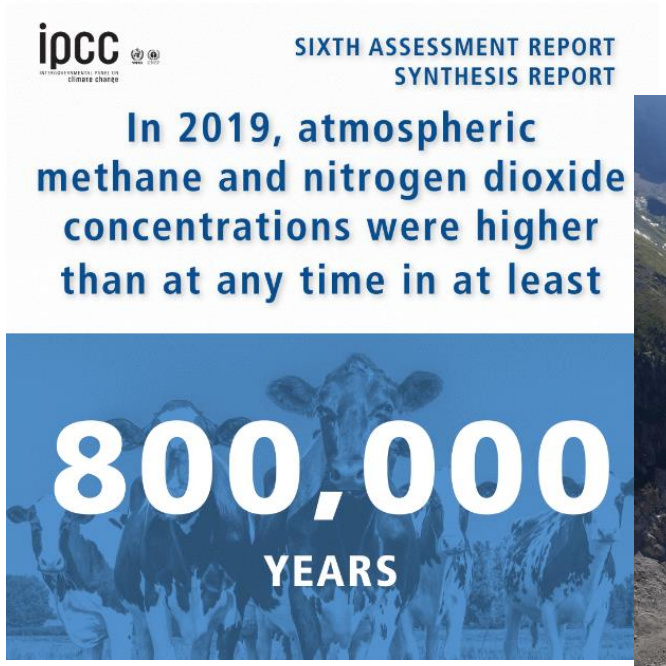
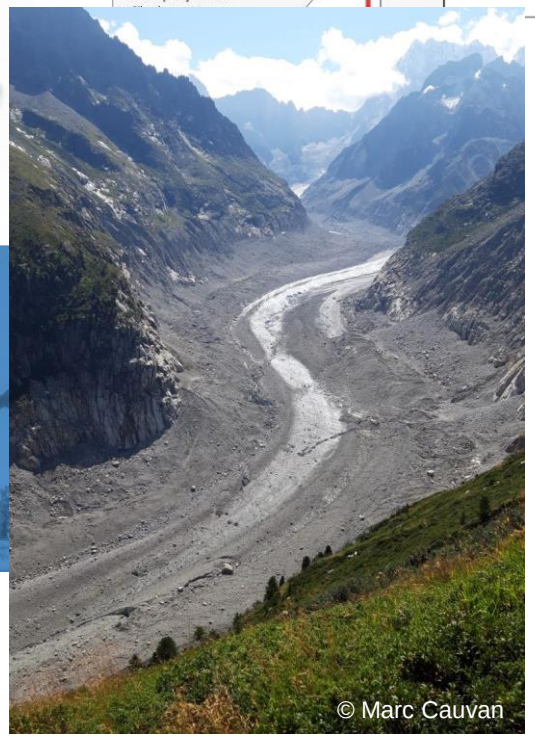
Stadt Zürich
Umwelt- und
Gesundheitsschutz

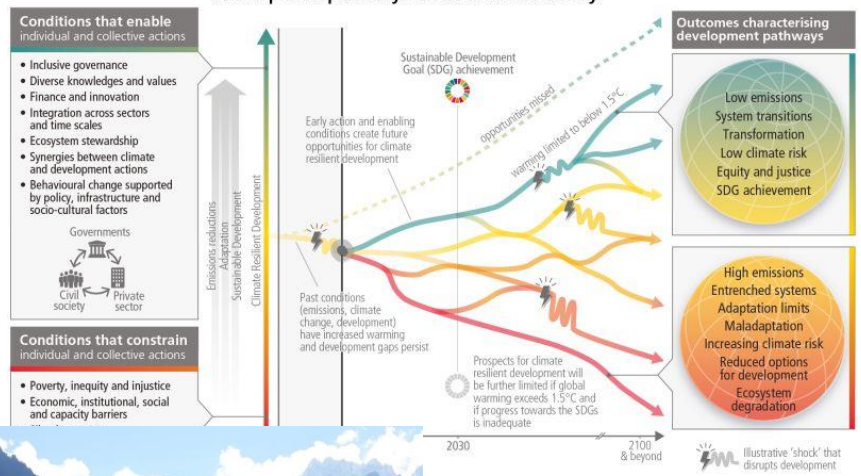
Towards real-time monitoring of climate action plans – City of Zurich

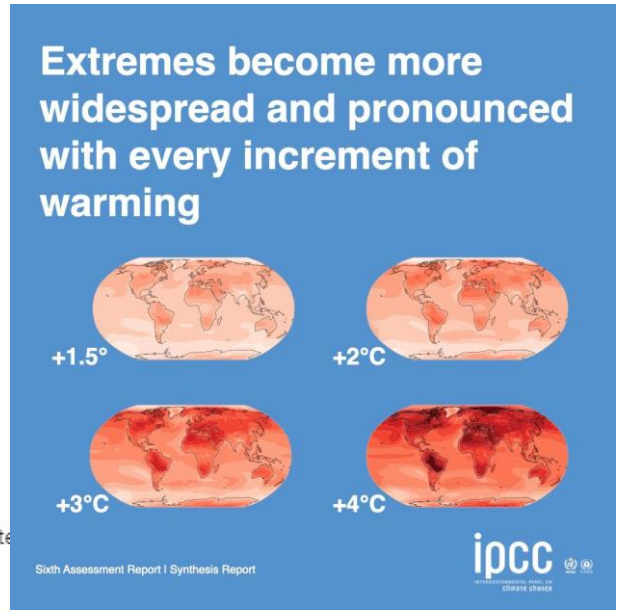
Amewu A. Mensah, Rainer Zah
March 28, 2023

Climate Crisis









Rise to action

Climate strikes 2019

Environmental Strategy

Goal 1

Climate Neutral City

Zurich is climate neutral and takes responsibility beyond the city limits.

Goal 3

Networked Urban Nature

Zurich complements urbanity with a variety of interconnected ecologically valuable habitats.

Goal 4

Intelligent Use of Resources

The city is a pioneer for resource conservation and an innovation driver for a circular economy.

Goal 2

Healthy Urban Environment

High environmental qualities in Zurich are the prerequisite offering everyone a healthy life in the city.

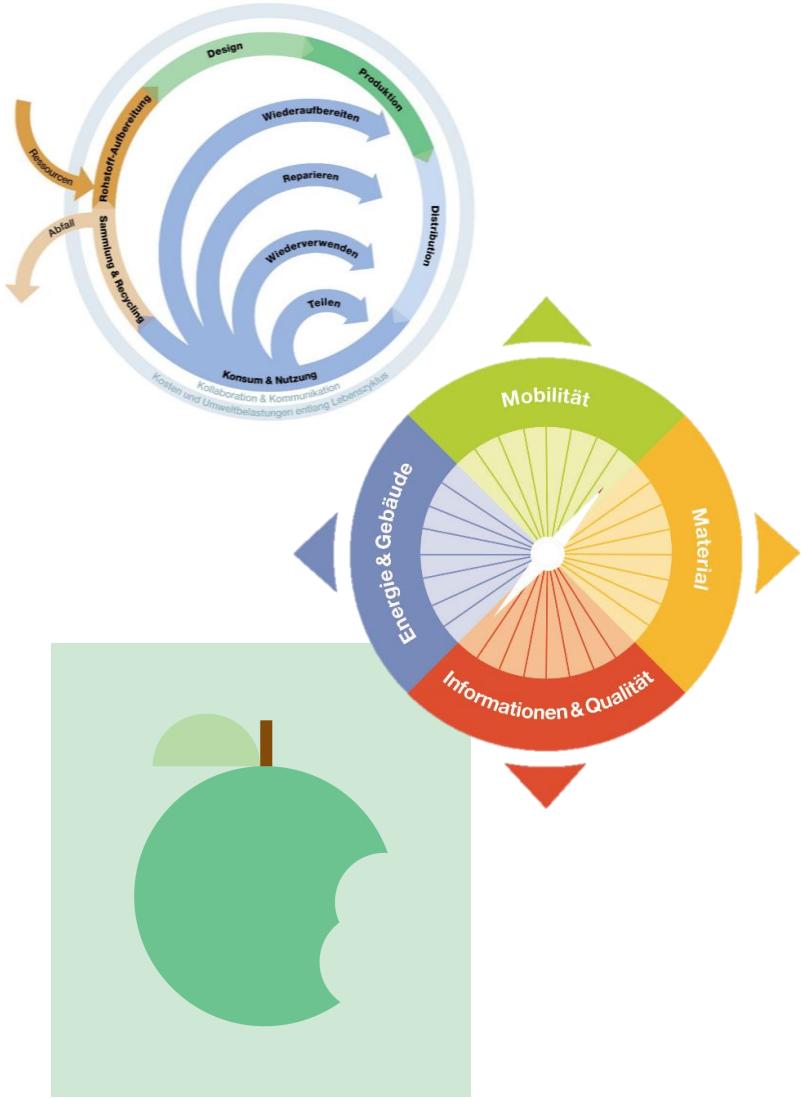
Goal 4

Intelligent Use of Resources

The city is a pioneer for resource conservation and an innovation driver for a circular economy.

Goal 4 – Intelligent Use of Ressources

- Circular Zurich
  - Cross-departmental strategy on implementing circular economy
- Eco-Compass
  - Consulting, networking for medium-sized enterprises
- Nutrition Strategy
  - Healthy and climate-friendly nutrition



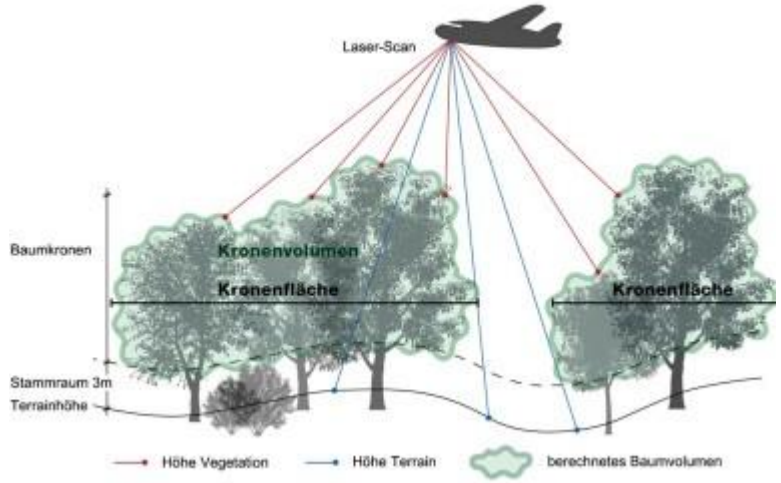
Goal 3

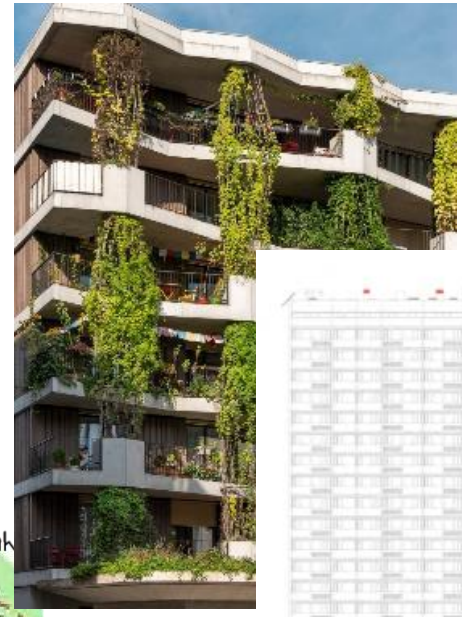
Networked Urban Nature

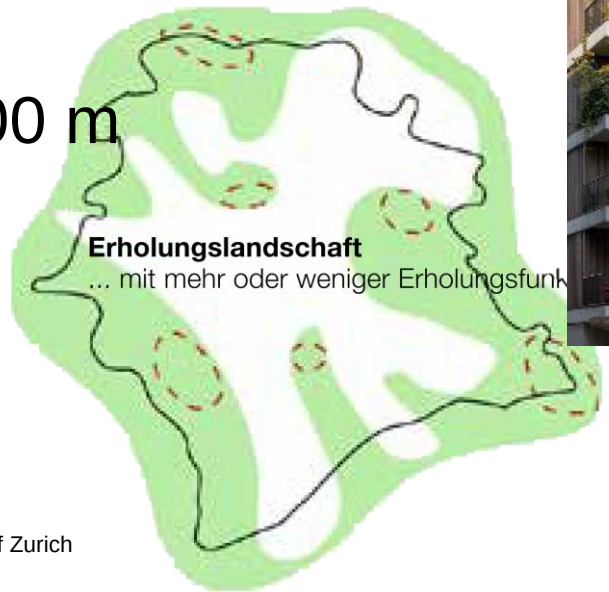
Zurich complements urbanity with a variety of interconnected ecologically valuable habitats.

Goal 3 – Networked Urban Nature

- Action Plan City Trees
  - Increase of tree top coverage from 17 to 25 % by 2029
- Living Wall Systems/Green Façade
  - Positive impact on multiple levels
- Recreational Space
  - 8 m^2/inhabitant within 200 – 400 m





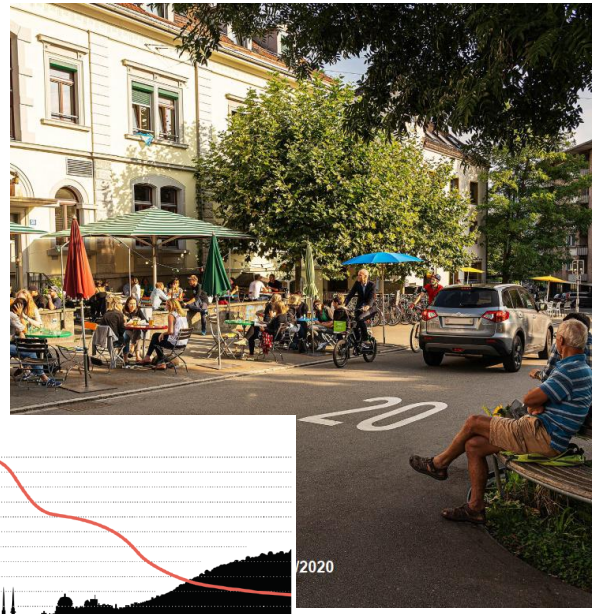


Goal 2

Healthy Urban Environment

High environmental qualities in Zurich are the prerequisite offering everyone a healthy life in the city.

Goal 2 – Healthy Urban Environment



- Noise Protection Strategy
  - Street noise
  - noise in planning & construction
  - noise of daily life
- Special Planning Heat Reduction
  - Reduce heat island effects
  - Preserve cold air systems
  - Relieve vulnerable areas
- Air Quality Action Plan
  - City of Zurich specific extended measures
  - Test lab for canton and Switzerland

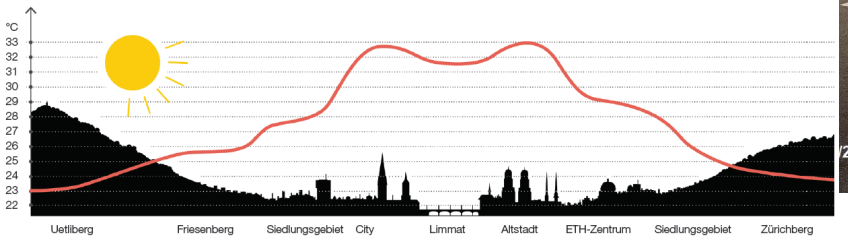
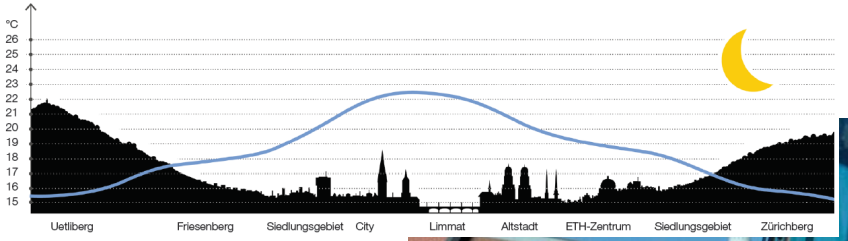
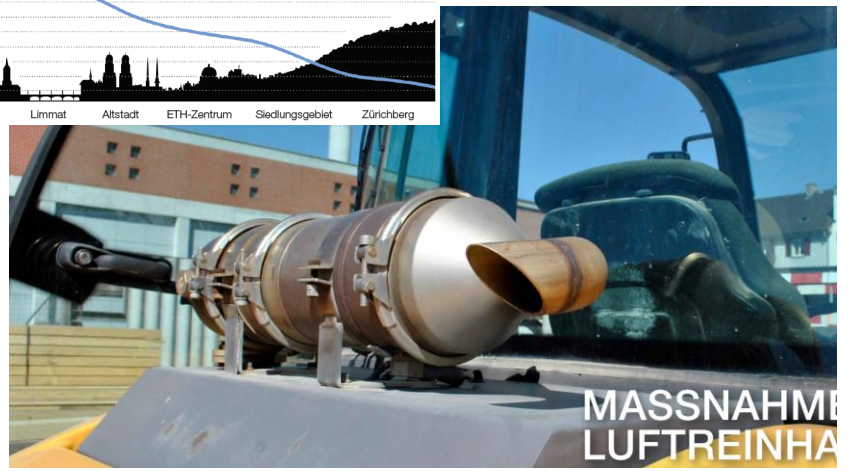


Abb. 6: Tagsituation - Wärmeinseleffekt (Lufttemperatur modelliert, ohne Berücksichtigung der Höhenlage)





Goal 1

Climate Neutral City

Zurich is climate neutral and takes responsibility beyond the city limits.

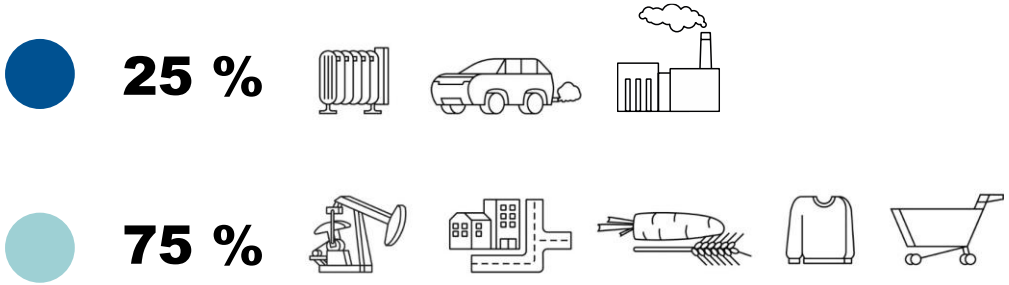
Referendum on May 15, 2022

Substantially more ambitious climate protection goal than before

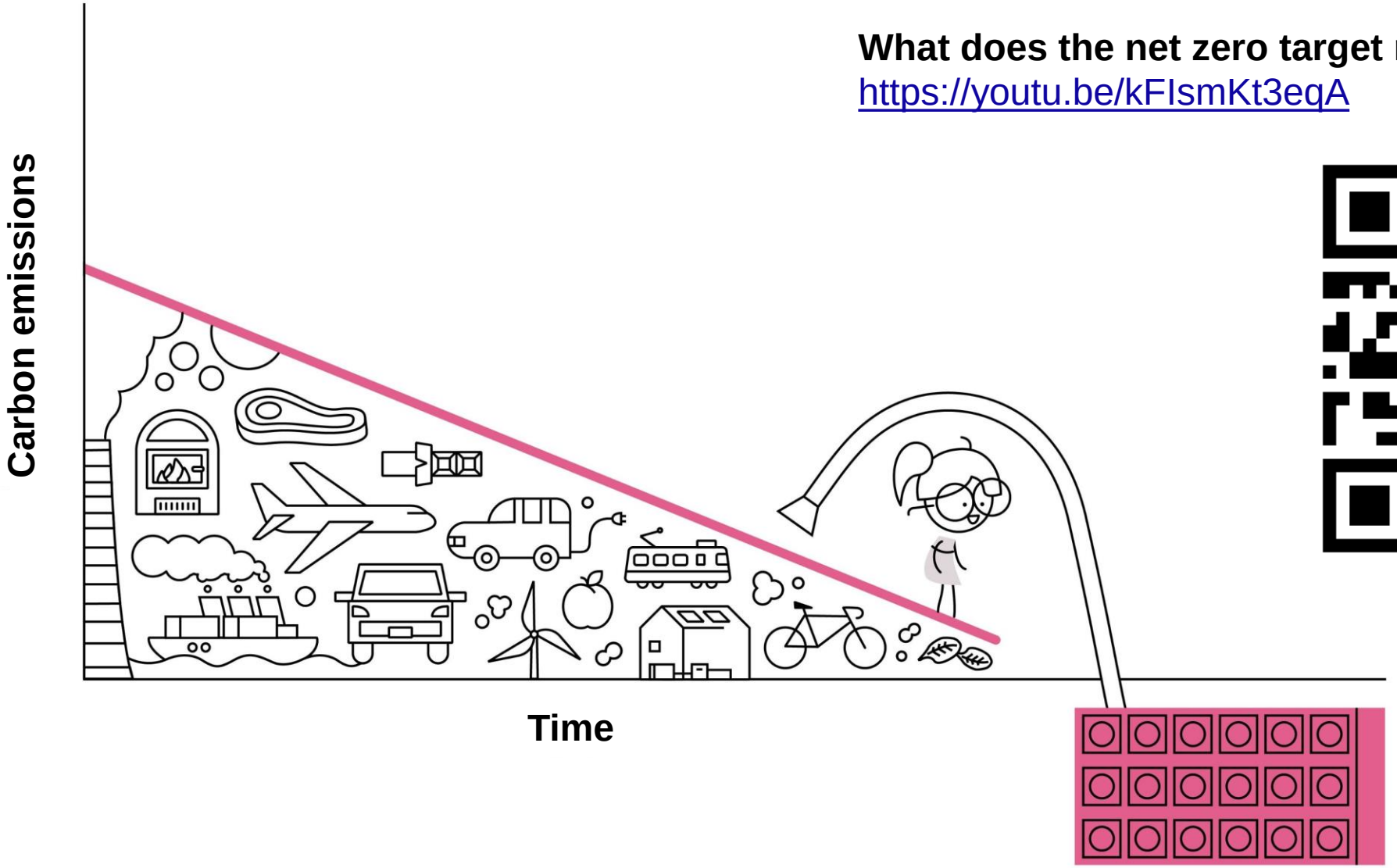
- Net-zero 2040 in the constitution of the city of Zurich
- 75 % voted YES
- Adjusted energy law of the canton of Zurich by September 1, 2022: replacement of oil- and gasheating at end of life.

Today's greenhouse gas emissions of Zurich

Influencing direct, indirect an negative emissions

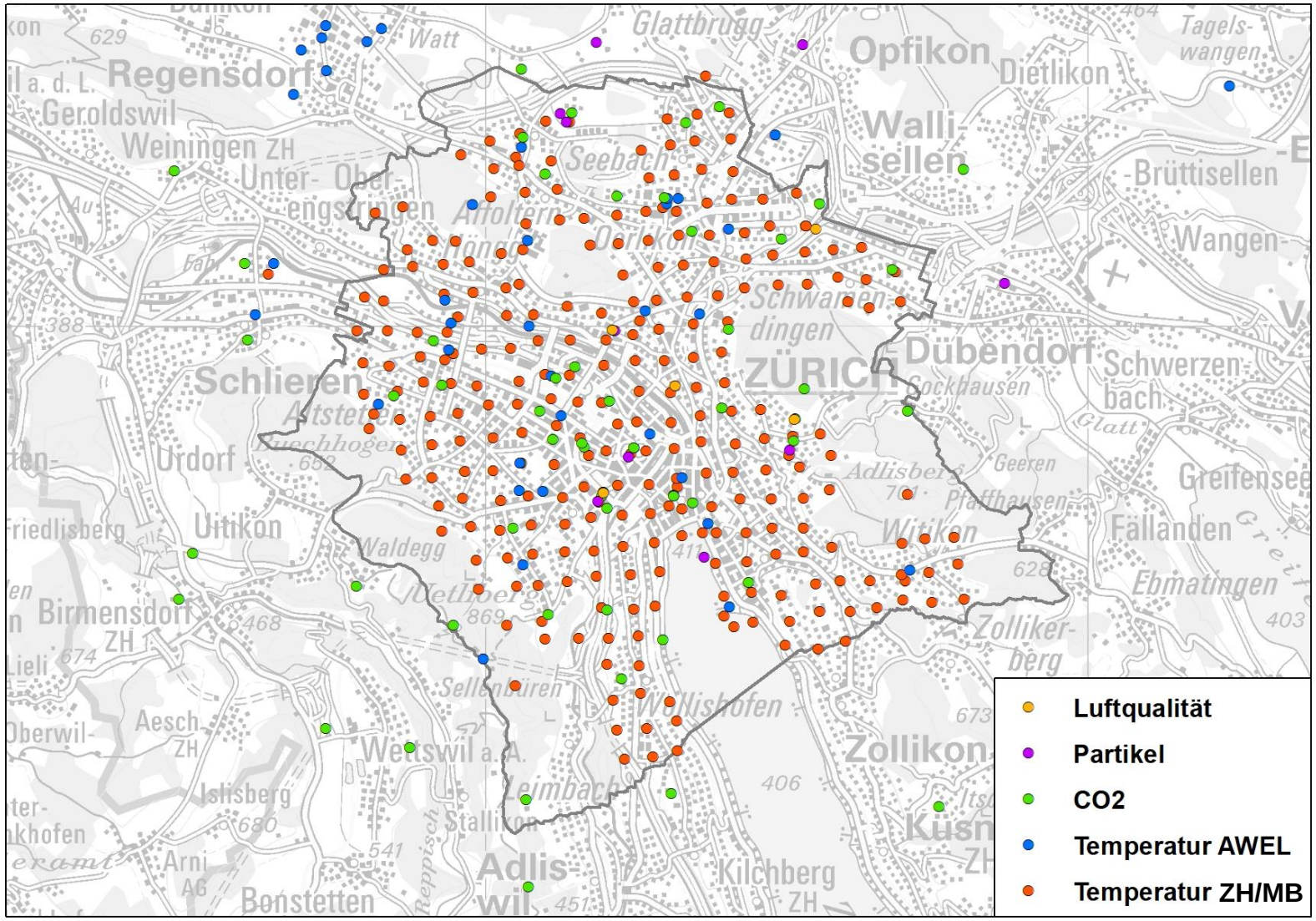


Scenario net zero



What does the net zero target mean for Zurich?
https://youtu.be/kFIsmKt3eqA

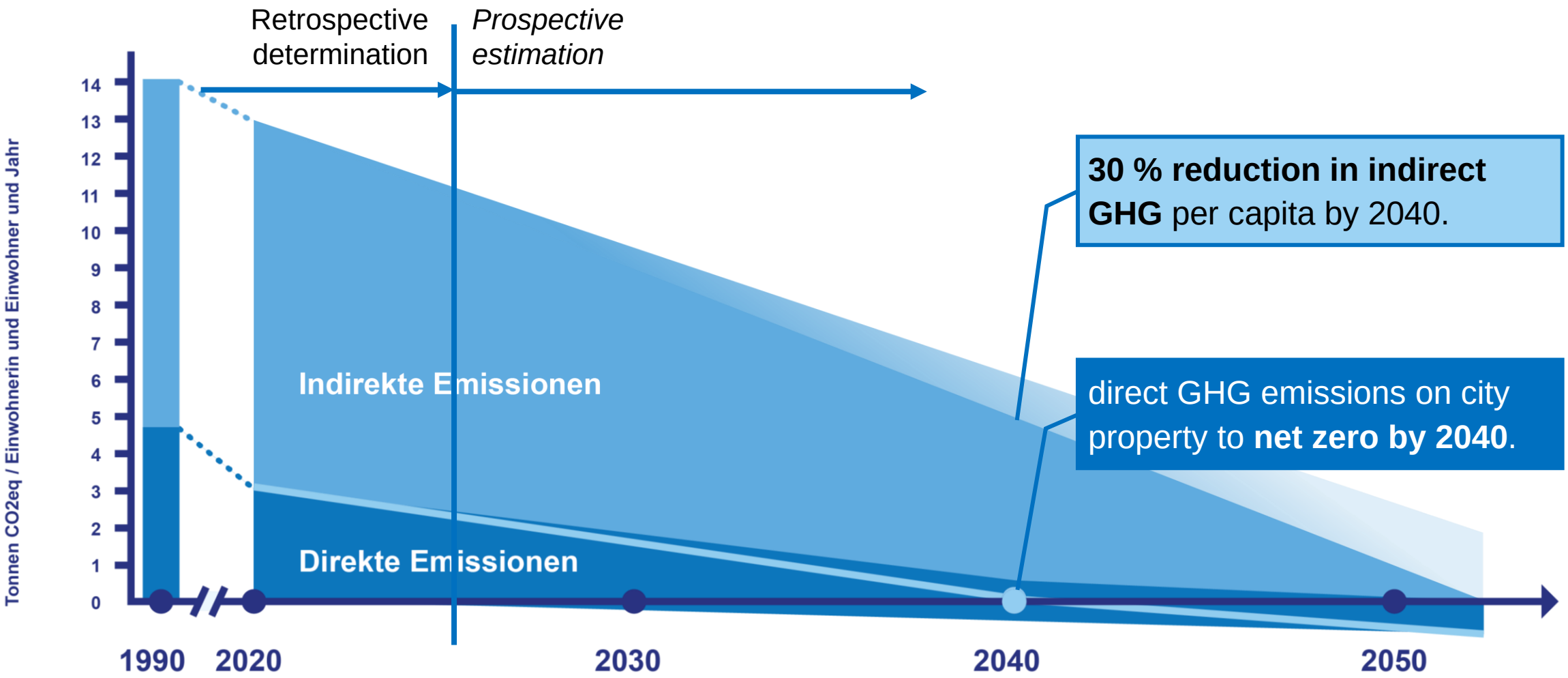
Measurement Networks



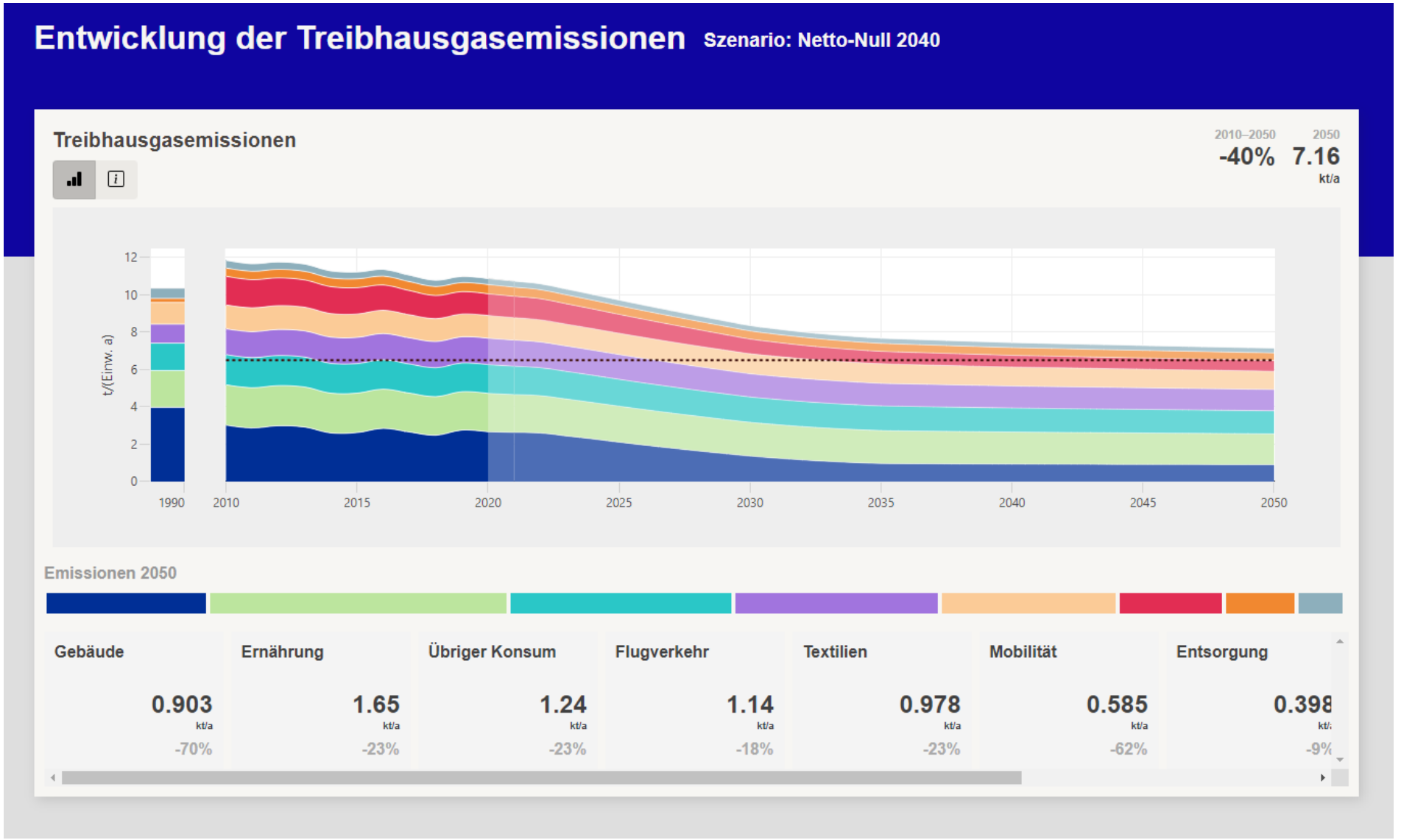
GHG Monitoring & Reporting

New aim: Net zero 2040 for the city of Zurich

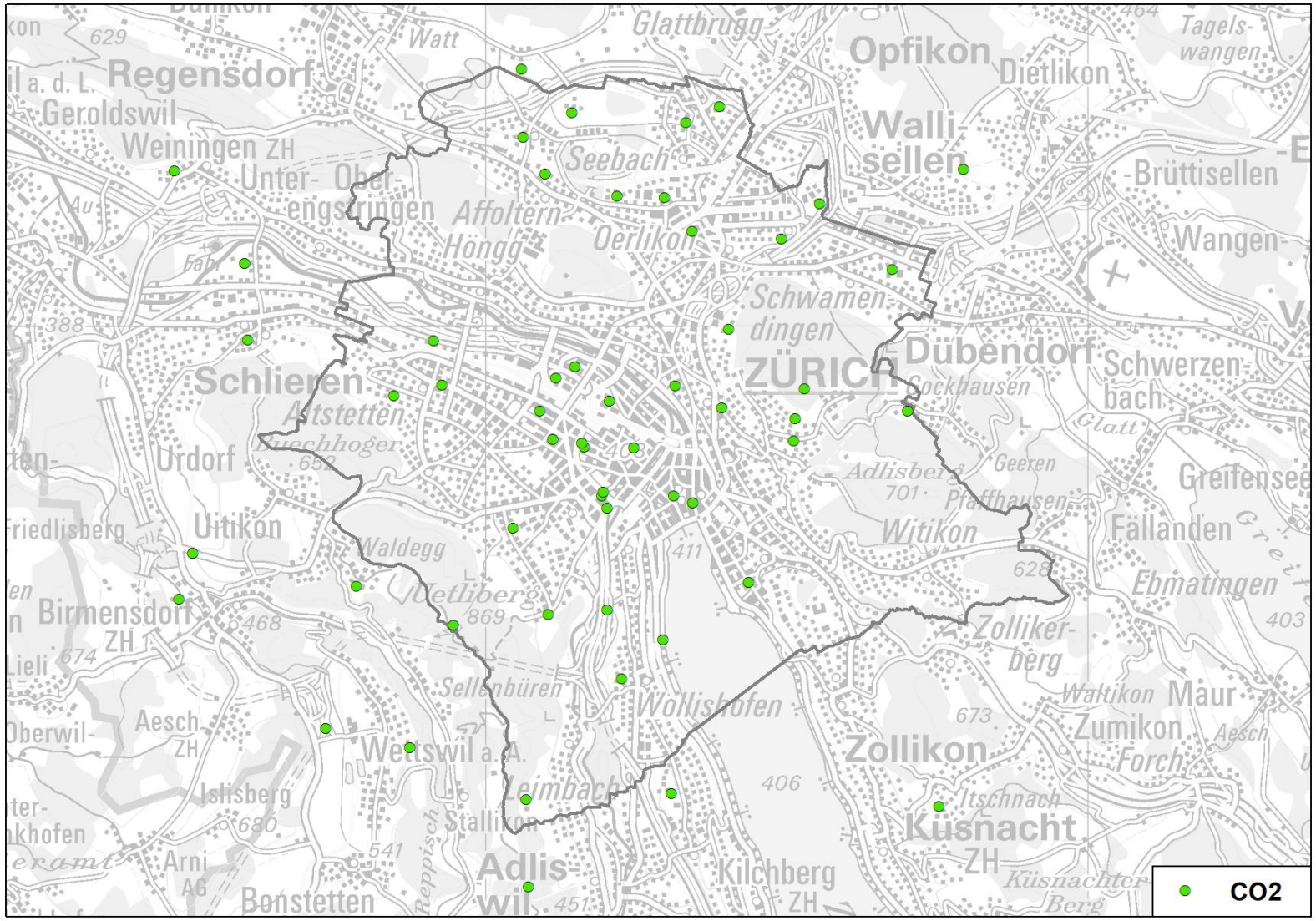
Measures within the influence of the city administration: Net zero 2035



Monitoring-Tool Kausal Paths

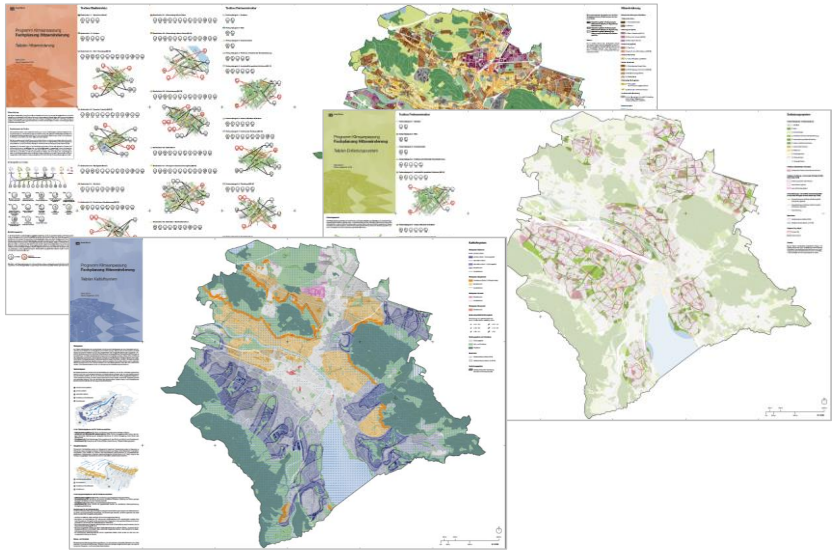


EMPA CO_2 Network



Urban Climate Monitoring

Special Planning Heat Reduction



+

Special Planning Heat Reduction

Report and 3 Maps

Planning basis incl. expertise
for administration, planners and property developers

Implementation Agenda

Implementation program
for the municipal administration

Toolbox – 13 Approaches and their Impact

Day

Grünflächen klimaökologisch gestalten

impact: - 8.7 °C
range: 7-20 m

Aufenthalts- und Bewegungsräume beschatten

impact: - 8.7 °C
range: 7-20 m

Wasser im städtischen Raum etablieren

impact: - 7.6 °C
range: 3-6 m

Fassaden klimaökologisch begrünen

impact: - 6.6 °C
range: 4-14 m

Freiräume und Strassen entsiegeln und begrünen

impact: - 6.6 °C
range: 2-4 m

Dächer klimaökologisch begrünen

impact: - 5.5 °C
range: 4-9 m
(auf Dachniveau)

Baukörper für günstiges Mikroklima optimieren

je nach Standort unterschiedliche Wirkung

Night

Fassaden klimaökologisch begrünen

impact: - 1.7 °C
range: 2-4 m

Dächer klimaökologisch begrünen

impact: - 1.4 °C
range: 2-4 m
(nur auf Dachniveau)

Freiräume und Strassen entsiegeln und begrünen

impact: - 1.3 °C
range: 2-3 m

Grünflächen klimaökologisch gestalten

impact: - 1.2 °C
range: 2-10 m

Aufenthalts- und Bewegungsräume beschatten

impact: - 1.2 °C
range: 2-6 m

Wasser im städtischen Raum etablieren

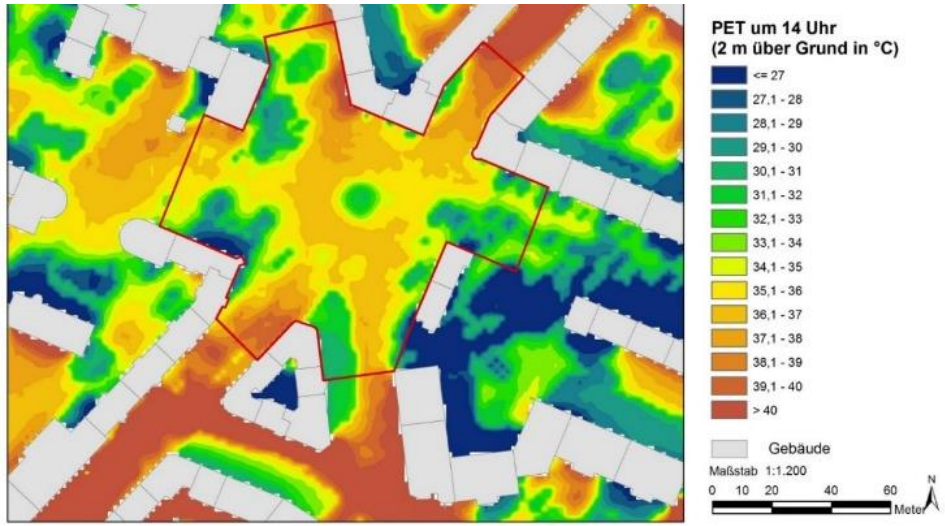
impact: - 1.2 °C
range: 2-4 m

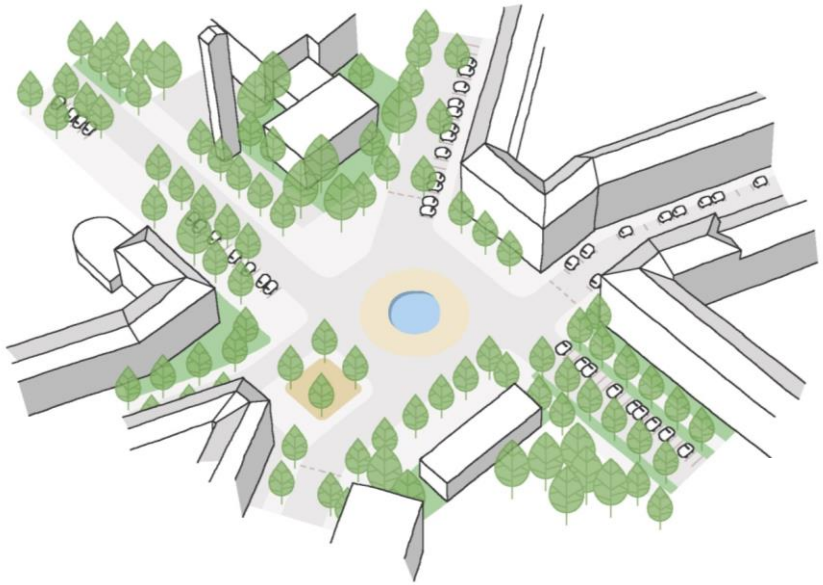
Baukörper für günstiges Mikroklima optimieren

je nach Standort unterschiedliche Wirkung

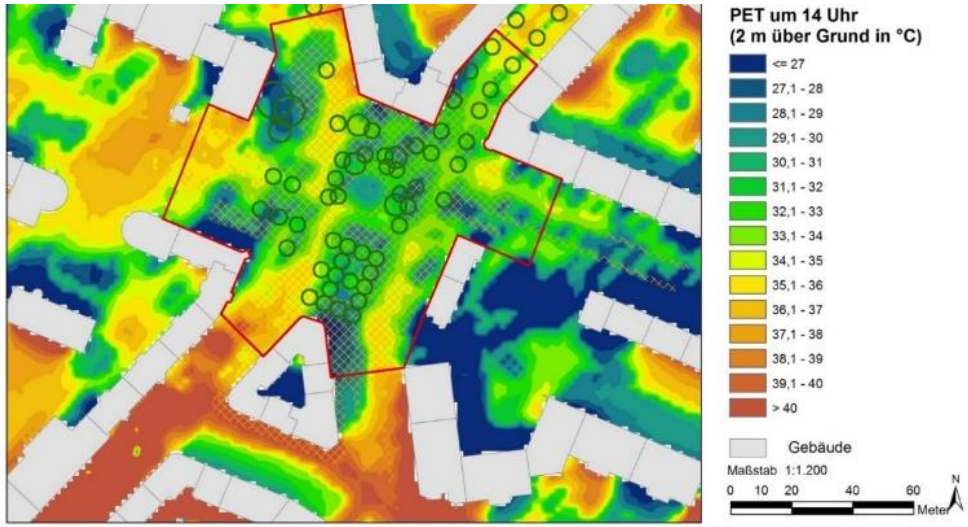
Toolbox – Impact of Selected Measures on a Square

Current aituation

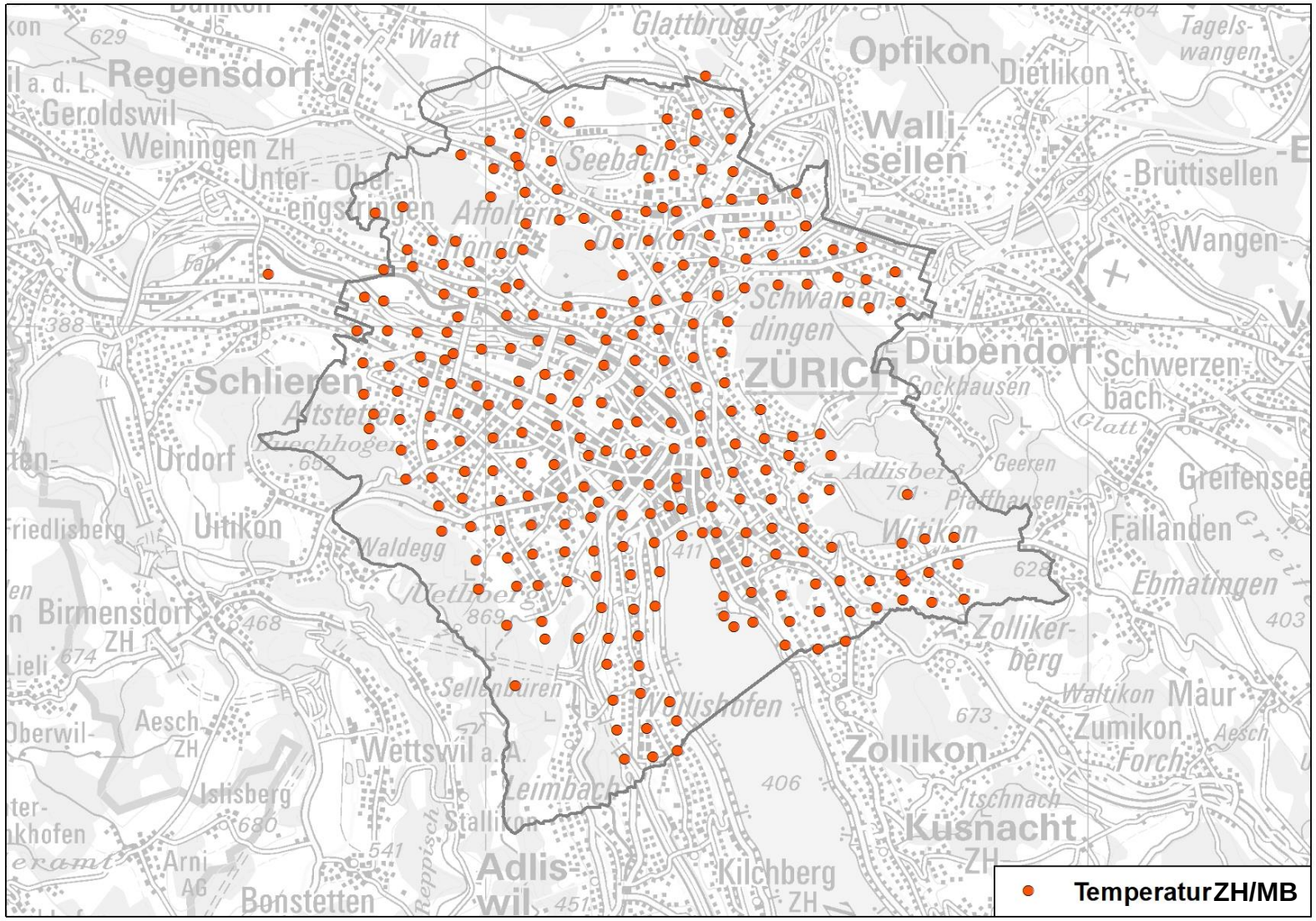




Modelling

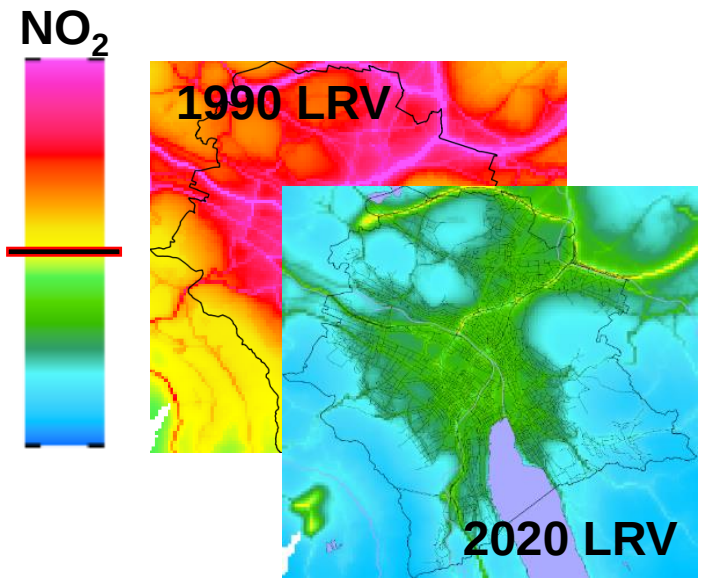


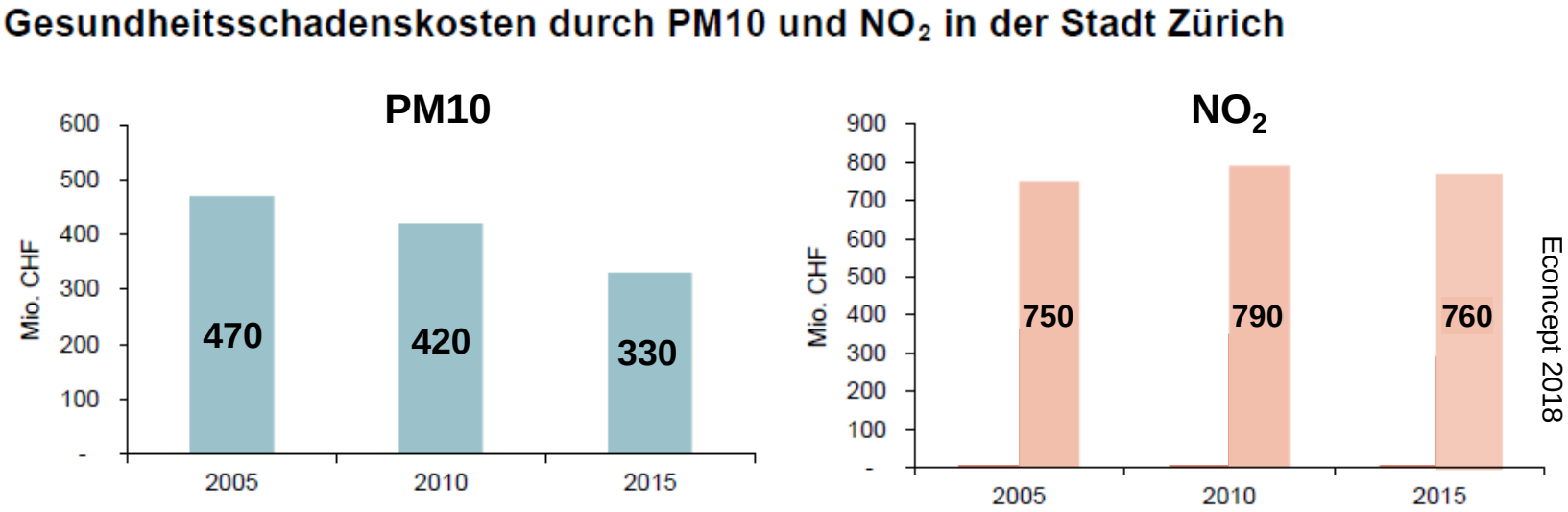
Temperature Networks



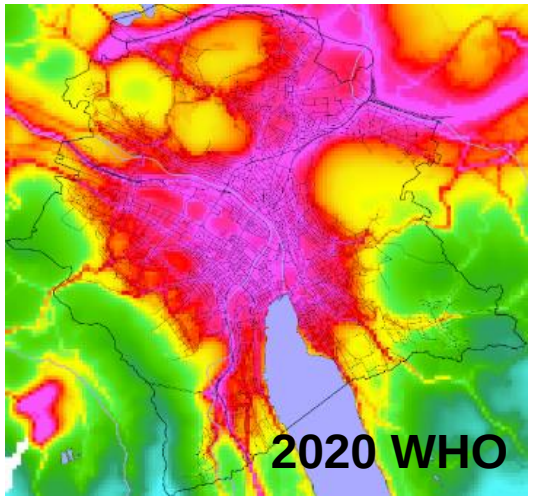
Air Quality Monitoring

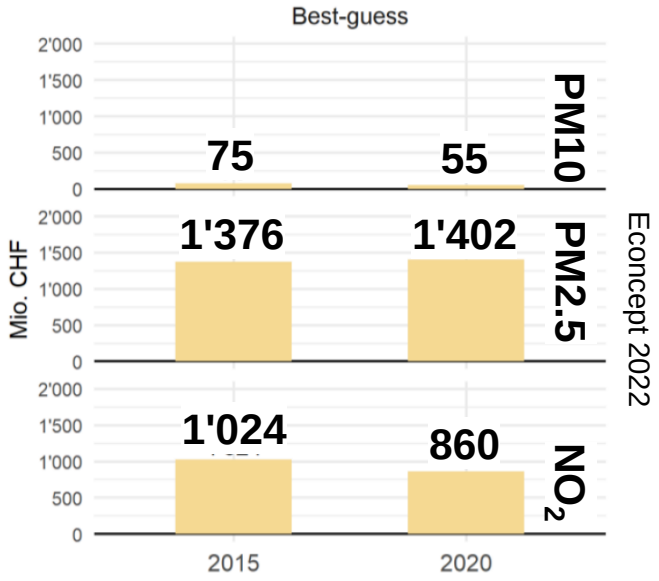
Pollution Burden & Associated Costs





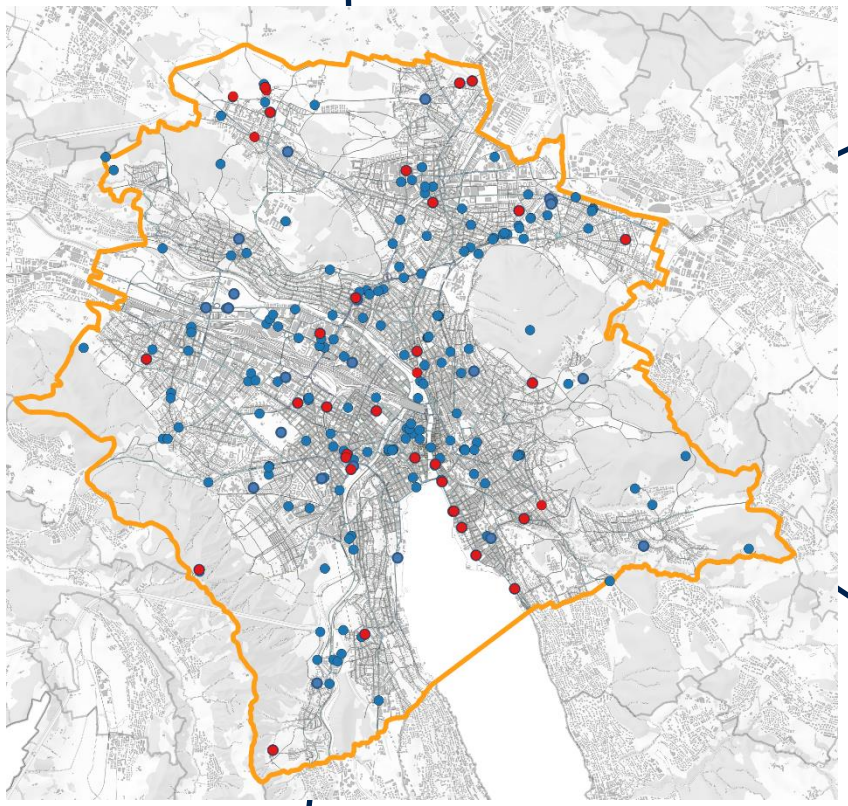
Schadstoff	LRV Grenzwert
PM_{10} [µg/m³]	20
$PM_{2.5}$ [µg/m³]	10
NO_2 [µg/m³]	30





Air Quality Networks

Rosengartenstrasse 2014



Stampfenbachstrasse 1983

NO_2 – PS	
currently:	37
total:	~250

GASE	NO_2
	O_3
	SO_2
	CO
PARTIKEL	PM_{10}
	$PM_{2.5}$
	PN
	EC
Meteo	

Schimmelstrasse 1988

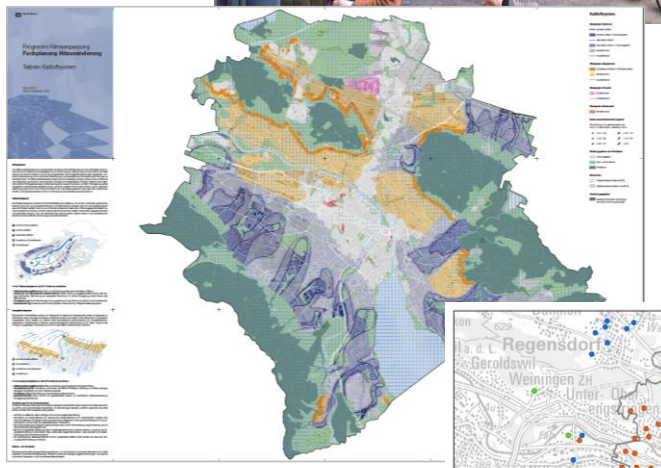
Schulhaus Heubeeribüel 1992

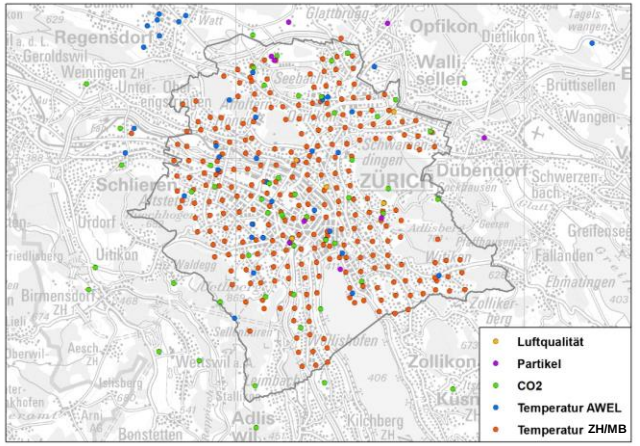
Summary

– City of Zurich Environmental Strategy
  • 4 key areas

– Action Plans & Strategies
  • Individual key areas

– Measurement Networks
  • Monitoring of key parameters

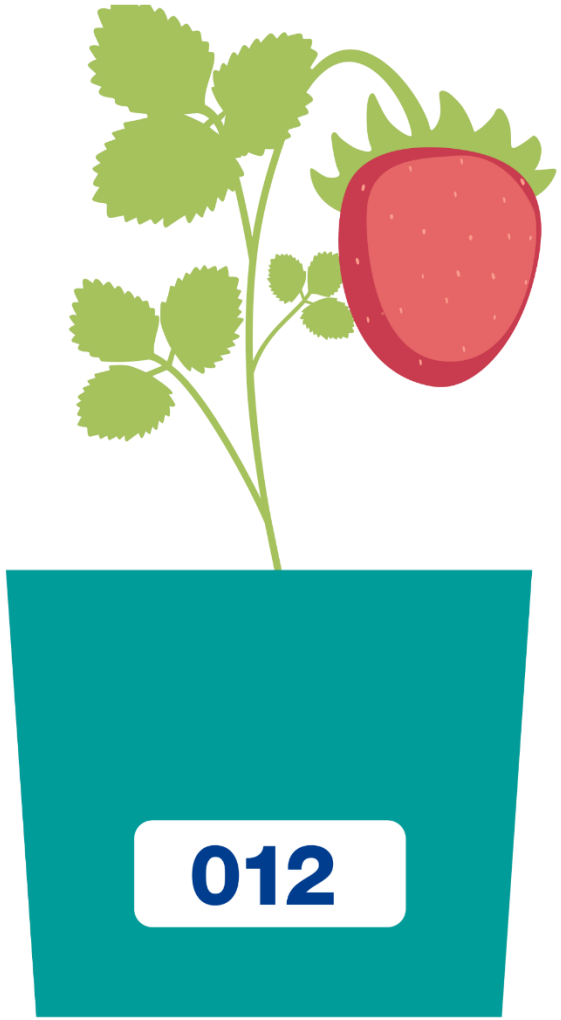




Thank you.

Luftbeeren – Mittendrin statt nur dabei

Erdbeerpflanzen als biologische Messstationen



Konzept

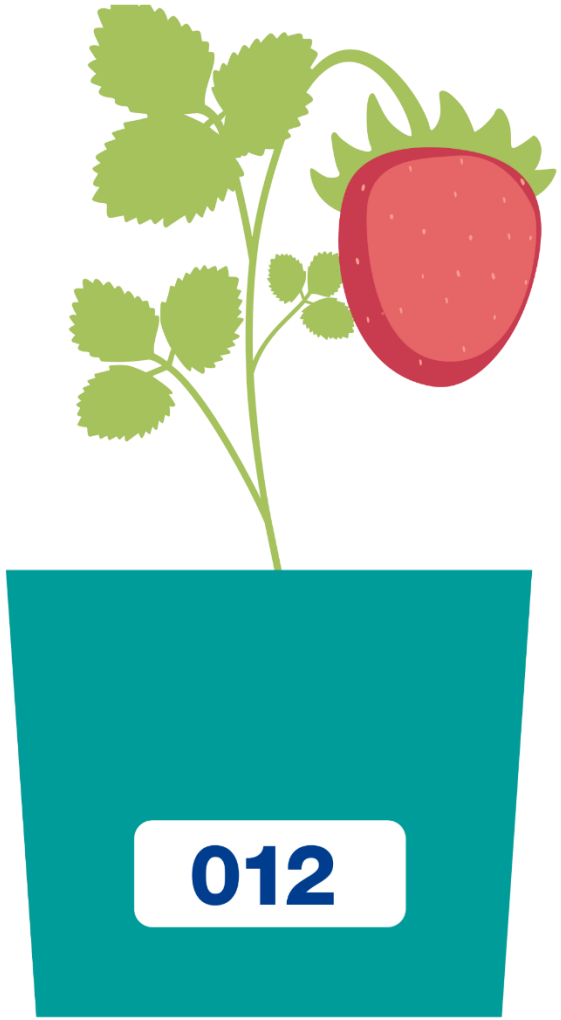
- Citizen Science – Beteiligung der Bevölkerung
- Beitrag zur Forschung (soz. & nat.)
- Sensibilisierung für alltagsferne Themen

Erdbeeren

- Pflanzen sind sehr robust (Trockenheit, Kälte)
- Leckere Früchte
- Freude in COVID-Zeiten

Luftbeeren – Mittendrin statt nur dabei

Erdbeerpflanzen als biologische Messstationen



Verteilung

- 2 Stadtsiedlungen + 2 Schulklassen
- 330 Pflanzen & 22 Sensoren (Klassen & Interessierte)

Analyse

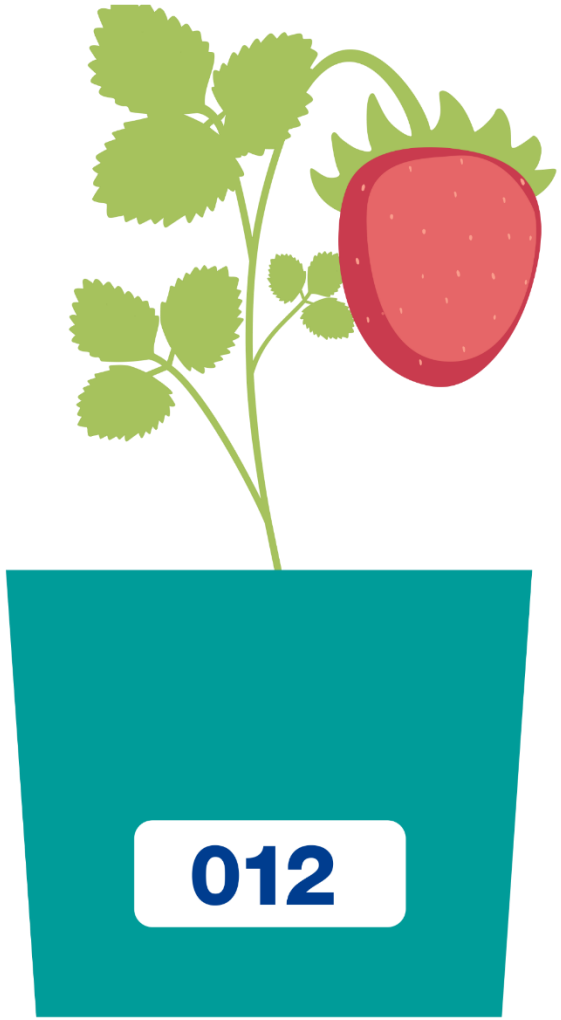
- 2 Monaten Exposition der Blätter
- Bestimmung der Suszeptibilität

Riedtli Siedlung
319 Wohnungen
150 Schüler*innen

Bucheggplatz
138 Wohnungen
680 Schüler*innen

Luftbeeren – Mittendrin statt nur dabei

Erdbeerpflanzen als biologische Messstationen

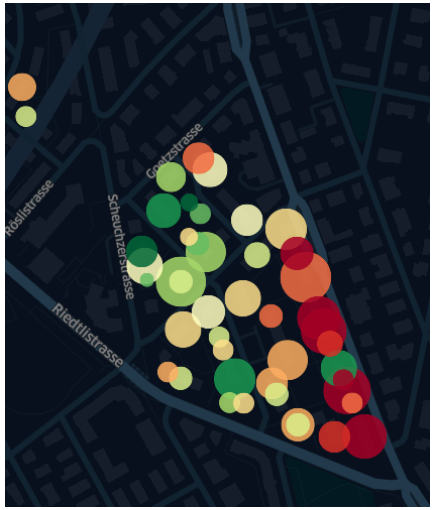


Aktivitäten

- Verteilaktion, Newsletter, Microsite
- Fragerunden, Unterricht, Workshops
- Scientifica, SRF CO_2-control

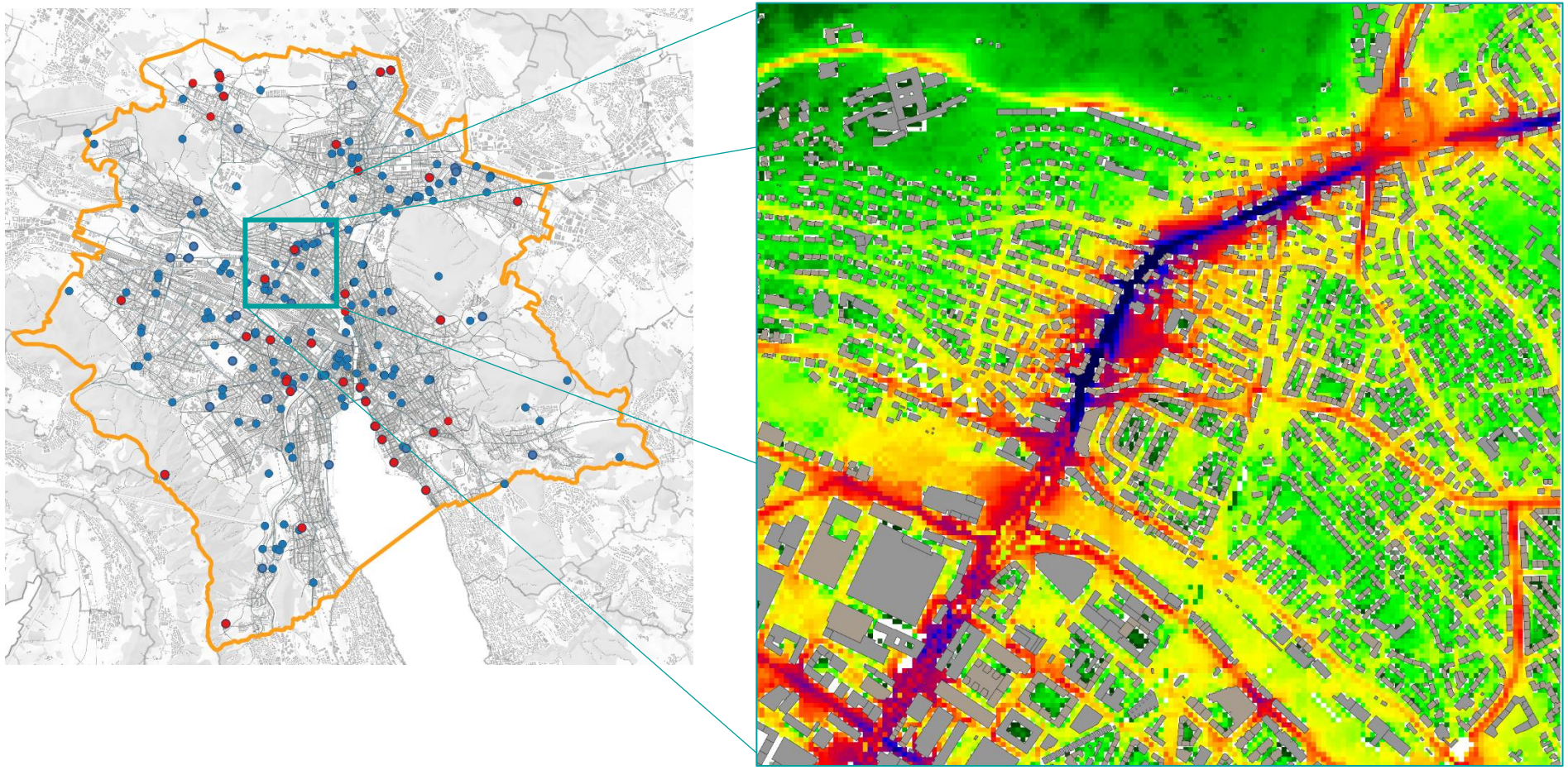
Ergebnisse

- 73 % Rücksendungen!
- Mehr Schadstoffe entlang grosser Strassen

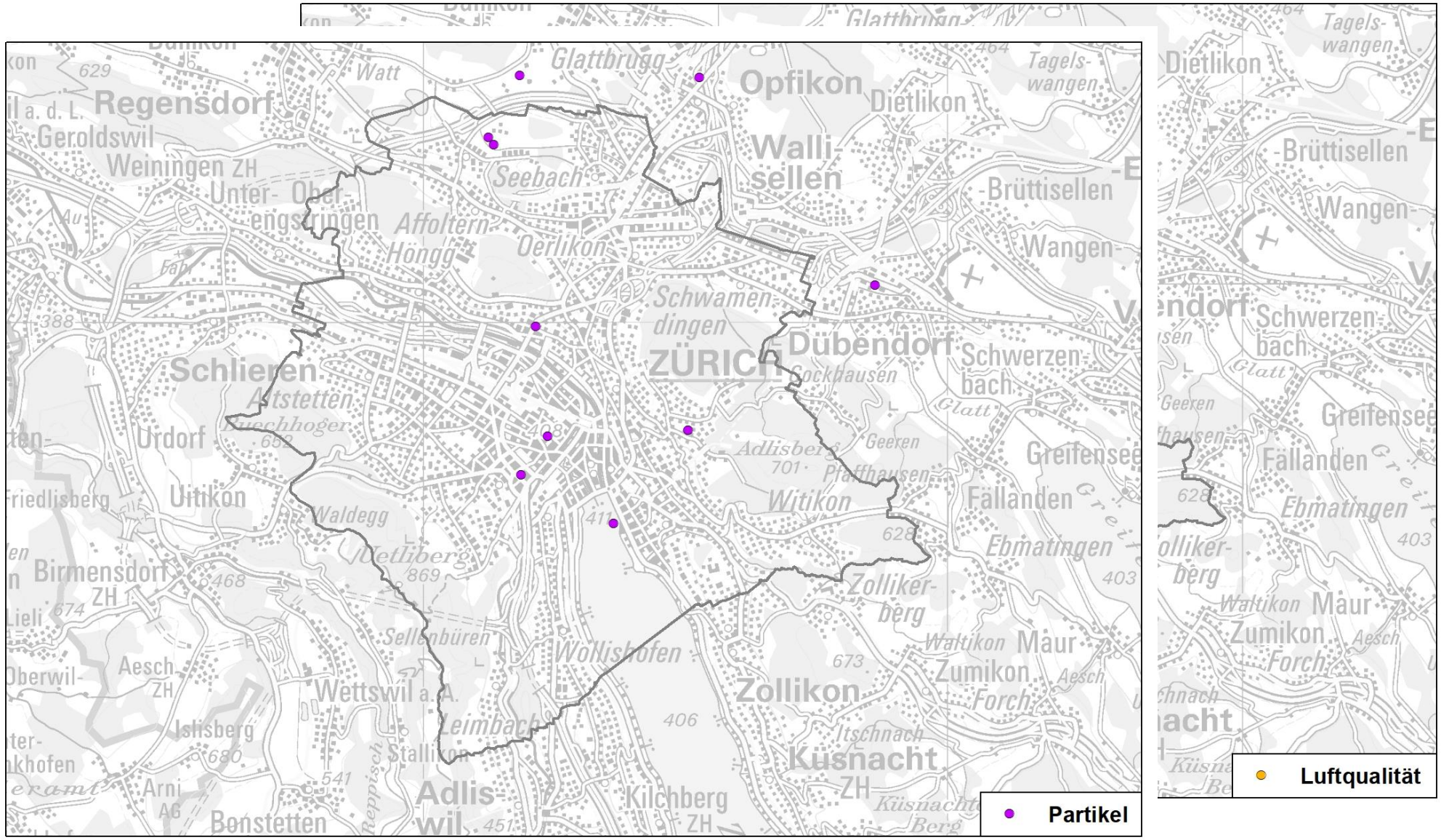


Appendix

Messungen – NO_2-Passivsammler

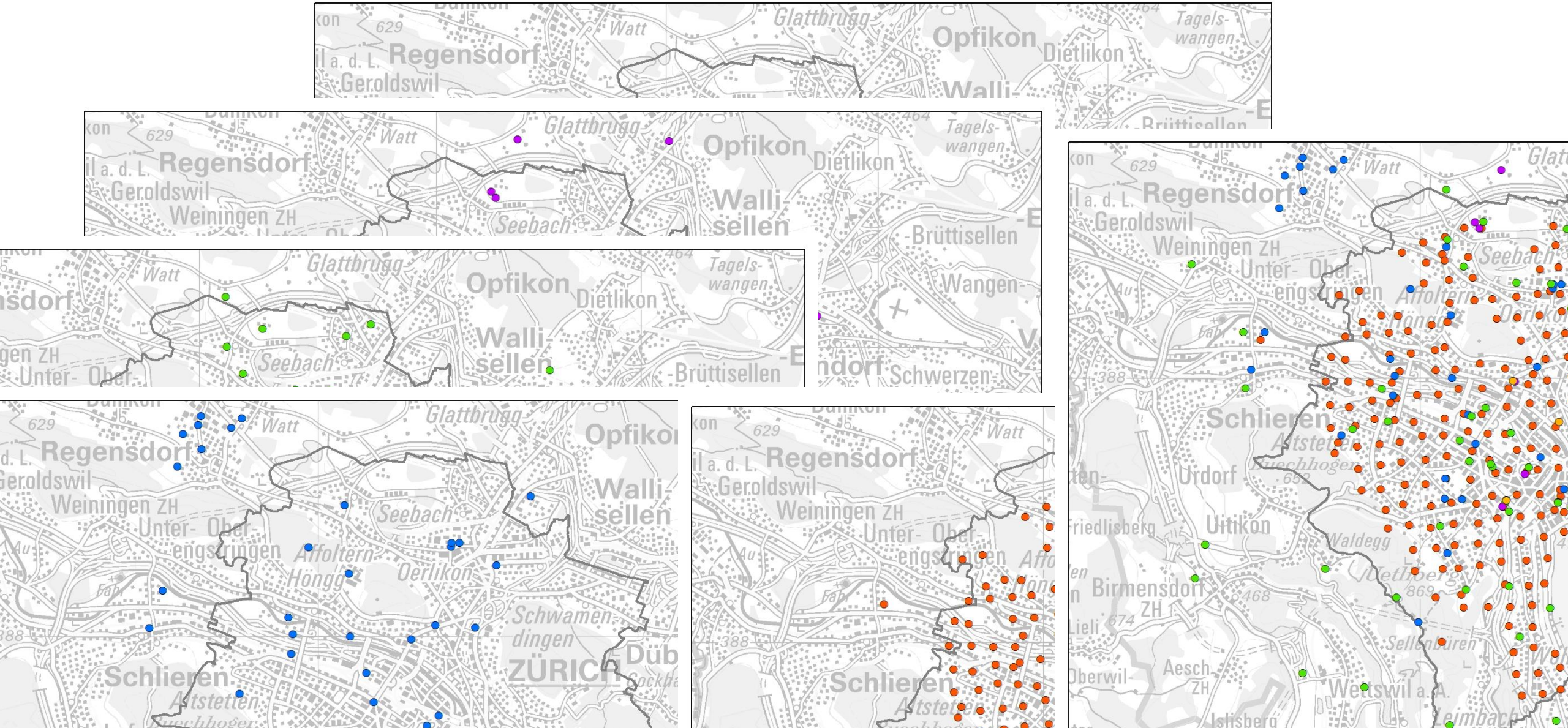


Air Quality-Networks

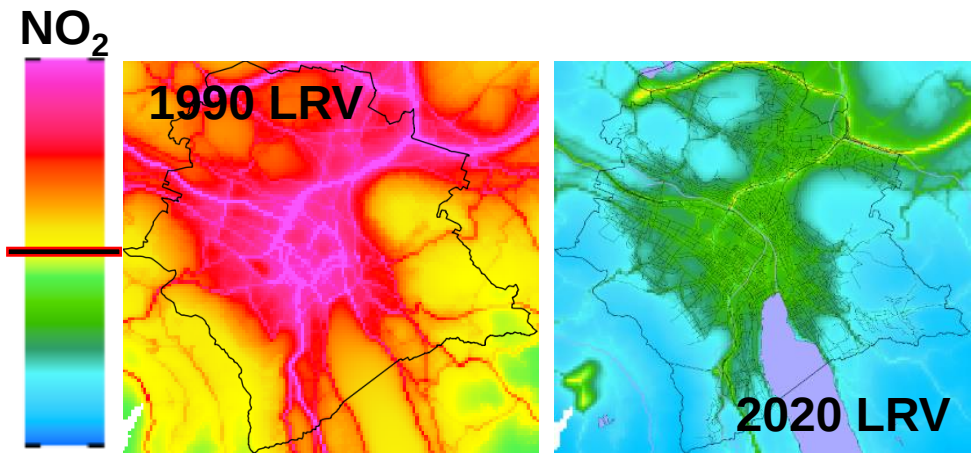


ES GHG UC AQ

Measurement Networks

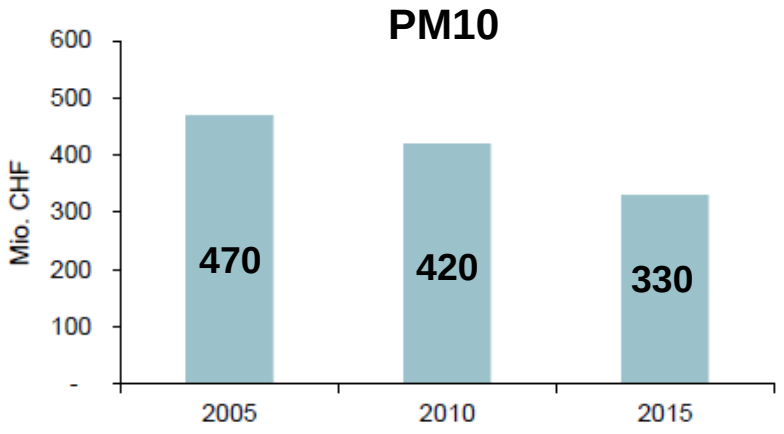


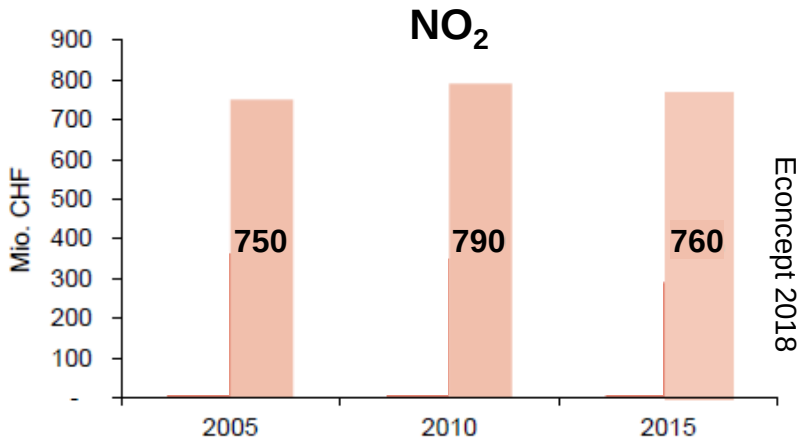
Pollution Burden & Assoziated Costs



Schadstoff	LRV Grenzwert
PM_{10} [µg/m³]	20
$PM_{2.5}$ [µg/m³]	10
NO_2 [µg/m³]	30

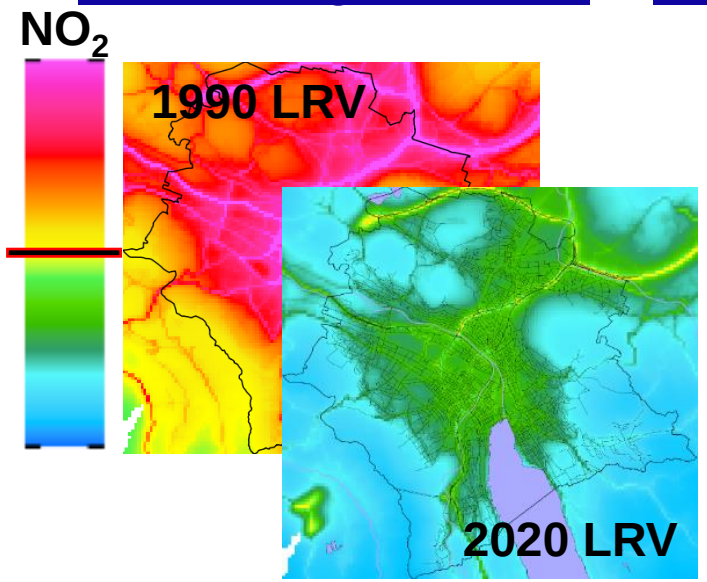
Gesundheitsschadenskosten durch PM10 und NO_2 in der Stadt Zürich

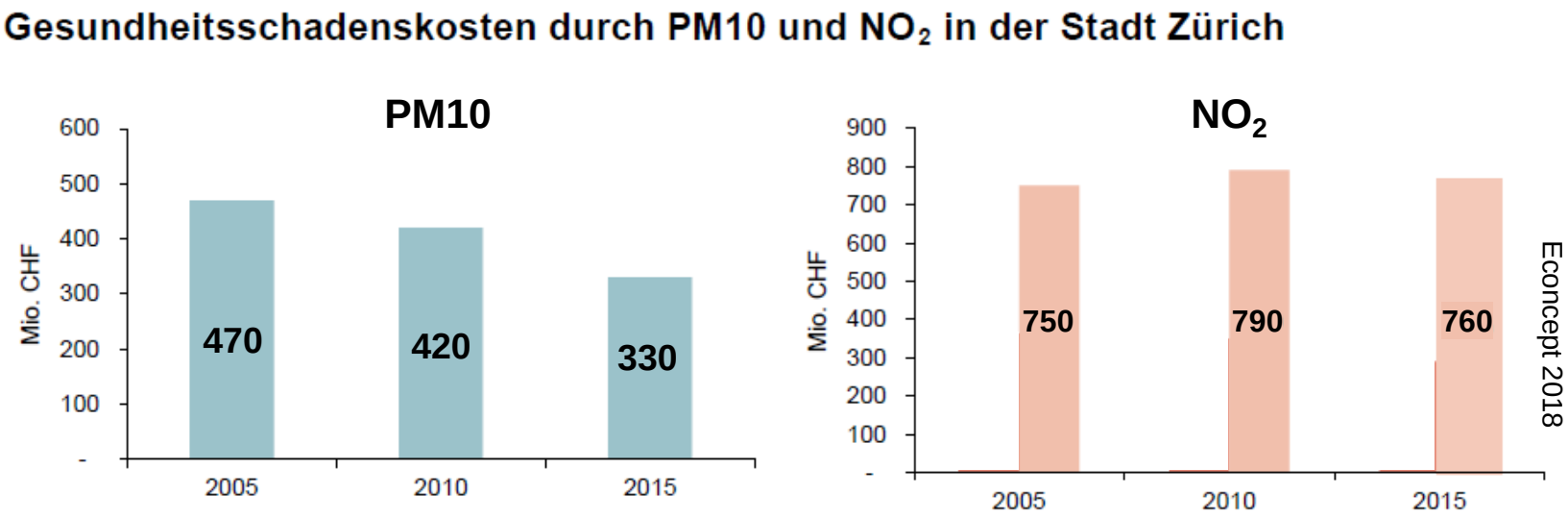




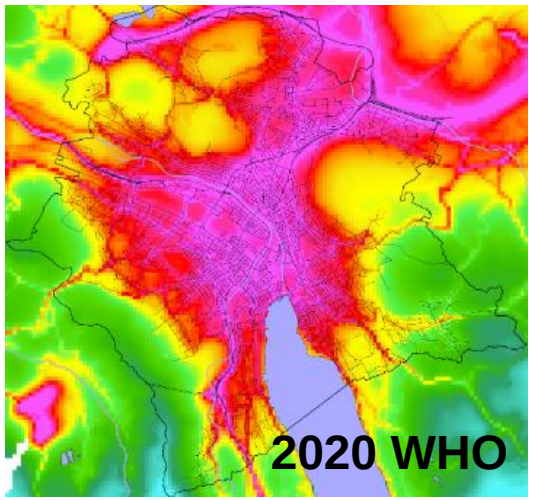
Pollution Burden & Assoziated Costs

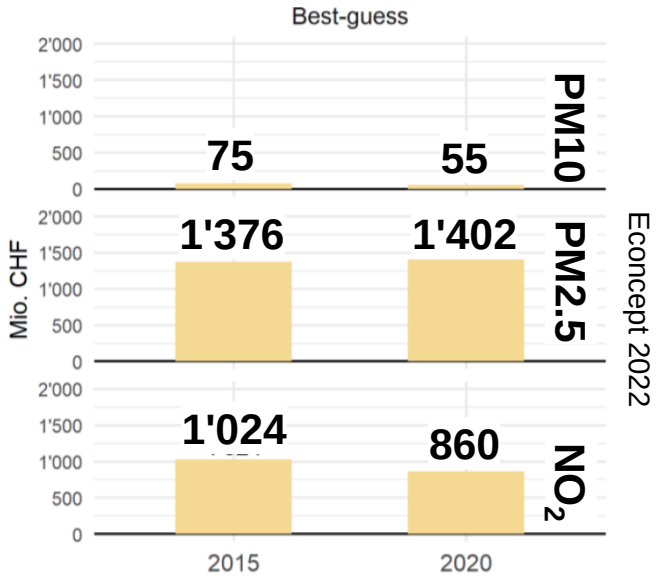
WHO AQG 2021 & StZh Study 2022





Schadstoff	LRV Grenzwert	WHO Richtwert
PM_{10} [µg/m³]	20	15
$PM_{2.5}$ [µg/m³]	10	5
NO_2 [µg/m³]	30	10



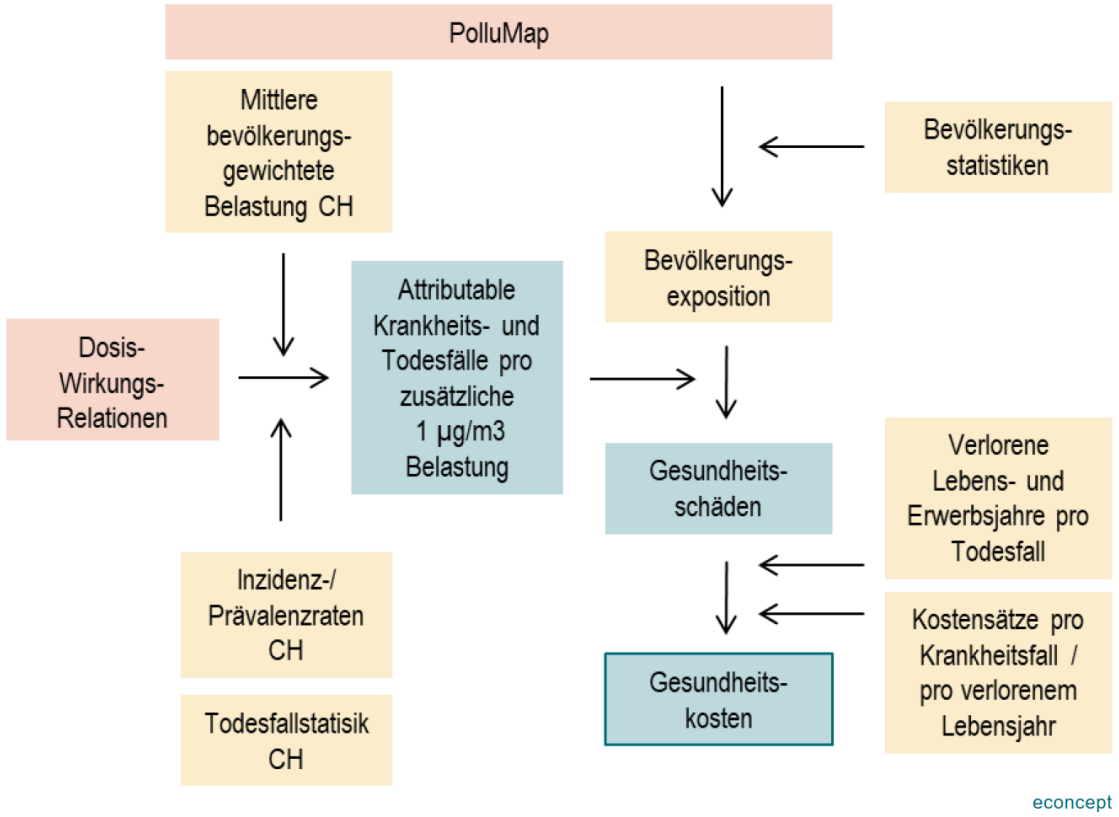


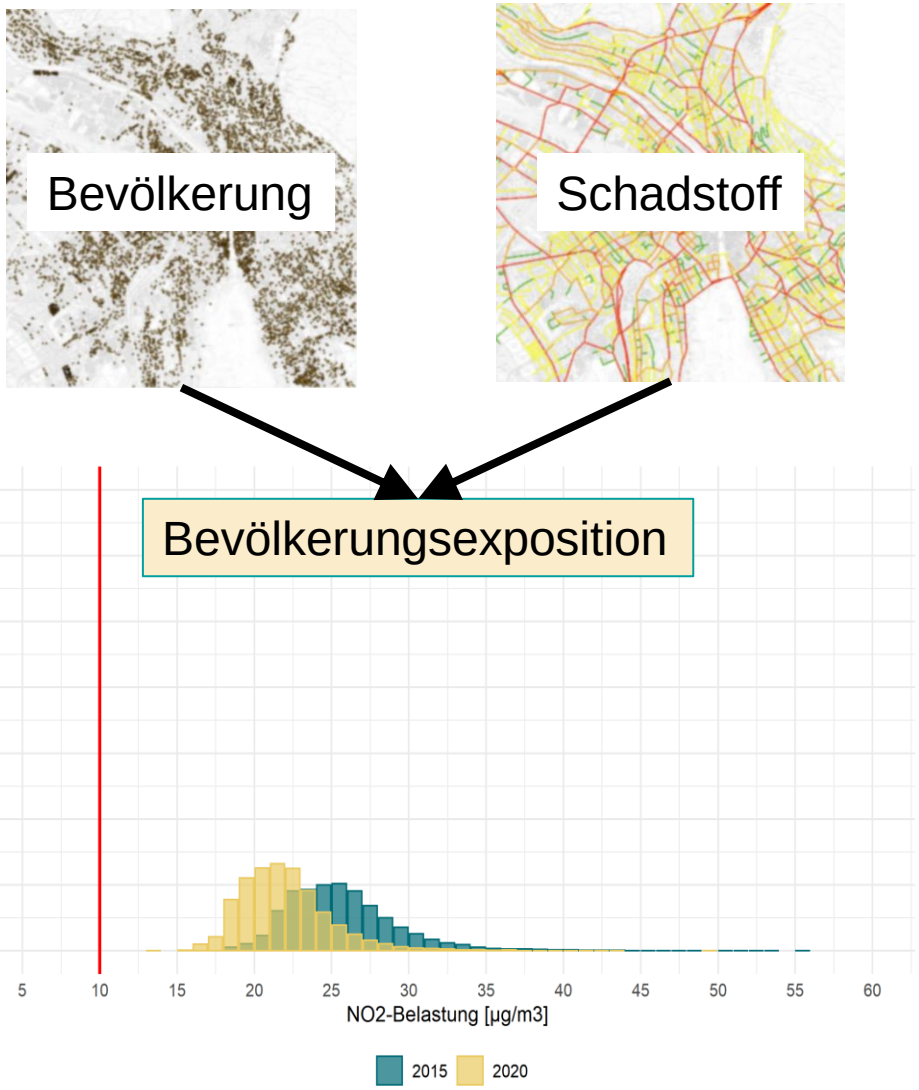
Schadstoffbelastung & assoziierte Kosten

Methodik – Berechnung der Kosten

aus: Studie econcept, 2022

Übersicht Vorgehen Kostenschätzung



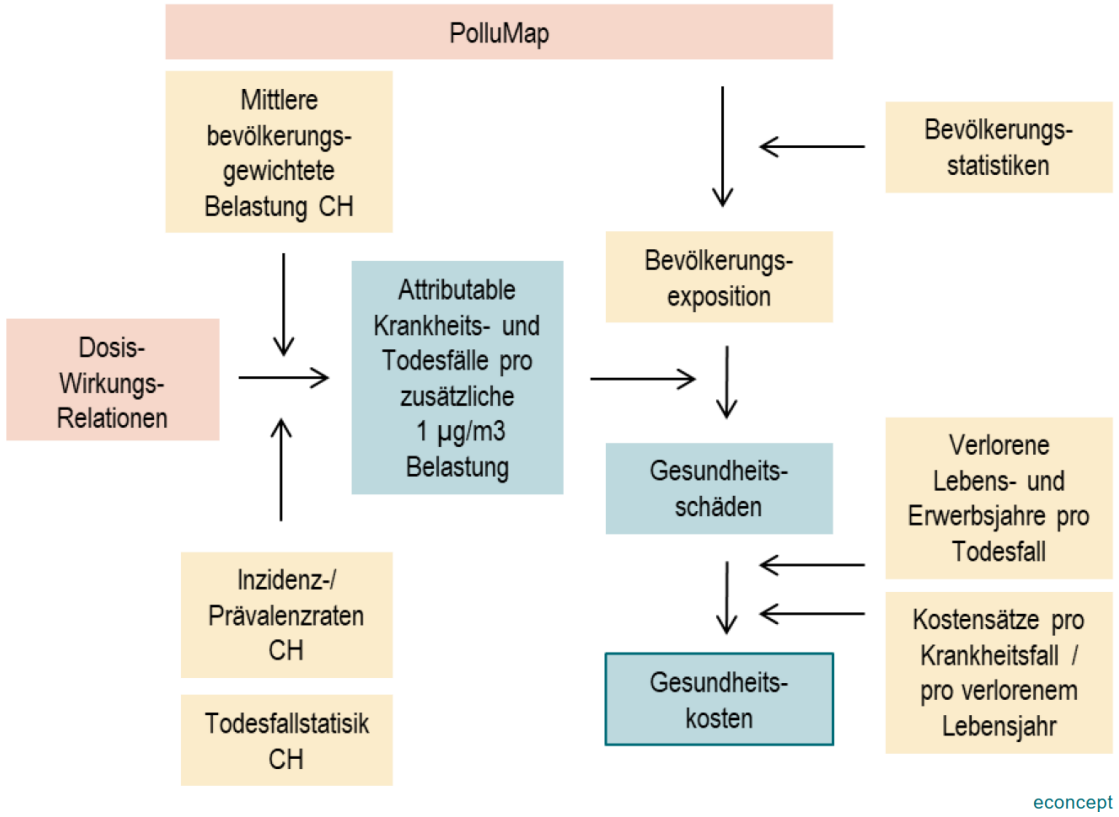


Schadstoffbelastung & assoziierte Kosten

Methodik – Entwicklung der Determinanten

aus: Studie econcept, 2022

Übersicht Vorgehen Kostenschätzung



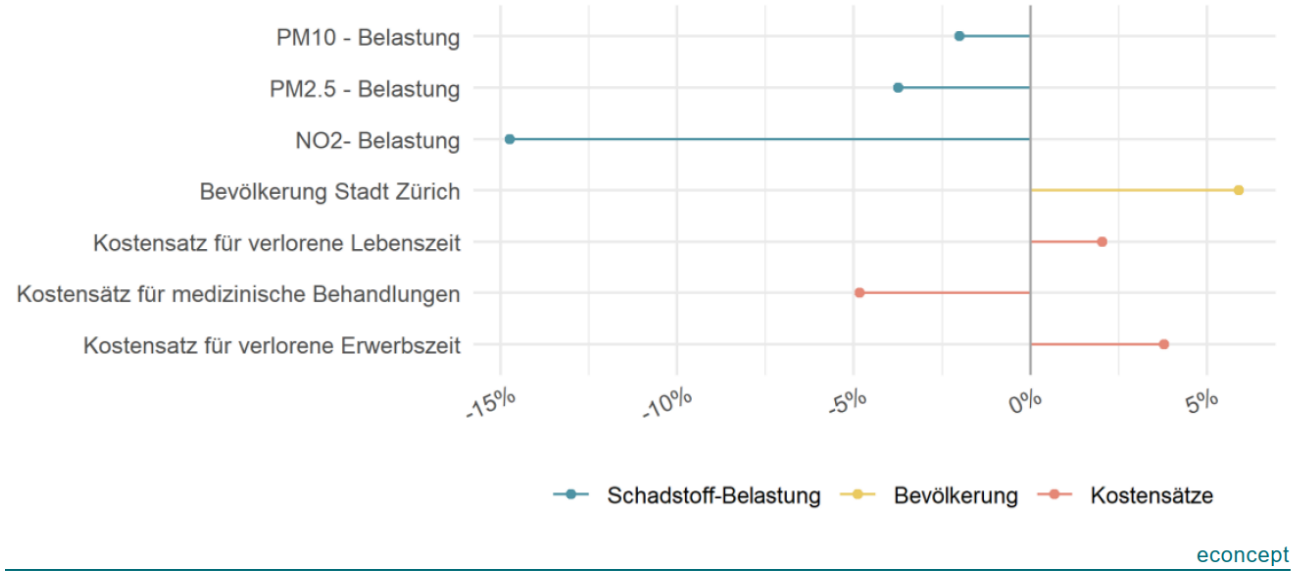
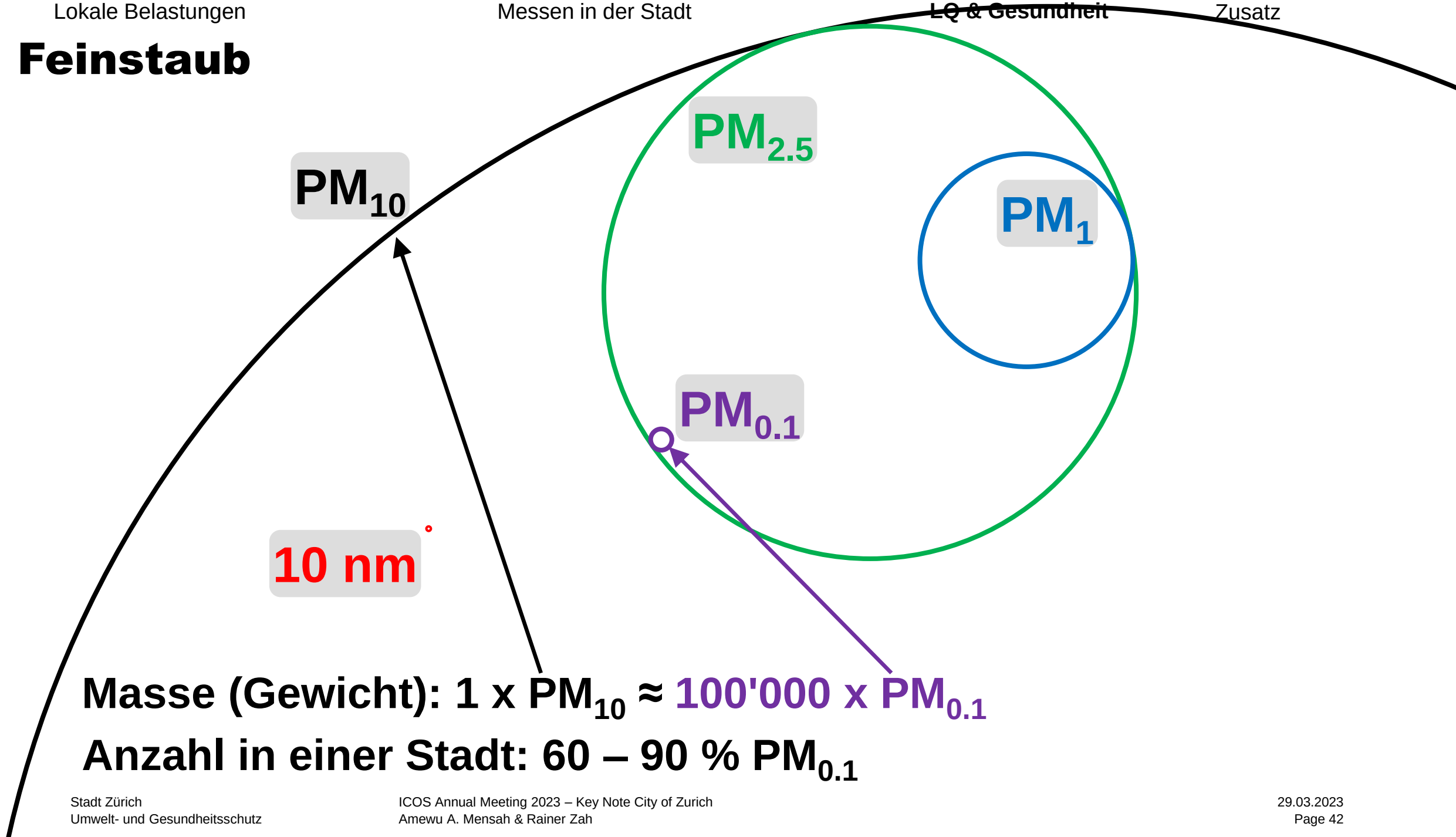


Abbildung 2: Determinanten der Kostenentwicklung. Veränderung zwischen 2020 und 2015.

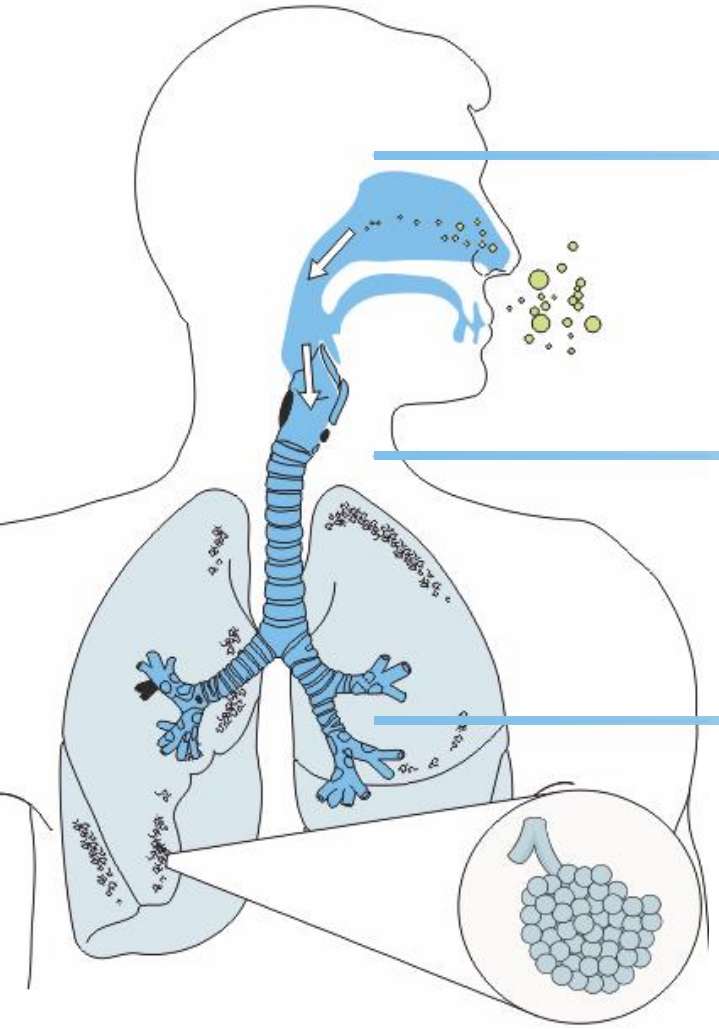
Feinstaub



Masse (Gewicht): 1 x PM_{10} ≈ 100'000 x $PM_{0.1}$

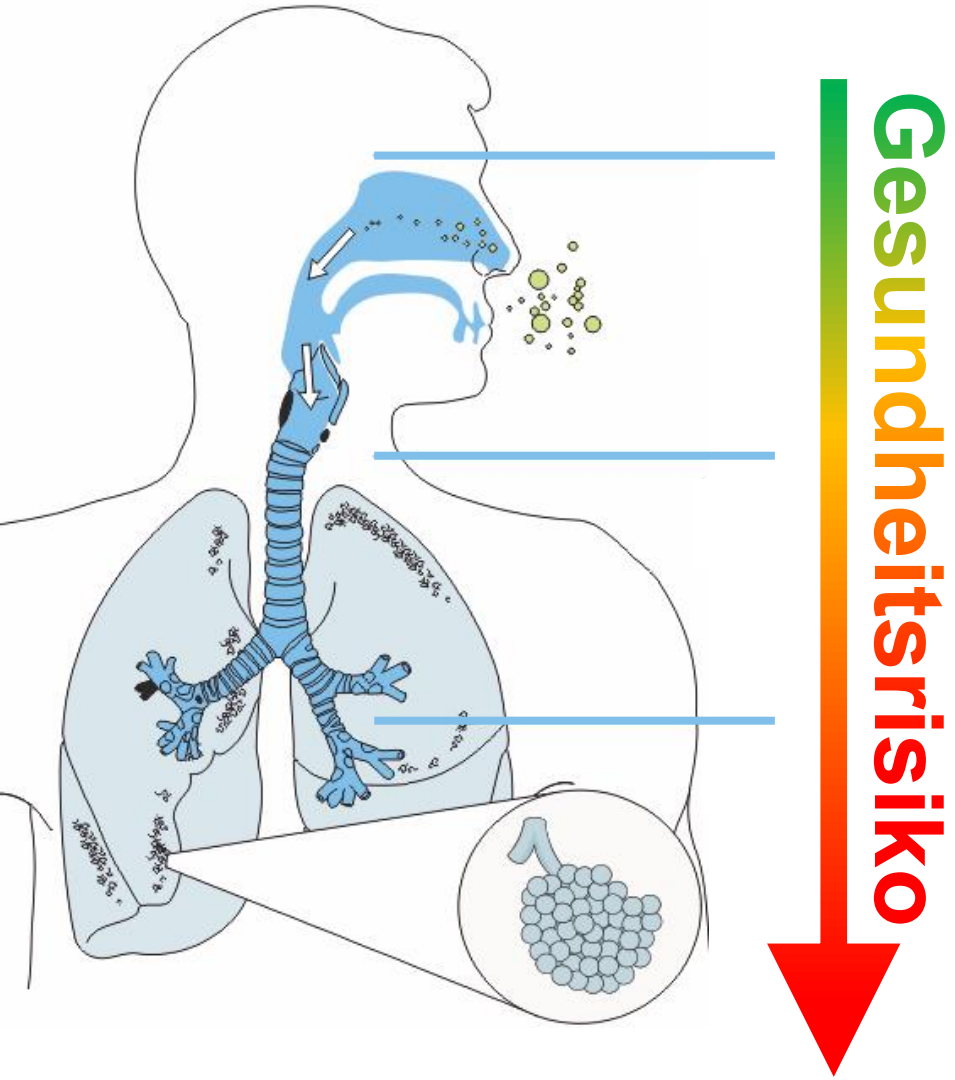
Anzahl in einer Stadt: 60 – 90 % $PM_{0.1}$

Eindringtiefe & Gesundheitsgefährdung



10 → 3 µm	inhalierbar	Allergien
3 → 1 µm	lungengängig	Asthma/ Lungenkrebs
1 → 0.1 µm	ultrafein	Herz-/Kreislauf-Erkrankungen

Eindringtiefe & Mess-/Grenzwerte

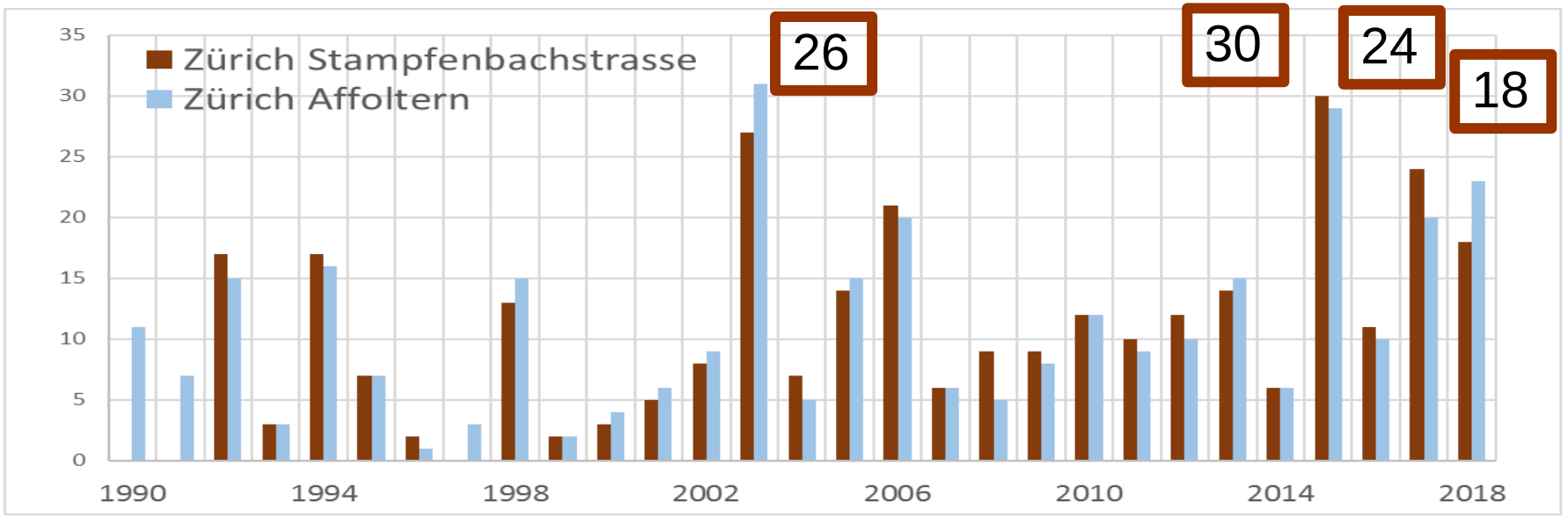


Schimmelstrasse – Bahnhof Wiedikon			
Parameter	Grenzwert	Einführung	Werte 2019
TSP	70 µg/m³	1986	--
PM10	20 µg/m³	1997	**15.7 µg/m³**
PM2.5	10 µg/m³	2018	**10.6 µg/m³**
PN			**~15'000 #/cm³**

Extreme Thunderstorm "Bernd", July 13th 2021

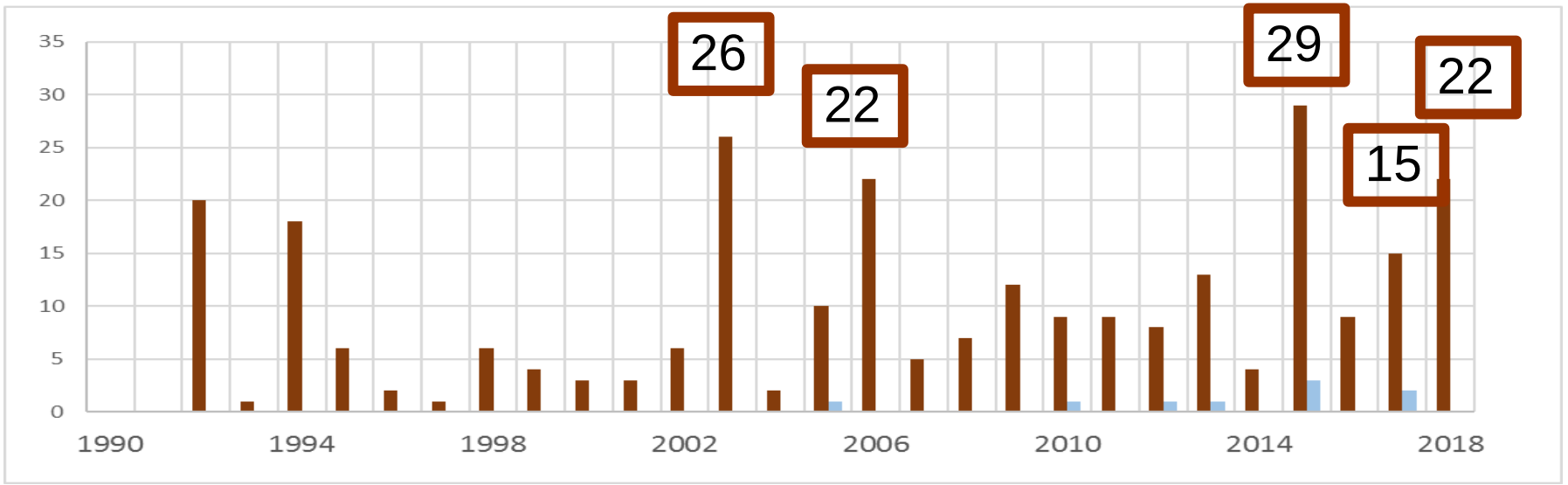
Extreme Heat in Zurich

Number of Heat Days and Tropical Nights 1990 - 2018



Heat days ≥ 30°C

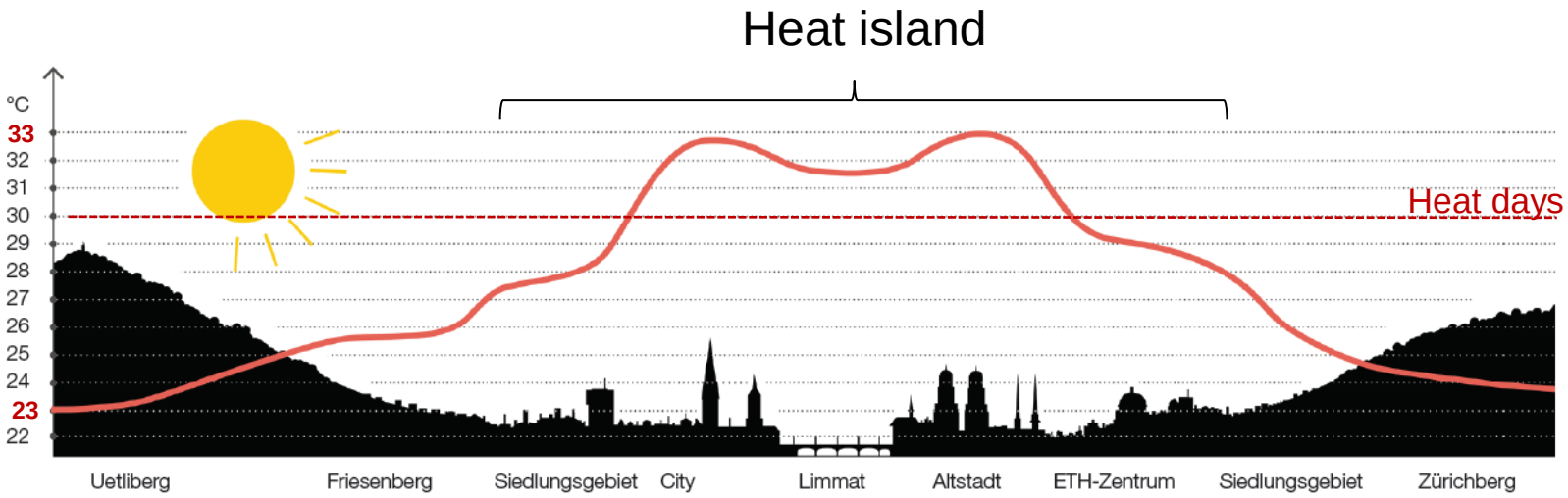
Forecast 2040: 44 days/y



Tropic nights ≥ 20°C

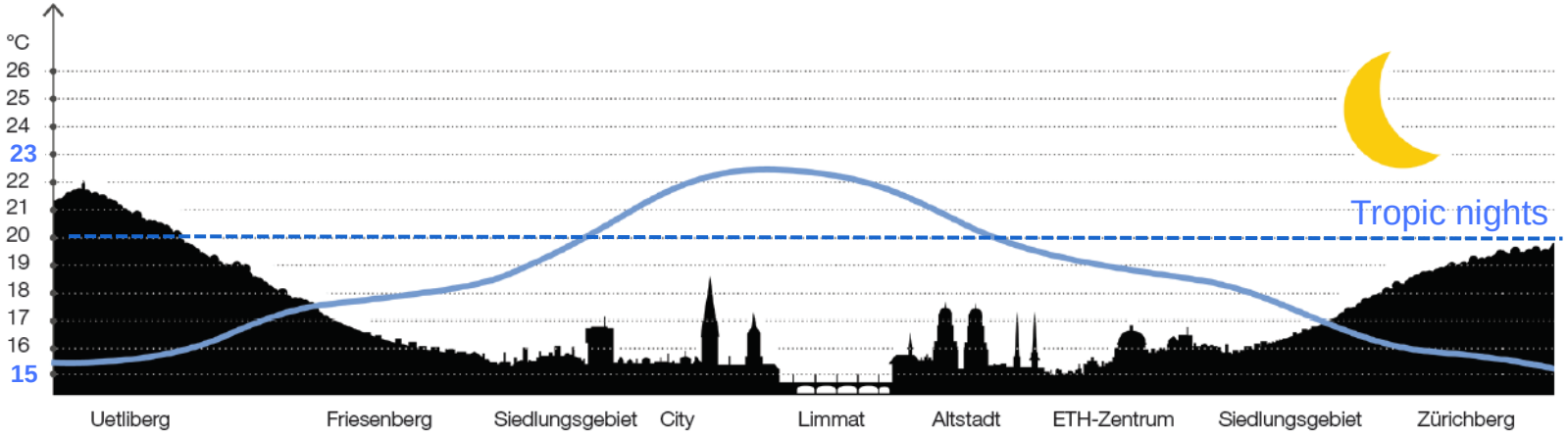
Forecast 2040: 50 nights/y

Heat Island City of Zurich



Day time situation (14:00)
Temperature differences within Zurich up to 10°C

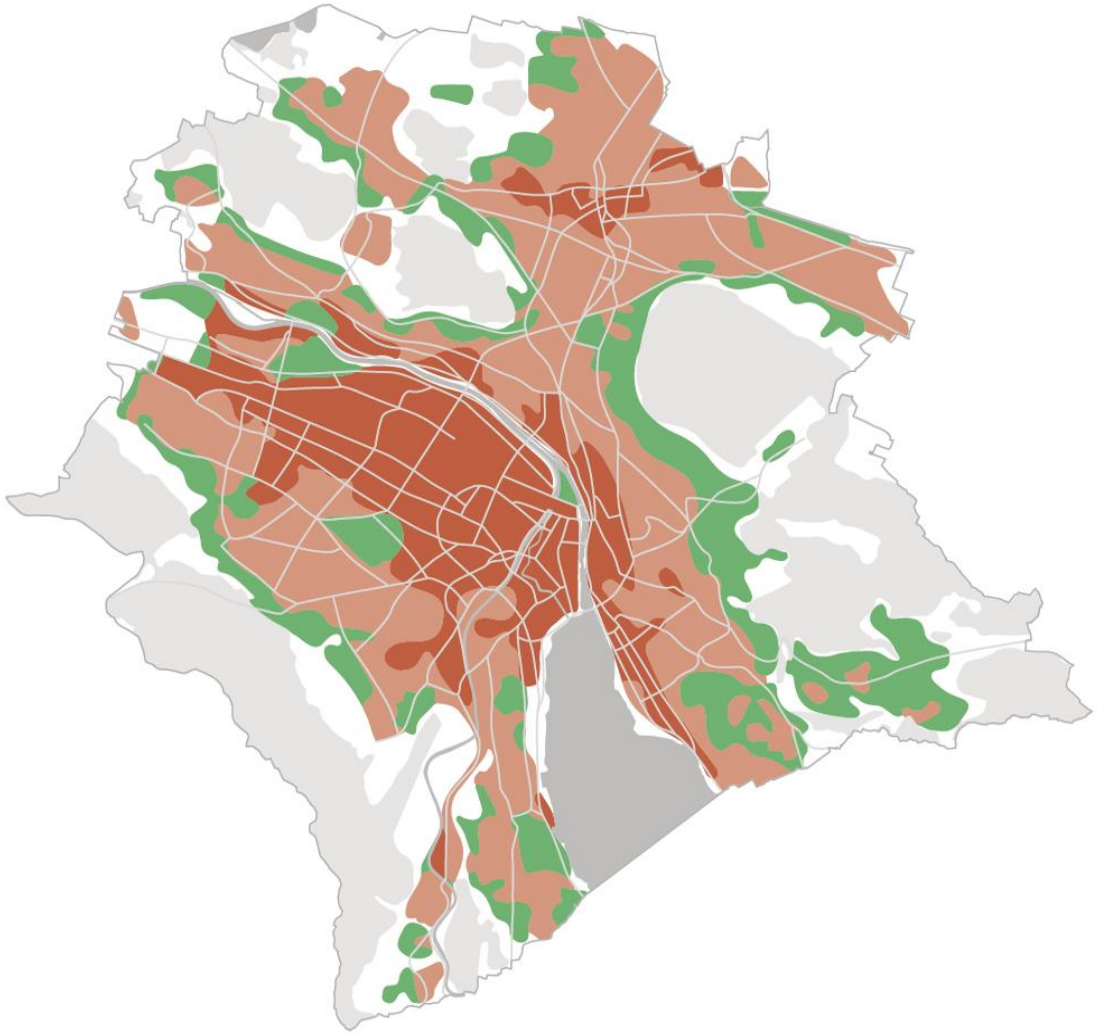
Heat island effect city – country
-2 bis 2°C



Night time situation (4:00)
Temperature differences within Zurich up to 8°C

Heat island effect city – country
2 bis 7°C

Areas of Action to Improve Bioclimatic Situation

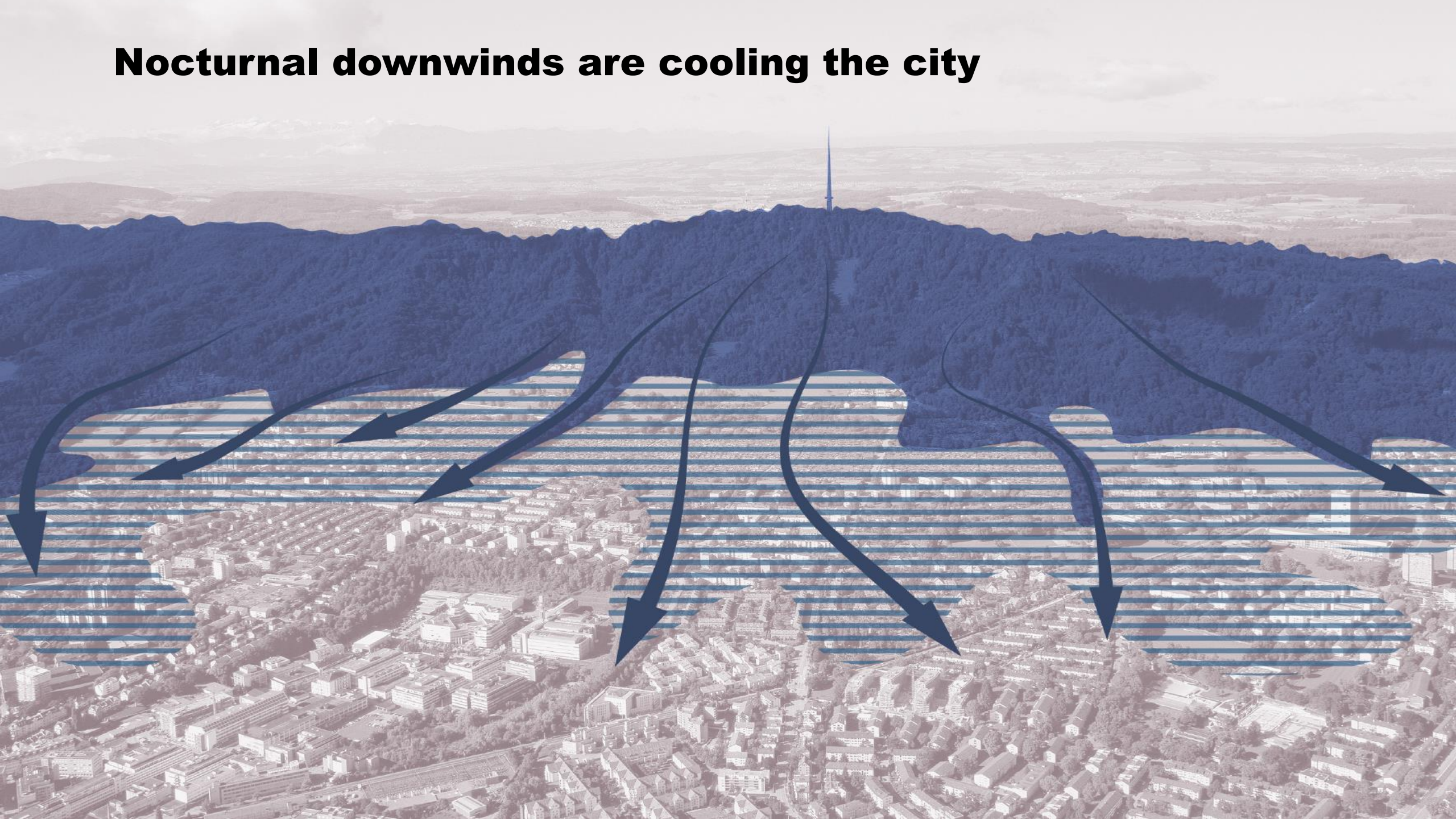


Area 1:
Improvement of the bioclimatic situation during the day and at night

Area 2:
Improvement of the bioclimatic situation during the day

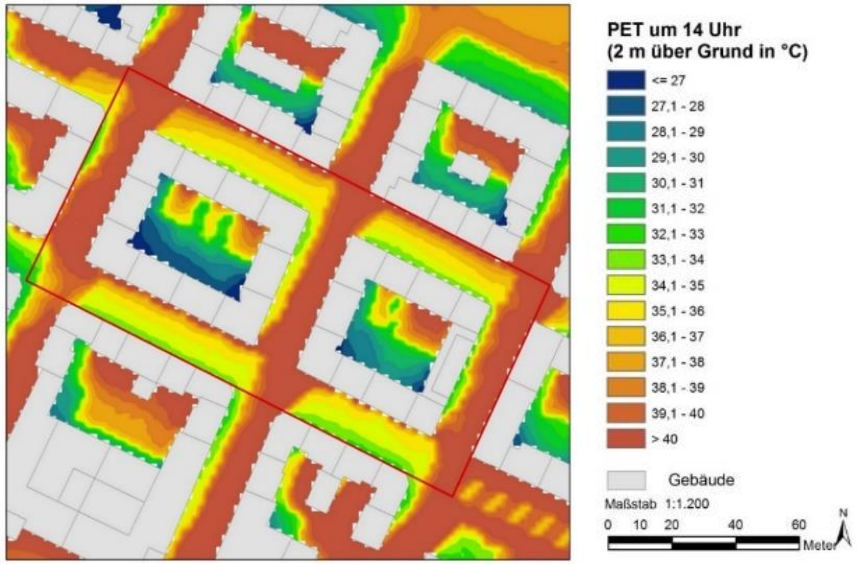
Area 3:
Maintaining the bioclimatic situation

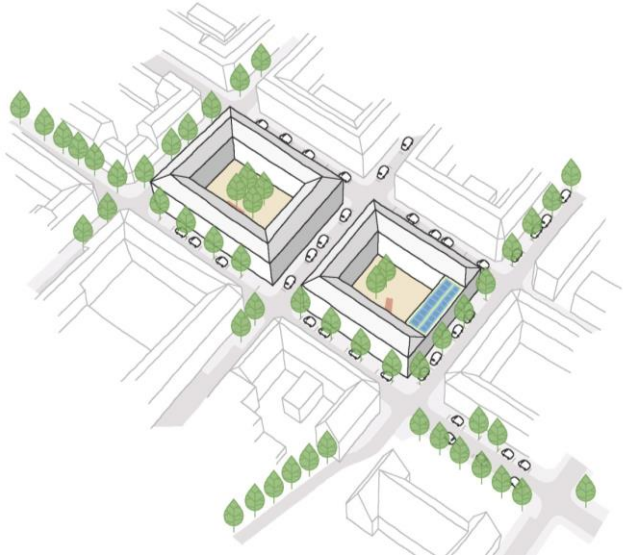
Nocturnal downwinds are cooling the city



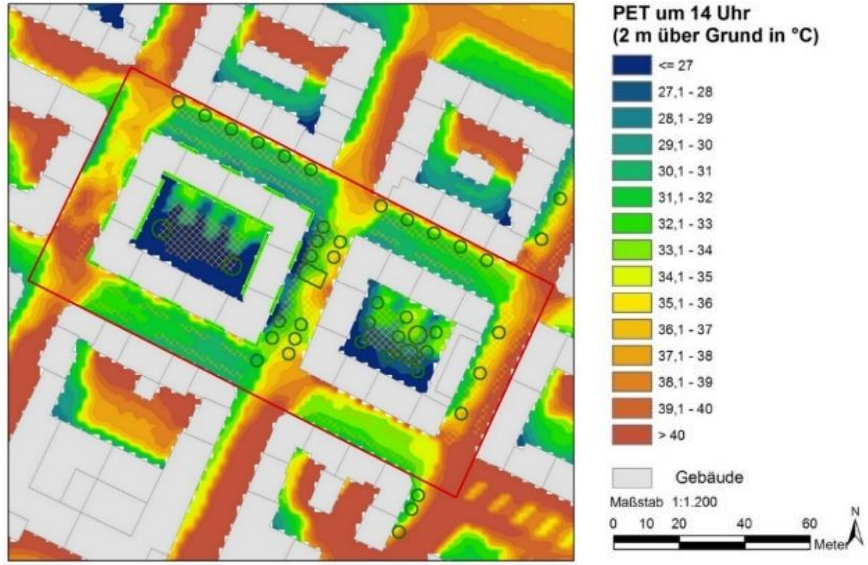
Toolbox – Impact of Selected Measures on a Block Building

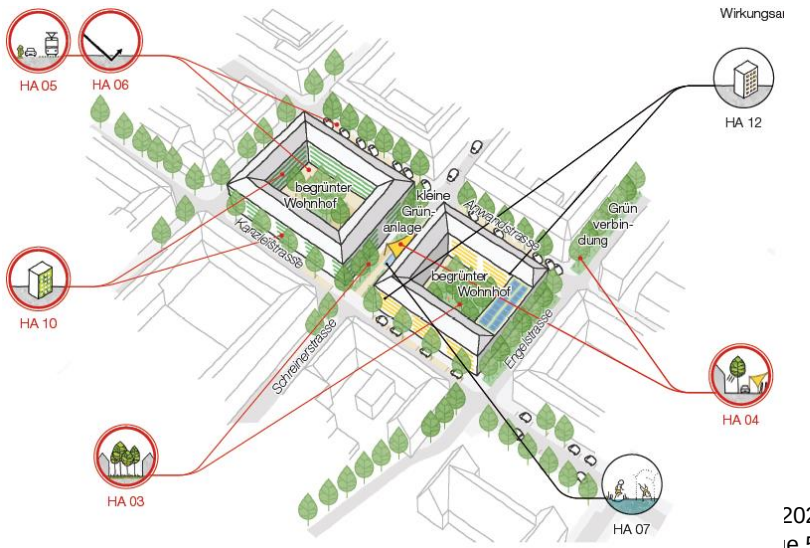
Current situation





Modelling



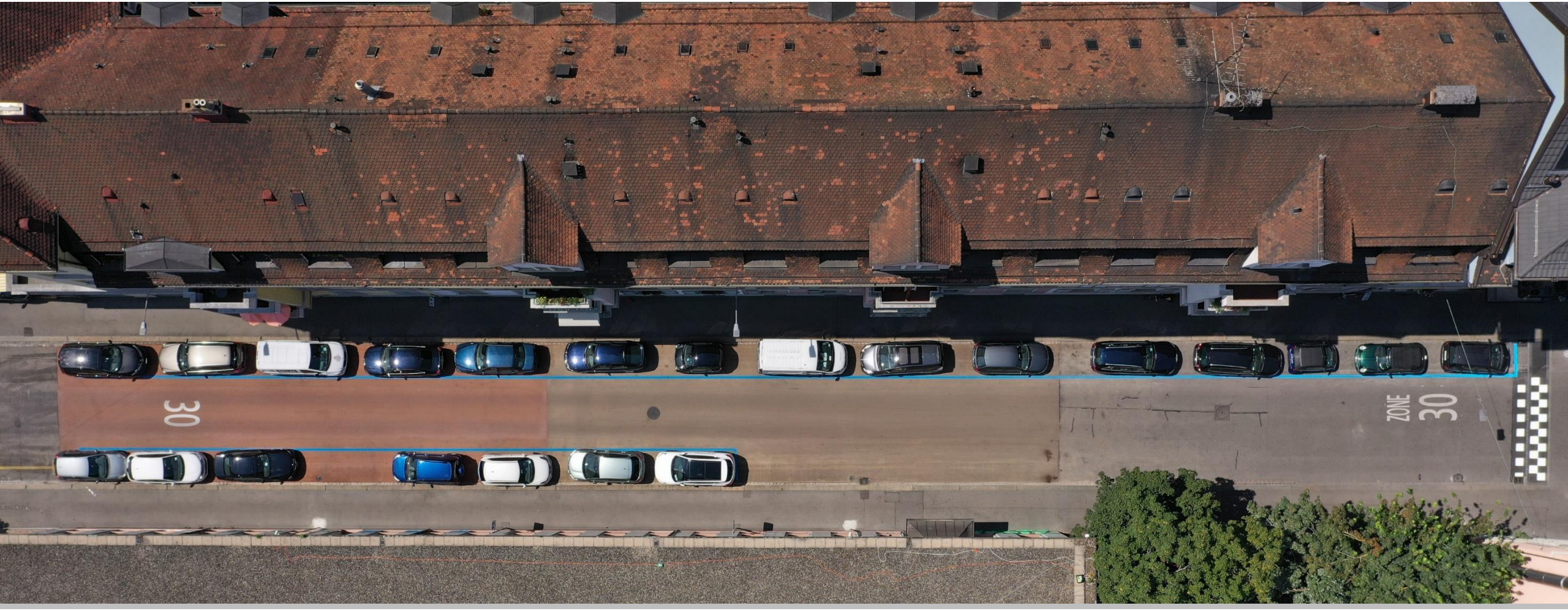


Implementation Agenda 2020-2023

22 on-going, 9 finished, 8 planned measures

Legal requirements 3 e.g., revision of building law	**Instruments binding on authorities** 3 e.g. integration in ongoing special use planning and transitional solutions
Urban strategies & concepts 13 E.g., real estate implementation strategy, urban tree planning, "Standards Urban Spaces" supplement, standards vertical greening.	**Municipal building & civil eng. Projects** 13 e.g. integration in architectural competitions, greening of Triemli facade, sponge city
Consulting & Information 5 e.g. internal trainings, city climate tool, exhibition "Cool down Zurich - we cool down the city", guided tours, lectures, publications	**Funding tools** 2 Adaptation of the "More than Green" funding program, development of the "Vertical Greening" funding program

Pilot project: light-coloured pavements



Pilot Projects in Zürich West

De-sieving/shading applications

Viaduktstrasse

Pfingstweid- /Zahnradstrasse

Support programs heat mitigation and biodiversity

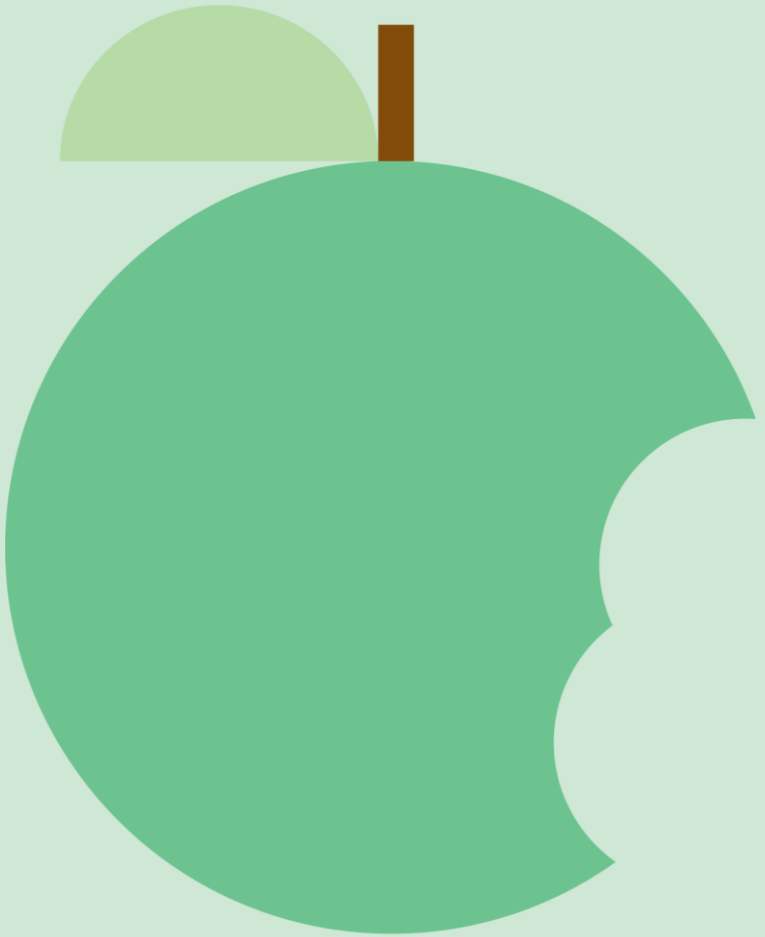
– "Vertical Greening: advice and funding for private landowners.
– "More than green": to foster heat mitigation and more biodiversity for private landowners.

Conscious, climate-friendly consumption

- **Communication** and awareness
- Promotion of the repair trade and the **circular economy** (longer service life)
- Establishment of a **monitoring system**: successes must be measurable & visible!
- Making **municipal procurement more climate-friendly and sustainable**:
  - Increasing transparency of all procurements
  - Prolongation of procurement cycles
  - Stronger weighting of climate protection in award criteria (e.g. with the help of CO_2 textile calculator)

Healthy and climate-friendly nutrition

- Implement **nutrition strategy** by 2030, then tighten up
  - by 2030: avoidable food waste below 10%
  - by 2030: environmental impact decreases by 30% compared to 2020
- **Information and awareness** campaigns on dietary habits/food waste
- **Education and training** of students and professionals
- Establish **sustainable catering** in event guidelines



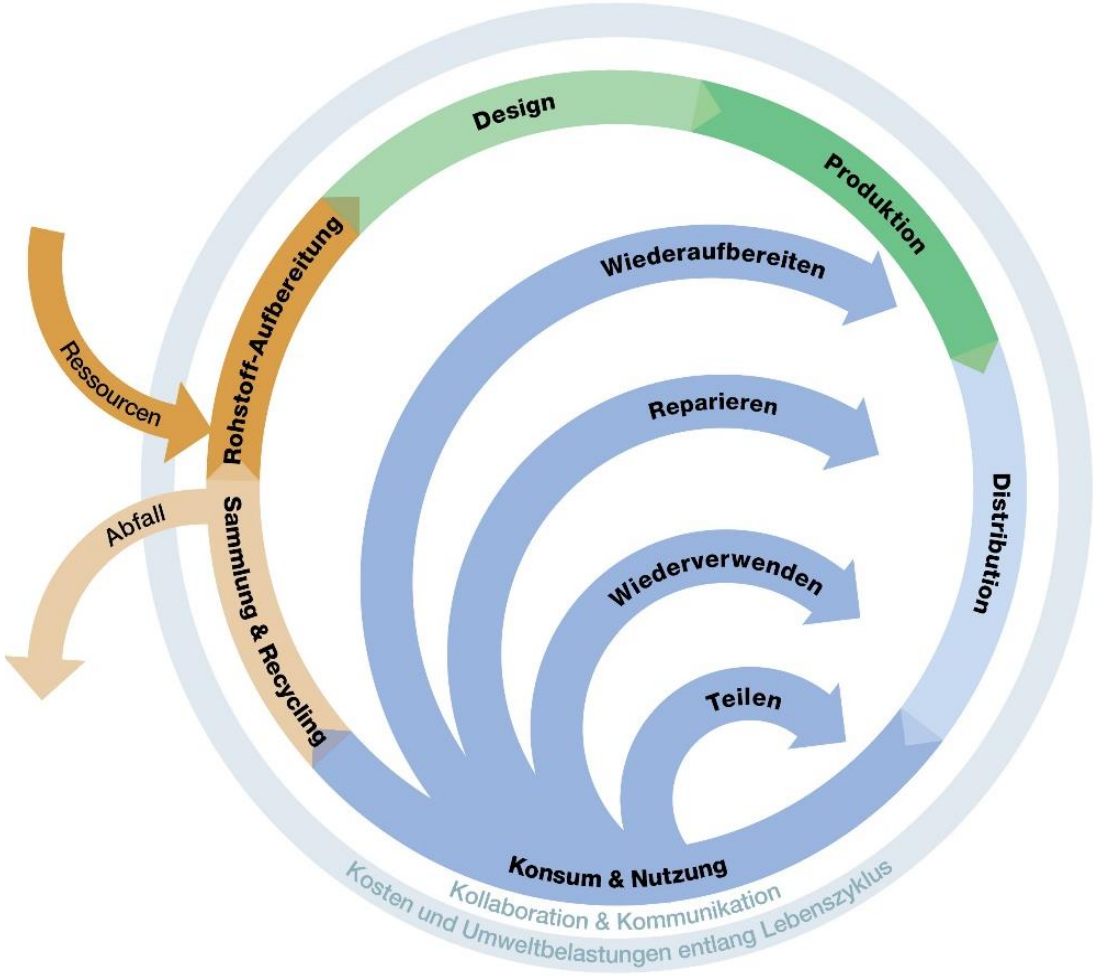
Circular Zurich

Cross-departmental strategy on implementing circular economy

– Collaboration of Departments of Environment, Economic development, Building and Waste Management

– Key activity to reduce value chain GHG emissions by extending the life span of products

– Goal is to foster and support private initiatives



Motion: Review of the objective in the municipal code

Demand of the parliament: Net zero by 2030

The City Council considered **adjusting the carbon target** from 1 ton of CO_2 by 2050 to **net zero by 2030, 2040 or 2050**.

Motion

GR Nr. 2019/ 106

20. März 2019

der Fraktionen SP, Grüne, GLP, AL
und der Parlamentsgruppe EVP

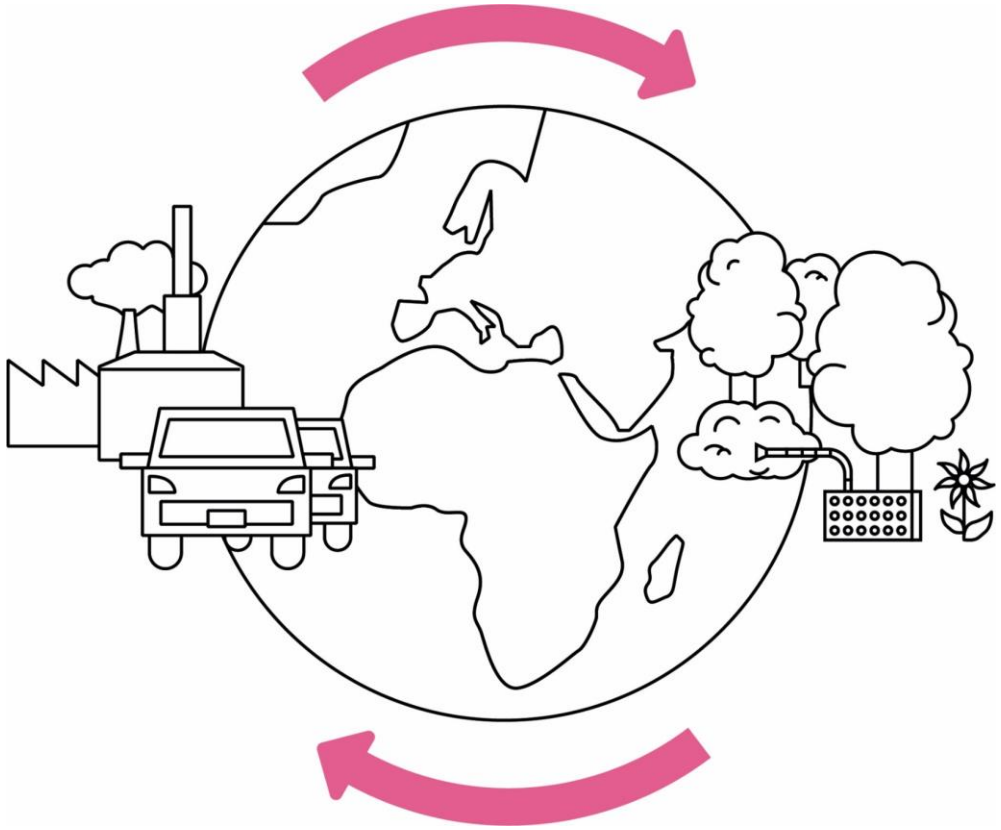
Der Stadtrat wird beauftragt, dem Gemeinderat eine Weisung für eine Änderung der Gemeindeordnung vorzulegen, die eine stringente Klimapolitik in der städtischen Verfassung festlegt. Die Stadt Zürich setzt sich im Rahmen ihrer Zuständigkeit das Ziel, bis ins Jahr 2030 eine Reduktion des CO_2-Ausstosses pro Einwohnerin und Einwohner und Jahr auf netto Null zu erreichen. Sie setzt sich dabei bei Kanton und Bund für die notwendigen Rahmenbedingungen ein und bezieht die Wirtschaft und Private aktiv mit ein. Der Artikel 2ter sowie die Übergangsbestimmung Artikel 122 sollen so formuliert werden, dass die notwendigen Grundlagen für eine Umsetzung kommunaler M... klar und widerspruchsfrei verankert sind.

Begründung:
Die Motionärinnen und Motionäre sind... makrise mit einer entschlosse... sich mit symbolische... ist ein konk...

Reports, abstracts and presentations are publicly available
www.stadt-zuerich.ch/netto-null

Net zero - a global concept

- CO_2 sources and sinks must balance each other out globally
- Limit global warming to **well below 2° C** (Paris Agreement 2015)
- What does this mean for the city of Zurich?

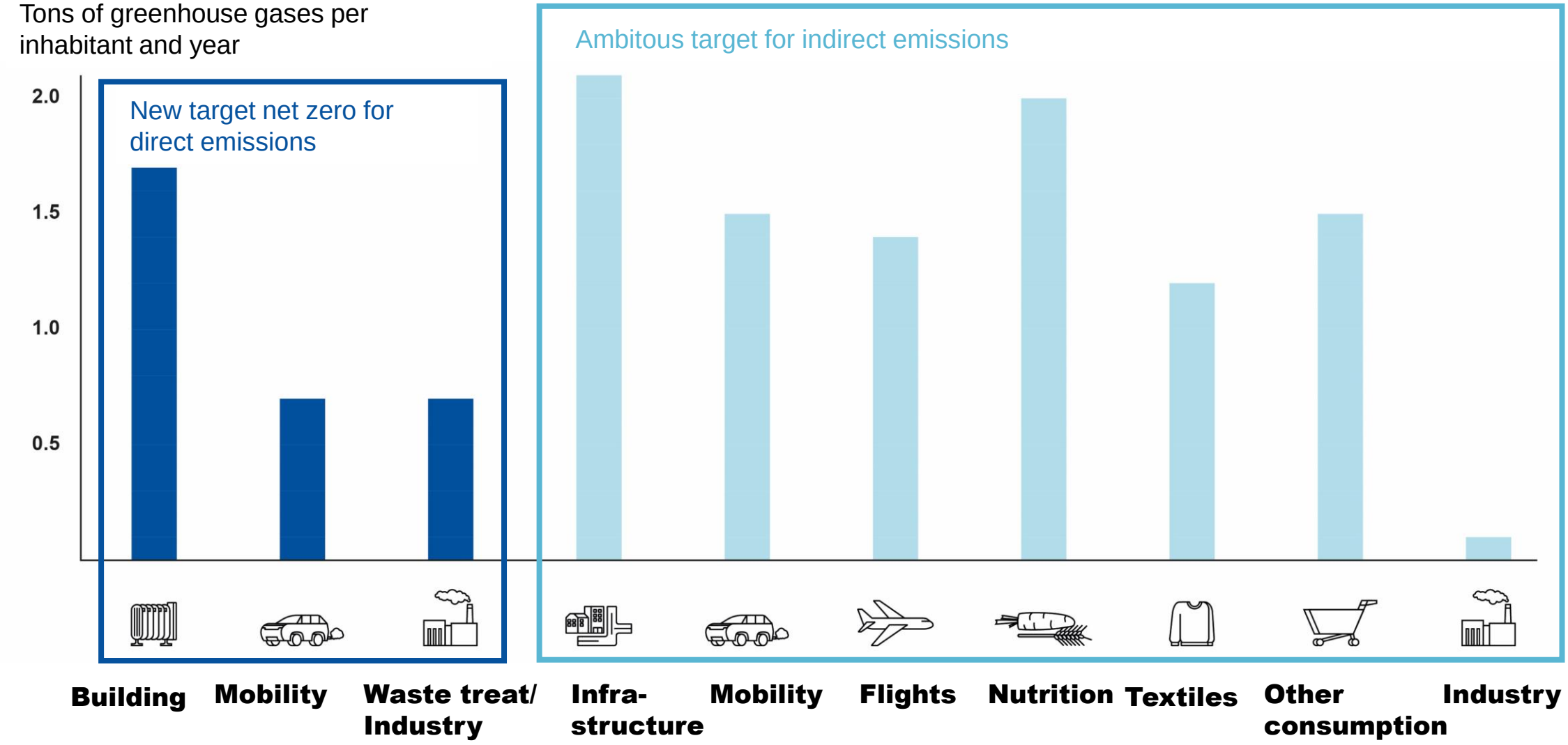



REPAIR CAFÉ
CREDIT SUISSE

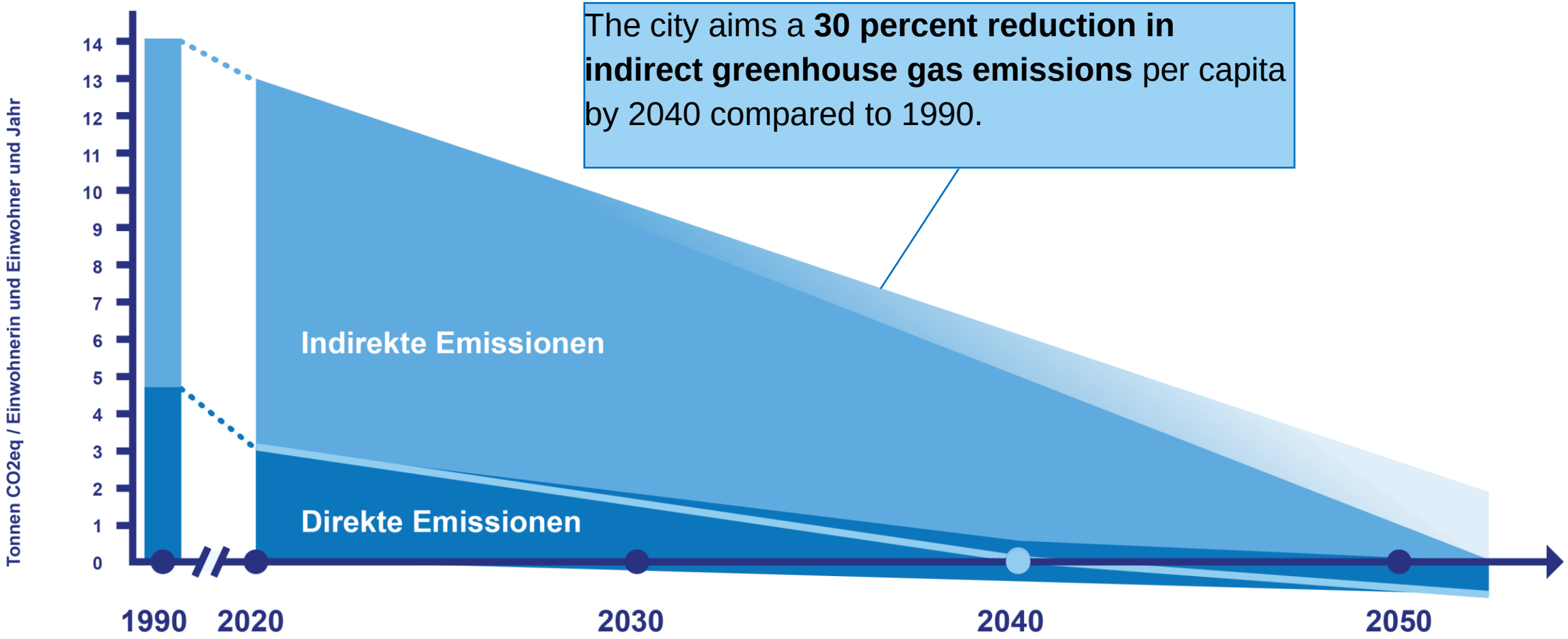
2. New goal for climate protection

Breakdown of greenhouse gas emissions

13 metric tons per person per year in direct and indirect emissions



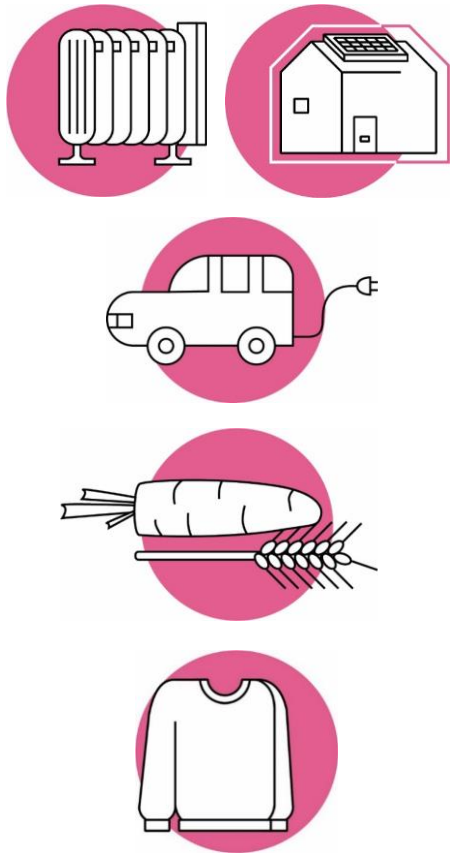
How to achieve our goal for the indirect emissions?



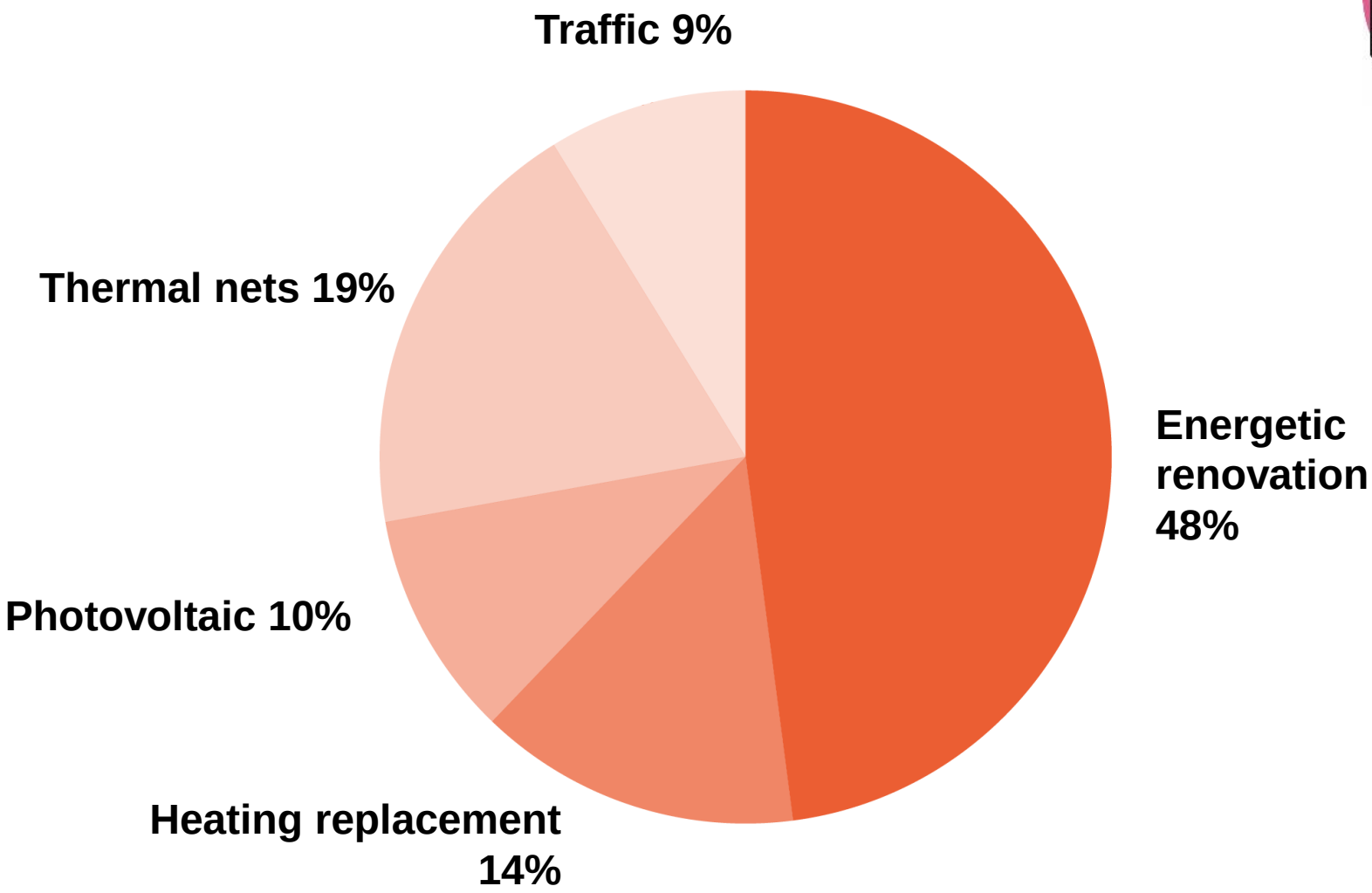
The big levers for greenhouse gas reduction

What we need to do to achieve net zero

- Replacement of **oil and gas heating systems** and **building renovation**
- Decarbonising **mobility**
- Healthy and climate-friendly **nutrition**
- Climate-friendly **consumption** (textiles, etc.)
- Carbon dioxide removals (waste)



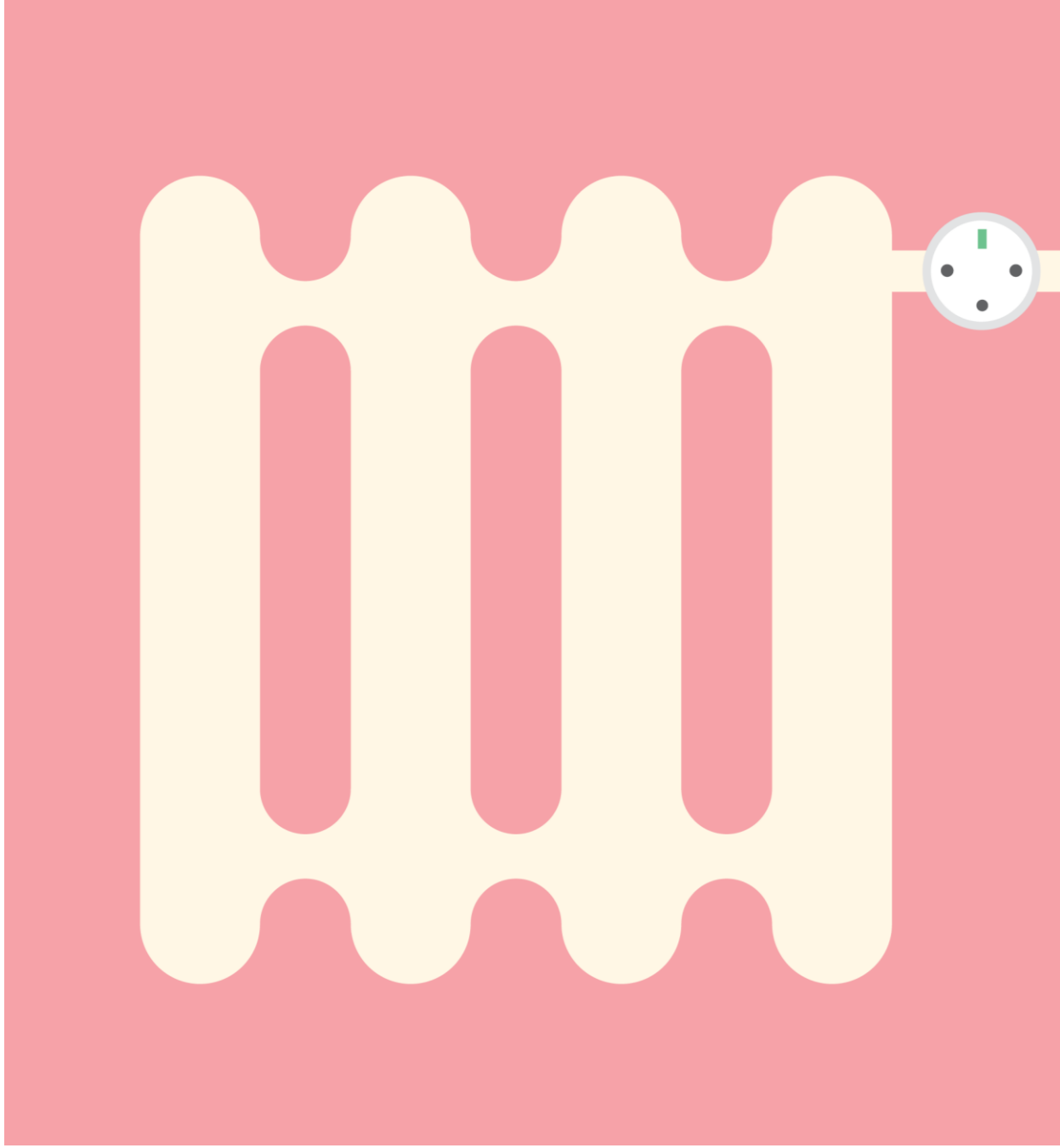
Investments until 2040 approx. 10 billion CHF



3. Measures for reducing direct emissions

Decarbonising buildings

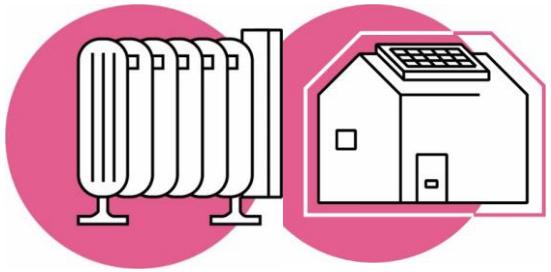
- **Expansion of district heating** & decommissioning of gas network
- Additional **subsidies** for heating replacement, building shell, photovoltaics
- Strengthening of **consulting** services
- Acceleration of **decarbonisation of city-owned buildings**

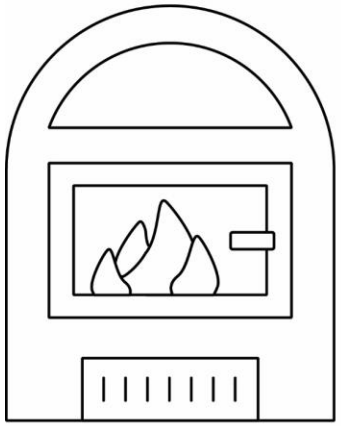


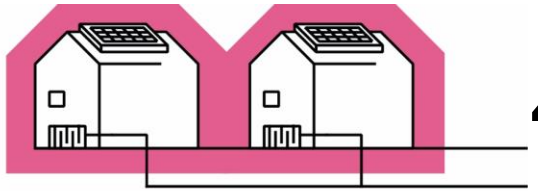
Replacement of oil and gas heating

Net zero requires replacement and optimisation

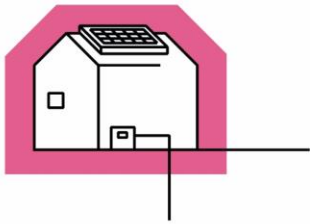
Building shell and addition of PV systems



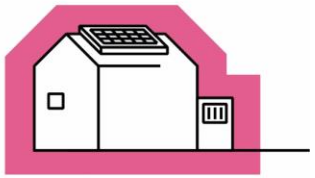




45% District heating



27% Geothermal heat pumps



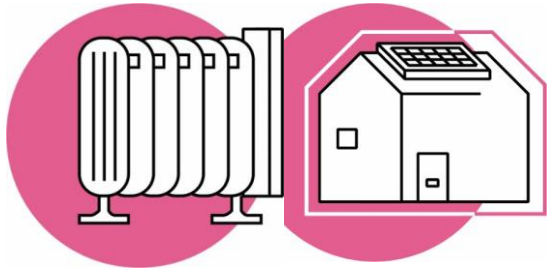
23% Air-to-water heat pumps

5% Biogas and wood heaters

14'700 gas heating systems
6'900 oil heatings

> Enables reduction of heat consumption by 30 percent.

Replacement of oil and gas heating

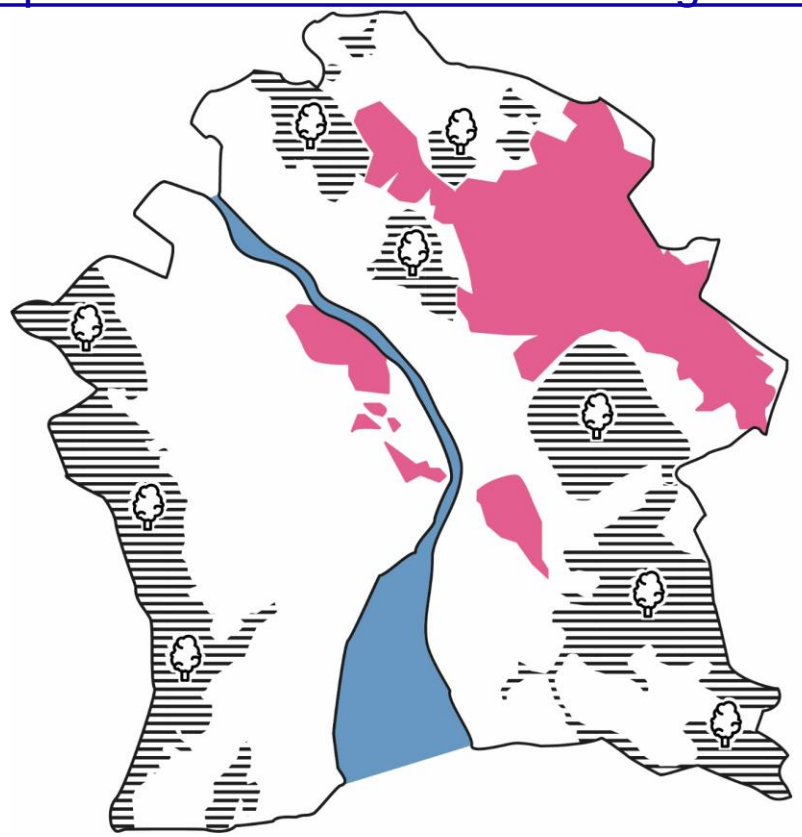


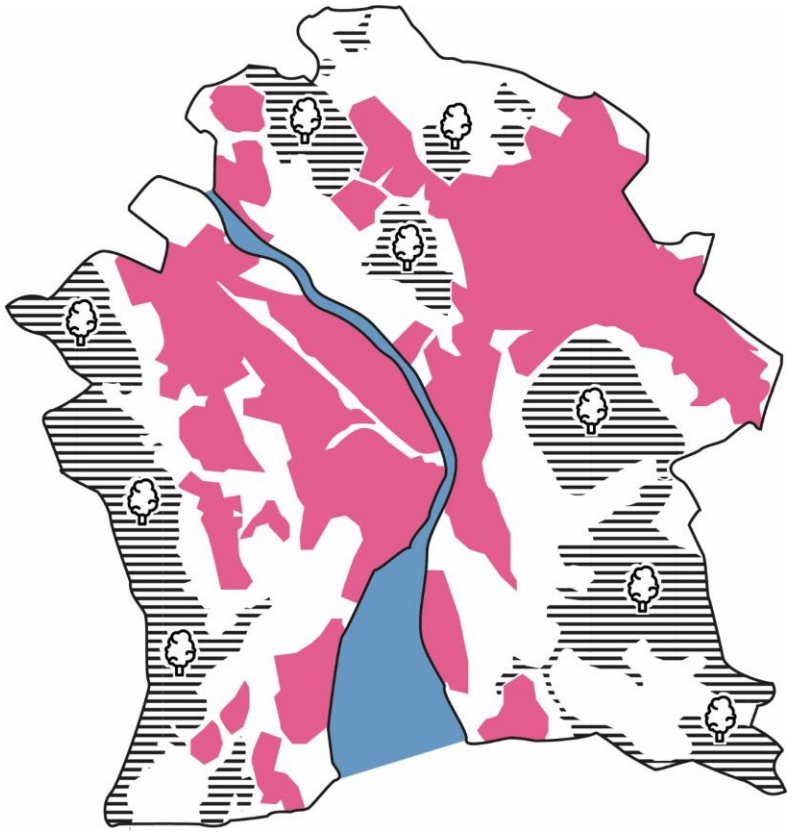
Net zero requires expansion of district heating from waste, lake Zurich water, wastewater

Currently: 30% of the city area

For net zero: 60 % of the city area

https://www.stadt-zuerich.ch/energis/frontend/





Netto-Null Reporting

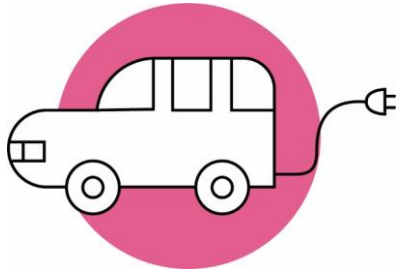
- 1. Reporting im Herbst 2023 für Berichtsjahr 2022
- Beschränkung auf direkte Emissionen und ggf. energiebedingte indirekte Emissionen
- Beschränkung auf Stadt Zürich (nicht Stadtverwaltung)
- Ergänzung indirekte Emissionen und Stadtverwaltung ab 2024

Decarbonising mobility

- Expansion of **pedestrian and cycling infrastructure and public transport capacity**
- **Parking management:**
  - Fees, reduction in number of parking spaces
  - Restrictions on conventionally powered vehicles
- Favorable conditions for **electric vehicle charging stations**
- Strengthening transformation of the **city's own vehicle fleet**

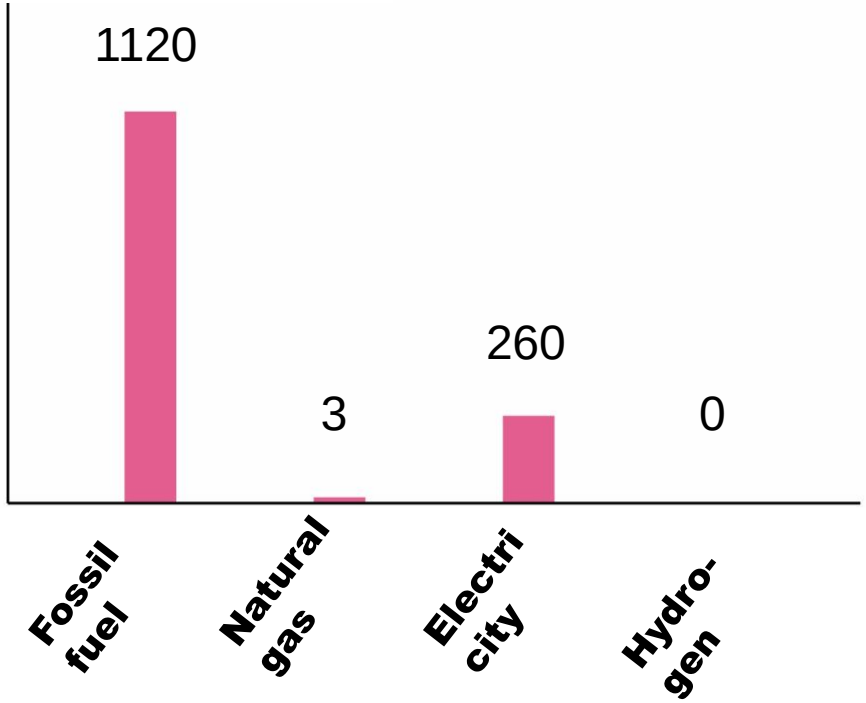
Replacement of fossil-fueled vehicles

Net zero requires switch to alternative fuels



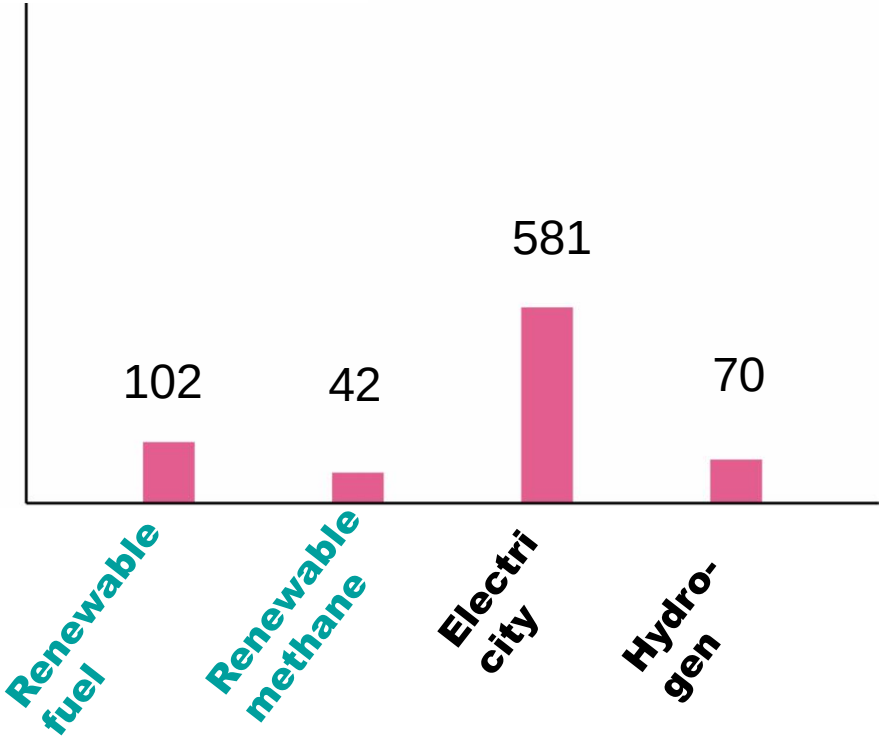
Current distribution of energy sources

Mill. KWh per year



Distribution for net zero

Mill. KWh per year

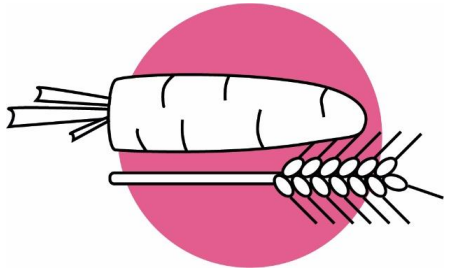


Additionally: Reduction of motorised vehicle kilometers per person by 30 percent.

4. Measures for reducing indirect emissions

Healthy and climate-friendly nutrition

Possible reduction path for net zero



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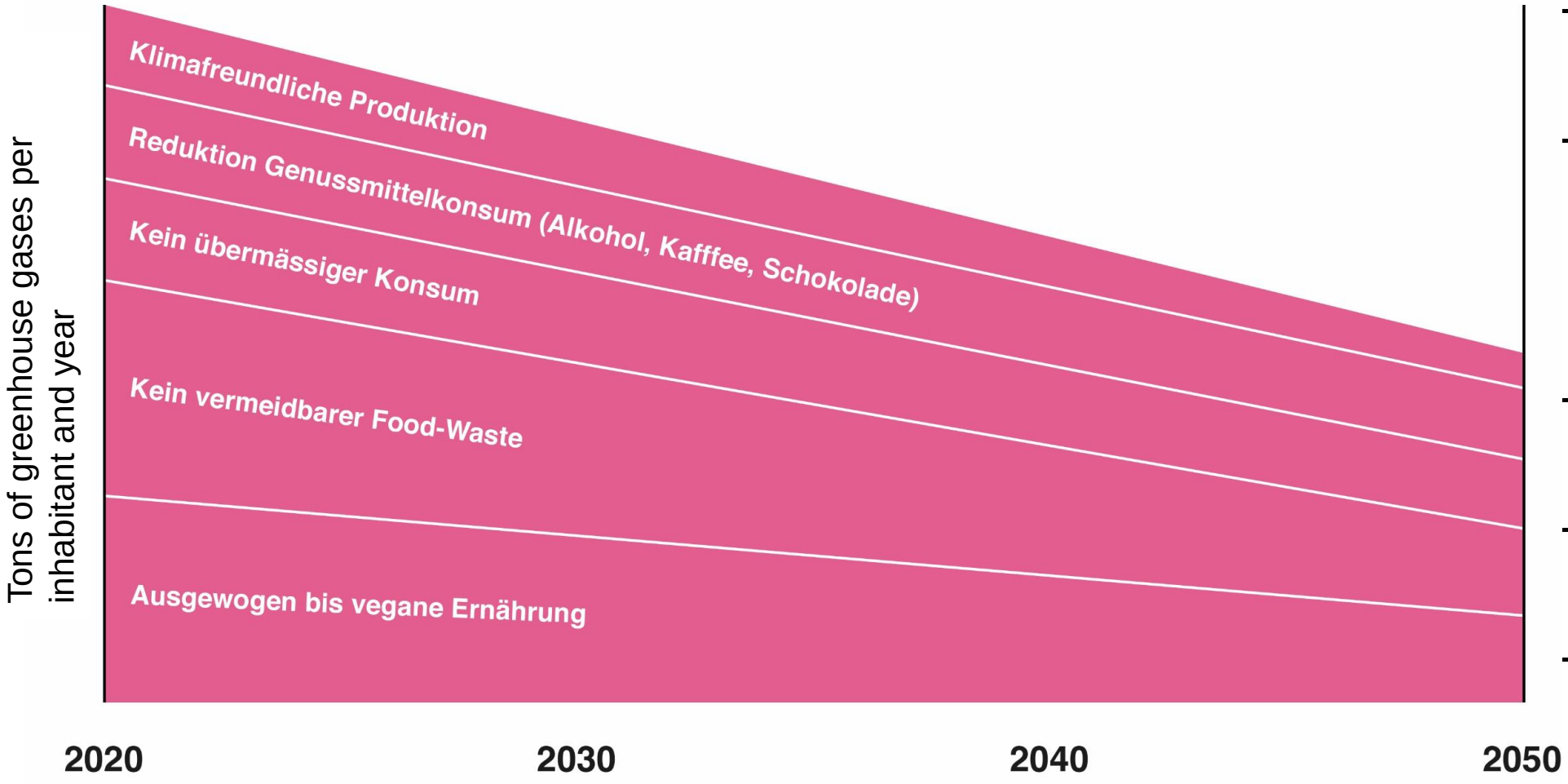
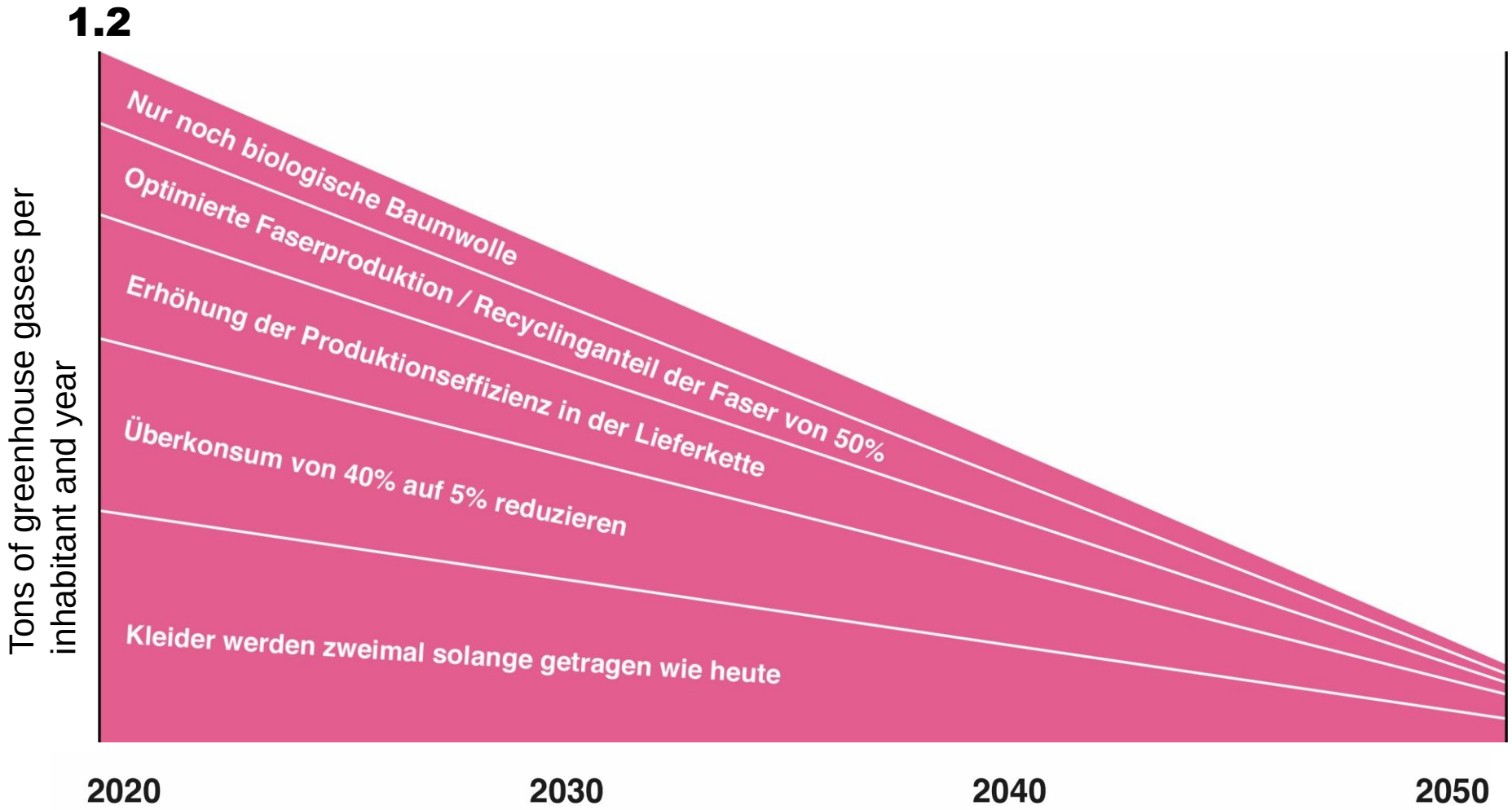


- Climate-friendly production
- Reduction of luxury food (alcohol, coffee, chocolate)
- No excessive consumption
- No avoidable food waste
- Balanced or even vegan diet

Conscious, climate-friendly consumption of textiles

Possible reduction path for net zero



- Only organic cotton
- Optimised fibre production/50 % recycled material
- Increased production efficiency
- Reduction of over-consumption from 40 to 5 %
- Clothes are being used twice as long as today

Supporting private initiatives

Support fund since 2011

- Direct support of various projects of citizens, organizations and companies.
- Annually about 30 supported projects (budget 180KFr.)

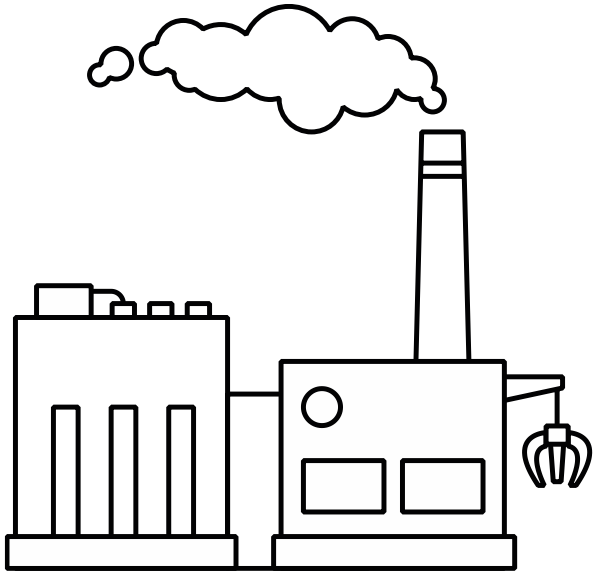
Project competition "Für Züri" 2021-2023

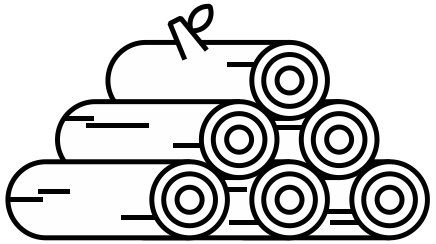
- Sponsored by jubilee dividend of Zürich Cantonal Bank
- 32 winners out of 152 applications in the field of environment/climate
- CHF 3.4 million have been distributed
- Implementation until end of 2023

5. Measures for negative emissions

Carbon capture and storage (carbon sinks)

- The biggest lever for **carbon capture and geological storage** in the city of Zurich are carbon emissions from **waste management**.
- Another, much smaller lever is the use of **wood as building material**.
- Carbon sinks in the city of Zurich are in the range of **0.3 to 0.5 tons/person.year** in the medium to long term. This is roughly equivalent to the sum of direct emissions remaining on the city's territory in 2040.
- The city of Zurich will continue to **support the development of carbon capture and storage technologies** and, if technically and economically viable, implement them.





6. Communication and participation

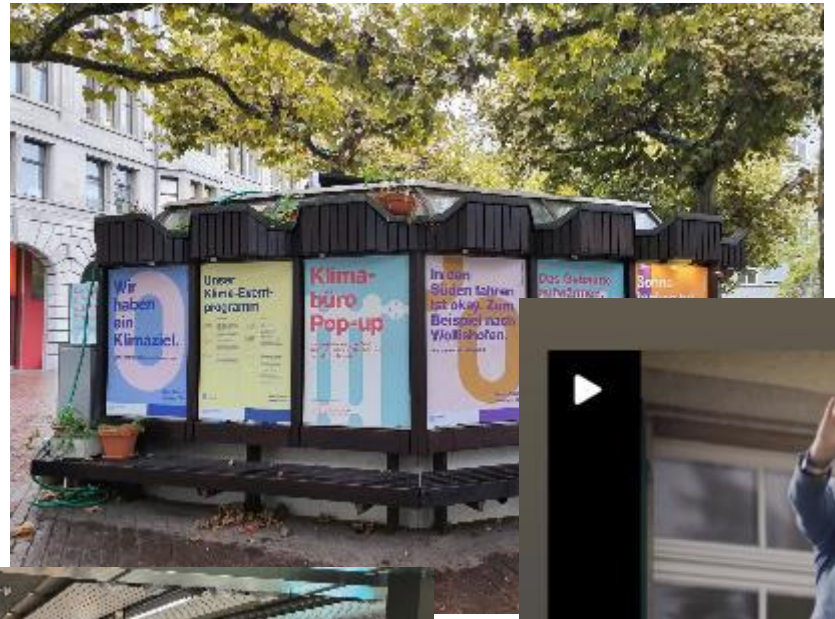
Campaign "Net zero climate target" summer 2021

https://www.stadt-zuerich.ch/content/site/zuerich-co2/de/index.html

https://www.instagram.com/klimazuerich/

Climate office pop-up at Werdmühleplatz autumn 2021

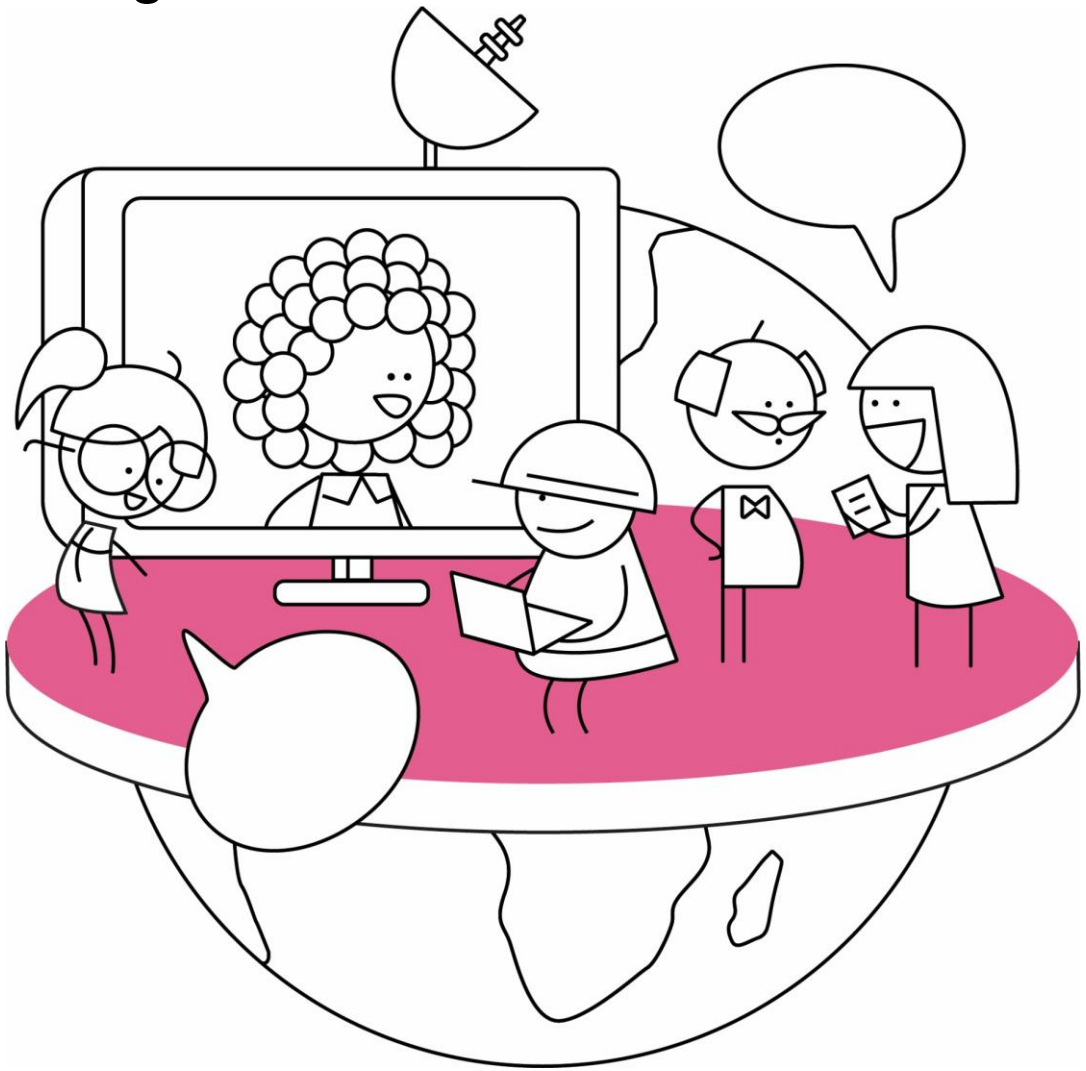
Focus energy consulting



https://www.youtube.com/watch?v=bO8jD13JxW0

The city of Zurich is taking action

Design of a Climate Forum

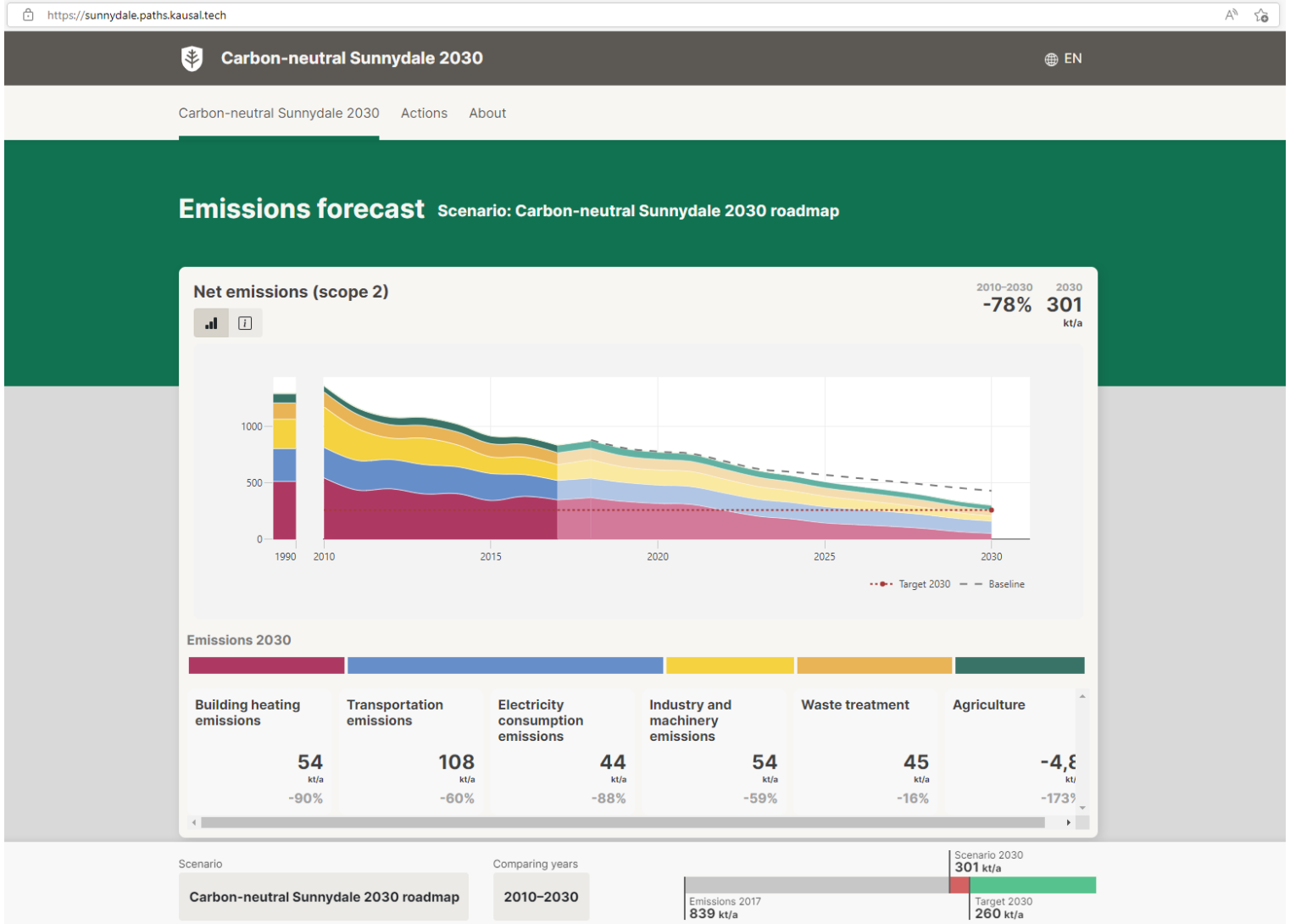


The Climate Forum Zurich

- a **cooperative platform** for networking, participation and implementation
- provides answers and creates scope for action on climate protection issues
- Everyone has access: https://mitwirken.stadt-zuerich.ch/processes/klimaforumzuerich

Monitoring-Tool Kausal Paths

https://zuerich.paths.staging.kausal.tech/?node=net_emissions



- Fiktives Beispiel-Dashboard: Sunnydale
- Tool wird noch gemäss Offerte bis Juli 2023 weiterentwickelt
- Zweck
  - Dateneingabe
  - Berechnungen
  - Analysen
  - Massnahmen
  - Berichterstattung & Kommunikation

Climathon Zurich 2021

IMPACT HUB Zürich

60+
participants

3
challenges

Stadt Zürich:
- Sustainable consumption
- Green protein transition
- Local bottom up movements

3
workshops

Prototyping and testing
Pitching and storytelling
Midnight yoga

12
solutions

3
winner teams

Trashare
Züri Wächst Zäme
Turtle App

15
volunteers

1
main partner

City of Zurich

26
experts/
coaches

13 experts (SZH)
13 coaches

7. Questions?

Thank you.

Questions?

Thank you.

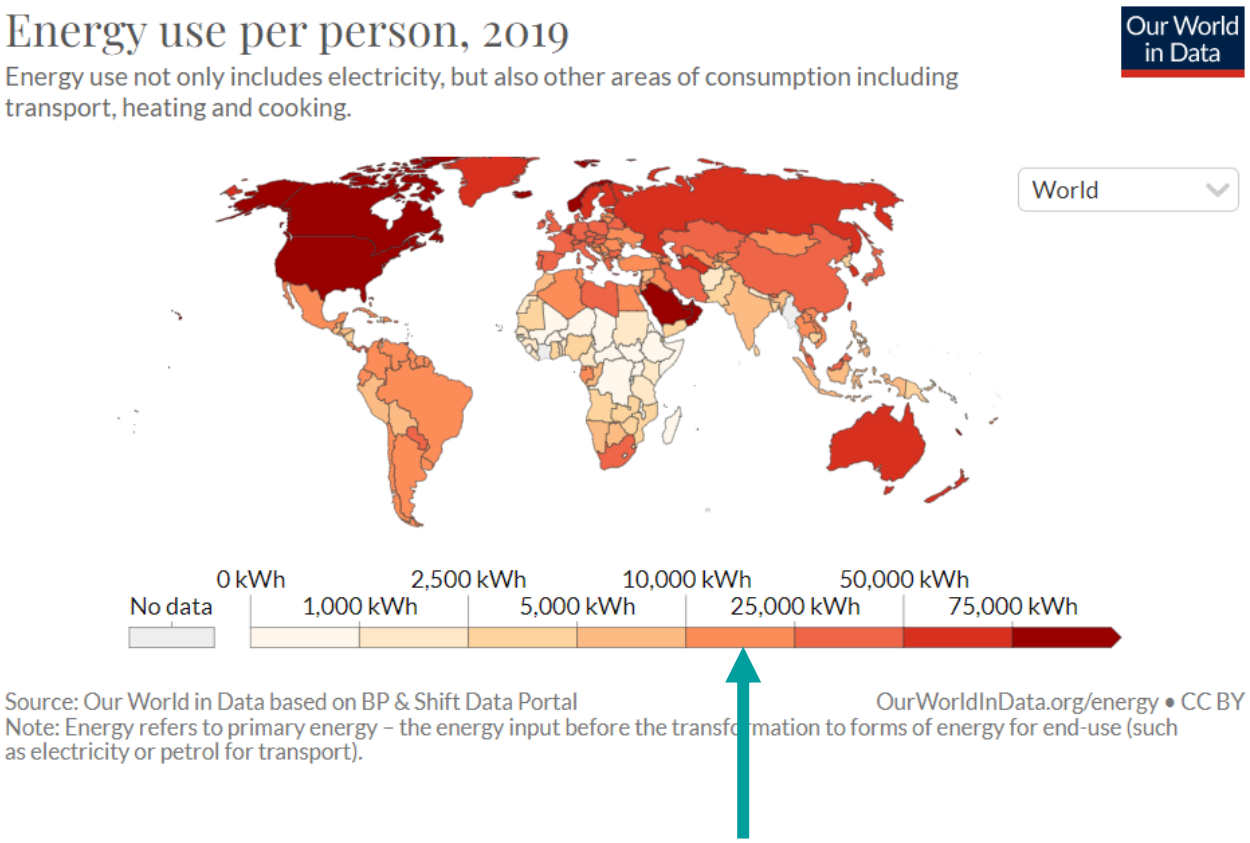
Appendix

Links

- Instagram: https://www.instagram.com/klimazuerich/
- LinkedIn: https://www.linkedin.com/company/umwelt-und-gesundheitsschutz-zuerich/
- Newsletter: https://www.stadt-zuerich.ch/gud/de/index/departement/strategie_politik/umweltpolitik/klimapolitik/newsletter.html
- Climathon: https://www.stadt-zuerich.ch/gud/de/index/departement/strategie_politik/umweltpolitik/klimapolitik/climathon.html
- Climate: www.stadt-zuerich.ch/klima
- Net zero: www.stadt-zuerich.ch/netto-null
- Campaign: www.stadt-zuerich.ch/weniger-co2 (Film)
- Climate forum: https://www.klimaforumzuerich.ch/
- EnerGIS: www.stadt-zuerich.ch/energis
- Energy coaching: www.stadt-zuerich.ch/energie-coaching
- Stories: https://storiesforfuture.ch/
- Zurich is full of solutions: https://www.transition-zuerich.ch/
- Network in Zurich: https://klimastadtzuerich.ch/
- Climate Action Plan: https://climatestrike.ch/de/crisis#solutions

Introduction to the 2'000-Watt society

Global fairness



17'500 kWh during one year is the idea of the 2'000-Watt society

- Fair and sustainable society
- Every human being today and in the future has the right to the same amount of energy

Zurich is on the right track

Referendum 2'000-Watt Society in 2008

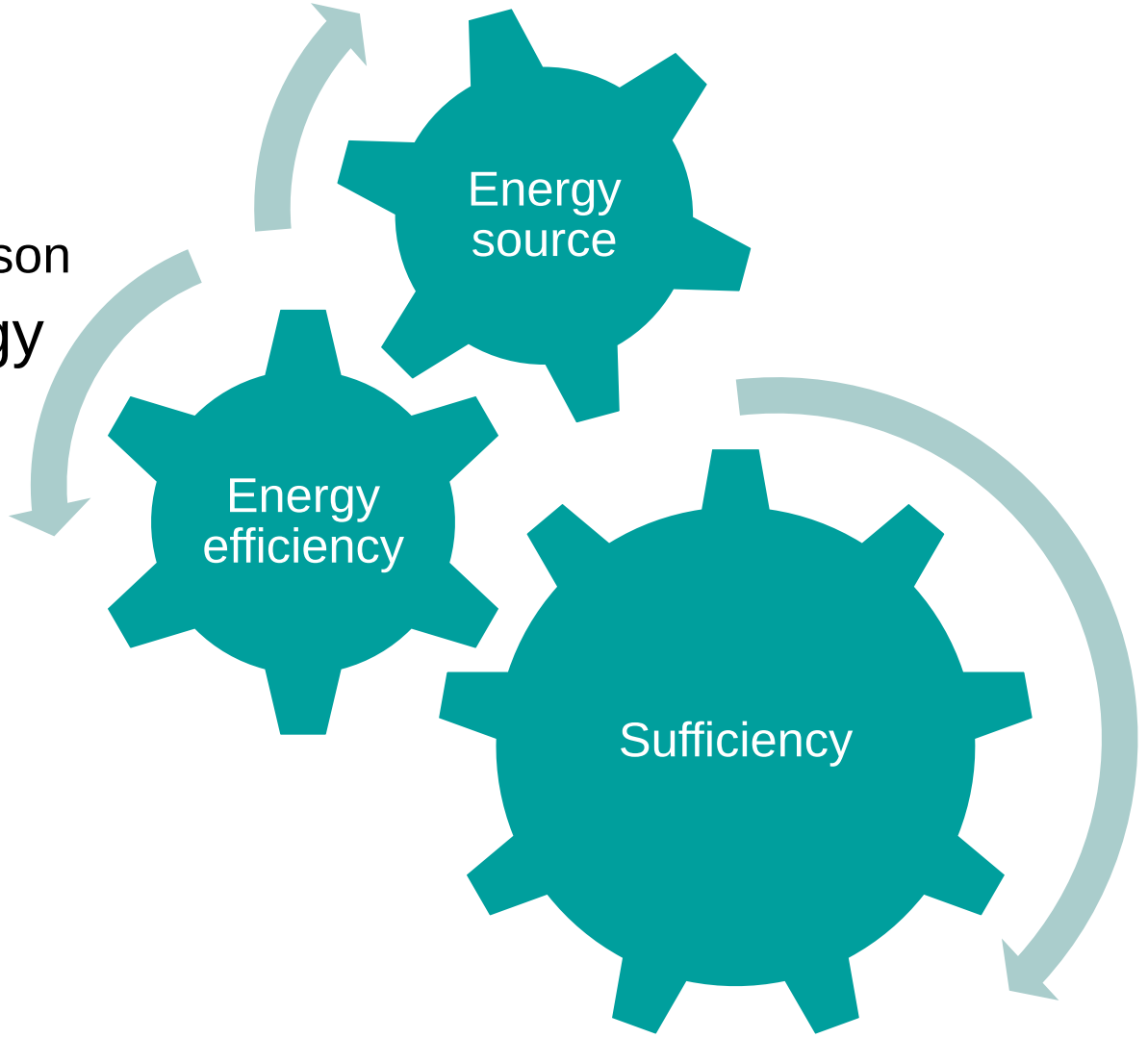
76.4 % YES

- **Reduction of energy** consumption (factor 3): 5000 → **2000 Watt** per capita
- **Reduction of greenhouse gases** (factor 5): 5 tons → **1 ton** per capita and year until 2050
- Promote **energy efficiency** and **renewable energy**
- Stopping **nuclear power** investments by 2034 at the latest

Target cascade

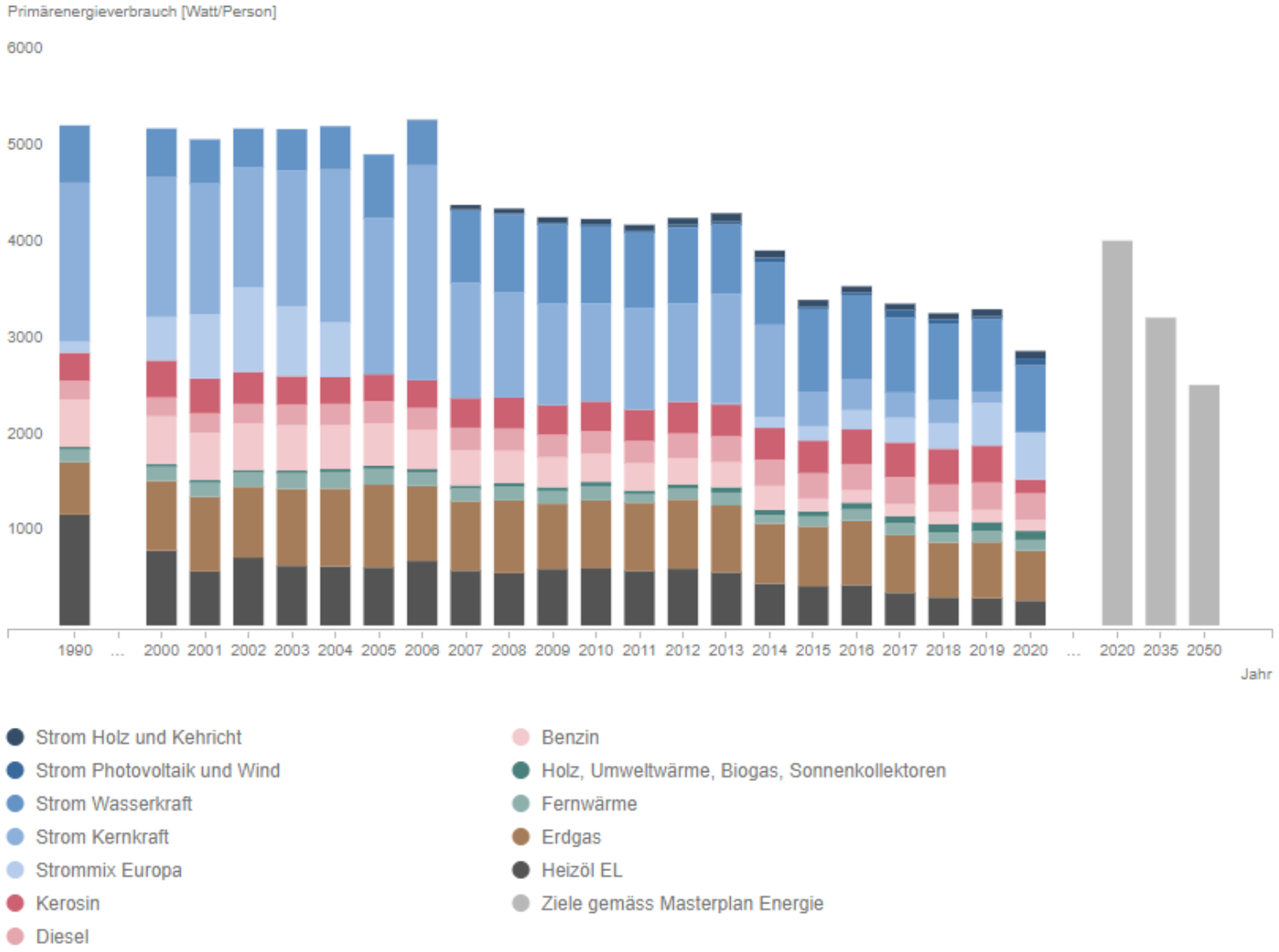
How to achieve 2'000 Watt?

1. Sufficiency
   - Living/work space and equipment per person
2. Improve energy efficiency/technology
   - Building insulation
   - Electric mobility
   - Operation optimisation
3. Choose a renewable energy source
   - Water
   - Sun
   - Wind
   - Biomass
   - (Waste)



Introduction to the 2'000-Watt society

Primary energy in Zurich 1990 - 2020

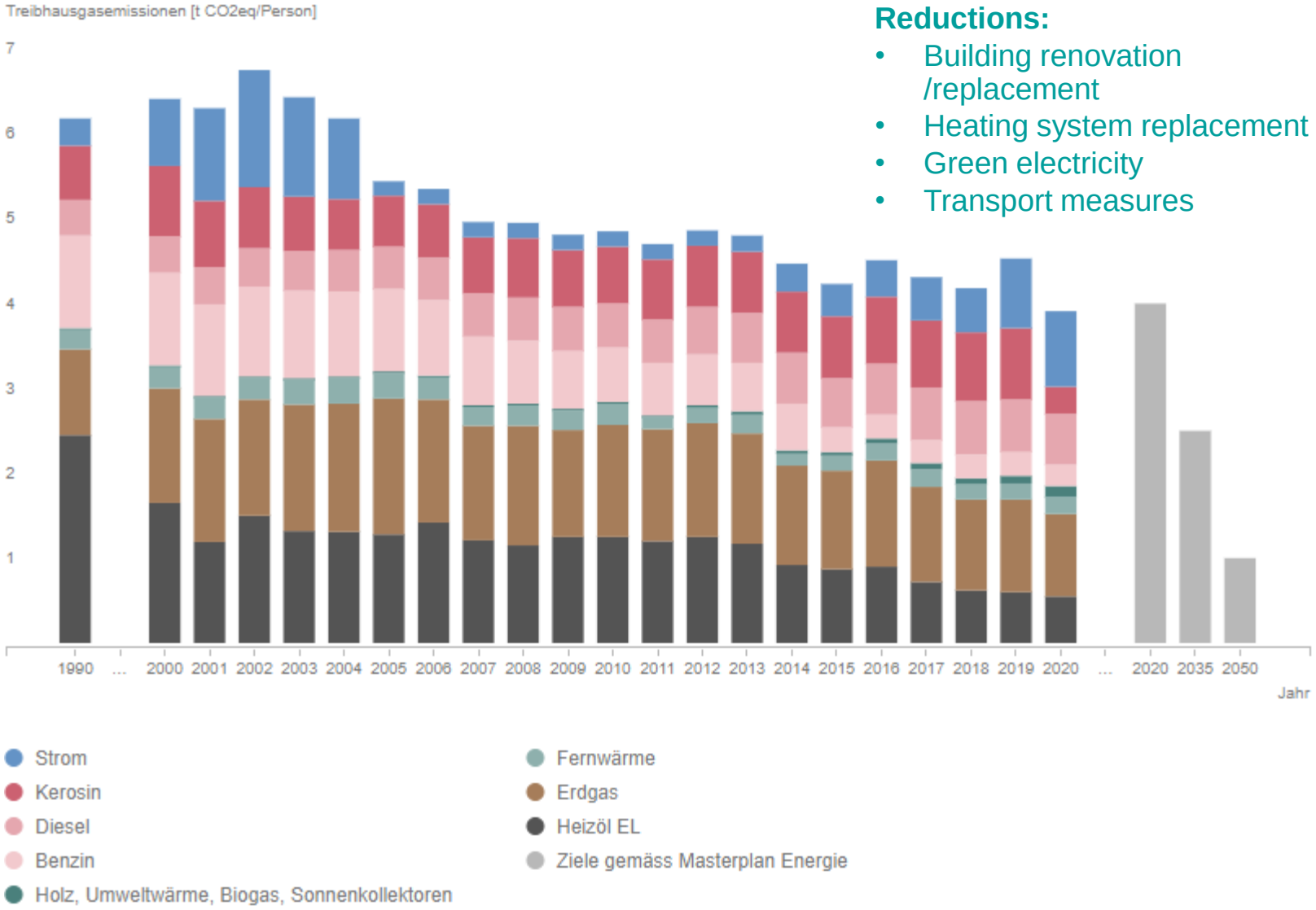


Average over last 5 years:
3'250 W/person

→ interim target for 2020 of consuming only 4'000 W has been achieved!

Introduction to the 2'000-Watt society

Greenhouse gases in Zurich 1990 - 2020



Reductions:

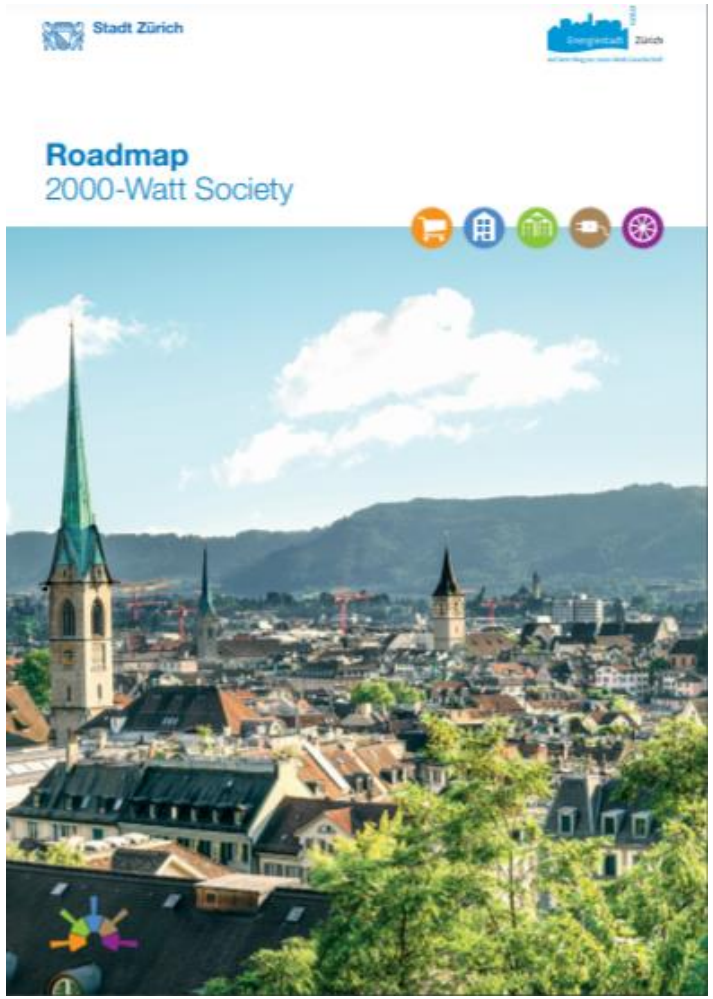
- Building renovation /replacement
- Heating system replacement
- Green electricity
- Transport measures

Average over last 5 years:
4.3 t CO_{2eq}

→ Interim target for 2020 of 4 t of CO_{2eq} could not be achieved (only in COVID-19-year 2020)

Introduction to the 2'000-Watt society

Roadmap 2017



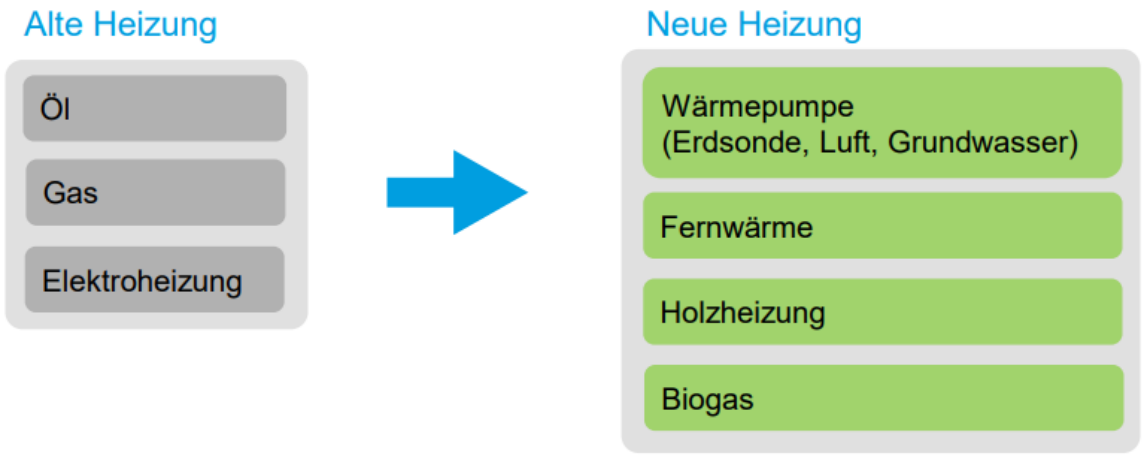
Fields of action

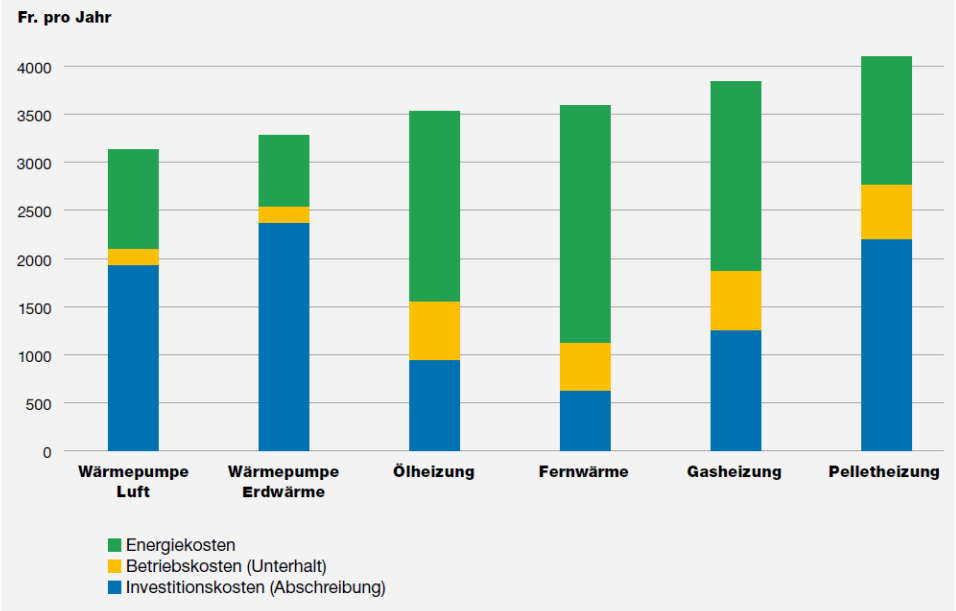
- Buildings
- Energy Supply
- Mobility
- Settlement
- Consumption

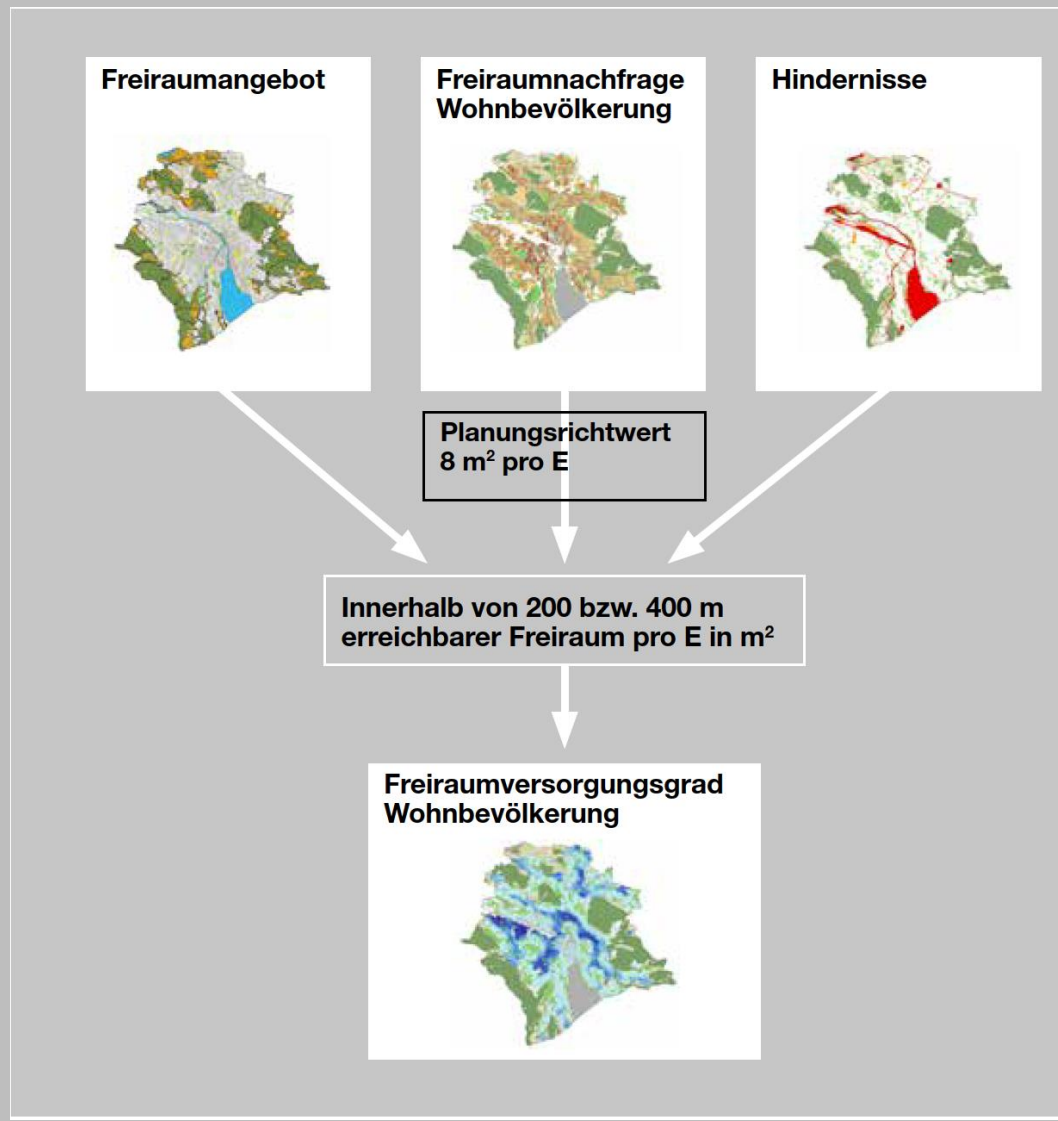
Referendum: Cantonal energy law

YES! on November 28, 2021

1. Requires the **replacement of oil and gas heating systems** at the end of their service life **with environmentally friendly heating** solutions (if technically and financially viable)
2. Will come into force in mid-2022






Freiraumangebot
Freiraumnachfrage Wohnbevölkerung
Hindernisse
Planungsrichtwert 8 m² pro E
Innerhalb von 200 bzw. 400 m erreichbarer Freiraum pro E in m²
Freiraumversorgungsgrad Wohnbevölkerung