



# Deep Dive Analysis: *Tracking SDG7: The Energy Progress Report 2024*

SDG7 Data: 2010 - 2022

PERSPECTIVE 2024

## Purpose of this document

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The purpose of this document is to:

- Highlight the progress made towards achieving SDG 7
- Highlight specific areas where there are challenges
- Help organizations prioritize where to focus and what to focus on



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A woman is shown in a traditional setting, cooking over an open fire. She is using a large pot and a water jug. The fire is burning brightly, and the scene is illuminated by the fire's light. The background is dark, suggesting an indoor or sheltered outdoor environment.

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## Snapshot: SDG7 tracking report data from 2010 to the latest available data (2021 / 2022)

SDG7	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
<b>Goal 7.1.1: Universal Electricity Access</b> , million of people without access	1,141	1,081	1,063	1,022	999	958	882	829	772	757	742	675	685
<b>Goal 7.1.2: Universal Access to Clean Fuels &amp; Technologies for Cooking</b> , million of people without access	2,972	2,927	2,874	2,813	2,747	2,682	2,602	2,520	2,435	2,352	2,262	2,180	2,100
<b>Goal 7.2A: Increase Share of Renewable Energy</b> , % share energy consumption from renewables	16.0%	16.0%	16.3%	16.5%	16.7%	16.7%	16.9%	17.1%	17.3%	17.7%	19.1%	18.7%	--
<b>Goal 7.2B: Increase Share of Renewable Energy</b> , % share energy consumption from modern renewables	8.7%	8.8%	9.2%	9.7%	9.8%	10.0%	10.4%	10.6%	11.1%	11.5%	12.5%	12.5%	--
<b>Goal 7.3: Double Rate of Energy Efficiency Improvement</b> , yearly rate of improvement of global primary energy intensity	-	2.2%	1.9%	1.6%	2.0%	3.0%	2.1%	1.4%	1.0%	1.3%	0.6%	0.8%	--

# SEforALL key messages – *Tracking SDG7: The Energy Progress Report 2024*

## **The trend of reducing unelectrified population was reversed for the first time in 2022**

- The number of global unelectrified population was reduced from 1.14 billion in 2010 to 685 million in 2022 but increased 10 million from 2021.
- 8 million out of the 10 million increase from 2021 to 2022 came from Asia, although the region reduced unelectrified population from 516 million in 2010 to 77 million in 2022. Meanwhile, Africa as a whole has stayed the same level of unelectrified population (591 million) during the same period with rapidly increasing population. 20 African countries increased unelectrified population from 2010.
- Countries that are backsliding or made no material changes should have robust tailor-made country strategies and their swift implementation, taking an account of the persistent differences in rural and urban electrification, to achieve universal access by 2030.

## **Population without clean cooking access has reduced but shows slow improvement.**

- There are currently 2.1 billion people without access to clean fuels and technologies for cooking with 50% of them in Asia and 45% in Africa. 75% of the people without access live in just 20 countries with 9 of them in Asia and the remaining 11 in Africa.
- All top 20 access deficit countries have more than 20 million domestic population without access. While Asia must provide access to a larger number of population by 2030, Africa's 170 million increase of population without access since 2010 necessitates significant growth of access rate improvement, particularly considering the continent's expected population growth.

## **The 2021 data of RE share in Total Final Energy Consumption (TFEC) also showed a setback from the previous year**

- Regionally, Oceania is the only region that RE share in TFEC progressed from 2020, while Asia had no changes. All other regions show setbacks. The world share of modern renewables in total energy consumption did not change from the previous year, staying at 12.5%
- The decline of international public financial flows in support of renewable and clean energy showed a comeback in 2022. However, the 2022 investment total was just 54% of the 2016 amount and need to be fortified further

## **Energy efficiency improvement has been continuously slow**

- A continuing decline in the pace of progress on energy efficiency since 2015 persists. The annual average improvement rate between 2010 and 2021 is down to 1.6%, far from the originally targeted 2.6%. The 2021 annual improvement rate was mere 0.8%, 0.2 percentage point up from the previous year data but still very low. This makes achieving SDG 7.3 target very difficult.
- Both Africa and Asia remain higher energy intensity than the world average and their progress is slow. Focus on these two regions as well as countries with higher energy intensity in the top 20 energy consuming countries can be effective.

# Executive summary

## **Based on the current trends, we will still have around 660 million unelectrified people by 2030 (SDG 7.1.1)**

- A current trend projection and the IEA's stated policy scenario analysis show that 660-663 million people will remain unelectrified in 2030.
- Countries with large unelectrified populations, low electrification rates, negative changes (increased unelectrified population and / or reversed electrification rates), or no material changes in the past few years need to be identified and the efforts to electrify need to be strengthened.
- Additionally, countries with the smaller number of unelectrified populations but low electrification rates also need immediate country actions based on sound strategies to leave no one behind. The strongest policy and investment focus need to be continuously on Sub-Saharan Africa.

## **Based on the current trends, 1.8-2.0 billion people do not have clean cooking access in 2030 (SDG 7.1.2)**

- Projections show that we are not on track to achieve universal access to clean fuels and technologies for cooking by 2030, with approximately 1.8 to 2.0 billion people expected to remain without clean cooking access based on current trends
- Although countries with large population without access can be prioritized for higher impacts on global SDG7.1.2 achievement, those show negative changes (increased population without access and / or reversed access rates) or no material changes, along with countries with very low access rates and countries with low improvement rates, all need tailor-made strategies and their rapid implementation.

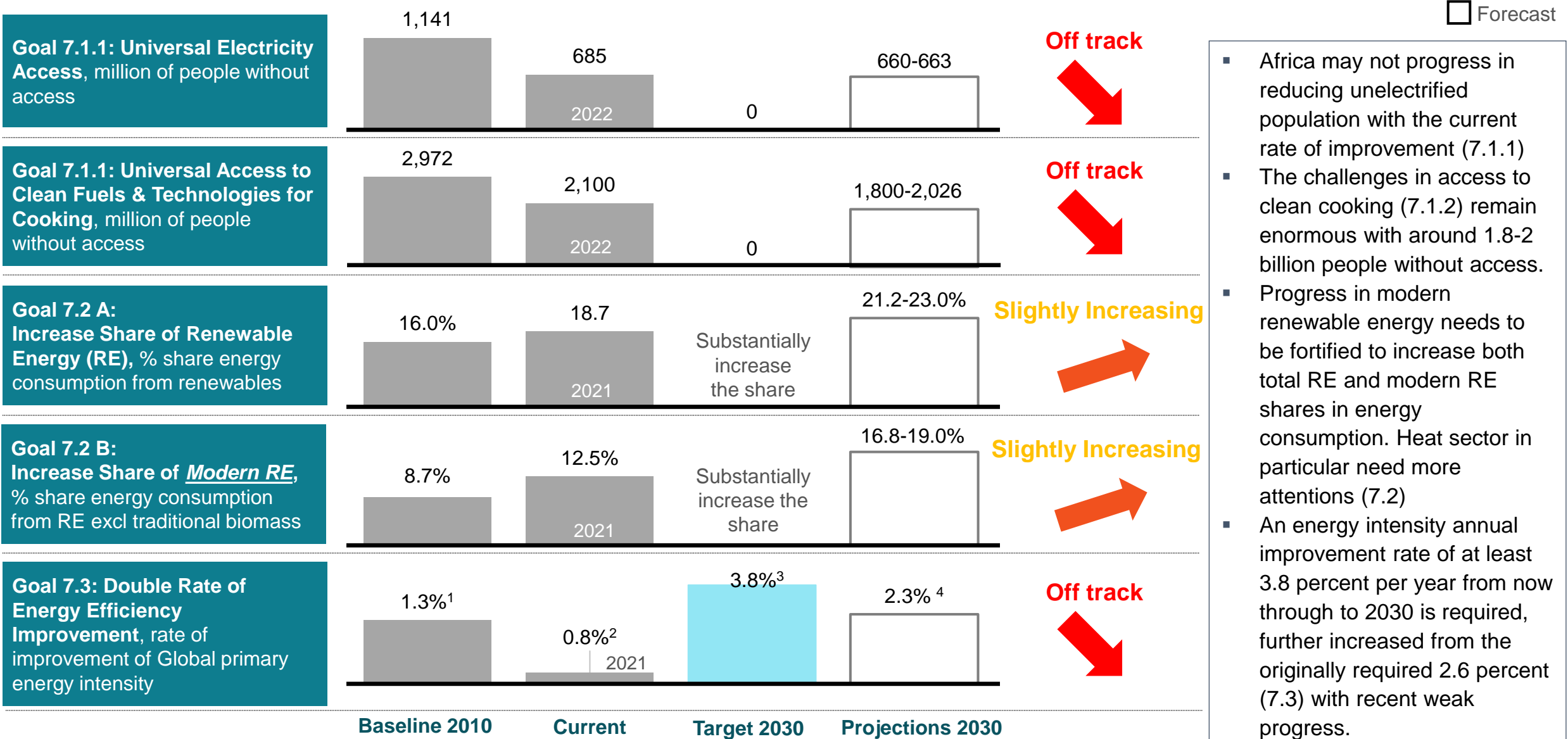
## **Based on the current trends, renewable energy will have only modest increase by 2030, far below to achieve net zero by 2050.**

- The share of renewables in TFEC is projected to increase to only around 21-23% by 2030. While the IEA projection has not changed from the previous year estimate, the 2021 setback lower the straight-line trend projection.
- Africa's modern RE stays around 15% of total RE share in 2030 without strong advancement, while all other regional have above 60% of total RE shares come from modern RE. Modern RE, electrification and clean cooking accesses should be pushed together in Africa to change this situation.

## **Based on recent data, an energy intensity improvement rate of at least 3.8 percent per year from now through to 2030 will be necessary to achieve SDG 7.3**

- With the continuous slowdown in the rate of improvement of energy intensity, the efforts to reach SDG 7.3 is increasing every year. The differences between the actual improvement rate and target rate get bigger and bigger.
- All end-use sectors (industry, transport and building) need to be incentivized to be more energy efficient with more investment and better enabling policies and regulations. In-depth analysis of sector specific energy intensity for each country is important to create sound and targeted and effective strategies, considering wide diversity of economic structure and climatic conditions.

# As the latest data shows slow or negative progress from the previous data year in all SDG7 areas, the off-tracking trends get stronger.



- Africa may not progress in reducing unelectrified population with the current rate of improvement (7.1.1)
- The challenges in access to clean cooking (7.1.2) remain enormous with around 1.8-2 billion people without access.
- Progress in modern renewable energy needs to be fortified to increase both total RE and modern RE shares in energy consumption. Heat sector in particular need more attentions (7.2)
- An energy intensity annual improvement rate of at least 3.8 percent per year from now through to 2030 is required, further increased from the originally required 2.6 percent (7.3) with recent weak progress.

1: Baseline for Goal 7.3: Double Rate of Energy Efficiency Improvement is the value for the years 2006-2010    2: annual rate of improvement from 2020 to 2021  
 3 Yearly rate of energy efficiency improvement required to meet 2030 Target 2022-2030    4: 2030 projection by the IEA Stated Policies Scenario (STEPS)



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## SDG 7.1.1 Electrification Access

The year 2022 was the first year that the number of unelectrified people has increased from the previous year. While Africa is becoming the sole region with the majority (86%) of unelectrified population, the remaining Asia seems struggling last-mile electrification.

- 80% of the unelectrified people live in just 24 countries (20 of them in Africa and the remaining 4 in Asia). This has not changed from 2021.
- 96% of the global improvement since 2010 has been driven by gains in Asia, particularly in India and Bangladesh (62% and 14% gains, respectively). Meanwhile, India and Pakistan have been struggling to close last-mile electrification, and some Asian countries (e.g., Afghanistan, Yemen) which are not in the top 24 list of the number of unelectrified population show backsliding in access rates in 2022.
- Africa's gain in electricity access rate has been 15 percentage points, from 44% to 59%, since 2010. However, with significant population growth, the 2022 unelectrified population has remained the same number with 2010 (591 million).
- The countries with negative changes (increased unelectrified population and / or reversed electrification rates) or no material changes need to be identified and the efforts to electrify need to be strengthened.

**Looking forward, based on the current trends, we are not on track to achieve SDG 7.1.1 by 2030**

- A current trend projection and the IEA's scenario analysis show that we are **not on track** to achieve universal electricity access by 2030, as 660-663 million people are expected to remain unelectrified in 2030
- We need much stronger and tailor-made actions and investments, particularly for many in Africa, but also for Asia's last mile electrification.
  - Regardless the improvement rates since 2010 and the current size of unelectrified populations, all countries with total access rates below 50-60% need more and accelerating efforts. 14 African countries in top 24 deficit countries have less than 50% access rates.
  - Even countries with relatively high rate of access (above 60-65%) still require continuous tailor-made efforts for both urban and rural populations to cross the goal line by 2030. Persistent differences in the rural and urban electrification rates in both Asia and Africa demand different approaches to close the gap in each region.
    - Asian countries in top 24 unelectrified population country list have close to 100% urban electrification rates and high rural electrification rates, except DPR Korea. Last mile rural electrification efforts needs to be implemented with strong determination in these countries.
    - Sub-Saharan Africa has 81% urban electrification rate, not changed from 2021, and rural electrification rates of just over 34%, decreasing from 37% in 2021. The slow progress in both urban and rural areas need to be changed with focused efforts for last-mile electrification of urban area and stronger rollout of large-scale rural electrification programs.

## Description

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### Data Sources







- The following data was gathered from WORLD BANK / ESMAP's Tracking SDG 7 database ([download link](#))
    - Total electricity access rate and population without access to electricity per country
    - Urban electricity access rate and population in urban areas without access to electricity per country
    - Rural electricity access rate and population in rural areas without access to electricity per country
    - Renewable installed capacity per capita per country and region
  - The following data was gathered from WORLD BANK open data source
    - Total population per country between 2010-2023.
    - Total population estimates per country from 2024 to 2030.
- 

### Projections

- Straight line extrapolation projections were made via the following process
  - The rate of change of the number of people without access to electricity (Compound Annual Growth Rate, CAGR) between 2019 and 2022 was calculated for each individual country. For countries with missing or unreliable data, available data between 2010 and 2021 was used to calculate CAGR.
  - Each country's 2023 population without access to electricity was projected forwards to 2030 (by 7 years) by adding the calculated average change to the 2022 population 8 times.
  - 0 was set as a minimum to prevent the unconnected population from being negative
  - The projected data was then summed up according to each country's regional classification
- IEA stated policy scenario was taken from the IEA's World Energy Outlook 2023 report and Tracking SDG7 2024 Report.

# Definition of electricity access

Electricity access is defined as a household being connected to an electricity supply at Tier 1 and above

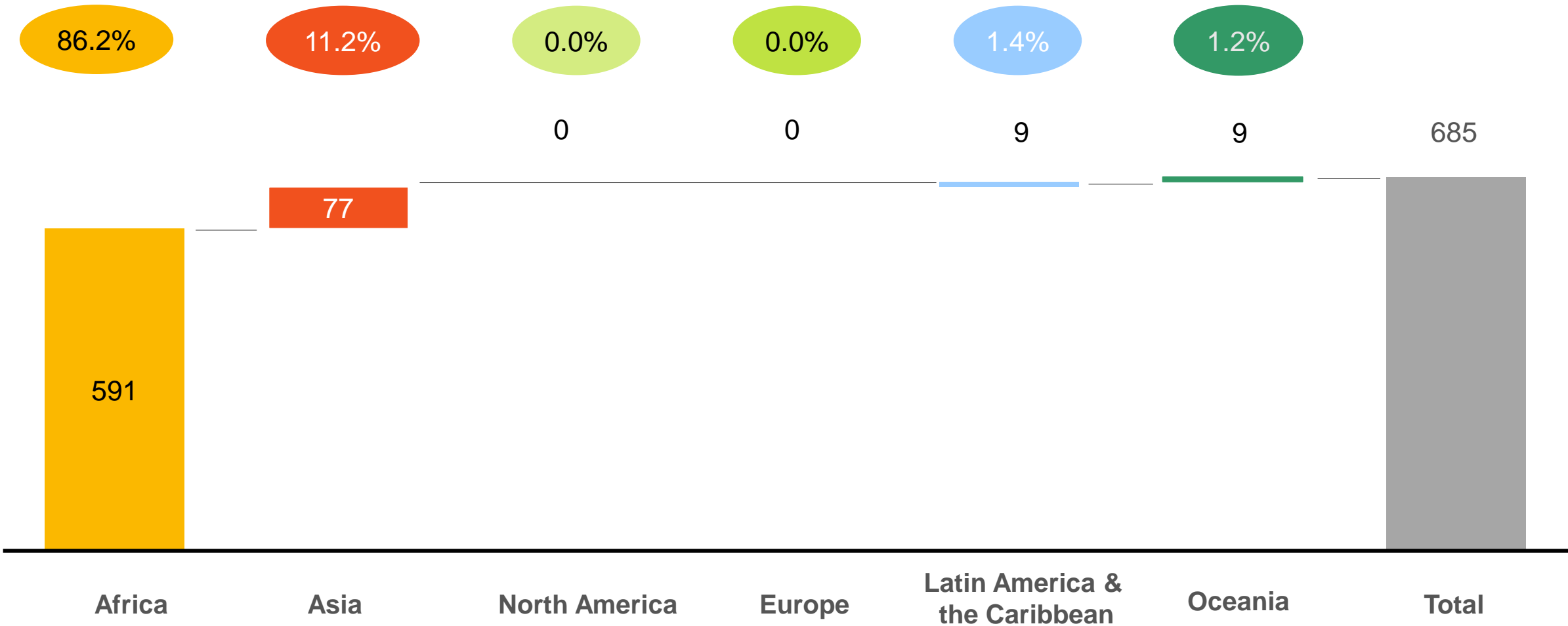
	Tier 0	Tier 1	Tier 2	Tier 3	Tier 4	Tier 5
						
<b>Minimum hours available per day</b>	<4 hours	4 hours	4 hours	8 hours	16 hours	23 hours
<b>Minimum power</b>	<3 Watts	3 Watts	50 Watts	200 Watts	800 Watts	2,000 Watts
<b>Minimum daily power capacity</b>	<12 Wh	12 Wh	200 Wh	1,000 Wh	3,425 Wh	8,219 Wh
		<b>Electricity access</b>				

- The numbers presented above are only to supply the absolute minimum of each stage to each household.
- **The Modern Energy Minimum advocates universal electricity consumption of at least 1,000 kWh** (of which approx. 300 kWh at the residential level), if we aspire for all people to reach an income of at least USD 2,500 per capita per year (or about USD 6.85 per day, midpoint for lower-middle income status), based on historical data.
- Meanwhile, this historical data does not include the **impacts of energy efficiency improvement**, which can make the same income level correlate to much less electricity consumption in the future. Hence, this should be considered as an indicative historical number, not an absolute minimum. What really matters is **energy service contents** enabled by a certain consumption level and **their impacts on people's lives**.

**There are ~685 million people globally without access to electricity as of 2022. This was 10 million increase from the previous year. Such an increase happened for the first time since 2010.**

(x) % of total

Population without electricity access<sup>1</sup> by region, millions, 2022

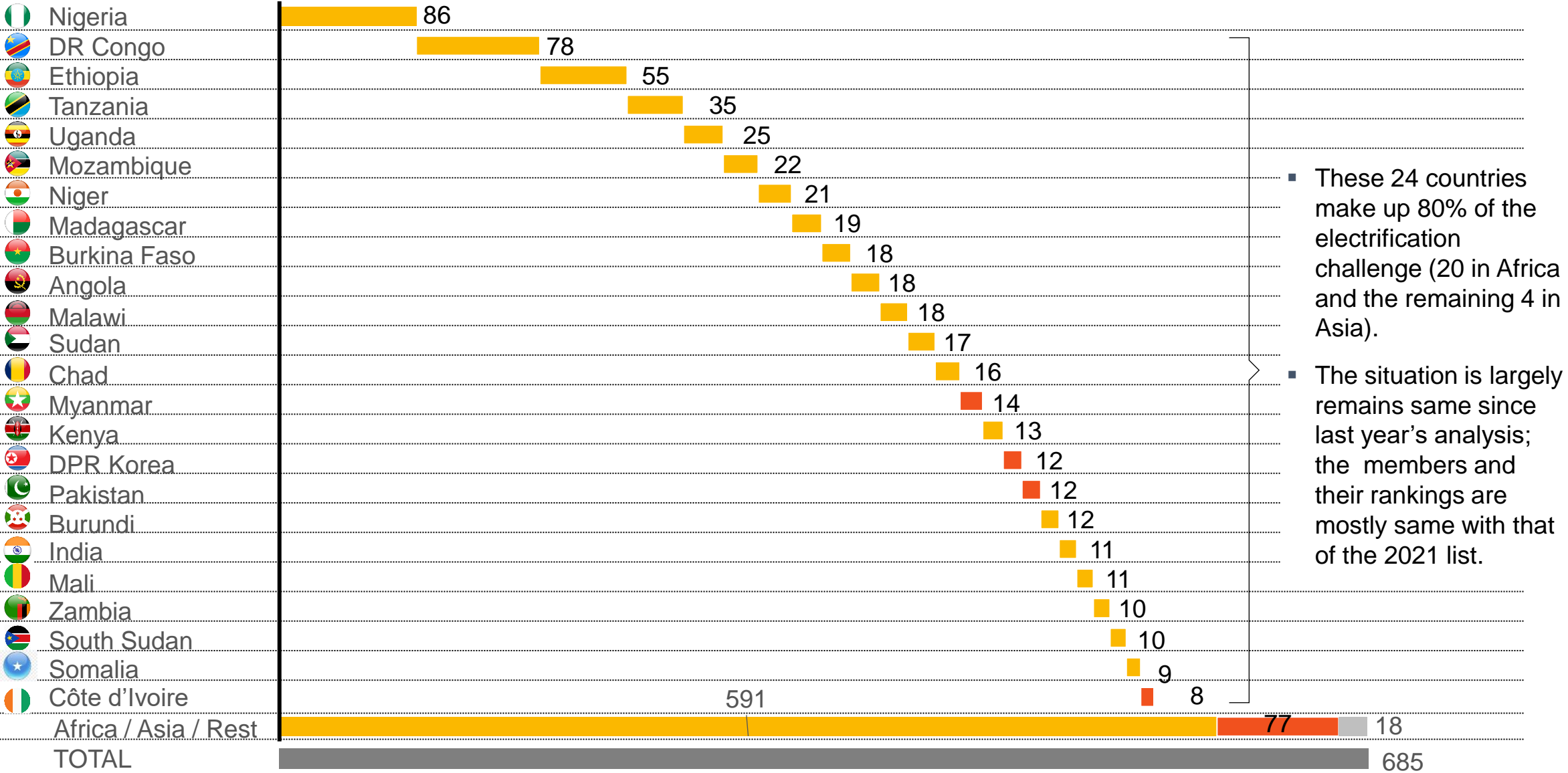


<sup>1</sup> Electricity access is defined as a household being connected to an electricity supply at Tier 1 and above

# 24 countries make up 80% of the electrification gap and 20 countries are in Africa

■ Africa  
■ Asia  
■ Rest

Population without electricity access, millions, 2022



- These 24 countries make up 80% of the electrification challenge (20 in Africa and the remaining 4 in Asia).
- The situation is largely remains same since last year's analysis; the members and their rankings are mostly same with that of the 2021 list.

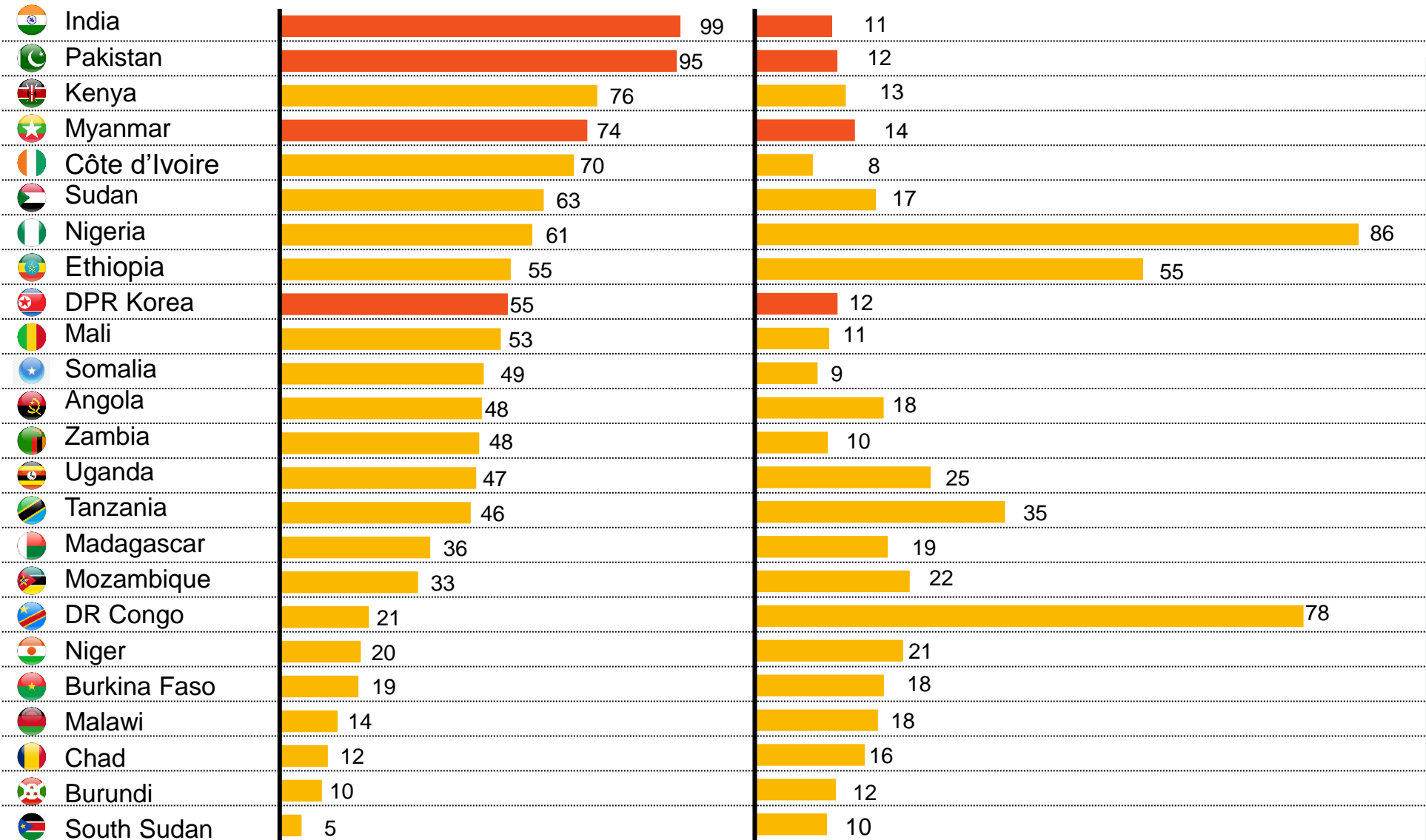
SOURCE: SEforALL Analysis DATA SOURCES: IEA, IRENA, UNSD, World Bank, and WHO (2024) Tracking SDG7 2024 Report Datasets

# Asian countries have higher electrification rates than African countries

Electrification rate, %, 2022

Population without electricity access, millions, 2022

■ Africa ■ Asia

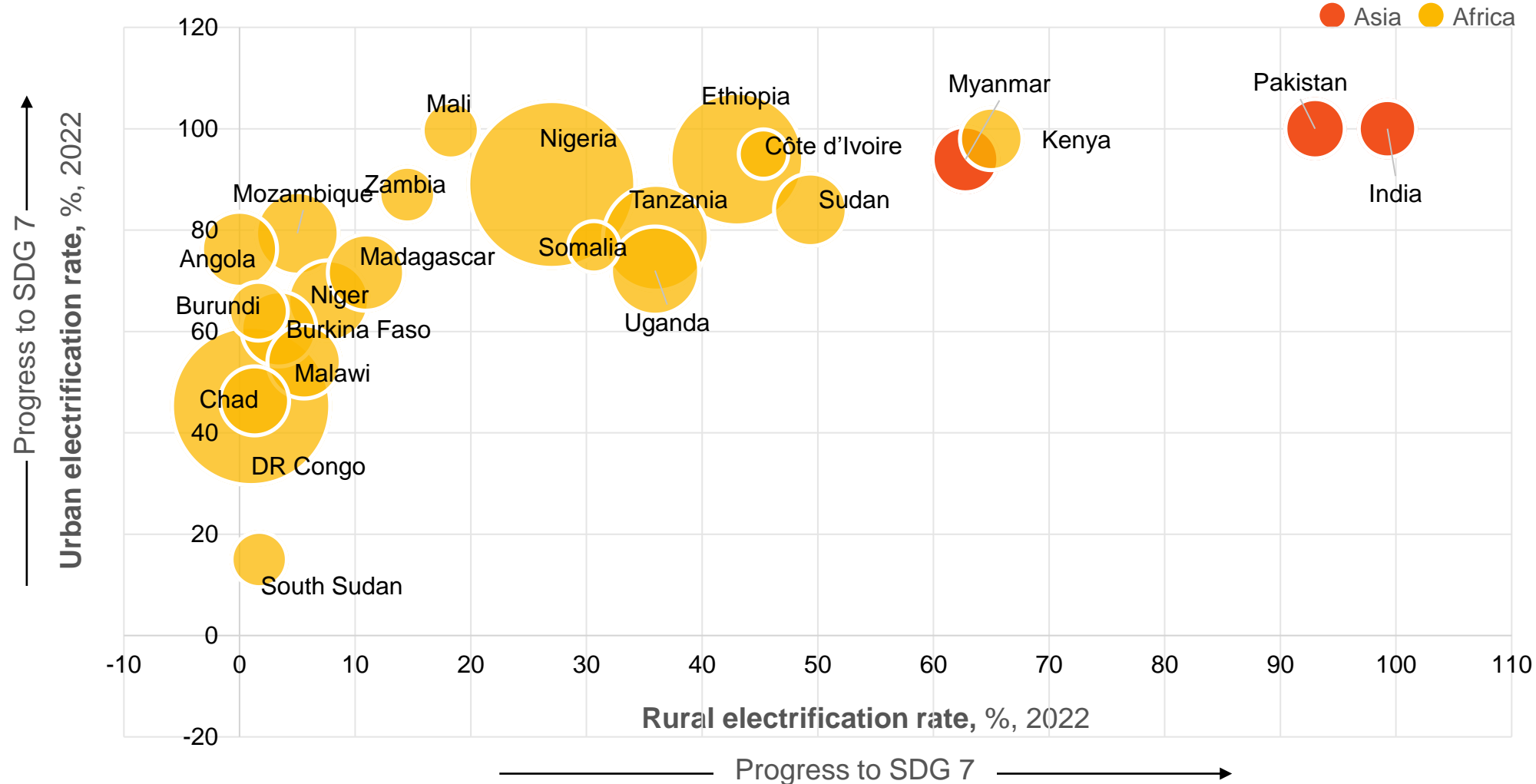


- Only six of 20 African countries have more than 50% of access rates.
- Nigeria has the largest unelectrified population, followed by DR Congo and Ethiopia.
- Although Asian countries have much lower number to electrify, Pakistan's number basically stayed same in 2022 after a dramatic improvement of 42 million from 2020 to 2021. Myanmar also show the stagnated result while India's unelectrified population increased from 6 million in 2021 to 11 million in 2022. They all show the difficulty of last-mile electrification.

# Both Asia and Africa needs strong rural push, while most African countries also needs urban electrification progress including last-mile schemes

Rural vs Urban electrification rates (top 24 countries), 2022

Bubble size = Total unelectrified population in million



- Both India and Pakistan have 100% urban access rates, while Myanmar has 94%. Last mile electrification, focusing on rural areas, is the key for Asian countries.
- Sub-Saharan Africa has 81% urban electrification rate, but rural electrification rates of just over 34% and has regressed from 37% in 2022. Simultaneous last mile urban push and massive roll-out of rural electrification schemes while stopping backsliding are required for all countries.

NOTE: Both urban and rural rates of DPR Korea were not available for any years from the 2024 database. Therefore, DPR Korea is not on this graph.

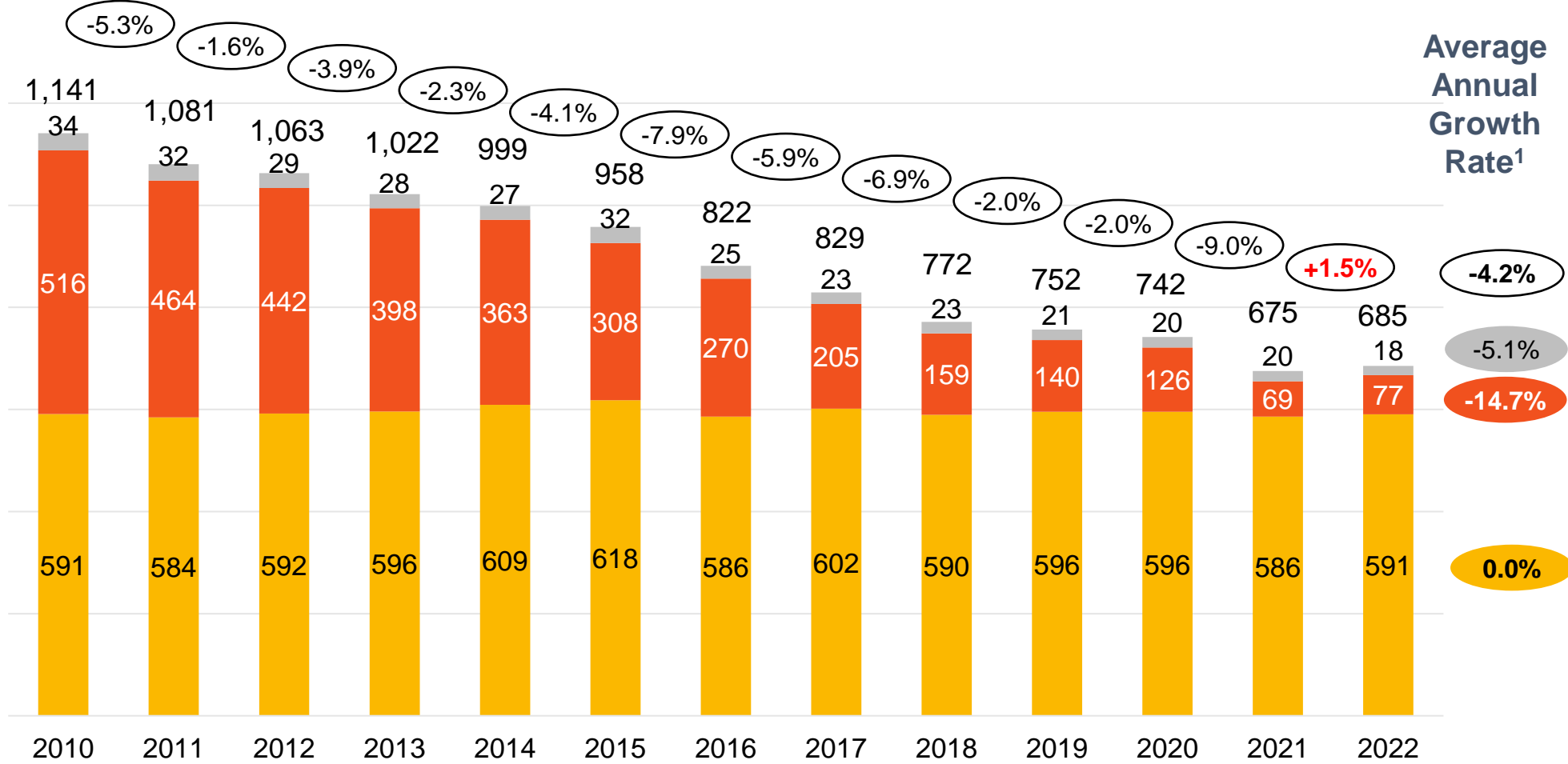
SOURCE: SEforALL Analysis DATA SOURCES: IEA, IRENA, UNSD, World Bank, and WHO (2024) Tracking SDG7 2024 Report Datasets



# 2022 was the first year that total unelectrified population increased from the previous year since 2010. Both Asia and Africa increased the numbers.

Population without electricity access, millions, 2010-2022

Rest of the World Asia Africa



**Average Annual Growth Rate<sup>1</sup>**

- 4.2%
- 5.1%
- 14.7%
- 0.0%

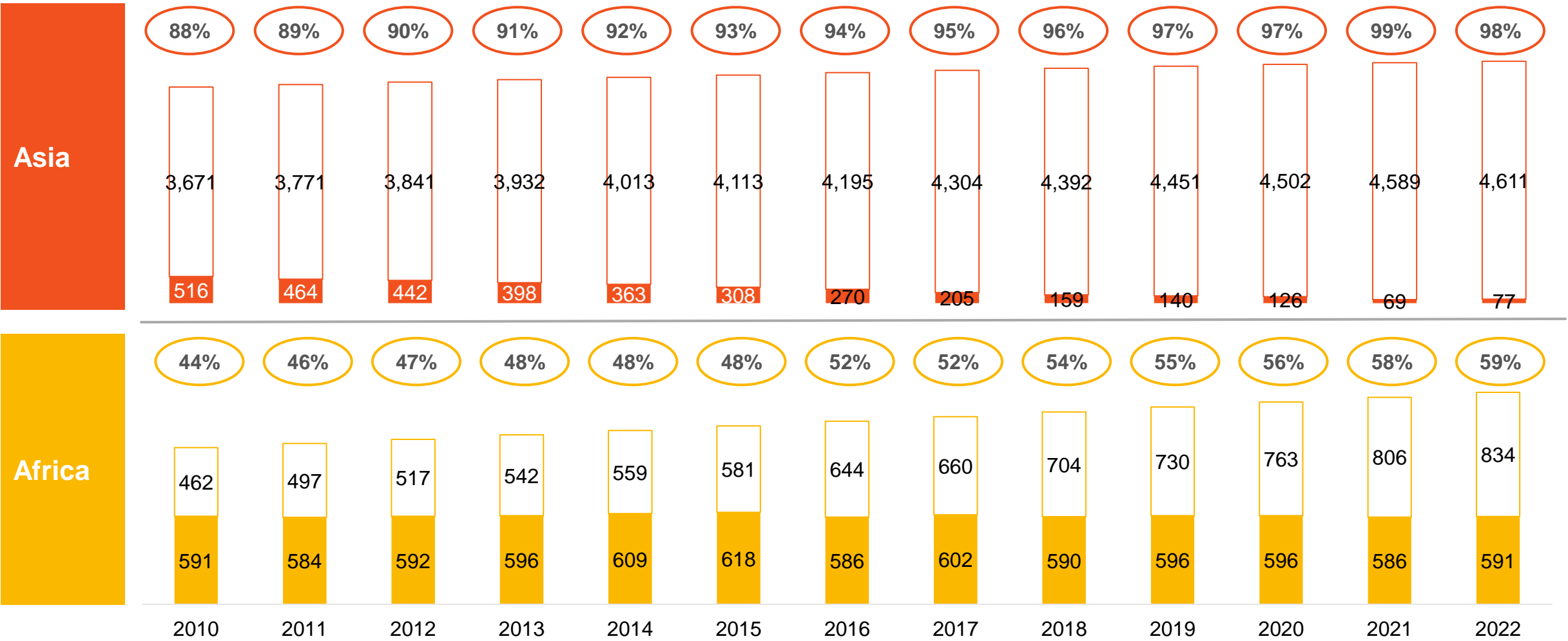
- The number of total unelectrified population in the world decreased by ~456 million between 2010 and 2022. 96% of this gain came from Asia (~439 million).
- Despite the strongest annual improvement between 2020 and 2021, 2022 was the first year that marked the increase of unelectrified population since 2010, even in Asia.
- Africa in 2022 shows no change in total unelectrified population from where it started in 2010.

<sup>1</sup> 2010 – 2022 Compound annual growth rate = the average annual growth rate

# Africa's unelectrified population stays the same with 2010 due to population growth, while Asia has struggled to reach universal access for multiple years.

Electrified and Unelectrified Population (2010-2022), millions

x% Electrification rate  
 Electrified population  
 Unelectrified population

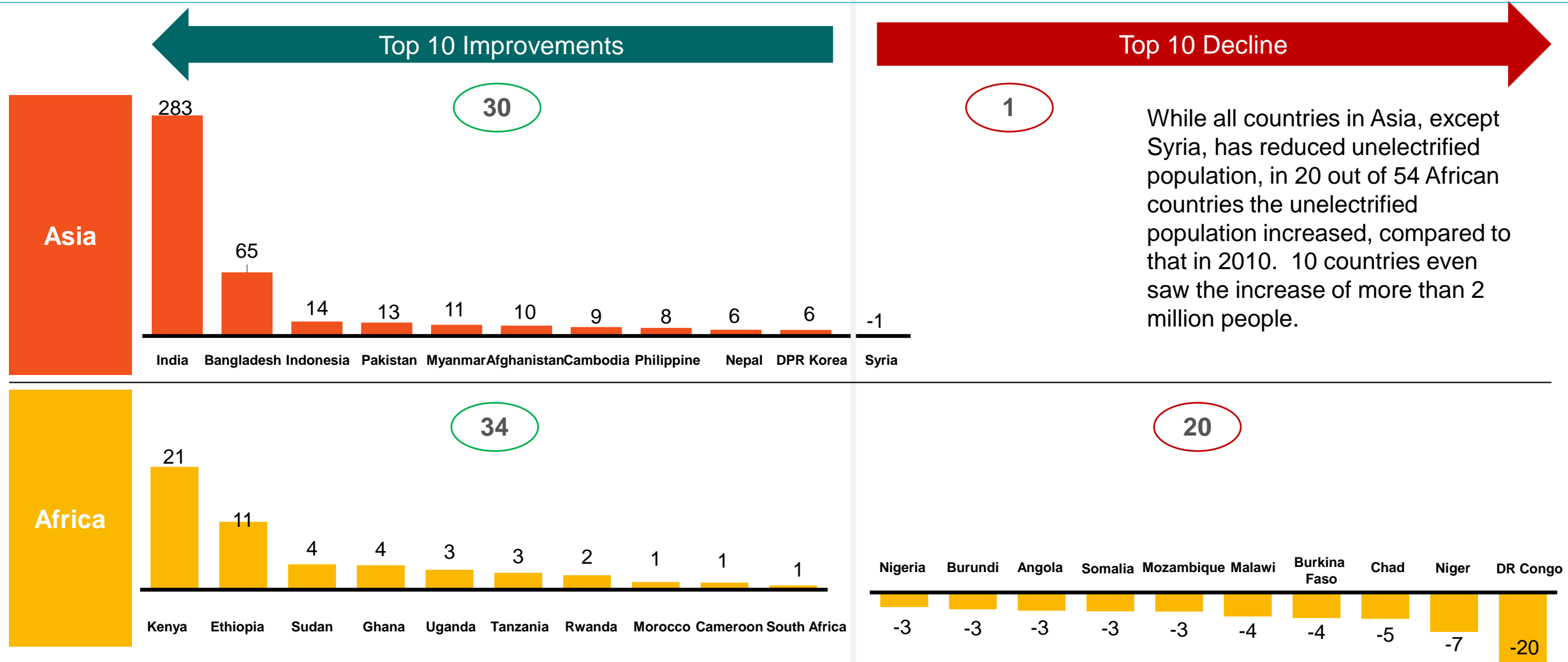


SOURCE: SEforALL Analysis DATA SOURCES: IEA, IRENA, UNSD, World Bank, and WHO (2024) Tracking SDG7 2024 Report Datasets; World Bank Open Data – Total Population downloaded on July 4th 2024

# 20 African countries show the number of unelectrified population backsliding from 2010. 10 of them have more than 2 million people without electricity access.

- x Number of countries with improvements
- x Number of countries with decline

Reduction in unelectrified population between 2010 and 2022, millions



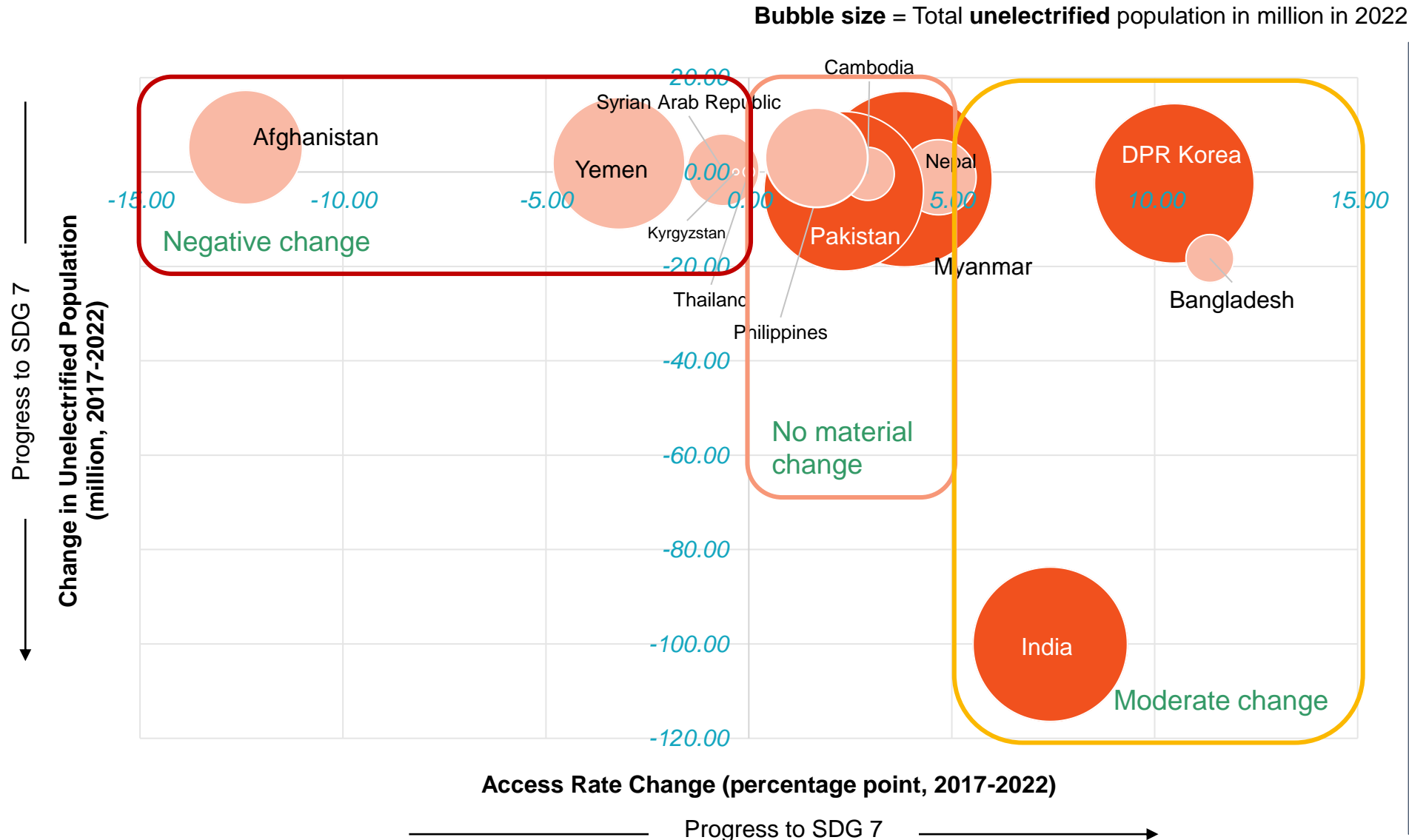
NOTE: These figures represent the absolute change in the number of unelectrified people between 2010 and 2022 and does not account for changes in the population due to birth rates, human migration etc.

SOURCE: SEforALL Analysis DATA SOURCES: IEA, IRENA, UNSD, World Bank, and WHO (2024) Tracking SDG7 2024 Report Datasets

# Electricity access: Deep dive on Asia

- In top 24 Asian countries
- Other Asian countries

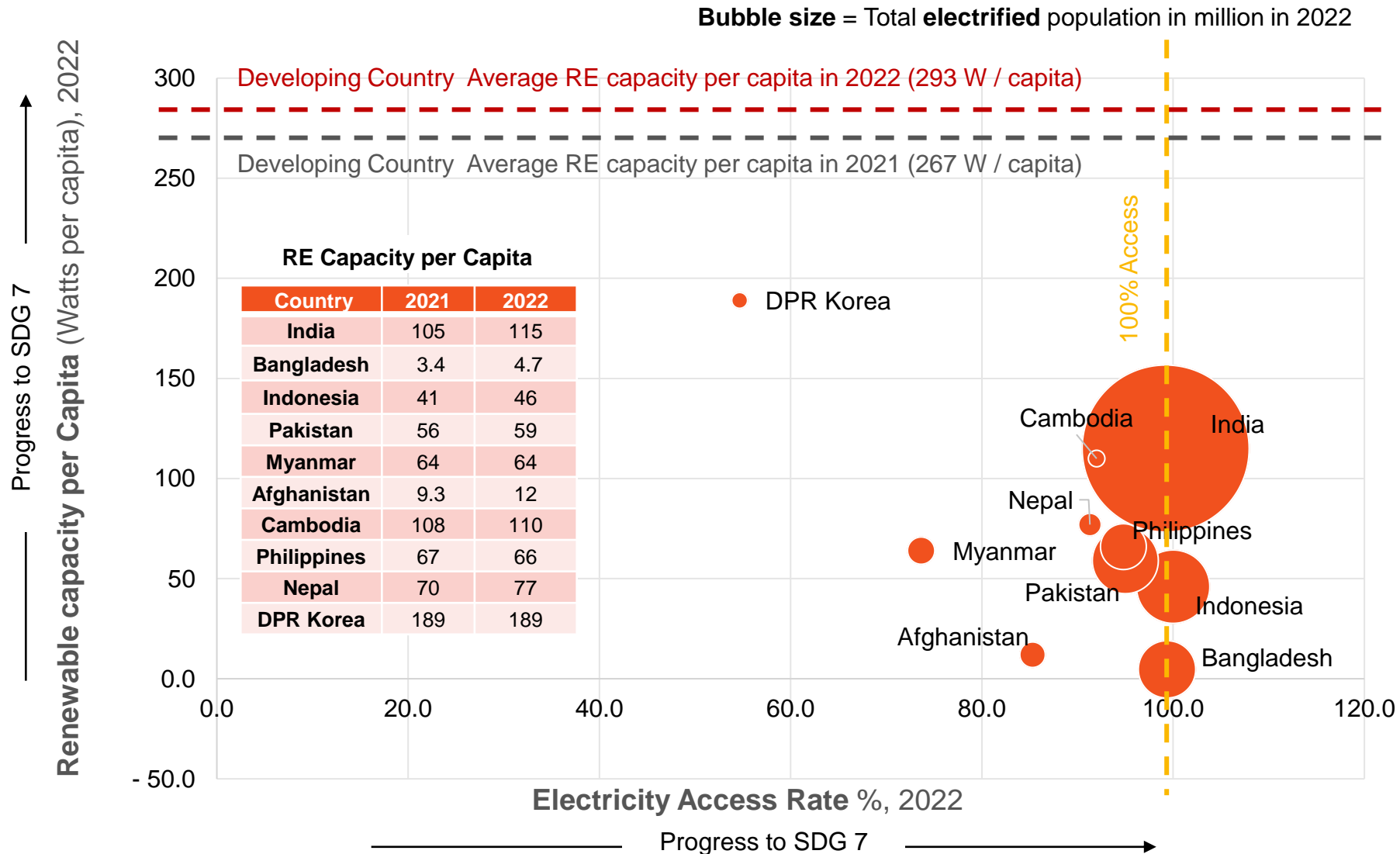
2022 Population without access vs Changes in population without access and in electricity access rates *between 2017 and 2022*



- An analysis of recent 5 data years reveals both Afghanistan and Yemen have been backsliding in access rate and increased unelectrified populations. Strong attentions and actions are needed to reverse the trend.
- India shows good progress in reduction of unelectrified population, while Bangladesh exhibits the highest improvement of access rate in recent years.
- Considering the remaining unelectrified population, however, countries need further and focused efforts including last-mile electrification strategy for India and Pakistan.

# Many Asian countries need to focus on increasing renewable capacity per capita while achieving universal electricity access

Electrified Population, Electricity Access Rate, and Renewable capacity per capita by country in Asia 2022

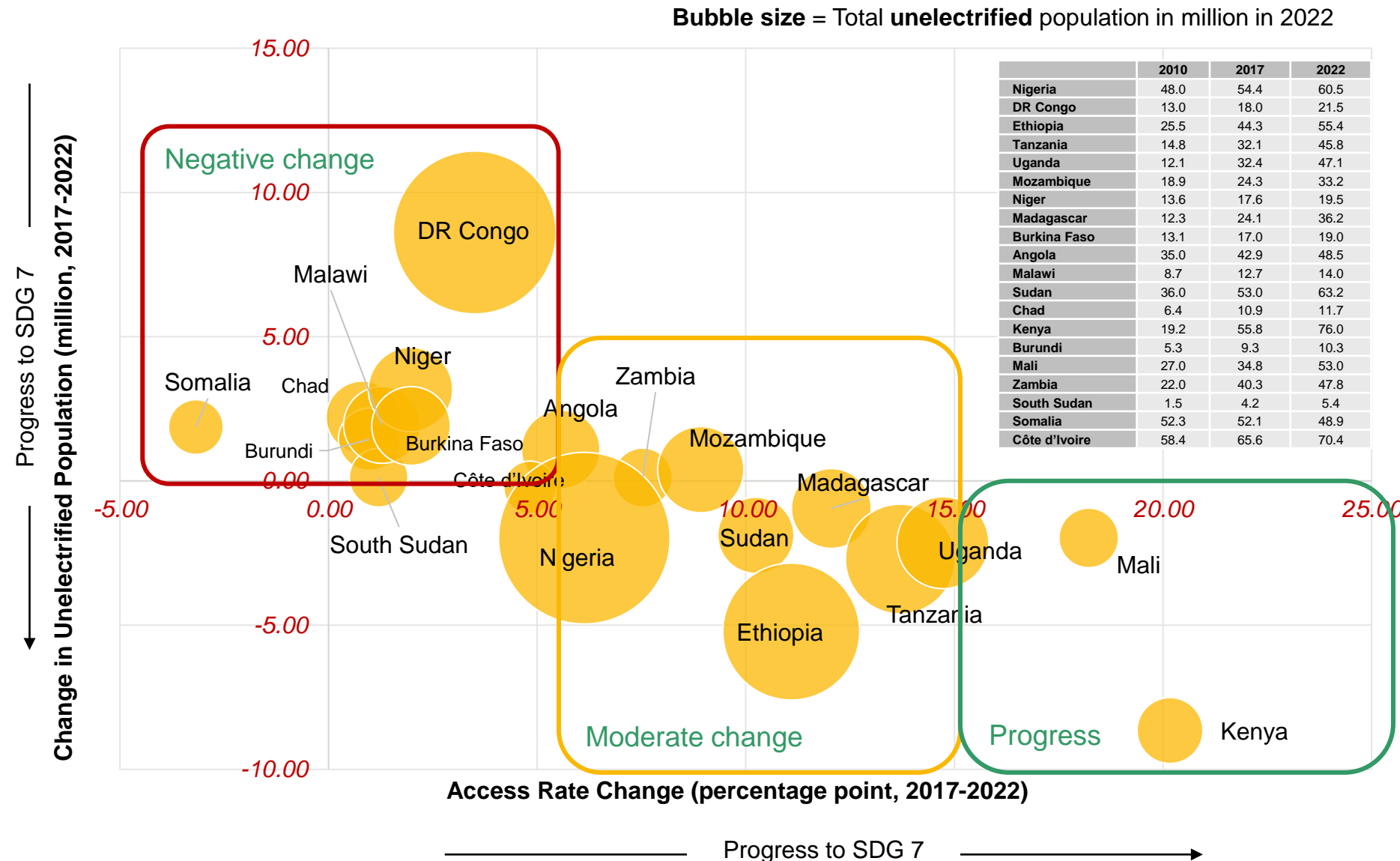


- Developing countries' average renewable power installed capacity per capita increased by 26 W / capita from 2021. However, the progress of Asian countries was much lower.
- Many Asian developing countries have more than 90% access rates, except DPR Korea, Myanmar and Afghanistan. However, their renewable capacity per capita are much lower than the developing country average (293 W / capita), indicating their newly gained access could be low Tier access such as Tier 1, 2 or lower Tier 3.
- To provide Modern Energy Service with clean energy for all, these Asian countries need to increase supply from renewable energy. Asian electricity access strategy needs to turn its attention to creating win-win situation of higher energy consumption with renewable energy provision.

# Electricity access: Deep dive on Africa (Top 24 Access Deficit countries)

● In top 24 African countries

2022 Population without access vs Changes in population without access and in electricity access rates *between 2017 and 2022*

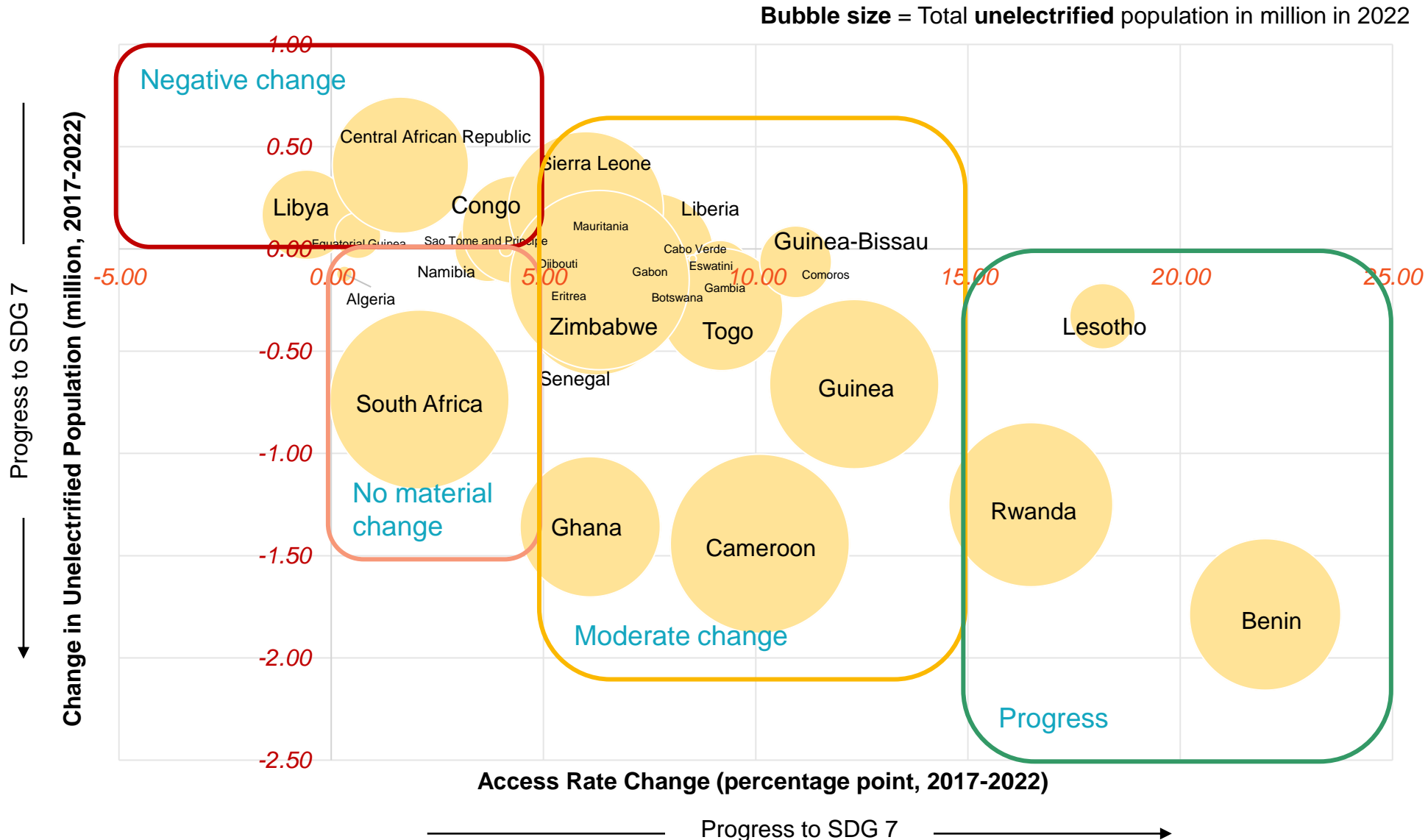


- 14 African countries in top 24 access deficit countries have less than 50% access rates.
- Cote d'Ivoire, Ethiopia, Kenya, Madagascar, Mali, Nigeria, Sudan, Tanzania, Uganda have increased access rates and reduced unelectrified population.
- Meanwhile Somalia has been reducing access rate and increasing unelectrified population in recent years.
- Other 10 countries increased access rate but the number of unelectrified population increased.
- All countries with increased unelectrified population since 2017 need to fortify the electrification effort regardless the remaining unelectrified population and access rate improvement.

# Electricity access: Deep dive on Africa (non-Top 24 Access Deficit countries)

● Non top 24 African countries

2022 Population without access vs Changes in population without access and in electricity access rates *between 2017 and 2022*

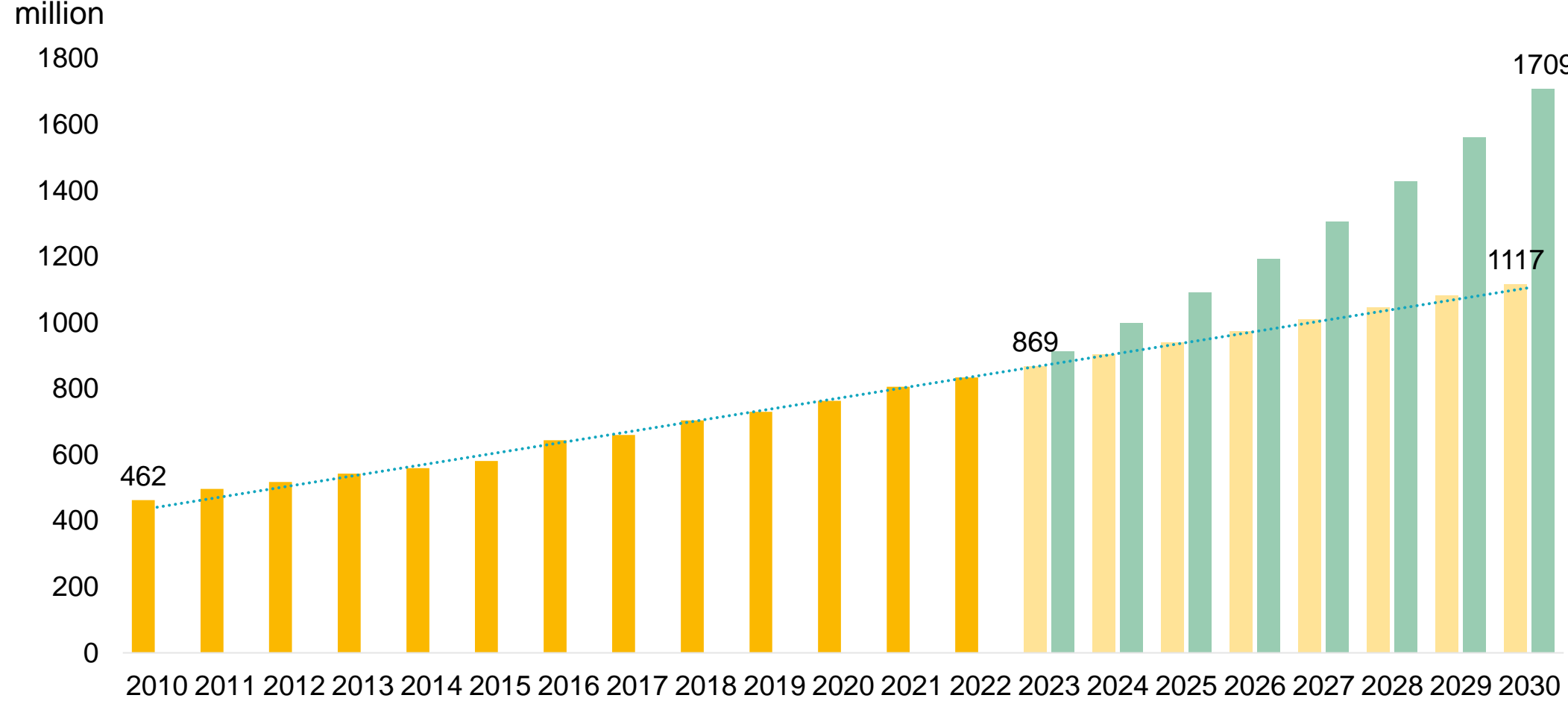


- 28 out of 29 African countries that are not in Top 24 access deficit country list improved access rates since 2017.
- Benin, Cameroon, Guinea, Lesotho, and Rwanda show strong improvement in access rates. Meanwhile, Central African Republic, Congo, Equatorial Guinea, Mauritania, and Sao Tome and Principe had increased the numbers of unelectrified population despite their access rate improvement.
- Libya is the only country that regressed in both access rate and unelectrified population number.

# With the current trajectory, Africa still has 591 million people unelectrified in 2030

Current trend trajectory vs required trajectory to achieve electricity access in Africa

□ Forecast shown lighter shade



A straight-line projection based on the past three data year's growth rate shows that 592 million people will be unelectrified in Africa in 2030, which is almost the same as the numbers in 2010 and 2022. This includes 575 million in Sub-Saharan Africa.

- Population with access in million (Current Trajectory)
- Population need to be electrified in million (Required Trajectory)
- ⋯ Linear (Population with access in million (Current Trajectory))

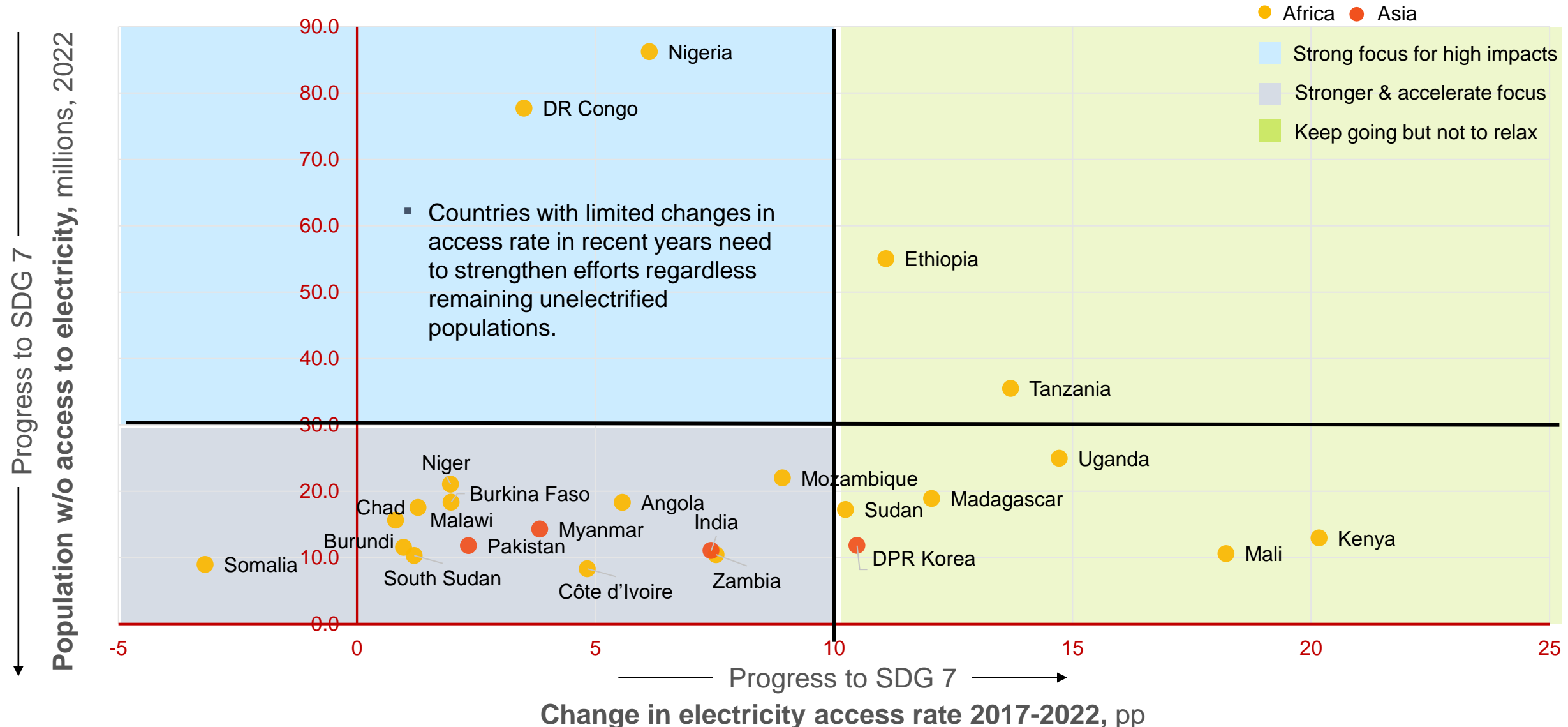
NOTE; This projection is a simple straight-line projection based on historical growth rates (methodology is stated in slide) and it does not match the number projected by the IEA WEO scenario analysis. The differences are shown on slide 27 and 28.

SOURCE: SEforALL Analysis  
 DATA SOURCES: IEA, IRENA, UNSD, World Bank, and WHO (2024) Tracking SDG7 Report 2024 Datasets; World Bank Development Indicators (2024)– Population, total, World Bank Data Bank (2024) Population projections and estimates



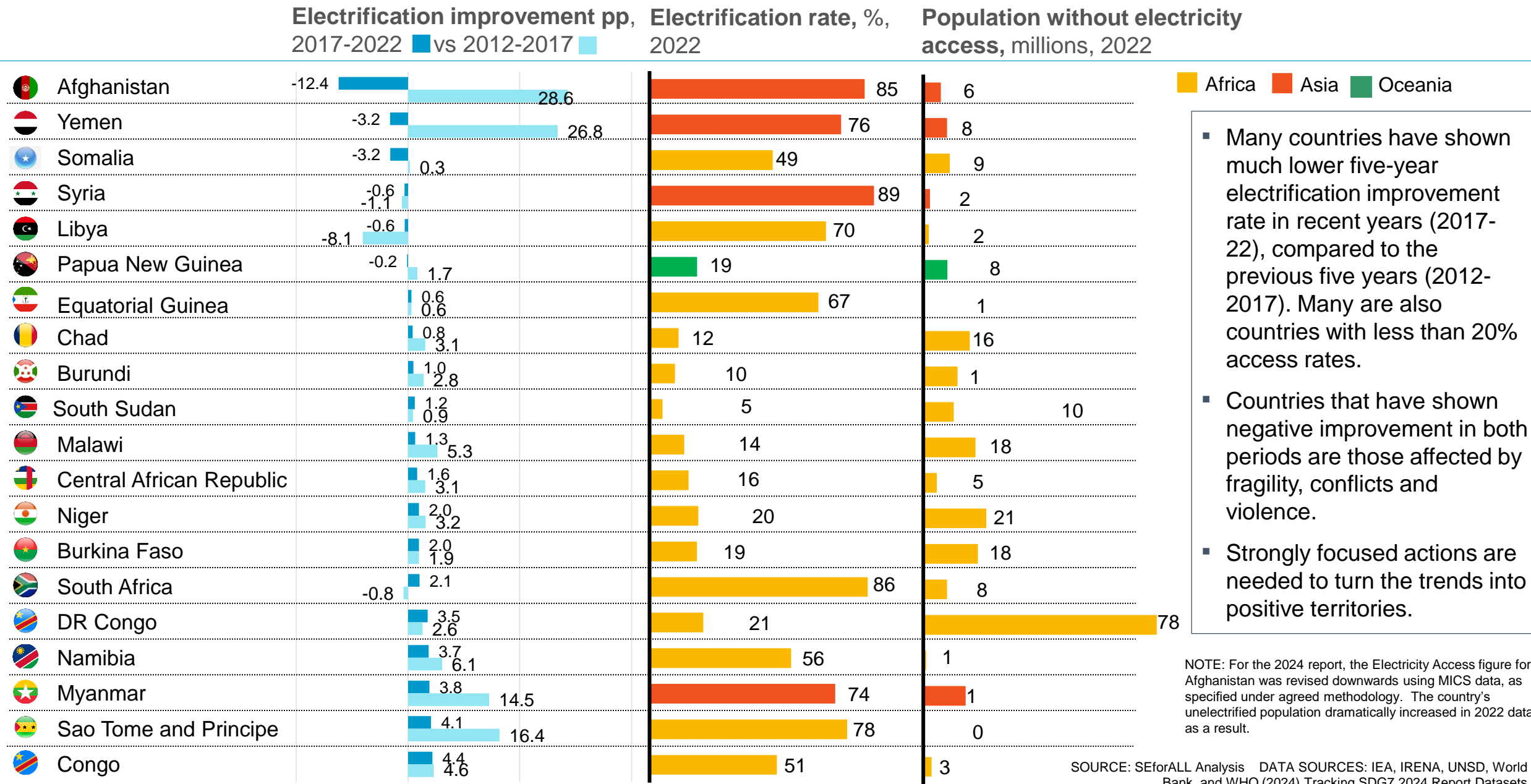
# Countries with large unelectrified populations have high impact potential, but tailored strategies are needed for all slow progress and low access rate countries

Population without access to electricity (2022) vs change in electricity access rates (2017-2022) - Top 24 access deficit countries



SOURCE: SEforALL Analysis DATA SOURCES: IEA, IRENA, UNSD, World Bank, and WHO (2024) Tracking SDG7 2024 Report Datasets

# Many countries that lost momentum to improve access rate in recently years require stronger focus, regardless the current number of population without electricity access

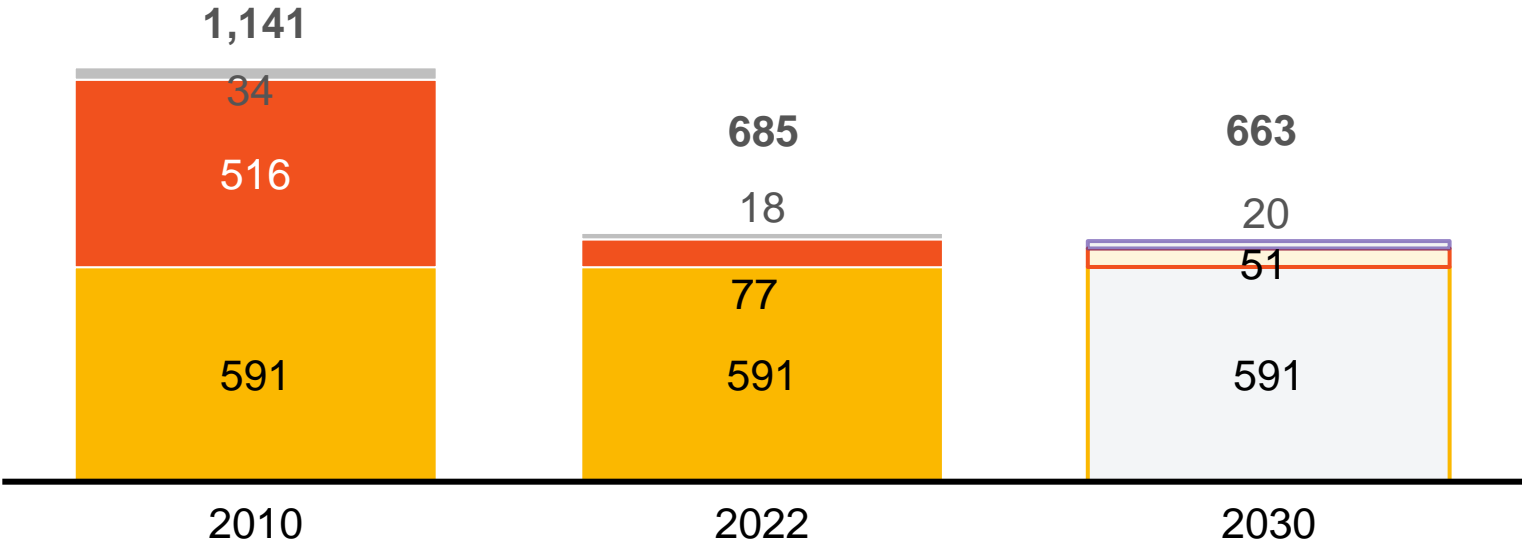


# Projections show that we are not on track to reach universal electricity access by 2030

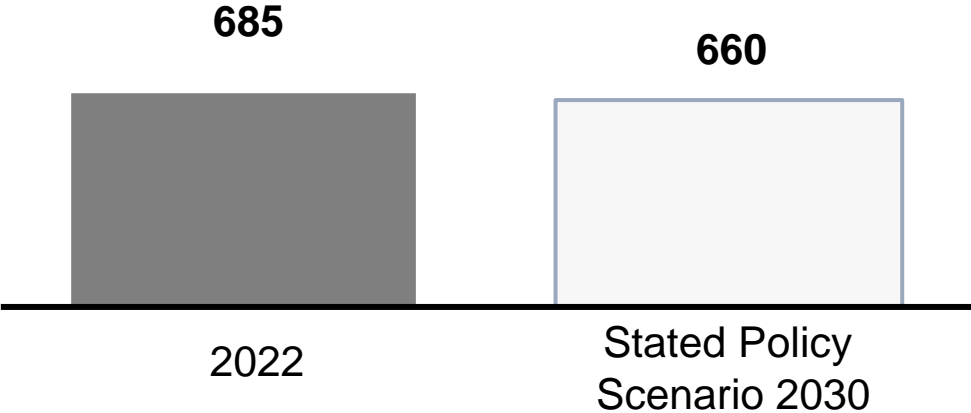
Projected population without access to electricity, millions

Rest of world Asia Africa  
Forecast shown lighter shade

**Straight line extrapolation**



**IEA Stated Policies (STEPS) Scenario, Tracking SDG7 2024**



- The straight-line projection with the current trajectory indicates that Africa will stay the same level of unelectrified population by 2030, 89% of which is in Sub-Sahara Africa. Meanwhile Asia will further reduce ~25 million population without access.
- According to the IEA STEPS scenarios analysis, the number of people without electricity access is projected to reach 660 million by 2030 and 85% of it will be in Sub-Saharan Africa.

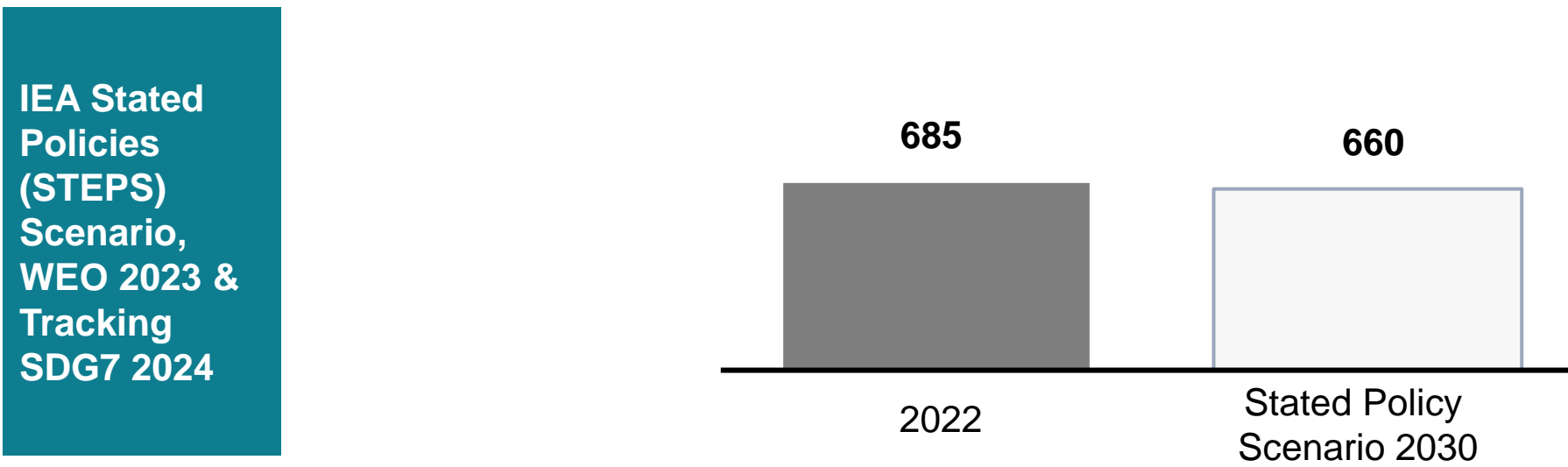
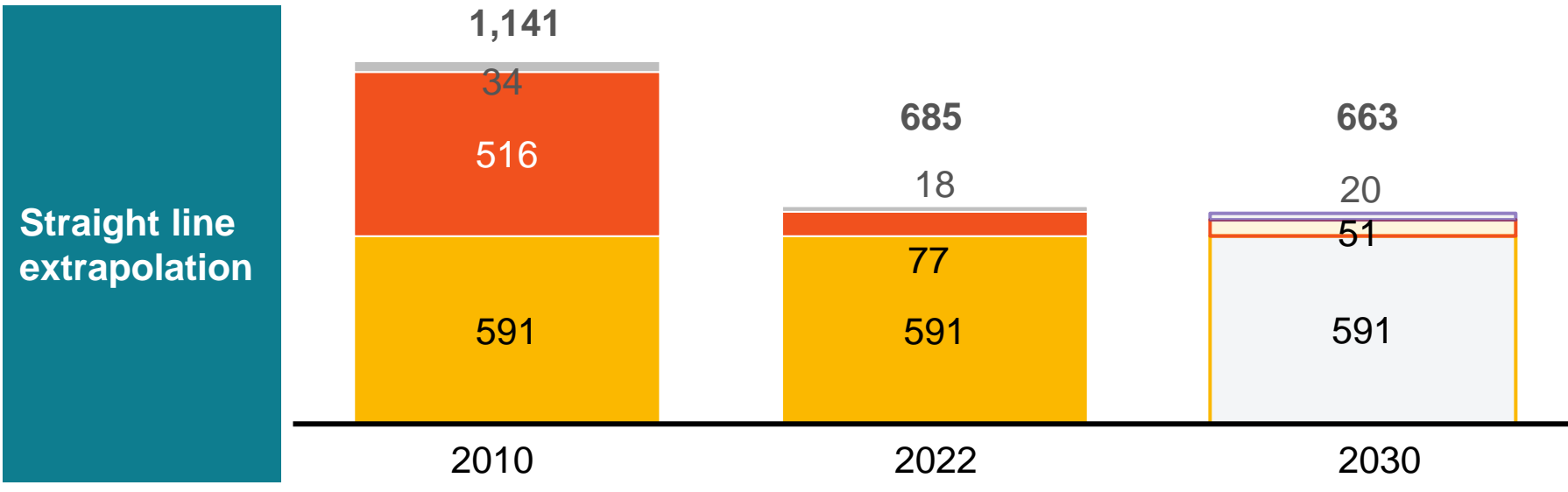
NOTE: For the 2024 report, the Electricity Access figure for Afghanistan was revised downwards using MICS data, as specified under agreed methodology. The country's unelectrified population dramatically increased in 2022 data as a result. The country's projection, therefore, took annual improvement rate from 2010, instead of the recent three years.

SOURCE: SEforALL Analysis DATA SOURCES: IEA, IRENA, UNSD, World Bank, and WHO (2024) Tracking SDG7 2024 Report & its Datasets; IEA World Energy Outlook (2023)

# Projections show that we are not on track to reach universal electricity access by 2030

Projected population without access to electricity, millions

Rest of world Asia Africa  
Forecast shown lighter shade



- Straight-line projection with the current rates of electrification,
  - Globally 12 additional countries will achieve universal access by 2030, including 2 Asian and 2 African countries (the lists in appendix)
  - 13 Asian countries would still have unelectrified populations (list in appendix) in 2030
  - 18 African countries will still have significant unelectrified populations of ~10 million or more (list in appendix) in 2030
- Under IEA's Net Zero Emissions by 2050 Scenario, achieving universal electricity access in developing economies requires average annual investments of USD 30 billion.

NOTE: For the 2024 report, the Electricity Access figure for Afghanistan was revised downwards using MICS data, as specified under agreed methodology. The country's unelectrified population dramatically increased in 2022 data as a result. The country's projection, therefore, took annual improvement rate from 2015, instead of the recent three years.

SOURCE: SEforALL Analysis DATA SOURCES: IEA, IRENA, UNSD, World Bank, and WHO (2024) Tracking SDG7 2024 Report & its Datasets; IEA World Energy Outlook (2023)

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SDG 7.2: Share of renewables  
in Total Final Energy Consumption (TFEC)

SDG 7.3: Energy intensity

## SDG 7.1.2 Clean Cooking Access

**There are currently 2.1 billion people without access to clean fuels and technologies for cooking with 50% of them in Asia and 45% in Africa.**

- 75% of the people without access live in just 20 countries with 9 of them in Asia and the remaining 11 in Africa
- Asian countries in this 20 high-impact group mostly have higher access rates than their African counterparts. However, Asia's large population size makes the absolute number without access larger than that of African countries, leaving a very significant room for improvement.
- Only 3 of the 11 African countries (Nigeria, Kenya, and Ghana) in the 20 high-impact countries have access rates over 10%.

**The global average annual reduction rate of the population without clean cooking access since 2010 is only 2.5%, just 0.1 percentage point increase from last year.**

- Asia's progress is stronger than other regions with annual improvement rate of 5.6% since 2010. The population without access has declined from 2.1 billion to 1.0 billion in the region. While 23 Asian countries reduce the population without access, 14 countries went backward since 2010.
- The number of population without clean cooking access in Africa has increased by 170 million (from ~776 million to ~946 million) since 2010, with annual average growth rate of 1.7% (increase of 0.1 percentage point from the 2010-2021 average). 39 African countries increased the numbers of population without access since 2010, three times more than 13 countries that reduced the numbers.

**Looking forward, based on the current trends, we are not on track to achieve SDG 7.1.2 by 2030**

- A current trend projection and the IEA's scenario analysis show that we are **not on track** to achieve universal access to clean fuels and technologies for cooking by 2030, as between 1.8 and 2.0 billion people are expected to remain without clean cooking access
- India, China, Indonesia, Nigeria, Pakistan and Ethiopia, will remain with more than 100 million population without clean cooking access, and all other top 20 access deficit countries will also have more than 20 million population without access. These countries can be prioritized for higher impacts on global SDG7.1.2 achievement. Regardless the size of total population and population without access, however, countries with very low access rates and countries with low improvement rates need more attentions to accelerate the rate of improvement.
- While the current annual global investment in clean cooking access is around 2.5 billion USD, this needs to be increased 3.2-fold to 8 billion USD annually by 2030 to achieve SDG7.1.2, according to the IEA.
- Electric cooking can be an option for solving both electricity and clean cooking access for 14 of high access deficit countries in both areas. However, it is not an easy task as well-coordinated planning accompanied with enabling policy and regulatory measures, realistic projects, and support investments are needed to provide higher Tiers of electricity access for cooking and increased affordability.

### Data Sources

- The following data was gathered from WORLD BANK / ESMAP's Tracking SDG 7 database ([download link](#))
  - Total access rate to clean cooking per country
- The following data was gathered from WORLD BANK open data source
  - Total population per country between 2010-2023
  - Total population estimates per country from 2024 to 2030
- The following data was gathered from the IEA's publication
  - Clean Cooking Investment needs (A Vision for Clean Cooking Access for All, 2023)

### Projections

- Straight line extrapolation projections toward 2030 were made via the following process
  - The average change made between 2018 and 2022 was calculated for Africa, Asia and the World
  - Each region's 2022 population without access to clean cooking was projected forwards to 2030 (by 8 years) by adding the calculated average change to the 2022 population 8 times
  - 0 was set as a minimum to prevent the unconnected population from being negative
  - Africa and Asia regions' projected population are subtracted from the World projection to obtain the remaining region's projection.
- IEA stated policy scenario was taken from the IEA's World Energy Outlook 2023 report and Tracking SDG 2024 report

# Definition of clean cooking access

Clean cooking access is defined as a household using clean fuels or improved technologies for cooking as defined by the WHO<sup>1</sup>

## Clean fuels for cooking



Clean fuels recommended by WHO<sup>1</sup> are

- LPG
- Ethanol
- Biogas
- Solar cookers
- Electricity

## Improved technologies for cooking



Emissions rates for improved technologies are defined by the WHO<sup>1</sup> and should be less than

- 0.23mg/min (unvented) and 0.8mg/min (vented) of PM<sub>2.5</sub><sup>2</sup>
- 0.16g/min (unvented) and 0.59g.min (vented) of CO

<sup>1</sup> In the Normative guidance World Health Organization guidelines for indoor air quality: household fuel combustion

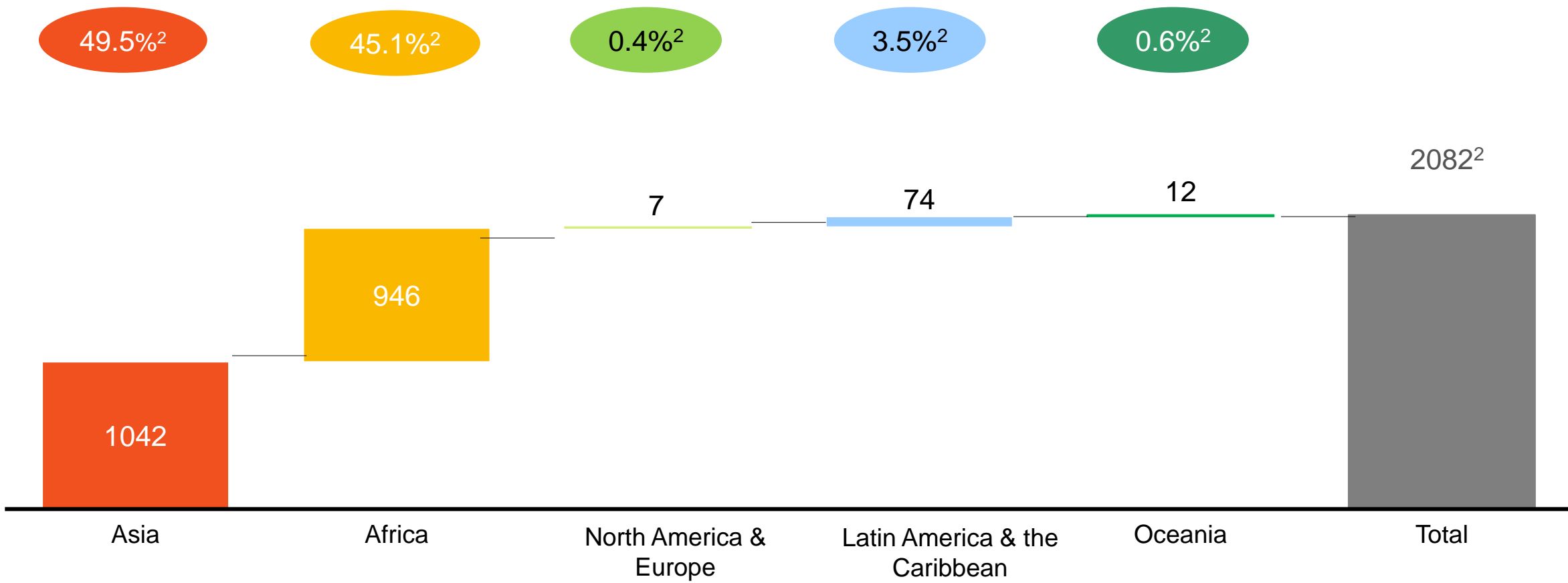
<sup>2</sup> Atmospheric Particulate Matter with diameter less than 2.5 micrometers



# There are ~2.1 billion<sup>2</sup> people in the world without access to clean fuels and technologies for cooking

Population without access to clean fuels and technologies for cooking<sup>1</sup> by region, millions, 2022

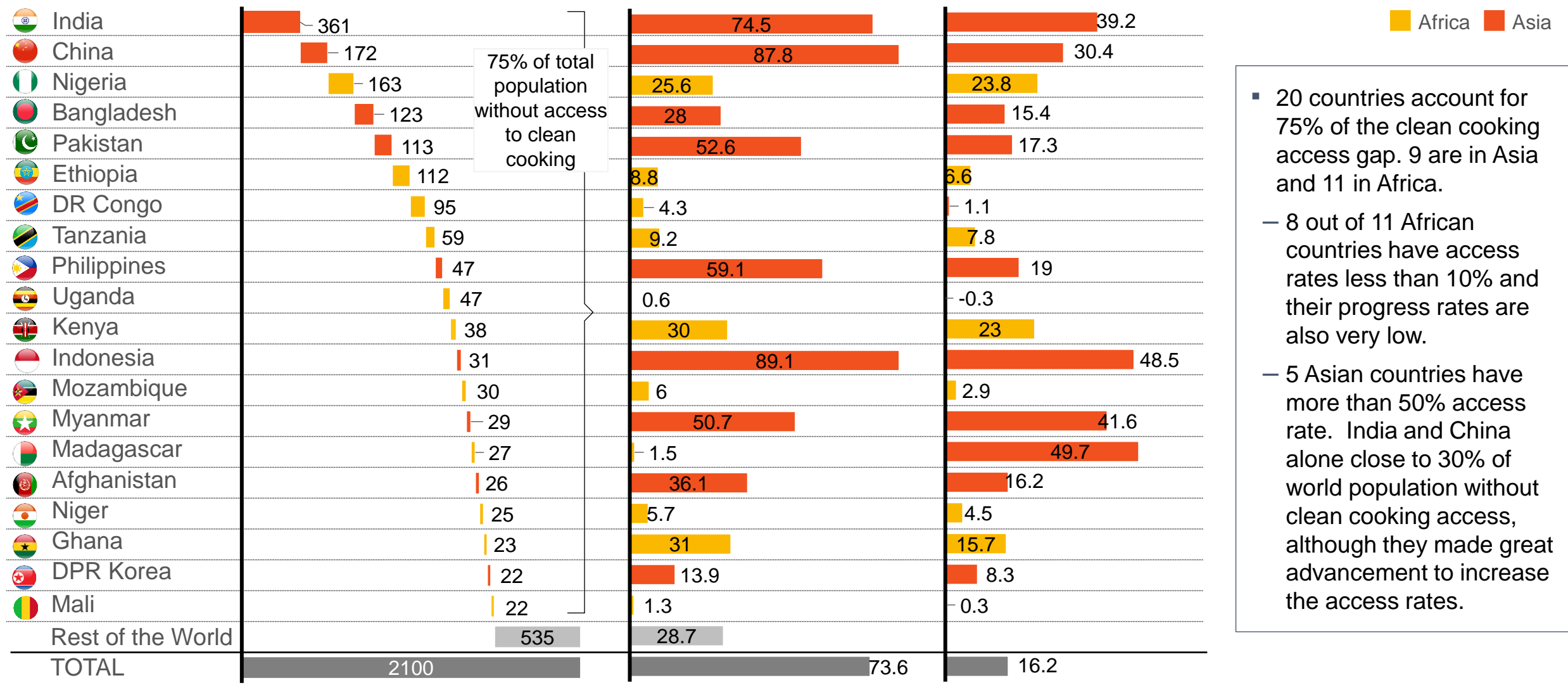
(x) % of total



NOTES: 1 Clean cooking access is defined as a household using clean fuels or improved technologies for cooking as defined by the WHO  
 2 Due to lack of access rate data for various countries in the 2024 dataset as well as the possible data disparity of total population data used, there is 18 million difference between the population calculated without access using the world access rate (2100 million) in the report and the sum of all countries population without clean cooking access of individual countries and regions (2082 million) calculated by the datasets. This creates the sum of the shares of each region only adds up to 99.1%. The 2024 Tracking SDG7 dataset and the World Bank Total Population dataset updated on June 28, 2024, were used for calculation.  
 SOURCE: SEforALL Analysis DATA SOURCES: IEA, IRENA, UNSD, World Bank, and WHO (2024) Tracking SDG7 2024 Report Datasets; World Bank Total Population data 2024

# Top 20 access deficit countries are in Africa and Asia, making up 75% of the access to clean cooking challenge

Population without access to clean cooking, millions, 2022    Access rate, %, 2022    Access rate improvement, pp %, 2010-2022



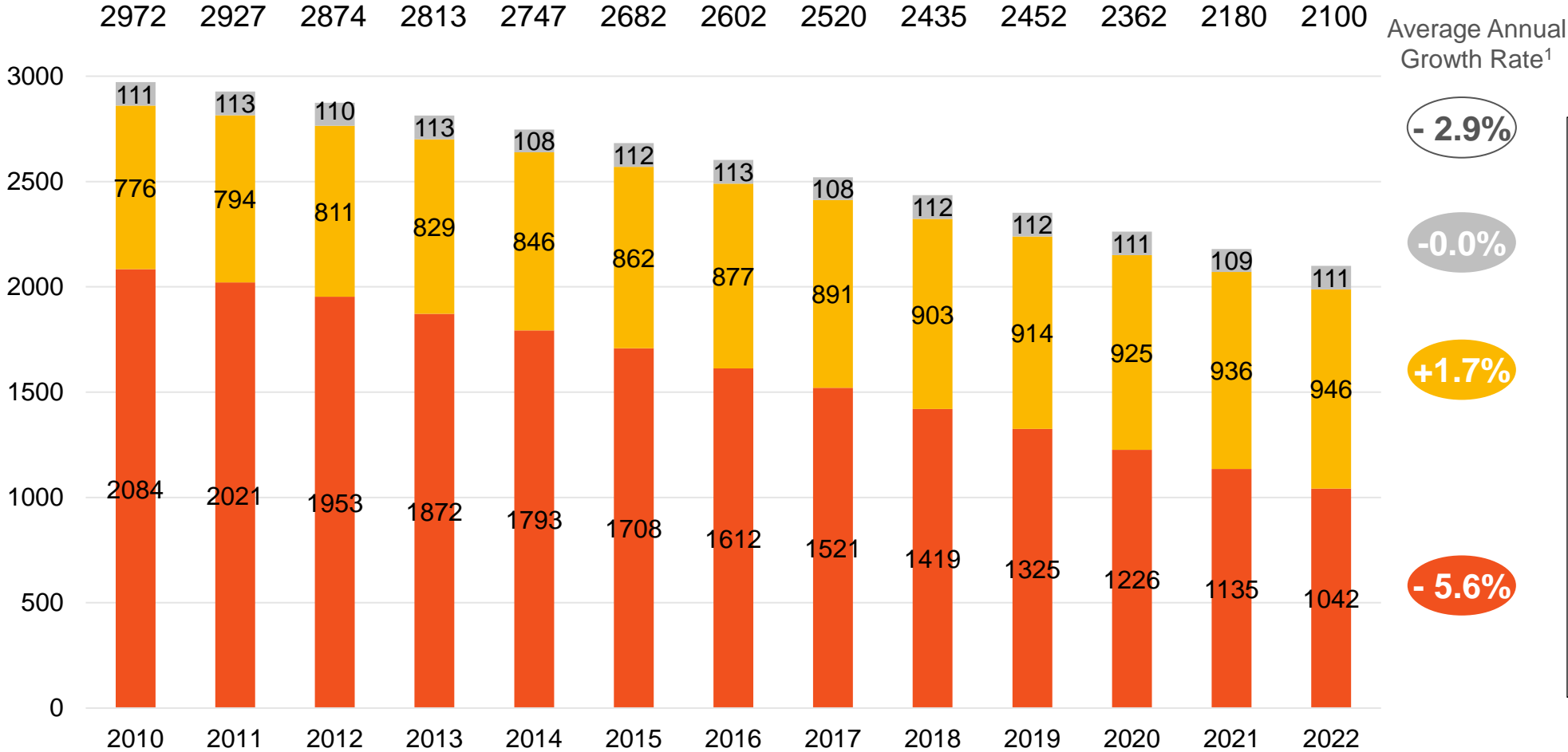
- 20 countries account for 75% of the clean cooking access gap. 9 are in Asia and 11 in Africa.
- 8 out of 11 African countries have access rates less than 10% and their progress rates are also very low.
- 5 Asian countries have more than 50% access rate. India and China alone close to 30% of world population without clean cooking access, although they made great advancement to increase the access rates.

SOURCE: SEforALL Analysis    DATA SOURCES: IEA, IRENA, UNSD, World Bank, and WHO (2024) Tracking SDG7 2024 Report Datasets; World Bank Total Population data 2024

# The number of people without access to clean fuels and technologies for cooking has declined to 2.1 billion in 2022.

Population without access to clean fuels and technologies for cooking by region, millions, 2010-2022

Rest of the World Africa Asia



- Progress of increasing access to clean cooking has been slow over the past decade.
- Asia has shown 50% reduction of access deficit population since 2010, but the large population size of the region makes it still the largest population without clean cooking access.
- The number of people without access in Africa shows 22% increase since 2010.

NOTE: The World Bank .ESMAP historical data up to 2021 and the total population historical data were both updated with the 2024 dataset. This creates inconsistencies with the analysis in the previous year

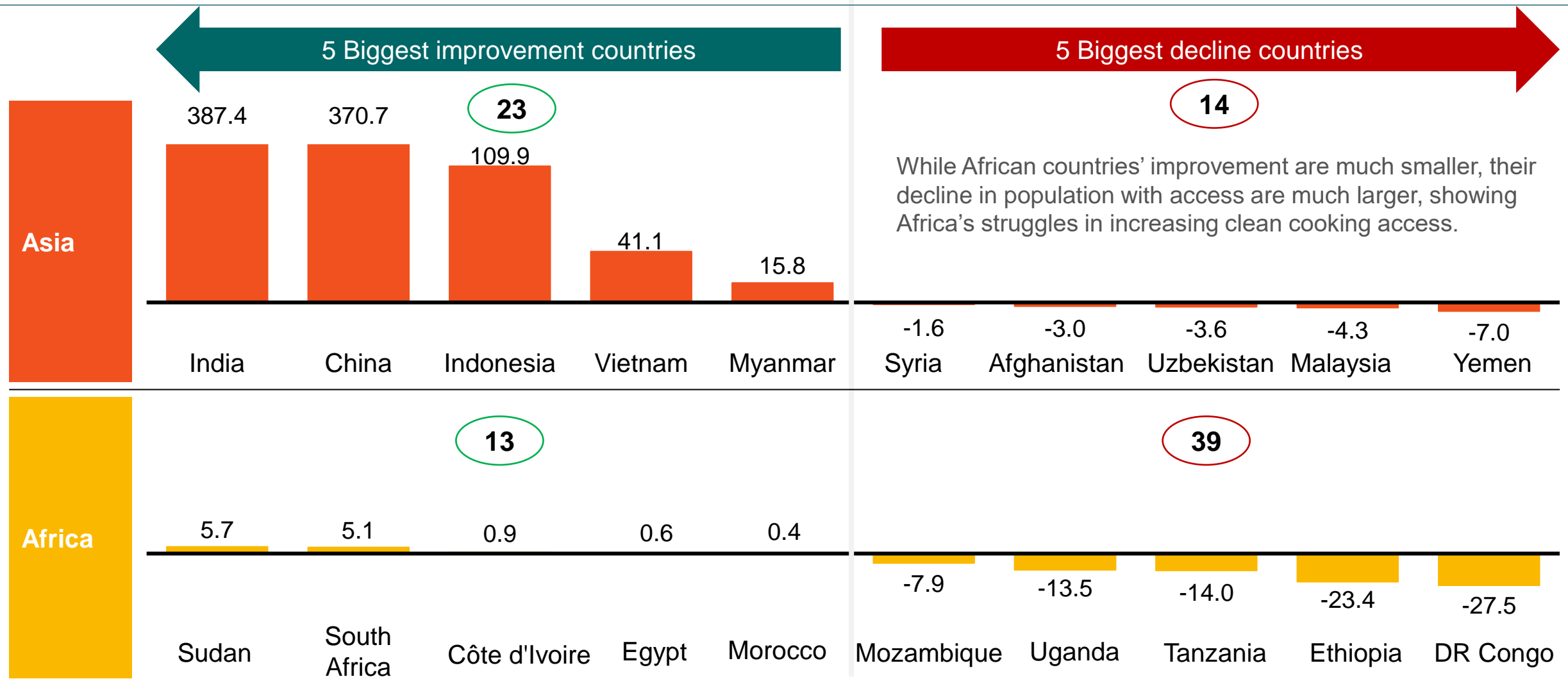
<sup>1</sup> Compound annual growth rate = the average annual growth rate

SOURCE: SEforALL Analysis DATA SOURCES: IEA, IRENA, UNSD, World Bank, and WHO (2024) Tracking SDG7 2024 Report Datasets; World Bank Total Population data 2024

# 72% of African countries (39 out of 54 countries) increased the population without access between 2010 and 2022 while more than 60% of Asian countries reduced access deficit population

Reduction in population without access to clean cooking between 2010 and 2022, millions

**x** Number of countries with improvements  
**x** Number of countries with decline



NOTE: These figures represent the absolute change in the number of people without access to clean cooking solutions between 2010 and 2022.

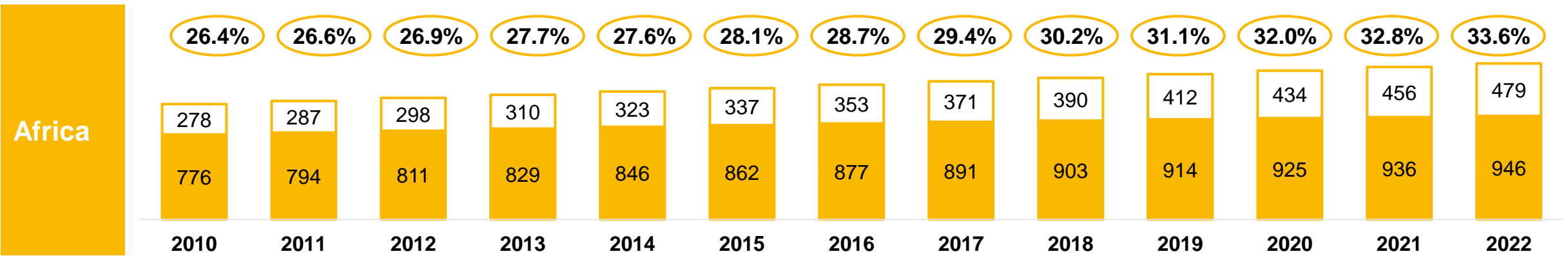
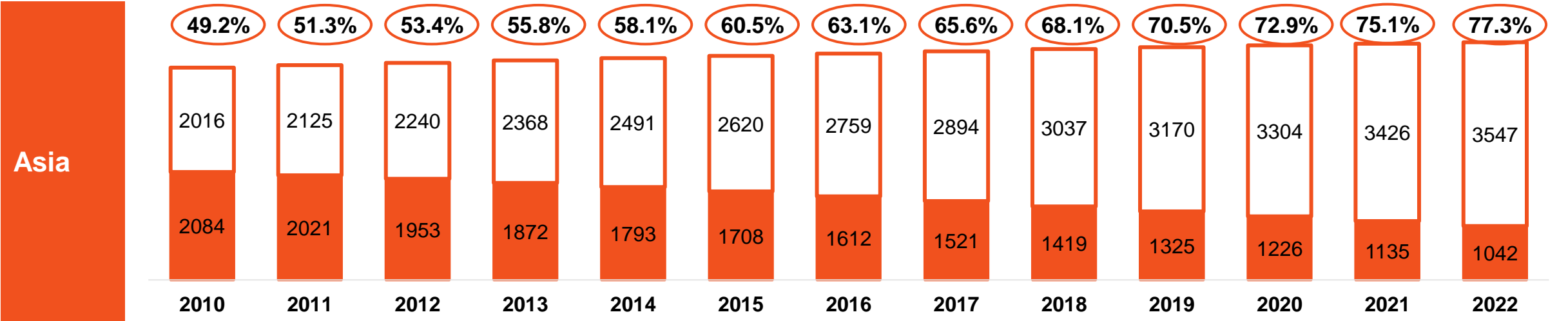
SOURCE: SEforALL Analysis | DATA SOURCES: IEA, IRENA, UNSD, World Bank, and WHO (2024) Tracking SDG7 2024 Report Datasets; World Bank Total Population data 2024

# Asia now has more than three-quarter of people with clean cooking access while Africa' rate stays below a third

Population, millions

x% Clean cooking access rate

Population with access to clean cooking Population w/o access to clean cooking



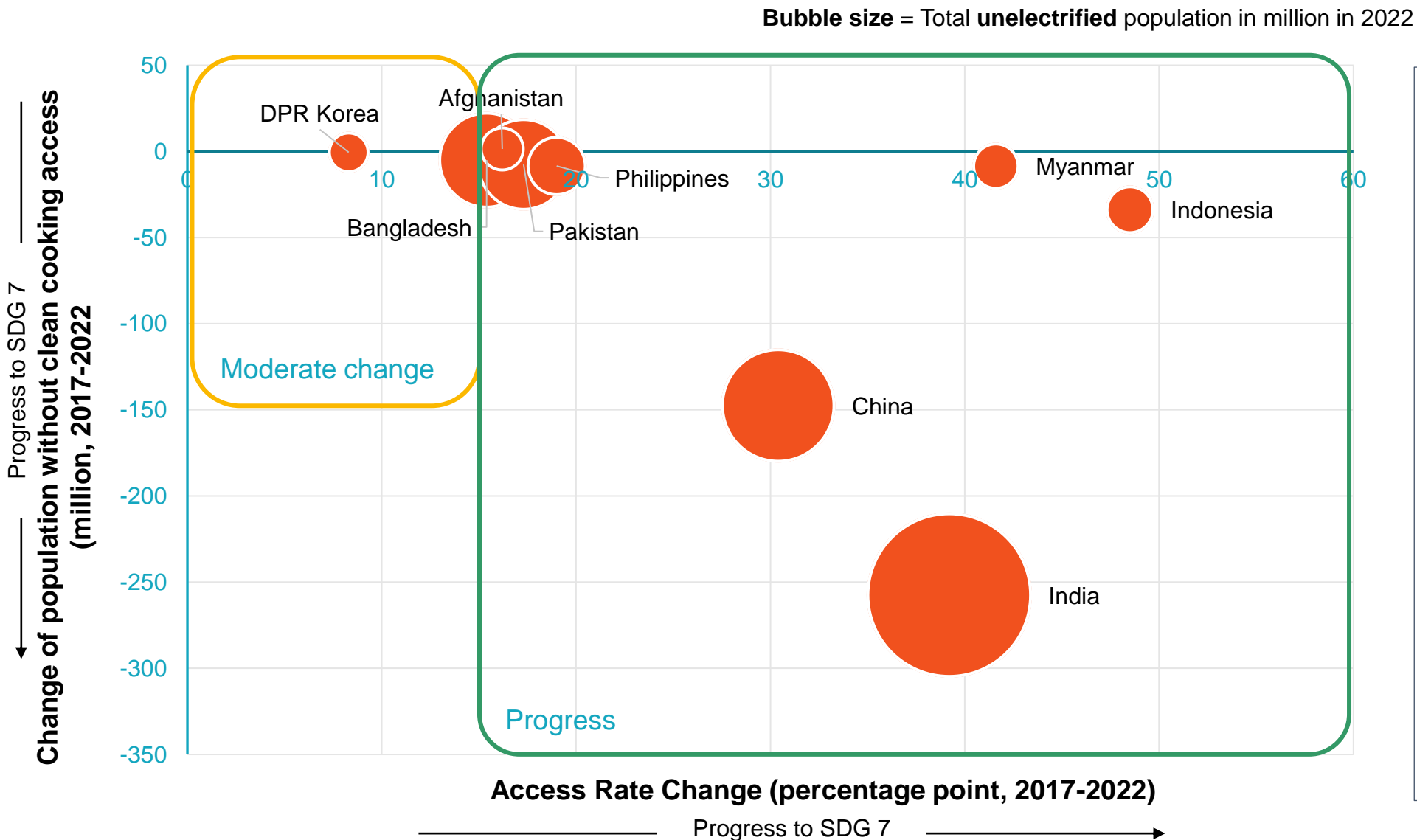
NOTE: The World Bank .ESMAP historical data up to 2021 was updated with the 2024 dataset. This creates inconsistencies with the analysis in the previous year

SOURCE: SEforALL Analysis DATA SOURCES: IEA, IRENA, UNSD, World Bank, and WHO (2024) Tracking SDG7 2024 Report Datasets; World Bank Total Population data 2024

# Electricity access: Deep dive on Asia

● In top 20 Asian countries

2022 Population without access vs Changes in population without access and in clean cooking access rates *between 2017 and 2022*



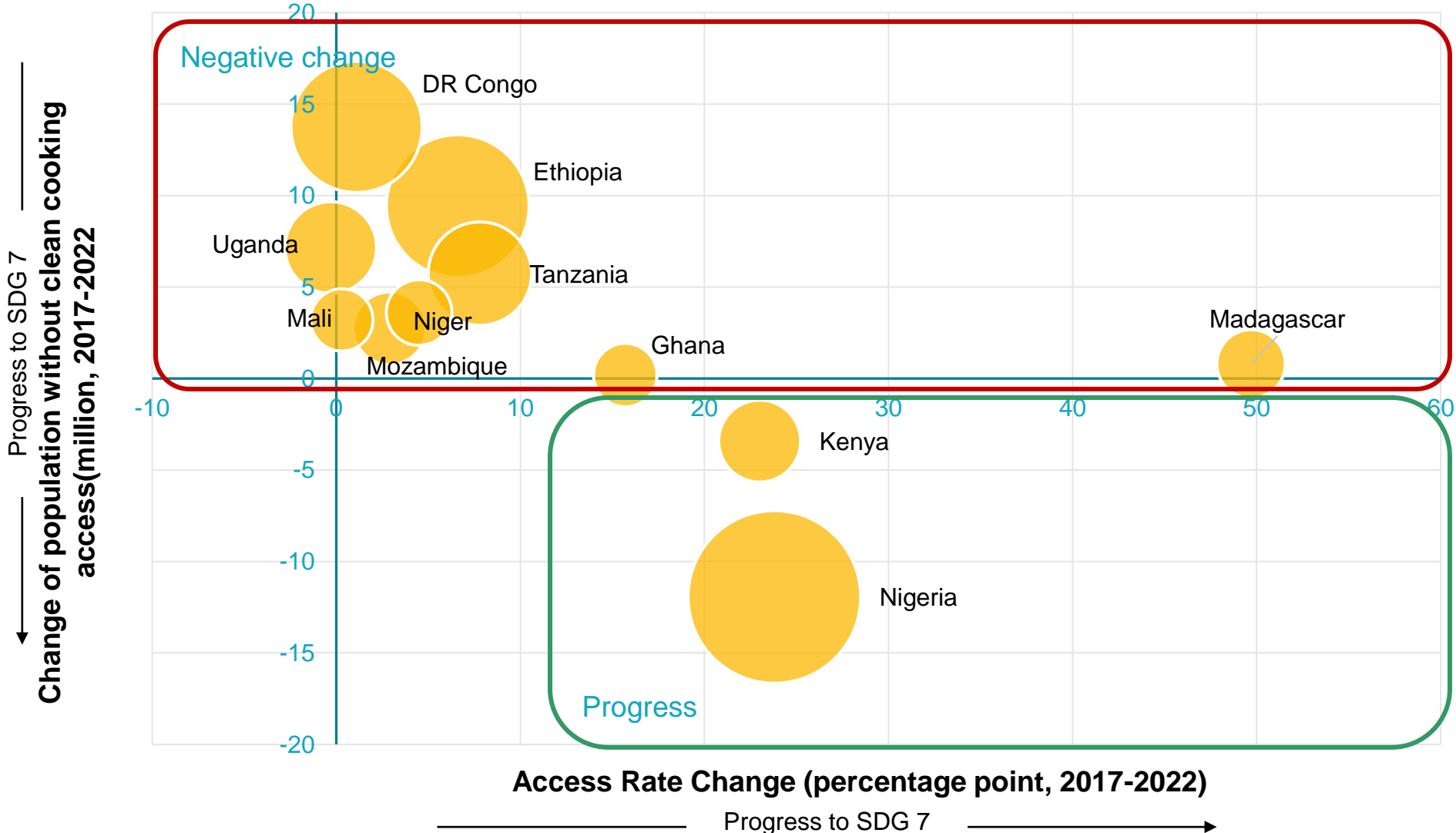
- An analysis of recent years shows that many leading Asian countries have made significant progress, with no country backsliding or experiencing negative change.
- India and China show good progress in reduction of population without clean cooking access, while Indonesia exhibits the highest improvement of access rate in recent years in this group.
- However, given the remaining unelectrified population, countries need to intensify and focus their efforts.

# Electricity access: Deep dive on Africa

● In top 20 Asian countries

2022 Population without access vs Changes in population without access and in clean cooking access rates *between 2017 and 2022*

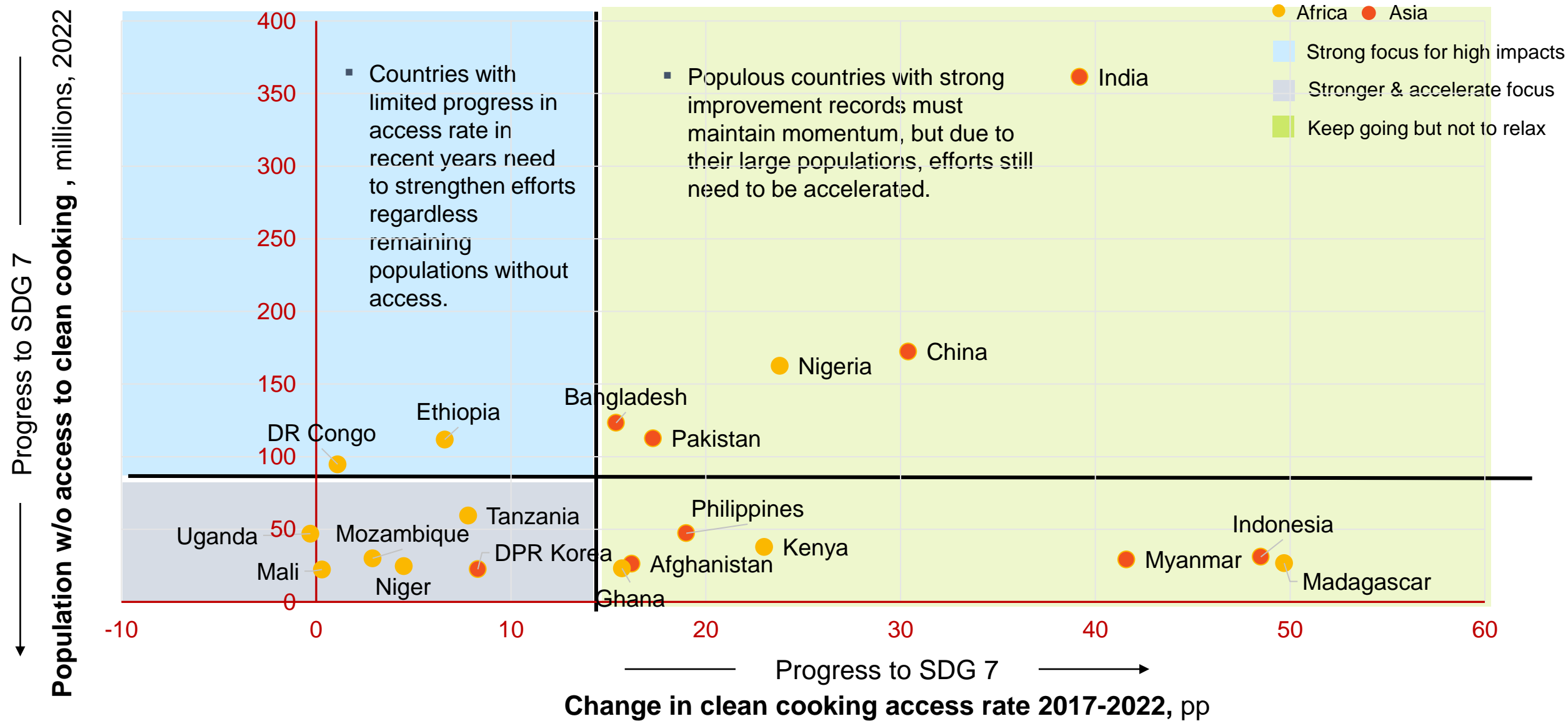
Bubble size = Total **unelectrified** population in million in 2022



- An analysis of recent years reveals that while many countries have improved their access rates, 9 out of 11 countries have seen an increase in the number of people without access to clean cooking. This is an alarming trend for these African nations.
- Only Kenya and Nigeria made real progress of both increasing access rates and reducing population without access.

# Countries with large unelectrified populations have high impact potential, but tailored strategies are needed for all slow progress and low access rate countries

Population without access to clean cooking (2022) vs change in clean cooking access rates (2017-2022) - Top 20 countries



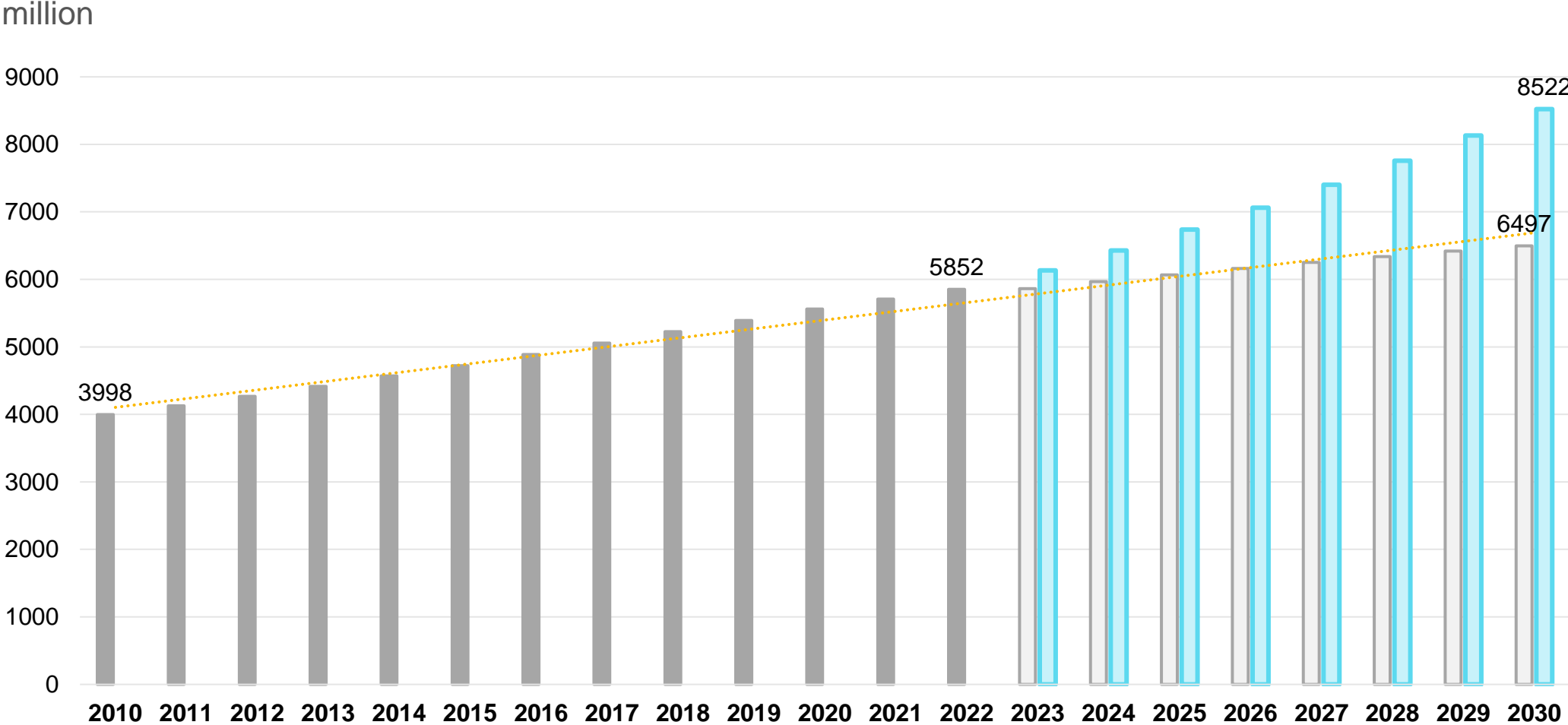
SOURCE: SEforALL Analysis | DATA SOURCES: IEA, IRENA, UNSD, World Bank, and WHO (2024) Tracking SDG7 2024 Report Datasets; World Bank Total Population data 2024



# Still 2 billion people are expected without access in 2030 with the current trajectory

Current trend trajectory vs required trajectory to achieve clean cooking access

Forecast shown lighter shade



2 billion people are estimated without clean cooking access in the world in 2030 if the current rate of improvement continues. The rate of improvement needs to be accelerated greatly

- Population with access in million (Current Trajectory)
- Population need to be electrified in million (Required Trajectory)
- Linear (Population with access in million (Current Trajectory))

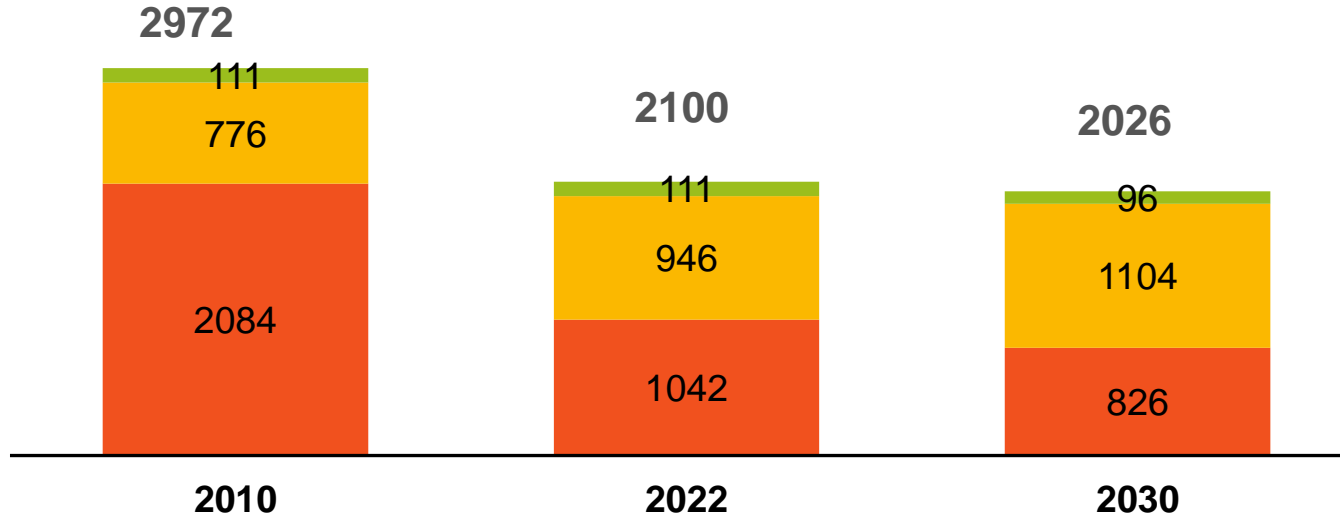
SOURCE: SEforALL Analysis  
 DATA SOURCES: IEA, IRENA, UNSD, World Bank, and WHO (2024) Tracking SDG7 Report 2024 Datasets; World Bank Development Indicators (2024)– Population, total, World Bank Data Bank (2024) Population projections and estimates

# Projections show that SDG7.1.2 is off-track for 2030 achievement with large margin

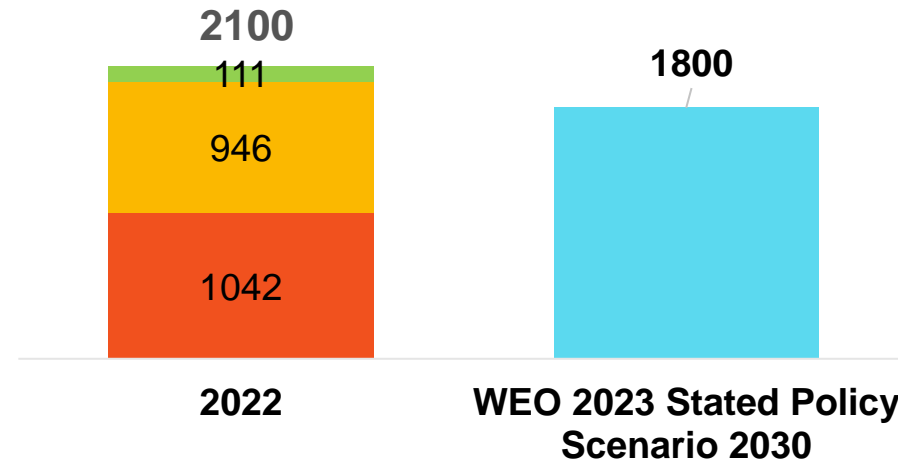
Number of people without access to clean cooking, millions

Rest of world Asia Africa Forecast shown lighter shade

**Straight line extrapolation**



**IEA Stated Policies Scenario (STEPS) Tracking SDG7 2024**

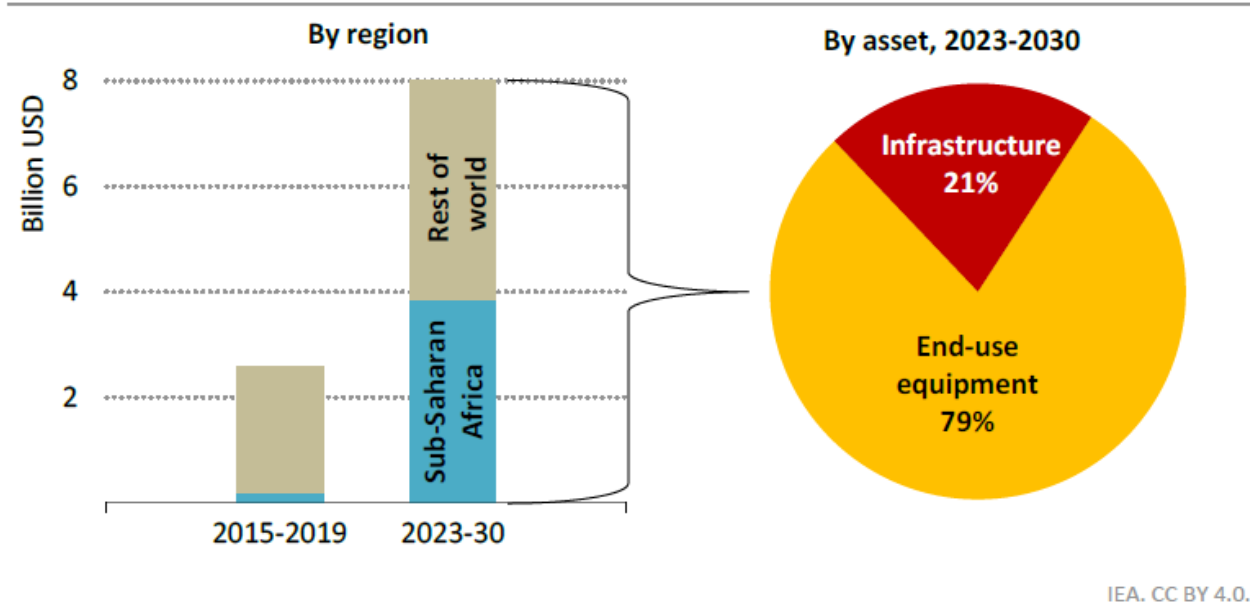


- We are very much off track to universal access to clean cooking at the current pace.
- ✓ The straight-line projection shows that population without access to clean cooking in Asia is expected decrease by 2030, but still a large population will remain without access. Africa is expected to increase the population without access to clean cooking due to the expected population increase. To achieve universal access by 2030, the world needs to reduce more than 5% of population without access annually, close to average 350 million per year.
- ✓ IEA and WHO project ~1.8 billion people without access in 2030, approximately 21% of the world population. IEA's scenario expects more than 1 billion people without access in Sub-Saharan Africa alone, and universal clean cooking access by 2030 requires over 300 million people each year (about half of them in Sub-Saharan Africa) through the decade's end.

# Average annual investment of USD 8 billion is needed between 2022 and 2030 for universal clean cooking access

Average annual investment for clean cooking access under IEA' Net Zero Emissions by 2050 Scenario, 2022-2030

**Figure 2.8** ▶ Annual investments required in the Access for All scenario by 2030



IEA. CC BY 4.0.

*Annual investments need to reach USD 8 billion per year until 2030 to achieve access for all, half of which would be in Africa. Most of the investment need is for stoves.*

Note: End-use equipment includes stoves, gas cylinders, and biodigesters. Infrastructure includes that for LPG (e.g., importing storage units, refilling stations, bottling facilities, etc.) and the consumer connection cost for electricity (e.g., connection to the grid or an off-grid system). Investment figures include upfront costs only and exclude fuel, energy and operation costs. LPG infrastructure represent the bulk of infrastructure investments as electricity infrastructure is often being expanded to support other end-uses than cooking.

- Today, clean cooking investments are around USD 2.5 billion annually.
- In the IEA's Access for All scenario, this would need to rise to USD 8 billion annually between now and 2030 – requiring a cumulative investment of around USD 60 billion.
- Africa makes up around half of these investment needs, standing at almost USD 4 billion annually.
- The required investments in clean cooking through the rest of this decade will need to be split between stoves, accompanying equipment and supporting infrastructure to ensure continued delivery. Roughly 80% of the total investment goes into providing stoves and equipment. The remainder is designated for infrastructure, largely to serve LPG delivery with a smaller share for electricity. This does not account for the investments needed to build up clean cook stove supply chains.

Note: IEA's Access for All Scenario examines practical regional strategies required to guarantee universal access to clean cooking, thereby aligning with the objectives of SDG7

Source: IEA A Vision for Clean Cooking Access for All, 2023

# While significant overlaps are found between lack of electrification and clean cooking, the large difference of population numbers without access between the two and other factors show that lower tier electricity access does not automatically contribute to clean cooking access as a fuel.

14 countries make up both of the top 80% of electricity access and 71% of clean cooking access challenge

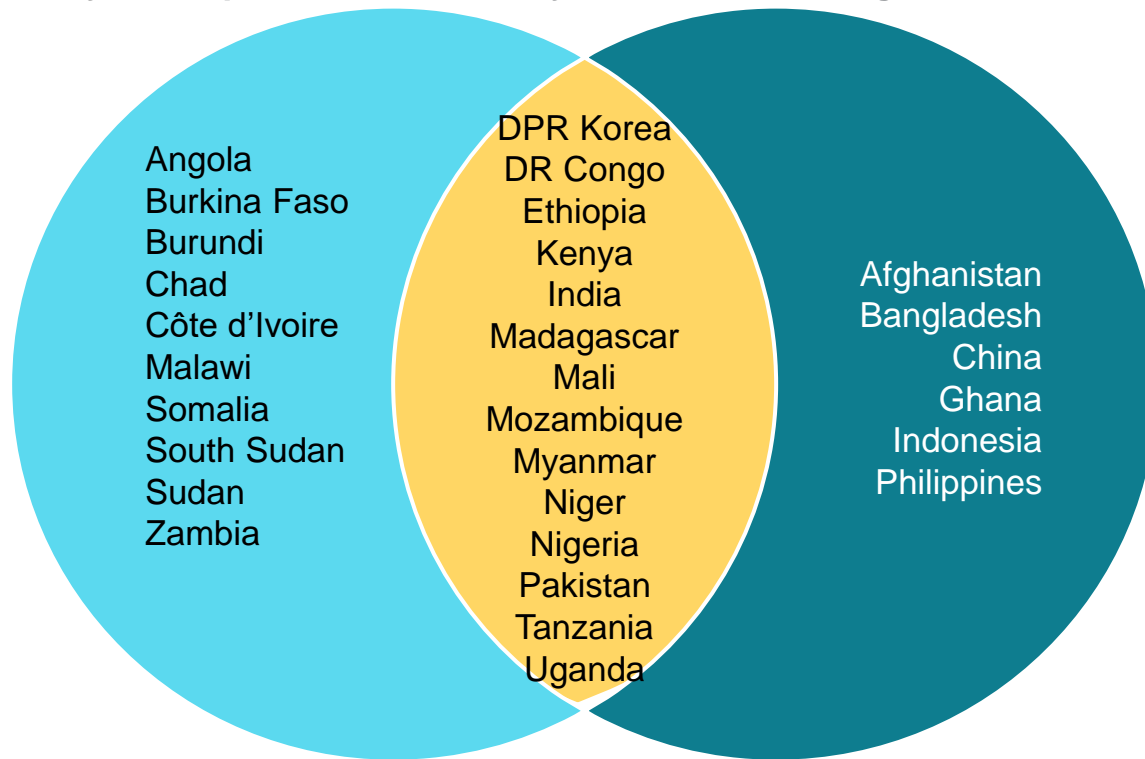


There is a correlation between electrification and access to clean cooking, but the difference in population without access in the two areas are large

~685 million people lack access to electricity with the countries making the top 80% being...

~2.1 billion people lack access to clean cooking with the countries making up the top 71% being...

Country Overlap between Electricity and Clean Cooking Access Challenges



- Clean cooking technologies (such as solar cookers) can be used as an entry product to unelectrified households, and e-cooking solution may create synergy between electrification and clean cooking access.
- In reality, however, **e-cooking affordability, cooking traditions, and level of electricity access** are some of the factors need to be overcome to create the synergy between the two energy accesses.
  - Tier 1 or 2 electricity access does not provide enough power for electric cooking, and efficiency plays an important role.
  - In many parts of the world, electricity is not an affordable clean cooking fuel compared to traditional fuels.
  - Electric cooking stoves could be also expensive and difficult to obtain due to weak local market demand and/or lack of local industry/supply.
  - Many people have strong fuel preferences on their cultural cooking practices.
- **To create synergy between electricity and clean cooking accesses through e-cooking, well-coordinated planning, policy and regulations based on the nature of market failures and more funding to multi-benefit projects may be needed.**

<sup>1</sup> Based on a study of the effects of Tier 2 electrification (low power and ~4 hours of electricity a day) in Kenya, Ethiopia and Bangladesh;

# Contents

Executive summary

SDG 7.1.1: Electricity access

SDG 7.1.2: Clean cooking access

**SDG 7.2: Share of renewables  
in Total Final Energy Consumption (TFEC)**

SDG 7.3: Energy intensity

## SDG 7.2 Share of Renewables Energy (RE) in Total Final Energy Consumption (TFEC)

The share of renewables, including the use of traditional biomass, in total final energy consumption (TFEC) was 18.7% in 2021, receding for the first time since 2010. The world share of *modern* renewables in total energy consumption stayed at 12.5%.

- The increase of global share of renewables in its total final energy consumption (TFEC) in 2021 was 2.7 percentage point from 16.0% in 2010, while the increase of the share of modern renewables in 2021 was 3.8 percentage points from 8.7% in 2010.
- Regionally, Oceania is the only region that progressed from 2020 in RE share in TFEC, while Asia had no changes. All other regions showed setbacks.
- As for Modern RE-share, Africa, Asia and Oceania has increased the shares, Latin America and the Caribbean and North America and Europe reduced their shares from 2020. Africa's modern renewable share stays around 15% of RE consumption without strong advancement, while all other regions have above 60% of modern sources among RE shares.
- In terms of RE power generating capacity per capita, Asia made strong progress since 2010, exceeding developed countries' average growth rate, while Sub-Saharan Africa (SSA) and Least Developed Countries (LDCs, many in SSA) have much smaller growth rates following the slow pace of electrification.

### International public investment in renewables to developing countries bounced back in 2022.

- The decline of international public financial flows in support of renewable and clean energy hit bottom in 2019, 2020 and 2021, and showed a comeback in 2022. However, the 2022 investment total was just 54% of the 2016 amount.
- Global total investment in renewables has been increasing but the 2023 amount is still only three-quarter of what is needed to achieve net zero by 2050. More than 80% of the total investment remains concentrated in advanced economies and China.

### Looking forward, based on the current trends, we are not on track to achieve SDG 7.1.2 by 2030

- The share of renewables in TFEC is projected to increase to only around 21-23% by 2030. While the IEA projection has not changed from the previous year estimate, the 2021 setback lower the straight-line trend projection.
- The IEA estimates that modern uses of renewables would represent just over a third of TFEC in 2030 under its the Net Zero Emissions by 2050 scenario. To achieve this level of share, modern RE needs to be accelerated further, particularly in Africa.
- Global RE heat consumption is progressing very slowly, while RE consumption in electricity has much higher annual average growth rates since 2010. Transport RE consumption is growing strongly but it needs make up for an extremely low starting point. All the growth trends in heat, electricity and transport have strong variations among regions.

## Description

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### Data Sources

- The following data was gathered from WORLD BANK / ESMAP's Tracking SDG 7 database ([download link](#)):
  - The total share of renewables in total final energy consumption in the world between 2010 and 2021.
  - The total share of renewables in total final energy consumption per country and per region between 2010 and 2021
  - The share of modern renewables in total final energy consumption per country and per region between 2010 and 2021
  - The total energy consumption per country in 2010 and 2021
  - International financial flows to developing countries in support of clean energy research and development and renewable energy production, including in hybrid systems between 2010 and 2022
  - Installed renewable power installed capacity in developing countries (in watts per capita) between 2010 and 2022
- The following data was gathered from the IEA's publications and their datasets:
  - Energy investment by sector and by region (World Energy Investment 2024)

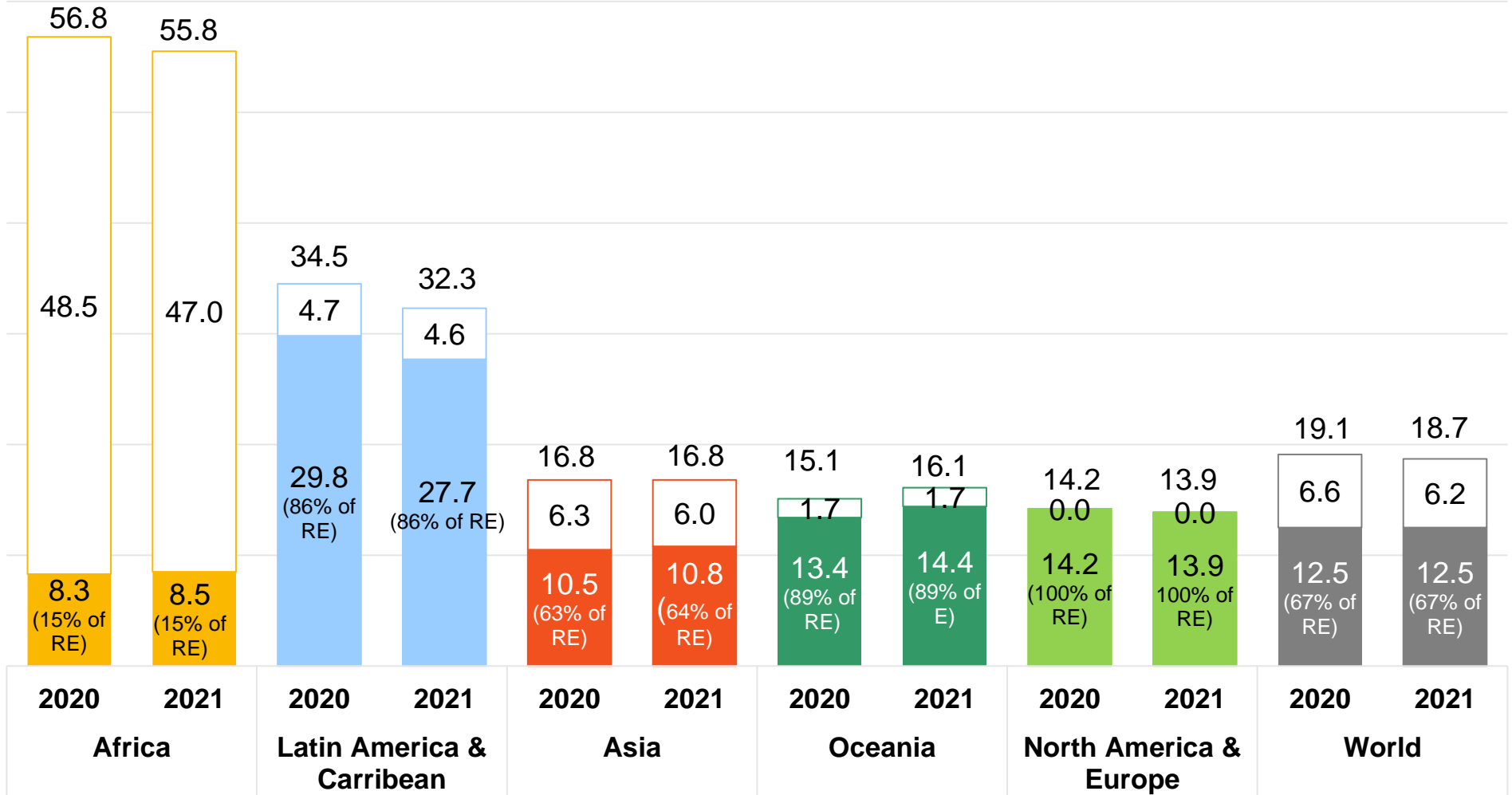
### Projections

- Straight line extrapolation projections were made via the following process:
  - The rate of change of the share of renewables in final energy consumption (Compound Annual Growth Rate, CAGR) between 2010 and 2021 was calculated at a global level
  - The share of renewables in energy mix was projected forward to 2030 (by 9 years) using the calculated CAGR as the growth rate
- IEA Stated Policies Scenario was taken from the Tracking SDG7 2024 report & World Energy Outlook 2023

# Today, the share of renewables in the energy consumption is 18.7%, 12.5% of which is modern renewables. In 2021, SDG7.2 saw a setback for the first time since 2010.

Share of renewables in total energy consumption by region, %, 2020 and 2021

■ Modern renewables □ Other renewables



- The world has only 12.5% of modern renewables (excl. traditional biomass) in its TFEC (Total Final Energy Consumption), unchanged since 2020.
- The world and all regions, except Oceania and Asia, showed receding or stagnating results in both renewable share and modern renewable share in TFEC in 2021, compared to 2020.
- Oceania and Asia showed advancements in modern renewable energy.

NOTE: The historical data up to 2020 was also updated with the 2024 dataset. This creates inconsistencies with the analysis in the previous year

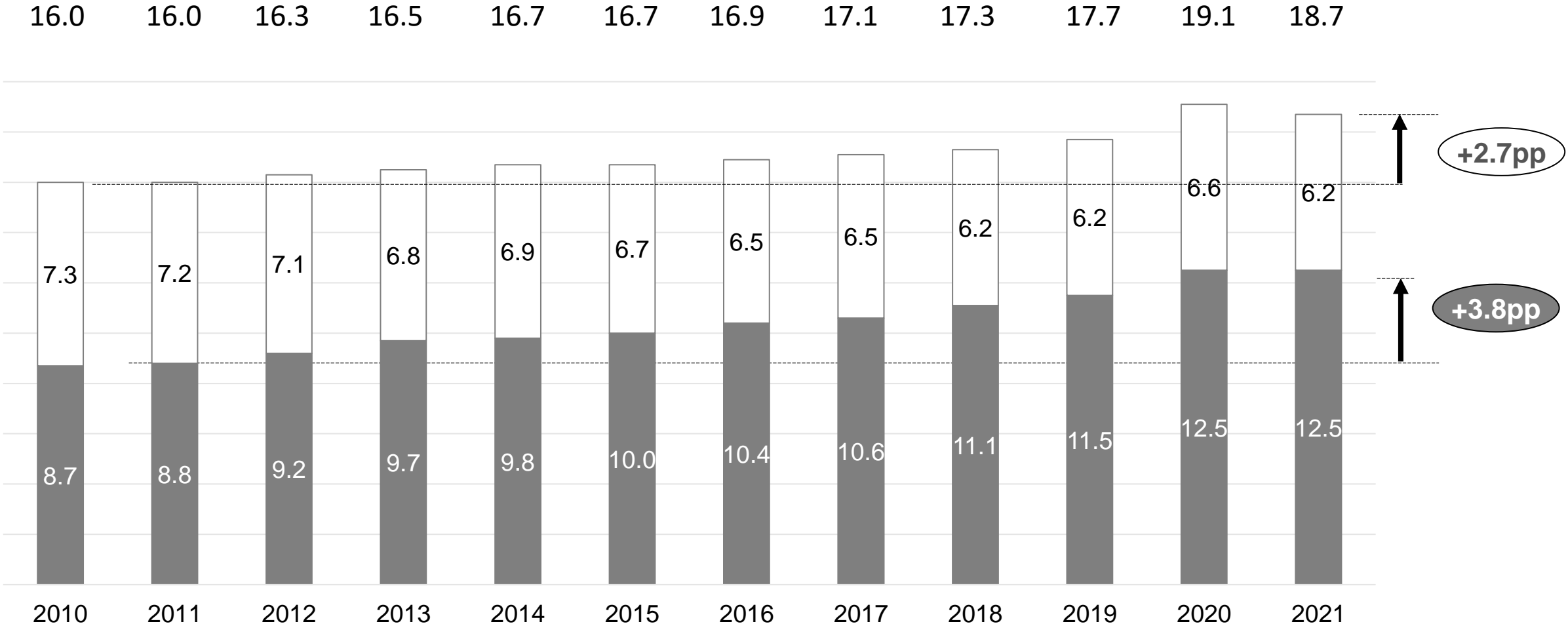
SOURCE: SEforALL Analysis DATA SOURCES: IEA, IRENA, UNSD, World Bank, and WHO (2024) Tracking SDG7 2024 Report Datasets



# The share of renewables and that of modern renewables in total energy consumption increased by 3.8pp and 2.7pp, respectively, in 2010-21 but it regressed for the first-time in 2020-21.

Share of renewables in total energy consumption, % 2010-2021

■ Modern renewables □ Other renewables



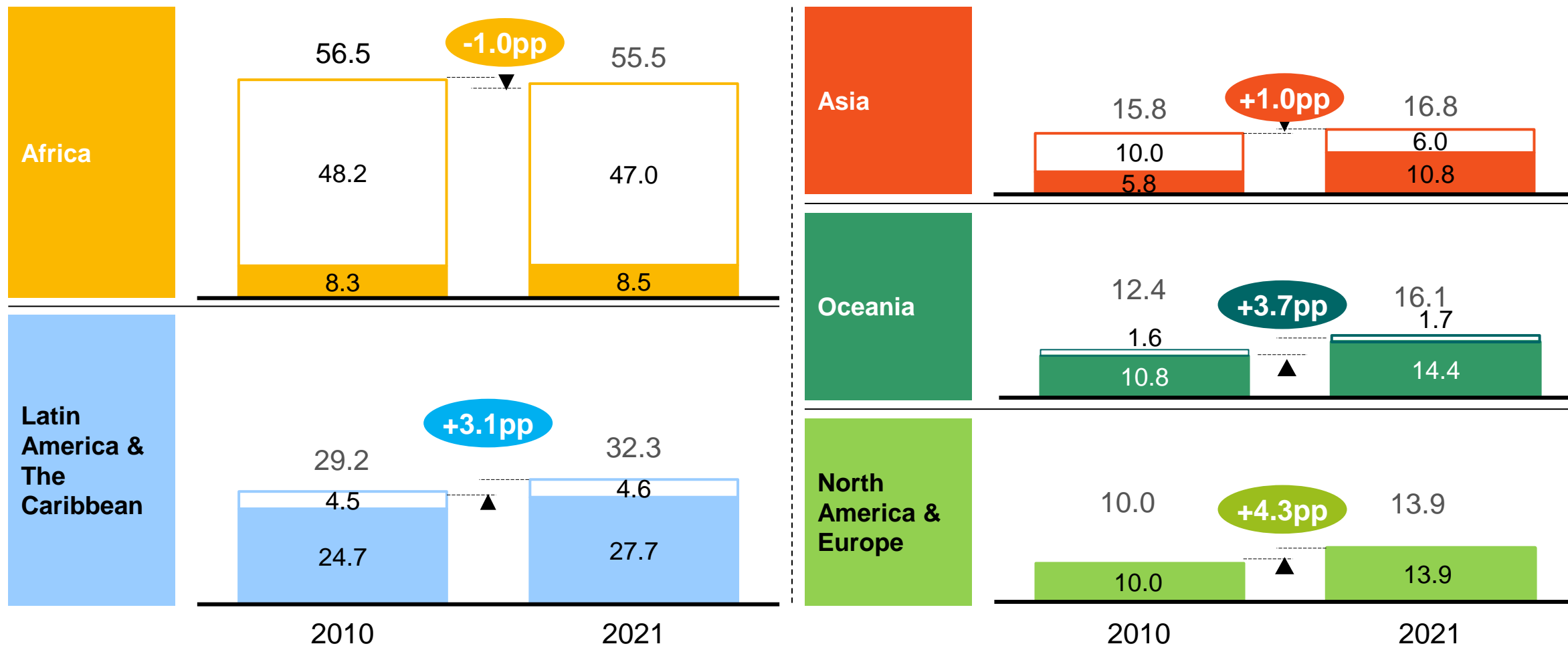
NOTE: The historical data up to 2020 was also updated with the 2024 dataset. This creates inconsistencies with the analysis in the previous year

SOURCE: SEforALL Analysis DATA SOURCES: IEA, IRENA, UNSD, World Bank, and WHO (2024) Tracking SDG7 2024 Report Datasets

# All regions show slow progress since 2010, in particular Africa and Asia. Africa is the only region that regressed since 2010 although the share of modern renewable has slightly increased.

Share of renewables in energy consumption by region, %, 2010, 2021

■ Modern renewables □ Other renewables

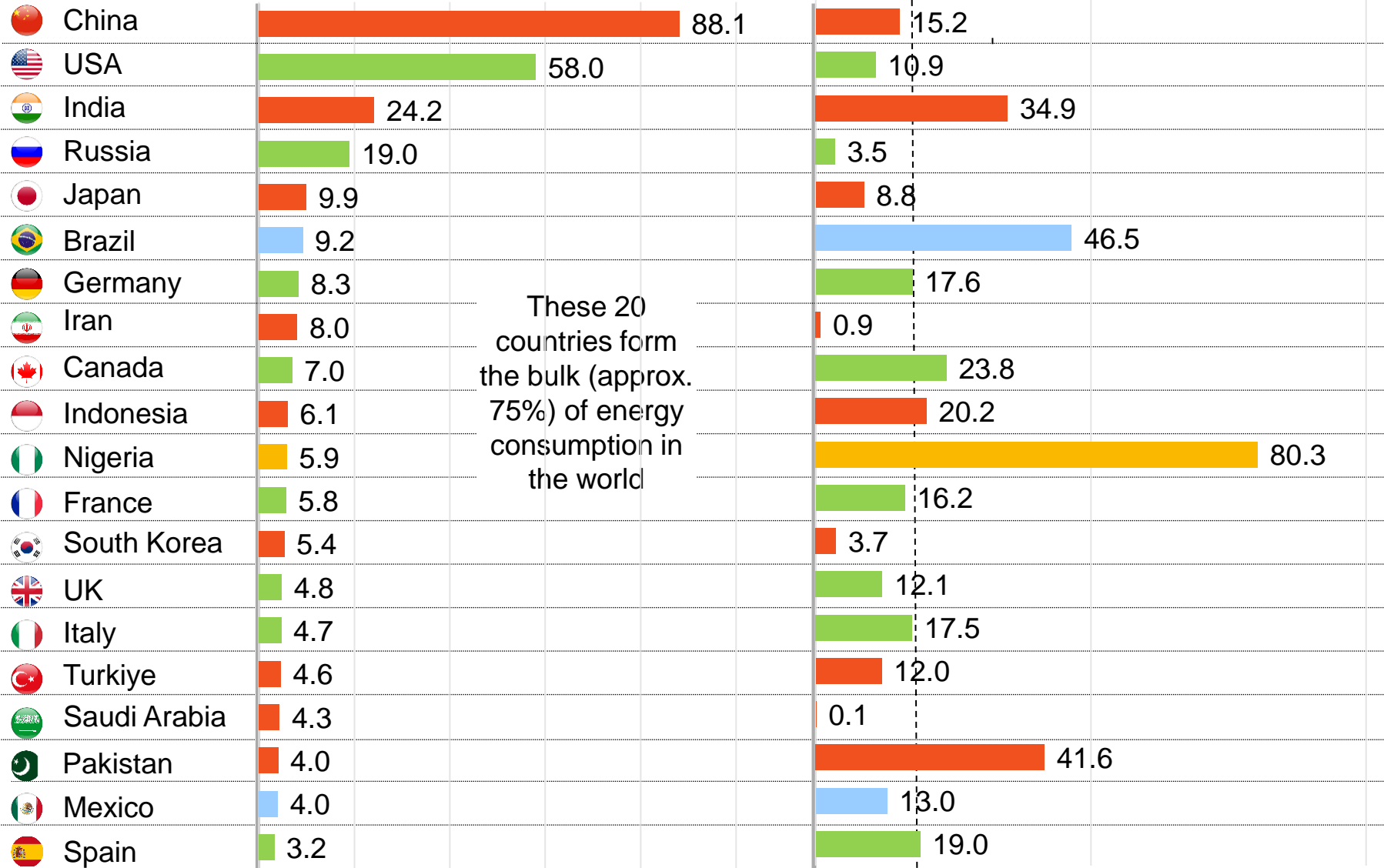


NOTE: The historical data up to 2020 was also updated with the 2024 dataset. This creates inconsistencies with the analysis in the previous year  
 SOURCE: SEforALL Analysis DATA SOURCES: IEA, IRENA, UNSD, World Bank, and WHO (2024) Tracking SDG7 2024 Report Datasets

# Only 17.2% of energy consumption of the top 20 energy-consuming countries are from renewables, 0.4 percentage point down from 2020.

Energy consumption, EJ<sup>1</sup> 2021

Share of renewables, %, 2021



These 20 countries form the bulk (approx. 75%) of energy consumption in the world

- Africa
- Asia
- Oceania
- North America & Europe
- Latin America & The Caribbean

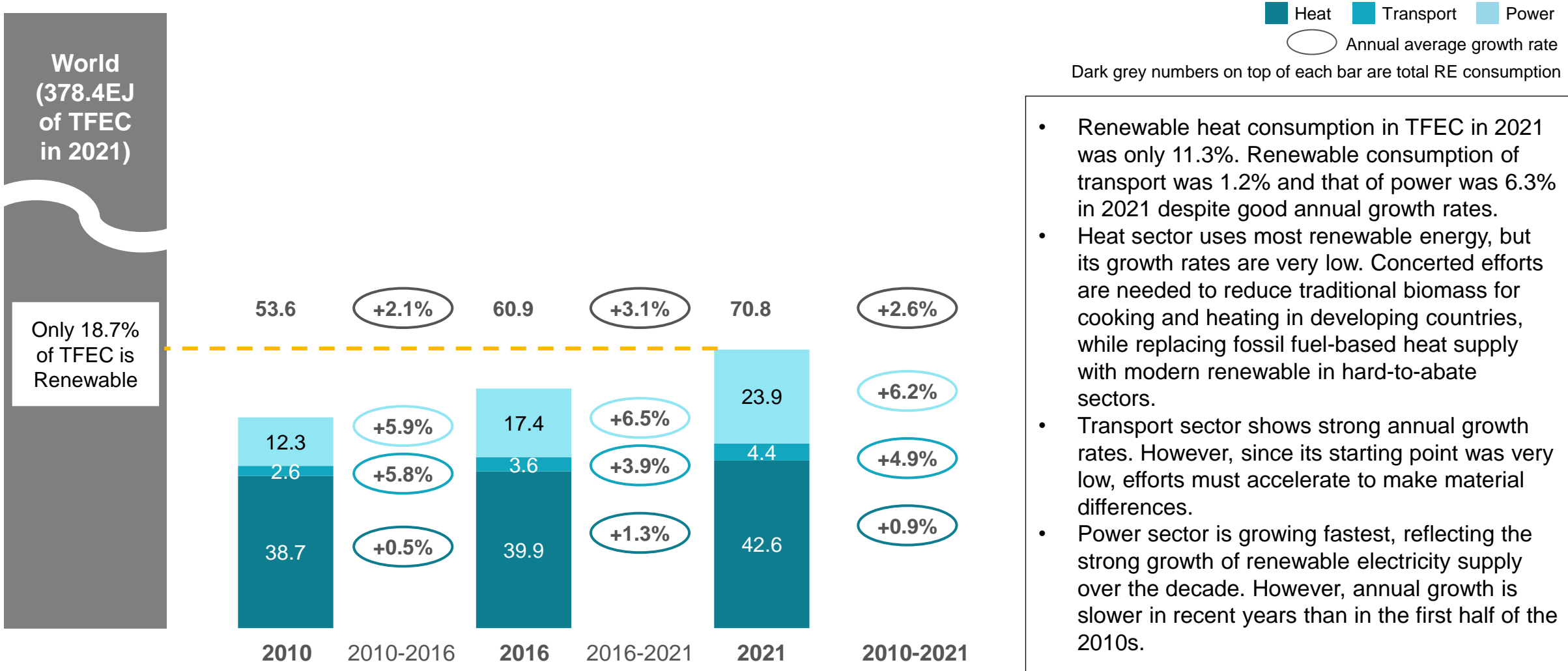
- Only 7 countries out of the top 20 energy-consuming countries have a higher share of renewables in their energy TFEC than the world average.
- Only 49.1 EJ (17.2%) in 284.6 EJ TFEC of top 20 countries come from renewables, slightly worsened from 2020.
- To substantially increase RE share in TFEC, fortifying efforts in all sectors in these top 20 High-Impact Countries will be most effective, especially in high consumption countries with low renewable / modern renewable shares such as China, the United States, India and Russia.

1: EJ = Exajoule = 1000 PJ

SOURCE: SEforALL Analysis DATA SOURCES: IEA, IRENA, UNSD, World Bank, and WHO (2024) Tracking SDG7 2024 Report Datasets

# Heat has the largest renewable consumption but shows the slowest growth, while power sector has the strongest growth rate.

Renewables total, heat, transport and electricity final energy consumptions, EJ, 2010, 2016, 2021

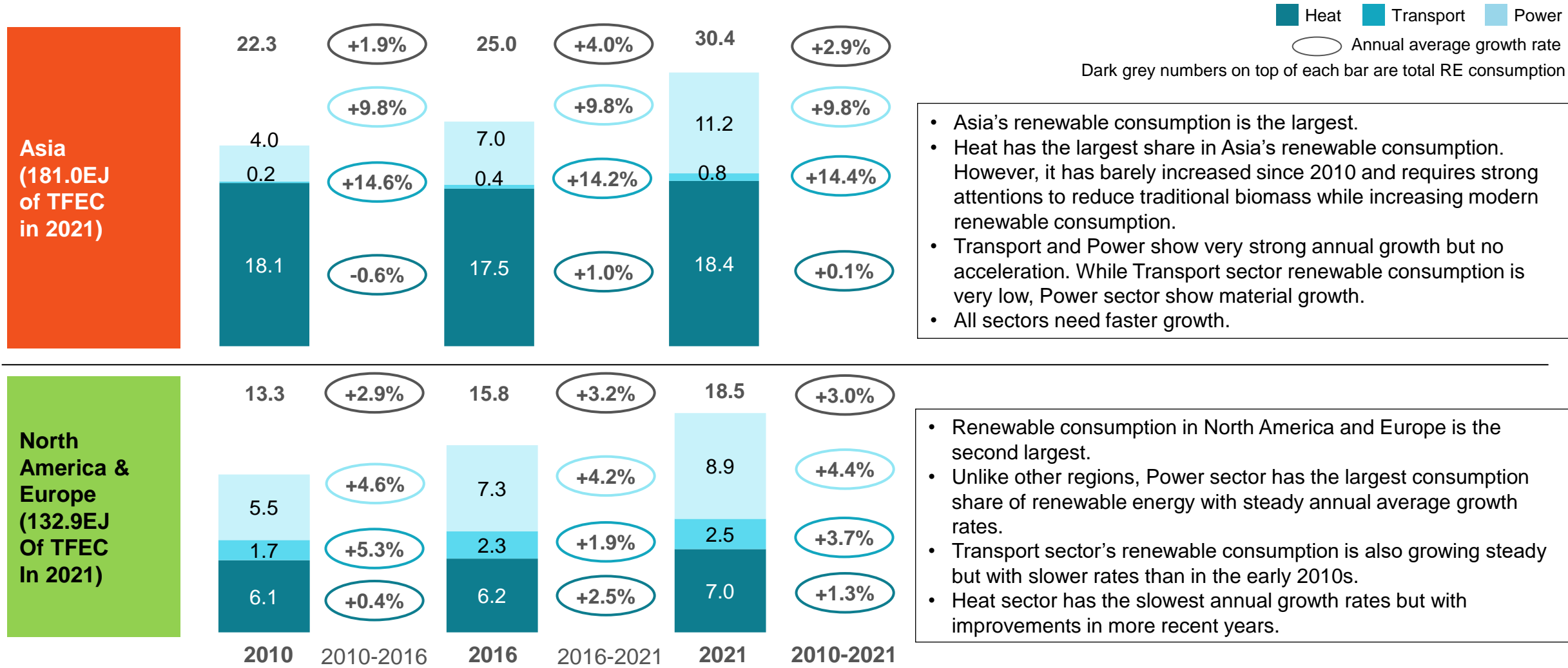


- Renewable heat consumption in TREC in 2021 was only 11.3%. Renewable consumption of transport was 1.2% and that of power was 6.3% in 2021 despite good annual growth rates.
- Heat sector uses most renewable energy, but its growth rates are very low. Concerted efforts are needed to reduce traditional biomass for cooking and heating in developing countries, while replacing fossil fuel-based heat supply with modern renewable in hard-to-abate sectors.
- Transport sector shows strong annual growth rates. However, since its starting point was very low, efforts must accelerate to make material differences.
- Power sector is growing fastest, reflecting the strong growth of renewable electricity supply over the decade. However, annual growth is slower in recent years than in the first half of the 2010s.

NOTE: The historical data up to 2020 was also updated with the 2024 dataset.  
 SOURCE: SEforALL Analysis DATA SOURCES: IEA, IRENA, UNSD, World Bank, and WHO (2024) Tracking SDG7 2024 Report Datasets

# Asia has struggled to increase RE consumption in Heat, while showing strong growth in the Power sector. North America & Europe are the only regions where RE consumption in Power sector exceeds Heat.

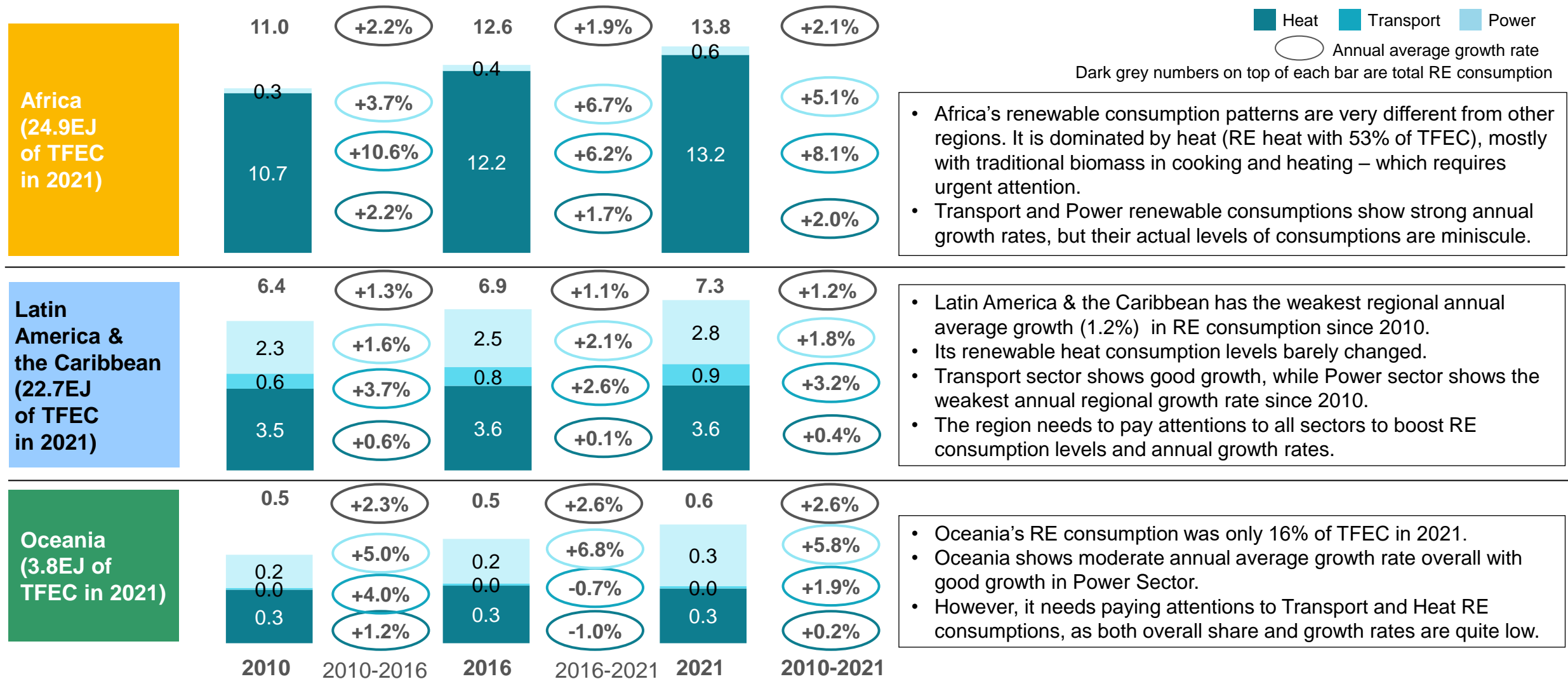
Renewables total, heat, transport and electricity final energy consumption by region, EJ, 2010, 2016, 2021



NOTE: The historical data up to 2020 was also updated with the 2024 dataset.  
 SOURCE: SEforALL Analysis DATA SOURCES: IEA, IRENA, UNSD, World Bank, and WHO (2024) Tracking SDG7 2024 Report Datasets

# Africa's RE consumption patterns are very different from other regions. Both Power and Transport RE consumptions need to grow. Oceania also needs to accelerate RE consumption in all sectors.

Renewables total, heat, transport and electricity final energy consumption by region, EJ, 2010, 2016, 2021



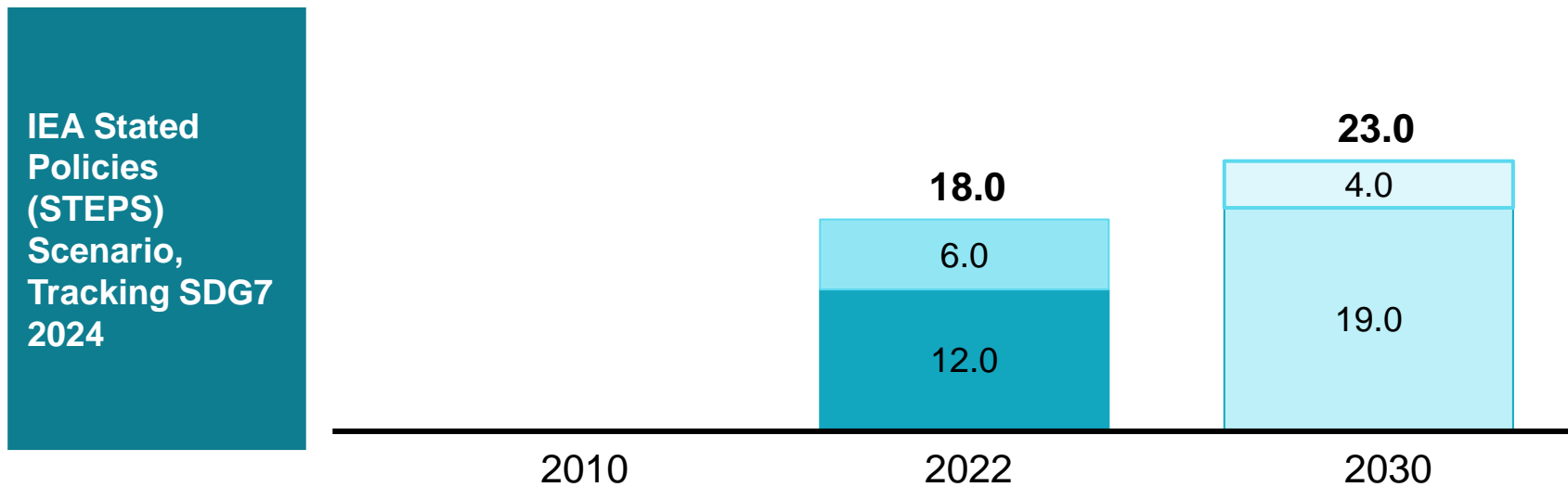
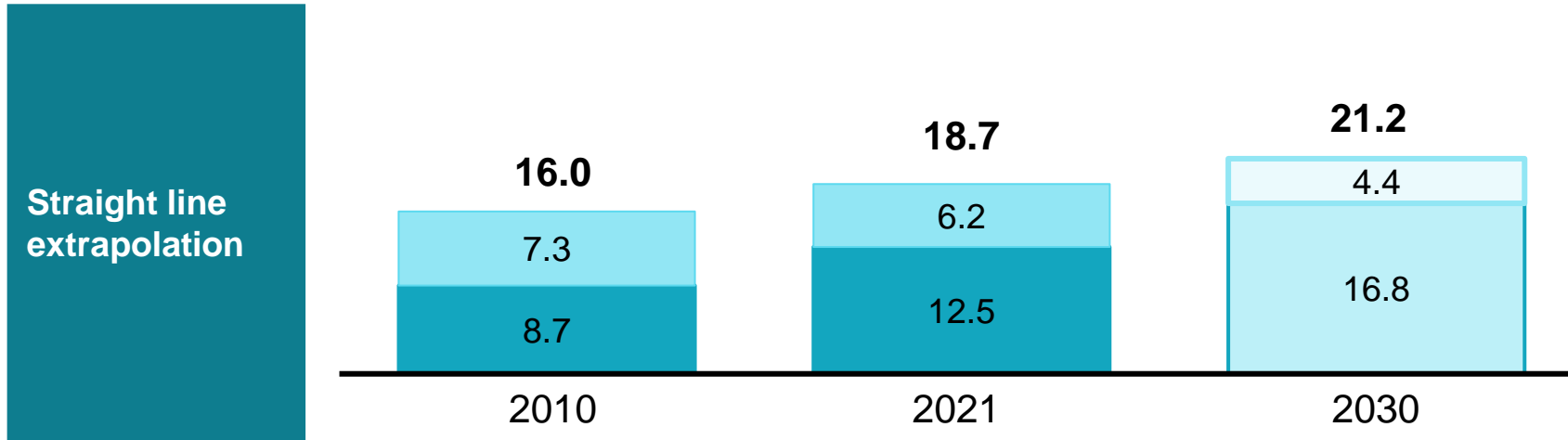
NOTE: The historical data up to 2020 was also updated with the 2024 dataset.

SOURCE: SEforALL Analysis DATA SOURCES: IEA, IRENA, UNSD, World Bank, and WHO (2024) Tracking SDG7 2024 Report Datasets

# Projections show that we could see very slow progress and moderate gains to 2030

Share of renewables in energy consumption, %

■ Modern renewables
 ■ Other renewables  
 Forecast shown lighter shade



- There is no quantitative target for SDG 7.2. But the IEA estimates that modern uses of renewables would represent just over a third of TFEC in 2030 under its the Net Zero Emissions by 2050 scenario. To achieve this level of share, modern RE needs to be accelerated further, particularly in Africa
- With the setback in 2021, the straight-line projection reduces the increase expected by 2030 with the current pace of improvement.
- It is necessary to ensure most of the unelectrified population to be connected to electricity via clean renewable energy and expand both direct renewable and renewable electricity use in industry, building and transport sector, in order to accelerate SDG7.2.

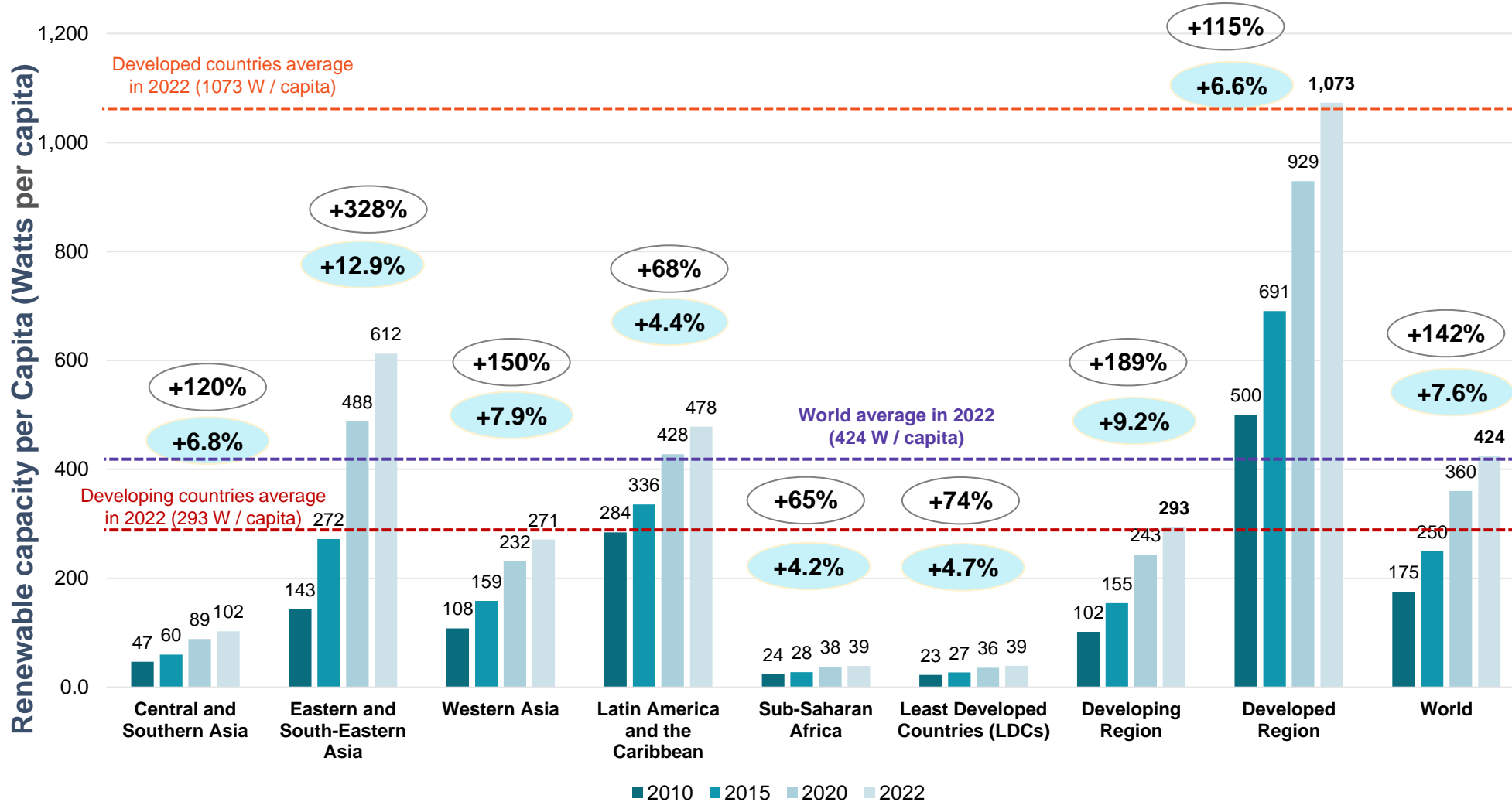
NOTE: The historical data up to 2020 are also updated with the 2024 dataset. This creates inconsistencies with the analysis from the previous year.

SOURCE: SEforALL Analysis | DATA SOURCES: IEA, IRENA, UNSD, World Bank, and WHO (2024) Tracking SDG7 2024 Report & its Datasets; IEA World Energy Outlook (2023)

# Sub-Saharan Africa's renewable capacity per capita are quite low, while Asia's advancement since 2010 is very strong since 2010

○ 12-year total improvement  
 ● Average annual growth rate

Renewable capacity per capita by region and development status, 2010, 2015, 2020 and 2021, Watts per capita



- Renewable power generating capacity per capita in Sub-Saharan Africa and LDCs (many in SSA is much smaller and shows slower growth than in Asia, corresponding the slow pace of electrification of the region).
- Meanwhile all Asian sub-regions made strong progress since 2010, exceeding average growth rates of developed countries.
- Eastern and South-Eastern Asia and Latin America and the Caribbean show higher capacity per capita than the developing country average.
- Central and Southern Asia's low capacity per capita, despite strong electrification progress in India, Bangladesh and Pakistan, suggests low Tier electrification in those populous countries (India: 105 W/capita, Bangladesh: 3.4 W/capita & Pakistan 56W/capita in 2021)

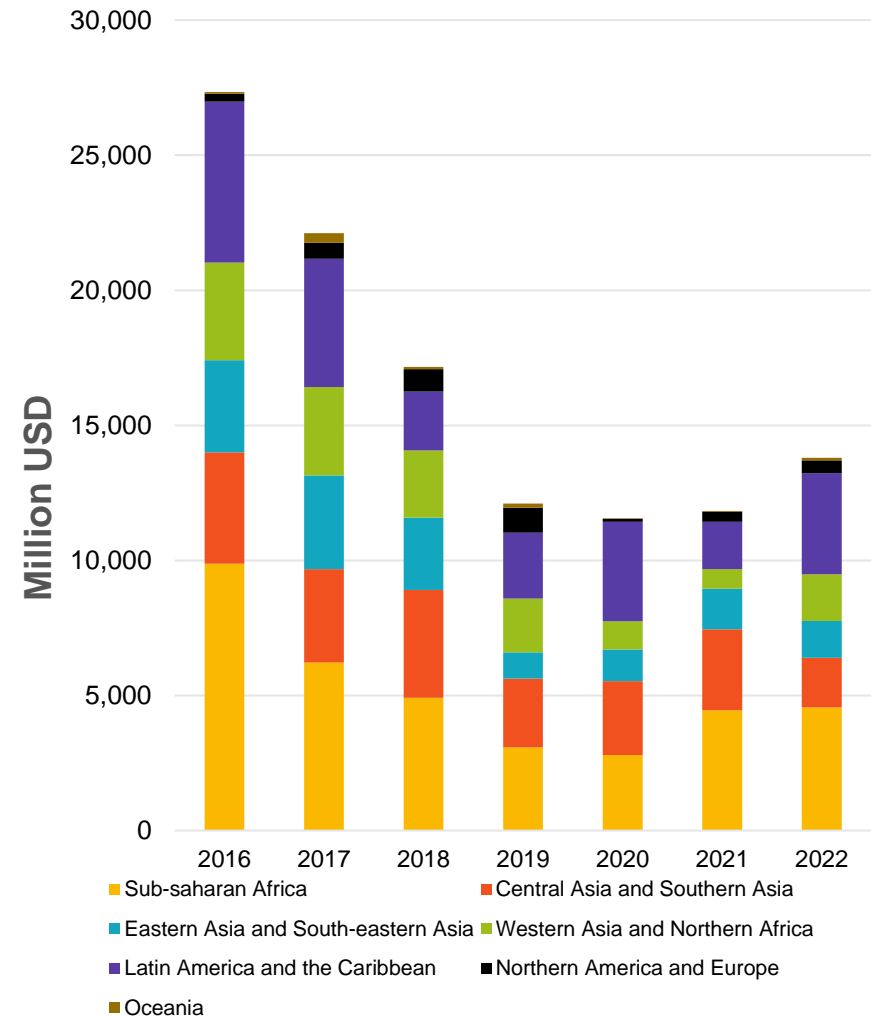
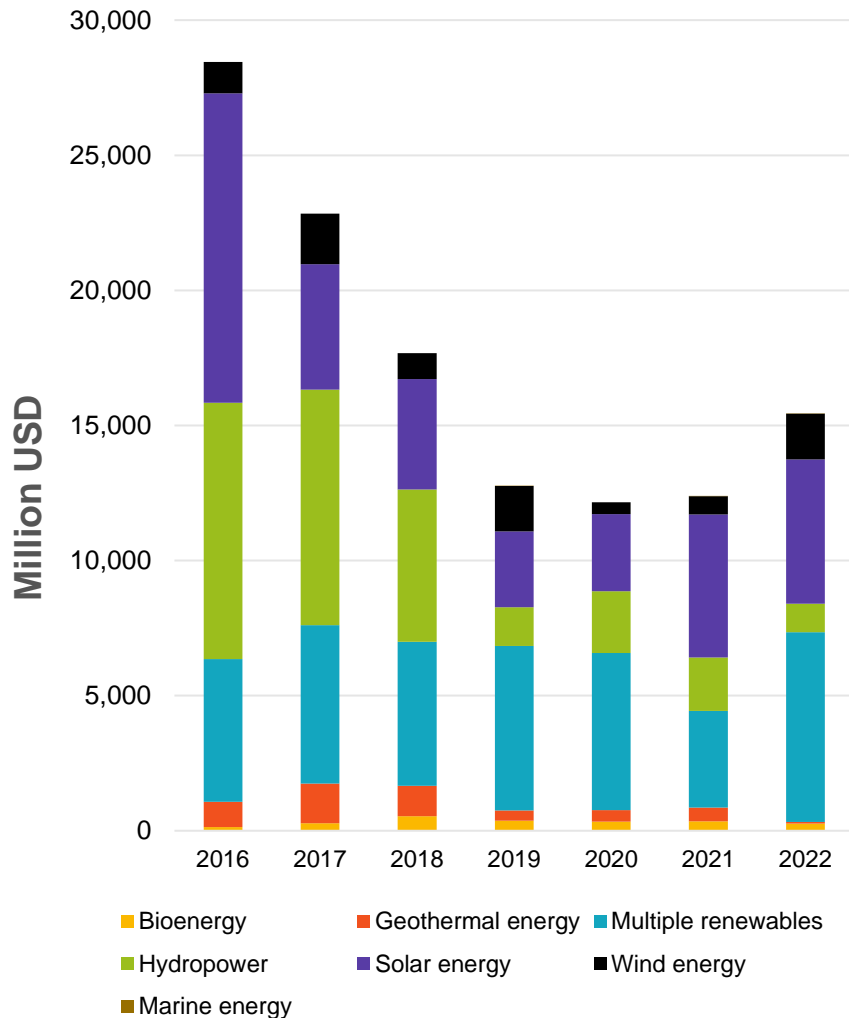
NOTE: The historical data up to 2020 are also updated with the 2024 dataset. This creates inconsistencies with the analysis from the previous year.

SOURCE: SEforALL Analysis DATA SOURCES: IEA, IRENA, UNSD, World Bank, and WHO (2024) Tracking SDG7 2024 Report Datasets



# International public financial flows to support Clean and Renewable Energy Investment in developing countries bounced back in 2022, but remains far below the 2016 level

International Public Investment in Renewable and Clean Energy to Developing Countries, 2016-2022

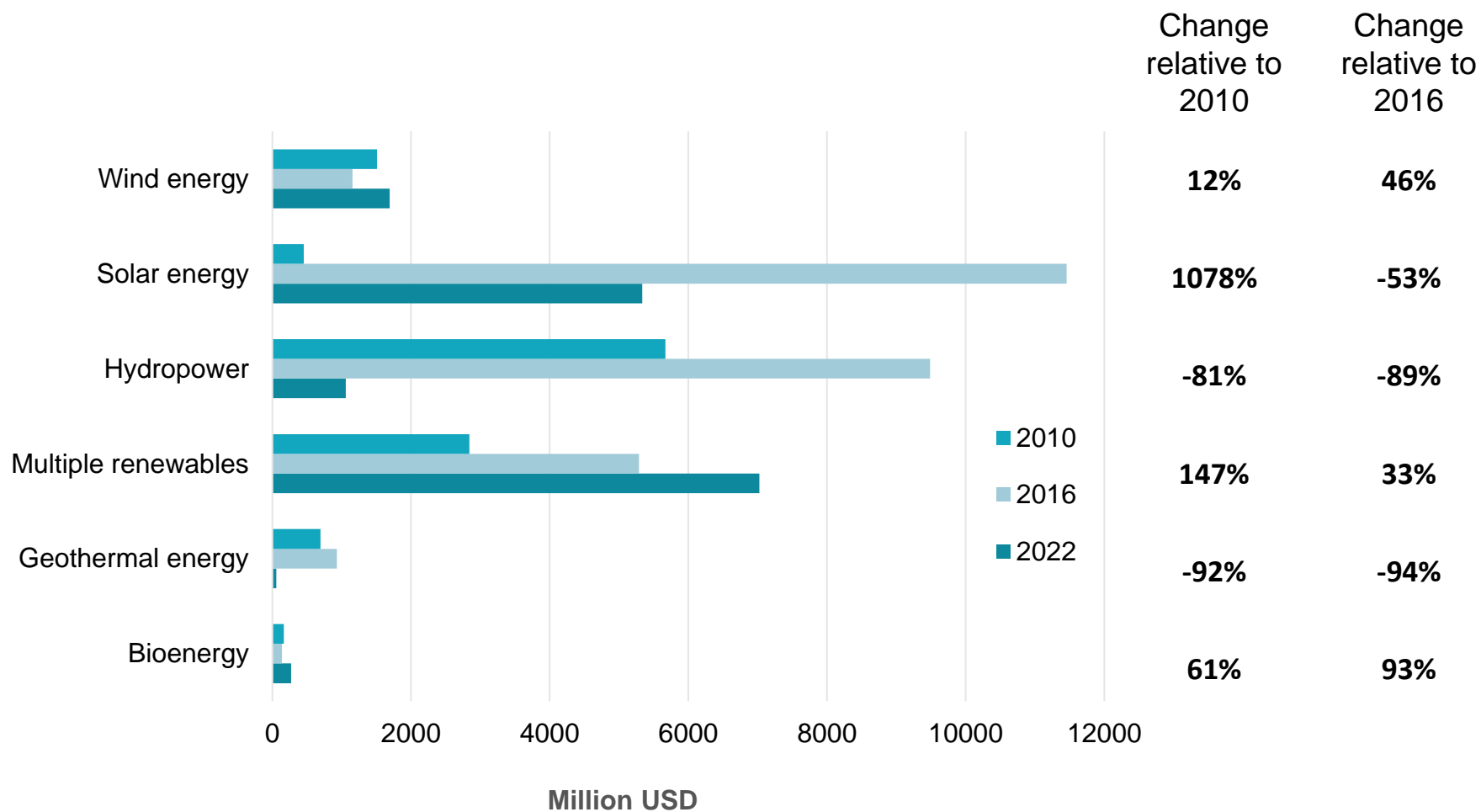


- International public financial flows in support of renewable and clean energy peaked in 2016 (around 28.5 billion USD). It declined steadily since 2016, but the year 2022 shows a bouncing back (15.4 billion USD). However, the 2022 investment total was just 54% of the 2016 amount.
- Multiple technology projects received the largest supports for the past 5 years in total (USD 27.8 billion), followed by solar energy (USD 20.4 billion). Hydropower has steadily lost its popularity.
- Sub-Saharan Africa received the largest amount in total (USD 19.7 billion USD) between 2018 and 2022, followed by Central and Southern Asia (USD 14.1 billion) and Latin America and the Caribbeans (USD 13.8 billion).

NOTE: The historical data up to 2021 are also updated with the 2024 dataset. This creates inconsistencies with the analysis from the previous year.  
 SOURCE: SEforALL Analysis DATA SOURCES: IEA, IRENA, UNSD, World Bank, and WHO (2024) Tracking SDG7 2024 Report Datasets

# Multiple, hybrid technology projects are the clear investment winner in the past decade. Where local resource availability permits, diversification of energy sources should be prioritized during clean energy transition

International Public Investment in Renewable and Clean Energy in Developing Countries, 2010, 2016 and 2022



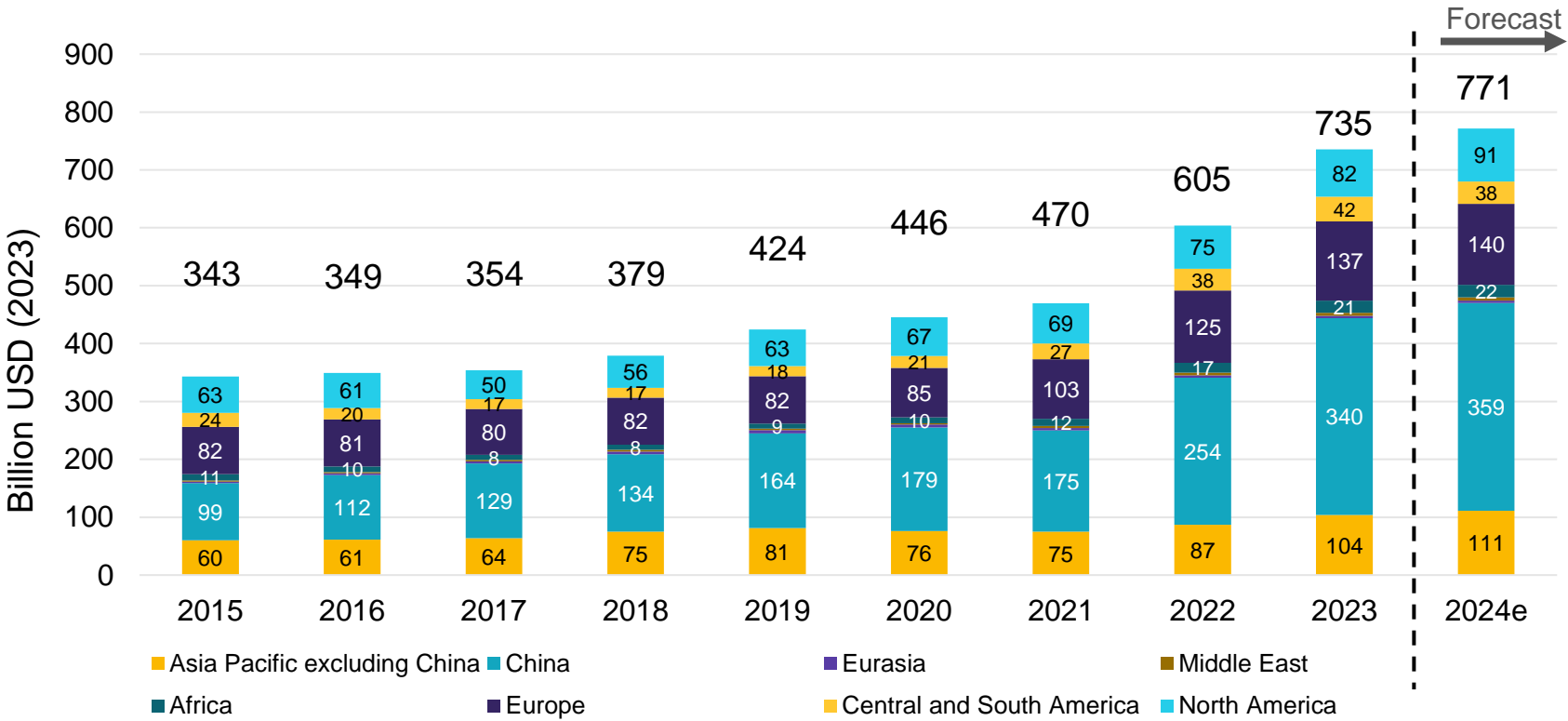
- Solar’s 2022 investment was more than almost 10-fold increase from 2010 but almost half of the peak 2016 amount.
- Hydropower investments have been greatly reduced since 2010, showing shifting technology preferences.
- Multiple technology projects are the clear winner in investment.
- Where resource endowment permits, diversifying energy resources could bring energy security benefits and system resiliency. Wherever suitable, bioenergy, geothermal energy and hydropower should be considered for investment, as they are non-variable renewables that can support system integration.

NOTE: The historical data up to 2021 were also updated with the 2024 dataset. This creates inconsistencies with the analysis from the previous year.

SOURCE: SEforALL Analysis | DATA SOURCES: IEA, IRENA, UNSD, World Bank, and WHO (2024) Tracking SDG7 2024 Report Datasets

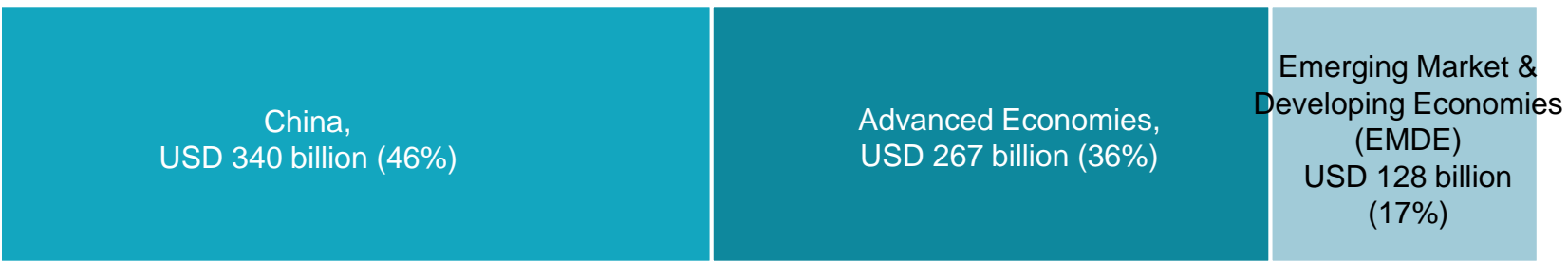
# Global investment in renewable power and fuels reached USD 659 billion USD in 2021, but the distribution is very uneven

Renewable Power Investment, Billion USD 2015-2023



- The global investment in renewable power have reached USD 735 billion in 2023.
- The investments have steadily increased but quite unevenly among geographies.
- China (46%) surpassed the Advanced Economies (36%) in Renewable Power Investment in 2022 and 2023 in revised data. Together they accounted more than 80% of total investment in 2023. China alone had more than 2.5 times of investment of the entire EMDE.
- Asia Pacific (including China) accounted for 55% of total investment made between 2015 and 2023. Within it, China alone accounted for 39% of the world total, more than any single country or region, followed by Europe (21%) and North America (14%).

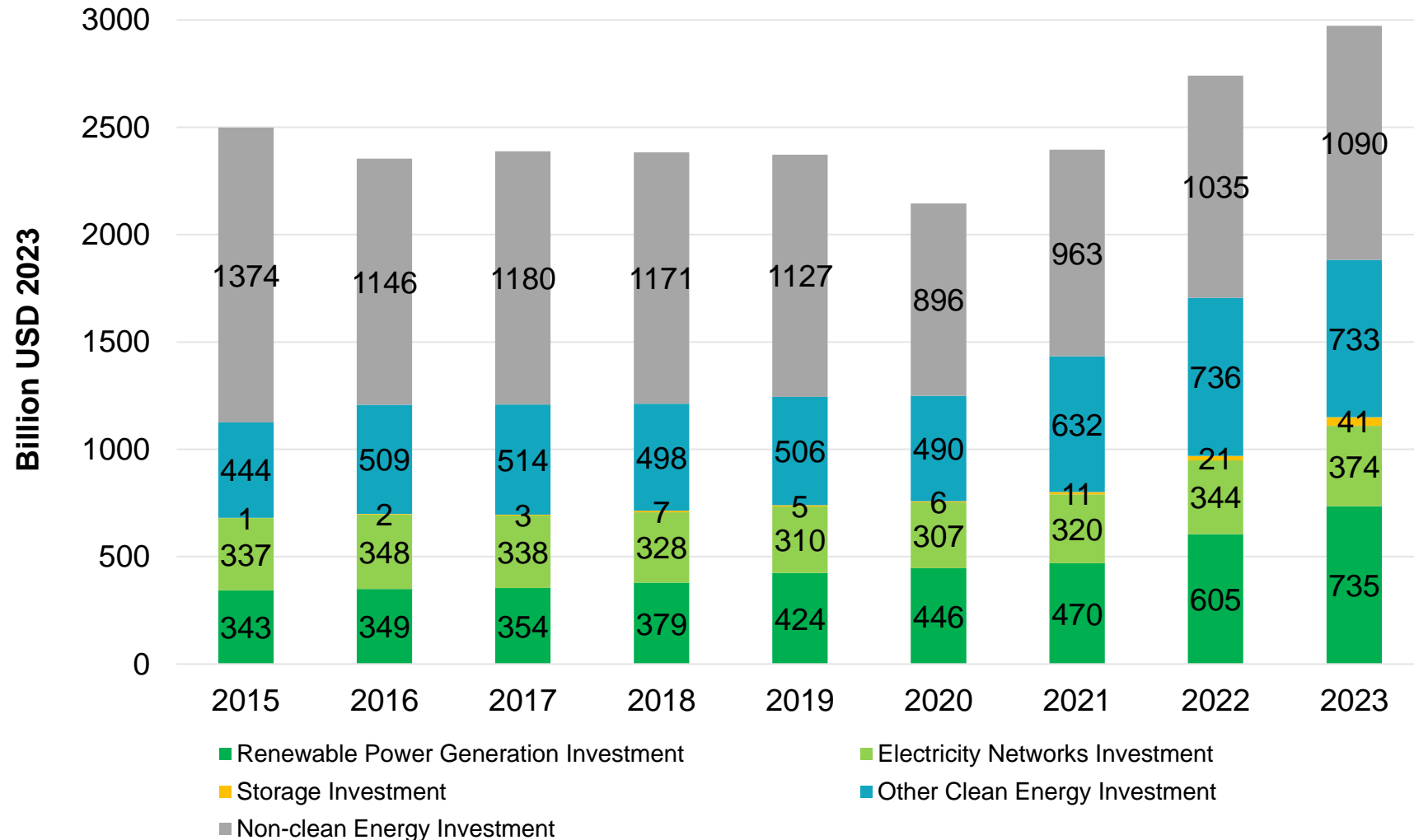
## Renewable Power Investment, 2023



NOTE: The historical data up to 2023 are also updated with the 2024 dataset. This creates inconsistencies with the analysis from the previous year.  
 SOURCE: SEforALL Analysis DATA SOURCES: IEA, IRENA, UNSD, World Bank, and WHO (2024) Tracking SDG7 2024 Report Datasets

# Global investment in renewable power generation and electricity network have been growing. However, they need further boosting for SDG7.2 under Net Zero by 2050 Scenario .

Global Energy Investment, 2015-2023, billion USD



- Global investment of clean energy in 2023 has increased 10% from 2022. In particular, renewable power generation investment grew more than 20% from 2022, while electricity network investment increased close to 9%.
- The IEA estimates that the investment required to meet the SDG 7 targets under the Net Zero Emissions by 2050 Scenario for renewables-based electricity generation (including batteries) amounts to USD 1,016 billion per year (2022 USD). Additional average annual spending of USD 222.494 billion on expanding and modernizing electricity networks is essential to support investments in renewables-based power.
- The 2023 investment amount is only around 76% of this figure.

# Contents

Executive summary

SDG 7.1.1: Electricity access

SDG 7.1.2: Clean cooking access

SDG 7.2: Share of renewables  
in Total Final Energy Consumption (TFEC)

**SDG 7.3: Energy intensity**

## SDG 7.3 Energy Intensity

### **The world used 4.6 MJ (megajoules) of energy to generate USD 1 of economic activity in 2021, unchanged since 2020**

- Africa (5.3 MJ/USD GDP) and Asia (5.0 MJ/USD GDP) remained more energy intensive than the world average with slow progress.
- Latin America & the Caribbean is the least energy intensive region with 3.4 MJ/USD GDP, but it increased 0.1 MJ/USD from 2020. It is followed by North America and Europe (4.0 MJ/USD GDP) and Oceania (4.1 MJ/USD GDP). Both regions reduced their intensity slightly.
- Of top 20 most energy consuming countries:
  - 13 countries have lower energy intensity than the group average, but 5 countries increased energy intensity from 2020.
  - 10 are more efficient than the world average, with the United Kingdom, Germany and the United States leading the way.
  - 16 countries have improved their energy intensity since 2017.

This calls for focusing on countries in this top 20 energy consuming group that have higher energy intensity and/or low improvement rate.

### **The global energy intensity has decreased from 5.5 MJ/USD GDP in 2010 to 4.6 MJ/USD GDP in 2021, but the average annual rate of improvement of 1.6% between 2010 and 2021 was lower than that between 2010 and 2016.**

- The rates of improvement have significantly slowed down in the recent years. The 0.8% annual improvement from 2020 to 2021 was the second lowest since 2010 and remains well below SDG 7.3 targets.
- Global end-use energy efficiency investment decreased 6% from 2022. In 2023, the world invested only around 70% of the annual amount required to meet the SDG7.3 under the IEA's Net Zero Emissions by 2050 Scenario (USD 566 billion per year (2022 USD))

### **We will need an energy intensity improvement rate of at least 3.8 percent per year through 2030 to achieve SDG 7.3**

- Due to the slowdown in the rate of improvement of energy intensity since 2015, reaching SDG 7.3 will require much higher improvement rate than the originally rate of 2.6%. The estimate by the IEA's scenario analysis showed that we need 3.8% of annual improvement rate between 2022 and 2030 to achieve SDG7.3, due to the slow progress between 2020 and 2021
- All end-use sectors (industry, transport and building) need to be incentivized to be more energy efficient with more investment and better enabling policies and regulations. In-depth analysis of sector specific energy intensity for each country is important to create sound and targeted and effective strategies, considering wide diversity of economic structure and climatic conditions.

## Description

### Data Sources

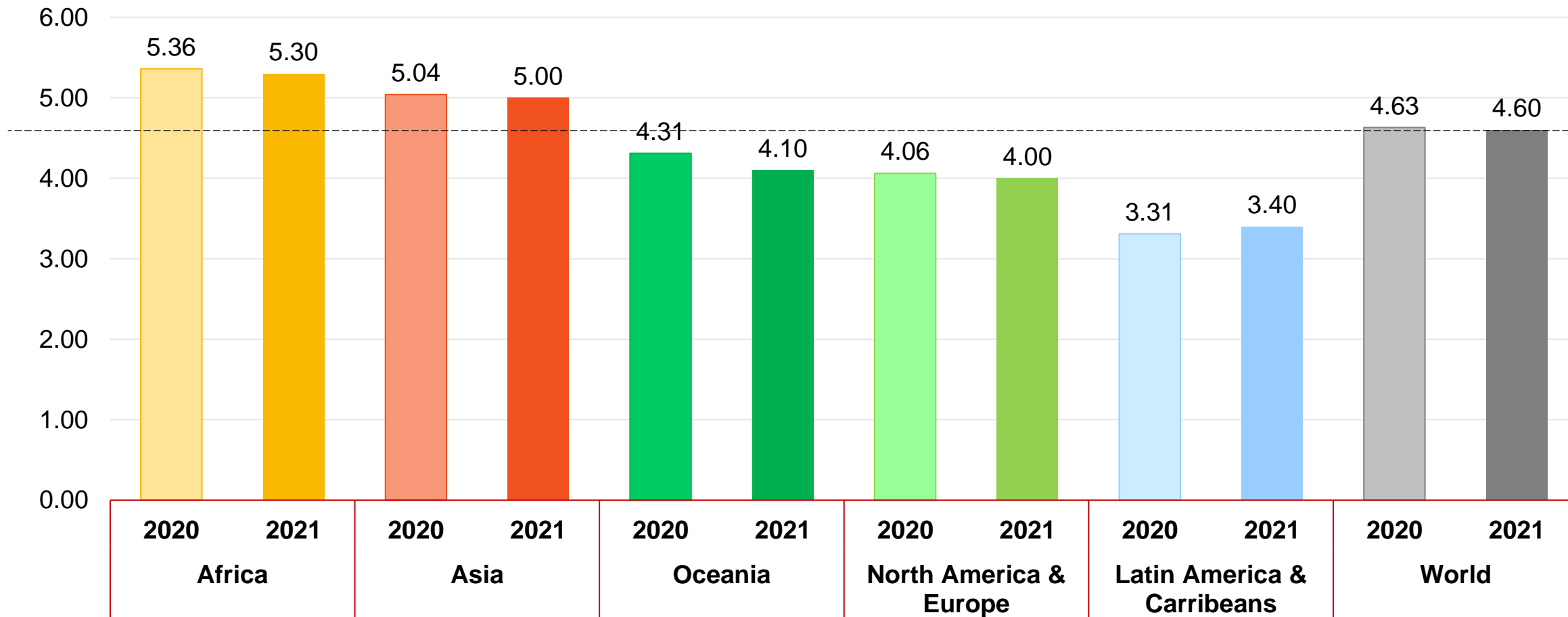
- The following data was gathered from WORLD BANK / ESMAP's Tracking SDG 7 database ([download link](#)):
  - Energy intensity per country (Energy intensity level of primary energy (megajoules per constant 2017 purchasing power parity GDP))
  - Total Final Energy Consumption per Country (PJ)
  - Total Energy Supply per Country (ktoe)
  - GDP per Country (billion USD 2017 prices and PPPs)
  - Total Energy Intensity per Region
- The following data was gathered from the IEA's publications and their datasets
  - Sources and uses of energy for consumption in 2021 for the World (World Energy Outlook 2023)
  - Energy Investment by sector (World Energy Investment 2024)

### Projections

- The straight-line extrapolation projection was made via the following process:
  - The rate of change of the energy intensity of GDP (Compound Annual Growth Rate, CAGR) between 2019 and 2021 was calculated at a global level
  - The energy intensity of GDP was projected forward to 2030 (by 9 years) using the calculated CAGR as the growth rate
- IEA Stated Policies Scenario was taken from the Tracking SDG7 2024 report & World Energy Outlook 2023

# The World uses 4.6 MJ of energy to generate USD 1 of economic output. All regions except Latin America & the Caribbean show no material changes in energy intensity from 2020

Energy intensity by region, MJ/USD 2017 ppp<sup>1</sup>, 2020 and 2021



<sup>1</sup> Unit is in megajoules per US dollar of GDP at 2017 purchasing power parity (PPP)

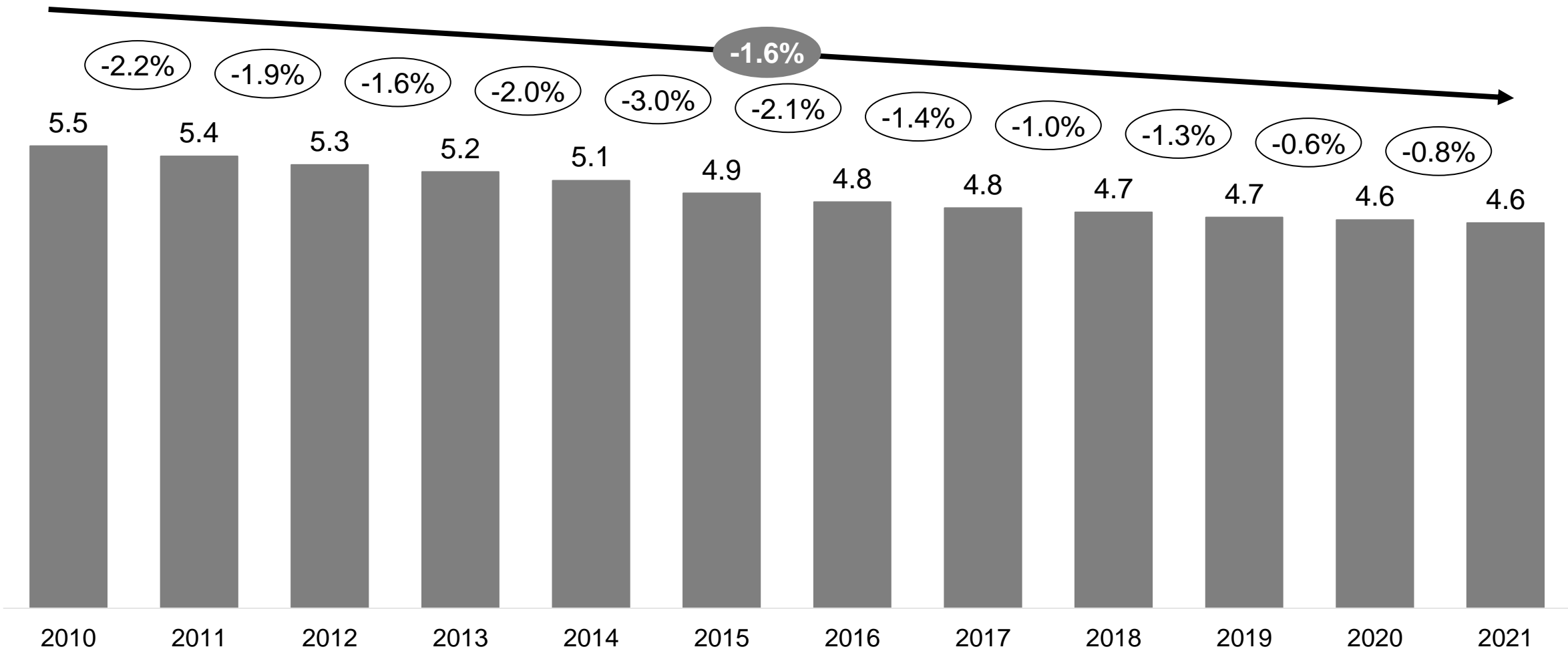
SOURCE: SEforALL Analysis DATA SOURCES: IEA, IRENA, UNSD, World Bank, and WHO (2024) Tracking SDG7 2024 Report Datasets



# There has been a ~0.9 MJ/USD improvement in energy efficiency over the past 11 years. The average annual reduction rate is 1.6% with significantly slower improvement in recent years

Energy intensity, MJ/USD 2017 ppp, 2010-2021

x% 11-year average reduction rate    x% Annual reduction rate

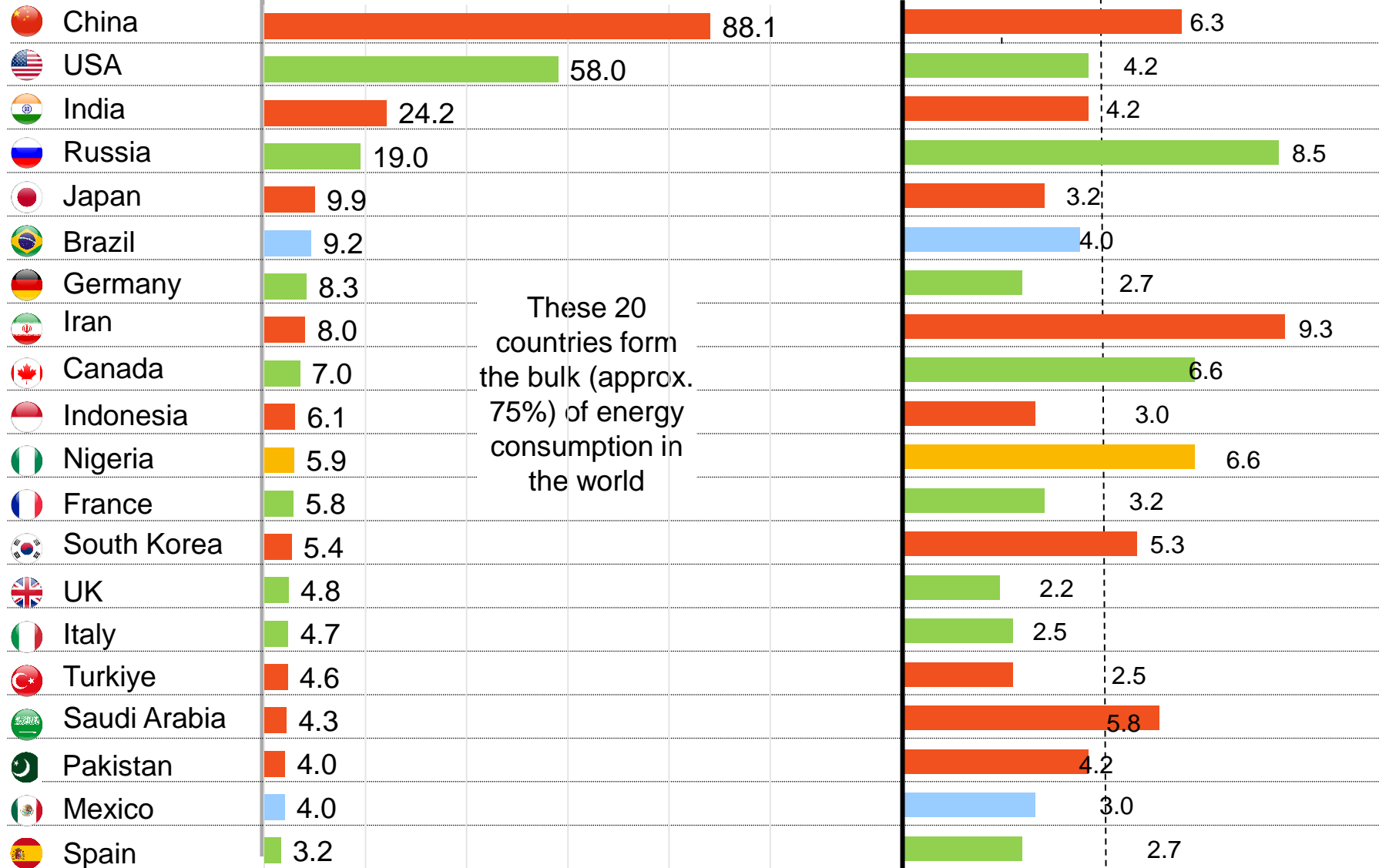


NOTE: The historical data up to 2019 was also updated with the 2024 dataset. This creates inconsistencies with the analysis in the previous year  
SOURCE: SEforALL Analysis    DATA SOURCES: IEA, IRENA, UNSD, World Bank, and WHO (2024) Tracking SDG7 2024 Report Datasets

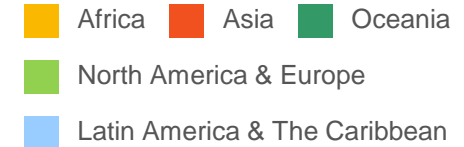
# 13 of top 20 energy consumption countries have energy intensity lower than the world average

Total energy consumption, EJ<sup>1</sup> 2021

Energy intensity, MJ/USD, 2021



These 20 countries form the bulk (approx. 75%) of energy consumption in the world



- 13 of top 20 most energy consuming countries are energy conscientious.
- 5 countries (Russia, Japan, Iran, Italy, and Pakistan) increased their energy intensity from 2020.
- Reducing energy intensity of 7 countries (China, Russia, Iran, Canada, Nigeria, South Korea, and Saudi Arabia), which have higher than the world average energy intensity, can help accelerating global decarbonization progress greatly.

Note: Energy intensity is defined as total energy supply divided by gross domestic product (GDP). The 2021 data shows Thailand and Australia, instead of Pakistan and Spain, are in top 20 energy supply countries. However, the comparison here was made for top 20 energy consumption countries.

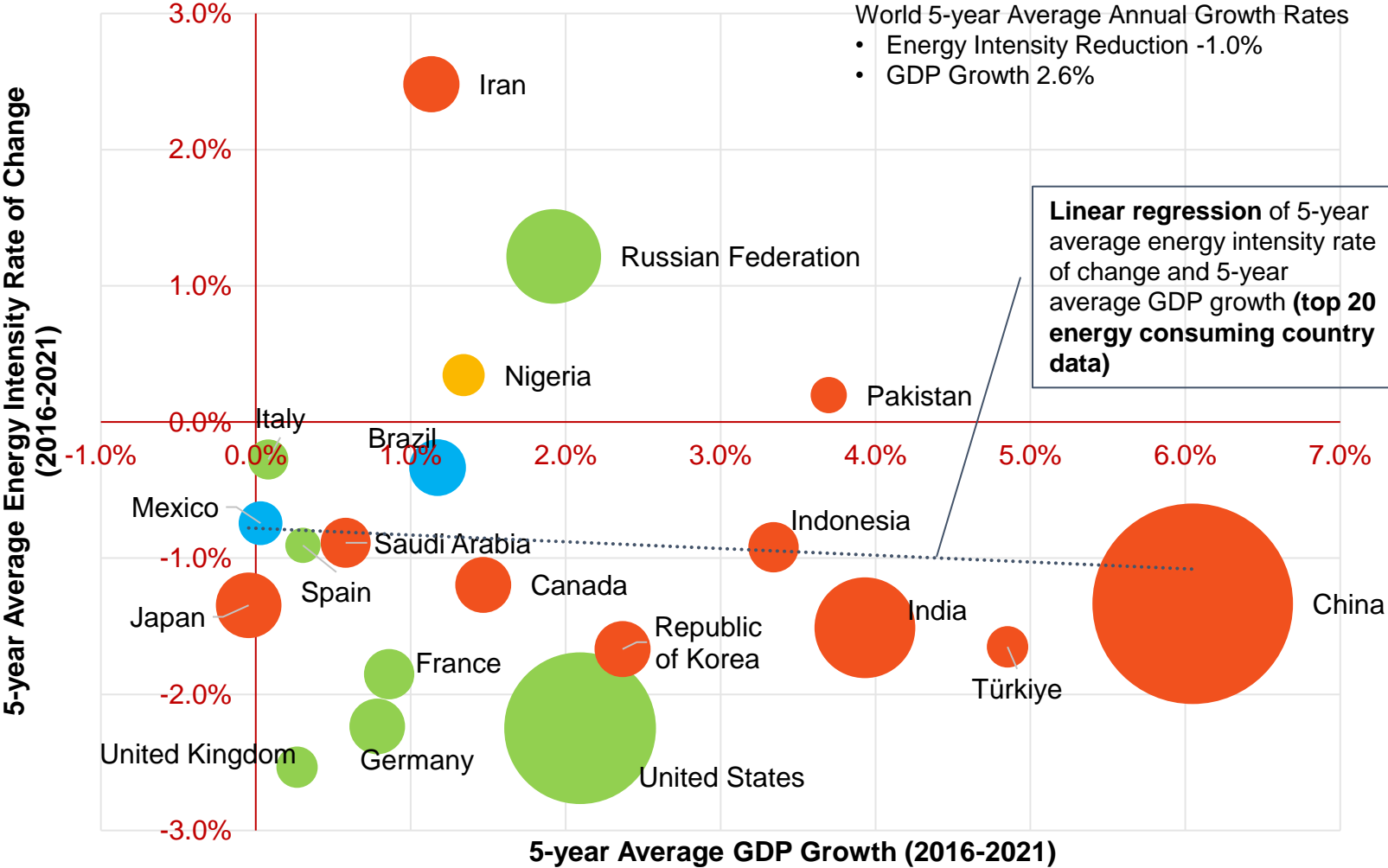
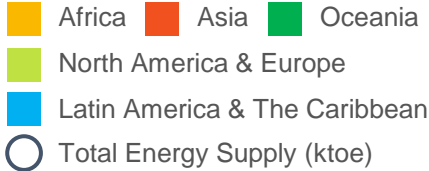
1: EJ = Exajoule = 1000 PJ

SOURCE: SEforALL Analysis DATA SOURCES: IEA, IRENA, UNSD, World Bank, and WHO (2024) Tracking SDG7 2024 Report Datasets

World: 4.6

# 16 highest energy consumption countries have decreased energy intensity, while Iran, Nigeria, Pakistan and Russia increased their energy intensity since 2016

Growth of Energy Intensity and GDP of Top 20 Energy Consuming Countries, 2016-2021



- 16 of the top 20 high energy consuming countries have improved their energy intensity over the latest five data years. The number decreased from 17 in last year.
  - 10 countries have been performing better than the global average based on their 5-year Average Energy Intensity Rate of Improvement. The number of countries increased from 2020, partly because the world 5-year average of energy intensity improvement regressed from -1.4% to -1.0% while GDP growth rate increased from 2.0% to 2.6%.
- Comparison among the top 20 energy consumers shows:
  - UK, France, Germany, Republic of Korea, and United States have been improving their energy intensity most when reflecting their GDP growth against other top 20 peers.
  - Nigeria, Russia, and Iran have performed very poorly in their energy intensity reduction when considering their GDP growth against other top 20 peers. Pakistan joined this group in 2021. Energy intensity in these countries has increased for the latest five years.
- Changes in energy intensity reflect not only changes in energy efficiency, but also in economic structure and activity levels which affect GDP. Countries with the slow and negative progress have an opportunity to improve energy efficiency, as well as diversify their economies, for instance away from energy-intensive fossil fuel extraction to more service-oriented economies.

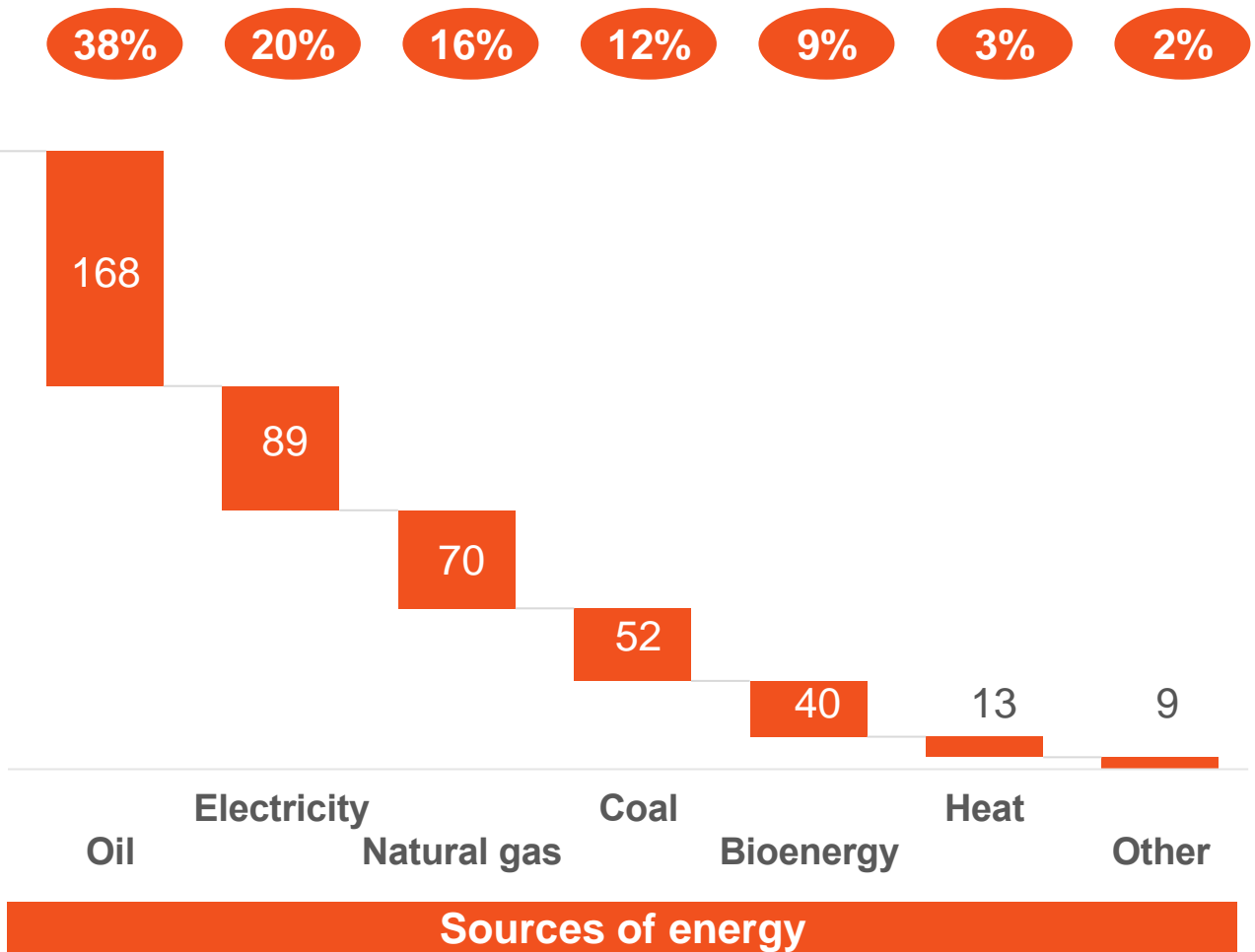
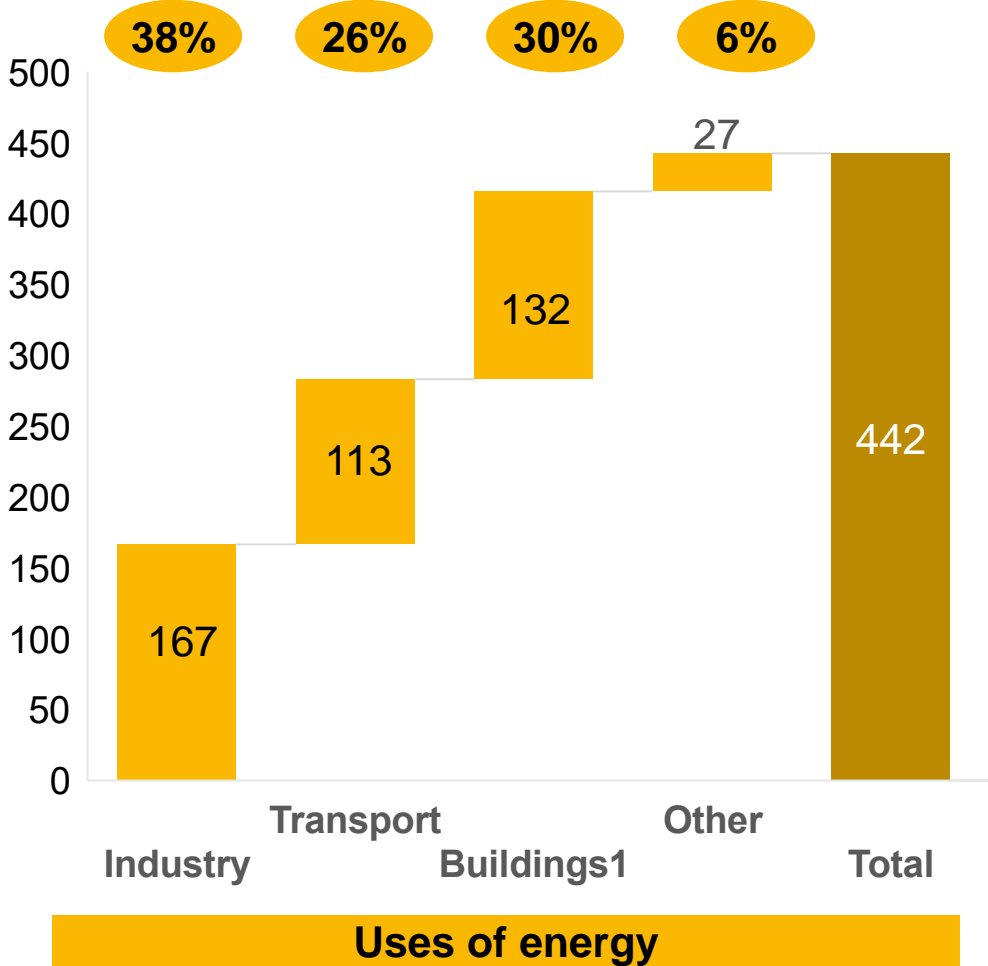
Note: Energy intensity is defined as total energy supply divided by gross domestic product (GDP). The 2021 data shows Thailand and Australia, instead of Pakistan and Spain, are in top 20 energy supply countries. However, the comparison here was made for top 20 energy consumption countries.

SOURCE: SEforALL Analysis DATA SOURCES: IEA, IRENA, UNSD, World Bank, and WHO (2024) Tracking SDG7 2024 Report Datasets

# Energy is mainly used in industry, transport and buildings with fossil fuel as the dominant source (66%), followed by electricity. The composition and shares unchanged from 2021.

Sources and uses of energy for consumption by sector, EJ, 2022

x% Share of total final energy consumption



1 Both residential and services.

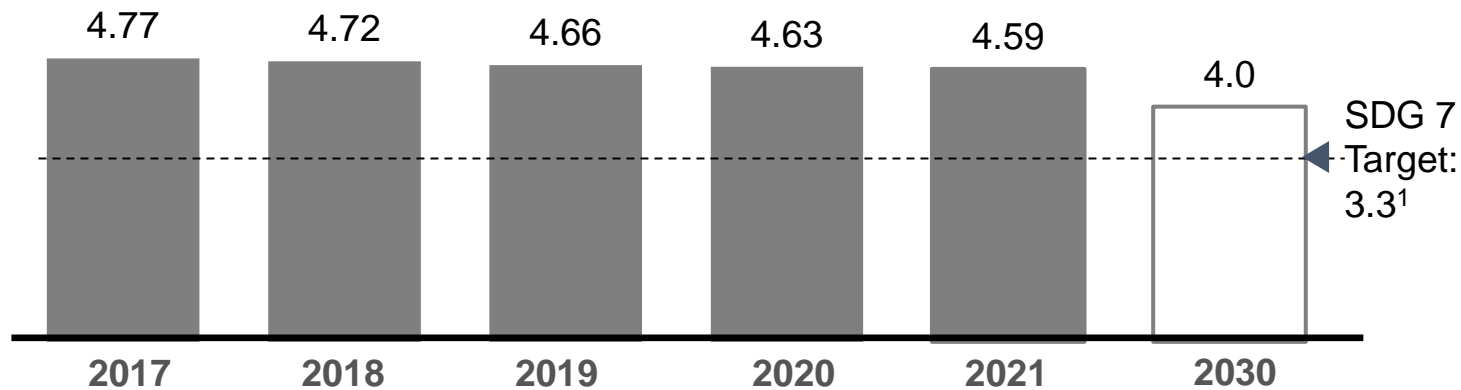
# An energy intensity improvement rate of at least 3.8 percent per year through 2030 will be needed to achieve SDG 7.3

□ Forecast

IEA WEO  
Stated Policies  
Scenario  
(STEPS) 2023,  
Annual Primary  
Energy  
Intensity  
Improvement  
Rates



Energy  
Intensity,  
MJ/USD 2017  
ppp



- Slow improvement rates of recent years mean that a 3.8% annual rate of improvement is necessary from 2022 to achieve SDG7.3 by 2030. However, the IEA's STEP shows that only 2.3% will be achieved with the currently stated policies.
- More aggressive and diverse policy and investments are necessary to achieve the required improvement rate by 2030, across all sectors and countries.
- High energy consumption economies with high energy intensity or slow progress can have large impacts with stronger improvements.
- However, all countries need to pay more attentions to energy efficiency.

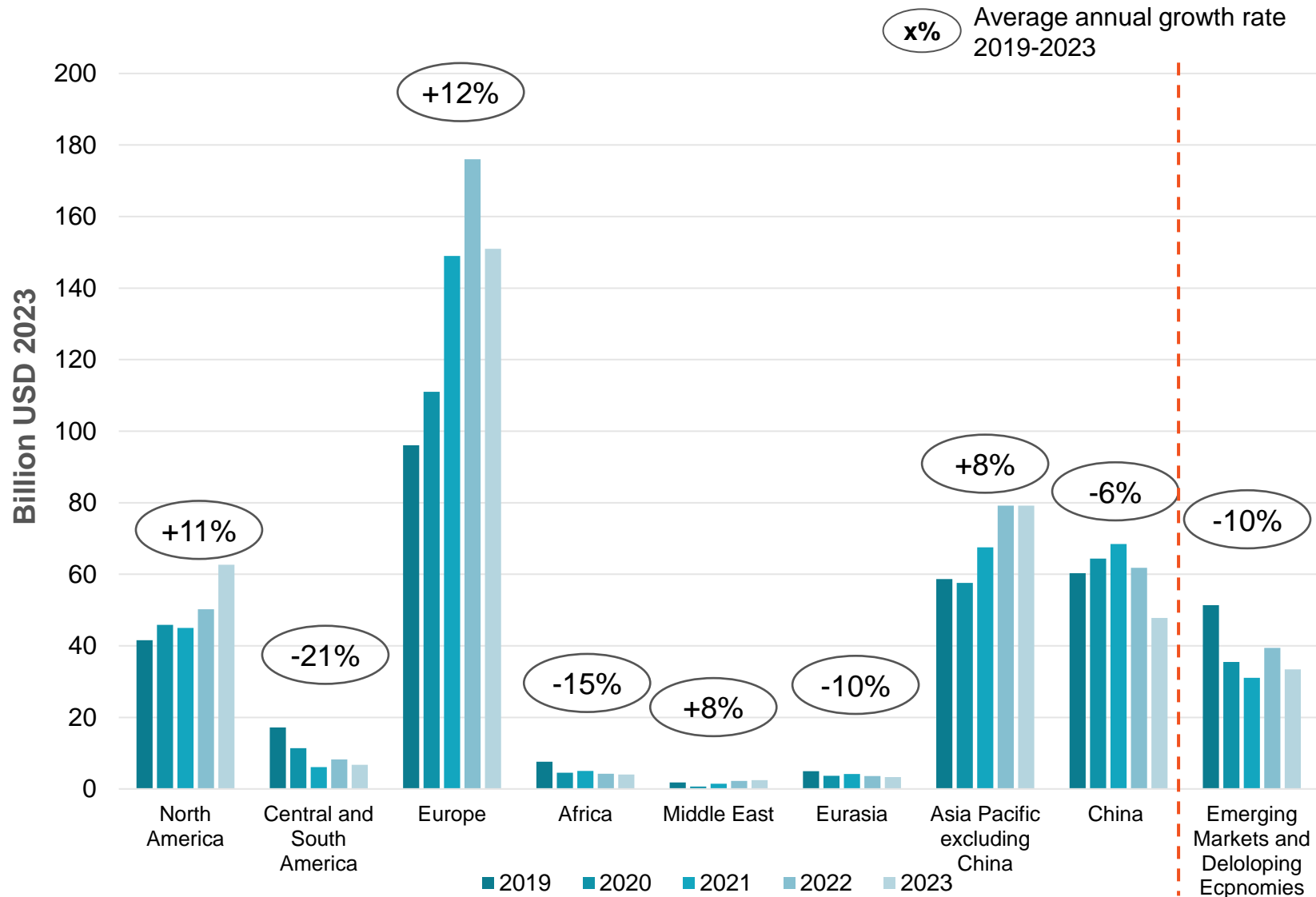
1: The target calculated with 2.6% of improvement rate after 2015.

NOTE: The World Bank/ESMAP historical data up to 2020 were also updated with the 2024 dataset. This creates inconsistencies with the analysis from the previous year.

SOURCE: SEforALL Analysis DATA SOURCES: IEA, IRENA, UNSD, World Bank, and WHO (2024) Tracking SDG7 2024 Report & its Datasets; IEA World Energy Outlook (2023)

# All regions except North America show decrease of energy efficiency investment in 2023

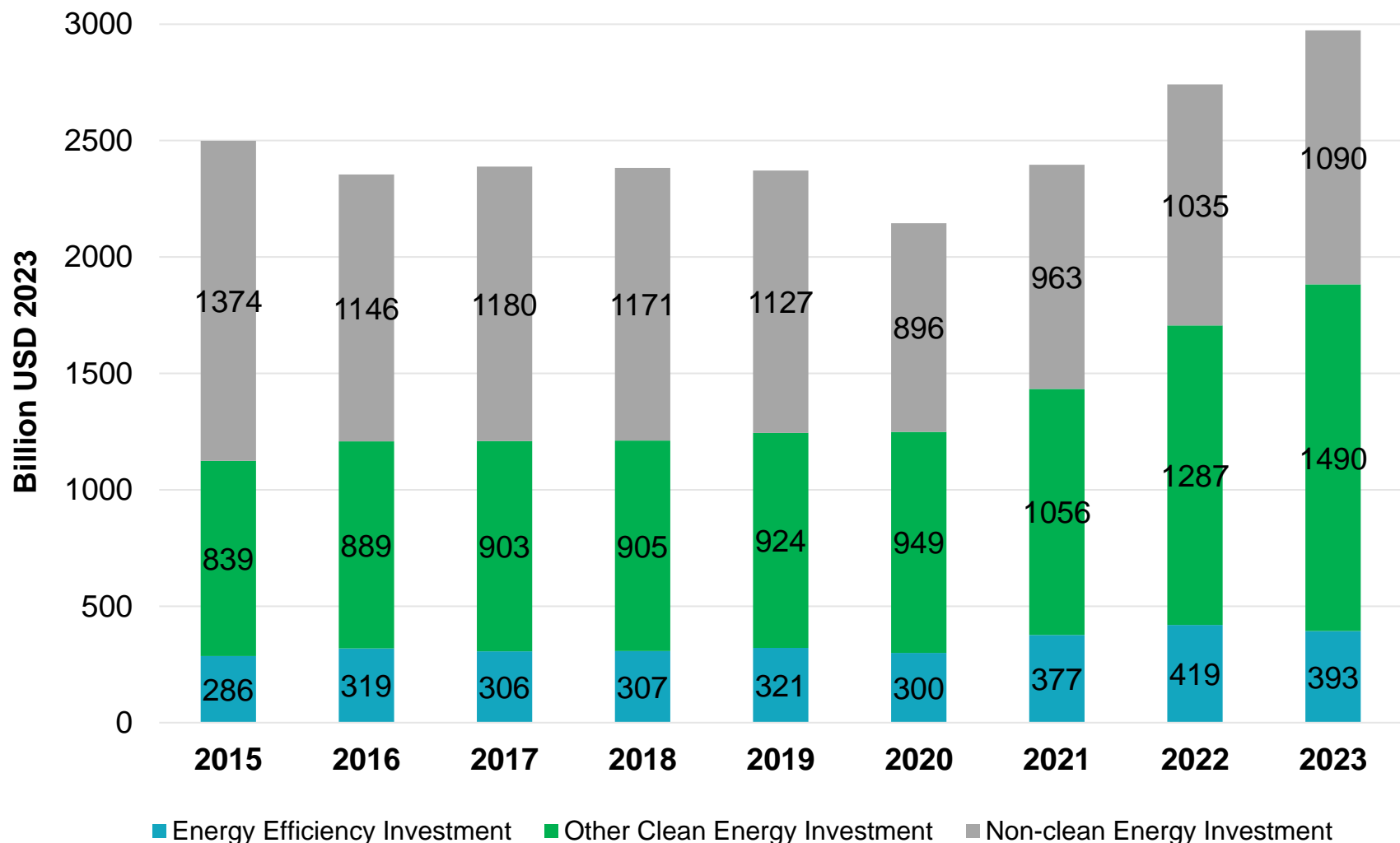
Energy Efficiency Investment by region, billion USD 2019-2023



- There is strong regional discrepancy in energy efficiency investment
  - 2023 saw the decrease of the investment in all regions except North America.
  - Europe and Asia Pacific including China have been strongly leading energy efficiency investments.
  - China received more than 50% of investments in Asia Pacific until 2021, but its share is getting lower in 2022 (44%) and 2023 (38%)
  - Central and South America, Africa, and Eurasia regions have much weaker investments, decreasing year-by-year. This trend needs to be reversed.
  - Middle East has positive annual growth rate, but it has been the weakest region in energy efficiency investment.
  - Emerging Markets and Developing Economies (EMDE) show much weaker investment than developed economies.
- The average growth rates (2019-2023) also vary greatly across regions.
  - Europe and North America are the only regions with substantial investment and positive good annual average growth rates.

# Global investment in energy efficiency in 2023 was USD 390 billion, as a part of the total end use sector investments of USD 669 billion.

Global Energy Investment, 2015-2023, billion USD



- Although global investment in clean energy in 2023 has increased 10% from 2022, total end use sector investment, which includes energy efficiency and end use and electrification, has slightly decreased (1.5%) from 2022.
  - Energy efficiency investment alone decreased 6% from 2022, as the IEA predicted in the previous year.
- The IEA estimates that the investment required to meet the SDG 7 targets under the Net Zero Emissions by 2050 Scenario for end-use efficiency amounts to USD 566 billion per year (2022 USD). The 2023 investment amount is only around 70% of this figure.

# Appendix



# Asia

**2 Asian countries will achieve universal access by 2030 with the current rate of improvement, while 15 countries will still have unelectrified populations**

---

**Countries expected to achieve universal access by 2030**

- Kyrgyzstan
  - Timor-Leste
- 

**Countries expected to have unelectrified population by 2030**

- Afghanistan
- Bangladesh
- Cambodia
- DPR Korea
- India
- Myanmar
- Nepal
- Pakistan
- Philippines
- Syria
- Thailand
- Yemen

# Africa

**While only 2 additional African countries will achieve universal access by 2030 with the current rate of improvement, 47 countries will remain with unelectrified populations and 18 of them will have significant numbers of unelectrified populations (10 million or more)**

## Countries expected to achieve universal access by 2030

- Algeria
- Cabo Verde

## Countries expected to have ~10 million or more unelectrified population by 2030

- Angola
- Burkina Faso
- Burundi
- Chad
- DR Congo
- Ethiopia
- Madagascar
- Malawi
- Mali
- Mozambique
- Niger
- Nigeria
- Somalia
- South Sudan
- Sudan
- Tanzania
- Uganda
- Zambia

## Rest of the World

**6 non-Africa / Asia countries will achieve universal access by 2030 if they continue to deliver at the current levels**

---

**Countries currently  
projected to achieve  
universal access by 2030**

- Belize
- Bolivia
- Fiji
- Guatemala
- Kiribati
- Suriname



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