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Office of the Chief Economist
EUROPE AND CENTRAL ASIA

The World Emissions Clock

Getting to Net-Zero in Europe and Central Asia - Fighting Climate Change with Data

Wolfgang Fengler
CEO, World Data Lab

24 January 2024 | Zoom

WORLD DATA LAB

Making Everyone Count

"World Data Lab creates actionable forward- looking data on consumer spending and sustainable development to improve quality of life around the world."

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1. The World Emissions Clock

World Emissions Clock

The WEC consortium

UNIVERSITY OF OXFORD

International Institute for Applied Systems Analysis
IIASA

PIK

WU WIRTSCHAFTS UNIVERSITÄT WIEN VIENNA UNIVERSITY OF ECONOMICS AND BUSINESS

WORLD RESOURCES INSTITUTE

nature

Bundesministerium für Wirtschaft und Klimaschutz

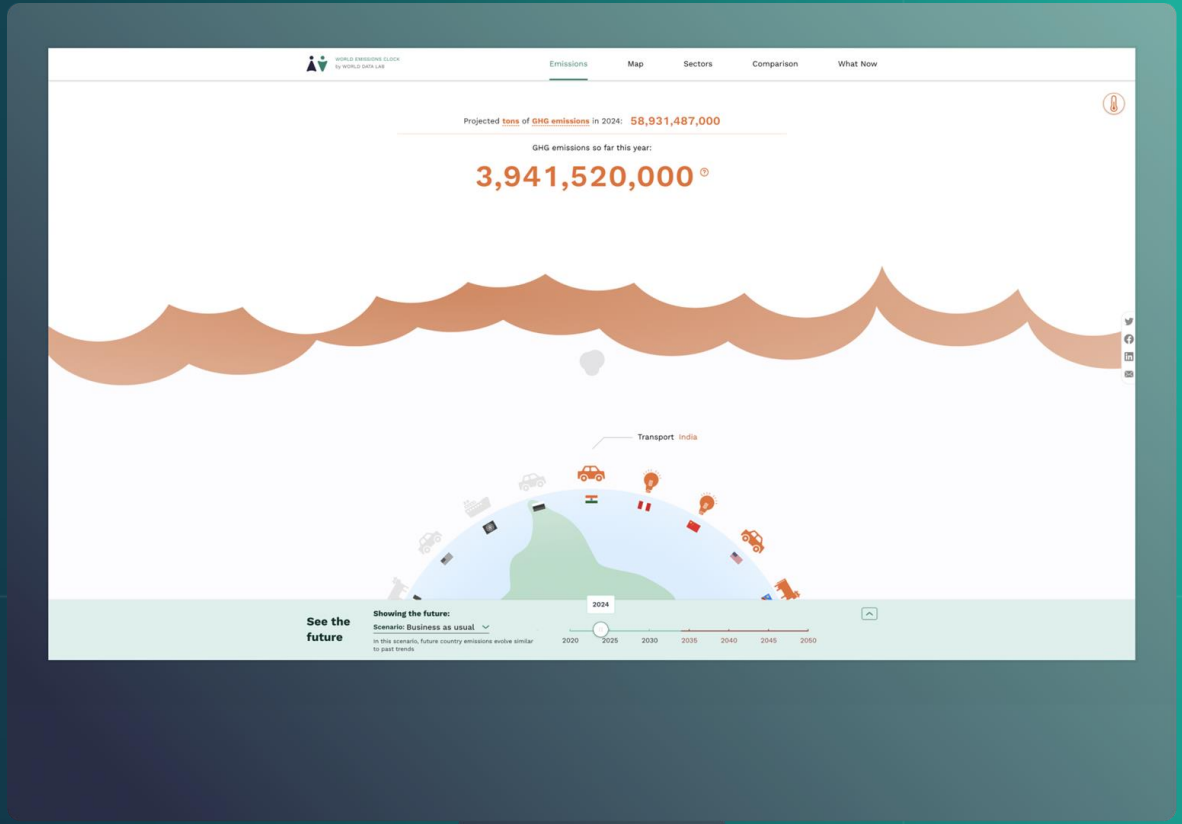
giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Patrick J McGovern FOUNDATION

World Emissions Clock

Approach and results

Explore →



The World Emissions Clock provides emission trajectories

- Three scenarios - Business as Usual (BAU), Nationally Determined Contributions (NDC), 1.5°C
- Covering 180 countries and 99.7% of today's population
- Modeling 5 main sectors and up to 24 subsectors
- Until 2050

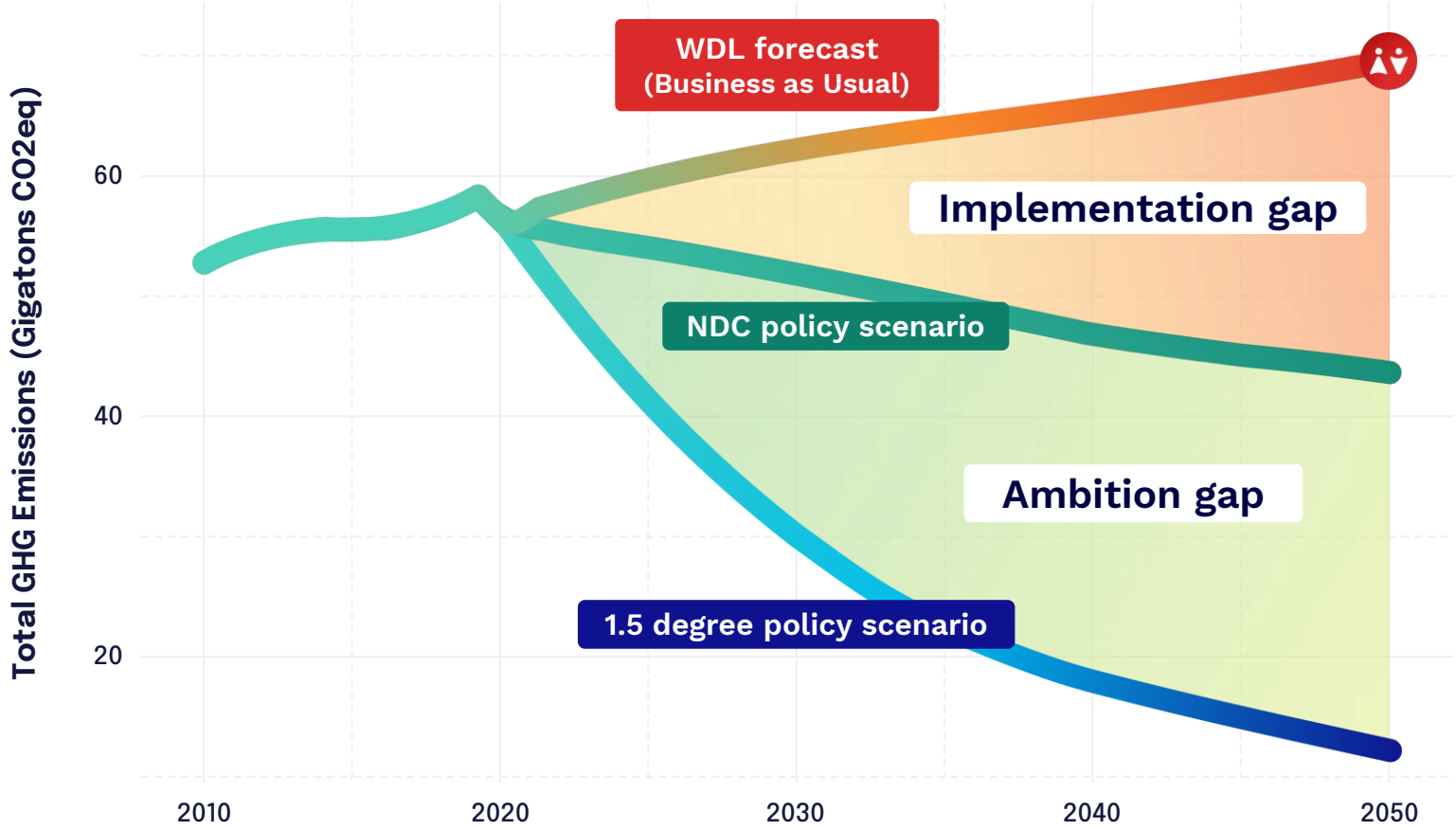
Modelling: Methodological Framework

Econometric specification: Panel Vector Autoregression

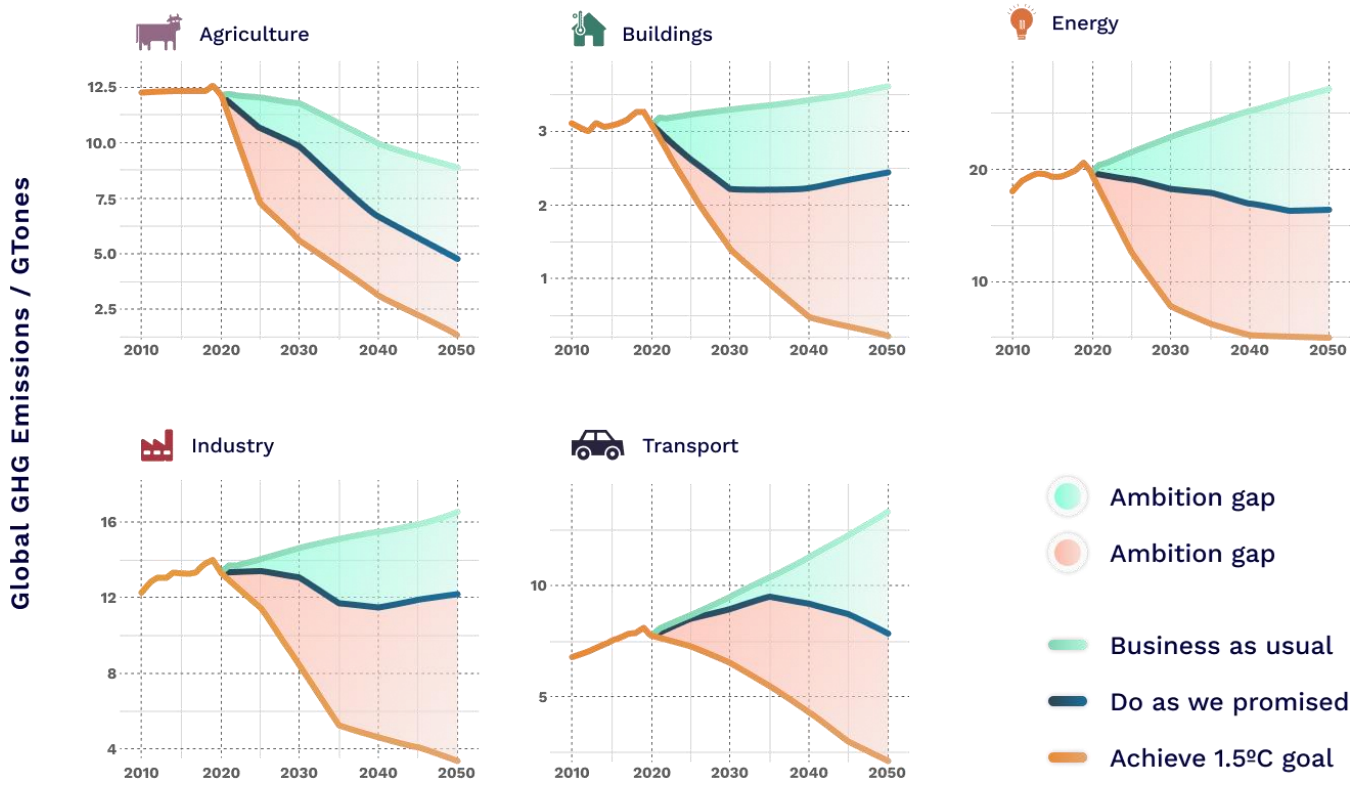
$$\mathbf{y}_{i,s,t} = \sum_{j=1}^{p} \mathbf{A}_{i,s,j}\mathbf{y}_{i,s,t-j} + \mathbf{a}_{i,s} + \delta t + \boldsymbol{\varepsilon}_{i,s,t}\,, \quad \boldsymbol{\varepsilon}_{i,s,t} \sim \mathcal{N}(\mathbf{0}, \boldsymbol{\Sigma}_{i,s})$$

- Models dynamic interdependencies between all driving factors from sectoral Kaya decomposition augmented with human capital and demographic variables
- Allows for different dynamic paths across countries/sectors, pooling information
- Combines short-term forecasts of GDP and population with projections from the Shared Socioeconomic Pathways to create sectoral emission intensity projections
- Follows Kaya decompositions, derives sectoral emissions

The WEC quantifies implementation and ambition gaps...



… which are based on 5000 consistent country-sector emission scenarios



Source: World Emissions Clock, 2022

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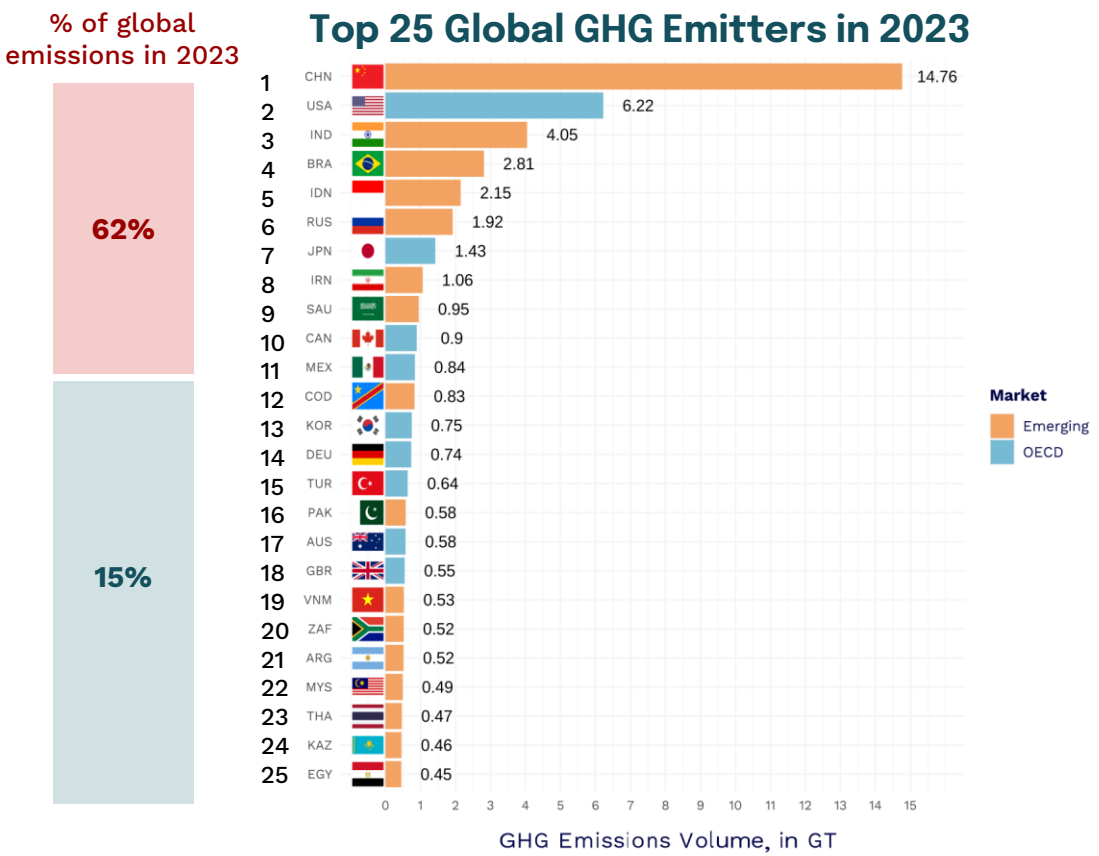
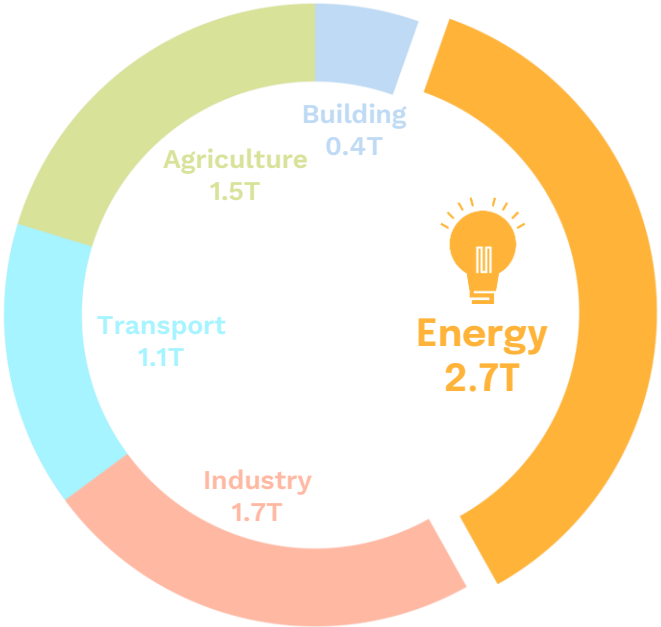
2. Global insights

Rich countries caused climate change, but they can't solve it alone

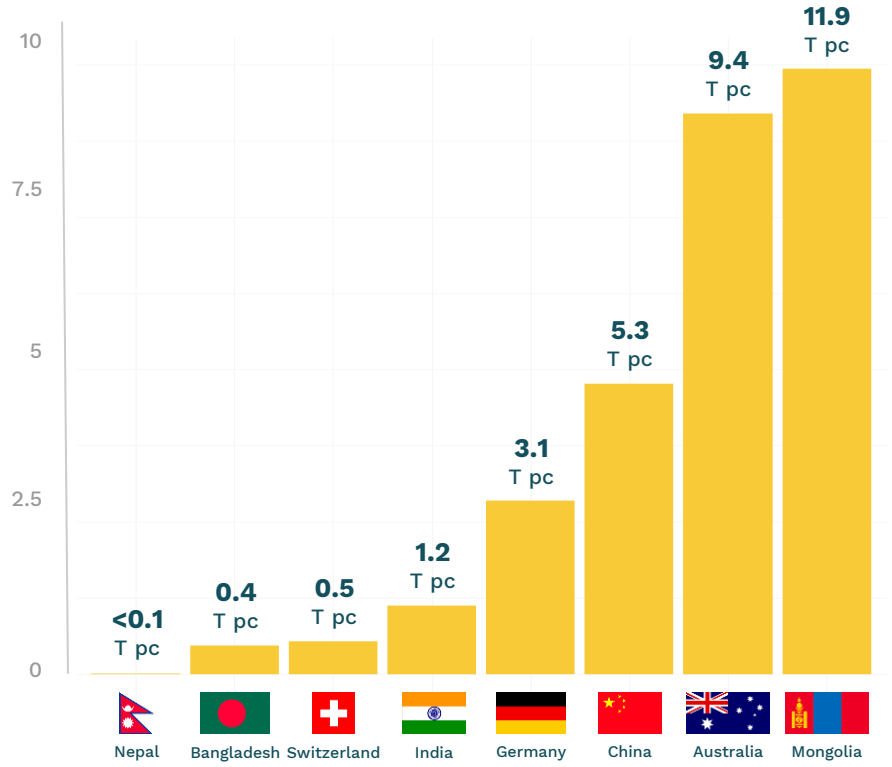


An energy-systems view: Rich countries sometimes pollute less

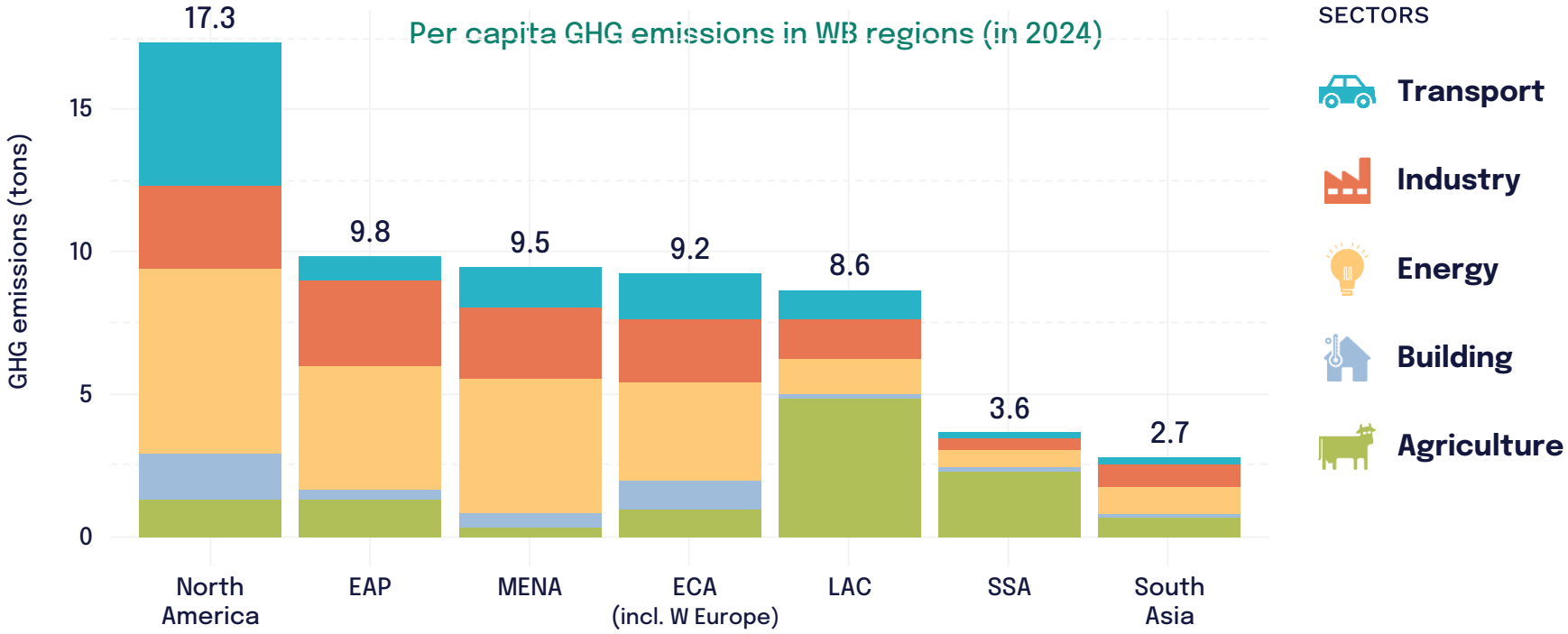
The Energy Sector accounts for **2.7 T per capita** out of the global 7.4 T per capita in 2024.



Selected countries, per-capita energy emissions



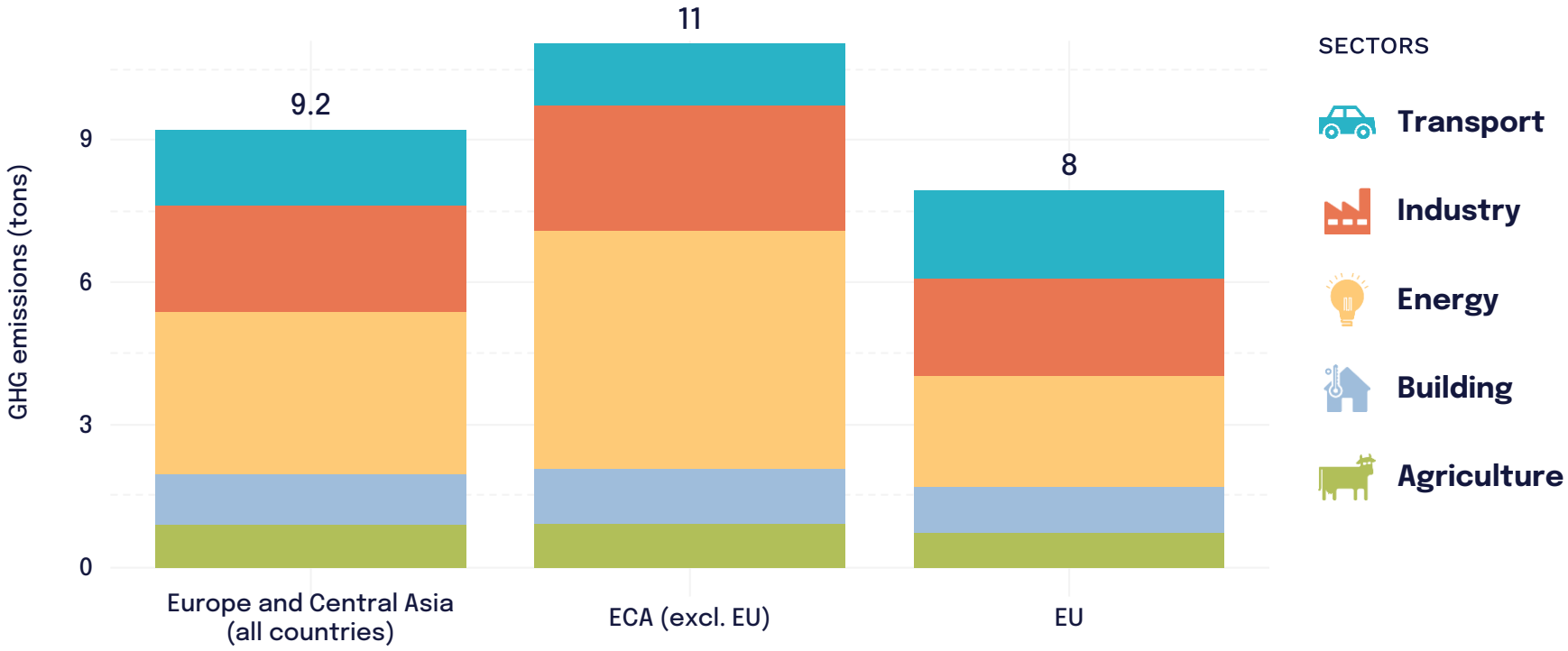
Most World Bank regions emit around 9t per capita;
South Asia is lowest (2.7t pc), ahead of SSA (3.6t pc)



Source: World Emissions Clock, 2024

The EU has lower emissions than ECA

Per capita GHG emissions in WB regions (in 2024)



Source: World Emissions Clock, 2024

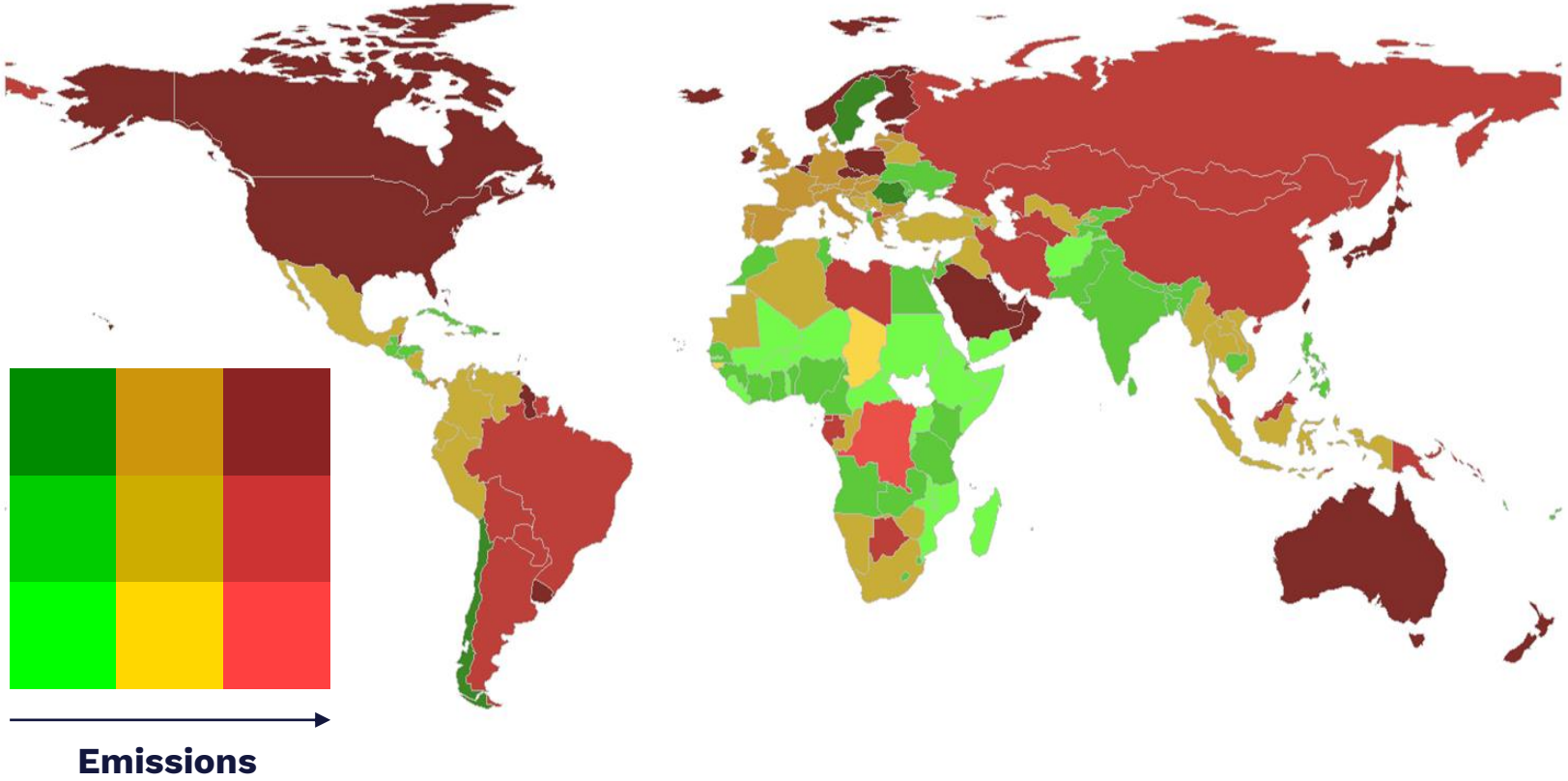
The income-emissions matrix

Income and Emission Country Classifications in 2024

	Low income 23 countries	Middle income 100 countries	High income 56 countries	Total
Low emissions 73 countries	**0.9 GT** 20 countries	**8.1 GT** 49 countries	 **0.2 GT** 4 countries 	**9.2 GT**
Medium emissions 54 countries	**0.2 GT** 2 countries	**8.1 GT** 30 countries	**3.1 GT** 22 countries	**11.4 GT**
High emissions 52 countries	**1.3 GT** 1 country	**24.0 GT** 21 countries	**12.6 GT** 30 countries	**37.9 GT**
Total	**2.4 GT**	**40.2 GT**	**15.9 GT**	**58.5 GT**

Source: World Emissions Clock, 2024

A Global View



Source: World Emissions Clock, 2024

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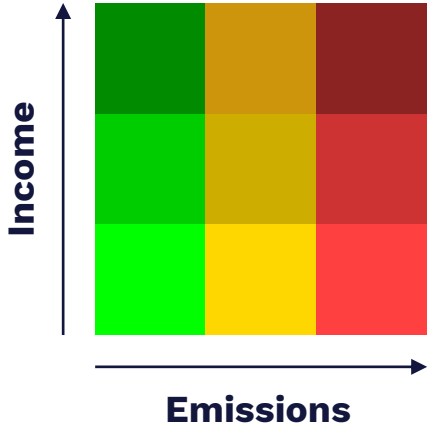
3. Europe and Central Asia

… with a special place for Europe and Central Asia



The income-emissions matrix for ECA (including Western Europe)

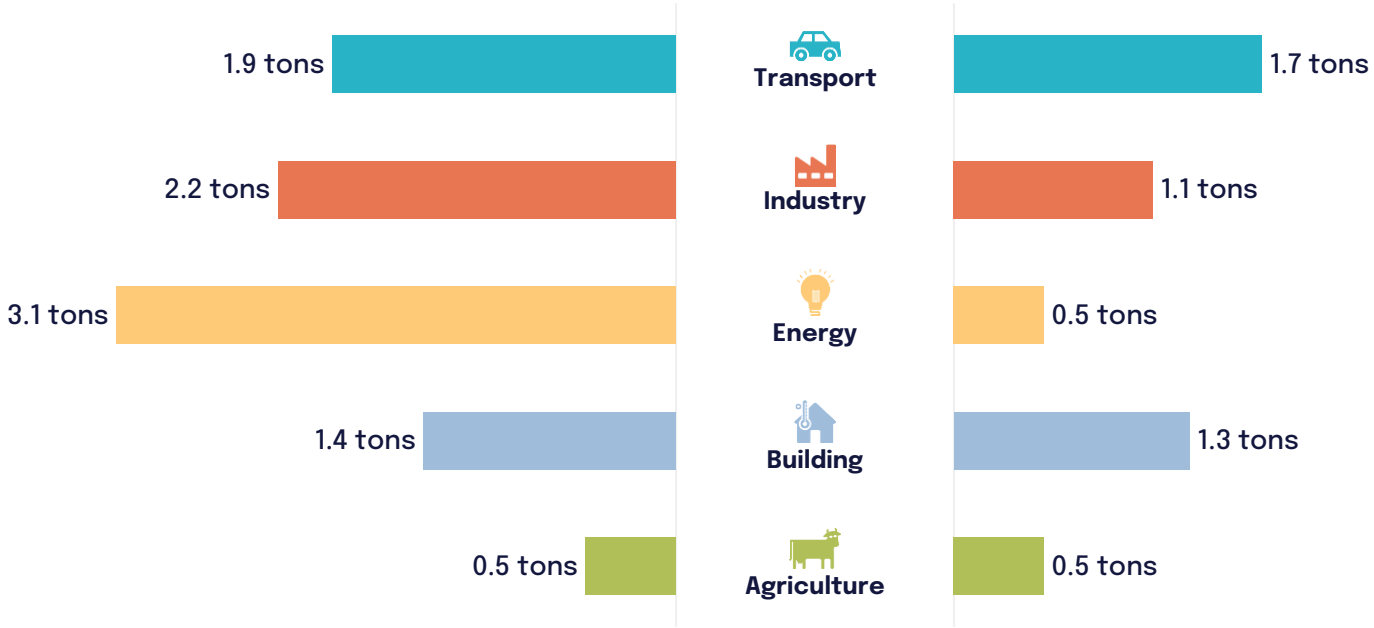
Income and Emission Country Classifications in 2024

	Middle income 18 countries	High income 31 countries	Total
Low emissions 8 countries	**0.2 GT** 6 countries	**0.1 GT** 3 countries	**0.3 GT**
Medium emissions 26 countries	**1.1 GT** 8 countries	**2.9 GT** 18 countries	**4.0 GT**
High emissions 14 countries	**2.9 GT** 4 countries	**1.1 GT** 10 countries	**5.0 GT**
Total	**4.2 GT**	**4.1 GT**	**8.3 GT**

Source: World Emissions Clock, 2024

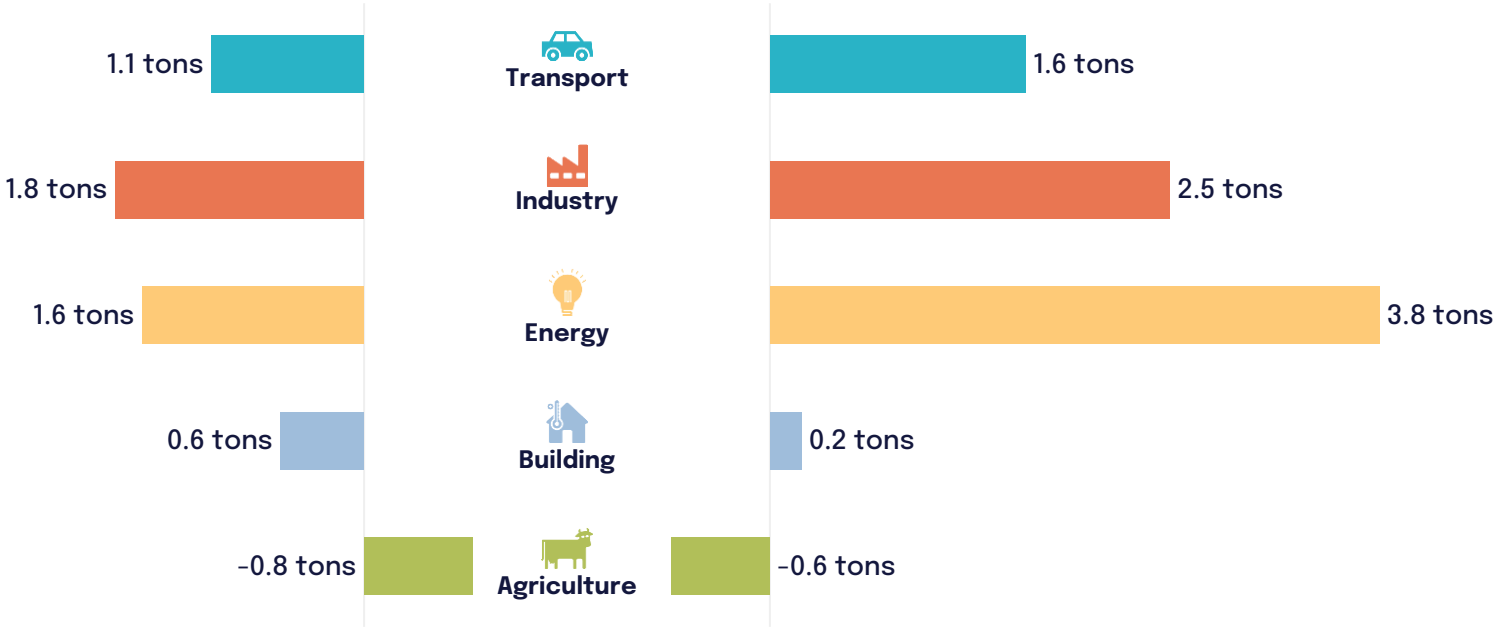
Germany vs Switzerland, 2024

AVERAGES, BUSINESS AS USUAL (BAU) SCENARIO)



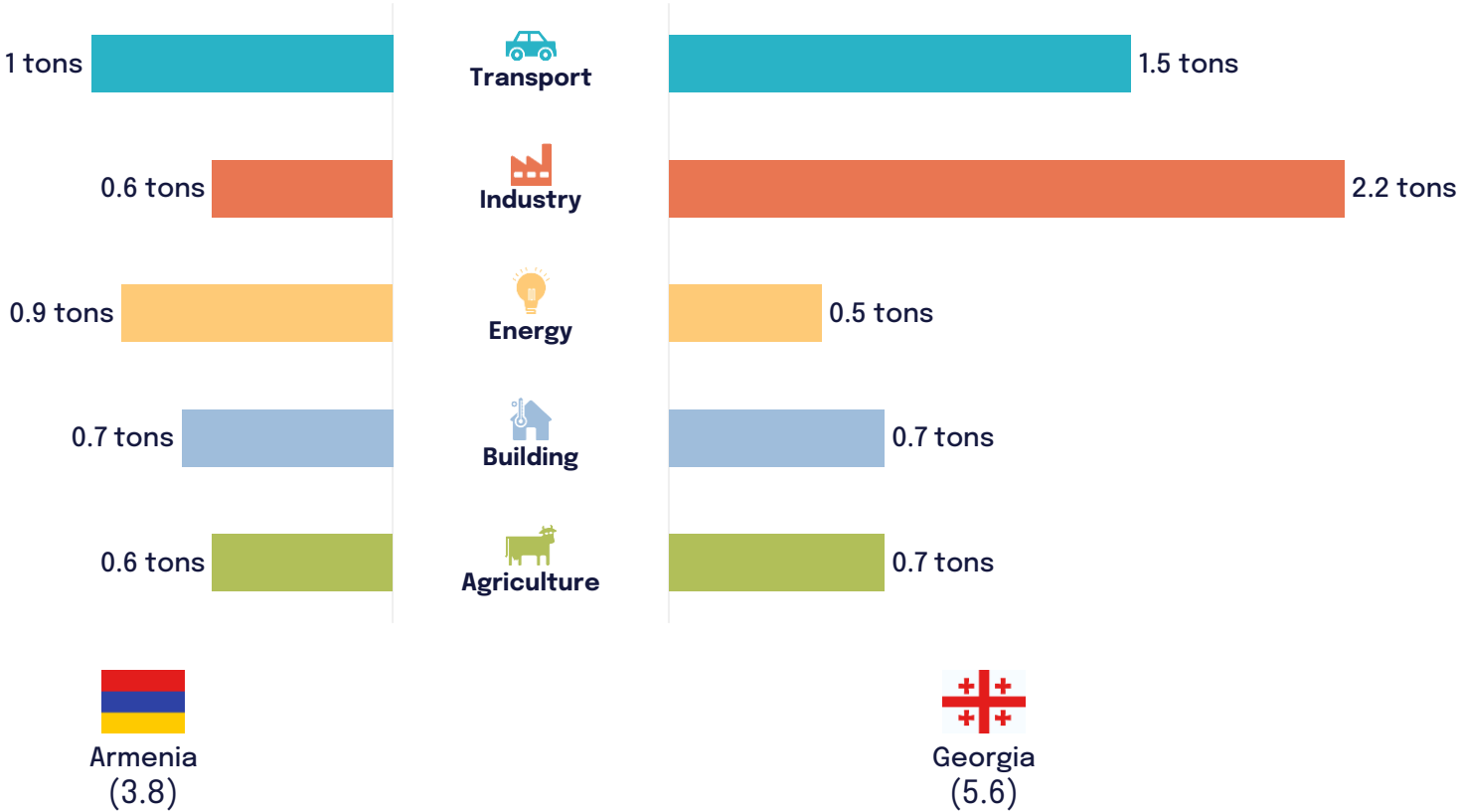
Romania Vs Bulgaria, 2024

AVERAGES, BUSINESS AS USUAL (BAU) SCENARIO)



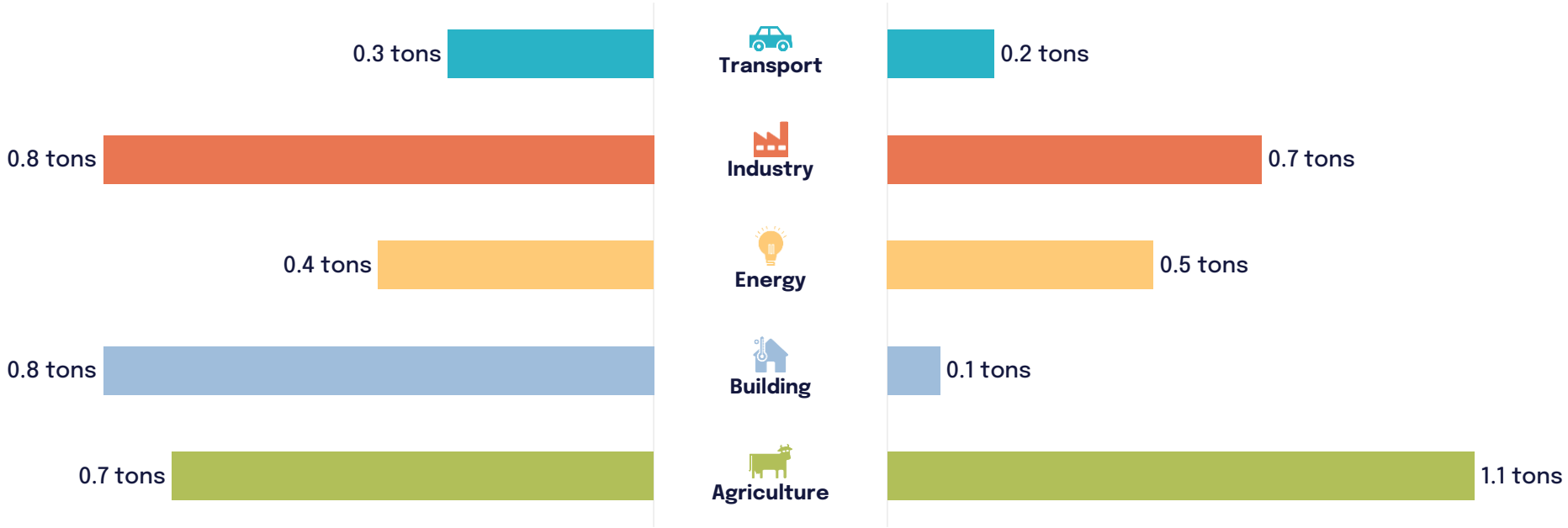
Armenia Vs Georgia, 2024

AVERAGES, BUSINESS AS USUAL (BAU) SCENARIO)

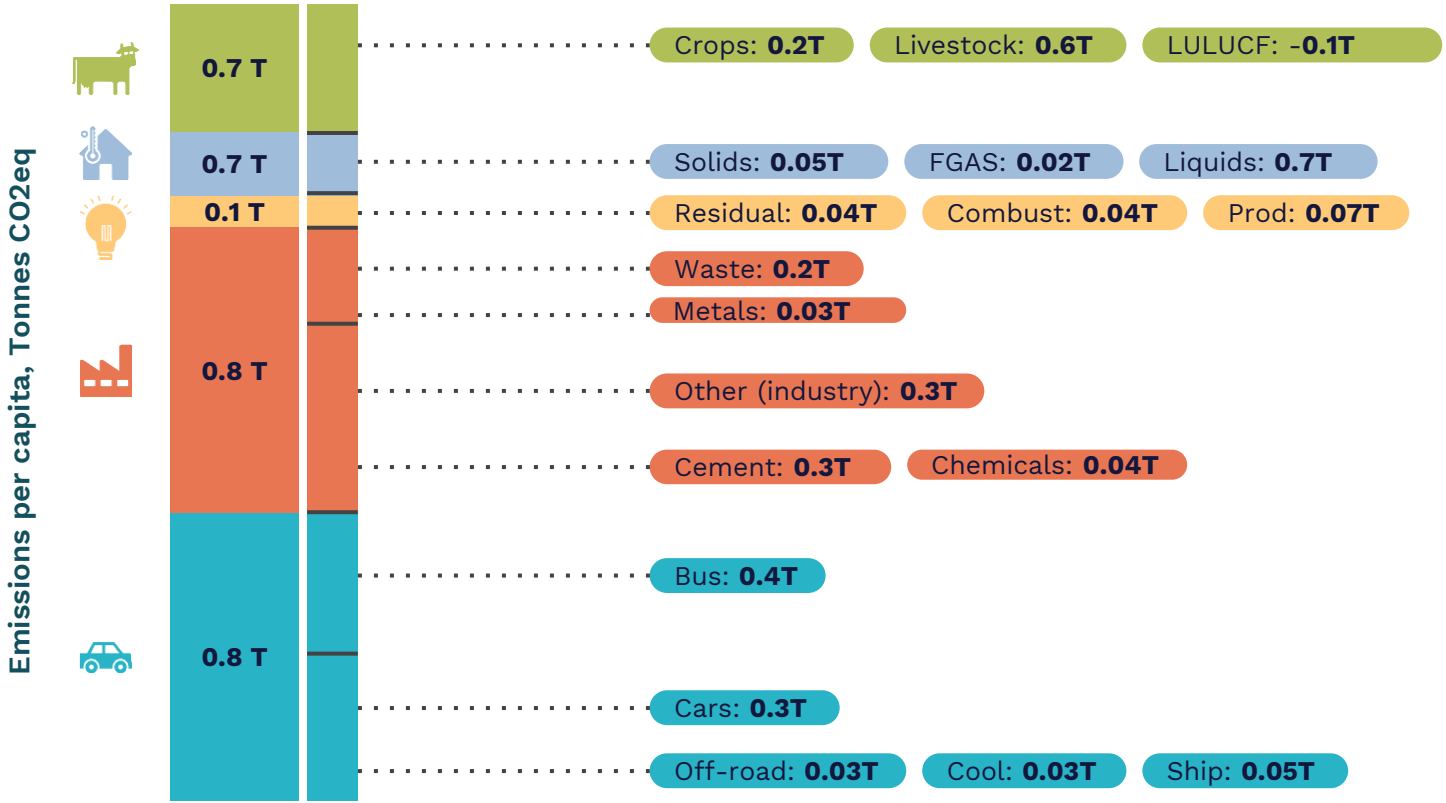


Kyrgyzstan vs. Tajikistan, 2024

AVERAGES, BUSINESS AS USUAL (BAU) SCENARIO



Drilling into Albania's sub-sectoral composition



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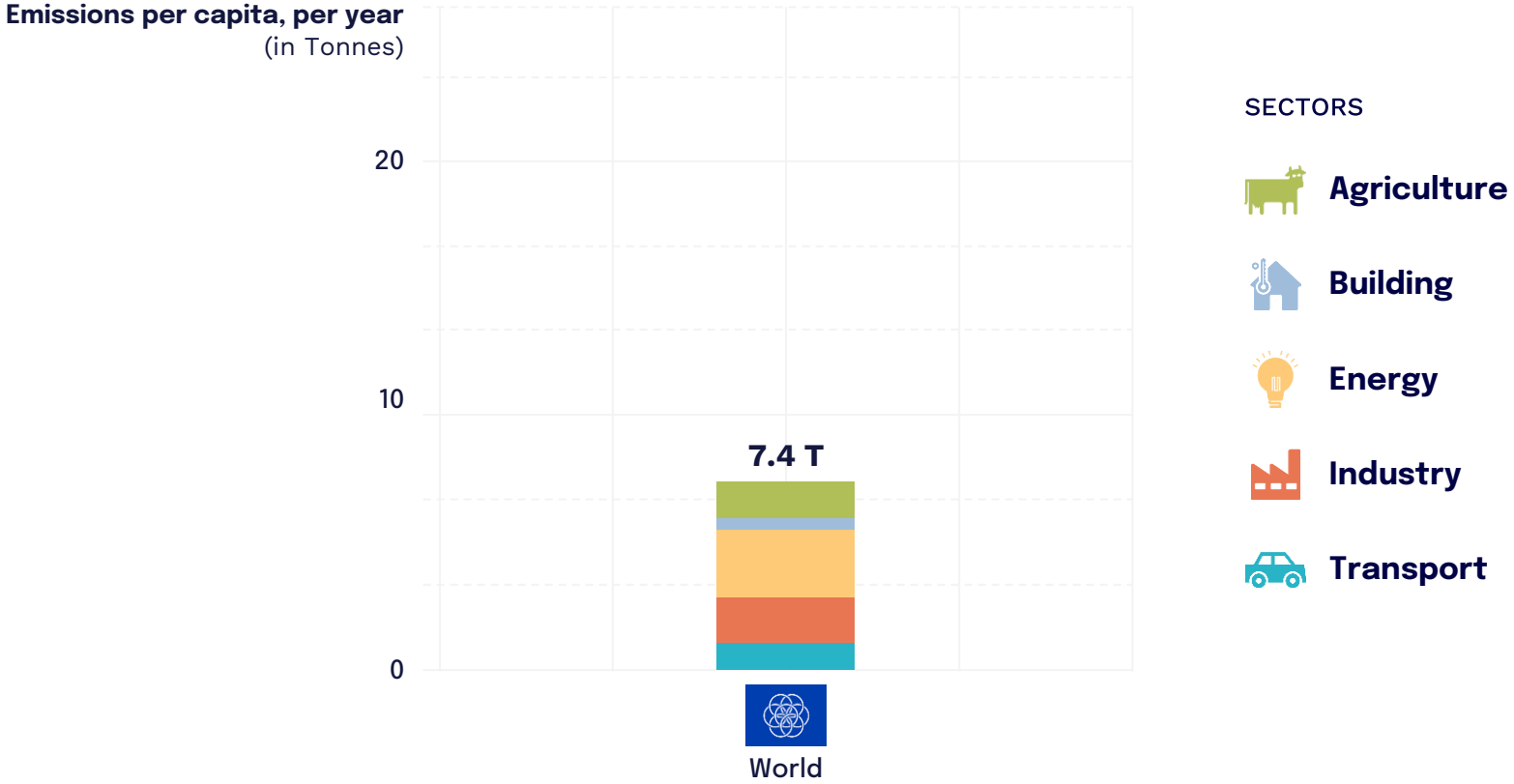
4. Can we achieve low-carbon prosperity?

How much are we emitting?

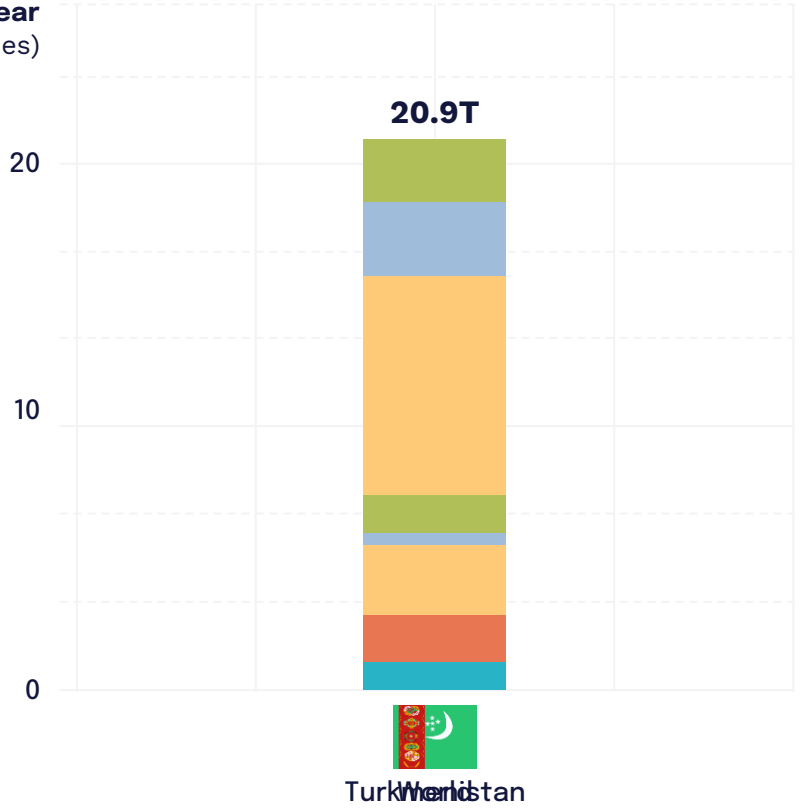
AVERAGES, BUSINESS AS USUAL (BAU) SCENARIO, 2024 FIGURES



How much are we emitting?

AVERAGES, BUSINESS AS USUAL (BAU) SCENARIO, 2024 FIGURES

Emissions per capita, per year
(in Tonnes)



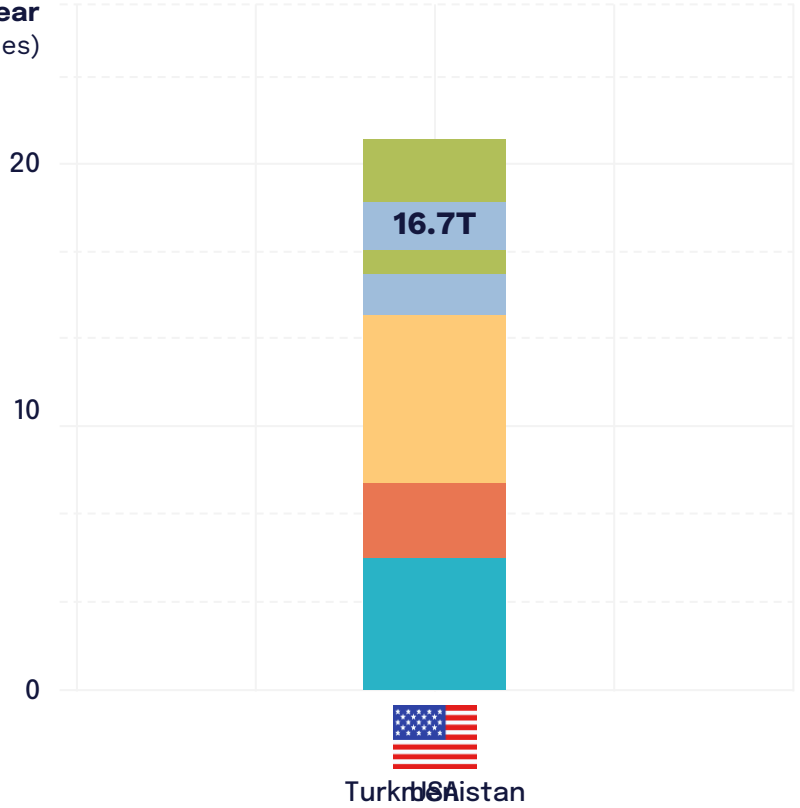
SECTORS

- Agriculture
- Building
- Energy
- Industry
- Transport

How much are we emitting?

AVERAGES, BUSINESS AS USUAL (BAU) SCENARIO, 2024 FIGURES

Emissions per capita, per year
(in Tonnes)



SECTORS

- Agriculture
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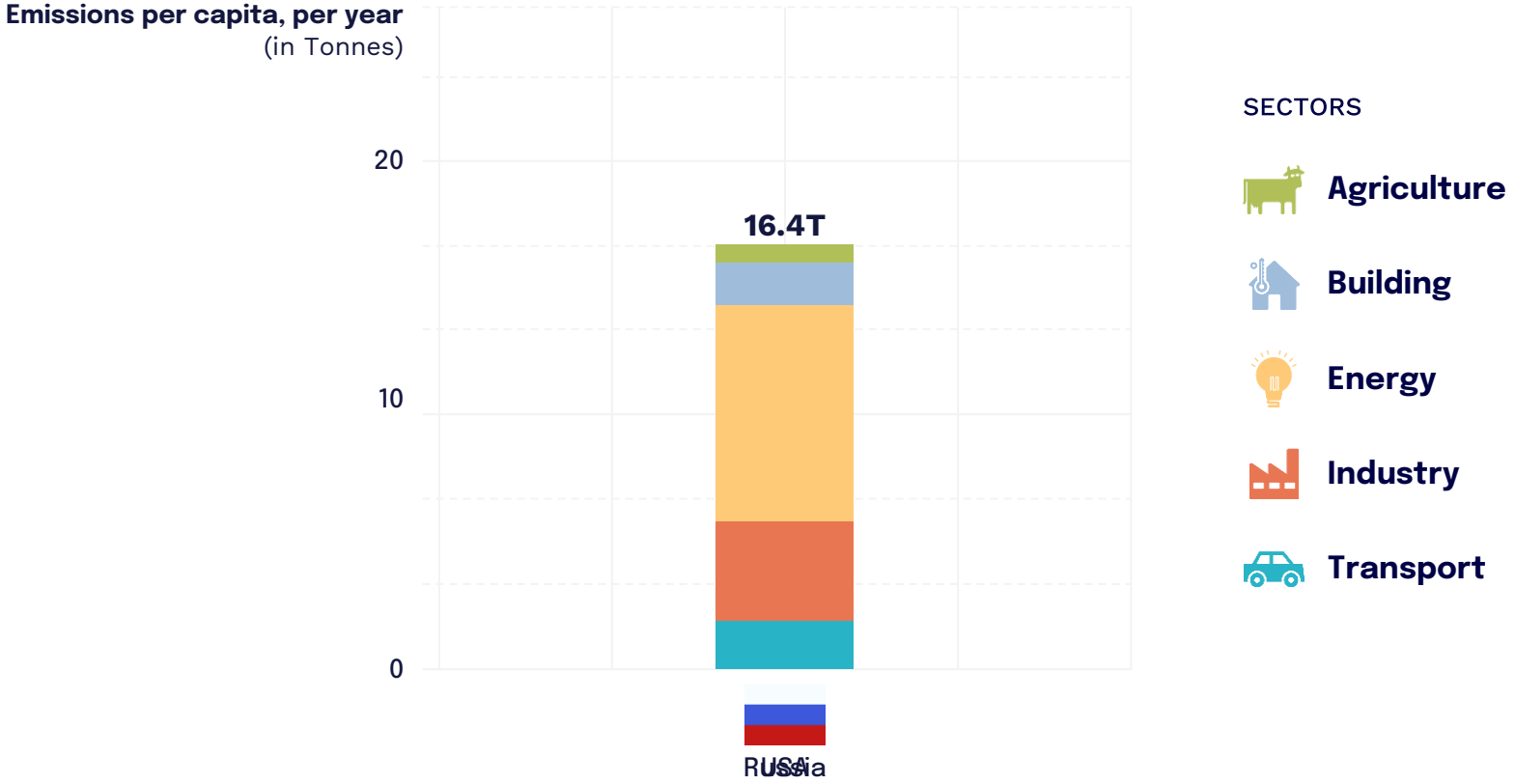
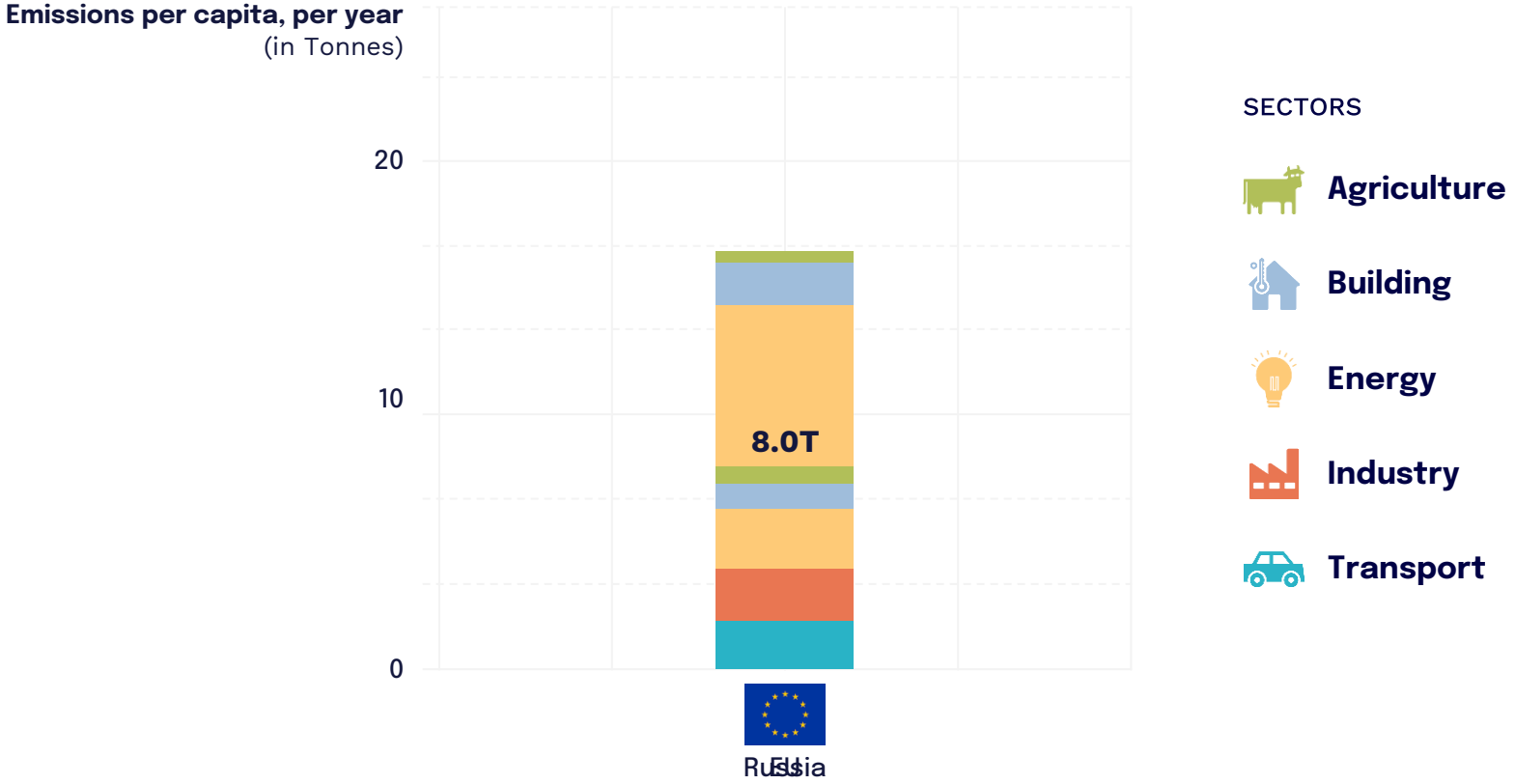
How much are we emitting?

AVERAGES, BUSINESS AS USUAL (BAU) SCENARIO, 2024 FIGURES



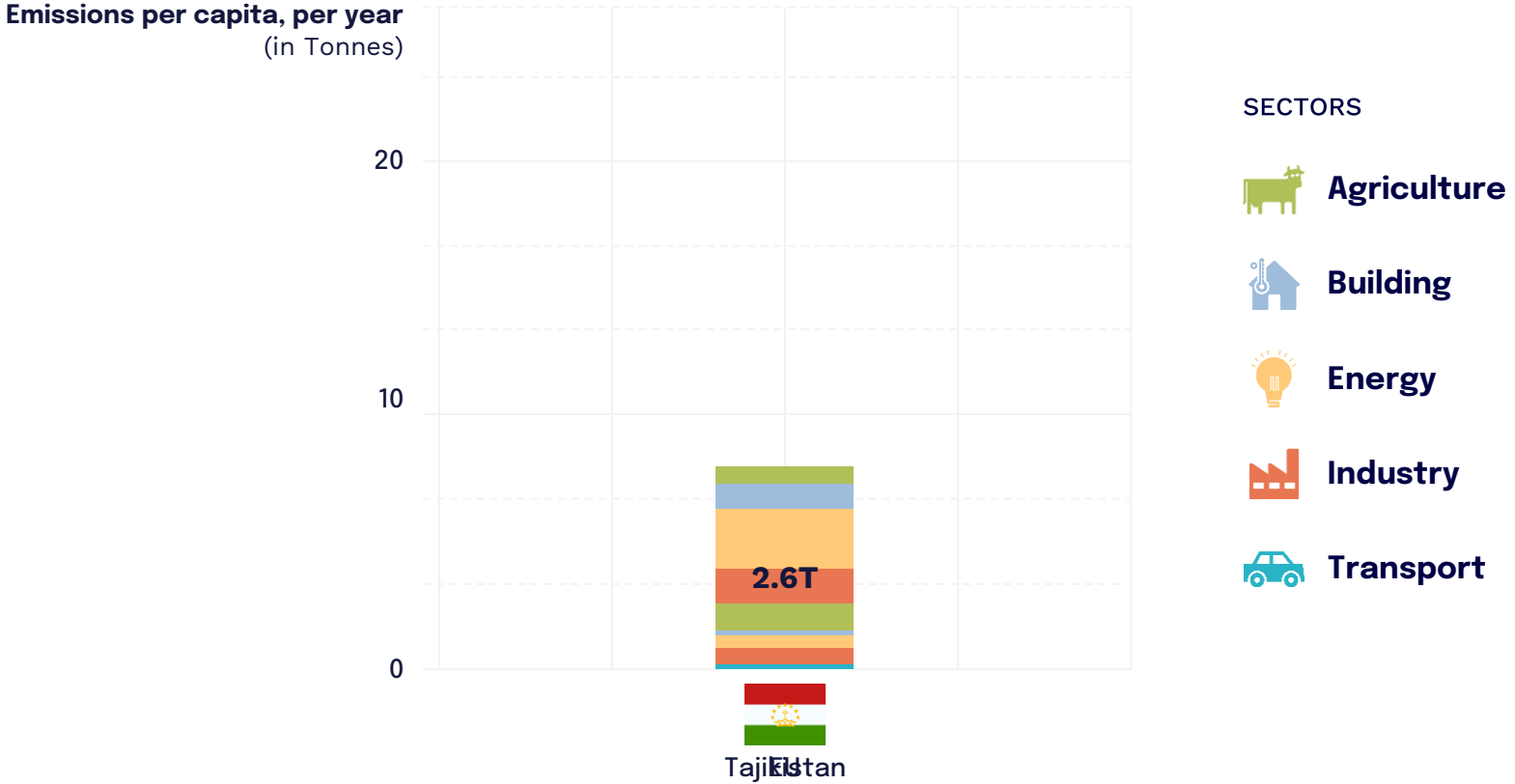
How much are we emitting?

AVERAGES, BUSINESS AS USUAL (BAU) SCENARIO, 2024 FIGURES



How much are we emitting?

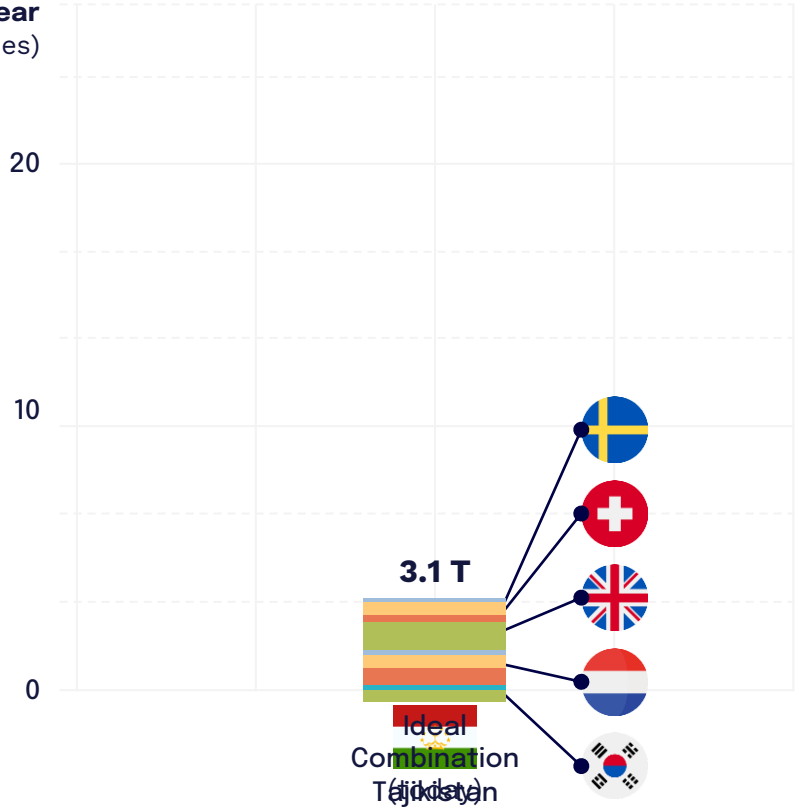
AVERAGES, BUSINESS AS USUAL (BAU) SCENARIO, 2024 FIGURES



How much are we emitting?

IDEAL SCENARIOS

Emissions per capita, per year
(in Tonnes)

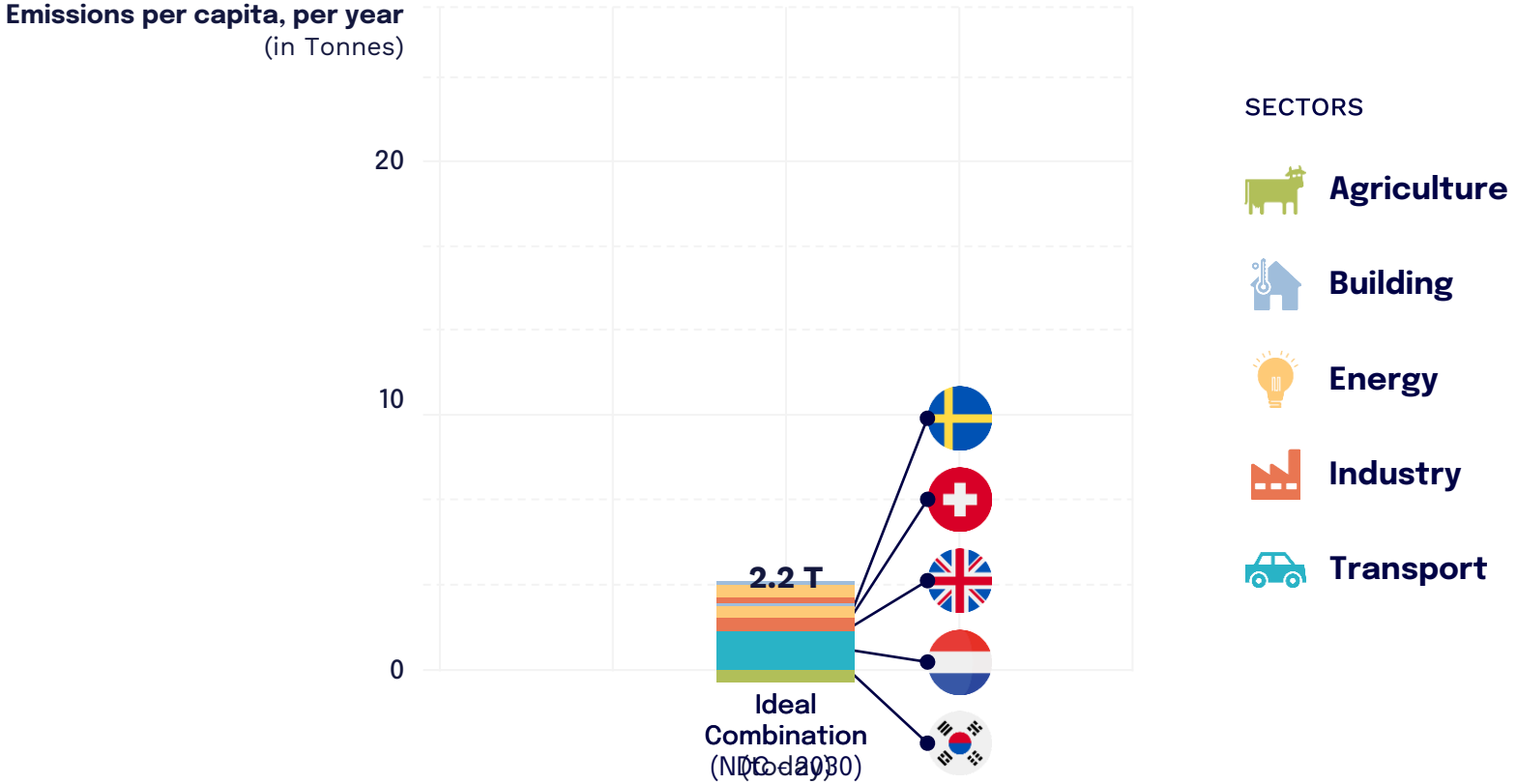


SECTORS

- Agriculture
- Building
- Energy
- Industry
- Transport

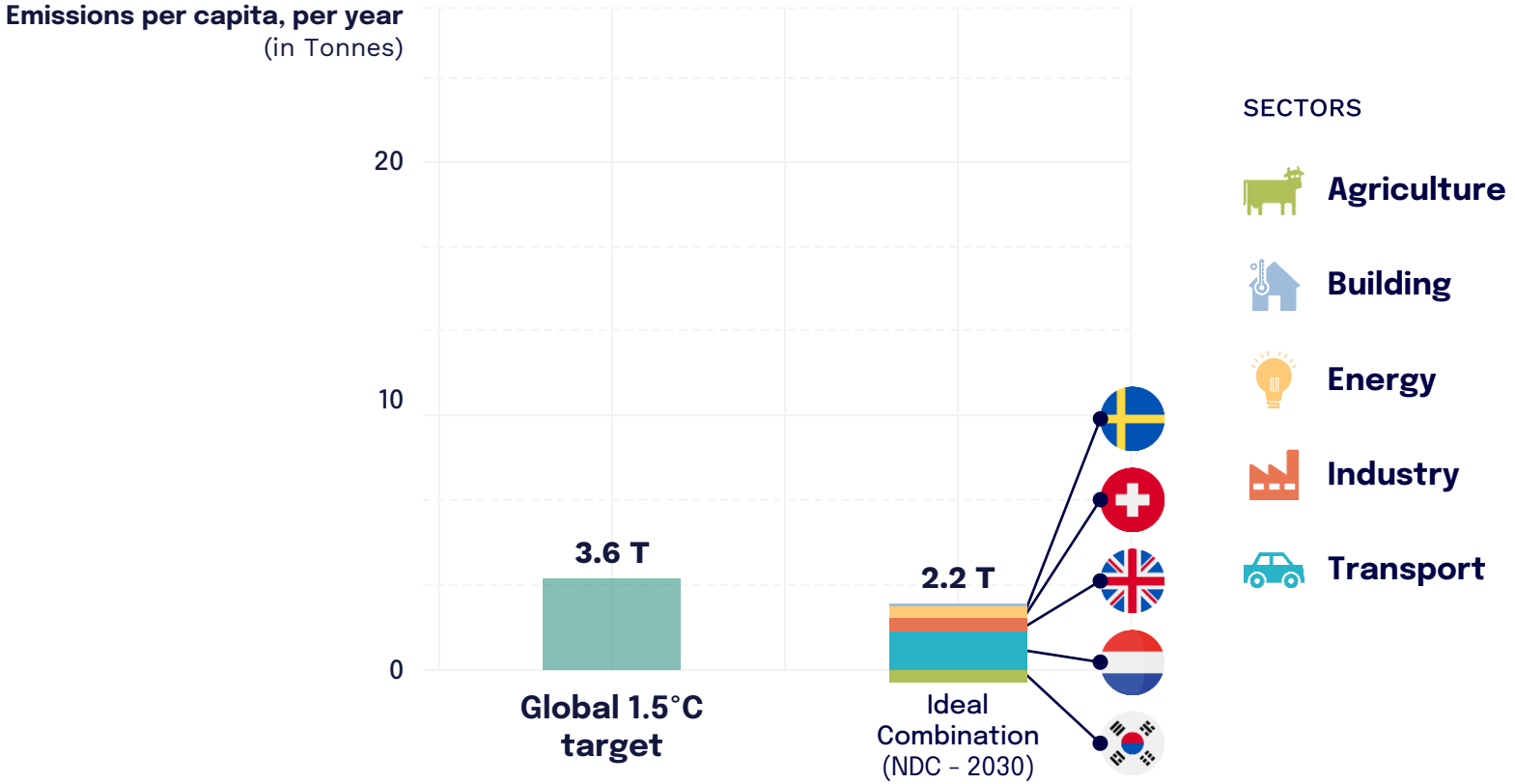
How much are we emitting?

IDEAL SCENARIOS



How much are we emitting?

IDEAL SCENARIOS



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