Dr Talha Manzoor
Assistant Professor and Associate Director (Operations)
Centre for Water Informatics and Technology (WIT), LUMS

Nexus Summit 2024 : Harmonizing Energy, Water and Agriculture Systems for a Low Emissions Future, March 7th, 2024

COMMITTED

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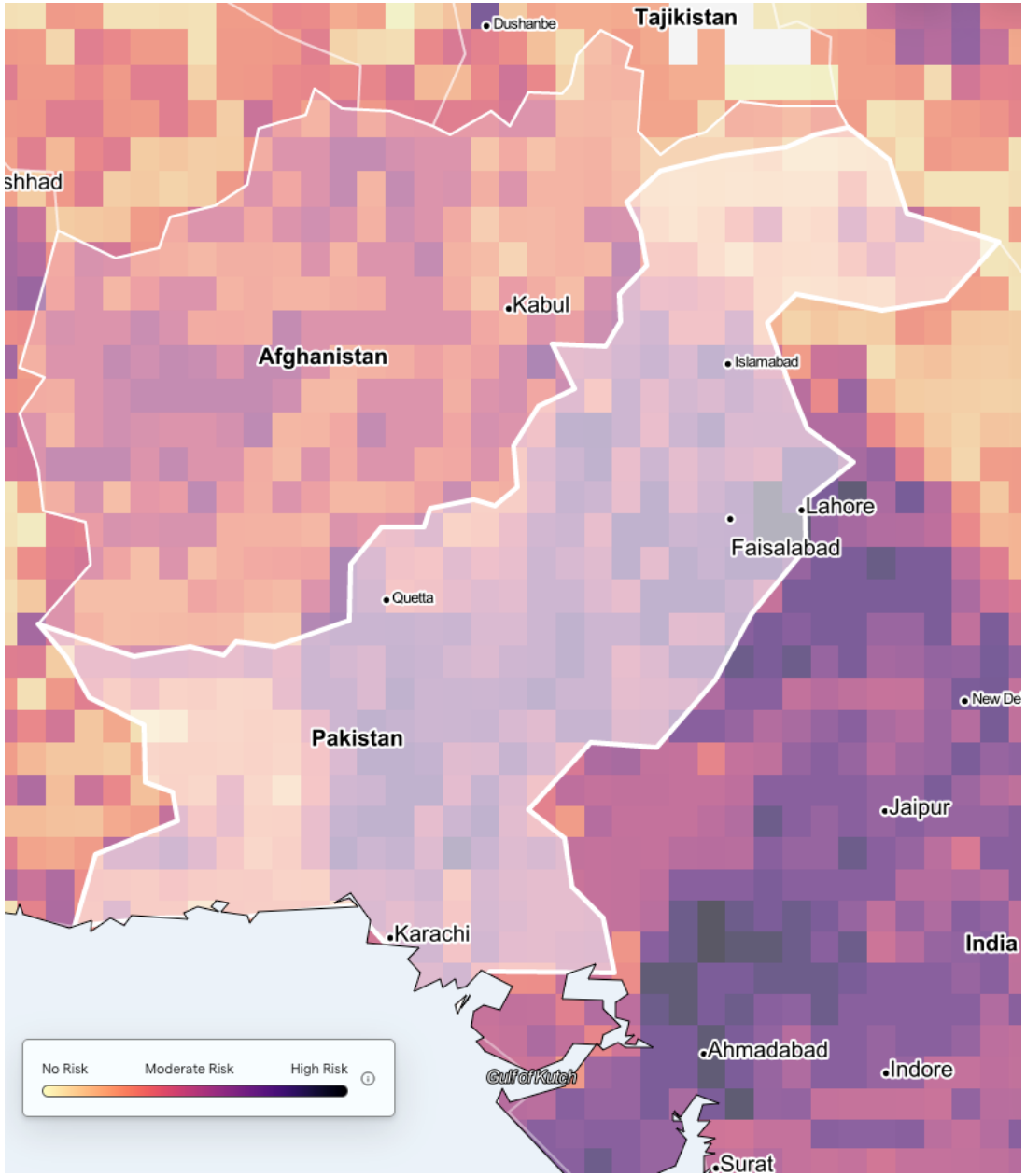
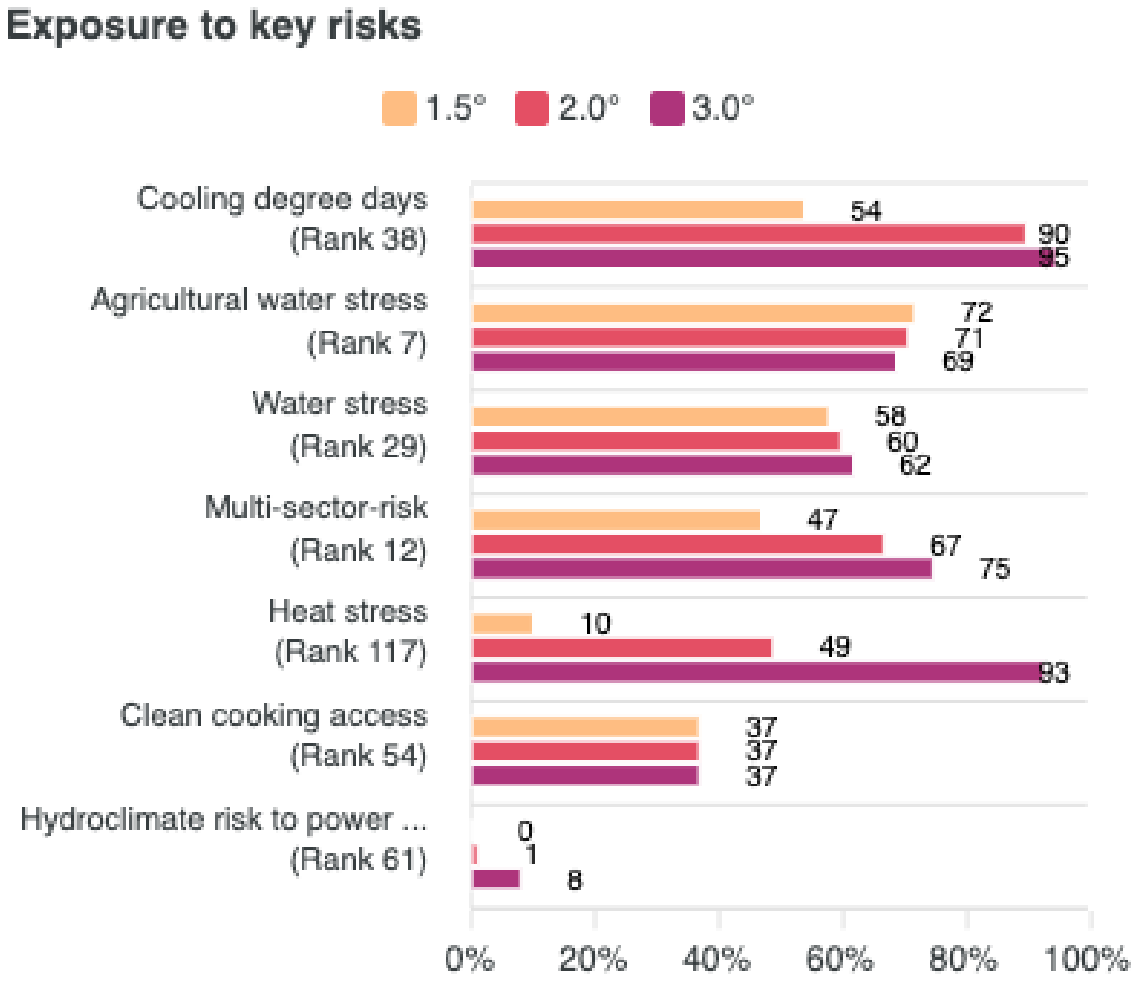
Funded by DG CLIMA

Pakistan - Exposure to key risks





Byers et al. 2018
More details at hotspot-explorer.org

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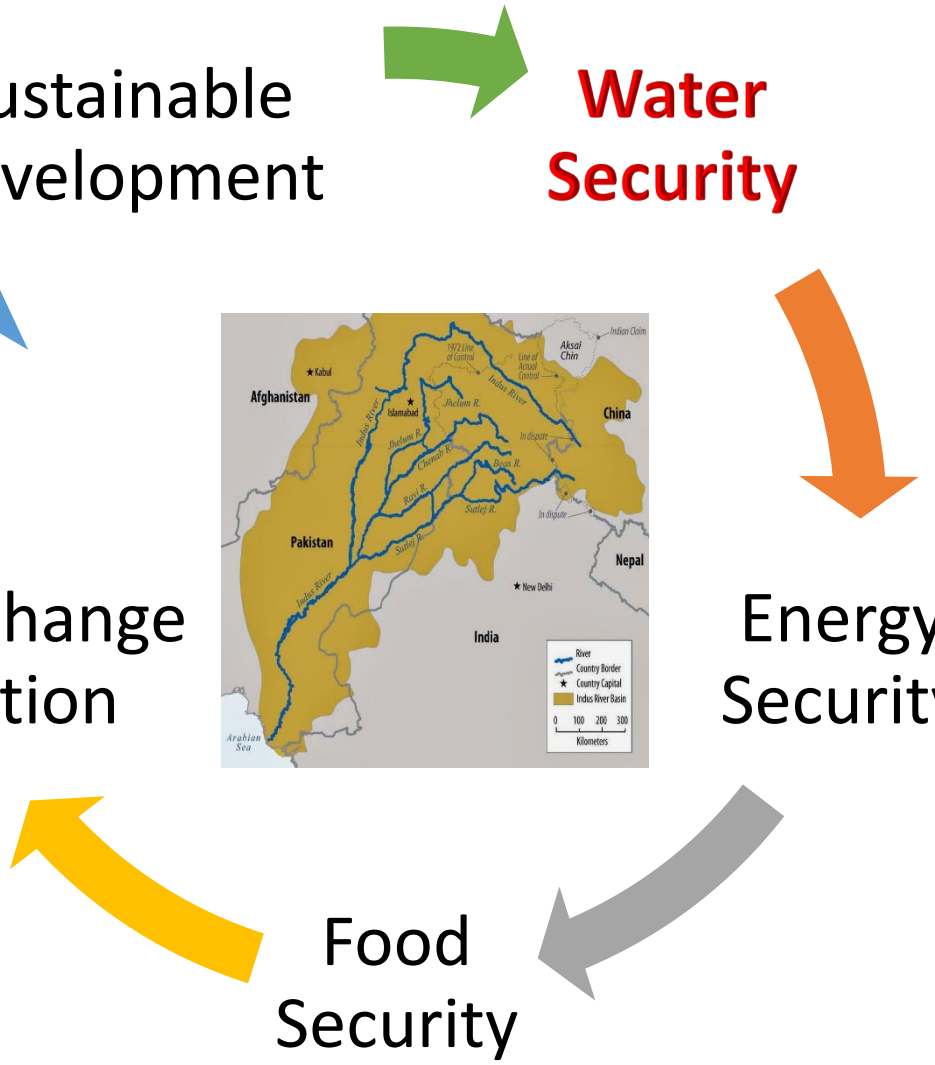
- 2022 unprecedented floods ravaged more than 35% of Pakistan
- killing more than 1,700 people
- 35 million displaced or affected
- > 10 billion dollars of damages and economic losses.



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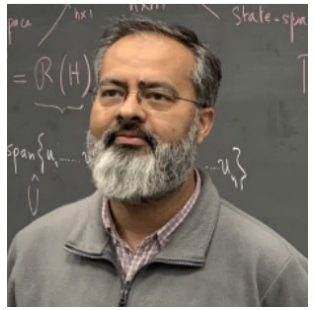
Team and Roles

- Dr. Abubakr Muhammad - Lead
- Dr. Talha Manzoor – Co-lead
- Joudat Khalil – Team Lead and Coordinator
- Dr. Muhammad Awais – Liaison with IIASA
- Nawaal Siddique – Research Assistant

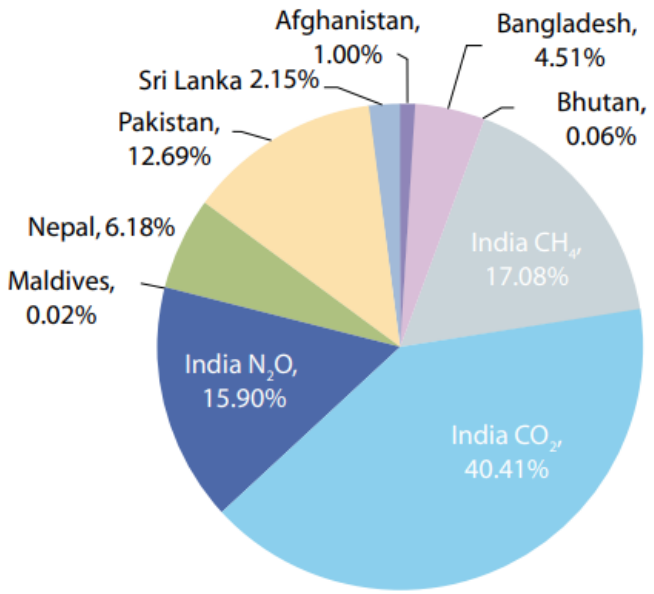


Former Affiliates

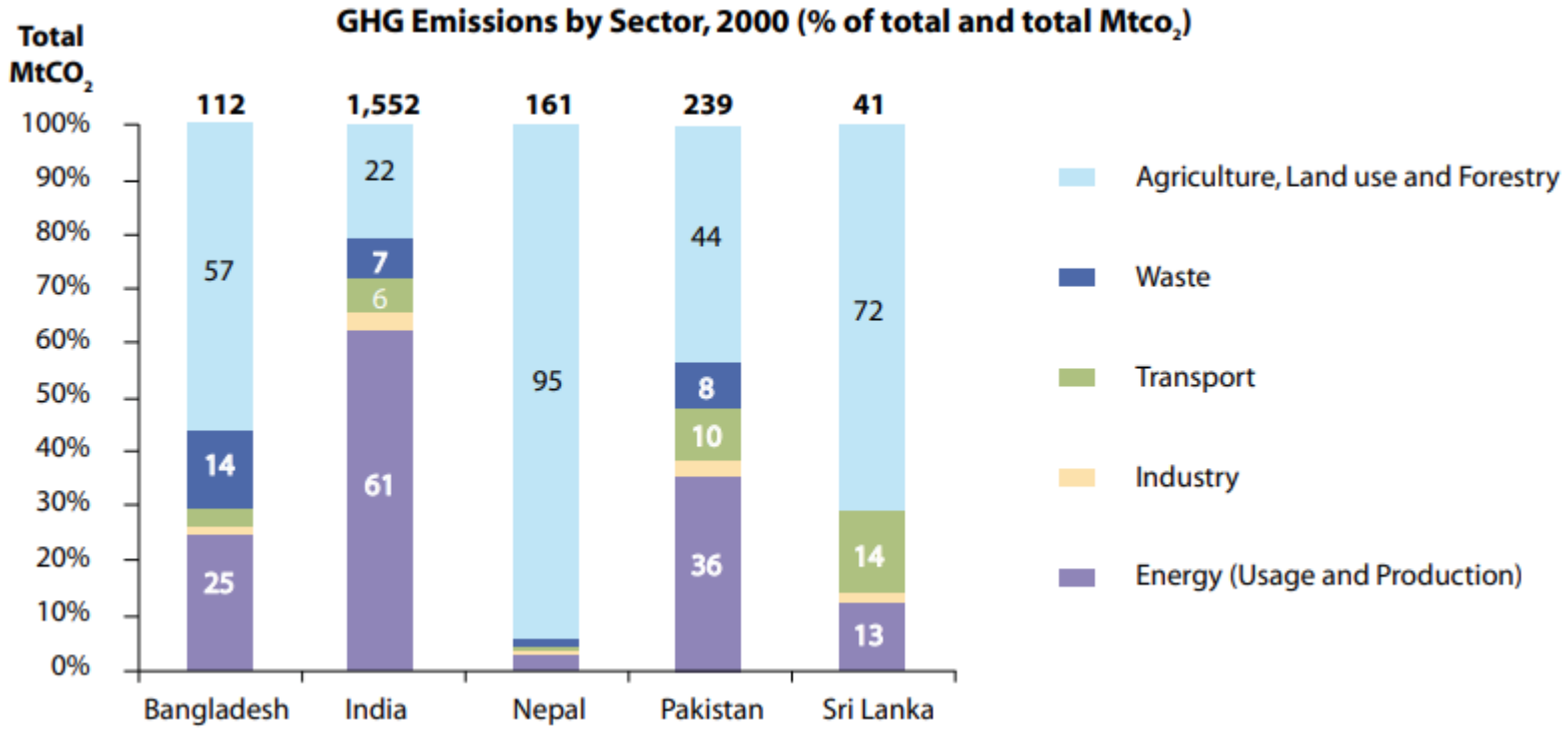
- Dr. Nadia Ayub – Visiting Fellow (Climate Smart Agriculture)
- Abdul Majid – Intern

Greenhouse Gas Emissions in South Asia

Greenhouse Gas Contributions by Country in South Asia, 2020



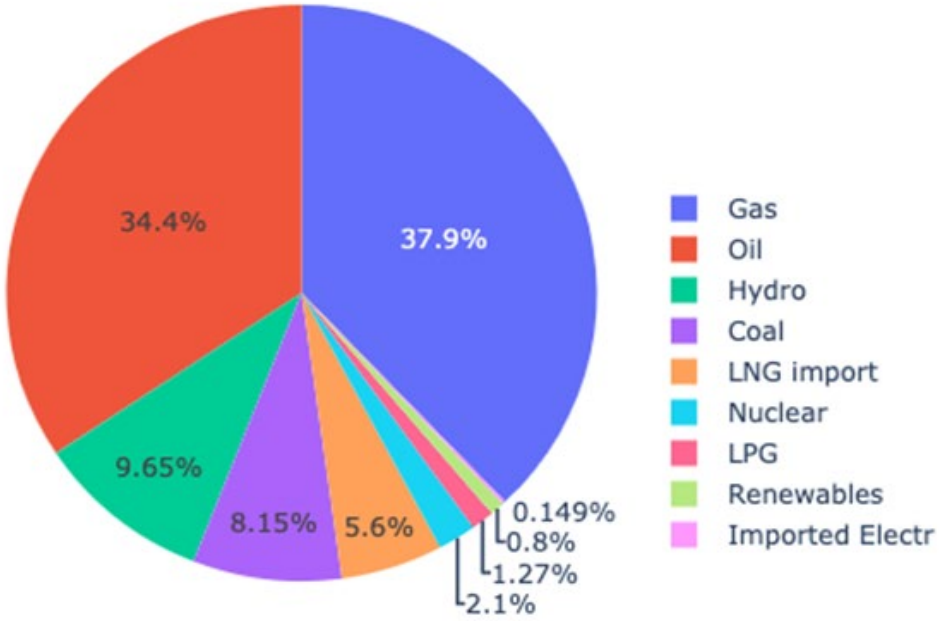
Contributions to Greenhouse Gas Emissions by sector and Country in South Asia



World Resource Institute (WRI), 2009

Overview of Pakistan's Energy System

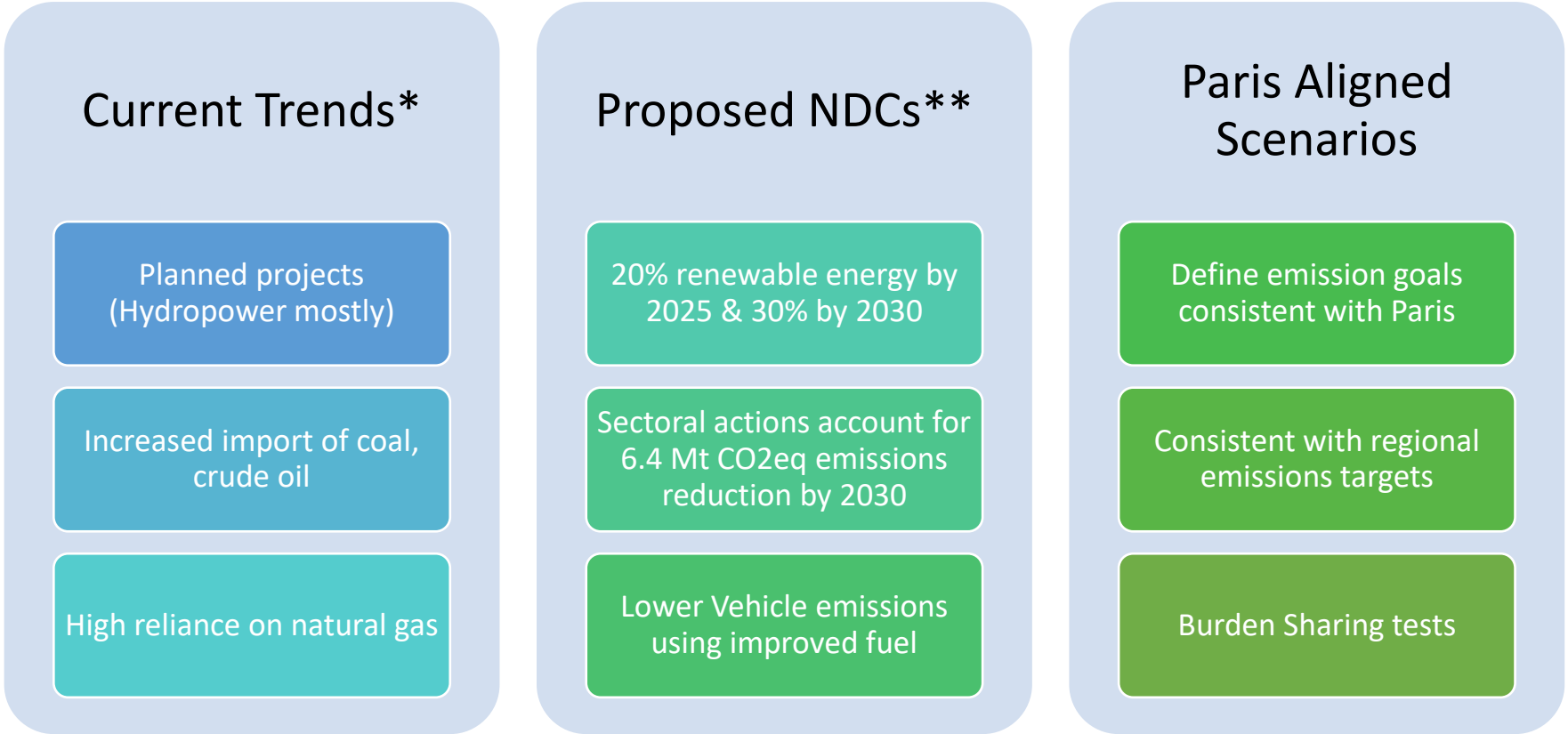
- Reliance on oil and gas in the energy mix
- Underutilization of renewable resources
- About 27% of the population lack access to electricity and 71% population lack access to clean cooking facilities
- Circular debt hampers smooth functioning of the system
- Weak governance of distribution companies
- Energy conservation and efficiency requires special emphasis



Primary Energy Supply by Source (2020/2021)
Source: National Electric Power Regulatory Authority (NEPRA) Report

MESSAGEix-Pakistan

"National-level energy model developed using the MESSAGEix framework to generate sustainable pathways for a low emission future for Pakistan"



Emissions Analysis using MESSAGEix: Input and Output Data

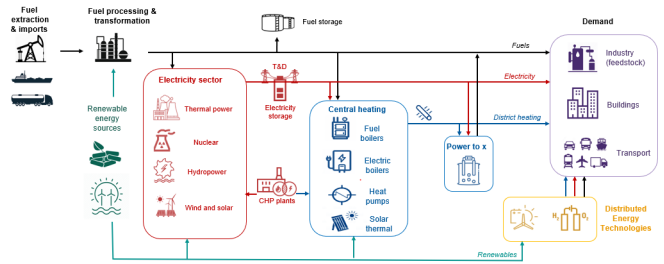
Model input data and output results

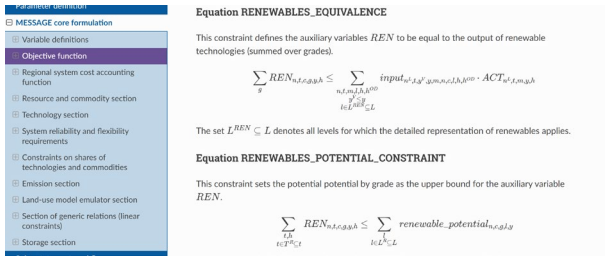
- Technology-rich, bottom-up model
- Suitable for analyzing energy transitions and GHG scenarios over several decades

Input data & Assumptions

- Technologies & resources
- Technical data (lifetime, capacity factor, efficiencies)
- Economic data (capital costs, O&M cost, discount rate)
- Emission factors
- Fossil fuel reserves & resources
- Renewable potential
- Energy balances (historical generation & activity)
- Demand for energy services (Long-term forecasting)

Core Model





Model Output

- Installed capacities
- Activities, generation & losses
- GHG & other Emissions
- Sectoral transitions (e.g electricity)
- Final & primary energy
- Share of renewables
- Energy import/export
- Energy Prices

Planned Tasks/On-going activities

Defining Research Perspective

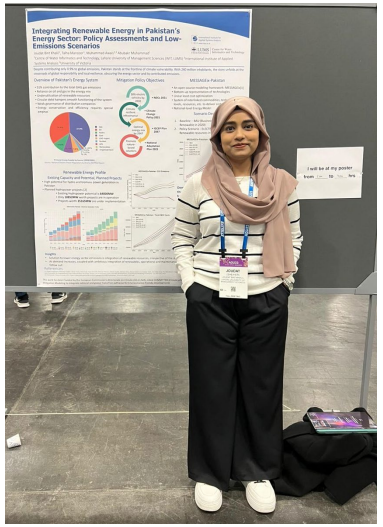
- Convincing narrative on co-benefits of low emissions for Pakistan
  - Sustainability – Mitigation nexus
- Emissions burden sharing with regional partners e.g India, China

Sectoral Enhancement

- Using previous work expanding further sectors e.g agriculture sector transition
- Improving spatial & temporal resolution

Capacity Building

- Capacity building of modelling team at LUMS by IIASA
- Stakeholder training workshops on modelling & policy dialogues
- Contributions to cross-country model-policy activities



Integrating Renewable Energy in Pakistan's Energy Sector: Policy Assessments and Low-Emissions Scenarios

International Institute for Applied Systems Analysis IIASA www.iiasa.ac.at

LUMS A Not-for-Profit University | Centre for Water Informatics and Technology

Joudat Bint Khalil[1], Talha Manzoor[1], Muhammad Awais[2,3] Abubakr Muhammad[1]

[1]Centre of Water Informatics and Technology, Lahore University of Management Sciences (WIT, LUMS) [2]International Institute of Applied Systems Analysis [3]University of Victoria

Despite contributing only 0.9% to global emissions, Pakistan stands at the frontline of climate vulnerability. With 240 million inhabitants, the story unfolds at the crossroads of global responsibility and local resilience, obscuring the energy sector and its contributed emissions.

American Geophysical Union (AGU) 2023 – December 2023, San Francisco

Summer Mentorship Program – Summer 2023, WIT LUMS

Join the Team

For Existing Opportunities Visit

https://wit.lums.edu.pk/careers

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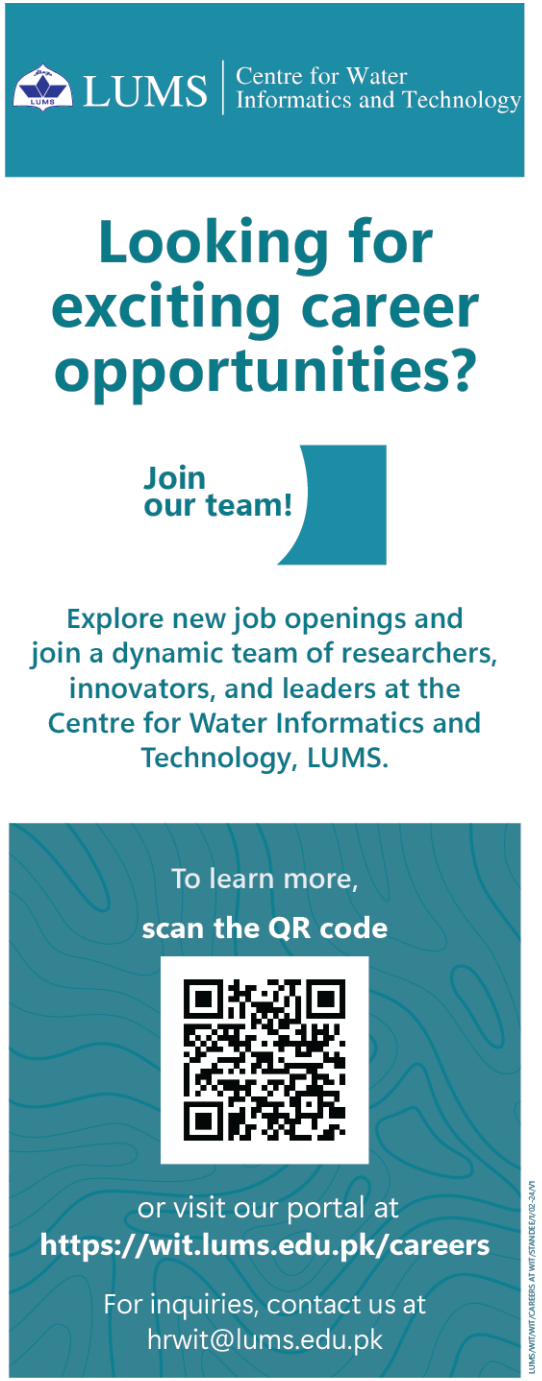

Time	Speaker	Title
09:30 AM - 10:00 AM	**Registration**	
10:00 AM - 10:15 AM	Dr. Tariq Jadoon Provost, LUMS	Opening Remarks
10:15 AM - 10:25 AM	Stephanie Solf Junior Researcher, Netherlands Environmental Assessment Agency (PBL), Netherlands	Introduction to the COMMITTED project
10:25 AM - 10:35 AM	Dr. Talha Manzoor Assistant Professor and Associate Director (Operations), Centre for Water Informatics & Technology, LUMS	Introduction to the LUMS National Model Development Team
10:40 AM - 11:10 AM	**Panelists:** 1. Ms. Aisha Khan, Chief Executive, Civil Society Coalition for Climate Change 2. Mr. Bilal Anwar, CEO, National Disaster & Risk Management Fund 3. Mr. Saad Hayat Tamman, Advisor to Living Indus Initiative **Moderator:** Dr. Fazilda Nabeel Climate Change and Water Resource Governance Specialist, Living Indus Initiative	**Panel Session** Perspectives from the Frontlines: Pakistan's delegates at CoP28
11:10 AM - 11:30 AM	**Tea break**	
11:35 AM - 12:05 AM	Dr. Abubakr Muhammad Associate Professor, Dept. of Electrical Engineering Executive Director, Center for Water Informatics & Technology (WIT)	Transformation of Pakistan's Agriculture and Food Sector Under Climate Change
12:10 PM - 12:40 PM	Dr. Asif Khan Water and Climate Change Consultant, Asian Development Bank (ADB)	Climate Change and Agriculture Governance in Pakistan
12:45 PM - 01:15 PM	Dr. Lara Aleluia Reis Scientist, Euro-Mediterranean Center on Climate Change (CMCC), Italy	COMMITTED Scenario Design: Transition from NDCs to national net-zero commitments.
01:15 PM - 02:15 PM	**Lunch Break**	
02:15 PM - 04:15 PM	**Moderator:** Dr. Abubakr Muhammad Associate Professor, Dept. of Electrical Engineering Executive Director, Center for Water Informatics & Technology (WIT)	**Round Table Discussion** Challenges and Opportunities on the pathway to Net Zero. Focus on National Planning Frameworks
04:15 PM - 04:30 PM	Mr. Nauman Zaffar Director, LUMS Center For Entrepreneurship (LCE), Professor, Electrical Engineering, LUMS	Reflection
04:30 PM - 05:00 PM	**Evening Tea**	

Time	Speaker	Title
08:30 AM - 09:00 AM	**Registration**	
09:00 AM - 09:30 AM	Dr. Isabela Schmidt Tagomori Researcher, Netherlands Environmental Assessment Agency (PBL), Netherlands	The Climate, Land, Energy, Water (CLEW) Nexus
09:35 AM - 10:05 AM	Dr. Fahad Saeed Climate Scientist and Regional Lead: South Asia and the Middle East, Climate Analytics	Assessment of Climate Change Impact on Pakistan
10:10 AM - 10:40 AM	Dr. Naveed Arshad Director, National Center in Big Data and Cloud Computing, Founding Member, LUMS Energy Institute, Associate Professor, Department of Computer Science, LUMS	Transformation of Pakistan's Energy Sector Under the Climate Change Threat
10:40 AM - 11:00 AM	**Tea break**	
11:00 AM - 11:20 AM	Dr. Muhammad Awais Researcher, International Institute for Applied Systems Analysis	Introduction to Integrated Assessment Modelling
11:25 AM - 11:45 AM	Dr. Talha Manzoor Assistant Professor and Associate Director (Operations), Centre for Water Informatics & Technology, LUMS	Integrated Assessment Modeling for Sustainable Transformations in the Indus
11:50 AM - 12:10 PM	Dr. Hasan Arshad Nasir Co-founder and Head of Energy Storage, Zyp Technologies	Indigenous route to electric mobility in Pakistan
12:15 PM - 12:35 PM	Dr. Hassan Abbas Khan	Offgrid electrification in Pakistan and beyond: status, trends, and opportunities
	Associate Professor of Electrical Engineering, Founding Member LUMS Energy Institute, Director of Energy and Power Systems Lab, LUMS.	
12:45 PM - 01:00 PM		Group Photo
01:00 PM - 02:15 PM	**Lunch Break and Friday Prayer**	
02:15 AM - 04:00 PM	**Moderators** Dr. Muhammad Awais, IIASA Mr. Hassan Niazi, PNNL	**Co-creation Activity** Scenario Development for Low Emissions Futures in Pakistan
04:00 PM - 04:15 PM	Dr. Asif Khan Water and Climate Change Consultant, Asian Development Bank (ADB)	Reflection
04:15 PM - 04:30 PM	Dr. Walther Schwarzacher Dean, SBA School of Science and Engineering, LUMS	Closing Remarks
04:30 PM - 05:00 PM	**Evening Tea**	

Syed Babar Ali School of Science and Engineering (SBASSE)
NICL Auditorium, - National Incubation Centre, Basement.

PEPSI Dining Centre (PDC)

LUMS Masjid

For Queries/Assistance

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Workshop Webpage

https://wit.lums.edu.pk/nexsum2024

THANK YOU