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Employment Outlook of China Pakistan Economic Corridor: A Meta-Analysis

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Abstract

This study explores the employment generated in different sectors of the early harvest phase of China Pakistan Economic Corridor (CPEC) namely; Energy, Infrastructure, Gwadar and Industrial Cooperation. For instance, around 43 major projects have been agreed under CPEC out of which 22 projects are on the fast track of development whereas nine of these are already completed. This study analyses the direct employment created under the aforementioned projects which are completed or commenced and also draw the projections about the projects which have been agreed so far under CPEC. The study shows that CPEC has generated 80,000 jobs so far in different projects commenced since 2013, and has a potential to create a total of 1.2 million direct jobs through its currently agreed projects. Moreover, with the inclusion of new projects under the CPEC long term plan in sectors like agriculture, tourism, mineral processing, oil and gas and services, the job portfolio is likely to be enhanced many fold.

JEL Classification: J08, J11, J2, J23, J48

Keywords – Employment Creation, CPEC, Projection of Employment, Special Economic Zones (SEZs)

INTRODUCTION AND BACKGROUND

It has been evident from a bulk of studies that employment is considered crucial for an economy to remain prosperous. Economic agents, if utilized in a systematic and optimal manner, can enhance overall gross domestic product and generate higher incomes and quality of life. It allows employees to enhance their absorption capacity and build their knowledge, causing a "snowball effect" in the future by creating new entrepreneurs in the market, hence, and further creating more employment opportunities. A drastic increase in domestic employment within Pakistan requires massive development investment for the sake of initiating basic labour cadres. The employment generated under early harvest projects of CPEC required precise, definite skills which were unfortunately lacking in the prevailing domestic workers. Consequently, Chinese companies became more inclined towards foreign workers. In this regard, the proportion of unskilled domestic labors hired in these projects was far more than the skilled/technical labour pool available in Pakistan. The CPEC umbrella intends to provide a way to fund projects ranging from energy generation, infrastructure, Gwadar Port, and industrial cooperation proposed within nine Special Economic Zones (SEZs)[1] in different provinces of Pakistan. These projects will support in shrinking the unemployment rate, which currently persists at 5.9 percent.

The crux of the matter for any economy is the mismatch of skills. Wherever a workforce exists, vacancies exist while the unemployment rate remains unaffected. The expertise acquired by workers is not consistent with the job market's needs. As a result, there exists a gap between practitioners and academics, while contemporary students are unable to plan their exact professional trajectory. To eradicate such gaps and in order to bolster

[1] See Annex-1

professional cadres, the Bureau of Labor Statistics of various developed states conducts the practice of monthly studies to render projections for employment rates. Developing countries, on the other hand, are undergoing the phase to just identify the number of jobs which will be created in the near future rather than classifying the skills required. This leads us to start from the first phase in order to illustrate and highlight the future of direct jobs in Pakistan while keeping in contrast the current market scenario.

According to the international labor organization (ILO), CPEC is estimated to create 400,000 jobs in the country, while according to the estimates of Applied Economic Research Centre, the mega-initiative would provide around 700,000 direct jobs between 2015 and 2030. The Planning Commission's data shows even more promising results, with CPEC generating around 800,000 jobs in the next 15 years.

LITERATURE REVIEW AND DISCUSSION

The literature in this particular context, which mostly tends to measure the estimates for job creation, is rather comprehensive. These estimates vary across different projects, working environments, human resource facilitations, infrastructure of the country, and so forth. Keeping this in view, we shall discuss the projections and the estimates of studies particularly concentrating on countries having resemblance with the economy and the development level of Pakistan. Typically, employment generation capacity of any project is assessed through direct, indirect and induced employment effects. Direct jobs refer to the core activities of project while indirect jobs refer to employment that is generated under input and output markets. In a more detailed method, jobs are categorized by the skill level and the phase of the project (Schwartz, Andres, and Dragoiu 2009). Similar techniques have been adapted in order to measure the employment generation capacity in many reports regarding energy and other developmental projects e.g. IRENA 2015, EWEA 2008 & ILO 2017. However, this study focuses on estimating and projecting the direct jobs created under known CPEC projects.

Energy projects based on their lifecycle can be separated into two parts, first, the construction, installation and manufacturing (CIM) phase, while the second is the operations and maintenance (O&M) phase. Both parts have varying employment potential and HRD requirements which should be studied specifically. CIM job duration relies upon the plant type and capacity (i.e. type of energy in MWs) while that of O&M jobs is also associated with plant life time. Employment related to O&M increases considerably as installed capacity increases (Dalton & Lewis, 2011). Studies have shown that CIM phases create a greater number of jobs in a given year than that of the O& M phases (c.f. Sooriyaarachchi et al., 2015 & EWEA, 2008).

Energy infrastructure projects, especially renewable energy projects, have potential to create an immense number of job opportunities. For instance, the European wind energy sector in recent years has mounted to 72,000, compared to 25,000 jobs in 1998. Energy infrastructure projects directly create employment opportunities in a variety of trades and professions with multiple skill sets in project development and engineering, construction, equipment manufacturing and diverse services in sales, operation and maintenance (ILO, 2017). Though employment generation is not the primary objective of setting up such a mammoth project, rather these investments affect employment significantly through induced effects. Furthermore, HRD remains a critical component for the successful economic contribution of these projects. In the following we shall discuss the estimates calculated in research studies in different energy sectors.

Hydro Power Plants

Early harvest projects of CPEC include a total of 2,850 MW of hydro power generation. These installations employ electrical, civil and mechanical engineers, technicians and skilled workers in reservoir management. Nothing seems in short fall in this section, as most of the HEIs are offering several degree and diploma programs which are sufficient to fulfill the requirements regarding top and middle level positions. Navigant Consulting

USA (2009) has estimated 5.10 Jobs per MW, while, in a recent study of ILO (2017) 4 direct jobs per MW have been estimated. According to future job estimation of the Gilgit-Baltistan Government (GB-WAPDA), the Azad Jammu and Kashmir Government (AJK-Hydro Electric Board) and the Private Power and infrastructure Board (PPIB), 11.66 Per/MW jobs are projected at construction phase and 3 jobs per/MW at Operation and Maintenance phase (O & M) (ILO-Pakistan, 2015). These benchmarks suggest a number of 40,000 to 50,000 expected jobs through CPEC hydro power projects.

Solar Power Plant

CPEC includes the Quaid-i-Azam Solar Park located in Bahawalpur, Punjab with a capacity of 1,000 MW, out of which 300 MW is in production. According to the European Photovoltaic Industry Association (EPIA, 2017) PV module manufacturing creates 3-7 direct jobs and 12-20 indirect jobs per MW installed. Thus this facility has potential of 7000 direct and 20000 indirect job creation. EWEA report (2008) suggests that solar energy projects would require 7 jobs/MW and has similar O&M job creation as that of coal and Hydroelectric projects.

Wind Energy Project

Four wind projects are under way with respect to CPEC energy projects, each of which is 50 MW. The Global Wind Energy Council (2012) has estimated that the global average of employment generation is fourteen individuals per MW in one person year. This estimation includes component manufacturing, wind farm development, construction and maintenance, whereas in the operations and maintenance, the average employment generation is 0.33 Per MW per plant year. Thus number of direct job potential for CPEC wind is calculated as 2800 during CIM and 66 jobs per year during O & M phases. EWEA report (2008) suggest that wave energy projects would require 10 jobs/MW and has similar O&M job creation as that of coal and Hydroelectric projects.

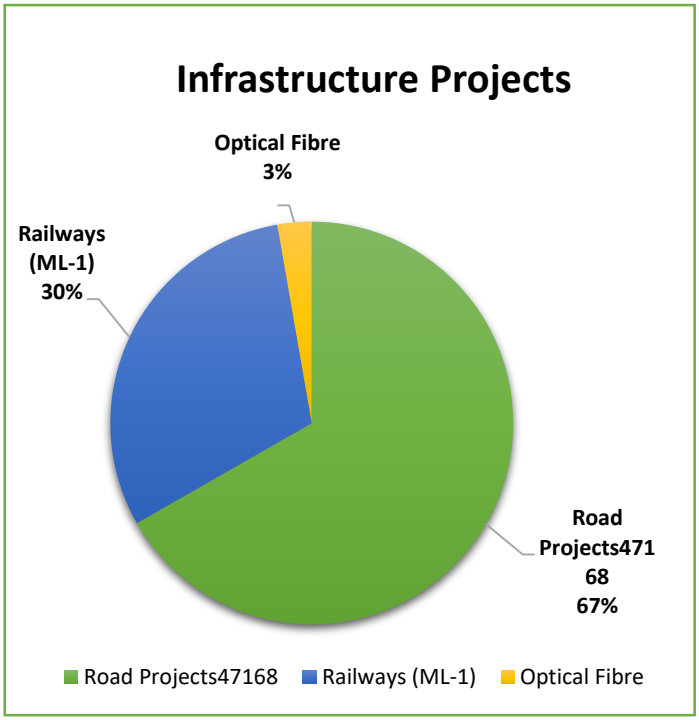
Coal Power Plant

Coal projects has large share under CPEC energy projects with estimated investment of $5.8 billion is a part of early harvest. Singh & Fehrs (2001) suggested that 0.18 employment production per MW is expected during the O & M phase from an average coal-fired power plant. In addition, immense jobs are created during the transportation of inputs and mining operations. Despite the estimates of Sign & Fehrs (2001), the estimates calculated by the Coal Industry Advisory Board (2014) are relatively more recent, whereas an advanced 3960 megawatt (MW) coal project, the Ultra Mega Power Project (UMPP) is considered as a better source for future estimations. According to this study, 1.26 & 0.16 direct jobs per MW are created during CIM and O&M phases respectively.

PROJECTIONS OF JOBS

Infrastructure

Infrastructure under CPEC includes the construction of roads, upgrading of M-1 Railway tracks, and optical fiber lines. The purpose of these projects is to connect all the main cities of Pakistan to the complex yet highly important web of BRI by China, and to make it more accessible by regional countries such as Afghanistan, Tajikistan, Iran, and China.



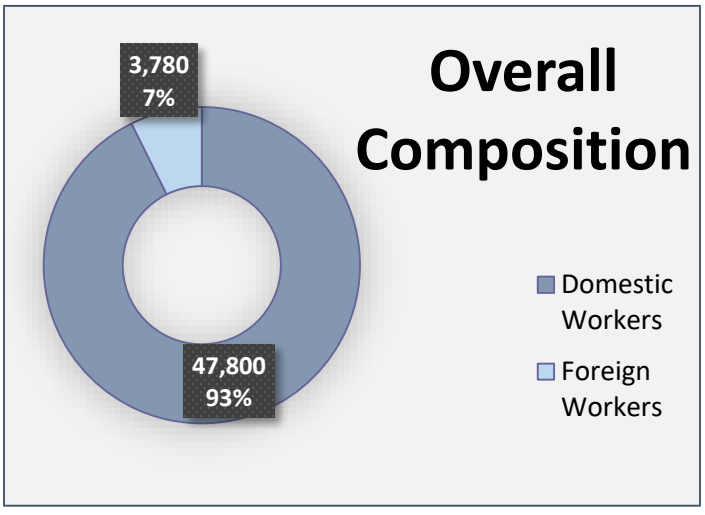
However, in this report our main focus is to analyze the future of the trained labor force while keeping the current trend of labor usage in the existing, and ongoing projects under CPEC. Further, the goal of this study is to highlight the number of employees who are either directly or indirectly benefitting and will benefit from the opportunities being raised by these projects.

Roads

Projects under the infrastructure of roads include KKH Phase (Thakot-Havelian section) in KPK (It is one of the early harvest projects with an estimated cost of US $ 1,366 Million) with the main goal of the project is to improve the existing structure and build further 440Km of road structure, bridges, and culverts from Raikot to Islamabad. Part of the project is expected to be completed by May 2018. However, the project will see its real face in the year 2020. The total estimated investment has created 7,800 direct jobs on this project out of which almost 6000 are ascribed to Pakistani nationals and the remaining 1800 have been allotted to Chinese.

Peshawar-Karachi motorway (Lahore-Multan section) which will connect Punjab with Sindh (total length of the project is estimated to be 392 Km with a predictable cost of US $ 2,980 Million. M/s China construction Engineering Corporation is responsible for its construction and financing is being done by a government concessional Loan, or GCL. Construction of the project was initiated in August 2016 and the project is estimated to be completed by August 2019. The project has created a total of 17,246 jobs at present, and is estimated to increase more. Out of the total number of 17,246 jobs - 96% of workers possess the nationality of Pakistan, and the remaining 570 workers belong to China. These projects include Khuzdar-Basima Road N-30(110Km), the upgrading of D.I. Khan (Yarik)-Zhob, n-50 Phase-I (210 Km), and KKH Thakot-Railkot N-35 with its remaining portion of (136 Km). These projects are aimed to connect Baluchistan, KPK and Gilgit-Baltistan to the overall network.

Skilled labor required for the road projects include Senior Executives, Business Process managers, Construction Managers, Building Specialists, Surveyors, Project Managers, Quality Engineers, Civil Engineers, Prime Movers Operations, and Construction Professionals along with Technical Staff. The demands for these skills have seen an upward growth. Thus, the technical and vocational institutes are ready to train further labor force of Pakistan in order to meet the demand for the upcoming projects. Currently the labor force being used by the infrastructure of roads is 51,580 which include Pakistani and Chinese nationals. However, out of the total number being used only 3,780 are Chinese and the remaining 47,800 is Pakistani.



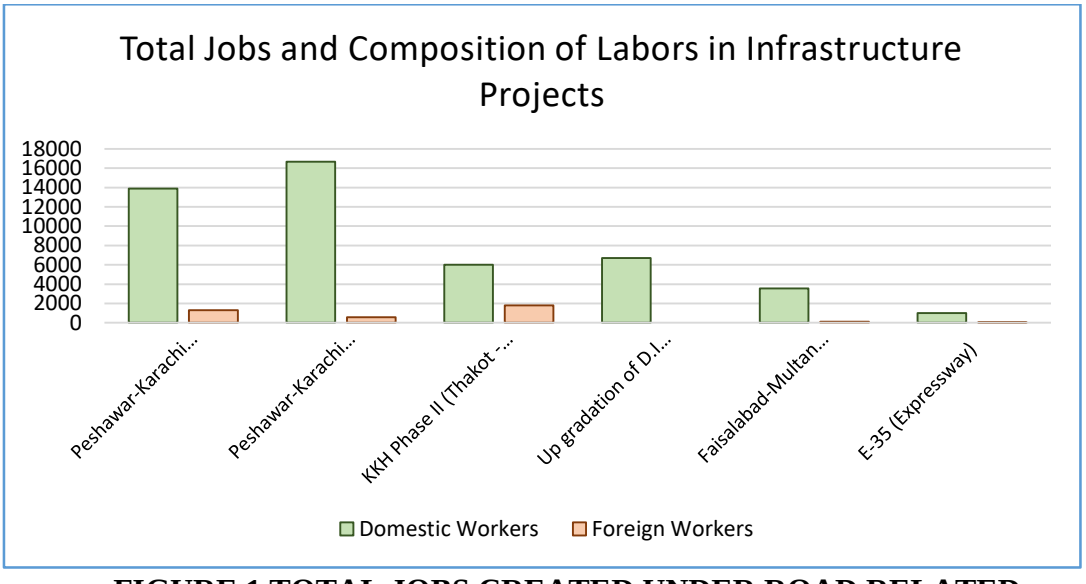


FIGURE 1 TOTAL JOBS CREATED UNDER ROAD RELATED INFRASTRUCTURE PROJECTS

Source: Author's own findings

Two projects among the CPEC road projects have not been initiated which includes Khuzdaar Basima Road N-30 (110km) and KKH Thakot-Raikot N35 remaining portion (136 Km). However, keeping in view the job created in various road projects, the jobs under these two projects has been expected to be created more than 1800 approx. (Annex-1 and Annex-2)

Railway Structure

Rail Routes are one of the fastest land transportation systems, which can carry a hefty load than any other motorized vehicle. Therefore, building and improving them is one of the essential parts of infrastructure development. Thus, keeping the above mentioned in mind the governments of both the countries have decided to expand the existing network and create new projects such as Hawelian Dry Port (450 m twenty- foot equivalent Units) and Expansion and Reconstruction of Existing Line ML-1. These projects are designed to connect KPK, Punjab and Sindh to China. The estimated cost of both these projects are US $ 8,247 Million, and are estimated to increase a massive amount of employment opportunities for skilled and non-skilled labour force. One of the main goals of the railway routes is to supply the coal for generating power to different power plants. This practice is currently being carried out from Port-Qasim to Sahiwal Coal Power Plant in the form of 5 trains daily with each train consisting of 40 wagons. Each wagon can carry more than 60 tons of Coal. The power plants pay 60 to 80 thousand in PKR as the transportation cost for each wagon thus making it 12 to 16 million daily, which becomes a part of revenue for Pakistan railways.

Estimates of 8 labourers per kilometre are required for successfully running the system. Thus, it results in 12,000 labours for 1500 km under these projects. The categories of skilled labour required for these projects include Signal Support Staff, Electrical Engineers, Project Managers, Communication Engineers, Electricians and Civil/ Construction Engineers. (Annex-1 and Annex-2)

In addition, 4 Urban Mass Transit (UMT) have also been included to be a part of the notified railway structure under CPEC infrastructure projects. These include:

- Karachi Circular Railway (50km)
- Greater Peshawar Region Mass Transit (93km up gradation while 30km construction from Charsadda to Peshawar)
- Quetta Mass Transit
- Orange Line – Lahore (27.1km)

The direct employment to be generated under these projects are around 1,521 based on the aforementioned estimates. (UMT, Annex-2)

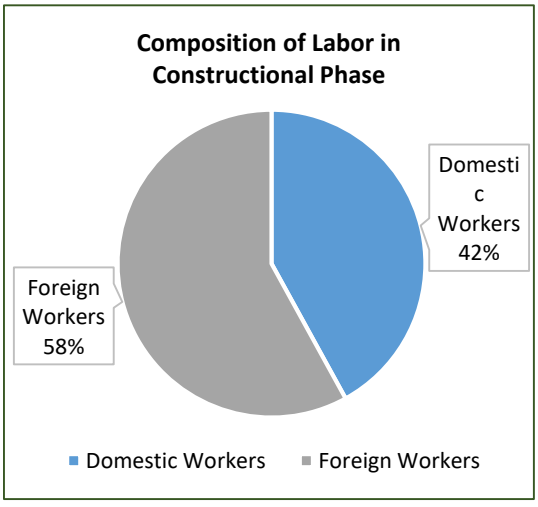
Optical Fiber

Fiber optic is a way of transmitting data from one part of a country to another. Data is an important part of Infrastructure which results in the smooth functioning of other important tasks. Thus, installation of this Cross Border Optical Fiber Cable also comes under the scope of CPEC which is estimated to increase the number of skilled staff in the fields of Project managers, ICT Engineers and electronics/ electrical Engineers in order to run the projects with smooth functioning. The work on this project has already been started, and is expected to complete in December 2018. This project is estimated to require the employment of 1,034 workers in the time span of 2015-17 while 260 during the 2017-18, which sums up to 1300 approx. (Annex-1 and Annex-2)

Energy Sector

Pakistan as a country is struggling due to Energy Shortage. Thus, revival of the energy sector is the need of time for Pakistan. Almost every sector of an economy requires sufficient energy in order to develop. Therefore, a high amount of focus is being paid on the energy related projects which will create energy through Coal, Hydro and wind. These projects include Sahiwal 2x660MW Coal-fired Power plant, 2x660 MW Coal-

Fired Power Plants at Port Qasim Karachi, Engro Thar Block II 3x330MW Coal Fired Power Plant, 300MW Imported Coal Based Power Project at Gwadar, SSRL Thar Coal Block-I 6.8 Mtpa, & SEC Mine Mouth Power Plant, CPHGC 1, 320MW Coal Fired Power Plant Hub, Thar Mine Mouth Oracle Power Plant (1320MW) & surface Mine, Hydro China Dawood 50MW wind farm (Gharo, Thatta), UEP 100MW Wind Farm (Jhimpir, Thatta), Sachal 50MW Wind Farm (Jhimpir, Thatta), Three Gorges Second Wind power project/three Gorges Third Wind Power Project, Suki Kinari Hydropower station, Naran, Karot Hydropower Station and Quaid-e-Azam 1000MW Solar Park (Bahawalpur).

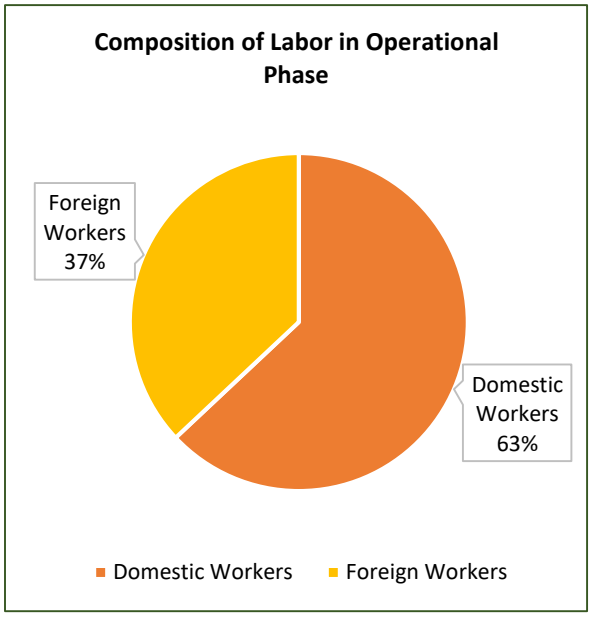


These projects will be located in Sindh, KPK, and Punjab respectively. The Category of skilled labor required for these projects include Civil Engineers, Electrical Engineers, General Managers, Safety Engineers, Maintenance Engineers, Electrical Trades, Installation Specialists, HVAC Engineers, Foreman/Supervisions and prime movers Operators etc. A vast number of Pakistani civil and electrical engineers could grab these opportunity, as the investors are planning to decrease their total cost by hiring more and more of Pakistani skilled labor by further enhancing their abilities and providing them concerned trainings.

Sahiwal coal power project is one of the first projects to be completed ahead of time, and it is in its operational phase running successfully. The data for the number of employed staff was extracted from the project in order to figure out the future trend of the market toward labor. Thus, the data provided shows that a 2x660MW coal power generating plant entails around 6500 labors during the construction phase out of which 3,770 were

foreigners and 2,730 were Pakistani nationals. Further, operational phase requires 1778 employees out of these Chinese employees are 671 and Pakistani nationals are 1107.

Therefore, keeping the aforementioned details in mind, the future of labor in the power sector is propitious. Almost 300 fresh graduates have already gained the required skills during the construction and operation of the Sahiwal Coal Power Plant. Further, to enhance the human capital in domestic labors, foreign firms are planning on laying off Chinese employees by further providing training to Pakistani labor. Thus, keeping Sahiwal power plant as a bench mark for the upcoming projects; the number of employment generated in the construction phase of power generation projects is estimated to be 50,828 in 16 energy projects, while 22900 of employment has been created under 5 energy projects which include coal and hydro projects. Thus making it a total of 73,728 jobs via power generation projects. (Annex-1 and Annex-2)



Gwadar Port and City

Gwadar is a port city located in the south of Baluchistan, due to its strategic location and deep-sea port it is an ideal location to serve as a heart of trade and development initiative as it is the key to minimize the distance between the routes of Belt and Road initiative. Development of this project will lead to the geo-economic cooperation between the regional countries, as Pakistan strongly believes in the regional connectivity for shared prosperity. Pakistan is aiming at developing strong cooperation between Iran and Pakistan through Gwadar Port and Chabahar Port. Pakistan's Interior Minister Ahsan

Iqbal During a session said “China-Pakistan Economic Corridor envisages regional connectivity; therefore, we are looking forward to Iran for developing new infrastructure in the region and beyond.”

Furthermore, the estimated cost allotted for the development of the Gwadar Projects is US $ 800 Million. The total number of completed and ongoing projects is twelve. Out of these, maximum shares of the total estimated investment amount is being prearranged to New Gwadar International Airport and Gwadar East-Bay Express Highway, with an estimated cost of US $ 230 Million and US $ 140.6 Million respectively. Gwadar East-Bay Expressway is estimated to be completed by the year 2018 along with some other projects. However, there are many which will begin in the year 2018 and onwards. Gwadar is also attracting investment from private sector as it is a future destination of people from all walks of life. It is estimated to create millions of direct and indirect jobs in times to come. In detail, the category of technical and skilled staff required for Gwadar projects include Pilots/Tig operators, Engineers, Quality Control Officers, Commandants, Hydro Graphic Officers, Counselor-Terminal, Customer Services, manager Airside, Mechanic-Aerospace, Mechanic-Avionics, Marine Scientists, and Shipmen. However, the number of total skilled labor currently working in Gwadar Free Zone is 1,100 out of these 850 are Chinese and 250 are Pakistani. The number is subject to change anytime, especially during the peak time. Along with these an estimated of minimum 0.1 million construction related to labor force is required for the construction of these projects.

Regional Integration and Cultural Connectivity plays a vital role in making world a global village. Therefore, promotion of tourism industry and encouraging the student and teachers exchange programs is necessary. Pakistan is full of high potential youth which is ready to enhance the learning horizons, and explore the vast beauty of different cultures and norms. These projects include people to people exchanges, Tourism Promotion, Trade Promotions, and Establishment of Pakistan Academy of social Sciences and China

Pakistan Consortium of Business Schools. These Projects are expected to benefit all parts of Pakistan. However, the focus group of technical staff includes Professors, Teachers, Scholars, Tourists Guides, Restaurant Managers, Investment Consultants, and Trade Promotion Specialists Etc.

This sector will see an increasing trend however step by step jobs will increase based on the promotion and proper advertisement of these projects. Currently 100 students have been stent on the training by CPEC Cultural Communication Centre. However, the plan is to send further 200 Students by next year. (Annex-1and Annex-2)

Industrial Cooperation

In order for a country to reach the stage where it can be called developed; it has to build a strong industry, and be ready to use its resources to produce maximum possible output. Building special Economic Zones in order to promote industrialization is the key towards development. The government of Pakistan has decided to include the development of the nine Special Economic Zones under the project of CPEC.

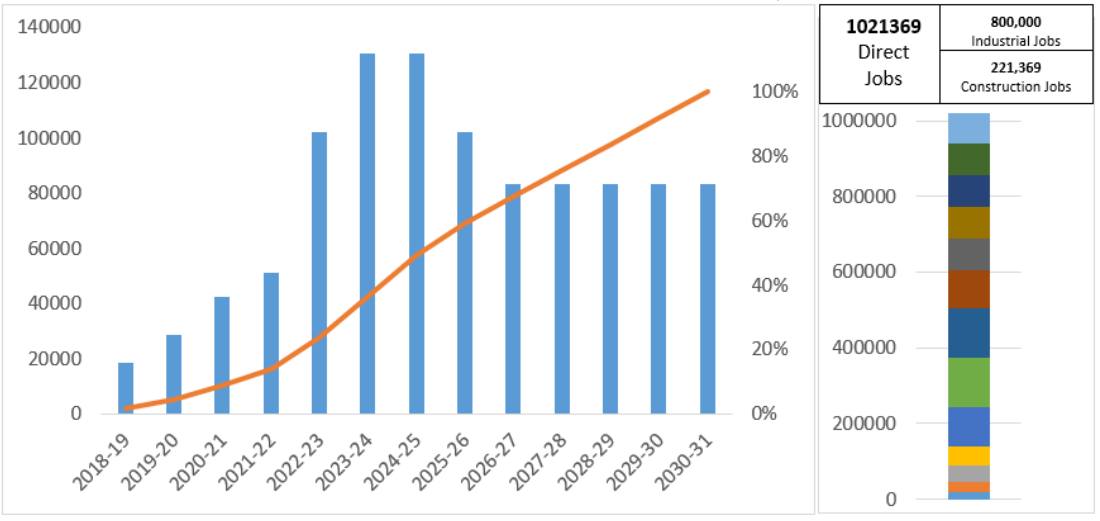


FIGURE 2 JOB PROJECTIONS IN INDUSTRIAL COOPERATION FROM 2018-30

Source: Author's own findings

These Economic Zones include Rashakai Economic Zone, M-1, Nowshera, China Special Economic Zone Dhabeji, Bostan Industrial Zone, Allama Iqbal Industrial City (M3) Faisalabad, ICT Model Industrial Zone, Islamabad, Development of Industrial Park on Pakistan Steel Mills Land at Port Qasim near Karachi, Special Economic Zone at Mirpur,AJK, Mohmand Marble City, and Moqpondass SEZ Gilgit-Baltistan. The economic zones are targeting all the 4 provinces of Pakistan including FATA GB AJK and ICT. These SEZs require technical staff which includes Civil Engineers, Electrical Engineers, General Managers, Safety Engineers, Maintenance Engineers, Electrical Engineers, Electrical Trades and Installation Specialist, HVAC Engineers, Foreman/ supervisors and prime Mover Operator etc.

The SEZs are designed to use 70% of their area for industrial zones and the remaining 30% is allocated for the housing and employee's facilitation. The area in total for these 9 SEZs is 9,400 Acre. The estimated amount for labour is almost 157 labour intensive jobs per acre of an industrial area. Therefore the total number of jobs in the nine SEZs are estimated to be around 1 million as illustrated in fig 1 out of which 20% would be required to construct the industrial park and the industries whereas the rest of jobs would be the industrial employees. For details, see Annex-1 and Annex-2.

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Annex-1

S.no	Projects/ Province			Skilled HR Traits	Estimated Skilled HR	Remarks
1	**Infrastructure (Roads)**	KKH Phase II (Thakot - Havelian Section)	KPK	• Senior Executive • Business Process Managers • Construction Managers • Building Specialists • Surveyors • Project Manager • Quality Engineer • Civil Engineer • Prime movers Operators • Construction Professionals and Technical Staff	Current job count is 51,580 (including 34,930 Pakistanis and 2009 Chinese). 1,900 is skilled manpower	As per data provided by NHA on the questionnaire by CoE-CPEC
2		Peshawar-Karachi Motorway (Multan-Sukkur Section)	Punjab and Sindh			
3		Khuzdar-Basima Road N-30 (110 km)	Balochistan			
4		Upgradation of D.I.Khan (Yarik) - Zhob, N-50 Phase-I (210 km)	KPK-Balochistan			
5		KKH Thakot-Raikot N35 remaining portion (136 Km)	GB-KPK			
6	**Infrastructure (Rail)**	Expansion and reconstruction of existing Line ML-1	KPK-Punjab-Sindh	• Signal Support • Electrical Engineers • Project Managers • Communication Engineer • Electricians • Civil/Construction Engineers	• 8 labourer / KM of construction • For 1,500 KM, 12,000 employee would be required	• Estimates from Literature • Data is already requested of Pak railways and soon evidence based analysis would be shared.
7		Hawelian Dry port (450 M. Twenty-Foot Equivalent Units)	KPK	• Project Managers • Inventory Manager • Port operator • Terminal Operator		

8	**Infrastructure (Optical Fibre)**	Cross Border Optical Fibre Cable	GB/KPK/Punjab	• Project Managers • ICT Engineers • Electronics & Electrical Engineers • Quality Engineers	1034 employees from August 2015 till Nov 2017 Than 260 Employees from Dec 2017 till Sep 2018	Data collection is in progress from SCO.
9	**Gwadar**	Development of Free Zone	Balochistan	• Pilot/ Tig Operator • Engineers • Quality Control Officers • Commandants • Hydro Graphic Officers • Counsellor – Terminal • Customer Services • Manager Airside • Associate Airside • Mechanic – Aerospace • Mechanic – Avionics • Marine science • Engineers • Shipman	Total Employed are 1100 out of which 850 are Chinese and 250 Pakistanis	Data received from China Port and Holding Company (COPHCL), Gwadar
10		New Gwadar International Airport			Around 75000 labours are required for all Gwadar projects	• Data received from FWO (verbal) • Data validation separately for each project and HR traits to be done soon.
11		Gwadar East-Bay Expressway				
12		Dredging of berthing areas & channels				
13		Construction of Breakwater				
14		Necessary facilities of fresh water treatment, water supply and distribution				
15		Pak China Friendship Hospital				
16		Technical and Vocational Institute at Gwadar				
17		Gwadar Smart Port City Master Plan				
18		Bao Steel Park, petrochemicals, stainless steel and other industries in Gwadar				

19		Development of Gwadar University (Social Sector Development)				
20		Upgradation and development of fishing, boat making and maintenance services to protect and promote livelihoods of local population				
21	**Energy**	Sahiwal 2x660MW Coal-fired Power Plant,	Punjab	• Civil Engineer • Electrical Engineer • General Manager • Safety Engineer • Maintenance Engineer • Electrical Trades and Installation • HVAC Engineer • Foreman/Supervisor • Primemover Operator etc.	Total employees in constructional phase is 6500 and 1778 in operational phase	Data provided by M/o Power in response to CoE CPEC questionnaire
22		2×660MW Coal-fired Power Plants at Port Qasim Karachi	Sindh		Total employees in constructional phase is 6500 and 1778 in operational phase	Estimates carried out by taking Sahiwal Project as a benchmark.
23		Engro Thar Block II 2×330MW Coal fired Power Plant	Sindh		Total number of jobs created are 4100	Estimates carried out by taking Sahiwal Project as a benchmark
24		300MW Imported Coal Based Power Project at Gwadar, Pakistan	Balochistan		Total number of jobs created are 4100	Estimates carried out by taking Sahiwal Project as a benchmark
25		SSRL Thar Coal Block-I 6.8 mtpa &SEC Mine Mouth Power Plant(2×660MW)	Sindh		Total employees in constructional phase is 2000 and 500 in operational phase	Estimates carried out by taking Sahiwal Project as a benchmark

26		CPHGC 1,320MW Coal-fired Power Plant, Hub,	Balochistan		Total employees in constructional phase is 6500 and 1778 in operational phase	Estimates carried out by taking Sahiwal Project as a benchmark
27		Thar Mine Mouth Oracle Power Plant (1320MW) & surface mine	Sindh		Total employees in constructional phase is 6500 and 1778 in operational phase	Estimates carried out by taking Sahiwal Project as a benchmark
28		Hydro China Dawood 50MW Wind Farm(Gharo, Thatta)	Sindh		Total employees in constructional phase is 255 and 70 in operational phase	Estimates from Literature (14 persons – years of employment per MW during construction and 0.33 person years for operations)
29		UEP 100MW Wind Farm (Jhimpir, Thatta)	Sindh		Total employees in constructional phase is 510 and 134 in operational phase	
30		Sachal 50MW Wind Farm (Jhimpir, Thatta)	Sindh		Total employees in constructional phase is 255 and 70 in operational phase	
31		Three Gorges Second Wind Power Project Three Gorges Third Wind Power Project	Sindh		Total employees in constructional phase is 510 and 134 in operational phase	

32		Suki Kinari Hydropower Station, Naran	Khyber Pukhtunkhwa		5000 direct jobs during construction on peak time	- Estimates from Literature (for an investment threshold of Euro 380 Million project). - M/o Power would be soon approached to seek precise estimates of HR.
33		Karot Hydropower Station	AJK/Punjab		Total employees in constructional phase is 5000 and 1250 in operational phase	
34		Quaid-e-Azam 1000MW Solar Park (Bahawalpur) Quaid-e-Azam	Punjab		Total employees in constructional phase is 1500 and 100 in operational phase	Obtained through questionnaire (*Estimates from Literature) (*4 jobs per MW during manufacturing, 6 jobs per MW during installation and 0.3 jobs per MW for operation and Management)
35		Matiari to Lahore ±660kV HVDC Transmission Line Project Matiari (Port Qasim) — Faisalabad Transmission Line Project	Sindh and Punjab		Number of jobs created over the 25-year life of the project are about 9,700	Estimates from Literature (Study of transmission line Project between India and Bhutan)
36		• People to People exchanges • Tourism Promotion • Trade Promotion	Across the country	• Professors • Teachers • Scholars	Step by step jobs will be increased in this sector based on its promotion	CPEC Cultural Communication Centre (CCCC), China is providing 100 Pakistani

37 38	**Social Sector Development Projects**	• Establishment of Pakistan Academy of Social Sciences • China Pakistan Consortium of Business Schools		• Tourist guides • Restaurant Managers • Investment Consultants • Trade Promotion Specialists		students the training and education in China and later jobs to them. Next year plan is to increase it to 2,000 students.
39	**Industrial Cooperation**	• 9 SEZs	All 4 provinces, FATA, GB, AJK & ICT	Engineers (various disciplines) General Manager Safety Engineer Maintenance Engineer Electrical Trades and Installation HVAC Engineer Foreman/Supervisor Prime mover Operator etc.	Approximately 1 Million direct jobs in total out of which 0.8 million are enduring jobs within the industries and 0.2 million jobs are for the industrial parks and industries development	- Estimate from BOI, 9,400 Acres total area for the 9 SEZs - As per SEZ Act, 70% is the actual industrial area and remaining is the commercial/area consumed in roads, etc. - Estimate from literature, 1 Acre of industrial enterprise creates 130 jobs. - To develop the industrial park, 27 jobs per acre created approximately

Annex-2

Employment Projections under CPEC Projects (Year wise Breakup) for currently known Projects

SR #	Financial Years	Actual Direct Employment under CPEC Related Projects (No. of Individuals)				Estimated Direct Employment under CPEC Related Projects (No. of Individuals)					Total Actual/Estimated Direct Jobs
		Infrastructure		Energy Projects (5 Projects)	Gwadar (1 project)	Roads (2 Projects)	Railways (ML-1) and 4 UMT	Gwadar (12 Projects)	Energy Projects (10 Projects)	Industrial Cooperation (9 SEZs)	
		Roads (3 Projects)	Optical Fiber (820 KM)								
1	2013-14	NA	NA	NA	NA	NA	NA	NA	NA	NA	0
2	2014-15	NA	NA	NA	400[9]	NA	NA	NA	NA	NA	400
3	2015-16	NA	1034[8]	6500[21] ,6500[22], 510[29],1500[34]	300[9]	NA	47[6]	NA	NA	NA	16391
4	2016-17	7800[1], 15174[2], 6700[4]		4100[23]	400[9]	NA	55[6]	NA	255[30]	NA	34484
5	2017-18		260[8]	134[29]	NA	NA	60[6]	5000[10-20]	255[28]	NA	5709
6	2018-19		NA	1778[22]1778[21] , 100[34]	NA	3850[3], 4760[5]	1555[6]	10000[10-20]	70[30], 2000[24], 6500[25], 6500[26], 510[31], 9700[35]	18385[39]	67486
7	2019-20		NA	NA	NA	NA	2100[6]	23000[10-20]	70[28]	28615[39]	53785
8	2020-21	NA	NA	NA	NA	NA	2990[6]	23000[10-20]	5000[32], 5000[33], 500[24], 134[31]	42376[39]	79000
9	2021-22	NA	NA	NA	NA	NA	3555[6]	10000[10-20]	1778[25], 1778[26]	50921[39]	68032
10	2022-23	NA	NA	NA	NA	NA	3830[6]	5000[10-20]	NA	102117[39]	110947

11	2023-24	NA	NA	NA	NA	NA	3015[6]	NA	1250[32], 1250[33]	130532[39]	136047
12	2024-25	NA	NA	NA	NA	NA	2090[6]	NA	6500[27]	130486[39]	139076
13	2025-26	NA	NA	NA	NA	NA	NA	NA	NA	102117[39]	102117
14	2026-27	NA	NA	NA	NA	NA	NA	NA	NA	83164[39]	83164
15	2027-28	NA	NA	NA	NA	NA	NA	NA	1778[27]	83164[39]	84942
16	2028-29	NA	NA	NA	NA	NA	NA	NA	NA	83164[39]	83164
17	2029-30	NA	NA	NA	NA	NA	NA	NA	NA	83164[39]	83164
18	2030-31	NA	NA	NA	NA	NA	NA	NA	NA	83164[39]	83164
Total Actual/Estimated Direct Jobs		29674	1294	22900	1100	8610	19297	76000	50828	1021369	**1,231,072**

Note: The superscripts mentioned are the references associated with F/B (serial number 1-39), whereas, “NA” represents unavailability of data or the projects are not yet initiated