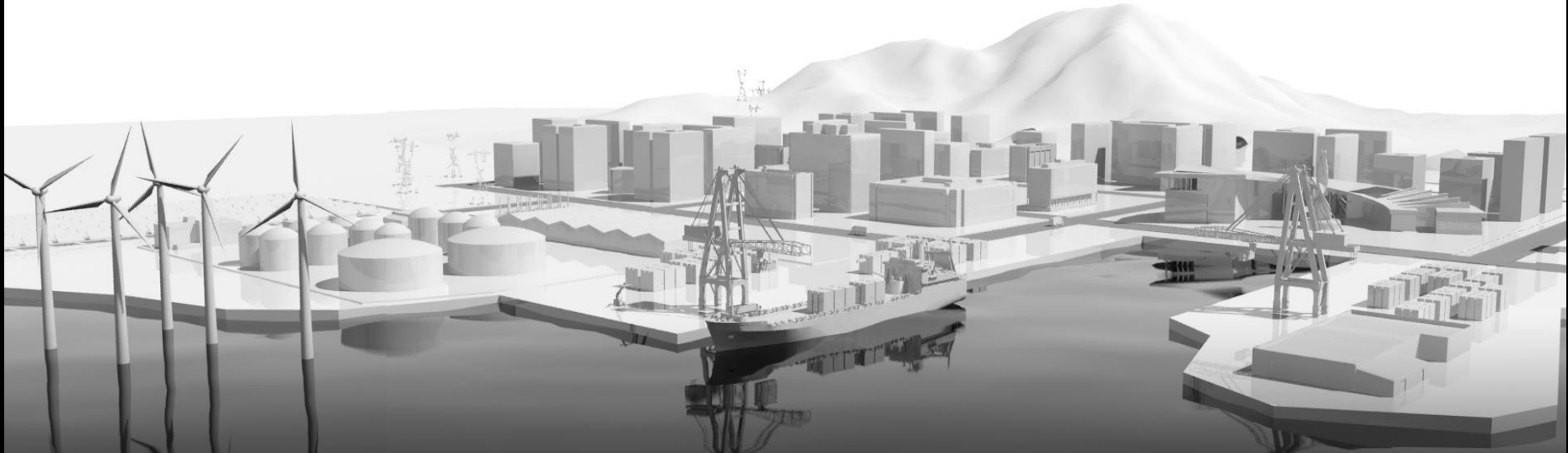


# AUGMENTED REALITY IN ENERGY

Wapice

Software. Electronics. Innovation.





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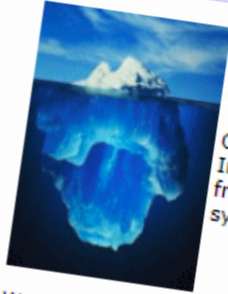
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*...connecting industrial applications to the internet*

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Wapice Ltd. solves industrial challenges while connecting their applications to the Internet - wired or wireless. We can support your R&D;,, develop new products or licence our existing platforms.

Our key knowledge areas are wireless telecommunication and embedded Internet systems: EPOC, Bluetooth or WLANs. We master the whole chain from third generation mobile software to networks and embedded systems.

Wapice Ltd. is a rapidly growing and well organised company. We are experienced in process management and we have a disciplined approach on our projects. We work hard, with good humor!

Wapice Ltd.  
email: [info@wapice.com](mailto:info@wapice.com)  
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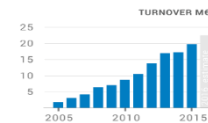
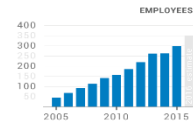
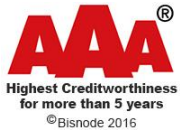
**Wapice WEB-Page from the year 2000  
Nothing new from the west coast...**

# Wapice

Software. Electronics. Innovation.



- Established in 1999
- Private ownership (majority owned by employees)
- Continuous organic and profitable growth
- Employing over 340 highly skilled software and electronics experts
- 10 offices in Finland
- ISO 9001:2008 and ISO 14001:2004 certified

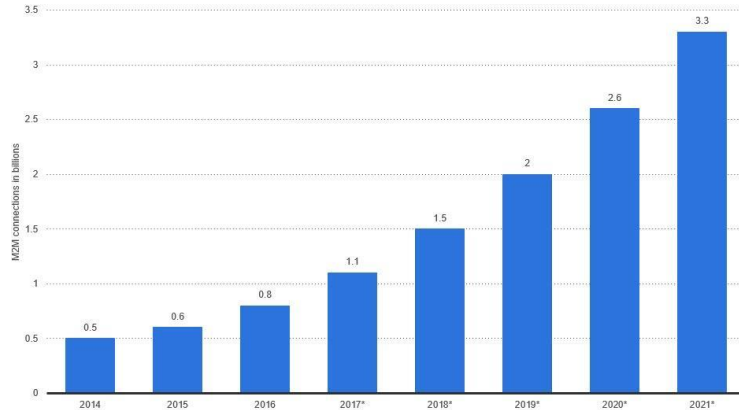


# Number of M2M and IoT connected devices is growing

Development is exponential – this is not hype – this is reality

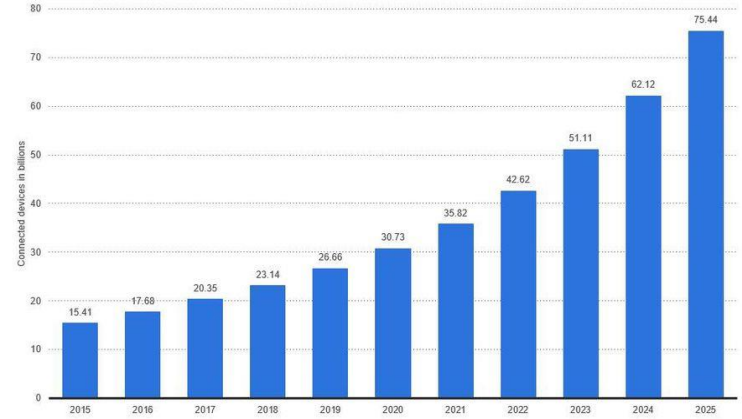
Machine-to-Machine (M2M) connections worldwide 2014-2021

**Number of Machine-to-Machine (M2M) connections worldwide from 2014 to 2021 (in billions)**



Internet of Things - number of connected devices worldwide 2015-2025

**Internet of Things (IoT) connected devices installed base worldwide from 2015 to 2025 (in billions)**



<https://www.forbes.com/sites/louiscolombus/2017/12/10/2017-roundup-of-internet-of-things-forecasts/#4847a001480e>

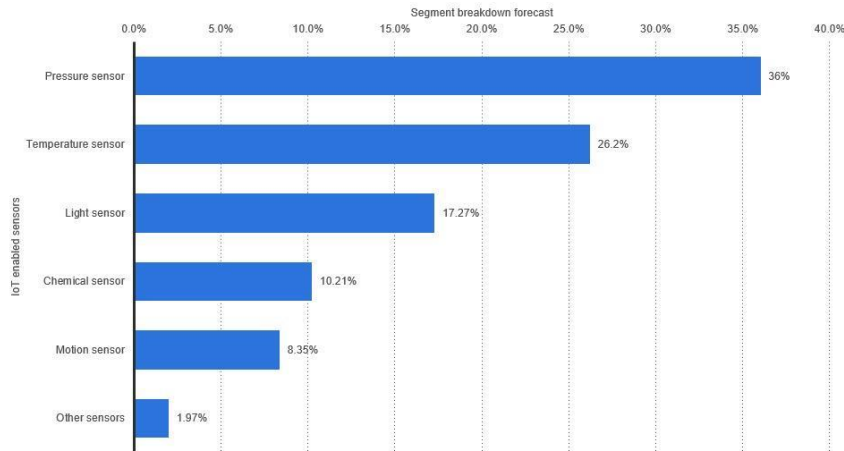


# Sensors are pushing more and more information

Only part is used by machine – we need more ways to illuminate data

Global IoT forecast: sensors market breakdown by segment 2022

**Projected global Internet of Things enabled sensors market in 2022, by segment**



## Low energy sensors:

- LoRa
- NBIoT
- Mesh
- Wireless

Mobile phone is also a sensor!



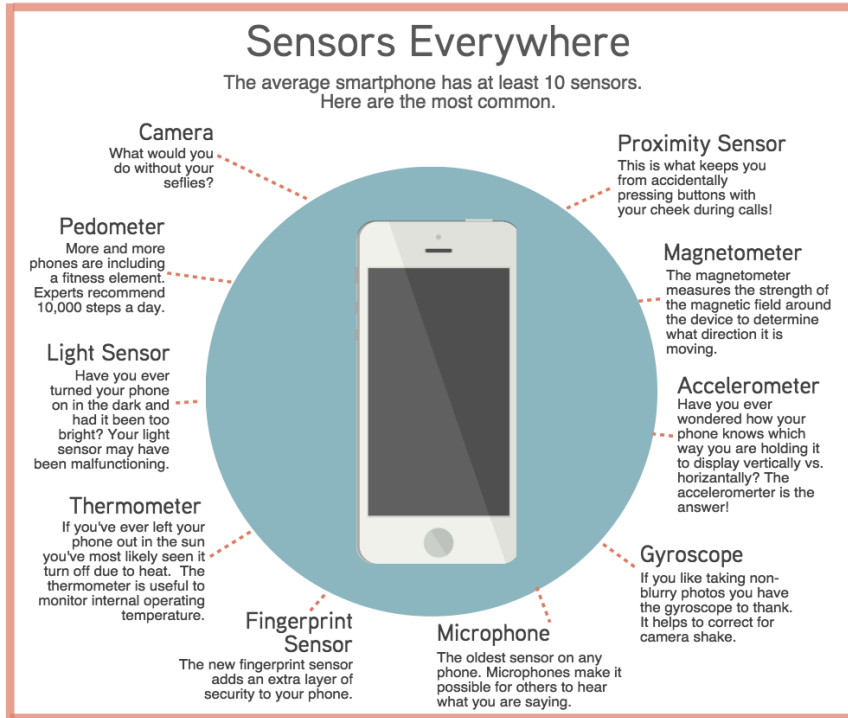
statista

<https://www.forbes.com/sites/louiscolombus/2017/12/10/2017-roundup-of-internet-of-things-forecasts/#4847a001480e>



# IoT sensors are everywhere

We are carrying big number of sensors daily

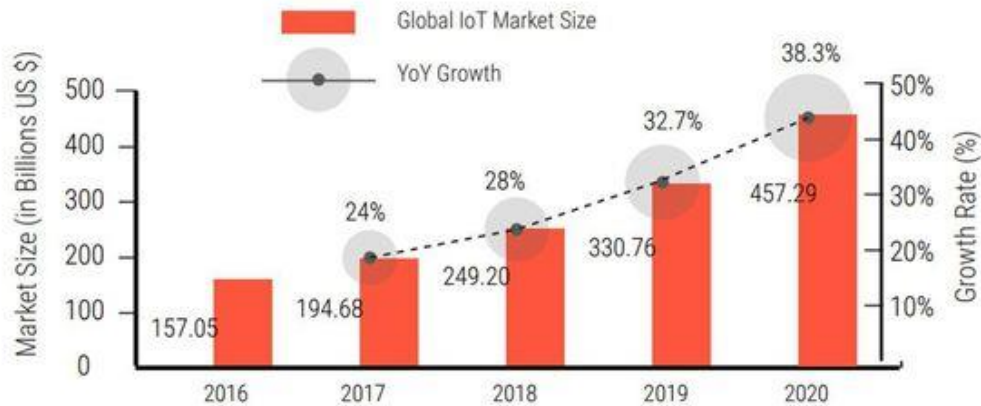


Mobile phone is also a sensor!



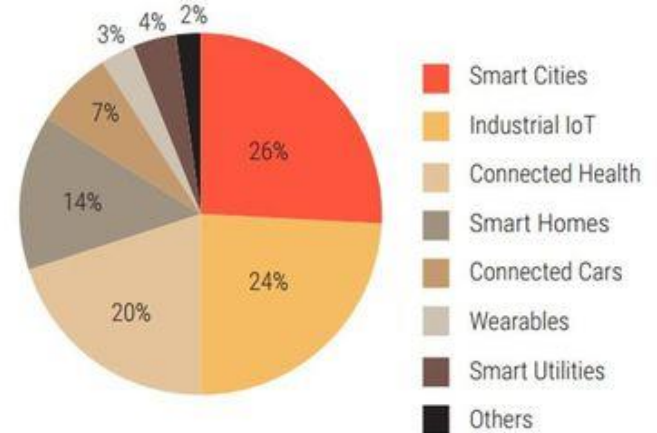
# IoT will remove boundaries between Sub-Sectors

This area is growing in terms 30% annually.



[Sources: GrowthEnabler Analysis/MarketsandMarkets]

### Global IoT Market Share by Sub-Sector



[Source: GrowthEnabler Analysis]



# Why Augmented Reality ?

Physical not valid only, we need to visualize information

- **Physical world is widely now becoming an information system.**
- **Billions of devices and systems are “sensorized” and connected to the internet to share relevant data with relevant systems in real-time.**
- **Connected devices are able to sense their environment and constantly provide feedback enabling instant and ongoing adjustment.**





# AUGMENTED REALITY



27.3°C



% 56.7%



**Wapice**

Technology Partner

# Why Augmented Reality In Energy

- In the consumer energy space, IoT is frequently used to provide feedback that allows consumers to adapt and change their behaviour with regard to electricity consumption. While this approach increases awareness regarding conservation, savings are **relatively small at around 3%**.



# Why Augmented Reality

## Smart Grid

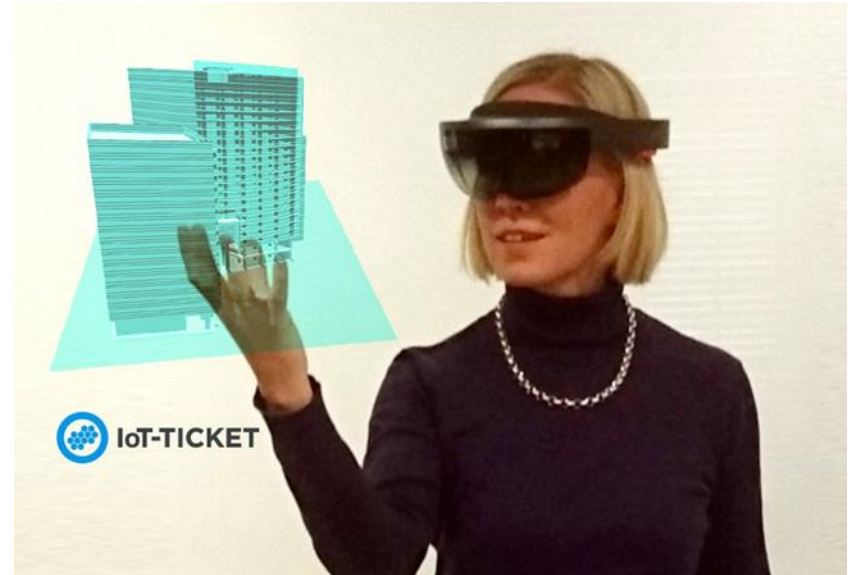
- It is much more efficient to build efficiency controls directly into appliances and use automation
- Real-time awareness of local conditions allows for immediate detection and action. The IoT is indispensable to optimize the integration of renewables and distributed energy generation and consumption.
- The IoT is an integral part of the Smart Grid. It helps increase the visibility of where energy is used or lost and allows to identify cost saving potentials. With the IoT energy can be managed based on immediate data rather than historic patterns of energy use.



# Why Augmented Reality

## Smart buildings

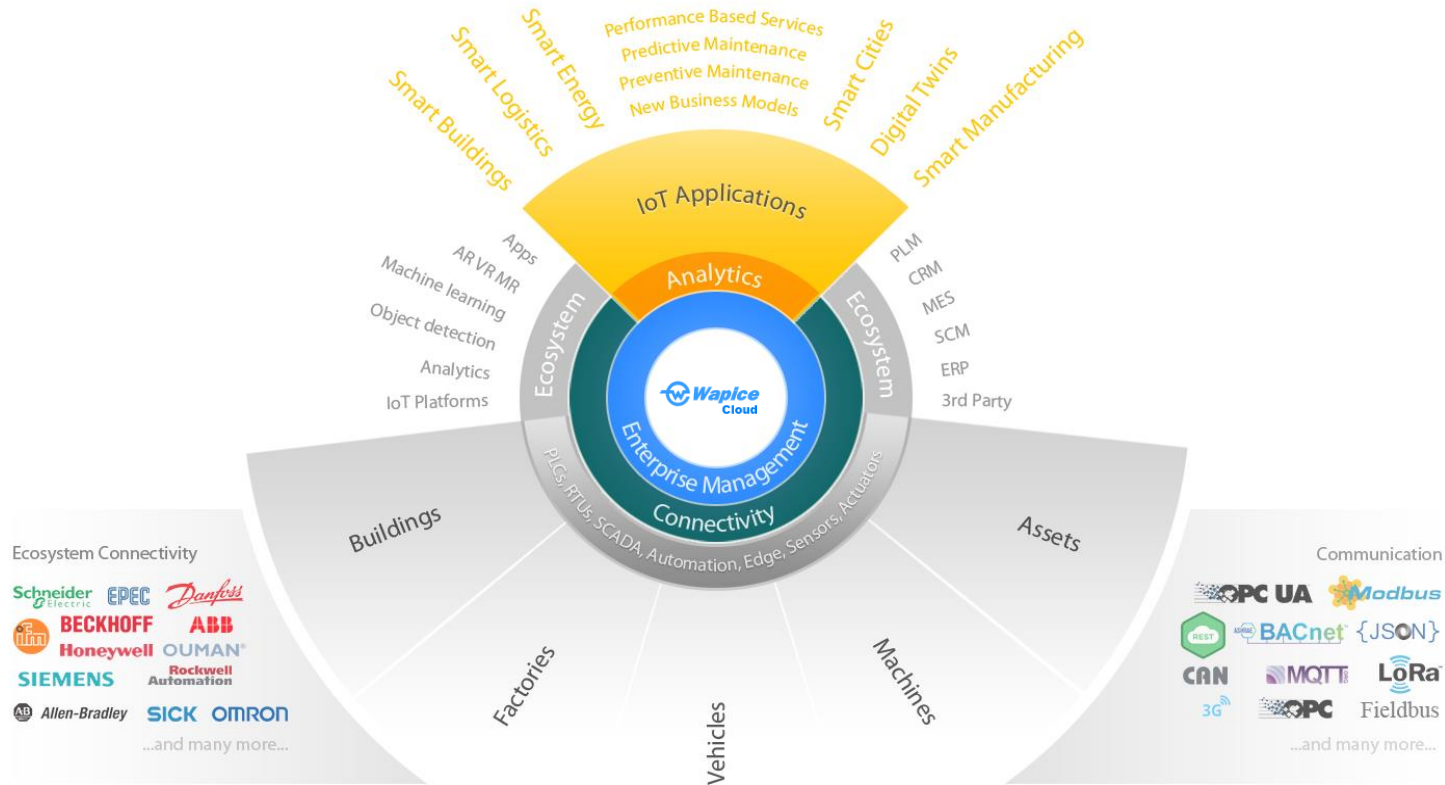
- Energy efficiency and sustainability are major features of a smart building. Buildings on average consume about 30% of the world's energy, and savings of up to a quarter of costs could be achieved by using advanced building management systems and analytics to optimize performance in areas such as ventilation, temperature, lighting and air quality



**30% of energy consumption, 25% savings -> total 7.5% decrease option**

# There are number of platforms

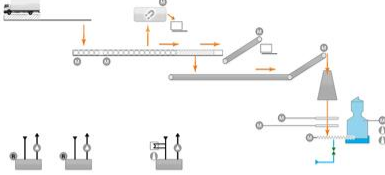
Interoperability is needed between platforms: IoT-Ticket



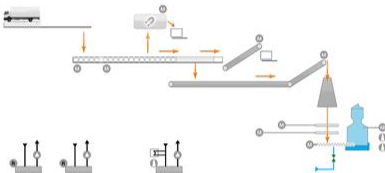


Park City Plant Overview: KPI Performance

Plant 1: Process overview



Plant 2: Process overview



General Information

Item	Value
Serial number	GCU7374987892902
Vehicle	GCU-XPB-75F
Cost center	
Manufacturer	GlobalCorpUnlimited
Manufacturer S/N	GCU7374987892902
Service	OK
Service status	OK

Operator Information

Operator Information

Firstname Lastname  
Organization  
Phone  
Status  
Working time  
Accident count




Status Overview

Item	Value
Fuel	
Engine hours	1265 h
Speed	57
Odometer	57
Service status	OK
Alarms	
Update time	January 31st, 2015 09:31:54
Status	OK



Report viewer | Report editor | Data flow editor

### Fleet Condition Report


Super Maritime 2000

Manage control / monitor

Executive summary

KPI 1: 1224, KPI 2: 4, KPI 3: 1234

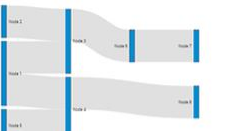
### Vessel Information



Service history

Year	Month	Status
2015	Jan	OK
2015	Feb	OK
2015	Mar	OK
2015	Apr	OK
2015	May	OK
2015	Jun	OK
2015	Jul	OK
2015	Aug	OK
2015	Sep	OK
2015	Oct	OK
2015	Nov	OK
2015	Dec	OK

### Energy decomposition



Additional information

Lower speed than at normal... Recommendations

DASHBOARDS | REPORTS | ANALYTICS | 3D | AUGMENTED REALITY | DATA-FLOWS

Park City Plant Overview: KPI Performance

Remote condition monitoring and control

Control selection

Motor status: Automatic control

Motor frequency (Hz): 614

Motor RPM trend

GCV-optimized estimate, H = 119703214.544







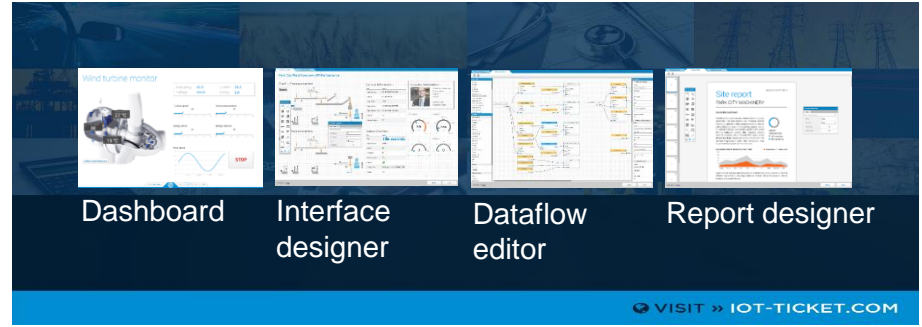
# Augmented Reality

## Is part of IoT-Ticket tool

- Different kind views are needed:
  - Dashboard, desk, mobile
  - Reports
  - Analytical views
  - Augmented reality



Augmented reality is one way to visualize data and show hidden information of IoT-systems



# IoT-TICKET

Key features: AR, VR and Mobile



Augmented & virtual reality



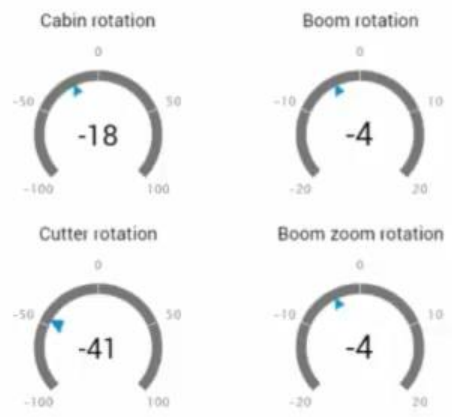
Mobile designer

From sensors to full stack, augmented reality enabled IIoT applications



Digitalization of assets and remote control enabled by IoT-TICKET



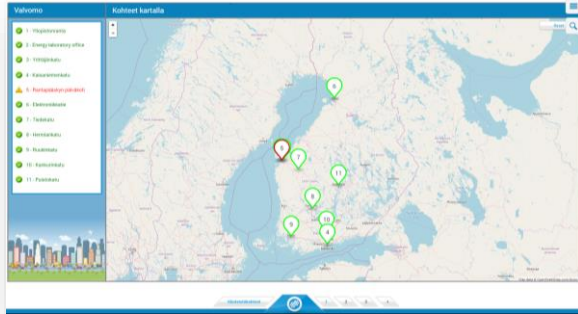


# Digital Twin

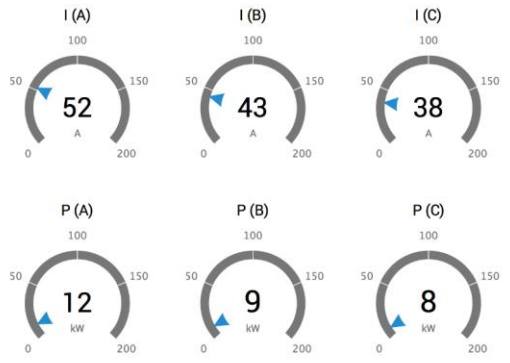
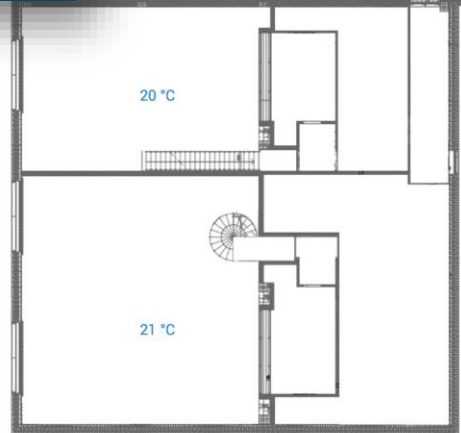
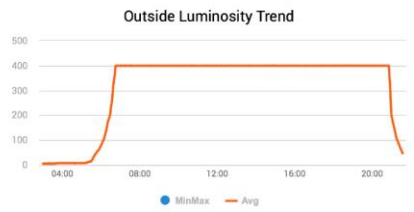
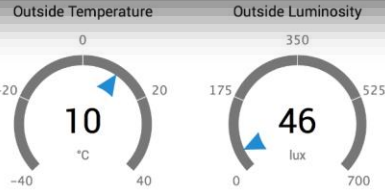


# IoT-TICKET, Smart Buildings

Case  
Smart Buildings



ENERGY EFFICIENCY  
BUILDING OPTIMISATION



Trend Analyzer





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Let's innovate the future together!  
Thank you.



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