

## **POLICY BRIEF**

### **CPEC Contribution in Greenhouse Gas (GHG) Inventory of Pakistan**

By

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China-Pakistan Economic Corridor (CPEC) is an ongoing mega development project which aims to connect Gwadar port of Pakistan to China's northwestern region of Xinjiang via a network of highways, railways and pipelines. The economic corridor is considered central to China-Pakistan relations and is stretched over 2700 km from Gwadar to Kashghar. Overall, the entire project is expected to be completed in fifteen years through three different phases, i.e. from 2015-2020, 2020-2025 and 2025-2030, respectively.

CPEC and its connectivity with Central Asia, Middle East and Africa is expected to reshape the entire region. The Corridor is an extension of China's proposed 21<sup>st</sup> century Silk Road Initiative or Belt and Road Initiative (BRI). The corridor is expected to be a strategic game changer for the region that aims to make Pakistan an economically viable and business-friendly country. Investments under CPEC in the power generation and distribution sectors will provide a momentous boost to the economy. Several large-scale investments in infrastructure, energy and industrial growth projects are currently in-progress, which are expected to further fasten the targeted economic growth of the country. CPEC portfolio is expected to trigger GDP growth of Pakistan by 1.5 % from 2016 to 2020 and a further increase of 1 % for the period 2020 to 2030 (Planning Commission of Pakistan, 2015).

One of the key priorities of the government of Pakistan is to exterminate energy crisis by 2018 and to harness economic dividends from the potential CPEC opportunities. However, a consequent effect of the expected increase in economic growth is that the share of GHG emissions from the energy and industrial sectors are expected to grow exponentially. Similarly, with the rapid increase in urbanization, the share of GHGs from the waste sector is also expected to increase in the coming years. An analysis of the past trend of GHG emissions for the last twenty-one years (1994 - 2015) shows that all sectors of the economy have exhibited an increasing trend of GHG emissions. Overall, the increase in emissions over this time-period (1994-2015) was approximately 123 %. The average annual increase in GHGs works out to be 10 MT CO<sub>2</sub>-equivalent in Pakistan, which represents an annual growth rate of 3.9 %, with periods of high and low-growth emissions commensurate with economic performance (Ministry of Climate Change, 2016).

The historical trend of increase in GHG emissions in Pakistan has so far been fairly consistent with the average GDP growth rate of around 4 % per year during the same period. The below mentioned Figure-1 shows the inventory of GHG emissions (MT CO<sub>2</sub>-equivalent) for all sectors (energy, agriculture, industrial processes, land use change & forestry, and waste) for 1994, 2008,

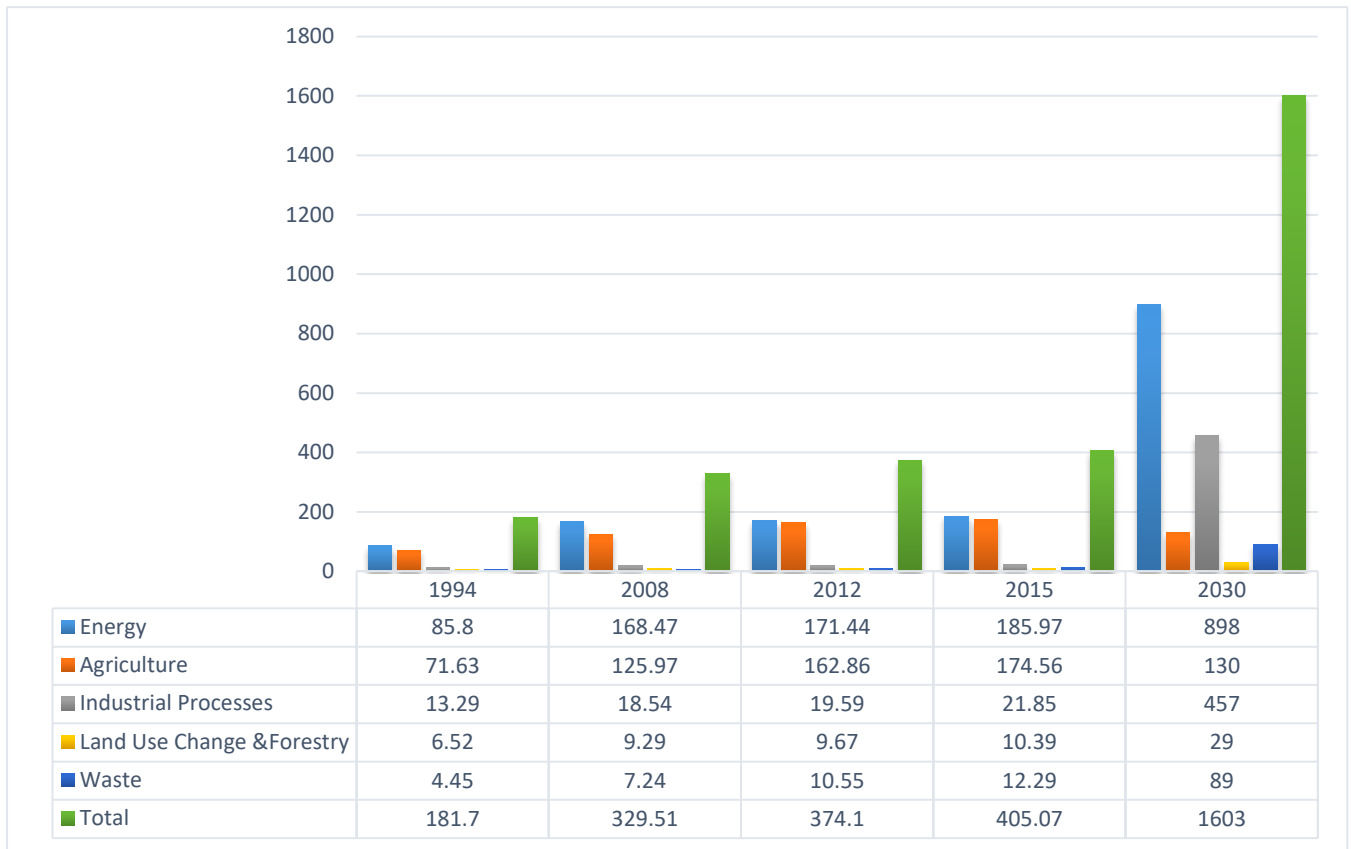
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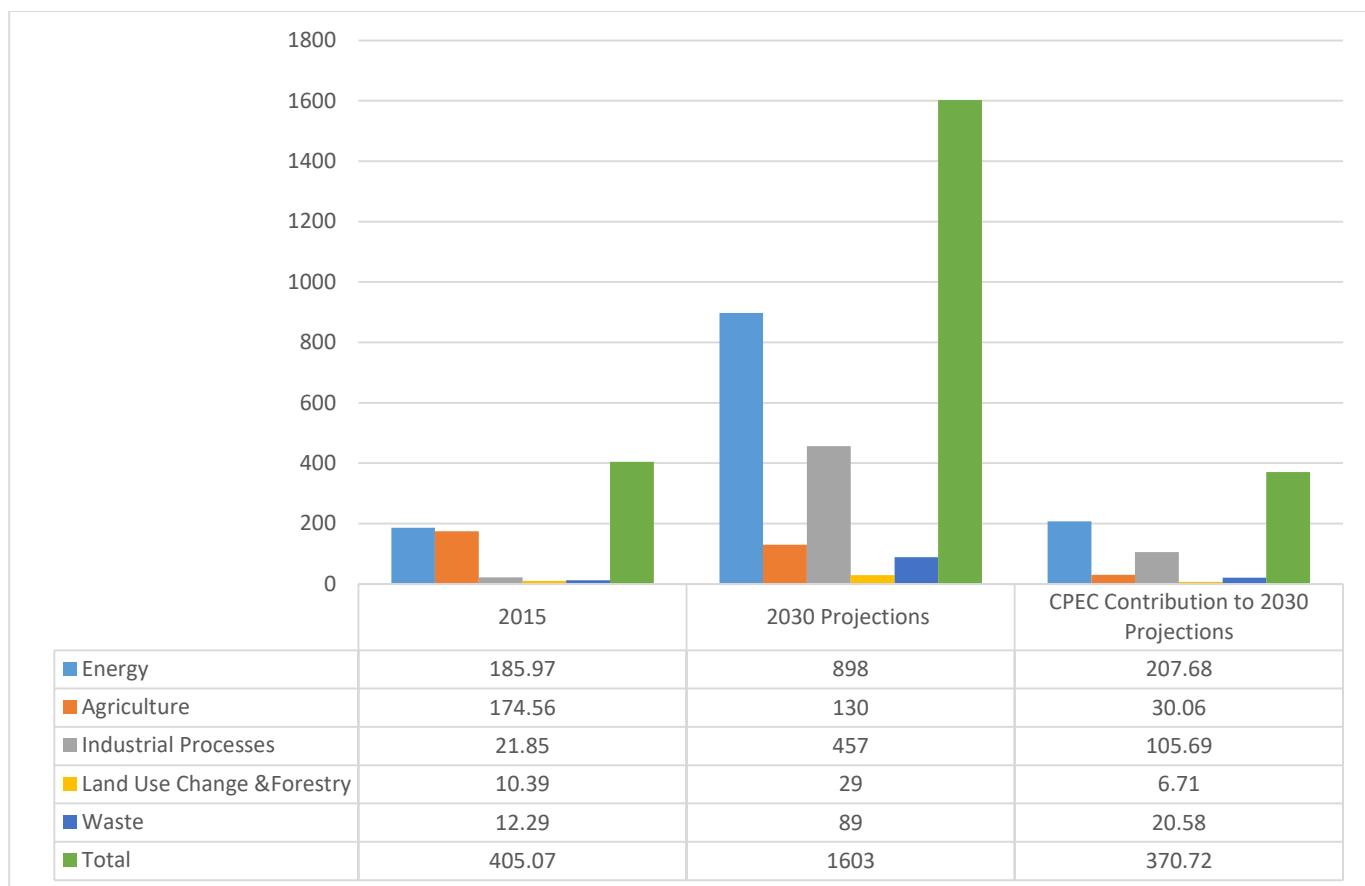
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2012, and 2015. Considering the historical trend of inventory of GHG emissions and a GDP growth rate of 4%, projections of inventory of GHG emissions for 2030 (1603 MT CO<sub>2</sub>-equivalent) have been plotted, which are also shown in Fig-1;



**Figure-01: Inventory of GHG Emissions (in MT CO<sub>2</sub>-equivalent)**

In case of Pakistan, CPEC projects are expected to accelerate the GDP growth by 1.5 % from 2016 to 2020 and a further increase of 1 % is expected for the period 2020 to 2030 in the overall expected growth rate of 7 % for the economy (Planning Commission of Pakistan, 2015). Therefore, keeping in view this anticipated GDP growth for the next 15 years under CPEC portfolio, the CPEC contribution to the projected GHG emissions for the year 2030 are calculated to be as 370.72 MT CO<sub>2</sub>-equivalent which are equal to 23.12 % of the whole projected GHG emissions inventory of 1603 MT CO<sub>2</sub>-equivalent for 2030. The contribution of CPEC portfolio to the 2030 projections of GHGs has been demonstrated in the below mentioned Figure-02.



**Figure-02: CPEC Contribution to 2030 Projections of GHGs**

The GHGs projections in Figures 1 & 2 have been made for 2030 by keeping in consideration the consistent trend and strong correlation between the average GDP growth and GHG emissions growth rate per year in Pakistan. Thus, it can be inferred that the total inventory of GHG emissions of Pakistan for 2030 will be 1603 MT CO<sub>2</sub>-equivalent; out of this total, around 370.72 MT CO<sub>2</sub>-equivalent will be the contribution of CPEC portfolio.

To find out the percentage contribution shares of different sectors in the projected GHGs inventory of Pakistan for 2030, the World Resources Institute's Climate Analysis Indicator Tool (WRI CAIT) and Pak-INDC Report-2016 have been used as mentioned in the USAID User Guide (2016), which indicate that the energy sector will contribute around 56% of Pakistan's total annual GHG emissions in 2030. Industrial processes (IPs) will account for 28.1% of the total GHG emissions. Moreover, the agriculture and waste generation will contribute 8.1% and 5.5%, respectively. Lastly, the land use change and forestry (LUCF) sector will contribute 1.8%.

The essential and central ingredients of development in Pakistan, such as energy needs, food and water consumption levels, infrastructure, transportation and communication channels are expected to nurture manifold in the coming years. Consequently, GHG emissions are likely to witness exponential growth in the country. Hence, the government of Pakistan, along with the provincial governments, are required to determinedly aware of the potential growth of GHG emissions and start devising suitable developmental strategies aiming to minimize possible carbon footprint by 20 % till 2030 in order to play their meaningful role in global efforts of

achieving the targets of United Nations Framework Convention on Climate Change (UNFCCC) under the Paris Agreement. As per Pakistan's Intended Nationally Determined Contribution (PAK-INDC) Report-2016, several mitigation and adaptation measures are needed to be taken on priority basis. These measures and actions can be augmented in coming years with potential availability of national and international climate financing, technological advancements, and capacity building of relevant stakeholders.

### **Policy Recommendations:**

To make the CPEC portfolio climate-resilient and climate-compatible, the following policy recommendations are made based on the GHGs projections described in the upper section of the policy research paper:

- As per PAK-INDC Report-2016, Pakistan has committed 20 % reduction in the projected GHG inventory for 2030, which is possible by utilizing domestic resources, as well as on receipt of some international financial assistances. Accordingly, Pakistan would require reducing its GHG inventory about 320 MT CO<sub>2</sub>-equivalent by 2030. For this purpose, comprehensive 'climate change mitigation' and 'climate change adaptation' plans need to be developed and implemented at federal & provincial levels to achieve the above target. Keeping in view the current developments made under CPEC portfolio, the federal & provincial policy makers should consider CPEC interventions in the mitigation and adaptation plans of their respective jurisdictions.
- Pakistan faces serious energy challenges. To combat this, the government of Pakistan is implementing a comprehensive plan under CPEC to meet the future energy requirements through establishing the coal-based power generation facilities, which may further add to the environmental degradation of the country. However, GHGs emissions from these coal-based power plants can significantly be reduced by the implementation of suitable environmental mitigation measures, like carbon capture, storage and the application of advanced combustion and related technologies. Employing state-of-the-art and highly efficient and low-carbon advanced technologies - deployed in the developed world and China - may also be helpful in this regard (World Coal Association, 2016). China has established power plants that are based on ultra-supercritical technology in their country. Pakistan may also commission such technologies for power generation through future agreements under CPEC. The usage of coal as a source of power generation is the need of time; however, the usage of latest technologies such as ultra-supercritical technology can further significantly reduce emissions from the power plants being commissioned under CPEC.
- Pakistani transport sector, as one of the key sub-sectors of Industrial Processes in GHG emission inventory of Pakistan, has strong potential to play a key role in tackling climate change. Huge investments are being made in infrastructure sector under CPEC, which will ultimately increase the number of vehicles in Pakistan; hence, mobility-based policy actions need to be analysed by using new and emerging transportation modeling tools for better results in the environment sector. As a first step, more strategic importance should be given to use Railway as means of cost effective, environment friendly, and sustainable freight transport in the country. National Transport Policy-2018 of Pakistan, currently in the process of finalization, should be harmonized with climate change, environmental protection, and sustainable development. Moreover, relevant strategies

should also be formulated to reduce transport emissions and to improve the living conditions in the country.

- Strategic Environmental Assessment (SEA) is an analytical and participatory approach that is used to integrate environmental considerations into policies and plans and to evaluate the inter-linkages between economic and social considerations. A good SEA - preparation and implementation - can help identify better opportunities for environmental protection, climate mitigation and adaptation, prevent costly mistakes, build stakeholders' commitment, reduce poverty more effectively, and prevent conflicts. As a tool, SEA is more effective than environmental impact assessment (EIA) while considering larger programmes. Hence, SEA for all special economic zones (SEZs) being set up under CPEC may be planned and carried out as an analytical, participatory and integrated approach to mainstream environmental considerations in CPEC industrial cooperation activities. This will help evaluate the inter-linkages of environment, economic and social considerations.
- Financial mechanisms such as Green Climate Fund (GCF), and others, may also be explored for CPEC projects. In order to tap GCF opportunities for CPEC projects there is a need for understanding of GCF modalities that include GCF basic concept orientation, project identification, development and project implementation.
- Clean Development Mechanism (CDM) is one of the tools defined in the Kyoto Protocol under the United Nations Framework Convention on Climate Change (UNFCCC) that helps countries (such as China in Pakistani context under CPEC) with stringent emission reduction targets in attaining partial acquiescence with their country targets by executing projects intended to reduce emissions in the developing countries (like Pakistan) that yet do not have such stringent compulsions. Through CPEC new projects, Pakistan can take advantage of bringing cost-effective and climate-compatible investments in the country. Therefore, Ministry of Climate Change in Pakistan, along with the federal and provincial Environmental Protection Agencies (EPAs), should prepare plans to seek support from China for Pakistan-focus carbon trading that may finance several new climate-compatible and climate-resilient projects in the country under the overall umbrella of CPEC in the future.

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