Policy Recommendations

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Section 1: Prioritized Actions for Renewables

1. Defining Ambitious and Realistic targets for Renewable Energy (RE)

- Setting targets for RE penetration as well as CO_2 emissions reductions can drive the growth of renewables. Pakistan should set ambitious but realistic targets for RE defining both short and long term objectives.
- The RE targets should be designed through stakeholder consultations and must be aligned with other strategic policy goals of Pakistan to avoid any perverse outcome or the cost of inaction which is evidently much larger than a "No Policy" scenario[1],[2].
- The initial version of IGCEP had a rapidly declining share of RE in energy mix after 2030 while in the revised version of IGCEP (2021-30), the share of renewables till 2030 is limited to around 10-12% which is not consistent with the targets of ARE Policy to achieve 60% RE by 2030 (including Hydro), PM's announcement on coal moratorium[3], and the world bank studies conducted on VRE potential in Pakistan[4],[5].

2. Building Energy Portfolio

- Policies and targets need to be backed by proper data monitoring and survey reports. Government and research institutes could cooperate to fill in the existing data gaps and develop the feasibility reports using comprehensive data sets[6].
- Making use of a Renewable Energy Atlas (Solar[7] and Wind[8]) that includes affordability, availability, and accessibility of each Renewable resource.
- Renewable Energy Zoning should be integrated in Solar and wind auctions of Pakistan. This will reduce the risk of investors while serving as a feasible solution for Grid handling.
- The government should present an energy plan based on multivariable analysis (Least Cost Generation and Least Emission Scenarios) while considering the global energy trends to portray long-sightedness of the plan rather than meeting short term goals.

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[1] Center for American Progress, "The Cost of Inaction Is Far Greater than the Cost of Action", https://ampr.gs/3hawUvn
[2] European Environmental Agency, Climate Change: Cost of Inaction vs Adaptation", https://bit.ly/3qtVpIl
[3] Please See: https://bit.ly/3hg6Jn2
[4] "Variable Renewable Energy Locational Study", 2021. Please See: https://bit.ly/2U8xbXO
[5] "Variable Renewable Energy Integration and Planning Study", Please See: https://bit.ly/2UM0fVy
[6] Aneeque Ahmed Mir and Hina Aslam, "Decision-Making under Uncertainty: Bridging data gaps for effective energy planning", 2020, https://bit.ly/3qvDtwN
[7] Please See: https://globalsolaratlas.info/map?c=11.523088,8.173828,3
[8] Please See: https://globalwindatlas.info/

3. Improve Energy Access: Developing Decentralized Energy System

- Around 25% population of Pakistan still does not have access to electricity[9]. The immediate solution would be off grid systems such as mini and micro grids to electrify those areas and rural communities.
- Integration of RE in all generation, transmission and distribution systems: The long term plan should be focused on improving and building transmission and distribution infrastructure for better transmission and reduction of losses, as well as enhancing the grid capacity to integrate renewable energy in the systems.
- These decentralized systems have lower per project capital cost, reduce the need for expensive transmission and distribution networks, and require decentralized businesses to built, operate, and maintain the plants. This further creates green opportunity for local business and employment. Average employment (jobs per MW) over life of facility is highest for solar PV (6.96-11.01) as compared to other conventional sources[10].
- Financial landscape for decentralized plants can be shifted towards unlocking of local and community driven finance available with the private sector (or international investors as well) whereas the public sector can act more as a facilitator of energy access than provider of energy access.
- Cost of battery storage systems (4-hour system) is expected to be reduced by 67% till 2030 and around 80% till 2050[11] which provides an opportunity to bringing power sector reforms to support a higher share of decentralized energy systems in a long term.
- Net metering in Pakistan present significant opportunities such as providing power access to scattered population with no grid access through decentralized energy systems. Pakistan has registered more than 40 MW of growth in this area only in past 3 months[12]. Streamline the net metering system introduced by the regulatory authority and develop a comprehensive distributed power generation plan.
- RE uptake at a local scale can be facilitated by both the consumers and the private sector and thus Pakistan needs to come up with an inclusive wheeling policy that allows private sector to sell cheap power without burdening the government with sovereign guarantees, returns on equity, or the capacity payment traps. Likewise, the private sector can be co-opted as partner in development as the provision of electricity is a fundamental right and the government's involvement will ensure provision to all member of Pakistani society.

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[9] Please See: https://bit.ly/2U9AUoh

[10] International Labour Office, "Investment in renewable energy generates jobs. Supply of skilled workforce needs to catch up". Please See: https://bit.ly/3dmXYX9

[11] IRENA, "Electricity Storage And Renewables: Costs And Markets To 2030." https://bit.ly/3A4W9rG

[12] Statistics provided by Energy Expert from Alternate Energy Development

4. Financing for Renewables

- Financial investments must vitally be made available to motivate, strengthen and support renewable projects in Pakistan. To reinforce investment in RETs and to actively encourage technology adoption, financial mechanism at domestic and international level must be fully developed. Funding approach may include:
    - Subsidies, tax breaks, lower trade taxes on inputs, and concessional credit for renewables should be materialized despite frequent changes in national and sub-national policies.
    - Feed-in-Tariffs have been proven out to be one of the bolstering policy approach to quickly enhance the percentage of electricity from renewable energy.
- Through Competitive Trading Bilateral Contracts Market (CTBCM), Pakistan is looking for Renewable Energy Auctions. These auctions need to be carefully analyzed and it would be better to try more than 1 mode of auctions while we are in the initial phase especially the site-based auctions.
- Mobilizing finance for renewables in Pakistan is no more a constraint since there are plenty of investors that are keen to invest in Pakistan. If policy is in place and government is serious in bringing competitive bidding at a large scale, majority of investors will come to Pakistan. There is a need to create enabling conditions for the investor and a clear focused time bound plan of action to have a clear roadmap to achieve the national targets.

5. Capacity Building for Renewables: Technology transfer and knowledge sharing

- A major challenge for relevant all stakeholders is to equip employment sector with knowledge of rapidly changing technologies, process complexity, and the latest platforms required for trainings. Overcoming these challenges would require several platforms and trainings on updated technologies, techniques and local production facilities and environment.
- Adapting to the changing environment, oil and gas companies can diversify their business strategies and look for decarbonizing tools such as clean hydrogen as a fuel, production of liquid biofuels, and carbon capturing and storage technologies.

Section 2: Role of Policies and plans

1. Need for an Inclusive Least Cost Generation (LCOE) Planning

- The existing costing model used by Government, known as 'Levelized cost of energy (LCOE)' which traditionally had been used worldwide, is now surfacing as misleading for its simplistic or average based costing approach towards technologies.

- Models such as 'Levelized avoided cost of energy (LACE)', 'Modelling Energy and Grid Services MEGS', 'CSIRO electricity system modelling' and other such mechanisms could be used to analyse true cost of a technology.
- Capacity expansion plans should incorporate benefits that are not priced such as use of indigenous resource, energy security, carbon emission. In a least cost generation plan, renewables should have a level playing field and NTDC needs to brings transparency about how energy prices are set.
- Currently, the revised capacity expansion plan of Pakistan is not entirely based on least cost generation planning since 88% of capacity intake is from the committed projects that were redefined in the revised version. An un-constrained least cost plan would have RE share of around 30-33% of total installed capacity by 2030.
- Pakistan is looking to substantially increase its hydro power development while ignoring its time and cost overruns in the planning process. Cost calculations should incorporate the declining cost of technology with respect to time and external/social costs of the projects such as climate change, migration of residents, health impacts, raising the cost of living, and possible risks of cost and time over runs. Given the constantly declining cost of RE, the capacity taken up by hydro plants can be replaced with solar and wind.

2. Technological advancements and Investments

- Revisit plans of Coal-to-liquid (CTL) and Coal-to-Gas (CTG) technologies considering their economical and environmental implications. Even for coal abundant countries, these technologies are uneconomical while Pakistan already has a higher cost of local coal with low energy intensity.
- The National Nuclear and Hydrogen Roadmap should be developed to create an outlook for low carbon hydrogen production, hydrogen utilization for green chemicals and fuels, as well as storage, transport and end use.
- Make plans for increasing cost effectiveness of battery storage technologies.
- Technology transfer in RE technologies and deployments to increase local production and improved supply chains to reduce the costs of technologies and equipment.
- Prepare for technologies of the future rather than to subsidize the technologies of the past.

3. Decarbonization of Energy and Power sector

Low-carbon development pathways

- Given the future economic growth, and an associated growth in the energy sector, the peaking of emissions in Pakistan is expected to take place much beyond the year 2030. Replacing coal-based power plants running on both local and imported fuels can save up to 28 Mt of CO2 in a single year (2030).
- Countries heavily relying on coal have highest external costs (around $0.172/kWh). Air pollution and climate account together for more than 80% of

the total costs. Therefore, calculations for external costs associated with fossil fuels result in greater price and less output and hence should be incorporated in planning process.

- In 2019, Pakistan paid $1.7 billion and $0.2 billion in coal and oil subsidies respectively. Power sector reforms would require reducing the cost of electricity subsidies by price adjustment and improved governance. Efficiency of subsidies can be improved through better targeting to deserved people. Removing energy sector efficiencies has a potential to save around 4%-6% GDP every year.
- Reducing power subsidies by adjusting the price and improving subsidy efficiency through better targeting to deserving people.

Decarbonization of demand sectors

For deeper decarbonization and improvement in the energy sector, Pakistan needs to think beyond the power sector only. Multiple policy measures can be adopted in different demand side sectors to transition towards a green economy.

Transport Sector

- Fiscal policies such as tax relaxations and rebates can promote the deployment of Electric Vehicles in Pakistan as per the EV policy. Other advantages may range from priority access to waiver of different tolls and fees.
- To initiate the growth of EVs in Pakistan, the initial step is planning to build the infrastructure for EVs support and a production industry.
- Before a market is build up, the government should provide relaxation for import tax of EVs as to change the public behavior.
- Reduction or battery prices will lower the market cost of EVs and hence research activities must be carried out within Pakistan to design most optimal configuration for batteries and cars.
- Since Pakistan is an agriculture-based economy, biofuels can also serve as an alternate for gasoline and diesel import in Pakistan.

Building Sector

- Residential sector demand can substantially increase due to unplanned development schemes. For a sustainable construction sector, the energy demand consumption through both active and passive processes needs to be controlled. A poorly constructed building can lock in emission intensive infrastructure.
- National Energy and Conservation Authority (NEECA) needs to come up with "Energy Conservation Building Codes" with a proper section of renewable integration in common households.
- Minor density regulations and the redevelopment of brownfields and urban infill through land value capture mechanism, assembly mechanism, and split-

rate property taxation can make cities of Pakistan more compact and sustainable.

- Local government should provide adequate green space for waste management systems to avoid air and land pollution and increase the livability of dense urban areas.
- Government also needs to show its intent of green development by solarization of different commercial buildings especially in Balochistan.

Industrial Sector

A large portion of industrial sector of Pakistan is on captive units due to un-reliability and affordability of the power sector. High line losses and inefficiencies of the national grid has posed a major challenge for a slow industrial growth. Following actions are needed in this sector:

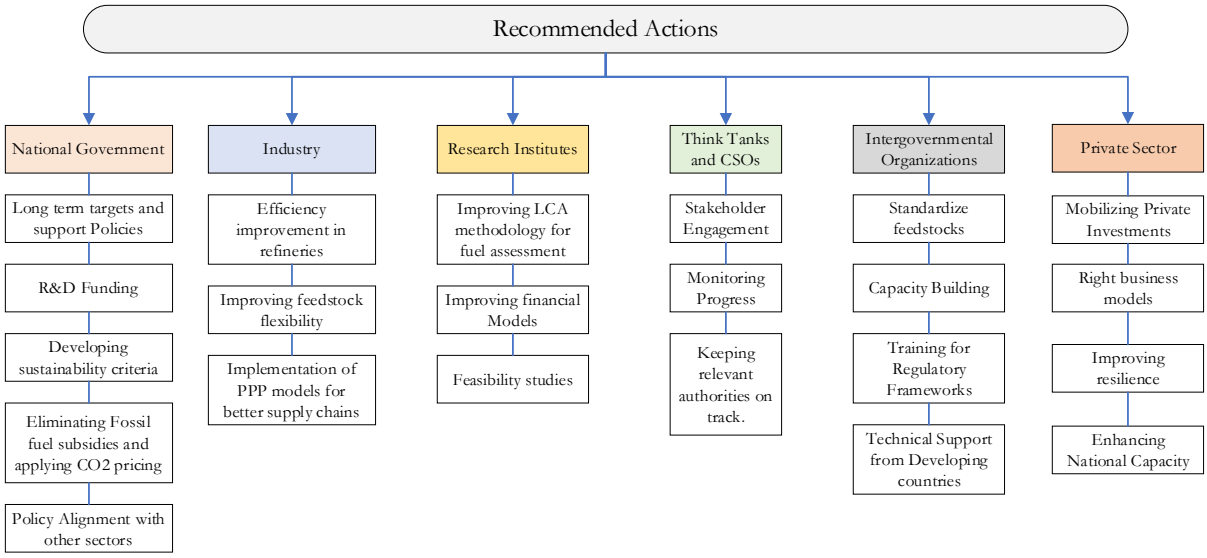
- Improving reliability and affordability of power to the industrial consumer to bring them back on national grid. This will spur the electricity demand and the bridge the gap of power surplus in Pakistan.
- Pakistan also needs to quickly move towards market liberalization reforms and in meanwhile look for supply and trade regulations. A cheap power source will also improve financial viability of Pakistan's export sector since power is the basic commodity.
- Industries and SMEs can be subsidized to support the development of green products.

Developing Carbon Taxing Mechanism and Green Trade Policies

1. Competitive space between renewable and fossil fuels can be reduced by taking into account the cost externalities and providing renewables a level playing field while the government plans to launch a competitive trading bilateral contracts market.
- Applying "Carbon Taxation" and "Cap and trade" policies to provide a higher level of certainty about cost and the level of emission to be achieved.
- Using Green trade policies and technology transfer from developed to developing countries to ensure an efficient technology conversion and resource harnessing.
- Developing policies to promote Mass deployment of Low Carbon technologies (LCTs) in Power, Industry, Transport, and Building sectors.
- Responsible and committed investments in human capital, infrastructure and financial markets to increase a country's ability to absorb and use technology.

Section 3. Institutional coordination among all Stakeholders

Policy formulations at each level must involve all the relevant stakeholders ranging from the local community to national government. Various tasks where each of the stakeholder can assist is shown in the figure.



1. Improved coordination between federal and provincial energy units

- Current energy sector requires interprovincial coordination and the federal level coordination for cost effective planning especially in demand supply forecast as well as in developing the transmission line activities.
- Provincial interests and constitutional safeguards need to be protected while making different business models and capacity expansion plans. Articles of the constitution (such as Article 161-Clause 2) dealing with power and subsequent laws flowing out of those constitutional provisions can be the key for sustainable and participatory development of provincial interests.
- Government should not only diversify the energy mix, but also look at various options and needs through which industrialization can be supported in different provinces. For example, in developing hydro, Water sites with political disputes (such as Chasma Jhelum Link Canal) should be solved through mutual discussion and without damaging the site location for investors.
- To overcome the mismatch of federal and provincial governments in demand forecasting, LOI (Letter of Intent) of a project from both federal and provincial ends should be issued after approvals from CPPA (Central Power Purchasing Agency)-that will purchase that electricity and NTDC that will provide the transmission infrastructure.

2. Promoting the Role of Academia and Research and development (R&D) Institutes

For training and knowledge building of employees during a just energy transition phase, following actions can be taken by Academia and R&D institutes:

- Shifting Academia from research-academia-cultural conservation to research-implementation-working along with industry.

- Curriculum of academic studies should be revised to include courses on "Clean Environment" and "Quality of life" and in post graduate programs, there should be vital availability of research grants to focus on projects dealing with clean energy transition.
- Skill development programs and academic curriculum should also be linked to Environmental Impact Assessment (EIA), CSR, and entrepreneurship projects.
- Increase their research and development particularly in the areas of electrification, carbon capturing storage technologies, local capacity building. One key area where Academia can majorly help policy formulators is analyzing the cost of inaction towards any particular policy.
- Financed to open certification and testing labs to overcome the failure of any junk project that is not technically or economically viable.
- Front-line dealers of technology transfer programs and there should be a venture capitalism along with a technology transfer policy.

3. Private Sector Engagement

- From a private sector standpoint, the key interest of investors which government should be mindful of are:
    - Sanctity of Contracts
    - Consistency of Policy
    - Reliable and Affordable supply of power.
- Pakistan needs to move away from single bimodal to multi bimodal where the country can either transition through bilateral or through proper CTBCM (Competitive Trading Bilateral Contracts Market) model which NEPRA is trying to roll it out by April 2022.
- Shift from upfront tariff to competitive bidding presents a major transformation from cost plus tariff regime to competitive actions and multiple wholesaler market. In view of CTBCM, government also need capacity building of various institution to overcome this transition.

Section 4: Greening China Pakistan Economic Corridor (CPEC)

1. Green Energy Transition Guidance under CPEC

- Although Pakistan is in a surplus capacity, the infrastructure support does not allow complete evacuation of the power. Pakistan as a priority needs to develop an integrated grid, particularly at Gwadar. Lessons from china's integrated grid development can be deployed through mutual collaboration.
- Coal should be a short-term solution for Pakistan coupled with use of advance technologies for mitigation the environmental impacts-to build a pipeline for infrastructure development of renewables. In view of this, China can rather invest majorly in renewable development than coal-based generation as a long term policy. This would help Pakistan to Transition from Long-term cost and financial threats of Coal.

- Pakistan policy makers must prepare a plan with a more concrete timeline to introduce the Environmental and Social Risk Management Systems in CPEC projects with green development regulations and evaluation standards including green financial performances.
- The "Joint Working group on Green CPEC" should be formulated, supported by the Joint Cooperation Committee (JCC), to accelerate Pakistan's green development ambitions, including green energy cooperation, green finance cooperation, green transport hub, including "Green Gwadar Hub", Green buildings and infrastructure.
- Building the local and international institutional capacity to enable effective monitoring and enforcement of environmental laws and regulations must be strengthened.

2. Role of Chinese financial institutions and Banks

- Green policies and investments- providing an opportunity to China to showcase the pro-climate ambitions of Chinese Investments under BRI and CPEC as a role model of green development.
- Both countries must find a common framework for the environmental risks' evaluation and reporting of financial institutions.

Section 5: Energy Efficiency and Conservation measures

Energy is an indispensable factor for smooth functioning of almost all sectors and ensuring provision of power to Hospitals, and increased demand of residential sector. Along with generation capacity, energy conservation measures are equally important for a green economy. UN-SDGs also target on doubling the energy efficiency by 2030. Following key actions are recommended:

- Energy efficiency improvements in power and transport sector can provide sufficient room for Pakistan to enable its green financing. As per SDPI's recent study, Pakistan can save around 17.69 billion dollars if energy sector inefficiencies are removed. Pakistan needs USD 3.85 billion per year to move towards green transportation[13].
- Reducing energy and transport sector inefficiencies by just 35% can finance green transition in Pakistan.
- Energy conservation measures in demand sector can accelerated by implementing building energy codes and minimum energy performance standards. This would allow developing new products and new supplier activities. Further it can also be used to redirect energy subsidies for improved social outcomes in Pakistan.
- Energy efficiency certifications can improve consumer purchase behavior. This can be incorporated with rental behaviors and environmental programs to

[13] Sajid Amin, "Financing Green Recovery from Covid 19 in Pakistan", [Forthcoming]

address information gaps. It would further lead to consumer and supplier confidence in market offerings.

- Financial Incentives can help promote energy efficiency by reducing the cost burdens through public-private partnerships, green funding, property assessed clean energy financing, and assistance with permitting fee reduction or elimination.

Section 6: Green Economic Recovery

1. Building Back Better in a more resilient way

- Reconsider its power business models and the regulatory methods.
- A digital transformation that includes smart meters, electronic bill payment methods and a digital infrastructure. Medium term investments for grid improvement, control, and data acquisition system can drive to better customer satisfaction and lower costs.
- Improvements in energy efficiencies such as cooling and standards, building codes, and other demand side management techniques will help reduce the energy demand especially across the residential sector since it observed an increase during the pandemic.
- Policy makers and regulatory bodies can assure that now the environment needs to be preserved by deploying clean energy standards and air quality improvements.

2. Aligning fiscal response with Green Recovery

- In the medium-to long term, Pakistan needs to move towards a climate informed fiscal plan. The budgeting and fiscal planning should be centered around green recovery or green financing linked to green initiatives.
- The strategy of government must be planned to better leverage resources where they look for attracting capital from various non-public sources including private institutions and commercial finances.
- Support packages for SMEs should be designed in a way that the priority focus is on SME sector which is involved in green products.

3. Green Financing Mechanisms

- Based on the availability of different financing mechanisms policy makers in Pakistan need to strengthen climate resilience in our ecosystems and to push forward better synergy and convergence between climate, biodiversity, and health finance.
- The Government has to play a critical role in leveraging and de-risking the needed finance and accelerating the green capital market.
- To provide financing for medium to large projects, local banks need to be also stimulated since they cannot start projects on their own and would need support in terms of blended finance to capitalize private sector investments in Pakistan; specifically in green finance.

Look for social impact bonds where the private sector and government collaborate to invest in a successful green project. Then instead of paying in cash, the government can also propose to let go the taxes for a particular amount of period.

- Looking at the growth of Islamic banking in past 5 years, there is a potential in Pakistan, not only for sovereign issuance, but also in domestic market. Pakistan can harness this low hanging fruit as well leveraging from such green sukuk bonds and social responsibility investment funds.
- Given lower fiscal space at the domestic level amid competing needs, international stakeholders/community has a very critical role in capacity building and creating space to finance green recovery. In backdrop of Covid 19, debt swaps Exploring Debt for Nature and Debt for Climate Swaps would support green recovery with policy pathways for implementation.
- For Pakistan to enter into private sector debt reduction or debt swap agreements, it needs to come up with a very broad Environmental Social Governance (ESG) profile that clearly outline its standards and view on economic quality and community engagement, sustainable assets, green financing and its expected interests for a long term.

Section 7: Energy Sector and a Just Transition

In context of energy transition, sustainability is more than just decarbonization. Communities that do not have access to electricity should ne able to make it out when the country makes that transition.

1. Employment Opportunities

An energy transition phase should be able to address the key issues of power sector and provide at least an equal number of green jobs and a pathway for fossil fuel sector to transition towards:

- Orienting infrastructure investments to green inclusive job creation would require a " *Transition Policy* "to support the clean energy transition in Pakistan.
- A $1 dollar spent in fossil fuels can produce 2.7 jobs while the same dollar spent in renewables and energy efficiency can produce 7.5 and 7.7 dollars, respectively.
- Showcase the need for an energy demand and built Eco-special economic zones (Eco-SEZs) to maximize the utilization of existing capacity.
- Clean Energy Transition also ensures gender equal opportunities by providing clean energy access and business opportunities to the rural areas.

2. Climate Actions and Sustainable Development

- Climate risk accounting, climate disclosure policies and mechanism, land use rights, relocation and reclamation policies, pollution laws and liabilities, can

strengthen social dialogue mechanisms, tripartism, and building the capacity of institutions to enforce transitional laws and ensure proper communication.

- A green economy with just transition would require growth policies, environmental regulations, greening enterprises, social protection policies, active labor markets, occupational safety and health policies, skill development, mechanism for social dialogue, and policy coherent mechanism.
- For any long-term policy, the main pillars to focus are a sustainable livelihood, sustainable energy, and the climate change mitigation.
- Clean energy transition would need adequate support from businesses that supports this transition. Business needs to understand that BAU will not get us any further.

3. Rural Cold Supply Chains

For successfully implementing a cold chain and logistic for vaccination in rural areas, the following action plans are recommended:

- A complete outreach of vaccines will require strengthening the existing cold chains and building additional ones, especially for the rural economies. Based on the limited energy availability and affordability, the vaccine and technology importing countries should ensure that the imported techniques are not highly energy-intensive or have an adverse environmental impact.
- An urgent expansion of a cold chain in such remote areas should also take ensure energy availability in those areas. In short-term plan where immediate and urgent electricity access is required, grid extensions and large diesel generators can be used (despite being an unsustainable approach). At a later stage this can be complemented with cost saving options to generate affordable hybrid systems.

Appendix 1: Agenda of Clean Energy Transition Summit-Pakistan, June 24, 2021

PLENARY SESSION (Serena Hotel, Islamabad: 10:00am – 05:00pm)	
Session 1: Introductory Session Moderator: Engr. Ahad Nazir, Head Centre for Private Sector Engagement, Sustainable Development Policy Institute (SDPI)	
10:00-10:10	Welcome Remarks by Dr. Abid Qaiyum Suleri, Executive Director, Sustainable Development Policy Institute (SDPI)
10:10-10:20	Introduction of the project objectives and achievements by Dr. Hina Aslam, Research Fellow, Sustainable Development Policy Institute (SDPI)
10:20 –10:30	Keynote Address by Ms. Shandana Gulzar Khan, Member National Assembly of Pakistan and Chairperson Commonwealth Women Parliamentarians at Commonwealth Parliamentary Association
10:30-10:40	Technical Presentation on "Pakistan's Way Forward towards a Green Economy: Perspectives for a Clean Energy Transition"
10:40-10:55	Technical Presentation on "Pakistan's Financing Needs and Options to Support Green Recovery"
10:55-11:05	Technical Presentation on "COVID19 and future outlook of Energy sector of Pakistan"
11:05-11:15	Summary of Policy Recommendations
11:15-11:30	Open Discussion

11:30-11:45	15 minutes stretch break
Session 2: Keynote Speech by relevant stakeholders	
11:45-12:30	1. Mr. Malik Amin Aslam, Minister for Climate Change, Ministry of climate change (MoCC) 2. Representative from Private Power & Infrastructure Board (PPIB) & Alternative Development Board (AEDB) 3. Mr. Waqas Bin Najib, Member Energy, Federal Ministry of planning, development, and Special Initiatives (MoPD&SI) 4. Mr. Danny Kennedy, CEO, Clean Energy Nexus Followed by a brief open discussion
Session 3: Panel discussion on the Prospects of Renewable energy in Pakistan: Opportunities, challenges, and way forward Chair: Mr. Shah Jahan Mirza, MD/CEO, Private Power & Infrastructure Board (PPIB) & Alternative Development Board (AEDB)	

12:30-13:30	1. Ms. Farzana Altaf Shah, Director General, Pakistan Environmental Protection Agency, Ministry of Climate Change (MoCC) 2. Dr. Irfan Yousuf, Consultant RE, National Electric Power Regulatory Authority (NEPRA) 3. Mr. Muhammad Faisal Shairf Wattoo, Director Project Appraisal, Private Power & Infrastructure Board (PPIB) 4. Mr. Syed Aqeel Jafari, Director Policy and International Cooperation, Alternative Energy Development Board (AEDB) 5. Engr. Asad Mahmood, Manager Technical, National Energy Efficiency & Conservation Authority (NEECA) 6. Mr. Oliver Knight, Senior Energy Specialist, The World Bank 7. Dr. Fatima Khushnud, General Manager Business Development at Engro Energy Limited 8. Mr. Ashruff Hassan Rana, Director, Bridge Factor Moderator: Dr. Hina Aslam, Research Fellow, Sustainable Development Policy Institute (SDPI) Followed by open discussion
13:30-14:00 Lunch	
Thematic Sessions *"Potential role of Chinese leadership and investment priorities in clean energy transition of Pakistan"* *(concept note attached in the annexure A)* (Venue & Time)	
Session 1: Green CPEC- Leveraging green financing and Low-Carbon Development Host: SDPI, Co-host: Pakistan-China Institute (PCI)	

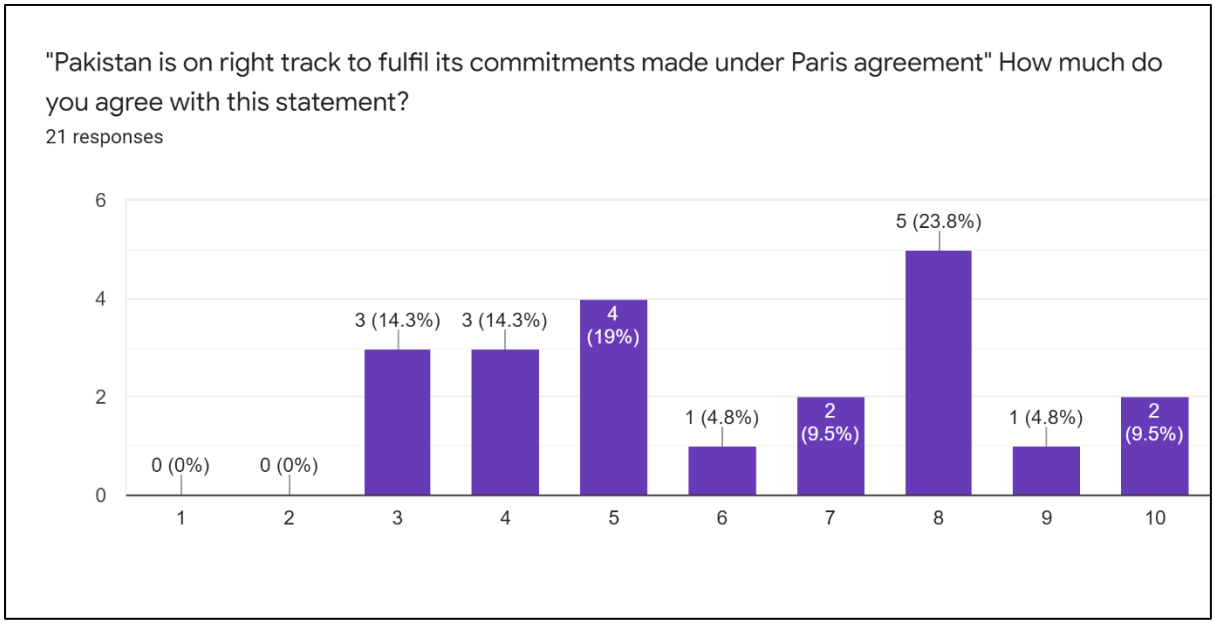
14:00-14:45	1. Dr. Liaqat Ali Shah, Executive Director, Centre of Excellence China- Pakistan Economic Corridor, CPEC 2. Mr. Ali Kemal, Chief SDGs, Ministry of Planning Development &Special Initiative (M0PD&SI) 3. Mr. Zarak Khan Assistant Director, State Bank of Pakistan 4. Mr. Mustafa Sayed Hyder, Executive Director, Pakistan – China Institute (PCI) 5. Ms. Zhu Hong, Deputy Chief Financial Officer, China Power International 6. Dr. Sajid Amin, Research Fellow, Sustainable Development Policy Institute (SDPI) Moderator: Ms. Maha Kamal, Teaching Fellow, Information Technology University, Lahore (ITU)
14:45-15:00 Stretch Break	
Session 2: Priorities for clean energy investments: Energy-climate nexus Host: Khyber Pakhtunkhwa-Board of Investment (KP-BoIT) & Trade, Sustainable Development Policy Institute (SDPI) Chair: Mr. Hassan Daud Butt, CEO, KP-Board of Investment and Trade (KP-BoIT)	

15:00-16:00	1. Mr. Sheeraz Anwar Khan, Director Wind, Alternative Energy Development Board (AEDB) 2. Ms.Kashmala Kakakhel, Climate Finance Expert 3. Ms. Sobiah Becker, Climate Change Advisor, Foreign, Commonwealth and Development Office (FCDO) 4. Ms. Vardah Malik, Investment Advisor, SEED Pakistan 5. Mr. Omar Malik, Director, Shams Power (Private) Limited 6. Dr. Fiaz Ahmad Chaudhry, Professor, Energy Institute, Lahore University of Management Science (LUMS) Moderator: Dr. Vaqar Ahmed, Joint Executive Director, Sustainable Development Policy Institute (SDPI)
Closing Session	
16:00-16:15	Summary of the discussion by Dr. Vaqar Ahmed, Joint Executive Director, Sustainable Development Policy Institute (SDPI)
16:15-16:30	Open Discussion
16:30-16:40	Closing Remarks by Mr. Shafqat Kakakhel, Chairperson, Board of Governors Sustainable Development Policy Institute (SDPI)
16:40-17:00	Vote of Thanks and Way Forward by Dr. Hina Aslam, Research Fellow, Sustainable Development Policy Institute (SDPI)

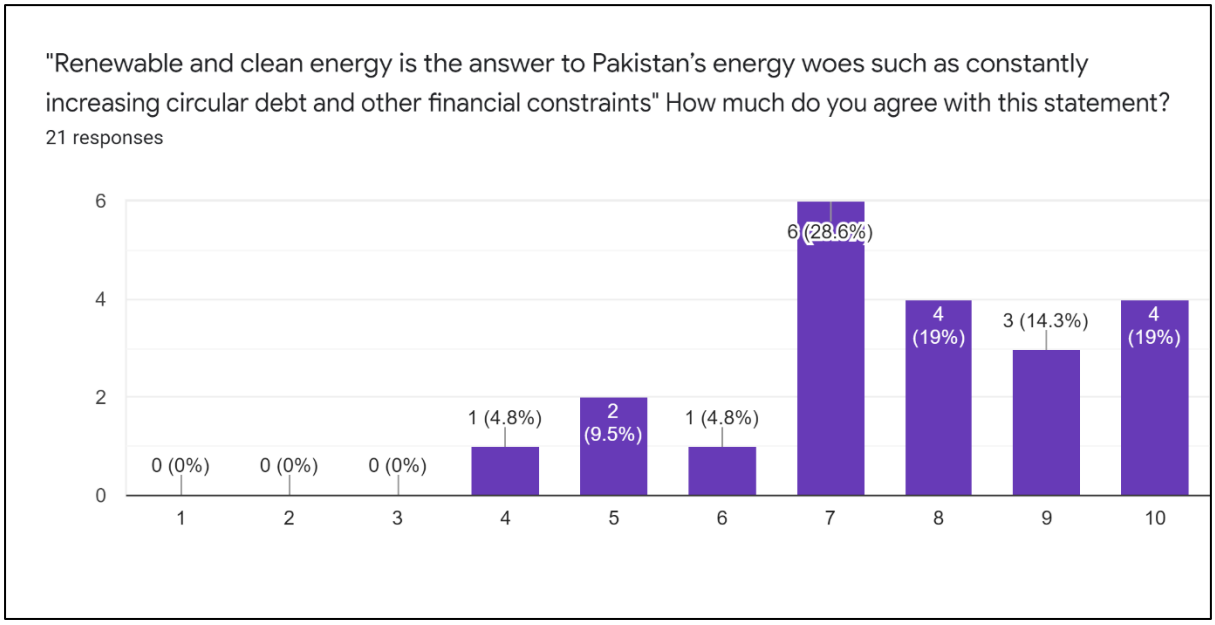
Appendix 2: Survey and Results

The results of technical surveys are based on responses from relevant stakeholders against a set of different questions as mentioned below

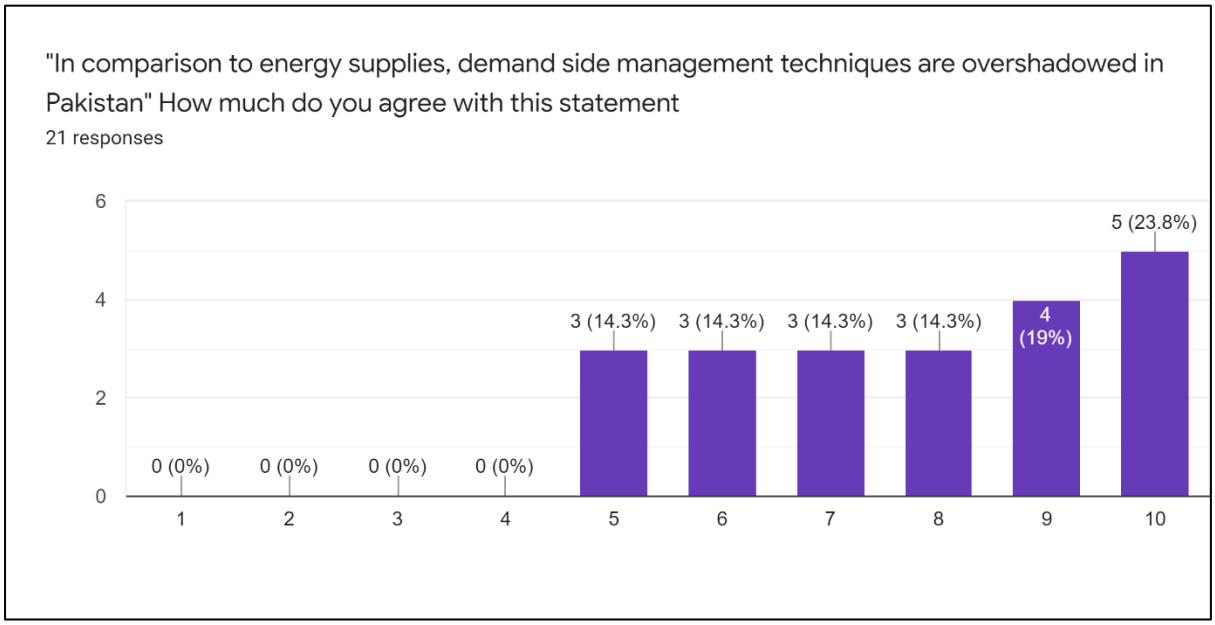
1) Is Pakistan is on right track to fulfil its commitments made under Paris agreement" How much do you agree with this statement (Rank on scale from 1-10)



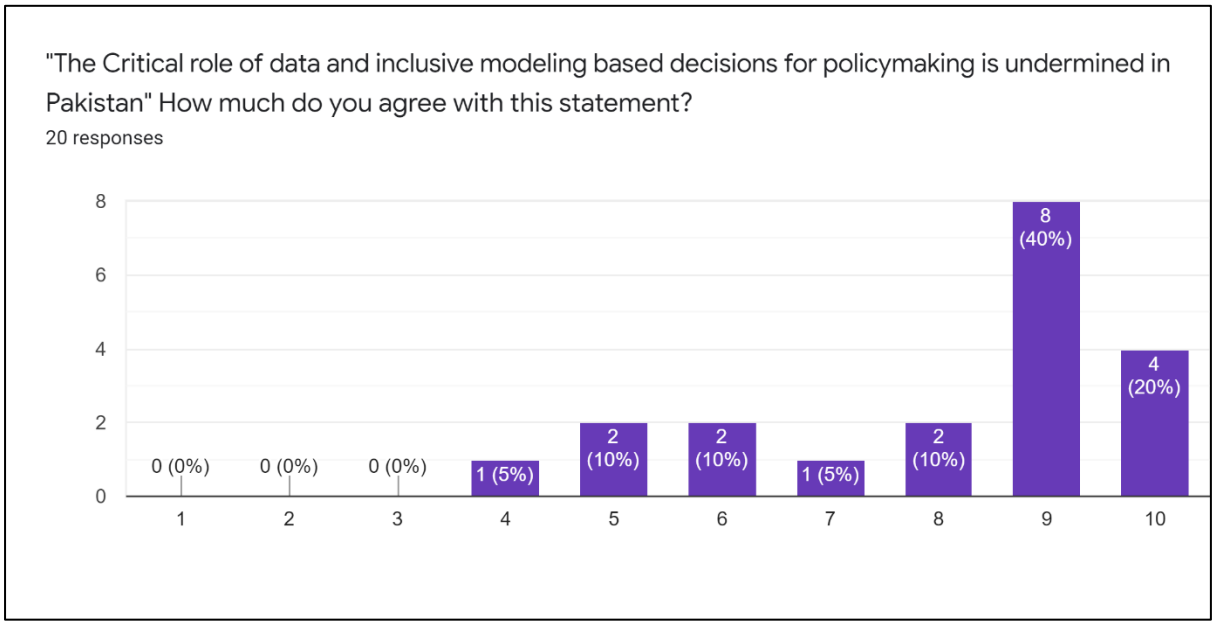
2) Renewable and clean energy is the answer to Pakistan's energy woes such as constantly increasing circular debt and other financial constraints" How much do you agree with this statement (Rank on scale from 1-10).



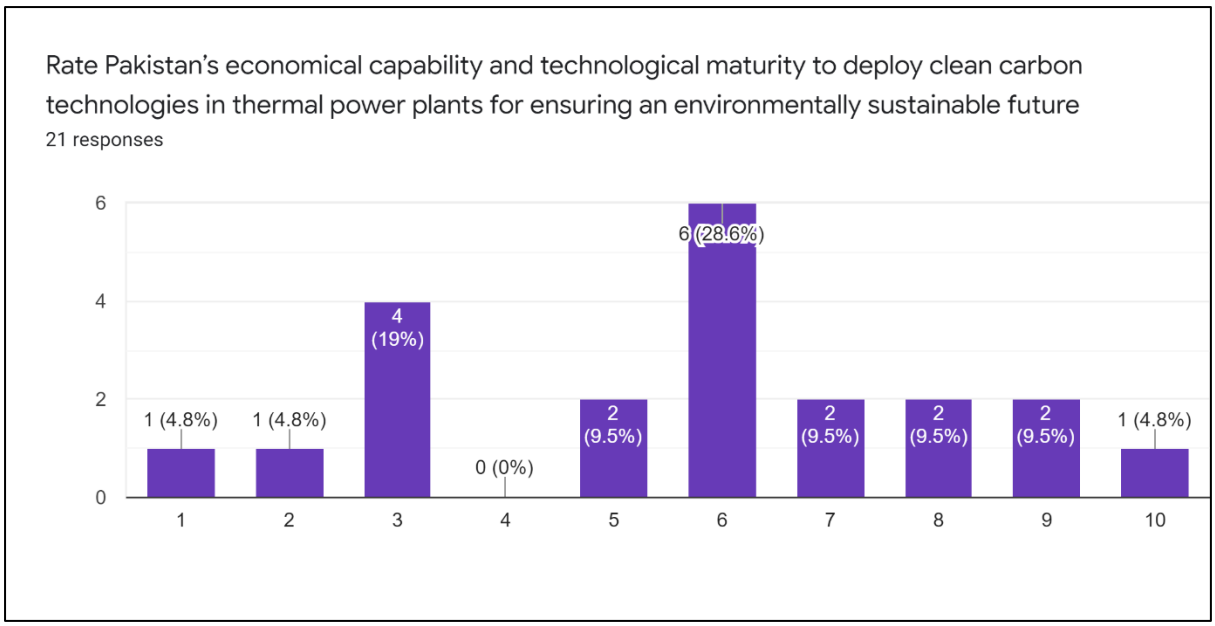
3) In comparison to energy supplies, demand side management techniques are overshadowed in Pakistan" How much do you agree with this statement? (Rank on scale from 1-10).



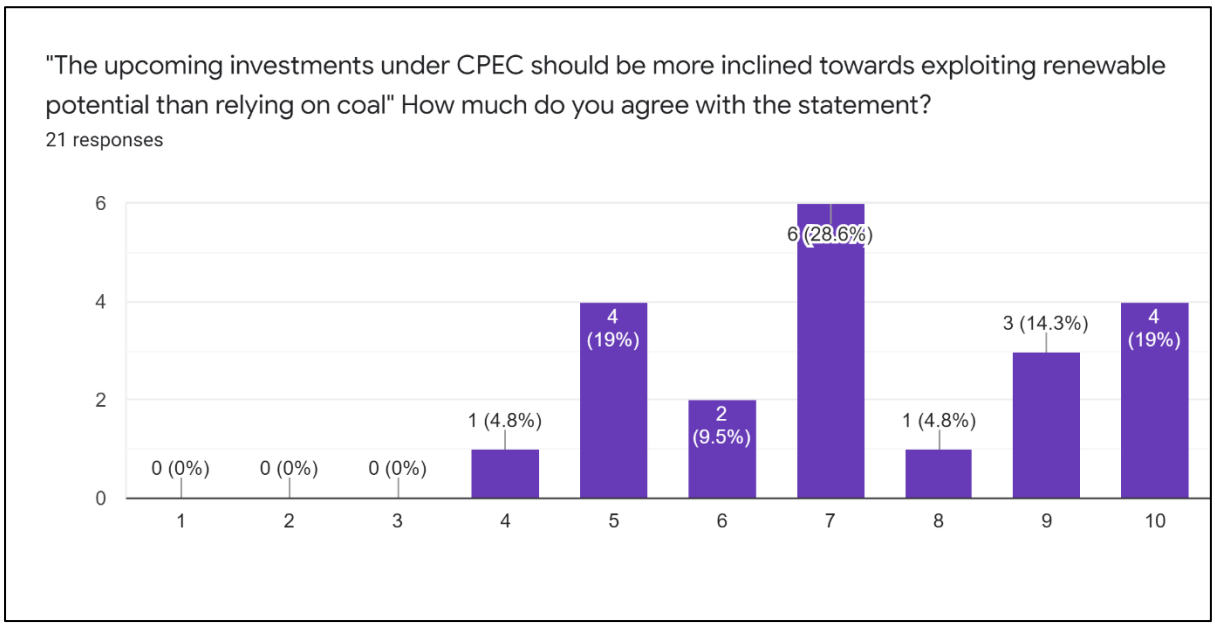
4) The Critical role of data and inclusive modeling based decisions for policymaking is undermined in Pakistan" How much do you agree with this statement? (Rank on scale from 1-10)



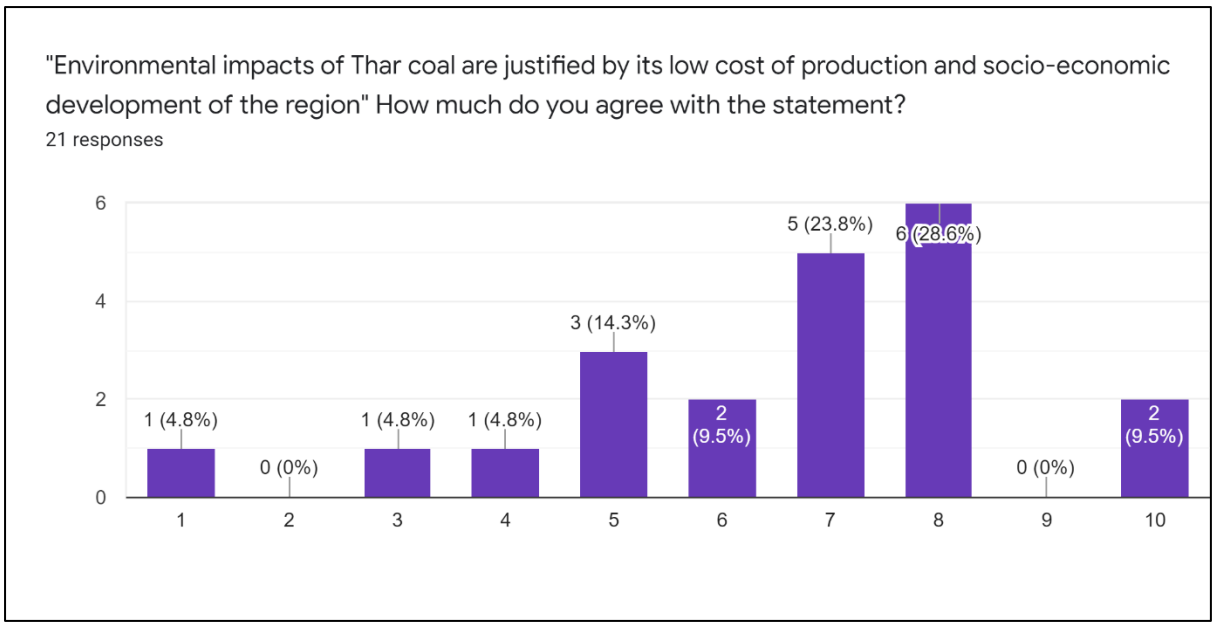
5) Rate Pakistan's economical capability and technological maturity to deploy clean carbon technologies in thermal power plants for ensuring an environmentally sustainable future. (Rank on scale from 1-10)



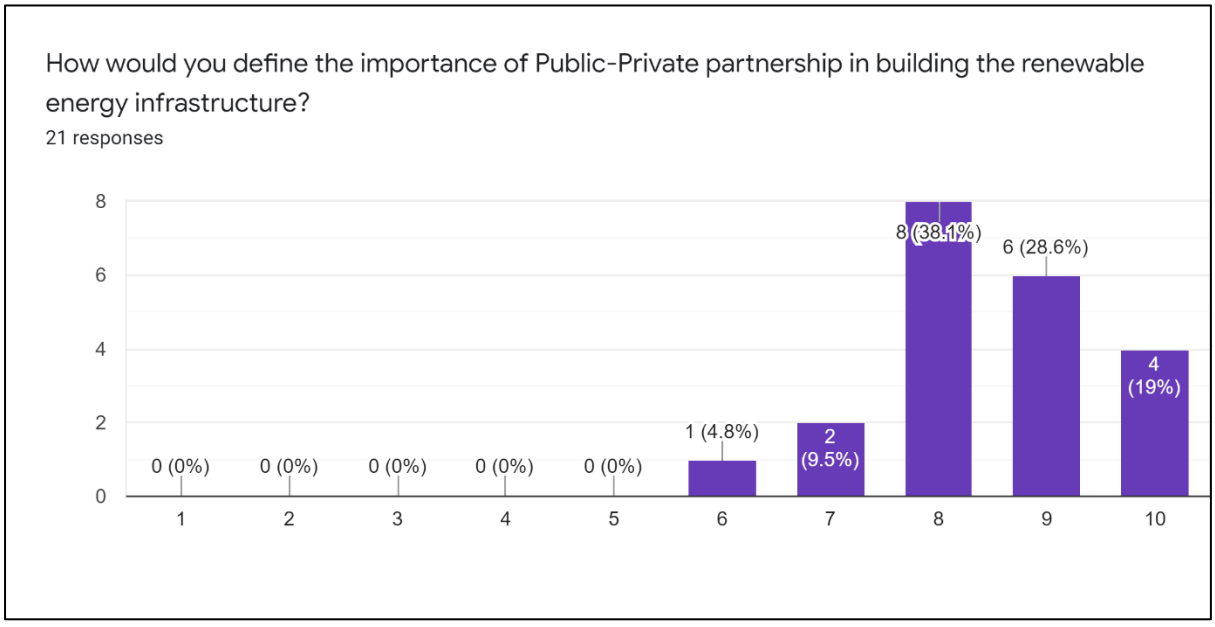
6) "The upcoming investments under CPEC should be more inclined towards exploiting renewable potential than relying on coal" How much do you agree with the statement? (Rank on scale from 1-10)



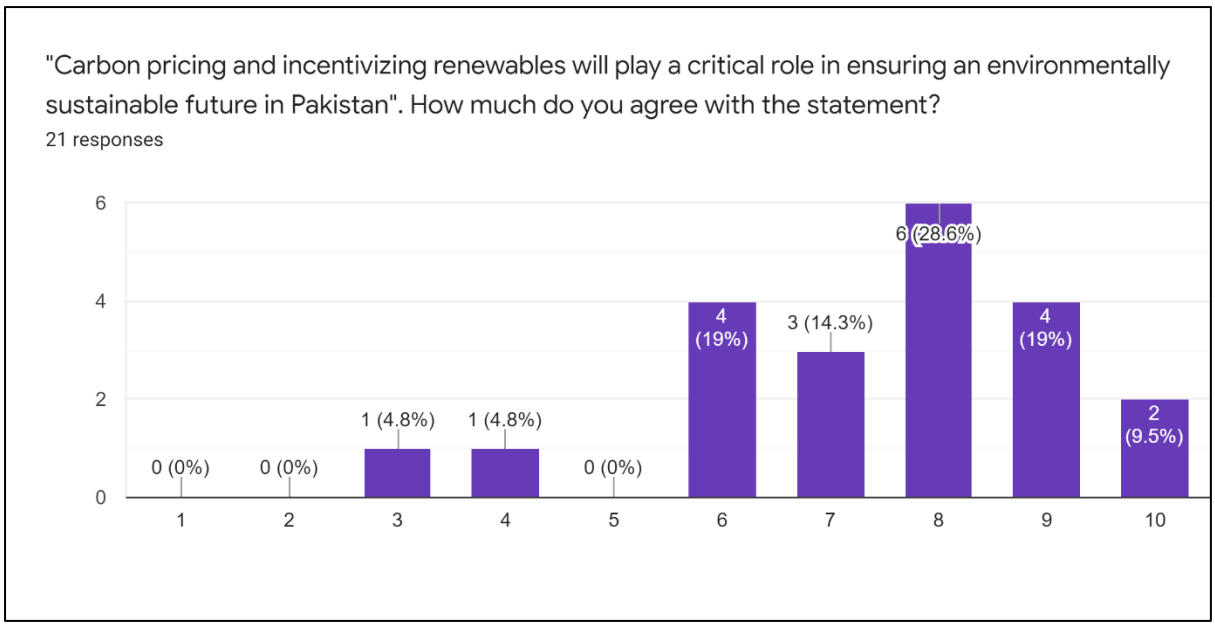
7) Environmental impacts of Thar coal are justified by its low cost of production and socio-economic development of the region" How much do you agree with the statement? (Rank on scale from 1-10)



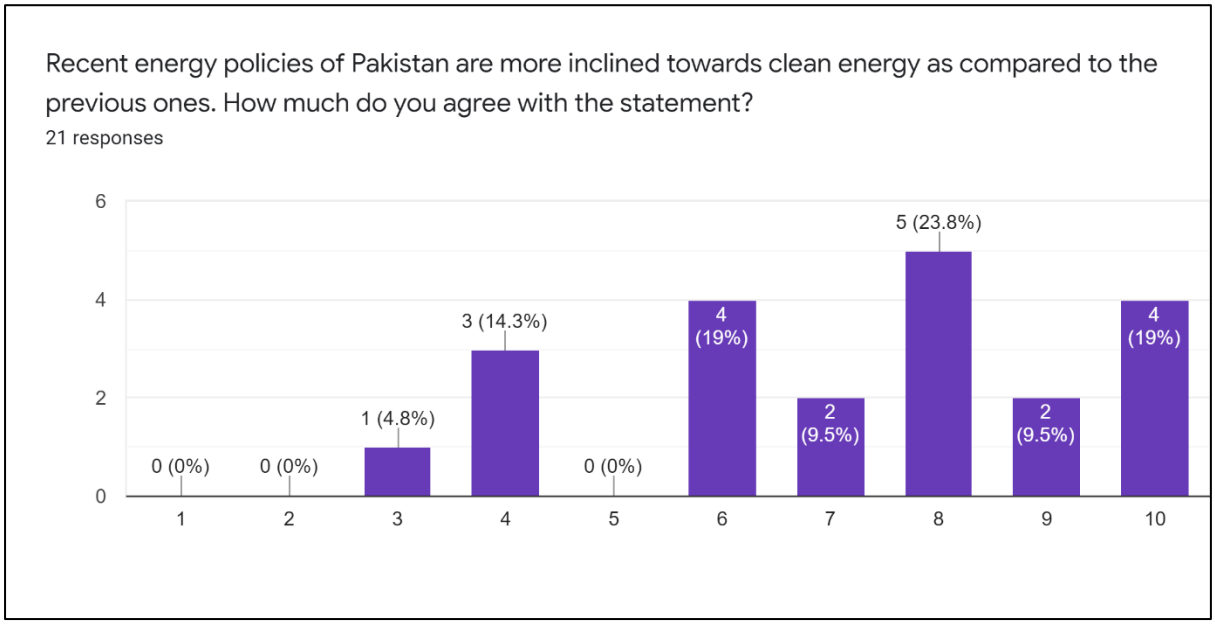
8) How would you define the importance of Public-Private partnership in building the renewable energy infrastructure? (Rank on scale from 1-10)



9) Carbon pricing and incentivizing renewables will play a critical role in ensuring an environmentally sustainable future in Pakistan". How much do you agree with the statement? (Rank on scale from 1-10)



10) Recent energy policies of Pakistan are more inclined towards clean energy as compared to the previous ones. How much do you agree with the statement? (Rank on scale from 1-10)



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