.3°C in winter, and mean annual temperature approximately 16.7°C. The rainfall is 481,1mm/year, with average monthly rainfall 0.5mm in July and 99mm in January. The Municipality comprises 38 km of coastal areas and the inland mountainous province.



The main income source in coastal areas is tourism with quality accommodation, blue flag beaches, professional golf courses, emergency medical centres and well equipped congress facilities. In the inland part the main income source is agriculture, mainly olive oil, wine production and animal husbandry. The main archaeological sites, located in the Hersonissos extended region, include the Minoan Palaces of Mallia and Amnissos (the summer Palace of King Minos), the archaeological sites of Niros, Karfi (Minoan refuge) as well as antiquities from the Classical, Hellenistic and Byzantine era.



The drinking and irrigation needs in Hersonissos are covered via 90 boreholes, and the water is pumped to storage tanks. The wastewater treatment plant (capacity 40,000) is twelve years old and is served by eight pumping stations. Compliance with EU legislation required improved effluent quality, which resulted in an upgrade to tertiary treatment using improved filtration techniques to reduce suspended solids and disinfection practices with UV filters to reduce Ecoli. There is a separate drainage network, which covers a small area in Hersonissos, however, effectiveness is limited as it is undersized and has significant sections of ageing pipelines that

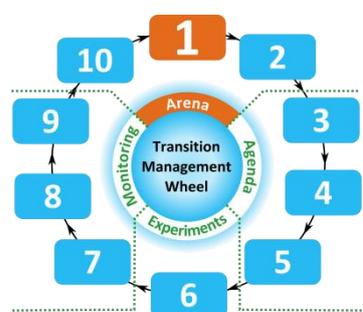


impose a flood risk, intensified by climate change impacts. There are planned measures to introduce drainage networks on the outskirts of the urban area.

Upgrading the WWTP to tertiary treatment in 2001 enabled irrigation of edible crops and aquifer recharge. There are plans to upgrade the existing network and expand the crop irrigation programme by identifying all agricultural users besides olive tree owners to enable distribution to a wider sector of end users.

Prior to E<sup>2</sup>STORMED Hersonissos had participated in 7 European Projects that were either co-funded by the European Regional Development Fund or by the European Commission. This provided Hersonissos with experience in managing EU funded projects. The projects focused on social, technical and environmental issues. The Municipality has also participated in 6 youth action Projects, three of which were related to environmental and energy saving issues.

## 5.1 ESTABLISH SUBJECT FOCUS AND IDENTIFY STAKEHOLDERS



The Municipality of Hersonissos participated in the E<sup>2</sup>STORMED project since its start, following the initiative of one of the project core partners, University of Abertay Dundee, to contact a SuDS expert in Greece seeking a Municipality in the country for inclusion in the project. The Municipality of Hersonissos was selected based on the geomorphological characteristics of the area and the availability of data. The final approval for the participation of the Municipality of Hersonissos was given by the Mayor and

the Municipal Board Members.

The initial core membership for the RWGEE included members of staff from the Planning and Development Department of Hersonissos Municipality, the Mayor and Deputy Mayor of Hersonissos, the Chairman and a

Mechanical Engineer from the Municipal Water Company. Additional bodies were invited at the several RWGEE. Participation in the RWGEEs is seen in the table attached as Annex I.



## 5.2 ORGANISE/FACILITATE STAKEHOLDERS

Two employees of the Municipality of Hersonissos have been engaged as facilitators for the RWGEE at the initial stages of E2STORMED (RWGEE 1 – 4). Their involvement was decided based on the specific topic of each RWGEE, their personal expertise and availability. However, since 01/01/2015 the facilitators have changed as the ones initially engaged have moved to new employment posts not related to the Municipality of Hersonissos.

Since March 2014 Hersonissos RWGEE has developed into a well-functioning working platform at which most key stakeholders are represented, from national down to local Government levels, including educational facilities and local people. The attendees at the realised RWGEEs are listed as Annex II.

The 1<sup>st</sup> meeting was dedicated into introducing the E<sup>2</sup>STORMED programme to the RWGEE members, introducing the SUDS concept and discussing around the stormwater management conditions in Hersonissos and Crete. Poor conditions and planning has been identified with regard to stormwater management in the region. Water cycle energy consumption issues were also discussed.

The 2<sup>nd</sup> meeting, which attracted the interest of numerous participants from a variety of institutions, focused on an in-depth presentation of the SUDS concept, related practices and implementation in other E.U. member states. Discussions held focused on identifying the key stormwater management issues in the area and potential solutions within the SUDS concept.

Updates on project progress, on the scenarios developed for the DST application in Hersonissos and the DST outcomes were presented in the 3<sup>rd</sup> and the 4<sup>th</sup> meeting. In the 4<sup>th</sup> meeting, the potential for planning for energy saving projects was discussed.

During the 5<sup>th</sup> RWGEE the participants were informed by the technical expert team on the DST outcomes in all E<sup>2</sup>STORMED participating Municipalities. Suggestions on sustainable stormwater management interventions for the Municipality of Hersonissos were also presented. The aim was to stimulate discussions on potential SUDS applications that could be included in the Sustainable Energy Actions Plan (SEAP) signed by the Covenant of Mayors, and in the E2STORMED Strategic Action Plan. The decision to focus efforts on dissemination, particularly addressed to schools and professionals involved in the tourist sector was taken.



The 6<sup>th</sup> RWGEE focused on discussing future steps in the dissemination of project results, on making better use of the project outcomes and on turning the wheel, after the end of the E<sup>2</sup>STORMED project.

Main particular outcomes of each one of the meetings are show in the following table:

Meeting N°	Date	Main outcome of the meeting
1	29-05-2013	Members introductions, scope of the project outlined (SUDS and DST), detailed discussions surrounding stormwater management issues in Hersonissos and Crete.
2	28-01-2014	Identification of key problems and potential solutions. SUDS Workshop.
3	26-04-2014	Project progress, DST case study results and potential for demo project discussed.
4	28-11-2014	Update on project process, planning for energy saving projects
5	18-03-2015	Update on project progress in all participating Municipalities, suggestions and discussion on finalising the SAP, and emphasising on dissemination efforts
6	20-5-2015	Turning the wheel – Focus on dissemination

*Main outcomes of RWGEE meetings.*

### 5.3 IDENTIFY PROBLEMS AND ISSUES

The main problems related to energy consumption in the urban water cycle, as those have been identified by the RWGEE members are:

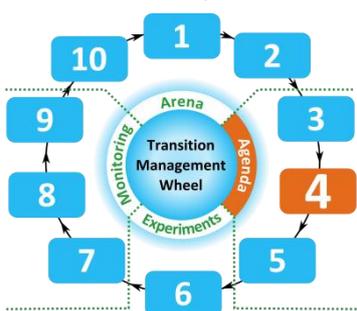
- Undersized and ageing infrastructure in town central areas resulting in flooding.
- Lack of infrastructure and open watercourses to convey stormwater from many areas on the periphery of towns.
- High energy consumption for water pumping and conveyance into storage facilities.
- Electric panels are not equipped with Power Factor Correction Systems.

Many storage tanks have been constructed in wrong locations for efficient water transfer.



### 5.4 DEVELOP THE LONG-TERM INTEGRATED VISION

The Municipality of Hersonissos has a vision for energy efficiency, which is linked to the Covenant of Mayors (CoM) Municipal Programme for Sustainable Tourism Development which was signed on the 18th April 2011. Key to the vision is the Municipality’s projection as a financial, touristic and cultural development centre. A Sustainable Energy Action Plan (SEAP) has been developed which outlines strategic energy planning measures to reduce 20% of CO<sub>2</sub> emissions by 2020.



The vision and SEAP do not, however, include sustainable stormwater management strategies. The Hersonissos Vision has been developed and agreed upon, during the Hersonissos open day and subsequent meetings between the Municipality and the SUDS experts.



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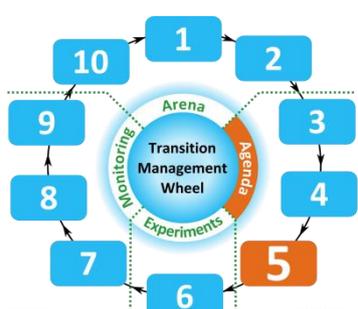
Key stormwater management problems and issues relating to energy in the urban water cycle were identified during the RWGEE meetings, the Hersonissos open day workshop outputs and meetings with the SuDS experts. Most of the identified solutions result in energy gains at some point in the water cycle e.g. collection and reuse of stormwater at source to reduce pumping costs for irrigation of local crops.

#### *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.”*

The vision depicts the key areas that Hersonissos RWGEE should focus in the future and the attempt to facilitate the change towards more energy efficient solutions for resources and sustainable urban water practices. The overall focus remains the same - a long-term aspiration of becoming a sustainable touristic region including sustainable urbanisation by increasing energy efficiency in line with the CoM. Implementation of SuDS can assist towards this agenda. This will be achieved through implementing SuDS, primarily water reuse solutions, to deliver energy efficiency gains thus reducing CO<sub>2</sub> emissions.

## 5.5 DEVELOP THE STRATEGIC ACTION PLAN



Developing the strategic action plan should strike a balance between individual and collective agendas of all stakeholders.

As there are no Municipal or Regional regulations related to storm water management in Crete, the main documents to be considered for formulating a strategic action plan are a. the **Sustainable Energy Actions Plan (SEAP)** signed by the Covenant of Mayors, which still requires amendment so to address the stormwater management element, and b. the **Hersonissos Business Plan 2011-2014**.

One of the weak points of the SEAP has been the lack of accurate data regarding the water cycle. This was one of the factors that resulted in a low score during the 2013 European Energy Award audit (current score 66%). E<sup>2</sup>STORMED is providing the opportunity to bridge this gap. It is envisaged that the Municipality will soon move towards regional regulations in this area.<sup>1</sup>



A number of actions have been outlined in the Municipal SEAP to improve energy efficiency in the urban water cycle:

- Introduce energy efficient stormwater management practices.
- Encourage disconnection of stormwater at source to reduce localised flooding.
- Promote collection of rainwater and re use for irrigation purposes.
- Provide capacity for new developments to go ahead through implementation of SUDS.
- Educate private and educational sectors, professionals and the public in sustainable water management and conservation issues.

In the energy efficiency sector, the Municipal SEAP (adopted by the CoM on 18th April 2012) outlines a number of actions to reduce CO<sub>2</sub> emissions by 26% by the year 2020: Record CO<sub>2</sub> emissions; Submit a SEAP; Create a working group; Submit proposals for projects related to reducing energy consumption; Educate the public and companies on environmental protection

<sup>1</sup> Key EU water legislation to support development of regulations includes the Water Framework Directive and the Wastewater Directive.



and energy consumption issues. In more detail, the mitigation options to be considered include: Improvement of thermal insulation in buildings; Use of renewable energy resources / e.g. use of solar energy for water warming; Use of efficient electrical devices. (e.g. eco-labeling products); Energy Efficiency of heating/cooling system; Good practices at office/home; Encourage the use of means of public transport/cycling/walking and use energy efficient cars with reduced emissions.

## 5.6 CARRY OUT PILOT/DEMONSTRATION ACTIVITIES

Transition experiments in the context of E<sup>2</sup>STORMED contains the analysis of outputs delivered by the DST for two stormwater management scenarios: developing drainage plans for a retrofit and a new development situation. Conventional stormwater was then compared with an appropriate SUDS solution for each location.

### Case Study 1 (retrofit scenario)

**Surface Water Management Issues:** Malia requires drainage improvements due to ageing and undersized infrastructure compounded by fluvial flooding from surrounding watersheds . The experiment compared re-engineering the drainage system in the area of the town hall with the installation of a green roof on the town hall building.

**Option 1 Redevelopment using Conventional Drainage System:** This option required an upsized drainage system for conveying the runoff which will discharge to the WWTP and then the Malia Sea.

**Option 2 Redevelopment using SuDS:** A green roof (300m<sup>2</sup>) is installed on the town hall with excess (but reduced) flows conveyed into a vegetated swale and eventually piped into the existing drainage system which will discharge to the WWTP then the Malia Sea. This option will deliver a SUDS showcase which disconnects surface water, reducing energy use in the building,

mitigates local flooding and provides grey water for non-potable use.



### DST Results from Malia

SuDS Scenario (including outflow conveyance and treatment and building insulation benefits)	
Building insulation benefits (€/year)	12682
Reduced energy consumption (KWh/year) (overall)	118965
Total energy saving (€/year)	17844
Reduced CO2 emissions (kgCO2/year)	2038.9

The scenario using SuDS retrofit demonstrates energy savings and reduction in the CO2 emission rates.

## Case Study 2 (new development)

**Surface Water Management Issues** Gournes has no formal drainage system and is also prone to fluvial flooding due to the reduced capacity of the local stream.

**Option 1 Redevelopment using Conventional Drainage System** Increase and widen the main stream area to receive flows from new a piped drainage network. The streets in Gournes are very narrow which will be a challenge for pipe installation.

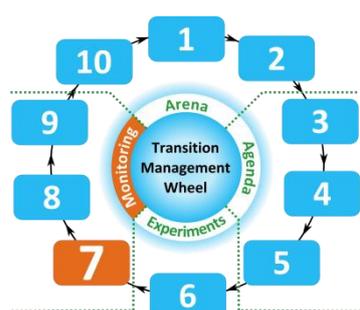
**Option 2 Redevelopment using SuDS** Convey the surface water runoff to a detention basin on the outskirts of the village located near olive groves. This option will deliver a SuDS (multi-functional basin) which will provide amenity benefits, reduce local flooding, provide capacity for a new development to go ahead and deliver water re-cycling for crop irrigation.

### DST Results from Gournes

	Conventional scenario			SuDS scenario		
	Financial cost (€)	Energy consumption (KWh/y)	Emissions (kgCO <sub>2</sub> /y)	Financial cost (€)	Energy consumption (KWh/y)	Emissions (kgCO <sub>2</sub> /y)
Construction	90000	29088	8604	25500	12844	3787
Maintenance	450	4,012	1,072	225	13,011	3,466
Stormwater conveyance and treatment	90,25003	48,7838	35,026768 4	0	0	0

In the new development area the SuDS scenario shows that the reduction of energy consumption and CO<sub>2</sub> emissions are principally in construction and maintenance costs.

## 5.7 IDENTIFY AND ENGAGE ADDITIONAL PARTIES



The Municipality of Hersonissos is supporting efforts of secondary schools in the region that undertake energy and water saving initiatives, as part of their curriculum, and has cooperated with the Gouves high school at the “Junior Energy Inspectors in Action” school project that was aiming at education students on energy saving.

Within the framework of E<sup>2</sup>STORMED, one MSc thesis presenting the DST application in the city of Hersonissos was successfully completed by a student of the University of Abertay Dundee, also in collaboration with the Municipality of Hersonissos. The MSc thesis has led to an MSc award.

The Municipality of Hersonissos has further emphasised on expanding the educational activities in the region. Educational events addressed to primary schools were implemented in May. These events attempted to disseminate the project outcomes and to inform school children on water saving initiatives and practices, emphasizing on the energy



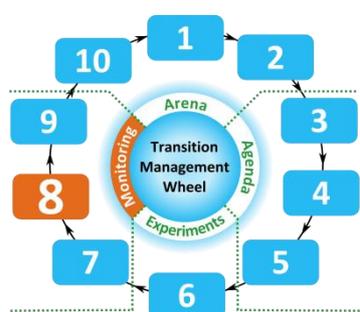
saving element of the water cycle. During the events the water-energy was presented alongside with good practice examples in stormwater management and rainwater harvesting, while emphasis was paid on the implementation of Mediterranean green roofs. Green roofs have been chosen to be presented due to the fact that within E<sup>2</sup>STORMED a green roof scenario was tested for the case of Hersonissos. The students participated to an outdoor activity that demonstrated the actual construction of a green roof, which is making use of endemic aromatic plants.



Information activities addressed to local stakeholders were also realized. The stakeholders were informed on the benefits and practices related to green roof construction and introducing a Mediterranean pond into the urban landscape. The two practices were selected on the basis of the scenarios tested with the use of the E<sup>2</sup>STORMED DST; a green roof on a Municipal building and a SuD pond in a rural area of Hersonissos, both using endemic species from Greece and Crete.

Leaflets and promotional material were developed for the dissemination events, which were positively accepted and received high publicity at local media and press.

## 5.8 PROCESS DOCUMENTATION AND BUILD CAPACITY



Process documentation and capacity building have been developed throughout the whole project implementation. The minutes delivered following each meeting have been effectively tracking the process of change and are allowing RWGEE members to monitor progress with transitioning activities. The transition case study and evaluation of each activity also comprise process documents. These documents are ensuring that the RWGEE reflect and debate progress to

ensure that the transition agenda is on target and deliver smarter outcomes to achieve the vision. In addition, reports on the DST application have been produced throughout the project implementation.

### Capacity Building

SuDS training workshop by an international SuDS expert employed by the Municipality following 2nd RWGEE meeting supported the capacity building agenda. The SuDS expert outlined how SuDS mimic natural processes and are therefore environmentally friendly, and compared SuDS with traditional drainage systems. Good practice SuDS examples from other European cities have also been presented. The workshop supported capacity development for members of the RWGEE by helping them understand the SuDS quality – quantity – amenity concept and gave them the opportunity to ask questions regarding suitable SuDS types for the Hersonissos climate and conditions, maintenance responsibilities and water quality issues for reuse purposes within the confines of EU Directives.

The project meeting held in Hersonissos between 31 March – 1 April 2014 contributed to capacity building, as it attracted local stakeholders who demonstrated a keen interest in the project processes and results. The publicity the meeting and the project received were also in support of the capacity building agenda as it provided knowledge on SuDS and increased interest on the project.

At the 5<sup>th</sup> RWGEE there was another attempt to strengthen capacity building via an expert presentation of the project progress in all Municipalities and by stimulating a discussion on potential stormwater management options to be considered for inclusion into the **Sustainable Energy Actions Plan (SEAP)** signed by the Covenant of Mayors, that will form part of the Strategic Action Plan developed within the framework of E2STORMED for the Municipality of Hersonissos. Finally, in the 6<sup>th</sup> RWGEE participatory processes were followed that resulted on turning the focus towards dissemination of project outcomes to school children and local actors, fact that is in support of capacity building.

## 5.9 EVALUATE AND LEARN



The project processes have been continuously evaluated during the project implementation and the lessons learnt were used to improve performance. Hersonissos, although having a slow start, as mentioned at the initial project meetings, fact that can be attributed to delays in allocating the technical expert team, has managed to successfully complete all steps of the transition wheel, as seen in the following Figure. In all these steps the contribution of local stakeholders has been valuable.

Driven by the vision developed at the early stages of the programme implementation, Hersonissos has also managed to expand project dissemination to additional parties and to attract the interest of the local community and society. The DST application and the experiences gained have informed the development of the Strategic Action Plan, and the enrichment of the CoM with foreseen activities related to stormwater management. The lessons learnt throughout the transition process have been used to improve processes and resulted to an over satisfactory project implementation. Activities, desirable outcomes, indicators and metrics are presented as Annex III.



*Evaluation of transition strengths in Hersonissos*

## 5.10 PREPARE THE NEXT TURN OF THE WHEEL



The 6<sup>th</sup> RWGEE signified the start for the preparation for the next turn of the Wheel within the Municipality of Hersonissos. Following participatory processes, it was decided to place emphasis at disseminating the project results towards reducing energy consumption within the urban water cycle. Plan for dissemination for the after-E<sup>2</sup>STORMED period are already in place.

The potential to use the DST, developed within E<sup>2</sup>STORMED, for future applications that could potentially lead to real-life implementation of SuDS within the Municipality of Hersonissos, has also been decided and it will be facilitated in the near future.

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## ANNEX 1. INSTITUTIONS PARTICIPATING IN RWGEE

Type of Stakeholder	Stakeholders invited to the RWGEE	Participation in Meetings*						
		1	2	3	4	5	6	7
National Bodies	Technical Chamber of Greece	Y	Y	N	N	N	N	
	Geotechnical Chamber of Greece	Y	N	N	N	N	N	
Regional public authority	Municipal Enterprise for Water and Wastewater Hersonissos (MEWWH)	Y	Y	N	Y	Y	Y	
	Decentralized Administration of Region of Crete / Water Directorate	Y	Y	N	N	N	N	
	Region of Crete/ Directorate Environmental and Landscape Planning / Water Department	Y	N	N	N	N	N	
	Energy Agency of Region of Crete	N	Y	N	N	N	N	
	Region of Crete / Water Saving Department	Y	N	N	N	N	N	
	Decentralized Administration of Region of Crete / Directorate of Environmental and Spatial Planning	Y	Y	N	N	N	N	
Local public authority	Municipality of Hersonissos	Y	Y	Y	Y	Y	Y	
	Mayor and Deputy Mayor of Hersonissos	Y	Y	Y	Y	Y	Y	
Academia	Technical University of Crete	N	Y	N	N	N	N	
Private sector	Electric Energy Company, Dialynas S.A., Oikosteges S.A.	N	Y	N	N	N	Y	
	ETAM SA (SuDS Experts)		Y	N	Y	Y	Y	
Civil society / community groups		-	-	-	-	-	-	
The Media		-	-	-	-	-	Y	
<b>Nº of Institutions invited to each meeting</b>		<b>13</b>	<b>13</b>	<b>13</b>	<b>10</b>	<b>10</b>	<b>9</b>	
<b>Nº of Institutions participating in each meeting</b>		<b>9</b>	<b>9</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>6</b>	

Y: The institution was invited to the meeting and attended.

N: The institution was invited to the meeting but did not attend.

-: 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 the Municipality. It counts as participant in the meeting.

It should be noted that institutional changes within the Municipality of Hersonissos have resulted in low participation in the RWGEE 3-5.



## ANNEX 2. RWGEE MEETINGS' ATTENDEES

Stakeholders invited to the RWGEE	Members	N° Attendees per Meeting							
		1	2	3	4	5	6	7	8
Technical Chamber of Greece	Manolis Dialynas, Nikitas Mavrakis	1	1	-	-	-	-		
Geotechnical Chamber of Greece	Evgenia Stylianou	-	1	-	-	-	-		
Municipal Enterprise for Water and Wastewater Hersonissos (MEWWH)	Konstantinos Filippakis, Ioannis Vretoudakis, Emmanouil Kosmadakis, George Gioullbas, Jphn Argyrakis	1	3	-	2	2	3		
Decentralized Administration of Region of Crete / Water Directorate	Marinos Kritsotakis, Dimitrios Stivaktakis, Heracles Mpouloukakis	2	1	-	-	-	-		
Region of Crete/ Directorate Environmental and Landscape Planning / Water Department	Stefanos Manouselis, Anna Troulinou,	2	-	-	-	-	-		
Energy Agency of Region of Crete	Nikos Zografakis	-	1	-	-	-	-		
Region of Crete / Water Saving Department	Maria Apostolaki, Maria Dramountani	2	-	-	-	-	-		
Decentralized Administration of Region of Crete / Directorate of Environmental and Spatial Planning	Emmanouil Mavrakis, Maria Panteri	1	1	-	-	-	-		
Municipality of Hersonissos	Anastasia Nistikaki, Efi Andrianou, Maria Symeonidou, Emmanouil Michelekakis, Anna Meidani, Eirini Soultatou, Ioannis Vretoudakis, Maria Pitaridi, Maria Korovezou, Eirini Perdikogianni, Nikolaos Vailakis, Agapi Perysinaki, Eleftherios Adamakis, Eirini Mastoraki, Tereza Karpathiotaki, Athanasios Sakkoudis, Emmanouel Tzobanakis, Michael Tsagakis, Thania Skyvalaki, Fani Anastasiou, Sofia Tzedaki	9	10	3	5	3	11		
Mayor's Office	Zacharias Doxastakis, Emmanouil Diamantakis, Ioannis Mastorakis, Apostolos Louloudakis, Emmanuel Petrakis	1	1	-	1	2	3		
Technical University of Crete			1	-	-	-	-		
Electric Energy Company	Georgios Kourletakis	-	-	-	-	-	-		
Private sector	George Dialynas, Andrew Clements	-	-	-	-	-	2		
ETAM SA (SuDS Experts)	Nikos Drakonakis, Maria Lydaki, Stella Apostolaki, Gerasimos Koutsogiorgos	*	3	2	2	3	3		
<b>N° of Attendees per Meeting</b>		<b>20</b>	<b>23</b>	<b>5</b>	<b>10</b>	<b>10</b>	<b>22</b>		

\*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 Municipality of Benaguasil. It counts as participant in the meeting but not as attendee to the meeting.



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## ANNEX 3. EVALUATION TABLE

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

\*Box to be 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.



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*\*\*Those stakeholders which have justified their absence but provide information and show interest in meeting outcomes can be considered to have participated in it.*



## E<sup>2</sup>STORMED PROJECT

Improvement of energy efficiency in the water cycle by the use of innovative storm water management in smart Mediterranean cities  
[www.e2stormed.eu](http://www.e2stormed.eu)

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