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Sustainable Development through Access to Affordable and Clean Energy: A Study of SAARC Countries

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Abstract

Climate change and impact on the environment has been a major concern of countries across the world. The Sustainable Development Goal seven focuses mainly on affordable, clean energy so that the negative impact on environment and climate change problems can be tackled to a great extent. This article tries to investigate the progress made by the SAARC countries in achieving the sustainable development goal with respect to clean, reliable and affordable energy access using selected variables. The time period selected has been from 2015 to 2020-21.The present study has found out that even though the percentage share of energy generation from renewables across countries has been increasing at a moderate pace, still the major share of the energy generation of all these countries comes from the non-renewables which emit greenhouse gases contributing to climate change and environmental problems. Hence countries should enter into collaboration and partnerships through which innovations in green technology can take place and people can have access to affordable clean energy.

Keywords: SDGs (Sustainable development goals), Climate change, Greenhouse gases, Fossil fuels, Renewable Source, Non-renewable Source, SAARC

Introduction

The interest of countries across the world in their attempt to achieve higher growth were colliding with the environment causing huge environmental risk of remarkable magnitude. The quest towards unprecedented and unsustainable growth pursued by countries without conserving the environment, resulted in environmental footprints, affecting human beings as well as the ecosystem. Taking into account the gravity of the problem, the Brundtland Commission was constituted and their report came up with the concept and idea of Sustainable Development which was adopted as a shared global concept in the Earth Summit of 1992 (https://thesustainablemag.com). Seventeen Sustainable Development Goals were adopted at the UN Sustainable Development Summit in New York in September 2015, after several discussions and follow ups. By adopting and following the Sustainable Development Goals, the countries across the world have been showcasing a strong moral obligation to implement these goals and address a wide range of issues at global level. The countries in their attempt towards achieving these SDGs are in other words, declaring themselves as accountable to the people and the ecosystem.

Rationale behind the study

Growth with development is always one of the priority goals of countries, irrespective of whether developed, developing or least developed. The objective towards achieving higher growth by countries happens at a cost to the environment in the form of greenhouse gas emissions leading to climate change which has its ensuing impact not only on the present generation but also on the future generations. Hence countries while pursuing any developmental activity should adopt a sustainability approach which takes into consideration, protecting the interest of human beings and the entire ecosystem.

Countries have formed various groups or blocs are divided into several groups to promote amicable relations, trade and economic relations as well as to strengthen political relations among member countries. The South Asian Association for Regional Cooperation (SAARC) is an intergovernmental arrangement of eight countries in South Asia, formed with the purpose of promoting economic development and regional cooperation and integration. Since the SAARC states together constitute around 3% of the world's area and account for 21% of the world's total population as of 2019 (https://data.worldbank.org), it becomes significant to study about sustainable development with special reference to SAARC countries.

Problem

The progress of countries towards the growth process has left a negative impact on the environment in the form of extreme climate changes resulting from the emission of Greenhouse Gases (https://www.un.org/sustainabledevelopment). Studies show that carbon dioxide forms 74% of greenhouse gas emissions and 92% of the CO2 emissions are from fossil fuels, especially for generation of electricity and heat, transportation, manufacturing and consumption (https://www.wri.org/insights/4-charts). Among the various sectors, the energy sector contributes to 76 % of greenhouse gas emissions worldwide followed by agriculture and allied sectors 11.6 % and industrial processes etc. (Mengpin Ge, Friedrich and Vigna, 2020). These emissions are causing extreme climatic situations making it difficult for the living beings to survive on earth.

The present study is an attempt to understand how much the SAARC countries are preparing for dealing with such problems and the extent to which they have taken proactive measures in this regard. The study period has been considered from 2015 to 2021. 2015 being the year from which the UN has initiated the 17 Sustainable Development Goals in continuity with the end of Millennium Development Goals. Thus, this study aims to analyze the progress of SDGs among the South Asian countries with reference to goal 7 which concentrates on access to clean, affordable energy.

Objectives of the study

1. To understand the energy scenario with respect to selected indicators in South Asian countries.

2. To identify the share of population having access to clean energy in SAARC countries.

3. To analyze whether the countries are able to fulfil the clean energy goal and suggest measures to achieve the same.

Data Source and Methodology

The study has used secondary sources of data from both print and online sources. Data from Climate watch, International Energy Agency, United Nations, World Bank etc. has been used. The study has used simple percentages to analyze the data and arrive at the conclusion.

The present study is an attempt to understand the response of SAARC countries towards fulfilling the seventh sustainable development goal which stresses on achieving clean, affordable and reliable energy. For this, the study looks into the population who have access to clean cooking fuel and technology. At the same time, the study also takes into account populations having access to electricity as well as primary energy generation by sources so that it can indirectly give us an idea as to whether the countries are adopting a sustainable development approach with respect to energy generation.. The study has specifically taken into account the energy sector as it has been one of the major contributors of greenhouse gas emissions.

Background of the study

The importance of reliable and affordable energy to the development of a country as well as human beings is immense. A well-developed energy system contributes to the development of various sectors ranging from agriculture, industry and service. Inadequate and unaffordable energy systems act as a constraint and obstacle to the development of human beings as well as the economy as a whole. Not only affordable but sustainable clean energy is the need of the hour.

Since several decades, fossil fuels like coal, petroleum products etc. have been used as the major source of energy and electricity production. But at the same time burning carbon fuels can lead to large amounts of greenhouse gas emissions causing climate change and having harmful impacts on people's well-being and the environment. Such energy sources are non-renewable in nature and can impact electricity production in the long run impacting the world economies adversely.

Various countries ranging from developed to less developed countries have to face the repercussions arising from climate change, one among the several reasons being the use of non-renewable sources of energy leading to the depletion of the environment and adversely affecting life on earth. The need arises to reduce the dependency on fossil fuels and switch to the use of affordable, renewable sources of energy which doesn't harm the environment and the life on earth.

Primary Energy Generation

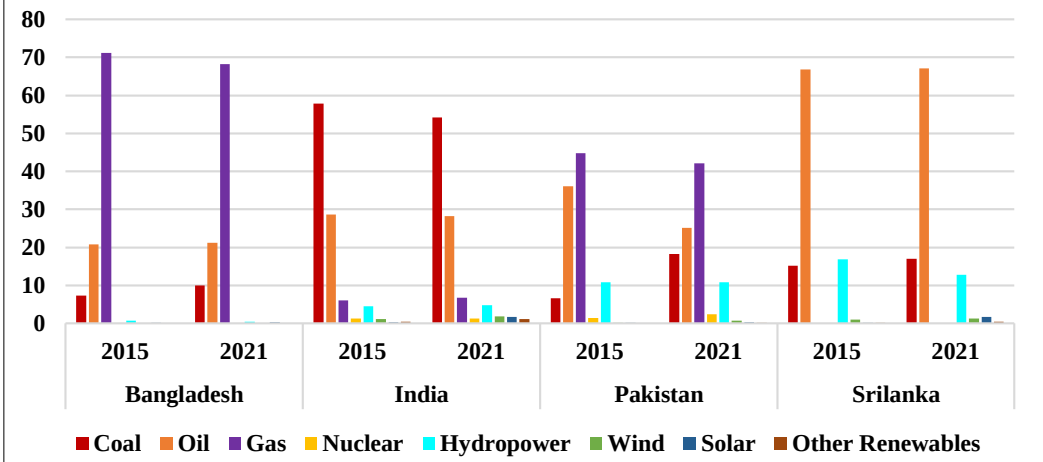
Energy can be divided into primary and secondary energy. Primary energy' refers to the energy in its unprocessed form. In other words these are the inputs which help to generate secondary energy like electricity by burning or through conversion methods. Primary energy sources are classified as renewables or non-renewables. Fossil fuels like coal, oil and gas are non-renewable in nature whereas hydro, wind, solar and wave power are usually treated as renewable. Since fossil fuels like coal, oil and gas form the largest contributor to global climate change, accounting for over 75 percent of global greenhouse gas emissions and nearly 90 percent of all carbon dioxide emissions (https://www.un.org/en/climatechange), it will be important to look into the primary energy generation by sources in SAARC Countries.

Table: 1 Primary energy generation by sources in selected SAARC Countries during 2015 and 2021 (in %)

	Bangladesh		India		Pakistan		Sri Lanka	
Energy Sources	2015	2021	2015	2021	2015	2021	2015	2021
Coal	7.3	9.9	**57.9**	**54.2**	6.7	18.2	15.1	16.9
Oil	20.8	21.3	28.7	28.3	36.0	25.1	**66.9**	**67.1**
Gas	**71.1**	**68.2**	6.0	6.8	**44.8**	**42.2**	0	0
Nuclear	0	0	1.3	1.3	1.4	2.5	0	0
Hydro	0.7	0.4	4.5	4.8	10.8	10.8	16.9	12.7
Wind	<0.01	<0.01	1.1	1.8	0.2	0.7	1.0	1.2
Solar	0.15	0.23	0.22	1.73	0.13	0.32	0.14	1.66
Other Renewables	<0.01	<0.01	0.4	1.2	<0.01	0.2	0.1	0.4
Total	100	100	100	100	100	100	100	100

Source: Our World in Data based on BP Statistical Review of World Energy (2022)

Figure: 1 Primary energy generation by sources in selected SAARC Countries during 2015 and 2021 (in %)



Source: Our World in Data based on BP Statistical Review of World Energy (2022)

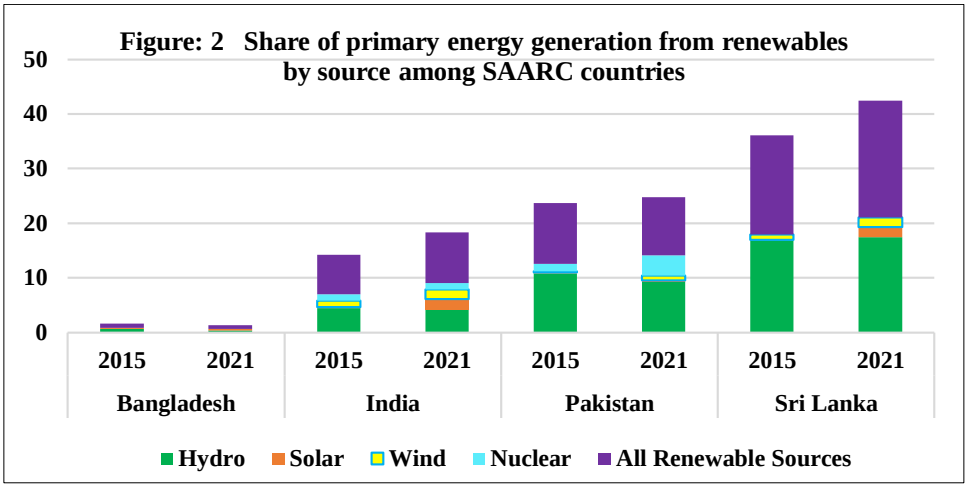
The above data clearly shows the breakdown of primary energy by sources across SAARC countries, major share of primary generation comes from fossil fuels like coal, oil and natural gas which contribute to the greenhouse gas emissions resulting in climate change and carbon footprints. Globally almost 85 percent of primary energy generation is from non-renewable sources which causes carbon emissions causing climate change. The Intergovernmental Panel on Climate Change (IPCC) of the United Nations clearly says that countries should reduce their dependence on fossil fuels and should shift towards low- carbon sources of energy like renewable sources.

The figure also indicates that in 2021 all the SAARC countries have increased their share of primary energy generation from renewable sources compared to 2015. However this increase is happening at a slow pace. One of the reasons can be the lack of efficient low cost technology and increased cost of generating energy from these renewable sources. Poorer countries are largely affected as they don't have the affordable technology to make use of their abundant renewable energy sources. Slow pace of shifting to greener energy sources cannot deal with the climate change problem as energy consumption is not stagnant, but rather, its demand has been increasing at a faster rate.

For dealing with climate change, countries irrespective of developed, developing and least developed should start replacing fossil fuels with greener sources of energy at a faster pace. Even though de-carbonization is happening through the increased use of renewable sources of energy, it is not fast enough to meet the increasing consumption of energy which is outgrowing the usage of renewables. Countries need to give importance not only to the increased use of renewable sources of energy to meet the new energy demands but also should start displacing existing fossil fuels in the energy mix at a faster rate.

Primary Energy Generation from Renewables

Dependency on fossil fuels results in emission of greenhouse gases polluting and harming the environment, having its repercussions in the form of global warming, extreme climatic conditions and climate change. Primary energy generation from renewable sources is sustainable and doesn't harm the environment through the emission of harmful gases causing climate change. Hence it becomes important to understand the share of primary energy generated from renewable sources which is shown in Figure 2.

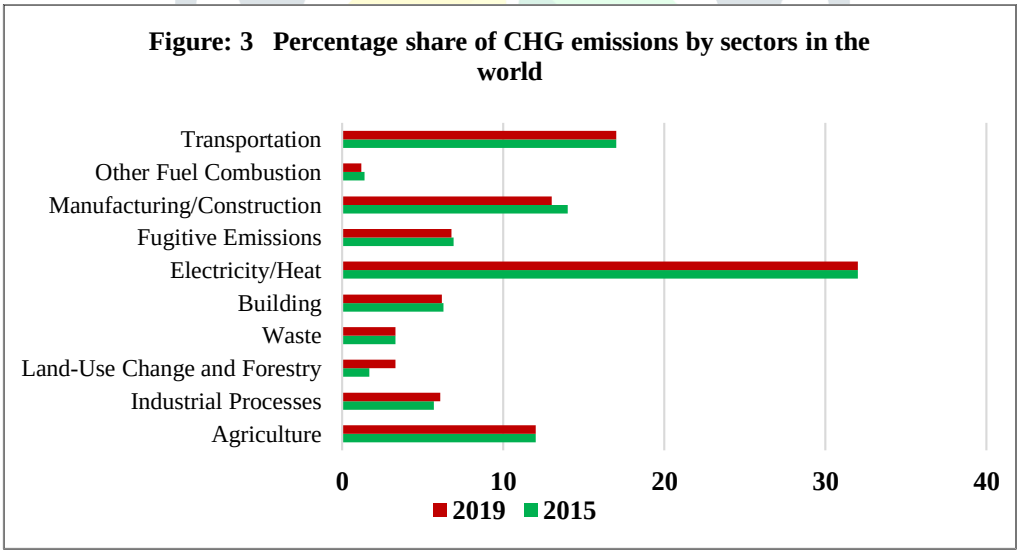


Source: Our World in Data based on BP Statistical Review of World Energy (2022)

Among the selected SAARC countries, Sri Lanka has the largest share of primary energy generation from renewables followed by Pakistan and India. If we have a breakup of the renewable sources, it clearly shows that individual SAARC countries resort to Hydro power as a major source of renewable energy. Percentage share of primary energy generated from other renewable sources like solar, wind and nuclear form less than 2 to 3 percentage points. Efforts should be made by each of the SAARC countries to encourage and promote generation of energy from low carbon renewable sources. This can be achieved by developing new techniques and technologies which are accessible and cost effective in generating energy from these sources.

Sector-wise Greenhouse Gas Emissions

Sector wise GHG emissions will give us a clearer idea as to the share of each sector towards climate change. The following figure clearly shows that electricity and heat contribute to the highest share of emissions in the world followed by transportation and then by Manufacturing and construction sector. See Figure 3.

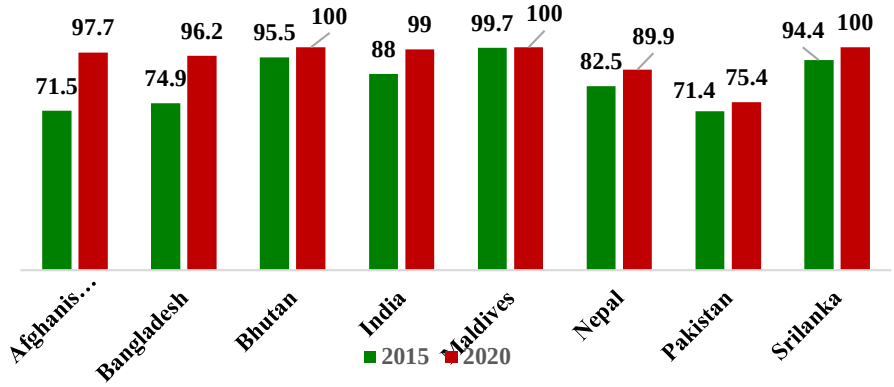


Source: Climate watch data and IEA

Access to Electricity

"Electricity is a secondary energy source which is produced from the conversion of primary sources of energy, like coal, natural gas, oil, nuclear power and other natural sources…"(Energy Information Administration , 2006). Even though electricity is a clean and relatively safe form of energy, the generation and transmission of it affects the environment. Since electricity contributes to the largest share of carbon emissions in the world (https://data.worldbank.org), the percentage of population having access to electricity indirectly gives us some idea as to the share of population contributing to GHG emissions through the use of electricity.

Figure: 4 Percentage of population having access to electricity



Source: https://www.climatewatchdata.org/

Figure 4 clearly points out to the fact that more than 95 percent of the population in SAARC countries will have access to electricity in 2020, the exceptions being Nepal and Pakistan. Almost 75 percent of the population in Pakistan has access to electricity, which is the lowest among SAARC countries followed by Nepal at 90 percent. Pakistan has a long way to go. But at the same time irrespective of access to electricity, countries should divert to non-renewable sources to generate electricity so that the GHG emissions and climate change problems can be dealt with to a certain extent.

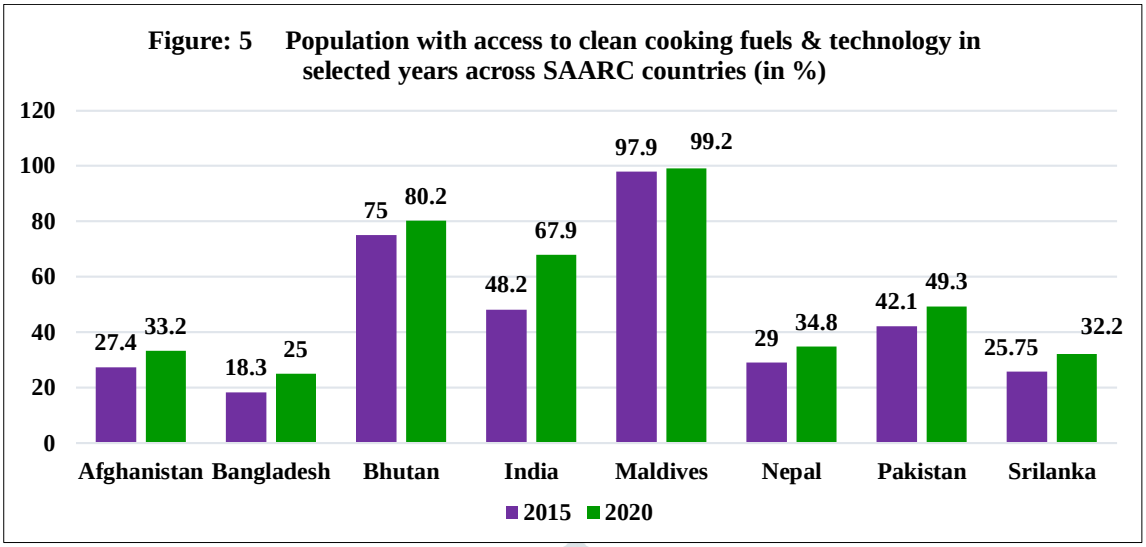
Demand for Clean Energy

Energy and environmental problems are closely related, since it is nearly impossible to produce, transport, or consume energy without significant environmental impact causing air pollution, climate change, water pollution, thermal pollution, and solid waste disposal. The emission of air pollutants from fossil fuel combustion is one of the major causes of air pollution. Hence care and proper measures should be taken by the countries to control the emissions by restricting the dependency on fossil fuels for energy generation so that environmental problems and climate change problems can be addressed to some extent.

Low carbon sources of energy like hydro, solar, wind etc. which are in abundance in SAARC countries should be used effectively to generate green energy through appropriate technology and should diffuse these techniques among the member countries. The government by entering into partnership with other countries or through public private partnership can carry out research and development in which cost effective techniques can be developed to generate secondary energy which will eventually help in reducing the dependency on fossil fuels and instead generate energy from carbon free sources restricting the extreme climate variations affecting the world.

Access to Clean fuels and Cooking Technology

Climate change problems had a vast impact on the lives of human beings as well as the ecosystem globally. Countries to achieve growth had been using techniques of production emitting greenhouse gases depleting the environment and causing global warming. Various sectors including the primary, secondary and tertiary sectors play an important role in this. In their endeavor to achieve growth, countries resort to various production techniques which impact the environment adversely.



Source: Climate watch & our world in data

Figure 5 clearly indicates that 99 percent of the population in Maldives have access to clean fuels and technology which shows that the response of the country with respect to this specific variable is promising. But at the same time in its objective to achieve the seventh SDG, countries instead of concentrating on only one variable should try to achieve its rather than concentration on specific variables alone, the SAARC countries should be committed towards fulfilling the seventh goal by giving importance not only to a specific variable but to different variables taken together and then only they will be able to achieve overall progress towards achieving Sustainable development altogether. See Table 2.

Table: 2 Commitment of SAARC countries towards achieving clean energy goal

Country	PWAE (%)	PACF &T (%).	CO2EFCPTEO (MtCO2/ TWh)	SRETES (%)	Affordable and Clean Energy	
Afghanistan	97.7	33.2	8.9	NA	↗	Challenges remain (MI)
Bangladesh	92.2	25	1.2	18.3	↗	Challenges remain, (MI)
Bhutan	100	80.2	0.1	NA	↑	SDG achievement on track
India	97.8	67.9	1.7	23.1	↗	Challenges remain, (MI)
Maldives	97.7	99.2	8.9	NA	↗	Challenges remain, (MI)
Nepal	89.9	34.8	3.2	NA	→	Stagnating/ Significant CR
Pakistan	73.9	49.3	1.9	35.7	→	Stagnating/ Significant CR
Sri Lanka	100	32.2	1.5	43.1	↗	Challenges remain, (MI)

Source: Sachs et al. (2022) & Climate watch

PWAE - Population with access to electricity
PACF &T - Population with access to clean fuels & techniques
CO2EFCPTEO - CO2 emission from fuel combustion per total electricity output
SRETES - Share of renewable energy in total energy supply
MI- Moderately Increasing
CR- Challenges Remain

Bhutan is on the track towards achieving the seventh goal whereas Nepal and Pakistan has a long way to go to achieve clean, affordable and reliable energy. The rest of the SAARC countries are still facing challenges but moderately increasing and moving towards the path.

Conclusion and Suggestions

SAARC countries in order to achieve the seventh goal of affordable, reliable clean energy should make use of their rich renewable sources like hydro, solar, wind etc. to their full potential. For this the countries should formulate policy measures of improved cooperation in research and development as well as greater private public participation by establishing partnerships and collaborations in various fields of carbon free green technology. Corporate sector can lend a supportive hand by green technological invention which reduces and restricts the carbon footprints on the environment. The government should provide subsidies for green technology innovations. Incentives should be given to those who use such environment protective technology which restricts the carbon emissions.

To accelerate the generation of electricity and energy from solar and wind power, electric transportation facilities, solar power panels, wind mills etc. should be nurtured with the right support at the right time through promoting investments in complementary technologies. All countries irrespective of region-wise division should devise and streamline proper climate strategies known as Nationally Determined Contributions to reduce carbon footprint and ecological imbalances. Such strategies should be well planned long term ones to reduce carbon emissions with the objective to achieve zero emissions and a world with affordable, accessible, reliable carbon free energy.

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