D5.6 Fiware4Water Exploitation plan

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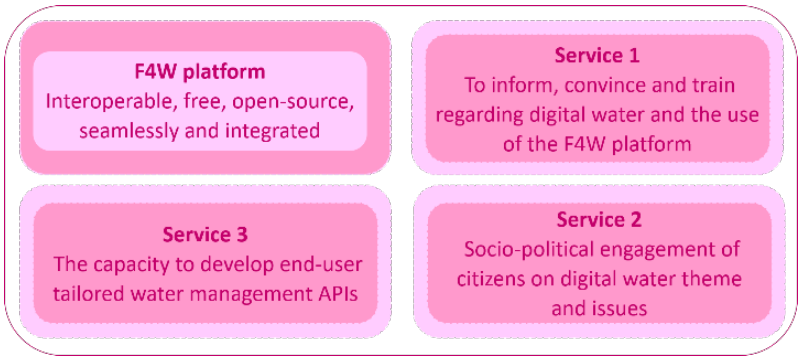
Project Consortium

Executive summary

The exploitation plan (Deliverable n°5.6) is an activity related to WP5 *Socio-political impact, end-user engagement and economic consequences of Fiware4Water*, Task 5.4 *Fiware4Water Economic Impact and Exploitation Plan*.

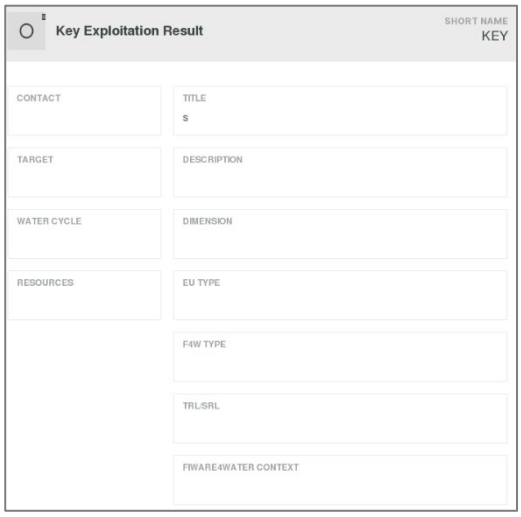
The main goal of the exploitation plan is to make use of the results for societal, scientific, financial or even political purposes. It illustrates the path to concretise the value and impact of the R&I activity for societal challenges[1].

Picture a: Fiware4Water list of product and services



The exploitation plan is the final step started with F4W Value Proposition Canvas (VPC)[2] and F4W Business Model Canvas[3]. The former aimed at bringing together the description of the different products and services that the project was delivering (value proposition map) with the needs of the potential end-users (i.e. private and public water utilities, river basin organisations, municipal authorities, local community organisations and SMEs, IT solutions developers). The latter provided a detailed list of products and related services that are considered in this report to set F4W exploitation plan (see picture a).

Picture b: Fiware4Water KER sheet template



F4W approach to elaborate its exploitation plan consisted in listing and prioritising all the products and services identified during the previous steps. Then, a frame to describe the Key Exploitation Results inspired by the one used by the European commission on its results platform was elaborated with 11 fields (see picture b).

On the process the set the exploitation plan, each of the products and the services was classified and numbered to be linked, to a KER. In the end, F4W delivered 26 KER, summarised in table a.

The exploitation plan shows how partners have successfully achieved F4W objectives. On the technological side, the demonstration has been made that FIWARE can provide the architecture and IT development functionalities to the water sector, with tools now available online, with algorithmic, artificial intelligence and machine learning modules. On the non-technological side, the demonstration has been made on how to engage with water stakeholders including the representatives of civil society and the policy dimension on the added-value of digital water.

Table a: Synthetic view of F4W Key Exploitation results

Technological solutions		
Raw water	**Drinking water**	**Waste water**
• Improvement of the raw water convection system at the Athens drinking water plant • Improvement of the operation of the drinking water production plant by choosing the reservoir with the least turbid water possible	• prediction of the summer demand for drinking water in Cannes, and of the availability of raw water • detection of water quality anomalies in the distribution network • detection of leaks in the distribution network • mobile application and installation of installation of connected sensors to encourage citizens to reduce their consumption	• forecast of nitrous oxide production based on the quality of the incoming wastewater in order to minimise its occurrence • optimising the energy consumption of a wastewater treatment plant
Non technological solutions		
• Socio-political and citizen engagement mechanisms • Smart water domain committee • DW2020 Synergy group		

Related deliverables

D5.4 -Fiware4Water Value proposition canvas 2.docx (month 20, January 2021), confidential

D5.5 - Fiware4Water Business model canvas (month 26, July 2021), confidential

1. European Commission, *Dissemination and Exploitation Activities in Horizon 2020*, H2020 Common Support Centre/J5, https://ec.europa.eu/research/participants/data/ref/h2020/other/events/2018-09-21/9_dissemination-exploitation-activities_en.pdf / 2. D5.4 -Fiware4Water Value proposition canvas 2.docx (month 20, January 2021), confidential / 3. D5.5 – Fiware4Water Business model canvas (month 26, July 2021), confidential

Document Information

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Work Package	**WP5: *Socio-political impact, end-user engagement and economic consequences of Fiware4Water***
Task	Task 5.4: *Fiware4Water Exploitation Plan*
Lead Beneficiary	P1: OiEau
Author	Natacha Amorsi (OiEau)
Contributor(s)	Sonia Siauve (OiEau), Stéphane Deveughele (SUEZ 3S); Llius Echeverria (EURECAT), Richard Elelman (EURECAT), Panagiotis Kossier (NTUA), Franck le Gall (EGM), Fernando Lopez (FIWARE), Christos Makropoulos (KWR), Joshua Pocock (SWW), Vasiliky Polychniatou (EYDAP), Alex van der Helm (Waternet), Fernando Lopez (FIWARE), Dirk Vries (KWR), Ben Ward (SWW)
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Dissemination Level	Confidential

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Version	Date	Author(s)/Contributor(s)	Notes
Version1	15/01/2022	Natacha Amorsi (OiEau)	Feedbacks from partners involved in the development of solutions (during meetings)
Version 2	14/04/2022	Natacha Amorsi (OiEau)	Setting the KER frame
Version 3	30/05/2022	Natacha Amorsi (OiEau)	Inputs from partners involved in the development of solutions
Final	31/05/2022	Natacha Amorsi (OiEau)	Finalisation
Final V2	18/07/2022	Natacha Amorsi (OiEau)	Following reviewers comments, a section on stakeholders engagement and a paragraph on the potential upscaling were added

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List of Acronyms/Glossary

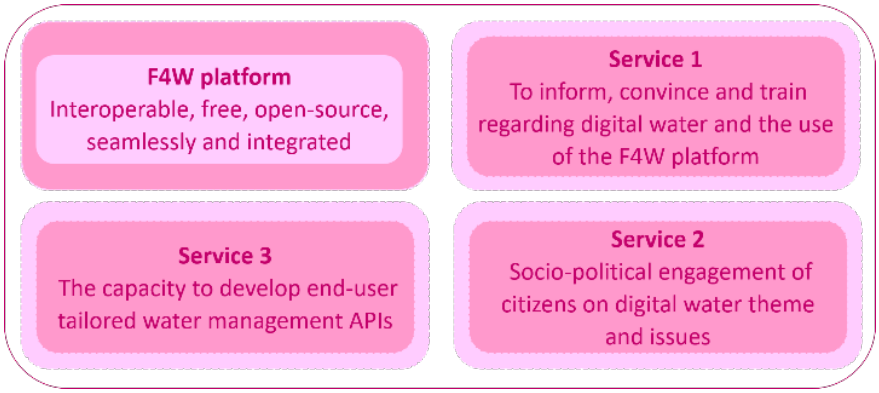
C&D	Communication & dissemination
BMC	Business Model Canvas
F4W	Fiware4Water project
KER	Key Exploitation Result
SRL	Societal Readiness Level
TRL	Technology readiness levels
VPM	Value Proposition Map
VPC	Value Proposition Canvas
WWTP	Waste Water Treatment Plan

I. Introduction

This report presents the Fiware4water (F4W) Exploitation plan. This activity has been undertaken within WP5 *Socio-political impact, end-user engagement and economic consequences of Fiware4Water*, Task 5.4 *Fiware4Water Economic Impact and Exploitation Plan*.

The exploitation plan is the final step started with F4W Value Proposition Canvas (VPC)[1][2] and F4W Business Model Canvas[3]. The former aimed at bringing together the description of the different products and services that the project was delivering (value proposition map) with the needs of the potential end-users (i.e. private and public water utilities, river basin organisations, municipal authorities, local community organisations and SMEs, IT solutions developers). The latter provided a detailed list of products and related services that are considered in this report to set F4W exploitation plan. Picture 1 presents the key categories of F4W product and services[4].

Figure 1: Fiware4Water list of product and services



I.1. Definition of Fiware4Water exploitation

As reminded by the European commission (a), exploitation can include actions such as utilizing the project results in further research activities other than those covered by the concerned project, developing, creating and marketing a product or process, creating and providing a service, or even in standardisation activities. Then, the main goal of the exploitation plan is to make use of the results for societal, scientific, financial or even political purposes. It illustrates the path to concretise the value and impact of the R&I activity for societal challenges.

The exploitation can take on different dimensions simultaneously. The first that comes to mind is commercial. Nevertheless, in the context of F4W, the other dimensions of exploitation are even more at stake. The challenges of F4W was to demonstrate the added-value of FIWARE to support the development of digital water solutions while the social-political and citizen engagement were triggered. On its way to demonstrate the feasibility, F4W tackled societal, political, technological dimensions by providing solutions to access the water resources along its whole value chain and encouraging resilience of the water management.

[1] D5.4 -Fiware4Water Value proposition canvas 2.docx (month 20, January 2021), confidential
[2] See annex 1
[3] D5.5 – Fiware4Water Business model canvas (month 26, July 2021), confidential
[4] The full list is presented in the annex 1.

Figure 2: What is meant by exploitation

Source: European commission (a)

In terms of actors in charge of the exploitation, F4W partners are the first to have exploited the project results, by their own efforts. The exploitation plan explains how to pass the relay to stakeholders outside the scope of the project to ensure F4W products and services will be used and support them in water related missions. The aim of the exploitation plan is also to highlight the effectiveness and impact by explaining the benefits of F4W legacy.

I.2. Structure of the document

This report is composed of 4 mains sections. Following the introduction and its explanation on the ambition of the exploitation, section 2 focuses on the method used to develop F4W Key Exploitation Results (KER). Section 3 lists of the KER delivered by the project. Finally, the conclusion opens up on the added value of the exploitation plan for the European commission.

II. Method to set Fiware4Water Key Exploitation Results

The Key Exploitation Results (KER) are the core of F4W exploitation plan. After setting a share vision of KER, this section defines the fields used to set F4W KER sheet, and finally shows which product and services (identified from the value proposition canvas and the business modal canvas) have been selected as KER.

II.1. Definition

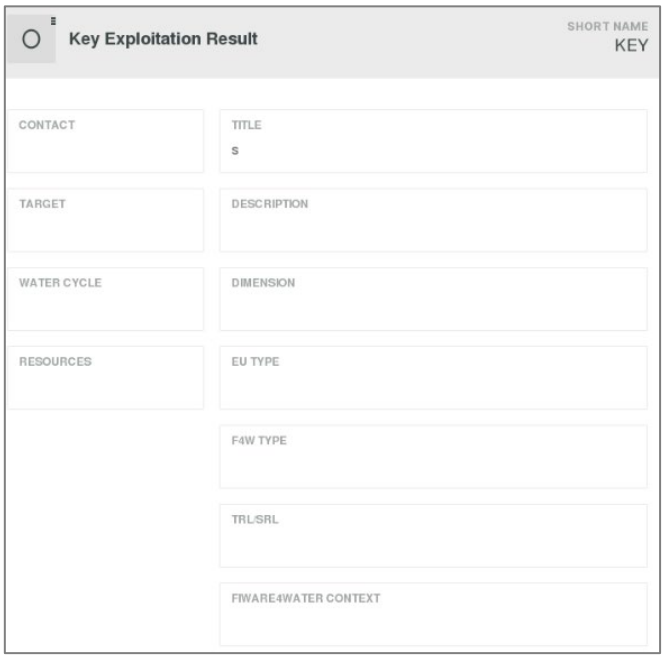
According to the European commission (a), a result is defined as any tangible or intangible output of the action, such as data, knowledge and information whatever their form or nature, whether or not they can be protected, which are generated in the action as well as any attached rights, including IPRs.

As defined in the Collins dictionary[5], exploit refers to make the best use of. In the context of F4W combining to two lead us to the KER that are the identified main interesting results which have been selected and prioritized due to their high potential to be exploited – meaning make use and derive benefits – downstream the value chain of a product, process or solution or act as an important input to policy, further research or education. In the word of the European commission (a), KER are the outputs generated during the project which can be used and create impact either by the project partners or by other stakeholders.

II.2. KER sheet template

A sheet[6] composed of 11 fields has been established to describe F4W KER (see figure 3).

Figure 3: Key Exploitation Result sheet



Description: this field is dedicated to gather a short description of the KER.

Contact: each KER has been developed by a partner or in collaboration between partners. Their name and email are indicated in that field.

Target: this field lists the key targeted stakeholders of the result.

Dimension: this field indicates if the KER is technological, non-technological or both.

EU type: this field has been added to be compatible with the European platform results. It lists the following types of KER: policy related result, scientific or technological R&D result including ICT Hardware, ICT software digital solution, other intangible results, services and other.

F4W type: this field indicates if the KER is a product or a services. In addition, this field also mentions the related F4W products and services (see section II.3)

Water cycle: all the F4W solutions refer to one stage of the water cycle (raw water, drinking water and waste water) or are transversal to the three stages (whole water cycle).

Readiness Levels: F4W solutions are described either with the Technological Readiness Level (TRL[7]) either with the Societal Readiness Level (SRL). **SRL** are described as the level of knowledge about the

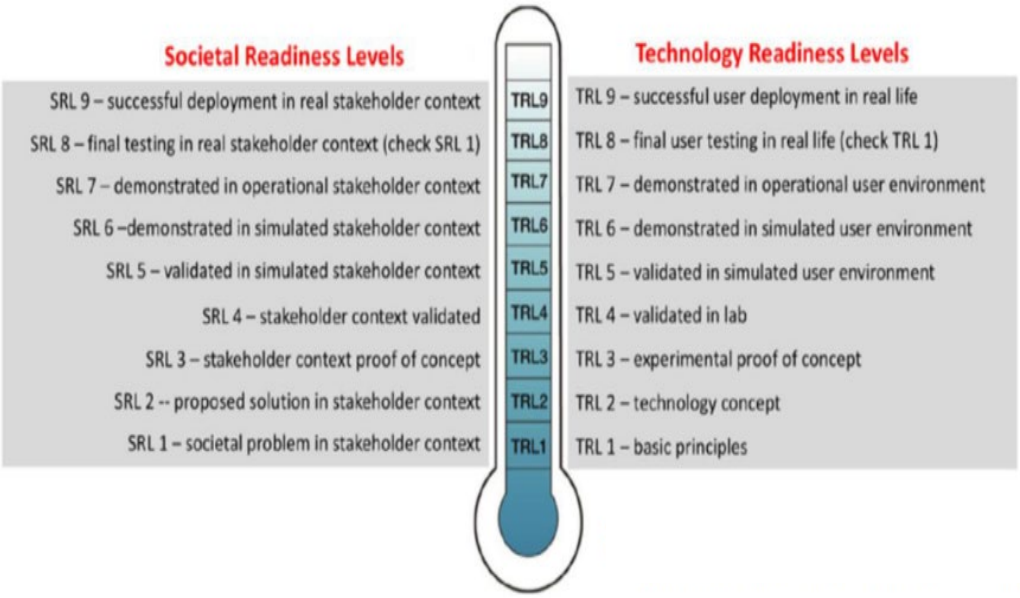
[5] https://www.collinsdictionary.com/dictionary/english/exploit

[6] F4W KER sheet is compatible with the information requested by the European commission on its results platform (https://webgate.ec.europa.eu/funding-tenders-opportunities/pages/viewpage.action?pageId=8913466) as F4W intends to report its KER on the platform.

[7] Technology readiness levels, https://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/annexes/h2020-wp1415-annex-g-trl_en.pdf

stakeholders' interests and concerns as well as to what extent the product/service impacts on society (from the recognition up to the involvement of the stakeholders), Cotelo (2020).
Resources: this field lists F4W references for each KER.

Figure 4: Technology and societal readiness levels



F4W context: this field highlights the project activities related to the KER described.

II.3. From Fiware4Water product and services to Key Exploitation Results

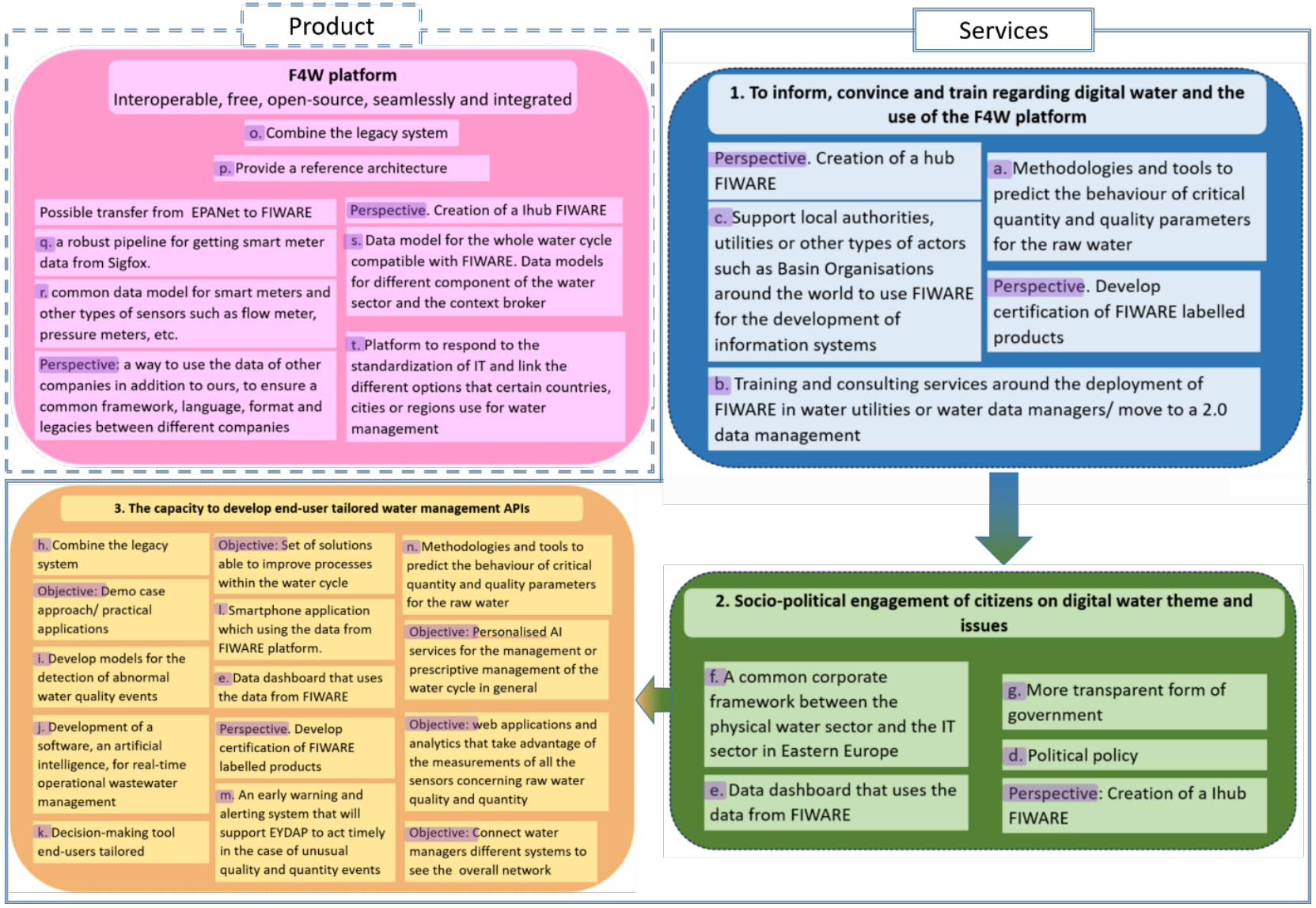
Part of the F4W Value Proposition Canvas (D5.2) consisting in identifying the products and services the project would deliver gathered under 4 main categories (see figure 1)[8]. On the process the set the exploitation plan, each of these items was numbered after a letter to be linked, when possible, to a KER. The numbers are used in the field 'F4W type' in the KER sheet.

In some cases, the formulation of the services appeared to be too general to be specifically linked to a KER. In the light of the F4W progress, they tend to be an expression of transversal objective to all the KER.

Two services and products represent potential perspective after the end of the project. The certification related to FIWARE labelled product is a main step that requires a series of preliminary actions. The creation of a FIWARE iHUb could be considered in the work undertaken by the FIWARE Smart Water domain committee (see section III).

[8] The list of F4W products and services is available in annex 1.

Figure 5: Fiware4Water Product and services



III. End-users engagement perspective

The KER combines both (i) the values describing the product & services which correspond to the supply side of F4W and (ii) the values describing the end users' needs, which corresponds to the demand side for F4W solutions. The first insight of these values is presented in the Value Proposition Canvas (D5.4). Their elaboration has started with a series of interview with all the partners' organization. This was possible because F4W is embedded in a **co-creation process** as the consortium gathers IT solutions developers and water utilities (private and public), both being the two main targets of F4W as described in the Business Model Canvas (D5.5). The first insight of F4W value proposition was delivered during the first year of the project while the solutions were being developed by the partners.

The second axis of end-users engagement relied on the 3 F4W **demo networks**. Each of them was dedicated to a specific target and aimed at showcasing F4W technological and non-technological solutions. Demo Network 1 (Municipalities) led by BDG focused on the local Water Forum, the socio-political solution developed by EURECAT. Demo Network 2 (Water managers) led by OiEau focused on the raising awareness and demonstrating the benefits of digital water solutions for managers to better assess their added value in the EU policies context. Demo Network 3 (SMEs-IT providers) organized a challenge for developers to propose innovative IT solutions to water utilities. These activities supported the development of end-users profiles in regards to the KER. This was reinforced by partners' pro-active demonstration of F4W solutions. The technology providers (EGM, FIWARE, EURECAT, EXETER, NTUA) and water utilities (KWR, WATERNET, EYDAP, SUEZ 3S) participated and/or organized a wide number of on line events to present the progress and their final results[9] such as (i) webinars aiming at offering a learning experience and (ii) workshops aiming at providing the opportunity to share experience both on the technicality of the solutions and their implementation. The exchanges among participants supported the work developed on the exploitation.

Finally, the last axis of end-users engagement deals with the **synergies** F4W took part. The DW2020 synergy group was composed of 5 projects (Fiware4Water, DigitalWater.City, SCOREwater, Aqua3S and Naiades) and 5 tasks force (n°0: Management, n°1: FIWARE and ontology; n°2: Sensors and demonstration, n°3: Business model and n°4: Communication-lead by OiEau). Meetings were organized to discuss the different business approaches, which helped each project to better align its method while benefiting from the others' feedbacks and experience. The communication task force allowed to have a multiplier effect in terms of activities & results' promotion and in the organization of events. Each project's event benefited from the support of the others and a series of joint events were also organized, enlarging the opportunities to reach out more end-users. In addition partners, are also involved in the ICT4Water cluster. Regular exchanges took place both on the development of technological-digital and non-technological solutions.

The end-users engagement was bi-lateral. Far from being a top down process, the aim was to also learn from the participants and even at the end to start a community of practice on behalf of DW2020.

These different aspects are taken into account in the KER with the Target, Dimension and Societal Readiness Level fields. The first one indicates the main target of the solutions so the end-user can easily scan the solutions. The Dimension field refers to the technological and non-technological dimensions of the solutions. These criteria have be used to classify the end-user profiles (D5.4). Finally, SRL indicates the level of knowledge about the stakeholders' interests and concerns.

[9] For more details, see D6.14-Webinars&eLearningMaterials-Year3_final.pdf and F4W-D6.16-CommunicationReport#3_final.pdf, available on https://www.fiware4water.eu/deliverables

IV. Fiware4Water Key Exploitation Results

The following sections list the 26 Key Exploitation Results[10] delivered by F4W. For each of them, the link is made with the products and services identified in the previous steps of the value proposition and business model canvas. A specific field on EU type of results has been also considered to harmonise F4W KER sheet with the one of the EU results platform, as some of F4W KER will be uploaded on the platform after the need of the project.

IV.1. KER 1: Access to real-time measurements, historical data and analytics

Key Exploitation Result #1

SHORT NAME
KEY

CONTACT
- Vasiliki Polychniatou EYDAP, vpolychniatou@eydap.gr
- Christos Makropoulos, NTUA, cmakro@mail.ntua.gr

TARGET
Water utilities

WATER CYCLE
Raw water

RESSOURCES
Interview video
https://www.youtube.com/watch?v=WOb9Jg9kjOg&feature=youtu.be
Demo case 1 description and results
https://www.fiware4water.eu/demo-cases/greece-raw-water-supply-optimisation-case
E-book :
https://bit.ly/3wUAPWf

TITLE
Access to real-time measurements, historical data and analytics

DESCRIPTION
A new web platform has been developed to enable the operational staff of EYDAP to process, analyse and visualise data from the integrated sensors, allowing the combined monitoring of flow and quality characteristics of raw water via a single web portal, on real-time basis. The platform provides also access to historical data to support the investigation of the evolution of monitored properties across time.

DIMENSION
Technological

EU TYPE
ICT software digital solution
Scientific or technological R&D result including ICT Hardware

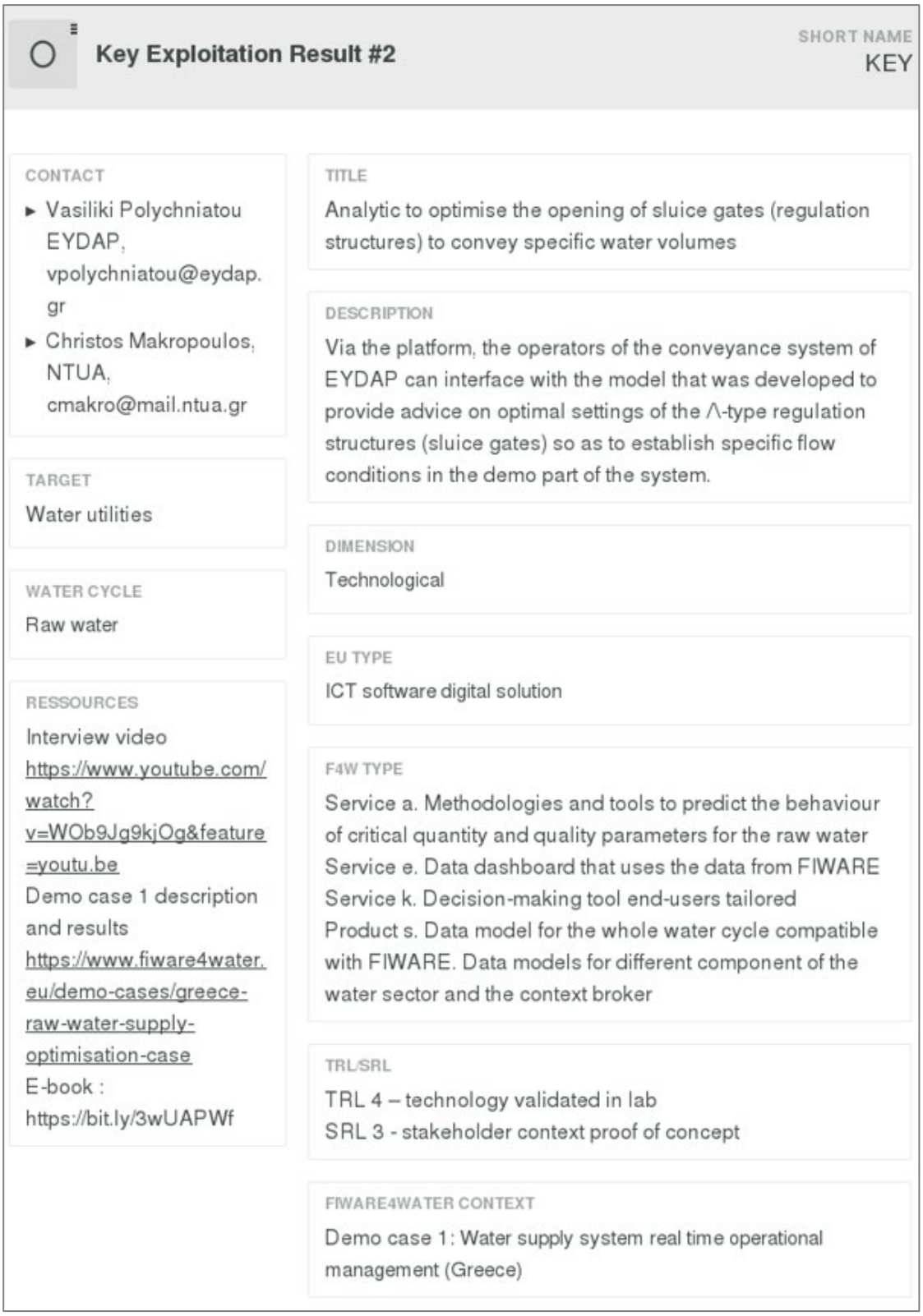
F4W TYPE
Service a. Methodologies and tools to predict the behaviour of critical quantity and quality parameters for the raw water
Service e. Data dashboard that uses the data from FIWARE
Service h. Combine the legacy system
Product s. Data model for the whole water cycle compatible with FIWARE. Data models for different component of the water sector and the context broker

TRL/SRL
TRL 1 – basic principles observed
SRL 7 – demonstrated in operational stakeholder context

FIWARE4WATER CONTEXT
Demo case 1: Water supply system real time operational management (Greece)

[10] All the resources of the KER are listed in the reference section

IV.2. KER 2: Early warning for high turbidity events and forecast of the level of turbidity at the downstream part of the systems



Key Exploitation Result #2

SHORT NAME
KEY

CONTACT
- Vasiliki Polychniatou EYDAP, vpolychniatou@eydap.gr
- Christos Makropoulos, NTUA, cmakro@mail.ntua.gr

TARGET
Water utilities

WATER CYCLE
Raw water

RESSOURCES
Interview video
https://www.youtube.com/watch?v=WOb9Jg9kjOg&feature=youtu.be
Demo case 1 description and results
https://www.fiware4water.eu/demo-cases/greece-raw-water-supply-optimisation-case
E-book :
https://bit.ly/3wUAPWf

TITLE
Analytic to optimise the opening of sluice gates (regulation structures) to convey specific water volumes

DESCRIPTION
Via the platform, the operators of the conveyance system of EYDAP can interface with the model that was developed to provide advice on optimal settings of the /\-type regulation structures (sluice gates) so as to establish specific flow conditions in the demo part of the system.

DIMENSION
Technological

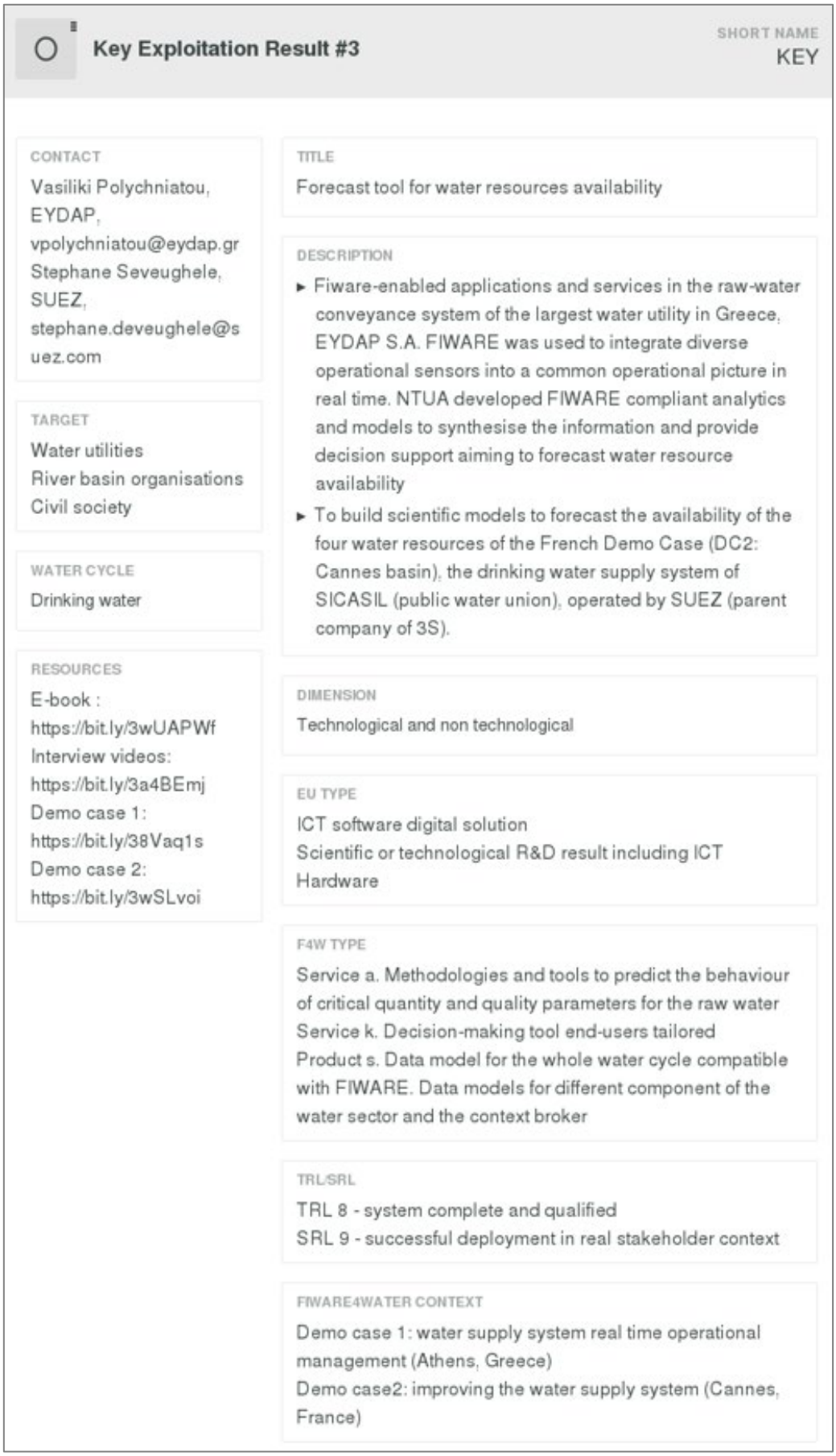
EU TYPE
ICT software digital solution

F4W TYPE
Service a. Methodologies and tools to predict the behaviour of critical quantity and quality parameters for the raw water
Service e. Data dashboard that uses the data from FIWARE
Service k. Decision-making tool end-users tailored
Product s. Data model for the whole water cycle compatible with FIWARE. Data models for different component of the water sector and the context broker

TRL/SRL
TRL 4 – technology validated in lab
SRL 3 - stakeholder context proof of concept

FIWARE4WATER CONTEXT
Demo case 1: Water supply system real time operational management (Greece)

IV.3. KER3:Tool to forecast water resources availability



Key Exploitation Result #3

SHORT NAME
KEY

CONTACT
Vasiliki Polychniatou, EYDAP, vpolychniatou@eydap.gr
Stephane Seveughele, SUEZ, stephane.deveughele@suez.com

TARGET
Water utilities
River basin organisations
Civil society

WATER CYCLE
Drinking water

RESOURCES
E-book : https://bit.ly/3wUAPWf
Interview videos: https://bit.ly/3a4BEmj
Demo case 1: https://bit.ly/38Vaq1s
Demo case 2: https://bit.ly/3wSLvoi

TITLE
Forecast tool for water resources availability

DESCRIPTION
- Fiware-enabled applications and services in the raw-water conveyance system of the largest water utility in Greece, EYDAP S.A. FIWARE was used to integrate diverse operational sensors into a common operational picture in real time. NTUA developed FIWARE compliant analytics and models to synthesise the information and provide decision support aiming to forecast water resource availability
- To build scientific models to forecast the availability of the four water resources of the French Demo Case (DC2: Cannes basin), the drinking water supply system of SICASIL (public water union), operated by SUEZ (parent company of 3S).

DIMENSION
Technological and non technological

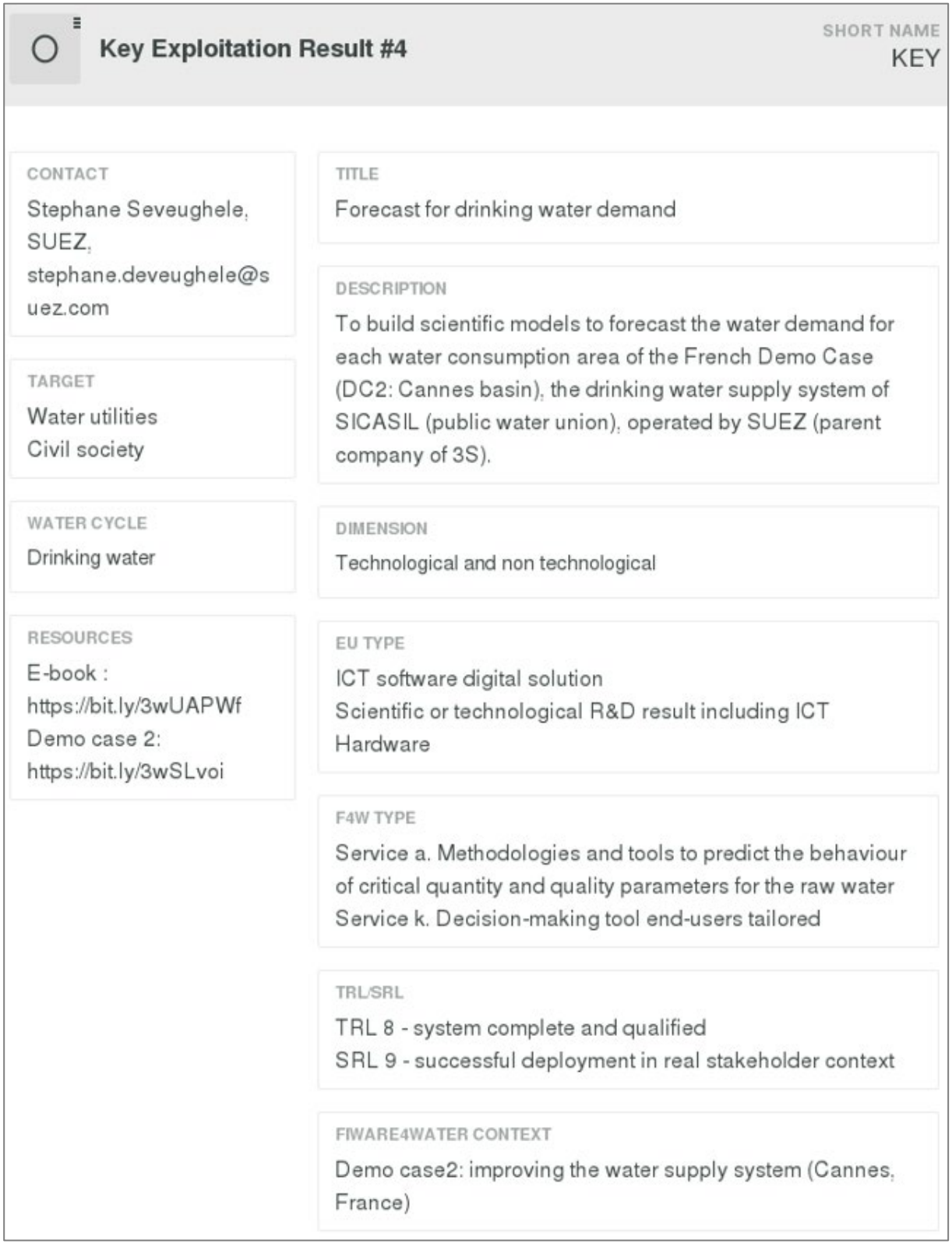
EU TYPE
ICT software digital solution
Scientific or technological R&D result including ICT Hardware

F4W TYPE
Service a. Methodologies and tools to predict the behaviour of critical quantity and quality parameters for the raw water
Service k. Decision-making tool end-users tailored
Product s. Data model for the whole water cycle compatible with FIWARE. Data models for different component of the water sector and the context broker

TRL/SRL
TRL 8 - system complete and qualified
SRL 9 - successful deployment in real stakeholder context

FIWARE4WATER CONTEXT
Demo case 1: water supply system real time operational management (Athens, Greece)
Demo case2: improving the water supply system (Cannes, France)

IV.4. KER4: Forecast for drinking water demand



Key Exploitation Result #4

SHORT NAME
KEY

CONTACT
Stephane Seveughele, SUEZ, stephane.deveughele@suez.com

TITLE
Forecast for drinking water demand

DESCRIPTION
To build scientific models to forecast the water demand for each water consumption area of the French Demo Case (DC2: Cannes basin), the drinking water supply system of SICASIL (public water union), operated by SUEZ (parent company of 3S).

TARGET
Water utilities
Civil society

WATER CYCLE
Drinking water

DIMENSION
Technological and non technological

RESOURCES
E-book : https://bit.ly/3wUAPWf
Demo case 2: https://bit.ly/3wSLvoi

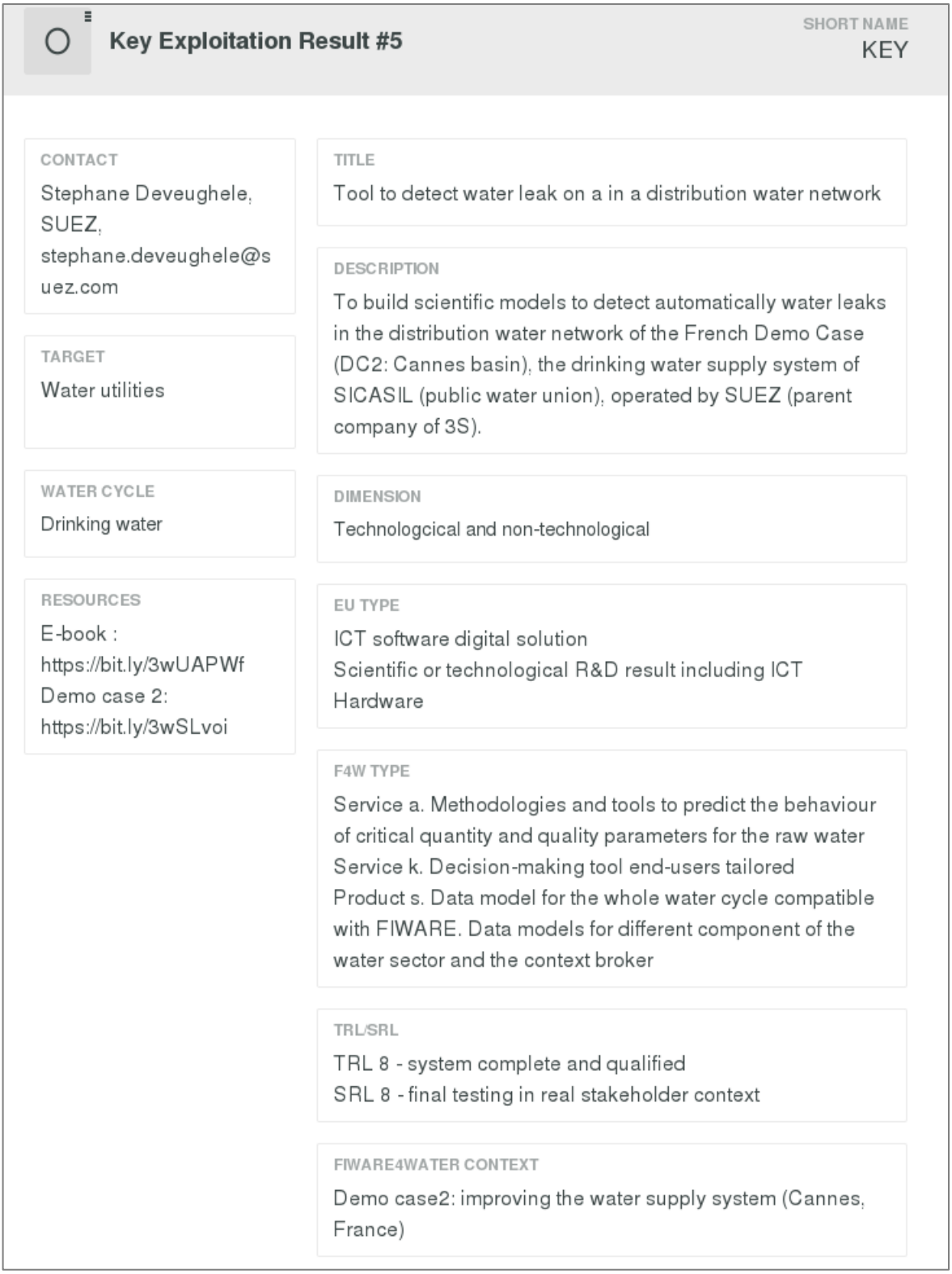
EU TYPE
ICT software digital solution
Scientific or technological R&D result including ICT Hardware

F4W TYPE
Service a. Methodologies and tools to predict the behaviour of critical quantity and quality parameters for the raw water
Service k. Decision-making tool end-users tailored

TRL/SRL
TRL 8 - system complete and qualified
SRL 9 - successful deployment in real stakeholder context

FIWARE4WATER CONTEXT
Demo case2: improving the water supply system (Cannes, France)

IV.5. KER5: Tool to detect water leak in a distribution water network



Key Exploitation Result #5

SHORT NAME
KEY

CONTACT
Stephane Deveughele, SUEZ, stephane.deveughele@suez.com

TITLE
Tool to detect water leak on a in a distribution water network

DESCRIPTION
To build scientific models to detect automatically water leaks in the distribution water network of the French Demo Case (DC2: Cannes basin), the drinking water supply system of SICASIL (public water union), operated by SUEZ (parent company of 3S).

TARGET
Water utilities

WATER CYCLE
Drinking water

DIMENSION
Technologcical and non-technological

RESOURCES
E-book : https://bit.ly/3wUAPWf
Demo case 2: https://bit.ly/3wSLvoi

EU TYPE
ICT software digital solution
Scientific or technological R&D result including ICT Hardware

F4W TYPE
Service a. Methodologies and tools to predict the behaviour of critical quantity and quality parameters for the raw water
Service k. Decision-making tool end-users tailored
Product s. Data model for the whole water cycle compatible with FIWARE. Data models for different component of the water sector and the context broker

TRL/SRL
TRL 8 - system complete and qualified
SRL 8 - final testing in real stakeholder context

FIWARE4WATER CONTEXT
Demo case2: improving the water supply system (Cannes, France)

IV.6. KER6: Tool to detect abnormal water quality events in a distribution water network

Key Exploitation Result #6

SHORT NAME
KEY

CONTACT
Stephane Deveughele, SUEZ, stephane.deveughele@suez.com

TARGET
Water utilities

WATER CYCLE
Drinking water

RESOURCES
E-book : https://bit.ly/3wUAPWf
Demo case 2: https://bit.ly/3wSLvoi

TITLE
Tool to detect abnormal water quality events in a distribution water network

DESCRIPTION
To build scientific models to forecast the availability of the four resources of the French Demo Case (DC2: Cannes basin), the drinking water supply system of SICASIL (public water union), operated by SUEZ (parent company of 3S).

DIMENSION
Technological

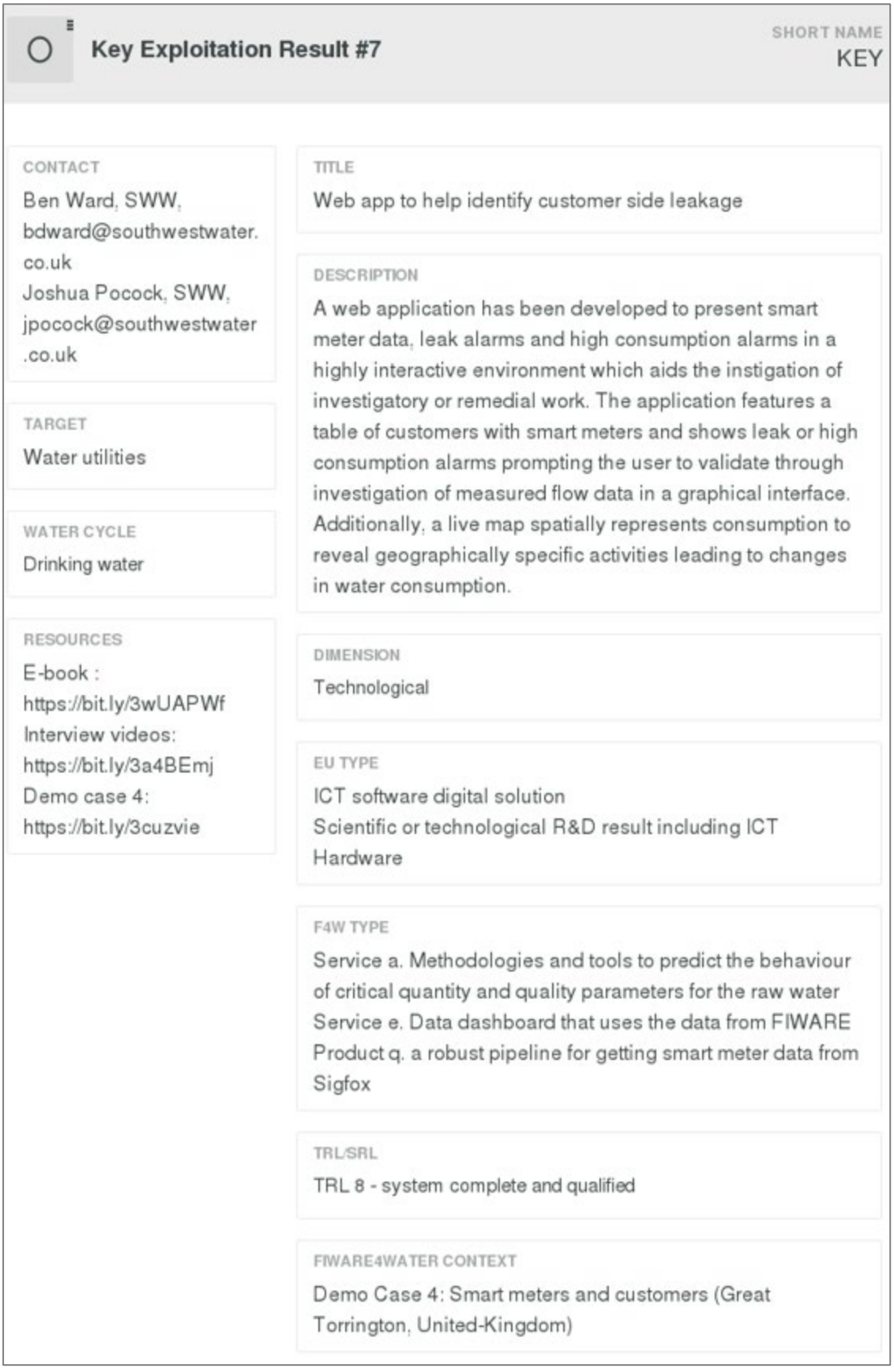
EU TYPE
ICT software digital solution

F4W TYPE
Service a. Methodologies and tools to predict the behaviour of critical quantity and quality parameters for the raw water
Service i. Develop models for the detection of abnormal water quality events
Product s. Data model for the whole water cycle compatible with FIWARE. Data models for different component of the water sector and the context broker

TRL/SRL
TRL 8 - system complete and qualified

FIWARE4WATER CONTEXT
Demo case2: improving the water supply system (Cannes, France)

IV.7. KER7: Web app to help identify customer side leakage



Key Exploitation Result #7

SHORT NAME
KEY

CONTACT
Ben Ward, SWW, bdward@southwestwater.co.uk
Joshua Pocock, SWW, jpocock@southwestwater.co.uk

TARGET
Water utilities

WATER CYCLE
Drinking water

RESOURCES
E-book : https://bit.ly/3wUAPWf
Interview videos: https://bit.ly/3a4BEmj
Demo case 4: https://bit.ly/3cuzvie

TITLE
Web app to help identify customer side leakage

DESCRIPTION
A web application has been developed to present smart meter data, leak alarms and high consumption alarms in a highly interactive environment which aids the instigation of investigatory or remedial work. The application features a table of customers with smart meters and shows leak or high consumption alarms prompting the user to validate through investigation of measured flow data in a graphical interface. Additionally, a live map spatially represents consumption to reveal geographically specific activities leading to changes in water consumption.

DIMENSION
Technological

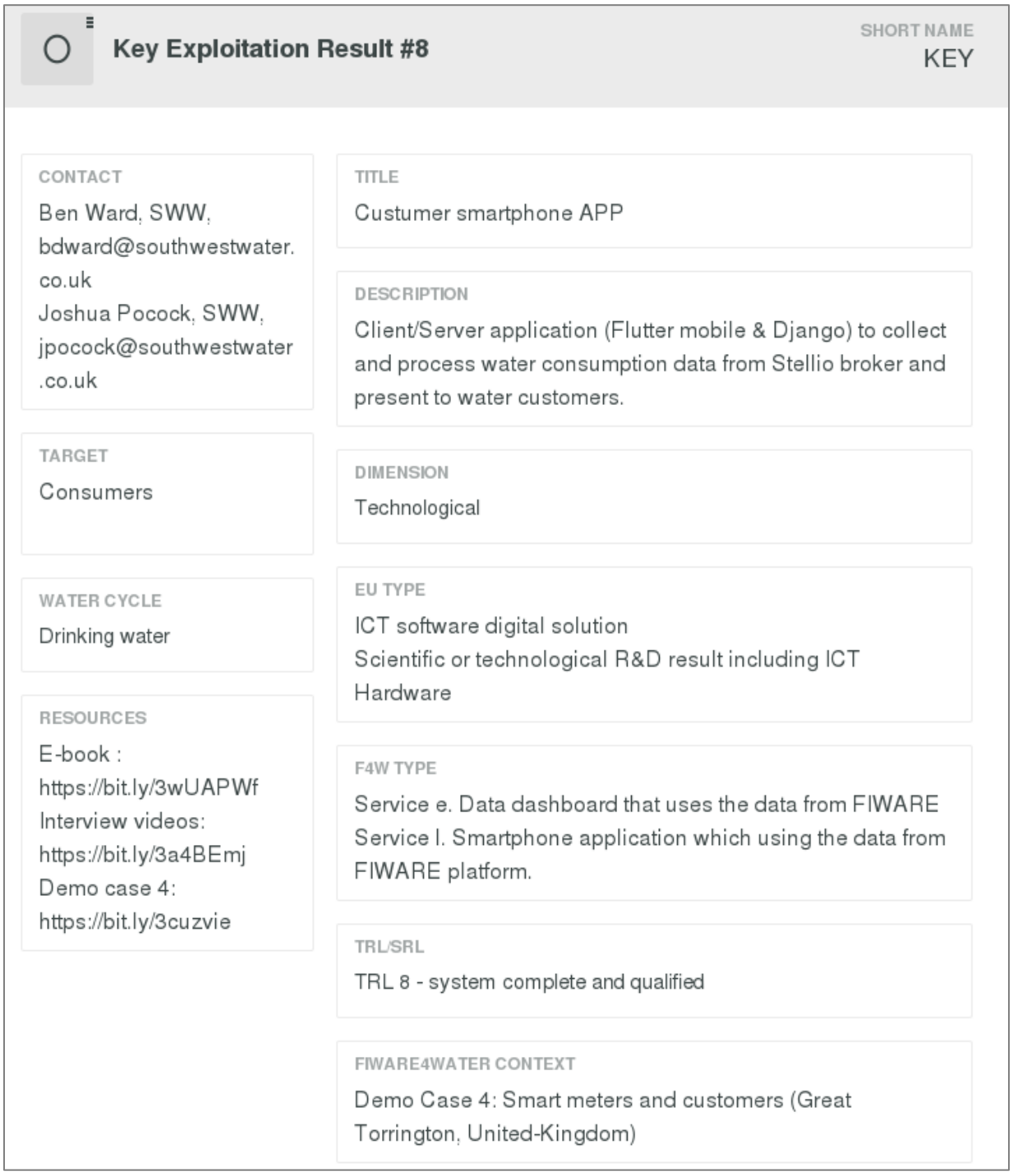
EU TYPE
ICT software digital solution
Scientific or technological R&D result including ICT Hardware

F4W TYPE
Service a. Methodologies and tools to predict the behaviour of critical quantity and quality parameters for the raw water
Service e. Data dashboard that uses the data from FIWARE
Product q. a robust pipeline for getting smart meter data from Sigfox

TRL/SRL
TRL 8 - system complete and qualified

FIWARE4WATER CONTEXT
Demo Case 4: Smart meters and customers (Great Torrington, United-Kingdom)

IV.8. KER8: Customer smartphone App to drive changes in DW



Key Exploitation Result #8

SHORT NAME
KEY

CONTACT
Ben Ward, SWW, bdward@southwestwater.co.uk
Joshua Pocock, SWW, jpocock@southwestwater.co.uk

TARGET
Consumers

WATER CYCLE
Drinking water

RESOURCES
E-book : https://bit.ly/3wUAPWf
Interview videos: https://bit.ly/3a4BEmj
Demo case 4: https://bit.ly/3cuzvie

TITLE
Custumer smartphone APP

DESCRIPTION
Client/Server application (Flutter mobile & Django) to collect and process water consumption data from Stellio broker and present to water customers.

DIMENSION
Technological

EU TYPE
ICT software digital solution
Scientific or technological R&D result including ICT Hardware

F4W TYPE
Service e. Data dashboard that uses the data from FIWARE
Service l. Smartphone application which using the data from FIWARE platform.

TRL/SRL
TRL 8 - system complete and qualified

FIWARE4WATER CONTEXT
Demo Case 4: Smart meters and customers (Great Torrington, United-Kingdom)

IV.9. KER9: Forecast tool for WWTP influent flow

Key Exploitation Result #9

SHORT NAME
KEY

CONTACT
Alex van der Helm, waternet, alex.van.der.helm@waternet.nl

TARGET
Water utilities

WATER CYCLE
Waste water

RESOURCES
E-book : https://bit.ly/3wUAPWf
Demo case 3: https://bit.ly/3wSwRxw
Deliverables: https://bit.ly/3z0UmWr

TITLE
Forecast tool for WWTP influent flow

DESCRIPTION
The tool is a soft sensor for the influent volumetric flow. It is a recurrent neural network that is able to accurately forecast the influent flow per treatment lane with a horizon of 75 minutes, which is key for using these data for smart control purposes. The soft sensor is fed by influent volumetric flow and rainfall data.

DIMENSION
Technological

EU TYPE
ICT software digital solution
Scientific or technological R&D result including ICT Hardware

F4W TYPE
Service j. Development of a software, an artificial intelligence, for real-time operational wastewater management

TRL/SRL
TRL 6 – technology demonstrated in relevant environment (industrially relevant environment in the case of key enabling technologies)

FIWARE4WATER CONTEXT
Demo case 3: Intelligent control for wastewater treatment (Amsterdam, Netherlands)

IV.10. KER10: Stellio

Key Exploitation Result #10

SHORT NAME
KEY

CONTACT
Philippe Cousin, EGM,
philippe.cousin@egm.io
Franck Le Gall, EGM,
franck.le-gall@egm.io

TARGET
Water utilities
River basin organisations

WATER CYCLE
Whole water cycle

RESOURCES
Deliverables:
https://bit.ly/3z0UmWr

TITLE
Stellio

DESCRIPTION
Standardised context broker allowing any legacy system of water management to communicate with the FIWARE environment

DIMENSION
Technological

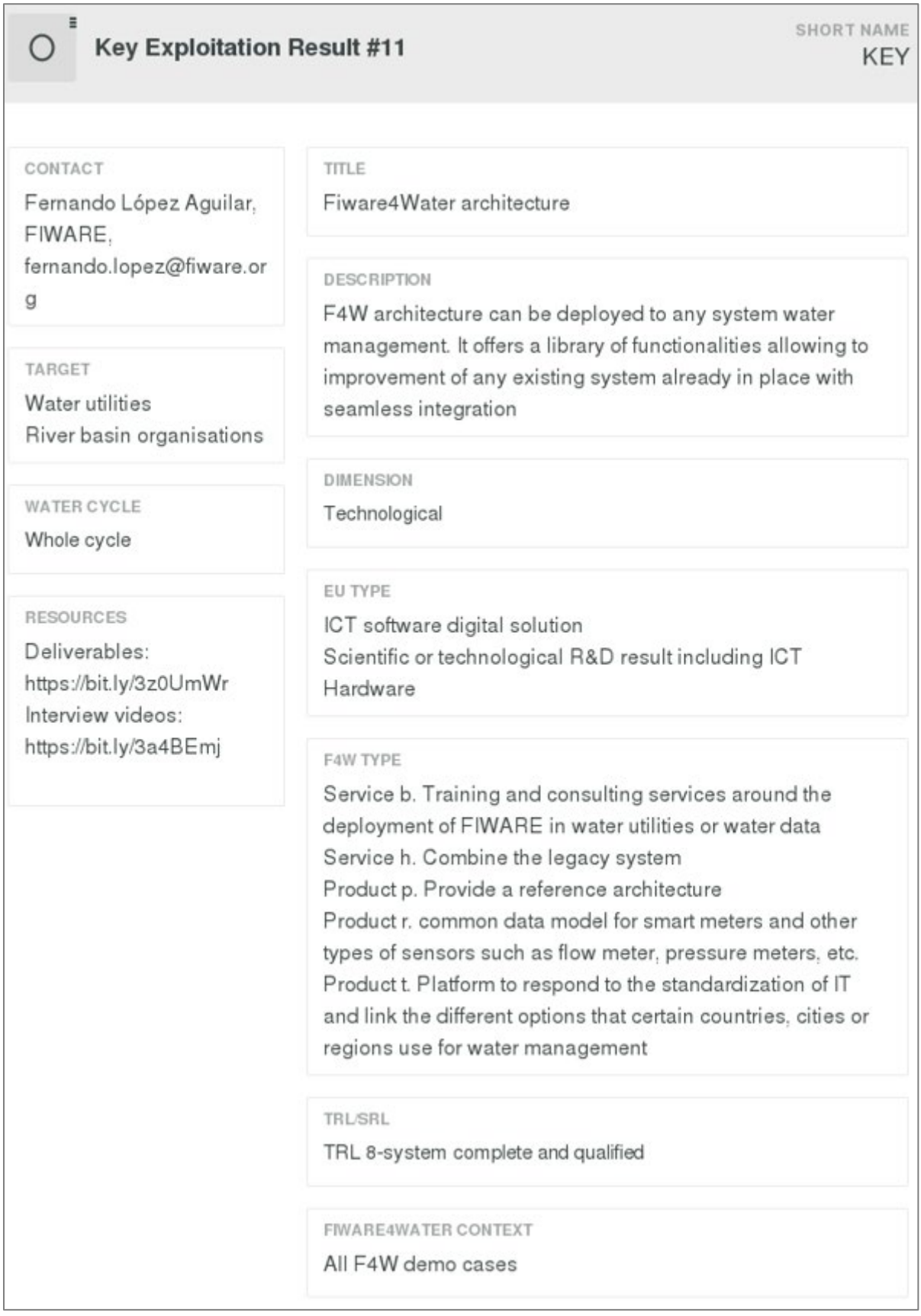
EU TYPE
ICT software digital solution
Scientific or technological R&D result including ICT Hardware

F4W TYPE
Product t. Platform to respond to the standardization of IT and link the different options that certain countries

TRL/SRL
TRL 9 – actual system proven in operational environment

FIWARE4WATER CONTEXT
Demo Case 4: Smart meters and customers (Great Torrington, United-Kingdom)

IV.11. KER11 Fiware4Water architecture



Key Exploitation Result #11

SHORT NAME
KEY

CONTACT
Fernando López Aguilar, FIWARE, fernando.lopez@fiware.org

TARGET
Water utilities
River basin organisations

WATER CYCLE
Whole cycle

RESOURCES
Deliverables: https://bit.ly/3z0UmWr
Interview videos: https://bit.ly/3a4BEmj

TITLE
Fiware4Water architecture

DESCRIPTION
F4W architecture can be deployed to any system water management. It offers a library of functionalities allowing to improvement of any existing system already in place with seamless integration

DIMENSION
Technological

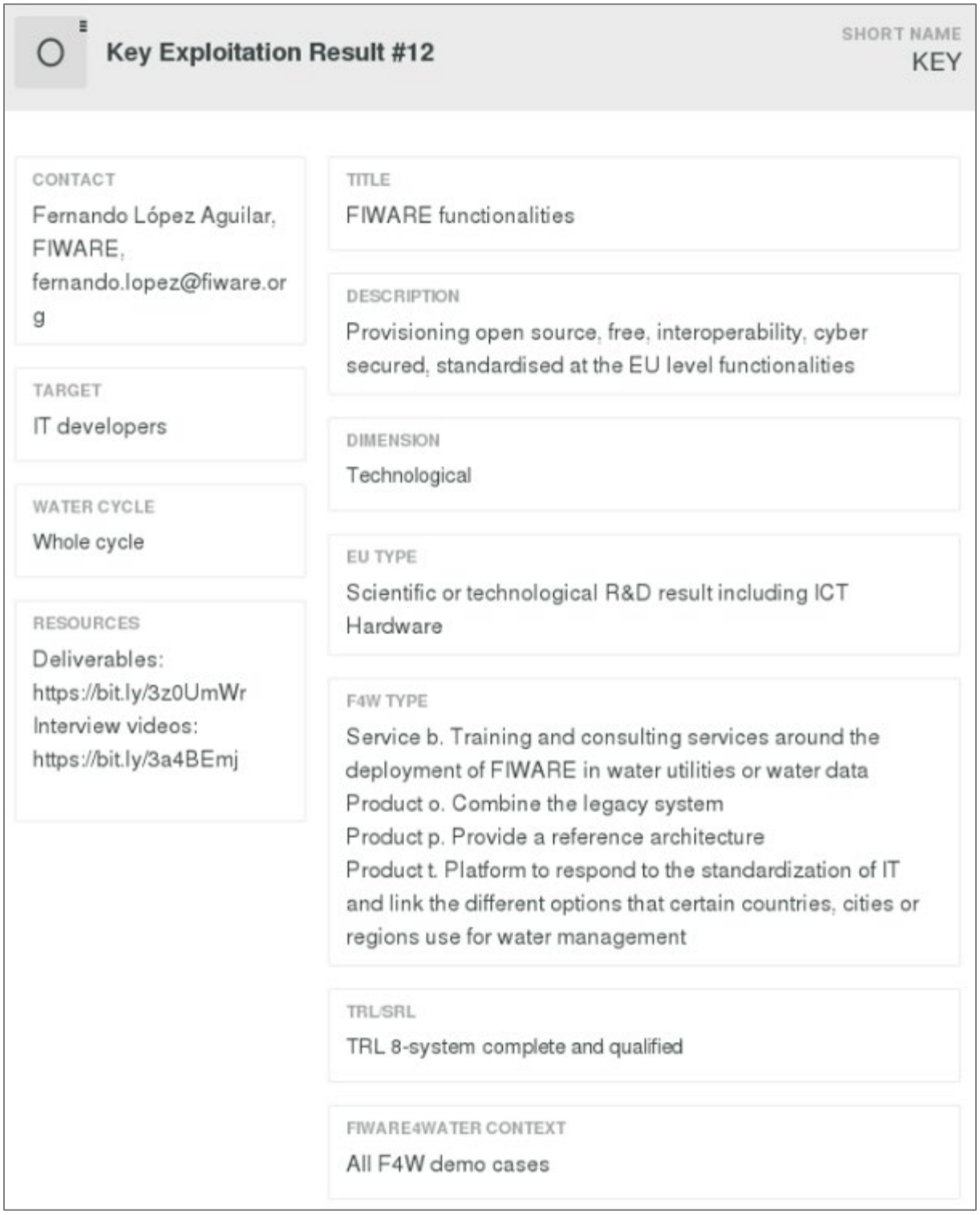
EU TYPE
ICT software digital solution
Scientific or technological R&D result including ICT Hardware

F4W TYPE
Service b. Training and consulting services around the deployment of FIWARE in water utilities or water data
Service h. Combine the legacy system
Product p. Provide a reference architecture
Product r. common data model for smart meters and other types of sensors such as flow meter, pressure meters, etc.
Product t. Platform to respond to the standardization of IT and link the different options that certain countries, cities or regions use for water management

TRL/SRL
TRL 8-system complete and qualified

FIWARE4WATER CONTEXT
All F4W demo cases

IV.12. KER12: FIWARE functionalities



Key Exploitation Result #12

SHORT NAME
KEY

CONTACT
Fernando López Aguilar, FIWARE, fernando.lopez@fiware.org

TARGET
IT developers

WATER CYCLE
Whole cycle

RESOURCES
Deliverables: https://bit.ly/3z0UmWr
Interview videos: https://bit.ly/3a4BEmj

TITLE
FIWARE functionalities

DESCRIPTION
Provisioning open source, free, interoperability, cyber secured, standardised at the EU level functionalities

DIMENSION
Technological

EU TYPE
Scientific or technological R&D result including ICT Hardware

F4W TYPE
Service b. Training and consulting services around the deployment of FIWARE in water utilities or water data
Product o. Combine the legacy system
Product p. Provide a reference architecture
Product t. Platform to respond to the standardization of IT and link the different options that certain countries, cities or regions use for water management

TRL/SRL
TRL 8-system complete and qualified

FIWARE4WATER CONTEXT
All F4W demo cases

IV.13. KER13: DW2020 Synergy group

Key Exploitation Result #13

SHORT NAME
KEY

CONTACT
Nicolas Caradot, KWB, nicolas.caradot@kompetenz-wasser.de

TARGET
Water utilities
IT developers
Scientists
Civil society

WATER CYCLE
Whole cycle

RESOURCES
DW2020: https://bit.ly/3wRaOGk
Deliverables: https://bit.ly/3z0UmWr
E-book : https://bit.ly/3wUAPWf

TITLE
DW2020 Synergy group

DESCRIPTION
DigitalWater2020 is composed of Fiware4Water, Digital Water cities, Naiades, Score water and Aqua3S, European Projects funded by the European Union's Horizon 2020 research and innovation programme. All these projects address the digital water related issues. All five act to (i) set synergies and complementarities in terms of development, research and communication (ii) join efforts and share experiences about the impact of digitalization on the water sector (iii) Support a more efficient means of managing and protecting water resources, solving several challenges related to resource efficiency, climate change and sustainable development.

DIMENSION
Technologcical and non-technological

EU TYPE
Policy related result
Scientific or technological R&D result including ICT Hardware

F4W TYPE
Service g. More transparent form of government
Service c. Support local authorities, utilities or other types of actors such as Basin Organisations around the world to use FIWARE for the development of information systems

TRL/SRL
SRL 8 - final testing in real stakeholder context

FIWARE4WATER CONTEXT
All F4W demo cases

IV.14. KER14: F4W E-book

Key Exploitation Result #14

SHORT NAME
KEY

CONTACT
Natacha Amorsi, OiEau,
n.amorsi@oieau.fr

TARGET
Water utilities
IT developers
Scientists
Civil society

WATER CYCLE
Whole cycle

RESOURCES
E-book :
https://bit.ly/3wUAPWf

TITLE
Fiware4Water e-book

DESCRIPTION
On-line document providing digital water perspectives from social innovation based on the Fiware4Water technological and non-technological dimensions

DIMENSION
Non-technological

EU TYPE
Policy related result
Scientific or technological R&D result including ICT Hardware

F4W TYPE
Service b. Training and consulting services around the deployment of FIWARE in water utilities or water data

TRL/SRL
SRL 8 - final testing in real stakeholder context

FIWARE4WATER CONTEXT
All F4W demo cases

IV.15. KER15: Webinars, interview-videos

Key Exploitation Result #15

SHORT NAME
KEY

CONTACT
Natacha Amorsi, OiEau, n.amorsi@oieau.fr

TARGET
Water utilities
River basin organisation
IT developers
Scientists
Civil society

WATER CYCLE
Whole cycle

RESOURCES
Interview videos: https://bit.ly/3a4BEmj
Webinars: https://bit.ly/3GpZ0z0

TITLE
Fiware4Water webinars and interview-videos

DESCRIPTION
Fiware4Water delivered a wide series of webinars/on-line workshops and a series of 9 interviews videos. They work as complementary source of information on digital water, addressing the political, technological, non-technological dimensions

DIMENSION
Non-technological

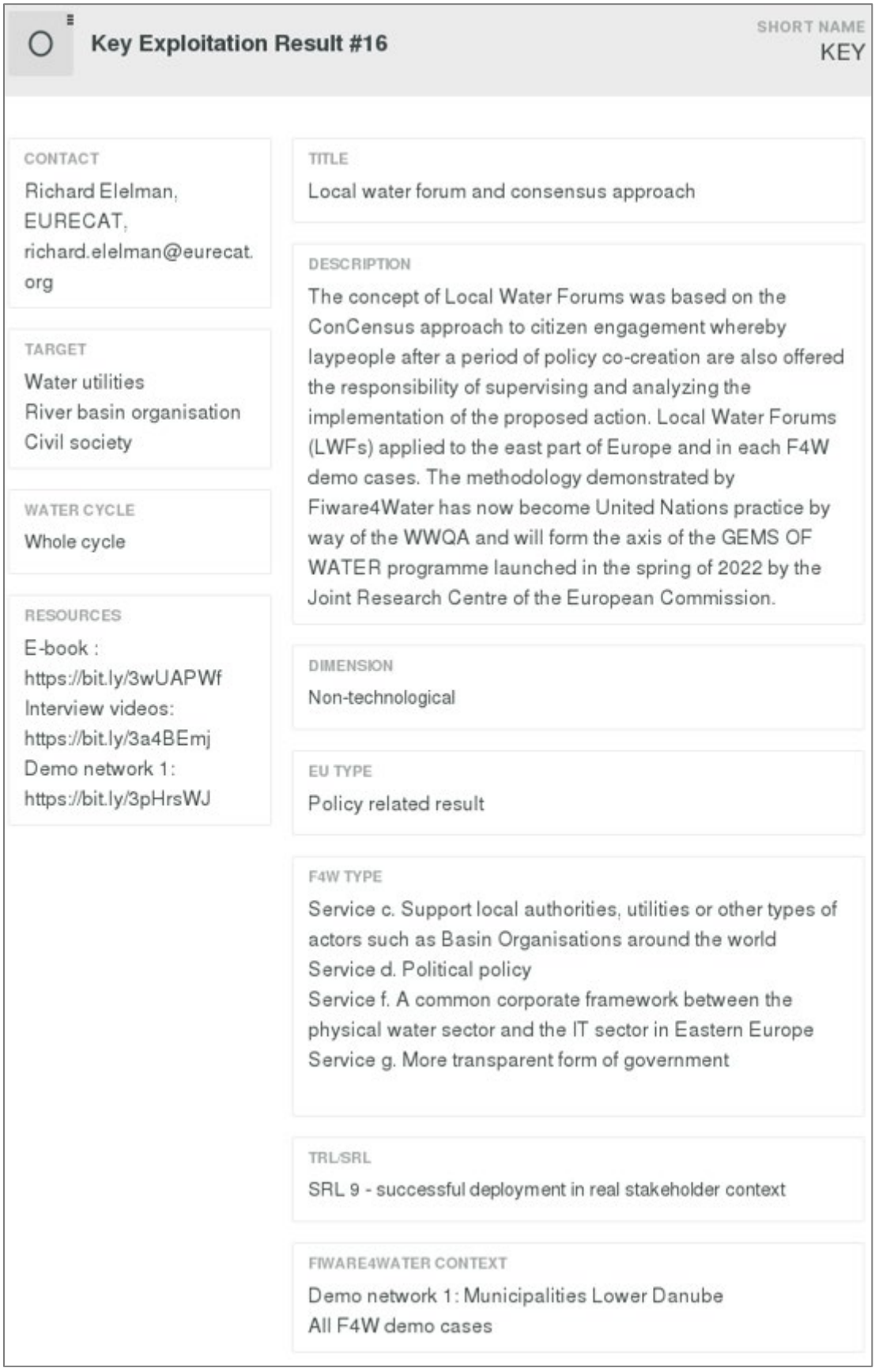
EU TYPE
Policy related result
Scientific or technological R&D result including ICT Hardware

F4W TYPE
Service b. Training and consulting services around the deployment of FIWARE in water utilities or water data managers/ move to a 2.0 data management

TRL/SRL
SRL 8 - final testing in real stakeholder context

FIWARE4WATER CONTEXT
All F4W demo cases

IV.16. KER16: Local water forum and consensus approach



Key Exploitation Result #16

SHORT NAME
KEY

CONTACT
Richard Elelman, EURECAT, richard.elelman@eurecat.org

TARGET
Water utilities
River basin organisation
Civil society

WATER CYCLE
Whole cycle

RESOURCES
E-book : https://bit.ly/3wUAPWf
Interview videos: https://bit.ly/3a4BEmj
Demo network 1: https://bit.ly/3pHrsWJ

TITLE
Local water forum and consensus approach

DESCRIPTION
The concept of Local Water Forums was based on the ConCensus approach to citizen engagement whereby laypeople after a period of policy co-creation are also offered the responsibility of supervising and analyzing the implementation of the proposed action. Local Water Forums (LWFs) applied to the east part of Europe and in each F4W demo cases. The methodology demonstrated by Fiware4Water has now become United Nations practice by way of the WWQA and will form the axis of the GEMS OF WATER programme launched in the spring of 2022 by the Joint Research Centre of the European Commission.

DIMENSION
Non-technological

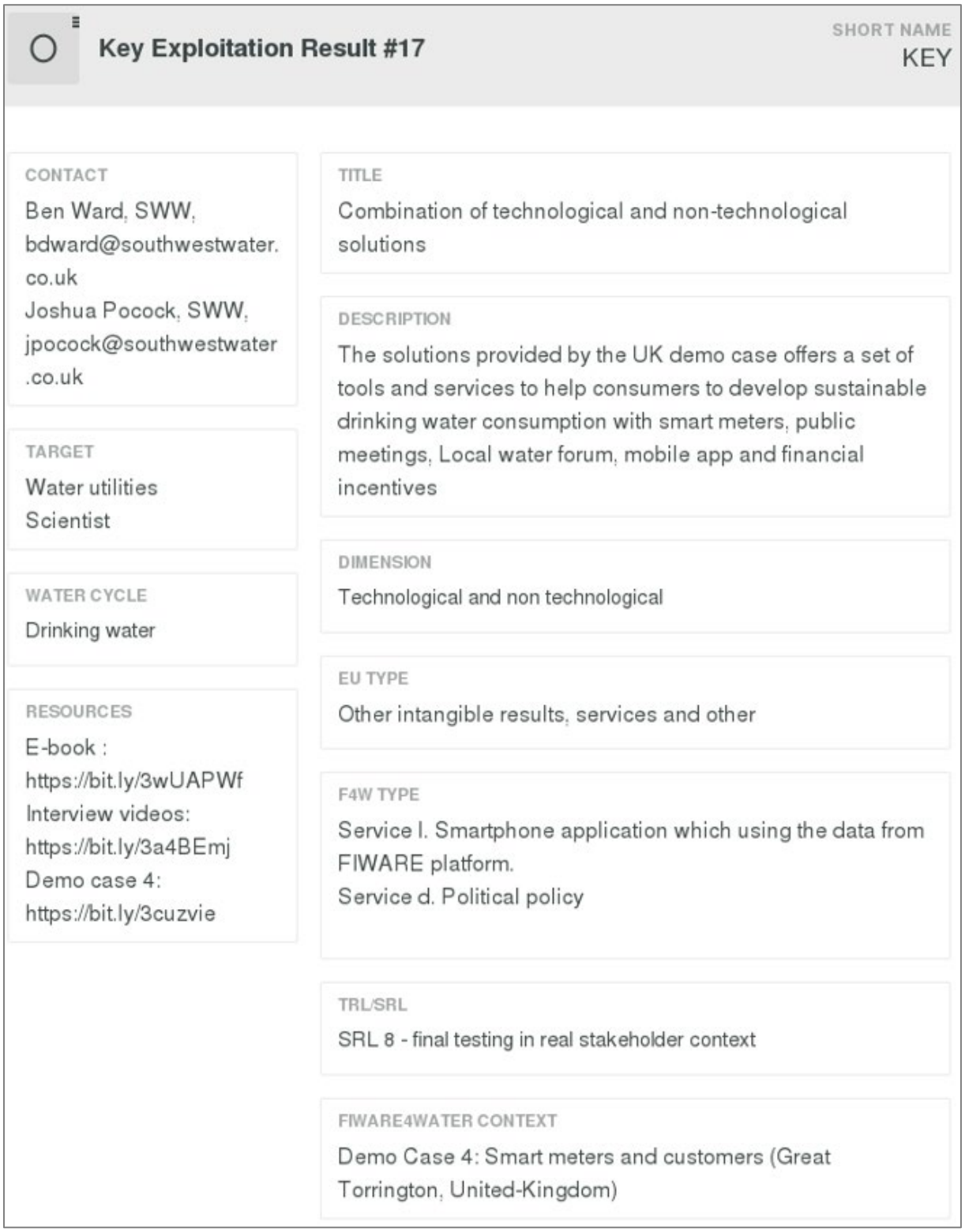
EU TYPE
Policy related result

F4W TYPE
Service c. Support local authorities, utilities or other types of actors such as Basin Organisations around the world
Service d. Political policy
Service f. A common corporate framework between the physical water sector and the IT sector in Eastern Europe
Service g. More transparent form of government

TRL/SRL
SRL 9 - successful deployment in real stakeholder context

FIWARE4WATER CONTEXT
Demo network 1: Municipalities Lower Danube
All F4W demo cases

IV.17. KER17: Combination of technological and non-technological solutions



Key Exploitation Result #17

SHORT NAME
KEY

CONTACT
Ben Ward, SWW, bdward@southwestwater.co.uk
Joshua Pocock, SWW, jpocock@southwestwater.co.uk

TARGET
Water utilities
Scientist

WATER CYCLE
Drinking water

RESOURCES
E-book : https://bit.ly/3wUAPWf
Interview videos: https://bit.ly/3a4BEmj
Demo case 4: https://bit.ly/3cuzvie

TITLE
Combination of technological and non-technological solutions

DESCRIPTION
The solutions provided by the UK demo case offers a set of tools and services to help consumers to develop sustainable drinking water consumption with smart meters, public meetings, Local water forum, mobile app and financial incentives

DIMENSION
Technological and non technological

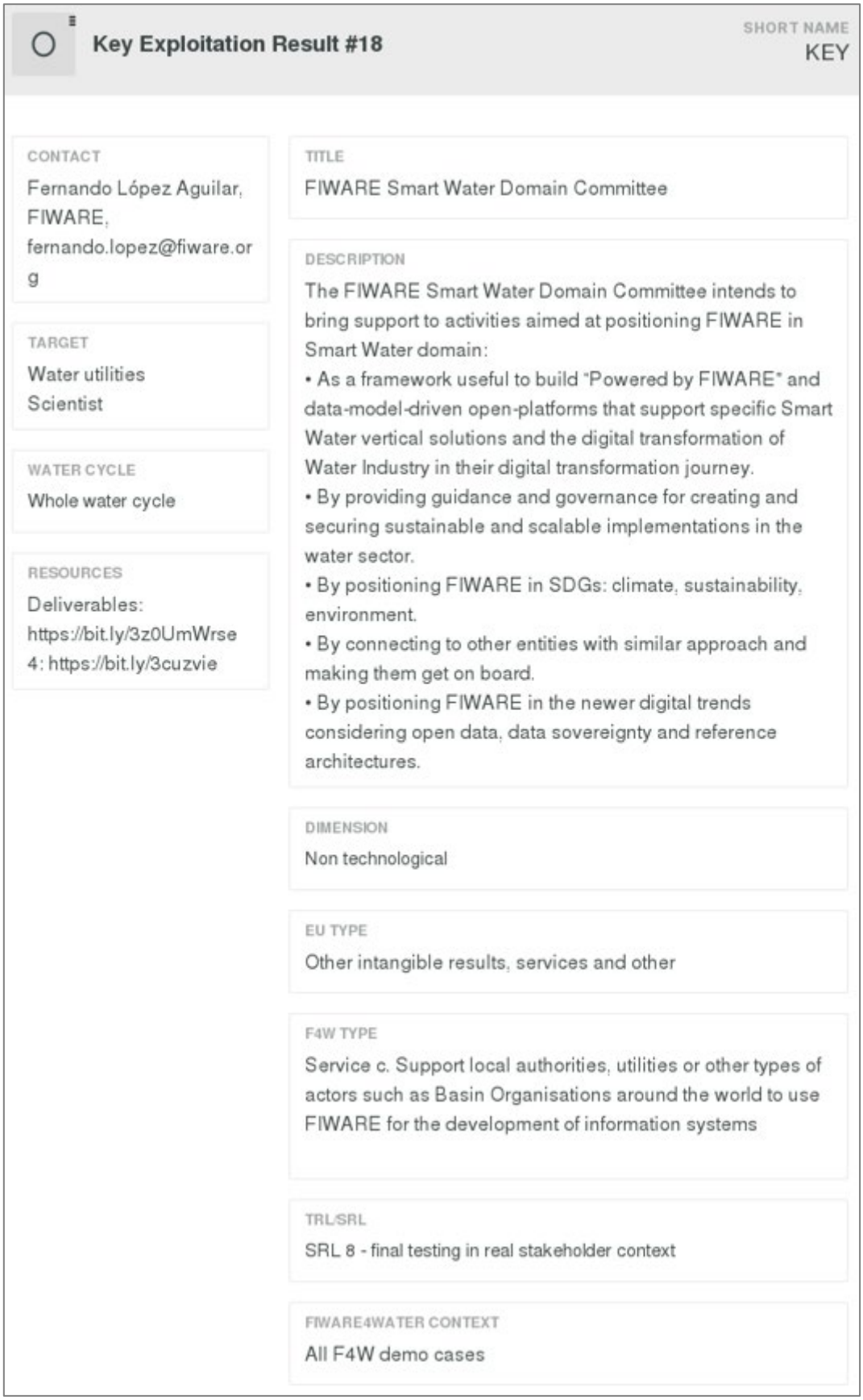
EU TYPE
Other intangible results, services and other

F4W TYPE
Service l. Smartphone application which using the data from FIWARE platform.
Service d. Political policy

TRL/SRL
SRL 8 - final testing in real stakeholder context

FIWARE4WATER CONTEXT
Demo Case 4: Smart meters and customers (Great Torrington, United-Kingdom)

IV.18. KER18: Smart water domain committee



Key Exploitation Result #18

SHORT NAME
KEY

CONTACT
Fernando López Aguilar, FIWARE, fernando.lopez@fiware.org

TARGET
Water utilities
Scientist

WATER CYCLE
Whole water cycle

RESOURCES
Deliverables: https://bit.ly/3z0UmWrse4: https://bit.ly/3cuzvie

TITLE
FIWARE Smart Water Domain Committee

DESCRIPTION
The FIWARE Smart Water Domain Committee intends to bring support to activities aimed at positioning FIWARE in Smart Water domain:
• As a framework useful to build "Powered by FIWARE" and data-model-driven open-platforms that support specific Smart Water vertical solutions and the digital transformation of Water Industry in their digital transformation journey.
• By providing guidance and governance for creating and securing sustainable and scalable implementations in the water sector.
• By positioning FIWARE in SDGs: climate, sustainability, environment.
• By connecting to other entities with similar approach and making them get on board.
• By positioning FIWARE in the newer digital trends considering open data, data sovereignty and reference architectures.

DIMENSION
Non technological

EU TYPE
Other intangible results, services and other

F4W TYPE
Service c. Support local authorities, utilities or other types of actors such as Basin Organisations around the world to use FIWARE for the development of information systems

TRL/SRL
SRL 8 - final testing in real stakeholder context

FIWARE4WATER CONTEXT
All F4W demo cases

IV.19. KER19: Data Models

Key Exploitation Result #19

SHORT NAME
KEY

CONTACT
Fernando López Aguilar, FIWARE, fernando.lopez@fiware.org

TARGET
Water utilities
Scientist
Civil society

WATER CYCLE
Whole water cycle

RESOURCES
Deliverables: https://bit.ly/3z0UmWrse4: https://bit.ly/3cuzvie

TITLE
Data Models

DESCRIPTION
Standardized data models, including terms' conceptual definitions, definition of the data types, and specification in six languages (EN, FR, GE, IT, JA, ES) and real use cases examples.

DIMENSION
Technological

EU TYPE
ICT software digital solution
Scientific or technological R&D result including ICT Hardware

F4W TYPE
Service e. Data dashboard that uses the data from FIWARE
Service k. Decision-making tool end-users tailored

TRL/SRL
SRL 8 - final testing in real stakeholder context

FIWARE4WATER CONTEXT
All F4W demo cases

IV.20. KER20 Cybersecurity analysis of F4W reference architecture components

Key Exploitation Result #20

SHORT NAME
KEY

CONTACT
Fernando López Aguilar, FIWARE, fernando.lopez@fiware.org

TITLE
Cybersecurity analysis of F4W reference architecture components

DESCRIPTION
Protocol and client application to analyse the security issues of the FIWARE Generic Enablers and provide feedback to the owners. Translated to the FIWARE Technical Steering Committee periodic report.

TARGET
IT developers
Water utilities

WATER CYCLE
Whole water cycle

DIMENSION
Technological and non-technological

RESOURCES
Deliverables: https://bit.ly/3z0UmWrse4: https://bit.ly/3cuzvie

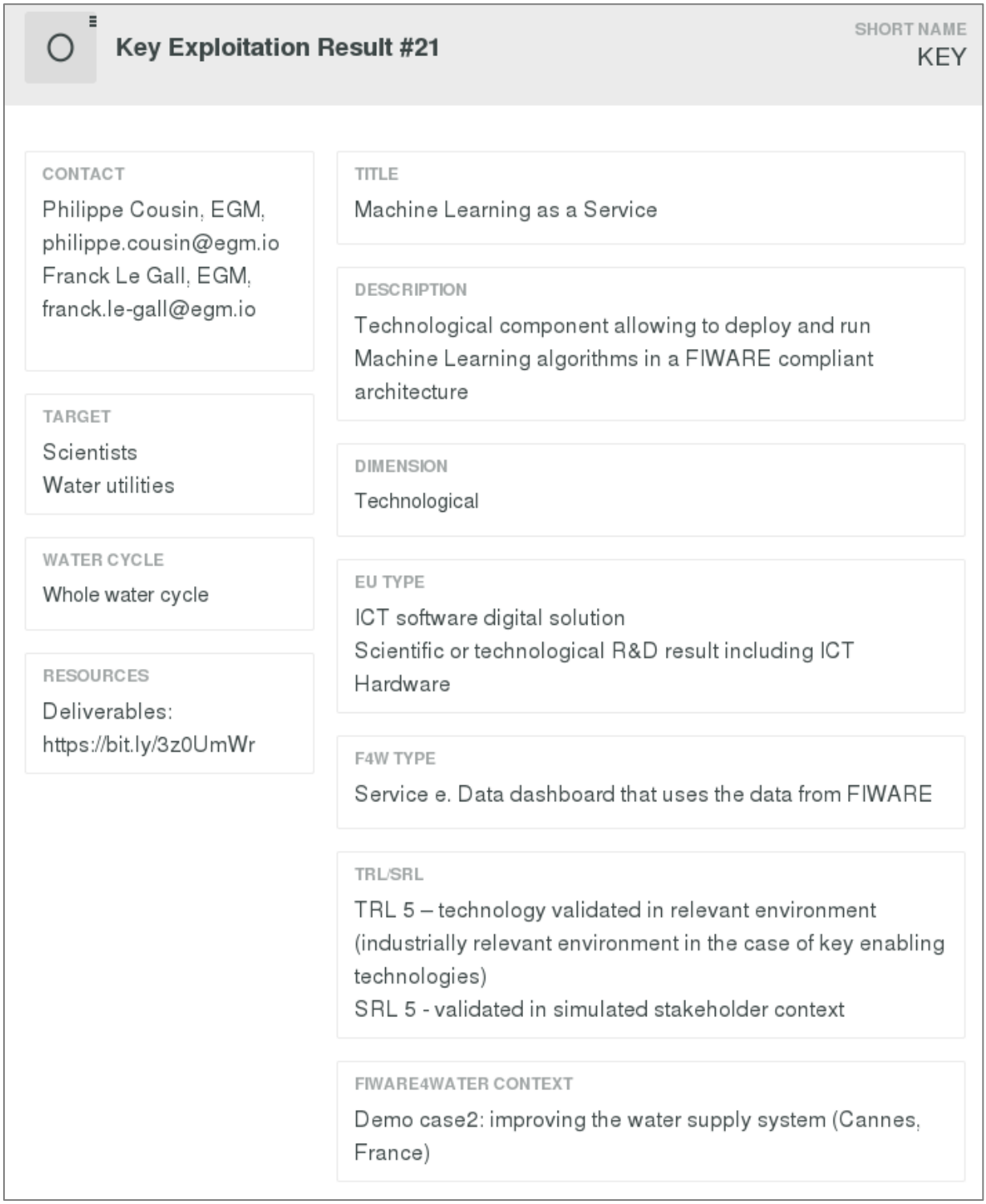
EU TYPE
ICT software digital solution

F4W TYPE
Product p. Provide a reference architecture
Product t. Platform to respond to the standardization of IT and link the different options that certain countries, cities or regions use for water management

TRL/SRL
TRL 8 - system complete and qualified

FIWARE4WATER CONTEXT
All F4W demo cases

IV.21. KER21 Machine Learning as a Service



Key Exploitation Result #21

SHORT NAME
KEY

CONTACT
Philippe Cousin, EGM, philippe.cousin@egm.io
Franck Le Gall, EGM, franck.le-gall@egm.io

TARGET
Scientists
Water utilities

WATER CYCLE
Whole water cycle

RESOURCES
Deliverables: https://bit.ly/3z0UmWr

TITLE
Machine Learning as a Service

DESCRIPTION
Technological component allowing to deploy and run Machine Learning algorithms in a FIWARE compliant architecture

DIMENSION
Technological

EU TYPE
ICT software digital solution
Scientific or technological R&D result including ICT Hardware

F4W TYPE
Service e. Data dashboard that uses the data from FIWARE

TRL/SRL
TRL 5 – technology validated in relevant environment (industrially relevant environment in the case of key enabling technologies)
SRL 5 - validated in simulated stakeholder context

FIWARE4WATER CONTEXT
Demo case2: improving the water supply system (Cannes, France)

IV.22. KER22 Grafana plugin for NGSI-LD

Key Exploitation Result #22

SHORT NAME
KEY

CONTACT
Philippe Cousin, EGM,
philippe.cousin@egm.io
Franck Le Gall, EGM,
franck.le-gall@egm.io

TITLE
Grafana plugin for NGSI-LD

DESCRIPTION
Visualisation of data (maps and time series) stored in a NGSI-LD context broker

TARGET
Water utilities
River basin organisations

DIMENSION
Technologcical and non-technological

WATER CYCLE
Whole water cycle

EU TYPE
ICT software digital solution

RESOURCES
Deliverables:
https://bit.ly/3z0UmWr

F4W TYPE
Service h. Combine the legacy system
Service e. Data dashboard that uses the data from FIWARE

TRL/SRL
TRL 8 - system complete and qualified
SRL 8 - final testing in real stakeholder context

FIWARE4WATER CONTEXT
Demo Case 4: Smart meters and customers (Great Torrington, United-Kingdom)

IV.23. KER23 AI control agent for WWTP optimisation

Key Exploitation Result #23

SHORT NAME
KEY

CONTACT
Lluis Echeverria, EURECAT
lluis.echeverria@eurecat.org

TARGET
Water utilities

WATER CYCLE
Waste water

RESOURCES
E-book : https://bit.ly/3wUAPWf
Demo case 3: https://bit.ly/3wSwRxw
Deliverables: https://bit.ly/3z0UmWr

TITLE
AI control agent for WWTP optimisation

DESCRIPTION
The control agent is trained and evaluated. A deep reinforcement learning (DRL) approach has been followed and two algorithms are used to solve two similar formulations of the optimisation problem. In addition, two reward functions have been formalized to represent the objective for minimising climate impact and penalising the exceedance of NO3 and NH4 concentration thresholds.

DIMENSION
Technological

EU TYPE
ICT software digital solution
Scientific or technological R&D result including ICT Hardware

F4W TYPE
Service j. Development of a software, an artificial intelligence, for real-time operational wastewater management

TRL/SRL
TRL 6 – technology demonstrated in relevant environment (industrially relevant environment in the case of key enabling technologies)

FIWARE4WATER CONTEXT
Demo case 3: Intelligent control for wastewater treatment (Amsterdam, Netherlands)

IV.24. KER 24 AI Tool for Automated Data Quality Control

Key Exploitation Result #24

SHORT NAME
KEY

CONTACT
Dirk Vries, KWR,
dirk.vries@kwrwater.nl

TARGET
Water utilities

WATER CYCLE
Waste water

RESOURCES
E-book :
https://bit.ly/3wUAPWf
Demo case 3:
https://bit.ly/3wSwRxw
Deliverables:
https://bit.ly/3z0UmWr

TITLE
AI Tool for Automated Data Quality Control

DESCRIPTION
The autoencoder neural network models of the DVR forecasts NO3 and NH4 with a window from 5 minutes to about 2 hours. The DVR promises to provide a robust and accurate screening and correction layer for further use of sensor data in digital twin and control applications – especially for anomaly events with a short duration.

DIMENSION
Technological

EU TYPE
ICT software digital solution
Scientific or technological R&D result including ICT Hardware

F4W TYPE
Service j. Development of a software, an artificial intelligence, for real-time operational wastewater management

TRL/SRL
TRL 6 – technology demonstrated in relevant environment (industrially relevant environment in the case of key enabling technologies)

FIWARE4WATER CONTEXT
Demo case 3: Intelligent control for wastewater treatment (Amsterdam, Netherlands)

IV.25. KER25 Analytic to provide early warnings for high turbidity events and forecasts of turbidity

Key Exploitation Result #25

SHORT NAME
KEY

CONTACT
- Vasiliki Polychniatou EYDAP, vpolychniatou@eydap.gr
- Christos Makropoulos, NTUA, cmakro@mail.ntua.gr

TARGET
Water utilities

WATER CYCLE
Raw water

RESSOURCES
Interview video
https://www.youtube.com/watch?v=WOb9Jg9kjOg&feature=youtu.be
Demo case 1 description and results
https://www.fiware4water.eu/demo-cases/greece-raw-water-supply-optimisation-case
E-book :
https://bit.ly/3wUAPWf

TITLE
Analytic to provide early warnings for high turbidity events and forecasts of turbidity

DESCRIPTION
The platform has the capacity to provide real-time alerts/warnings for exceptionally high or low turbidity events on real-time basis. Specifically, the platform enables the operators to create/customise threshold-based alerts that trigger notifications.

DIMENSION
Technological

EU TYPE

EU TYPE
ICT software digital solution
Scientific or technological R&D result including ICT Hardware,

F4W TYPE
Service a. Methodologies and tools to predict the behaviour of critical quantity and quality parameters for the raw water
Service e. Data dashboard that uses the data from FIWARE
Service i. Develop models for the detection of abnormal water quality events
Service m. An early warning and alerting system that will support EYDAP to act timely in the case of unusual quality and quantity events
Product s. Data model for the whole water cycle compatible with FIWARE. Data models for different component of the water sector and the context broker

TRL/SRL
TRL 4 – technology validated in lab
SRL 3 - stakeholder context proof of concept

FIWARE4WATER CONTEXT
Demo case 1: Water supply system real time operational management (Greece)

IV.26. KER26 Analytic to analyse and estimate daily water supply volumes

Key Exploitation Result #26

SHORT NAME
KEY

CONTACT
- Vasiliki Polychniatou EYDAP, vpolychniatou@eydap.gr
- Christos Makropoulos, NTUA, cmakro@mail.ntua.gr

TARGET
Water utilities

WATER CYCLE
Raw water

RESSOURCES
Interview video https://www.youtube.com/watch?v=WOb9Jg9kjOg&feature=youtu.be
Demo case 1 description and results https://www.fiware4water.eu/demo-cases/greece-raw-water-supply-optimisation-case
E-book : https://bit.ly/3wUAPWf

TITLE
Analytic to analyse and estimate daily water supply volumes

DESCRIPTION
The platform provides a dedicated analytic for the analysis of daily supply volumes. This analytic supports the analysis of these 10 series and allows the user to: 1) Obtain information on meaningful statistical characteristics of the series 2) Obtain information on the variation of water volumes of days or periods where exceptional events take place (e.g., Christmas, Easter or bank holidays of Greece) 3) Obtain estimation of the total outflow from the 4 WTPs of the next day

DIMENSION
Technological

EU TYPE
ICT software digital solution
Scientific or technological R&D result including ICT Hardware

F4W TYPE
Service a. Methodologies and tools to predict the behaviour of critical quantity and quality parameters for the raw water
Service k. Decision-making tool end-users tailored
Product s. Data model for the whole water cycle compatible with FIWARE. Data models for different component of the water sector and the context broker

TRL/SRL
TRL 4 – technology validated in lab
SRL 3 - stakeholder context proof of concept

FIWARE4WATER CONTEXT
Demo case 1: Water supply system real time operational management (Greece)

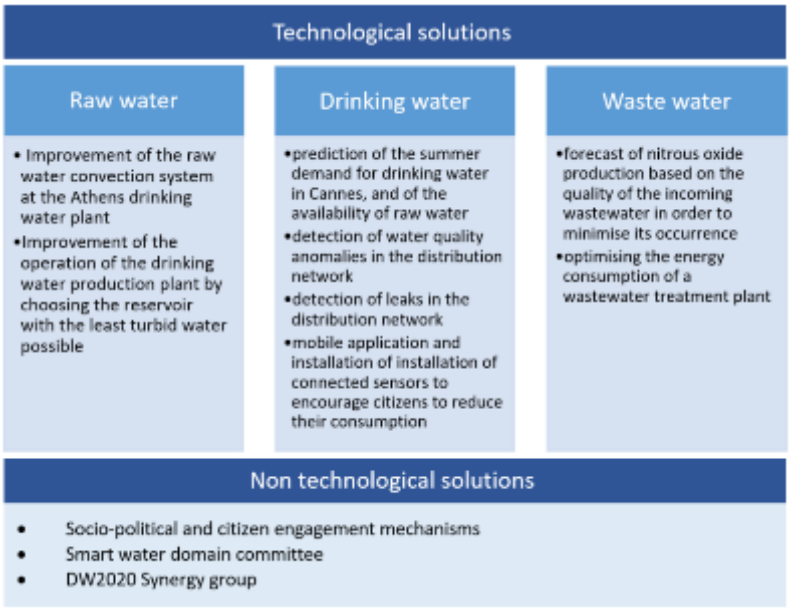
V. Conclusion

The F4W story started in 2018, when partners from the digital and water fields built a project to demonstrate the use of the FIWARE IT platform to develop digital solutions addressing specific needs in the water field. Different sectors (Smart Cities, energy, agriculture, etc.) were already using this platform to develop smart applications but this was not the case for the water sector. The main objectives of the F4W project was to develop modular applications using FIWARE and an open, standardised, interoperable and secure interface architecture (API) for real-time management of water systems, and to demonstrate how to engage with water stakeholders including the representatives of civil society and the policy dimension on the added-value of digital water

The exploitation plan shows how partners have successfully achieved these objectives. On the technological side, the demonstration has been made with tools now available online with algorithmic, artificial intelligence and machine learning modules. On the non-technological side, the demonstration has been made with socio-political mechanisms applied in UK and municipalities in the east part of Europe.

In terms of method, the list of products and services previously identified by F4W value proposition and business model was the starting point of the exploitation plan. The method consisted of categorised these products and services to link them to F4W key exploitation results. The analysis ended up on 26 KER presented in a sheet composed of 11 fields[11].

Figure 6: Synthetic view of F4W Key Exploitation Results



The KER represent altogether a tailored tool box to develop digital solutions for any water management system, using the FIWARE IT platform and its ecosystem of developers as well as engaging with local stakeholders. On one other hand, the exploitation plan provides an enabling support the technological side with "Smart Water" applications, to help SMEs and developers create a new generation of internet services in this field. On the other hand, it also provides the support to reach out the stakeholders at the local scale and engage with them.

[11] The fields of the F4W KER sheet are: title, description, contact, target, water cycle, dimension, EU type, F4W type, TRL/SRL, F4W context, resources.

General recommendations

European added value

F4W exploitation plan provides to the European commission 26 Key Exploitation results with the information for any stakeholders to understand digital water solutions, access related resources and get in direct contact with the solution's owner. These KER demonstrate the feasibility of using F4W architecture and FIWARE environment in the water sector while addressing key issues such as legacy system, cyber security. The access of FIWARE potentialities for the water sector is continuing after the end of the project. In order to maintain the newly created F4W interface, the FIWARE Foundation have launched a dedicated Smart Water Domain Committee at the end of 2021 (KER18).

By organizing the KER according to their technological and non-technological dimensions, F4W path the way towards social innovation and provides evidence based approach on how to combine the different dimensions of social innovation to address digital water issues and provide solutions to stakeholders. One objective of the project was to look at the digitalisation of the water sector from the perspective of social innovation in order to combine technological solutions with governance, capacity building and economic dimensions. F4W has devoted a wide range of activities to socio-political and citizen engagement, including the application of the ConCensus methodology and the creation of Local Water Forums. This initiative has proved successful and has now been adopted by the United Nations World Water Quality Alliance. (More information here: https://www.fiware4water.eu/demo-network-1-lower-danube-romania-bulgaria-hungary-croatia-serbia-and-moldova-middle-east-jordan).

These activities bridge the gap towards the policy. A policy brief is being developed by the DW2020 Synergy group addressing all the dimensions mentioned above. The aim of the document is to (i) highlight recommendations to better link the technological and non-technological dimensions of digital water solutions to the European policies, (ii) emphasis policy gaps, and (iii) provide evidence for potential new policy orientations.

Potential up scaling

As already explained two main types of KER have been developed by F4W partners. A series of-technological solutions focuses on digital functionalities that support water managers to better manage water resources along the whole water value chain (from the source to the treatment). Those solutions are written in black in the following table. The second series of solutions is not technological and focusses on the management mechanisms with stakeholders (from the citizens to authorities). These solutions are written in blue in the following table.

Table 1: KER potential upscaling from a PESTE perspective

Political	Economic	Socio-cultural	Environmental
KER16 KER18	KER4 KER5 KER6 KER7 KER8 KER9 KER10 KER21 KER22 KER23 KER24 KER25 KER26	KER7 KER8 KER13 KER14 KER15 KER16 KER17	KER1 KER2 KER3 KER4 KER5 KER6 KER7 KER8 KER9 KER22 KER23 KER24 KER25 KER26

KER Technological - Digital
KER Non technological

All F4W KER aim at providing tailored solutions to water managers. Table 1 highlights the key impacts associated to each solution. Political refers to mechanisms that aim to facilitate the engagement of all the stakeholders in raising awareness on digital water solutions as well as implementing long term approach to engage with stakeholders so they can be part of the water governance. The economic refers in terms of impact to the savings that could be realized with the implementation of the solutions. The solutions have been tested at the scale of F4W Demo cases. The economic dimension is being analyzed

by the partners that are named in each KER file. For more details, the partners can directly be contacted.

Social cultural refers to the solutions that have an impact on the citizens and provide either tailored learning materials on digital water management or specific mechanisms that support their engagement. Finally, the environmental dimension focusses on the technological solutions that provide tailored services and tool for water managers to better anticipate water availability (in terms of quality and quantity). Even if all F4W solutions aim for a better resilience to climate change, the KER listed in that column provide concrete solutions to climate change adaptation.

VI. References

Osterwalder A., Pigneur Y. (2010), *Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers (Strategyzer)*, John & Sons, 288p

European Commission (a), *Dissemination and Exploitation Activities in Horizon 2020*, H2020 Common Support Centre/J5, https://ec.europa.eu/research/participants/data/ref/h2020/other/events/2018-09-21/9_dissemination-exploitation-activities_en.pdf

Cotelo C., Franco L. (2018), *Science & society RPI project presentation*, Fundación Empresa Universidad Gallega –FEUGA), https://cica.udc.gal/es/adjunto/281

Fiware4Water on line resources

Deliverables: https://www.fiware4water.eu/deliverables#deliverable

Demo case 1: https://www.fiware4water.eu/demo-cases/greece-raw-water-supply-optimisation-case

Demo case 2: https://www.fiware4water.eu/demo-cases/france-water-supply-system-management-case

Demo case 3: https://www.fiware4water.eu/demo-cases/netherlands-intelligent-control-wastewater-case

Demo case 4: https://www.fiware4water.eu/demo-cases/united-kingdom-smart-metering-and-citizen-engagement-case

Demo Network 1: https://www.fiware4water.eu/demo-network-1-lower-danube-romania-bulgaria-hungary-croatia-serbia-and-moldova-middle-east-jordan

Demo Network 2: https://www.fiware4water.eu/demo-networks/international-network-basin-organisation

E-book: https://www.fiware4water.eu/deliverables#dissemination

Interview videos: https://www.fiware4water.eu/deliverables#videos

Webinars: https://www.fiware4water.eu/deliverables#webinars

Annex: List of Fiware4Water Products and services

Service 1:To inform, convince and train regarding digital water and the use of the F4W platform
a. Methodologies and tools to predict the behaviour of critical quantity and quality parameters for the raw water
b. Training and consulting services around the deployment of FIWARE in water utilities or water data managers/ move to a 2.0 data management
c. Support local authorities, utilities or other types of actors such as Basin Organisations around the world to use FIWARE for the development of information systems
Service 2: Socio-political engagement of citizens on digital water theme and issues
d. Political policy
e. Data dashboard that uses the data from FIWARE
f. A common corporate framework between the physical water sector and the IT sector in Eastern Europe
g. More transparent form of government
Service 3: The capacity to develop end-user tailored water management APIs
h . Combine the legacy system
i. Develop models for the detection of abnormal water quality events
j. Development of a software, an artificial intelligence, for real-time operational wastewater management
k. Decision-making tool end-users tailored
l. Smartphone application which using the data from FIWARE platform.
m. An early warning and alerting system that will support EYDAP to act timely in the case of unusual quality and quantity events
n. Methodologies and tools to predict the behaviour of critical quantity and quality parameters for the raw water
Products
o. Combine the legacy system
p. Provide a reference architecture
q. a robust pipeline for getting smart meter data from Sigfox.
r. common data model for smart meters and other types of sensors such as flow meter, pressure meters
s. Data model for the whole water cycle compatible with FIWARE. Data models for different component of the water sector and the context broker
t. Platform to respond to the standardization of IT and link the different options that certain countries, cities or regions use for water management
Perspectives
Develop certification of FIWARE labelled products
Creation of a ihub FIWARE
Develop certification of FIWARE labelled products
Possible transfer from EPANet to FIWARE
A way to use the data of other companies in addition to ours, to ensure a common framework, language, format and legacies between different companies
Objectives
Demo case approach/ practical applications
Set of solutions able to improve processes within the water cycle
Personalised AI services for the management or prescriptive management of the water cycle in general
Web applications and analytics that take advantage of the measurements of all the sensors concerning raw water quality and quantity
Connect water managers different systems to see the overall network