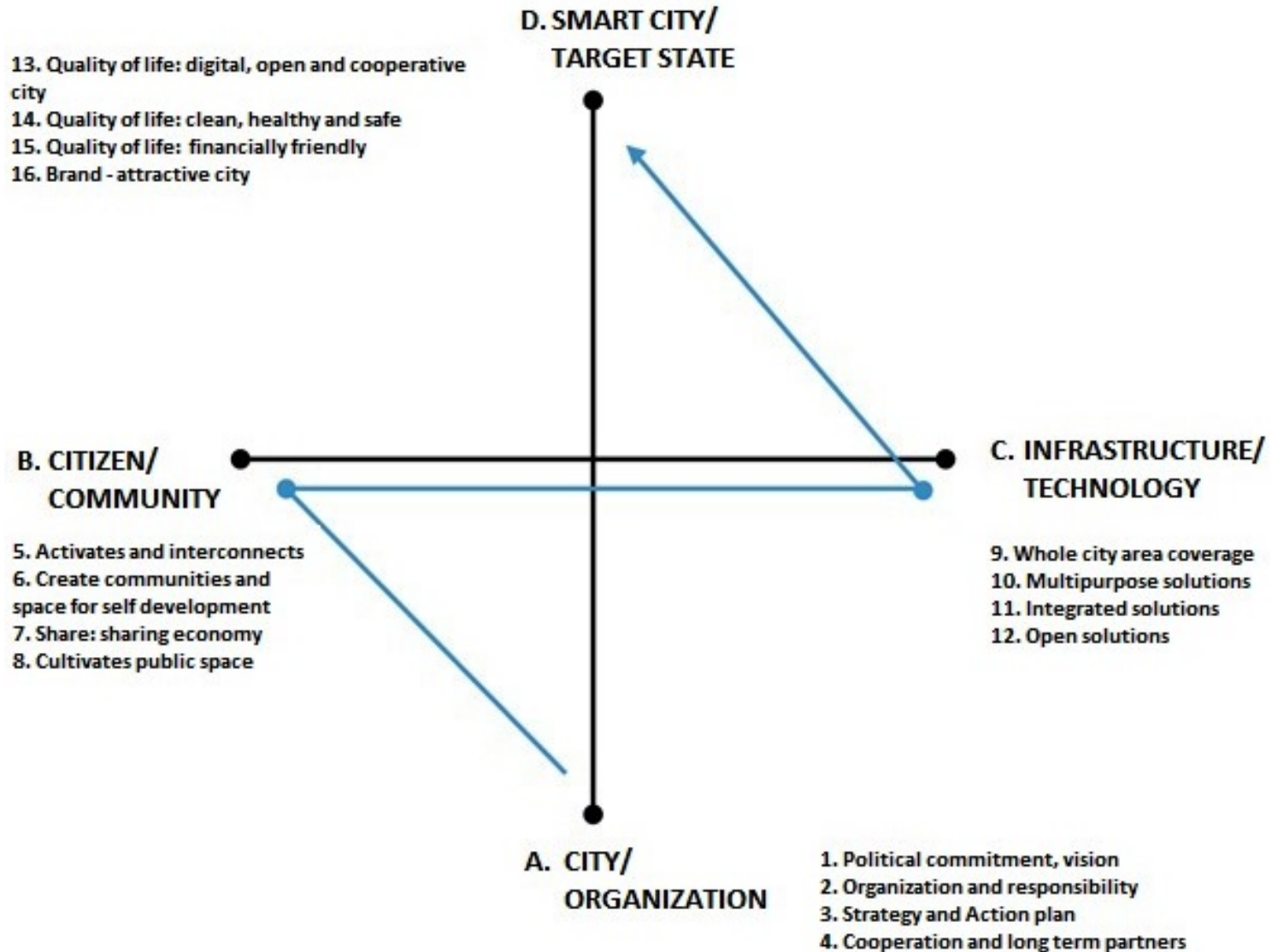




Smart City principles described on Air Quality management case

Budapest, 8th November 2017

Smart city principles – Czech methodology



Intesmog project (6/2018-6/2020)

- **Smart technologies deployment** to solve smog events in Brno, CZ
- **Interconnection of traffic and air quality monitoring** by two independent networks
- **Data mining** for long term and efficient city strategy
- The project submitted for funding by the State Fund of Environment (1,1 M Euro) based on the research projects:
SmartNet (TAČR Alfa, 2015-2017) a
SOLEZ (Interreg Central Europe 2016-2019)

Phase 1: City/Organization

- **Responsible** politician (Green party)
- **Air quality action plan 2017** –
Intesmog is an action item
- 10 months preparation phase –
meeting with **relevant stakeholders**
- City departments, telco and traffic
city companies, research

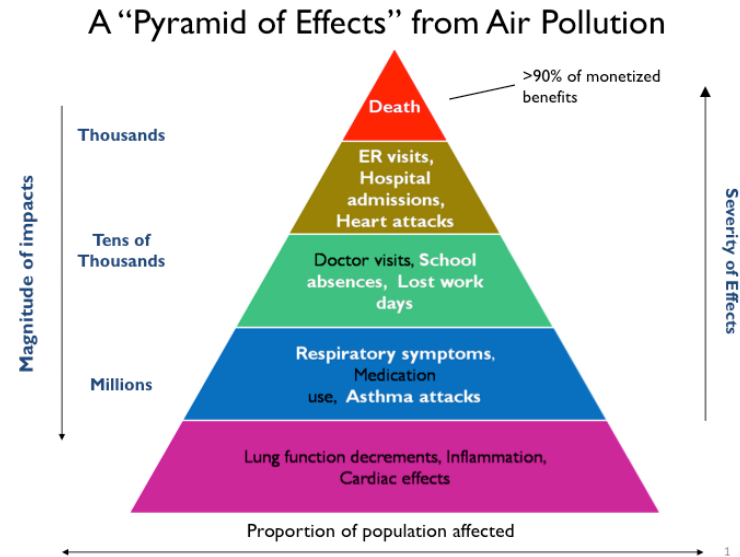


Intesmog context

- **Measure (Action item) in Action plan of air quality** of the city of Brno (2017)
- It is related to **residential parking** introduction and parking strategy
- It is related to **LEZ introduction**
- It is related to **Internet of Things (IoT) city network** (connectivity for other sensors = future extendability and sustainability of the project)

Phase 2: Citizens/community

- **Right to park obstacle**
- **Air quality is invisible**
(just for some eco terrorists)
- Negative impact on Social and Economic **is not promoted**
- Need of a **long term education campaign in the streets** based on hard everyday data
- Need of **transparent rules for a mindset change**



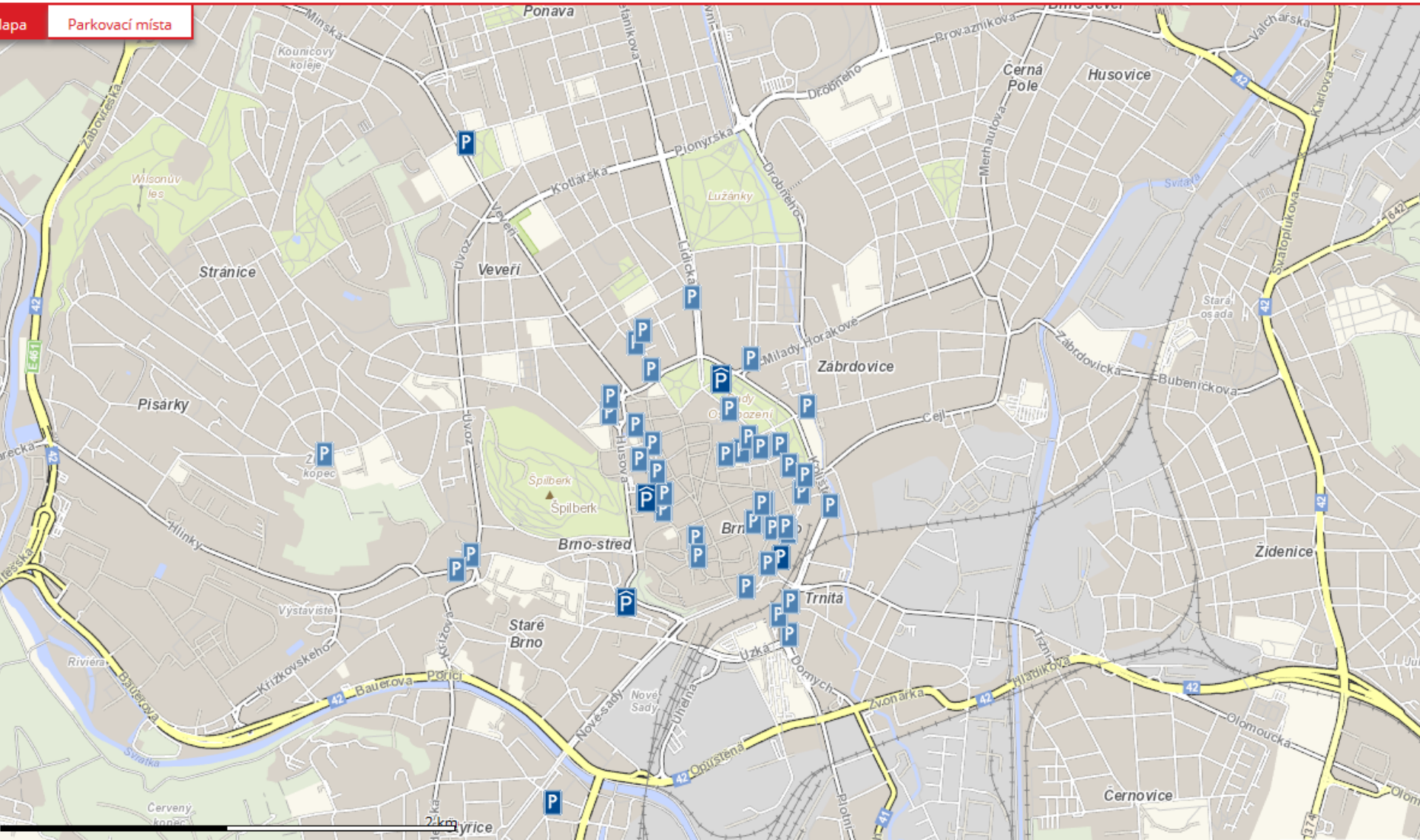
Phase 3: Technology deployment

- Principles: **area coverage, multipurpose, integrated and open solutions**
- **ZONING** the city
- Traffic (parking) + air quality + IoT network
- Use what you already have (existing detection)
- All the output **data is open!**
- IoT network can be open to local developers

Price parking policy by zoning in Amsterdam



Existing parking regulation in Brno



Potential parking zones in Brno, the green zone is the subject of the project



Meaning of zones

- **The solution that works for traffic regulation** in cities (Amsterdam, Barcelona, Vienna)
- **Common rules** inside the zone – single price, alternative modes preference
- **Zone borders serve as exchange nodes** – strategy for P+R deployment or e.bikesharing/e.carsharing services

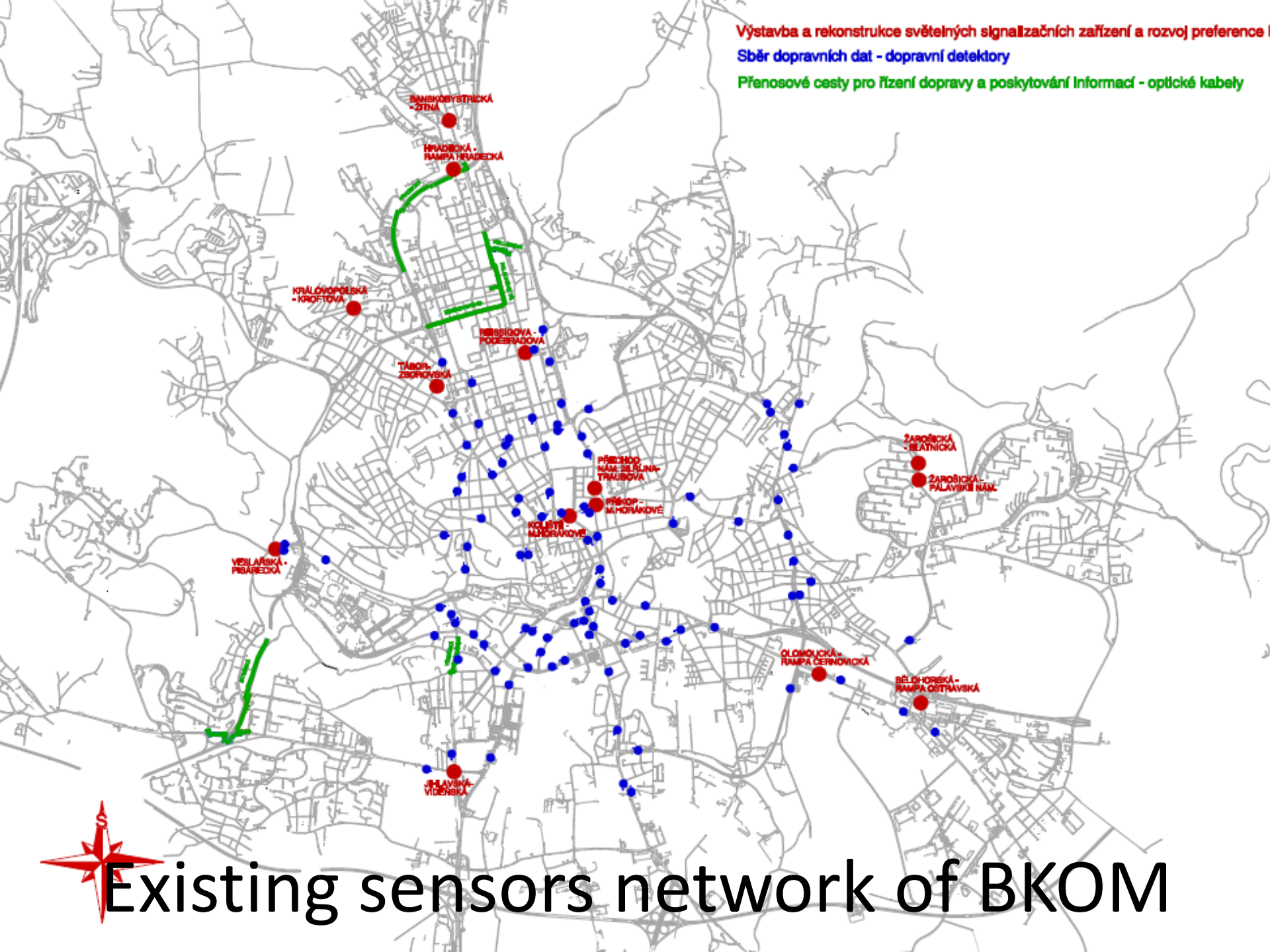
Technology deployment

- **1. phase: Traffic Burden Monitoring System – sensors network for every street in the zone** (complement the existing sensors network of the city Traffic company BKOM)
- **2. phase: Air quality measurement stations**, the places of deployment are to be proposed based on the phase 1 results and the place typology
- **3. phase: Data work**, tj. correlation between mathematical model and measured values

Výstavba a rekonstrukce světelných signalizačních zařízení a rozvoj preference

Sběr dopravních dat - dopravní detektory

Přenosové cesty pro řízení dopravy a poskytování informací - optické kabely



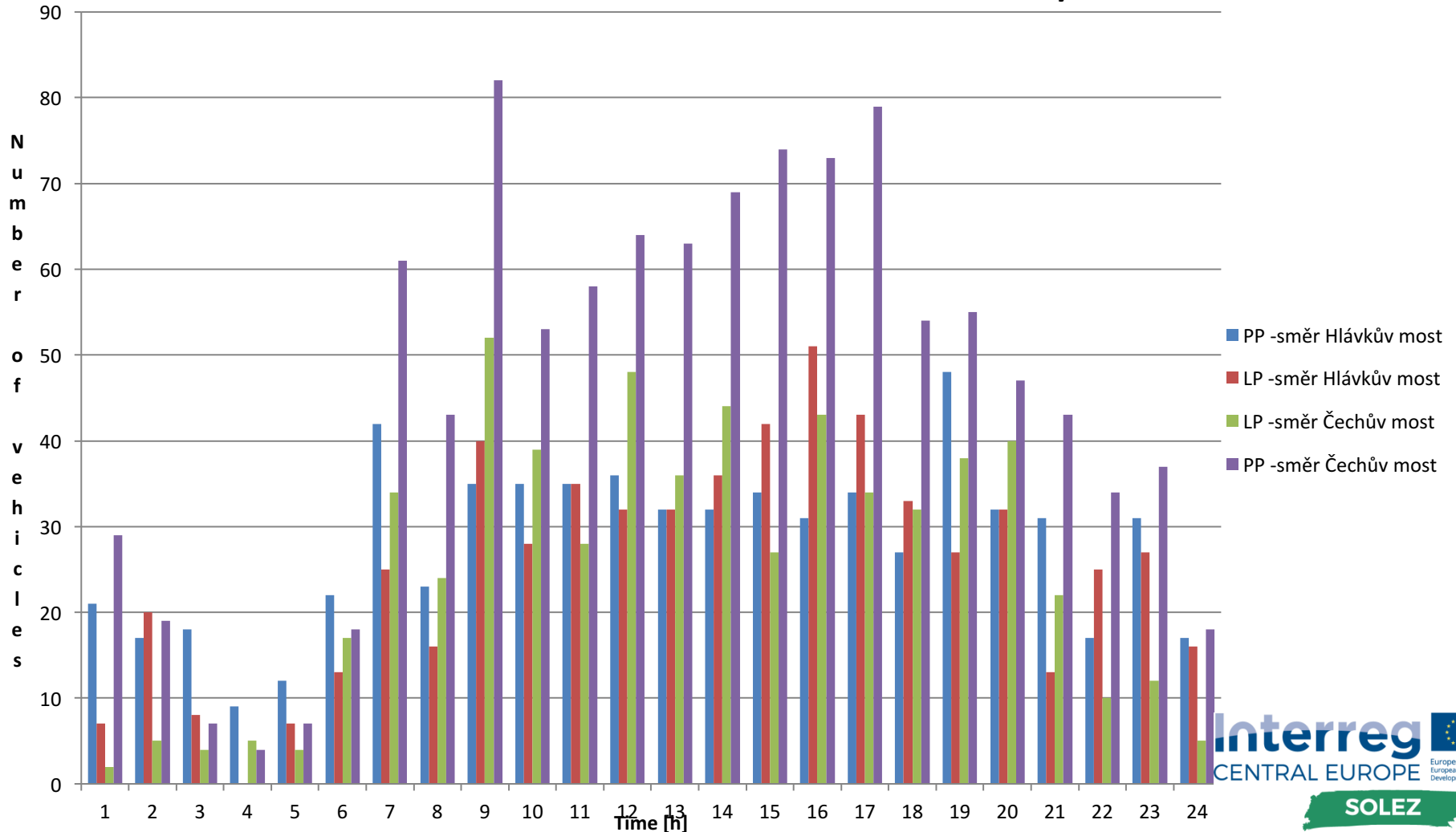
Existing sensors network of BKOM

Traffic Burden Monitoring System

- **Traffic flow magnetometers on every street** controlled as an Internet of Things network (local IoT system) in the future ZONE
- Estimated cost per street **6k Euro**, will be contracted with fixed budget to cover as many streets as possible
- **min. 70 streets**
- **Traffic burden means:** vehicles' number, length and velocity per minute
- **Parking:** testing of counting (entrance/exit) with potential combination of telco operators' data

Magnetometers in Prague – output data illustration

Number of vehicles driven faster than 60km/h

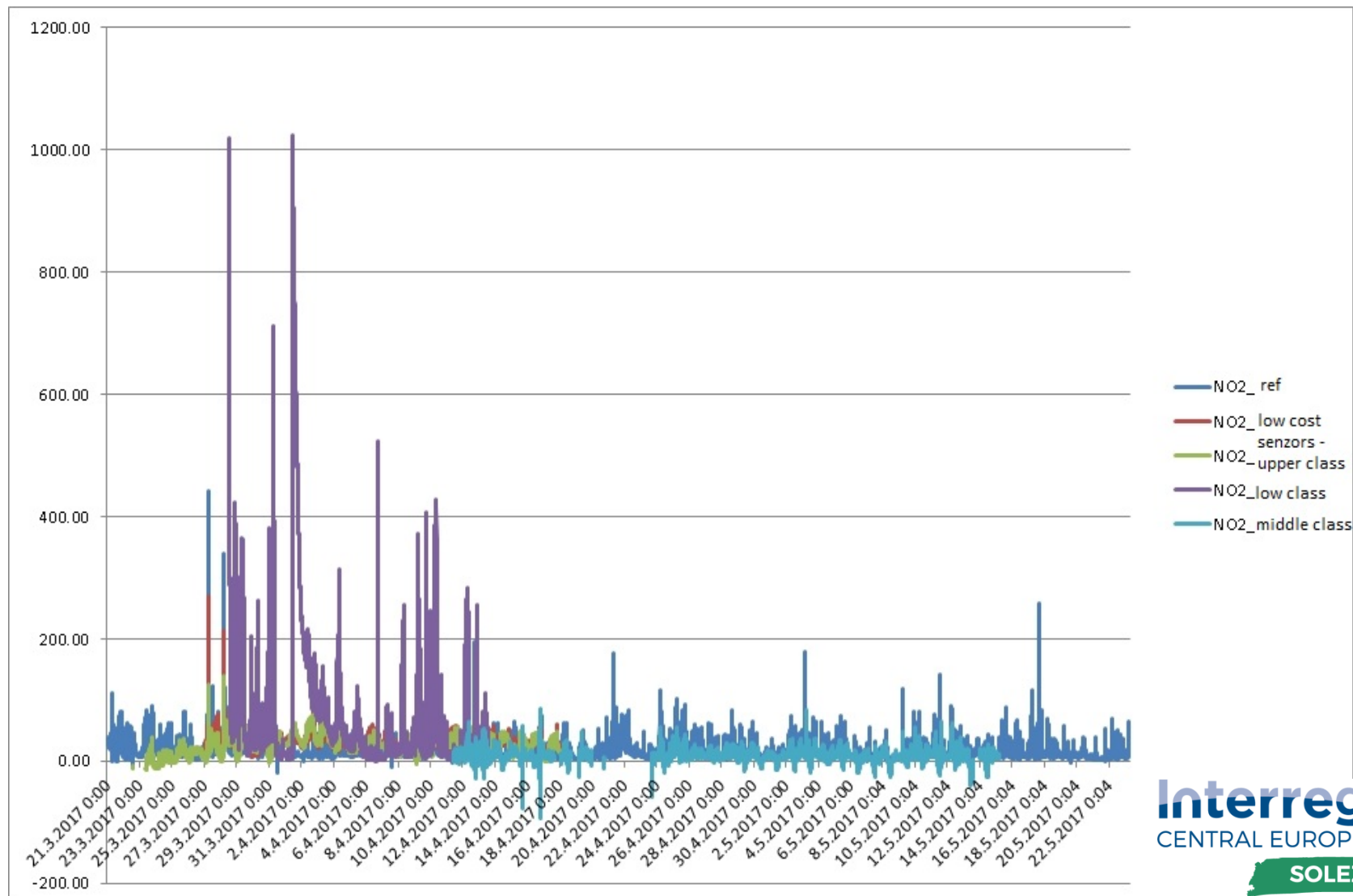


ITS Air Quality stations

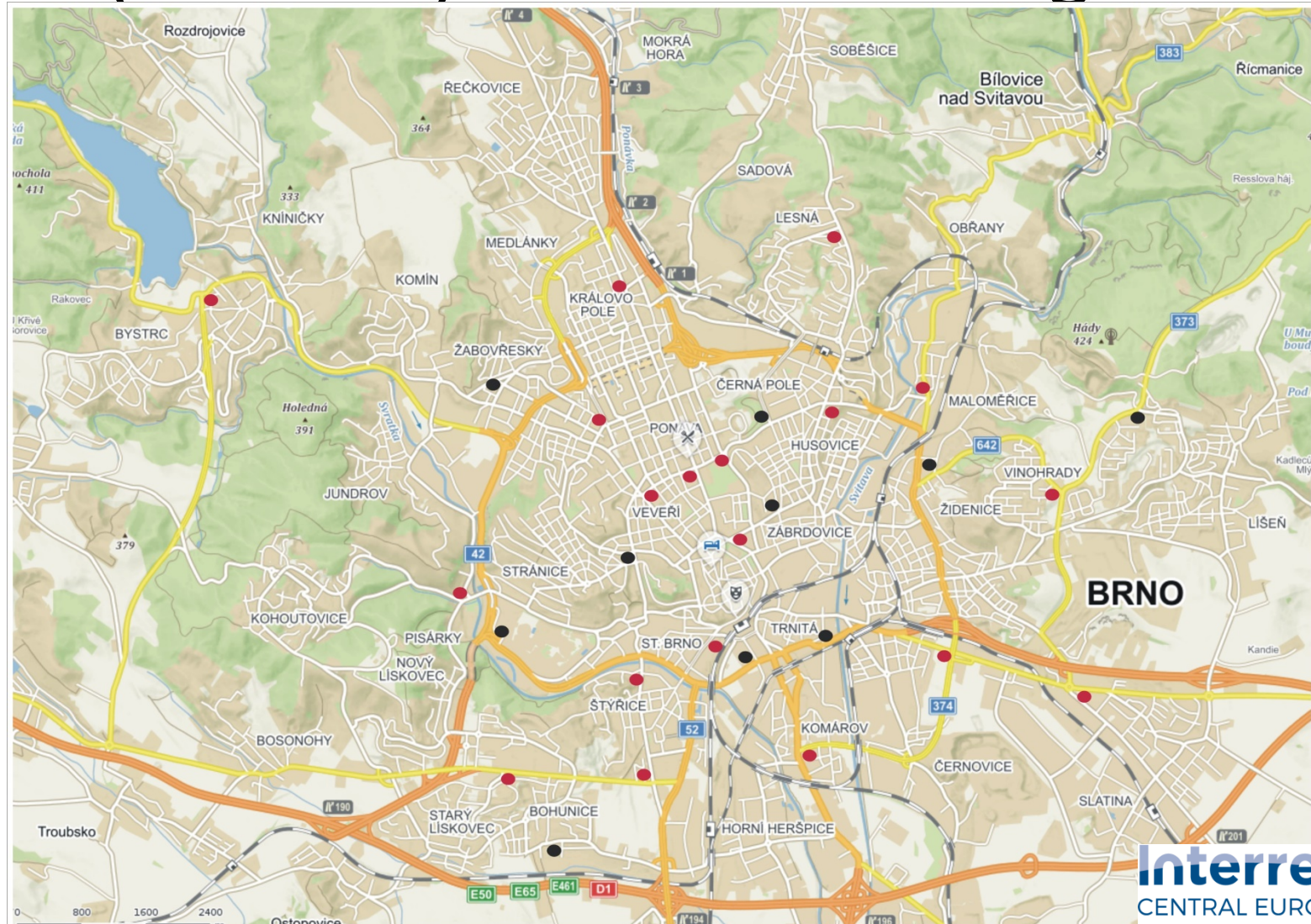
- **CEN/TC 278/WG 17 Urban ITS work item** on air quality management and geofencing
- Definition of:
 - what to measure:** NO_x, PM₁₀, PM_{2,5} and benzene
 - reqs on equipment:** 3 classes, based on reference methods
 - new tresholds:** triggering actions
 - set of actions:** classification and the list

Results of Testing of various Air Quality stations available at the market

NON RELIABILITY found for low cost solutions – arguments for reference methods equipment as AirPointer , source: SMARTNET (2017)



Draft of the equipment placement (red dots) – it can be changed



● stanice ČHMÚ, OŽP MMB, ZÚ Ostrava

● Navrže:

Information LED panels

- Deployment **at the entrances** to the ZONE
- **Information on air pollution level** in the understandable way
- **Information on actual parking prices** based on air pollution levels
- **Communication campaign** on 12 large format panels

Expected Intesmog outputs

- **Zoning for Brno** (parking strategy)
- **List of air quality measures suitable for Brno** triggered when value daily limits are reached (NOx and dust particles) and yearly limits for benzene
- **Map of traffic burden/noise/air pollution per street** – communication campaign
- **Open data** for third parties apps
- **Big data** for consistent planning
- **A smart solution to share with other CEE cities**

Let's **SHARE**
good practice
in Central Europe

city:one



Magazín pro sdílení chytrých řešení mezi městy střední Evropy

: Profily 10 středoevropských měst a jejich chytrých projektů
: chytré nástroje pro veřejnou správu : využití zdrojů a občanské aktivity



Thank you for your attention

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