White Paper

NO FUTURE FOR FOSSIL FUELS

THE FOSSIL FUEL NON-PROLIFERATION TREATY

CANSA
CLIMATE ACTION NETWORK
South Asia

NO FUTURE FOR FOSSIL FUELS

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NO FUTURE FOR FOSSIL FUELS

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01 EXECUTIVE SUMMARY

The success of human societies depends intimately on the sustainable balance between the living components of natural and managed systems. Although the demographic rise of the human population and geographical range limits of species are dynamic and fluctuate over time, climate change is impelling a universal redistribution of life on Earth (Pecl, Araujo, Bell, Blanchard and Bonebrake 2017).[1] This has raised the demand for the design of climate policy to promote sustainable consumption and production that will be influenced by how countries perceive climate induced uncertainties and policymakers prioritize national risk. Climate change also magnifies existing risks of health, livelihoods, water, food insecurity, poverty, and migration. Addressing climate change requires a multifaceted and holistic approach. Thus, effective mitigation will not be achieved if individual agents advance their interests independently (IPCC 2014).[2] Though the world has realized climate change truism, multiple pieces of evidence suggest meager policy action. Research published by the Stockholm Environment Institute shows that despite all the rhetoric about transitioning to renewable energy, the world is on track to produce 120 percent more fossil fuels than would be consistent with limiting global warming to 1.5°C, the goal set by the Paris Agreement in 2015 (The New York Times 2019).[3] The recent Sixth Assessment Report (AR6) of IPCC number of innovations, including a new chapter on-demand, services, and social aspects of mitigation, and a chapter dedicated to innovation, technology development, and transfer.

In an attempt to bridge country analyses on the development and implementation of climate change policies that improved community-based responses for more efficient use of resources, one may explore what are the evidence-based alternative approaches to address anthropological climate change.

The review paper is based on literature and document analysis of policy and practices in South Asia. The selection of three large and populous countries for this analysis was based on findings of the literature, further triangulated with the expert interviews. The preliminary analysis of the current energy landscape of India, Bangladesh, and Pakistan suggests heavy reliance on coal, oil, and natural gas. A representative set of industries were considered for analysis. These included energy generation, heavy fleet transportation, and carbon-intensive industry sub-sectors; steel and cement.

These government policy experimentations become increasingly important to explore in the context of South Asia, with India, Pakistan, and Bangladesh, as it has incorporated fossil fuels in their future energy planning. This paper advocates building a case

for policy-practice interface towards non-proliferation of fossil fuels-based energy procurement, generation, and investment. This is in line with multiple emerging research and real-world investments that insist upon increasing renewable energy portfolios, which carry much lower risk, higher flexibility, and are cost-competitive as compared to fossil fuels-based infrastructure.

The findings of the paper suggest that anthropological climate change mitigation requires a two-pronged approach; a) to increase penetration of renewable energy and low carbon technologies in emerging economies and b) refuse the addition of more fossil fuels in the energy mix. This paper recommends evidence-based rationale for building policies free from Fossil Fuel (FF) and advocates exploration of sustainable alternatives. Through content analysis of the literature available in popular media, and civil society discourse analysis on the humanitarian aspects of end-use, it suggests that fossil fuel extraction, production, and generation have disastrous human and environmental impacts, which further drive warming levels dangerously high. On land, impacts on biodiversity and ecosystems, including species loss and extinction, are projected to be lower at 1.5°C of global warming compared to 2°C. Limiting global warming to 1.5°C compared to 2°C is projected to lower the impacts on terrestrial, freshwater, and coastal ecosystems and to retain more of their services to humans. The avoided climate change impacts on sustainable development, eradication of poverty, and reducing inequalities would be greater if global warming were limited to 1.5°C rather than 2°C if mitigation and adaptation synergies are maximized while trade-offs are minimized (IPCC 2018).[4] Moreover, tying livelihoods with this sector creates job insecurity. Thereby, a case for a just transition has been recommended.

In conclusion, the paper focussses on the four critical thrust areas for civil society to advocate policies on a) Energy security, b) Cost-competitiveness of renewables, c) Human health and well-being, and d) Just transition, and develops a case to move away from fossil-fuel proliferation.

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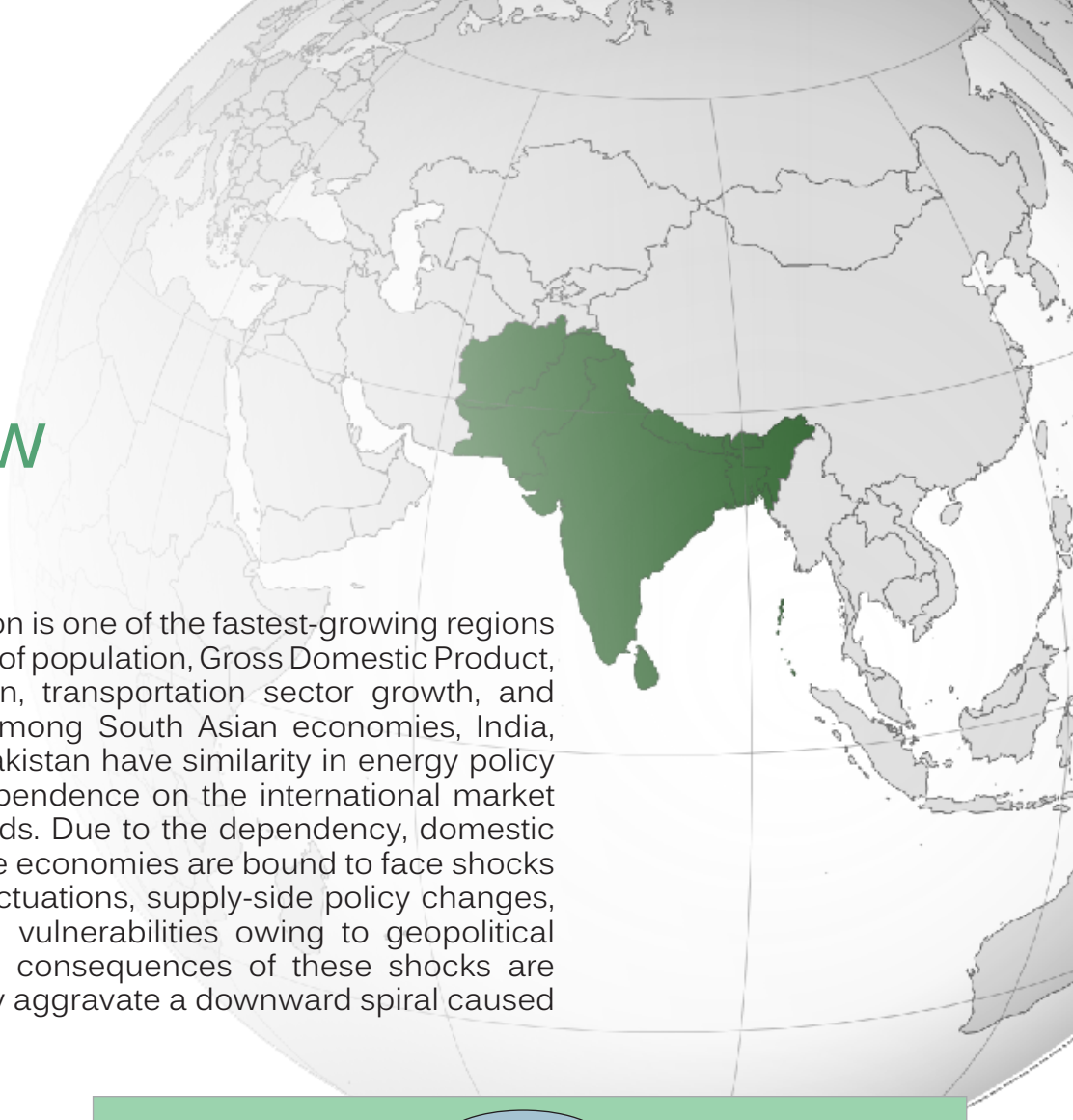
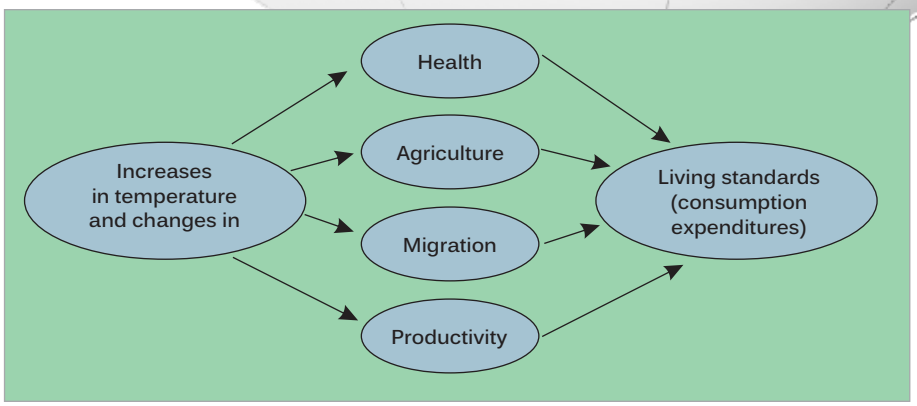
02

OVERVIEW



The South Asia region is one of the fastest-growing regions of the world in terms of population, Gross Domestic Product, energy consumption, transportation sector growth, and industrial growth. Among South Asian economies, India, Bangladesh, and Pakistan have similarity in energy policy pursuance, with dependence on the international market for their energy needs. Due to the dependency, domestic markets within these economies are bound to face shocks owing to market fluctuations, supply-side policy changes, price changes, and vulnerabilities owing to geopolitical circumstances.[5] The consequences of these shocks are expected to severely aggravate a downward spiral caused due to COVID-19.



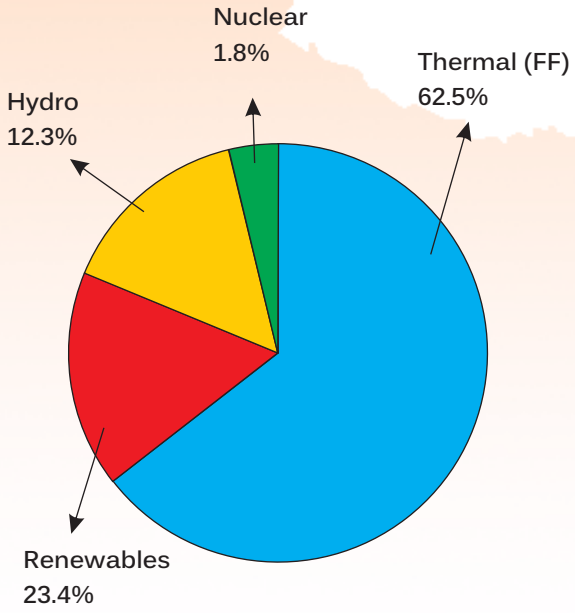
Source:
Mani et al. 2018* [6]

The region is set to plunge in 2020 into its worst-ever recession as the devastating impacts of COVID-19 on South Asian economies linger on, taking a disproportionate toll on informal workers and pushing millions of South Asians into extreme poverty' (The World Bank 2020).[7]

In addition to energy market vulnerabilities, climate change poses a huge risk to the region, as rising temperatures signal higher adaptability issues, and would exacerbate the currently prevailing issues of energy insecurity, poverty, food insecurity, lack of healthcare and sanitation, droughts, adverse weather events and deteriorating living standards. Notably, urban centers are the most exposed to severe warming trends that create “urban heat islands”, which could render major cities unfit for living in the upcoming years.[8] Carbon emissions in the region have been increasing, with India becoming the world's third-largest emitter after China and the US with 3.2 Billion metric tons (3.2 Gt) of Carbon emissions in 2016; while India ranks tenth in terms of emissions per capita at 2.44 metric tons/CO2e.[9]

Bangladesh emitted 209.58 million tons (209 Mt) and Pakistan emitted 403.67 million tons (403 Mt) in 2016,[10] while their per capita emissions peaked at 1.33 tCO2e and 1.98 tCO2e respectively.[11] In this context, the three countries, India, Bangladesh, and Pakistan comparison is critical to understand the implications of the current trend and its exposure to risks.

India



Source: Fig. 1

India's energy sector is extremely dynamic, with the Government of India recognizing the need for sustainable development and taking on ambitious climate goals. While ensuring electricity access and clean cooking to its 1.3 billion population, India also plays a pivotal role in the region's energy dynamics [Ref].

Overall, India's energy mix is dominated by thermal power at 226 GW by 2019, where the total capacity is 356 GW. Hydro accounts for around 45 GW, while wind and solar combined account for 77 GW, with 26 GW of solar PV capacity installed. Nuclear energy has also seen a rise and accounts for 6.7 GW [Ref]. While crude oil import stood at 225 Mtoe and natural gas at 24 Mtoe, India produced 269 Mtoe of coal, 41 Mtoe of crude oil, and 26 Mtoe of natural gas in 2017. Imported coal accounted for around 118 Mtoe, [Ref].

A breakdown of the power sector suggests 62.5 percent thermal, followed by renewable, hydro, and 1.8% nuclear (Please see for details Fig.1).

The Indian power sector is dominated by government-owned National Thermal Power Corporation (NTPC Ltd.) with 62 GW installed capacity.[12] Tata Power and Adani Power are the major private players with 12.26 GW [13] and 12.45 GW [14] of installed capacities.

India's energy demand growth is set to double by 2040, with the growth being met by coal (42% of new energy demand), which would effectively double its emissions. The transport sector is expected to grow to 253 Mtoe, whereas the Industry sector will see a tripling in growth to 990 Mtoe by 2040. [15] Reports [16] suggest that power generation from non-fossil fuel sources will contribute about 64% of the total generation mix.

India with an oil refining capacity of 249.9 million tons (Mt) is planning to expand its oil import shortly. Among, the non-OECD actors, India will become the largest petroleum consumer. In 2019, India was the world's third-largest consumer of oil, with around 5.16 million barrels per day.

In addition, India has developed around 16,000 km of gas pipeline infrastructure.[18] The heavy transportation segment is dominated by over 60% of road freight and covers 1.8 million km and over 300 million tons of load annually.

The energy sector contributes the majority of emissions as outlined in the graphic, followed by Land Use Change and Forestry, and Industrial Process and Product Use. A further breakdown of Energy sector emissions is outlined as well.

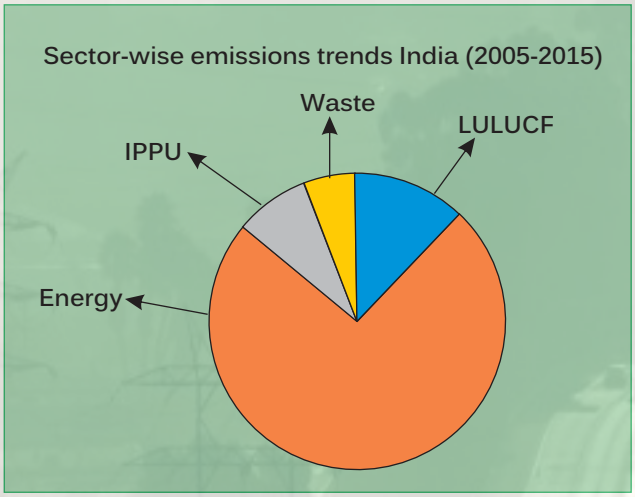
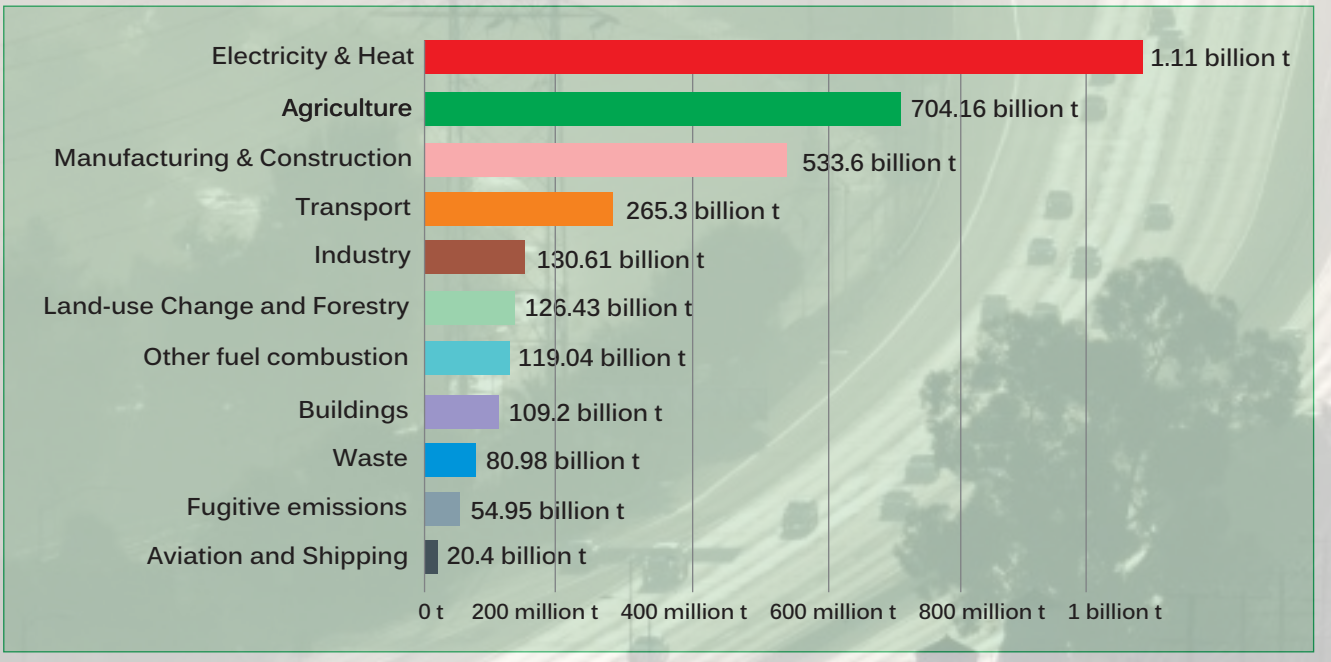


Fig 2: Sector-wise emissions trends in India (2005-2015)[17]

Greenhouse gas emission by sector, India, 2016

Greenhouse gas emissions are measured in tonnes of carbon dioxide-equivalents (CO_2e)



Source: CAIT Climate Data Explorer via. Climate Watch

The industry sub-sector Iron and Steel contributes nearly 242 million tons of carbon emissions and is projected to triple by 2050 with increasing demand, which would further drive fossil fuel-based emissions. Steel is the largest emitter in the IPPU category. There are nearly a thousand steel plants in the country, where the Government is investing upward of US$1.5 trillion in the upcoming years for upgrades and new infrastructure.[19]

Bangladesh

With a population of 161 million and a GDP of US$240 billion, Bangladesh is a strong fast-growing economy and remains one of the front-runners in terms of energy production and consumption. Bangladesh produced 33.64 Mtoe of energy in 2018, where natural gas production peaked at 1.04 million TJ-gross and oil (natural gas liquids) at 407 kt. The percentage of carbon emissions from natural gas dominated with more than 60% contribution.[20]

In Bangladesh, the apex institution of power is the Power Division under the Ministry of Power, Energy & Mineral Re-sources (MPEMR), and the regulatory control rests with Bangladesh Energy Regulatory Commission (BERC). The generation lies in the ambit of Bangladesh Power Development Board (BPDB), Ashuganj Power Station Company Ltd. (APSCL), Electricity Generation Company of Bangladesh (EGCB), North-West Power Generation Company Ltd. (NWPGCL), and other Independent Power Producers (IPP). Transmission is under the Power Grid Company of Bangladesh Ltd (PGCB). Bangladesh Power Development Board (BPDB) is a major stakeholder, a partially integrated public utility that is responsible for building least cost plans and other Integrated Resource Plans.[21]

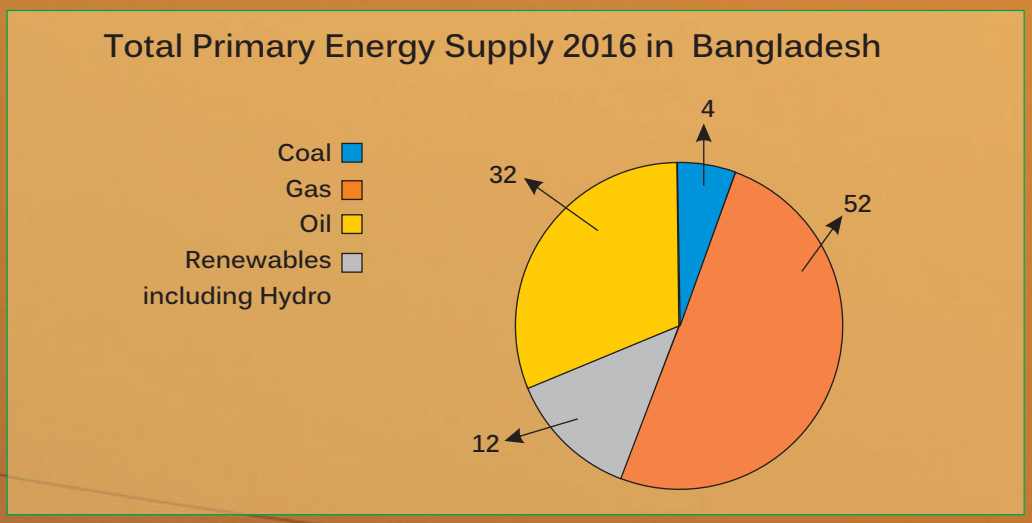


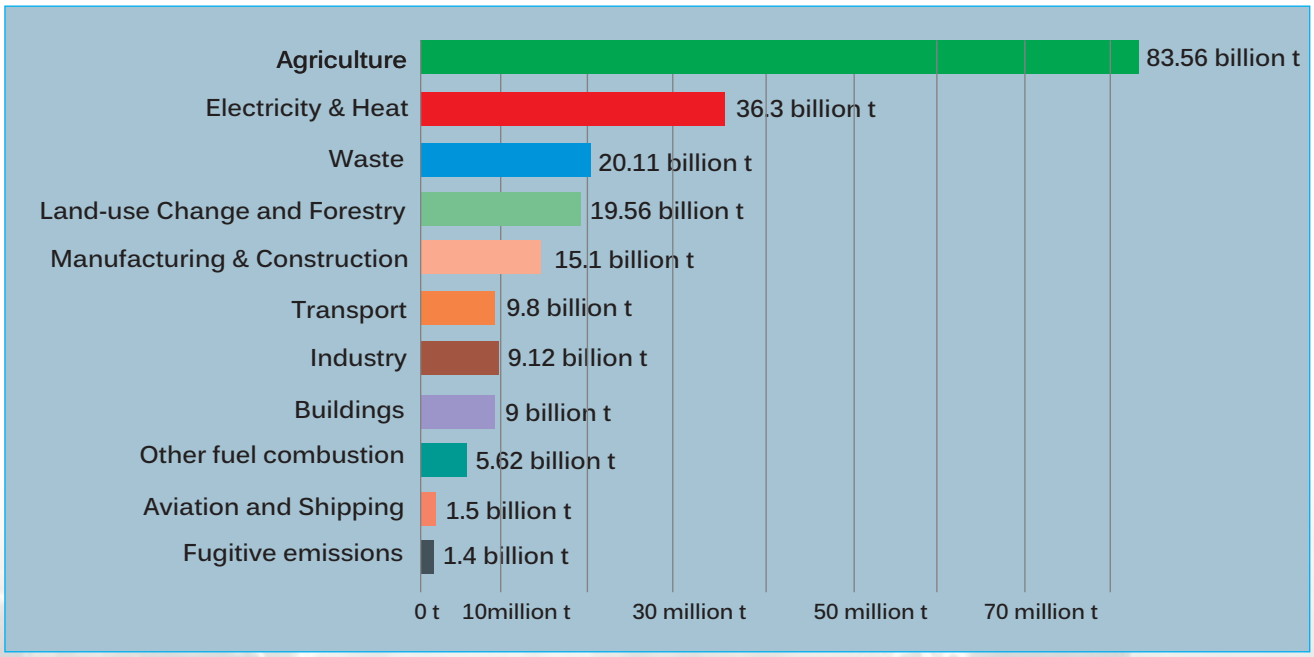
Fig 4: Total Primary Energy Supply in 2016 in Bangladesh [22]

The installed capacity of power generation in Bangladesh stood at 21.4 GW in 2020, and the country is planning to add another 40 GW by 2040. Coal-based power generation is expected to contribute to over 35% of Bangladesh's energy mix by 2030, where Chinese, Japanese, Indian, and South Korean investments are expected to rise. Currently, the country has around 500 MW of installed coal capacity, 10 GW of natural gas capacity, 6 GW of oil, and the remaining capacities covered by imported power, hydro, and other renewables.[23]

Bangladesh is among the top 20 Asian economies in terms of natural gas production. There are 27 natural gas fields in Bangladesh, with more than 900 billion cubic feet of production capacity.[24] Bangladesh's sector-wise emission differs from India in with highest on agriculture, followed by electricity. Waste and land-use rank as third and fourth largest emissions, followed by manufacturing and construction. A sector-wise emissions breakdown of Bangladesh is shown in fig.5 below:

Greenhouse gas emission by sector, Bangladesh, 2016

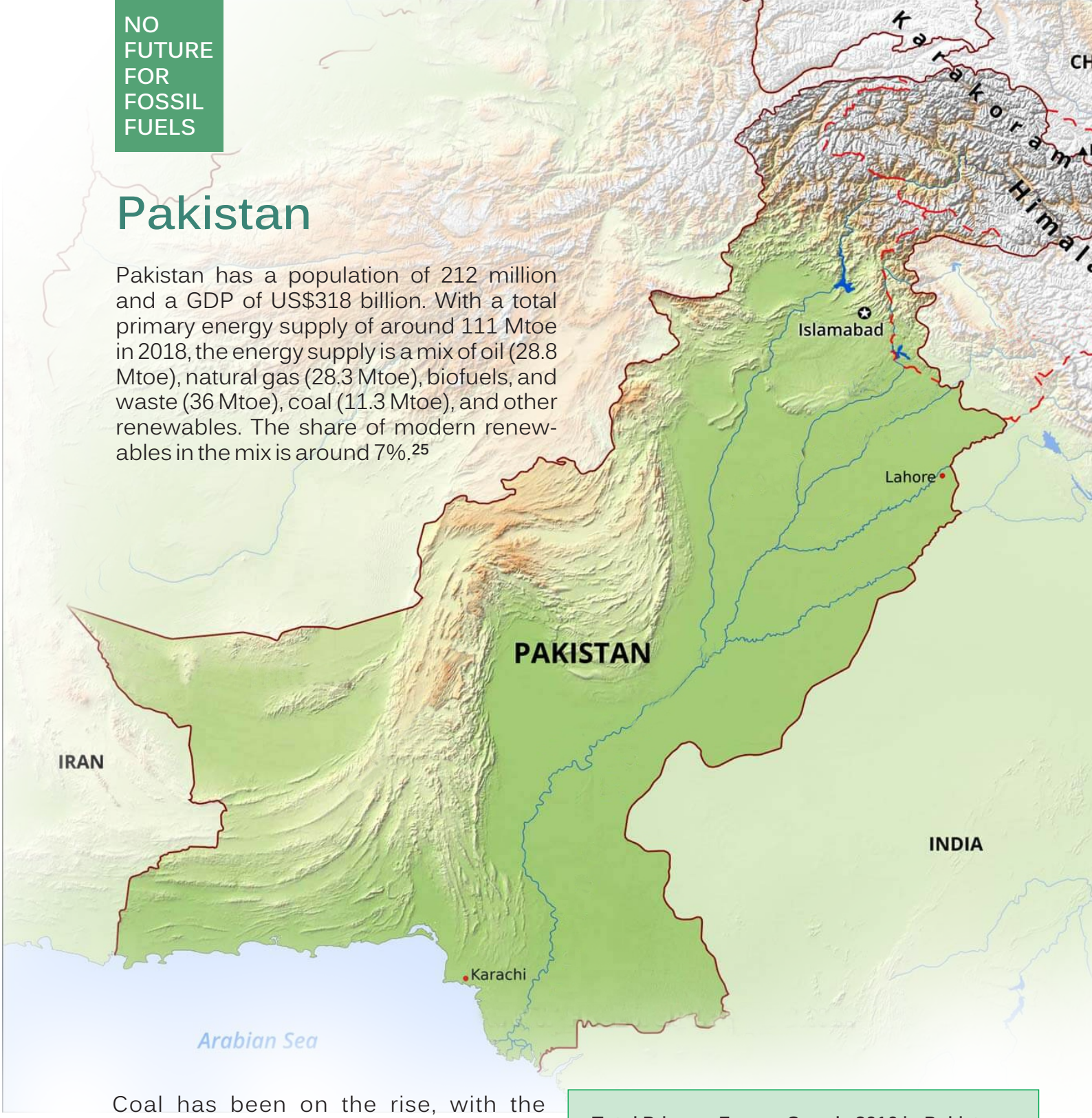
Greenhouse gas emissions are measured in tonnes of carbon dioxide-equivalents (CO_2e)



Source: CAIT Climate Data Explorer via. Climate Watch

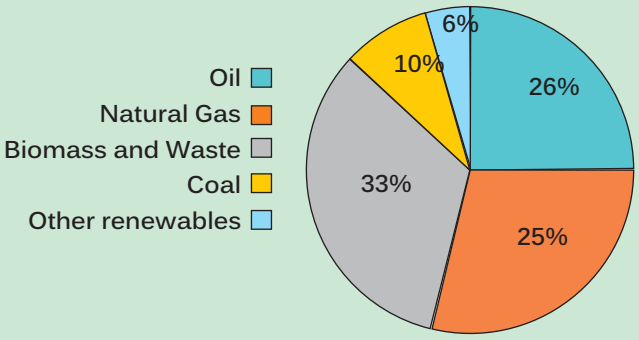
Pakistan

Pakistan has a population of 212 million and a GDP of US$318 billion. With a total primary energy supply of around 111 Mtoe in 2018, the energy supply is a mix of oil (28.8 Mtoe), natural gas (28.3 Mtoe), biofuels, and waste (36 Mtoe), coal (11.3 Mtoe), and other renewables. The share of modern renewables in the mix is around 7%.[25]



Coal has been on the rise, with the Government looking to expand its coal plant capacity to install 4000 MW by 2030.[26] Pakistan Electric Power Company has authority over public sector thermal plants and T&D companies, where four thermal generation companies, nine distribution utilities, and the sole grid operator, National Transmission and Despatch Company, all lie under PEPC's ambit. The Central Power Purchasing Authority Guarantee Limited is the country's sole buyer.[27]

Total Primary Energy Supply 2016 in Pakistan (Mtoe)



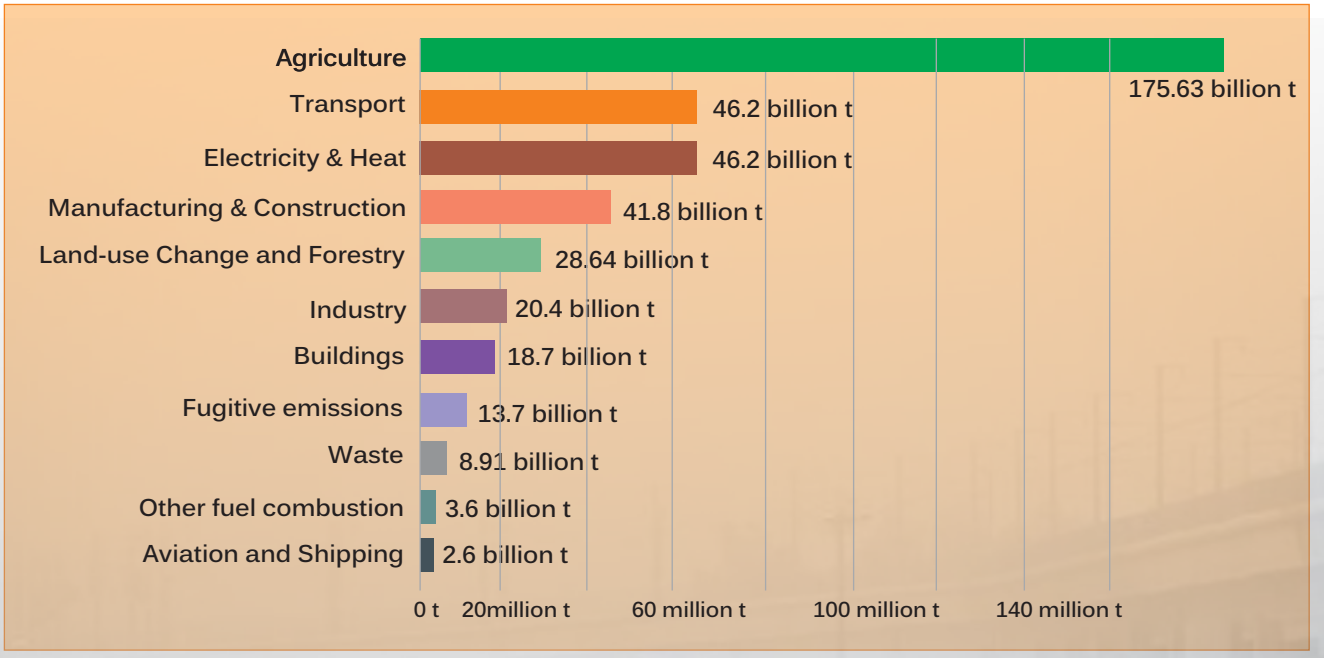
Pakistan produced 89,000 barrels per day (bpd) in 2019, however it is a net importer of crude oil and refined petroleum products. The country has six oil refineries with a cumulative crude oil distillation capacity of around 3.9 million bpd. The Oil and Gas Development Company Limited (OGDCL) is a majority stakeholder in the oil and gas sector in Pakistan. Natural gas production has seen a decline in this decade and has caused significant energy security issues. Pakistan produced 1361 billion cubic feet of natural gas in 2018.[28]

Unlike India and Bangladesh, Pakistan, the electricity sector is ranked third in terms of emission, while agriculture tops the list similar to Bangladesh. However, in terms of emission India's agriculture sector emission is more than three times higher than Pakistan, and Bangladesh is approximately half of Pakistan's level of emission. The transport sector in Pakistan is ranked with 46.2 billion t as second highest in terms of emission. However, Bangladesh's emission from transport is less than 10 million t. The comparison of waste is interesting to see with Bangladesh being more than twice in terms of emission with 20.11 million t compared to Pakistan with 8.9 million tons.

A sector-wise breakdown of Pakistan's CO2e emissions is shown in Fig. below:

Greenhouse gas emission by sector, Pakistan, 2016

Greenhouse gas emissions are measured in tonnes of carbon dioxide-equivalents (CO_2e)



Source: CAIT Climate Data Explorer via. Climate Watch

It is evident from the current trend in India, Bangladesh, and Pakistan that fossil fuel dependence in South Asia will put the region away from the Paris Agreement 1.5°C temperature goal. Findings using the integrated assessment model suggest that the total climate change cost in South Asia will increase over time and will be prohibitively high in the long term. Without global deviation from a fossil-fuel-intensive path, South Asia could lose an equivalent of 1.8% of its annual gross domestic product (GDP) by 2050, which will progressively increase to 8.8% by 2100 on the average under the business-as-usual (BAU) scenario. The model suggests that the Maldives will be hardest hit in GDP loss, while Bangladesh, Bhutan, India, Nepal, and Sri Lanka are projected to face 2.0%, 1.4%, 1.8%, 2.2%, and 1.2%, respectively, loss of annual GDP by 2050 (Ahmed and Suphachalasai 2014).[29] This scenario may further be squeezed with the contraction of the economy as the after-effects of COVID-19.

In the coming decades, changes in average weather will hurt living standards in Bangladesh, India, and Pakistan. The analysis suggests that the risks associated with changes in average weather can increase over time when combined with poverty, lack of education, and poorly maintained infrastructure. By 2050, under the carbon-intensive scenario, the declines in living standards are projected to be 6.7 percent for Bangladesh, 2.8 percent for India, and 2.9% for Pakistan (Mani, Bandyopadhyay, Chonabayashi, Markandya, and Mosier 2018).[30] As a result, fossil fuel dependency deepens and mitigation challenges are high.

Way Forward

There is need for a “just transition” to a low-carbon economy — a transition that minimizes disruption for workers and communities reliant on unsustainable industries and energy sources. A central concern of just transition efforts is to ensure that low carbon transitions redress the rise in social and economic inequality. The UNFCCC calls for a transition that “contribute(s) to the goals of decent work for all, social inclusion and the eradication of poverty (Piggot, Boyland, Down, and Torre 2019). [31]Transition planning rarely acknowledges the citizen's traditional rights and social exclusion that may result from inequitable growth propelled by a rapid shift in energy sources. Transition policies tend to ignore the potential cascading impacts of industry closure, such as how the loss of jobs in one industry might flow on to affect others. More importantly, these industries propel substantive informal economy that remains a primary source of livelihoods of millions. The simplistic approach adopted across the world is focusing on compensating workers and communities directly affected by fossil fuel transitions, however, South Asia unlike most parts of the world needs gender and social equality concerns. Often compensation ignores holistic pathways of transition; rather it treats compensation as an instrument of accession. Thus, the just transition should be embedded within the local realities. Lack of inclusion of communities in the transition process may give rise to the assertion of traditional rights and conflicts for a claim to their traditional resources lost with appropriation by the State or private players.

While just transition is desired to mitigate climate change effects on human health and well-being, energy security is marred with a limited understanding of cost-competitiveness. To overcome the twin-fold problem just transition provides a sustainable pathway. To demonstrate a case for just transition, the following sections are divided into four parts: human health and well-being; energy security; cost-competitiveness of energy security, and finally concludes with just transition.

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03

SECTION 1: HUMAN HEALTH AND WELL-BEING

Studies suggest that impacts of fossil fuel use on community health and well-being are essential for sustainability (McMichael AJ, Campbell-Lendrum D, Kovats S, Edwards S, Wilkinson P, Wilson T, et al 2004).[32] The estimated clinical health impacts produce substantial economic costs: US$23 billion in 2010 and US$106 billion in 2030 (Kjellstrom and McMichael 2013).[33] There are prevalent twin problems of pollution and warming. While air, water, and soil pollution are directly correlated with thermal power plants, heavy industries, and transportation; warming has a compounding effect. India and Pakistan witnessed deadly heatwaves in 2015 resulting in more than 3500 deaths.[34] In 2010, the city of Ahmedabad, India, saw over 1300 deaths caused by the heatwave during the summer months.[35] These heat waves will increase in intensity and duration under a 2° C warming world causing further damage to humans and property.

Another spatial phenomenon like droughts would become more common, especially in urban centers. Drought-prone cities would face a larger conflict in terms of water scarcity and groundwater depletion. As a significant portion of the economy of India, Pakistan, and Bangladesh is based on agriculture, this sector and its allied activities at risk from dual issues of drought owing to low precipitation and heavy flooding owing to unexpectedly higher rainfall. Heavy flooding in low-lying areas exacerbated by climate change-related sea-level rise poses threat to some of the financial capital cities like Mumbai, Kolkata, and Dhaka, where nearly 46 million people dwell. Estimates show that around 17000 square kilometers are at risk of inundation in Bangladesh owing to a one-meter sea-level rise, one-tenth of its total area.[36] These issues will put pressure on food production and the loss of crops. Owing to rising ocean temperatures and ocean acidification, coastal ecosystems are at heavy risk, and species and habitat loss, it would further put pressure on human food supply chains and communities dependent on coastal areas.[37]

Apart from spatial impact, it is important to highlight here that effects from climate change would be severe among the vulnerable populations, resulting in the rise of inequality and social exclusion. Women, children, the elderly, indigenous populations, and people already in poverty, would be impacted even further due to limited adaptive capacity.[38] Particularly, children will be at an increased risk due to malnutrition, vector-borne diseases like malaria, dengue, etc., and diarrhoeal diseases affecting the health and wellbeing of the demographic bulge. Though the general population will bear high mortality and morbidity owing to heat stress, deaths, injuries, and other psychosocial issues due to adverse weather events, and waterborne diseases due to flooding are only some of the risks that aggravate vulnerabilities.[39]

South Asia has the highest number of polluted cities in the world with 22 out of 30 of those in India alone. In India, a disturbing 4 in 10 persons are subjected to air pollution five times the safe limit. Increased incidences of lung cancer have been reported in India, and it has been seen to affect women (40%) and younger groups aged between 30 and 50 years old. People in South Asia are increasingly exposed to 5 to 10 times the WHO safe limit.[40] A summary of health risks posed by climate changes and climate vulnerability in South Asia possess multiple risks to every country with varying degree. The table below highlights some of the select health risks.

Table 1 :

Summary of health risks posed by climate change and climate variability in South Asian Countries

Country	Health risks from climate change
Afghanistan	Increased incidence of waterborne diseases such as cholera, typhoid, diarrhoea, and ascariasis because of droughts, flooding, and rise in temperature
	Increased incidence of vector-borne diseases such as malaria and leishmaniasis due to rise in temperature and flooding
	Illnesses associated with cold weather due to frost and cold spells
	Ocular, respiratory, and skin diseases due to change in monsoon and strong winds
Bangladesh	Diarrhoeal diseases from temperature change and extreme weather events. Studies find that a 1°C rise in temperature increased diarrhoeal incidence rates by 5.6%
	Vector-borne diseases such as dengue and leishmaniasis are rising due to increase in temperature
	Deaths, injuries, and psychosocial stress due to extreme weather events such as floods, cyclones, storm Surges, droughts, and heat waves
Bhutan	Death and injuries due to glacial lake outburst floods, landslides, and flash floods
	Vector-borne diseases such as malaria, dengue, Japanese encephalitis, and chikungunya; waterbome diseases, and respiratory diseases
India	Mortality and morbidity related to heat stress
	Vector-borne diseases such as malaria, dengue, Japanese encephalitis, leishmaniasis
	Waterbome diseases due to flooding. Diarrhoeal incidence in north India is expected to increase by 13.1% by 2040
	Respiratory diseases due to poor air quality
	Deaths, injuries, and psychosocial stress due to extreme weather events. Of the 7516 km long coastline, almost 5700 km is prone to cyclones and tsunamis
	Undernutrition due to food insecurity caused by droughts
Maldives	Annual rainfall and number of rainfall days is decreasing: temperatures are increasing in the northem part and decreasing in the southern part, and sea levels are projected to increase by 0.40 to 0.48m by 2100. These make the low lying archipelago vulnerable to storm surges, tsunamis, heavy rains and flooding. tidal waves, and dry spells
	Incidence of dengue, chikungunya, scrub typhus along with newly emerging diseases such as Zika virus infection

Country	Health risks from climate change
Maldives	Waterborne diseases such as diarrhoea and typhoid due to unsafe water and poor sanitation
	Mental health problems and injuries due to extreme weather events
	Damage to healthcare facilities located in coastal areas
	Undernutrition due to the effect of flooding or drought on agriculture
Nepal	Combined effects of increased temperature and diminished snowfall followed by rapidly receding glaciers have resulted in depletion of water available for drinking, livestock, and irrigation
	Waterborne and foodborne diseases, cardiorespiratory diseases, malnutrition, injuries, and mental illness
	A recent report shows that for a 1°C increase in ambient temperature, the incidence of diarrhoeal diseases rose by 4.39% and for a 1 cm increase in rainfall the incidence of diarrhoeal diseases rose by 0.28% Warmer temperatures have led to an expansion in the range of vectors, Mosquito vectors of malaria, chikungunya, and dengue and lymphatic filariasis and Japanese encephalitis can now be found at 2000 m above mean sea level in Nepal. Zika virus threat is emerging in Nepal and the high altitudes of the Hindu Kush Himalayan region." A study conducted in two malaria endemic districts shows that a 1°C increase in minimum and mean temperatures increases malaria incidence by 27% and 25%, respectively
Pakistan	Morbidity and mortality from extreme weather events
	Melting glaciers in the Himalayas threaten river flows, increased frequency and severity of monsoons and cyclones, and saline intrusion
	Increase in geographical range and incidence of vector-borne diseases
	Increase in cardiovascular and respiratory diseases, waterborne diseases, malnutrition, and heat stress
Sri Lanka	Mortality and morbidity from increased flooding due to sea level rise, increased risk of vector-bome diseases such as malaria and dengue, and heat related diseases

Source: Adopted from Sen and Dhimal et al, 2017

The above health and well-being risks are accentuated with thermal power plants and heavy transport, contributing a majorly to PM 2.5 particulates. In addition to PM 2.5 and PM 10, they also produce heavy metals and toxins, which settle in water streams that percolate and pollute the groundwater table. The number of pollution-related to premature deaths in India is alarmingly high at 23.26 million, the highest in the world, while Pakistan and Bangladesh witness around 0.2 million each.[41] Low- to middle-income countries suffer the highest loss, with some countries facing 1-in-10 deaths owing to outdoor air pollution.[42] India and China witnessed the highest total annual air pollution-related deaths at 1.24 and 1.20 million a year, whereas Pakistan witnesses 0.12 million a year each.[43] Notably, the worst affected are workers and communities closely associated with thermal plants and heavy industries with exposure to air pollution and also due to degraded and polluted water tables and soil.[44]

Concerning land degradation, coal mines largely cause ecosystem loss, along with long term impacts on land use patterns in active mining sites. Severe impacts include depletion of natural resources, loss of cultivable land, reduction in soil carbon, and biodiversity loss. Many of the coal mining sites either in operation or being commissioned are at eco-sensitive sites and forest lands, which effectively magnify the negative impact on indigenous and marginalized populations and accelerate habitat loss. Unfortunately, the resources, forests, and marginalized communities overlay investment opportunities. Thus, the proposed and the potential sites are directly at the heart of environmentally sensitive zones with thick forest cover, where the allocation of mining on a for-profit basis would put the areas under consideration at high-risk. The land used for mining is unfit for further use unless expensive remediation and resuscitation are undertaken.[46] Also, thermal power plants consume an estimated 22 billion cubic meters of water, which accounts for more than half of India's domestic water consumption.[47]

This further aggravates risks to human health and well-being associated with fossil fuel extraction and production-related failures or catastrophes, where damages have been shown to have long-term impacts from fires, spillage, and blowouts.[48] Oil spills from marine tankers are notorious for creating high-impact environmental damages, where large areas of marine ecosystems are affected in a short period. Oil spills pose a serious threat to marine species, and thereby coastal communities reliant on them.[49]

With trans-boundary common health challenges and consequences arising out of similar social-economic features, India, Bangladesh, and Pakistan will gain through regional policy advocacy based on collaborative endeavor and with the exchange of local sustainable practices for policy formulation.

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04

SECTION 2: ENERGY SECURITY

Comprising one-fifth of the world's population, the countries in the South Asian region are currently known for their expanding economies and large populations (Chary and Bohara 2010).[50] The economies of South Asia will see unprecedented growth in the years leading up to 2040, especially in terms of population, GDP, and energy demand. China, India, and Japan are the top three major energy producers in the Asia Pacific region with China leading the pack at 3063 Mtoe and India falling second at 881 Mtoe (2017). Pakistan produced 104 Mtoe while Bangladesh produced 40 Mtoe.[51] Energy security is crucial for the South Asian region, where rapid economic growth is expected, and energy poverty is a reality. Large populations do not have access to clean energy and electricity and depend on the traditional use of biomass for cooking and heating. Moreover, a large proportion of energy needs are met through international imports. This calls for regional cooperation and moving away from an energy mix dependent on fossil fuels.[52]

The UN, under Sustainable Development Goal number 7 (SDG7), has set 2030 as the date by which universal access to electricity should be achieved worldwide. Electrification has been described as a necessary step to achieving other goals, including the goals of poverty eradication (SDG1), enhancing education (SDG4), creating economic opportunity (SDG8), and empowering women (SDG5), the Governments across South Asia face wicked problems as they seek to improve the lives of the more than 1.8 billion people that live in the region (Ichord 2020).[53] At the same time, with energy as an engine of growth, the rising urbanization has offered a premise for increased electrification demand in urban centers, where it has had a double-whammy effect with increasing urban heat islands accelerating the usage of cooling equipment to mitigate heat in urban dwellings. Since, much of the energy mix is dominated by fossil fuels, an increase and thereby, a heavy reliance on fossil fuel supplies is imminent.

With dwindling FF prices and high dependence on imports, such a heavy reliance on FF warrants energy security issues in South Asia. For instance, India's net oil imports are bound to reach 9.3 million barrels per day in 2040, effectively tripling the demands, wherein this figure accounts for 90% of its oil use. At the same rate, coal and natural gas have seen an upward trend in all three countries. Despite significant investments in renewable energy, India still relies on coal (44%) and oil (25%) for most of its energy consumption, while Bangladesh is heavily reliant on natural gas with increasing investments in coal, and Pakistan is dependent on natural gas and fuel oil. This puts these nations at an energy security risk. With a large population moving to middle-and-higher income categories, there is an unprecedented increase in energy demand.[54] For instance, in India, it is estimated that by 2050 the energy mix will be dominated by fossil fuels at 65%, while the world would see a decrease in fossil fuel dependence.[55]

India would require at least four times the current amount of per capita generation of electricity to enable opportunities for energy poverty alleviation estimated at 3250 TWh/year. Heavy reliance on international oil imports is projected for 2030, where it poses risk to financial health as well.[56] The projection illustrated below suggests rapid growth in energy demand in the more intensive industry and transport sectors compared to the 2012 baseline. A desirable energy efficient pathway would lead to around 8000 TWh and 3000 TWh of energy demand by 2047 in the two sectors respectively. It is also evident from the energy supply scenarios that solar and wind, along with other alternate resources can cater to more than 80% primary energy demand by 2051.

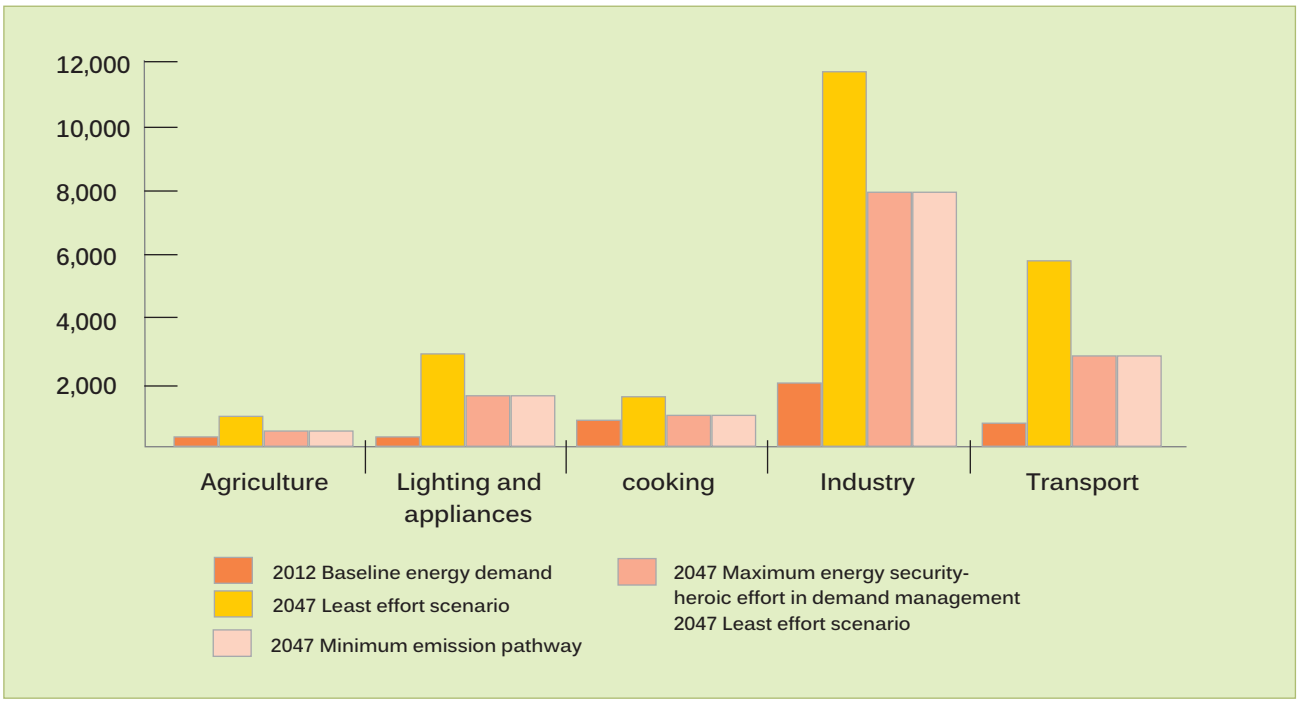

Figure 2: Energy Demand Scenarios (Planning Commission) in TWh

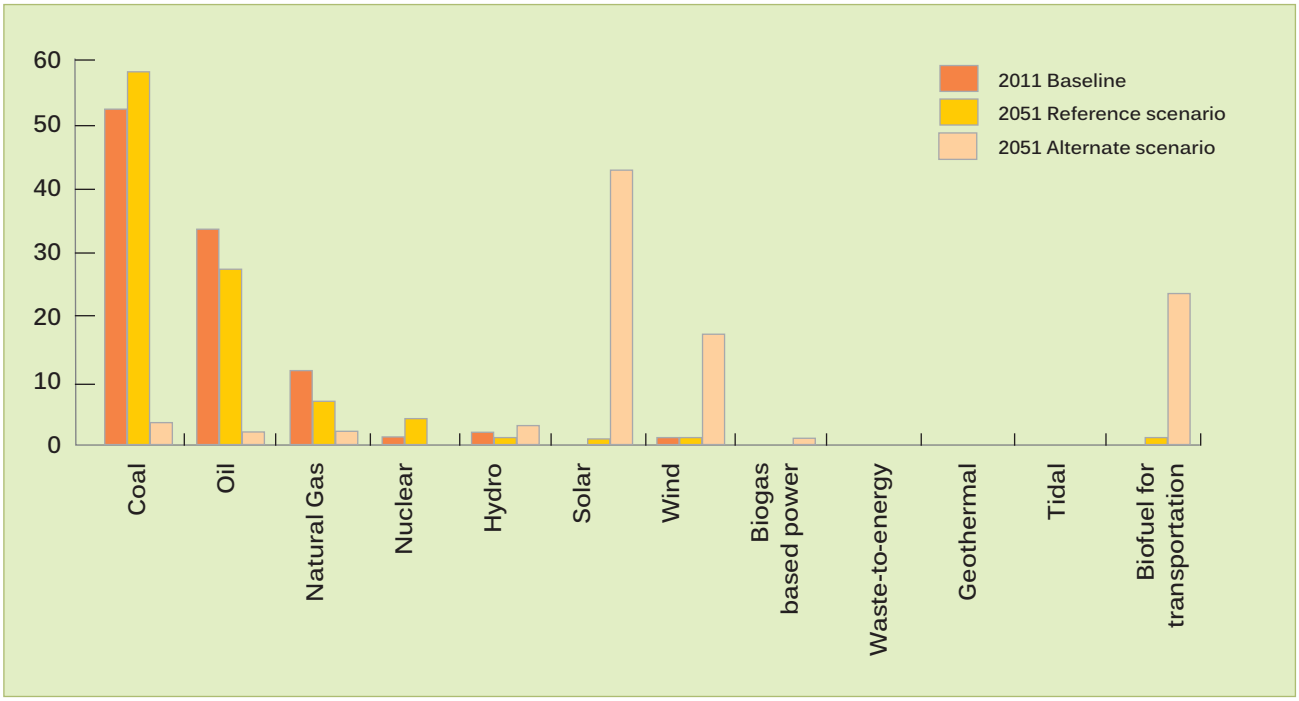

Figure 3: Energy Supply scenarios % (WWF-TERI)

At the same time, Pakistan is also planning to increase coal investments, where five new thermal power plants were commissioned by 2018, to cater to the increasing electricity crisis. In the natural gas sector, the South Asian region will likely consume more than it produces, and therefore builds reliance on FF.[57] The energy demand projections by fuel for Pakistan dictate an accelerated growth in coal usage, nearly ten times by 2030, and taking one-fifth share in the overall fuel mix. Here, although renewables increase ten times, their overall share in the fuel mix remains under 3%, while share of nuclear sources is set to increase. [58]

	2010		2015		2030	
	Mtoe	Share (%)	Mtoe	Share (%)	Mtoe	Share (%)
Oil	20.69	26.1	32.15	26.8	66.84	18.5
Natural gas	39.99	50.4	52.98	44.1	162.58	45
Coal	7.16	9	14.45	12	66.65	19
Hydro	11.03	13.9	16.4	13.7	38.93	10.8
Renewable	0.84	1.1	1.60	1.3	9.2	2.5
Nuclear	0.69	0.9	2.23	1.9	15.11	4.2
TOTAL	**79.4**	**100**	**120.1**	**100**	**361.31**	**100**

Source: Ministry of Planning Development and Reforms, Government of Pakistan

Figure 4: Energy Demand projections by fuel in Pakistan

Bangladesh suffers from energy poverty, with one of the lowest per capita electricity consumption. Industrial use of power generation is bound to increase and heavy demand from this sector is expected.[59] Rapid industrialization and urbanization increase pressure on energy and water consumption, and this demand is set to triple by 2030. Climate change has further aggravated this issue by putting pressure on water resources, that are linked to both power and industrial use. A balance between water for human consumption and economic activities is warranted.[60]

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05

SECTION 3: COST-COMPETITIVENESS OF RENEWABLE ENERGY

The health and well-being risks with the current energy scenario in South Asia, moving away from fossil fuel-based power generation makes an important economic policy direction. Renewables, especially solar photovoltaic (PV), are 14% cheaper than coal-fired power in India, where costs have reached lower than that in Australia. By 2030, renewables will have a lowerLevelized Cost of Electricity (LCOE) than coal-fired power by around 17%.[61] Globally, new utility-scale renewable energy generation was cheaper than the lowest-cost fossil fuel-fired power.[62] The figure below illustrates the steep fall of solar photovoltaic cost in comparison to the other renewables.

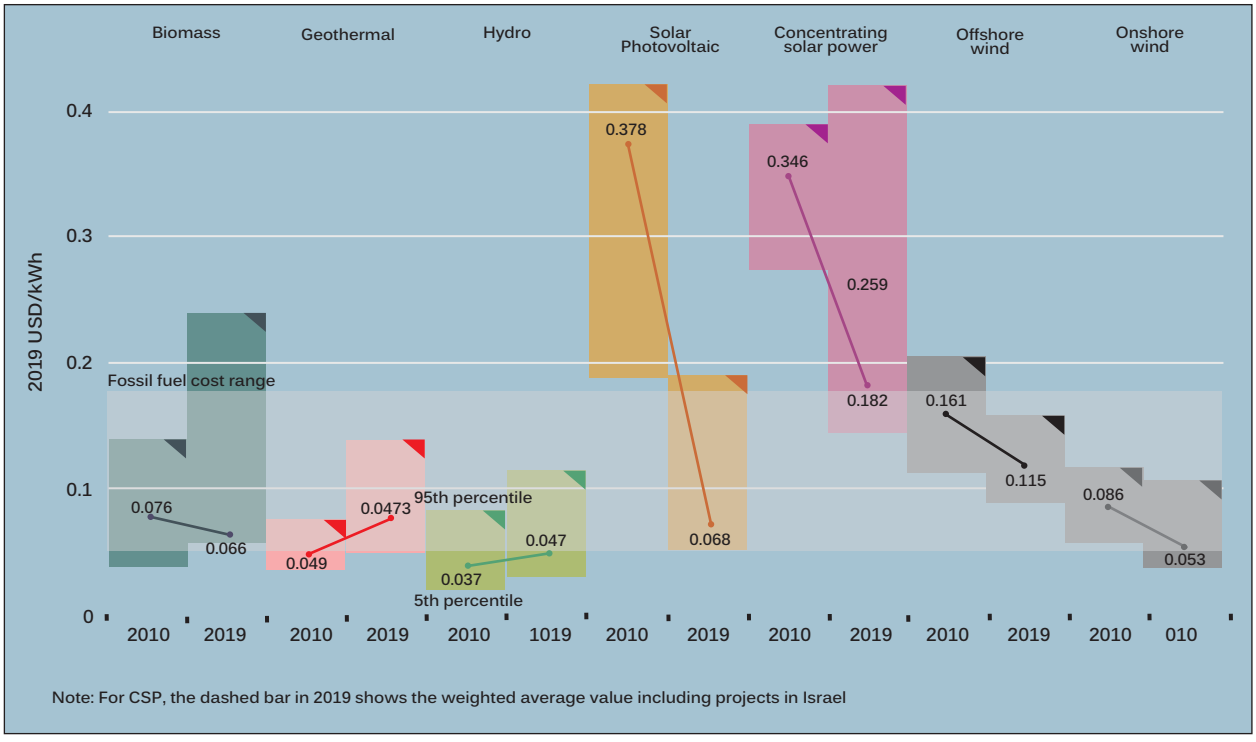

Figure: Source: IRENA Renewable Cost Database.

Within the past decade, an estimated 80% reduction in solar PV costs have allowed rapid development of utility-scale solar power in India. Around 36% of India's electricity comes from renewables (including large hydro) totaling 89 GW, while in Pakistan the mix is at around 31% (27% comes from hydro), which are significant. The (LCOE) was obtained at US$0.085 per kWh in India in 2018.[63] In Bangladesh, over 5 million Solar Home Systems have been distributed in off-grid areas. Programs such as 100% Renewable Energy for Bangladesh are aiming to transition the country towards a cleaner future [64] [Ref]. Currently, about 4% of Bangladesh's energy is supplied by renewables (excluding hydro). It is estimated that a 1.5°C pathway could save US$60 billion in fuel costs. Recently, the World Bank approved around $185 million for an incremental renewable energy capacity addition of 310 MW in Bangladesh, starting with a 50 MW utility-scale solar park in the Feni district.[65] Around 8% of Bangladesh's power generation came from off-grid solar, which goes to show the immense potential for solar power generation.[66]

Moreover, the international market has welcomed this clean transition, showcasing a positive attitude towards renewable portfolios. Although challenges exist, renewable energy has been dominated by private investments largely. In India, the IEA estimates a $3.1 trillion climate-friendly investment opportunity from 2018 to 2030, which includes $448 billion in renewable energy development.[67]

The Asian Development Bank (ADB) has committed $132 billion in energy investments in the Asia Pacific region, out of which $11 billion were in Bangladesh on 238 projects, $18 billion on 272 projects in Pakistan, and $26 billion on 378 energy projects in India.[68] A quarter of all committed ADB Private Sector Operations' transactions have been for clean energy as of 2019, with the total figure amounting to $346 million.[69]

Increasing interest in clean energy in the region has been witnessed with the creation of new funds and gap-filling.[70] Pakistan is aiming to increase its share of renewables to 30% by 2030, which will include wind, solar, geothermal, wave, tidal, and biomass energy, and where new investments are expected to come from private investors. International investments up to $15 billion are expected by 2030.[71] The country is also planning on building an incremental 8000 MW of renewable capacity and is looking at a potential $40 billion investment opportunity in the sector.[72] Another major investment line is the China Pakistan Economic Corridor (CPEC), where around $35 billion have been allocated for energy and power transmission infrastructure.[73]

Expanding energy access works best when it is part of a broader development plan. Beginning around 1980, both China and Thailand launched electricity programs that accompanied economy-wide reforms and managed to achieve universal electrification in two decades. In Vietnam, rural electrification formed part of the nationwide doi moi (renovation) reforms, which the government began in 1986. The measures included a gradual move from central planning to market mechanisms and an opening of the economy to trade and foreign investment, which laid a foundation on which the country's nascent energy sector could grow. Only later did the private sector begin participating. Likewise, Rwanda rolled out its energy-access efforts in 2009, it used what is called a "sector-wide approach" that pooled aid from various sources together in a single program. In just four years, the share of Rwanda's population with electricity roughly tripled. Vietnam and Rwanda, like China and Thailand, recognized that efforts to combat energy poverty must go beyond the needs of rural households and aim to create wealth across the entire economy.

Source: Morgan D. Brazilian (2015) Power to the Poor: Provide Energy to Fight Poverty. Foreign Affairs, Vol. 94(2) pp. 133-138

India saw around 9 GW of renewable capacity installed in 2019 and added another 1.5 GW in rooftop solar.[74] Investment of up to $500 billion is likely by 2028 for renewable energy capacity expansion in the country, where it is possible to witness more than 140 GW of installed capacity by 2022.[75] From 2014 to 2018, the renewable sector in India saw investments of up to $50 billion and is continuing to be one of the hotspots for clean energy investments.[76] India allows a 100% Foreign Direct Investment (FDI) through the Automatic Route and requires no prior Government approval.[77]

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06

SECTION 4: JUST TRANSITION

With climate change being the central driver of almost every government's energy policy, the world will inevitably move away from fossil fuels and towards low carbon technologies and allied activities. Stakeholders associated with the fossil fuel industry require support in transitioning towards green jobs. Rightly, the International Labour Organization (ILO) has appropriate mechanisms to administer programs in communities that would be affected by transitions in the energy mix.[78] The important consideration given to the nature of jobs is that these are categorized as "decent jobs". Also, the core areas that are identified for employment are renewable energy, waste management, green transport, and urban farming.[79]

Millions of poor all over the mineral tracts of Global South countries labor in a range of mineral extractive practices; some operations are small-scale, some are licensed, others evade tax payments and some have been traditionally carried out for generations in contrast to more recent establishments. Practices occur across the spectrum of mining, for miners use mercury for gold extraction, care little for the rehabilitation of denuded, deforested, and disturbed land, and have been at times marginalized and ostracized as reckless environmental and social criminals. Neither these people, nor their practices, have been at the forefront of debates on resource extraction, nor have they been interrogated in light of recent theoretical advancements in understanding the political economy of livelihood diversification and transformations of rural society.

Source: Kuntala Lahiri-Dutt, Between the Plough and the Pick: Informal, Artisanal and Small-Scale Mining in the Contemporary World.

Photograph by Shailendra Yashwant

With around 0.7 million Indians already employed in green jobs, it is estimated that around 24 million jobs could be created in associated activities such as recycling, repair, rent, and remanufacture, and ecosystem services such as air and water purification, soil renewal, and fertilization.[80]

Restructuring the coal mining sector through increased private investments may not fit well with the principles of just transition. While restructuring is essential in terms of improving work conditions and providing legal rights and benefits, it is important to consider long-term community impacts by putting human and environmental well-being ahead of economic objectives. Any activity that impinges on indigenous rights would not be just.[81]

The advantages of just transition cannot be stressed enough. Researchers and labor unions have long argued for such a transition, which would enhance support for vulnerable groups, create green jobs, render energy affordable by a larger section of the economy and reduce climate impacts on low- and middle-income populations. In South Asia, the aspect of such a transition would tackle not only the decarbonization of the economy but also improve accessibility to clean energy and services. There is an increased risk that privatization of energy and mining industries will remove the social aspects of power production, and render it an entirely economic game [Ref]. This will not only violate worker rights but also create further vulnerabilities in terms of desisting from social use of energy.

It is therefore not essential that these sectors are under the public ambit and have assigned social end-use, but also that a phase-out should factor in livelihood loss, wherein India, around one million livelihoods are interlinked with coal power.[82] The idea that achieving a new climate regime aligned with a 1.5°C warming scenario would create further inequalities in energy, cities, land-use, and water sectors, is a novel finding and when laid against the economic conditions in the Global South, it was shown to bear extreme importance. The term "Just Transition" has since taken on newer definitions including equity, fairness, and environmental justice.[83]

Just transition also means recognizing and mitigating the effects of decarbonization on other economic actors, such as small businesses that depend either directly or indirectly on carbon-intensive industries (UNFCCC 2016). Just transition also involves addressing the environmental legacies that mining and heavy industry often leave behind (Atteridge and Strambo 2020).[84] This means ensuring that the private sector does not simply transfer the environmental costs of contaminated lands and water to the public purse – or leave environmental damage unaddressed (Healy and Barry 2017; Just Transition Alliance 2018). Though low-carbon transitions are expected to create multiple economic opportunities and deliver a range of co-benefits, such as better air quality and energy security (Karlsson et al. 2020), However, these opportunities and the costs of the transition will not be distributed evenly between and within countries (Gambhir et al. 2018; Green and Gambhir 2019). A study by the International Labour Organization, for example, shows that while the low-carbon transition will lead to an increase in employment, new jobs will not necessarily emerge in regions where carbon-intensive jobs will be phased out (ILO 2018).

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07

SECTION 5: CALL TO ACTION FOR NON-PROLIFERATION OF FOSSIL FUELS

The IPCC special report on 1.5ºC creates a benchmark for emissions and emission trajectories that countries are required to follow, to maintain warming below 1.5 degrees.

The objective of the paper:
This position paper is aimed at building a case for a rapid transition away from fossil fuel use – through the lens of ill-effects vis-à-vis emissions, pollution, and human impacts; availability and viability of clean energy options; and the need for equity, fairness and social use of energy along-with tenets of environmental justice. The impact of the paper is to inform policymakers; to amplify this concurrent issue through other policy influencers, chiefly, ENGOs; and to initiate dialogue on the non-proliferation of fossil fuel.

Note: The aim of this paper is to guide the phase wise campaign and implementation that can lead to effective and accelerated reduction in dependency on fossil fuel reliance and expansion in South Asia in the next few years. This paper would be a living document and will be periodically updated by CANSA Secretariat based on the local situation and necessity.

We also believe that the accessibility of dependable data points publicly would also improve effectiveness of the impact of our work.

Some important issues and data points that the CANSA Secretariat would be keen to cover in the next periodic update of this paper are listed as follows:

1. More transport and industry GHG trends for India

2. Detailed breakdown of transport and industry GHG trends could be added - projections for Bangladesh.

3. Detailed breakdown of transport and industry GHG trends could be added – projections. could use updated information, preferably 2017 or later, where renewable trends actually picked up more than the first half of the decade. While many points in here have 2018 data, most of these are sources that have extrapolated from older available data points Graphic on correlation between fossil fuel use and health impacts will add gravitas to the argument for Pakistan.

4. Data on grid parity, reliability of grid with RE could be added to strengthen position.

5. Circulate ideas on de-risking as well. There are several initiatives to de-risk renewable investments that could be added to strengthen argument.

6. More info on how to administer green jobs training, which institutes should be involved, impacts in both urban and rural context could be studied further and added.

Climate Action Network – South Asia (CANSA) is a coalition of over 300 organisations spread across all South Asian countries. We promote equity and sustainable development through effective climate change policies and their implementation in South Asia and at the global level.

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The **Fossil Fuel Non-Proliferation Treaty** Initiative is a civil society campaign for a global Treaty that aims "to prevent catastrophic climate change by putting an end to any further expansion of oil, gas and coal production; phase out existing fossil fuel production in a manner that is fair and equitable and invest heavily in the global transition to renewable energy.

March 2021