



May 2024

CIA for Sovereigns

Methodology & Main Results

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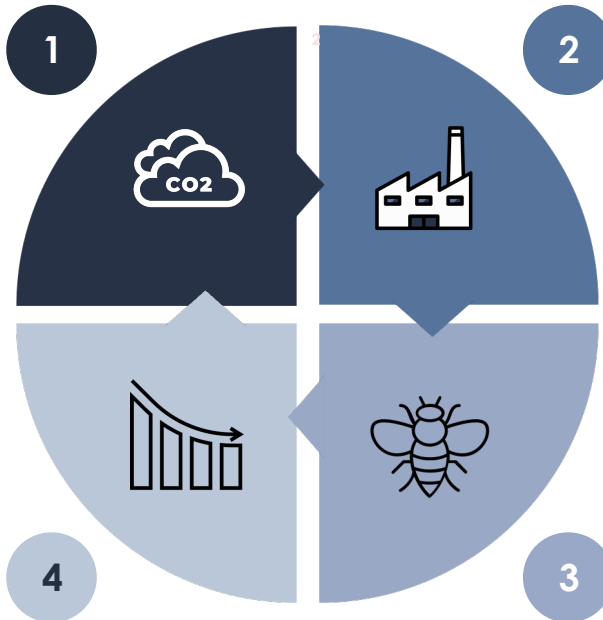
Our services

Assessment of transition risks (CIA)

Carbon footprint
Scope 1, 2 & 3
Emission Savings
Climate scenario alignment

Web platform & Datafeed

Issuer Analysis
Portfolio performance



Assessment of physical risks (CRIS)

7 climate Hazards
3 IPCC Scenarios
2 time-horizons

Assessment of Biodiversity risks and Impacts (BIA-GBS™)

MSA.Km2
Scope 1, 2 & 3
10 Terrestrial and Aquatic pressures

Our approach



An innovative bottom-up technology



An international coverage (c. 400 000 instruments, corporate, green bonds and sovereign) on 42 000 entities



25 analysts, each specialized in each of the 75 specific sectors



A multi-sector approach
Listed and unlisted Assets

Climate



 **carbone4** | conseil



carbon
impact
analytics



climate
risk
impact
screening

Biodiversity



CDC BIODIVERSITÉ



biodiversity
impact
analytics

How to access the data?



Pedagogical & friendly
platform

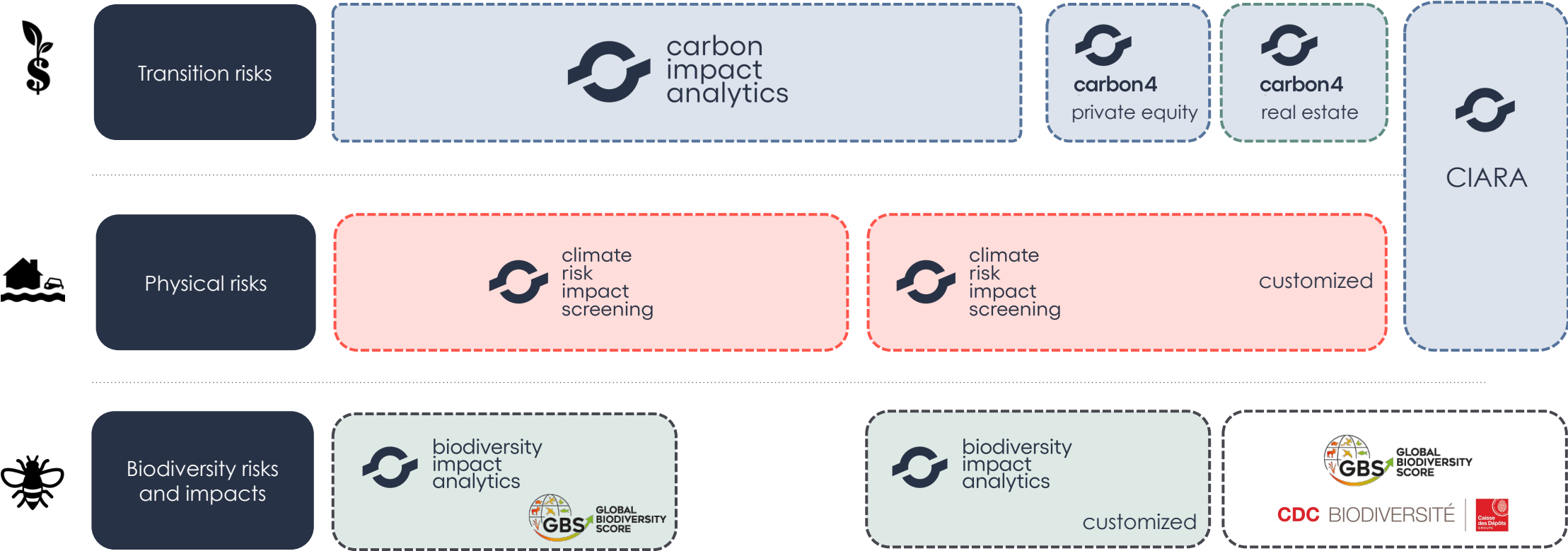


SFTP (secured flow transfer
protocol) directly into client's
systems



Expert's support and research
papers

A comprehensive service offering with common methodological principles for all asset classes



Carbon4 Finance, a pioneer in measuring the carbon impact of financial institutions

Asset Managers



Asset Owners



Banks



Other collaboration



BIA-GBS™, trusted to assess the **biodiversity** risks and impacts of investment portfolio

Asset Managers



Asset Owners



Banks



Summary

1. The CIA methodology for sovereigns
2. Carbon Intensity Score
3. Fossil Fuel Dependency Score
4. Dynamic Trend Score
5. Results & Discussion

1. The CIA methodology for sovereigns - Overview

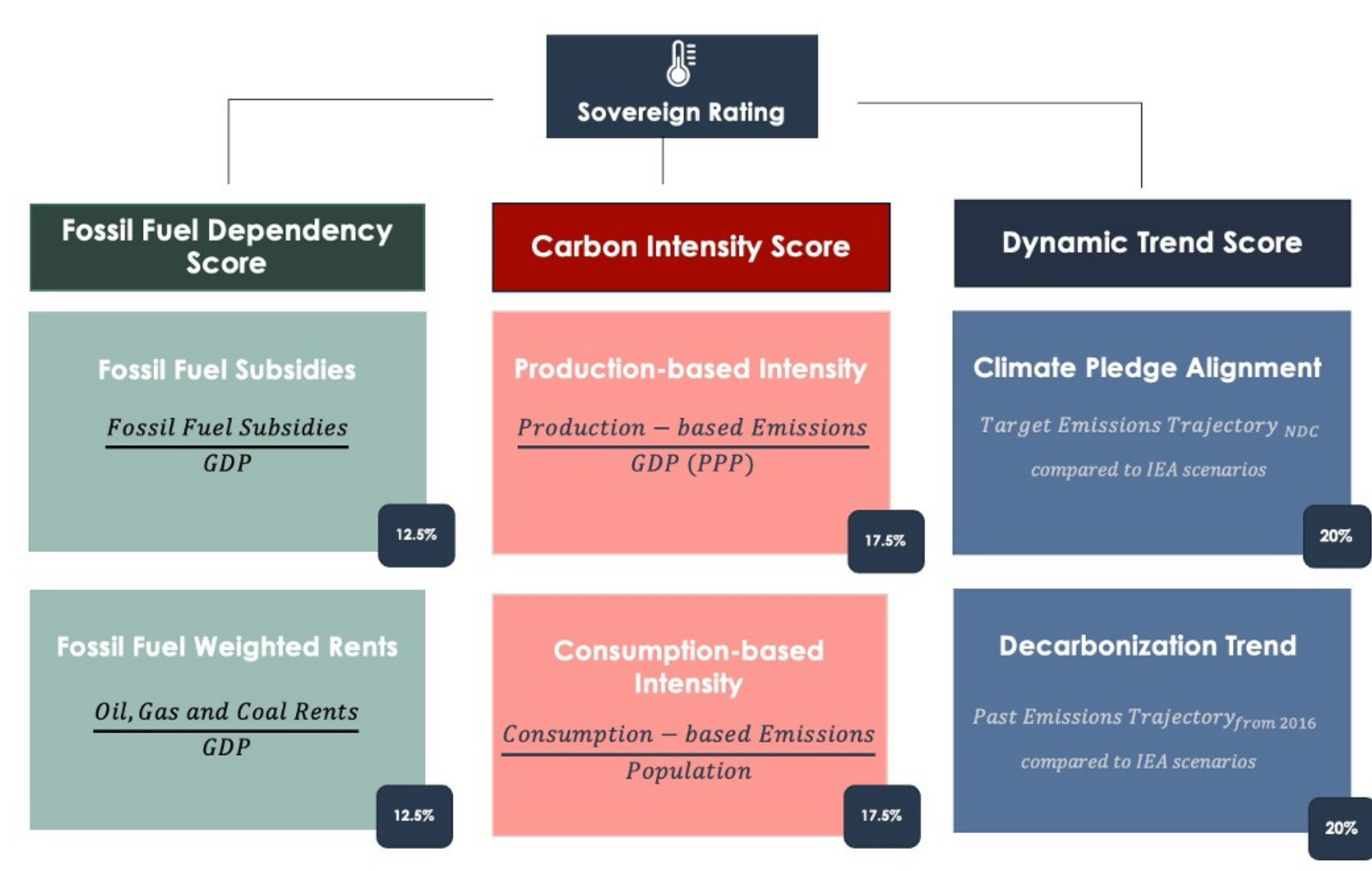


Figure 1: Sovereign methodology - Overview of the indicators, April 2024

1. The CIA methodology for sovereigns - Rating approaches

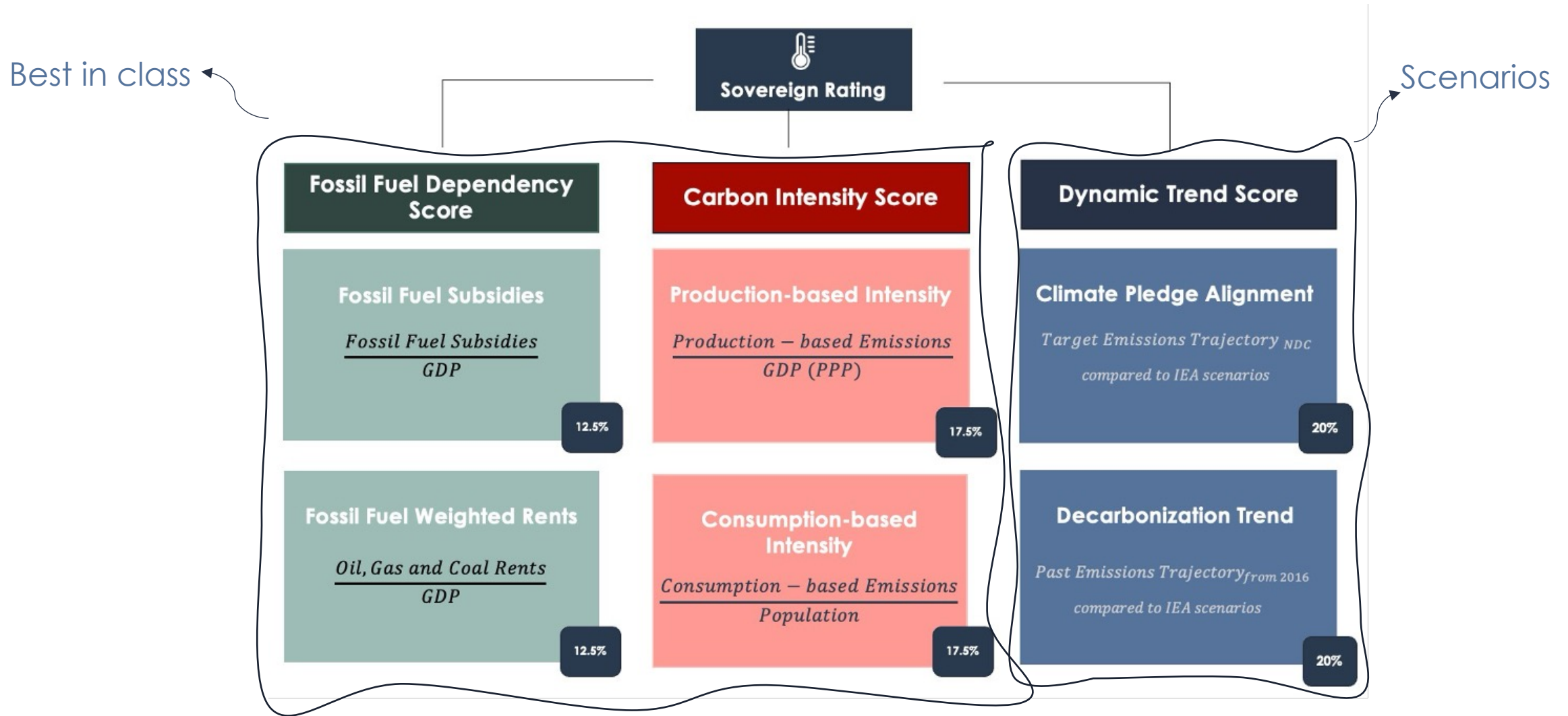


Figure 2: Sovereign methodology – Rating approaches, April 2024

2. Carbon Intensity Score – Sovereign GHG emissions

Greenhouse gas emissions for sovereign countries are regrouped under two categories:

- **Territorial emissions, or production-based emissions**, refer to all GHG emissions produced within a country's borders, encompassing sources like factories, vehicles and power plants.
- **Consumption-based emissions** reflect the total emissions generated globally to produce goods and services consumed within a specific country.

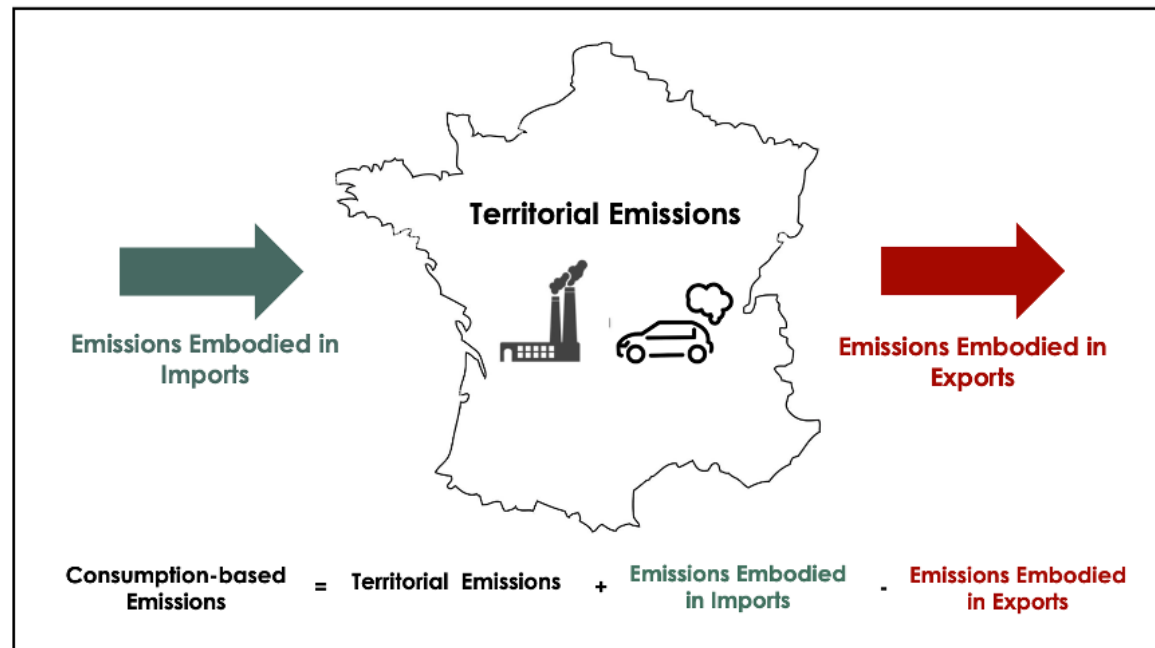


Figure 3: Definition - Production-based and consumption-based emissions

2. Carbon Intensity Score – Methodology overview

The score is duplicated into two distinct metrics:

- **Consumption-based Intensity:** reflects the average carbon footprint of a country's population
- **Production-based Intensity:** reflects the carbon intensity of a country's economy

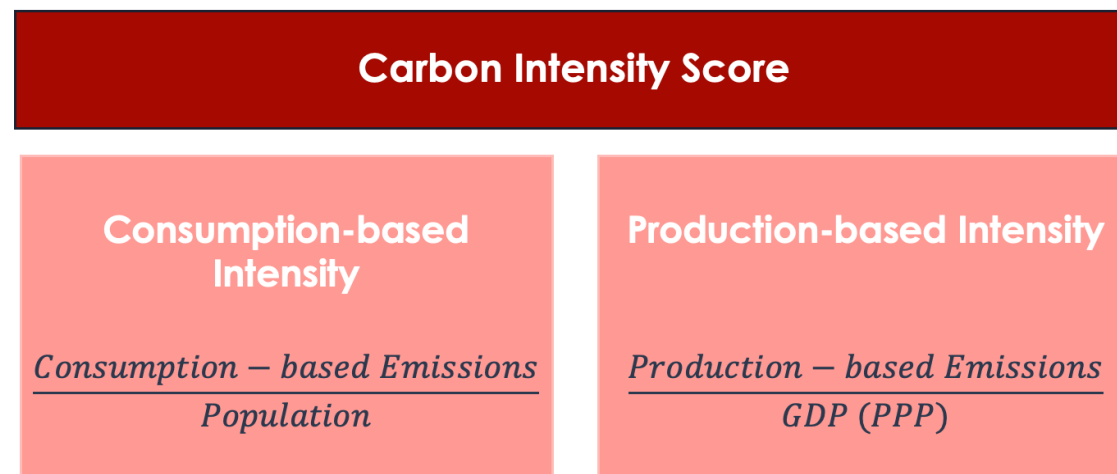


Figure 4: Carbon Intensity Score indicators

The dual-indicator approach offers a comprehensive view of a nation's emissions, capturing both the scale of emissions tied to its economic activities and the carbon footprint of its population.

2. Carbon Intensity Score – What is PPP-adjusted GDP?

- PPP-adjusted GDP accounts for differences in **price levels** and **living costs**, providing a more **equitable** basis for comparing economic output across countries.

The formula for Purchasing Power Parity (PPP) is generally expressed as:

$$S = \frac{P_1}{P_2}$$

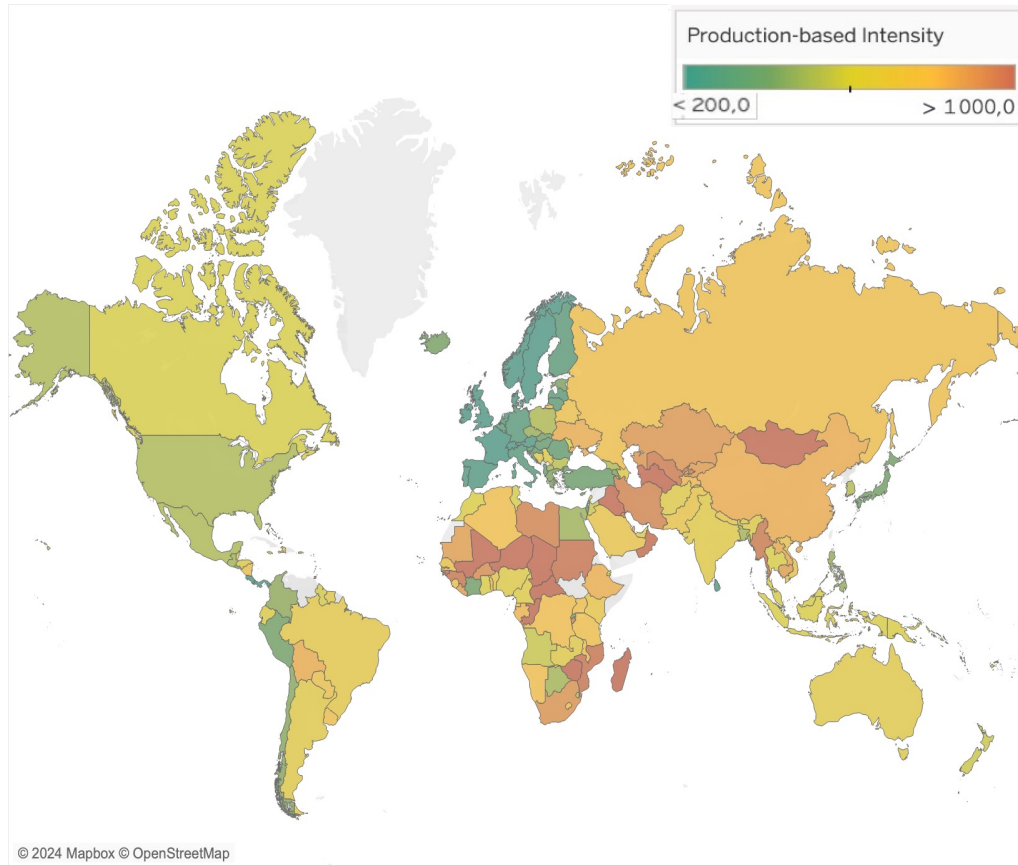
Where :

- S is the PPP exchange rate
- P_1 is the price of a basket of goods in the study country.
- P_2 is the price of the same basket of goods in the reference country (USA).

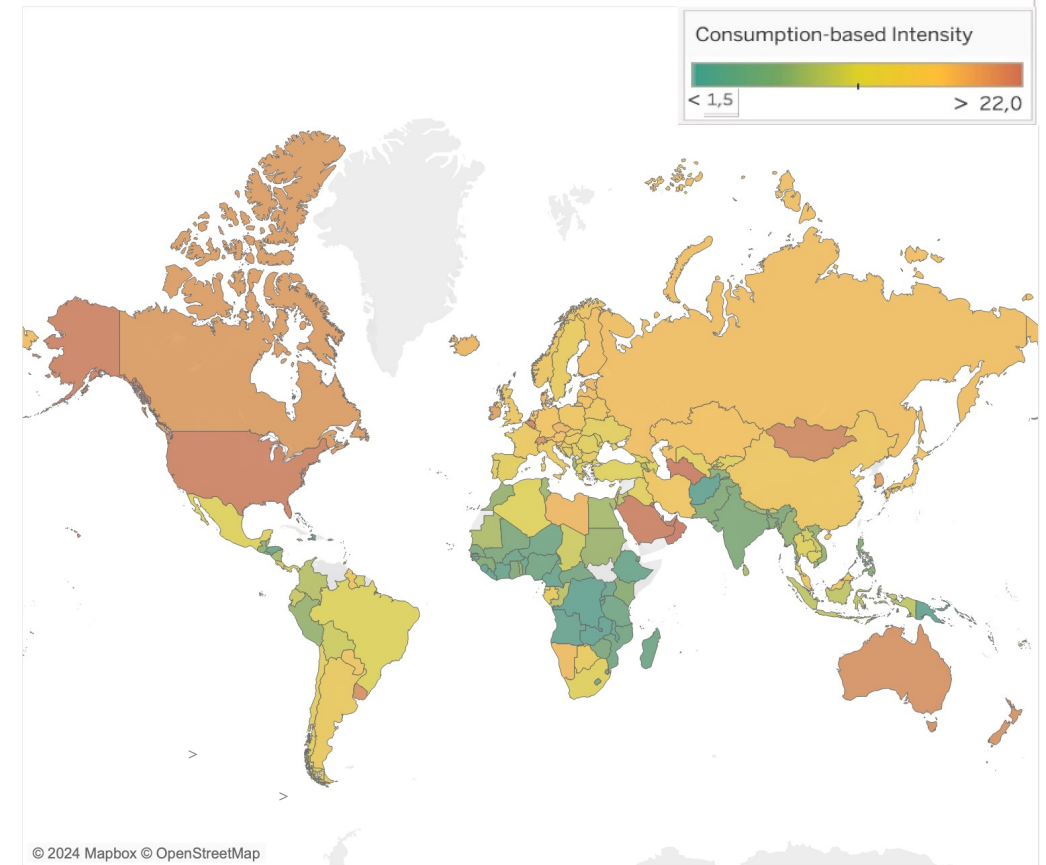
Formula 1: PPP adjustment factor

2. Carbon Intensity Score – Two opposite realities

- Developed countries tend to have lower production-based intensities compared to their developing counterparts. These nations have more efficient processes and less intensive economies.
- On the other hand, developing countries, due to their lower income levels, tend to have lower consumption-based intensities.



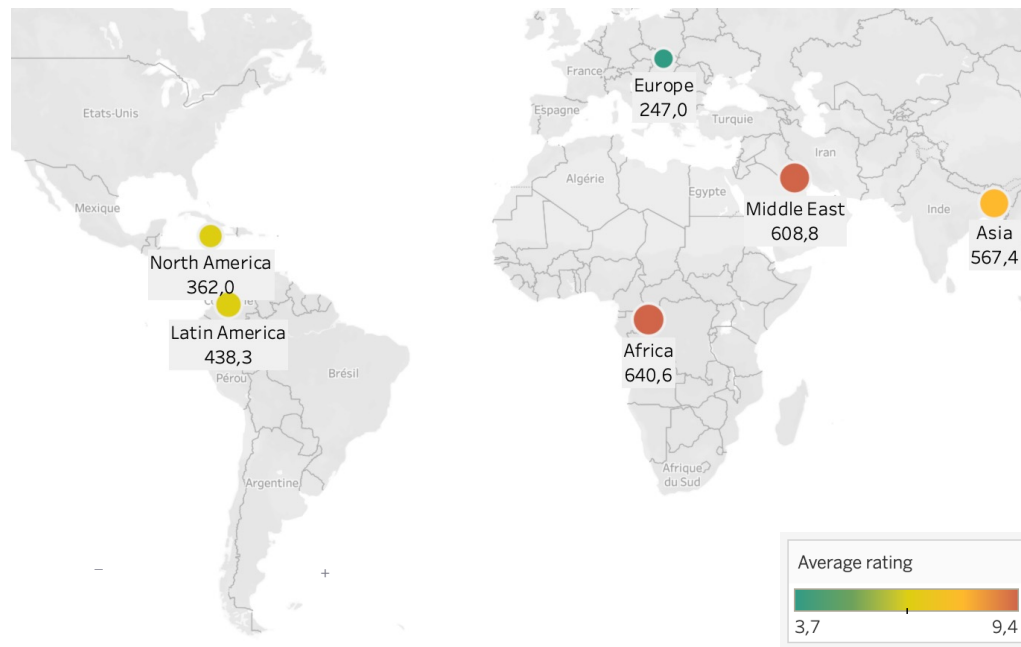
Map 1: Intensity by country, in tCO₂e per EURm GDP (PPP) Production-based



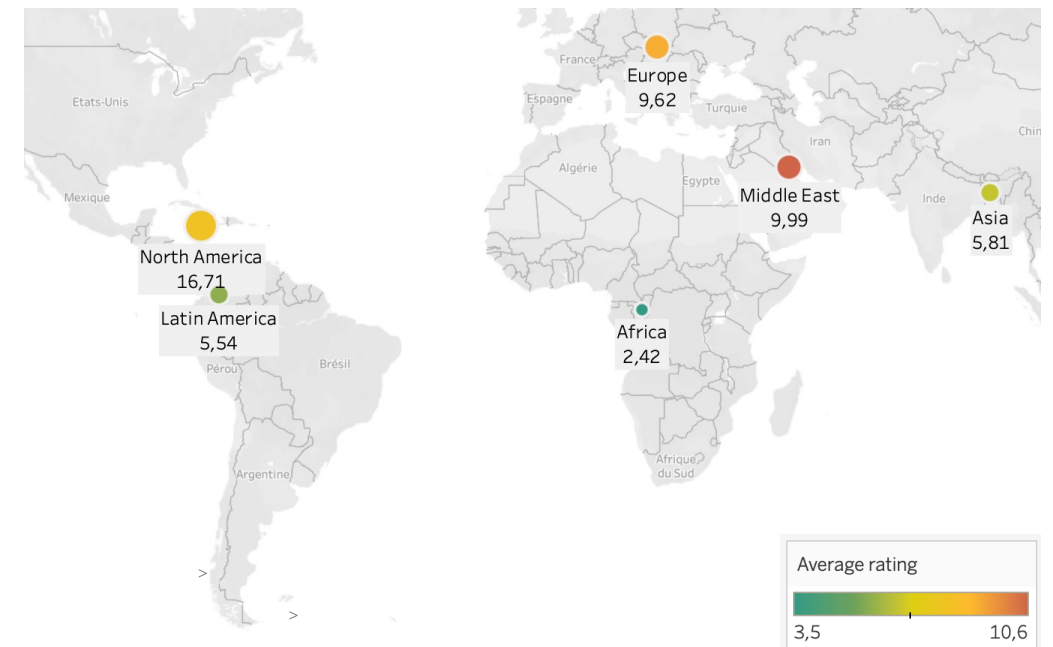
Map 2: Consumption-based Intensity by country, in tCO₂e per Capita

2. Carbon Intensity Score – Regional discrepancies

- European countries have the least carbon-intensive economies while maintaining moderate to high consumption-based intensities.
- In North America, there are low production-based intensities and high consumption-based intensities, primarily driven by the US and Canada.
- Africa exhibits very low consumption-based intensities. However, African countries have high territorial intensities due to less efficient economies.
- In the Middle East, high values are observed for both intensities. This is attributed to oil-producing Gulf countries, which have economies dependent on oil and high consumption rates due to high income levels.



Map 3: Production-based Intensity by region, in tCO₂e per EURm GDP (PPP)



Map 4: Consumption-based Intensity by region, in tCO₂e per Capita

3. Fossil Fuel Dependency Score - Methodology overview

1. Fossil Fuel Weighted Rents: defined as the ratio of fossil fuel revenues, each weighted by its respective emission factor relative to oil, to the Gross Domestic Product (GDP). The indicator is calculated as follows:

$$\frac{(\text{Rents}_{\text{Oil}} \times \text{EFI}_{\text{Oil}}) + (\text{Rents}_{\text{Gas}} \times \text{EFI}_{\text{Gas}}) + (\text{Rents}_{\text{Coal}} \times \text{EFI}_{\text{Coal}})}{\text{GDP}_{\text{Current year}}}$$

where **rents** represent fossil fuels net revenues (as defined by the World Bank), and **EFI** is a CIA Emissions Factor Index for average commodity unit (Oil = 1).

Formula 3: Fossil Fuel Weighted Rents Formula

- The indicator assesses the dependency of a country's economy on fossil fuel revenues, highlighting its vulnerability to transition risks associated with the decline in fossil fuel sales, due to the energy transition.
- We weight each type of fuel's rents by its emission factor relative to oil. This approach penalizes coal-dependent countries due its higher warming impact.

3. Fossil Fuel Dependency Score - Methodology overview

2. Fossil Fuel Subsidies: measure the gap between the price paid by consumers and the actual costs of fossil fuels, including supply costs and externalities related to global warming. The indicator is calculated as follows:

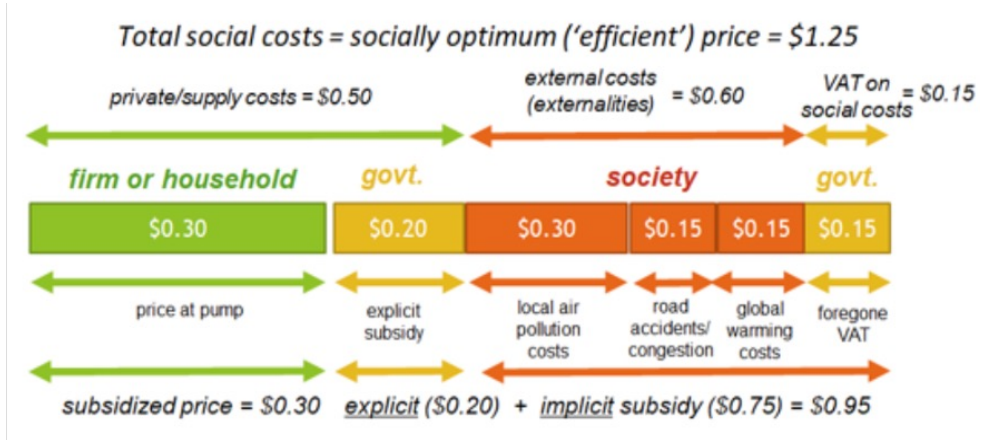


Figure 5: Fossil fuel subsidies full categories, Source: International Monetary Fund (IMF)

We include **explicit** fossil fuel subsidies and **global warming-related implicit** subsidies, as defined by the IMF.

$$\frac{\text{Explicit Subsidies}_{\text{Oil}} + \text{Explicit Subsidies}_{\text{Gas}} + \text{Explicit Subsidies}_{\text{Coal}} + \text{Explicit Subsidies}_{\text{Electricity}} + \text{Implicit Subsidies}_{\text{Global Warming}}}{\text{GDP}_{\text{Current year}}}$$

Formula 2: Fossil Fuel Subsidies Formula

3. Fossil Fuel Dependency Score - Rents

- In 2021, fossil fuel rents accounted for 1.8% of global GDP, with nearly two-thirds of the revenues derived from oil sales.

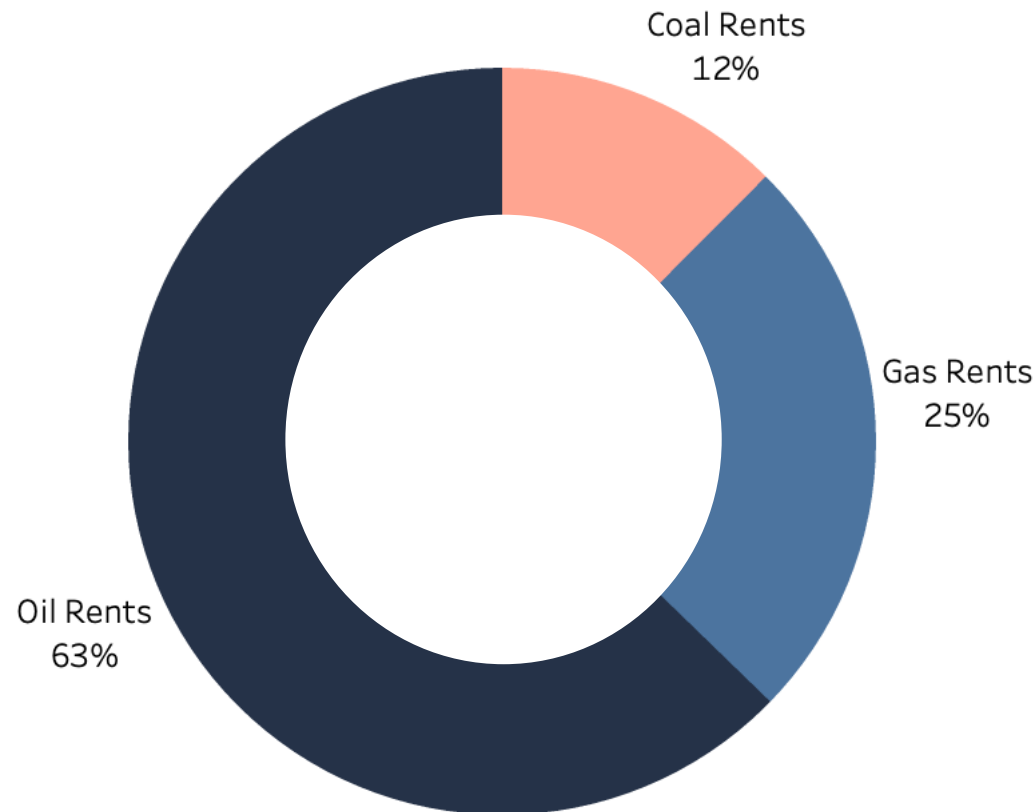
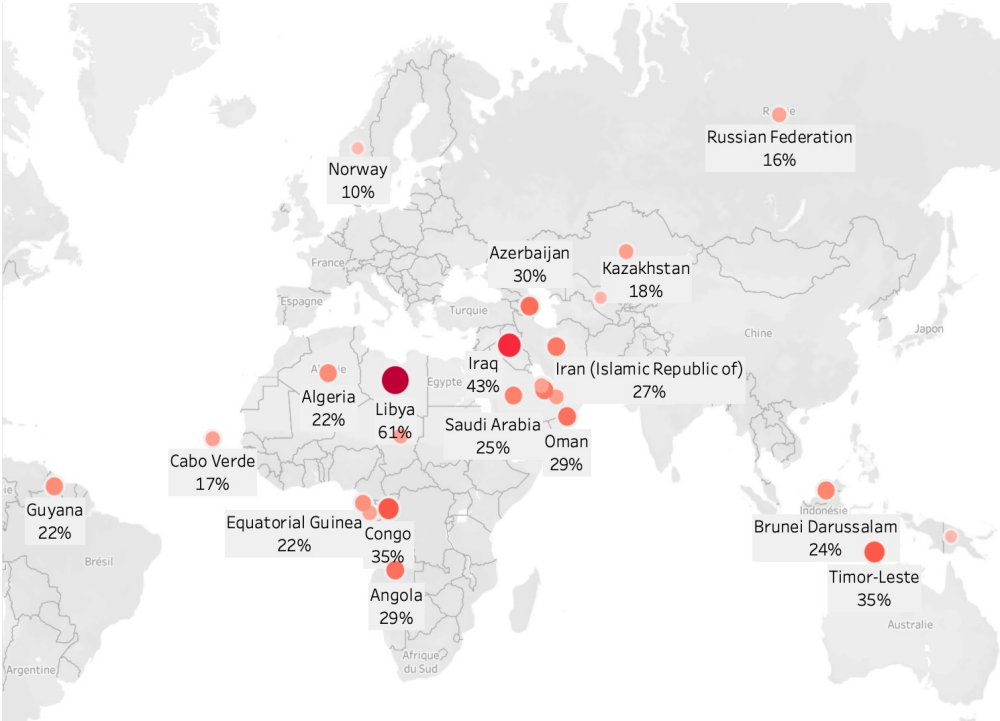


Figure 4: Proportion of Global Fossil Fuel Revenues by Fuel Type

- 24 countries have economies that are heavily reliant on fossil fuel revenues, with fossil fuel rents representing more than 10% of their GDP.



Map : Countries where fossil fuel rents exceed 10% of the GDP

3. Fossil Fuel Dependency Score - Subsidies

- In 2021, the selected subsidies accounted for **2.3%** of global GDP. Underpricing for local climate damages is the largest contributor to global subsidies, accounting for approximately 76%.

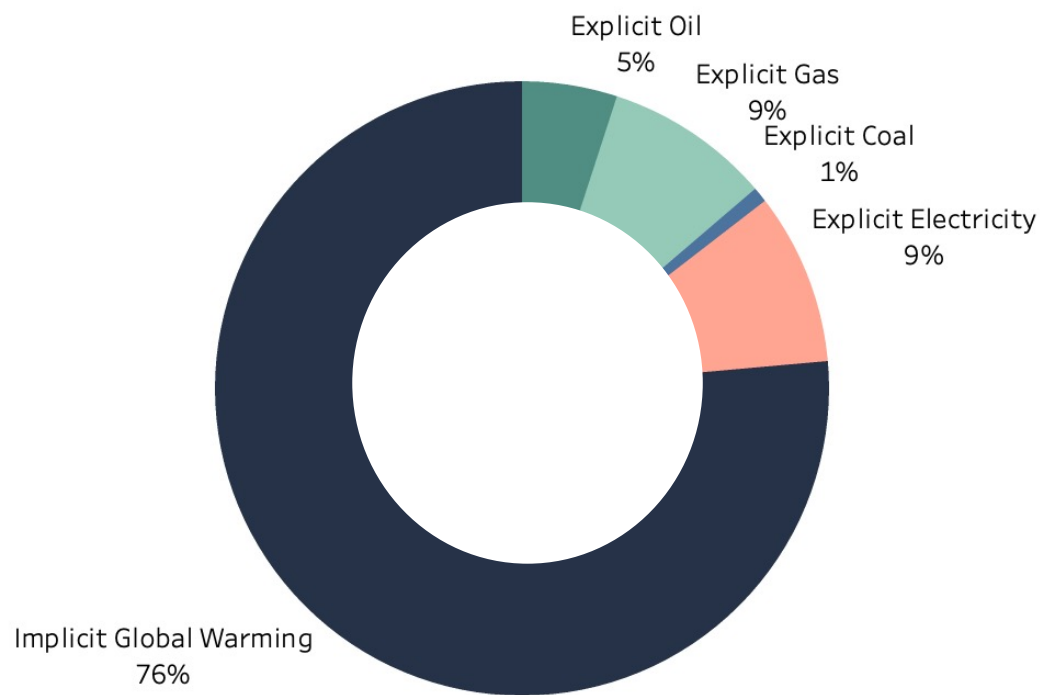


Figure 5: Proportion of Global Fossil Fuel Subsidies by subsidy Type

- Countries with the highest share of GDP allocated to fossil fuel subsidies are generally those heavily dependent on fossil fuel revenues. However, exceptions exist where some countries maintain high subsidies despite having marginal fossil fuel revenues.

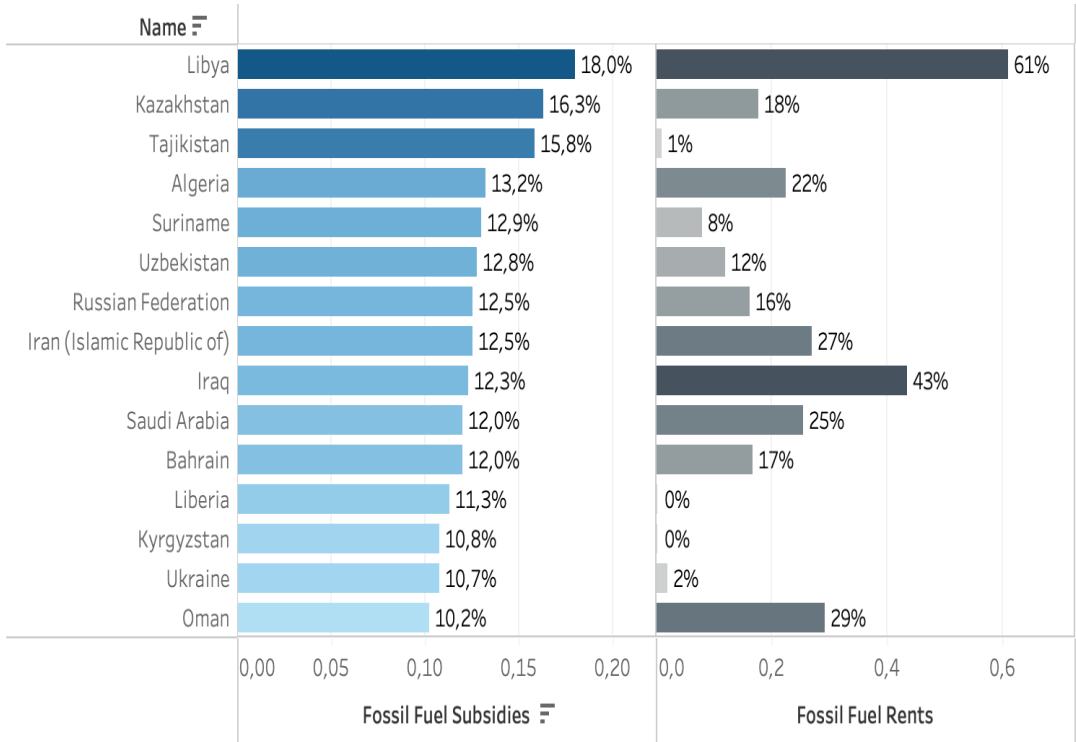


Figure 6: Fossil fuel subsidies (left) and rents (right) for countries where subsidies exceed 10% of GDP

3. Fossil Fuel Dependency Score - Subsidies

- Countries with the highest share of fossil fuel revenues often provide substantial fossil fuel subsidies. However, there are notable exceptions to this trend, reflecting different policy and economic frameworks.
- Countries like Libya and Iraq are heavily dependent on fossil fuels. These countries maintain high levels of subsidies to keep energy prices low for their populations, serving as a form of social welfare. However, this approach deepens their dependency on fossil fuels.
- In contrast, Norway has the lowest share of fossil fuel subsidies among the selected countries. It manages its oil revenues through the Government Pension Fund Global, which invests in diversified economic sectors. The country aims to further reduce fossil subsidies to achieve its climate commitments.

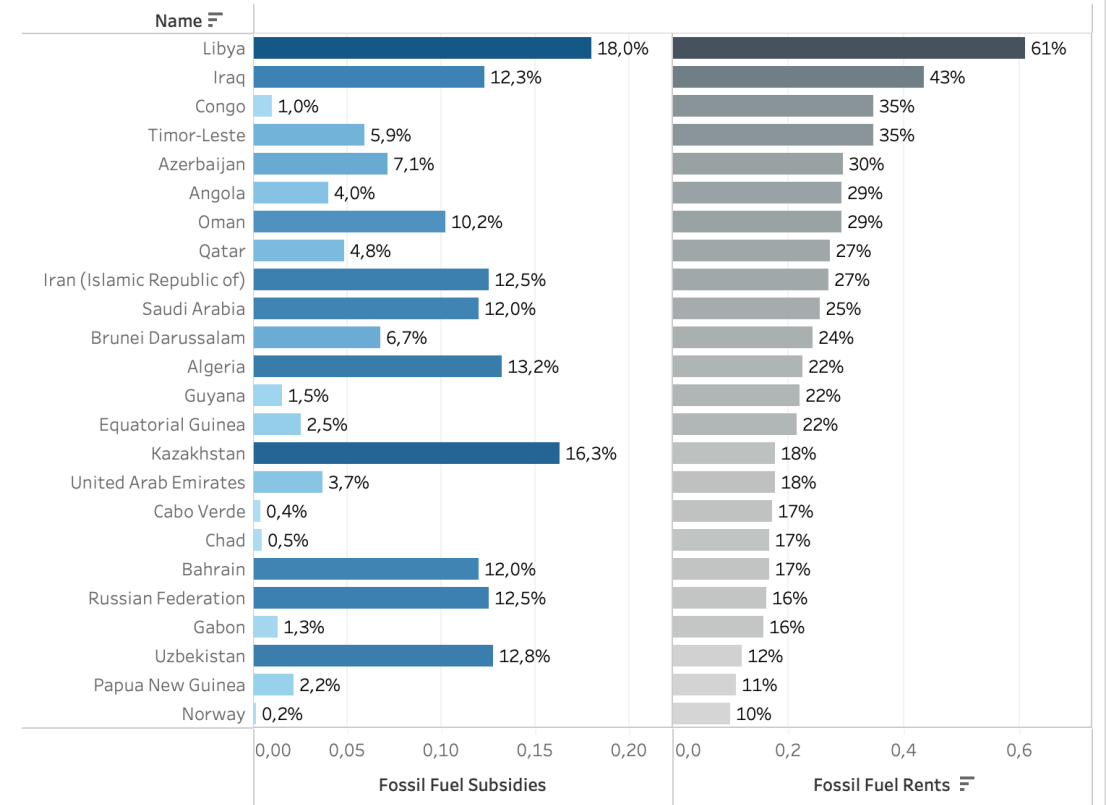


Figure 7: Fossil fuel subsidies (left) and rents (right) for countries where rents exceed 10% of GDP

4. Dynamic Trend Score - Methodology overview

The score is composed of two indicators:

- **Climate Pledge Alignment:** evaluates countries emissions reduction targets, as defined in their Nationally Determined Contributions (NDC), against the International Energy Agency's (IEA) scenarios.
- **Decarbonization Trend:** evaluates countries emissions pathways since the ratification of the Paris agreement in 2016 against the International Energy Agency's (IEA) scenarios.

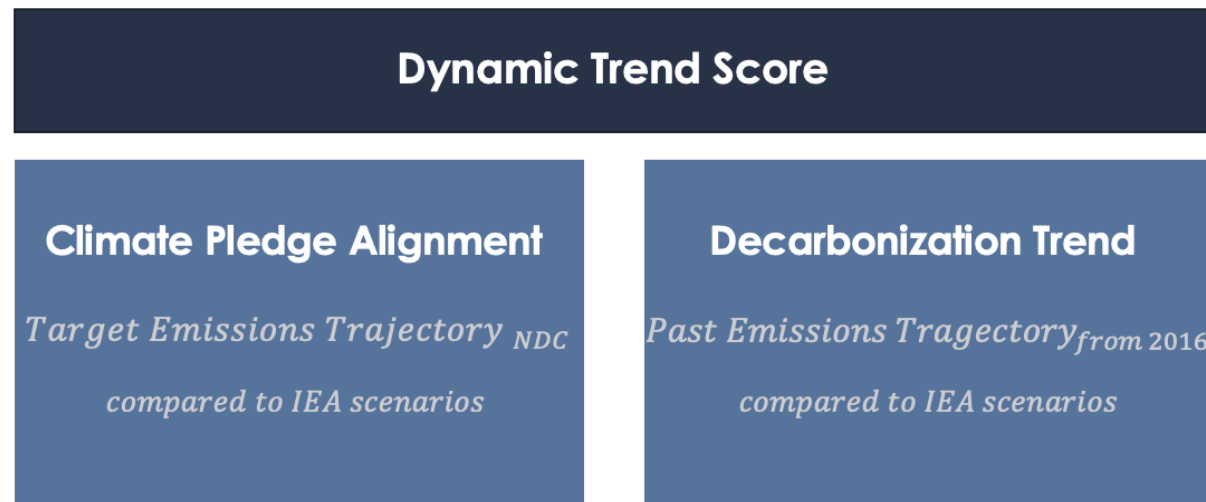
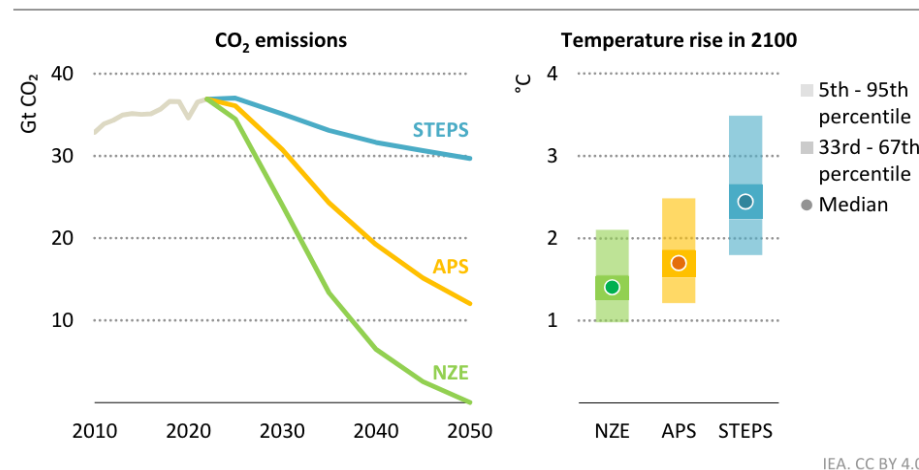


Figure 8: Dynamic Trend Score definition

4. Dynamic Trend Score - Methodology overview

We use the IEA's World Energy Outlook (WEO) 2023 scenarios, namely:

- **Net Zero Emissions (NZE):** A scenario which sets out a pathway for the global energy sector to achieve net zero CO₂ emissions by 2050.
- **Announced Pledge Scenario (APS):** A scenario which assumes that all climate commitments made by governments and industries around the world will be met in full and on time.
- **Stated Policies Scenario (STEPS):** A scenario which reflects current policy settings based on a sector-by-sector and country-by-country assessment of the energy-related policies that are in place, as well as those that are under development.



Temperature rise in 2100 is 2.4 °C in the STEPS and 1.7 °C in the APS; it peaks at just under 1.6 °C around 2040 in the NZE Scenario and then declines to about 1.4 °C by 2100

Figure 9: Global energy-related and industrial process CO₂ emissions by scenario and temperature rise above pre-industrial levels in 2100, Source : IEA World Energy Outlook 2023

4. Dynamic Trend Score – Climate Pledge Alignment

Within their Nationally Determined Contributions (NDCs), countries may outline both **unconditional emissions** reduction targets, which they implement with domestic resources, and **conditional targets**, which are contingent on international support.

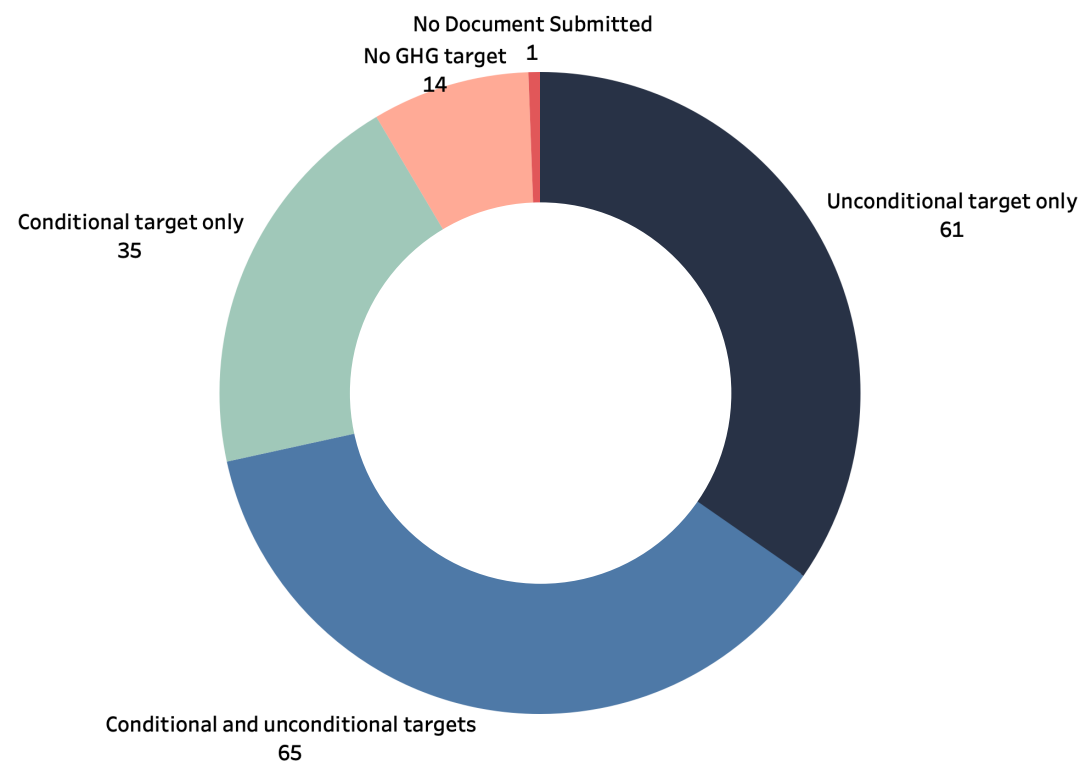


Figure 11: Distribution of GHG reduction targets by type

The Climate Pledge Alignment Indicator specifically assesses unconditional targets because the actualization of conditional targets is reliant on often vaguely specified international assistance.

4. Dynamic Trend Score - Case study

- From 2016 to 2021, France registered a 9.2% reduction in production-based emissions, indicating an insufficient decarbonization pace. The emission pathway of the country diverges from the trajectory outlined by the Stated Policies Scenario (STEPS).

D+ France receives a rating of 10/15 for the Decarbonization Trend indicator.

- Conversely, France's NDC pledges a substantial 55% cut in emissions by 2030 from a 1990 baseline, positioning its emissions trajectory in the intermediate range between the Net Zero Emissions (NZE) and the Announced Pledge Scenario (APS).

A- France receives a rating of 3/15 for the Climate Pledge Alignment indicator.

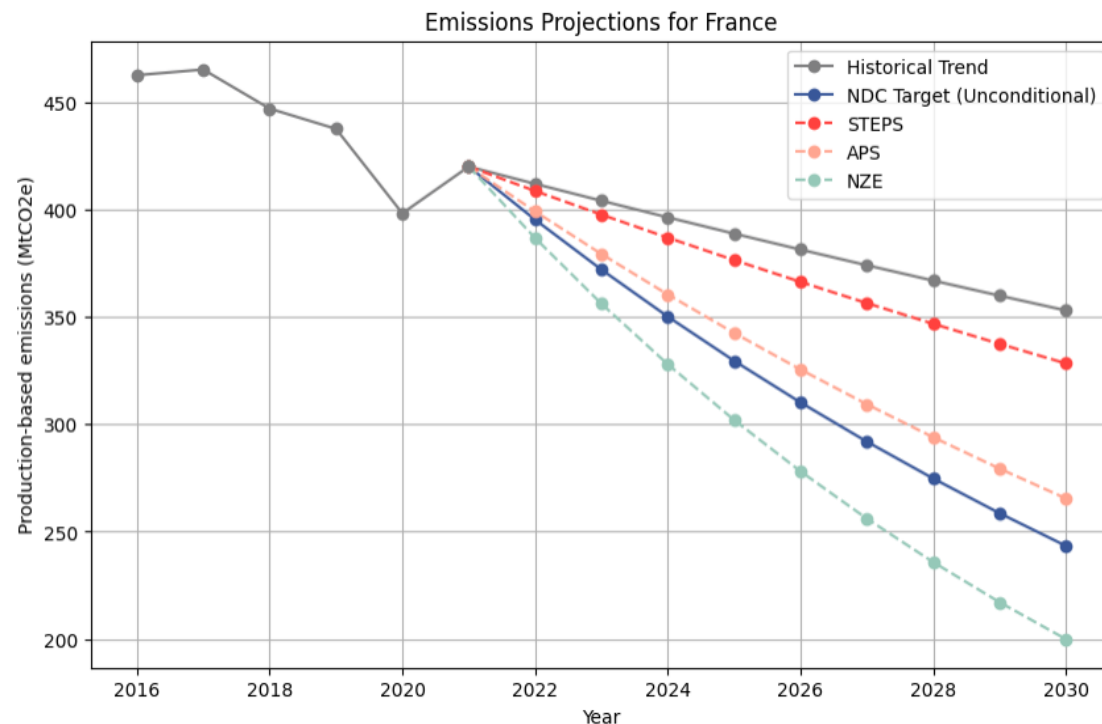


Figure 10: France's historical and targeted emissions trajectory compared to IEA scenarios

4. Dynamic Trend Score – Climate Pledge Alignment

Nearly a third of the evaluated countries have established notably unambitious **unconditional** emissions reduction targets in their Nationally Determined Contributions (NDCs). The projected pathways of these countries' GHG emissions, based on their targets, do not align with the Stated Policies Scenario (STEPS) outlined by the International Energy Agency (IEA).

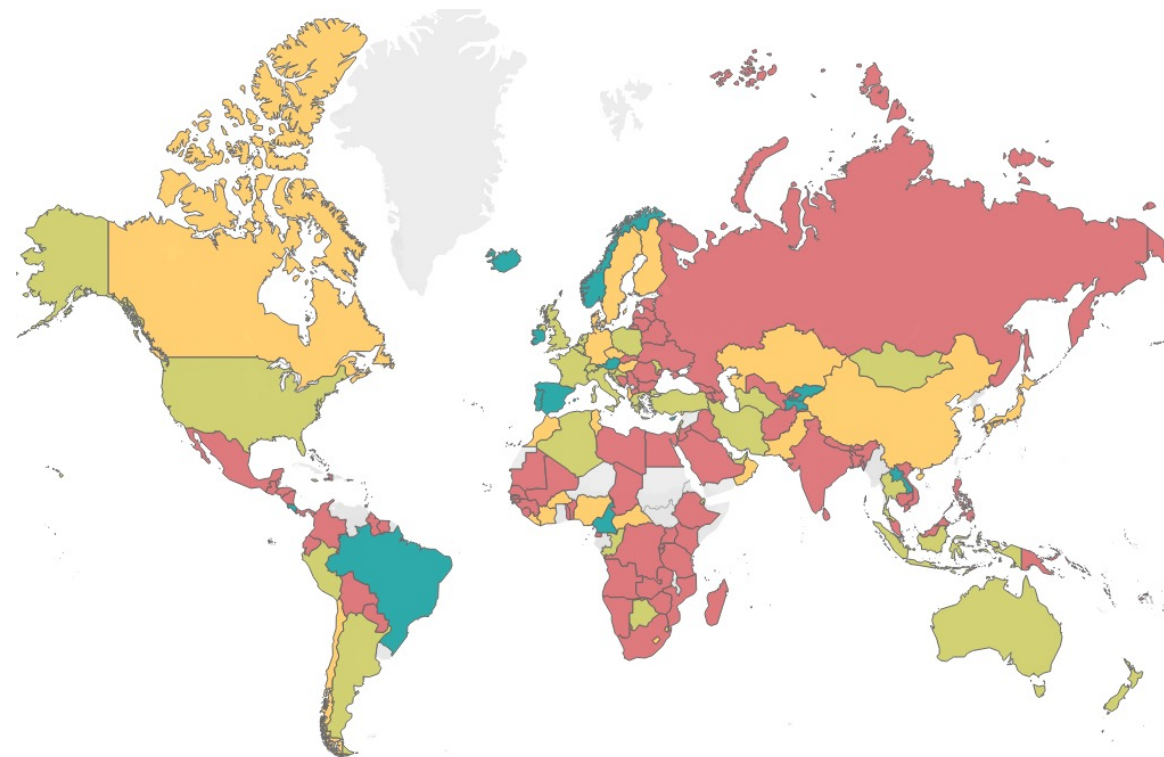
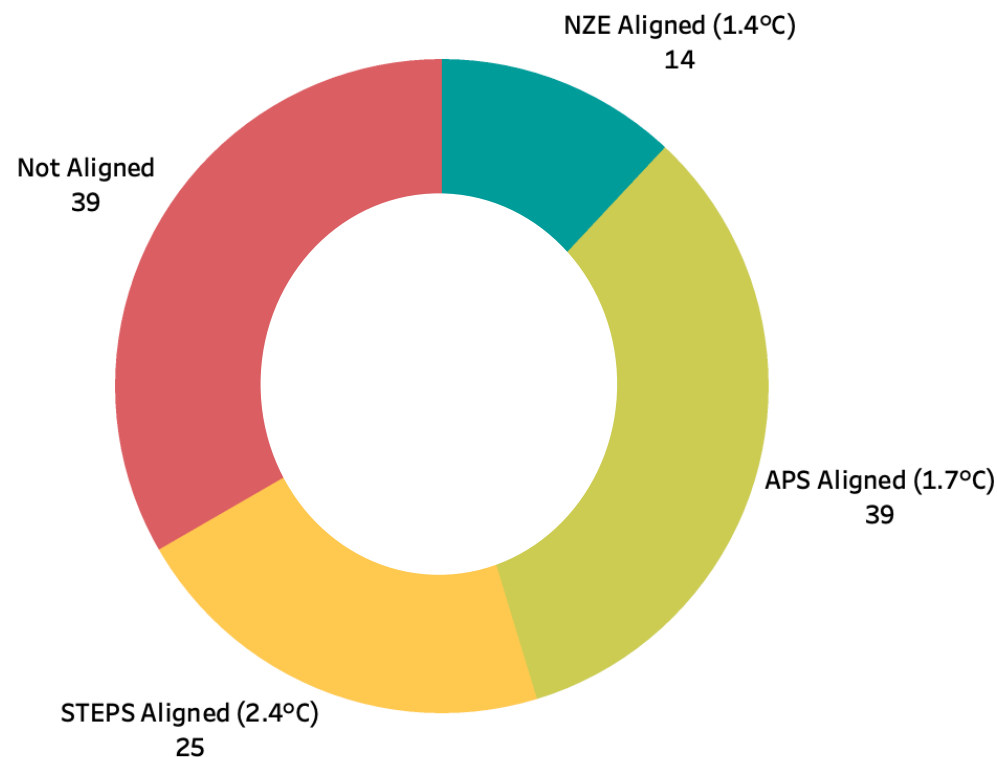


Figure 12: Distribution of evaluated countries according to the alignment of their unconditional GHG emissions reduction targets with International Energy Agency (IEA) scenarios.

4. Dynamic Trend Score – Decarbonization Trend

Most of the assessed countries (74%) have registered insufficient and highly insufficient decarbonization paces since the ratification of the Paris Agreement in 2016. Their emissions trajectories are diverging from the Stated Policies Scenario (STEPS) pathway, resulting in low ratings for the Decarbonization Trend indicator.

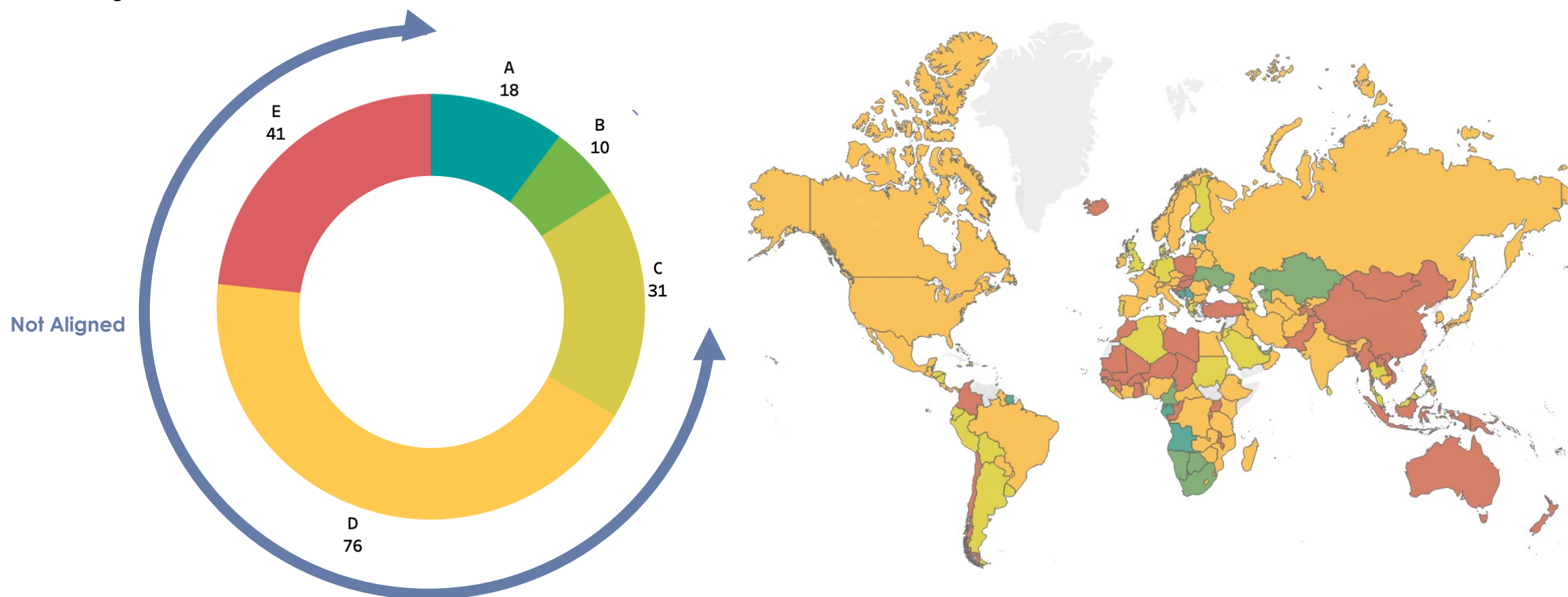


Figure 13: Distribution of Decarbonization Trend Ratings

4. Dynamic Trend Score – Decarbonization Trend

- The trend of global GHG emissions between 2016 and 2021 reflects **highly insufficient decarbonization efforts since the ratification of the Paris Agreement.**

- Aligning global emissions with the STEPS trajectory would depend on the **implementation of the policies** considered in this scenario. However, this trajectory remains highly unambitious, leading to a temperature rise **of 2.4°C by 2100**, far from the 1.5°C objective of the Paris Agreement.

- Most of the assessed countries (84%) are **not on track** to meet their emissions reduction targets outlined in their NDCs. Meeting these targets would require substantial efforts to accelerate the pace of decarbonization. Furthermore, achieving the Net Zero Emissions objective requires more ambitious climate commitments to close the gap between the APS and NZE trajectories.

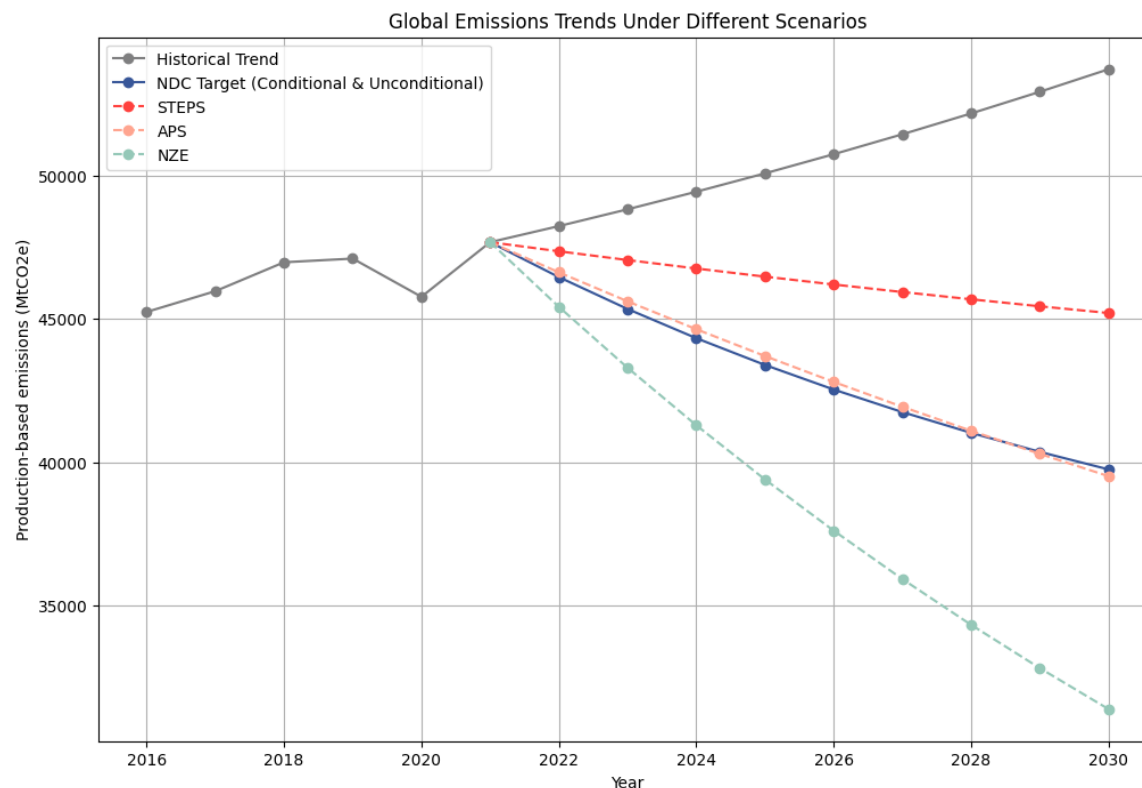


Figure 14: Distribution of evaluated countries

5. Results & Discussion: Overall ratings distribution

- Most countries have registered moderate climate change mitigation performance with ratings ranging from 7 to 9.
- The histogram is skewed to the left, indicating a tendency towards better performance
- Few countries have performed exceptionally well (ratings from 1 to 3) or exceptionally bad (ratings from 13 to 15)

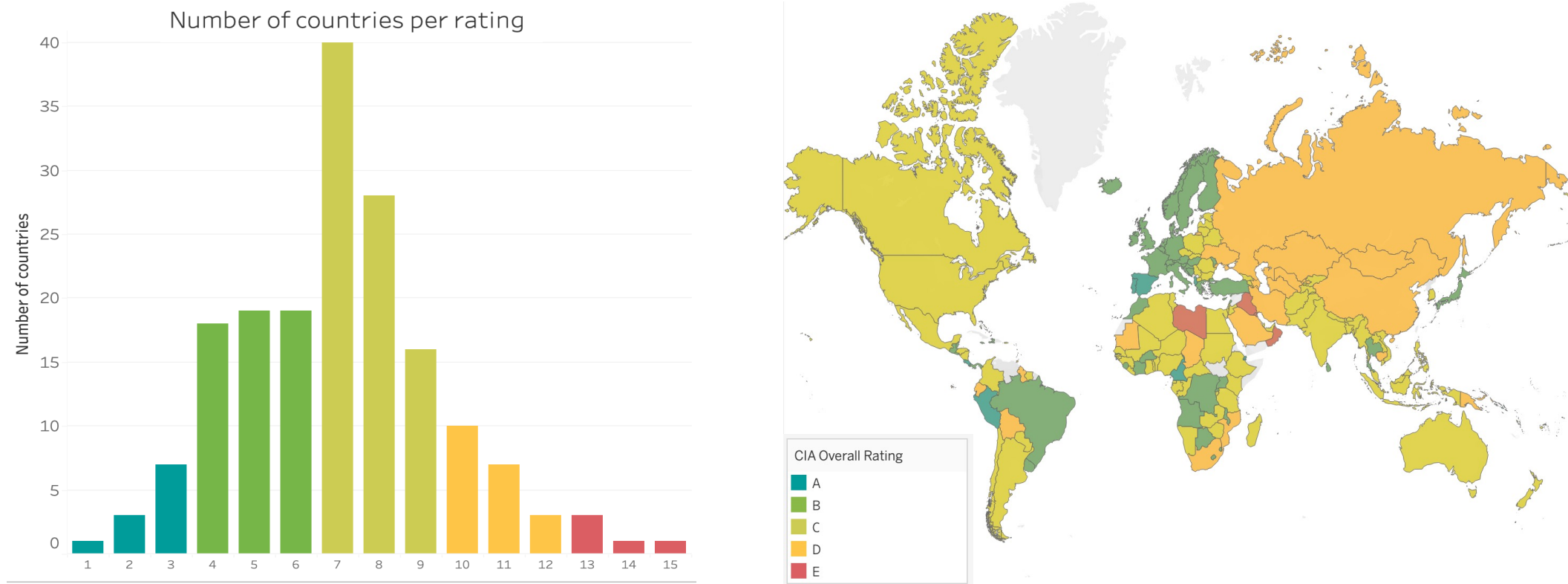


Figure 15: Distribution of CIA overall ratings by country

5. Results & Discussion: Overall ratings distribution by region

- On average, European countries have registered the best performance. This is primarily due to their low production-based intensities, ambitious emissions reduction targets, and low dependency on fossil fuels.
- Average results are observed in Africa, Asia, Latin America, and the Pacific.
- Middle Eastern countries received the worst average rating. This is mainly due to the performance of Gulf countries, which have very high carbon intensities and a high dependency on fossil fuels.

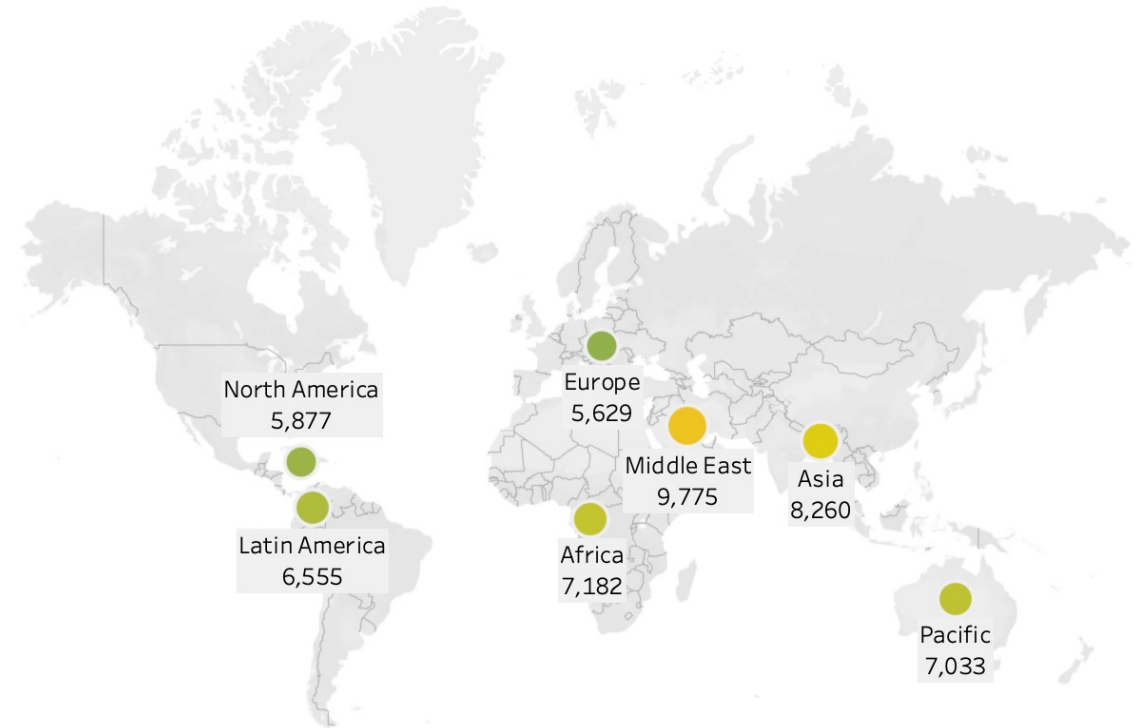


Figure 16: Average CIA overall rating by region

Thank you for your attention!