



**Policy Brief # PB-45-2017**  
January 24, 2018

**Coal and Climate Change**



## Coal and climate change

### Key messages

- ↘ **Reduction in the use of coal is one of the major issues to be tackled with by the world community, if it is to realize the spirit of the Paris Climate Agreement. Developed countries are moving away from dirty technologies and reducing their dependence on coal. Currently South Asian countries are following the opposite trend. They shied away from making ambitious pledges on reducing their GHGs in the Climate Summit in Paris.**
- ↘ **International commitments relating to climate should be incorporated in the installation of energy producing projects.**
- ↘ **Developing countries need heavy domestic investment and international funding to make their coal plants smarter and increase the share of their renewable energy to the ideal 20% mark. Only India would require US\$200 billion from 2015-2030. Development of regional linkages at the policy making levels is needed to devise common strategies for low carbon growth in South Asia.**

### Introduction

Nearly 200 nations of the world, including South Asian countries pledged during the Conference of Parties (COP 21) organized in Paris in 2015, to reduce their Greenhouse Gas (GHG) emissions, so as to keep the global temperature rise to 2 °C from the pre-industrial levels. However, there are strong hiccoughs on the way to achieve this end.

Coal is among the major and cheapest sources of energy. Despite the promotion of renewable technologies and their reducing cost, its use for electricity production is still on the rise. Coal is abundantly available throughout the world. Production of a kilowatt (kWh) of power from coal on an average costs 3.1 cents, compared to 5.8 cents/kWh from fuel oil and 4.9 cents/ Kwh from natural gas.

Coal-fired plants provide over 40 percent of the global electricity supply. At the same time, these plants account for over 28 percent of global carbon dioxide emissions. Coal-fired power plants will release 500 billion tonnes of carbon dioxide by 2050; accounting for half of the global carbon budget that ensures that the Earth remains within the 2 °C limit.

Though environmentalists severely criticize the use of coal, it is the policymakers' instant choice to meet energy demands all over the world, especially in the context of its role in poverty alleviation. Most of the poverty reduction in the last three decades came through explosive growth in China, mainly fired by coal (80%), resulting in poverty reduction from 84% in 1981 to 5% in 2014. India and its neighbouring countries have started adhering to the principle of Climate Justice and are following the Chinese economic model of growth to reduce their energy deprivation and to meet the pressing needs of their growing economies and population. It is estimated that energy shortages cause losses of up to \$65 billion annually to India and about 2% of Gross Domestic Product (GDP) to Pakistan.

Many countries of South Asia shied away from making ambitious pledges on

reducing their GHGs in the Climate Summit in Paris. India pledged to reduce its carbon emissions from 35% to 30% by 2030, mainly through developing renewable energy technologies, research and development (R&D) in coal gasification, enhancing electricity storage, tapping solar energy and seeking private investment. Currently, India is producing 33 gigawatt (GW) of power through renewable sources, which it vows to increase to 175 GW by 2022. India would also increase its forest cover to absorb an additional 2.5 to three billion tonnes of carbon emissions. At the same time, it is likely to exceed the United States in net coal consumption by 2020, as it is a highly energy deprived country in terms of provision of electricity to its 1.2 billion population and a rapidly growing economy. While the United States and China made landmark agreements to cap their respective GHG emissions, India has stayed away from any binding agreements. However, it

became part of the International Solar Alliance of 100 nations during COP 21, which would share solar technology and innovation and invest in expanding solar power across emerging markets. Pakistan's pledges were not considered significant, while Bangladesh made its commitments conditional to international facilitation.

## Methodology

The Shahid Burki Institute of Public Policy in association with LEAD Pakistan, the Urban Unit, the Institute of South Asian Studies and National University of Singapore invited leading experts from India, Bangladesh, Pakistan and other countries to a workshop titled 'Expanding Regional Linkages in South Asia' in Lahore from 7th to 9th March 2016.

The workshop aimed at developing regional linkages at the policy making levels to devise common strategies for low carbon growth in South Asia by learning from the experiences of policy makers and researchers at the regional and international levels. Researchers and policy makers presented their research, experiences and findings on public policies in South Asia during the workshop.

## Findings

1. Developed countries are moving away from dirty technologies and reducing their dependence on coal. China has agreed to peak its emissions by 2030 and cap annual coal consumption through 2020. It has already begun upgrading existing coal plants. The United States on the other hand has committed to reducing GHG emissions of 2005 levels by 26% by 2025. President Barack Obama announced 'clean power plan' in August 2015, which requires the country's power plants to cut carbon dioxide emissions to 32 percent below 2005 level, by 2030.

put pressure on its already scarce water resources and high levels of air pollution in major cities.

China is set to invest about two billion USD in coal-fired power projects in Pakistan. Several UK, UAE and Czech-based companies are also interested in making similar investments in the country. Bangladesh and Sri Lanka are also trying to head in the same direction. However, these are meeting much political resistance. Currently, 75% of Bangladesh's power generation is from natural gas. Bangladesh has only one coal mine, which is in the development stage. However, several investors have pulled out, most recently Norway, from its first major coal-fired power project near Sundarbans (a 1,320 MW plant in Rampur), citing environmental concerns and public dissent. Sri Lanka has only two coal power stations. However, no coal power stations have been further commissioned due to several accidents in the Norochcholai power station. Currently over half of the country's power generation is from imported oil and natural gas.

3. There is ample evidence of coal having fueled economic growth and poverty reduction. However, this development comes with a heavy price in the form of environmental degradation and an increase in related expenditure. China, India and Pakistan are already experiencing air pollution, resulting in severe health hazards and loss of economic output in major cities like Beijing, Delhi and Karachi.

4. The international community is lean on lending support to developing countries in terms of technology and finance transfer, to facilitate these countries in meeting their energy needs and ensuring that the climate justice prevails.

**Table 1: Use of coal for power generation (%)**

| Year | India | Pakistan | Bangladesh | Sri Lanka |
|------|-------|----------|------------|-----------|
| 1980 | 51    | 0.2      | 0.0        | 0.0       |
| 1990 | 65.5  | 0.1      | 0.0        | 0.0       |
| 2000 | 68.5  | 0.4      | 0.0        | 0.0       |
| 2005 | 66.9  | 0.1      | 0.6        | 0.0       |
| 2011 | 66.8  | 0.1      | 1.8        | 8.9       |
| 2012 | 71.1  | 0.1      | 1.8        | 11.8      |

2. Currently, South Asian countries are following the opposite trend. India is a major producer and consumer of coal for electricity generation. In 2012, coal consumption in South Asia was about 685 million tonnes, of which 98% was consumed in India. Other countries in the region, including Pakistan, though having significant coal reserves, are modest consumers of coal. The government of Pakistan approved at least 10 coal fired electricity generation plants to overcome its electricity shortfall of 6,000 megawatts (MW). However, the decision is likely to

## Recommendations

1. Pakistan and other countries of the region should proceed with care while opting for coal technologies, as this decision exerts tremendous pressure on water resources and other environmental sectors. Cleaner coal technologies are available, which remove soot and polluting gases. Energy efficient plants should be developed, since these not only consume less coal, but have lesser carbon emission.

2. The local environmental standards such as NEQS in Pakistan

- should be strictly implemented in the installation and operation of coal fired plants, besides taking care of the environmental quality of the area, such as agricultural sector.
- 3. The disposal of batteries and silica should be dealt with care, as these pose major hazard to the environment.
- 4. The benefit of generating interest of the international renewable companies for local investment and reducing prices of solar technologies should be seriously evaluated.
- 5. Local investment should be mobilized and local capacity should be developed to benefit from climate finance windows for increasing share in the renewable energy mix to an adequate level.
- 6. Learn from best regional and global practices. For example, Bhutan and Maldives significantly rely on renewable energy resources to reduce poverty and fuel growth. Internationally, Germany has set the target of 45% share in the energy mix by 2030. Other European countries

have also made ambitious wish lists and have begun making successful progress in achieving the targets.

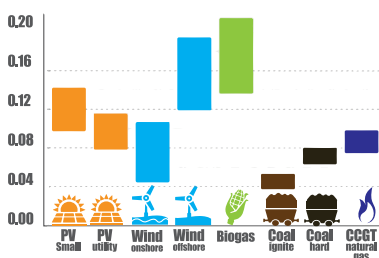
7. Present a strong case for seeking international assistance in developing alternative and cleaner technologies to overcome energy deprivation of the region and achieve the growth objectives.

8. Conduct country level cost benefit analysis of shifting to renewable energy from fossils to develop a strong rationale for the consumers. For example, Germany has estimated that it accrued the economic benefit of more than 9 billion euros (\$12.7 billion) in 2006 from renewable energy, including fuel-import savings of 0.9 billion euro (\$1.27 billion), avoided environmental and health damages worth 3.4 billion euro (\$4.8 billion), and a decline in wholesale electricity prices amounting to 5 billion euro (\$7 billion)<sup>(1)</sup>.

**SOUTH ASIA RELIANCE ON COAL & GLOBAL CONCERNS ABOUT CLIMATE CHANGE**

- It was the Industrial Revolution (United States) in the 1800s that played a major role in bringing about the extensive use of coal.
- Coal replaced charcoal as the primary fuel for iron blast furnaces to make steel and with steamships and steam-powered railroad becoming the chief mode of transportation, coal also started being used to fuel the boilers.
- Today, 75% of the coal mined in the world is used for generating electric power.
- This increase in coal consumption throughout the world has primarily been due to greater need for electricity generation in China, India and other non-OECD countries which have seen total power generation from coal double since 2000. According to IEA, coal demand will reach 9 billion tonnes by 2019, compared to 5.4 billion tonnes in 2013.
- Coal is the cheapest source of energy; cheaper than oil, natural gas, nuclear or hydro energy.
- On average, it costs 3.1 cents to produce a kWh of power from coal compared to 5.8 cents/kWh from fuel oil and 4.9 cents/kWh from natural gas.

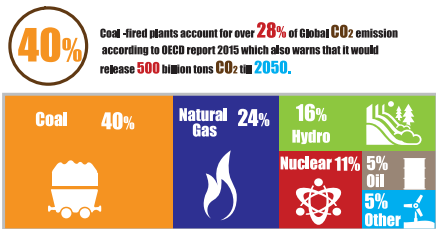
**LEVELIZED COST OF ENERGY PRODUCTION(C/KWH)**



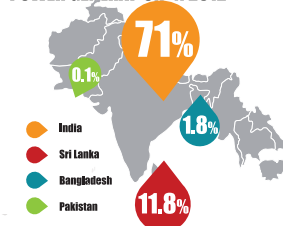
**COAL RESERVOIRS IN SOUTH ASIA**



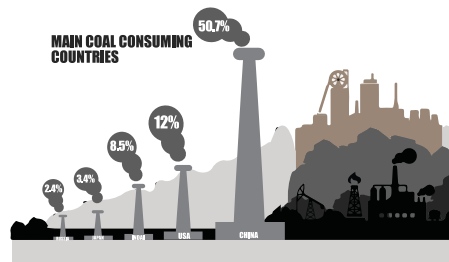
**SOURCE OF POWER GENERATION IN THE WORLD**



**SOUTH ASIA USE OF COAL FOR POWER GENERATION IN 2012**



**MAIN COAL CONSUMING COUNTRIES**



**COAL & SOUTH ASIA**

- Today, India Is One of the World's Top Coal Producer and Consumer.
- India Has the Fifth Largest Coal Reserves in the World (After United States, Russia, China and Australia) Estimated at 60 Billion Tonnes.
- In 2012, Coal Consumption in South Asia Was About 685 Million Tonnes, Of Which 98% Was Consumed in India.
- According to The 2012 Pakistan Energy Yearbook, currently 31% Of Pakistan's Energy Is Generated by Oil, 50% By Gas and Only 6.6% By Coal, In Spite of Coal Reserves of About 185 Billion Tonnes (Idea); Making It The 7th Largest Coal Reserve in The World.
- India's Energy Demand Has Quadrupled Since 1980. India's Energy Consumption in 2012 (Roughly Equal to China's Energy Consumption in 1990) Was 870 Tw. Of This, 609 Tw Was from Coal (70%)
- Coal Contributes Roughly 1.5% To The Gap and Job Opportunity to Millions of People.

**GHG & CLIMATE JUSTICE**

- Top GHG Emitters in 2012 Were China (24%), USA (6%) And European Union (9%) and India (6%).
- Coal-Fired Plants Provide Over 40 Percent of Global Electricity Supply. At The Same Time, These Plants Account for Over 28 Percent of Global Carbon Dioxide Emissions.
- India's Per Capita Carbon Emissions Were 1.7 Metric Tonnes in 2010 Compared to The Global Average of 5 And Its Historical Cumulative Emission Is Below 3%.
- Similarly, Although India's One of the Largest Emitter of Greenhouse Gases (GHs), On A Per Capita Basis, It's Much Lower in World Rankings at 140.

**COP21 PARIS SUMMIT**

- Us\$100 Billion A Year Support Would Be Mobilized by Developed Countries to Developing Countries to Shift to Cleaner Fuels
- This Agreement Would Have to Be Signed Between 22nd April 2016 And 21st April 2017 And Would Become Legally Binding If Joined by at Least 55 Countries Which Represent 55% Of Global Greenhouse Emissions

## References

1. <http://www.worldwatch.org/node/5430>.

## About this publication

This policy brief shares research and experiences of the leading experts and policy makers from India, Bangladesh, Pakistan, on coal and climate change, who participated in the Workshop on ‘Expanding Regional Linkages in South Asia’ in Lahore, Pakistan in March 2016.

Coal is among the major and cheapest sources of energy. Despite promotion of renewable technologies and their reducing cost, its use for electricity production is still on the rise.

Coal-fired plants provide over 40 percent of global electricity supply. At the same time, these plants account for over 28 percent of global carbon dioxide emissions. Though, environmentalists severely criticize the use of coal, it is policymakers’ instant choice to meet energy demands all over the world, especially in the context of its role in poverty alleviation.

The developed countries are reducing their dependence on coal. Currently, the South Asian countries are following the opposite trend. And this policy brief discusses much more about the nexus between Coal and Climate Change, responding to and prospects of ‘Expanding Regional Linkages in South Asia’ in this context.

## About LEAD Pakistan

LEAD, or Leadership for Environment and Development, is a think tank with a focus on policy relevant research. In this connection, LEAD launched three special initiatives in 2015: Pakistan 2047; Knowledge Hub on SDGs; and Sustainable Cities. These are the strategic steps with an ambitious agenda and are aimed at shaping the development framework of the government of Pakistan in line with the global trends and requirements.

LEAD has been pursuing an ambitious research agenda (policy as well as action research) regarding various dimensions of climate change, environment, water, governance, health, education and other thematic areas relevant to its programmes. In addition to the demand driven research, we generate knowledge products, including case studies from all our project interventions to adduce evidence for contributing to the larger development discourse.

With a history of successful delivery of more than 180 development initiatives, we look forward to producing greater developmental impact through sophistication in design and implementation of projects and interventions.

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## Acknowledgement

LEAD Pakistan acknowledges Shahid Burki Institute of Public Policy for inviting leading experts from India, Bangladesh, Pakistan and other countries to workshop on ‘Expanding Regional Linkages in South Asia’ in Lahore, in association with LEAD Pakistan, the Urban Unit, Institute of South Asian Studies and National University of Singapore. This valued support will contribute to developing regional linkages at the policy making level, by exploring common strategies for low carbon growth in the South Asian countries by developing synergies and cooperation to explore possibilities of reduction in the use of coal.

**Writer :** Muhammad Arshed Rafiq

**Editors :** Khawar Shahzad, Abbas Hussain

**Designers :** Irfan-Ul-Haq, Abbas Mushtaq

**Published :** May 2016

**Produced by :** Learning and Knowledge Management

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## Contact us

LEAD Pakistan, LEAD House, F-7 Markaz, Islamabad - Pakistan  
 T: +92 (051) 2651511  
 F: +92 (051) 2651512  
 E: [main@lead.org.pk](mailto:main@lead.org.pk)  
 W: [www.lead.org.pk](http://www.lead.org.pk)