# KIPSUM – PITCH DECK

# 1 – The Problem

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# Context

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Decrease in primary resources

Uncontrolled energy consumption

No reduction in CO2 emissions and increased global warming

We are at the convergence between technology and the 2015 Paris Agreements

Statistics on the market

20 % — CO2 linked to comfort in building

30 % — CO2 linked to industrial activity

O % — No or few improvement since years

3-4°C — Global warming if nothing is done

# Introduction

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Kipsum has designed an intelligent and connected energy manager that minimizes consumption through artificial intelligence

Markets: smart building, smart city, smart transportation

Paris/France

5

2017

Creation

# AI for All systems

# Data management



kipsum
energy efficiency

IoT

kipsum
energy efficiency

MADE IN FRANCE

Digital Twins

MBOPC

Monitoring Based OPtimum Control

3DS OUTSCALE

-20%
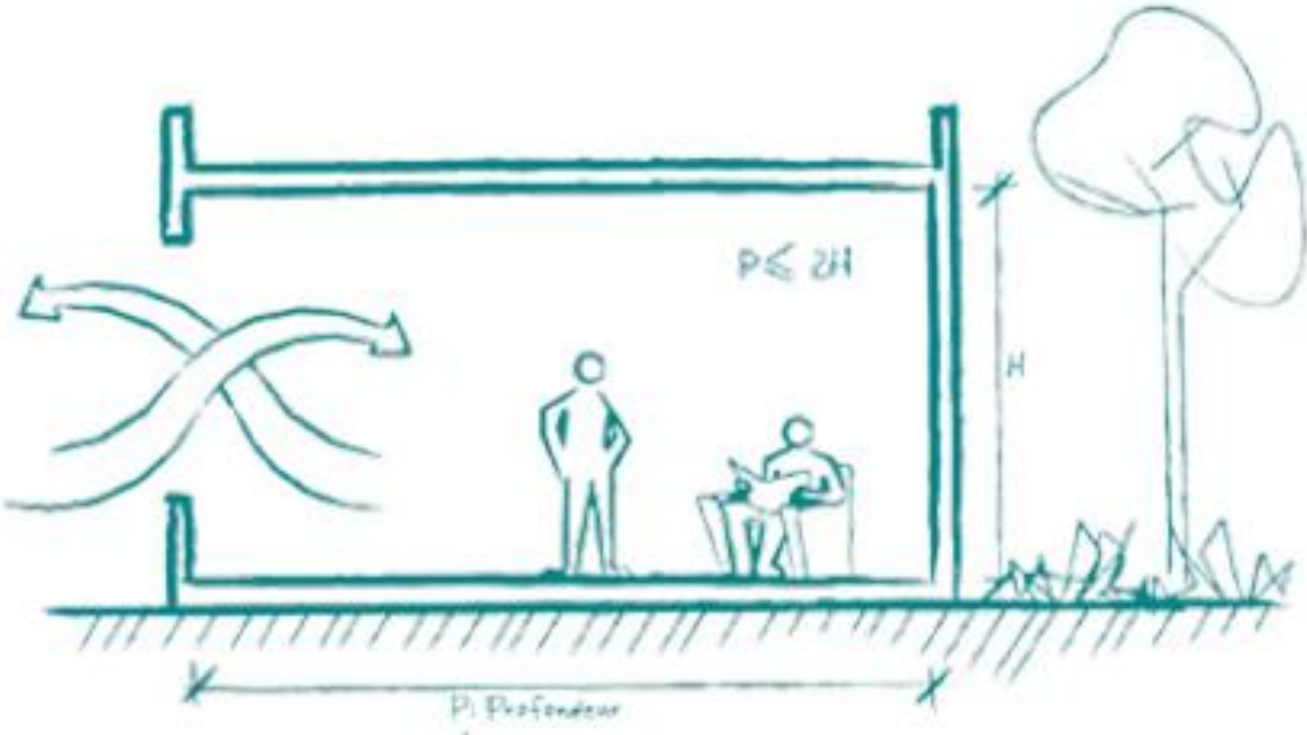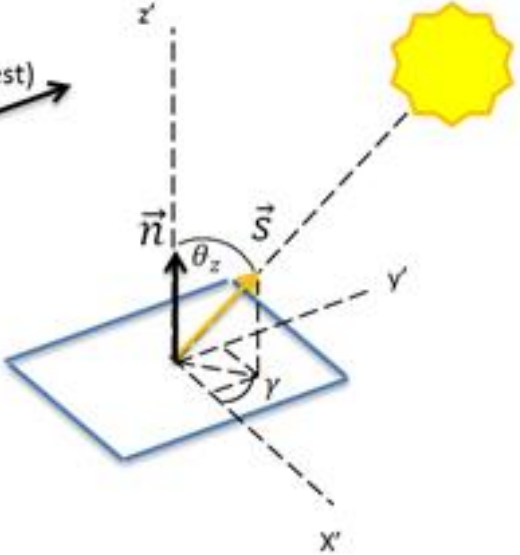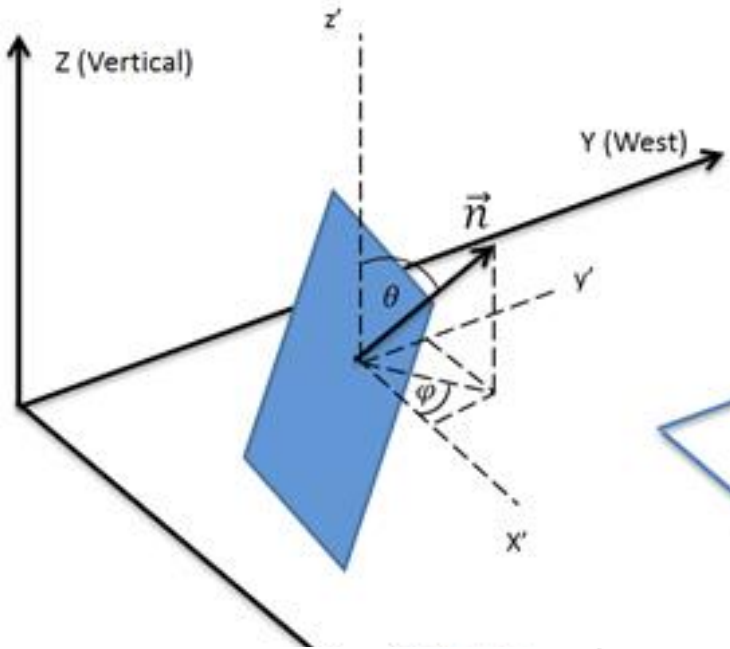Through PHM

CO₂

-15 to -30
kWh/year/m²

-15 to -30% kWh
through AI

# Optimum control (MBOPC) : what does it means

MBOPC  Learning methods, Parameters identification through IOT

$$\dot{E}_{int} = \dot{Q}_{struct,int} + \dot{Q}_{infiltration} + \dot{Q}_{window} + \dot{Q}_{int,solar} + \dot{Q}_{occupant} + \dot{Q}_{HVAC} + \dot{Q}_{ventilation}$$



$$\dot{Q}_{window} = \delta_{window} K_{window}(T_{ext} - T_{int})$$

$$\delta_{window} = \begin{cases} 1 & \text{if window is open} \\ 0 & \text{if window is closed} \end{cases}$$
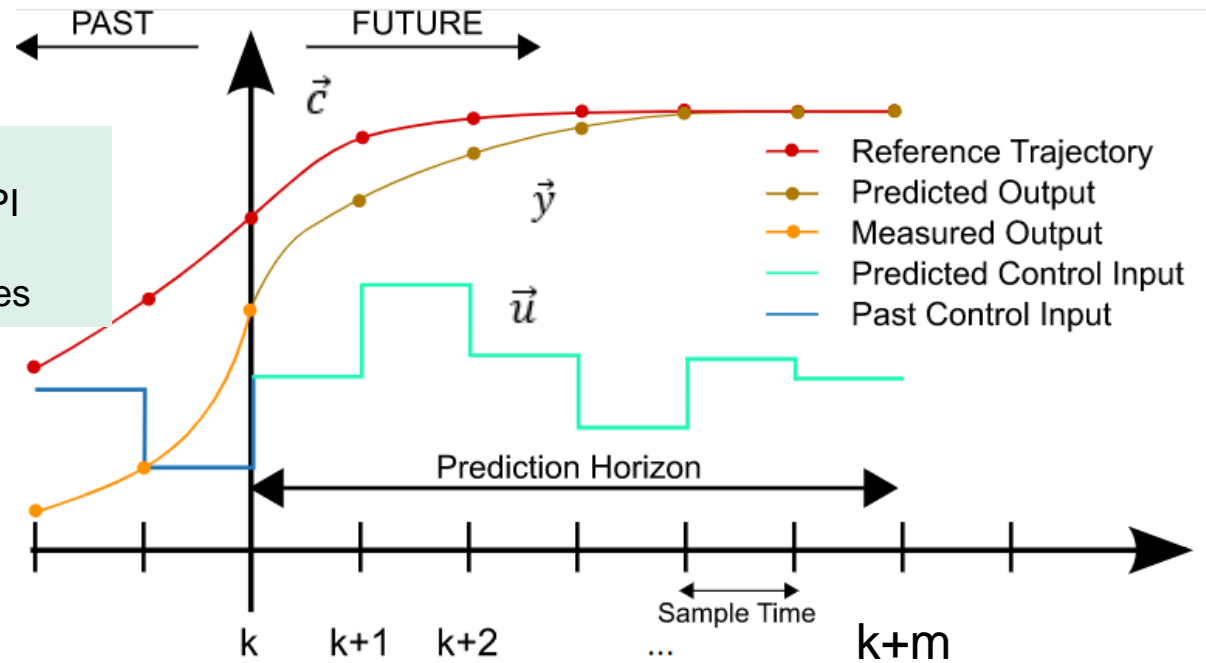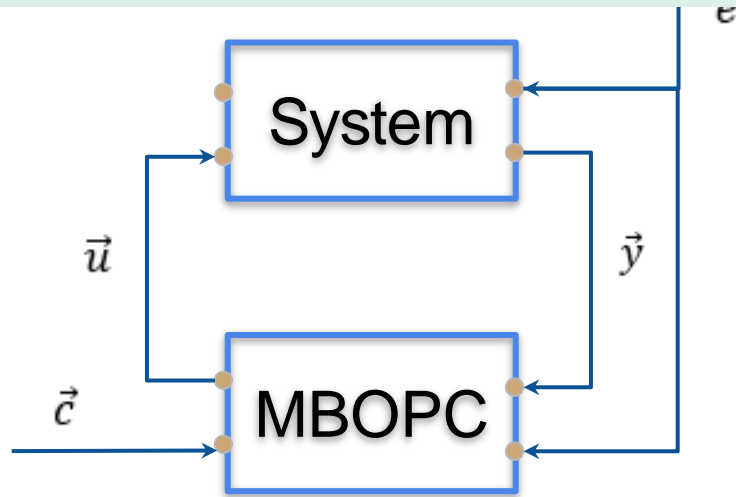
# Optimum control (MBOPC) : what does it means

MBOPC | Optimum control through API in real time

Principle:

Transmitted as a curve or as a CSV / Excel file through API

Influence on the water laws, or the launch of comfort modes



The challenge is to find m control vector u which will minimize the objective function J over a horizon where the command will change m times

$$J = \sum_{j=1}^{m}\left[\sum_{i=1}^{n}\left[\alpha_i\left(T_{int,i} - T_{sp,i}\right)^2 + \beta_i\left([CO_2]_{int,i} - [CO_2]_{sp,i}\right)^2 + \gamma_i \dot{W}^2\right]\right]$$

# The team

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Rami Abou-Eid (PhD)
CEO Co-Founder
40% share
10 ans Alstom

MINES
ParisTech

Philippe Chevalier
General Manager Co founder
40% share
16 years PSA, Alstom

CENTRALE
P A R I S

Bruno Vallet (PhD)
CTO-Co founder
20% share
15 ans INRIA, IGN

l'X
ÉCOLE
POLYTECHNIQUE
IP PARIS

# 2 – Implementation of the solution

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# Solution

## Advanced Solution

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- Already 15 active customers
- Renault, Dalkia, Daher trust us

## Innovative

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- Patented solution
- Unique digital twin on the market

## Key success factor

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- Follow market growth
- Be responsive and customized
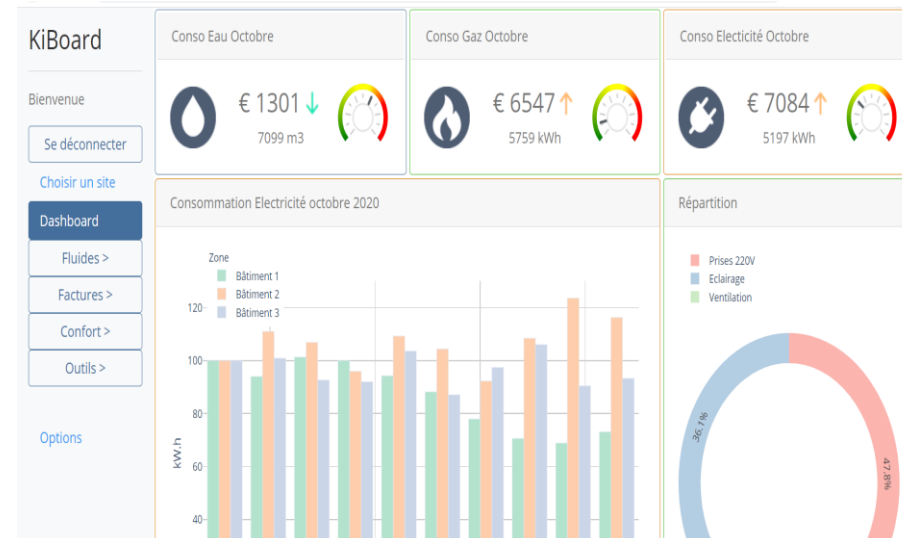
# Smart building and factory Solution in SAAS mode

## Standard

API Implementation with customer

Digital twin creation

Predictive command achievement

Performance follow up

**Intrumented building**



KiBoard

Bienvenue

Se déconnecter

Choisir un site

Dashboard

Fluides >

Factures >

Confort >

Outils >

Options

Conso Eau Octobre
€ 1301 ↓
7099 m3

Conso Gaz Octobre
€ 6547 ↑
5759 kWh

Conso Electicité Octobre
€ 7084 ↑
5197 kWh

Consommation Electricité octobre 2020

Zone
Bâtiment 1
Bâtiment 2
Bâtiment 3

Répartition
Prises 220V
Eclairage
Ventilation

## Premium

**Standard**

+ Instalation of Kipsum associated sensors

+ Implémentation of associated interfaces

+ dedicated dashboard and follow up associated

**All buildings**

# Smart Lighting with our kilight smart transformer

### Standard

smart transformer installation

Creation of the digital twin

Optimum command or design recommendation

Predictive maintenance performance monitoring

Tout éclairage

- Partner installer

- LoRa or GSM mesh of all lighting

- Savings of up to 70% on your bills. ROI - 3 years old. IP 65 enclosure

- Robust connected voltage regulator compatible with all cameras

**Cycle semaine (Lun-Ven)**

H1  H2          H3    H4

**Cycle week-end (Sam-Dim)**

H1  H2          H3    H4
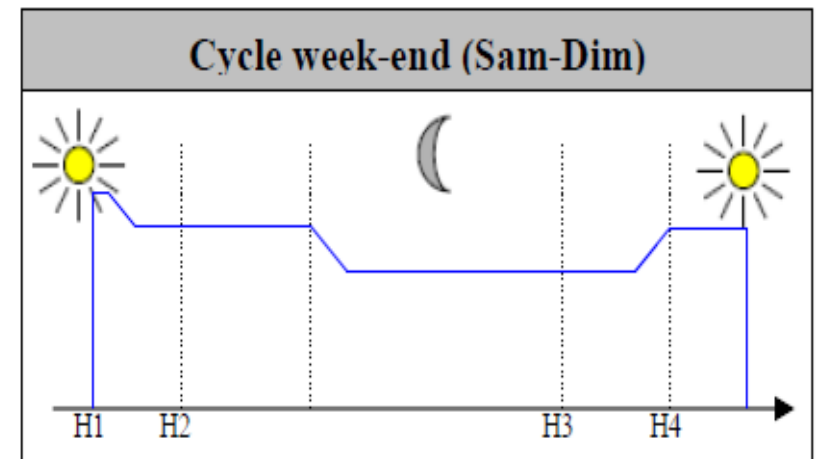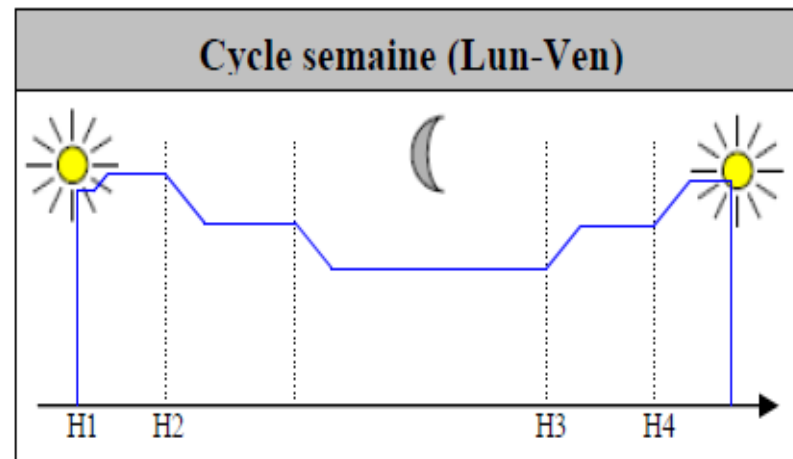
# A strategic differential on predictive maintenance

❑ Head-end measurements, source separation algorithms:

  ▪ Evaluation of yields and their evolutions (degradations).

❑ So-called "health" indicators for modeling the aging of equipment and the building envelope.

❑ a maintenance plan based on availability, maintainability / costs / availability criteria

❑ Algorithms build the indicators: minimum input data / advanced modeling techniques coupling physics and machine learning methods (AI and optimization).

❑ Predictive maintenance makes it possible to follow, detect and predict the evolution:

  ▪ Energy yields of machines (pumps, compressors, fans, filters, etc.)

  ▪ Thermo-physical characteristics of the constituent elements of the building envelope (openings, infiltrations, walls, etc.)

  ▪ Characteristics and health of distribution units (ducts, pipes, radiators, etc.)

  ▪ In occupant behavior (excessive locker, opening windows, control of eco mode during absences, etc.)

Health Monitoring and Aging Assessment of HVAC Refrigerant Compressors in Railway Systems
Andrea Staino; Rami Abou-Eid; Argenis Rojas; Breiffni Fitzgerald; Biswajit Basu
2019 IEEE Intelligent Transportation Systems Conference (ITSC)
Year: 2019 | Conference Paper | Publisher: IEEE
▶ Abstract    (( html ))    (551 Kb)    ©

A Monte-Carlo approach for prognostics of clogging process in HVAC filters using a hybrid strategy a real case study in railway systems
Andrea Staino; Rami Abou-Eid; Pierre Dersin
2018 IEEE International Conference on Prognostics and Health Management (ICPHM)
Year: 2018 | Conference Paper | Publisher: IEEE
Cited by: Papers (1)
▶ Abstract    (( html ))    (1979 Kb)    ©

# Smart Transportations

## Standard

API connection with the client via our cloud

Creation of the digital twin

Optimum command or design recommandation

Predictive maintenance performance monitoring

## All Vehicles

- It is our algorithms that we implement as well as study services
- We work on the upstream side as well as on embedded software

**UBIMOBILITY**
Autonomous Vehicle Technologies

INSTITUT
VEDECOM
DU VÉHICULE DÉCARBONÉ ET
COMMUNICANT ET DE SA MOBILITÉ

# 3 - They talk about us / They trust us / Awards _

# What the experts say about our technology :

" The Kipsum team is capable of proposing concrete and disruptive solutions to open questions of research and innovation.

Their expertise and commitment have enabled VEDECOM to guide the development choices for thermal management simulation tools "

Roch EL KHOURY, Ph.D. Head of Electrification department at VEDECOM

# An innovative firm with strategic partnerships

- Cloud strategic partner



- Many recognations in innovation

# Competitors

| | Kipsum | Oze | Energisme | Ubiant |
|---|---|---|---|---|
| Price | ✓ (ROI <1year) | ? | ? | ? |
| IT/algorithms | ✓ | | | |
| User interfaces | | ✓ | ✓ | ✓  o |
| Size/Notoriety | | ✓ | | ✓ |
| All sectors | ✓ | | | |

**Full diagnosis**

kipsum
energy efficiency

energisme

HXPERIENCE
Like Never Before

DELTA DORE
Smart is the new power

Deepki

BeeBryte
Energy Intelligence & Automation

**Optimal actions**
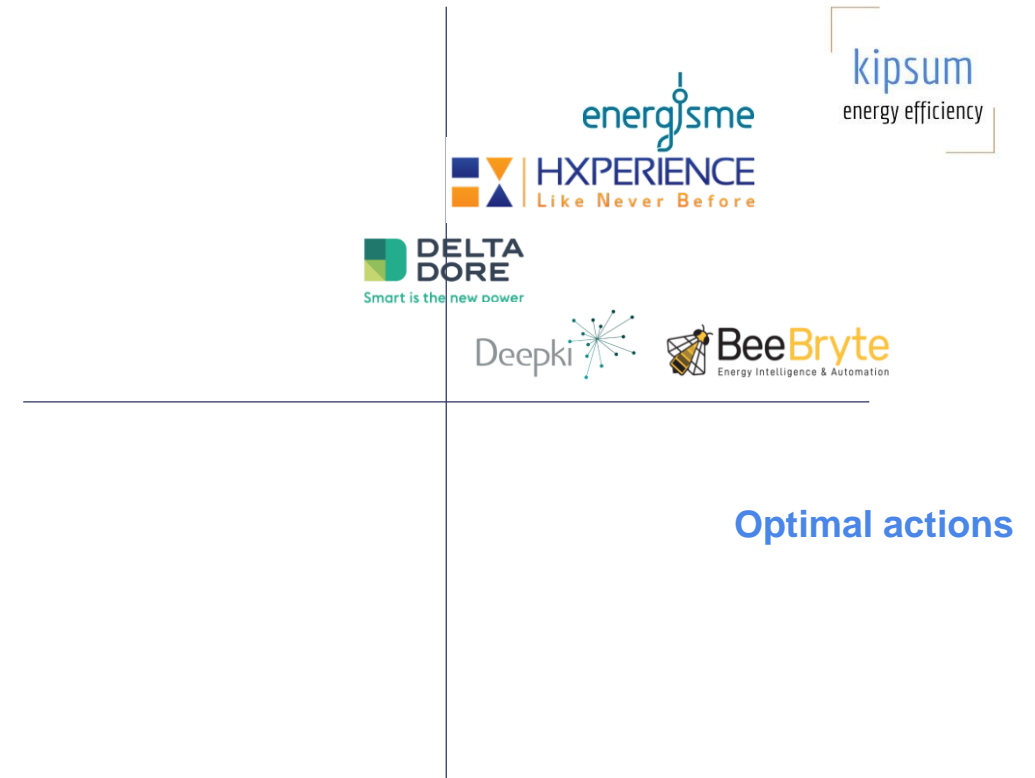
- Price differentiation, tailor-made service and quality of algorithms (under Program Protection Agency). We innovate in products and markets to stay ahead
- A strategic differential on modeling and predictive maintenance
- We are the only ones to intervene in the 3 areas, smart building, smart lighting and smart transportation
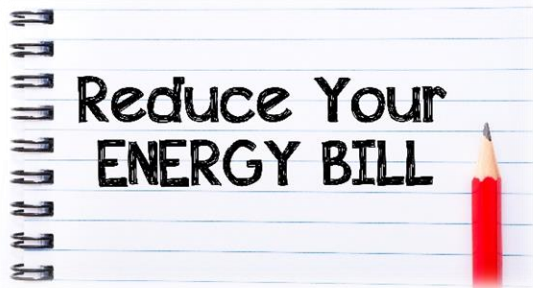
IEEE
BEST PAPER AWARD

# They already trust us

# Ambitions

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Become a global player in energy optimization

+650 000 m²

From -15 to -30% through IA

ROI < 1 year

-15 à -30 kWh/year/m²

-20%

15

# Thank You !

Philippe.chevalier@kipsum.fr