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***D6.3 Smart City Decision Making Tool***

***User Guide***

***WP6, Task 6.6***

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## Introduction

The Smart City Decision Making Tool has been developed as part of the EU co-funded Horizon 2020 Smart Cities and Communities Project, [Triangulum](#). Over the course of the project, more than 50 Smart City Solutions were implemented in the Lighthouse Cities of Eindhoven, Manchester and Stavanger. The overarching aim of the tool is to foster replication of these projects by effectively capturing and disseminating the knowledge gained from these implementations and enabling cities across Europe to find relevant, proven Smart City Solutions, which fit their needs.

The tool helps find the most relevant Use Cases from Triangulum by guiding you through a two-step process. Initially, based on the choices in the Input Form, the output Form will provide a list of relevant Use Cases with preliminary information. To learn further about a specific Use Case, you could click on the Details button on the far right. This gives you the specifications of the Use Case in a standard Use Template, which contains the most essential information for replicating it.

The template includes general information to help put the Use Case in context: such as location of implementation, time taken for planning and implementation, public participation model used and so on. Implementation information such as local supporting factors (legal, social, infrastructural, geographical, financial, etc.) which enabled the successful implementation helps understand the key reasons for the success of the Use Case. They highlight rules, regulations, partnerships, or infrastructural developments that could help with implementation of a similar Use Case. Further information, such as challenges faced and lessons learned helps you learn from pilot cases and prepare for upcoming challenges while replicating the Use Case. Financing and stakeholder models are intended to help you identify suitable business models and experienced partners for implementing your Use Case. As each template has been filled by implementers of Use Case, it ends with their advice for replication concerning possible future customers and financing model and their contact details.

Therefore, the tool helps find the most relevant Use Case to address the needs of your city. It also helps you with implementation decisions by guiding you through the experiences of the pilot projects from Triangulum.

This guide provides you systematic information on how to use the tool.



## Instructions for Use

### Step 0: Setting up Microsoft Excel

The tool has been built using the Visual Basic Application from Microsoft Excel. In order to ensure its smooth functioning it is required to enable editing and Macros when you open the Excel file. These options are found on the top of the Excel Workbook.

#### 1. Enable Editing

This allows you to edit the document

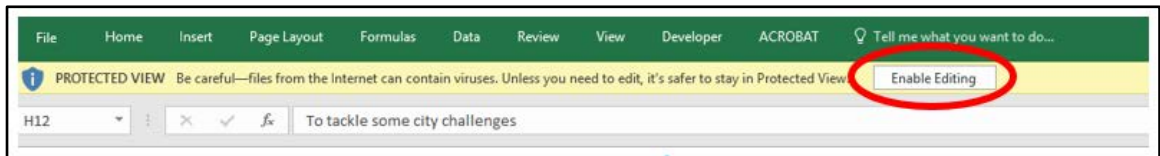


Figure 1: Enable Editing Dialogue Box

#### 2. Enable Content (Macros)

This enables Microsoft Excel to run the code to ensure functioning of the tool.

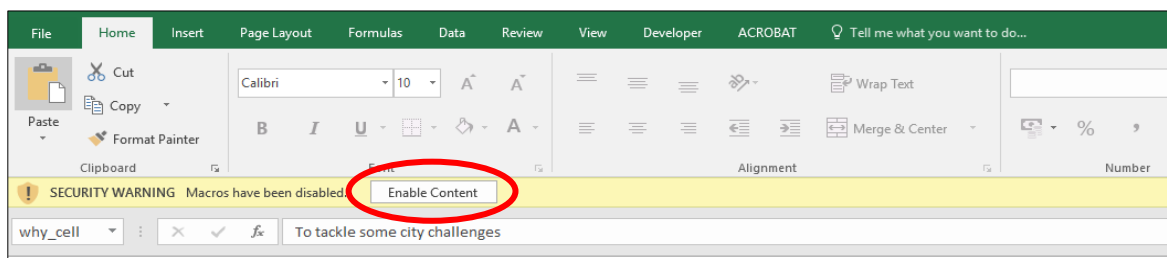


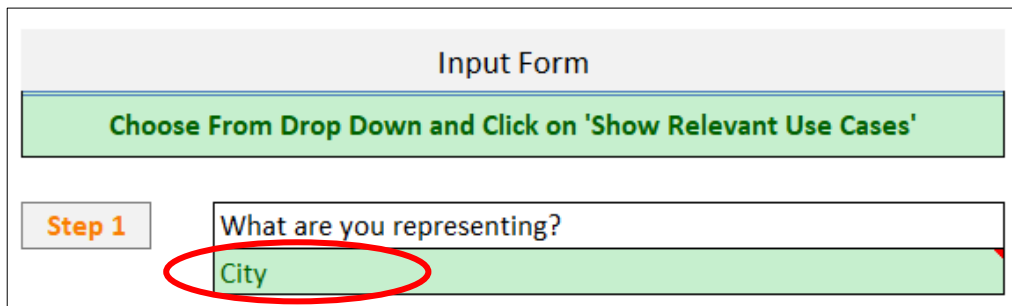
Figure 2: Enable Content Dialogue Box

Once Microsoft Excel is set-up, using the tool is quite simple. In the next steps, you choose from drop-downs (all cells in green) to specify what you are interested in. These selections help the tool to filter out the most relevant Use Cases.



### Step 1: Chose whether you are from City or Industry (Mandatory)

The tool has been built taking into account the needs and goals of representatives from cities and industries. In this step, choose what you are representing.



Input Form

Choose From Drop Down and Click on 'Show Relevant Use Cases'

Step 1

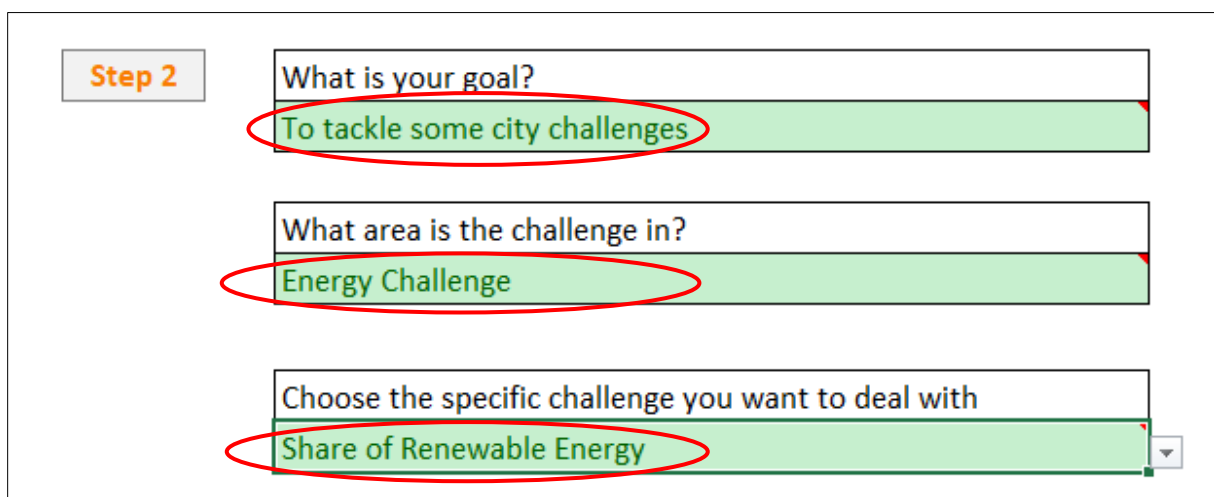
What are you representing?

City

Figure 3: input Form Step 1

### Step 2: Inputs to identify most relevant Use Cases (Mandatory)

The number of questions in this step varies based on your previous and current selections. The main aim is to understand your interests to show you only relevant Use Cases. It is important to fill each green box by choosing from drop-downs.



Step 2

What is your goal?

To tackle some city challenges

What area is the challenge in?

Energy Challenge

Choose the specific challenge you want to deal with

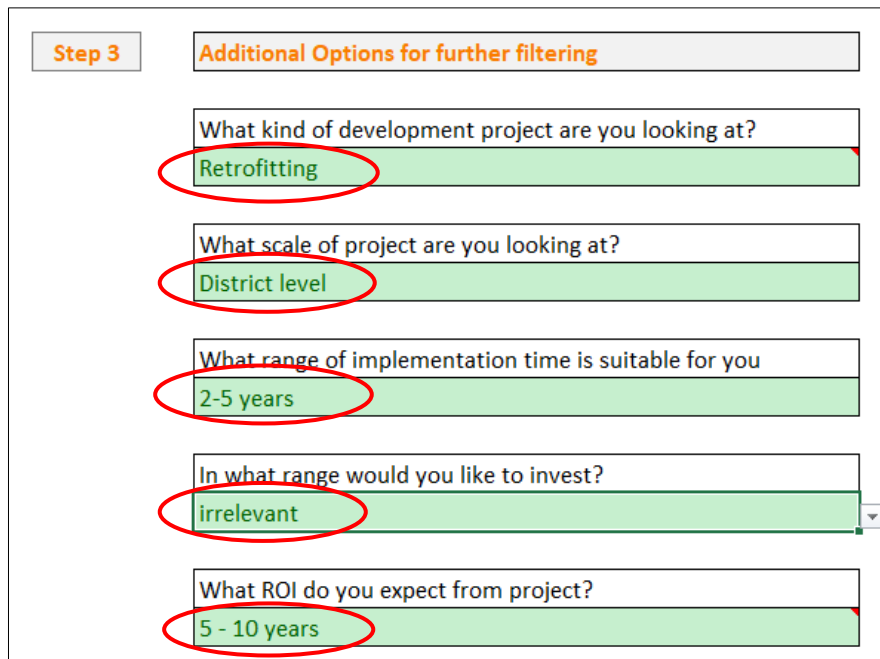
Share of Renewable Energy

Figure 4: Input form Step 2



### Step 3: Choose from Additional Filters (Optional)

To help you find the Use Cases that fit your needs best, there are five additional filters, which can be used. For example, if a city were looking for Smart City Solutions that help them reduce greenhouse gas emissions within a specific budget and time, choosing the right filters would show them the relevant Use Cases on top of the list. However, using these filters is optional.



**Step 3** Additional Options for further filtering

What kind of development project are you looking at?  
Retrofitting

What scale of project are you looking at?  
District level

What range of implementation time is suitable for you?  
2-5 years

In what range would you like to invest?  
irrelevant

What ROI do you expect from project?  
5 - 10 years

Figure 5: Input form Step 3

### Step 4: Click on 'Show Relevant Use Cases'

Once all the inputs have been selected, you can view the relevant Smart City Use Cases by clicking on the orange button shown in the image below. The tool searches for the most relevant Use Cases and ranks them as per your preferences. This process takes a few seconds.



Figure 6: Input form final selection





In case not all required input-fields are filled, you will get an error message. Please ensure all fields are filled and then continue with Step 4.

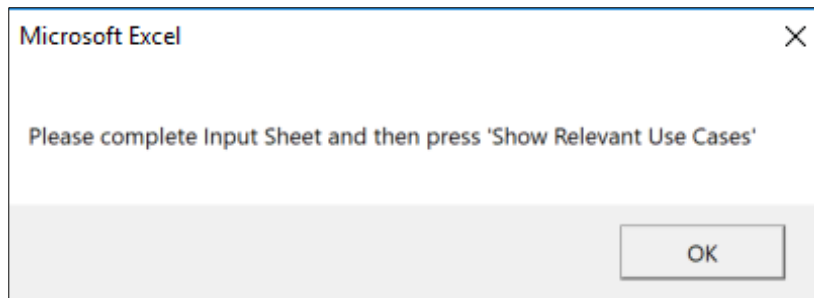


Figure 7: Error Message Dialogue Box

### Step 5: Output Sheet

The output sheet shows the most relevant Use Cases with a minimum amount of details to help you choose the ones, which interest you. Following are some of the important elements of the Output sheet:

Current Selection		Shortlisted Usecases								
To tackle some city challenges		Name	City	Short Description	Scale of Implementation	Planning Time	Implementation Time	Initial Investment Amount	Filter Score	Details Link
Share of Renewable Energy		Sewage heat pump system	Stavanger	A thermal energy plant which supplies the base load by utilizing the waste heat from sewage systems using heat pumps.	Neighborhood	0.5 - 1 years	0.5 - 1 years	1,000,000 - 5,000,000	5	Details →
Modify Selection		Biogas peak load system	Stavanger	Biogas generated from Sewage and Agri waste(existing system) is used to supply peak loads	Neighborhood	0.5 - 1 years	<0.5 years		5	Details →
		Micro-grid management system	Manchester	Micro grid management controller, designed to integrate disparate energy assets throughout single stakeholders to deliver improved energy performance within the areas of cost, CO2, flatten peak and effective use of low carbon generation	Neighborhood	0.5 - 1 years	0.5 - 1 years		5	Details →

Figure 8: Output Form main elements

#### 1. Current Selection

In the top left corner of the output sheet, a summary of your current selection from the input sheet is displayed. For example, in this case, the user is looking for ways to increase share of renewables. The 'Modify Selection' button takes you back to the input sheet if you want to change your preferences.

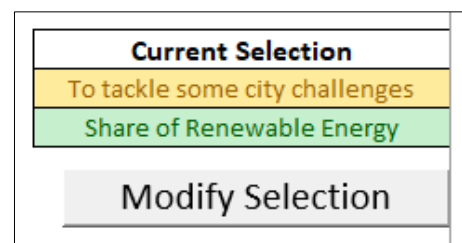


Figure 9: Output Form Current selection



## 2. Filter Score:

The filter score indicates the number of optional filters of the Step 3 (from Input Form) that this Use Case satisfies. It can have a maximum score of 5 indicating all the optional filters are met and can be up to 0, indicating none of the filters is satisfied. The Use Cases with the score of 0 are displayed as they still relevant to the area you are interested in.

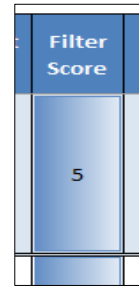


Figure 10: Output form Filter Score

## 3. Details Link

For each Use Case, the tool database contains all the detailed information including the stakeholders, financial details, benefits, challenges faced, lessons learned, contact person etc. Since displaying all the information can be overwhelming, the Details link helps you see all the details of a specific Use Case in a new Excel Workbook. You can always come back to the output sheet and find the details of other Use Cases.



Figure 11: Output form Details Link

## Step 6: Use Case Details Sheet

For each Use Case the Details link gives a new Workbook with all the details from the Use Case.

Following is an example of one of the Use Cases from Stavanger.



Blink: Innovative video for communication services			
General Information			
City	Stavanger	Sector	ICT
Country	Norway	Triangulum	Yes
Short Description			
Video installation linked to the TV screen that enables communication between private users/homes to allow for experience sharing between people. The system can link many different communication channels. Could link public services like library presentations.			
USP/Highlight			
Full HD facilities, different communication channels can be used, it has an easy User interface			
Project Scale	Individual site	Planning Time	2-5 years
Development Type	Technological Development	Implementation Time	< 2 years
Participation Model	Active participation	Active design changes were made due to user inputs	
Stakeholder Analysis			
Owner	household	Implementer	t.b.d. (to be defined)
Customer	Small Businesses	Service Provider	t.b.d. (to be defined)
Implementation of UseCase			
Supporting Factors			
Legal		Geographical	Long and twisted roadways prolonging travel times result in big demand for distance communication services
Infrastructural	Strong broadband connection needed (symmetrical bandwidth)	Social	Physical distance between family member is elongating as younger generation moves away for studies and work. Elderly feel lonely and are not used to smart devices. They are more familiar with operating and using the TV
Financial		Partners	
Other			
Main Implementation Challenge			
Technology in testing phase and under development.			
Lessons Learned			
Technology development on hardware and software side is moving fast. Outsourcing hardware to specialized companies is much cheaper and reduces the time and efforts required.			
Important to maintain high respect for the privacy of customers as you are in their homes			



Financing Information			
Initial Investment	< 50,000 Euros	ROI	
Scale of Investment			
Financer (Contribution in Percentage)			
City		Private Sector	
National funds		Public Companies	
EU funds		Financial institutions	
Regional funds		End User	100%
Others		Private Owners	
Revenue Streams/ Monetized Value			
Could be sold to end users, health care service providers or rented out in a service contract (to be decided); Different offers for different user groups to reduce overall costs: more expensive simple to use devices for elderly; more basic versions for young people			
Project Details			
Standard & Technical Details			
Open standards are being used to integrate island systems; Collaboration with Pexip to connect to other proprietary systems, different open standards still available			
Necessary Projects			
Supporting Projects			
The communication service can be used for a variety of different use cases which facilitate communication.			
Benefits			
Primary Benefits		Secondary Benefits	
Reducing Operation Costs		Encouraging digital entrepreneurship	
Improving personnel efficiency		Enabling new business opportunities	
Improving social integration		Reducing traffic congestion	
Improving Life Quality		Increasing Safety	
Closer connection to family members; Closer social integration		Improving data availability	
Wider Benefits			
Video conferencing with HD services for companies and other users for home office. Possible application in Court for Interpreters to avoid traveling. Many wider use cases can be built (e.g. for communication with specially abled people)Can also be included in home entertainment devices.			
Suggested Financing Options			
Affordable system financed by end users			
Prospective Customers for future			
Small Businesses (reduce flying costs), Courts, Consultancy Services, Public Service Institutions			
Contact for further Details			
PerErling.Fjeld@lyse.no			



### Step 7: Change Selection (Optional)

The user can always go back to the Output sheet to get the detailed information for any other Use Case. In case you want to change your preferences, you can go back to Input Form as explained in Step 5.1 or use the simple navigation at the bottom of the Excel Sheet to go to Input Sheet.

### Notes:

- The tool database was last updated in December 2017. As the tool is an Excel-VBA based deliverable, this information cannot be further updated. Kindly get in touch with the respective Use Case contact persons for further updates.
- The tool database consists of 58 Use Cases funded by the European Commission under the project Triangulum. It also contains 13 Use Cases which are closely linked to the Triangulum Use Cases, however have not been financed by Triangulum. These have been indicated in the Use Case Template.
- Details of the tool logic and development have been included in the Smart City Framework Deliverable 6.2 from Triangulum.

