How to kickstart Net Zero journey and Greenhouse Gas Accounting?

KPMG in Thailand

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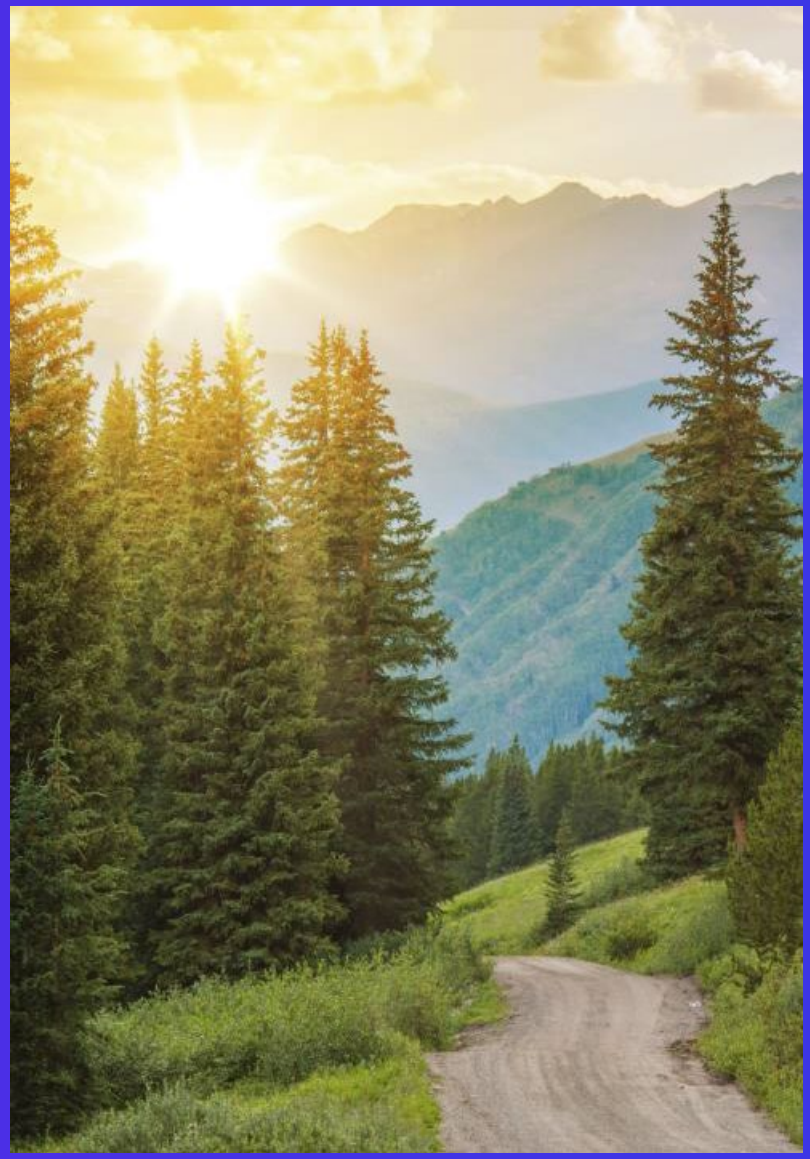
Introduction on Net Zero



Introduction on Net Zero

What is Net Zero ?

*Put simply, net zero means **cutting greenhouse gas emissions to as close to zero as possible**, with any remaining emissions re-absorbed from the atmosphere, by oceans and forests for instance*

Why is Net Zero Important?

*The science shows clearly that global temperature increase needs **to be limited to 1.5°C above pre-industrial levels** to avert the worst impacts of climate change and preserve a livable planet*

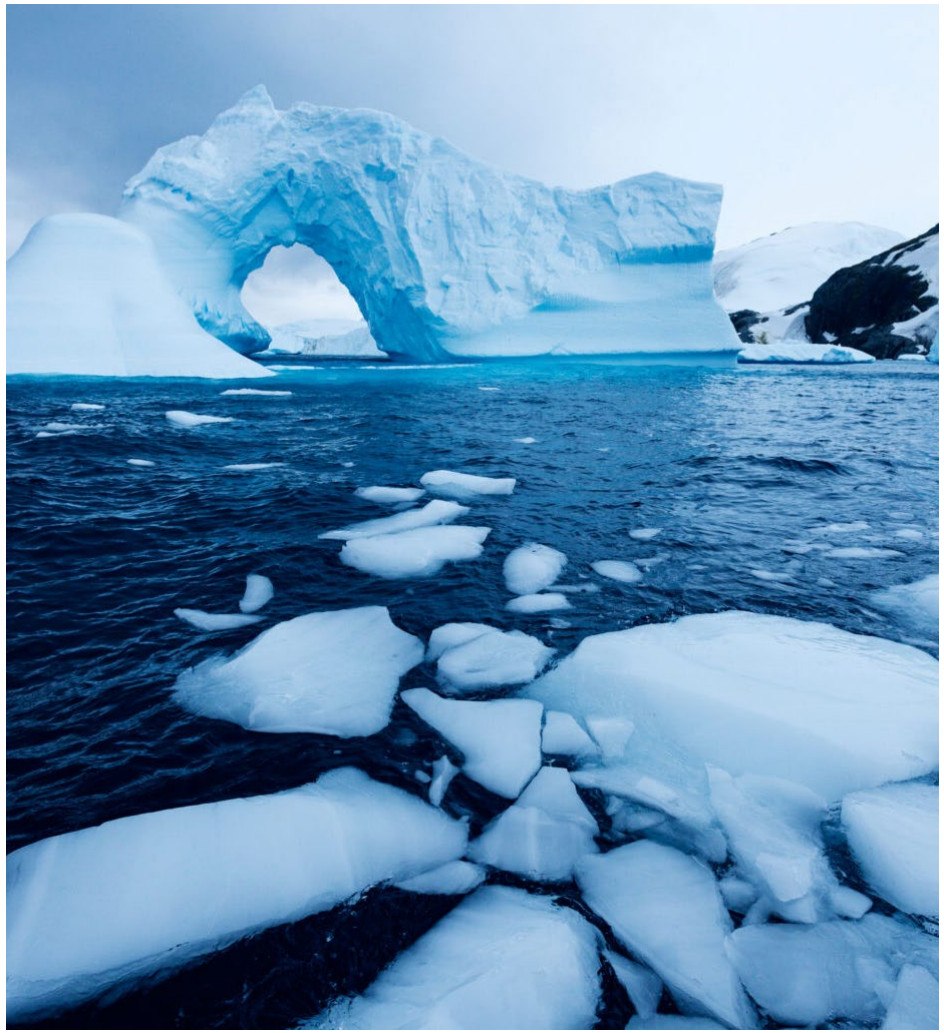
*To keep global warming to no more than 1.5°C – as called for in the Paris Agreement – **emissions need to be reduced by 45% by 2030 and reach net zero by 2050.***

How can Net Zero be achieved?

Transitioning to a Net Zero world is one of the greatest challenges humankind has faced.

Replacing polluting coal, gas and oil-fired power with energy from renewable sources, such as wind or solar, would dramatically reduce carbon emissions.

Source: Net Zero Coalition | United Nations



Why we have to reach Net Zero ?

- The 2015 Paris Agreement set out an international commitment to pursue efforts to limit warming to substantially reduce global greenhouse gas emissions to limit the global temperature increase in this century to 2 degrees Celsius while pursuing efforts to limit the increase even further to 1.5 degrees.

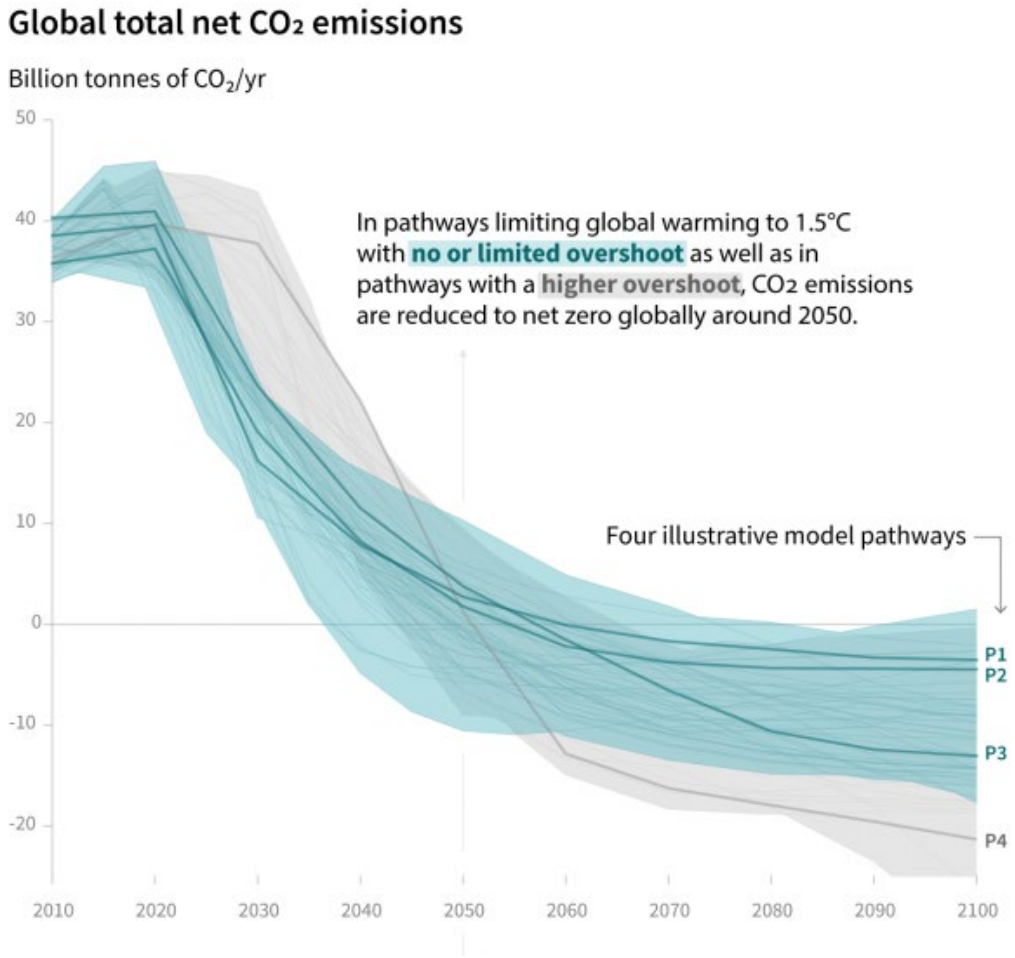
- Achieving 1.5°C target rather than allowing temperatures to rise by 2°C, would save around 61 million people from drought, bring down the financial costs of global climate damages by 25%, and prevent triggering critical climate ‘tipping points’.

- The climate model suggest the pathways scenarios to meet the global goal of 1.5°C need us to halving our emissions in this decade and reaching Net Zero by around 2050

Pathways to limiting global warming to 1.5 C or 2 C

- **IPCC SR1.5:**Pathways and possibility level to keep 1.5C or 2C target.

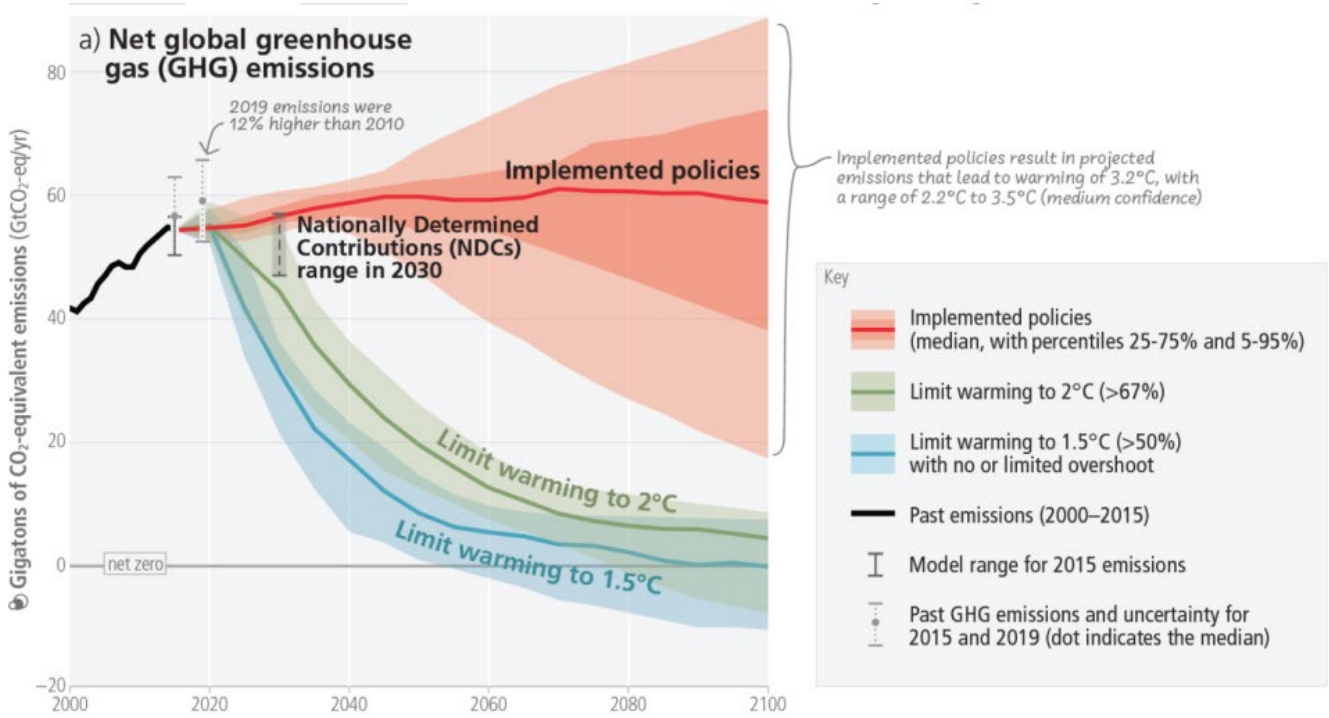
  - In model pathways with no or limited overshoot of 1.5°C, global net anthropogenic CO2 emissions decline by about 45% from 2010 levels by 2030 (40–60% interquartile range), reaching net zero around 2050 (2045–2055 interquartile range).
  - For limiting global warming to below 2°C, CO2 emissions are projected to decline by about 25% by 2030 in most pathways (10–30% interquartile range) and reach net zero around 2070 (2065–2080 interquartile range).
  - Non-CO2 emissions in pathways that limit global warming to 1.5°C show deep reductions that are similar to those in pathways limiting warming to 2°C.



Source: IPCC, Summary for Policymakers, https://www.ipcc.ch/sr15/chapter/spm/

IPCC Assessment Report # 6 (AR6)

Reaching net zero CO2 or GHG emissions primarily requires deep and rapid reductions in gross emissions of CO2, as well as substantial reductions of non-CO2 GHG emissions.



		Reductions from 2019 emission levels (%)			
		2030	2035	2040	2050
Limit warming to1.5°C (>50%) with no or limited overshoot	GHG	43 [34-60]	60 [49-77]	69 [58-90]	84 [73-98]
	CO_2	48 [36-69]	65 [50-96]	80 [61-109]	99 [79-119]
Limit warming to 2°C (>67%)	GHG	21 [1-42]	35 [22-55]	46 [34-63]	64 [53-77]
	CO_2	22 [1-44]	37 [21-59]	51 [36-70]	73 [55-90]

Ref: IPCC AR6 Synthesis report : Summary for Policy Maker, (IPCC, 2023)
IPCC_AR6_SYR_SPM.pdf

Climate action will dominate the next decade

According to the Global Risk 2023 Report by World Economic Forum, climate action failure will be most severe global risk in the next decade.

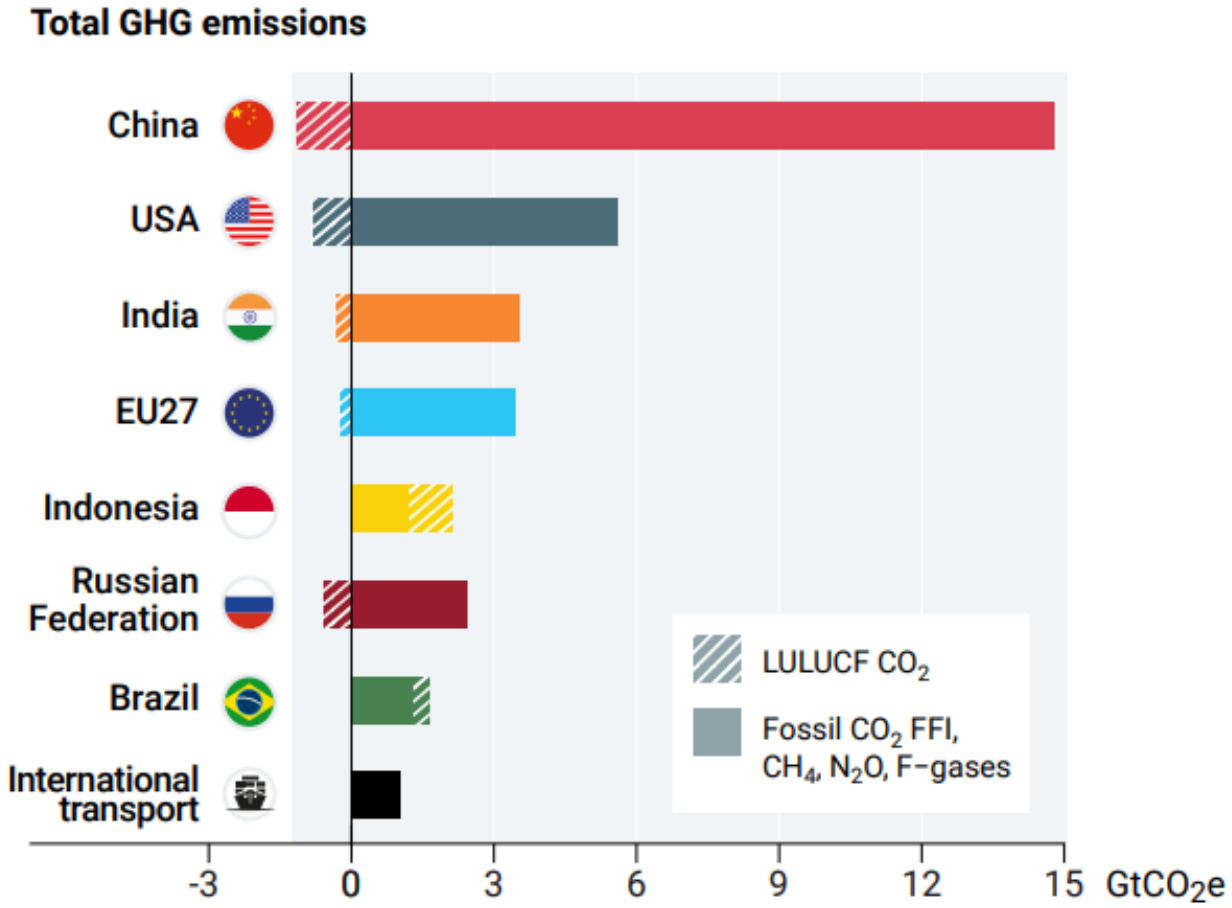
	2 years from 2023	10 years from 2023
1	Cost of living crisis	Failure to mitigate climate change
2	Natural disasters and extreme weather events	Failure of climate change adaptation
3	Geoeconomics confrontation	Natural disasters and extreme weather events
4	Failure to mitigate climate change	Biodiversity loss and ecosystem collapse
5	Erosion of social cohesion and societal polarization	Large-scale involuntary migration
6	Large-scale environmental damage incidents	Natural resource crises
7	Failure of climate change adaptation	Erosion of social cohesion and societal polarization
8	Widespread cybercrime and cyber insecurity	Widespread cybercrime and cyber insecurity
9	Natural resource crises	Geoeconomics confrontation
10	Large-scale involuntary migration	Large-scale environmental damage incidents

Source: The Global Risk Report, 2023, World Economic Forum

All **6 environmental risks** feature in the top 10 risks over the next 10 years while **"Biodiversity loss and ecosystem collapse"** is viewed as one of the fastest deteriorating global risks over the next decade,

9 risks are featured in the top 10 rankings over both the short and the long term, alongside **two new entrants** to the top rankings: **"Widespread cybercrime and cyber insecurity"** and **"Large-scale involuntary migration".**

GHG emissions are highly uneven across regions, countries



Note: Land Use, Land-Use Change and Forestry Emissions (LULUCF)
Note: International transport represents freight transports of traded good through aviation, shipping and any mode of public transportations.
Source: Net Zero Coalition | United Nations

"*The top seven emitters **(China, the EU27, India, Indonesia, Brazil, the Russian Federation and the United States of America)** plus international transport accounted for 55 per cent of global GHG emissions in 2020 .*"

"*Collectively, **G20 members are responsible for 75 per cent of global GHG emissions***"

Thailand commitment to Net Zero GHG emissions

Carbon Neutrality by **2050**

" Carbon neutrality means having a balance between emitting carbon and absorbing carbon from the atmosphere in carbon sinks "

Net zero emission by or before **2065**

0.88%
Share of global GHG emissions

 # 9th
Global Climate Risk Index*

40%
Emissions reduction conditional target by 2030
(compared to business as usual)

Examples of Companies committed to Net Zero in Thailand

PTTEP, SCG, true, CPF, ttb, BDMS

According to the annual Global Climate Risk Index, **Thailand ranked 9th** on the ranking of most affected countries by extreme weather in the latest analysis **in 2021**. **(Jumped from 43rd in 2011 analysis)**

All of **Bangkok** will be **vulnerable to floods** in the scenario of an extreme sea level rise by **2030**.

Note: * Conditional target to 40% subject to adequate and enhanced access to technology development and transfer, financial resources and capacity building support.

Source: Thailand | Climate Promise (undp.org)

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KPMG's approach to achieving Net Zero

Key Benefits in Net Zero Journey

Meeting regulatory requirements

Important to have Net Zero strategy in place when legal requirements come in.

01

Attract investment

Investors look to companies with established long-term strategies for the transition to Net Zero.

02

Protect business's reputation

Adopting a Net Zero strategy provide customers that business is ethically and environmentally responsible.

03

Competitive edge

Adopting a Net Zero strategy gain a competitive advantage both business processes and brand image.

04

KPMG's 8 key elements to a Net Zero Plan

Disclose your decarbonization governance

to give direction, oversight and accountability

Be transparent about your emissions covered in your commitment

to show that your organization has a practical plan that acknowledges limitations

Disclose your full and intermediate Net Zero targets

to help ensure that ambitions are realizable with current technology

Present a detailed, credible Net Zero plan

that encompasses the entire value chain and different types of emissions

Describe how the plan is integrated into your corporate strategy

outlining how execution is achieved within the organization

Highlight the plan's risks, challenges and uncertainties

such as fluctuating decarbonization costs and political developments

Detail your plan's impact

on business models, investments, value chain and skills

Review and report annual progress

setting metrics for an internal and external audience, especially investors

KPMG's eight steps for Net Zero plan

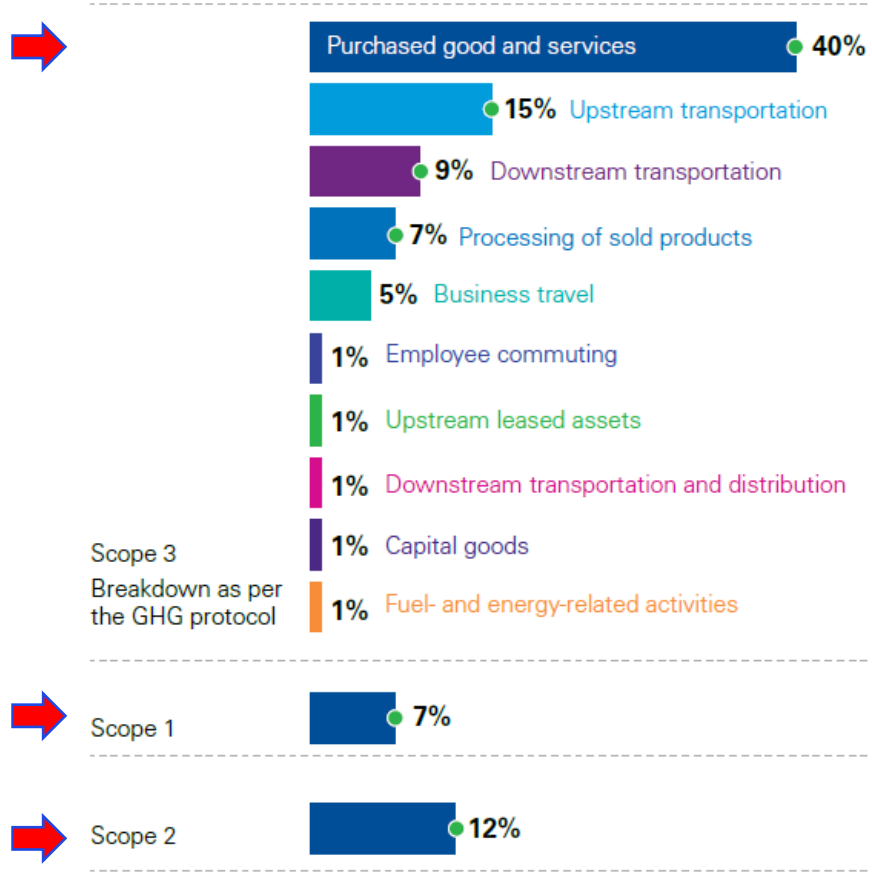
Disclose your decarbonization governance | 2 | 3 | 4 | 5 | 6 | 7 | 8

- Need commitment, monitor and oversee the Net Zero progress from top management.
- The monitoring and implementation should also be clarified.
- Top-down governance provides much-needed direction and senior oversight.
- Bottom-up approach helps ensure the implementation and validate the plan's directions and feasibility.

KPMG's eight steps for Net Zero plan

1 | **Be transparent about your emissions covered in your commitment** | 3 | 4 | 5 | 6 | 7 | 8

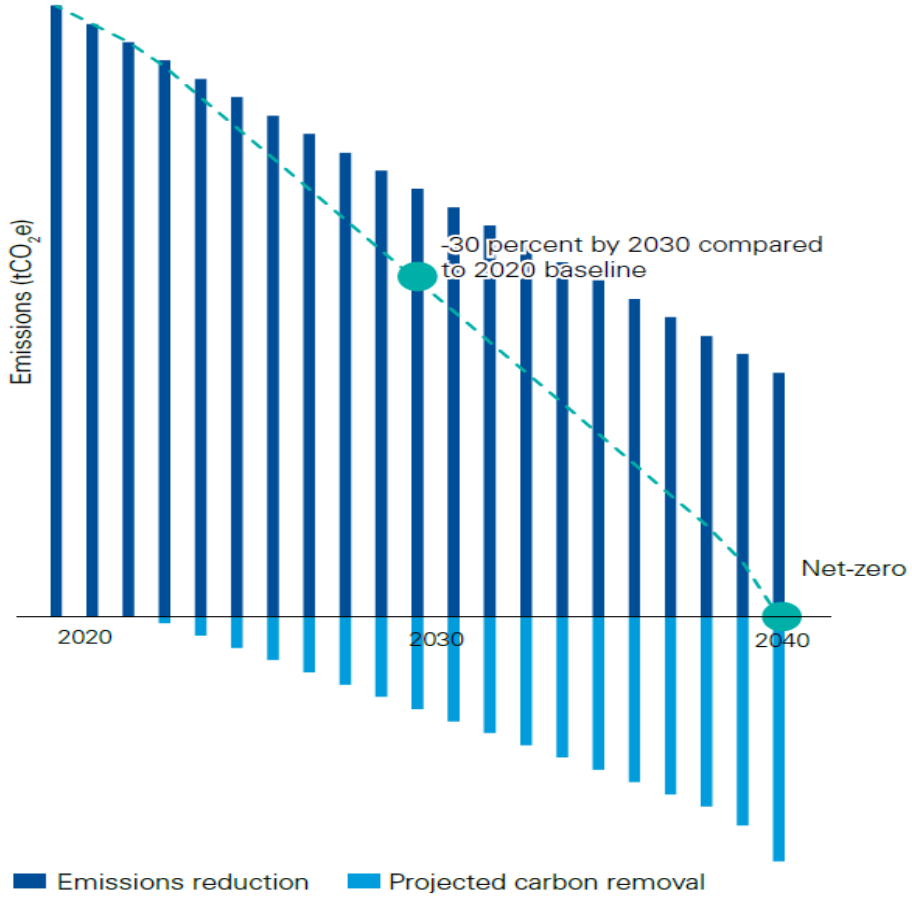
- The Net Zero commitment covers all GHG emissions scopes (scope 1, 2 and 3).
- Because emissions from the value chain are the greatest, the Net Zero commitment covers all of the main scope 3 emissions, as well as the scope 1 and 2 emissions.
- Sample metrics
  - Percentage of total emissions (scope 1, 2, and 3) covered by a Net Zero target.



KPMG's eight steps for Net Zero plan

1 | 2 | **Disclose your full and intermediate Net Zero targets** | 4 | 5 | 6 | 7 | 8

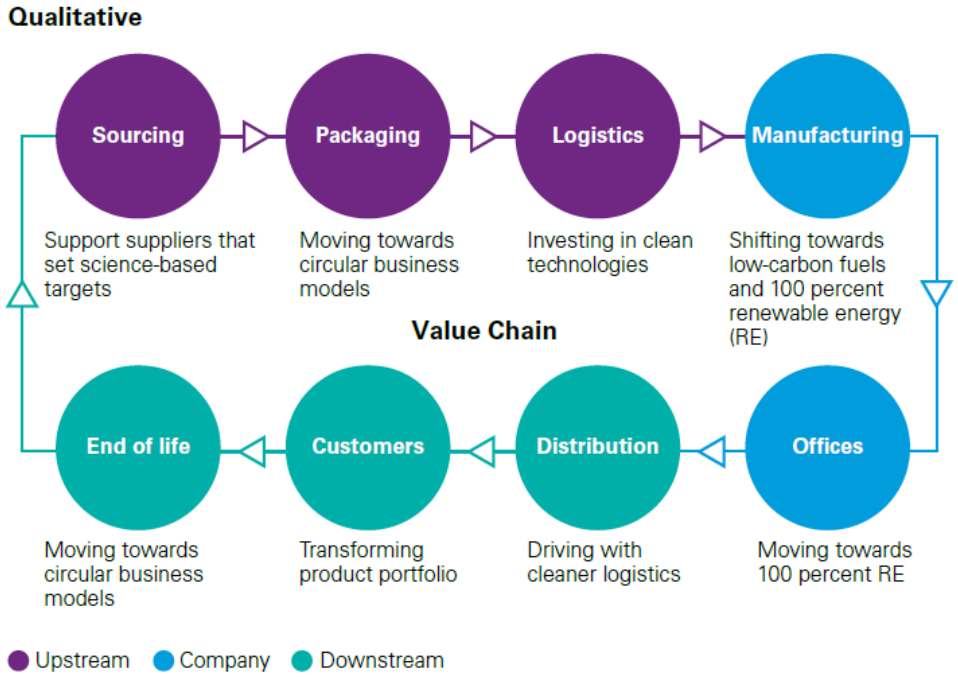
- The target year for the Net Zero commitment should not be later than 2050, to ensure the possibility to keep temperature not exceed 1.5C at 2100.
- The Science-Based Target Initiative (SBTI) helps organizations define achievable pathways to help reduce emissions, on a year-by-year basis.



KPMG's eight steps for Net Zero plan

1 | 2 | 3 | **Present a detailed, credible Net Zero plan** | 5 | 6 | 7 | 8

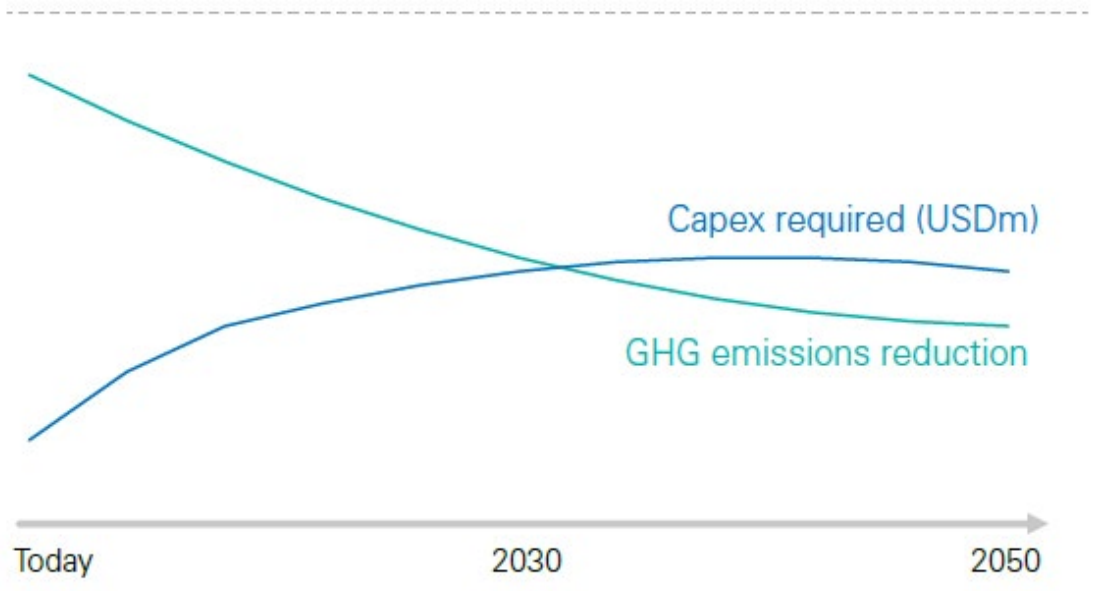
- Present a comprehensive decarbonization strategy that encompasses the entire value chain and clarifies which emissions are covered.
- The plan would include different rates of progress for different parts of the organization, as well as scenarios for slower and faster rates of decarbonization across the supply chain, manufacturing, etc.



KPMG's eight steps for Net Zero plan

1 | 2 | 3 | 4 | **Describe how the plan is integrated into your corporate strategy** | 6 | 7 | 8

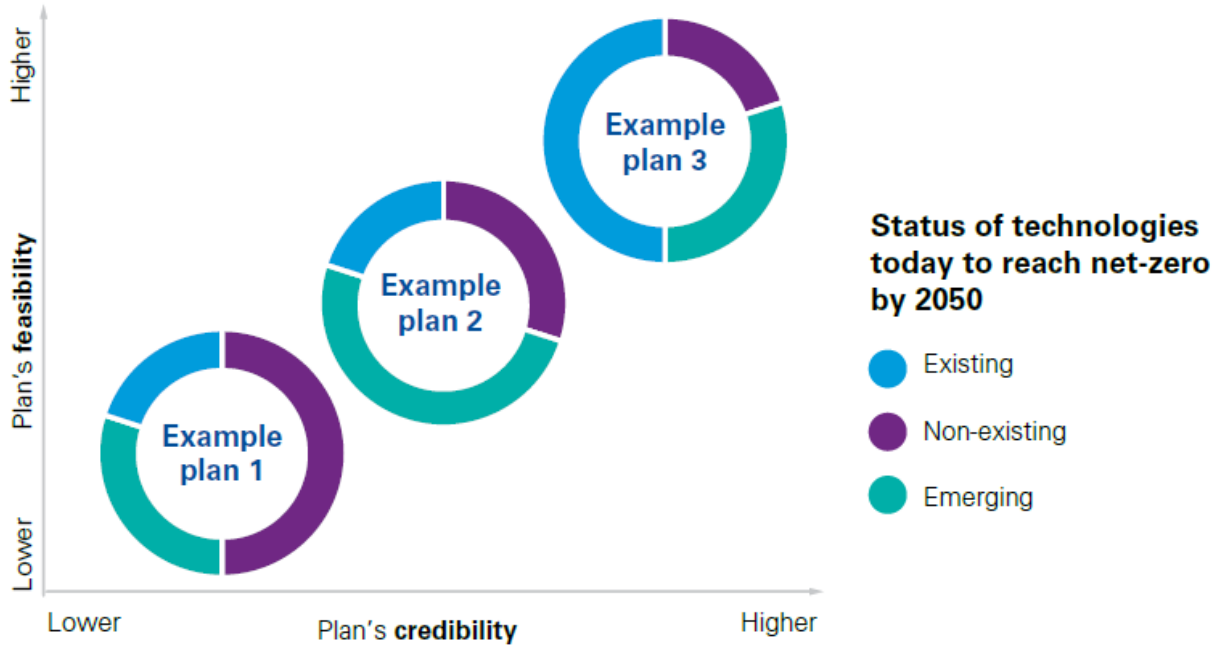
- The plan should be a core business strategy, not just fitting into it.
- How execution of the decarbonization plan is cascaded within the organization, incorporated into business planning and aligned with the overall strategy.
- Anticipate the future impact of carbon pricing by introducing an internal carbon price, as well as using other mechanisms.



KPMG's eight steps for Net Zero plan

1 | 2 | 3 | 4 | 5 | **Highlight the plan's risks, challenges and uncertainties** | 7 | 8

- Describe the risks, challenges and uncertainties to achieve the Net Zero plan
  - Fluctuating decarbonization costs:
  - Political development:
  - Countries' future energy mix:
  - Technological breakthrough:
  - Availability of carbon removal techniques:
  - Price of carbon offsets and carbon price:
  - Controversies over technologies:

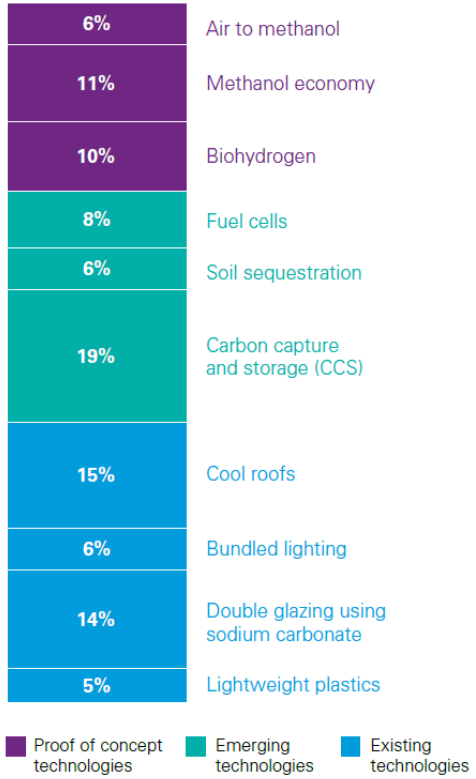


KPMG's eight steps for Net Zero plan

1 2 3 4 5 6 **Detail your plan's impact** 8

- Identify how the plan impacts their strategy in terms of business models, investments, and upstream and downstream value chain including products, business lines, R&D and operations.
  - The highest emissions-intensive supplies or products will probably have to be discontinued, with low-emission ones accelerated, using different pricing structures.
  - Rethink about logistics to help reduce transport distances and source locally where possible.

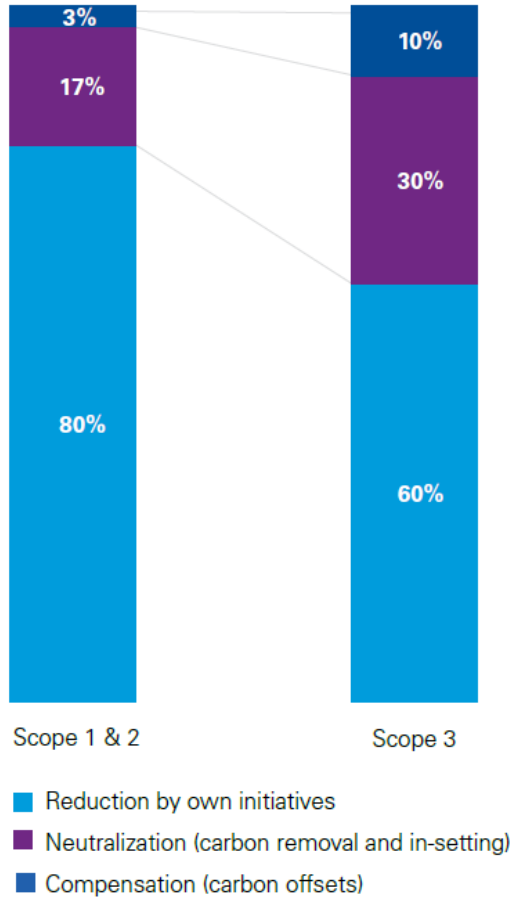
Breakdown of the net-zero plan per technology expected to be used:



KPMG's eight steps for Net Zero plan

1 2 3 4 5 6 7 Review and report annual progress

- Decarbonization plans should be dynamic and evolve as uncertainty reduces over time, as companies get closer to targets or intermediate targets.
  - By setting metrics, it's possible to measure, track and report for an internal and external audience.
  - This information is now relevant for investors to understand the financial implications of the plans as well as the risks if plans are not achieved.



Key challenges on Net Zero journey

Target setting and clear roadmap

The target setting process, detail decarbonization roadmap plans use of internationally accepted metrics for comparability, and realistic assumptions backed with science.

Investment and innovation

Significant investment may required to develop and scale up new technologies and infrastructure needed to achieve net zero.

Measuring and reporting

Measuring and reporting on emissions accurately, and verifying progress towards net zero targets can be complex and challenging, requiring robust data collection and analysis systems.

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GHG Reporting

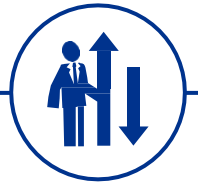
Steps for GHG reporting

01 Set up Policy, Strategy, & Procedure (P-S-P)

Set up GHG-related committee to work on GHG strategy, policy and procedure to roll out GHG action plan across organization.

02 Determine Scope of reporting

Draw a line on which part of organization to be included in GHG disclosure whether (a) Control Approach (operation & financial), or (b) Equity Share Approach.



03 Categorize type of GHG sources (Scope 1-3)

Identify what are the type of GHG whether it's scope 1, 2 or 3

04 Collect activities data and evidences

Gather all data whether in daily, monthly or yearly basis to support GHG calculation as well as its related emission factor.

05 Calculate GHG emission

Apply this equation :

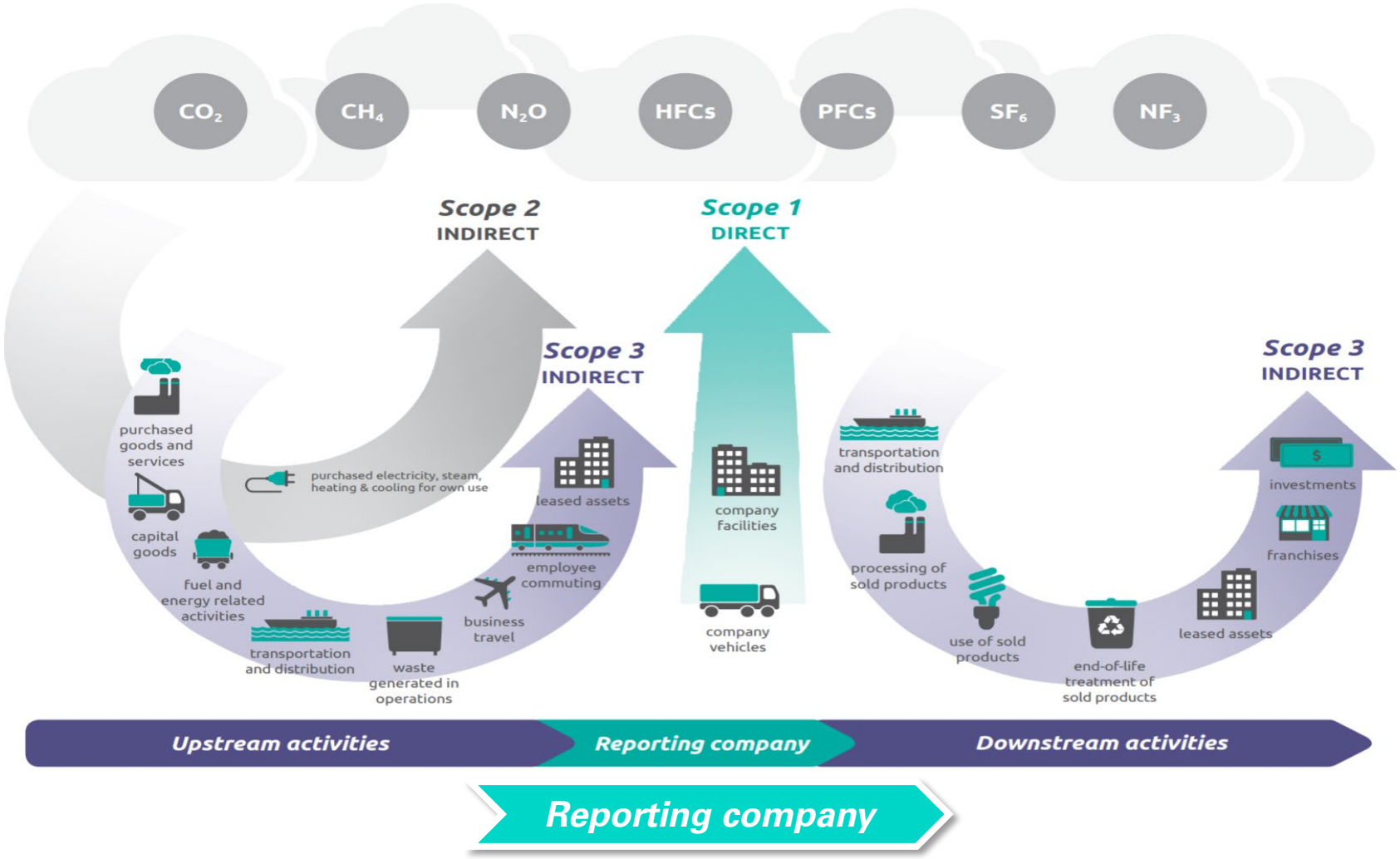
GHG emission = Activities data X Emission Factor

06 Assurance & Disclose amount of GHG emission

Auditable. This can be one year disclosure or multiple year disclosure with comparison with previous performance.

GHG DISCLOSURE

Understand Scope 1, 2 and 3 Emissions



Source: Technical Guidance for Calculating Scope 3 Emissions, GHG Protocol, WBCSD 2013

Example calculation of GHG

Your Company running with these kind of activities

- Boiler consuming fuel oil A for 1500 L per year
- 3 Forklifts consuming diesel oil totally at 2,500 L per year
- Electricity usage at 30,000 kWh a year
- All staff commuting to office with their sedan car, estimated at 100,000 km per year
- Water consumption from Industrial Estate Facility at 500,000 L per year




Example (cont.)

Scope 1	Activities Data	✖	Emission Factor	=	Amount of GHG emission
	1,500 L		3.2198 kgCO2e / L		4,829.7 kgCO2e
	2,500 L		2.7403 kgCO2e / L		6,850.8 kgCO2e

ชื่อ		Units	EMISSION FACTORS			
			CO_2 [$kgCO_2$/unit]	CH_4 [$kgCH_4$/unit]	N_2O [kgN_2O/unit]	Total [$kgCO_2eq$/unit]
Stationary Combustion						
1	Natural gas	scf	5.72E-02	1.02E-06	1.02E-07	0.0573
2	Natural gas	MJ	5.61E-02	1.00E-06	1.00E-07	0.0562
3	Lignite	kg	1.06E+00	1.05E-05	1.57E-05	1.0619
4	Fuel oil A	litre	3.21E+00	1.24E-04	2.49E-05	3.2198
5	Fuel oil C	litre	3.24E+00	1.25E-04	2.51E-05	3.2455
Mobile Combustion (On road)						
13	Motor Gasoline - uncontrolled	litre	2.18E+00	1.04E-03	1.01E-04	2.2373
14	Motor Gasoline - oxydation catalyst	litre	2.18E+00	7.87E-04	2.52E-04	2.2703
15	Motor Gasoline - low mileage light duty vihicle vintage 1995 or later	litre	2.18E+00	1.20E-04	1.79E-04	2.2325
16	Gas/ Diesel Oil	litre	2.70E+00	1.42E-04	1.42E-04	2.7403

Example (cont.)

Scope 2 | Activities Data ✖ Emission Factor = Amount of GHG emission

30,000 kWh ✖ **0.4999 kgCO2e / kWh** = **14,997 kgCO2e**

ชื่อ	Units	EMISSION FACTORS			
		CO_2	CH_4	N_2O	Total
		[$kgCO_2$/unit]	[$kgCH_4$/unit]	[kgN_2O/unit]	[$kgCO_2eq$/unit]
Electricity, grid mix (ไฟฟ้า)					
33 ไฟฟ้าแบบ grid mix ปี 2016-2018; LCIA method IPCC 2013 GWP 100a V1.03	kWh	0.4954	6.10E-05	1.04E-05	0.4999

Example (cont.)

Scope 3 | **Activities Data** ✖ **Emission Factor** = **Amount of GHG emission**

Fuel consumption rate for Sedan (1600 CC)

= 100,000 km — 2.1894 kgCO2e / L

= 100,000 km / 15.238 km/L — 2.1894 kgCO2e / L

= 6,564 L — 2.1894 kgCO2e / L — 18,198 kgCO2e

ชื่อ	Units	EMISSION FACTORS			
		CO_2	CH_4	N_2O	Total
		[$kgCO_2$/unit]	[$kgCH_4$/unit]	[kgN_2O/unit]	[$kgCO_2eq$/unit]
Motor gasoline	litre	2.18E+00	9.44E-05	1.89E-05	2.1894

อัตราการสิ้นเปลืองเชื้อเพลิงจากการเดินทางด้วยรถประเภทต่างๆ

ประเภทรถยนต์	เชื้อเพลิง	หน่วย	อัตราการสิ้นเปลืองเชื้อเพลิง
รถยนต์ขนาดเล็ก (1500 cc)	เบนซิน	km/L	17.770
รถยนต์ขนาดกลาง (1600 cc)	เบนซิน	km/L	15.238

Example (cont.)

Scope 3 | Activities Data ✖ Emission Factor = Amount of GHG emission

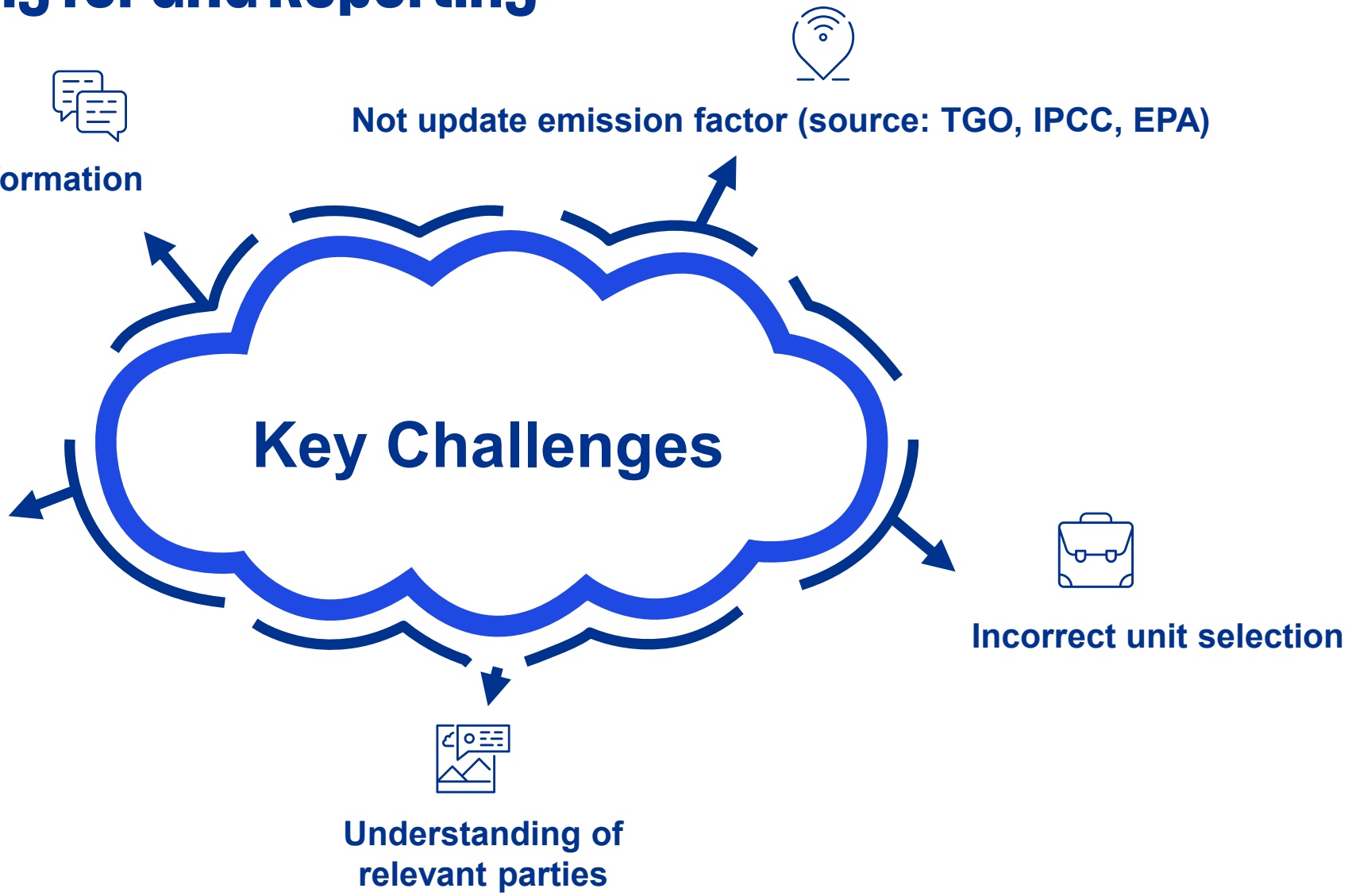
= 500,000 L × 0.2575 kgCO2e / m3

= 500,000 L / 1,000 L/m3 × 0.2575 kgCO2e / m3 (Unit conversion)

= 500 m3 × 0.2575 kgCO2e / m3 = 128 kgCO2e

ลำดับที่	ชื่อ	รายละเอียด	หน่วย	ค่าแฟคเตอร์ (kgCO2e/หน่วย)	แหล่งข้อมูลอ้างอิง	วันที่อัพเดท
5.กลุ่มน้ำประปาและน้ำอุตสาหกรรม (Tap water)						
60.	น้ำประปา-การประปานครหลวง	ผลิตโดยใช้น้ำผิวดิน; LCIA method IPCC 2013 GWP 100a V1.03	m3	0.7948	Thai National LCI Database, TIIS-MTEC-NSTDA (with TGO electricity 2016-2018)	Update_Dec2019
61.	น้ำประปา-การประปาส่วนภูมิภาค	ผลิตโดยใช้น้ำผิวดินและน้ำใต้ดิน; LCIA method IPCC 2013 GWP 100a V1.03	m3	0.2843	Thai National LCI Database, TIIS-MTEC-NSTDA (with TGO electricity 2016-2018)	Update_Dec2019
62.	น้ำประปา-การนิคมอุตสาหกรรม	ผลิตโดยใช้น้ำผิวดิน และน้ำประปา; LCIA method IPCC 2013 GWP 100a V1.03	m3	0.2575	Thai National LCI Database, TIIS-MTEC-NSTDA (with TGO electricity 2016-2018)	Update_Dec2019

Key Challenging for GHG Reporting



Why Assurance is important?

Requirement under ONE report

Verify GHG data by TGO-registered or **competent international firm**

Ensure creditability, reliability and accuracy of information

Improvement of system, process and internal controls

Improves positioning with sustainability rankings

Enhance the trust of stakeholders

Conclusion

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Please provide your feedback.

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