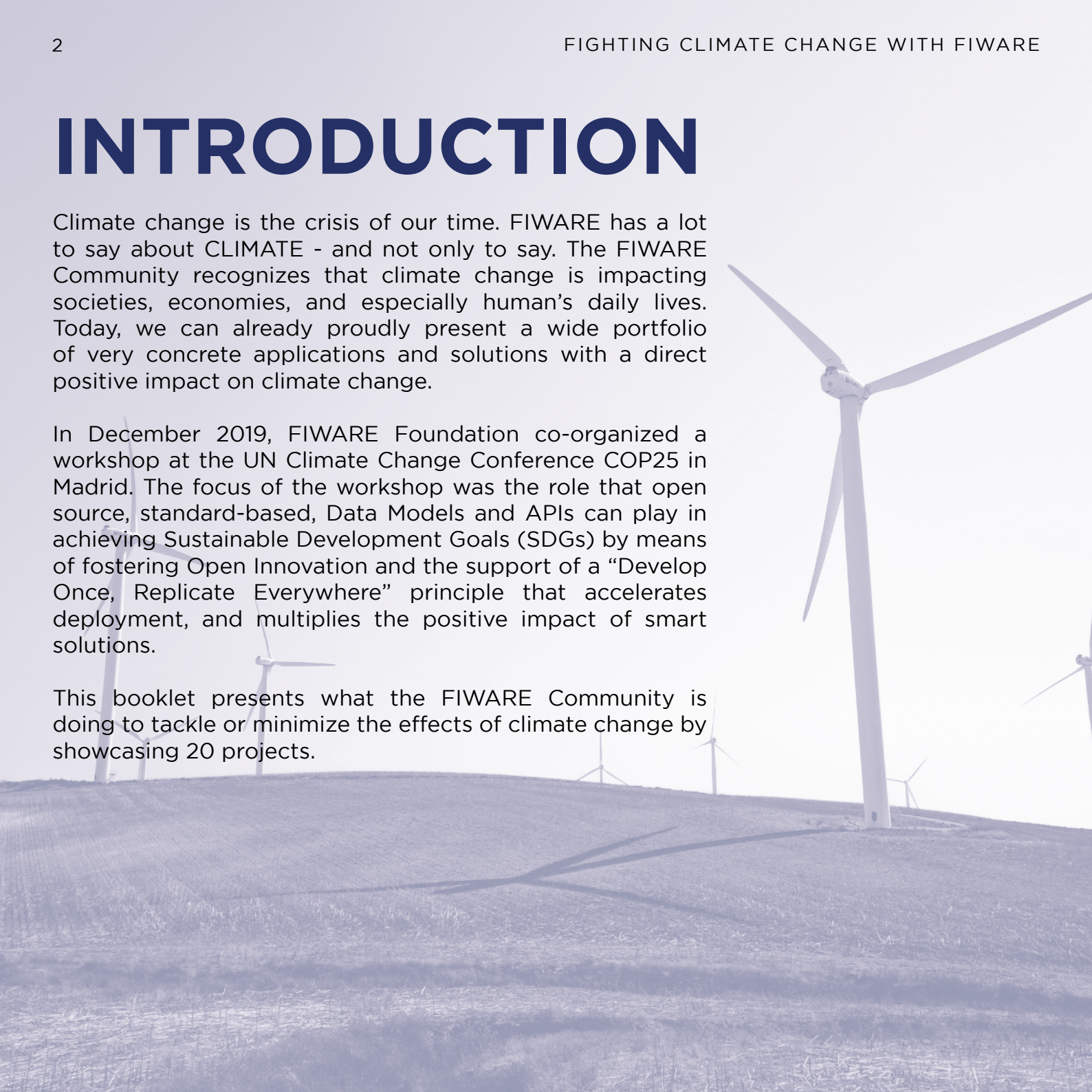FIWARE
FOUNDATION

LET'S DO IT TOGETHER

FIGHTING CLIMATE CHANGE WITH FIWARE

12 - 2019

INTRODUCTION

Climate change is the crisis of our time. FIWARE has a lot to say about CLIMATE - and not only to say. The FIWARE Community recognizes that climate change is impacting societies, economies, and especially human's daily lives. Today, we can already proudly present a wide portfolio of very concrete applications and solutions with a direct positive impact on climate change.

In December 2019, FIWARE Foundation co-organized a workshop at the UN Climate Change Conference COP25 in Madrid. The focus of the workshop was the role that open source, standard-based, Data Models and APIs can play in achieving Sustainable Development Goals (SDGs) by means of fostering Open Innovation and the support of a "Develop Once, Replicate Everywhere" principle that accelerates deployment, and multiplies the positive impact of smart solutions.

This booklet presents what the FIWARE Community is doing to tackle or minimize the effects of climate change by showcasing 20 projects.

AGRICOLUS®

Agricolus

Company: Agricolus s.r.l.
Website: www.agricolus.com
Marketplace: www.marketplace.fiware.org/Agricolus

Agricolus is a cloud-based ecosystem of precision farming applications, that supports the needs of farmers through decision support systems (DSS), forecast models, remote sensing or smart pest and disease control. On the platform, farmers can map their fields differentiated by crop, find weather information and satellite images with the related indexes of vigor and water stress for drawn fields. In addition, they can manage and monitor all the necessary activities such as treatments, find and recover damages, follow the crop cycles, and crop scouting for soil analysis and control. Agricolus is a complete solution for any agronomic need, allowing farmers to monitor production and improve the quality of the production.

Agricolus has several impacts on the agricultural sector in order to mitigate climate change: maintaining biodiversity and soil nutrients; preserving the balance of ecosystems; efficient use of water resources; decreased impact of agriculture on air and soil pollution, and avoidance of contamination of groundwater and the soil itself. Additionally, thanks to continuous and systematic monitoring, Agricolus allows clients to prevent and monitor the climatic and parasitic adversities of crops, allowing a healthier and more regular development of the territory, and reducing the environmental impact of agriculture.

IDA ‹ ☁ ☀ ❄ 🌡 ›

IDA

Company: Amigo
Website: www.amigoclimate.com

IDA integrates climate modelling, ground-based and remotely-sensed measures of weather variables into one web platform to provide high level software capabilities for customized climate risk assessment globally, including climate index computation, visualization and reporting.

When Insurance companies have to estimate the risk of recurring extreme events, they have to rely on internal experts for downloading, analyzing, and computing climate-related risks. Cities, banks, and farmers associations need to cover themselves with insurance and they have to estimate their risk from climate disasters. Estimating and forecasting risk implies using large datasets, involving experts and spending a large amount of time in analysis. Moreover, the risk of human errors is very high. IDA provides insurance companies with an automatic tool to individuate, monitor and estimate climate risks for the areas in which they have interest. IDA can be used also by all the actors in the chain: citizen, administrations, farmers, banks, seed suppliers and cooperatives.

AtoS

CityGO

Company: Atos
Website: www.booklet.atosresearch.eu/node/1813
Marketplace: www.marketplace.fiware.org/CityGO

CityGO is a mobile application powered by FIWARE, which indicates to the user what public transport options are available at any time for a particular route. For instance, it suggests options such as electric car sharing, buses, the nearest public bike rental station, available parking spaces, etc. Everything is managed in real time to obtain an optimal route based on data provided by the sensor network and open data from the city. Additionally, the web-based dashboard in the Atos Urban Data Platform for the city municipality allows civil servants to visualize all the data coming from the city sensors network to support everyday decision making and evidence-informed analysis to improve the traffic planning in the city in times of high tourist's flows and sport events, among others.

bettaïr®
Mapping Air Quality

Bettair

Company: Bettair Cities
Website: www.bettaircities.com
Marketplace: www.marketplace.fiware.org/Bettair

Bettair is an Air Pollution Mapping tool that allows, for the first time, the mapping of air pollution in urban scenarios at a large scale with outstandingly accurate Air Quality Monitors by using advanced post-processing algorithms. This information permits cities to identify appropriate urban plans to improve the air quality and to make smarter decisions to mitigate air pollution.

Air quality data is provided using the latest GIS visualization tools and it can be adapted to the individual requirements of each city. The bettaïr® platform is built around a grid of nodes that are strategically placed to optimize area coverage. The solution is scalable and can be adapted to any city. The raw sensor data is run through a unique post-processing algorithm. These algorithms provide precise measurements of over 9 air quality indicators with similar accuracy as traditional equipment but at a fraction of the price with ani impressive Pearson Correlation (R2 > 0.9) when compared with traditional AQM equipment.

BREEZE
TECHNOLOGIES

Air Quality Sensors
& Environmental Intelligence Cloud

Company: Breeze Technologies
Website: www.breeze-technologies.de
Marketplace: www.marketplace.fiware.org/Breeze

Breeze Technologies' air quality sensors measure the most common air pollutants and climate indicators every 30 seconds (temperature, humidity, CO, CO2, PM2.5, PM10, NO, NO2, SO2, NH3, VOCs, O3). Data can be transmitted to the Breeze Environmental Analytics Cloud through various wireless standards, including WiFi, LTE and LoRa. The data is calibrated through the ground-breaking Adaptive Cloud Calibration Engine, increasing data quality and accuracy.

Sensor data is checked, filtered and calibrated in real-time to increase data quality and accuracy. The calibration works on the basis of a neural network, including more than 30 different dimensions in correcting the data. In benchmarks, the system was able to achieve 90% accuracy compared to air quality monitoring equipment 1.000 times more expensive.

The Environmental Analytics Cloud helps customers to interpret historic and real-time sensor data even without extensive knowledge in environmental sciences. Based on a catalogue of more than 3.500 known solutions and best practice examples, decision-makers are offered actionable insights on how to improve challenging air quality situations.

City Enabler

Company: Engineering Ingegneria Informatica, EIT Digital,
                  ATC International
Website: www.select4cities.eu
Marketplace: www.marketplace.fiware.org/CityEnabler

City Enabler (CE) is a flexible, modular, open and standard-based platform that allows a number of stakeholders (e.g. city managers, citizens, businesses) to benefit from heterogeneous data provisioned by different data providers in a city. In particular, the CE provides city managers and businesses with the tools to easily integrate the data and exploit them through innovative map-based urban services. City managers can create personalized city dashboards, and efficiently exploit the data provided by public or private sources in order to take effective and evidence-based decisions. City Enabler is a tailored and adapted version of the Digital Enabler (digitalenabler.eng.it), a FIWARE-based Digital Ecosystem Platform provided by Engineering Ingegneria Informatica (as lead contractor).

SNIFFER*BIKE*

Sniffer Bike

Company:　　　Civity
Website:　　　www.civity.nl/en/products-solutions/sniffer-bike/
Marketplace:　www.marketplace.fiware.org/Snifferbike

Sniffer Bike measures air quality, road condition and location while cycling. Sniffer Bike (in Dutch: Snuffelfiets) is a collaboration between the province of Utrecht, Civity, Sodaq and RIVM. Participating citizens use Sniffer Bike to measure three types of particulate matter, and also location, (average) speed, wattage, temperature, humidity and organic gases.

The solution offers various advantages for individual cyclists, society as a whole and the environment:

- The solution offers cyclists the opportunity to choose healthier routes.
- Greater insight into particulate matter values helps people suffering from lung diseases to prevent air pollution, a well-known trigger.
- The collected data supports local and provincial policymakers and urban planners in making informed decisions based on new insights.
- Research agencies and national control authorities can collect more data to better understand air pollution.
- The project supports climate neutrality.

ENGINEERING
Digital Services & Solutions

City Of Monheim - Smart Meter For Green Transition - Digital Enabler

Company: Engineering DSS GmbH
Website: www.monlightgrid.de

The MonLightGrid project has the objective to implement a modern, citizen-orientated lighting concept that aims to reduce energy consumption, improve local security, optimize private vehicle traffic and support citizens to raise related issues. To achieve these goals ENGINEERING's FIWARE-powered solution, Digital Enabler, integrates different data sources from lamps, street lighting systems, lighting control systems, asset management systems and geoserver. Based on the FIWARE data model for smart lighting, LoRa IoT devices are integrated and report actual environment data to improve on-demand lighting services. This new service reduces the CO_2 footprint and also lighting pollution, which improves also the local biodiversity.

One cornerstone of the City of Monheim's (Germany) climate plan is the development of an energy optimisation strategy for decentral energy production in a district. An optimisation strategy must combine different production curves for local block heat and power plants, photovoltaics and solar power systems to reduce the risk of energy peak loads, to help optimize short-term and cross-border trading and visualize the current status of the CO_2 footprint in a district. Digital Enabler, uses smart meter data and combines this data with other IoT-sensor and asset management data to achieve these goals.

IoT Booster: Smart Watering of Community Green Spaces

Company: Faubourg Numérique
Website: www.ec.europa.eu

Saint-Quentin (France) is aiming to find new ways of achieving the city's goals in sustainable social development and increasing accountability to citizens regarding their concerns, such as the environment and the conservation of water.

Faubourg Numérique developed the IoT Booster to tackle the interoperability and scalability challenges brought by the big data nature of the project. The cornerstone of the solution is the CEF Context Broker building block, which provides the data consolidation and analysis capabilities needed to offer services based on open data mashups. With the IoT Booster it is easy to connect to and manage the heterogeneous IoT devices installed and used on the field, such as the existing sprinklers and lawnmowers, as well as new soil sensors and valve controllers. It allows to consolidate and analyse data from sensors, and to take action with sprinklers and lawn mowers.

A Data-driven Solution to Support Urban Decision Making Considering Human-perception, Climate Change, and Air Quality Impact

Company: HOPU
Website: www.hopu.eu
Marketplace: www.marketplace.fiware.org/SmartSpot

Smart Spot is an integral solution for human-centralised sustainable and scalable Smart Cities. Smart Spot is considered a data powered tool with dashboard and decision support tools based on Artificial Intelligence algorithms.

In order to monitor air pollution, the Smart Spot solution also includes HOPU's own manufactured devices/monitors to measure the NO2, CO, SO2, NO and O3 at specific points in real-time. In addition, HOPU has a sophisticated high precision lab, where, through machine learning algorithms, it improves the precision of its sensor measures, reducing the effect of cross sensitivity. These certifications and calibrations have also been verified and certified by reference institutions as Fraunhofer (Germany) and CETENMA (Spain).

In detail, air quality sensors are calibrated and validated in a laboratory with high accuracy and certified meteorological stations. This device also has other functionalities such as noise pollution, temperature and humidity, particulate matter, energy consumption and weather. Thanks to artificial intelligence and data economy, the solution is evolving with enriched.

HELIOS - High Efficiency Lighting Online System

Company: Interfaces Hombre Máquina Avanzados S.L. (IHMAN)
Website: www.helioslumen.com

Helios Lumen is a control system that allows distributed intelligence control in any lighting system scenario. Helios makes it easy for municipalities to save a huge quantity of energy and money in lighting, reduce human resources, have better lighting service, and have full remote control and monitoring of the whole city.

In the late night hours, when there are less people on the streets, turning off every third lamp or dimming lights can save up to 40% of annual costs. Remotely managing and controlling the street lights from any place with an internet connection can reduce the maintenance costs and ease the management. The system also alerts on changes in voltage or other electricity-related problems more quickly, helping to provide the highest street lighting quality.

Respira

RESPIRA Open Air Quality Station and IoT Platform

Company: panStamp S.L.U.
Website: www.calidadmedioambiental.org
Marketplace: www.marketplace.fiware.org/RESPIRA

The RESPIRA FIWARE station (hardware) follows a simple architecture. An ESP32 SoC acts as the brain of the environmental station. Ambient temperature, relative humidity, NO2 concentration and particle matter (PM) are read from three external sensors via I2C and UART. The ESP32 has sufficient space in flash and horsepower to internally store and process readings in order to filter levels and periodically run some calibration routines. Finally, processed information is transmitted to the FIWARE platform via a HTTP UltraLight 2.0 request.

RESPIRA is the open IoT platform created for the Spanish Province of Badajoz to host any kind of environmental-related IoT information, including readings coming from RESPIRA stations, official AEMET stations and the air quality stations coordinated by the European Environment Agency.

PLAYSIGN

Playsign LIVE

Company: Playsign
Website: www.playsign.net

The solution provides 3D visualization of real-time and historic air quality information combined with human feedback about the indoor conditions. Facility managers wants to save energy, to reduce CO_2 emissions, for example, by using less energy for heating and air conditioning of the buildings, for instance in schools. But at the same time, they want to guarantee that the indoor conditions are not made worse for the building users, and that there is no risk of damage to the building from e.g. moisture.

To that end, Playsign combine data from air quality sensors, and from a mobile web based service that the building end users use to easily report room specific conditions. The data is relayed via FIWARE Context Broker (Orion) and the historical data is stored to FIWARE STH-Comet, both provided by the CityIoT project in Finland. The Playsign solution is available on the market for any facility managers.

RainBrain, the Smart Blue-green Roof

Company: Sumaqua, Agilis, and Greenbeat
Website: www.rainbrain.no

Green roofs are an important climate adaptation tool for cities. They manage rainwater, reduce flood chances, increase biodiversity, reduce the urban heat island effect and can even clean the air. However, extreme weather conditions give green roofs a hard time. Extreme temperatures and long periods of drought can have a devastating impact on the vegetation. This limits the variety of plants than can survive, and leads to high maintenance costs.

RainBrain tackles this problem by optimizing the water availability in and around green roofs. The system constantly monitors the vegetation health, watering needs and available water. Hereto, RainBrain combines sensors, actuators and IoT with predictive models and open data. For instance, RainBrain detects when plants have too little water, and can automatically water the green roof. On the other hand, if a heavy rainfall event is predicted that could lead to floods throughout the city, RainBrain empties water buffers proactively to create more storage capacity.

SENSATIVE

Yggio IoT platform

Company: Sensative AB
Website: www.sensative.com/yggio

The Yggio IoT platform is a horizontal FIWARE-based platform for cities and buildings for more efficient digitalization.

- Multipoint-to-multipoint connectivity with device and service.
- Interoperability integration with IoT devices from multiple network technologies and standards.
- Standard APIs that allow service providers to focus on application development.
- Security and personal data privacy (GDPR).
- IoT network control panel for full control of the multi-technology IoT network and the devices.

Buildings consume incredibly large amounts of energy. By integrating IoT sensors with the Building Systems using the Yggio IoT platform you stand to gain considerably, both in cost and in reduced carbon footprint. From a customer case, Sensative AB have data that shows that just by better optimization they reduce heating costs. Reducing heating with 1 degree celsius saves them 4% in heating costs, without reducing the comfort of the tenants.

ubiwhere
SUITING THE FUTURE

Urban Platform

Company: Ubiwhere
Website: www.ubiwhere.com
Marketplace: www.marketplace.fiware.org/UrbanPlatform

Meet Ubiwhere's Urban Platform! An innovative solution that provides a global and integrated view of your city.

An easy-to-use platform that allows you to manage your city, whether you are responsible for traffic and mobility, safety, infrastructure or high-level decision making.

The Urban Platform helps the city to meet the Sustainable Development Goals (SDGs) by taking into account the Sustainable Cities and Communities Indicators from ISO 37120 and 37122, among other indicators.

UNaLab Project and ICT Framework

Company: Engineering Ingegneria Informatica
              and other relevant partners
Website: www.unalab.eu

The UNaLab partner cities are committed to addressing climate and water-related urban challenges with an innovative and citizen-driven approach. The UNaLab cities aim to develop smarter, more inclusive, more resilient and increasingly sustainable societies through innovative Nature-Based Solutions (NBS). UNaLab ICT framework gives value to non-processable urban data by providing tools to discover already available datasets on the web, to plug-in new IoT devices and sensors, to find correlations among data, to harmonize datasets with respect to a standard format and to guide the creation of personalized dashboards in order to calculate and analyze Key Performance Indicators based on the data. The UNaLab ICT framework is mainly derived by the adaptation and tailoring of the Digital Enabler (digitalenabler.eng.it), the Digital Ecosystem Platform provided by Engineering Ingegneria Informatica.

Waste4Think-Suite

Company: DeustoTech-Facultad de Ingeniería (Univesidad de Deusto), Engineering Ingegneria Informatica, Zabala Innovation Consulting, and other relevant partners.
Website: www.waste4think.eu/ecosolutions
Marketplace: www.marketplace.fiware.org/Waste4Think

The main goal of the Waste4Think project is to work towards a new waste management paradigm, shifting from conventional finalistic methods of treatment and disposal towards models of recycling and recovery of materials based on the principles of the circular economy. 20 eco-innovative solutions are therefore incorporated and checked out, some technological, others non-technological, which act throughout the value chain, ranging from raising awareness among the public to new collection systems and pricing systems. The project also proposes a data capture and management method based on FIWARE components that enables decisions to be made reliable across the board by all actors. This method is tested and checked out in 4 different settings to help bring these eco-innovative solutions to the market at the end of the project.

Wellness TechGroup

Quamtra Smart Waste Management

Company: Wellness TechGroup
Website: www.wellnesstg.com
Marketplace: www.marketplace.fiware.org/Quamtra

Quamtra Smart Waste Management is the ideal solution for cities looking to adapt the collection of solid urban waste to meet residents' needs. The solution moves municipalities away from a reactive, static collection model based on historical values towards a more proactive and innovative method. Quamtra measures and transmits the status or fill level of each garbage bin, allowing for more efficient planning by only collecting full or nearly full bins.

The IoT solution proposed by Quamtra Smart Waste Management is based on smart devices (the Q sensor and MiniQ sensor) installed in the upper interior of garbage containers. These sensors constantly measure the fill level using a measurement module based on ultrasound. In the same way, the sensors collect parameters such as the bins' interior temperature, inclination, movement, and location. The information collected by these sensors is sent to a software platform that compiles, conveniently displays, and analyzes the data. The platform creates multiple reports and alerts that allow for agile analysis and decision making by responsible parties.

Wellness TechGroup

WeLight Smart Lighting

Company: Wellness TechGroup
Website: www.wellnesstg.com
Marketplace: www.marketplace.fiware.org/WeLight

WeLight Smart Lighting system was developed to improve the quality and efficiency of public lighting for enhanced service and a better user experience. Integrating new technologies in the public lighting infrastructure has the potential to generate savings, optimize processes, and facilitate improved decision making. It establishes a base for the implementation of a smart digital platform to manage other city services, a step towards becoming a Smart City.

WeLight monitors and controls the public lighting infrastructure, detecting irregularities in consumption or operational malfunctions, as well as compiling consumption and savings reports. The system helps managers to prepare inventories and carry out both preventative and corrective maintenance. This solution not only guarantees energy efficiency but is also key for public and traffic safety.

Are you using FIWARE to combat or minimize the effects of climate change? Submit your FIWARE-powered solutions to be featured in our booklet.

FIWARE FOUNDATION

FIWARE Foundation, e.V.

Franklinstraße 13A, 10587 Berlin

www.fiware.org

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