

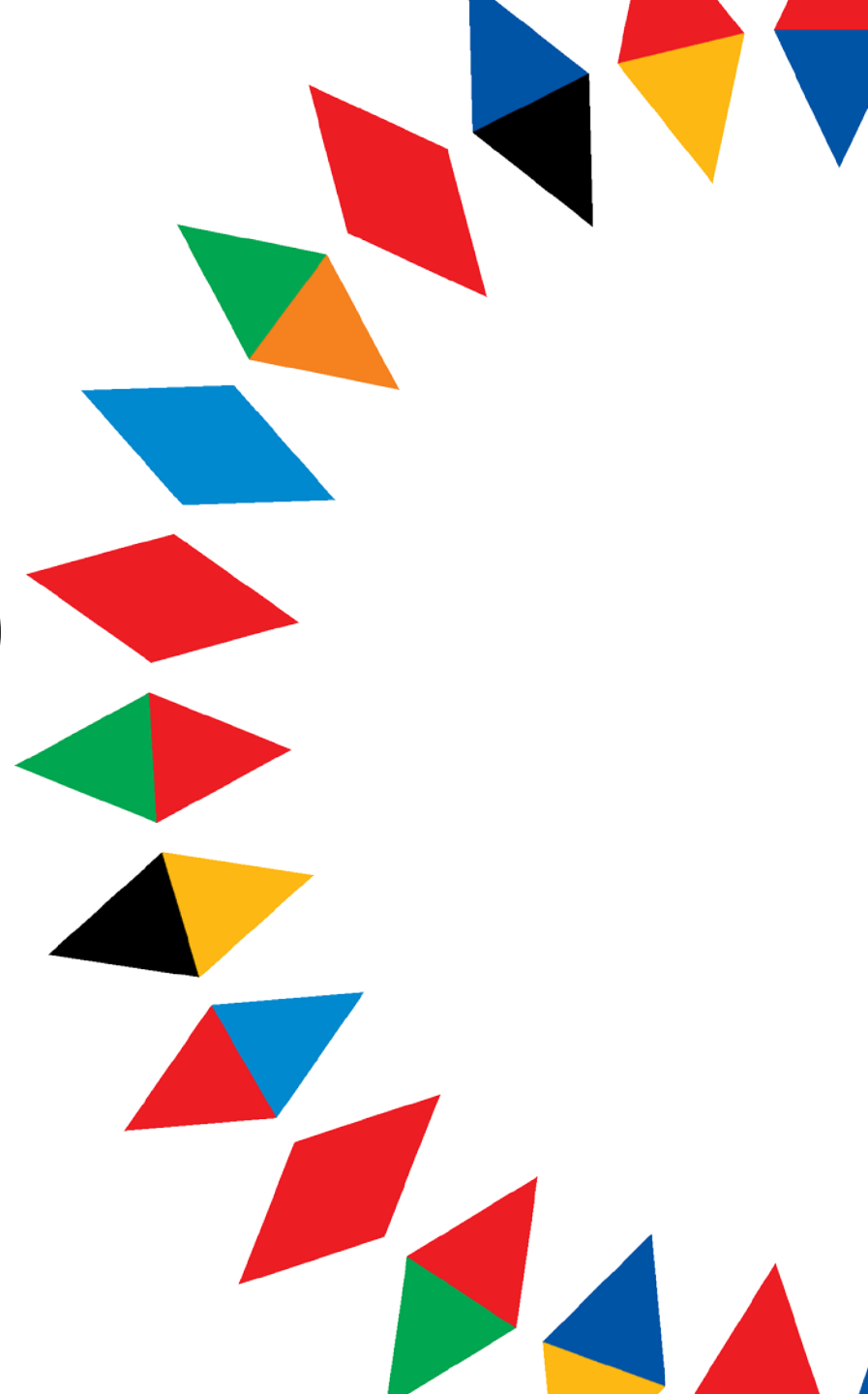
Martin Bursík
Sustainable Energy and Climate Commission, Prague

Prague Climate Plan 2030

Prague on the Road Towards Climate Neutrality by 2050

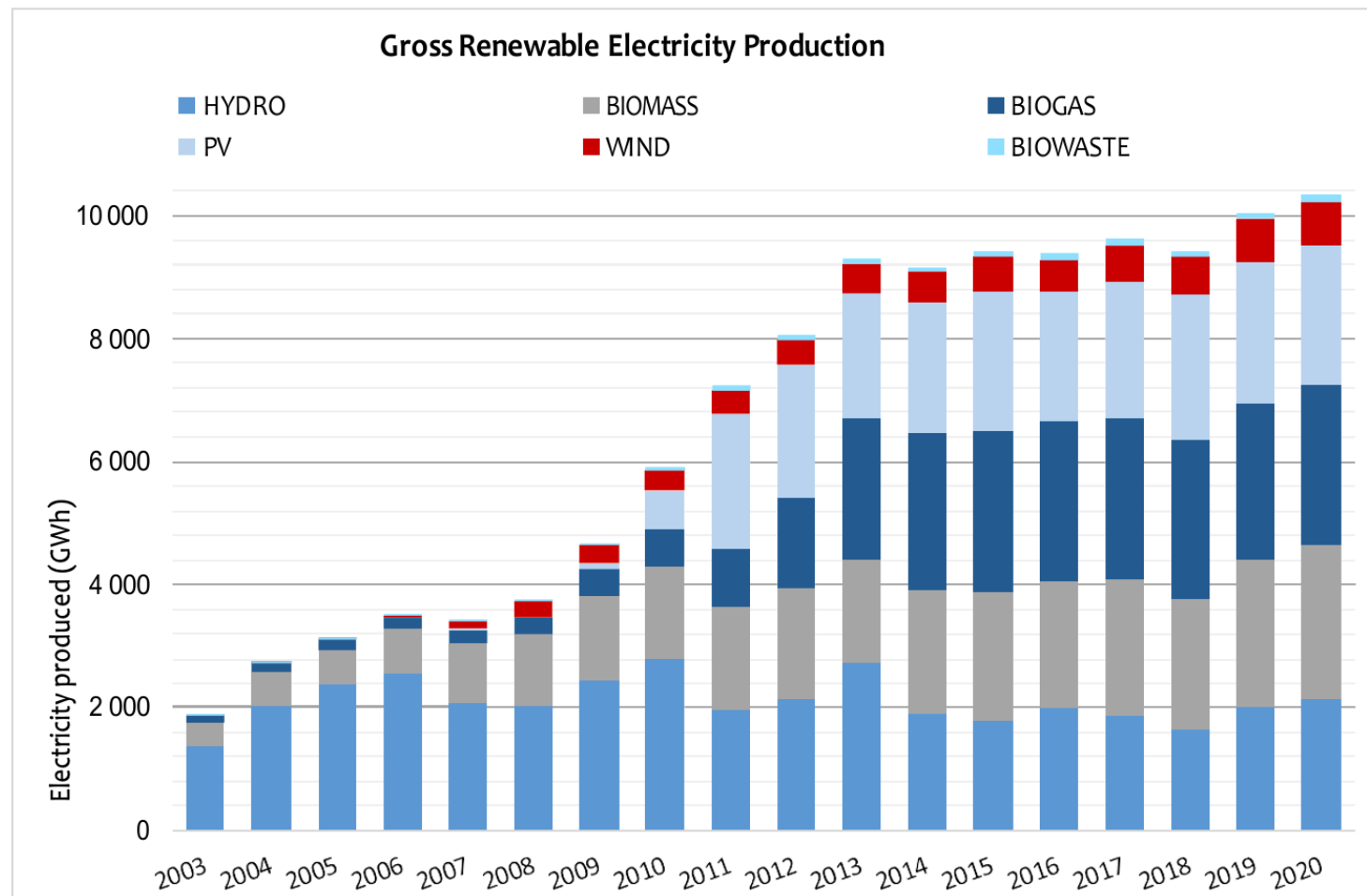


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RE in CZ 2020

- 17,30 % Renewable Energy,
- 14,81 % Renewable Electricity,
 - 3,11 % hydro
 - 3,23 % PV
 - 3,55 % biomass
 - 0,96 % wind
 - 3,70 % biogas
 - 0,15 % biowaste



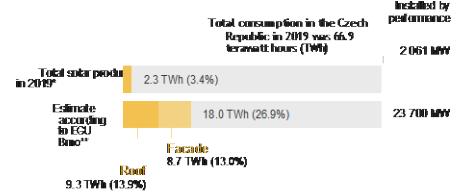
RE electricity potential in CZ

PV on roofs and facades 18 TWh
= 27 % of electricity consumption

SOLAR ENERGY POTENTIAL IN THE CZECH REPUBLIC: ROOFS AND FACADES

According to a study by EGU Brno, solar power plants on all technically suitable roofs and facades in the Czech Republic would cover up to 27% of electricity consumption.

HOW MUCH OF THE CONSUMPTION WOULD ROOFTOP AND FACADE SOLAR POWER PLANTS COVER?



* For 2019, production from all types of solar power plants is included.
** Estimate of EGU Brno does not take into account landscape character, attitude of inhabitants and local constraints.

HOW MUCH SPACE WOULD THE SOLAR PANELS TAKE UP?



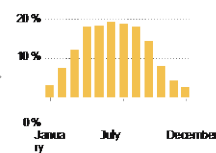
BASIC CONCEPTS

Installed capacity refers to the maximum electrical output of a power plant for which it is technically capable. It is expressed in watts (W).
Generation (and therefore consumption coverage) refers to how much a power plant actually produces under given external conditions. It is expressed in watt-hours (Wh).

The ratio between the actual electricity production and the electricity that would have been produced if the installed capacity had been used continuously is expressed by the so-called utilization factor.

This is 12.5% on average for solar power plants, due to the night-time absence of sunlight, its lower intensity outside the midday hours or cloudy skies. Its value varies throughout the year.

Average coefficient of utilization of solar power plants in 2015-2020



HOW TO IMAGINE A SOLAR PANEL?

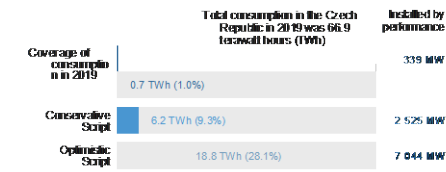
Panel (dimensions 1x2 m)
Slope (on roofs 33°, on facades 90°)

Wind 18.8 TWh
= 28 % of electricity consumption

WIND ENERGY POTENTIAL IN THE CZECH REPUBLIC

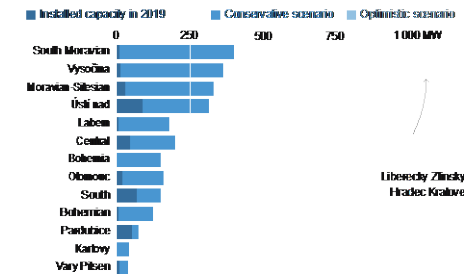
According to a study by the Academy of Sciences, wind power plants can cover up to 28% of electricity consumption in the Czech Republic.

HOW MUCH OF THE ELECTRICITY CONSUMPTION CAN WIND COVER? BASIC CONCEPTS



These scenarios take into account landscape character, residents' attitudes and local constraints.

WHERE IS THE POTENTIAL FOR WIND POWER?



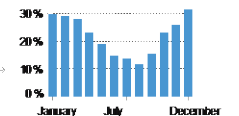
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The ratio between the actual electricity production and the electricity that would have been produced if the installed capacity had been used continuously is expressed by the so-called utilization factor.

This averages out to about 20%, but its value varies throughout the year.

Average utilization factor of wind power plants in 2015-2020



HOW TO IMAGINE A WIND POWER PLANT?

Rotor (diameter 110-160 m)
Typical mast spacing is 5 rotor diameters.
The greatest potential for wind energy is in the South Moravian Region, the Vysočina Region and the Moravian Silesian Region.



The City of Prague

- 1,5 mil. inhabitants,
- highest life expectancy (82.86 / 78.16),
- high quality of life (7th in Expat City Ranking),
- safe city,
- effective and cheap public transport (40 % personal mobility via public transport (3,5 mil./day = 1,2 bill./year),
- effects of climate change (2002 and 2014 floodings, heat waves, heavy rains),
- 06/2019 the City adopted the climate commitment (-45% CO₂ comp. to 2010 by 2030),
- 05/2021 Prague Climate Plan 2030 / Prague on the Road towards Climate Neutrality by 2050.



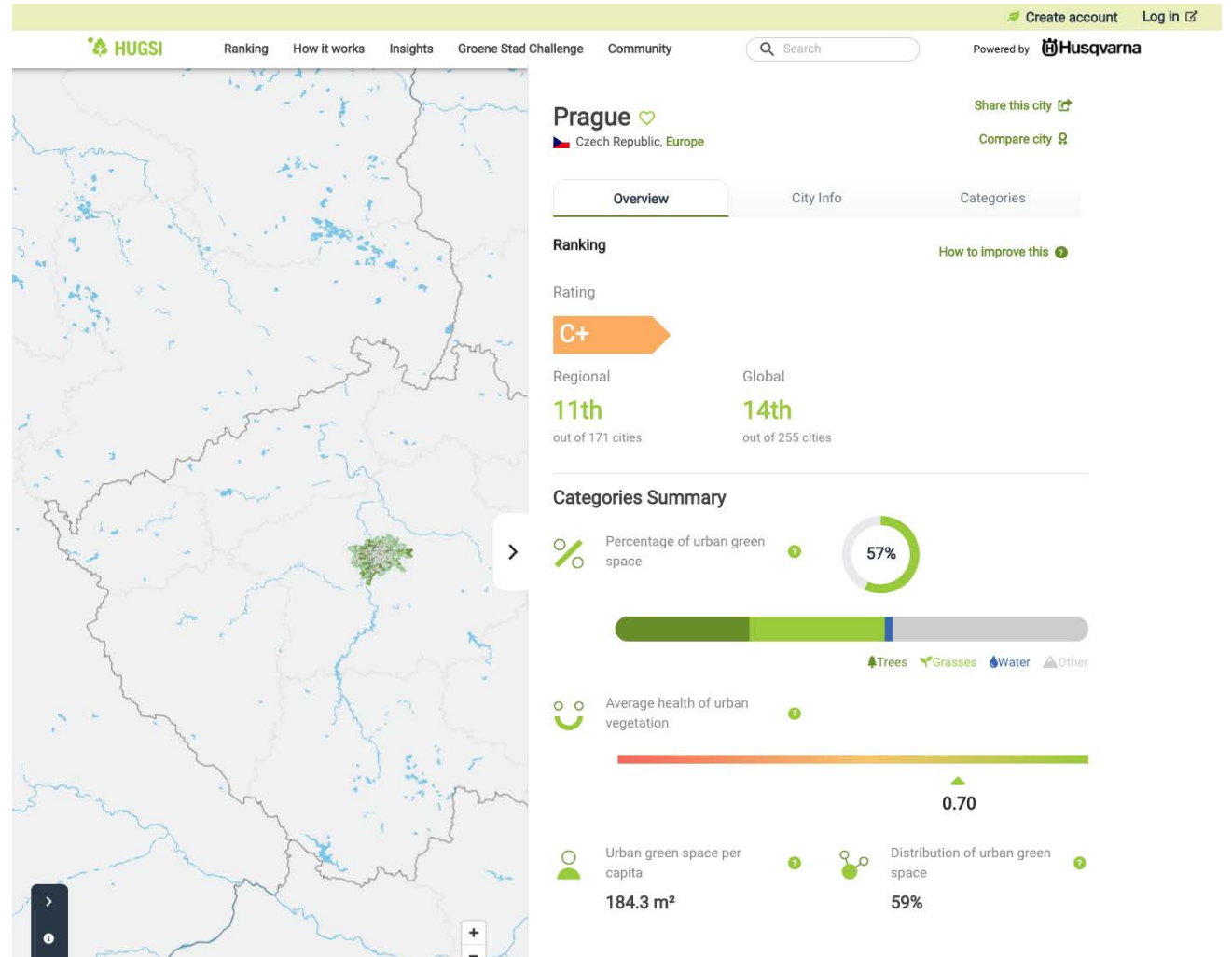
Green City

- 13th largest share of parks, forests and greenery among 155 cities from 60 countries

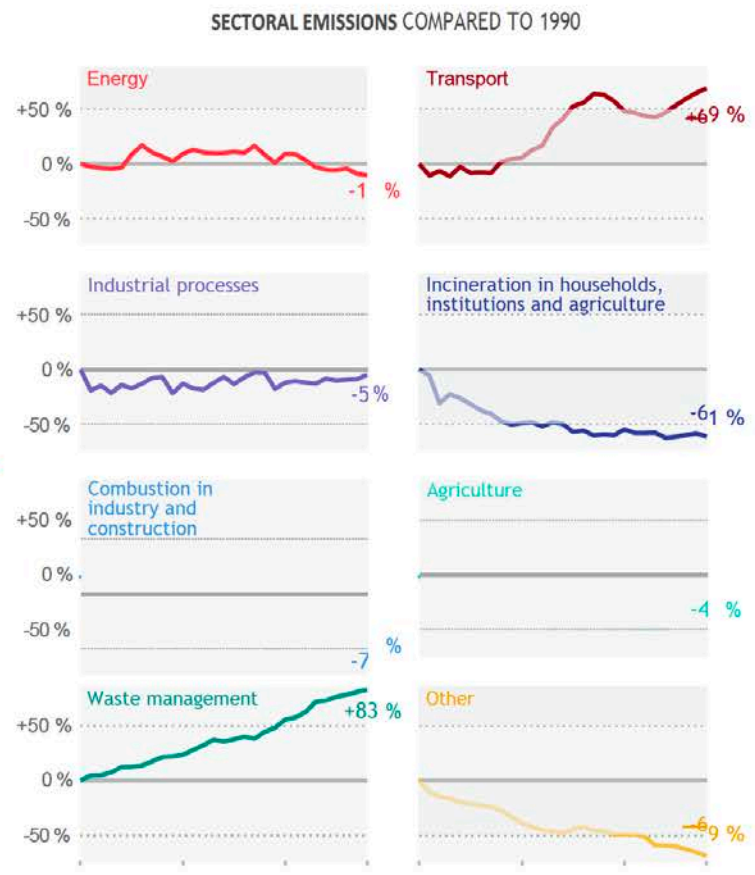
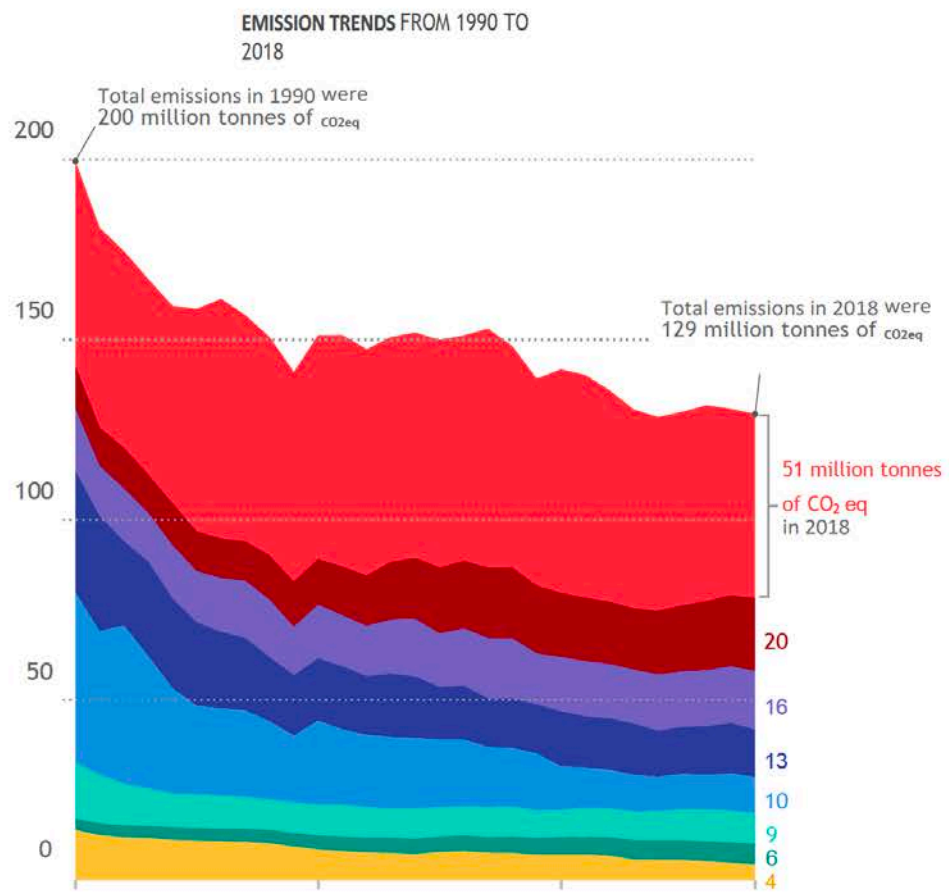
- 57 % urban green space,

-184 m² of green space per person,

- 59 % distribution of urban green,



CO_{2eq} emissions: 200 MIO t/1990 to 135 MIO t/2010

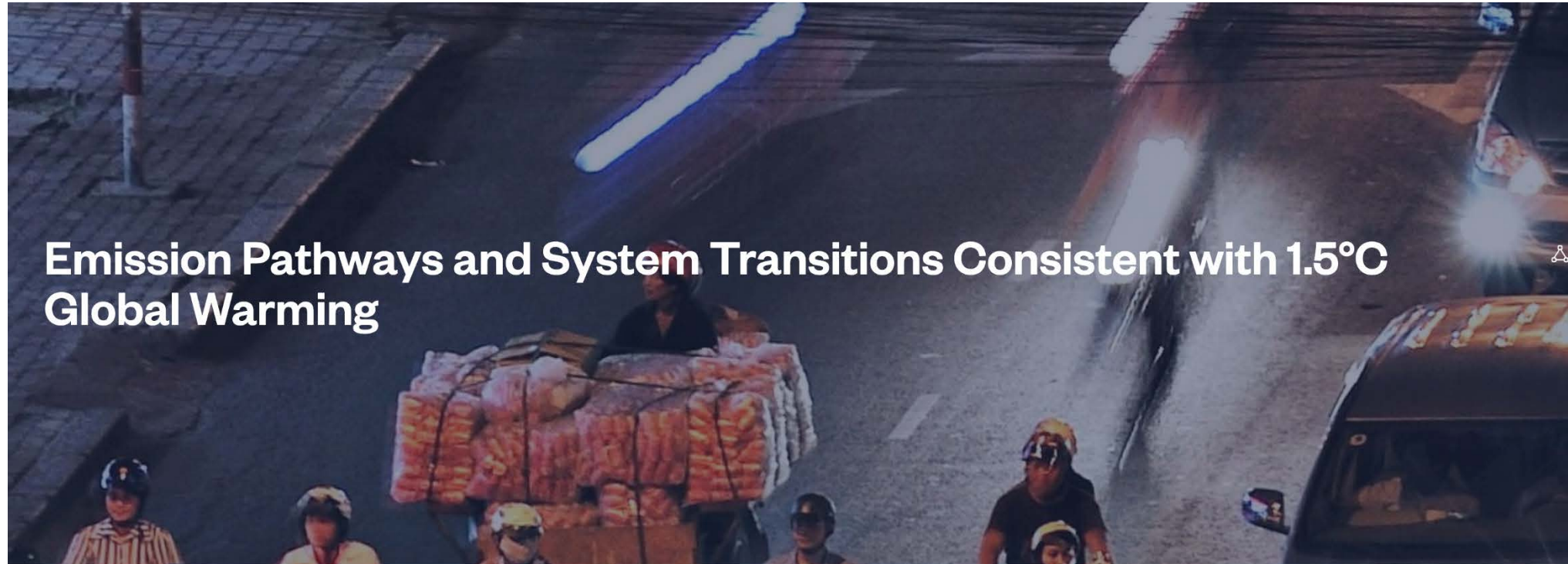


IPCC 1,5°C versus Fit for 55

- Reduction by **55% compared to 1990**
 - from 200 MIO tons₁₉₉₀ by 110 MIO tons **to 90 MIO tons₂₀₃₀**
- Reduction by **45 % compared to 2010**
 - from 135 MIO tons₂₀₁₀ by 61 MIO tons **to 74 MIO tons₂₀₃₀**
- **55 < 45**



IPCC special Report on Global Warming by 1,5 °C



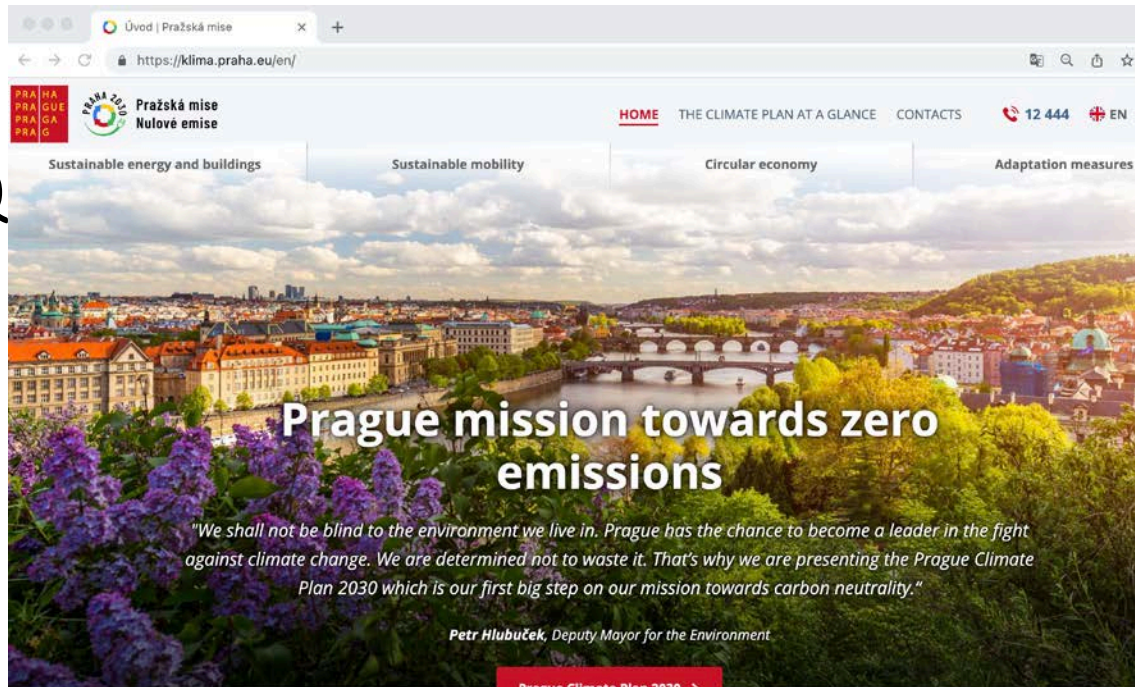
Emission Pathways and System Transitions Consistent with 1.5°C Global Warming



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C.1. In model pathways with no or limited overshoot of 1.5°C, global net anthropogenic CO₂ emissions decline by about 45% from 2010 levels by 2030 (40–60% interquartile range), reaching net zero around 2050 (2045–2055 interquartile range). For limiting global warming to below 2°C ^{FN 12} CO₂ emissions are projected to decline by about 25% by 2030 in most pathways (10–30% interquartile range) and reach net zero around 2070 (2065–2080 interquartile range). Non-CO₂ emissions in pathways that limit global warming to 1.5°C show deep reductions that are similar to those in pathways limiting warming to 2°C. (*high confidence*) (Figure SPM.3a) {2.1, 2.3, Table 2.4}

Q



Sustainable Energy and Buildings

Prague is responsible for 10 % of the whole energetic consumption of the Czech Republic. The city should aim for independence of external fossil energy suppliers and reorient itself more towards its own production based on renewable sources. A rich building fund can play a crucial role. What are the specific steps that can be achieved?

[More information >](#)



Sustainable Mobility



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Initial Carbon Footprint 2010 – 8,8 MIO tons/year

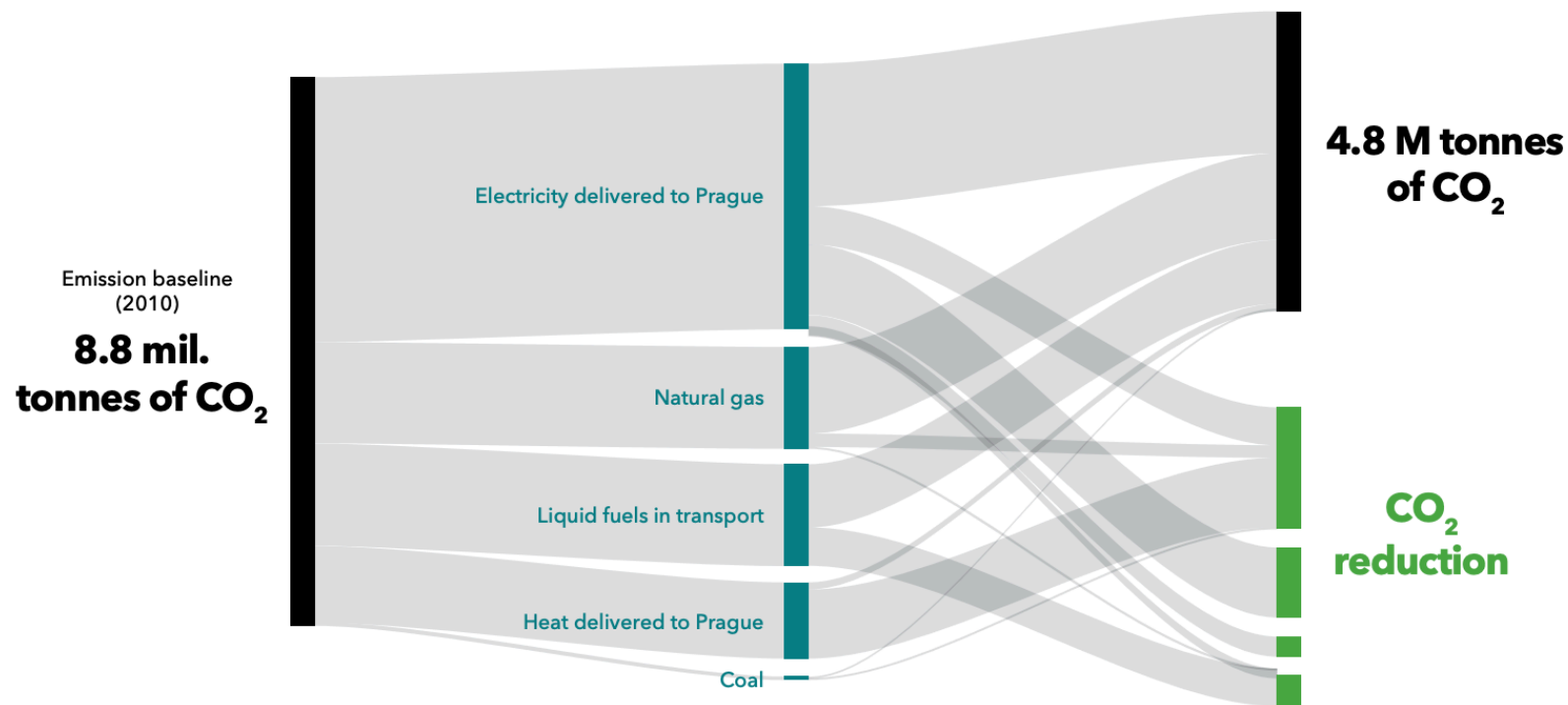
• Electricity	4,1 mio CO ₂ tons/year	48 %
• Heat	0,9 mio CO ₂ tons/year	11 %
• Natural Gas	1,9 mio CO ₂ tons/year	22 %
• Liquid Petr. Gases	1,6 mio CO ₂ tons/year	18 %



Commitment of Prague: - 45 % CO₂eq. comp. to 2010 by 2030

FIGURE 3 **Changes in the CO₂ balance in Prague between 2010 and 2030 displayed as a Sankey diagram**

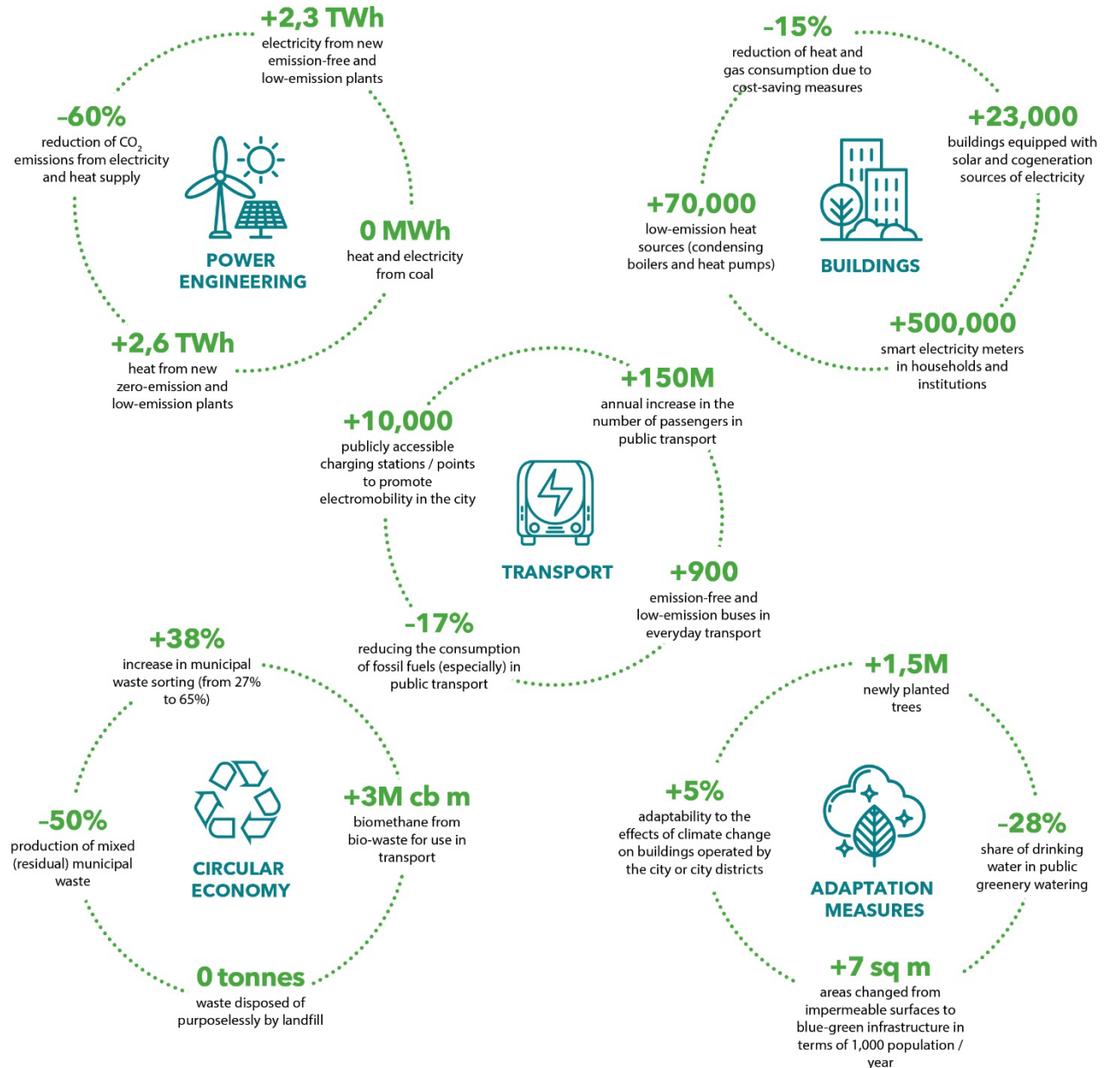
These are CO₂ emissions tied to the types of energy which are to be supplied within the city's territory (the reference year is 2010 and target is 2030).



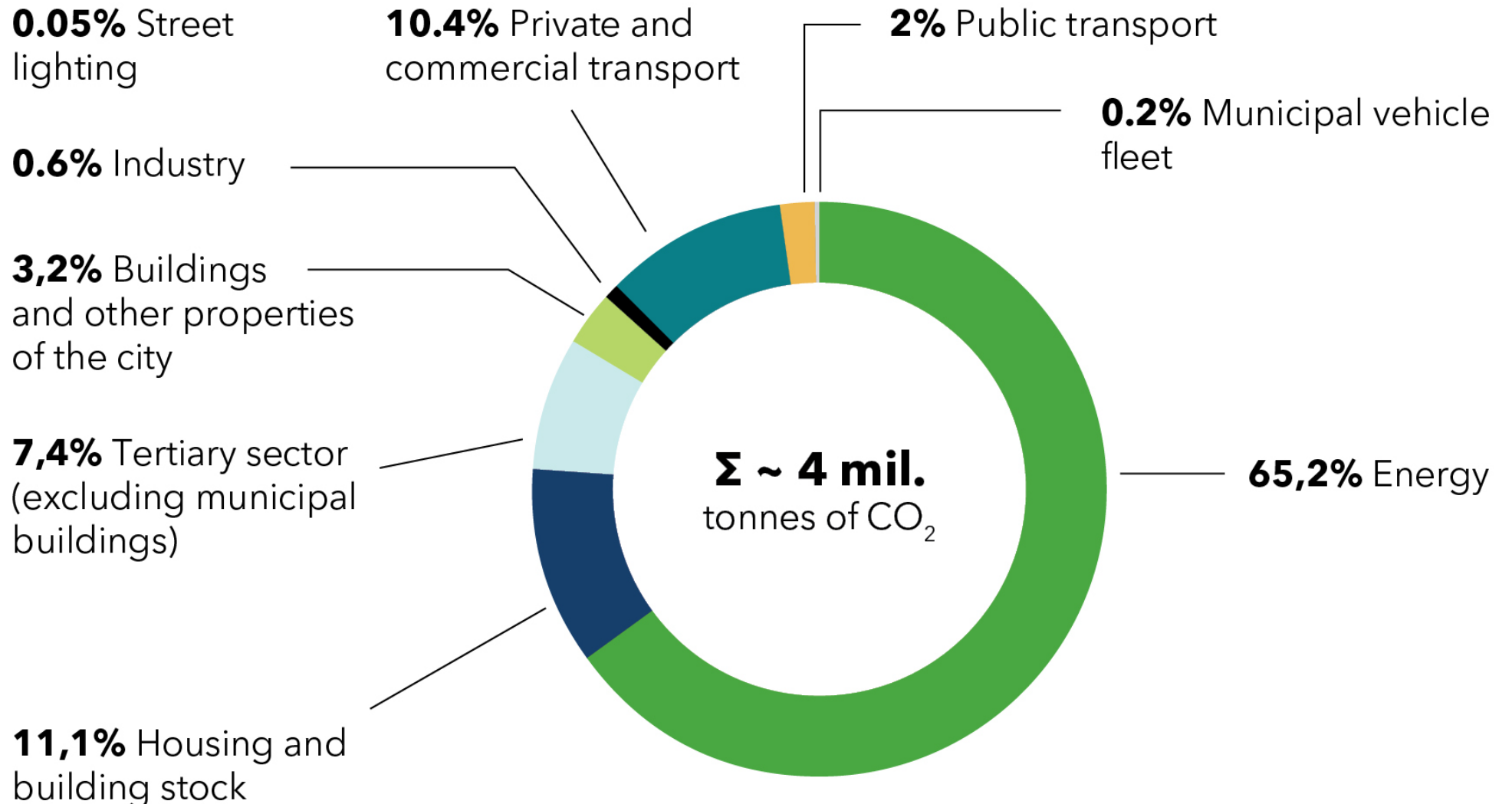
69 measures / 4 areas

4 working groups:

- Sustainable Energy,
- Sustainable Mobility,
- Circular Economy,
- Adaptation to Climate Change.



Decarbonisation potential: energy, housing and construction



Sector by Sector Tonn by Tonn towards

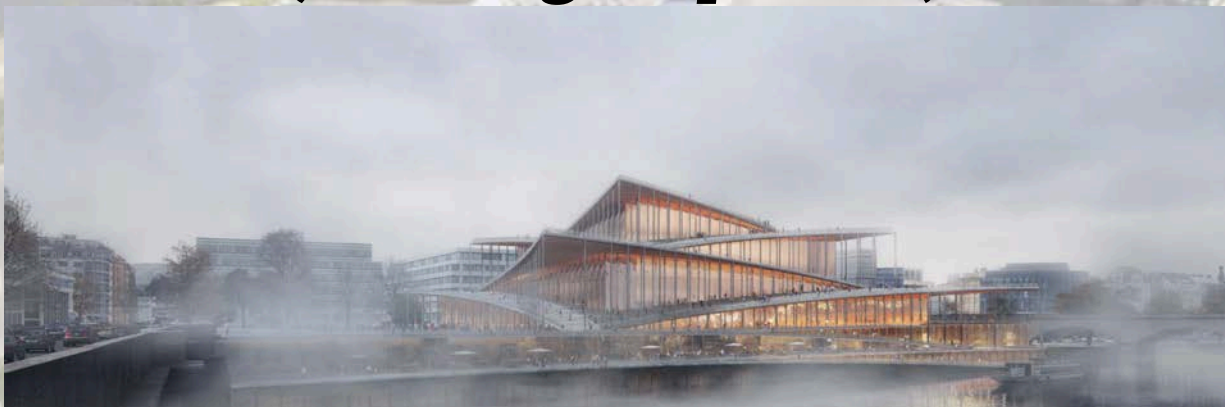
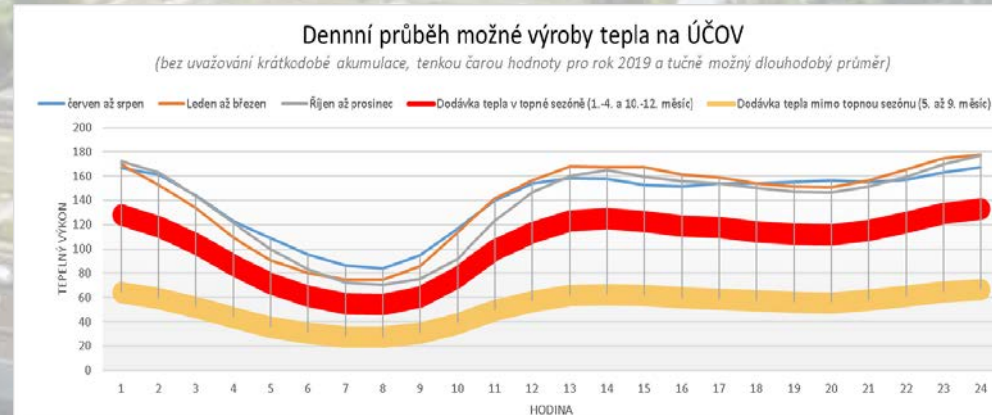


Area / priority	(%)	(t/year)	(%)	(MWh/year)	(thousand CZK/Year)	(%)	(MWh/year)	Total	From PCH budget	From city owned company budgets	From other sources, including grant programmes
1. Sustainable energy and buildings	39.64%	3,506,039	9.31%	2,263,835	5,267,119	6.77%	1,645,338	174,061	14,842	12,530	146,689
Energy (production and distribution of electricity, heat, and gas)	29.50%	2,608,584	2.72%	661,518	645,845	4.40%	1,070,000	55,055	6,480	12,530	36,045
Housing and building stock	5.01%	442,729	4.06%	987,511	2,201,256	1.08%	262,963	74,086	1,304	0	72,782
Tertiary sector (excluding municipal buildings)	3.35%	296,410	1.85%	449,825	1,683,644	0.82%	198,750	32,020	86	0	31,934
Buildings and other property of the city	1.45%	128,403	0.52%	126,364	588,806	0.37%	91,125	11,050	6,468	0	4,583
Industry	0.29%	25,255	0.10%	25,333	121,000	0.09%	22,500	1,025	10	0	1,015
Street lighting	0.05%	4,658	0.05%	13,284	26,568	0.00%	0	824	495	0	330
2. Sustainable mobility	5.61%	496,468	8.48%	2,063,177	5,022,758	0.00%	0	56,340	17,125	9,876	29,339
Private and commercial transport	4.73%	418,390	7.09%	1,724,364	4,191,911	0.00%	0	10,880	5,950	0	4,930
Public transport	0.80%	70,396	1.38%	336,601	841,502	0.00%	0	45,000	11,025	9,750	24,225
Municipal vehicle fleet	0.09%	7,682	0.01%	2,212	-10,654	0.00%	0	460	150	126	184
3. Circular economy			0.00%	0	0		30,000	600	360	0	240
Use of biodegradable waste in production biomethane*			0.00%	0	0		30,000	600	360	0	240
CELKEM	45.3%	4,002,507	17.8%	4,327,012	10,289,877	7.2%	1,675,338	231,001	32,327	22,406	176,268



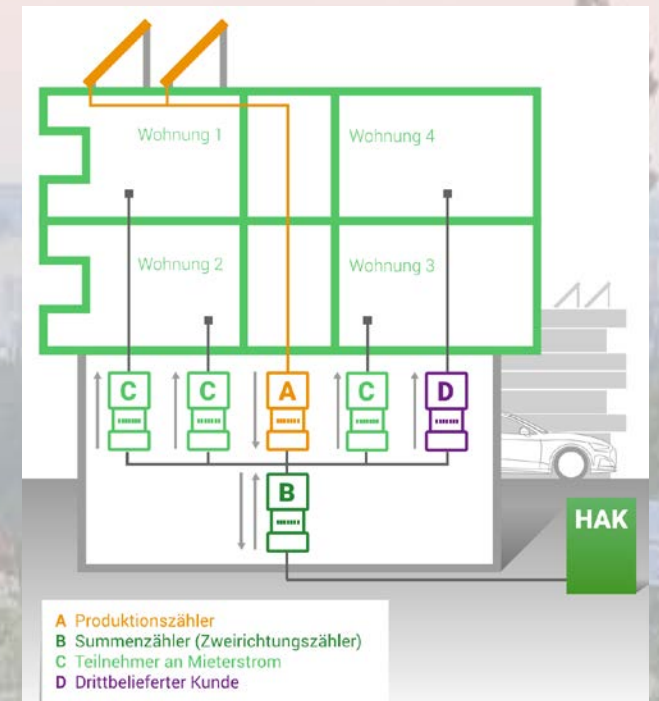
1. Heat Utilisation from Central Wastewater Treatment Facility ENERGYCENTRE

- Heat and cooling source of renewable origin (ambient heat),
- series of large heat pumps,
- heat output $> 220 \text{ MW @ } 90 \text{ }^\circ\text{C}$,
- substitute of $> 30 \%$ heat from coal PP Melnik ($< 200 \text{ kg CO}_2/\text{MWh}$)



2. Prague's Renewable Energy Community

- City Funded organization,
- full service for RE / citizens communities,
- open to cooperatives, condominiums, private owners, SMEs etc.,
- 50 pilots by 2022 (1 MWp), hundreds in pipeline,
- **> 850 interested parties,**
- Plan of more than **23,000 buildings eq. PV** with electricity output **> 500 MW** by 2030,
- joint PV electricity production in apartment buildings,
- electricity sharing options,
- + shared community-based PV plants.





Naše cíle v číslech

23 000
střech

Tolik pražských nemovitostí chceme během následující dekády osadit fotovoltaickými elektrárnami.

10
miliard Kč

Takovou částku hodlá Praha v tomto desetiletí vydat na dotační podporu čisté energie.

1
miliarda Kč ročně

Náš plán počítá s tím, že počátkem nového desetiletí ušetří Pražané na provozních nákladech miliardu každý rok.

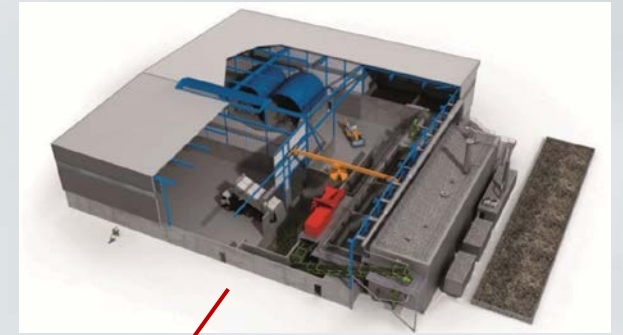
160 000
tun CO₂

O tolik od roku 2030 Praha sníží své roční emise, což odpovídá zplodinám 40 tisíc aut s benzinovým motorem.



3. Biogas Station for Municipal BIOwaste

- 1st unit - 50 thous. t/year, (bio-)
- 2nd unit - 25 thous. t/year (gastro-),
- = **approx. 40 GWh** bioCNG/year,
- plant base BIO collected since 2022, est. 15 thous. t/year for composting,
- bioCNG from wastewater sludge pilot (05/2023),
- Prague's Circular Strategy 2022.



4. Zero Emission Transport

- Public transport buses, waste collection and roads maintenance (more than 1,7 ths)
- Up to 75 % zero emission vehicles by 2030
- Diversification:
 - battery trolley-buses,
 - e-buses,
 - hydrogen fuel cells power buses,
 - bioCNG,
 - ...



5. EV Charging Infrastructure

- Several thousands city lights upgrade to EV-ready (ready to install charging station),
- an advantage: faster building permission and construction process, almost no public space needed
- to be solved: design, economic conditions
- up to **10 ths. publicly available CHS**,
- SKODA Auto (ENYAQ iV) involved,
- Energy utilities PRE, CEZ etc.



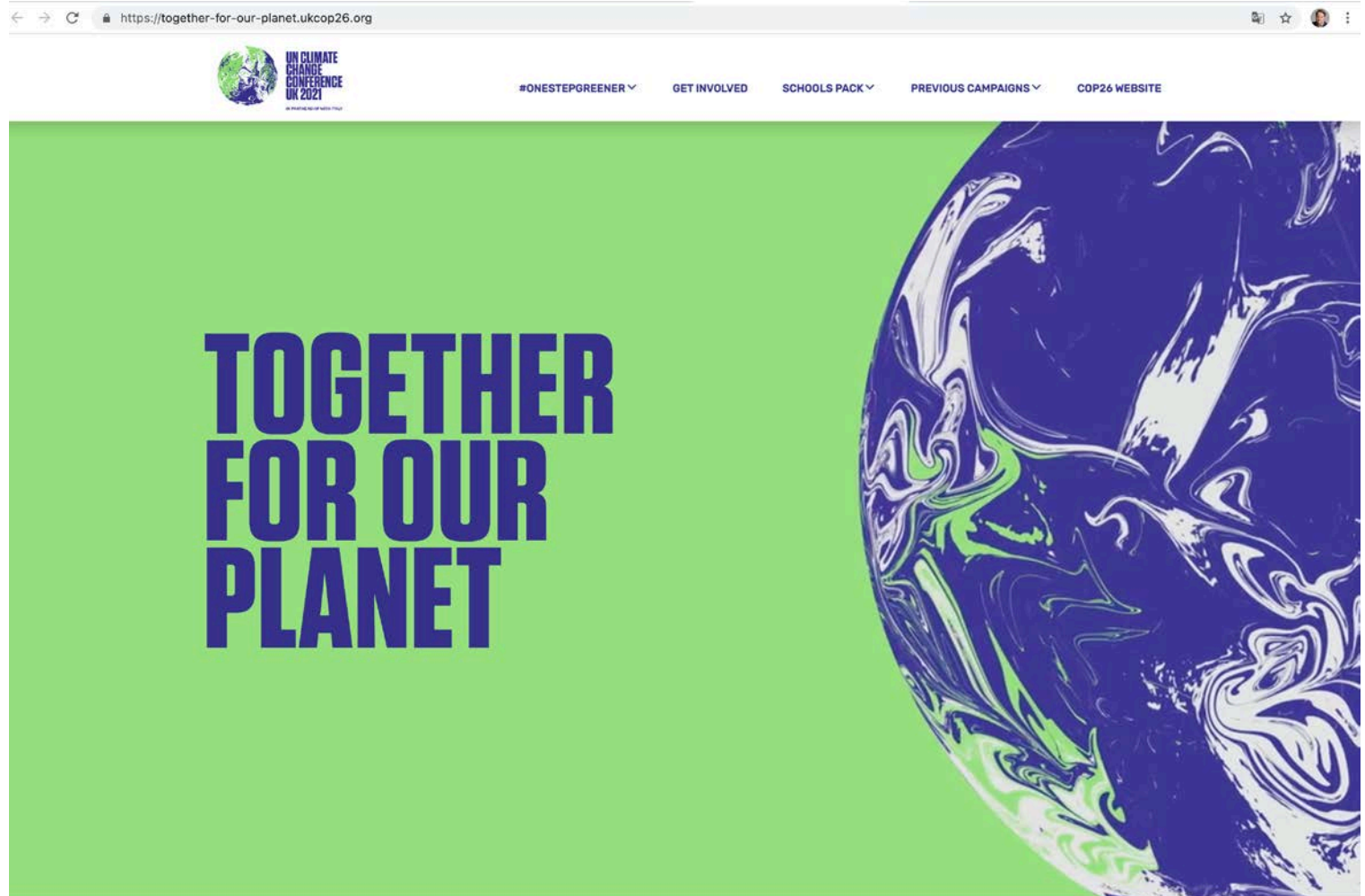
Reduction of the Dependence on Russian Gas

- substitution of gas by HP in new development,
- subsidy program „*Clean Energy Prague*“ supports HP, PV, PT, water tanks and substitution of gas boilers for households,
- speeding-up project preparation of large heat pumps ENERGYCENTRE,
- study of the Vltava River HPs utilisation potential,
- help centre „*Clean Prague*“ for the citizens.



COP 26 Race to Zero UNFCCC Campaign

- 1,049 cities
- 67 regions
- 5,235 businesses
- 441 biggest investors
- 1,039 Higher Education Institutions



Prague on COP26 Glasgow

- Paris (Deputy Mayor for Ecological Transition, Climate and Energy Dan Lert),
- Vienna (Councilor for Environment Jürgen Czernohorszky),
- London (Deputy Mayor for Environment and Energy Shirley Rodrigues),
- Budapest (Deputy Mayor Kata Tüttö and Ada Amon),
Ed Milliband, John Prescott ..



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Wonderful to be with you after some years.

Thank you!



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