

Implications of Paris Agreement for Thermal Power Generation

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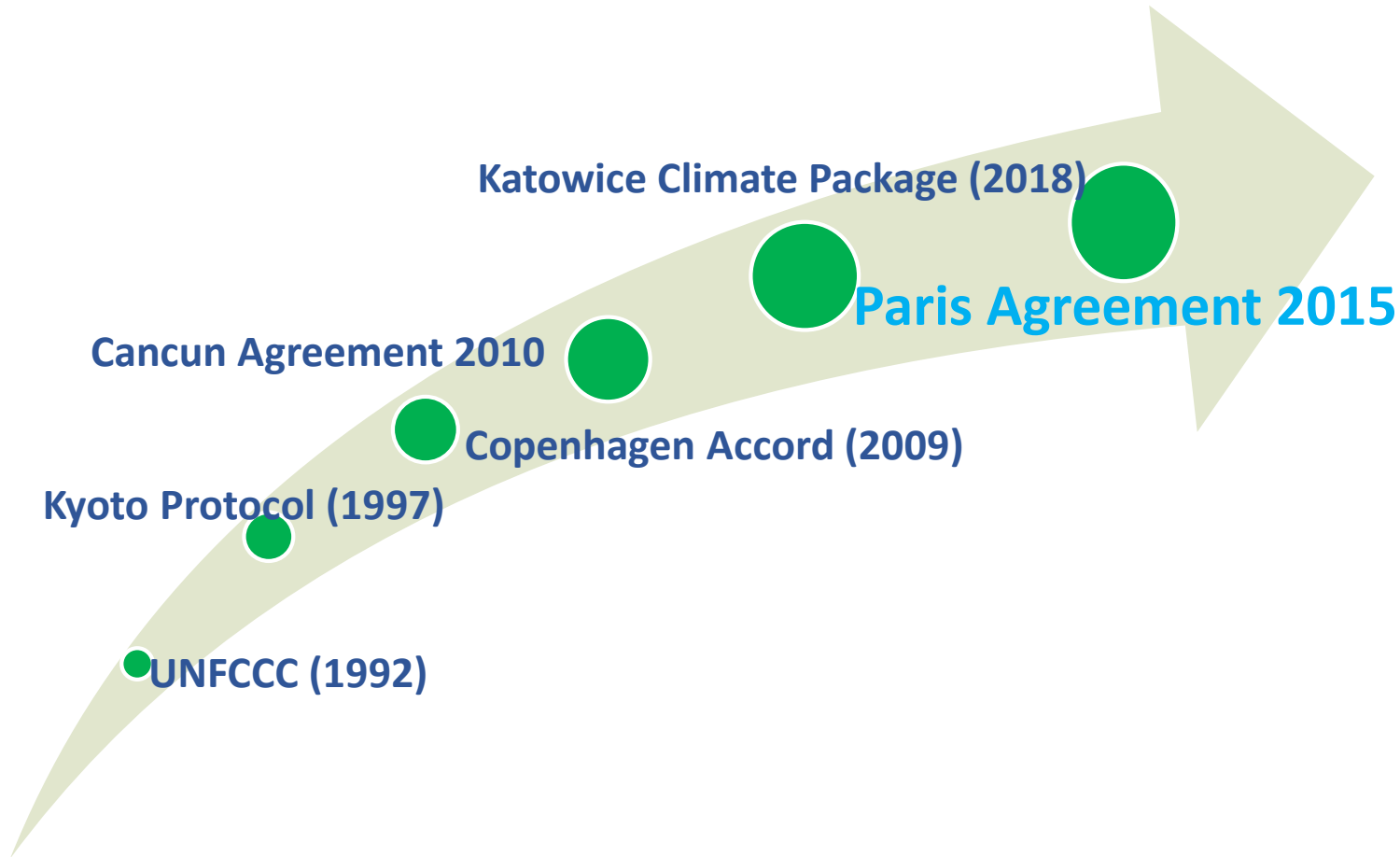


Outline of Presentation

- **Paris Agreement Among the Multilateral Process**
- **Paris Agreement: Goals and Key Features**
- **Global and SAARC Scenario of Thermal Power Generation**
- **National Determined Contributions (NDCs) and Initiatives of Bangladesh, India, Pakistan and Sri Lanka**



Paris Agreement Among the Multilateral Process





Paris Agreement



- International agreement to combat climate Change
- Adopted on 12 December, 2015
- Came into force on 4 November, 2016
- Intends to reduce and mitigate Greenhouse Gas emission

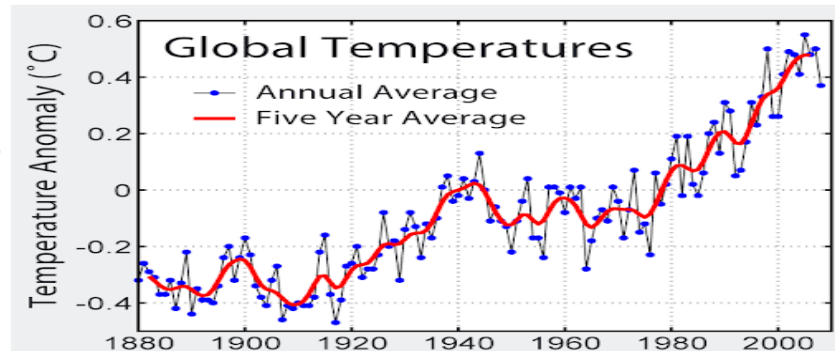




Goal of Paris Agreement



➡ To Keep global temperature rise well below 2 degrees Celsius, or even below 1.5 degrees Celsius



➡ To strengthen the ability of countries to deal with the impacts of climate change



➡ To put in place the financing, new technology and an enhanced capacity-building framework





Principles of Paris Agreement

Follows the Principle of equity but differentiated responsibilities and respective capabilities, in the light of different national circumstances.



Key Features of Paris Agreement

Climate neutrality-Balance between anthropogenic emissions by sources and removals by sinks of GHGs in the second half of the century



Mitigation- Binding commitments by all Parties to prepare, communicate and maintain a **Nationally Determined Contribution (NDC)** and to pursue domestic measures to achieve them



Sinks and Reservoirs –The Paris Agreement also encourages Parties to conserve and enhance, as appropriate, sinks and reservoirs of GHGs





Key Features of Paris Agreement...

Voluntary Cooperation – The PA recognizes the possibility of voluntary cooperation among Parties to allow for higher ambition and sets out principles



Adaptation – To enhance adaptive capacity, strengthen resilience and reduce vulnerability to climate change, all Parties should engage in adaptation, including by formulating and implementing National Adaptation Plans



Loss and Damage – The Paris Agreement recognizes the importance of averting, minimizing and addressing loss and damage associated with the adverse effects of climate change





Key Features of Paris Agreement...

Finance, technology and capacity-building support

- The PA reaffirms the obligations of developed countries to support the efforts of developing country Parties
- Provision of resources should aim to achieve a balance between adaptation and mitigation
- The agreement also provides that the Financial Mechanism of the Convention, including the Green Climate Fund (GCF)
- Technology framework is established under the Agreement
- Capacity-building activities-climate change education, training as well as public awareness, participation and access to information



Key Features of Paris Agreement...

Transparency, implementation and compliance

- Reporting information submitted by each Party undergoes international technical expert review
- Includes a mechanism that will facilitate implementation and promote compliance in a non-adversarial and non-punitive manner, and will report annually to the CMA

Global Stocktake - A global stocktake is to take place in 2023 and every 5 years thereafter. Its outcome will inform Parties in updating and enhancing their actions and support and enhancing international cooperation on climate action



Paris Agreement Landscape

Purpose/Objective of the Paris Agreement

Strengthen the global response to the threat of climate change

Long-term temperature goal
(2°C/1.5°C)

Climate resilience and low
emissions development

Financial flows

Action

Adaptation

Mitigation

Means of implementation

Finance

Technology dev. & transfer

Capacity-building

Accountability (individual and aggregate level)

Transparency of action
and support

Global stocktake

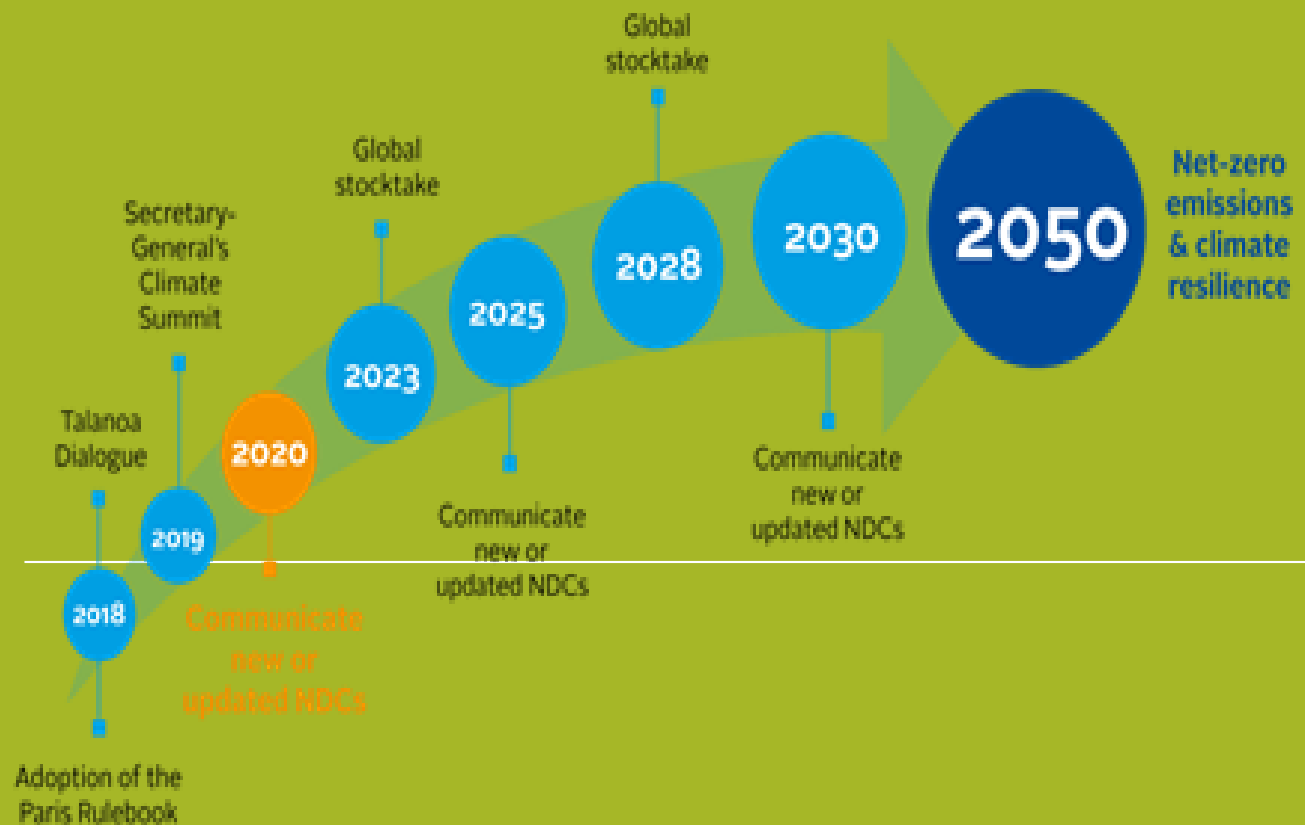
Facilitating
implementation and
compliance



Nationally Determined Contribution (NDC)

The Paris Agreement requires that each Party to UNFCCC prepare, update and communicate its **Nationally Determined Contribution (NDC)** document declaring the actions it plans to undertake to combat climate change, especially to reduce its greenhouse gas emissions

AMBITION MECHANISM IN PARIS AGREEMENT





Global Scenario of Thermal Power Plant

Contribution of Fossil Fuel on Power Generation		
Fuel Type	Installed Capacity, GW	Share by percentage
Coal	1965.54	34%
Gas	1493.05	26%
Oil	261.88	5%
Renewable & others	1986.51	35%
Total	5706.98	100%

Source: Data extracted from Global Power Plant Database

Globally 80 per cent of the coal capacity has to retire by 2030 if we have to stick to the Paris Climate Agreement to keep global warming below 1.5-degrees Celsius



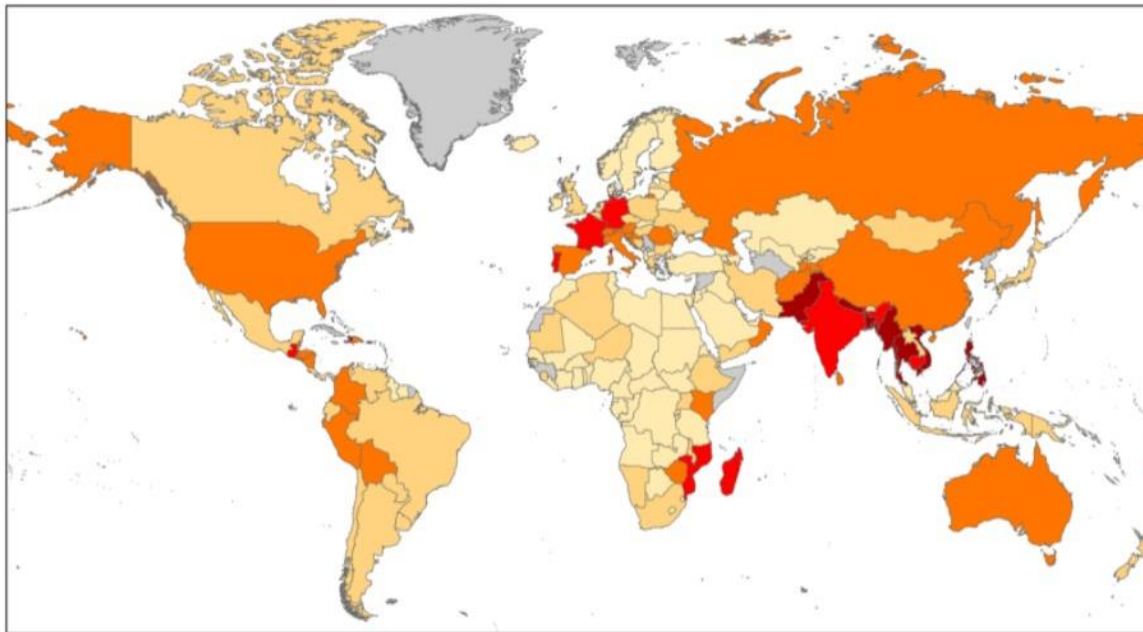
Thermal Power Contribution in SAARC

Country	Installed Capacity (MW)	Major Fuel type power plant	Percentage of Thermal Power Plant
Afghanistan	1,341	Hydro and Oil Dominated	Thermal (50%)
Bangladesh	25,171	Gas & Furnace Oil Dominated	Gas (53.86%) and Furnace oil (27.18%)
Bhutan	2,326	Hydro Dominated	
India	383,373	Coal Dominated	Coal (54.59%)
Maldives	366	Oil, Diesel Dominated	Oil (96 %)
Nepal	1,280	Hydro Dominated	Thermal (5 %)
Pakistan	38,719	Gas, Oil And Hydro Dominated	Thermal Power base plant (61 %)
Sri-Lanka	4,086	Hydro, Oil and Coal Dominated	
	456,663		

Climate Risk Index of SACs



Climate Risk Index 2020



Climate Risk Index: Ranking 1999 - 2018

1 - 10 11 - 20 21 - 50 51 - 100 >100 No data

Bangladesh-7
Pakistan-5
Nepal-9

www.germanwatch.org/en/cri



India's Thermal Power related Response to Paris Agreement (NDC)

- To reduce the emissions intensity of its GDP by 20–25% by 2020 and 33-35 percent by 2030 from 2005 level
- To achieve about 40 percent cumulative electric power installed capacity from non-fossil fuel based energy resources by 2030
- To create an additional carbon sink of 2.5 to 3 billion tones of CO₂ equivalent through additional forest and tree cover by 2030
- India has advocated global collaboration in R&D, particularly in clean technologies



India's Thermal Power Related Response to Paris Agreement (NDC)...

- **Renovation and Modernization and Life Extension (LE) of existing old power stations is being undertaken in a phased manner**
- **About 144 old thermal stations have been assigned mandatory targets for improving energy efficiency**
- **Coal beneficiation has been made mandatory**
- **Shifting towards supercritical technologies for coal based power plants**
- **Introduction of ultra-supercritical technology, as and when commercially available is part of future policy**



India's Thermal Power related Response to Paris Agreement (NDC)...

Mitigation technologies used in thermal power

- **Pulverized Combustion Ultra Super Critical (PC USC)**
- **Pressurised Circulating Fluidised Bed Combustion, Super Critical, Combine Cycle (PCFBC SC CC)**
- **Integrated Gasifier Combined Cycle (IGCC)**
- **Solid Oxide Fuel Cell (SOFC), Integrated Gasifier Fuel Cell (IGFC)**
- **Underground Coal gasification (UCG)**



India's Thermal Power related Response to Paris Agreement (NDC)...

- To use only fly ash/ fly ash based products in construction within a radius of 100 km from a coal based thermal power plant
- To utilize Fly Ash for backfilling or stowing of the mines



India's Thermal Power related Response to Paris Agreement (NDC)...

➤ Some Fiscal Responses

- Coal cess, cuts in subsidies

India imposed a cess on coal in 2010 @ INR 50 (USD 0.8) per ton and recently increased to INR 200 (USD 3.2) per ton of coal. This is used in **Clean Environment Fund**. India has also set up a **National Adaptation Fund** with an initial allocation of INR 3,500 million (USD 55.6 million)

- Increase in taxes on petrol and diesel
- Market mechanisms including perform achieve and trade (PAT), renewable energy certificates (REC) and a regulatory regime of renewable purchase obligation (RPO).



Pakistan's Thermal Power Related Response to Paris Agreement (NDC)...

Pakistan NDC Statement:

Pakistan intends to reduce up to 20% of its 2030 projected GHG emissions subject to availability of international grants to about US\$ 40 billion at current prices.

- Over the last twenty one years (1994-2015), the overall increase in the emissions was approximately 123 percent
- Pakistan's Vision 2025, a major policy document has guided the strength of INDC
- Vision 2025 envisaged adding 25,000 MW of electricity to the national grid by 2025
- Improvement in coal efficiency - Improving the efficiency of planned coal-based power generation could lead to GHG mitigation Pak NDC statement



Bangladesh's Thermal Power Related Response to Paris Agreement (NDC)...

- In INDC, Bangladesh has an ambitious GHG reduction target of 15%(of which 5% unconditional and 10% conditional) from a Business as Usual (BAU) level by 2030
- Bangladesh wants to actively play its part in the global collective action to reduce future GHG emissions government is **repowering** old steam turbines to increase efficiency
- The NDC envisaged **800 MW** of additional generation capacity to be brought online by 2030 through repowering of steam turbines.



Bangladesh's Thermal Power Related Response to Paris Agreement (NDC)...

- Coal based generation options are the highest prioritized plants in the Bangladesh power sector development plan
- The revised Power Systems Master Plan (2016) envisages 30 GW of new coal capacity by 2030 using clean coal technology (super-critical technology, or even ultra-super- critical coal technology)
- Support will be needed in terms of finance, technology transfer and capacity building to help ensure that all new coal generation is either supercritical or ultra-super-critical.



Bangladesh's Thermal Power Related Response to Paris Agreement (NDC)...

- Has Planned to use coal technologies such as IGCC (integrated gasification combined cycle) plants,
- Use of CCS options remain extremely expensive and nascent technologies
- With the use coal/fossil-fuel based energy economy, carbon footprint might go to half of that of the United States current carbon footprint
- Establish procedures and processes for actively monitoring and reporting total emissions from coal based generation
- Retrofitting (where possible) coal generation assets to reduce the sector's overall carbon footprint.



Sri Lanka's Thermal Power Related Response to Paris Agreement (NDC)...

- Sri Lanka's per capita greenhouse gas emission in 2010 was 1.02 tons and its global cumulative contribution in 2019 was 0.03%.
- Furthermore, no new coal power plant addition is expected for the future, and converting existing fuel oil based combined cycle power plants to natural gas and introducing new natural gas based power plants will support emission reduction efforts, contributing to NDCs
- Development of hydro-power base to its maximum potential through new large and small
- hydro-power plants amounting to around 300 MW.
- Develop approximately 800MW of wind power generation in Northern and North-Western coastal areas of the island.
- Develop approximately 2,000 MW of solar power capacity using different modalities such as solar rooftops, small scale, and large solar PV power plants.



Sri Lanka's Thermal Power Related Response to Paris Agreement (NDC)...

- **Conversion of existing 600 MW of fuel oil-based combined cycle power plants to NG 2021-2026**
- **Establishment of new combined cycle power plants in place of anticipated coal power capacity additions in the BAU and gas turbines with approximately 700 MW of capacities to be operated from NG 2021-2027**
- **It is expected that the implementation of updated NDCs will result in GHG emissions reduction against BAU scenario by 25% in the electricity sector (5% unconditionally and 20% conditionally) equivalent to an estimated mitigation level of 9,819,000 MT unconditionally and 39,274,000 MT conditionally (total of 49,093,000 MT) of carbon dioxide equivalent during the period of 2021-2030**



**“Earth has enough resources to meet people’s needs, but
will never have enough to satisfy people's greed”**

Thank You