# Smart Sense
# Air Quality Monitoring Solution

# AIR POLLUTION

- An environmental and social problem
- Affects human health
  - Causes aggravated asthma, increases allergic reaction symptoms, lung cancer, heart diseases
- Economic impact
  - Increases medical costs – 4 billion EUR/year in Europe
  - Increases number of days lost at work – 16 billion EUR/year in Europe
- Causes premature deaths
  - ✓ WHO estimates that 6,5 million people die prematurely each year from causes directly linked to air pollution

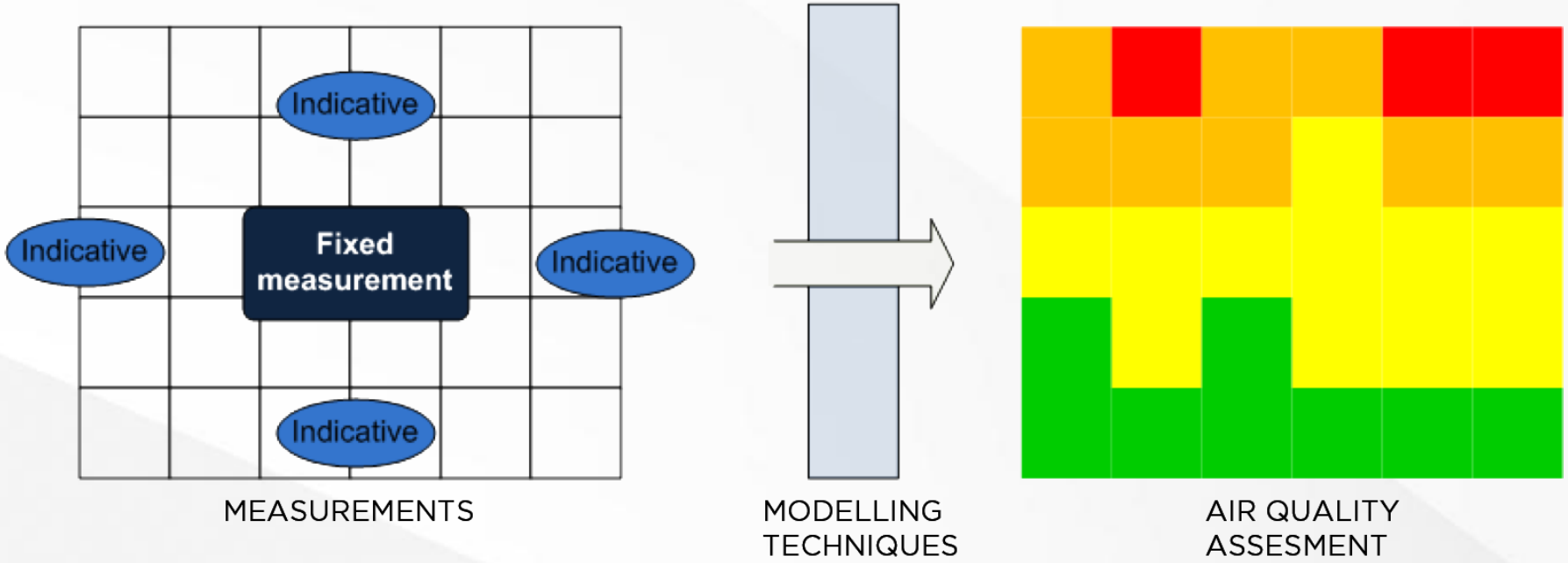
**6.5 milion !**

# CURRENT STATUS


- Professional fixed monitoring stations
  - ✓ Very expensive equipment, high servicing costs
  - ✓ Low spatial coverage
  - ✓ Used by specialized governmental institutions

# INDICATIVE MEASUREMENTS - EU DIRECTIVE

- EU directive 2008/50/EC
  - ✓ Proposes indicative measurements as supplement to the fixed ones
  - ✓ Combining those measurements and modelling techniques → possibility to asses air quality over wider geographic area with more detailed overview than just using one or few fixed measuring stations

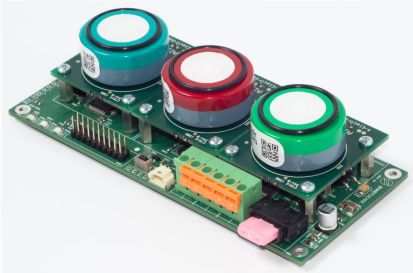


# INDICATIVE MONITORING STATIONS

1. Took the functionalities from professional monitoring stations


2. Add connectivity

3. Make it much smaller

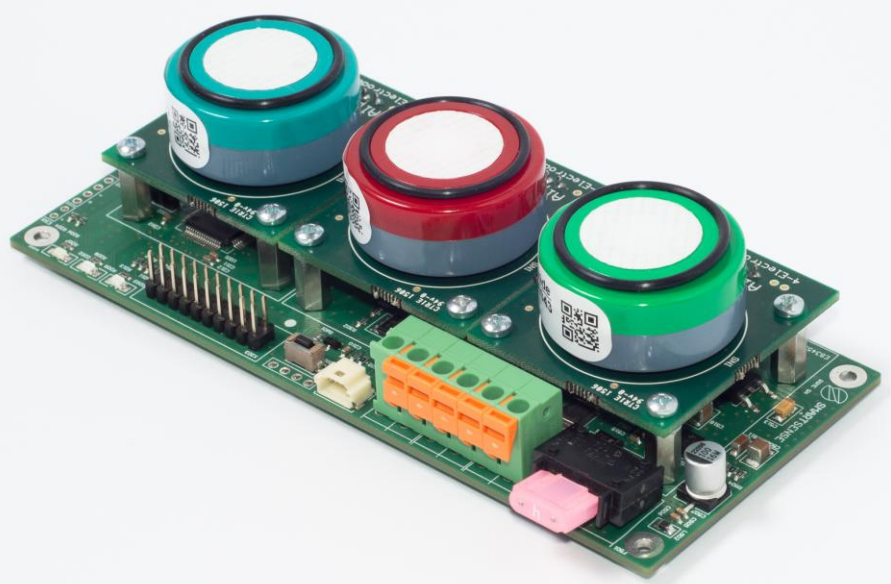


4. Lower the price

5. Smart Sense AirQ Monitoring Station

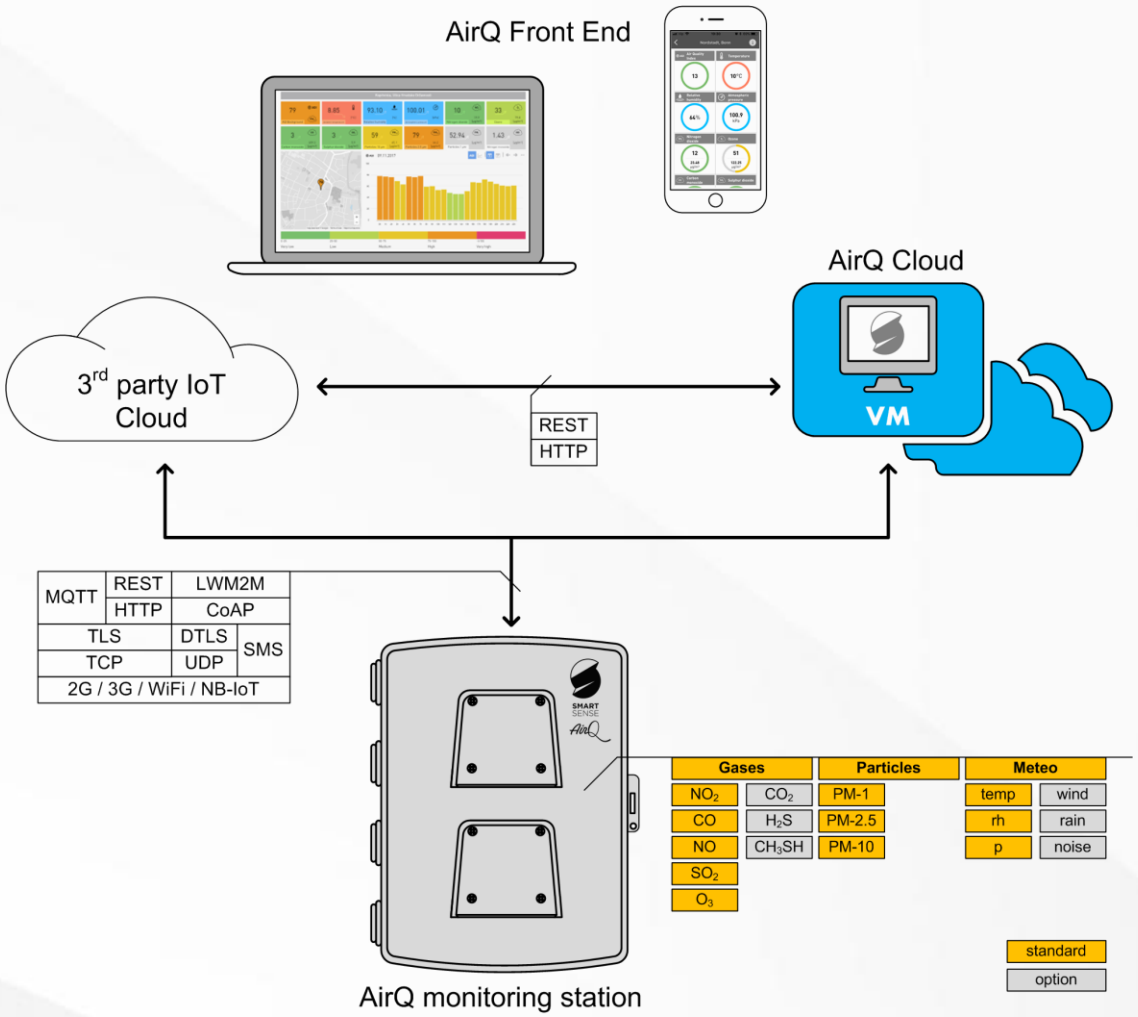
# AirQ MONITORING SYSTEM

- Solution consists of:
  - ✓ Smart Sense AirQ monitoring station:
    - ✓ Modular design with swappable sensing modules ($NO_2$, $NO_X$, CO, $SO_2$, $O_3$, airborne particles $PM_1$, $PM_{2.5}$, $PM_{10}$)
    - ✓ Microclimate sensors: temperature, humidity, air pressure
    - ✓ Other supporting sensing elements: $NH_3$, $H_2S$, $SO_2$, wind speed and direction, precipitation, noise
  - ✓ Smart Sense AirQ cloud (or any other IoT platform)
  - ✓ Smart Sense AirQ web and mobile application



- Simple *plug & play* installation
- Real - time data

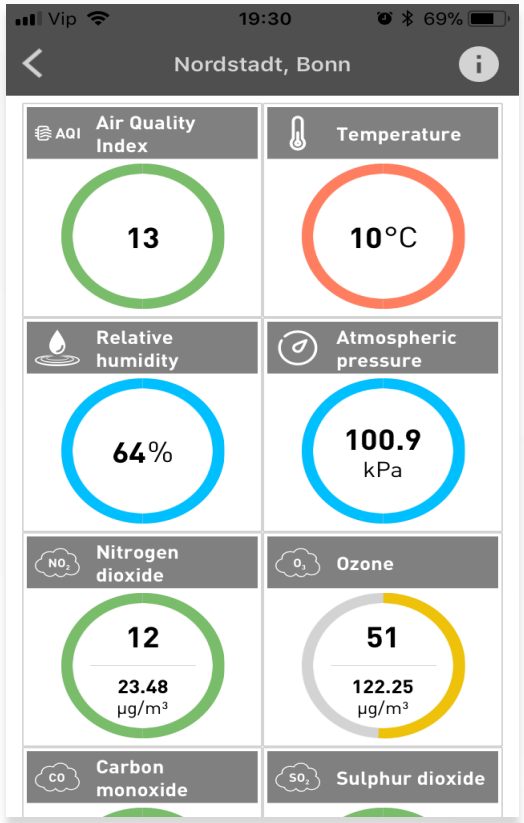
# SYSTEM FOR MONITORING OUTDOOR AIR QUALITY

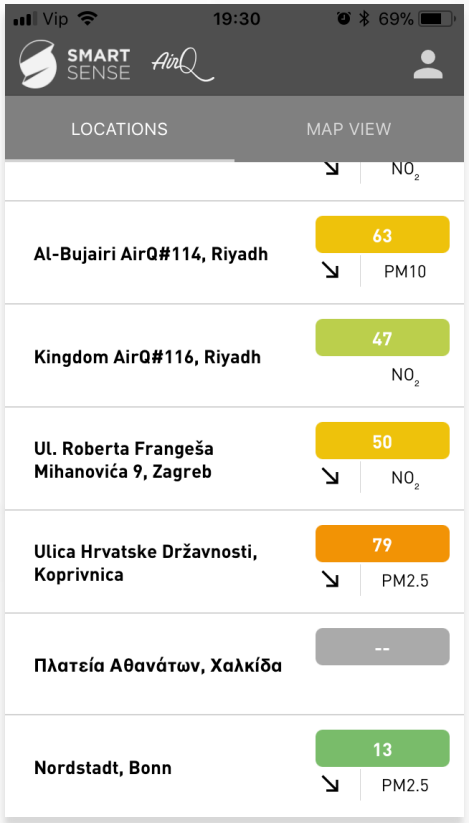


# WEB APPLICATION


- Location of station on Google Maps
- Graphical and numerical view of measured values for each gas and particulate for a certain period
- Current air quality index value (AQI) and colour of the current situation indicating general air quality
- Data history

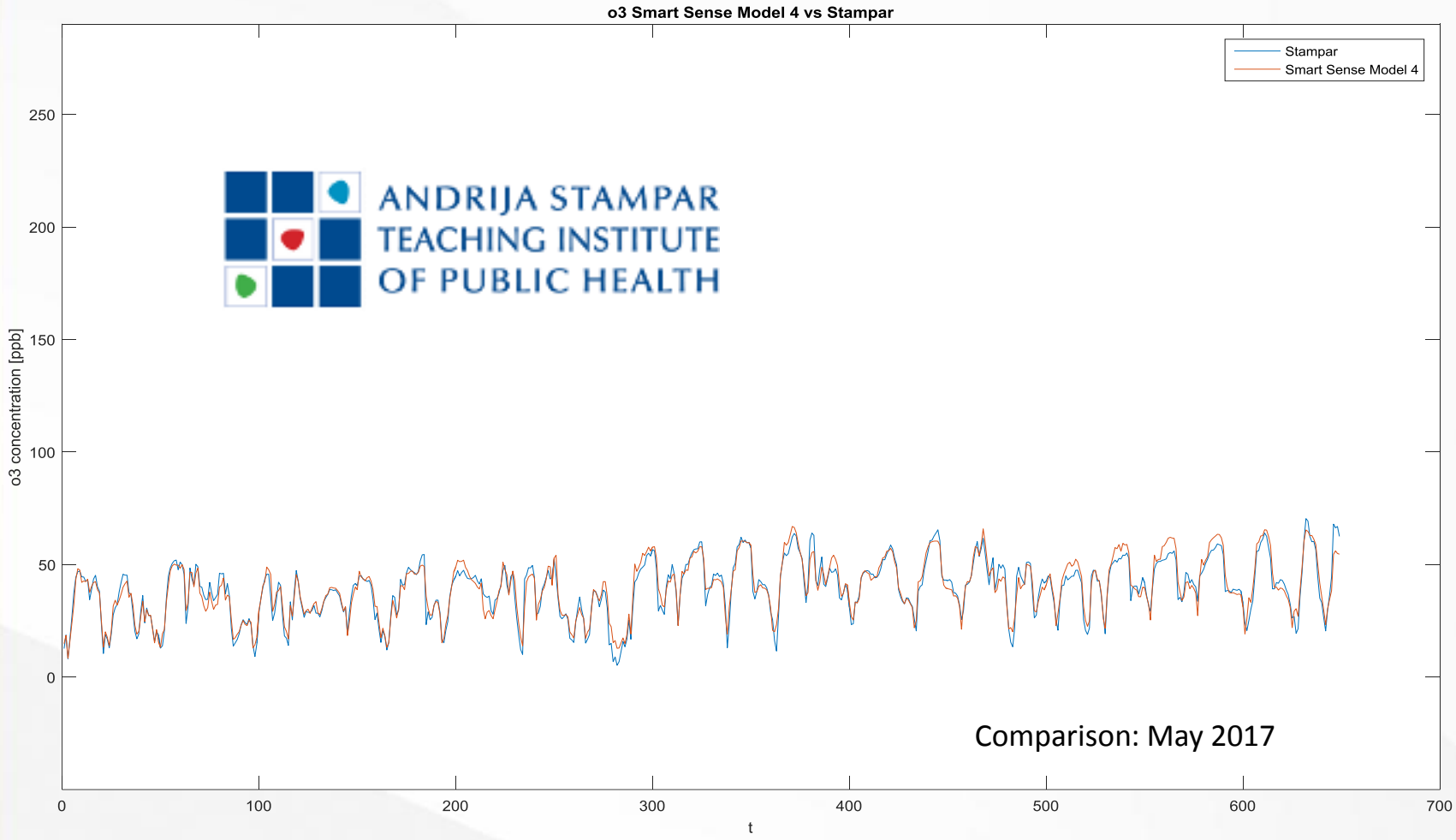
# MOBILE APPLICATION


- iOS and Android application
- Real – time data

# OUR RESULTS



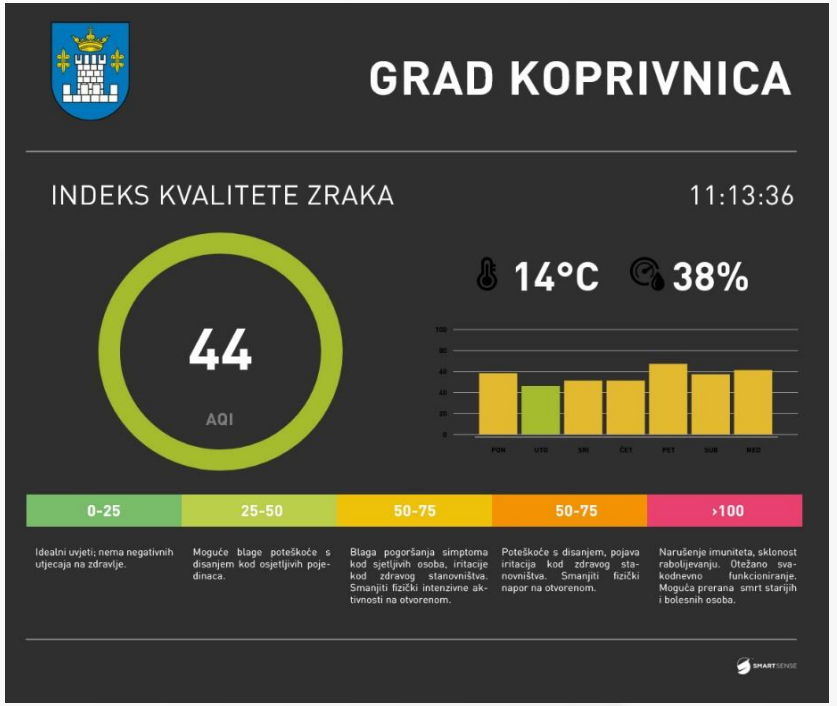

- **Collaboration with Andrija Stampar Teaching Institute of Public Health in Croatia** in validating Smart Sense AirQ Monitoring Station data with professional environmental station data
- Result → Data validated by Teaching Institute of Public Health in Croatia!

# USE CASE – BIG DATA

- **Data management by ecological and health agencies**
  - Data collected through  monitoring stations can be used for modelling techniques, estimates and predictions of air quality in the cities
  - Better air quality overview in the cities→ action plans
    - Accurate information about certain pollutants on certain locations
    - Avoiding general announcements about air quality in the City in the case of natural disasters
  - „Real – time” traffic management

# USE CASE - PROMOTION

- **Promotion of the city as a tourist destination with high air quality**
  - Show air quality data on the ferry docks, beaches, city center, promenades, ...
  - Let's show our guests that they can enjoy the fresh air all over the city!

# USE CASE – NOISE DETECTION

- Air pollution is also measured by the present noise level
- **Monitor the noise level in the city –** regulation of coffee shop and restaurant working hours in populated area according to the noise level
- Send the noise level information on the mobile phones (in real - time) to the responsible institutions / communal officers

# USE CASE – EMERGENCY SITUATIONS

- Be smart and social responsible city!
- Inform citizens precisely about air quality depending on their location – particularly important in case of natural disasters (e.g. fire) and emergency situations