# Introduction to MClimate
## B2B Solutions

We make any home smart.

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# Company Introduction

- MClimate is an **IoT company which designs and develops affordable and universally compatible smart home and smart building automation solutions** with a focus on delivering enhanced comfort, security and energy savings to its end users.

- The Company is founded in 2015 and is **headquartered in Sofia, Bulgaria** with a local production and assembly facility with capacity of 8,000 devices per day

- MClimate has a proven track record in designing state of art hardware sensors and actuators using **WiFi and LoRaWAN. We are getaway and IoT platform agnostic** and our mission is to make the world a more connected and smarter place.

- We also offer software white label solutions: **proprietary end user application and desktop analytical tool for instant 24/7 monitoring and control**

# Our Worldwide Network

## MILESTONES

STARTUP OF THE YEAR
**2015, 2016**
Selected by the InvestBulgaria Agency

ƎNDЄAVOR
**2017**
Becomes an Endeavor company

BULGARIAN STOCK EXCHANGE
**2020**
Selected in the Top10 BG Fastest Growing Scale Ups

**1**
EU Based Production Facility

**20+**
Designed hardware IoT devices for smart automation

**70+**
Inter-national Markets covered in 2019 alone

**120+**
Smart buildings since 2019 for large corporate clients using our B2B solutions

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# Our IoT B2B and B2B2C Solutions

## MClimate Hardware Only Solutions

- Provides affordable, universally compatible and rigorously tested **fully configurable LoRaWAN sensors and actuators**

- **Feeds data into any IoT platform for** data analytics, monitoring, remote control of energy use and consumption patterns

## MClimate Hardware + MEnterprise / App Software Solutions

- **LoRaWAN sensors and actuators** send data for analytics and control to **(i) MCloud-hosted or (ii) self-hosted IoT platform** to receive, analyse data, create customer outputs and set controls

- **Consumer MClimate app** available for residents / tenants use

## White label and Customizable End User Software

- Experienced in **offering white label hardware solution** (different casing design and functionalities tailored to end customers)

- Ability to offer **MEnterprise for whole buildings and App for end clients as white label software**

# Our Production Facility

MClimate uses one of the **most experienced and internationally accredited and certified Contract Electronic Manufacturer.** It has secured **dedicated production lines and experienced staff** for MClimate production since 2015.

- **Foundation:** 2006

- **Certification:** ISO 9001:2015

- **Production site:**
  - 3200 sqm. production of electronic modules site
  - 2300 sqm. production site
  - 900 sqm. R&D engineering and administration site

- **Client base:** Internationally renowned companies and partners in **4 continents in 30+ countries** in the automotive, healthcare and industrial electronics sectors

- **Production capacity for MClimate:**
  - **8 production lines**
  - Ability to produce and test up to **8000+ devices/day**
  - 3 shifts of 8 hours **able to cover 24 hours manufacturing cycle**

# Your Solution for Smart Buildings with MClimate

Our mission to provide **digital**, **connected**, **smart** and **low carbon footprint buildings automation** products and services to our customers **is fully aligned with major corporates and government objectives** to prepare their assets and clients for the future through innovation

| Save energy, time and money and do your part for the environment | Use AI and data to drive business insights and informed business strategies | Work towards carbon neutrality goals and 2030 targets in line with the UN's SDGs | Quick time to market with limited upfront investment and high ROI | Increase existing revenues and utilise resources more efficiently | Improve occupant experience, wellbeing, engagement and customer retention |
| --- | --- | --- | --- | --- | --- |
| Reduce peak energy, operational cost and environmental pollution by better space management using connected devices. | IoT devices can provide data that's critical in improving customer experiences and driving more informed business decisions. | Leverage actuators and sensors data to drive sustainability and optimize for efficiency gains, provide granular ESG reporting, monitoring and control. | Have your own brand innovative product on the market in a matter of days not years without the R&D and testing costs associated with it. | Ability to provide timely maintenance and additional value-added services after the sale or installation of the product. | Provide customer care, maintenance and better quality service more tightly integrated with product performance and customer usage. |

# Delivering the Smart Buildings of Tomorrow – Our Capabilities

Software and gateway agnostic universally compatible sensors and actuators LoRaWAN offering

Easy to install, rigorously tested and competitively priced hardware with LoRaWAN connectivity manufactured in the EU

Ability to create new LoRaWAN devices on demand rapidly using MCore LoRaWAN (short time to market for innovation)
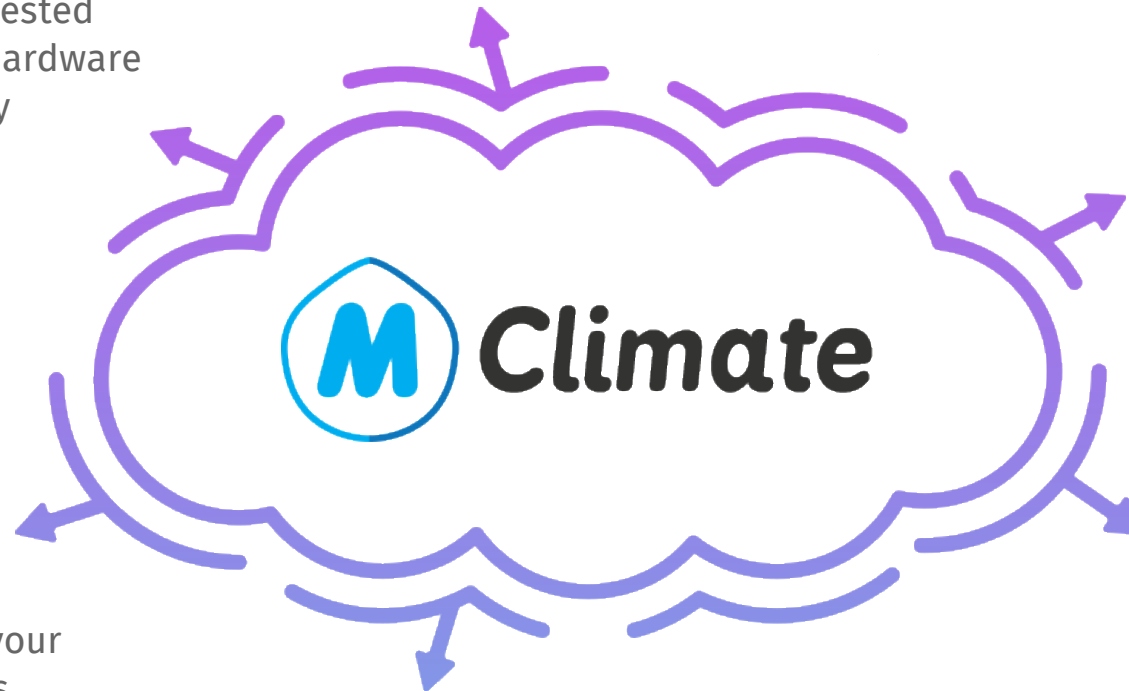
Detailed and secure data services, geo-location and data analytics tailored to your and your customer's needs

Ability to control c. 80% of the energy consumption of a building generating savings of up to 33% with devices paying for themselves in 1-2 years*

*depending on the length of the heating season and the user settings / control set up*

API and cloud to cloud services connecting your app, software or service with our display or platform (white label app solutions available on request)

# Delivering the Smart Buildings of Tomorrow – Our Advantages

Lower production costs due to local EU production

Short lead time due to EU industrial manufacturing (8000+ devices per day)

Small and dynamic team centrally located in Europe to serve the world

Most competitive and affordable pricing for end customers in Europe

One of the most comprehensive portfolios offering white label software and hardware

One of the few European teams with hardware and software in-house capabilities

One of the few EU based IoT companies with ability to bring new LoRaWAN products to market quickly

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**Smart Buildings**
LoRaWAN Products

We make any home smart.

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# Delivering the Smart Buildings of Tomorrow – Current Solutions

## Energy Efficiency – Heating an Cooling Control

## Water Control and Damage Prevention

## Actionable Air Quality and Health Care

**PRODUCT view & KEY features**

### Vicki
**LoRaWAN**

Heating accounts for c.60% of most building's energy usage. With Vicki you can retrofit old radiators, allowing you to monitor, control and optimise your energy usage and generate up to 30% bill savings. 5+ years battery life.

### Indoor temperature and humidity sensor
**LoRaWAN**

Aimed to provide an accurate & timely reading of every home or office indoor temperature and humidity with 10+ years battery life and discrete design. It can be paired with Vicki to offer most comfortable living or working environment.

### T-Valve
**LoRaWAN**

Floods rarely happen, but when they do, it can cost a fortune to fix the damage. Pair T-Valve with our flood sensor to have total leak and flood prevention and peace of mind. 3/4" and 1" version with 10+ years battery.

### Flood Sensor
**LoRaWAN**

Identify floods or leakage as soon as they happen with our operated flood sensor. It will notify you through the app when a leak is detected, so you can take things into control and save you money and effort in the long run.

### Air Quality Index sensor and notifier
**LoRaWAN**

A 4-in-1 sensor with gas, humidity, pressure and temperature measurement based on proven sensing principles developed by Bosch. Measures $CO_2$ and VOC and has a buzzer and LED to notify tenants if the Air Quality Index is below a configurable threshold.

### Your Customised
**LoRaWAN or White label device?**

LoRa is a great technology offering many benefits such as superior range, long battery life and option for private infrastructure. If you are looking for a LoRaWAN device or have an idea, we are open to making your goals a reality.

| | | | | | | |
|---|---|---|---|---|---|---|
| Long operational range | Long battery life of up to 10 years | Bi-directional communication | Open source standard | Reliable Indoor penetration | Low capex and opex for scalable projects | High military grade security |

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# Selected LoRaWAN Connectivity Benefits

### Long operational range

The wider the coverage, the better and cheaper the IoT infrastructure. With LoRaWAN, the range is nearly 8 km in urban settings and 15 km in suburban areas.

### Bidirectional communication

Wide variety of uses cases requiring uplinks and downlinks. Sending data and receiving information in return, LoRaWAN devices can deliver status messages even to remote locations.

### Indoor penetration

The LoRa waves can pass through obstacles and allow deep indoor penetration and adds the ability to reach sensors monitoring water or gas meters located underground.

### Scalability

Wireless, easy to set up and able to support thousands of connected end-devices and millions of messages transmitted. Its fast deployment allows for large scale projects to come to live quicker and cheaper.

### Long battery life of up to 10 years

Specifically designed to dramatically reduce the power consumption and extend the battery life, LoRaWAN based data transmission and reception requires low current (< 30 mA).

### Open source standard

The LoRaWAN standard is based on an open protocol approach managed by the LoRa Alliance which supervises the development of the standard and ensures interoperability.

### Low capex and opex

The LoRaWAN open standard combined with cost-free operation frequencies and low-cost base stations allows operators to roll out networks quickly and with minimum investment.

### High Security

LoRaWAN security design adheres to state-of-the-art principles: use of standard, well-vetted algorithms, and end-to-end security ensuring mutual authentication, integrity protection and confidentiality.

# Delivering the Smart Buildings of Tomorrow – Common Use Cases

## Government-owned and Public Buildings

Hospitals

Schools and Universities

Social housing / Student homes

Care homes

## Private Corporate and Shared Office Buildings

Consulates

Private Offices

Shared Office Buildings

## Single Houses, Remote Villas and Residential Blocks

Houses

Villas

Block of flats / Residential complex

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Temperature and Humidity Control

Scheduling Timers / Occupancy Schedules

Child lock for no manual control

Open Window detection alerts

Leak detection and Flood prevention

Software and app for remote control

Air Quality Index notifications and alerts

# Delivering the Smart Buildings of Tomorrow – Illustrative Installation



**FRAMEWORK** overview

**1** Sensors and Actuators

**2** LoRaWAN Gateway

**3** LoRaWAN Network Server (LNS)

**4** IoT Platform (any solution or MCLoud solution– self hosted or hosted by MClimate)

MClimate App  MClimate Enterprise  API

Cloud

**1** **LoRaWAN Sensors and Actuators**
- Humidity & Temperature sensors
- Smart thermostatic valves
- Flood sensors & T-Valve shut off valve
- Air Quality Index and $CO_2$ sensor

**2** **LoRaWAN Gateway**
- Communicates with all installed hardware devices (sensors and actuators)

**3** **LoRaWAN Network Server (LNS)**
- In charge of management LoRaWAN gateways, authorisation of devices and data exchange

**4** **IoT Platform**
- Receives and analyses data, creates customer outputs and sets controls

**COST** view

| LoRaWAN Gateway | Price (one off ) |
|---|---|
| Internal | EUR 50 - 300 |
| External | EUR 300 - 1000 |

| LNS | Price per month | Details |
|---|---|---|
| Self-hosted | Own server cost | ChirpStack.io |
| TTN | EUR 0 | Free with restrictions |
| TTI | EUR 190 - 340 / month | Unlimited, subscription |
| Kerlink | EUR 14 / gateway / month | Unlimited, subscription |

| IoT Platform | Price per annum |
|---|---|
| Off the shelf IoT platform solution | EUR Variable |
| MCloud self-hosted | EUR Variable |
| MCloud hosted by MClimate | EUR per device |

# Smart Buildings = Satisfied End Users

**Efficient Consumption**
Use data analytics to produce, connect and deliver cleaner, more secure and affordable energy

**Energy as a Service**
Develop an ongoing relationship with clients – provide service rather than one off commodity purchase

**Lifestyle Products Offering**
Focus on improving customers' quality of life and experience offering smart home devices

**Time-of-use Optimisation**
Improve demand shifting/ response management through resource allocation

**ROI – Innovation as a Value Driver**
Create business value while maintaining financial strength and low risk profile

**Sustainability**
Manage peak demand to produce cleaner energy and comply with emission reduction targets

**Responsive Maintenance**
Smart energy efficiency measures ensure that the building is well maintained and doesn't depreciate

**Marketplace Operations**
Develop better stakeholders connectivity - a marketplace rather than the products / services within

**Smart Building Solution**

# Vicki: The Smart LoRaWAN Thermostatic Valve

**Key Product Features**

- Manual or remote adjustment of temperature through application or desktop platform
- Automatic temperature control algorithm with internal humidity and temperature sensor
- Automatic temperature control algorithm with external temperature reading
- Manual valve openness control
- Open window detection
- Child lock function to prevent tampering with predefined settings (manual lock)

**Key Technical Specifications**

- **Design:** PC reinforced with Glass Fibers, Anodised copper (metal nut)
- **Operating Conditions:** Temperature: - 20 - 60°C and Humidity: 0-80% RH (non-condensing)
- **Battery Type:** 2 x AA with operating voltage 3 VDC
- **Expected Battery Life:** 10 years (depending on configuration and environment)
- **Wireless Technology:** LoRaWAN® 1.0.3
- **Wireless Security:** LoRaWAN® End-to-End encryption (AES-CTR)
- **Device Type:** Class A End-device
- **Supported Features:** OTAA , ADR , Adaptive Channels setup

Long range / Great Penetration

10 years of Battery Life

Remote Control and Monitoring 24/7

Flexible Timers & Schedule

Up to 33% Generated Savings

7,8 cm

5,4 cm

9 cm

# T-Valve: The Smart Water Valve

## Key Product Features

- 3/4" and 1" versions available for remote water supply control
- Water and Environment temperature
- Wired Flood Sensor (optional)
- Housing and Magnetic tampering detections
- Buttons for manual control
- LEDs for valve and device status indication
- Buzzer

## Key Technical Specifications

- **Operating Conditions:** Temperature: 0 - 60°C and Humidity: 35%-90% RH (non-condensing)
- **Battery Type:** LiSO Cl2 ER26500 3.6V 9000mAh; operating voltage 3.6 VDC
- **Expected Battery Life:** 10 years (external power supply optional)
- **Wireless Technology:** LoRaWAN® 1.0.1
- **Wireless Security:** LoRaWAN® End-to-End encryption (AES-CTR)
- **Device Type:** Class A End-device
- **Supported Features:** OTAA , ADR , Adaptive Channels setup

CE

Anti-tampering detection

10 years of Battery Life

Remote Control and Monitoring 24/7

Buzzer and Notifications

Selected MClimate
Case Studies

# Recent LoRa and LoRaWAN Use Cases

## Nordic
### Telecom Operator

**12 000**
Vicki LoRa installed in Residential buildings in the Nordics
(District heating)

**2019 - ongoing**

## International
### Water Utility

**100 + 100**
T-Valve LoRaWAN + Flood sensors in Office pilot project with roll out in 2021
(Utility)

**2020 - ongoing**

## German
### Energy Efficiency Provider

**900+**
Vicki LoRaWAN installed in German Police regional headquarters
(Government building)

**2020 - ongoing**

## German JV and
### Utility

**1 100 - 1 500**
Vicki LoRaWAN installed in Utility office and Banking institutions headquarters
(Private)

**2020 - ongoing**

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# Recent LoRaWAN Use Cases – continued

## Spanish
### University Campus

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**185+**

Vicki LoRaWAN installed in an university campus in Spain to generate savings and provide automation

**Ongoing**

## London-based
### Property Portfolio

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**Not disclosed**

Vicki LoRaWAN installed in Residential buildings in London (single houses with other BMS software)

**Ongoing**

## UK
### Office Building

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**Not disclosed**

Vicki LoRaWAN installed a single office building as a test project before full roll out
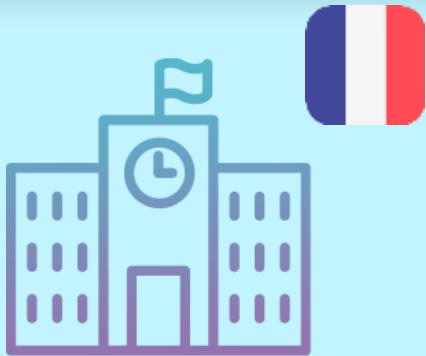
**Ongoing**

## UK
### Government Building

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**Not disclosed**

Pilot project to automate energy consumption in municipality building using LoRaWAN

**Ongoing**

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# Successful Pilot Projects (Pending Roll Out)

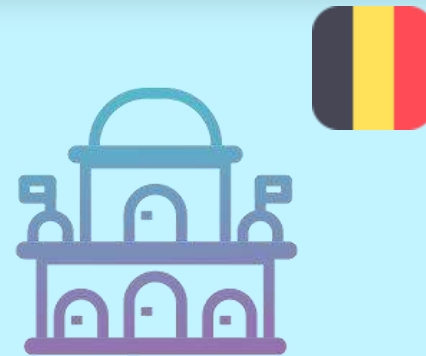| French Integrator **IoT Solutions Provider** | German **Utility and Energy Efficiency advisor** | Belgium **National Bank Building** | Swedish **IoT Solutions Provider** |
|---|---|---|---|
| 🇫🇷 | 🇩🇪 | 🇧🇪 | 🇸🇪 |
| **Not disclosed** Vicki LoRaWAN projects for schools and commercial buildings (such as hotels) | **Not disclosed** Utility energy efficiency arm with projects for hospitals and schools | **Not disclosed** Vicki LoRaWAN considered for the National Bank / historical buildings retrofit solution | **Not disclosed** Vicki LoRaWAN considered for municipality and smart school energy management |
| **Ongoing** | **Ongoing** | **Ongoing** | **Ongoing** |

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