



GreenInn

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Home Automation Code Camp

Outline

- Problem & Vision
- Concept & features
- Monetization
- Implementation
- Poster
- EnOcean

Problem & Vision

Problem

Hotels consume large amounts of energy which is often wasted, since the facilities are not tuned to the mode of their use. Guests are away from their rooms more than 50% of the time, frequently leaving utilities running in their absence.

Vision

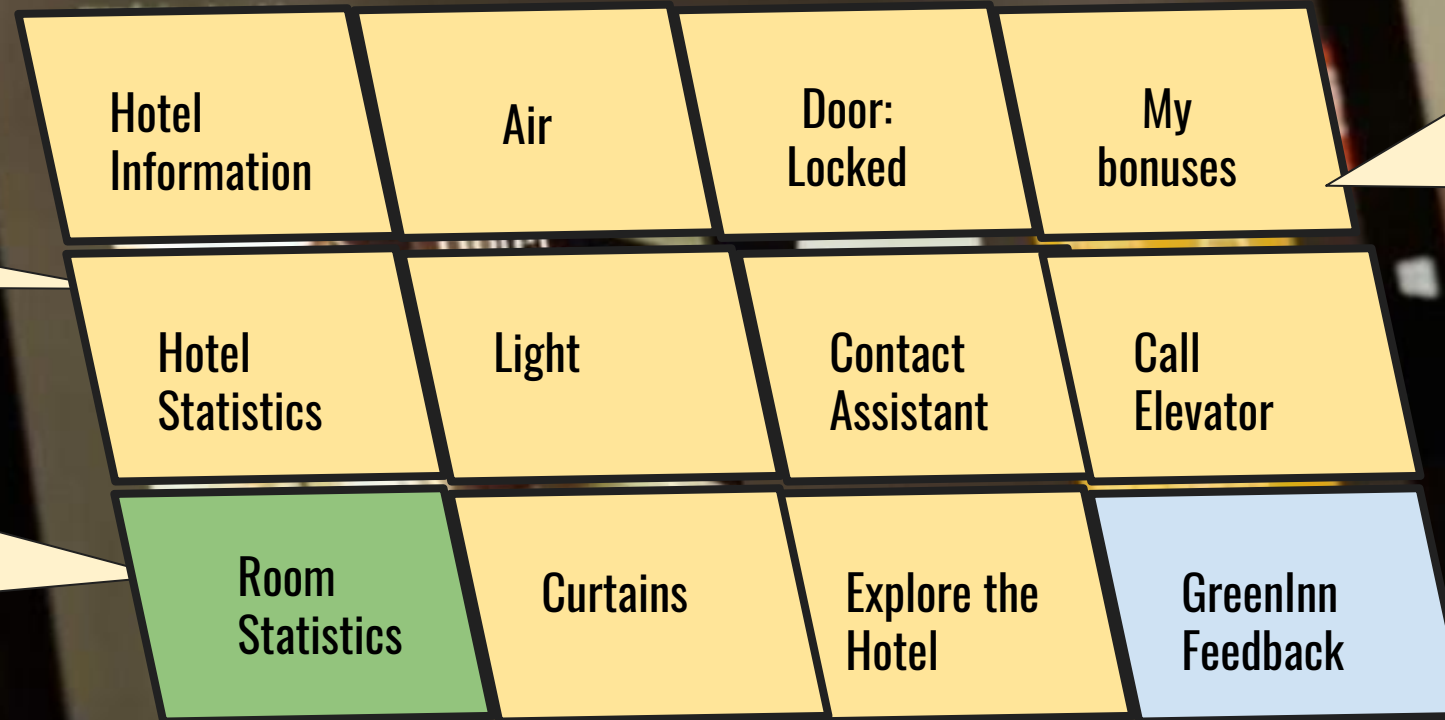
To pave the way towards a smart hotel industry which cuts costs, is greener and provides comfort and leisure with the technology of the future

GreenInn Concept



Short-term scenario

Manage your environment from a tablet/phone



Water use
Energy use
Food waste

Water use
Energy use
Suggestions on
electricity use

5 cents for each
kWh less than
average

10 % savings
= 71 kWh
= 3,5 €/h for the
greenest guest

Futuristic scenario

3D Printing of the Wardrobe

1 bag 23 kg
=
9 kg airplane fuel
=
22 € added for a ticket
=
5 T-shirts, 1 suite on a 3D printer

Advanced Air Sensing

Aromatherapy in every room
Saving space used for spa facilities

Flexible Walls

Adjust rooms to different groups of guest by moving the walls and reshaping the rooms



Virtual Travel

10km in a car
=
1.37kg CO₂
VS
5 hours of HTC Vive
=
211g CO₂

Systematic Green Audit

Independent measurements will rate hotels from one chain according to their

Monetization



Monetization

- **Direct Savings:** 10% energy savings for a 1000 room hotel with room square 15 m² daily results in **50 million €/year**
- **Market Value:** Act as advertisers for equipment manufacturers and provide discounts for guests
- **Marketing Image:** The first “Green Enabler” hotel where guests can control their environmental impact and get incentives for being green

Implementation



Implementation

2 scenarios realized

- Temperature based ventilation and signal
- Consumption based “psychological persuasion”

Components used

- FHEM Server
- HomeMatic protocol
- RF PowerPlug Actuator
- Electric Fan
- Philips HueBridge with HueGo and LightStrip
- HomeMatic Temperature and Humidity Sensor

GreenInn Central Mgmnt

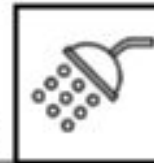
FHEM
Server



Hotel Room



Hotel Bathroom



FHEM briefly



FHEM...

- is a home automation server written in PERL
- typically runs on low power devices 24/7
- can integrate many different devices using many different communications protocols
- is running basically as an infinite loop
- can support various front-ends and mobile apps
- ... can be problematic in a crowded environment
- ... can suddenly crash (sabotageAttackID?!?!)
- ... can be difficult to pair with some devices
- ... can be hard to learn, due to a language barrier

Conclusion: FHEM is not for the typical end-user who can only use plug-and-play stuff....

Thank you for your attention and
enjoy the Demo!

EnOcean



enocean®



No Wires. No Batteries. No Limits.

Technology

1) Based on Energy Harvesting

- Motion, Light, Temperature
- Uses micro energy converters to power devices

2) Ultra-low Power Management

- Standby current of order 100 nA

3) Low Power Wireless Communication

- A signal can be transmitted to a distance of 30 meters indoors with 50 μ W

Architecture



■ EnOcean core IP

Features

- Simple radio transmission system
- Use of Frequency Shift Keying (FSK) modulation to enhance efficiency of amplifiers
- Use of frequency ranges with highest air time availability
 - 868MHz, 902MHz, 928MHz
- High data rate of 125kbps
- Highly reliable communication with very low collision probability
- Interoperability b/w a variety of devices

Standardization

- EnOcean wireless standard developed for interoperability of devices and ratified as international standard ISO/IEC 14543-3-10 in 2012
- The standard covers 1 - 3 layers of OSI model



EnOcean Alliance

- A spin-off of Siemens founded in 2001 currently based in Oberhaching
- To promote the technology an alliance was formed initially by EnOcean, Texas Instruments, Omnio, Sylvania, Masco, and MK Electric
- The alliance aimed to create an international wireless standard for seamlessly interoperable products
- Currently with more than 250 members