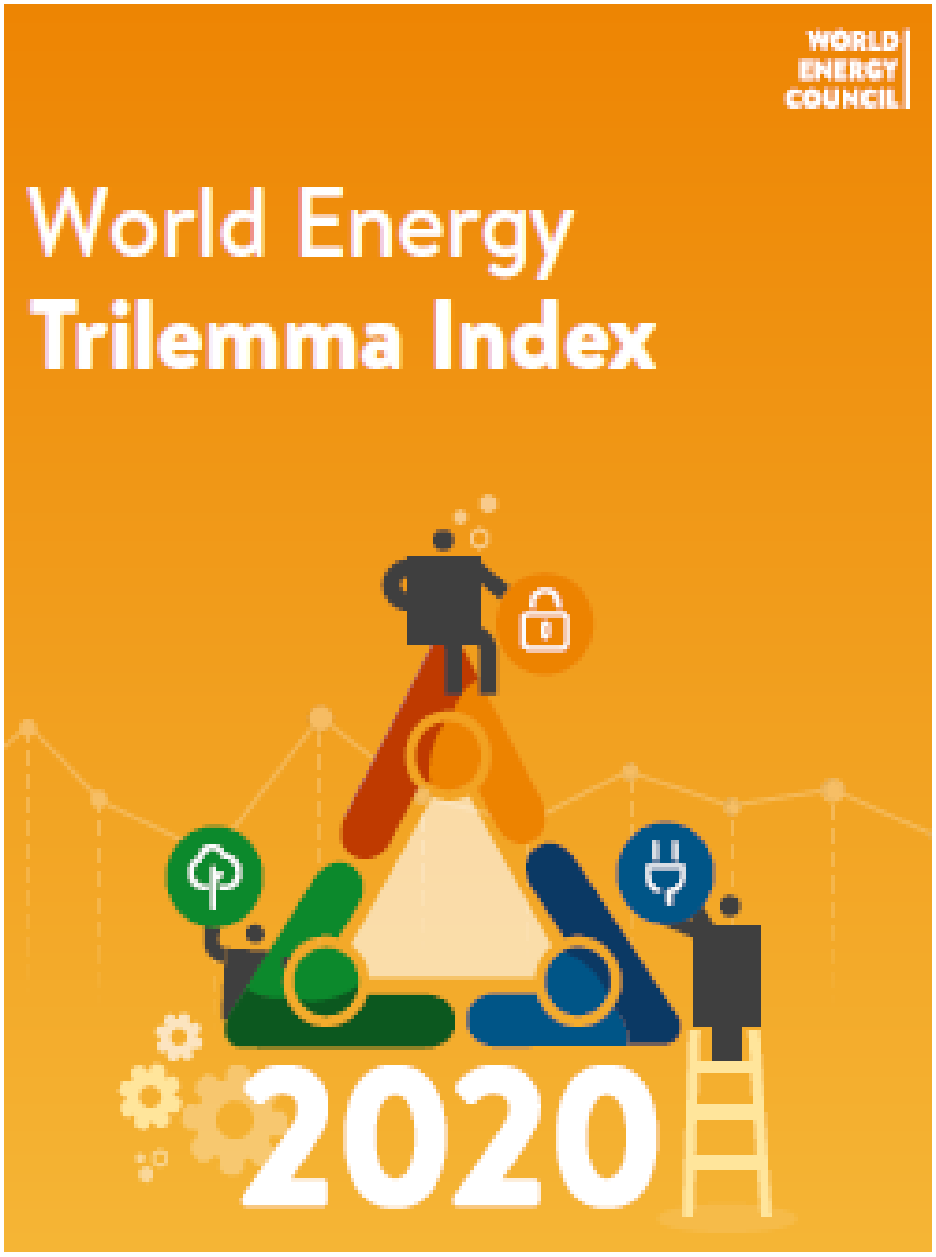
"Ketahanan Energi Nasional: Dimensi dan Indikator Menuju Transisi Energi Indonesia untuk Net Zero Emission 2060"

Jakarta, 11 September 2021

- **World Energy Council - World Energy Trilemma Index**
- **Strongly Required Deep Decarbonization of Energy Sector**

Dr. Hardiv Harris Situmeang

Komite Nasional Indonesia - World Energy Council



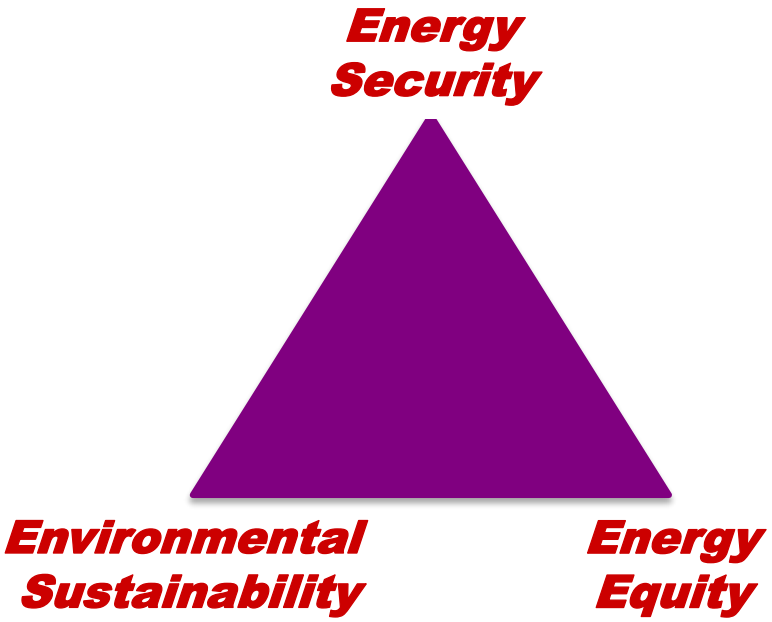
The goal of the Index is to provide insights into a country's relative energy performance with regards to Energy Security, Energy Equity and Environmental Sustainability. In doing so, the Index highlights a country's challenges in balancing the Energy Trilemma and opportunities for improvements in meeting energy goals now and in the future. The Index aims to inform policy makers, energy leaders, and the investment and financial sector. Index rankings provide comparisons across countries on each of the three dimensions, whilst historical indexed scores provide insights into the performance trends of each country over time.

World Energy Trilemma Index 2020

- The World Energy Council's definition of energy sustainability is based on three core dimensions: Energy Security, Energy Equity, and Environmental Sustainability of Energy Systems.
- Balancing these three goals constitutes a 'Trilemma' and balanced systems enable prosperity and competitiveness of individual countries.
- The World Energy Trilemma Index has been prepared annually since 2010 by the World Energy Council in partnership with global consultancy Oliver Wyman, along with Marsh & McLennan Advantage of its parent Marsh & McLennan Companies.
- It presents a comparative ranking of 128 countries' energy systems. It provides an assessment of a country's energy system performance, reflecting balance and robustness in the three Trilemma dimensions.

The Three Dimensions of The Energy Trilemma

Balancing The 'Energy Trilemma'



Energy Security

Energy Security measures a nation's capacity to meet current and future energy demand reliably, withstand and bounce back swiftly from system shocks with minimal disruption to supplies. The dimension covers the effectiveness of management of domestic and external energy sources, as well as the reliability and resilience of energy infrastructure.

Energy Equity

Energy Equity assesses a country's ability to provide universal access to reliable, affordable, and abundant energy for domestic and commercial use. The dimension captures basic access to electricity and clean cooking fuels and technologies, access to prosperity-enabling levels of energy consumption, and affordability of electricity, gas, and fuel.

Environmental Sustainability

Environmental Sustainability of energy systems represents the transition of a country's energy system towards mitigating and avoiding potential environmental harm and climate change impacts. The dimension focuses on productivity and efficiency of generation, transmission and distribution, decarbonisation, and air quality.

What is the World Energy Trilemma Index?

The Energy Trilemma Index aims to support an informed dialogue about improving energy policy by providing decision-makers with an objective relative ranking of countries' energy system performance across three core dimensions of Energy Security, Energy Equity and the Environmental Sustainability of energy systems.

The 2020 Index is based on an evolved methodology and focuses on a historical index of progress. This means that while the results cannot be directly compared with previous report iterations, the Index builds upon last year's new time-series analysis capability that has calculated Trilemma performance back to 2000.

The Index is a quantification of the Energy Trilemma, which is defined by the World Energy Council as the triple challenge of providing secure, equitable and affordable, environmentally sustainable energy. Balancing these priorities is challenging but is also the foundation for the prosperity and competitiveness of individual countries.

The Energy Trilemma Index assesses current and past performance across the three dimensions of Energy_Security, Energy Equity, and Environmental Sustainability. A fourth dimension of Country Context is also included within the calculations, to capture important differences in countries' institutional and macroeconomic contexts.

Dimension A: **Energy Security** measures a nation's capacity to meet current and future energy demand reliably, withstand and bounce back swiftly from system shocks with minimal disruption to supplies. The dimension covers the effectiveness of management of domestic and external energy sources, as well as the reliability and resilience of energy infrastructure.

Dimension B: **Energy Equity** assesses a country's ability to provide universal access to reliable, affordable, and abundant energy for domestic and commercial use.
The dimension captures basic access to electricity and clean cooking fuels and technologies, access to prosperity-enabling levels of energy consumption, and affordability of electricity, gas, and fuel.

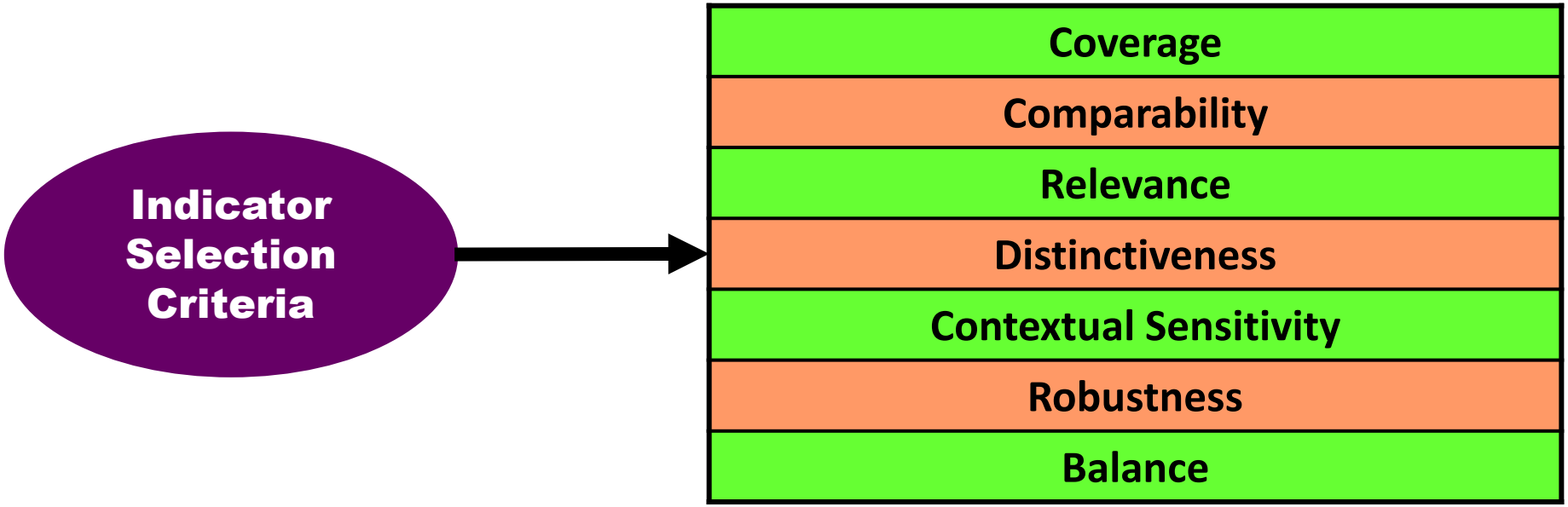
Dimension C: **Environmental Sustainability of energy systems** represents the transition of a country's energy system towards mitigating and avoiding potential environmental harm and climate change impacts. The dimension focuses on productivity and efficiency of generation, transmission and distribution, decarbonisation, and air quality.

Dimension D: **Country Context** focuses on elements that enable countries to develop and implement energy policy effectively and achieve energy goals. The dimension describes the underlying macroeconomic and governance conditions, reports on the strength and stability of the national economy and government, the country's attractiveness to investors, and capacity for innovation.

How Are Indicators Selected for the Index?

Each indicator category is composed of a set of carefully selected indicators that meet our selection criteria and are highly relevant to the World Energy Council's understanding of the Energy Trilemma.

It is also critical that the indicators can be consistently and readily derived from reputable sources and cover a high proportion of the World Energy Council's member countries; some potential indicators were excluded from the Index due to low member country coverage. The key data sources for the Energy Trilemma Index model are: (1) IEA World Energy Balances, Indicators, World Energy Prices, and Emissions; (2) World Bank/UN SDG 7 tracking data; (3) World Bank Getting Electricity report; (4) JODI and IGU data; (5) Global Competitiveness Index, WEF.



Indicator selection criteria includes:

Coverage: The World Energy Council includes indicators that are critical to the Index's methodology and strives to ensure that each indicator possesses a strong coverage of data (more than 75% coverage across the 133 tracked countries).

Comparability: Data to calculate indicator scores are derived from as unique and comprehensive sources as possible, focusing on a single source per indicator as far as practical, to ensure comparability between countries.

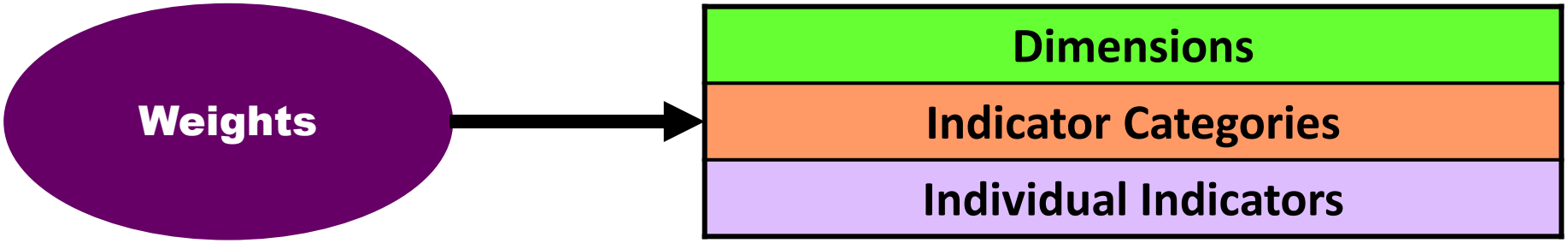
Relevance: Indicators are chosen or developed to provide insight into country situations in the context of the project goals and in line with the narrative.

Distinctiveness: Each indicator focuses on a different aspect of the issue being explored and avoids overlaps or redundancy with other indicators.

Contextual sensitivity: Indicators capture different country situations (e.g. wealth, size) and, where appropriate, indicators are normalised by GDP (PPP), GDP (PPP) per capita, population, or other relevant metrics.

Robustness: Indicator scores are computed from data made available by reputable sources with the most current information available at sufficient coverage.

Balance: Indicators within each dimension (and dimensions across the Index) exhibit coverage of different issues.



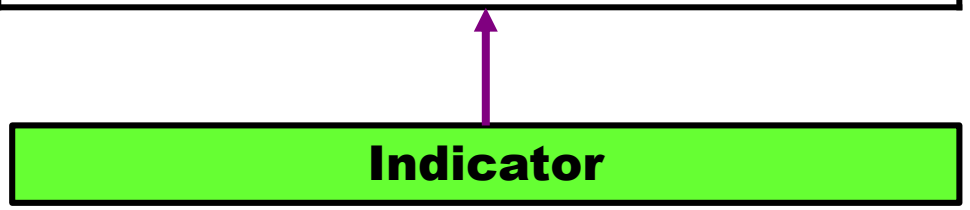
- Dimensions, Categories and Indicators are assigned weights in the World Energy Trilemma Index to account for their relative importance while balancing scientific robustness and transparency.
- A major, overarching proposition of the Index is that the fundamental three dimensions of energy security (A), energy equity (B), and environmental sustainability (C) are equally important.
- Therefore, each of them contributes 30% of the final score. The country context dimension (D) has the remaining 10% weight.
- Weight of each indicator category is mainly determined by the number of indicators included in it and its relevance to the indicator category and dimension.

Energy Trilemma Index Indicators - Index Structure

Energy Trilemma Index	**A. Energy Security**	**A1. Security of supply and energy demand** **A2. Resilience of energy systems**
	B. Energy Equity	**B1. Energy access** **B2. Quality energy access** **B3. Affordability**
	C. Environmental Sustainability of Energy Systems	**C1. Energy resource productivity** **C2. Decarbonisation** **C3. Emissions and pollution**
	D. Country Context	**D1. Macroeconomic environment** **D2. Governance** **D3. Stability for Investment and innovation**

A1. Security of supply and energy demand	A1a. Diversity of primary energy supply A1b. Import dependence
A2. Resilience of energy system	A2a. Diversity of electricity generation A2b. Energy storage A2c. System stability and recovery capacity
B1. Energy access	B1a. Access to electricity B1b. Access to clean cooking
B2. Quality energy access	B2a. Access to “modern” energy
B3. Affordability	B3a. Electricity prices B3b. Gasoline and Diesel prices B3c. Natural gas prices B3d. Affordability of electricity for residents
C1. Energy resource productivity	C1a. Final energy intensity C1b. Efficiency of power generation and T&D
C2. Decarbonisation	C2a. Low carbon electricity generation C2b. CO_2 emissions trend
C3. Emissions and pollution	C3a. CO_2 intensity C3b. CO_2 emissions per capita C3c. CH4 emissions per capita C3d. $PM_{2.5}$ mean annual exposure C3e. PM_{10} mean annual exposure

D1. Macroeconomic environment	D1a. Macroeconomic stability
D2. Governance	D2a. Effectiveness of government D2b. Political stability D2c. Rule of law
D3. Stability for Investment and innovation	D3a. Foreign direct investment, net inflows D3b. Ease of doing business D3c. Perception of corruption D3d. Efficiency of legal framework in challenging regulations D3e. Intellectual property protection D3f. Innovation capability



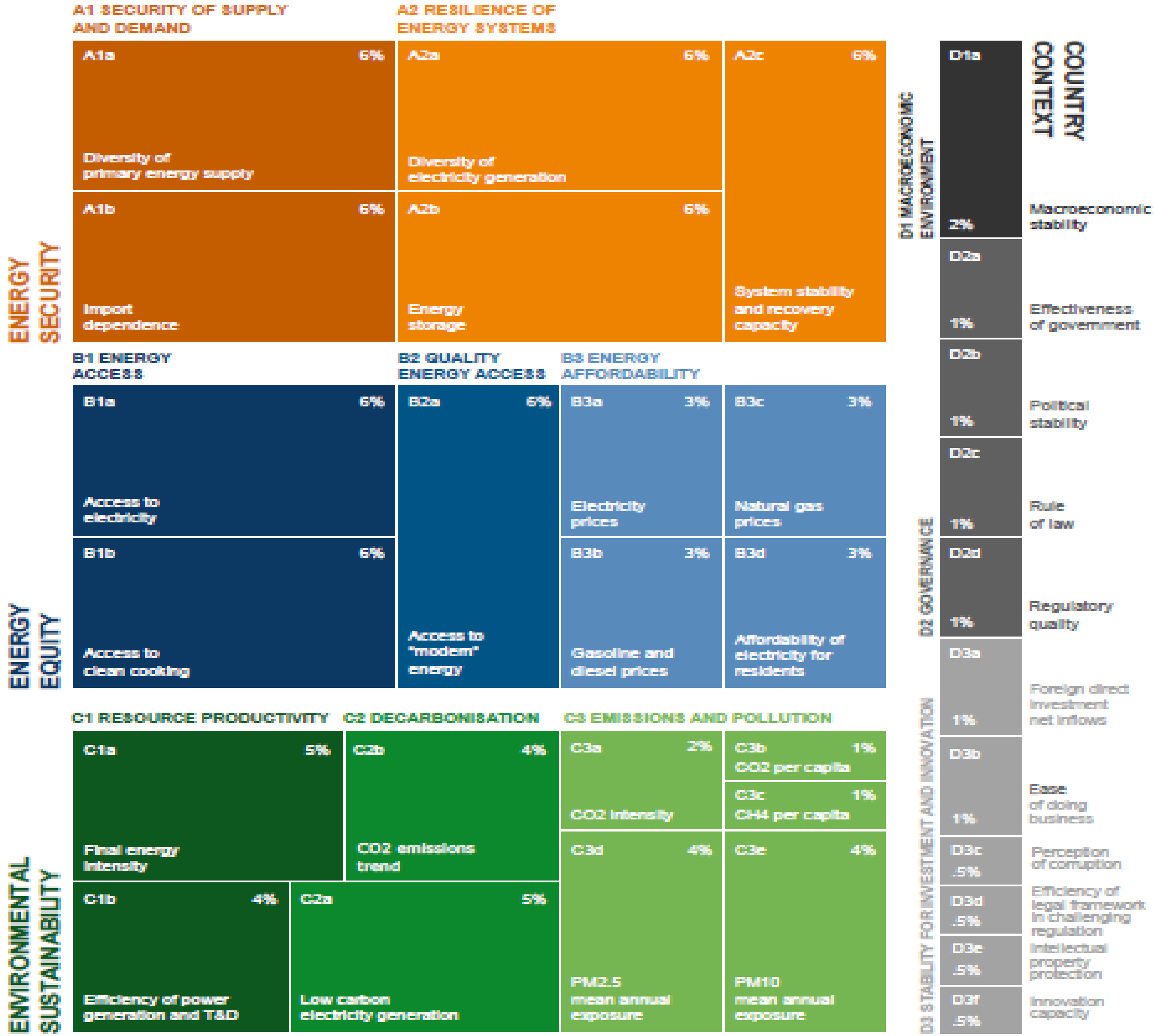
What is the 2020 Index Based On?

Each country's overall Index ranking is based on the calculation of 32 underlying indicators which aggregate up to 11 categories across the four dimensions (including country context). Some of these indicator calculations are based on multiple datasets, others rely on just one.

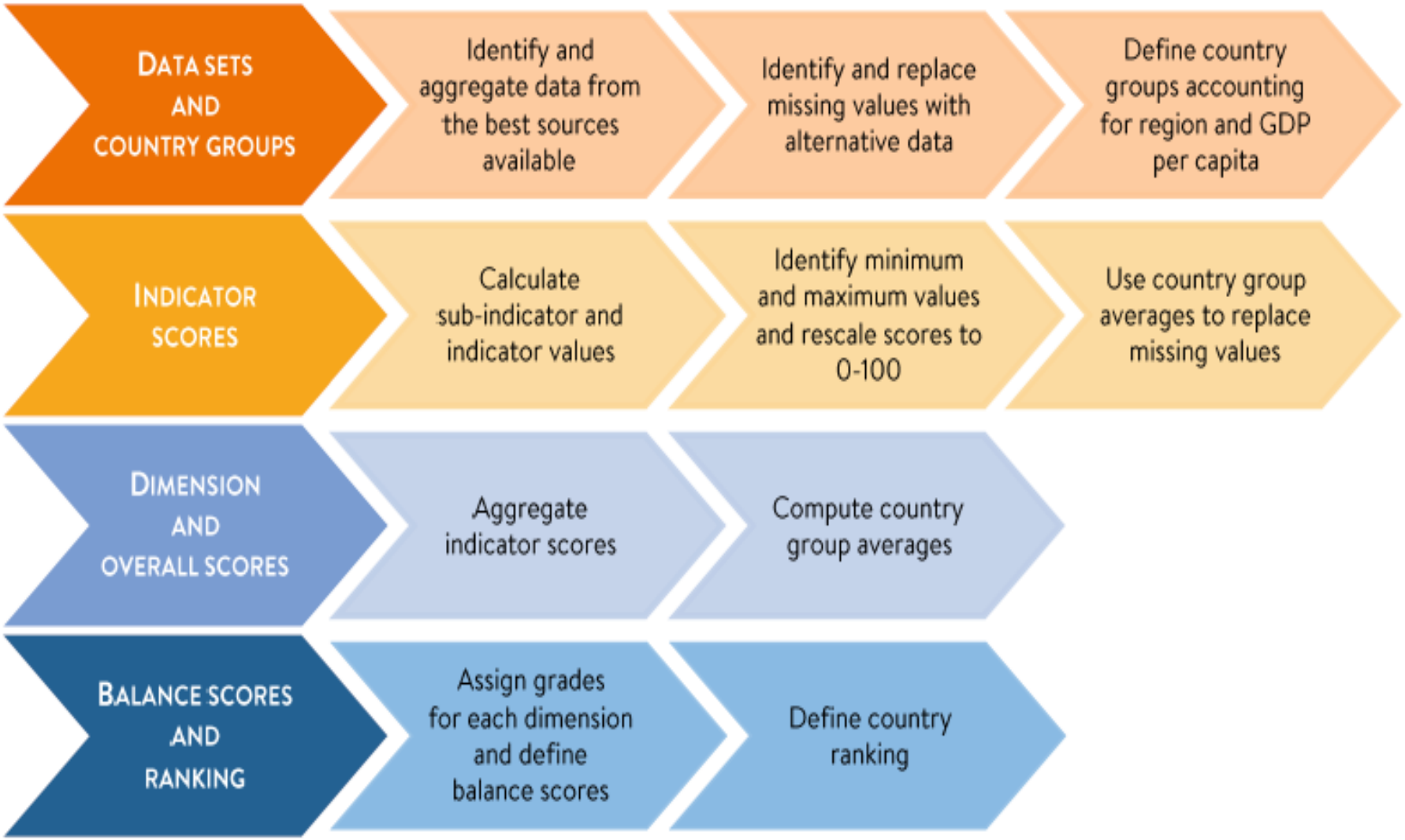
For example, the category "Affordability" is measured using four indicators, each of which is supported by multiple datasets. Two additional indicators (A2d. System resilience and C2c. Transport sector decarbonisation) and one sub-indicator (A2b.c. Energy storage – electricity) were not included in the model due to lack of available data, and remain placeholders for future Trilemma iterations.

The following figure provides an overview of the indicators and their weighting.

2020 Energy Trilemma Index structure and weighting of the indicators



The Approach in Calculating Index Results



WORLD ENERGY COUNCIL

World Energy Trilemma Index

2020

2020 Highlights

- In this year's Trilemma, the overall scores top ten ranks remain dominated by OECD countries, which illustrates the benefit of longstanding active energy policies.
- The top three ranking countries of Switzerland, Sweden and Denmark have overall scores of 84 and above.
- The top ten ranks have a strong European flavour with Canada, the United States and New Zealand breaking the OECD European monopoly.
- This year we have introduced tied ranks due to the closeness of some country scores; for example, Austria and Finland have the same score and are ranked 4th while the UK and France also share the same score to be ranked 5th.
- The path followed by the greatest improvers since 2000 reveals the importance of diversifying energy systems and increasing access.
- Historic analysis shows that the "Trilemma" of balancing the differing policy priorities remains relevant with no country having consistently improving in each dimension every year since 2000.

Paris Agreement

Global Goal of Keeping Warming Between 2 ^{0}C and 1.5 ^{0}C

Article 2

1. This Agreement, in enhancing the implementation of the Convention, including its objective, aims to strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty, including by:

(a) Holding the increase in the global average temperature to well below 2 °C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change;

(b) Increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production;

(c) Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development.

2. This Agreement will be implemented to reflect equity and the principle of common but differentiated responsibilities and respective capabilities, in the light of different national circumstances.

Article 4

1. In order to achieve the long-term temperature goal set out in Article 2, Parties aim to reach global peaking of greenhouse gas emissions as soon as possible, recognizing that peaking will take longer for developing country Parties, and to undertake rapid reductions thereafter in accordance with best available science, so as to achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century, on the basis of equity, and in the context of sustainable development and efforts to eradicate poverty.

2. Each Party shall prepare, communicate and maintain successive nationally determined contributions that it intends to achieve. Parties shall pursue domestic mitigation measures, with the aim of achieving the objectives of such contributions.

3. Each Party's successive nationally determined contribution will represent a progression beyond the Party's then current nationally determined contribution and reflect its highest possible ambition, reflecting its common but differentiated responsibilities and respective capabilities, in the light of different national circumstances.

9. Each Party shall communicate a nationally determined contribution every five years in accordance with decision 1/CP.21 and any relevant decisions of the Conference of the Parties serving as the meeting of the Parties to this Agreement and be informed by the outcomes of the global stocktake referred to in Article 14.

SALINAN

PRESIDEN
REPUBLIK INDONESIA

UNDANG-UNDANG REPUBLIK INDONESIA
NOMOR 16 TAHUN 2016

TENTANG

PENGESAHAN *PARIS AGREEMENT TO THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE* (PERSETUJUAN PARIS ATAS KONVENSI KERANGKA KERJA PERSERIKATAN BANGSA-BANGSA MENGENAI PERUBAHAN IKLIM)

DENGAN RAHMAT TUHAN YANG MAHA ESA

PRESIDEN REPUBLIK INDONESIA,

Pasal 2

Undang-Undang ini mulai berlaku pada tanggal diundangkan.

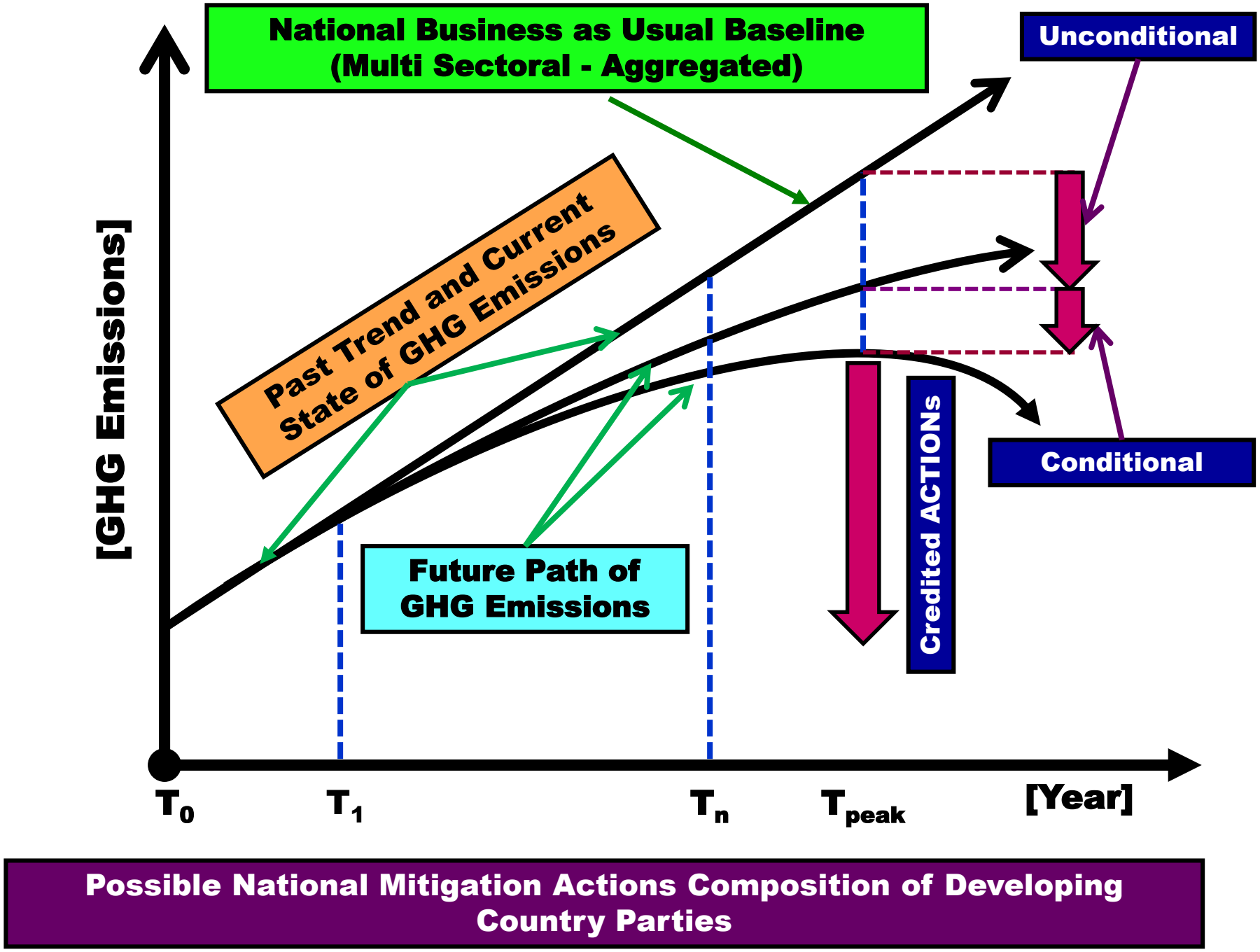
Agar setiap orang mengetahuinya, memerintahkan pengundangan Undang-Undang ini dengan penempatannya dalam Lembaran Negara Republik Indonesia.

Disahkan di Jakarta
pada tanggal 24 Oktober 2016
PRESIDEN REPUBLIK INDONESIA,
ttd.

JOKO WIDODO

Diundangkan di Jakarta
Pada tanggal 25 Oktober 2016
MENTERI HUKUM DAN HAK ASASI MANUSIA
REPUBLIK INDONESIA,
ttd.

YASONNA H. LAOLY



Possible National Mitigation Actions Composition of Developing Country Parties

Updated Nationally Determined Contribution
Republic of Indonesia
(Corrected Version, 12 August 2021)

After Correction – page 15

Table 1. Projected BAU and emission reduction from each sector category

Sector	GHG Emission Level 2010* (MTon CO_2e)	GHG Emission Level 2030			GHG Emission Reduction				Annual Average Growth BAU (2010-2030)	Average Growth 2000-2012
		MTon CO_2e			MTon CO_2e		% of Total BaU			
		BaU	CM1	CM2	CM1	CM2	CM1	CM2		
1. Energy*	453.2	1,669	1,355	1,223	314	446	11%	15.5%	6.7%	4.50%
2. Waste	88	296	285	256	11	40	0.38%	1.4%	6.3%	4.00%
3. IPPU	36	70	67	66	3	3.25	0.10%	0.11%	3.4%	0.10%
4. Agriculture**	111	120	110	116	9	4	0.32%	0.13%	0.4%	1.30%
5. Forestry and Other Land Uses (FOLU)***	647	714	217	22	497	692	17.2%	24.1%	0.5%	2.70%
TOTAL	**1,334**	**2,869**	**2,034**	**1,683**	**834**	**1,185**	**29%**	**41%**	**3.9%**	**3.20%**

Notes: **CM1**= Counter Measure 1 (*unconditional mitigation scenario*)

CM2– Counter Measure 2 (*conditional mitigation scenario*)

*) Including fugitive.

**) Only include rice cultivation and livestock.

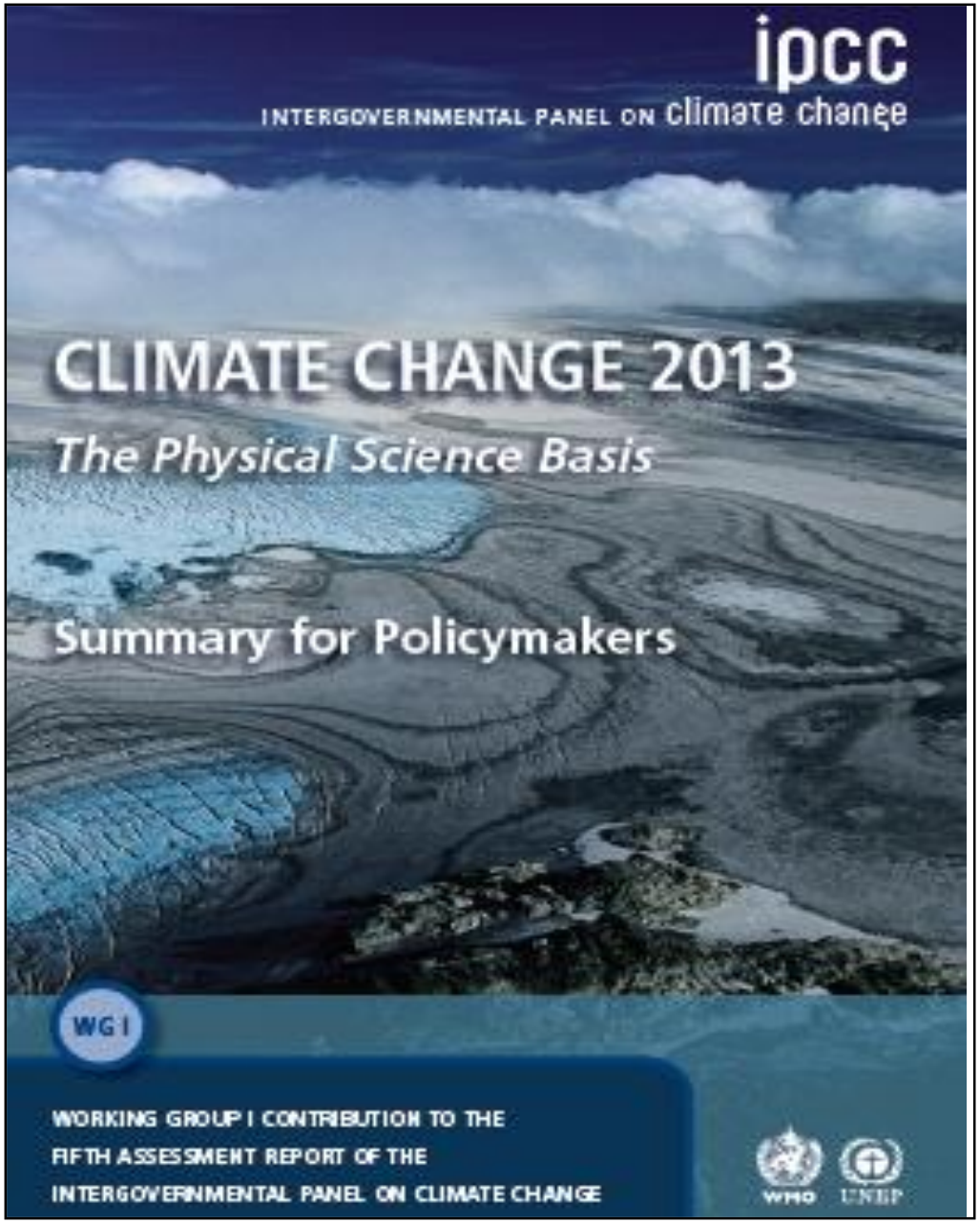
***) Including emission from estate crops plantation.

4.6. Indonesia's NDC contributes towards achieving the objective of the Convention as set out in its Article 2

The Indonesia's NDC will contributes towards achieving the objective of the Convention as set out in its Article 2 through its climate change related policies by reducing greenhouse gas emission and enhancing climate resilience which will lead to sustainable economic development.

Climate change policies will align with sustainable economic development through reduced GHGs emission and enhanced climate resilience. Sustainable economic development needs conducive environment for investment, fair international trade, and industrial-based economic growth. Climate change policies requires low carbon and climate resilient development, supported by domestic and international resources.

Indonesia also considers to work on finding the peaking time of national GHGs emissions necessary to meet the national sustainable development objectives while contributing to the global efforts to fight against the dangerous impacts of climate change by limiting temperature increase to 2°C and pursuing the limitation to 1.5°C.


ipcc
INTERGOVERNMENTAL PANEL ON Climate change
CLIMATE CHANGE 2013
The Physical Science Basis
Summary for Policymakers
WG I
WORKING GROUP I CONTRIBUTION TO THE
FIFTH ASSESSMENT REPORT OF THE
INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE
WMO
UNEP

B.5 Carbon and Other Biogeochemical Cycles

The atmospheric concentrations of carbon dioxide (CO_2), methane, and nitrous oxide have increased to levels unprecedented in at least the last 800,000 years. CO_2 concentrations have increased by 40% since pre-industrial times, *primarily from fossil fuel emissions and secondarily from net land use change emissions*. The ocean has absorbed about 30% of the emitted anthropogenic carbon dioxide, causing ocean acidification (see Figure SPM.4).

C. Drivers of Climate Change

Total radiative forcing is positive, and has led to an uptake of energy by the climate system. The largest contribution to total radiative forcing is *caused by the increase in the atmospheric concentration of CO_2 since 1750* (see Figure SPM.5). {3.2, Box 3.1, 8.3, 8.5}

D.3 Detection and Attribution of Climate Change

Human influence has been detected in warming of the atmosphere and the ocean, in changes in the global water cycle, in reductions in snow and ice, in global mean sea level rise, and in changes in some climate extremes (Figure SPM.6 and Table SPM.1). *This evidence for human influence has grown since AR4. It is extremely likely that human influence has been the dominant cause of the observed warming since the mid-20th century*. {10.3–10.6, 10.9}

ipcc
INTERGOVERNMENTAL PANEL ON climate change

2018/24/PR

IPCC PRESS RELEASE

8 October 2018

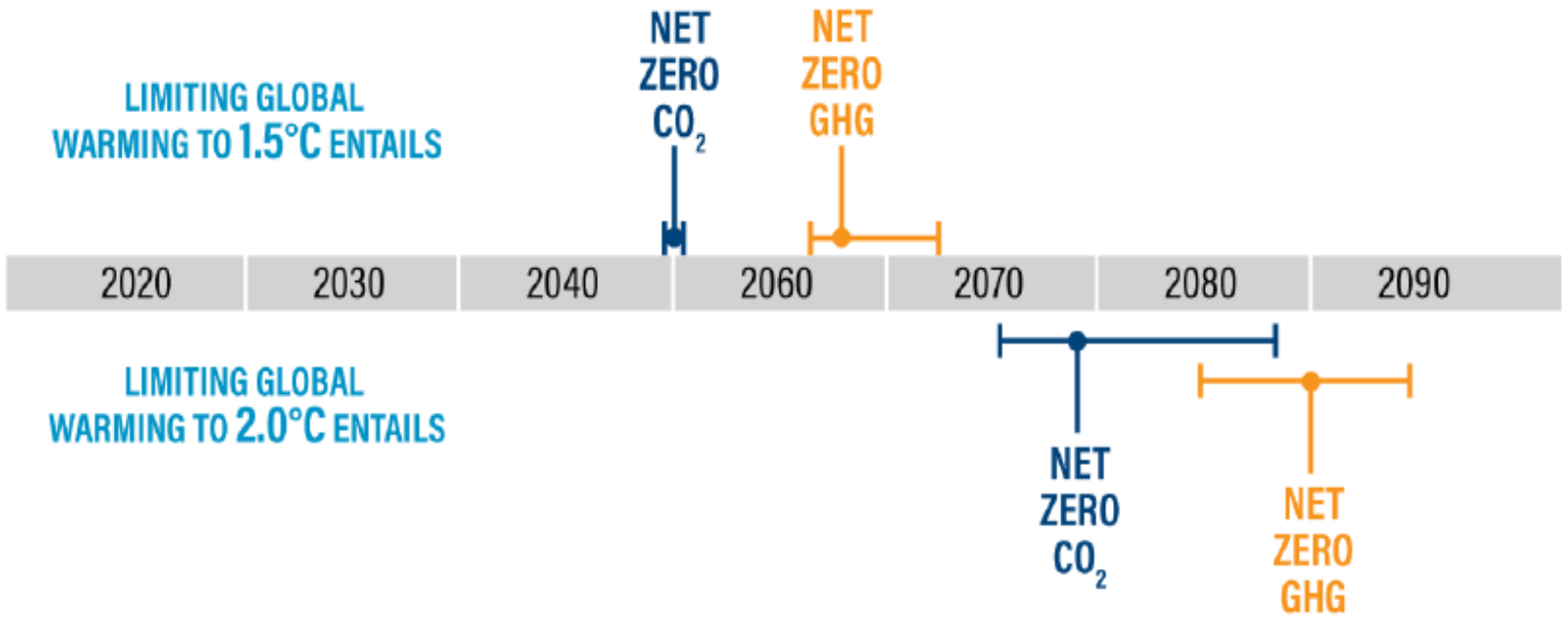
Summary for Policymakers of IPCC Special Report on Global Warming of 1.5°C approved by governments

INCHEON, Republic of Korea, 8 Oct - Limiting global warming to 1.5ºC would require rapid, far-reaching and unprecedented changes in all aspects of society, the IPCC said in a new assessment. With clear benefits to people and natural ecosystems, limiting global warming to 1.5ºC compared to 2ºC could go hand in hand with ensuring a more sustainable and equitable society, the Intergovernmental Panel on Climate Change (IPCC) said on Monday.

"One of the key messages that comes out very strongly from this report is that we are already seeing the consequences of 1°C of global warming through more extreme weather, rising sea levels and diminishing Arctic sea ice, among other changes," said Panmao Zhai, Co-Chair of IPCC Working Group I.

The report finds that limiting global warming to 1.5°C would require "rapid and far-reaching" transitions in land, energy, industry, buildings, transport, and cities. Global net human-caused emissions of carbon dioxide (CO_2) would need to fall by about 45 percent from 2010 levels by 2030, reaching 'net zero' around 2050. This means that any remaining emissions would need to be balanced by removing CO_2 from the air.

Global timeline to reach net-zero emissions



Source: IPCC Special Report on Global Warming of 1.5°C

WORLD RESOURCES INSTITUTE

Aggregate Effect of the Intended Nationally Determined Contributions: An Update

Synthesis Report by the UNFCCC Secretariat

FCCC/CP/2016/2 – 2 May 2016

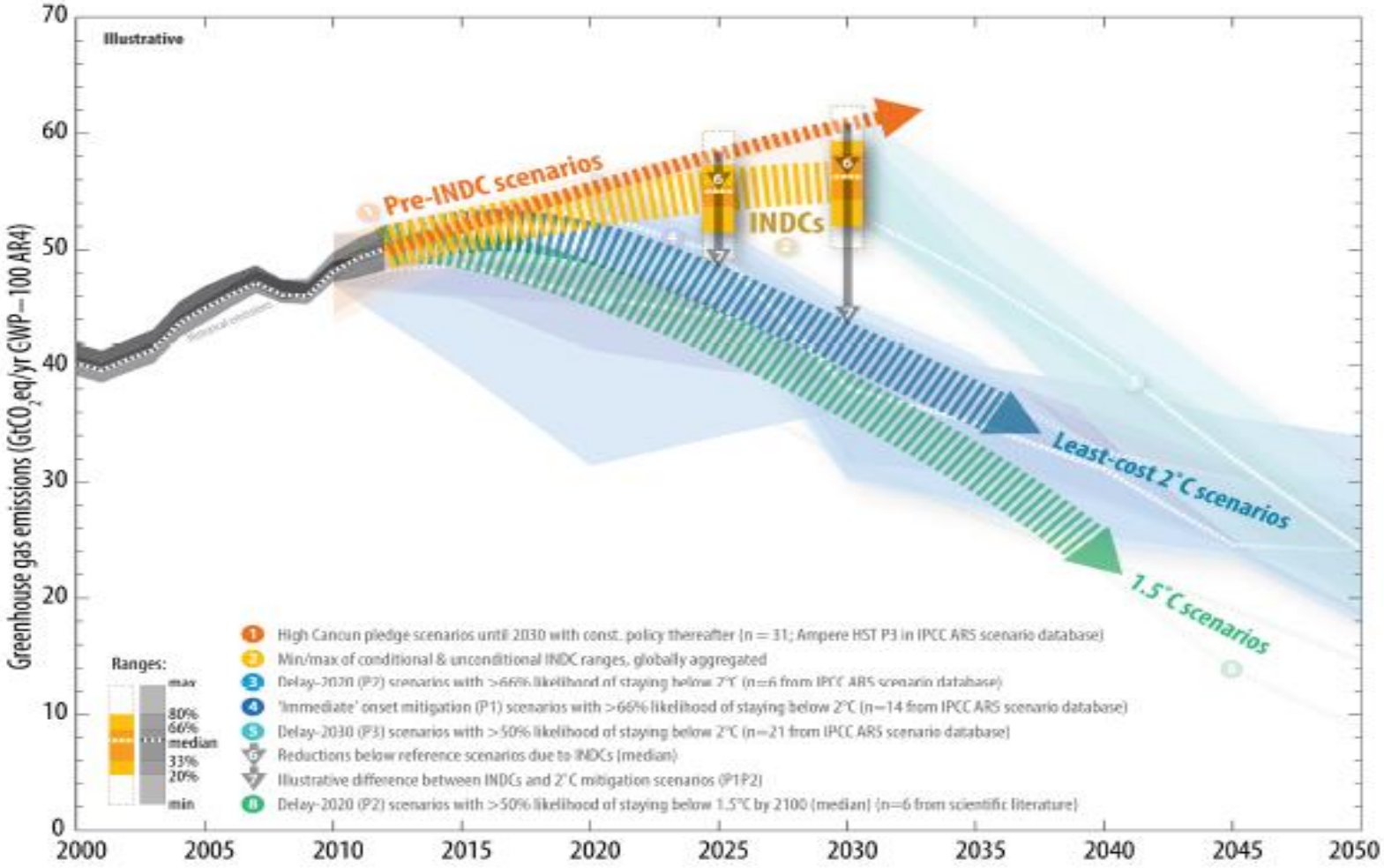
Aggregate Effect of the INDC: An Update

Synthesis report by the Secretariat - FCCC/CP/2016/2

Report - 02 May 2016

- The UN Climate Change Secretariat has published an update to its synthesis report on the collective impact of national climate action plans (Intended Nationally Determined Contributions, or INDCs), submitted by governments as contributions to global climate action under the Paris Agreement.
- Since the publication last October of the 1st synthesis report prepared ahead of the Paris Climate Change Conference, 42 additional countries submitted their INDCs. The updated report now captures the overall impact of 161 national climate plans covering 189 countries and covering 95.7% of total global emissions. (The European Union and its 28 member States submit a joint INDC.)
- There are 137 of the 161 INDCs (85%) which include an adaptation component, reflecting a common determination of governments to strengthen national adaptation efforts.
- INDCs are expected to deliver sizeable emission reductions and slow down emissions growth in the coming decade. However, these are still not enough to keep the global temperature rise since pre-industrial times to below 2, or preferably 1.5 degrees Celsius.

Comparison of Global Emission Levels in 2025 and 2030 Resulting from the Implementation of the INDC and under Other Scenarios



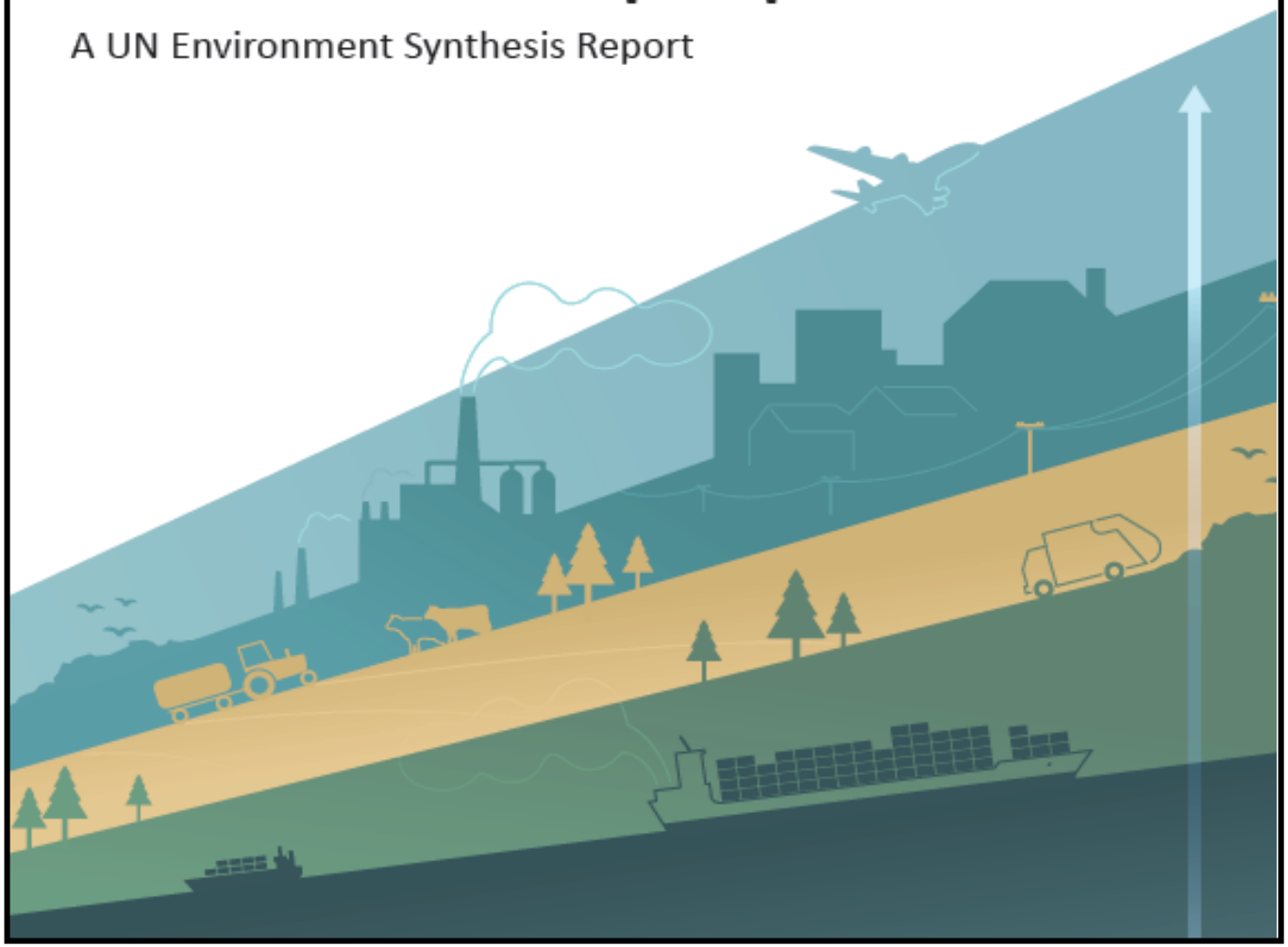
***Source*: Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report scenario database, 1.5 °C scenarios from scientific literature (see footnote 18), IPCC historical emission database and intended nationally determined contribution quantification.**

***Abbreviations*: AR4 = Fourth Assessment Report of the Intergovernmental Panel on Climate Change, GWP = global warming potential, INDC = intended nationally determined contribution, IPCC AR5 = Fifth Assessment Report of the Intergovernmental Panel on Climate Change, n = number of scenarios, yr = year.**

UN environment

The Emissions Gap Report 2017

A UN Environment Synthesis Report



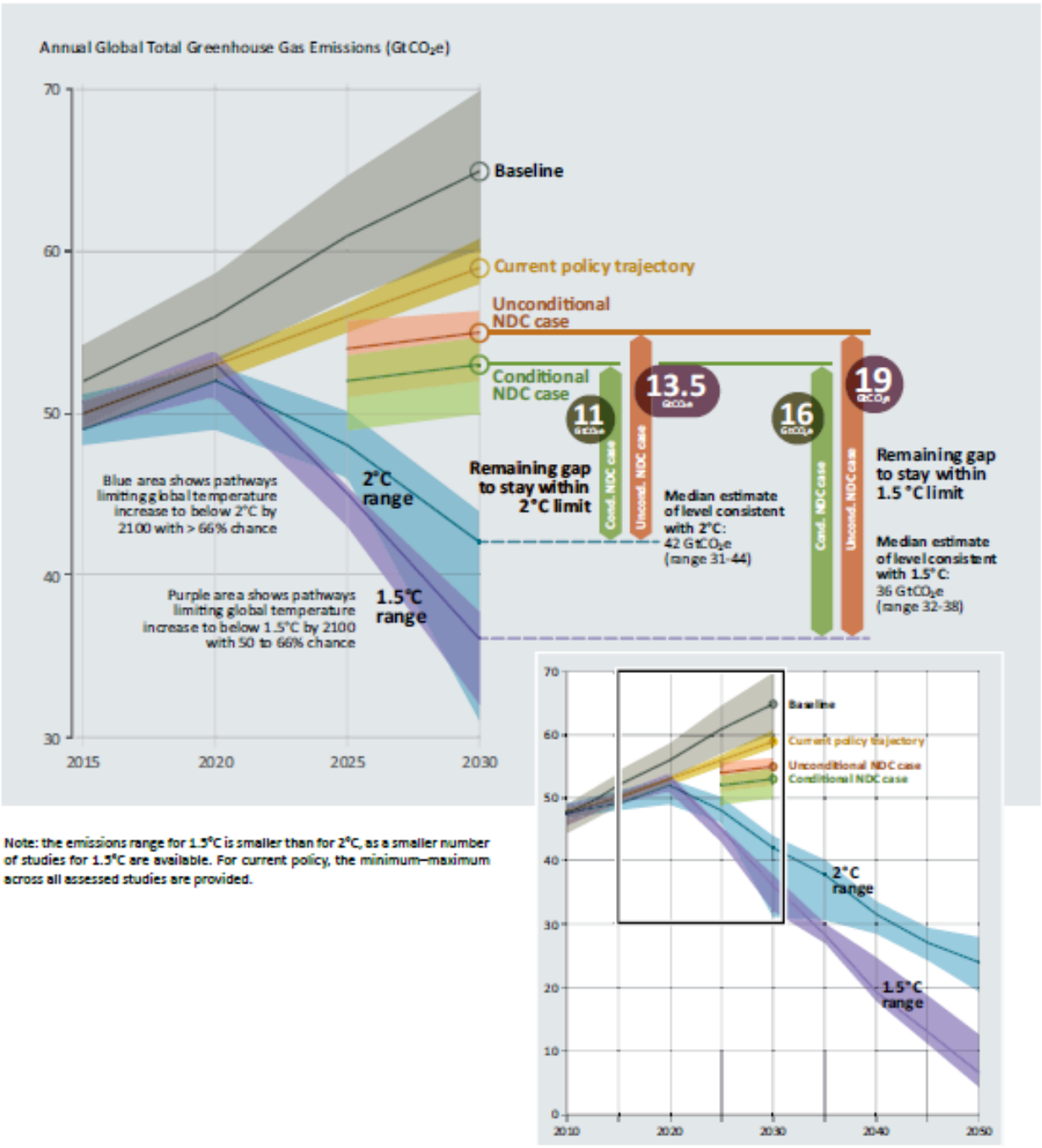


Figure ES.2

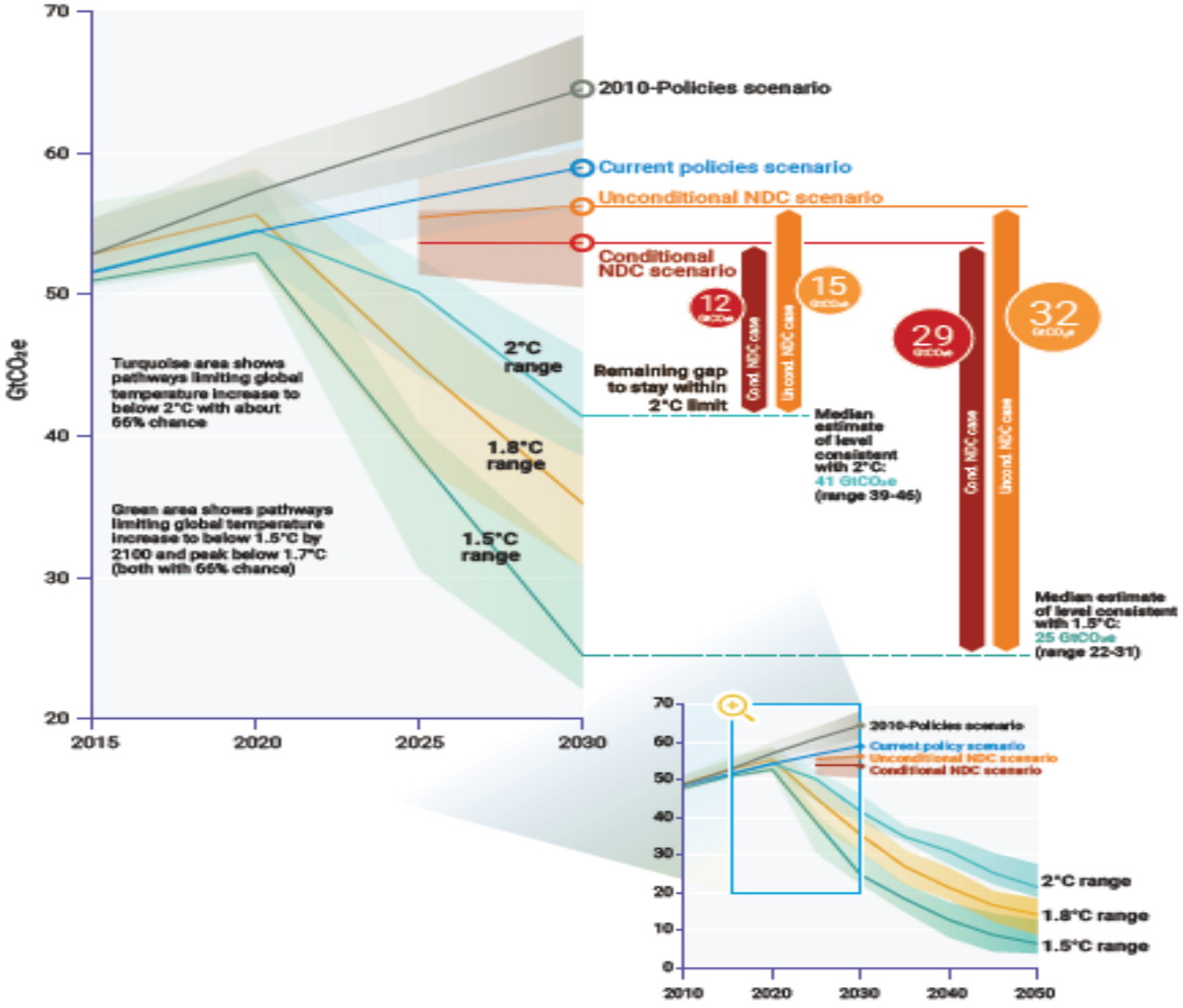
Global GHG emissions under different scenarios and the emissions gap in 2030 (median estimate and 10th to 90th percentile range).

Emission Reduction Options and Potential in the Energy Sector

In the current policy scenario, energy sector emissions amount to 21.3 $GtCO_2$ in 2030, of which 16.3 $GtCO_2$ comes from power generation (IEA, 2016, USEPA, 2012). **Main options for reducing emissions in the energy sector are wind and solar energy. In addition, hydro, nuclear, geothermal, carbon capture and storage (CCS) and bioenergy combined with CCS can contribute.**


UN environment programme
UNEP DTU PARTNERSHIP
Emissions Gap Report 2020

Global GHG emissions under different scenarios and the emissions gap in 2030 (median and 10th to 90th percentile range; based on the pre-COVID-19 current policies scenario)



Emissions Gap Report 2020

INDONESIA
Long-Term Strategy for Low Carbon and Climate Resilience 2050

2021

Through ambitious pathway (LCCP) Indonesia will reach peaking in emission in 2030 with net sink in forestry and land use, and with further exploring opportunity to rapidly progress towards net-zero emission by 2060 or sooner. Hence, the implementation of LTS-LCCR post 2030 will follow the implementation of the corresponding NDC. Development of post 2030 NDC shall be in line with the set target and other guidance under LTS-LCCR, taking into account relevant regulatory frameworks and policies.

Effective engagement of non-party stakeholders (NPS) will be a key driver of successful implementation of the LTS-LCCR. Therefore, taking into account relevant regulatory frameworks and policies, the mechanism for enhancing the effectiveness of NPS engagement will be continuously improved.

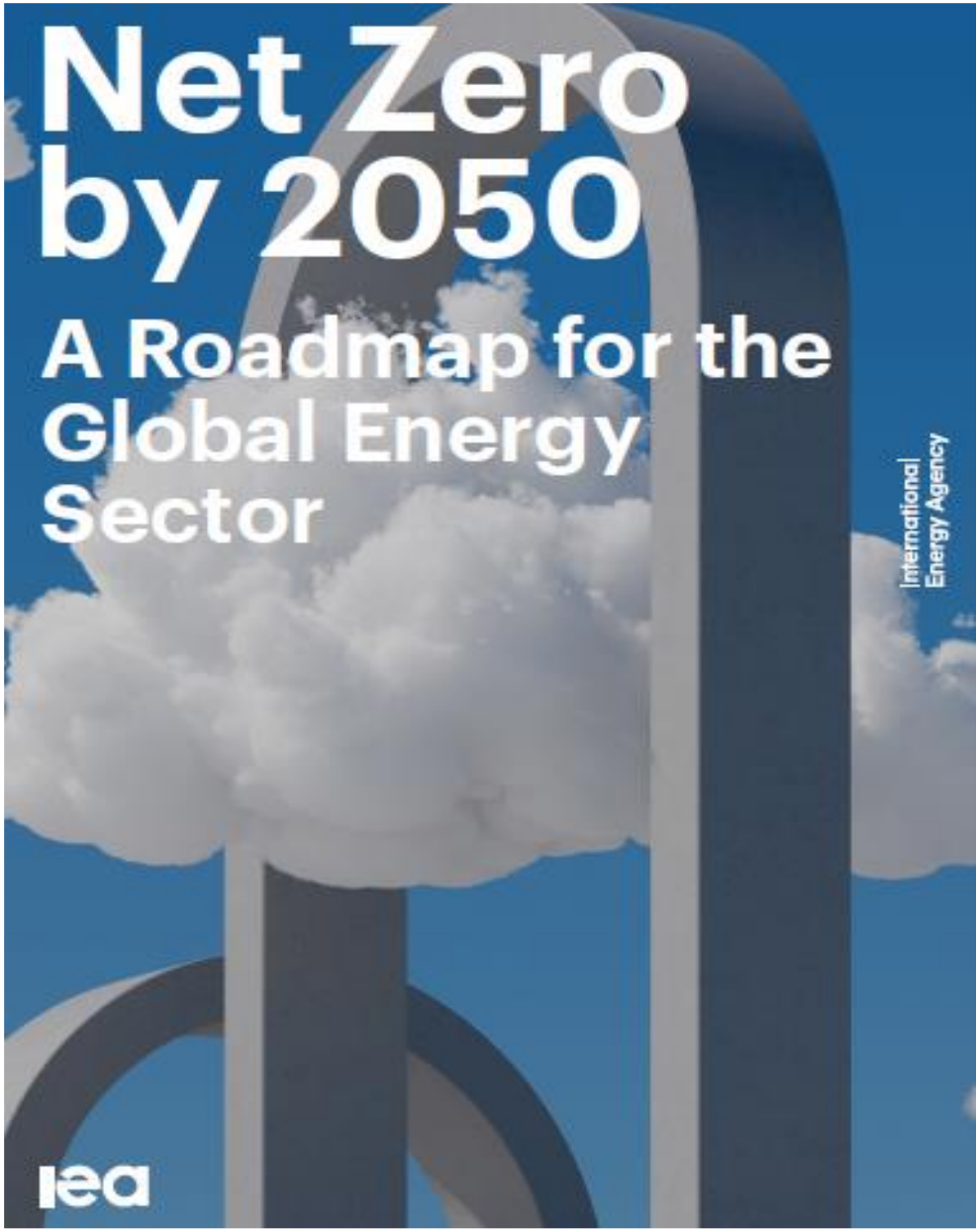
Which Countries Have A Net-Zero Carbon or NZE Goal?

Country	Target Date	Status
Austria	Climate neutrality 2040	Policy Position
Bhutan	Currently carbon negative and aiming for carbon neutrality as it develops	Pledged towards the Paris Agreement
California	Carbon neutral 2045	Executive order
Canada	Net zero emissions 2050	Policy position
Chile	Carbon neutral 2050	Policy position
China	Peak CO2 emissions before 2030 and reach carbon neutrality before 2060*)	Statement of intent
Costa Rica	Net zero emissions 2050	Submission to UN
Denmark	Climate neutral society 2050	In law
European Union	Net zero emissions 2050	Submission to UN
Fiji	Net zero carbon emissions 2050	Submission to UN
Finland	Carbon neutral 2035	Coalition Agreement
France	Net zero 2050	In Law
Germany	Greenhouse gas neutrality 2050	In law
Hungary	Climate neutrality 2050	In law

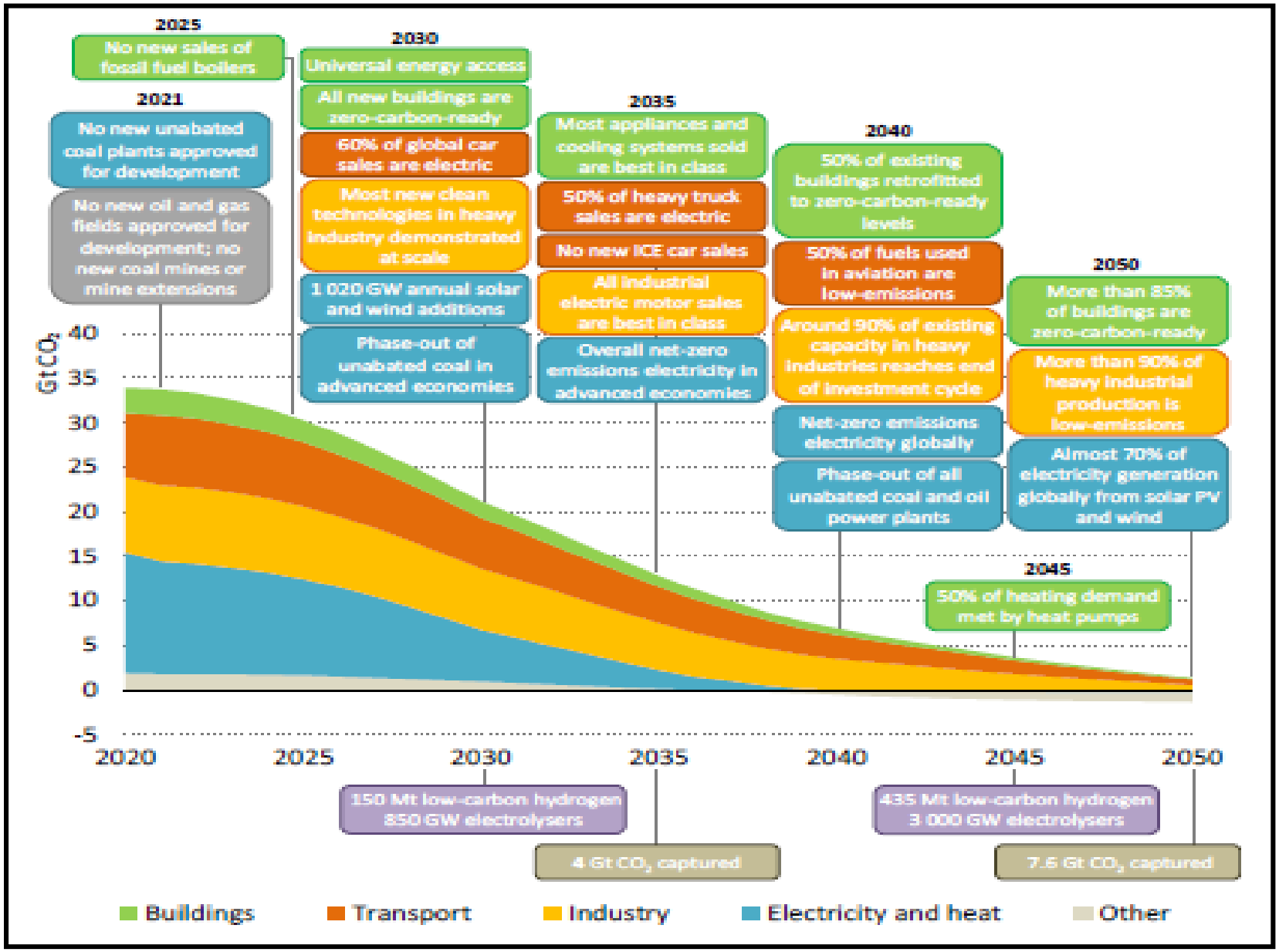
Source: 2020 Climate Home News Ltd., 17/09/2020; 2019 Climate Home News Ltd., 03/06/2019;
*) Ranping Song, "4 Questions About China's New Climate Commitments", WRI, September 2020.

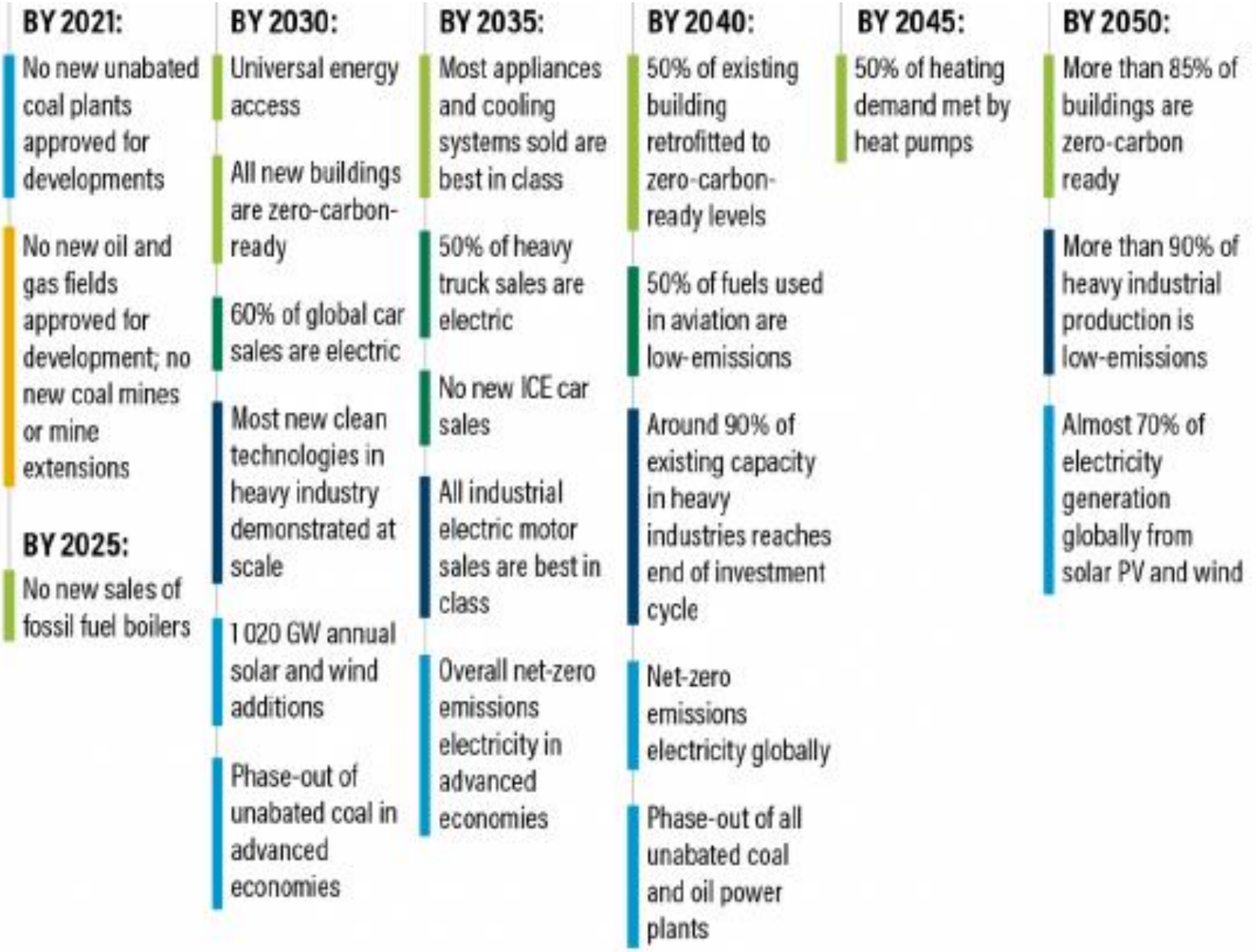
Country	Target Date	Status
Ireland	Net zero emissions 2050	Coalition agreement
Japan	Carbon neutrality 2050[1)]	Policy Position
Republic of Korea's	Net zero emissions 2050[2)]	Commitment
Marshall Islands	Net zero emissions 2050	Pledged towards the Paris Agreement
New Zealand	Net zero goal for all ghg except biogenic methane (mostly from sheep and cattle), which is to be cut 24-47% from 2017 levels by 2050	In law
Norway	Climate neutrality, for 2050 domestically and 2030 with international offsets	Policy position
Portugal	Net zero 2050	Policy position
Slovakia	Climate neutrality 2050	Policy position
Sweden	Carbon neutrality 2045	In Law
Switzerland	Net zero carbon emissions 2050	Policy position
United Kingdom	Net zero 2050	In Law
Uruguay	Net zero carbon sink 2030	Contribution to the Paris Agreement

Source: [1)] 2020 Climate Home News Ltd., 21/10/2020; [2)]Spokesman for the Secretary-General, UN Secretary-General, New York, 27 October 2020.


Net Zero by 2050
A Roadmap for the Global Energy Sector
International Energy Agency
iea

Selected Global Milestones for Policies, Infrastructure and Technology Deployment in the NZE





Source: International Energy Agency, Net Zero by 2050 Report, 2021

WORLD RESOURCES INSTITUTE

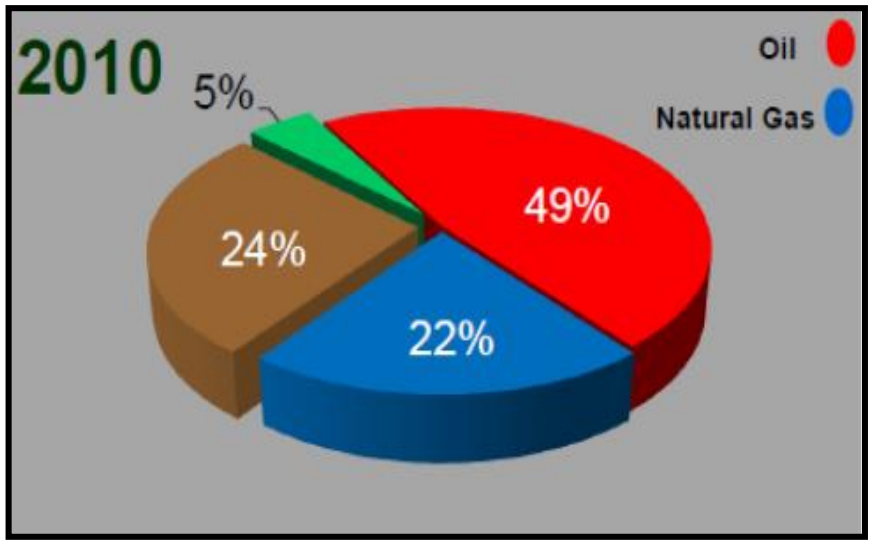
21.05.24

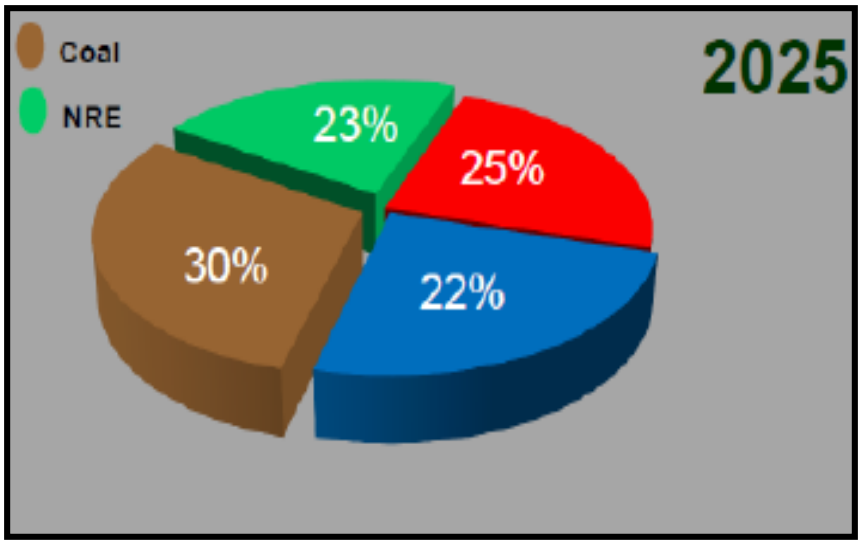
VISI → "*TERWUJUDNYA PENGELOLAAN ENERGI YANG BERKEADILAN, BERKELANJUTAN, DAN BERWAWASAN LINGKUNGAN DENGAN MEMPRIORITASKAN PENGEMBANGAN ENERGI TERBARUKAN DAN KONSERVASI ENERGI DALAM RANGKA MEWUJUDKAN KEMANDIRIAN DAN KETAHANAN ENERGI NASIONAL*"

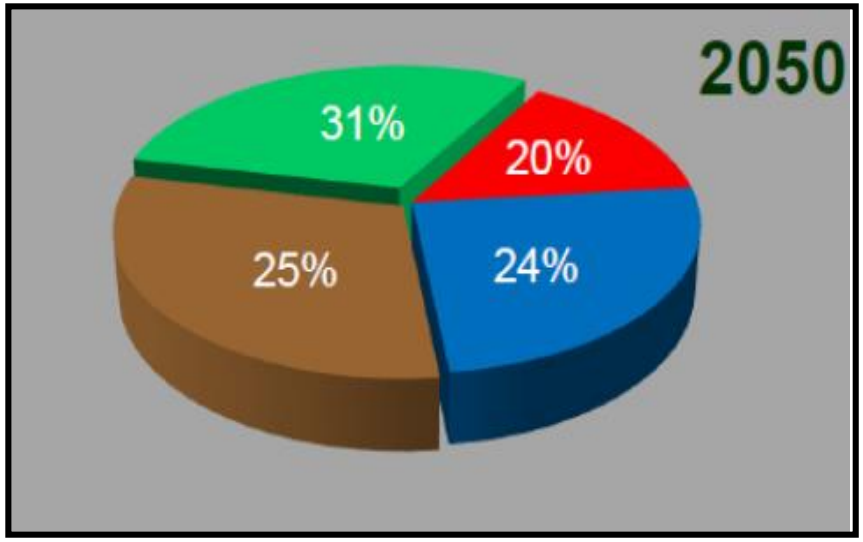
Rencana Umum Energi Nasional

- Sasaran – Sasaran yang diamanatkan dalam KEN Tahun 2015-2050
- National Energy Mix up to 2050
- Emisi GRK Tahun 2015-2050
- Penurunan Emisi GRK Tahun 2015-2050

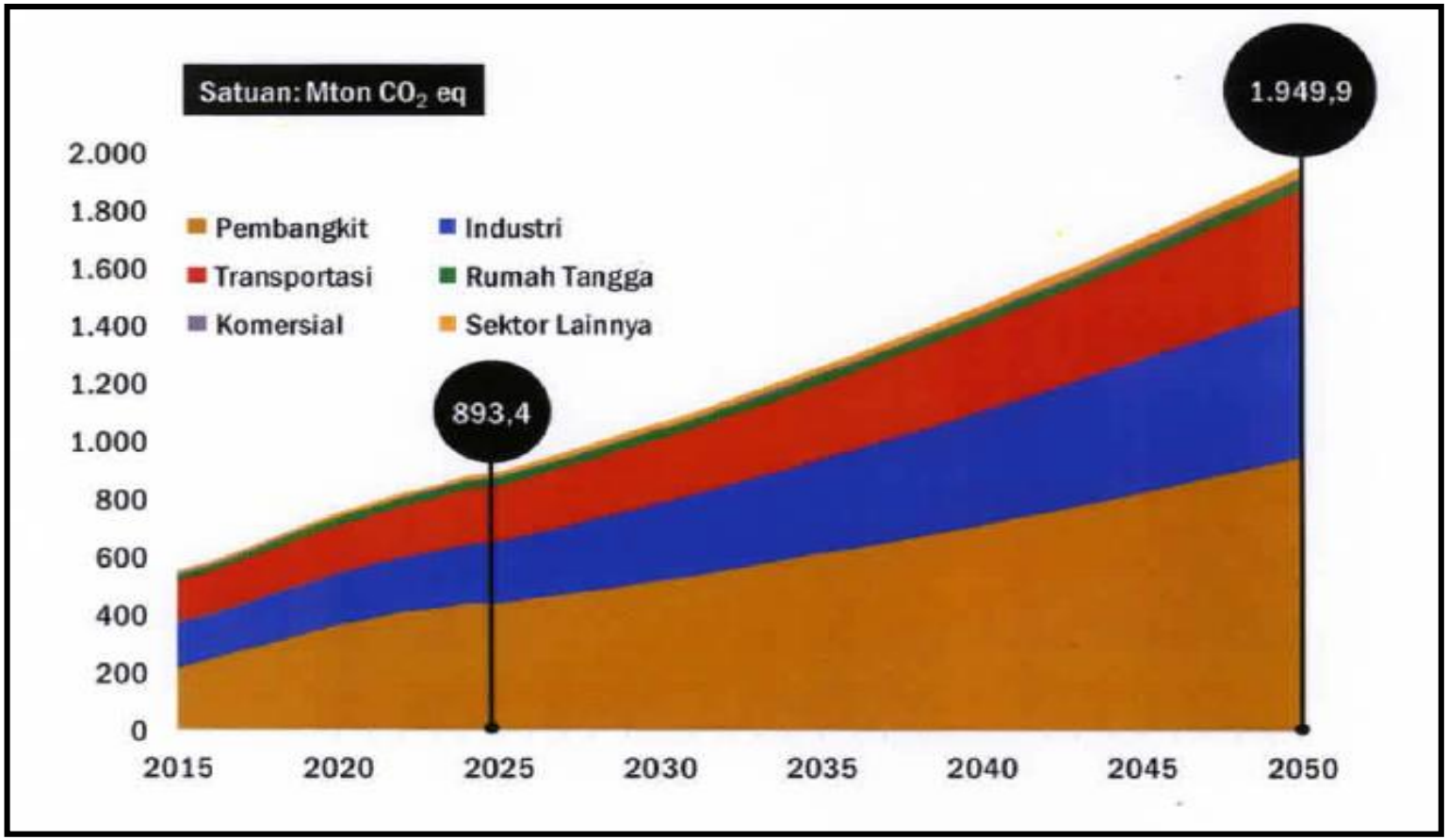
National Energy Mix Menuju 2050







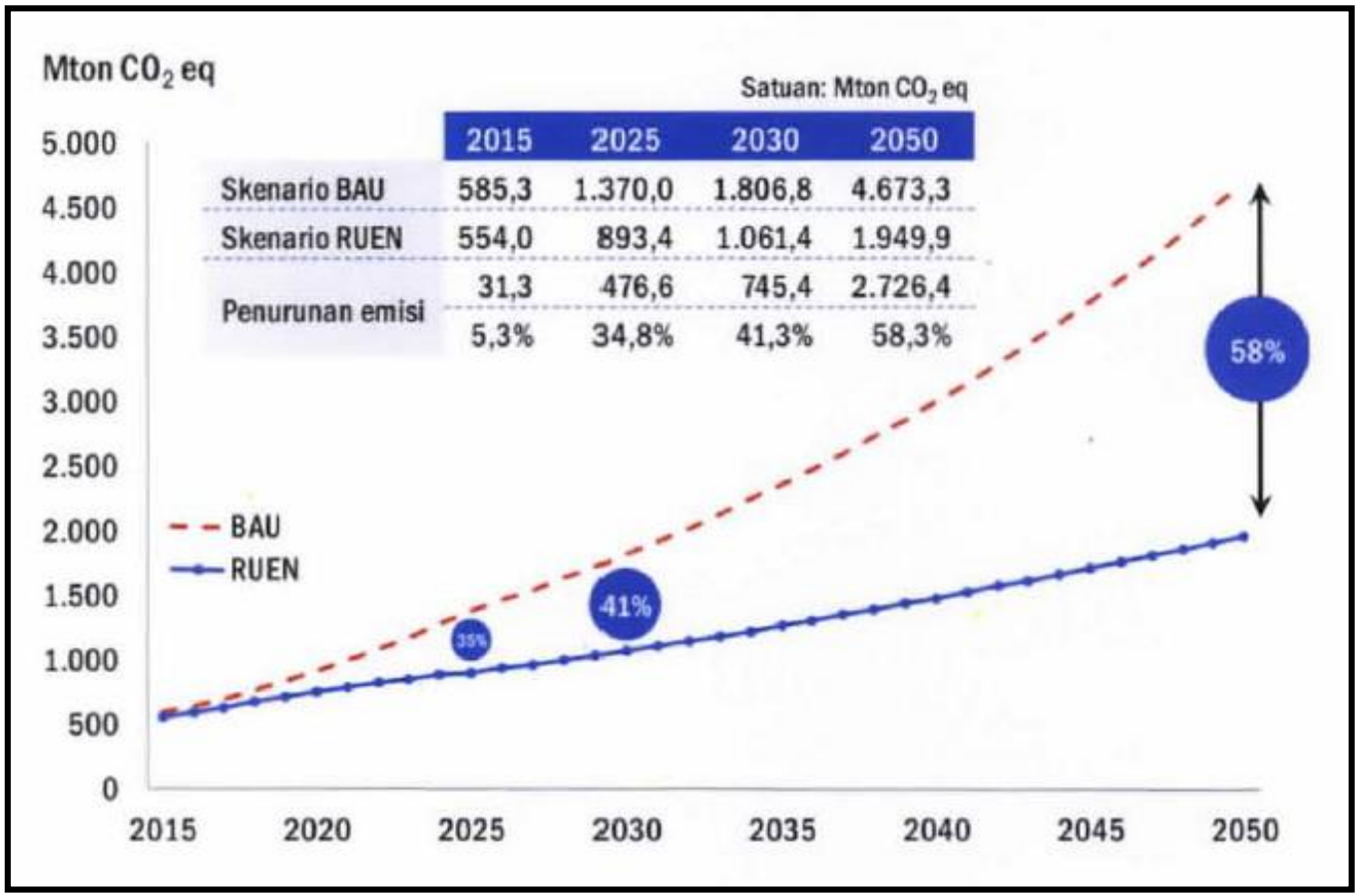
Emisi GRK Tahun 2015-2050



Sektor pembangkit listrik **diproyeksikan akan menjadi penyumbang emisi terbesar, diikuti oleh sektor industri dan sektor transportasi. Proyeksi emisi GRK pada tahun 2025 sebesar 893 juta ton $C0_{2eq}$ dan tahun 2050 sebesar 1,950 juta ton $C0_{2eq}$, sebagaimana dapat dilihat pada gambar diatas.**

Hasil pemodelan pencapaian sasaran KEN akan memberikan dampak penurunan GRK secara signifikan apabila dibandingkan dengan *Business as Usual* (BAU). Penurunan emisi GRK tahun 2025 sebesar 34,8% dan pada tahun 2050 sebesar 58,3%, sebagaimana dapat dilihat pada slide berikutnya.

Penurunan Emisi GRK Tahun 2015-2050

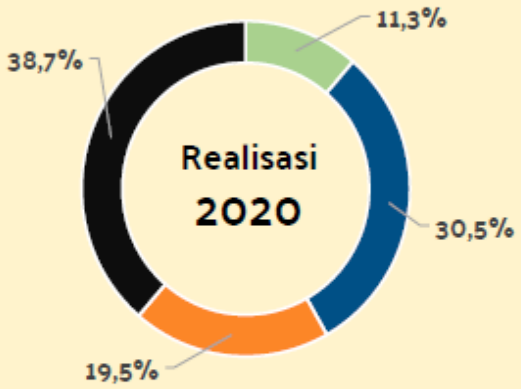


	2015	2025	2030	2050
Skenario BAU	585,3	1.370,0	1.806,8	4.673,3
Skenario RUEN	554,0	893,4	1.061,4	1.949,9
Penurunan emisi	31,3	476,6	745,4	2.726,4
	5,3%	34,8%	41,3%	58,3%

Penurunan emisi GRK disebabkan oleh empat faktor: (1). Diversifikasi energi, dengan meningkatkan porsi energi terbarukan dan mengurangi porsi energi fosil; (2). Pemanfaatan teknologi batubara bersih (clean coal technology) untuk pembangkitan tenaga listrik; (3). Substitusi penggunaan energi dari BBM ke gas bumi; dan (4). Pelaksanaan program konservasi energi pada tahun-tahun mendatang. Penurunan emisi GRK dalam RUEN sudah sejalan dengan Nationally Determined Contribution (NDC) Indonesia sebesar 29% pada tahun 2030 yang merupakan bagian dari komitmen Indonesia untuk turut mendukung upaya pengendalian peningkatan suhu global rata-rata di bawah 2°C.

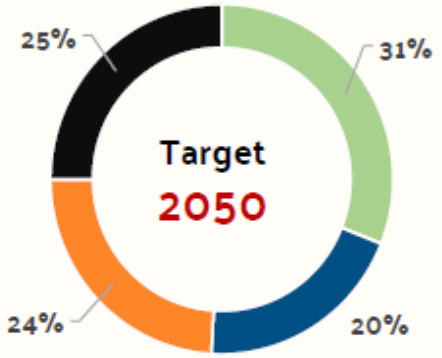
REALISASI DAN TARGET RENCANA UMUM ENERGI NASIONAL

● Batu Bara ● Gas Bumi ● Minyak Bumi ● EBT



1. Konsumsi Energi : 0,8 TOE/kap
2. Konsumsi Listrik : 1.086 Kwh/kap
3. Kapasitas Pembangkit Total : 71 GW

1. Konsumsi Energi : 1,4 TOE/kap
2. Konsumsi Listrik : 2500 Kwh/kap
3. Kapasitas Pembangkit Total : 135 GW



1. Konsumsi Energi : 3,2 TOE/kap
2. Konsumsi Listrik : 7000 Kwh/kap
3. Kapasitas Pembangkit Total: 443 GW*)

TOE : Ton Oil Equivalent

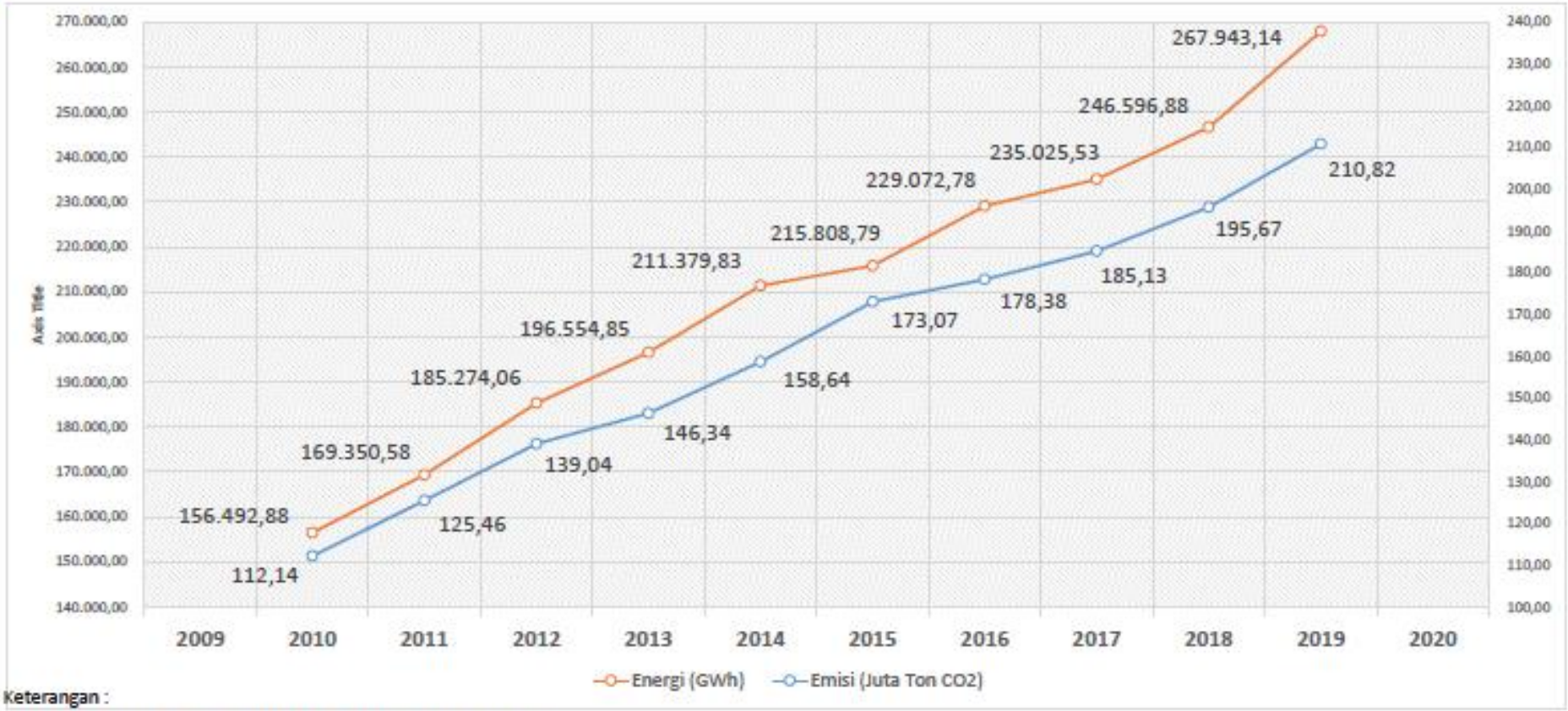
Direktorat Jenderal Ketenagalistrikan
Kementerian Energi dan Sumber Daya Mineral
Republik Indonesia

Penyelenggaraan Inventarisasi dan Mitigasi GRK Sub Bidang Ketenagalistrikan

Wanhar
Direktur Teknik dan Lingkungan Ketenagalistrikan

Jakarta, 11 Januari 2021

PROFIL TINGKAT EMISI GRK PEMBANGKIT TENAGA LISTRIK 2010-2019 (Ton CO_2)



Keterangan :

- Data 2010-2016 berdasarkan perhitungan manual emisi GRK
- Data 2017-2019 berdasarkan pelaporan emisi GRK melalui APPLE-Gatrik

Source: Wanhar, Direktur Teknik dan Lingkungan Ketenagalistrikan, Direktorat Jenderal Ketenagalistrikan, KESDM, "Penyelenggaraan Inventarisasi dan Mitigasi GRK Sub Bidang Ketenagalistrikan.".

Establish long-term deep decarbonization of energy sector in supporting the Indonesia NDC in achieving the national emissions reduction target, in which its long-term emissions path compatible with emission trajectory of temperature rise staying no more than 1.5^{0}C above pre-industrial levels.

Strongly Required Deep Decarbonization of Energy Sector

Deployment of low-carbon & zero-carbon energy technologies and renewable energy; greater role of energy efficiency & conservation from up-stream to down-stream (energy end-use - provide efficient transmission and distribution systems); and move the energy system towards using low-carbon energy sources (fuel switching) to improve national energy mix for its associated sectors (power, transport, industry, building, and households, etc.) to be imbedded in the long-term national energy program.

Energy Sector

WORLD ENERGY COUNCIL | KOMITE NASIONAL INDONESIA

To promote the sustainable supply and use of energy for the greatest benefit of all people.

Terima Kasih