



# State of Environment in Prague Threats and Challenges Successful Projects

Viktor Třebický, Průhonice, 22. 10. 2018





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# Sources of environmental information in Prague

- Environmental Yearbook
- Web pages of Prague City Administration
- Scientific institutions (Air, Water, Noise, etc. )

Prinášit | Registrace

**PRAHA PRAHA PRAHA** Portál životního prostředí  
HLAVNÍHO MĚSTA PRAHY

Hledat

Pražské weby | Portál praha.eu | Adresář | Ročenky Praha ŽP | Atlas ŽP | Dotace a granty v ŽP | Zelená domácnost | Informační materiály

Ovzduší | Voda | Příroda, krajina a zeleň | Hluk | Odpady | Energetika | EIA, IPPC, Právo, Plány a koncepce, ... | Ekologická výchova, MA21, ...

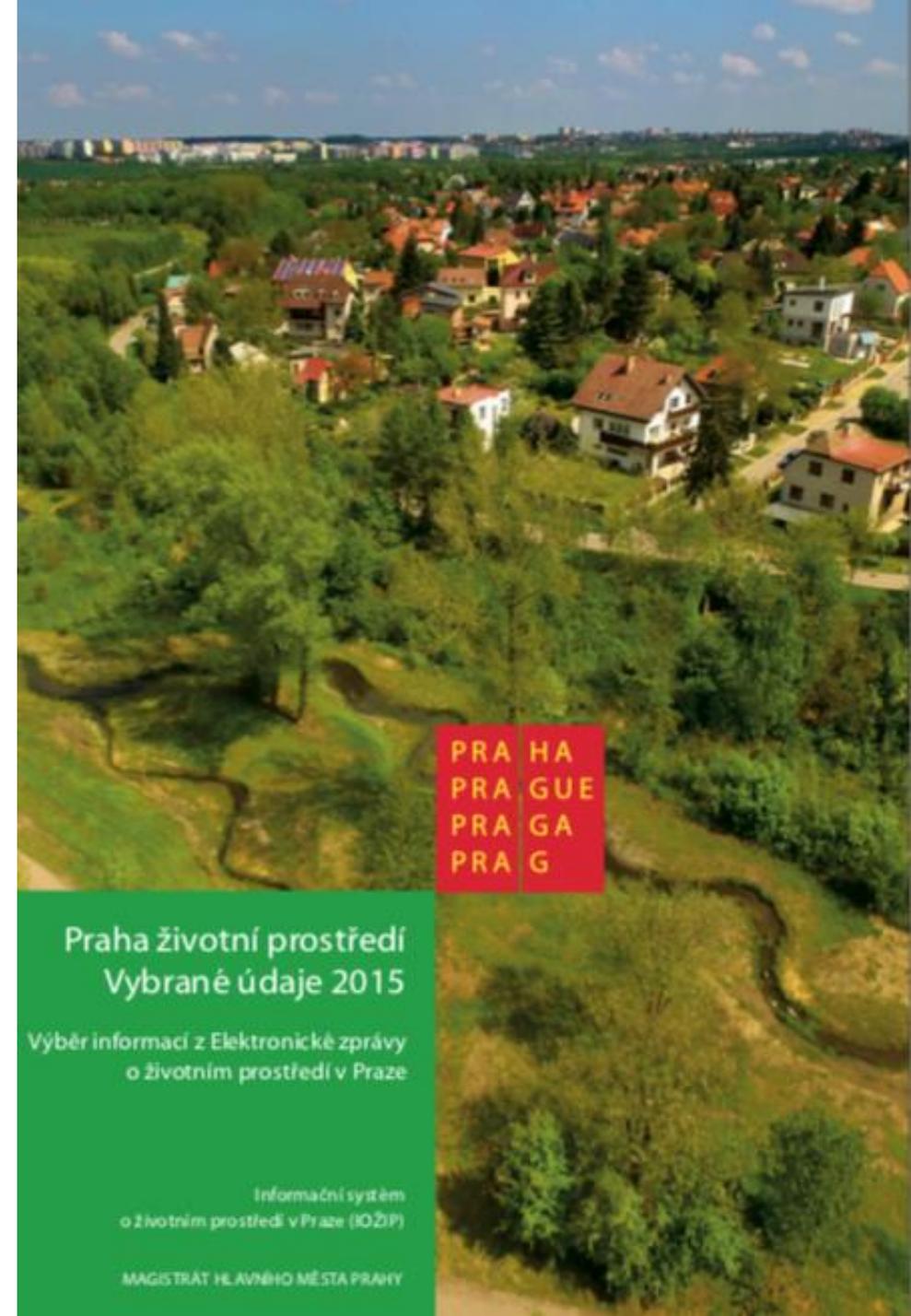
Aktuální údaje | Souhrnné informace | Právní úprava | Závazná stanoviska a povolení | Plány, koncepce | Orgány ochrany ovzduší | Potřebuji řešit

# Prague Environmental Yearbook

Since 1990 every year

More than 300 pages

Indicators



# The biggest threats



Air pollution



Climate change and high GHG emissions



Car transport



Waste generation

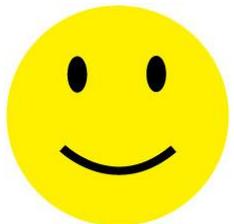
# Success stories



Reduction of pollution from industry and energy sources



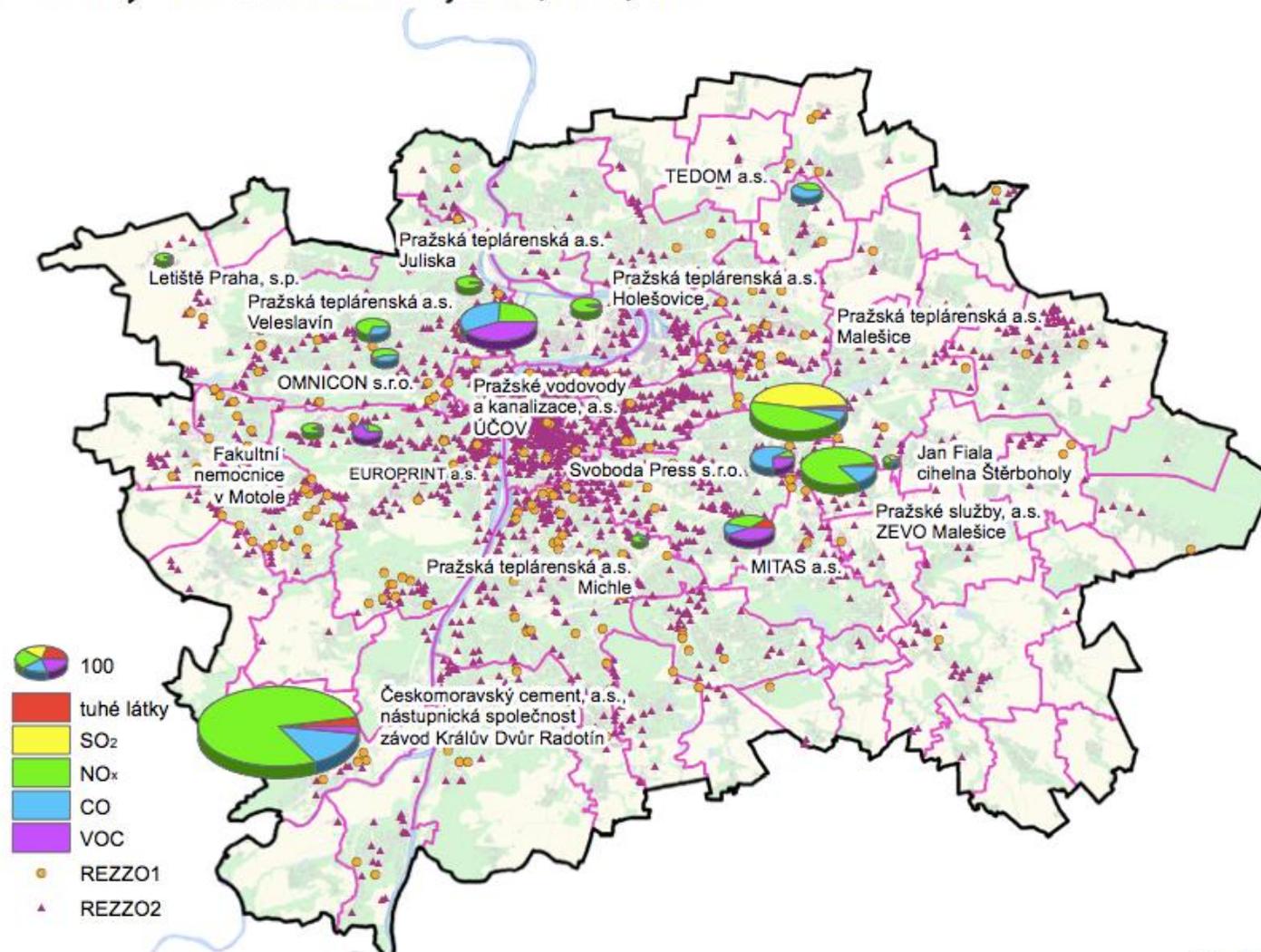
Nature and biodiversity



Adaptation to climate change

# Point sources of air pollution

Obr. B1.2.1: Významné stacionární zdroje emisí, Praha, 2012



Zdroj: ČHMÚ

# Stationary sources of air pollution – incredible reduction in the last 30 year

Tab. B1.2.3: Emise vybraných základních znečišťujících látek ze stacionárních zdrojů v Praze v letech 1980–2012 [t.rok<sup>-1</sup>]

| Rok*   | Kategorie zdrojů             |                 |                 |                       |                 |                 |                           |                 |                 |
|--------|------------------------------|-----------------|-----------------|-----------------------|-----------------|-----------------|---------------------------|-----------------|-----------------|
|        | Zvláště velké a velké zdroje |                 |                 | Střední a malé zdroje |                 |                 | Stacionární zdroje celkem |                 |                 |
|        | tuhé látky                   | SO <sub>2</sub> | NO <sub>x</sub> | tuhé látky*           | SO <sub>2</sub> | NO <sub>x</sub> | tuhé látky                | SO <sub>2</sub> | NO <sub>x</sub> |
| 1980   | 19 152                       | 48 402          | 15 950          | 9 481                 | 12 304          | 1 473           | 28 633                    | 60 706          | 17 423          |
| 1990   | 5 862                        | 24 361          | 8 855           | 15 149                | 21 006          | 7 318           | 21 011                    | 45 367          | 16 173          |
| 2000   | 175                          | 1 294           | 2 394           | 475                   | 496             | 737             | 650                       | 1 790           | 3 131           |
| 2003   | 124                          | 1 250           | 2 398           | 575                   | 696             | 812             | 699                       | 1 946           | 3 210           |
| 2004   | 197                          | 1 800           | 2 789           | 516                   | 569             | 771             | 713                       | 2 369           | 3 559           |
| 2005   | 130                          | 1 752           | 2 675           | 529                   | 616             | 864             | 659                       | 2 368           | 3 540           |
| 2006   | 166                          | 1 702           | 2 791           | 474                   | 526             | 751             | 640                       | 2 228           | 3 541           |
| 2007   | 92                           | 969             | 2 396           | 443                   | 453             | 726             | 535                       | 1 422           | 3 122           |
| 2008   | 96                           | 1 258           | 2 489           | 671                   | 460             | 614             | 767                       | 1 718           | 3 103           |
| 2009   | 93                           | 1 142           | 2 378           | 490                   | 484             | 574             | 583                       | 1 626           | 2 951           |
| 2010   | 94                           | 976             | 1 969           | 478                   | 538             | 689             | 572                       | 1 514           | 2 657           |
| 2011   | 57                           | 287             | 1 605           | 401                   | 516             | 590             | 458                       | 803             | 2 195           |
| 2012** | 55                           | 171             | 1 517           | 321                   | 189             | 509             | 376                       | 360             | 2 026           |

# Why?

- Better regulation (end-of-pipe)
- Radical change in economical structure (from heavy industry to IT services....)
- Outsourcing of environmental problems (to other districts, abroad...)
- From local heating to central
- From coal to gas (but not yet to low-carbon sources!!!)
- Heating plant Malešice – decrease of coal consumption by 50% in just one year



# This biggest source of air pollution in Prague?

Too many cars...

Porovnání počtu registrovaných vozidel v letech 1961–2017

| Rok  | Praha    |                  |     |                   |     | Česká republika (do roku 1971 Československo) |                  |     |                   |     |
|------|----------|------------------|-----|-------------------|-----|---|------------------|-----|-------------------|-----|
|      | Obyvatel | Motorová vozidla |     | Osobní automobily |     | Obyvatel                                      | Motorová vozidla |     | Osobní automobily |     |
|      | (tis.)   | celkem           | %   | celkem            | %   | (tis.)  | celkem           | %   | celkem            | %   |
| 1961 | 1 007    | 93 106           | 22  | 44 891            | 13  | 13 746  | 1 326 801        | -   | 291 680           | -   |
| 1971 | 1 082    | 203 519          | 48  | 133 129           | 40  | 14 419  | 2 931 629        | -   | 1 041 137         | -   |
| 1981 | 1 183    | 367 007          | 86  | 284 756           | 85  | 10 306  | 3 449 300        | 85  | 1 872 694         | 79  |
| 1990 | 1 215    | 428 769          | 100 | 336 037           | 100 | 10 365  | 4 039 606        | 100 | 2 411 297         | 100 |
| 2000 | 1 181    | 746 832          | 174 | 620 663           | 185 | 10 267  | 5 230 846        | 129 | 3 720 316         | 154 |
| 2010 | 1 257    | 928 769          | 217 | 699 630           | 208 | 10 533  | 6 036 576        | 149 | 4 494 425         | 186 |
| 2015 | 1 267    | 941 145          | 219 | 740 745           | 220 | 10 554  | 6 990 542        | 173 | 5 130 266         | 213 |
| 2016 | 1 281    | 1 002 645        | 234 | 795 178           | 237 | 10 579  | 7 265 766        | 180 | 5 346 182         | 222 |
| 2017 | 1 295    | 1 058 949        | 247 | 844 613           | 251 | 10 610  | 7 550 908        | 187 | 5 572 788         | 231 |

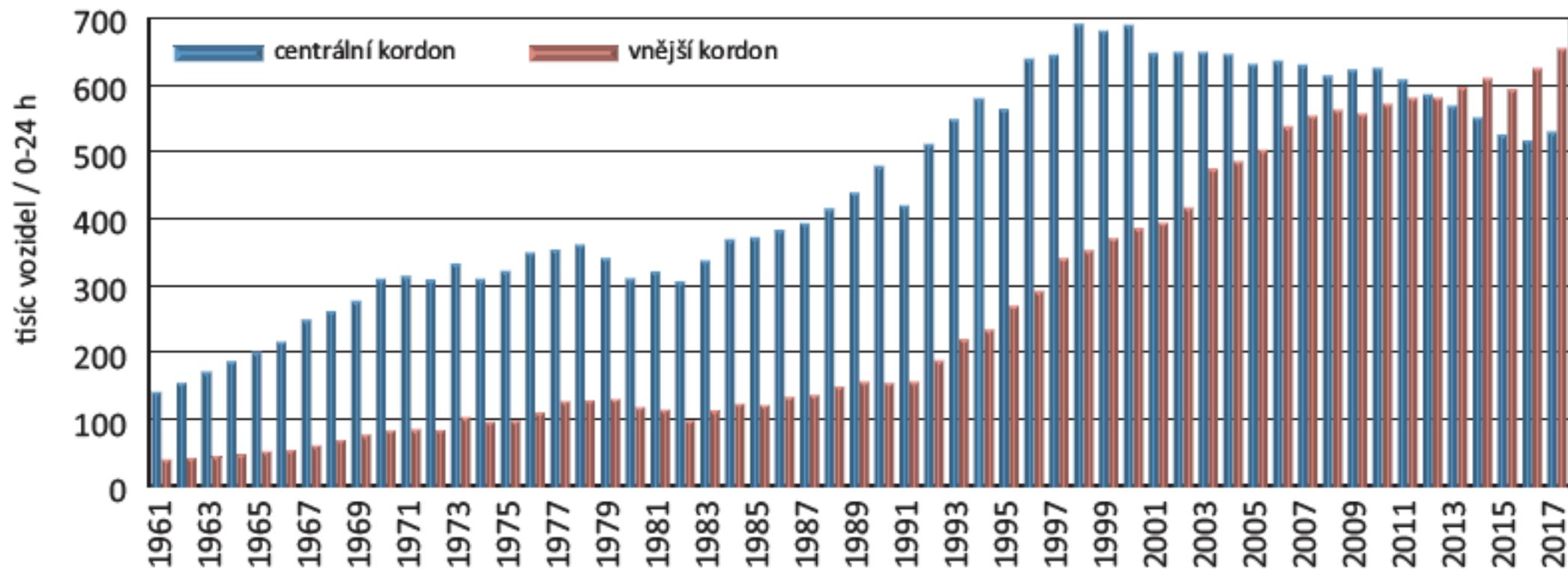


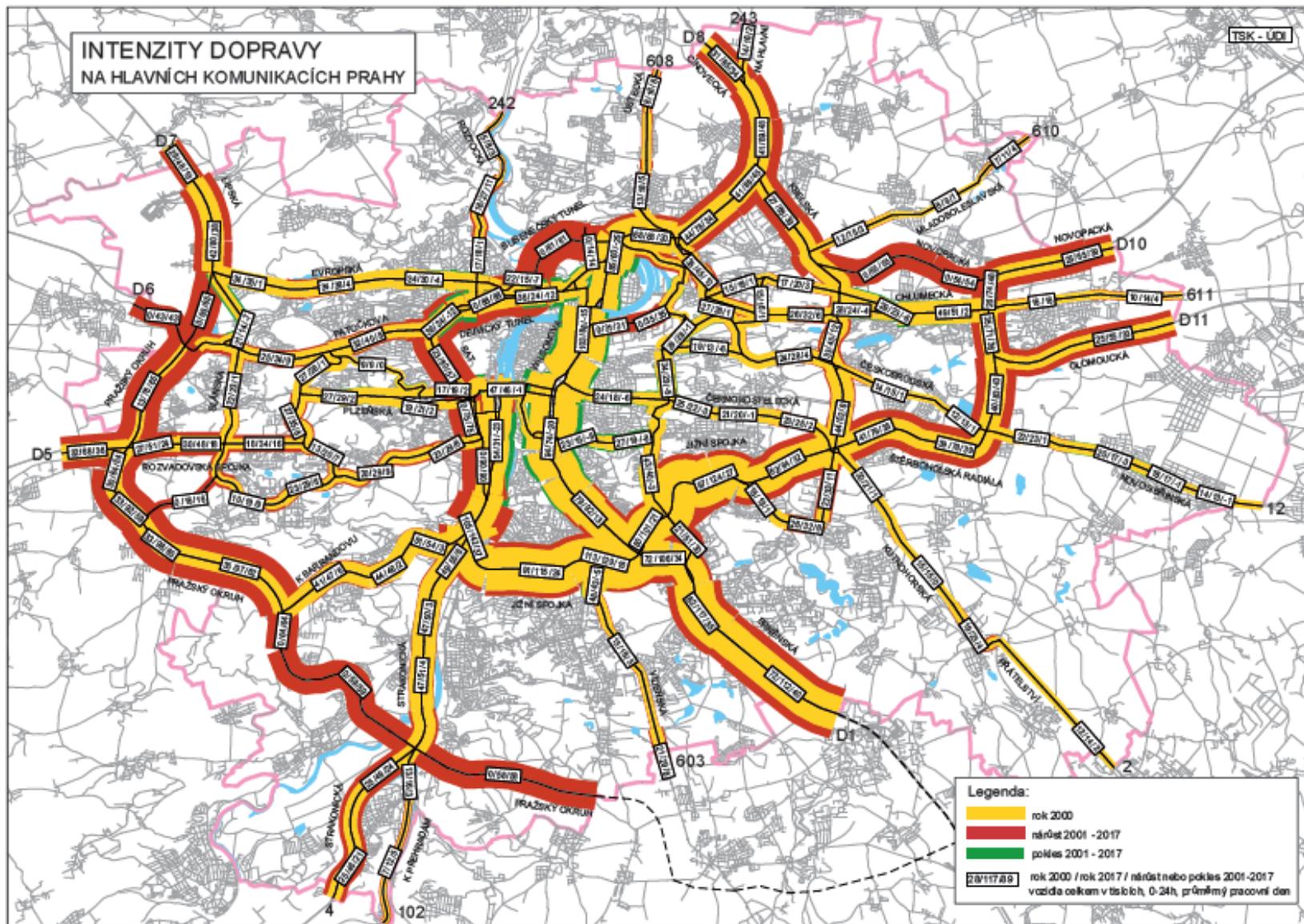
# Number of personal cars increased by 1 900% from 1961 - 2017



# ....a too many of journeys of cars

Vývoj intenzity dopravy na kordonech v Praze (průměrný prac. den, oba směry celkem, období 0-24 h)





# Impacts

## Most of Prague has impaired air quality compared to health limits

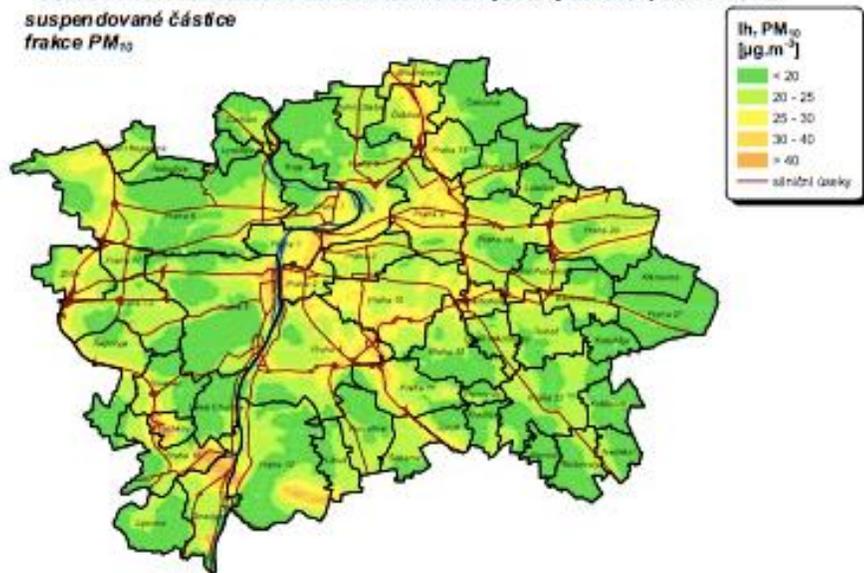
Obr. B1.3.24: Vyznačení oblastí se zhoršenou kvalitou ovzduší vzhledem k imisním limitům pro ochranu zdraví, 2012

území s překročením LV 89,1 %

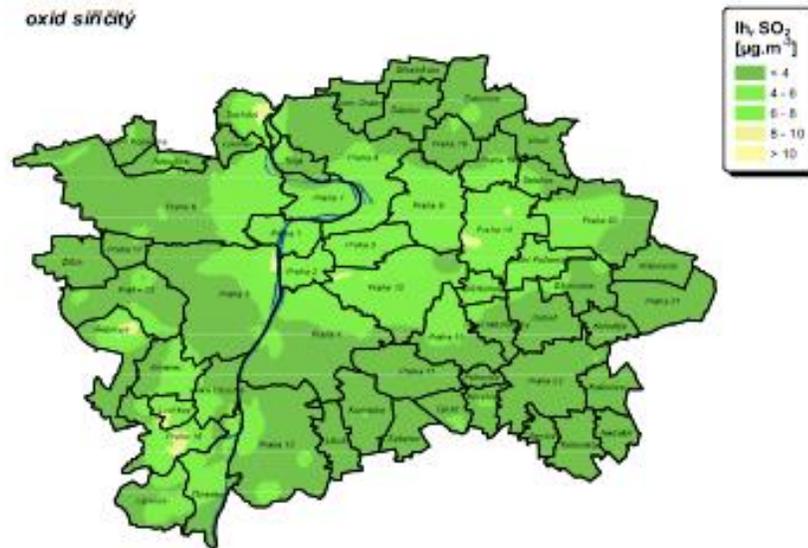


Zdroj: ČHMÚ

Obr. B1.4.6: Průměrné roční koncentrace vybraných látek, 2011-2012  
 suspenované částice  
 frakce PM<sub>10</sub>



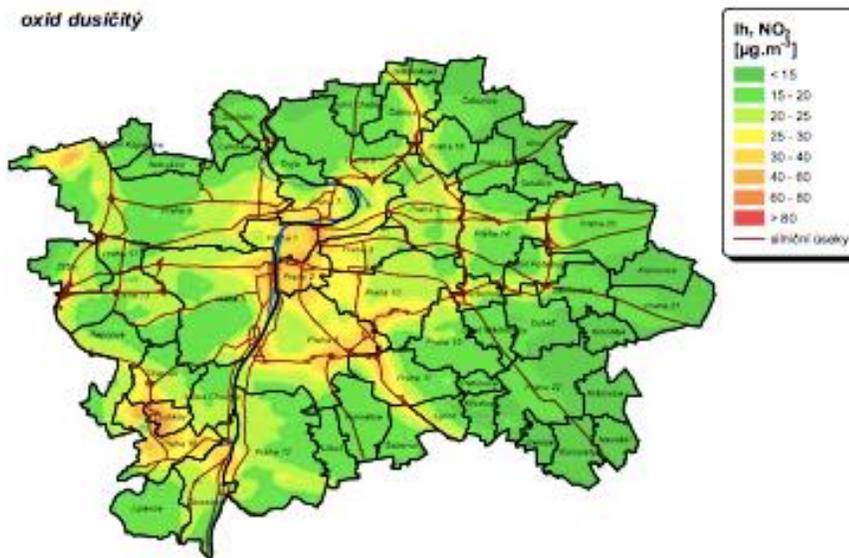
oxid siřičitý



benzen



oxid dusičitý



zdroj: ATEM – Ateliér ekologických modelů, s.r.

# Conclusions – air pollution

**Prague's air pollution has decreased significantly (especially in the 1990s).**

**However, quality is not the same as in the smaller towns of the Czech Republic or European (green) capitals.**

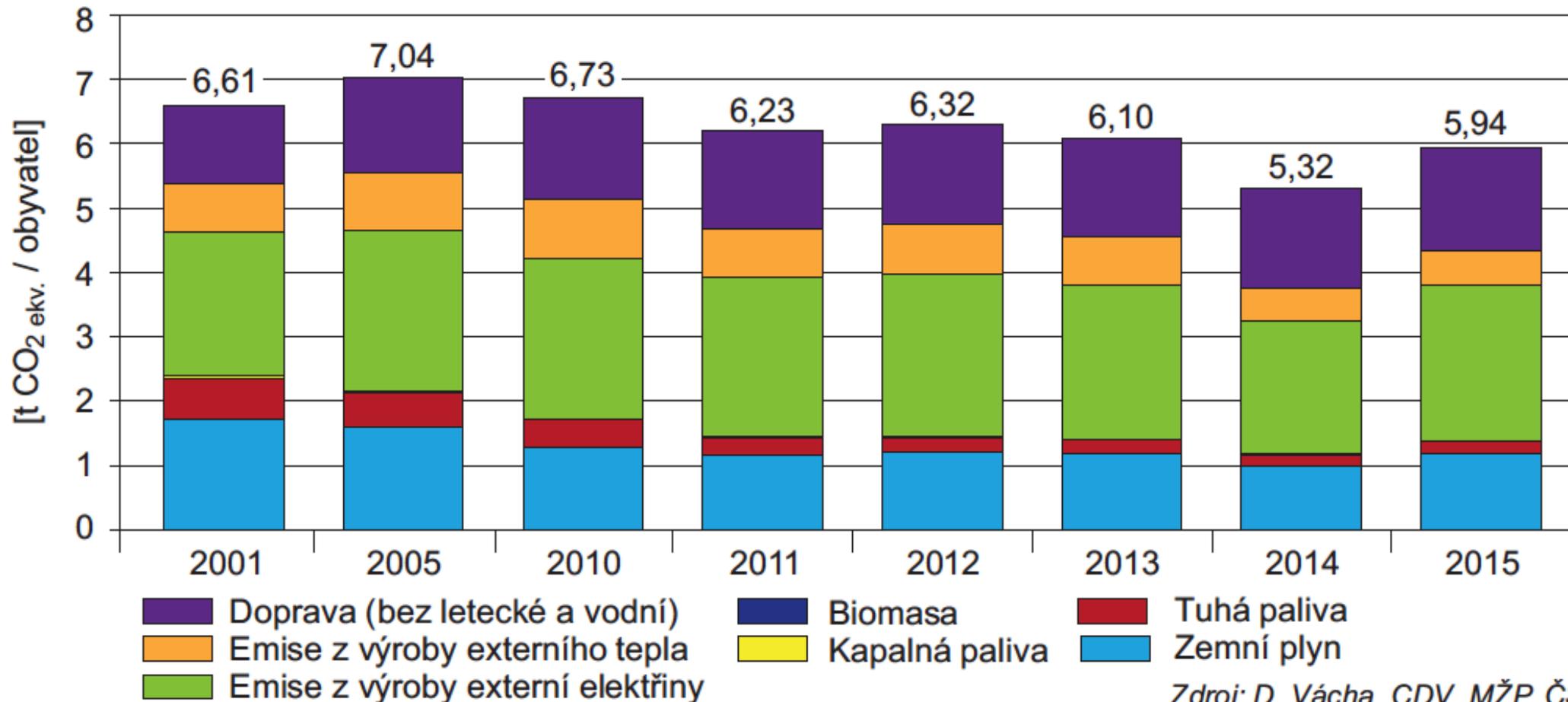
**Recently, this biggest cause of pollution is car traffic.**

**This has an measurable impact on the health of citizens, property, local economy ...**

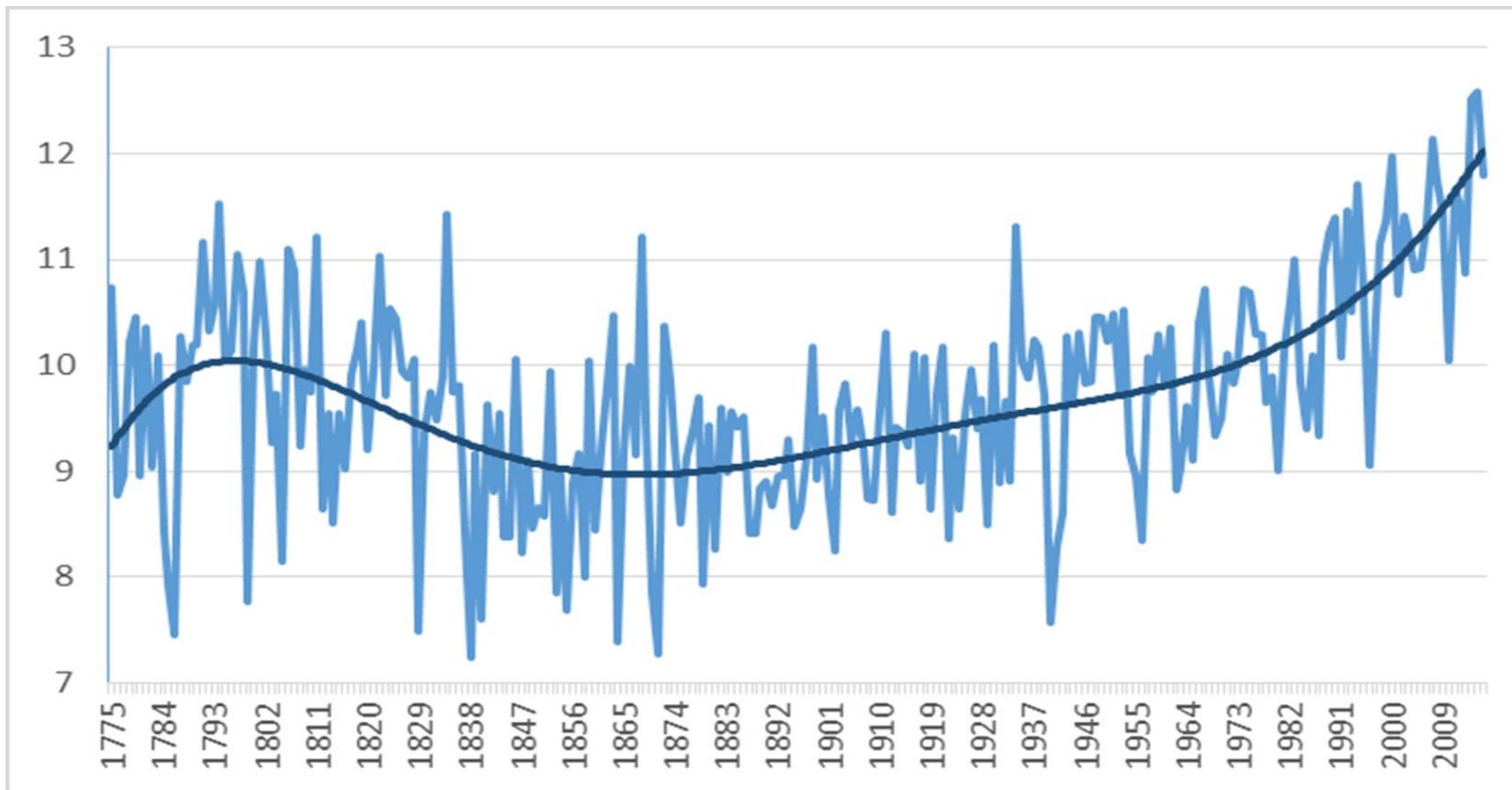
**Both households and businesses can benefit from improvements, as well as the state.**



# Climate change and high GHG emissions



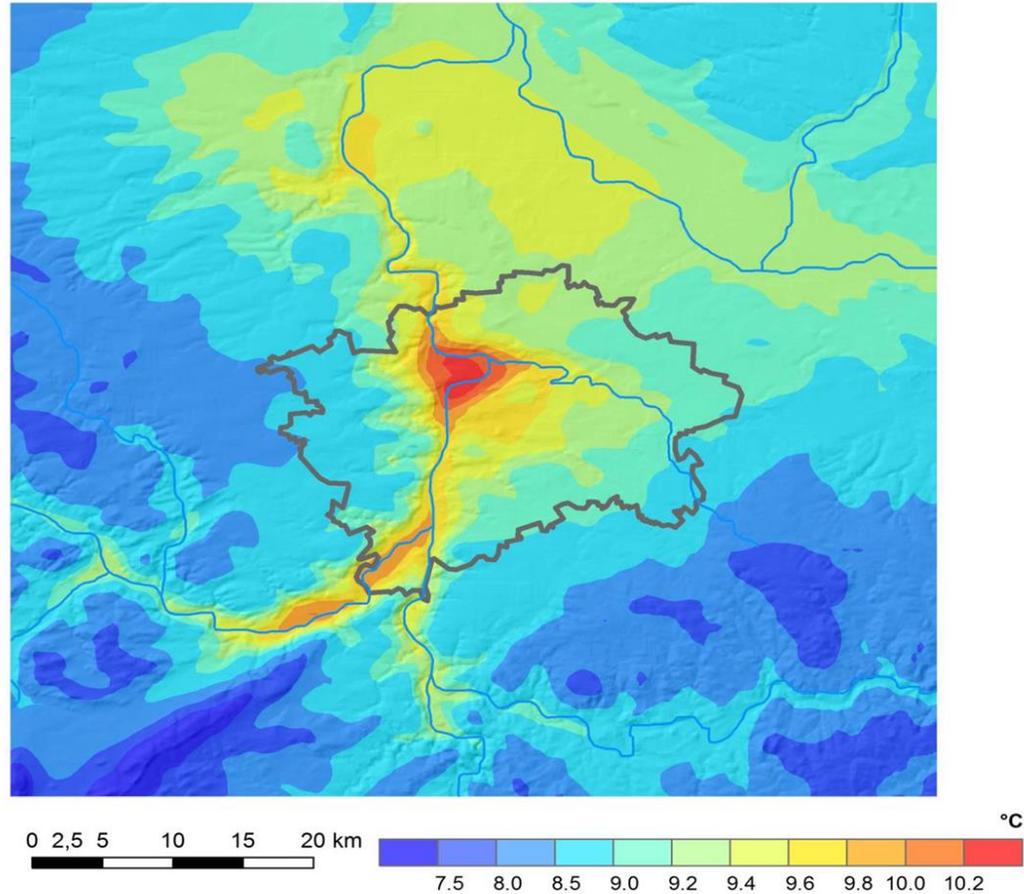
# Average temperature in Prague is rising and will continue to rise



Source: CHMU, Prague - Klementinum



# Average annual temperature in Prague and surroundings (1961-2016)



Source:: CHMU



# The effect of Urban Heat Island in Prague

**In summer temperatures up to 6-8 degrees higher than in the surrounding area**

**City Geometry** - Multiple reflection and absorption of radiation in surfaces increases the intensity of heat absorption (so-called canyon effect), wind weakening

**Extensive use of materials** with different absorption thermal properties than natural surface (asphalt, concrete) – change of energy balance, reduction of water evaporation intensity (channels, smaller amount of vegetation ...)

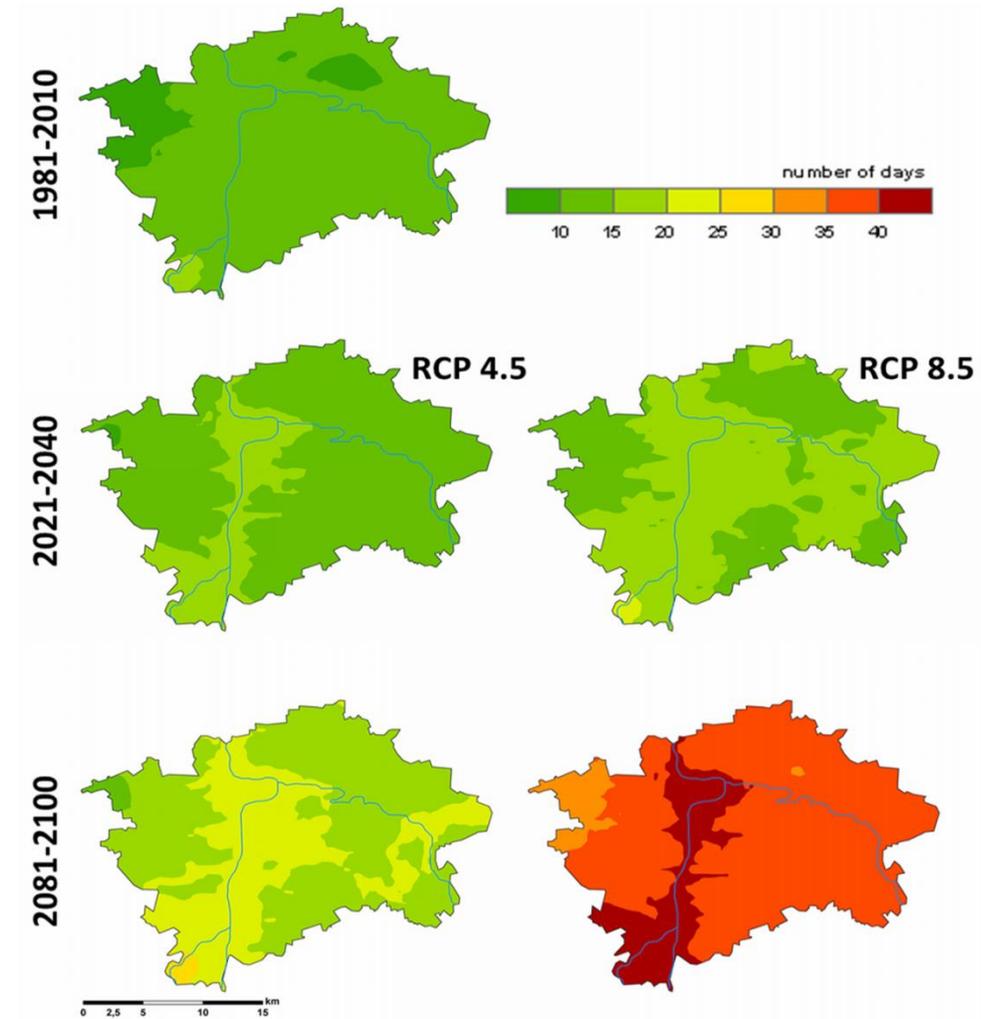
**Waste heat** generated by human activity (heating, industry, transport ...)



# The effect of Urban Heat Island in Prague

## Increase in number of tropical days – prediction

*Max. prediction 38,6 tropical days/1 year*



# Adaptation strategy of Capital City of Prague to climate change

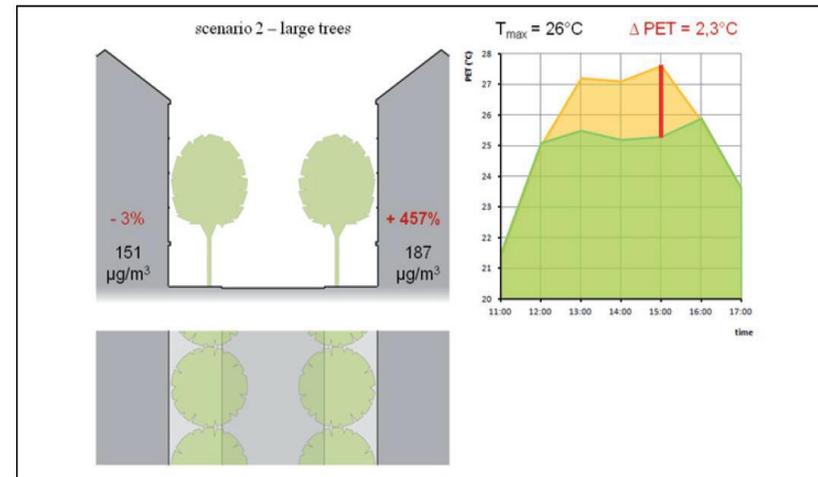
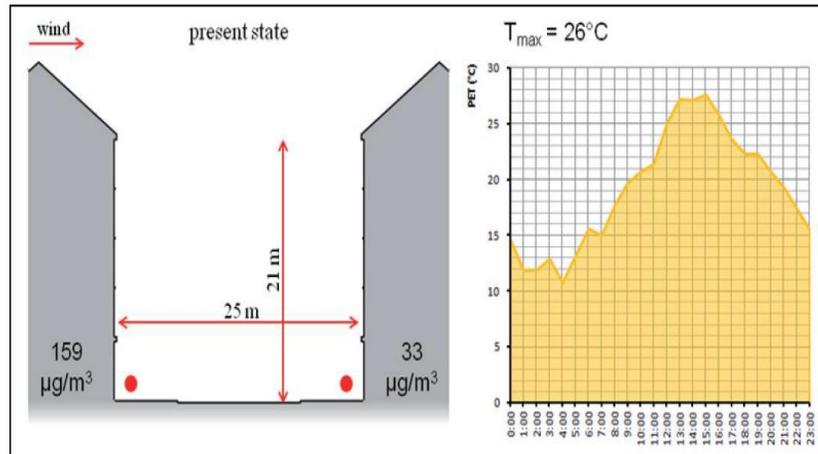
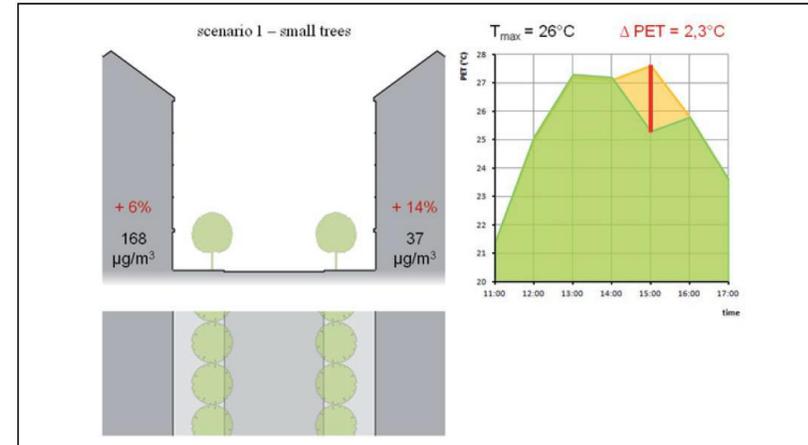
- Analysis of the current state
- Analysis of the anticipated impacts of climate change in Prague
- Assessing Prague's risks and vulnerability to climate change

## **Strategic vision:**

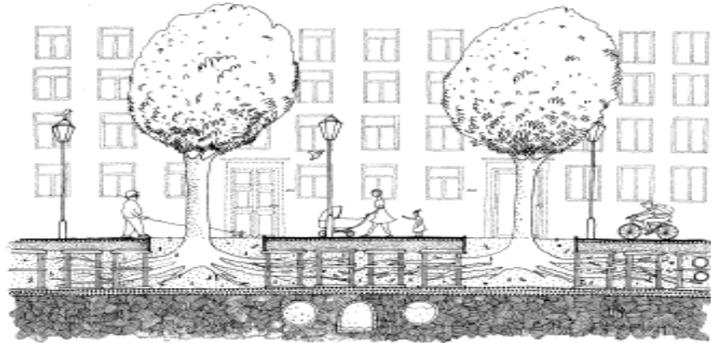
Increasing long-term resistance and reducing vulnerability of Capital City of Prague to the impacts of climate change through the gradual implementation of appropriate ecosystem-based measures in combination with technical and educational measures to ensure the quality of life of the capital's population.

# Proposed adaptation measures and projects

## Project of a new alley in Legerova Street



# Usage of "Roots Cell" in Alley's Reconstruction in the Centre



Source: OCP MHMP, Atelier a05

# Planting new trees in Vinohradská avenue



náměstí Jiřího z Poděbrad



úsek Baranova - Sudoměřská



realizace před parkovištěm u Olšanských hřbitovů



závlivka javorů v úseku nám. Jiřího z Lobkovic – Zásmecká



soliterní svitel v úseku Velehradská - Milešovská



realizace otevřeného povrchu stromové mísy a instalace mříže



Source: OCP MHMP

# Project of the suburban park "Confluence" IPR Prague



mládkův luh, foto: David Píhant



lesní pasiva, foto: David Píhant



londýň luh, foto: David Píhant

Source: IPR Prague

# Revitalisation of stream "Rokytká"



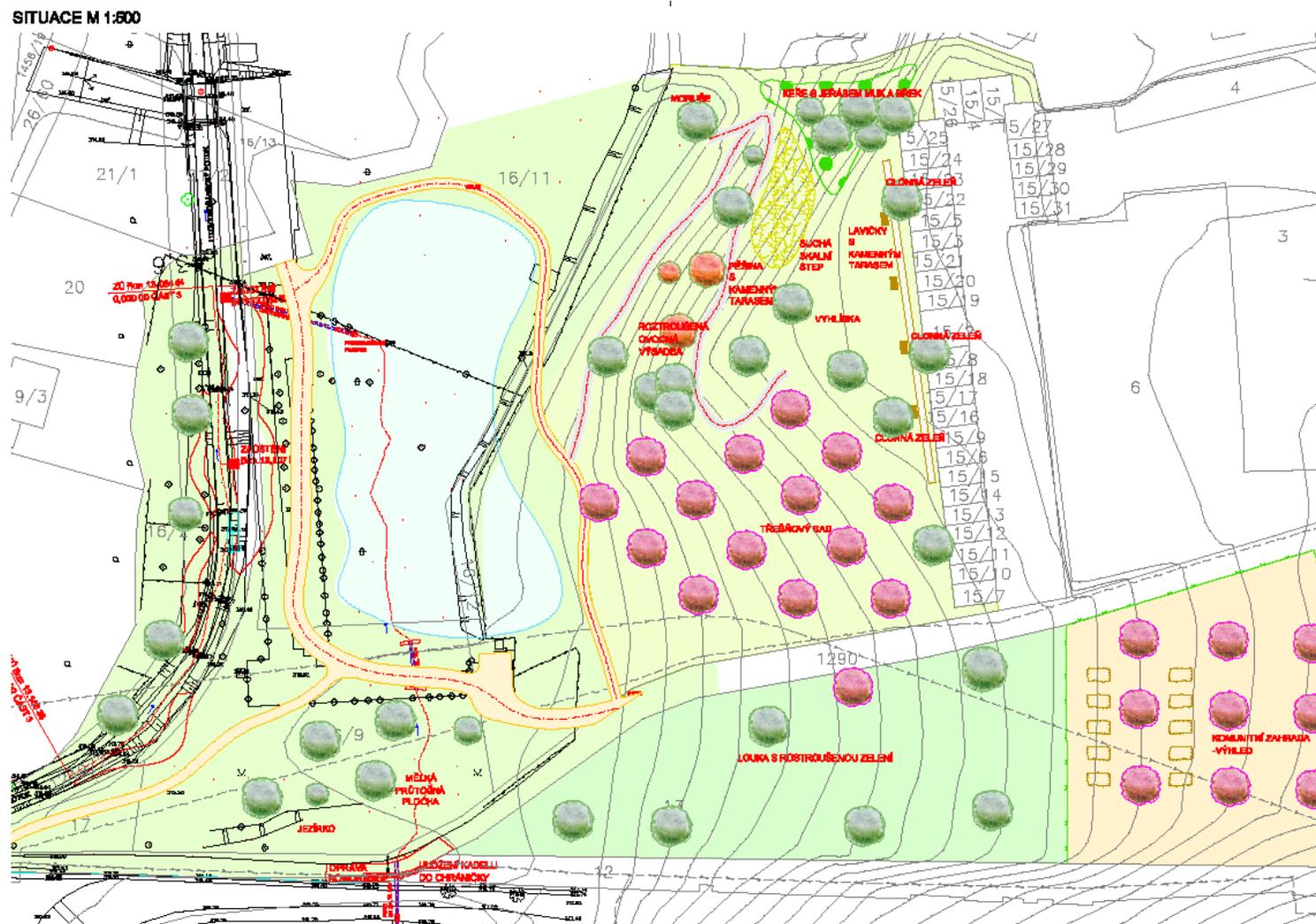
Source: MHMP

# Polder with relaxation zone in broader centre of Prague (Karlín)



Source: VRP Prague

# New pond in Prague – Liboc



Source: MHMP

# Retaining rainwater

- New “blue area” Lipiny - Modřany
- Residential complex Malá Řepora - drainage
- Drainage of the SUOMI Hloubětín area
- Solution for rainwater management, school, Prague 7



Source: MHMP

# Community garden Kuchyňka in Prague – Troja



Source: <http://kzkuchynka.cz/>

# Revitalization of courtyards



Source: [www.ekocentrumkoniklec.cz](http://www.ekocentrumkoniklec.cz)



# Restoration of the orchard with herbs at the Small River in Stromovka (former Royal game reserve)



Source: MHMP

# Complex revitalization of central part of Stromovka



Source: MHMP

# Adaptation of buildings to climate change – pilot projects

- Adaptation of the set of kindergartens and primary schools in Prague 12, including rainwater management
- Extensive Green Roof Project - CUBE Building



# Conclusions – Prague Green City?

- **Prague has changed incredibly over the last 30 year, including the environment**
- **There are serious challenges we face, including climate change, car traffic, air pollution and waste production**
- **Many current projects seeks to improve the environment in Prague and to adapt the city to climate change**



# Contact

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