A. Introduction

1. Climate change is a global issue that demands policies addressing both mitigation and resilient infrastructure. While carbon emissions from power generation and transportation are major contributors worldwide, the transition from fossil fuel dependency to clean energy also presents complex social challenges. The energy transition must be accompanied by a thorough assessment of their impacts, particularly for low-income, vulnerable, and marginalized populations, to ensure that they do not exacerbate energy poverty or create other negative social impacts. A well-managed and inclusive energy transition presents significant opportunities for improving access to and affordability of energy services, as well as increasing employment and livelihoods.

2. An inclusive energy transition refers to the process of transitioning from fossil fuel-based energy systems to low and zero-carbon, sustainable and renewable energy sources, in a manner that prioritizes social equity, inclusivity, and environmental sustainability, to ensure that all segments of society, particularly vulnerable and marginalized communities, are actively involved in and benefit from the transition.

Energy Transitions in the Subregion

3. Bhutan and Nepal both have predominantly hydro generation in their generation mix, with almost similar generating capacity (Bhutan - 3473 MW[1], Nepal - 3157 MW[2]). (Bhutan Power System Operator, 2024, Nepal Electricity Authority, 2024) Whereas Nepal has an NDC target of achieving net zero by 2050[3], Bhutan's includes maintaining carbon neutrality, a target it has upheld since 2009[4].

4. Bhutan is actively exploring alternative power sources due to concerns about energy security, seasonal fluctuations in river flow impacting hydropower generation, climate change, and the need to diversify its energy mix to meet growing demand across different sectors. Bhutan's 13th Five Year Plan[5] has an ambitious target of 523 MW of solar and wind generation by 2029. The Alternative Renewable Energy Policy (2013)[6] targets an achievement of a minimum of 20 MW of renewable energy generation by 2025, with a mix of solar (5MW), wind (5MW), biomass (5MW) power sources, Biomass Energy System (3 MW equivalent) and Solar Thermal System (3 MW equivalent) with a focus on further increasing solar capacity to potentially reach 300MW by 2026. The policy prioritizes community-based initiatives in remote areas and exploring the use of electric vehicles to diversify the energy mix.

5. In Nepal, hydro projects have been constructed by the Nepal Electricity Authority (NEA), a Government undertaking and Independent Power Producers, through private funding, having PPAs with the NEA, and, lately, joint sector projects with public sector undertakings of the Government of India. According to the NEA (2024) installed electricity generating capacity in Nepal is 3,157 megawatts (MW), with a renewable capacity of 98.3%. The total capacity includes 2,990 MW from hydropower, 107 MW from solar, 53 MW from thermal and 6 MW from bagasse. Targets in the Nationally Determined Contributions under the Paris Agreement include increasing e-vehicles to cover 90% of all private passenger vehicle sales, including two-wheelers and 60% of all four-wheeler public passenger vehicle sales by 2030. In residential cooking, Nepal has set targets for 2025, to ensure 25% of households use electric stoves as their primary mode of cooking and to install 500,000 improved cook stoves, specifically in rural areas.

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[1] Druk Green Power Corporation. *Annual Report 2023*. https://www.drukgreen.bt/wp-content/uploads/2024/09/DGPC-annual-report-2023.pdf
[2] Nepal Electricity Authority. *Annual Report 2023-2024*. 21 Aug 2024. https://www.nea.org.np/annual_report
[3] Climate Action Tracker. *CAT Climate Target Update Tracker*. 8 Dec 2020. https://climateactiontracker.org/climate-target-update-tracker/nepal/
[4] Kingdom of Bhutan. *Second Nationally Determined Contribution*. 5 Jun 2021. https://unfccc.int/sites/default/files/NDC/2022-06/Second%20NDC%20Bhutan.pdf
[5] Royal Government of Bhutan. 13th Five Year Plan 2024-2029. https://www.pmo.gov.bt/wp-content/uploads/2019/09/13-FYP.pdf
[6] Royal Government of Bhutan. *Alternative Renewable Energy Policy*. 8 Apr 2013. www.moenr.gov.bt/wp-content/uploads/2017/07/Final-Alternative-RE-Policy-April-2013.pdf

Green Jobs and Skilling

6. Bhutan and Nepal share structural challenges in employment and social protection. Nepal's workforce is dominated by agriculture (63%)[7], while Bhutan has a more balanced labour force between agriculture (44%) and services (78.5% in urban areas).[8] Unemployment rates are higher for women in both countries. Bhutan's hydropower sector, despite contributing significantly to GDP, employs less than 1% of the workforce,[9] and Nepal has demonstrated some potential in green jobs growth through waste-to-energy projects and e-mobility programs.

7. There are various initiatives underway to expand Nepal's green economy including the E-Mobility Program supported by ADB to create skilled employment opportunities[10], promoting circular waste management, and targeting youth unemployment by providing vocational training to participants from disadvantaged backgrounds. In Bhutan, employment in renewable energy projects is starting to emerge. Bhutan's first utility-scale solar project, the Renewable Energy for Climate Resilience Project in Sephu funded by the ADB, apart from a workers employed during the construction phase and a small crew of fulltime employees required for the for the operations phase, is expected to contribute to business expansion and create employment opportunities for local communities, such as contract work for maintenance tasks[11].

8. Social protection remains limited in both nations. Nepal has 662,201 workers in its Social Security Fund[12] and its social protection expenditure stood at 3.9% of GDP in 2018/19, with the highest proportion allocated to the Old Age Basic Pension. However, Nepal's social protection still only covers 17% of the population, and informal workers, who make up 84.6% of the workforce, remain largely excluded from social security.[13] Bhutan is still in the early stages of attempting to establish a structured system. The Government of Bhutan aims to address this gap under the 13th Five Year Plan by developing a structured social protection framework.[14]

B. Objectives and Participants

9. The Sub-regional Workshop is part of an ADB technical assistance project aimed at promoting inclusive strategies for a low-carbon energy transition in Bhutan and Nepal and other South Asian Member Countries. The workshop will facilitate knowledge sharing and collaboration among government agencies, ADB project implementers, and other key energy stakeholders. The Subregional Workshop follows and builds on the main themes, topics and insights from the South Asia regional conference in Galle, Sri Lanka and the India national conference in Chennai, India in 2024. Specifically, it will examine in greater depth the energy transitions in the respective countries, as well as the similarities and differences, focusing on inclusive clean energy solutions.

C. Key Conference Sessions

10. The main themes of the conference sessions are outlined below.

Session 1: The Energy and Socio-Economic Policy Environment. Session 1 will provide an overview of the key energy and socio-economic policies designed to address the interconnected challenges for an inclusive energy transition in the subregion.

Session 2: Cultivating the workforce for the green economy transition and catalyzing local economies. Session 2 will provide strategies to address the challenges of cultivating a workforce equipped for the green economy transition and highlight the opportunities for community development through employment creation and MSME development.

Session 3: Frontier Technologies: Techno-Economic Challenges and Socio-Technical Approaches. Session 3 will examine the multifaceted challenges faced when implementing new renewable energy technologies, making significant capital investments in related infrastructure and the interconnected nature of economic, technical, and social factors in this context.

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[7] World Bank. *Nepal Jobs Diagnostic*. Washington, DC: World Bank, 2018. https://documents.worldbank.org
[8] World Bank. *Bhutan Labor Market Assessment Report*. Washington, DC: World Bank, 2020. https://documents.worldbank.org
[9] International Finance Corporation. *New World Bank Group Strategy for Bhutan focuses on Job Creation*. 13 Jan 2021. https://www.ifc.org/en/stories/2021/new-world-bank-group-strategy-for-bhutan-focuses-on-job-creation
[10] Asian Development Bank (ADB). *Nepal: E-Mobility Program – Technical Assistance Report*. 2024.
[11] ADB. *Kingdom of Bhutan: Renewable Energy for Climate Resilience Project*. Oct 2022. https://www.adb.org/sites/default/files/project-documents/54142/54142-001-pam-en.pdf.
[12] Human Rights Watch. *Nepal's Social Protection System Reinforces Inequality*. 1 Feb 2023. https://www.hrw.org/news/2023/02/01/nepals-social-protection-system-reinforces-inequality
[13] Social Protection & Public Finance Management. *Nepal.* https://socialprotection-pfm.org/partner-countries/nepal/#:~:text=Social%20protection%20is%20a%20fundamental,for%20the%20Government%20of%20Nepal.
[14] The Bhutanese. *Government aims to establish a social protection system in 13th plan to protect the vulnerable*. 15 May 2024. https://thebhutanese.bt/government-aims-to-establish-a-social-protection-system-in-13th-plan-to-protect-the-vulnerable/

D. Program at a Glance

DAY 1	
08:00–08:30	**ARRIVAL & NETWORKING**
08:30-09:00	**WELCOME, OPENING REMARKS & SPECIAL ADDRESS**
09:00-10:00	**SESSION 1** | **THE ENERGY AND SOCIO-ECONOMIC POLICY ENVIRONMENT** **PANEL PRESENTATION 1** Topics include: *Policy Innovation for Access and Affordability in Bhutan; Policies for Human Resource Preparation in Nepal; Change Management in South Asia* **OPEN FORUM & LIVE POLLING OF SESSION 1**
10:00-10:30	**NETWORKING BREAK**
10:30-11:20	**SESSION 2** | **CULTIVATING THE WORKFORCE FOR THE GREEN ECONOMY TRANSITION AND CATALYZING LOCAL ECONOMIES** **PANEL PRESENTATION 2** Topics include: *Pathways for Skills Development; Young People and Future-Ready Skills; Utility Perspectives on Workforce Requirements; Optimizing Social Protection Programs; Last Mile MSME Development*
11:20-11:35	**CASE STUDY 1** Nepal: Last Mile Electrification and MSME Development
11:35-11:45	**OPEN FORUM & LIVE POLLING OF SESSION 2**
11:45-12:30	**BREAKOUT SESSION: WORKING GROUPS**
12:30-13:30	**LUNCH NETWORKING BREAK**
13:30-14:00	**WORKING GROUP REPORT BACK AND SUMMARY**
14:00-14:40	**SESSION 3** | **FRONTIER TECHNOLOGIES: TECHNO-ECONOMIC CHALLENGES AND SOCIO-TECHNICAL APPROACHES** **PANEL PRESENTATION 3** Topics include: *Technology innovation in South Asia; Role of the Private Sector in Funding; Lessons from Hydropower Generation in Bhutan; Socio-technical Systems*
14:40-14:55	**CASE STUDY 2** Bhutan: Renewable Energy for Climate Resilience
14:55-15:00	**OPEN FORUM & LIVE POLLING OF SESSION 3**
15:00-15:30	**NETWORKING BREAK**
15:30-17:00	**BREAKOUT SESSION: WORKING GROUPS**
18:00-20:00	**DINNER RECEPTION AND NETWORKING**

DAY 2	
08:30-09:00	**ARRIVAL AND NETWORKING**
09:00-10:00	**LECTURE: INTERNATIONAL EXPERIENCES**
10:00-10:30	**SUMMARY AND NEXT STEPS**
10:30-11:00	**NETWORKING BREAK**
11:00-16:00	**FIELD VISIT TO: DRUK GYALPO'S INSTITUTE ROOFTOP SOLAR PV SITE; THE MUSEUM OF LIGHT**

E. Detailed Agenda

DAY 1		
08:00-08:30	**ARRIVAL & NETWORKING**	
08:30-09:00	**WELCOME, OPENING REMARKS & SPECIAL ADDRESS**	
	• Conference Chair: Reihana Mohideen, Principal Advisor, Inclusive Energy Transitions, Nossal Institute for Global Health, The University of Melbourne (UoM)	
	• Opening Remarks: Shokhimardon Musaev, Country Operations Head, Bhutan Resident Mission, ADB	
	• Priyantha Wijayatunga, Senior Director, Energy Sector Group (SG-ENE), ADB	
	• Francesco Tornieri, Principal Social Development Specialist (Social Inclusion) Human and Social Development Sector Group (SG-HSD), ADB	
	• Special Address: Dasho Karma Tshering, Secretary, Ministry of Energy and Natural Resources (MoENR), Government of Bhutan	
09:00-09:40	**CONFERENCE SESSIONS**	
	Program overview by Reihana Mohideen, UoM	
	SESSION 1 | **THE ENERGY AND SOCIO-ECONOMIC POLICY ENVIRONMENT**	
	***Objective**: To provide an overview of the key energy and socio-economic policies designed to address the interconnected challenges for an inclusive energy transition in the subregion.*	
	***Topics**: Policy Innovation for Access and Affordability in Bhutan; Policies for Human Resource Preparation in Nepal; Change Management in South Asia*	
	PANEL PRESENTATION 1	
	Moderator: Francesco Tornieri, ADB	
	a. Managing the Change: Insights from South Asia Region	• Priyantha Wijayatunga, ADB
	b. Bhutan: Innovative Governance Solutions to Increase Access and Improve Affordability	• Dawa Chhoedron, Chief Engineer, Department of Energy, MoENR, Government of Bhutan
	c. Nepal: Emerging Green Industries: Policies for Human Resource Preparation	• Tara Pradhan, Deputy Managing Director, Project Management Directorate, Nepal Electricity Authority, Government of Nepal
09:40-09:50	**OPEN FORUM**	
	LIVE POLLING OF SESSION 1	
09:50-10:00	**GROUP PHOTO**	
10:00-10:30	**NETWORKING BREAK**	
10:30-11:20	**SESSION 2** | **CULTIVATING THE WORKFORCE FOR THE GREEN ECONOMY TRANSITION AND CATALYZING LOCAL ECONOMIES**	
	***Objective**: To identify pathways to address the challenges of cultivating a future-ready workforce equipped for the green economy transition, highlight opportunities for local development, and examine the role of social protection.*	
	***Topics**: Pathways for Skills Development; Young People and Future-Ready Skills; Utility Perspectives on Workforce Requirements; Optimizing Social Protection Programs; Last Mile MSME Development*	
	PANEL PRESENTATION 2	
	Moderator: Shuvechha Khadka, Gender Equality and Social Inclusion Specialist, Nepal Resident Mission (NRM), ADB	
	a. Pathways for Acquiring Future-Ready Skills and Employment	• Sangay Dorji, Officiating Director, Department of Workforce and Planning, Ministry of Education and Skills Development, Government of Bhutan
	b. Equipping Young People with Future-Ready Skills	• Tenzin Dorji, Senior Engineer, De-suung Skilling Program (DSP) – Solar Initiative Bhutan
	c. Skills Expansion and Upskilling: A Utility Perspective	• Shiva Adhikary, Director, Human Resource Department, Administrative Directorate, Nepal Electricity Authority, Government of Nepal
	d. Optimizing Social Protection Programs	• Samreen Shabbaz, Social Development Consultant, ADB

11:20-11:35	**CASE STUDY 1**	
	A key priority of the AEPC is to improve electricity access through last-mile connectivity and advance the living standards of rural communities by promoting productive energy use and MSME development. Various subprojects linked to the ADB South Asia Subregional Economic Cooperation Power System Expansion Project provided electricity to remote areas, such as Jumal, in Karnall province, powered by mini-hydropower systems. This promoted local development through the establishment of a garment factory, bakeries and other small enterprises, with co-benefits for agriculture with the use of lift irrigation systems, local technology innovation for water-heating systems utilising off-peak hour electricity, women empowered through participation in decision making, etc. This case study discusses the approaches used and the lessons learned.	
	Nepal—Last Mile Electrification and MSME Development	• Nawa Raj Dhakal, Executive Director, Alternative Energy Promotion Center (AEPC), Government of Nepal
11:35-11:45	**OPEN FORUM**	
	LIVE POLLING OF SESSION 2	
11:45-12:30	**BREAKOUT SESSION: WORKING GROUPS**	
	Working Group Coordinator: Lachana Shresthacharya, Energy-GESI Consultant, NRM, ADB	
	Participants will break into working groups to discuss key themes of the sessions, with a focus on developing actionable recommendations.	
12:30-13:30	**LUNCH NETWORKING BREAK**	
13:30-14:00	**WORKING GROUP REPORT BACK AND SUMMARY**	
14:00-14:40	**SESSION 3**	**FRONTIER TECHNOLOGIES: TECHNO-ECONOMIC CHALLENGES AND SOCIO-TECHNICAL APPROACHES**
	Objective: *To examine the multifaceted challenges faced when implementing new renewable energy technologies, making significant capital investments in related infrastructure and the interconnected nature of economic, technical, and social factors in this context.*	
	Topics: *Technology innovation in South Asia; Role of the Private Sector in Funding; Lessons from Hydropower Generation in Bhutan; Socio-technical Systems, RE for Climate Resilience*	
	PANEL PRESENTATION 3	
	Moderator: Grishma Shah, Senior Project Officer (Energy), NRM, ADB	
	a. Technology Innovation in South Asia: Economic Feasibility and Long-Term Viability	• Pankaj Batra, Energy Transition and Reform Expert
	b. Nepal: Filling Funding Voids: Private Sector's Strategic Role	• Dinesh Dulal, Chief, Sustainable Energy Banking, NMB Bank, Nepal
	c. Bhutan: Lessons from Hydropower Generation	• Dasho Chhewang Rinzin, Managing Director, Druk Green Power Corporation
	d. Designing Socio-technical Systems	• Reihana Mohideen, UoM
14:40-14:55	**CASE STUDY 2**	
	Bhutan's energy transition, diversifying its energy mix to bring on non-hydropower sources, such as solar power, incorporates multiple benefits, including building climate-resilient systems and enhancing knowledge on adaptation and resilience. The ADB funded 'Renewable Energy for Climate Resilience Project' incorporates these elements as key outputs and promotes women and girls' participation in the energy sector and STEM education. Introduction by Sonam Zam, Energy Project Officer, Bhutan Resident Mission, ADB,	
	Bhutan: Renewable Energy for Climate Resilience	• Ugyen Thaye, Chief Engineer, Department of Energy, Ministry of Energy and Natural Resources, Government of Bhutan
14:55-15:00	**OPEN FORUM**	
	LIVE POLLING OF SESSION 3	
15:00-15:30	**NETWORKING BREAK**	
15:30-17:00	**BREAKOUT SESSION: WORKING GROUPS**	
	Working Group Coordinator: Shuvechha Khadka, NRM, ADB	
	WORKING GROUP REPORT BACK AND SUMMARY	
18:00-20:00	**DINNER RECEPTION AND NETWORKING**	

DAY 2	
08:30-09:00	**ARRIVAL AND NETWORKING**
09:00-10:00	**LECTURE: INTERNATIONAL EXPERIENCES** Frontier Technologies: Techno-Economic and Socio-Technical Challenges Lecturer: Pierluigi Mancarella, Chair, Professor of Electrical Power Systems, The University of Melbourne; Introduced by Reihana Mohideen, UoM (Pre-recorded video)
10:00-10:30	**SUMMARY AND NEXT STEPS** **Conference Summary** by Reihana Mohideen, UoM **Ways Forward** by Francesco Tornieri, ADB
10:30-11:00	**NETWORKING BREAK**
11:00-13:15	**FIELD VISIT** *The field visit aims to provide a practical understanding of Bhutan's energy transition, including how the country is meeting the challenges of the new skills required to enable an effective clean energy transition.* *a.* ***Druk Gyalpo's Institute Rooftop Solar (RTS) PV Installation**; Hosted by DSP - Solar Initiative Bhutan* *The DSP installed the RTS system, 1.5MW capacity, with the support of youth volunteers. This will be an opportunity to view the physical systems and to meet and discuss with the youth volunteers working on the site.*
13:15-14:15	**LUNCH NETWORKING BREAK**
14:15-15:30	*b.* ***The Museum of Light, Paro**; Hosted by the Bhutan Power Corporation (BPC)* *The Museum of Light provides a historical overview and context for the present energy transition underway in Bhutan, with a focus on the previous grand transition that provided electricity, driven by hydropower sources. The site visit will be conducted by the BPC.*
15:30-16:00	**NETWORKING BREAK**

Additional resource person and working group coordinators: Sonam Zam, Project Officer (Procurement and Implementation), BHRM; Imelda Marquez, Associate Social Development Officer, SD3-HSD; and international consultant Samreen Shahbaz.