SERVICIZING POLICY PACKAGES FOR THE WATER SECTOR

June 2015

This publication is a summary of the SPREE deliverable 8.2.1 which presents the full Servicizing Policy Packages for the Water Sector, and can be referred to for further details.

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About SPREE Project

The **S**ervicizing **P**olicy for **R**esource **E**fficient **E**conomy (**SPREE**) three-year research project was launched in July 2012 under the European Commission's Seventh Framework Programme (FP7). Its overarching goal is to provide insights into how servicizing can help EU countries to achieve a sustainable and prosperous economy characterized by decoupling of economic growth and social prosperity from inefficient use of resources. **Servicizing**, which facilitates the transition from selling products to providing services has the potential to address such a challenging goal of decoupling and hence was chosen as the core of SPREE research.

Servicizing is defined in SPREE project as a transaction where value is provided through combination of products and services and where satisfaction of customer needs is achieved by selling function of the product rather than product per se and/or by increasing the service component of the offer. Servicizing, theoretically, has the potential to bring us closer to decoupling as its realization in practice influences production as well as consumption patterns.

However, servicizing can lead both to increased and decreased environmental, economic and social impacts. Hence it becomes necessary to study the conditions under which servicizing can actually live up to its potential and establish profitable but resource efficient business activities, enhance consumer satisfaction and promote high quality of life. For this purpose, SPREE team applied Agent-Based Modelling (ABM) on the basis of evidence-based data derived from nine case studies in six different countries, in order to evaluate the impact of servicizing systems' diffusion together with the effects of policies designed to support these systems.

SPREE focused on the application of servicizing in three sectors: Greywater Recycling and Rain Water Harvesting systems in the Water sector; Car- and Bike-Sharing systems in the Mobility sector; and Crop Protection Management Solutions in the Agri-food sector.

The Servicizing Policy Packages is the key outcome of SPREE Project. The Servicizing Policy Packages in the Water sector is based on the project's accumulated knowledge on the transition towards servicizing and contributes to the development of policies to promote decoupling of economic growth and social prosperity from inefficient use of resources, through the facilitation of Greywater Recycling (GWR) and Rain Water Harvesting (RWH) systems.

Please see the SPREE Website Report section for the key results of the Water case studies in the UK, Israel and Spain.

SPREE Project website: www.spreeproject.com

Greywater Recycling (GWR) and Rain Water Harvesting (RWH) Systems

Water is already servicized in most developed countries. Hence the Water case study differentiates between 'first and second level servicizing'. First level servicizing is understood as the process whereby consumers already pay for the water treatment services provided by water companies, including the cost of supply and of treating the water once it has left the household premises. Second level servicizing pertains to the reuse of water within the household, a process known as Greywater Recycling and to options for alternative sourcing of water such as Rain Water Harvesting.

The Water case study explores the potential to expand services around **Greywater Recycling (GWR) and Rain Water Harvesting (RWH) at the household level** in order to reduce the use of potable 'mains' water in the household to essential uses such as drinking and cooking only, thereby reducing the environmental impacts associated with the provision of water through 'mains'. The Water case selected is considered as a Business-to-Consumer (B2C) type of servicizing.

The empirical work of the Base Case has focused on the South East of England. The Base Case in the Water sector and where attention was focused on in the initial Policy Packaging process (the Basic and Effective Packages) was the UK. Additional two case studies were carried out in Israel and Spain.

The main characteristics of the GWR & RWH servicizing system are:

- GWR systems collect water from showers, sinks and baths and typically re-use it for toilet flushing and/or garden watering. Water from dishwashing and even clothes washing can also be recycled. How much water is recycled depends on where the water comes from and the size and location of storage tanks.

- RWH systems collect rainwater from roofs, balconies and patio areas, store it and then use it for toilet flushing, garden watering or even clothes washing.

GWR and RWH systems may require alterations to the rooms where they are installed (e.g. bathroom, kitchen, loft, and cellar) but they help households to save water and reduce reliance on standard water supply. These systems can contribute to save money on water bills when water is metered.

To assess the degree to which GWR & RWH contribute to decoupling, three possible decoupling pathways were analyzed:

- Economic growth from water consumption;

- Economic growth from emissions/other environmental impacts associated with water provision and consumption;

- Well-being (social impacts) from water consumption.

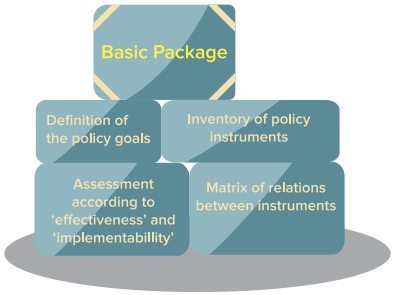
The degree to which GWR & RWH servicizing systems may advance these pathways was the focus of the study.

Servicizing Policy Packaging towards Decoupling: The Case of GWR & RWH Systems

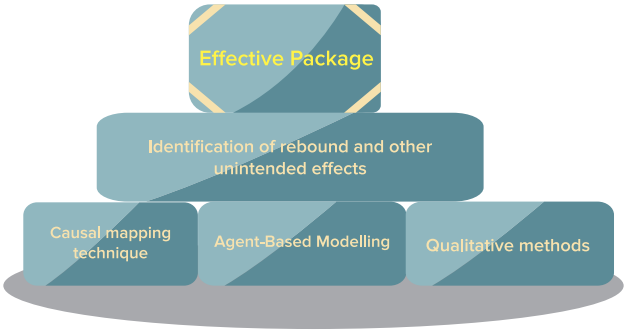
Policy Packaging – aim and methodology

A Policy Package is a combination of policy instruments designed to address one or more policy objectives. Through a combination of policy instruments, a Policy Package should result in meeting goals that otherwise cannot be met with a single policy instrument. Policy Packages utilize positive synergy effects between policy instruments while avoiding contradictory effects and reducing negative unintended effects. They are also designed to increase public acceptance of policies - social acceptability - and to achieve political compromises – political acceptability. **Thereby, Policy Packages facilitate both (1) effectiveness and (2) implementatability of the desired policy goals.**

In order to design a Policy Package, several stages of development and refinement are defined (Figure 1). Initially, a "Basic Package" of policy instruments is created. The Basic Package is designed in order to directly achieve the desired policy goals. It is the result of a process in which many individual policy instruments are assessed based on their 'effectiveness' and 'implementability' characteristics. On this basis, the most promising instruments are identified. Then, pre-conditions to the implementation of these promising instruments are identified as well as instruments which may facilitate the effects of the policy instruments, or have synergetic effects with them. In addition, potential contradictions among instruments are identified. On this basis the Basic Package is formed.



At the second packaging stage – the "Effective Package" formulation, primary and ancillary instruments are added and removed to enhance the net effectiveness of the Package. That is, to maximize the benefits of the Policy Package, while taking into account rebound and other unintended effects. For that, causal mapping technique is used, as well as Agent-Based Modelling (ABM), and insights derived from expert interviews and the other Water study's methodologies in order to better understand the criteria that couldn't be assessed in the ABM due to the model's limitations. Causal mapping illustrates the mechanisms through which a policy instrument may affect the policy goal and by that anticipate some unintended effects.



In the final stage – the "Viable Package" formulation, social and political acceptability are thoroughly examined, alongside an analysis of possible implementation barriers such as financial, institutional, regulatory and technological barriers. On the basis of additional changes, the most viable Package is designed – the Package that it is expected to be implementable and effective.

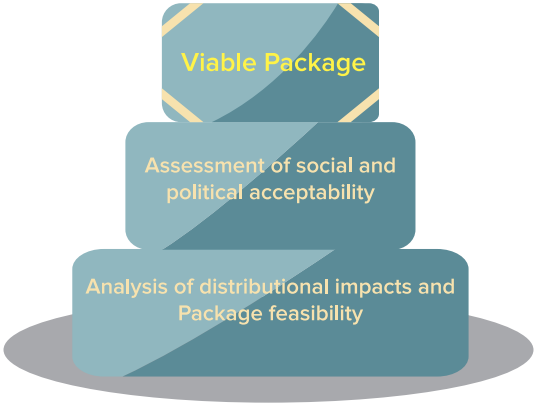


Figure 1. Three key stages of the Policy Packaging process

Basic Package for the Base Case in South East England

The process of comprising the Basic Package for the Water sector followed a series of steps in which 100 Policy Instruments were outlined, scored according to 'effectiveness' and 'implementability' criteria and reviewed according to relevance for the Base Case.

The inventory of policy instruments was created in order to achieve the policy goal of decoupling. The decoupling indicator for the Water sector was defined as the ratio between the economic cost and environmental impact (emissions/mains water use) of abstracting, treating, delivering and disposing of water in GWR & RWH systems. The decoupling level was measured against the decoupling level in the conventional water supply system in order to assess the effects of shifting to servicizing.

The inventory of policy instruments was then cut down to a list of those 20 with the most potential of being effective and implementable. A Matrix to identify relationships between pairs of instruments (synergies, pre-conditions, facilitation and contradictions) was created. Based on the scores for each policy instrument and its relations with other promising instruments 'Golden Measures' and 'Low-Hanging Fruits' were identified to establish the Basic Package. 'Golden Measures' are very effective and easy to implement instruments that do not contradict other instruments, while 'Low-Hanging Fruits' are easy to implement but not necessarily the most effective ones. 'Bad' instruments (contradictions) and any mistakes identified in the relationships were eliminated in the second phase of this process that aimed at grouping policy instruments and identifying patterns.

Effective Packages for the Base Case in South East England

Each proposed policy instrument for the Basic Package may have some unintended effects that will erode or eliminate its actual net effectiveness with respect to the defined policy goal. There can also be unintended effects affecting other policy domains which are of importance. Therefore, a causal mapping technique was used to anticipate these unintended effects and mitigate them by adding supporting ancillary policy instruments or removing instruments from the Basic Package. The ABM results were utilized in this stage to assess which of the instruments in the Basic Package has the most desirable effect on achieving the policy goal of decoupling through servicizing. Ancillary instruments were also considered in order to facilitate the function of one or more policy instruments thus affecting the policy goals indirectly by facilitating implementation.

With the above aims in mind, the Effective Package were created based on the modifications to the Basic Package derived from the causal mapping and the ABM. In essence, the causal mapping, with inputs from the ABM results, led to the identification of policy instruments that should be added, removed or modified. The results of this process were two Effective Packages: Regulation-led and Incentive-led, which were designed for the sector's Base Case in South East England, UK.

The Effective Packages are structured around building regulations that require all new housing, to include GWR & RWH systems. To forestall raising housing cost in social housing these systems will be included in social housing at the expense of local jurisdictions that will be (partially) reimbursed from higher tiers of government. Local jurisdictions will also fund the introduction of such systems to schools and other public facilities. In order to

provide incentives to homeowners to introduce such systems, water prices have to be raised, which requires that all properties be metered. In addition, tax breaks for buildings that introduce GWR and/or RWH systems should be implemented. Finally, several means to raise public awareness and understanding of the severity of water issues and the potential of GWR & RWH systems should be included in the Effective Packages.

Viable Packages for case studies in the UK, Israel and Spain

In the next stage the implementability of the Effective Packages was assessed to derive the Viable Package – the Package that has the most chances of being implemented and achieving the desired policy goal. Implementability was assessed by considering first social acceptability of the Effective Packages - assessment of the main losers and winners from implementing the Package, then considering a range of potential implementation barriers to assess the feasibility of implementing the Package, and finally considering political acceptability. To assess political acceptability the main initiator/promoter of the Package was identified and then the main political actors were identified that are important in implementing the Package.

Due to its unique context specific character a different Viable Package was designed for each of the case studies in the Water Sector in the UK, Israel and Spain. This process included first modification to the Effective Packages to adjust it to local case conditions before carrying out the implementability analysis and forming the case specific Viable Policy Package.

Using Agent-Based Modelling for GWR & RWH Systems

On Agent-Based Modelling (ABM)

Agent-Based Modelling (ABM) is a relatively new simulation method which allows analyzing the physical part of complex systems, such as technology and infrastructure, as well as the social part including behavior of individuals and organizations. As the developments within complex socio-technical systems are subject to many uncertainties, ABM is used for exploration rather than for prediction, that is to explore possible future development pathways. To date, ABM has been applied in various disciplines, including economics, sociology, geography, political science, anthropology, linguistics and even social history.

One of the main strengths of ABM is that social behavior of individuals and the interactions between them can be taken into account explicitly by representing them as autonomous agents. An ABM therefore consists of agents, objects and the environment. Agents are entities that have individual properties and behavior. They make decisions and interact with each other. Objects are passive entities that may represent any other relevant concept in the system under consideration. The Environment provides the context for the interaction between agents and objects. In an Agent-Based simulation, the model runs step-by-step activities and decisions by all the individual agents. System-level patterns then emerge and evolve as a result of the agent interactions and serve as the knowledge produced by the ABM for consideration and evaluation.

ABM use in SPREE project

In SPREE project, Agent-Based Modelling has been incorporated as a main methodology for the purpose of studying the potential of servicizing and servicizing policy to reach decoupling. The main reason is that ABM allows for the consideration of the role of consumer and business behaviors in the economic and environmental developments of industrial sectors. These developments are characterized by business strategies and consumer preferences which can be captured in an ABM. Furthermore, a generic ABM of servicizing systems can be used to represent and simulate servicizing in various sectors. In SPREE, the sector-specific ABM enables the exploration of different policy instruments and Policy Packages in different simulation runs to gain better understanding of their likely effects.

To develop the SPREE Water sector ABM, the Water experts specified the relevant businesses, consumers, products, services, and production and consumption processes, including the associated costs and environmental impacts. This resulted in the Base Case model, which simulated the 'world' – the interactions between agents, objects and the environment - without the presence, or implementation, of any policy instrument or Policy Package. At the next stage, various policy instruments were inserted into the model, as well as Policy Packages, to test their potential to promote decoupling through servicizing.

Thus, the main role of the ABM in SPREE project is to support the design of Policy Packages by simulating the effects of different policy instruments and Policy Packages and to assist in the design of the Effective Packages.

The main simulation outputs of the SPREE ABM to assist with the above are business profits, consumer expenditures, product and service market shares, product and service volumes and prices, supply-chain GDP, system-level environmental impact,

and consumer preference fit (indicating satisfaction with product/service quality). By comparing the supply chain GDP defined as the profits of the businesses - and the system-level environmental impact outputs for different policy scenarios, the potential for decoupling through servicizing was extracted. Naturally, these results should be interpreted in view of the model and data assumptions in place.

The ABM results for the Water Base Case in the UK suggest that:

1. The implementation of GWR & RWH systems at the household level leads to decoupling of water consumption from detrimental impacts on the environment

2. Servicizing GWR & RWH has great potential for increasing the uptake of these systems and for furthering decoupling between water consumption and negative impacts on the environment

Results for individual policy instruments simulated in the ABM have been examined and classified for the purpose of assessing which policies have the highest and lowest impacts in terms of achieving the goal of promoting GWR & RWH and thus reducing CO2 emissions and mains water consumption, while maintaining or increasing revenue (GDP) in the GWR & RWH supply chain compared to the business as usual scenario. ABM results show that all policy instruments lead to the revenue (supply chain GDP) increasing or remaining the same as in the business as usual scenario, while there is a reduction in negative environmental impacts. The two single policies with the greatest impact in terms of increased revenue are the instruments on compulsory installation of GWR & RWH systems (Table 1).

ABM scenario ABM outputs	ABM simulation for the Base Case of GWR & RWH systems in the UK	ABM simulation for the Base Case of GWR & RWH systems in the UK, with Incentives-led Effective Policy Package added (all Incentives, plus info/awareness & water metering & pricing policy instruments)	ABM simulation for the Base Case of GWR & RWH systems in the UK, with Regulations-led Effective Policy Package added (all regulations, plus info/awareness policy instruments but no water metering & pricing Instruments)
Environmental impact – embedded CO^2 emissions compared to Base Case (current scenario)	c. 70,000 Kg of CO_2 linked to large GWR & RWH (main market share through the simulation)	⬇ Decrease from Base Case to c. 50,000 Kg mark (with minor fluctuations)	⬇⬇ Decrease from Base Case to c. 41,000 Kg of CO_2 linked to large GWR & RWH (main market share through the simulation)
Supply Chain GDP (Revenue in £) compared to Base Case (current scenario)	Approximately on the £40,000 mark for the first 25 years and then c. £30,000	⬆ Similar to Base Case on £40,000 for the first 25 yrs then modest increase to c. £55,000 on average	⬆⬆⬆ Increase from £40,000 Base Case to above £400,000 for first few years, then c. £300,000 and £225,000 last 50 yrs

Amount of Water consumed per consumer (liters) for each consumer group	Ranging from 7.9 million litres per consumer for wealthy families with metered water supply, to 17 million litres per consumer for low income families with unmetered water	↓↓ Between 7.2 and 7.8 million litres per consumer depending on consumer group	↓↓↓ Between 3.2 and 3.4 million litres per consumer depending on consumer group
Type & Number of tools used over period and type	Small GWR with maintenance: 340 Large GWR&RWH with maintenance: 9	↑↑ Small GWR with or w/o maintenance: 606 Large GWR&RWH with or w/o maintenance: 107	↑ Large GWR&RWH: 318 Large GWR&RWH maintenance: 86

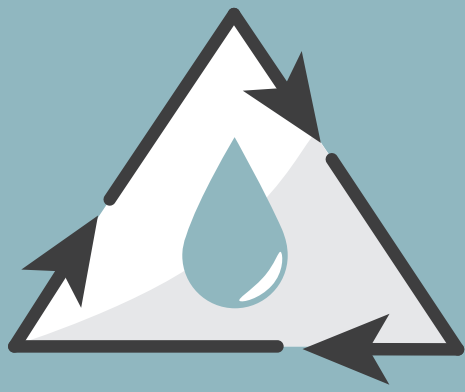
ABM scenario ABM outputs	ABM simulation for the Base Case of GWR & RWH systems in the UK	ABM simulation for the Base Case of GWR & RWH systems in the UK, with Incentives-led Effective Policy Package added (all Incentives, plus info/awareness & water metering & pricing policy instruments)	ABM simulation for the Base Case of GWR & RWH systems in the UK, with Regulations-led Effective Policy Package added (all regulations, plus info/awareness policy instruments but no water metering & pricing Instruments)
Type & Number of service units used over period (years of system service)	Small GWR: 2,000 (among wealthier groups and some among metered low income families) Large GWR & RWH: 2,000 (mostly among wealthier groups)	↑↑ Small GWR: 3,500 Large GWR & RWH: 5,800	↑↑↑ Choice of system - Large GWR & RWH: 8,100 (fewer small GWR systems with maintenance or servicized in use)

Lifestyle		same as Base Case	√ Improvement in comparison with Base Case
Environmental impacts (embedded CO^2 emissions - Kg) over time per consumer group	Between 17,000 and 34,000 Kg per consumer depending on consumer group	⬇⬇ Between 16,000 and 16,800 Kg per consumer depending on consumer group	⬇⬇⬇ Between 8,100 and 8,600 Kg per consumer depending on consumer group

Arrows represent ⬇ for decrease and ⬆ for increase when comparing the relative output values of different scenarios, i.e. Base Case compared to simulations with policy packages added on. More arrows up or down indicate larger or smaller increase/decrease than under other policy scenarios by comparison. All figures, for example No. of Service units and litres of Water consumed, are rounded up. √ for improved 'Lifestyle fit' over time and - no improvement in 'Lifestyle fit' over time in relation to the Base Case (currently).

Table 1. Summary table of ABM outputs for the Water Base Case in the UK compared to simulations with Effective Policy Packages added

A GLANCE AT THE SERVICIZING POLICY PACKAGES IN THE WATER SECTOR



The Effective Policy Packages for GWR & RWH systems

Based on the above analysis and experts' judgment together with inputs from an extensive fieldwork and a large survey, the following Effective Policy Packages to achieve decoupling through GWR & RWH systems in South East England, UK where designed: Regulation-led Effective Policy Package and Incentives-led Effective Policy Package (Figures 2 & 3).

The policy instruments comprising the Effective Policy Packages for South East England, UK are:*

1. Building regulations: Compulsory for all new properties to include GWR systems

2. Building regulations: Compulsory for all new properties to include RWH systems (in blocks of flats, RWH in common roofs, balconies, etc.)

3. Direct provision of funding to local authorities to install household-based GWR & RWH systems in all new social housing projects

4. Enforcement (including warnings, fines and prosecution) of GWR & RWH conditions in planning and building regulation permissions

5. Funding GWR, RWH and/or combined GWR & RWH in schools and public buildings

6. Implement universal water metering

7. Increase the price of potable water and sewage collection and treatment

8. Produce clear and transparent bills and cost models for GWR, RWH and mains water for consumers' benefit

9. Promoting GWR & RWH

10. Tax breaks aimed at encouraging the installation of GWR & RWH systems by consumers

12. Company sponsorship of GWR & RWH systems

13. Raising awareness about sustainability of water resources and GWR & RWH among business and the public by Government

14. Public information campaigns encouraging households to collect and use rainwater and recycle grey water, i.e. encouraging installation of RWH & GWR systems

15. Subsidies for low-income households to install RWH & GWR systems

* Policy instruments were numbered at the early stage of the Basic Policy Package and each instrument 'kept' its serial number throughout the process, allowing to trace back of the instruments included in the various stages of the Policy Packaging.

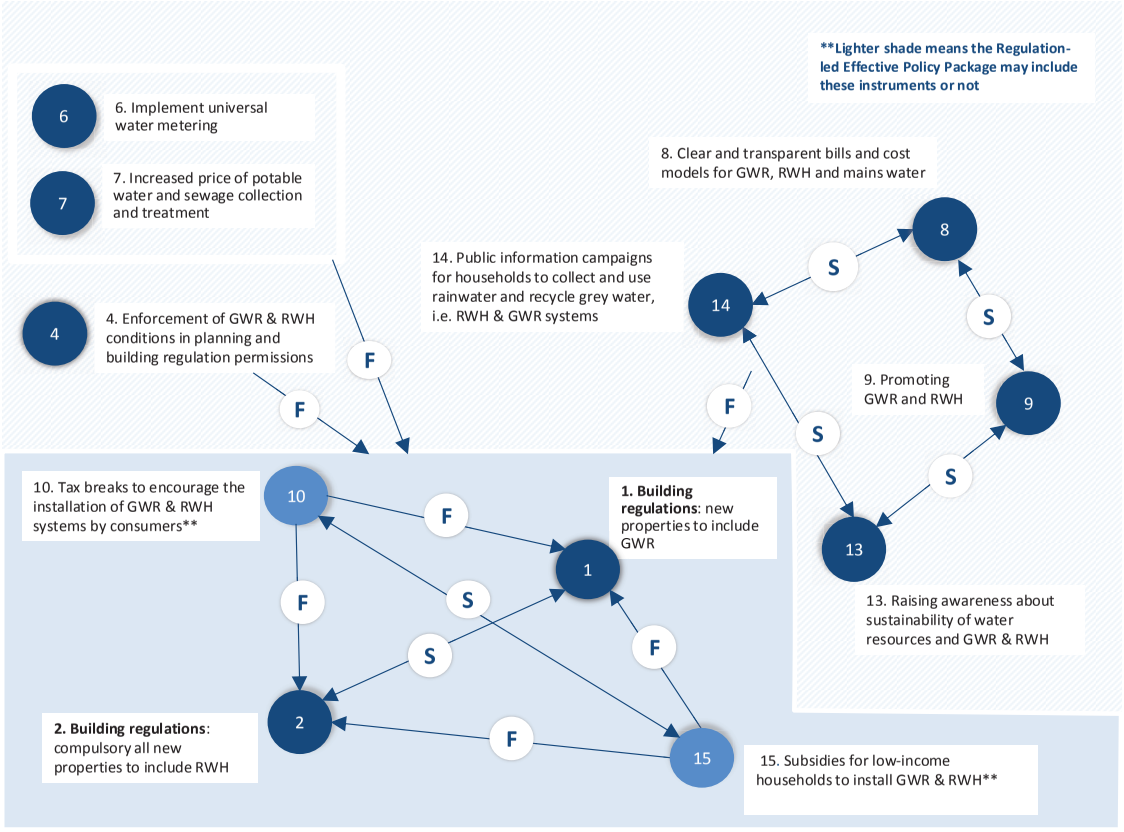


Figure 2. The Regulation-led Effective Policy Package for South East England, UK
[F=Facilitation relations; S=Synergy relations]

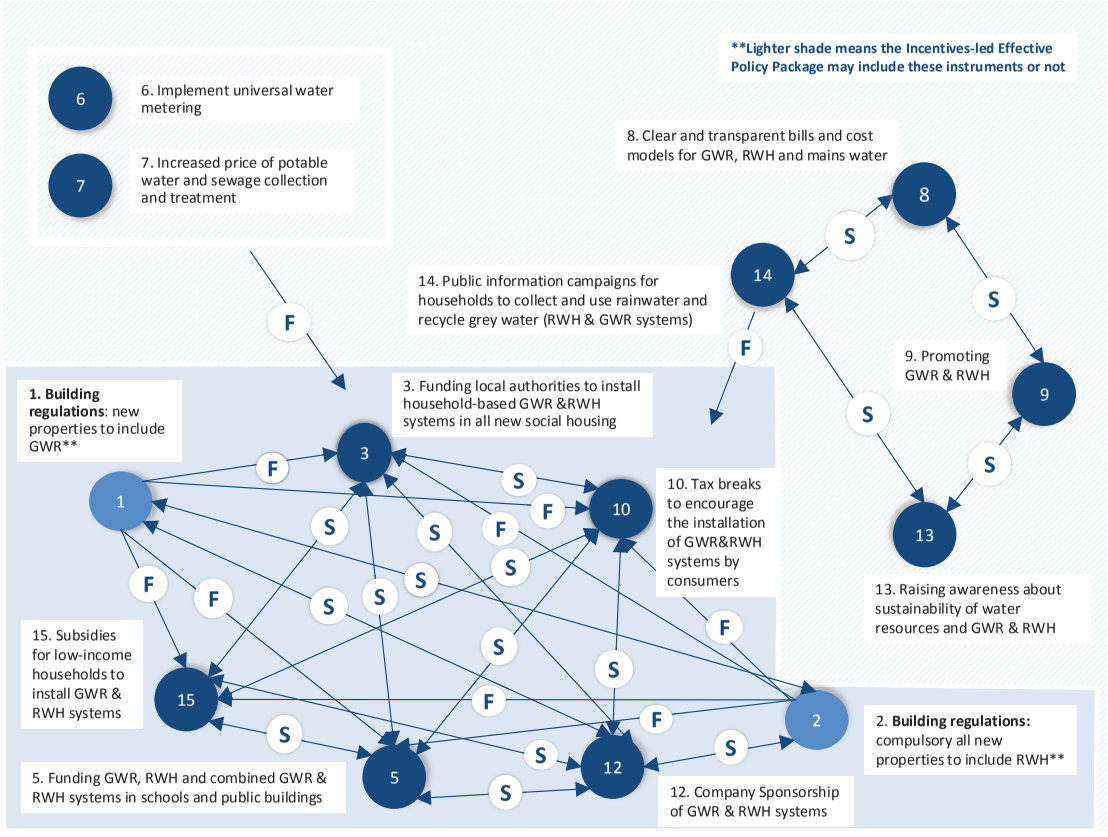


Figure 3. The Incentives-led Effective Policy Package for South East England, UK

[F=Facilitation relations; S=Synergy relations]

The Viable Policy Package for South East England, UK

In order to implement a Policy Package it is necessary for it to be promoted by somebody with the appropriate standing both legally and institutionally. In the UK case several potential promoters were identified: the Department for Environment, Food and Rural Affairs (DEFRA) - policy; the Water Services Regulation Authority (OFWAT), the Drinking Water Inspectorate (DWI), and the Consumer Council for Water – pricing regulation; the Environment Agency (EA)– policy/regulations/implementation/ enforcement on abstraction, pollution control, flood defense and flood risk management; and Local Authorities and Building Regulations – implementation and enforcement.

To assess the political feasibility of the Policy Package and the likelihood that the potential promoters indeed do so, a number of stakeholders were consulted including policy and decision-making actors and the potential main initiators/promoters of the Policy Package. These consultees were asked to comment on barriers to the individual policy instruments and the way to overcome them. They were also asked to provide their views on the Policy Package as a whole.

Based on the assessment of feasibility and political acceptability, a number of changes have been made to achieve the final Viable Policy Package. The policy instruments around regulation for compulsory installation of GWR & RWH systems in all new houses have been removed, as the current political climate in the UK will not accept further regulation at present, and the consensus is that these regulations are not realistic at the moment as they would

face lack of support on political, institutional and implementation levels, regardless of what actions are proposed to overcome existing barriers.

On the other hand, it is concluded from the stakeholder consultation, that even without regulations, more consumers may voluntarily opt to install GWR & RWH systems if more information is made available on potential financial incentives, and if GWR & RWH maintenance services and servicizing contracts were to become available. A main barrier identified by all stakeholders consulted is the issue of trusting GWR & RWH systems in terms of health and safety and in terms of performance throughout their design lifecycle. Therefore, actions to overcome these barriers have been translated into a new policy instrument on regulation/ guidance to encourage maintenance and servicizing of all GWR & RWH systems installed and on additional funding for Local Authorities that will need to enforce any regulation leading to increase uptake of GWR & RWH systems. Taking into account the features of the UK case and the regulatory framework, the following Viable Policy Package has been designed (Figure 4).

The Policy instruments comprising the Viable Policy Package South East England, UK are:

3. Direct provision of funding to local authorities to install household-based GWR & RWH systems in all new social housing projects

6. Implement universal water metering

7. Increased price of potable water and sewage8. Clear and transparent bills and cost models for GWR, RWH and mains water

9. Promoting GWR and RWH

10. Tax breaks to encourage the installation of GWR & RWH systems by consumers

11. Stricter water abstraction limits for existing licensed users

13. Raising awareness about sustainability of water resources and GWR & RWH

14. Public information campaigns for households to collect and use rainwater and recycle grey water, i.e. RWH & GWR systems

15. Subsidies for low-income households to install GWR & RWH systems

16. Regulation/guidance on maintenance /servicizing of GWR & RWH systems to ensure their good working order (life span guarantee), and to minimise Health and Safety risks (e.g. GWR & RWH and mains pipes cross-connections)

17. Additional funding for Local Authorities to deal with planning and enforcement of new regulation / guidance for GWR & RWH systems

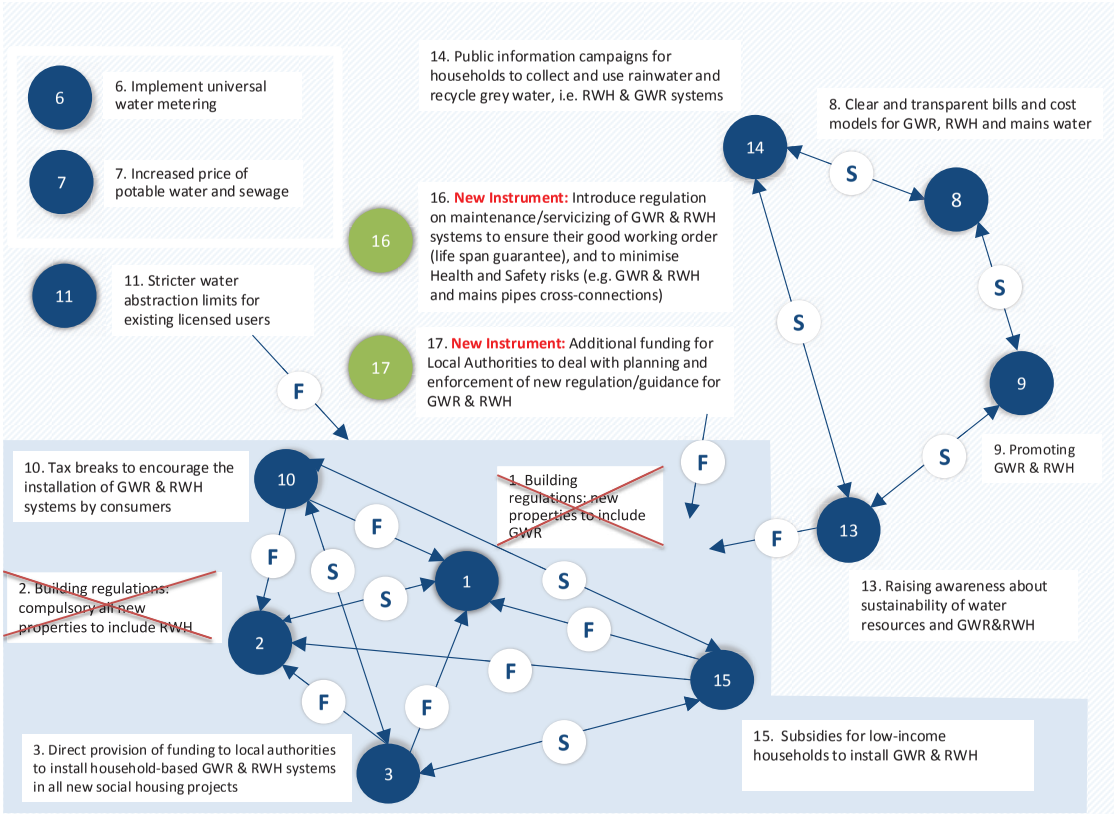


Figure 4. The Viable Policy Package for South East England, UK

[F=Facilitation relations; S=Synergy relations]

The Viable Policy Package for Israel

Israel is a semi-arid state. Hence, Rain Water Harvesting is not deemed feasible, given that the amount of rain in most parts of the country is meagre, and there is much uncertainty regarding rainfall in any particular year. Thus, the Israeli case focused exclusively on Greywater Recycling.

GWR is currently prohibited in Israel. However, there is an active Greywater Coalition promoting it. The coalition succeeded in proposing legislation allowing GWR during the last Knesset (parliament) session. But as the government collapsed, this effort will need to be renewed in the present Knesset. Hence, an additional policy instrument to the Package was added – legislation allowing the installation of GWR systems.

Israel has long advanced water conservation measures. Hence, Israel has universal metering for many decades; hence the policy instrument calling for such metering is redundant in Israel. Similarly, Israel has high water tariffs by world standards. Hence, increase in price of potable water and wastewater was also deemed as infeasible in Israel. As water is rationed and abstraction is strictly controlled, the ability to implement stricter abstraction limits for existing users was also seen as impractical in the Israeli case. Finally, no new social housing has been built in Israel in the last two decades; hence the direct provision of funding for installing GWR in social housing was seen to be of little benefit in the current Israeli context. The remaining policy instruments, plus the additional legislation that allows GWR, constitute the initial country-adjusted Viable Policy Package.

Most consumers in Israel are not familiar with GWR systems. Therefore, it is extremely important to raise public awareness while informing about the potential advantages of the system and the option to save water and money. In parallel it is

important to provide them with information regarding technical characteristics of the systems, its maintenance requirements and available maintenance and servicizing contracts. Customers should also be informed of all the incentives that are provided by the government and the municipalities for installing the system. Marketing campaigns will be designed in order to publicize all the information related to the system, its advantages and its potential to assist in solving Israel's water deficit.

Financial barriers have been identified as the implementation of the GWR systems may lead to a short term increase in property prices. This should be mitigated by providing a tax exemption for "green" houses. Contractors will gain specific grants to market their GWR equipped houses as "green" houses.

Once being legalized and promoted, GWR systems are expected to generate for the government total savings of NIS 6.95 billion, as the need for desalination will decrease. Thus, they may enjoy support of the Treasury.

Taking into account the features of the Israeli case and the regulatory framework, the following Viable Policy Package has been designed (Figure 5).

The Policy instruments comprising the Viable Policy Package for Israel are:

1. Building regulations: Compulsory for all new properties to include GWR systems

8. Clear and transparent bills and cost models for GWR and mains water

9. Promoting GWR 10. Tax breaks to encourage the installation of GWR systems by consumers

13. Raising awareness about sustainability of water resources and GWR

14. Public information campaigns for households to collect, use and recycle grey water with GWR systems

15. Subsidies for low-income households to install GWR systems

16. Legislation regarding the installation and use of GWR systems

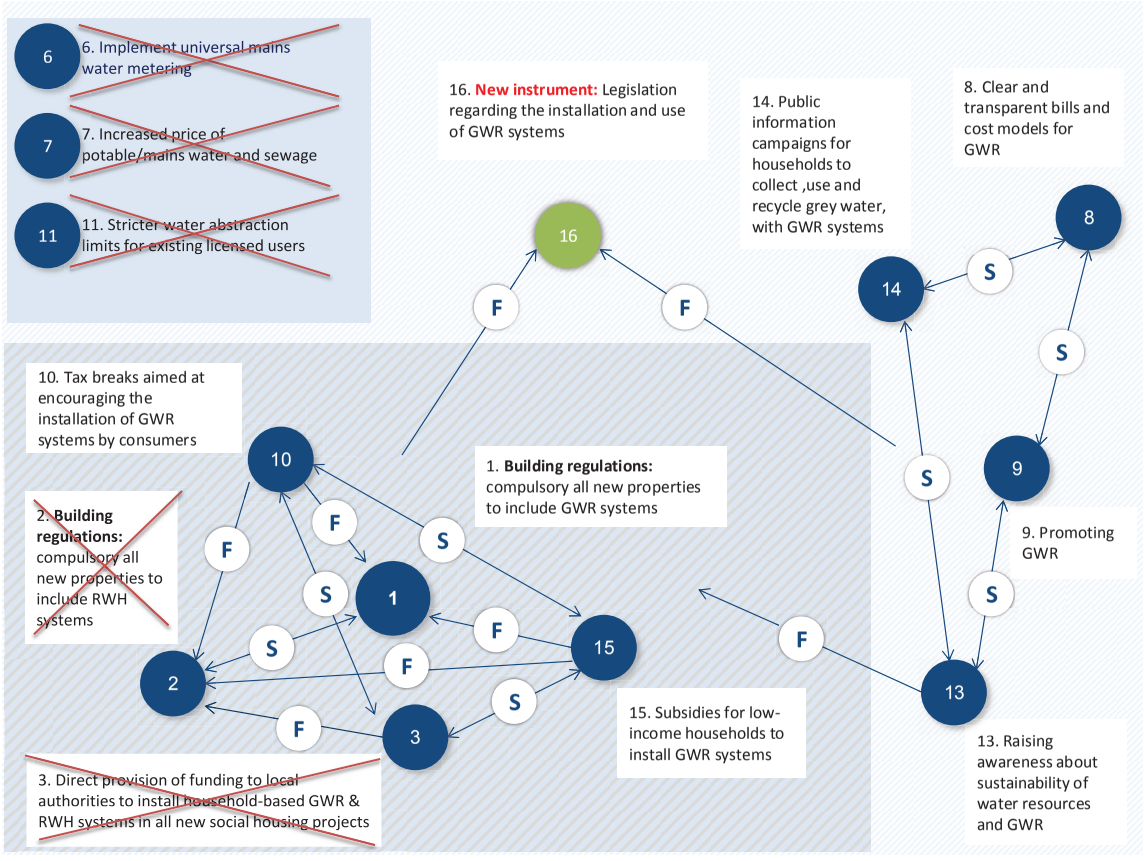


Figure 5. The Viable Policy Package for Israel

[F=Facilitation relations; S=Synergy relations]

The Viable Policy Package for Galicia, Spain

Most of Spain suffers from acute water shortages. However, Galicia, at the most north-western part of Spain is the wettest part of Spain. Thus, no droughts have affected the area in recent decades, in contrast to the rest of Spain. Given the relatively high rainfall and the lack of incentives to conserve water, the emphasis in Galicia was placed on the introduction of RWH systems into new housing.

Due to the high awareness of water scarcity in Spain in general, all houses are metered. Hence, the requirement of water metering was removed. Similarly, subsidies for low income households were removed, as the emphasis is on new development.

In general, the implementation of the Policy Package is affected by financial and institutional obstacles. Financial barriers are especially pertinent to those instruments that consist of providing public funding or tax breaks for diffusing RWH technologies. The way to overcome these financial barriers may consist of achieving neutrality through other instruments, such as higher prices for potable water and sewage.

One of the possible impediments is the lack of incentives and know-how of the current companies operating in Galicia to supply and maintain RWH systems. Hence, in the Viable Policy Package an additional policy instrument is introduced: subsidization for companies to hire the staff necessary to develop a new line of RWH supply and maintenance. The subsidy is intended to cover the Social Insurance of these employees for three years.

“Augas de Galicia” is the organisation responsible for water service management in the Galician government. There are three companies that provide water services in Galicia. They should be

clearly involved in the strategy in order to effectively implement it. In addition, it is necessary to promote the collaboration between the water companies and the water saving system suppliers. There are not many water saving system suppliers in Galicia but there are some of them in Spain.

Taking into account the features of the Spanish case and the regulatory framework, the following Viable Policy Package has been designed (Figure 6).

The Policy instruments comprising the Viable Policy Package for Spain are:

2. Building regulations: compulsory to include RWH systems in public buildings (schools, hospitals, government buildings), new blocks of flats and big single houses that have more than 250 m2 and a land area of 1,000 m2

3. Direct provision of funding to local authorities to install household-based RWH systems in all new social housing projects

7. Increase the price of potable water and sewage collection & treatment

8. Produce clear and transparent bills and cost models for RWH and mains water for consumers' benefit

9. Promoting RWH

10. Tax breaks aimed at encouraging the installation of RWH systems by consumers

11. Stricter water abstraction limits for existing licensed users

13. Raising awareness about sustainability of water resources and RWH among businesses and the public by Government

14. Public information campaigns encouraging households to collect and use rainwater and recycle grey water, i.e. encouraging installation of RWH systems

16. Subsidy for companies to hire the staff necessary to develop a new business lines based on maintenance of RWH. The subsidy is aimed at avoiding the cost of the Social Insurance of those workers for a specific period (new)

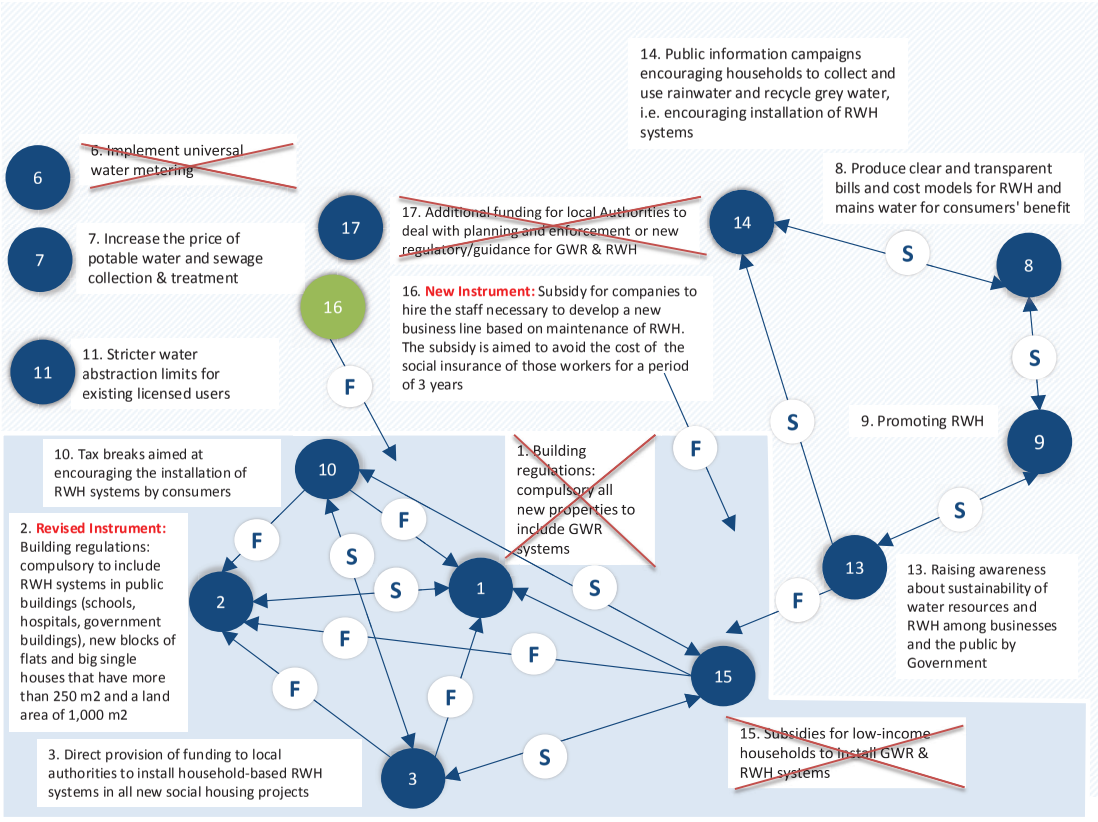


Figure 6. The Viable Policy Package for Galicia, Spain

[F=Facilitation relations; S=Synergy relations]

Selected Recommendations

The Servicizing Policy Packages for the Water sector were designed to support decision-making processes on the European level in order to improve Resource Efficiency and to achieve decoupling through servicizing. The European Commission can find the selected conclusions outlined below as the starting point for actual implementation of a Servicizing Policy Package to promote and facilitate the adoption of GWR & RWH systems, after which modifications will be made in order to improve efficiency. In this modification process, the entire knowledge of the SPREE project, documented in the various Deliverables can be consulted, and specifically the full 8.2.1 Deliverable: "Servicizing Policy Packages for the Water sector" available on SPREE website.

The process described here is recommended to follow as a systematic way to think about the different ways to design policy that is at the same time effective and implementable. Policy Packaging aims to try and ensure that the political policy formulation process is streamlined, to the extent possible, and is progressing while considering several stages and associated 'tests' or evaluations. By empirically testing the Policy Packaging methodology, use was made for the first time of an Agent-Based Model (ABM), developed and specifically tailored for each servicizing case. The ABM thus allowed for a simulation of the outcome of implementing different policy instruments.

The introduction of both GWR and RWH systems into the built environment may lead to decoupling. By introduction of such systems less water has to be conveyed through mains, thereby reducing the pressure on water resources and saving the energy that is used to convey and pump water. However, not in all settings is the introduction of both types of systems feasible. In arid or semi-arid environments, such as along the Mediterranean, precipitation may be too meagre and variable to rely on RWH systems. Similarly, in areas with low pressure on water resources GWR systems may be deemed as superfluous and carrying health risks.

Due to the health concerns associated with both GWR and RWH, the professional maintenance of such systems is crucial. Servicizing is thus a crucial for the introduction of such systems. Essentially, through servicizing both the building and maintenance of such systems is carried out by professionals, who take responsibility for the performance of such systems. Hence, servicizing should be viewed as integral for the introduction of such systems, and for their decoupling benefits.

However, the introduction of both GWR and RWH is not simple. In each of the case studies examined it faces obstacles, and requires that Policy Packages be used. The most effective and realistic policy instrument is a requirement that such systems be compulsory in all new buildings. However, such regulations are insufficient in and of themselves. They have to be complemented by a number of additional instruments. In all cases some promotion

of such systems is needed to facilitate their introduction, as most households and developers are unaware of the potential and requirements of such systems, and may balk at the requirement to introduce them due to perceptions regarding their health ramifications. Also some sort of incentives, mainly tax breaks for houses with such facilities, can reduce opposition to their introduction.

But beyond these instruments, which seem to be desirable in all circumstances, there is a need to consider additional instruments that are likely to vary across settings. Thus, if there is no universal water metering such metering should be introduced. Similarly, if there are no companies with the necessary expertise, measures have to be taken to encourage companies to gain the find the appropriate personnel or train its employees. Furthermore, it is essential that the agencies and companies that dominate the water provision scene will be on board. Yet the nature of these agencies and/or companies varies across settings. Thus, it is essential that the Policy Package will be adapted to the local circumstances (see the Viable Policy Packages outlined in the document). In conclusion, the introduction of GWR and RWH systems should be encouraged. To this end promotion campaigns may be helpful. Moreover, such systems should be promoted through servicizing, in order to alleviate health concerns and assure proper maintenance, but the way to do so is place specific.

This publication is a summary of the SPREE deliverable 8.2.1 which presents the full Servicizing Policy Packages for the Water Sector, and can be referred to for further details.

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