United Nations | Department of Economic and Social Affairs

Tackling Climate Change

United Nations Office for Sustainable Development

Okhyun Yang

Presentation preview

1. Why Climate Action?
2. Climate Action Agreement
3. Climate Change Adaptation & Mitigation
4. Monitoring, Reporting and Verification of GHG emissions

1. Why Climate Action?

1.1 Integration of SDGs

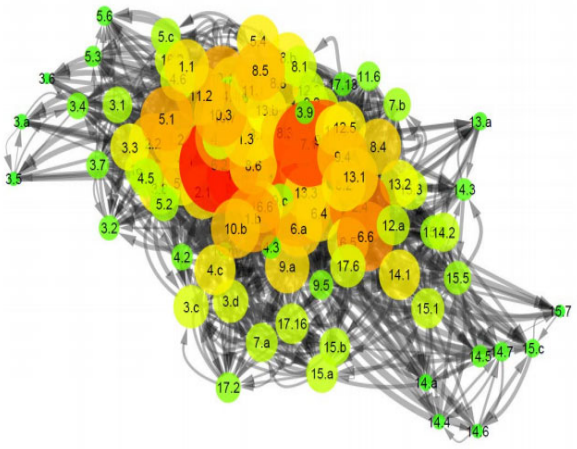


Figure 2: A complicated network of SDG interlinkages between SDG targets

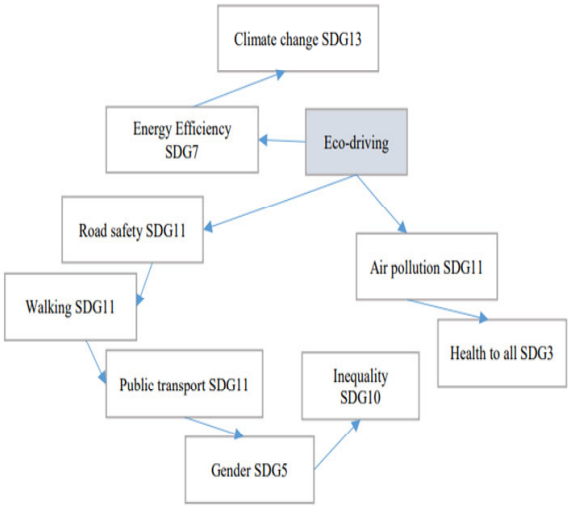


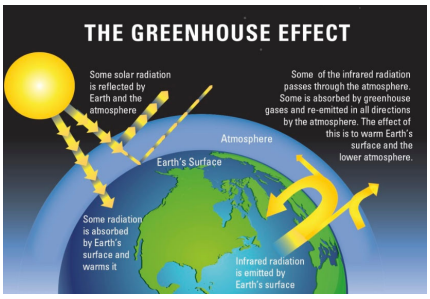
Figure 10: The connection between SDG targets in terms of eco-driving

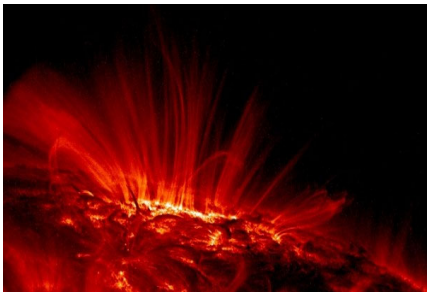
Source: Taking an Integrated Approach to the SDGs

1. Why Climate Action?

1.2 What are Greenhouse Gases?

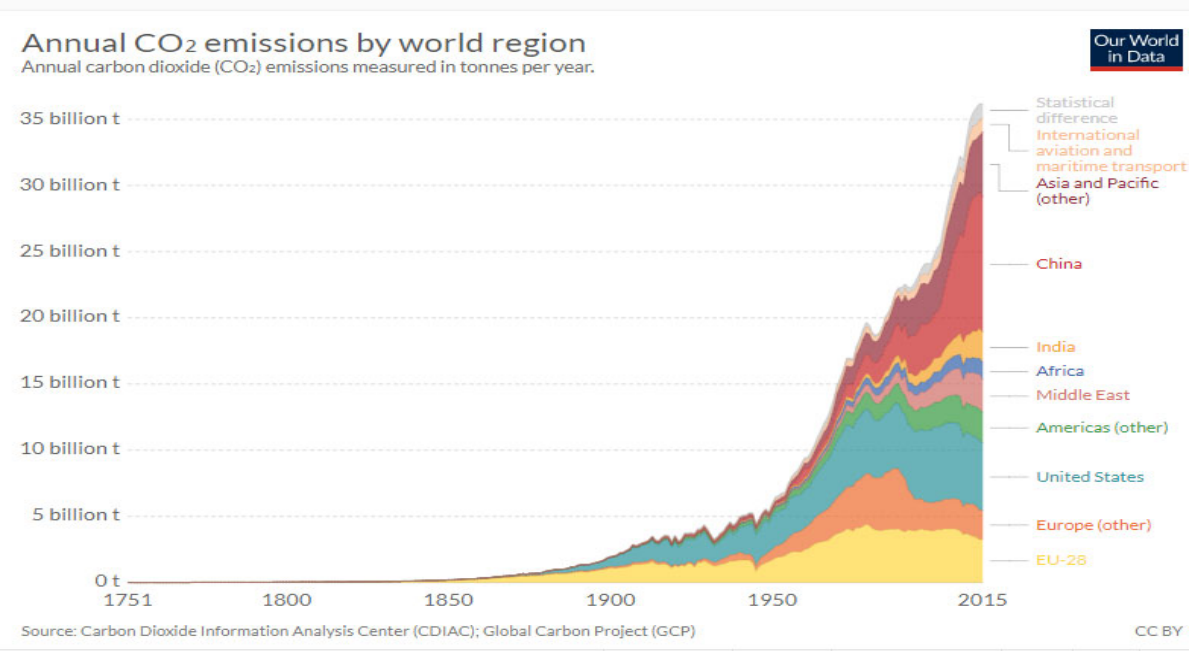
- Carbon Dioxide (CO_2)
- Methane (CH_4)
- Nitrous Oxide (N_2O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulphur Hexafluoride (SF_6)
- Nitrogen Trifluoride (NF_3) etc..





1. Why Climate Action?

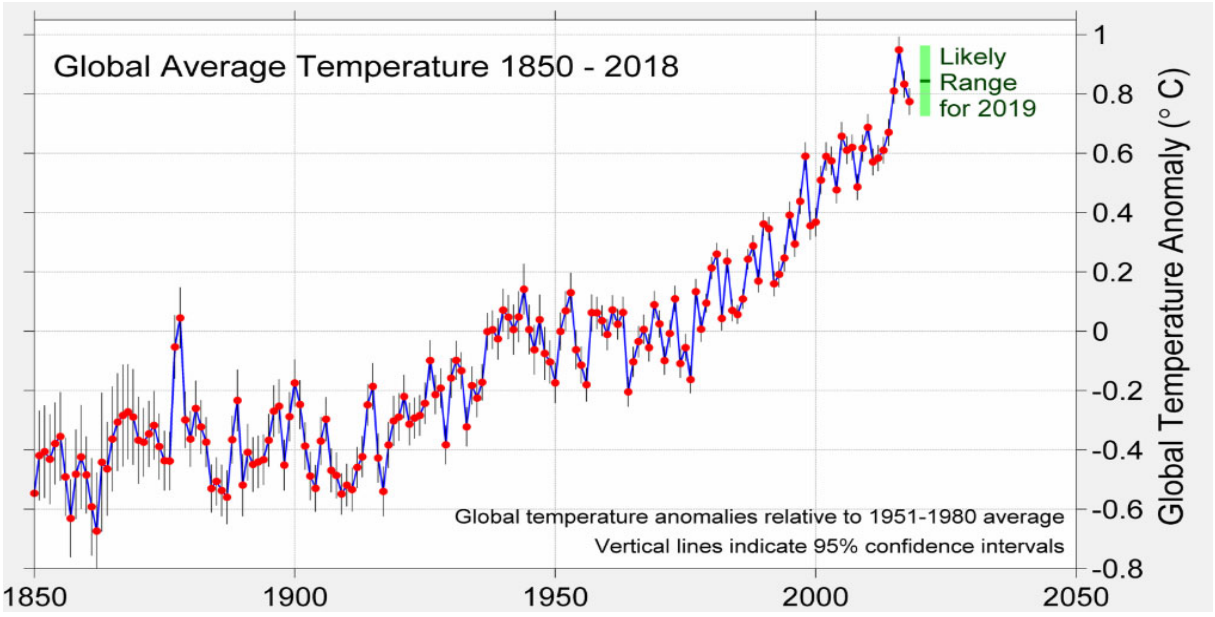
1.2 Annual CO2 emissions



Source: Our World in Data

1. Why Climate Action?

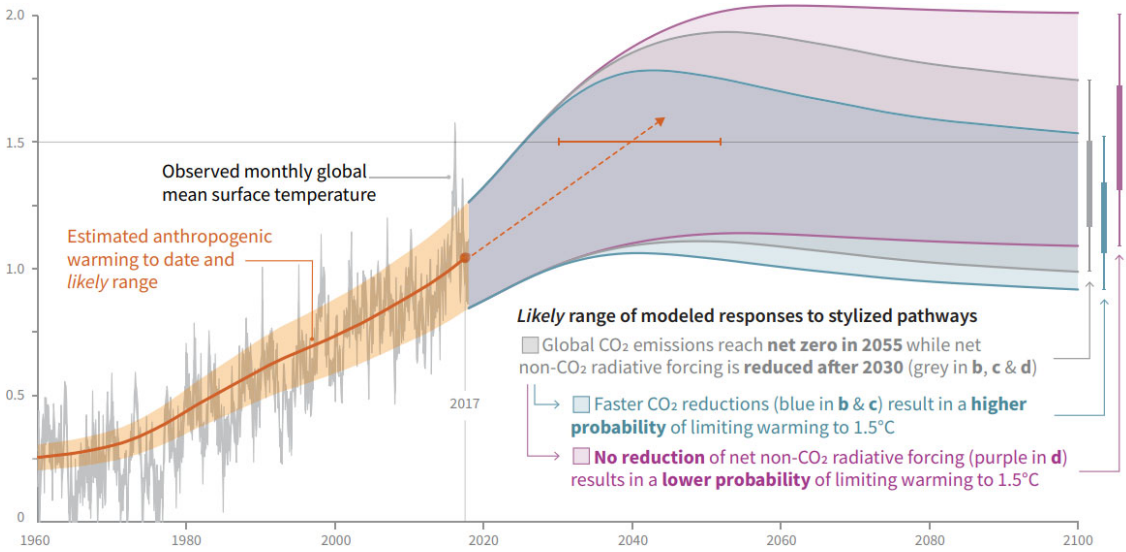
1.2 Global average temperature



Source: Our World in Data

1. Why Climate Action?

1.3 GHG Emissions Target



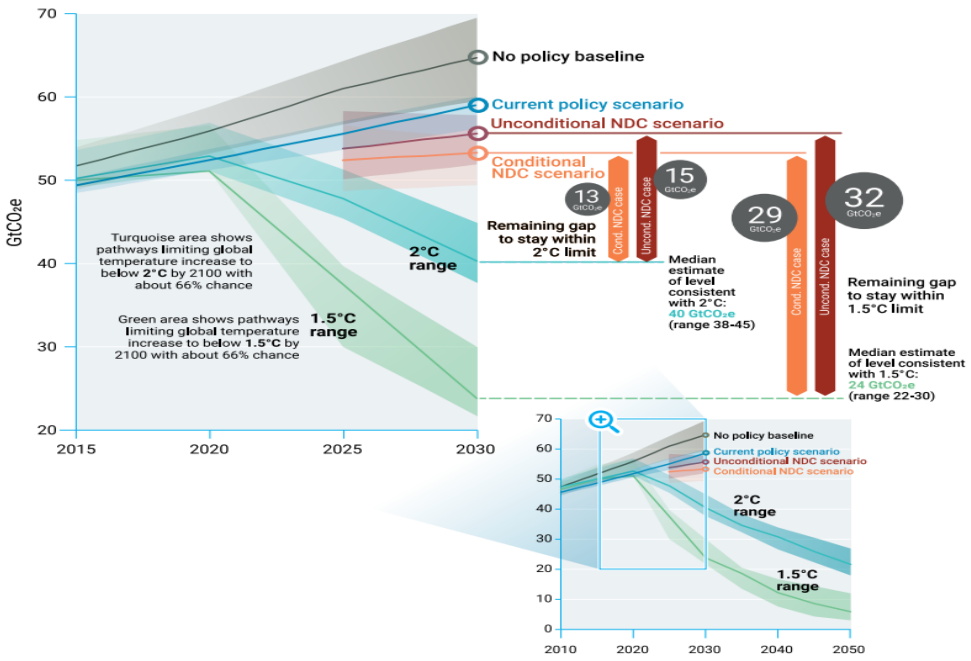
United Nations | Department of Economic and Social Affairs

Source: 1.5C IPCC Report

UNOSD

1. Why Climate Action?

1.3 GHG Emissions Target



United Nations | Department of Economic and Social Affairs

Source: Emissions Gap Report 2018

UNOSD

1. Why Climate Action?

Summary of Part 1

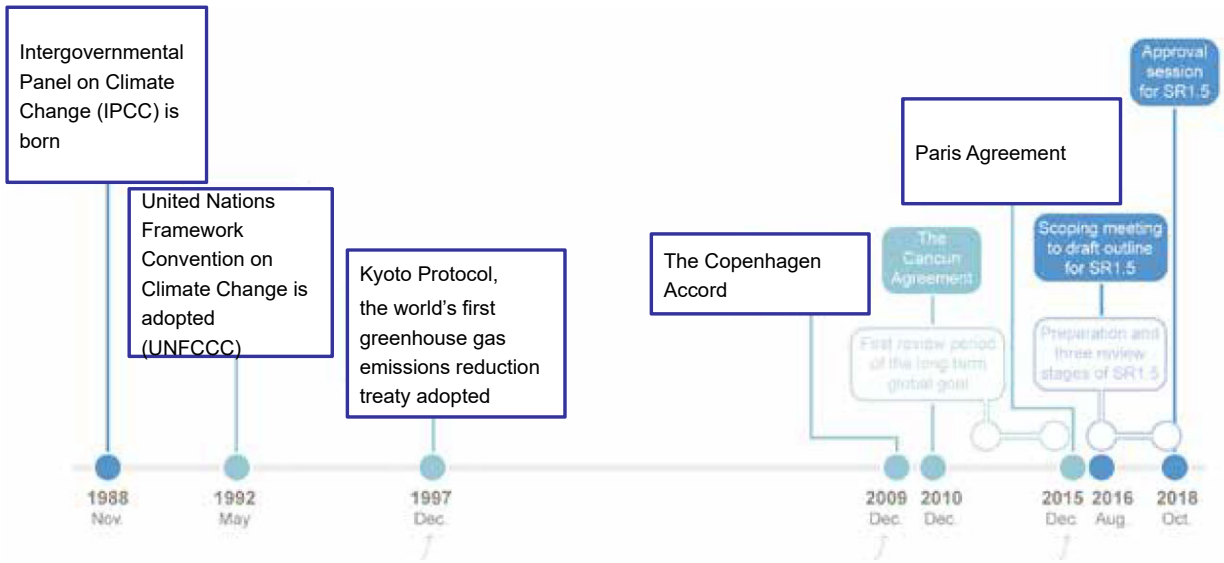
1. **All goals are interconnected. Achieving SDG 13 will accelerate implementation of other goals**

2. **GHGs are CO_2, CH_4, N_2O, HFCs, PFCs, SF_6 etc.. Attributing global warming leading to temperature rise.**

3. **The global goal is to limit global temperature increase to well below 2 ℃, while pursuing efforts to limit the increase to 1.5 ℃.**

2. Climate Action Agreement

1.1 Timeline of 1.5℃



2. Climate Action Agreement

1.2 The Start of Climate Negotiations

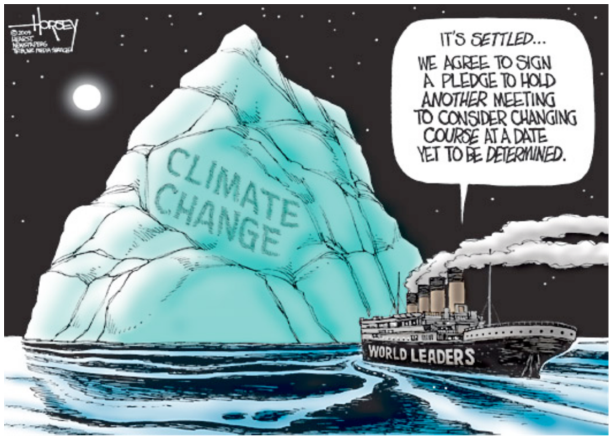
In 1992, the United Nations Conference on Environment and Development (UNCED) was held, also known as the Earth Summit, the Rio Summit and the Rio Conference.

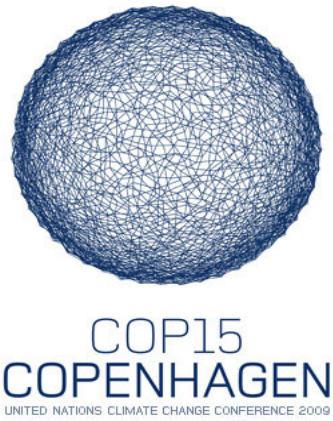
UN Framework Convention on Climate Change (UNFCCC) was created.

The first COP meeting was held in Berlin in March 1995, attended by around 25,000 participants.

2. Climate Action Agreement

1.2 The Kyoto Protocol and the Copenhagen Accord





In 1992, the Kyoto Protocol was adopted, which commits its Parties by setting internationally binding emission reduction targets.

In 2009, at COP 15 in Copenhagen, an attempt was made to increase ambition and to include developing countries into the equation. COP 15 raised climate change policy to the highest political level.

Copenhagen Accord recognized actions should be taken to keep any temperature increase to below 2°C.

2. Climate Action Agreement

1.2 Paris Agreement

The Paris Agreement was created in 2015 with its key aspects:

(Art. 2) the goal of limiting global temperature increase to well below 2, while pursuing efforts to limit the increase to 1.5

(Art. 6) Voluntary Cooperation/Market and non-market-based approaches

2. Climate Action Agreement

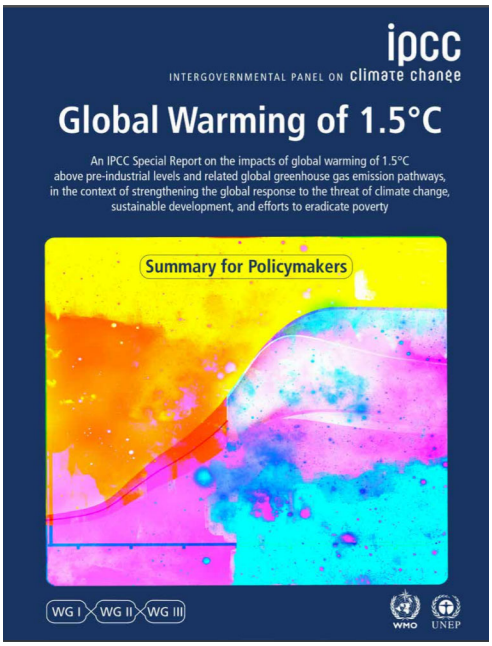
1.2 Kyoto Protocol VS Paris Agreement

1. More of top down approach
2. Legally Binding emission reduction targets
3. Obligations for only developed countries (called annex I)
4. Some major emitters remained out of the agreement
5. Effective in two terms (First commitment period (2008-2012) & Second commitment period (2013–2020)).
6. Only covered 18% of global emissions and 5% and 20% reduction target in the first and second commitment period respectively in compared to 1990 emissions.

1. Based upon bottom up approach
2. A voluntary agreement
3. Each signatory set its own emission reduction target
4. Major emitters excluding the USA (which withdrew later) have agreed on it.
5. The parties should revise its NDC in every 5 years.
6. EU target to reduce 40% and 80-95% emissions by 2030 and 2050 respectively compared to its 1990 emissions.

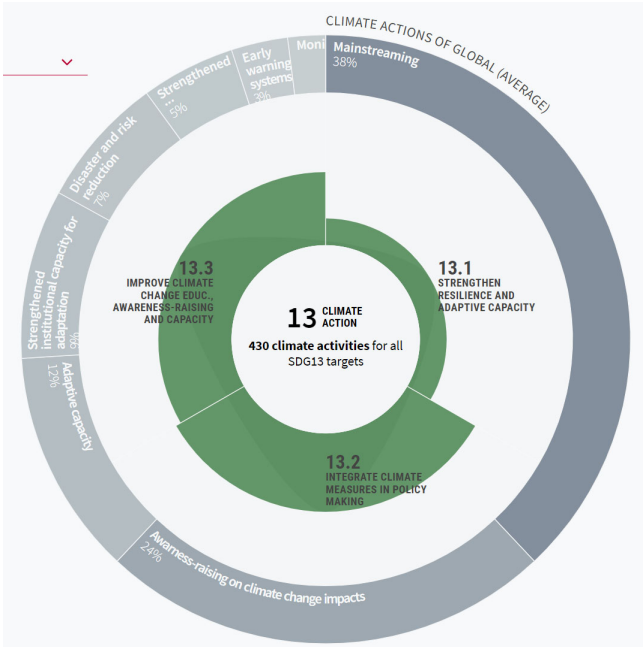
2. Climate Action Agreement

1.3 Progress of Paris Agreement



2. Climate Action Agreement

1.3 SDG 13 and the Paris Agreement



United Nations | Department of Economic and Social Affairs
UNOSD

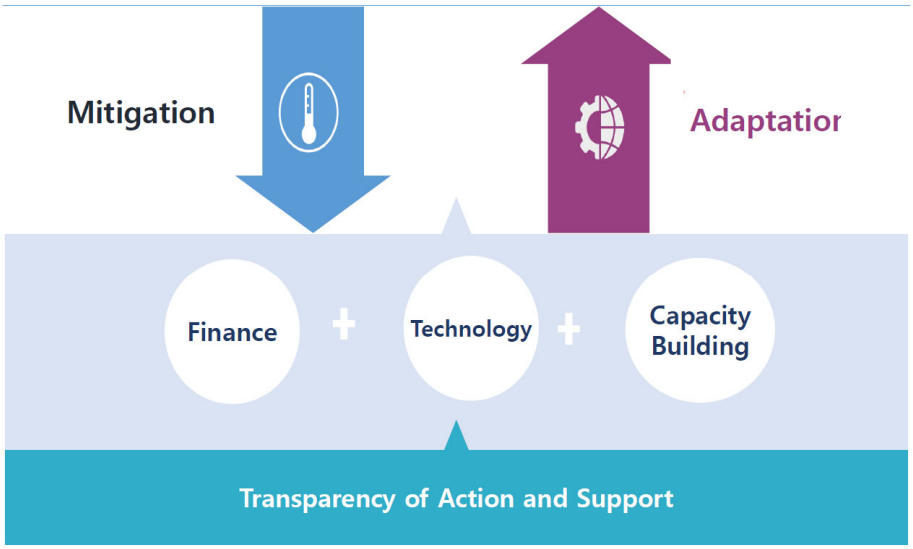
2. Climate Action Agreement

Summary of Part 2

1. **The Kyoto Protocol was to bind emission reduction targets. (First commitment period 2008–2012, second commitment period 2013-2020).**
2. **The Paris Agreement is a voluntary agreement and major emitters excluding the USA (which withdrew later) have agreed on it. The parties should revise its NDC in every 5 years.**
3. **NDC is to achieve the purpose of the Article 2 of the Agreement, each individual country should make an effort to address climate change and its impact. .**

3. How to Tackle Climate Change?

3.1 Approaches of Climate Action

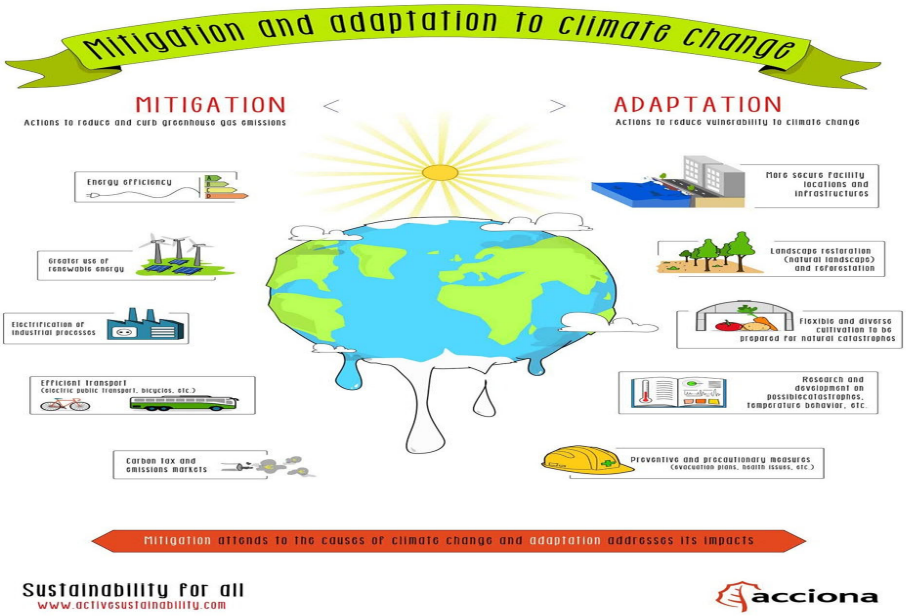


United Nations | Department of Economic and Social Affairs

UNOSD

3. How to Tackle Climate Change?

3.1 Approaches of Climate Action

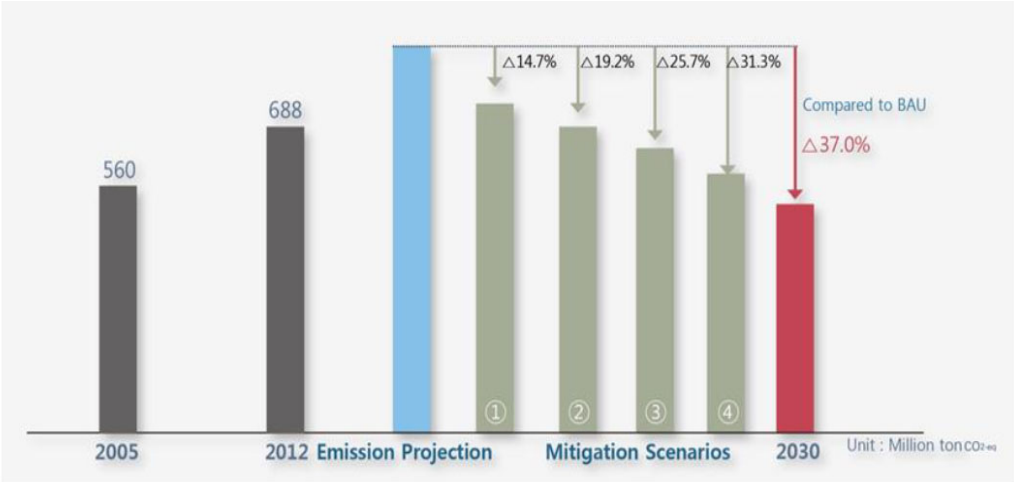


United Nations | Department of Economic and Social Affairs

UNOSD

3. How to Tackle Climate Change?

3.1 Approaches of Climate Action



United Nations | Department of Economic and Social Affairs

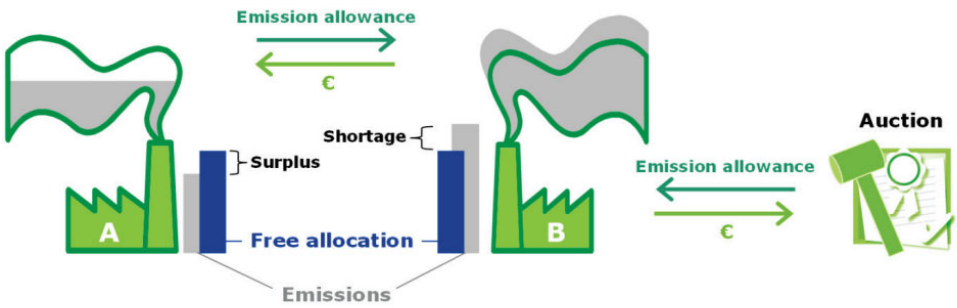
UNOSD

3. How to Tackle Climate Change?

3.2 Climate Change Mitigation – Carbon Tax

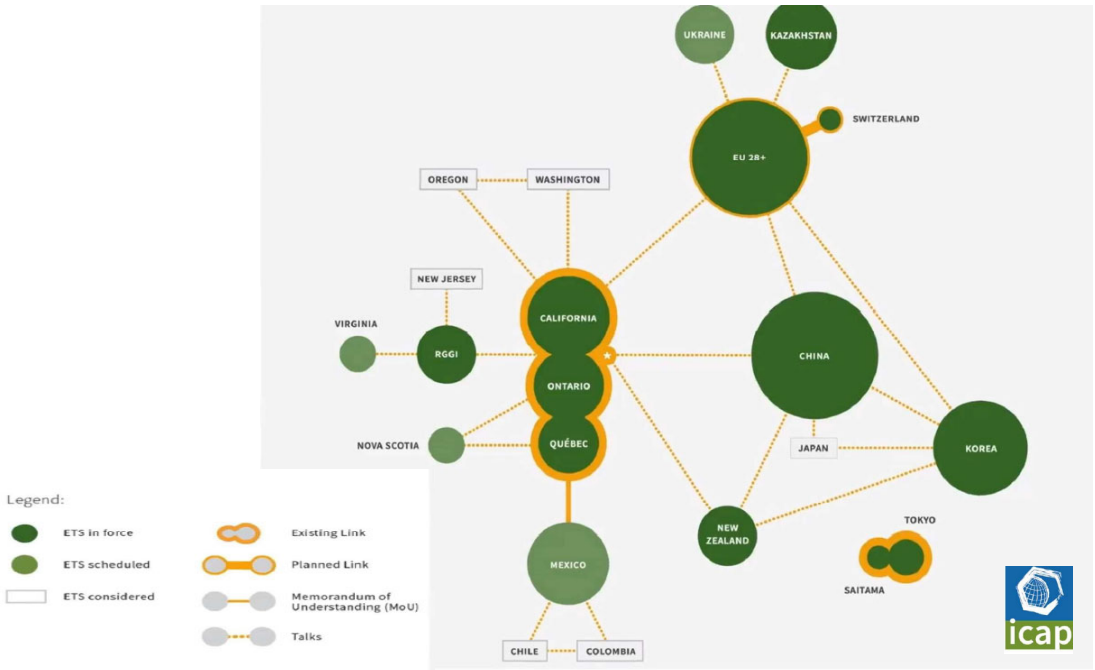
3. How to Tackle Climate Change?

3.2 Climate Change Mitigation – Carbon Trading



3. How to Tackle Climate Change? –

3.2 Carbon Market Connections



United Nations | Economic and Social Affairs

UNOSD

3. How to Tackle Climate Change?

3.2 Climate Change Mitigation – GHGs Management Scheme

20,000 tCO2eq

Emissions

18,000 tCO2eq

Emissions Target

By Negotiation

Otherwise, pay the fine

United Nations | Department of Economic and Social Affairs

UNOSD

3. How to Tackle Climate Change?

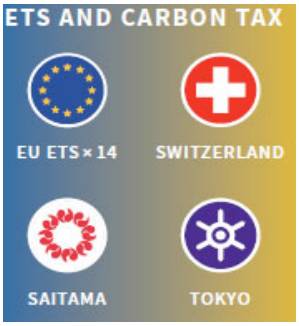
3.2 Carbon Tax vs ETS

Common

1. **They put a price on Carbon**
2. **They are cost effective**
3. **They can generate revenue**

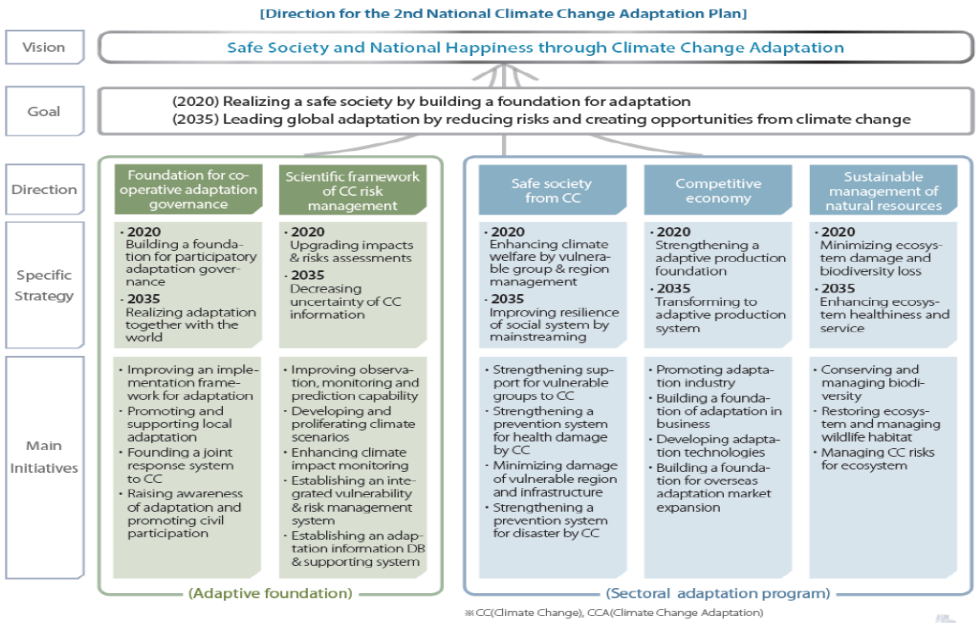
Key Differences

1. **Quantity certainty vs Price Certainty**
2. **Simplicity vs Flexibility**



3. How to Tackle Climate Change?

3.3 Climate Change Adaptation (Case of ROK)



United Nations | Department of Economic and Social Affairs
UNOSD

3. How to Tackle Climate Change?

Summary of Part 3

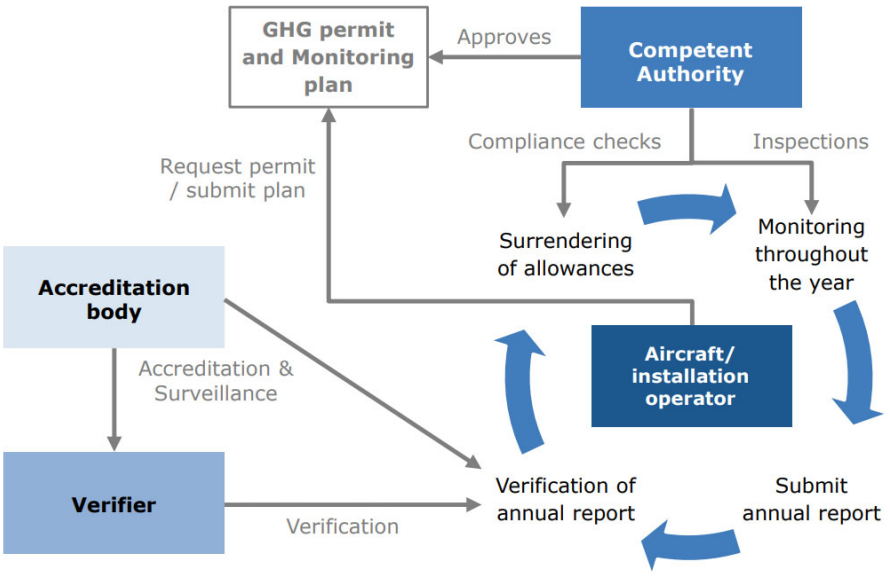
1. **Mitigation and adaptation for climate change have to be carried out along with finance investment, technology development and enhancement of capacity building.**

2. **Mitigation tools are carbon tax, carbon trading and GHG management scheme, which are targeting to reduce GHG emissions.**

3. **Safe society, competitive economy and sustainable management of natural resources have to be built on the adaptation governance and scientific framework of CC risk management.**

4. Measuring Reporting Verification

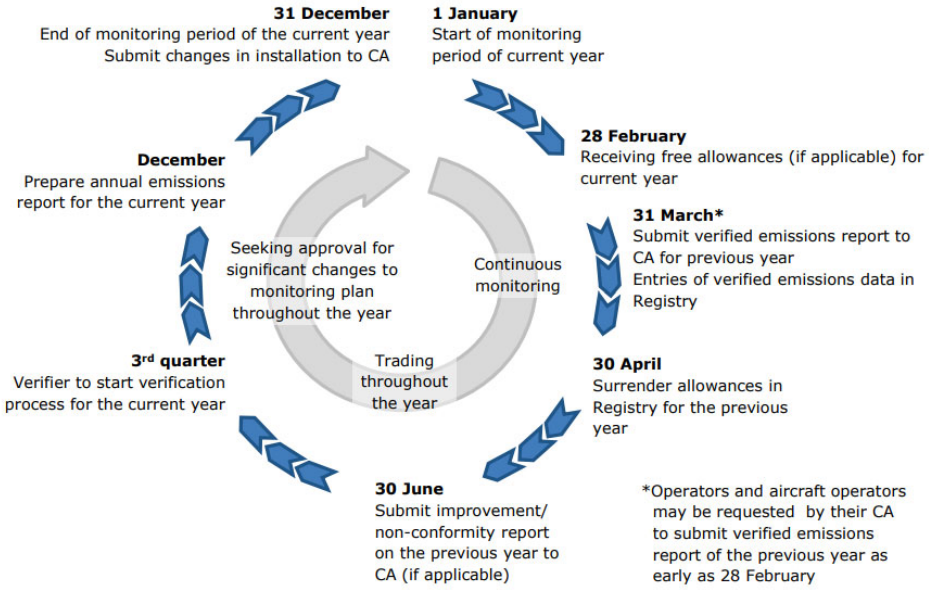
4.1 Actors in the compliance cycle



Source: Adapted from: European Commission EU ETS "Monitoring and Reporting Regulation" Guidance Document 1

4. Measuring Reporting Verification

4.1 Actors in the compliance cycle



4. Measuring Reporting Verification

4.2 Monitoring and Reporting Process

- Monitoring Process through…
  - Monitoring Plan
  - IT-based GHG information registry
- Reporting Process through…
  - Inventory Report
  - IT based GHG information registry
- Verification Process through…
  - Independent 3rd party of a verification body
  - Attached verification Report

4. Measuring Reporting Verification

4.2 Monitoring and Reporting Process

1. Identify organizational boundary
2. Identify each emission source & categories, installations
3. Establishing Monitoring system at installation level
4. Check estimation method (Tier) and uncertainty level according to the minimum requirement of guideline
5. Estimation GHGs and preparing MP&IR
6. Quality control and quality assurance (internal audit)
7. External Verification of MP&IR (3rd VB)

4. Measuring Reporting Verification

4.2 Monitoring and Reporting Process

- Minimum requirement of estimation(Tier) is based on the type of categories and size of installation
  (referring to EU-ETS MRG)
  - A group : <50ktCO_2eq (installation level)
  - B group : <500ktCO_2eq
  - C group : >500ktCO_2eq

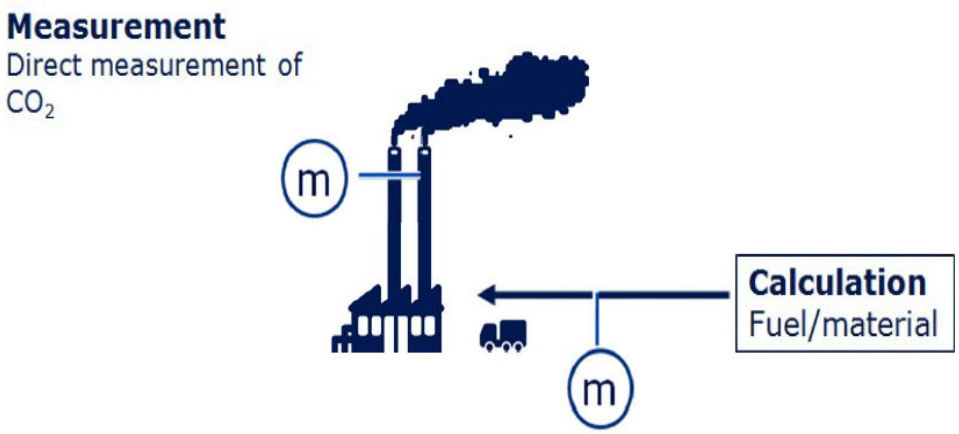
- Tier (estimation level)

	Activity uncertainty	Emission Factor	LHV	reference
Tier 1	< ±7.5%	2006 IPCC default	2006 IPCC default	-
Tier 2	< ±5.0%	Country specific	Country specific	-
Tier 3	< ±2.5%	Installation specific	Installation specific	Mass balance
Tier 4	CEM (optional)			

United Nations | Department of Economic and Social Affairs
UNOSD

4. Measuring Reporting Verification

4.2 Monitoring and Reporting Process



4. Measuring Reporting Verification

4.2 Monitoring and Reporting Process

Standard Methodology (Combustion)

Emission Activity	Unit	Equation
Stationary Combustion	(Nm^3, ℓ, kg)/Month	Amount×LHV×EF×GWP×OF
Mobile combustion	ℓ/Month	Amount×LHV×EF×GWP×OF
Electricity	kWh/Month	Amount(kWh)×EF($kgCO_2$/kWh)
Steam	(Gcal,kWh) /Month	Amount×EF

- LHV = Lower Heating Value (Energy Content, e.g. TJ/Nm3)
- EF = Emission factor (e.g. Tonne CO2/TJ)
- GWP = Global Warming Potential
- OF = Oxidation Factor (Fraction which is oxidized)

Mass Balance Approach

For all incoming and outgoing fuels/material/products:
Carbon (t) = amount x carbon content
CO2 – Emissions (t) = (Carbon IN – Carbon OUT) x 3.664
Relevant for activities where products contain carbon from input, e.g. Steel, Chemicals

4. Measuring Reporting Verification

4.2 Monitoring and Reporting Process

categories	methodology			Activity						Emissions factor			Oxidation Factor		
				Activity uncertainty			LHV								
Size of inst`	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
1. Stationary															
①Solid fuel	1	2	3	1	2	3	2	2	3	1	2	3	1	2	3
②Liquid fuel	1	2	3	1	2	3	2	2	3	1	2	3	1	2	3
③gaseous fuel	1	2	3	1	2	3	2	2	3	1	2	3	1	2	3
2. Mobile															
①Aviation	1	1	2	1	1	2	2	2	2	1	1	2	-	-	-
②Road	1	1	2	1	1	2	2	2	2	1	1	2	-	-	-
③Railway	1	1	1	1	1	1	2	2	2	1	1	1	-	-	-
④maritime	1	1	1	1	1	1	2	2	2	1	1	1	-	-	-

4. Measuring Reporting Verification

4.3 Verification

Role? Verification of annual GHG & Energy data

- Monitoring Plan, Inventory Report

*** Entities should contract with not a Verifier but a Verification Body**
*** At least 2 verifiers should implement verification**

To be? through National Standardization

Preliminary Verifier

Competent Verifier

* EHRD (National Institute of Environmental Human Resource Development)

* Competent Verifier should finish sectoral training (min. 24H) every 2 years

Summary of Part 4

1. **GHG emissions have to be annually reported through an approved and verified monitoring plan to a competent authority.**
2. **The first step to estimate GHG emissions is to identify organizational boundary.**
3. **According to the size of installation and a business sector, different calculation methodologies are applied. (Tier1 < 50,000 tCO2eq, Tier 2 < 500,000 tCO2eq, Tier 3 >= 500,000 tCO2eq)**

Thank you