

Is the World Progressing in Carbon Circularity?

Moderated by



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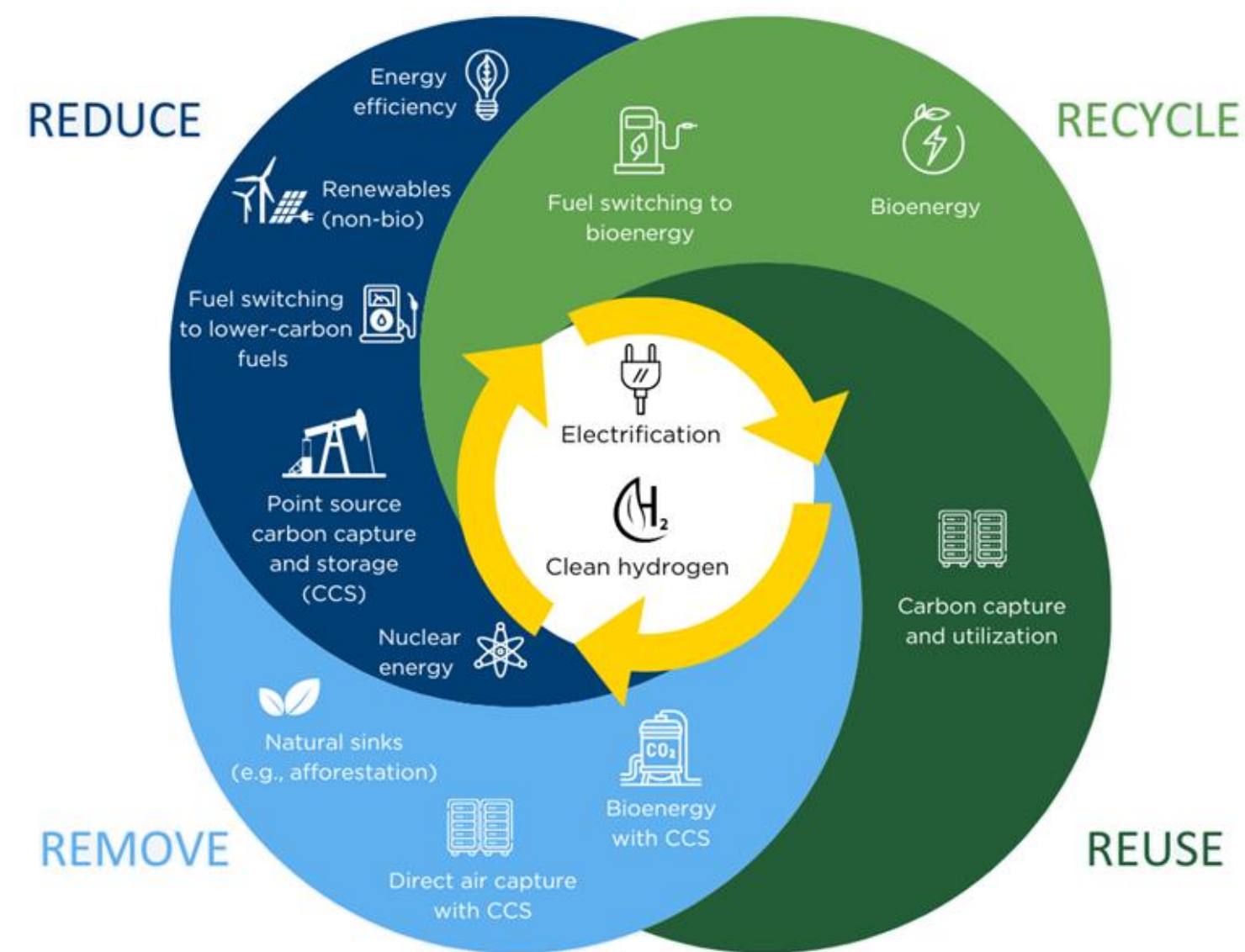
Senior Consultant,
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Virtual COP 30 side event – November 18, 2025

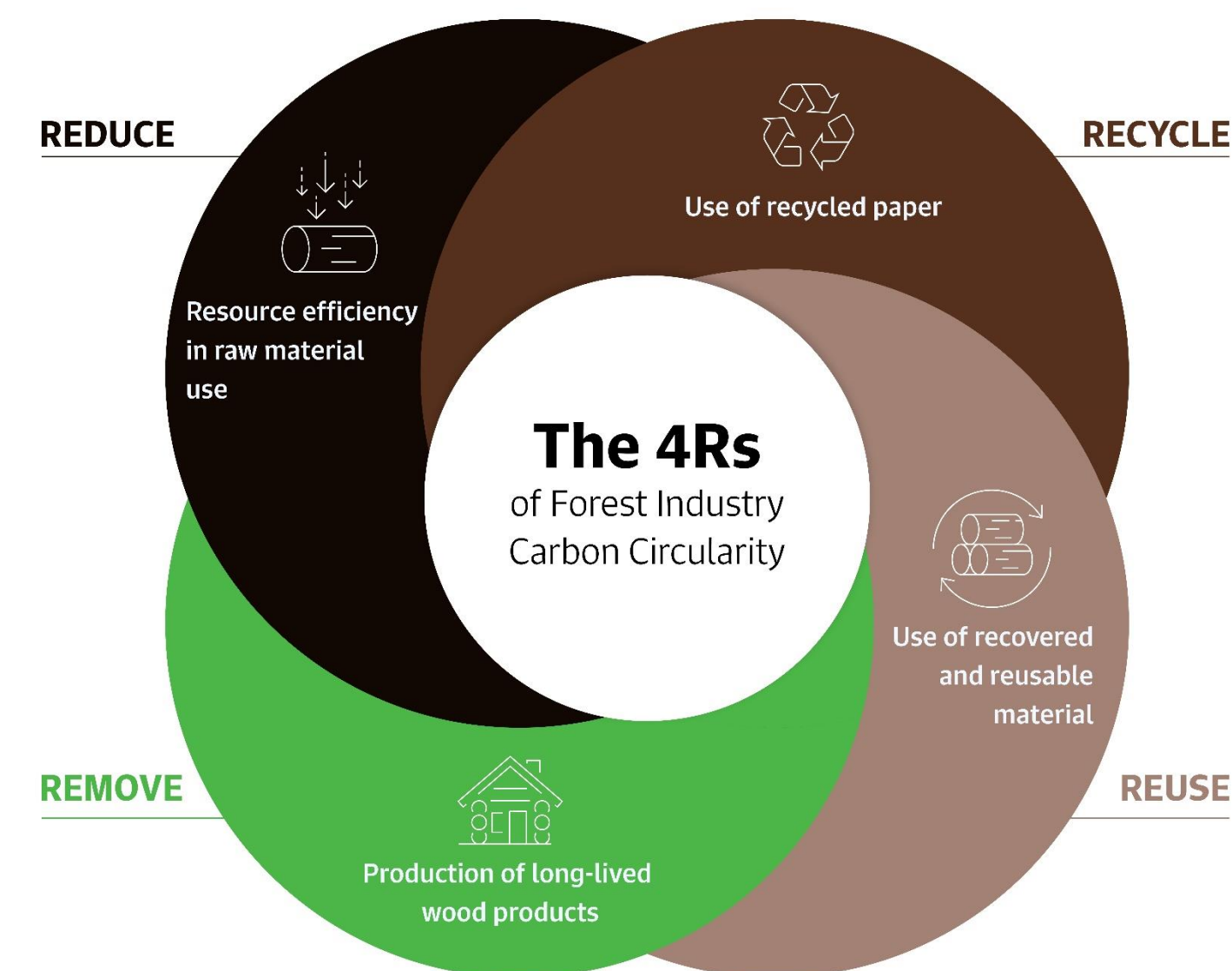


Agenda

1. 2025 CCE INDEX RESULTS



2. LAUNCH OF THE CCE INDEX FOREST INDUSTRY LENS



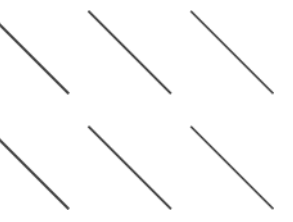
3. QUESTIONS & ANSWERS

Is the World Progressing in Carbon Circularity?

Launch of the 2025 CCE Index

Virtual COP 30 side event – November 18, 2025

2025 CCE Index core team: Mari Luomi, Fatih Yilmaz, Hind Aldhuwaihi, Thamir Alshehri; web portal/visual storytelling team: Alaa Alarfaj, Pavithra Shetty, Khawlah AlHarbi, Jaidaa Alidrisi, Alejandra Dander



2025 CCE Index results – outline

1. CCE INDEX
FRAMEWORK

2. CCE INDEX
RESULTS

3. 5-YEAR
TRENDS

4. NEW
INDICATORS
ZOOM-IN

5. OIL
PRODUCERS
LENS

1

The CCE index framework for assessing net-zero transitions

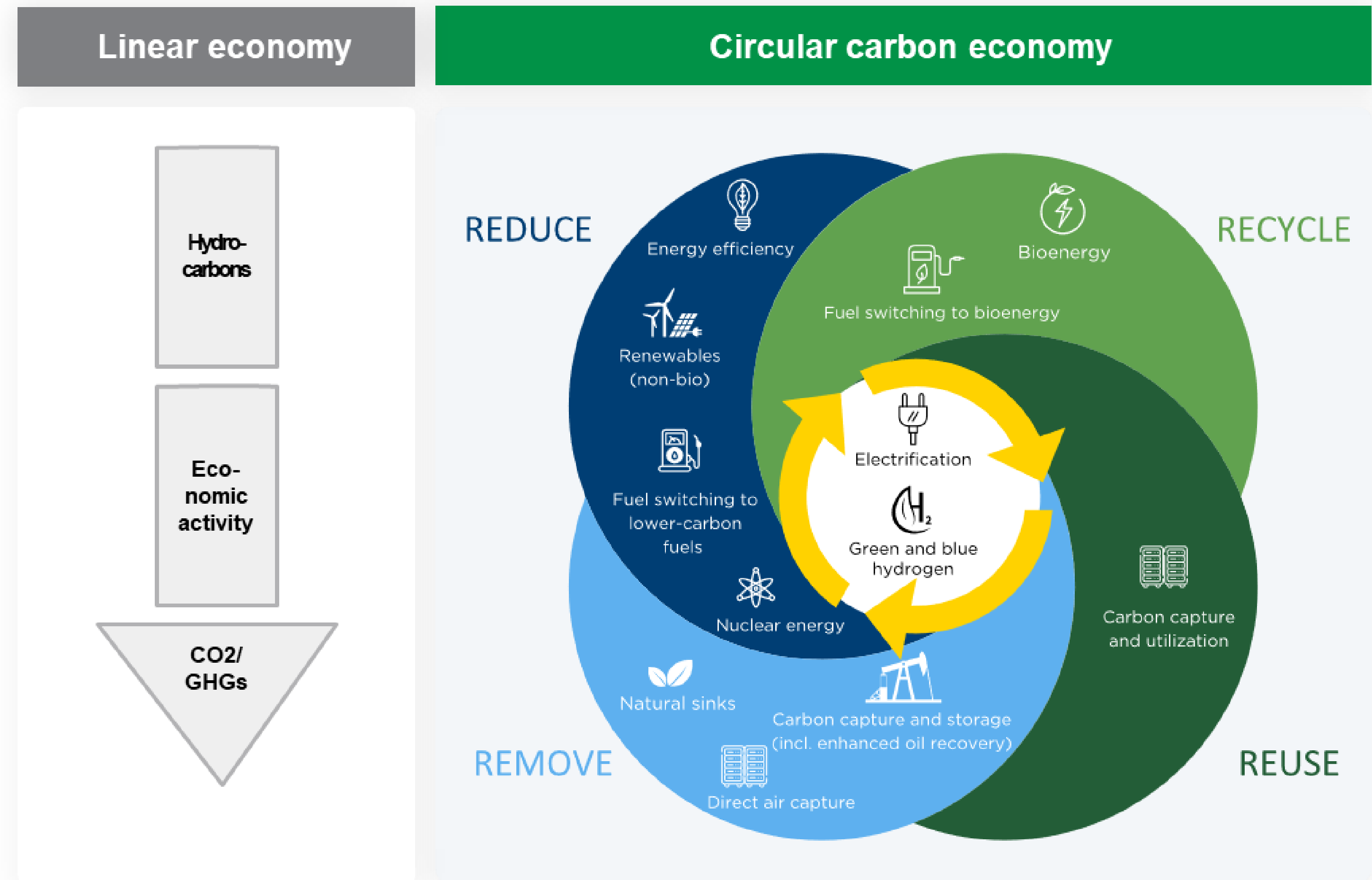
Carbon Circularity in a Circular Carbon Economy

Framework to **support transitions to net-zero emissions** in line with the Paris Agreement's goals – a full CCE equals to net-zero

Builds on the circular economy concept, but focuses on energy and emissions flows – a **mitigation-focused** concept

A **technology-based approach** – 4 Rs of the CCE divide mitigation approaches into: reduce, recycle, reuse and remove carbon/emissions

Technology-neutral approach enables **effective and efficient** emissions reductions – **each country should play to its strengths**



The Circular Carbon Economy Index

Tracks net-zero transition progress and potential across 125 countries

CCE Performance (50%)

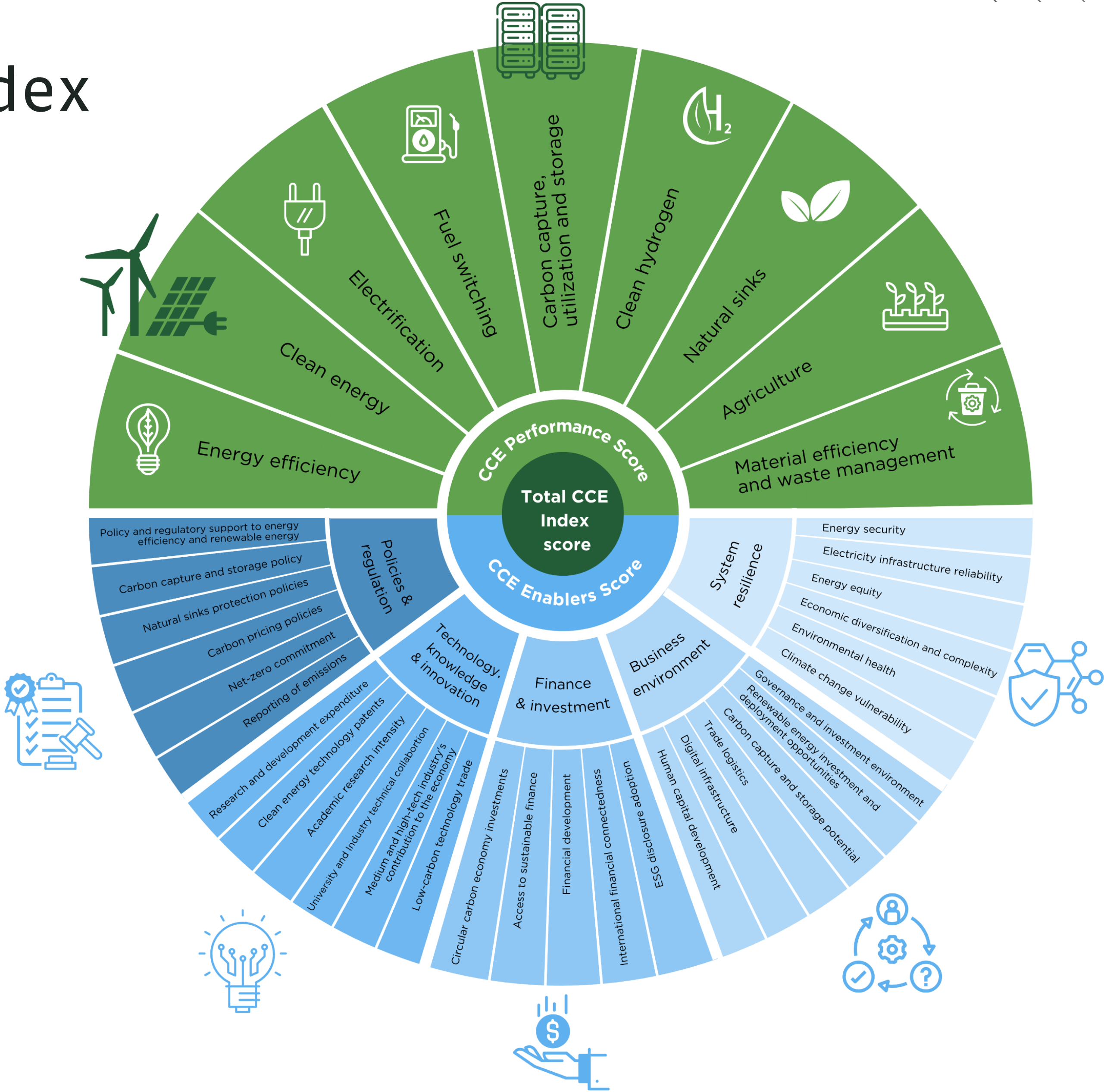
How are countries engaging with diverse climate change mitigation options and technologies in terms of depth and diversity?

CCE Enablers (50%)

How are countries positioned to accelerate progress toward circular carbon economies?

Total CCE Index score

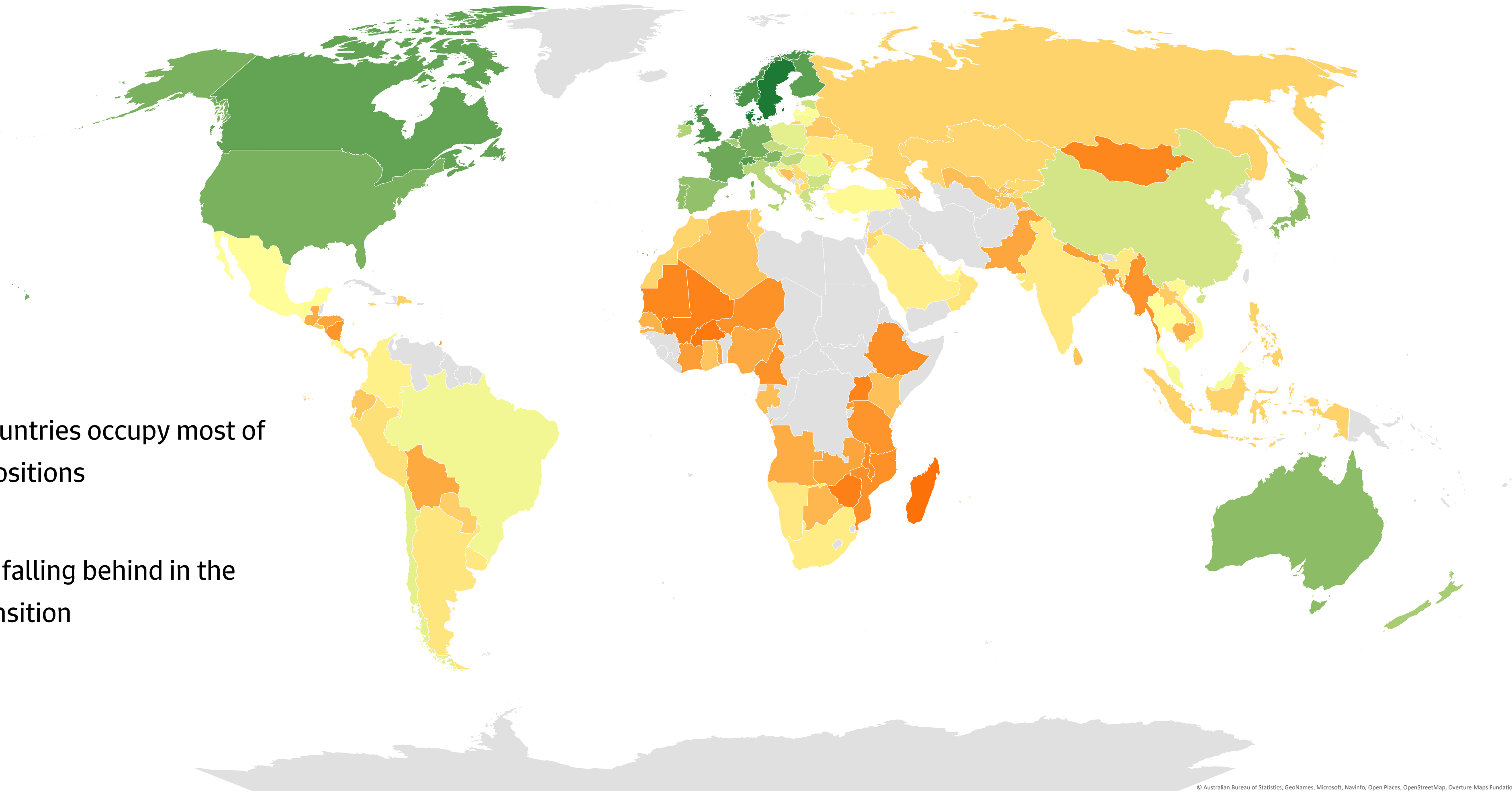
How are countries overall managing the transition to the CCE, and is their current performance on par with their future potential?



2

2025 CCE Index results: are we bringing everyone along in the transition?

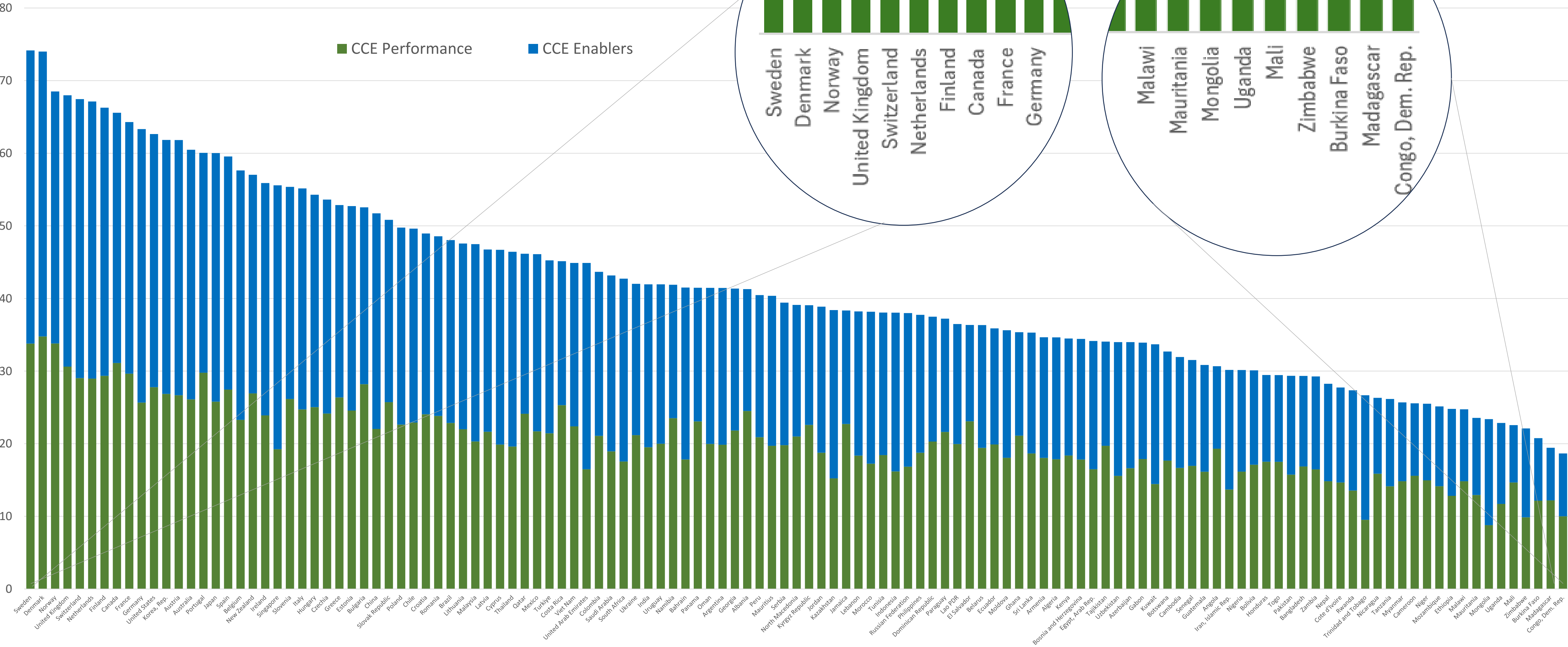
2025 Total CCE Index Ranking



European countries occupy most of the top-10 positions

Africa is still falling behind in the net-zero transition

Top 10 and bottom 10 in 2025

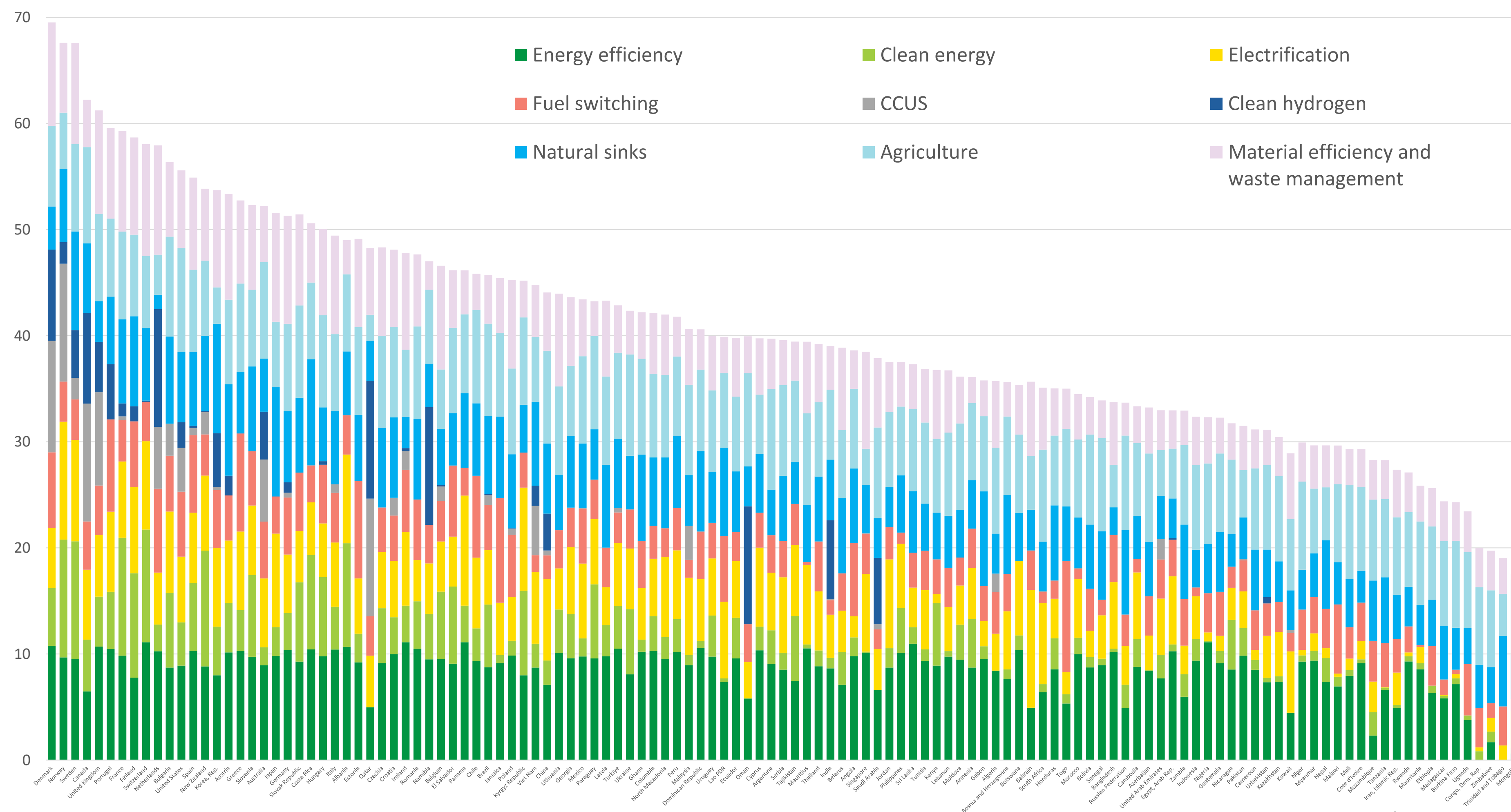


A 2x3 grid of diagonal lines, with two lines in each of the six cells. The lines are parallel to each other within each cell and are oriented diagonally from the top-left to the bottom-right.

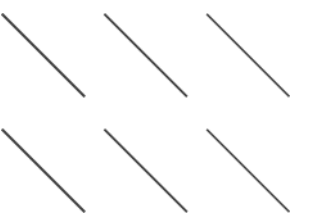
- Denmark
- Norway
- Sweden
- Canada
- United Kingdom

- Uganda
- Dem. Rep. of Congo
- Zimbabwe
- Trinidad and Tobago
- Mongolia

- 52-point gap between top (Denmark 69) and bottom (Mongolia 18) – top score 4 times bottom score
- High-income countries from Europe and Asia dominate top-20
- Countries from various income levels, but mainly from Sub-Saharan Africa, dominate bottom-20

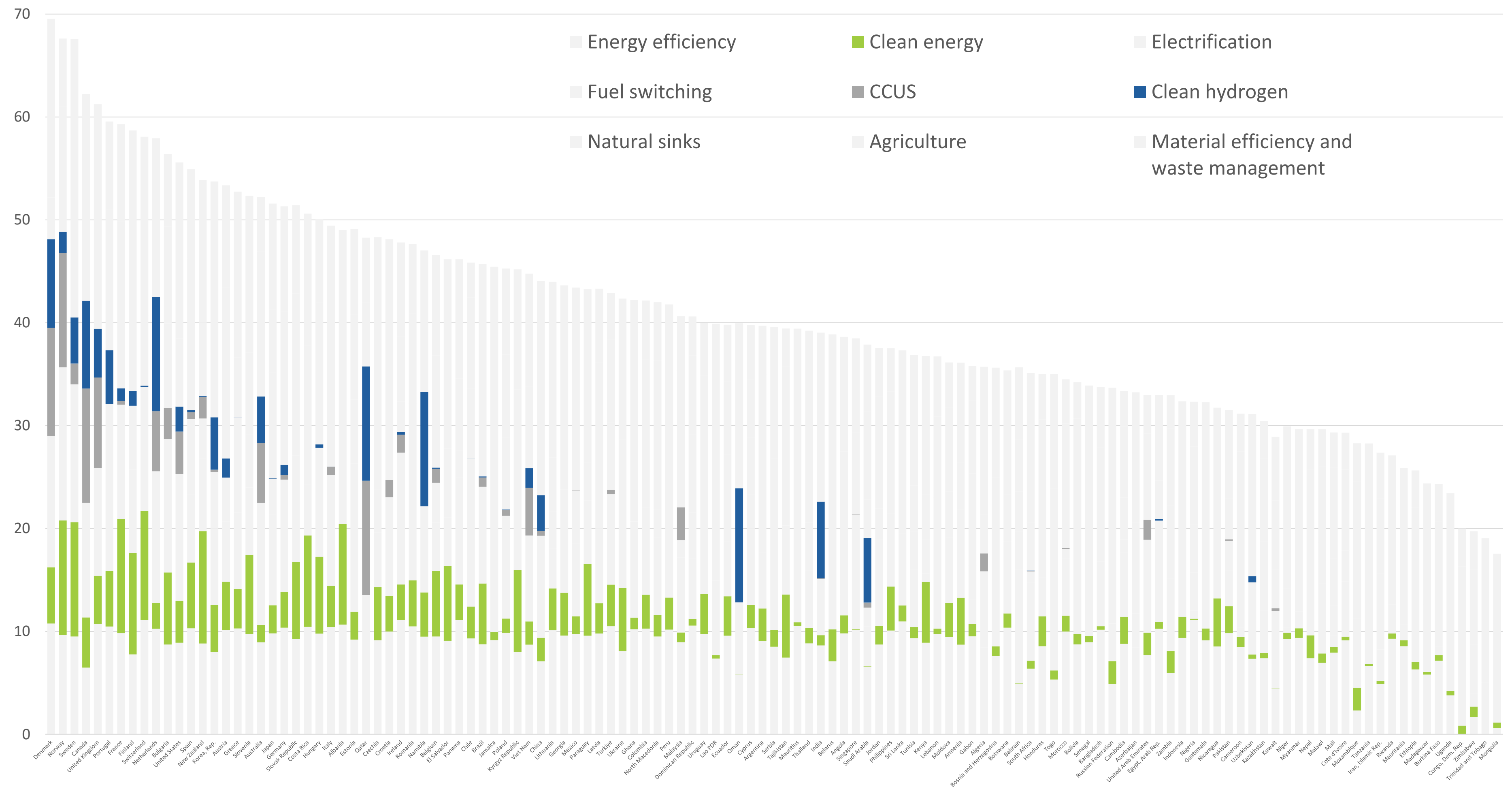


2025 CCE Performance ranking



Highlights

- Scaling up clean energy remains a challenge in a large share of the world's economies
- Clean hydrogen and CCUS projects are being implemented in a limited number of countries



2025 CCE Enablers ranking

Top 5 countries

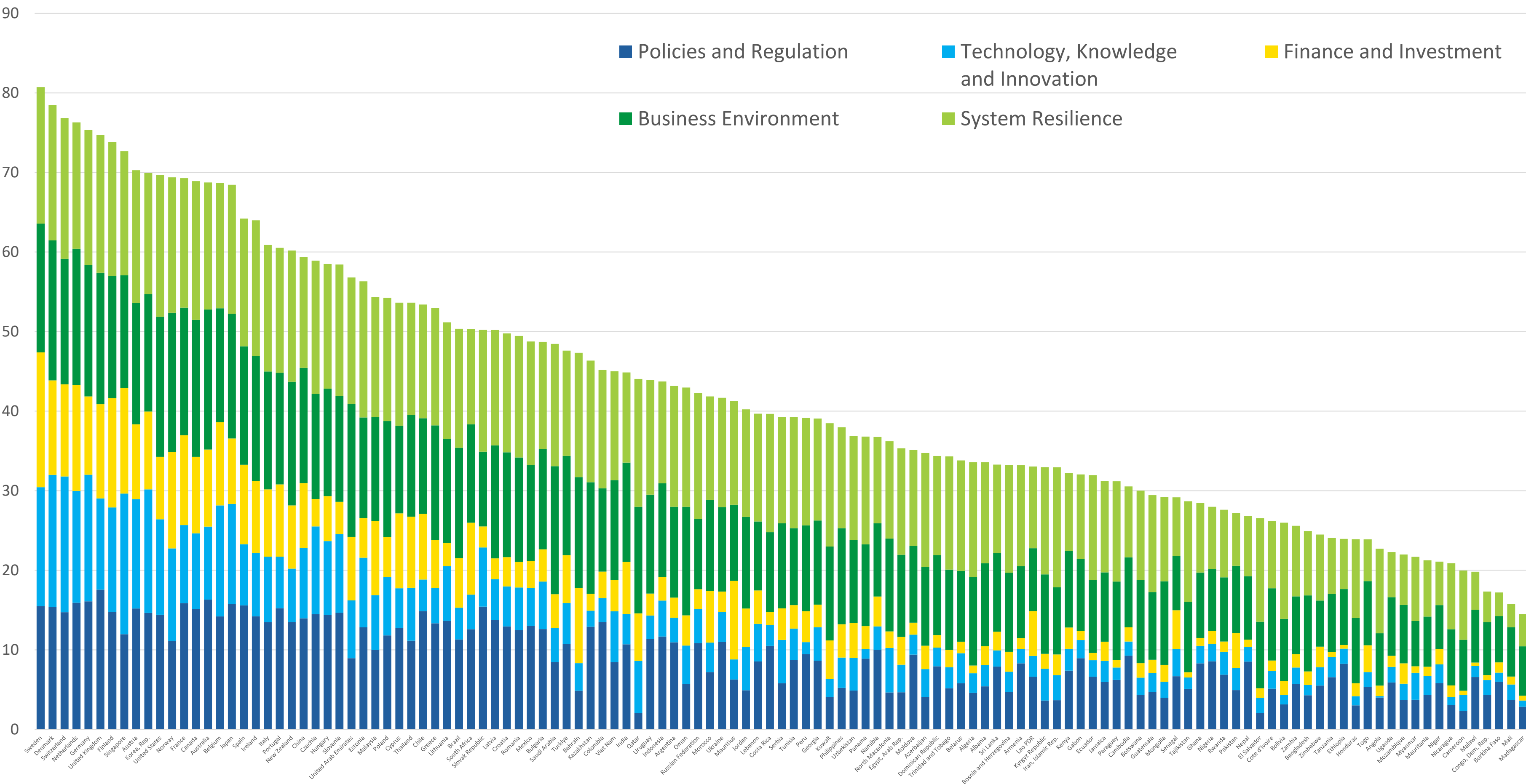
- Sweden
- Denmark
- Switzerland
- Netherlands
- Germany

Bottom 5 countries

- Malawi
- Dem. Rep. of Congo
- Burkina Faso
- Mali
- Madagascar

Highlights

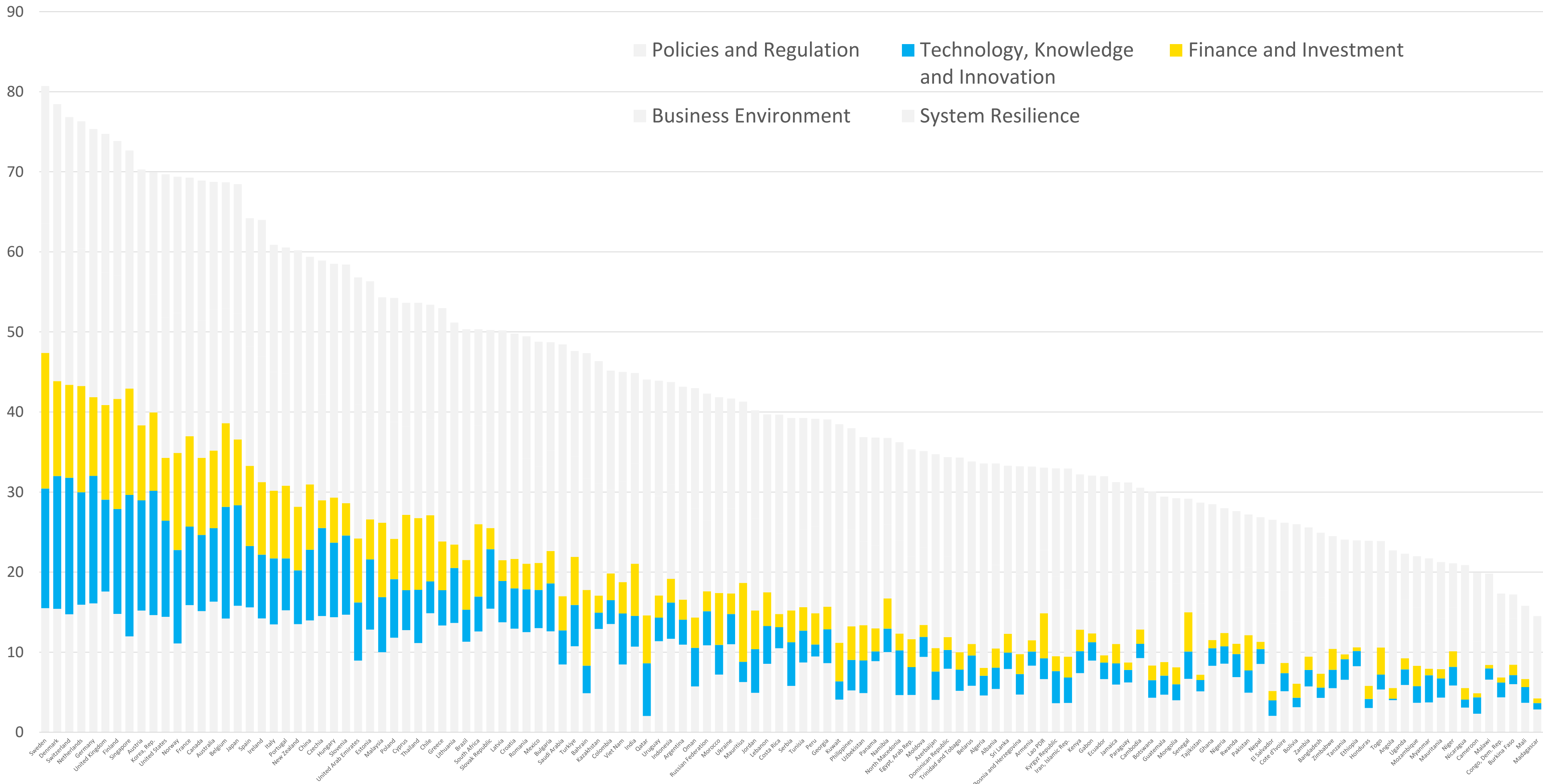
- 66-point gap between top (Sweden 81) and bottom (Madagascar 15) – top score 5.5 times bottom score
- High-income countries from Europe and Asia dominate top-20
- Low and lower-income countries mainly from Sub-Saharan Africa dominate bottom-20



2025 CCE Enablers ranking

Highlights

- Gaps between top and bottom-ranked countries are the widest in Technology, Knowledge and Innovation (87 points) and Finance and Investment (83 points)
- Wide gaps also persist in Policies and Regulation (78 points) and System Resilience (74 points)



Country quadrants

Leading countries

Showing the way on net-zero transitions but still need to step up efforts

Countries performing below their potential

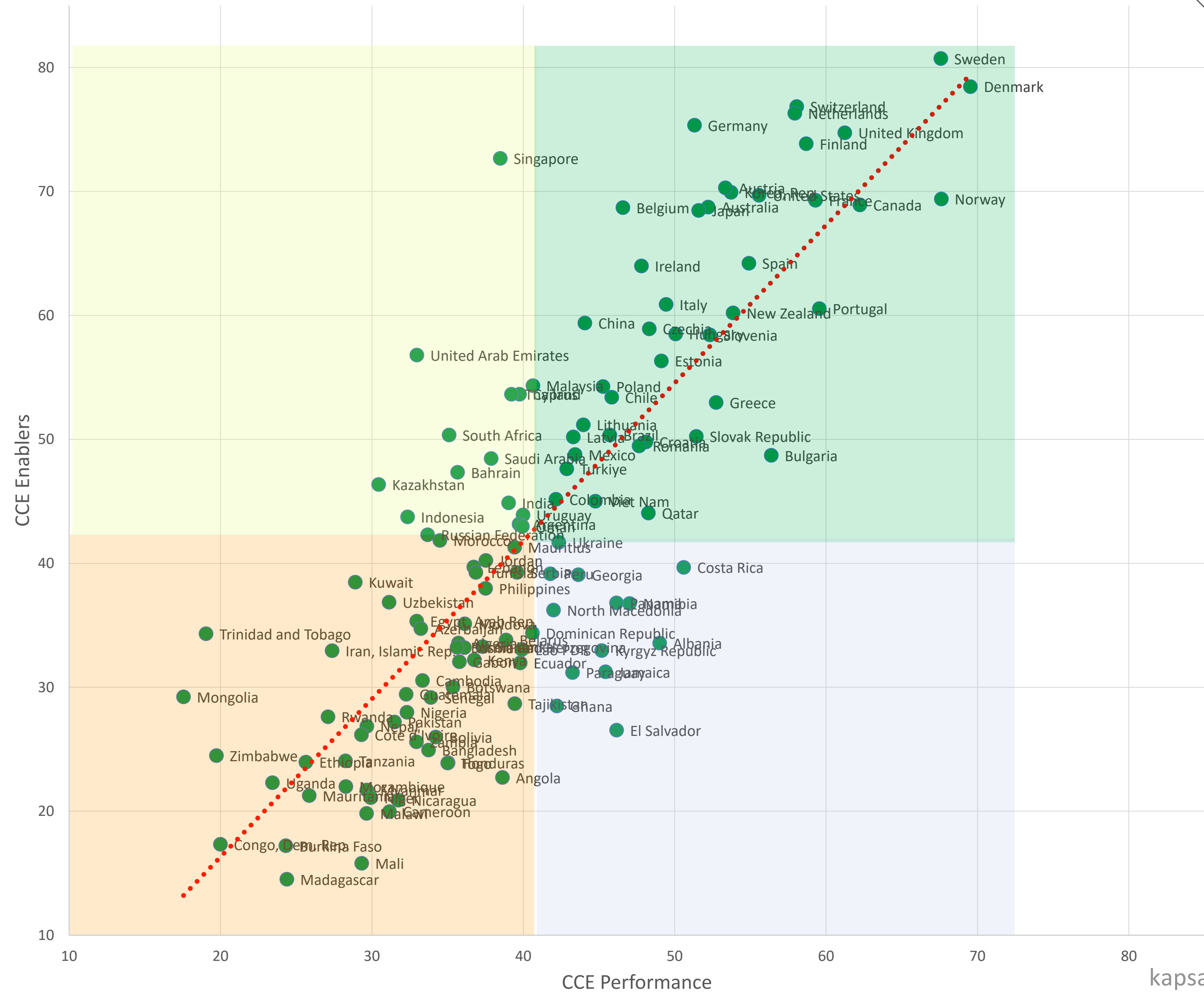
Based on their Enablers score have potential to do more

Countries with transitions at risk

Performing fairly, but transitions are at risk, given the weaker enabling environments

Countries falling behind

Performing below the global average in both main areas of the index; must not be forgotten in the global net-zero transition



3

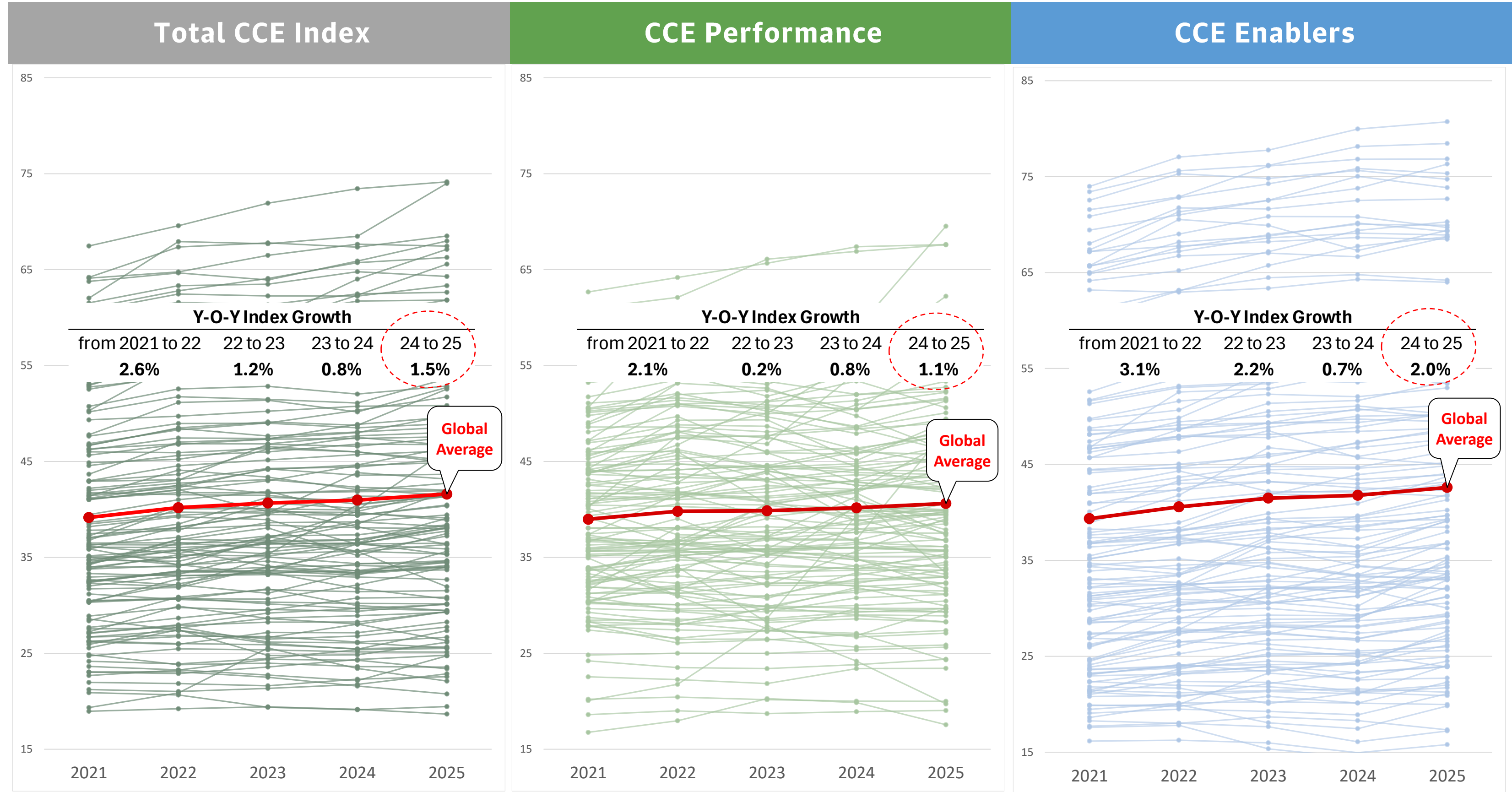
Five-year trends – is the world progressing on carbon circularity?

Trends in CCE Index scores 2021-2025 – Global

Key highlights

- Following a global plateauing in the CCE transition trend, 2025 index scores have seen an increase in pace
- Growth in global average CCE Index scores is significant in 2024-2025
- CCE Performance score growth increased moderately compared to the previous year
- Growth in the average global CCE Enablers Index score is particularly remarkable

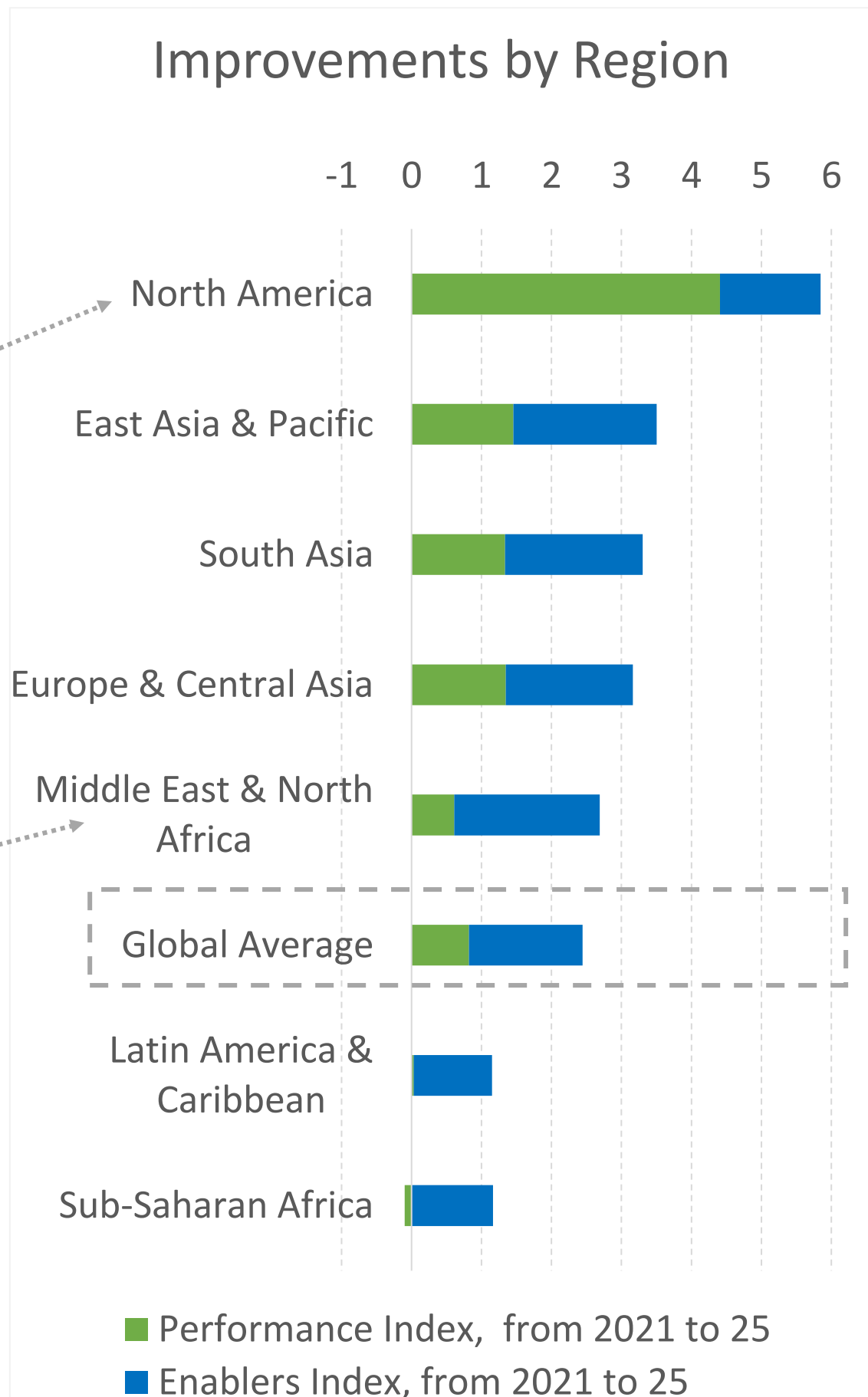
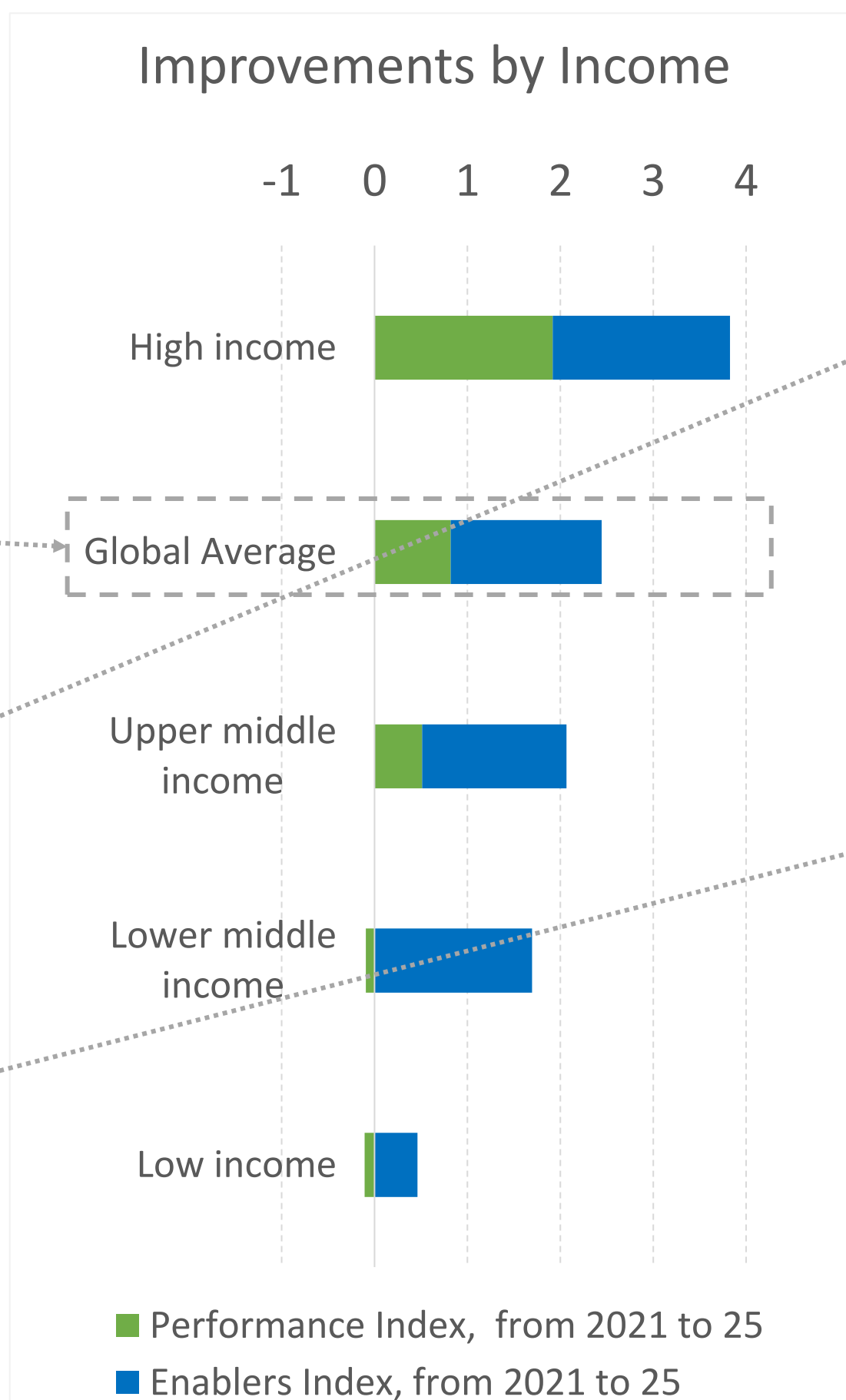
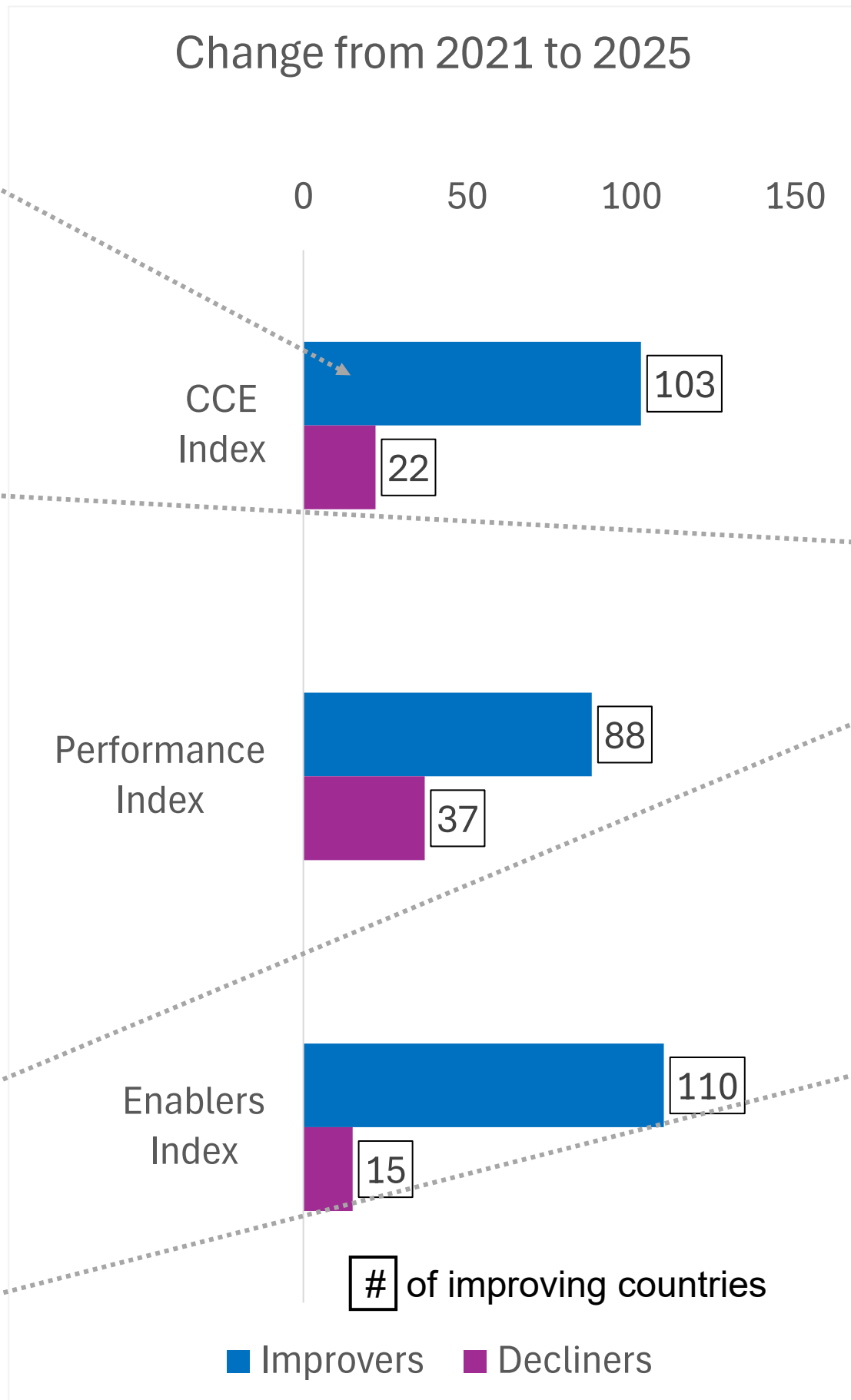
Total CCE Index and sub-index scores, all countries



Changes in CCE Index scores from 2021 to 2025 – Groups

Key highlights

- Most countries improved their CCE Index scores over the last half-decade
 - Number of countries **improving** on CCE **Enablers** (110) is larger than on CCE **Performance** (88)
- Large heterogeneity continues across countries and income groups
 - Most countries improved their enabling environment (i.e., **Finance** and **Policy**), except the low-income group
 - High-income countries recorded a big jump, especially in CCE Performance (i.e., **H2, CCUS, RE**)
- Across regions:
 - **North America** recorded the most significant improvement in CCE Performance
 - MENA saw a notable improvement in enabling environments



Changes in CCE Index scores from 2021 to 2025 – Countries

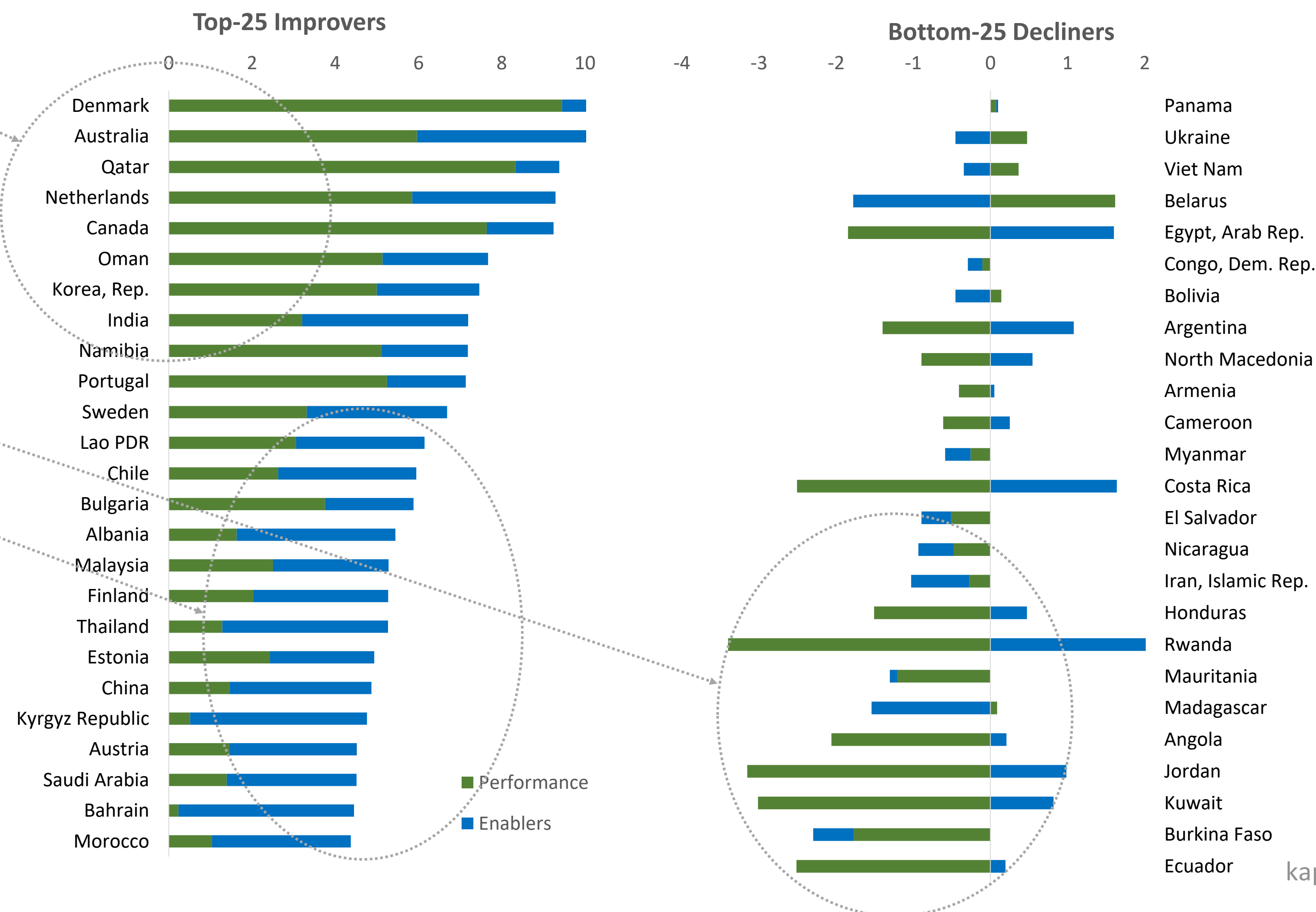
Key highlights

• CCE transition **performance**

- Development of **CCUS and H2 projects** is a salient trend among mostly high-income countries, e.g., Denmark, Qatar, the Netherlands, Oman, and some middle-income countries, China and Namibia
- Among top-improving middle-income countries, **different technologies** were influential: in Laos, fuel switching and electrification; in Albania, renewable energy
- In most middle and low-income countries, **CCUS and H2** usually don't exist, and **renewable energy** penetration is weak

• CCE transition **enablers**

- Improvements in **finance and investment** are a common element among all countries, particularly strong in high-income countries, e.g., Bahrain, Sweden, Finland, Laos, and Thailand
- Climate **policies and regulation** show an upward trend among developing countries, e.g., Oman, India, and Saudi Arabia
- Enabling private business environments, finance and technology spillovers are mostly on decline, e.g., Burkina Faso, Vietnam, and Kuwait



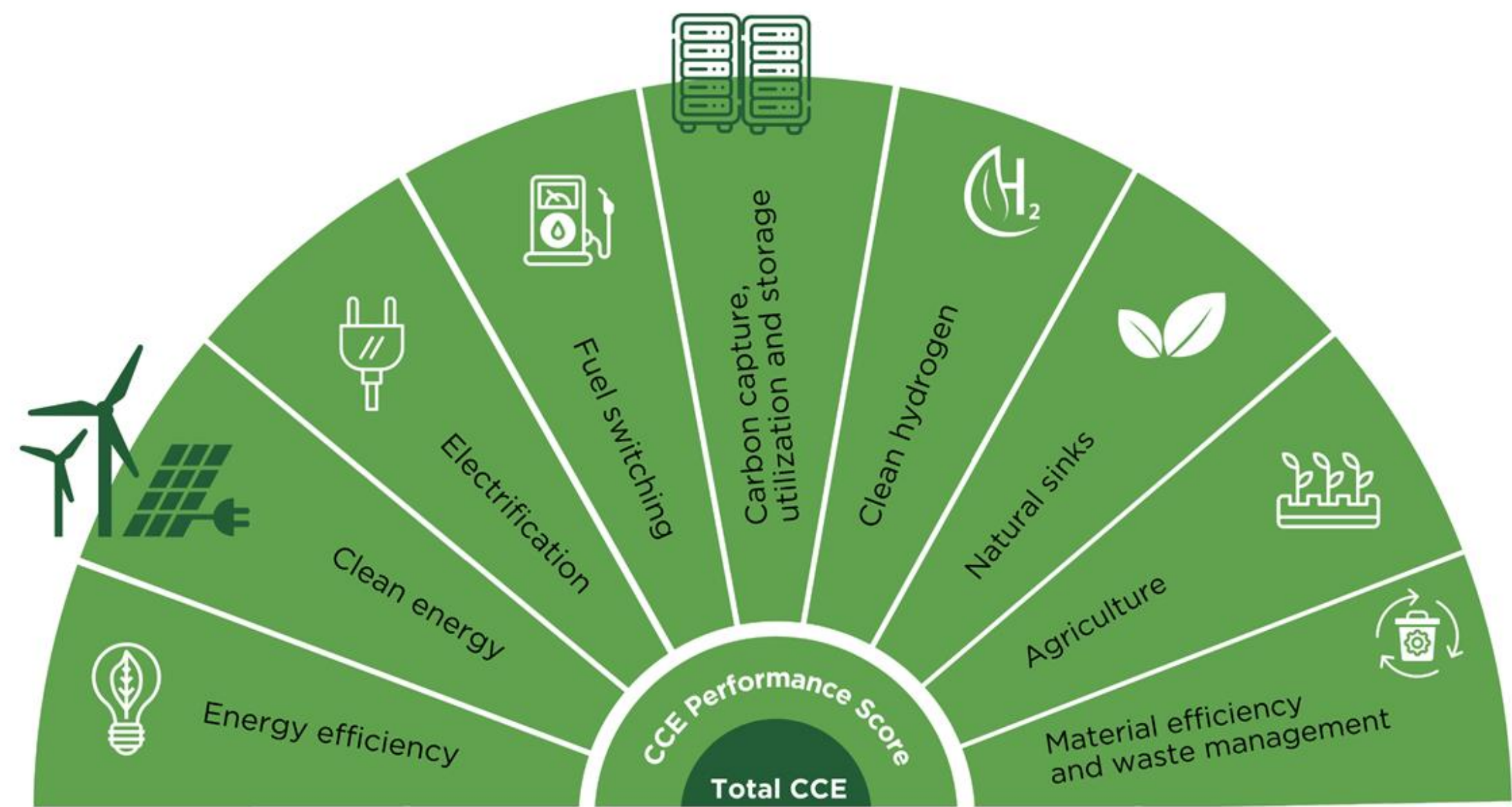
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2025 indicator revisions –
completing the picture on carbon
circularity

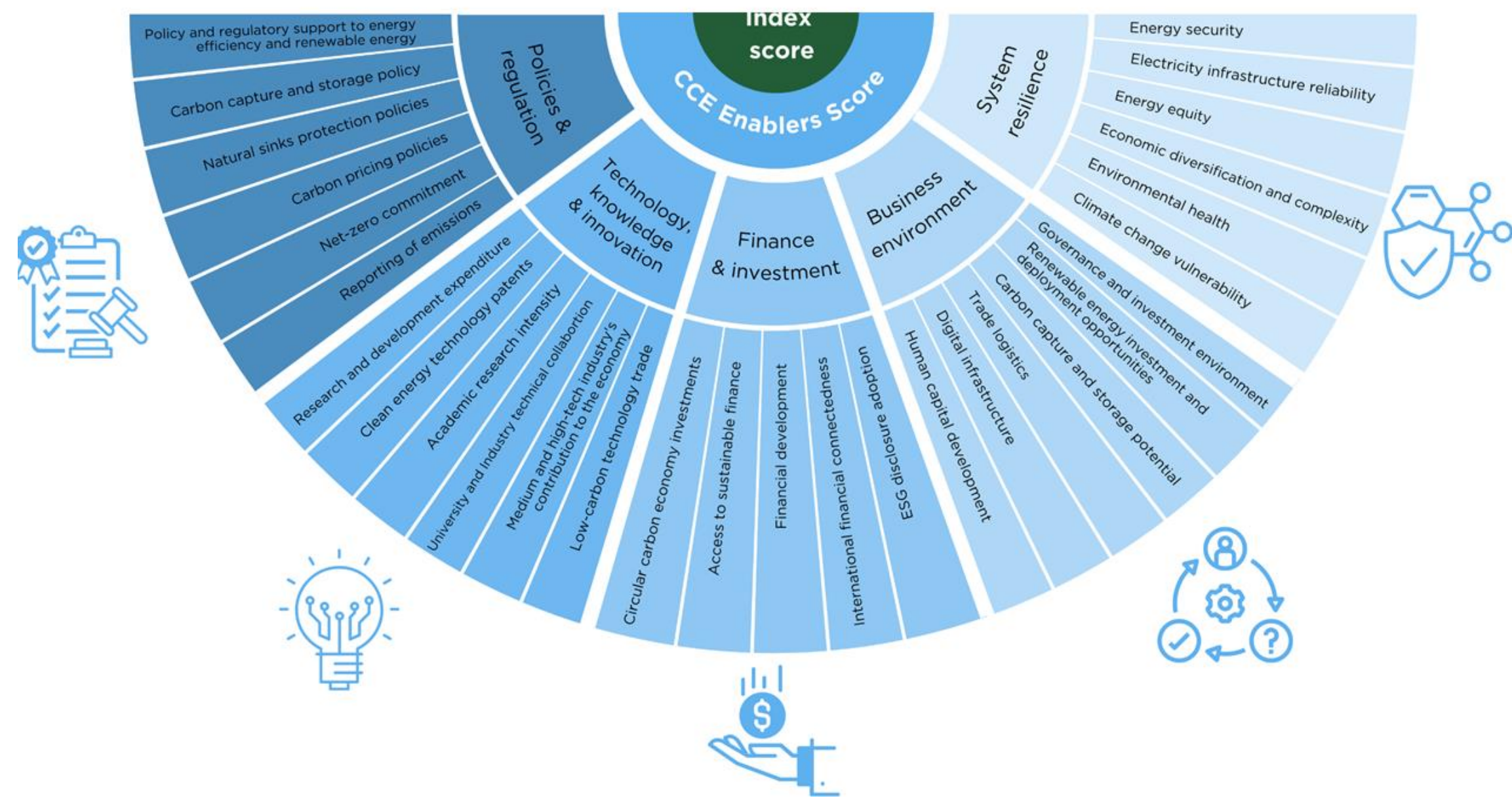
Indicator updates in 2025

CCE Performance

- **Clean energy** – revised
- **CCUS and clean hydrogen** – revised
- **Natural sinks** – revised
- **Agriculture** – **new**
- **Material efficiency and waste management** – **new**



CCE Enablers



- **POLICIES : Natural sinks protection policies** – revised
- **POLICIES: Carbon pricing policies** – moved/revised
- **POLICIES: Reporting of emissions** – revised
- **TECHNOLOGY: Low-carbon technology trade** – revised
- **FINANCE: International financial connectedness** – revised
- **FINANCE: ESG disclosure adoption** – **new**
- **BUSINESS: Governance and investment environment** – revised
- **BUSINESS: Digital infrastructure** – **new**
- **BUSINESS: Human capital development** – revised
- **SYSTEM: Energy security** – revised
- **SYSTEM: Adjusted national income** – removed
- **SYSTEM: Climate change vulnerability** – revised

Zoom-in on Natural Sinks – 2025 ranking and 5-year trends

Indicator description

Forest area as a proportion of total land area (%); and 3-year average of **LULUCF emissions and removals** as a proportion of total land area

Top 3 countries

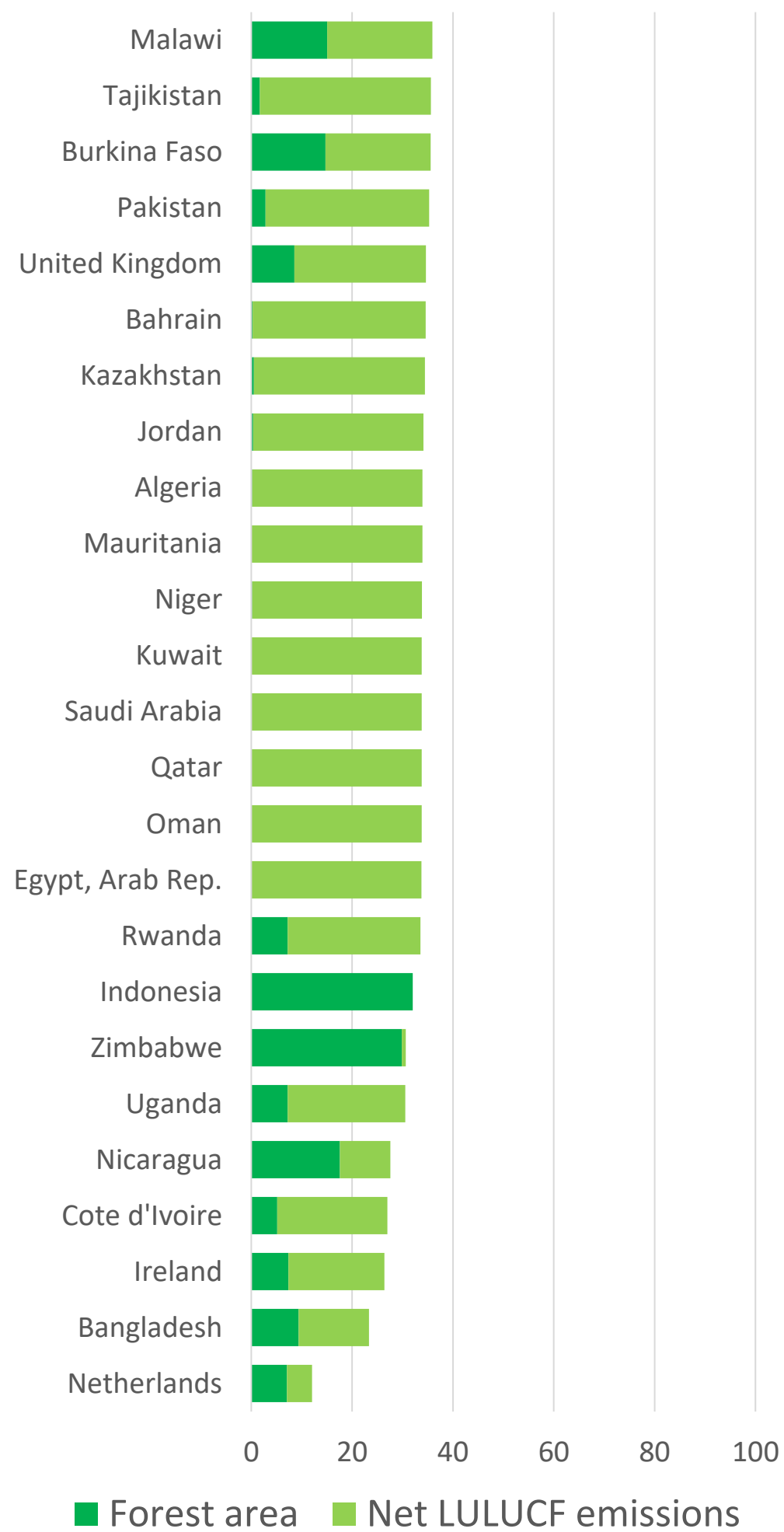
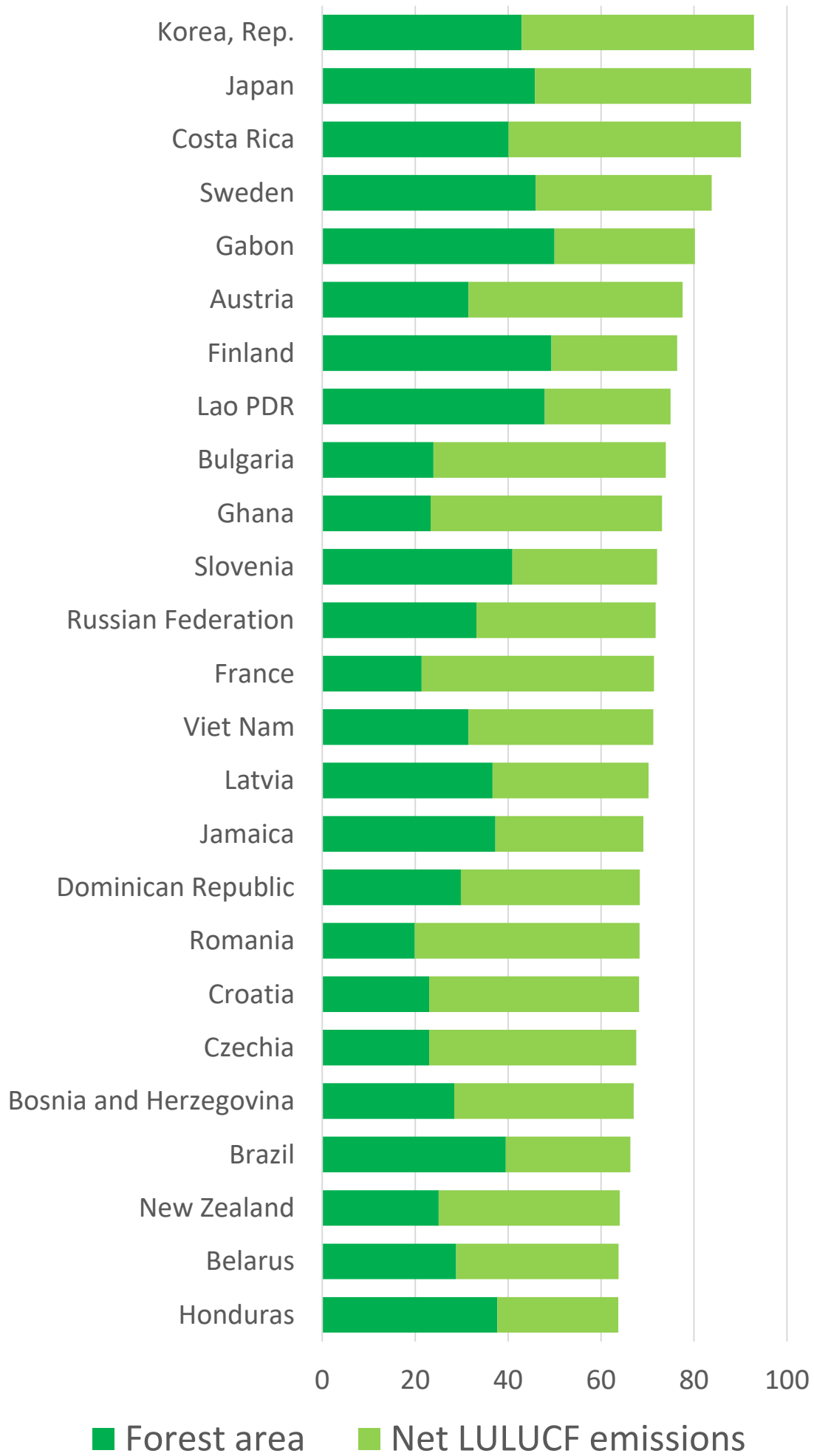
- Rep. of Korea
- Japan
- Costa Rica

Bottom 3 countries

- Ireland
- Bangladesh
- Netherlands

Highlights

- Large differences across countries
- Arid countries score generally low
- Most countries have not seen changes over time



Zoom-in on Agriculture – 2025 ranking and 5-year trends

Indicator description

Agriculture efficiency (relative crop yield, nitrogen management, phosphorous surplus, pesticide pollution)*; **agricultural emissions** as share of total agricultural area (%)

Top 5 countries

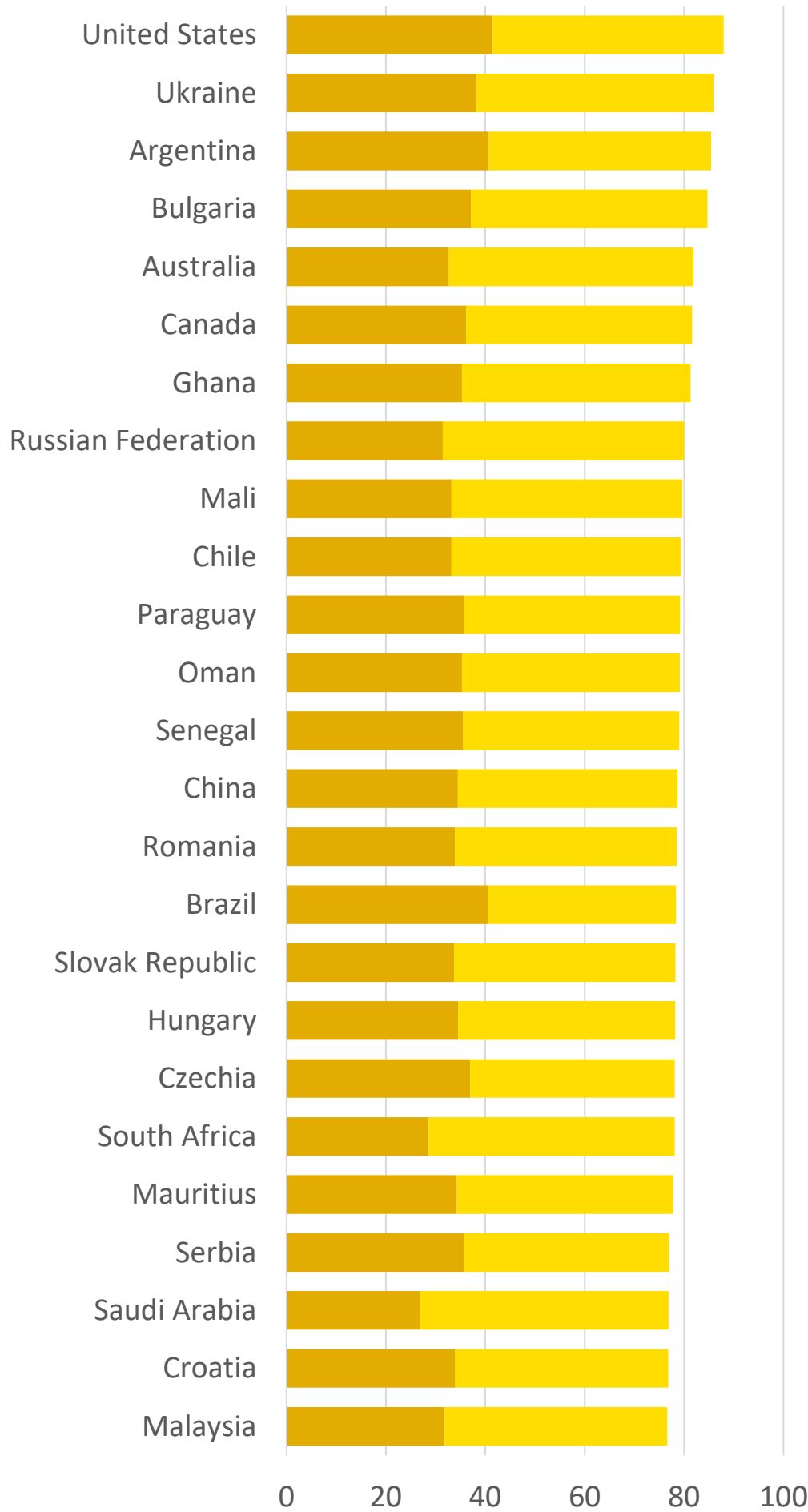
- United States
- Ukraine
- Argentina

Bottom 5 countries

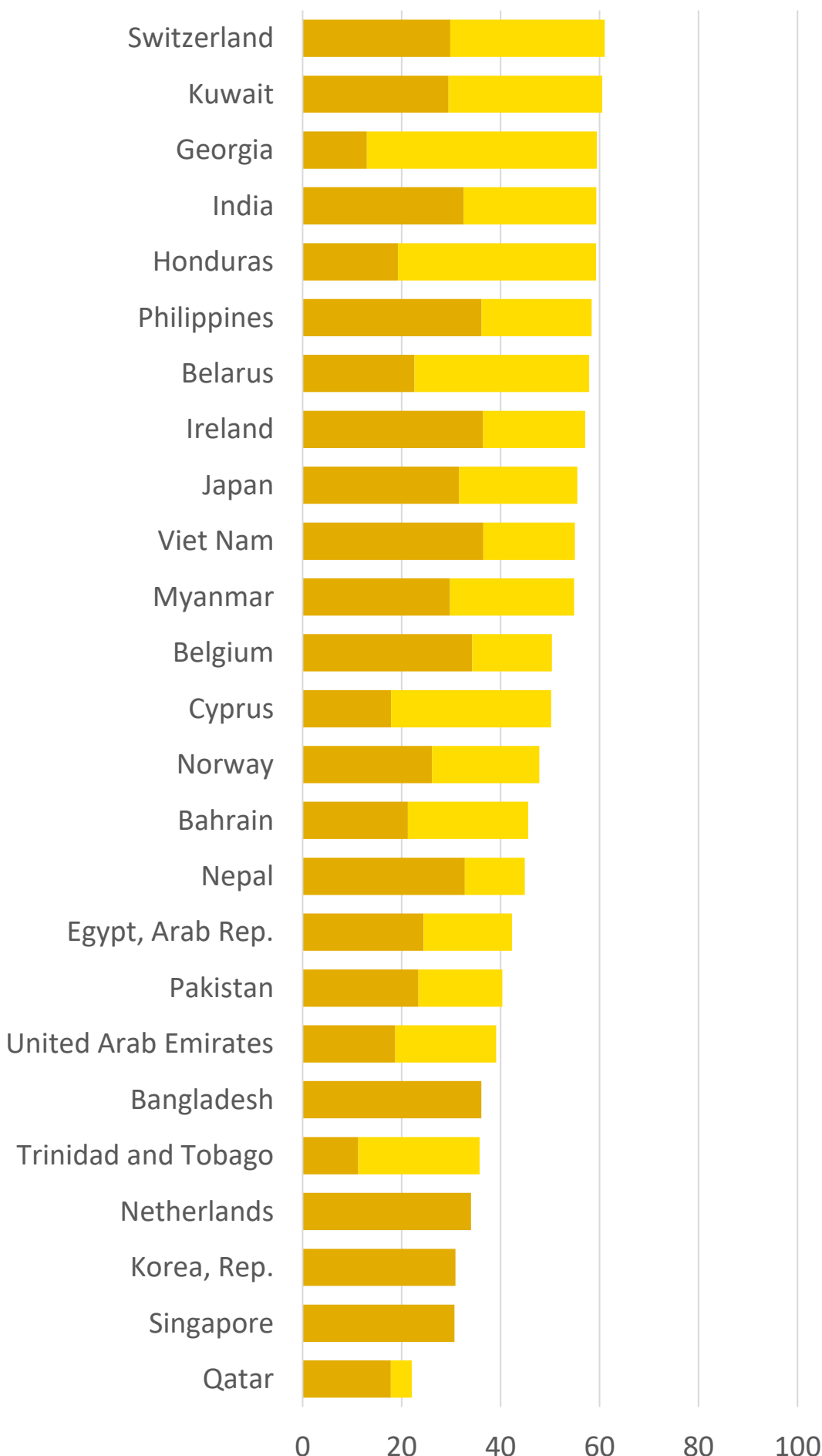
- Korea, Rep.
- Singapore
- Qatar

Highlights

- More even distribution of component scores among the top
- Major changes in scores over time in a number of countries



■ Agriculture efficiency
■ Agricultural emissions



■ Agriculture efficiency
■ Agricultural emissions



Zoom-in on Materials and Waste – 2025 ranking and 5-year trends

Indicator description

Domestic material consumption per capita; **controlled solid waste** score from the Environmental Performance Index (EPI); and **waste recovery rate** from the EPI

Top 3 countries

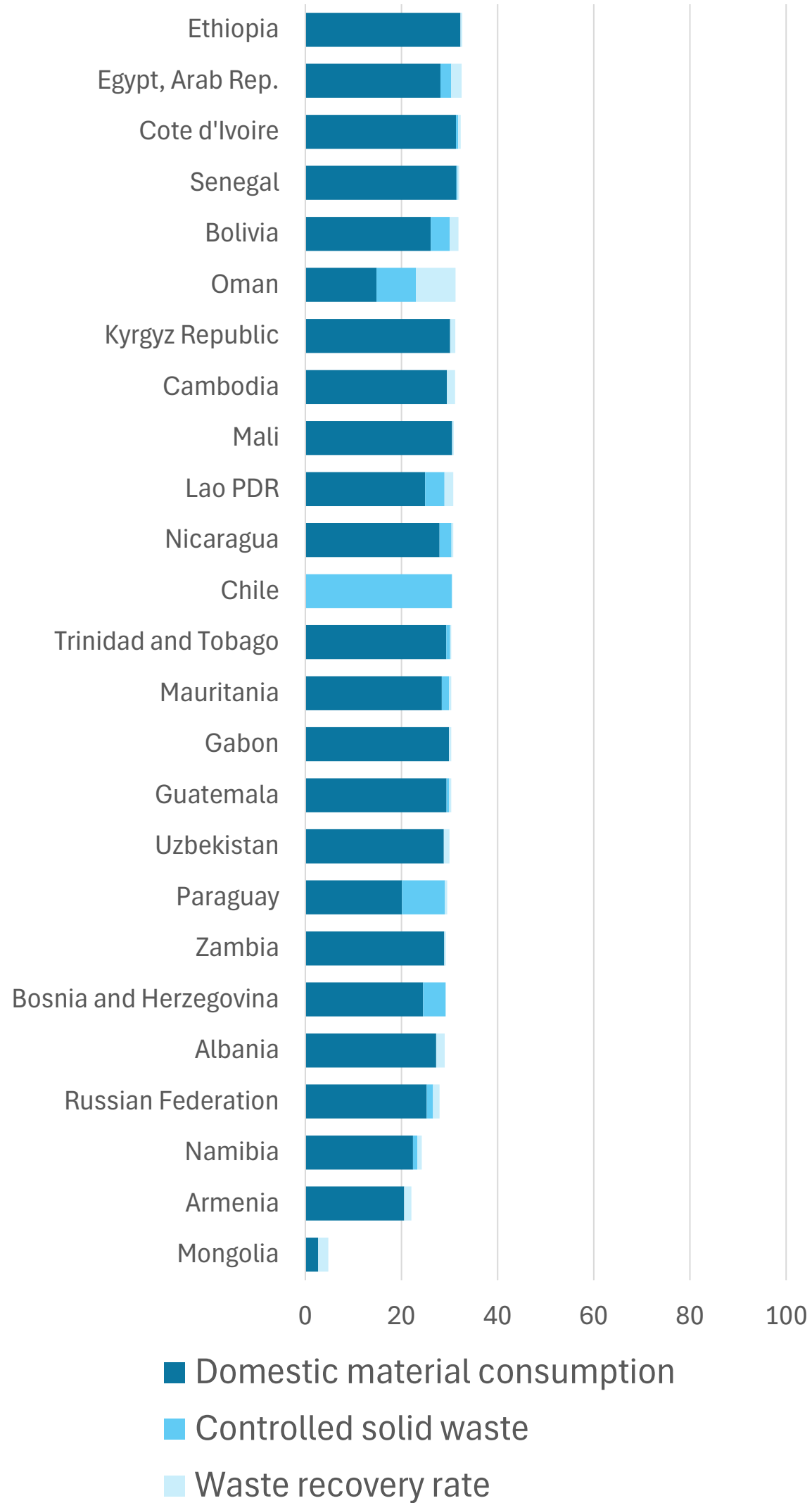
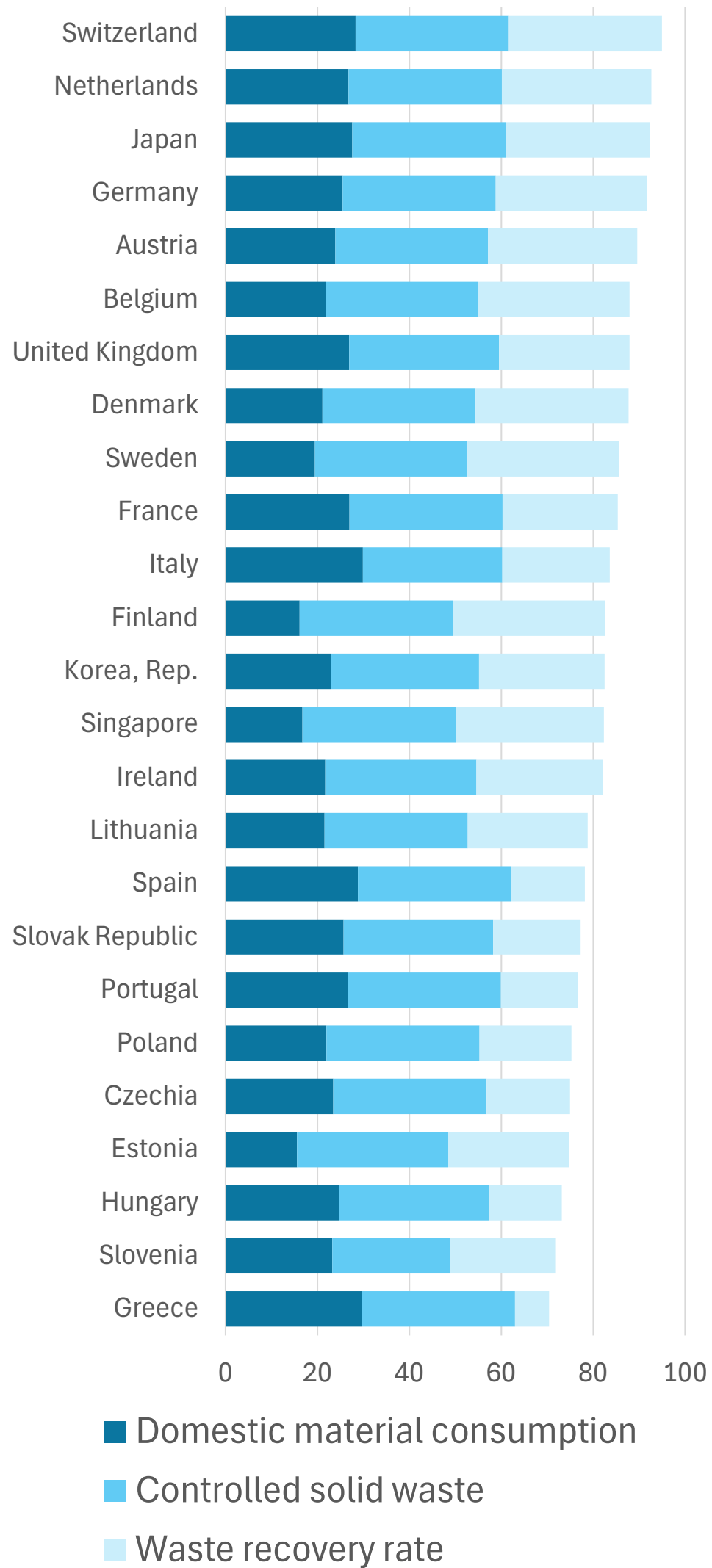
- Switzerland
- Netherlands
- Japan

Bottom 3 countries

- Namibia
- Armenia
- Mongolia

Highlights

- Top performers tend to score well on all components
- Waste management/recovery tend to be a challenge at the bottom of the distribution
- Major changes in scores over time in a number of countries



5

The 2025 Oil Producers Lens – the carbon circularity of major oil producing nations

The Oil Producers Lens

Compares major oil and gas producers' CCE progress & potential

CCE Performance (25%)

How are countries engaging with diverse climate change mitigation options and technologies in terms of depth and diversity?

Oil Producers Lens indicator score (25%)

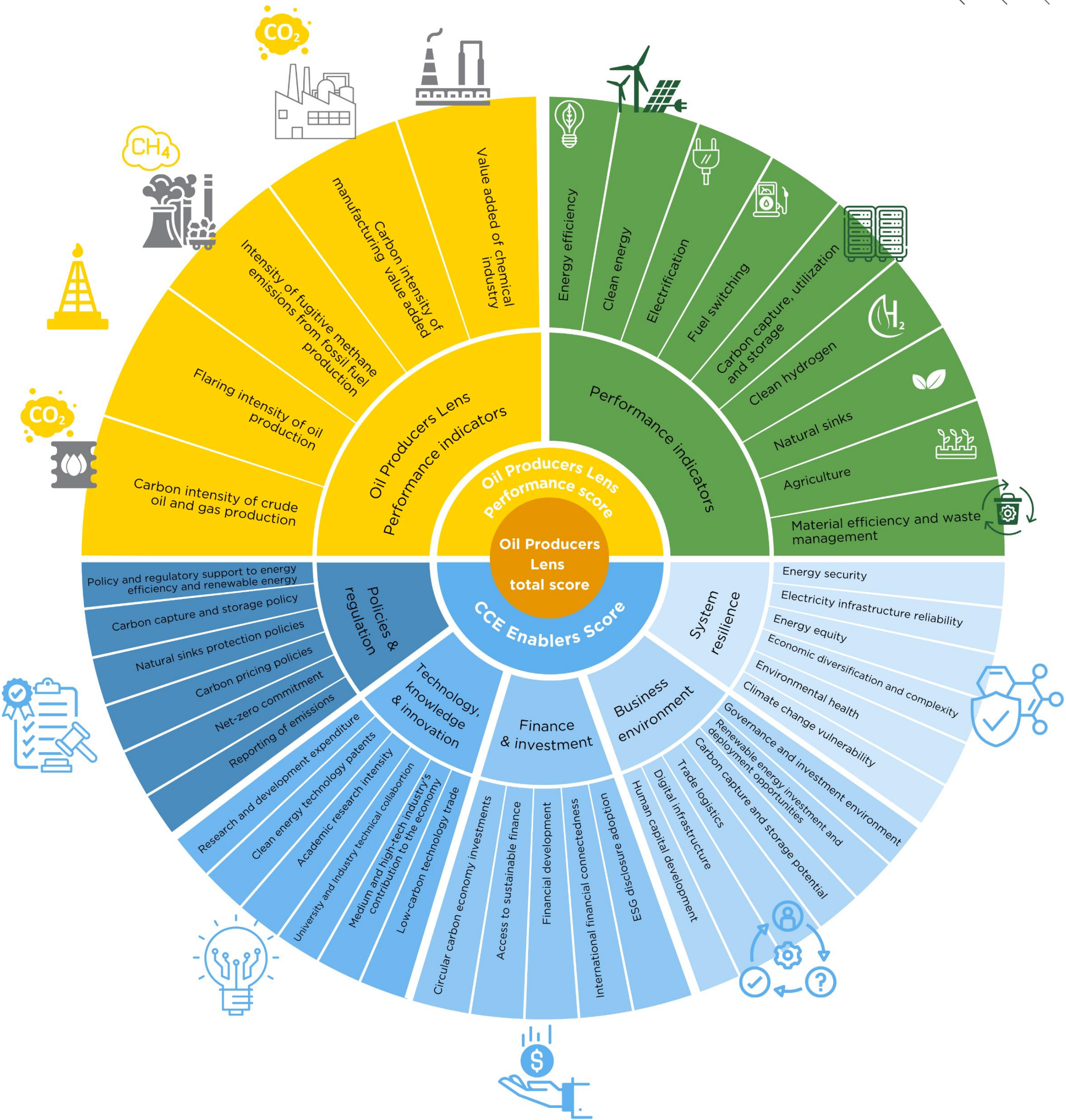
How is major oil and gas producers' industrial performance aligning with carbon circularity?

CCE Enablers (50%)

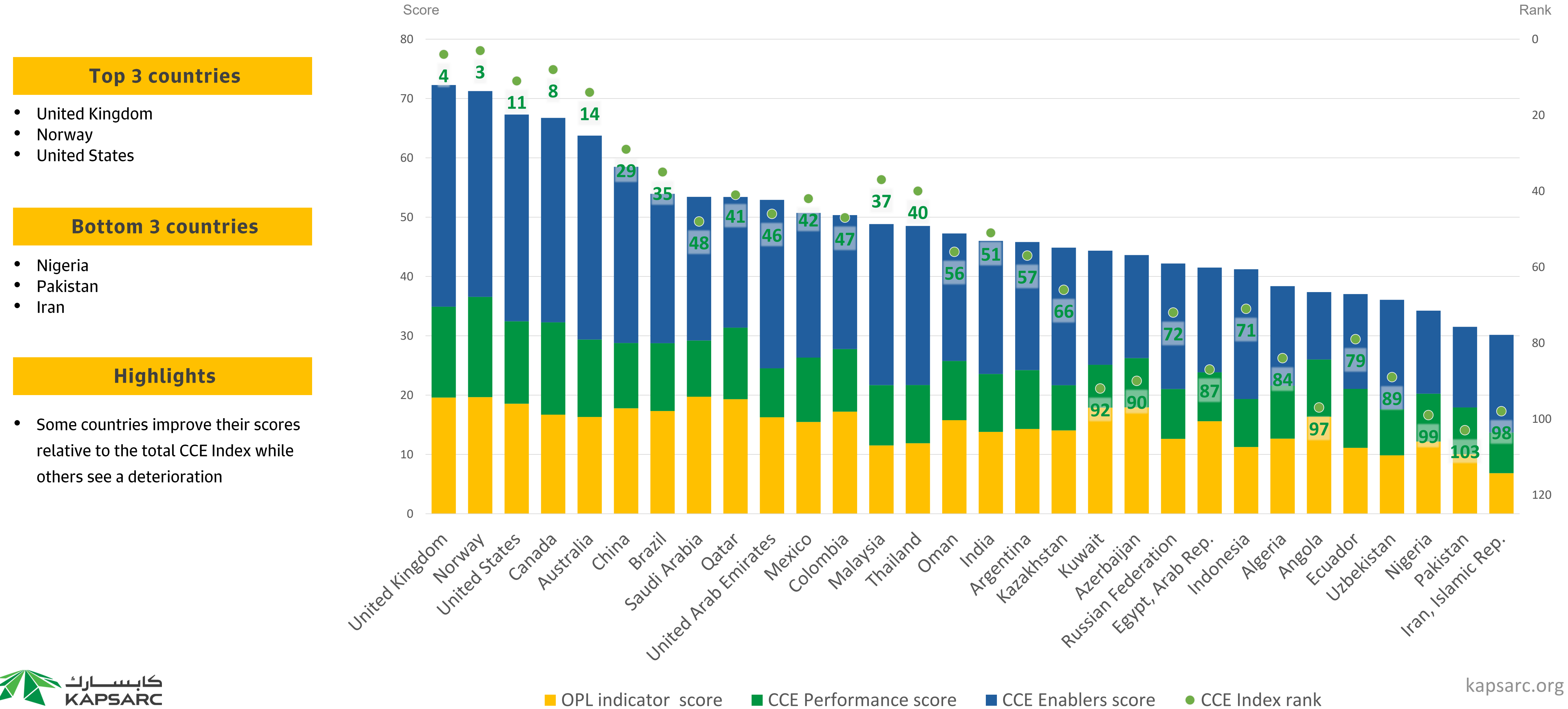
How are countries positioned to accelerate progress toward circular carbon economies?

Total CCE Index score

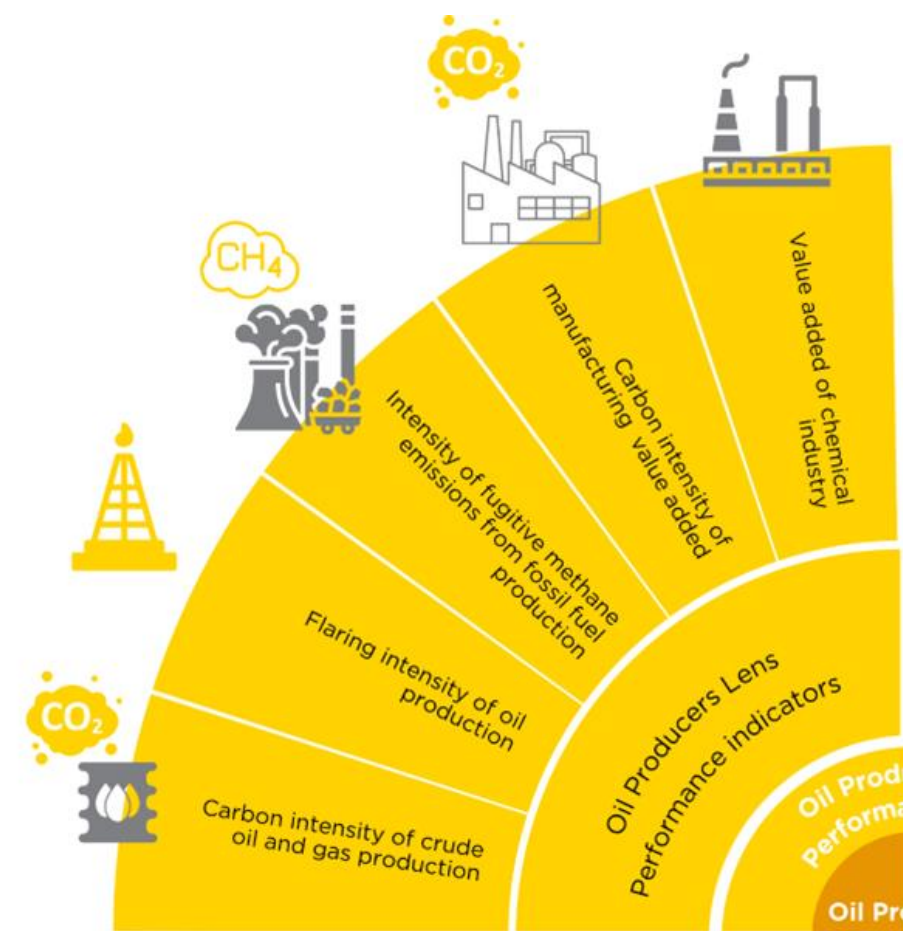
How are countries overall are managing the transition to the CCE, and is their current performance on par with their future potential?



2025 Oil Producers Lens ranking vs CCE Index ranking



2025 Oil Producers Lens indicator ranking vs CCE Index ranking



Top 3 countries

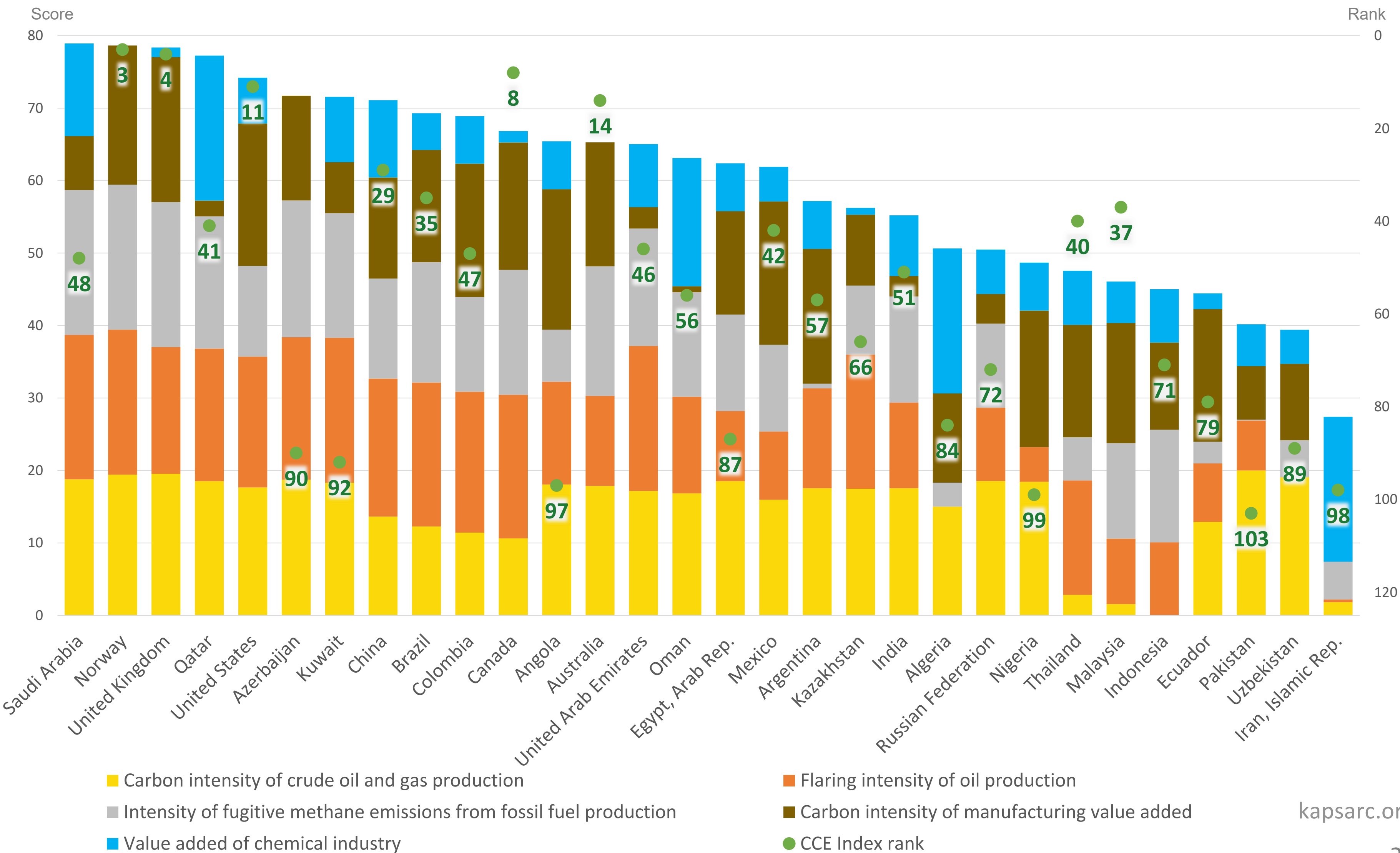
- Saudi Arabia
- Norway
- United Kingdom

Bottom 3 countries

- Pakistan
- Uzbekistan
- Iran

Highlights

- Countries' performance on the 5 OPL metrics differs from their performance on the total CCE Index but a correlation still exists (0.565)

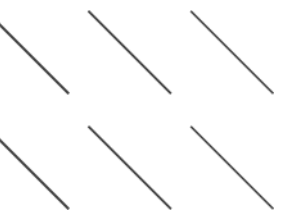


Measuring Carbon Circularity in the World's Major Forest Economies

Launch of the CCE Index Forest Industry Lens

Virtual COP 30 side event – November 18, 2025

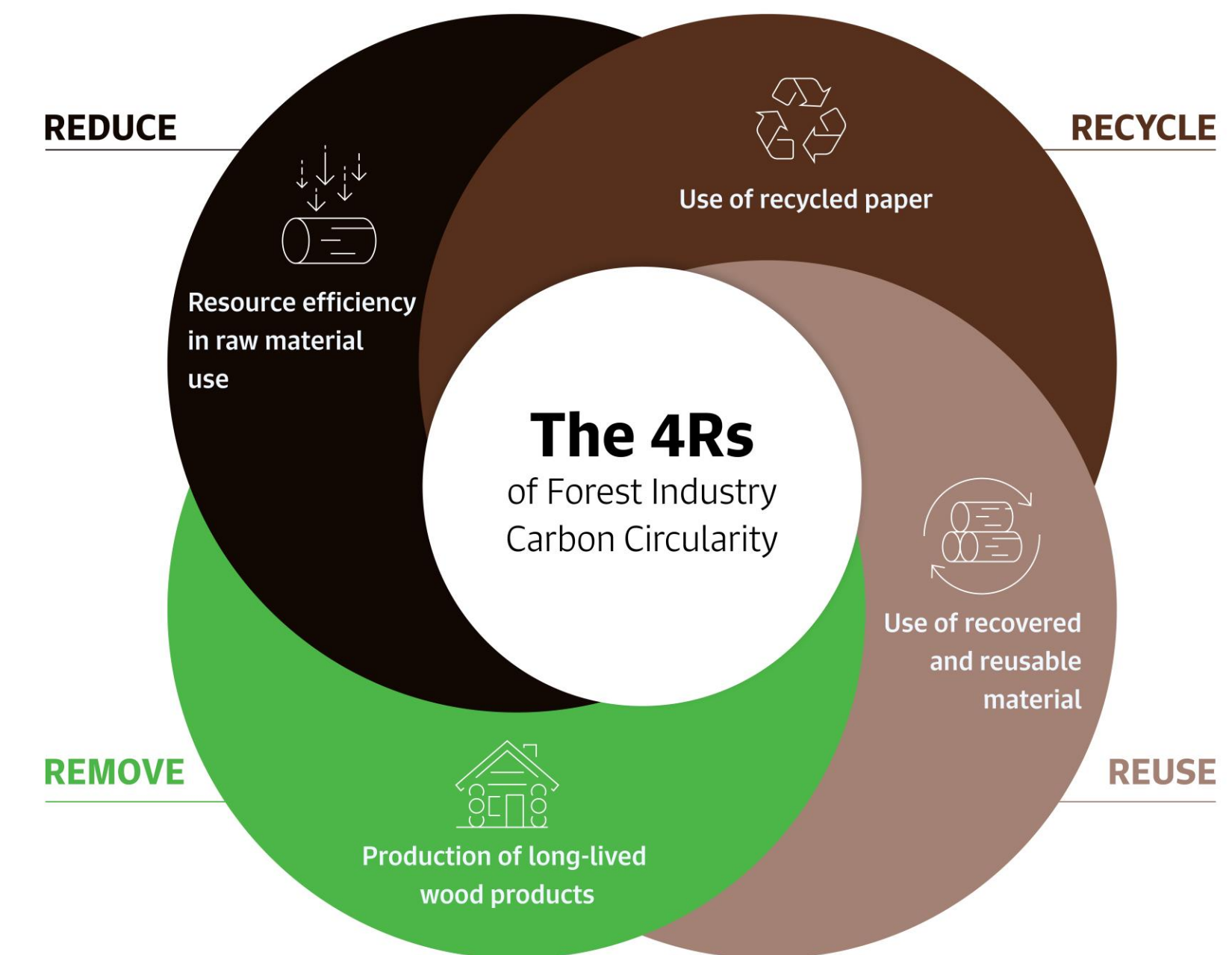
Nicklas Forsell, Senior Consultant, Land Use Analytics



The CCE Index Forest Industry Lens (FIL) and its 4 indicators

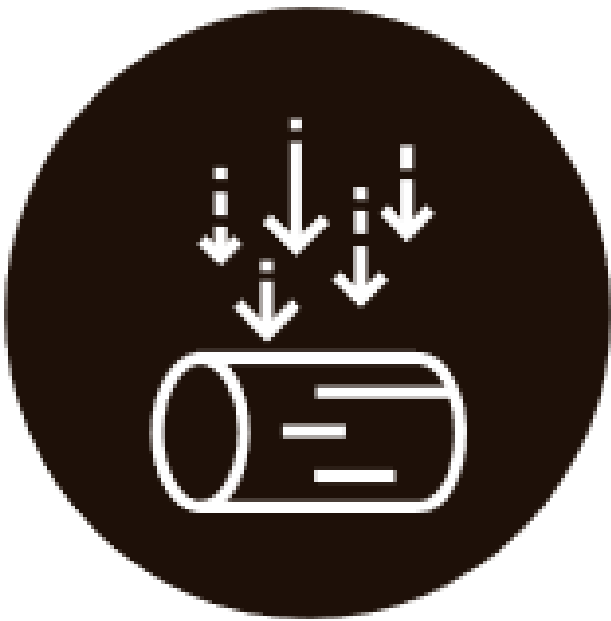
- The forest industry: sector of the economy that processes and distributes timber and other forest products for commercial use
- Forest biomass and forest products are important resources for decarbonization of the economy
- Forest materials offer a unique possibility to support a sustainable and climate-neutral circular carbon economy
- The FIL constitutes the world's first composite indicator measuring the carbon circularity in the world's major forest industry nations in the four areas of the CCE: reduce, reuse, recycle and remove
- The FIL allows us to quantify and measure progress towards carbon circularity in the forest industry sector and how key producers are faring compared to one another
- The index cover 30 countries which jointly account for 93% of global production of semi-finished wood products
- The FIL measures the carbon circularity performance of forest industries – it is not a measure of the overall carbon circularity within a country

The FIL and its four indicators



The four indicators of the FIL are based on the 4R framework of carbon circularity associated with a transition to a CCE

Reduce



Resource efficiency in raw material use

Efficiency with which raw biomass resources are used in the production of semi-finished harvested wood products

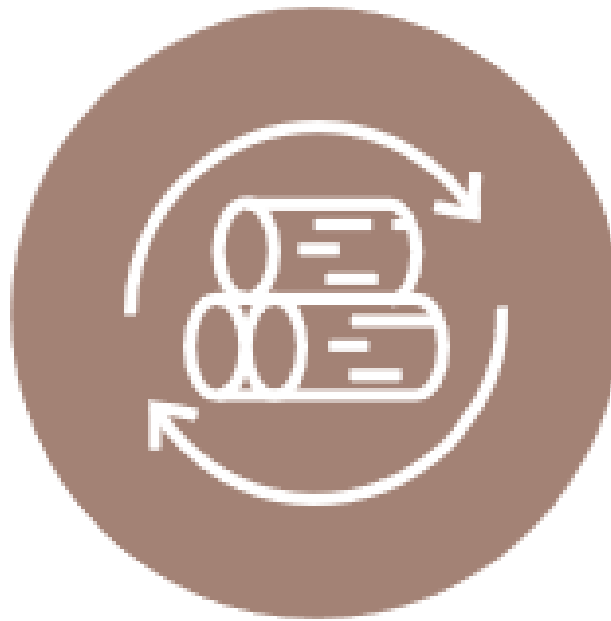
Recycle



Use of recycled paper

Use of recovered and recycled paper in the national production of paper and paperboard products

Reuse



Use of recovered and reusable material

Share of recovered and reusable material (i.e., wood chip and particles) used in the production of semi-finished harvest wood products

Remove

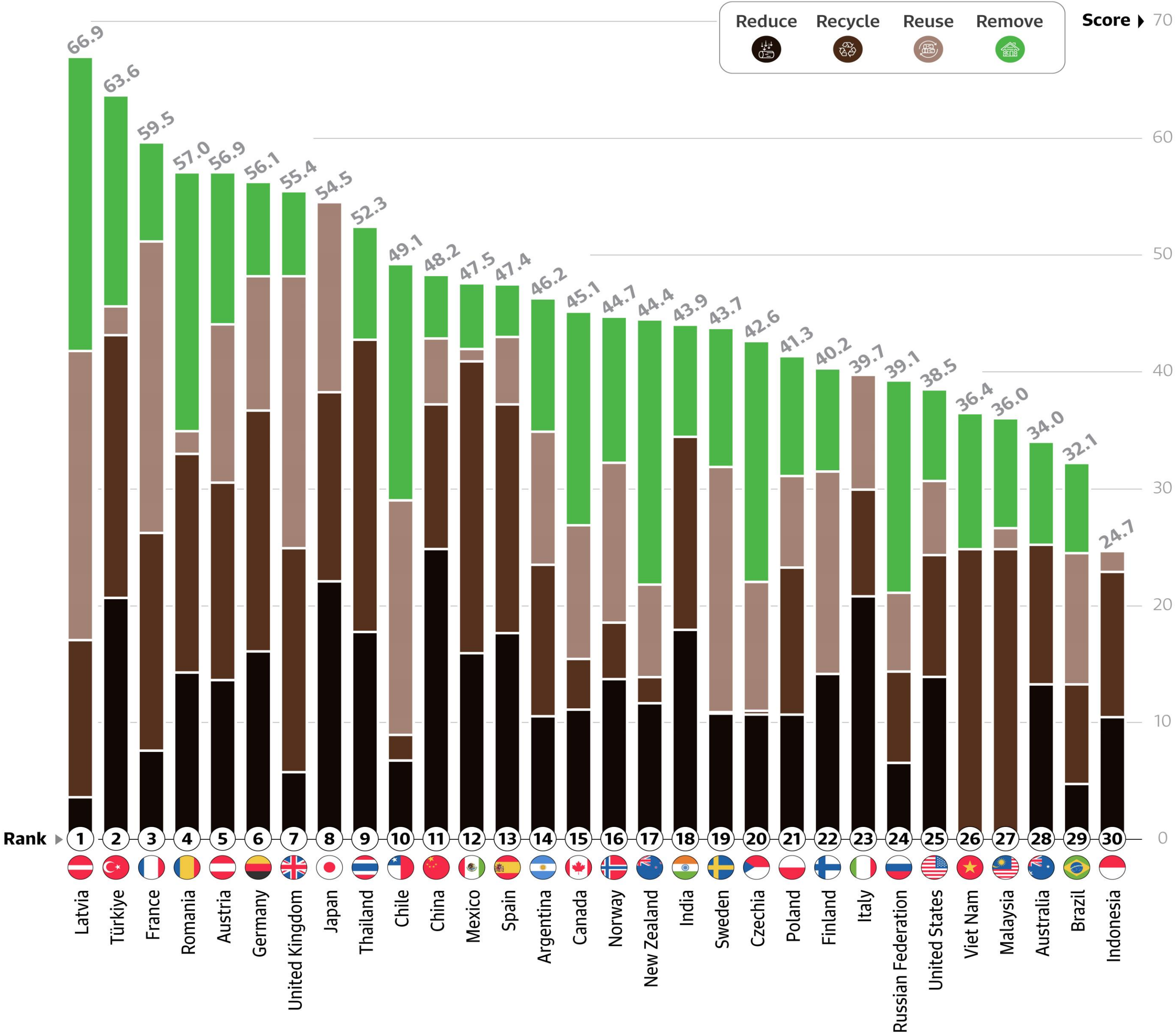


Production of long-lived wood products

Production of long-lived wood products as a share of total production of semi-finished harvest wood products

2025 FIL country scores and rankings

- The forest industry globally displays uneven performance of carbon circularity: most countries excel in some areas but show uneven development in others
- No country scores well on all the four indicators. Rather, many countries perform well on 1-2 dimensions only
- The results reflect that countries generally tend to strongly specialize in one area of the forest industry, and this focus varies significantly across countries
- In terms of regional groups, Europe and Central Asia dominate the top of the ranking, with 7 out of the top-10 coming from this region
- In terms of income, high-income countries occupy 8 of the top-10 positions, although Türkiye, a middle-income country, ranks the 2nd



2025 Forest Industry Lens indicator ranking vs CCE Index ranking

Top 3 countries

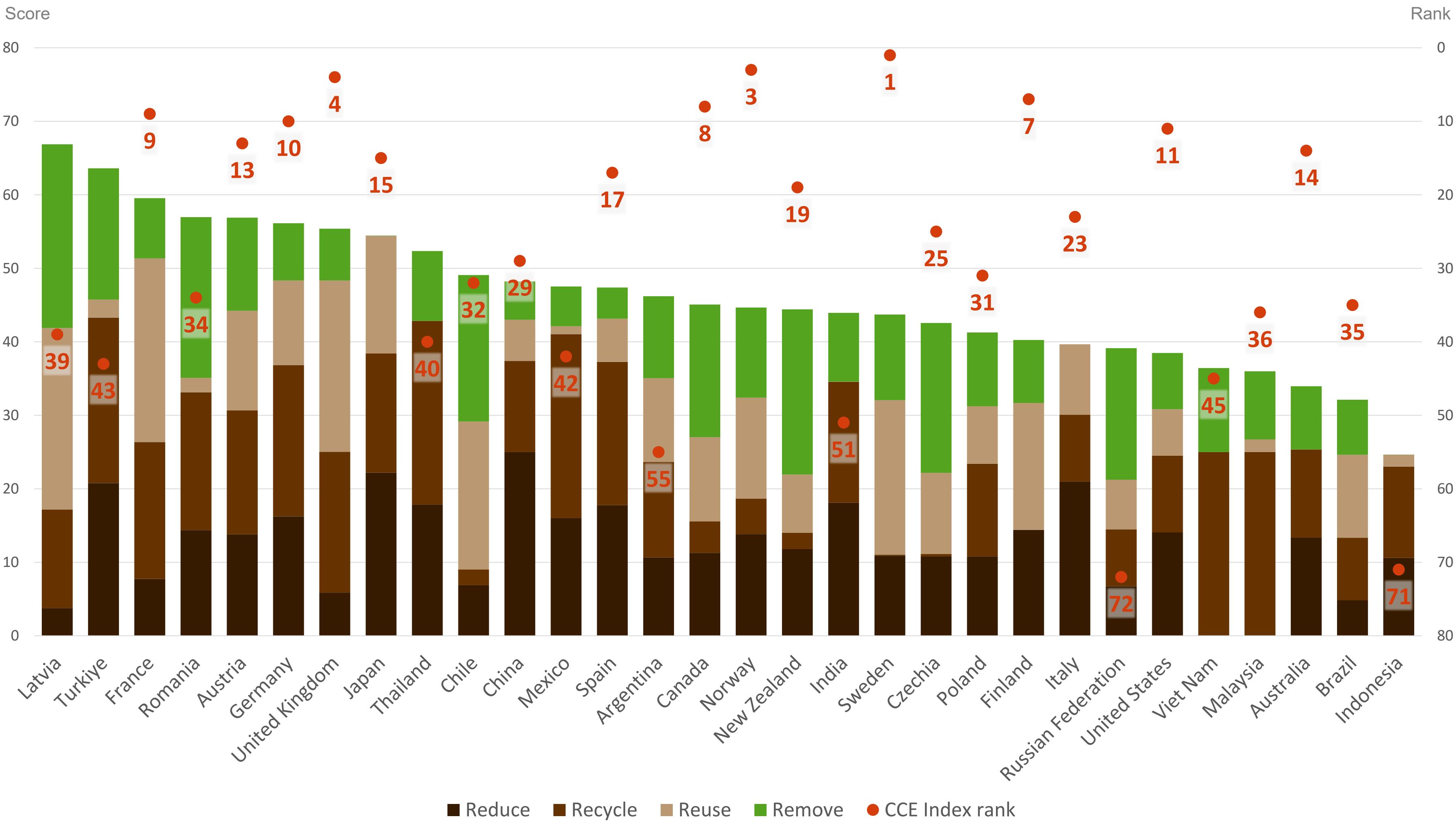
- Latvia
- Türkiye
- France

Bottom 3 countries

- Australia
- Brazil
- Indonesia

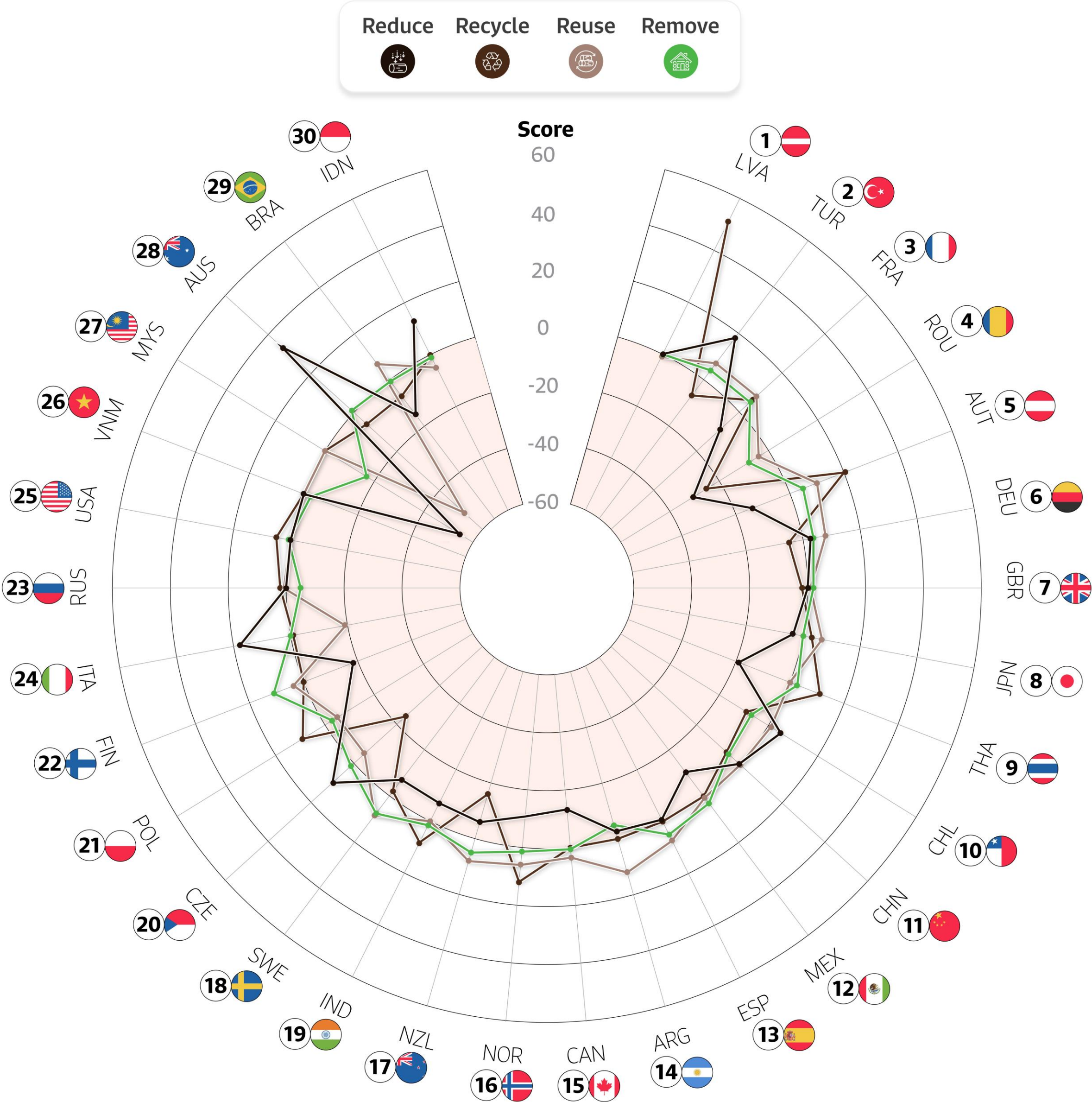
Highlights

- Countries' FIL indicator performance differs from their total CCE Index performance
- Many top-10 countries the CCE Index do not score as well on the FIL, particularly Nordic countries, but a number of other European countries score better on the FIL than on the CCE Index



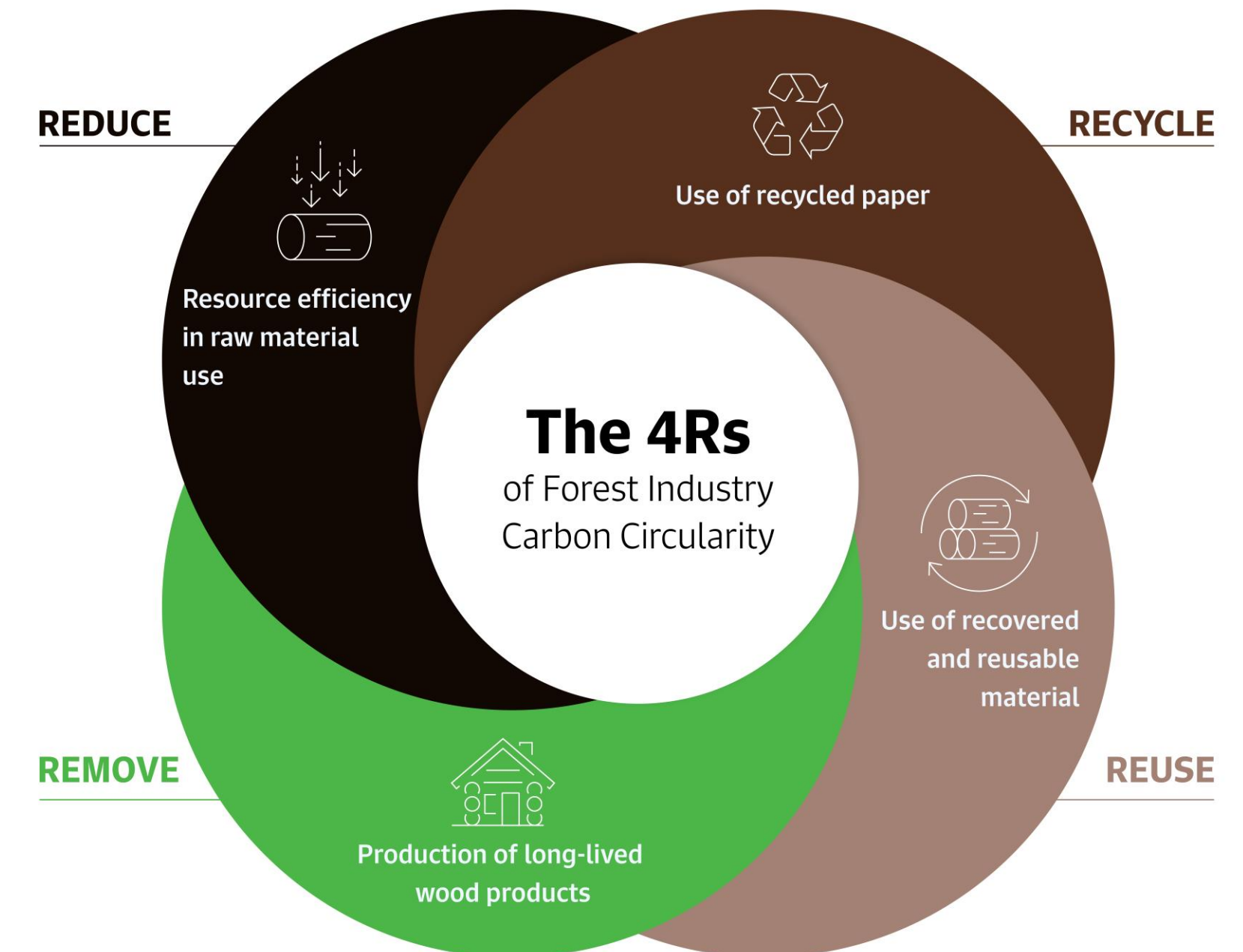
Changes over time

- Over the five-year period measured by the 2025 FIL, covering the years 2019-2023, the forest industries have made uneven progress toward carbon circularity
- Many countries have seen a reduction in the overall carbon circularity of their forest industries over this period
- The reduction of the global average score is primarily driven by an overall deterioration in resource efficiency ("Reduce")
- In the case of three indicators (Recycle, Reuse and Remove), changes across the indicators largely cancel each other out
- At the level of individual countries' indicator scores, many countries have made progress in 1-2 indicators, but progress is in most cases offset by setbacks in other indicators
- Overall, the mixed performance within indicators and countries and the lack of progress towards CCE goals are of concern and merit further attention to understand their causes

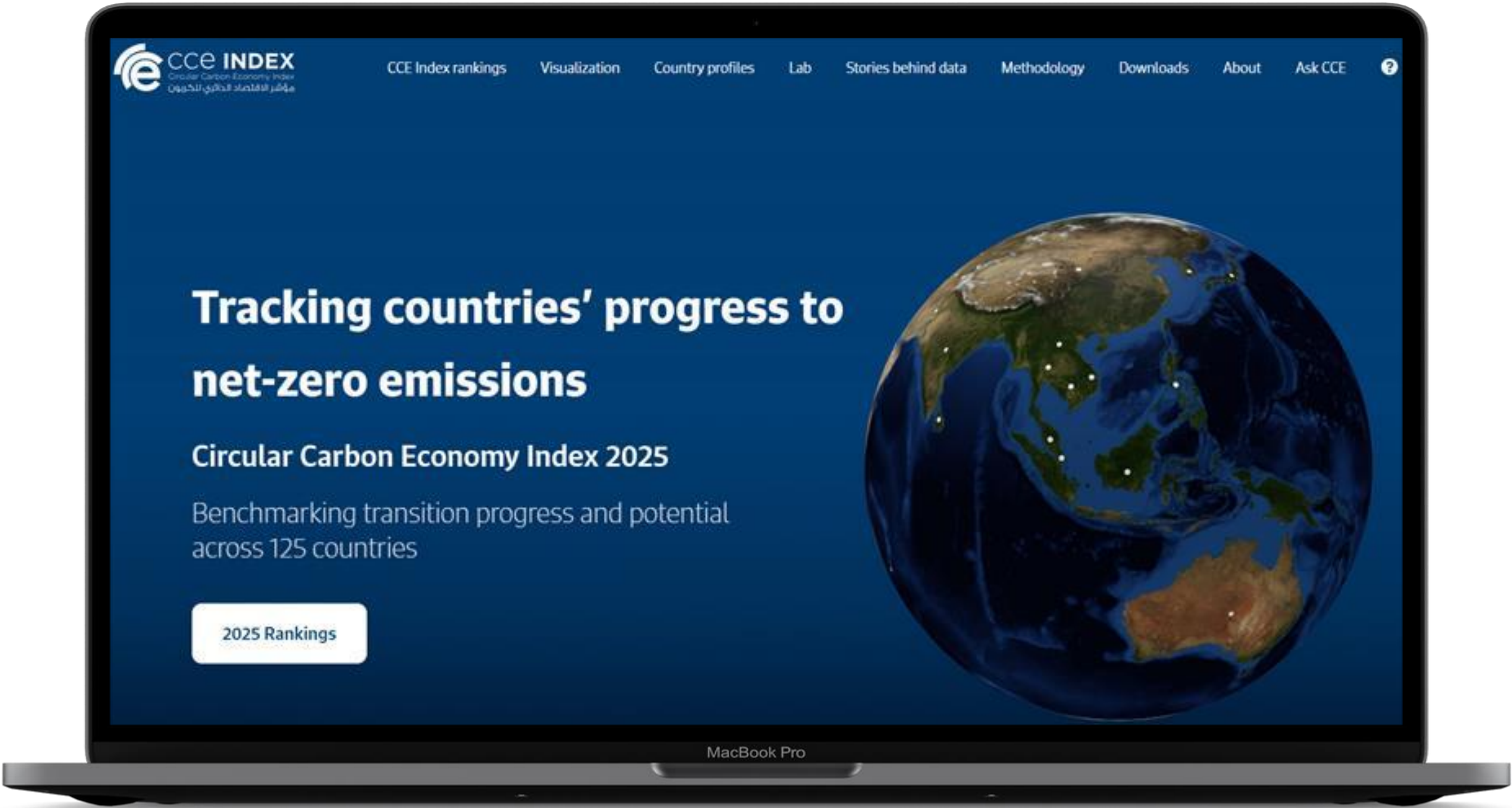


Conclusions

- The FIL constitutes the world's first composite indicator measuring the carbon circularity in the world's major forest industry nations
- The analysis shows that there is considerable specialization in the forest industries across countries, and that the specialization varies significantly from country to country
- The overall carbon circularity of countries' forest industries has unfortunately decreased over the period of 2021-2025. Progress in 1-2 indicators is counterbalanced by setbacks in other indicators, highlighting a fragmented, if not stalling, transition towards CCE goals
- A paradigm shift towards integrated and balanced policies is required. Such policies need to ensure that progress in one area does not undermine progress in another and that, instead, win-win solutions across indicators are being implemented
- The full results of the FIL will be available via the CCE Index web portal downloads section: <https://cceindex.kapsarc.org/cceindex/downloads>



Thank you!





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