SOUTH ASIA SUBREGIONAL WORKSHOP

NEPAL- Last Mile Electrification and MSME Development

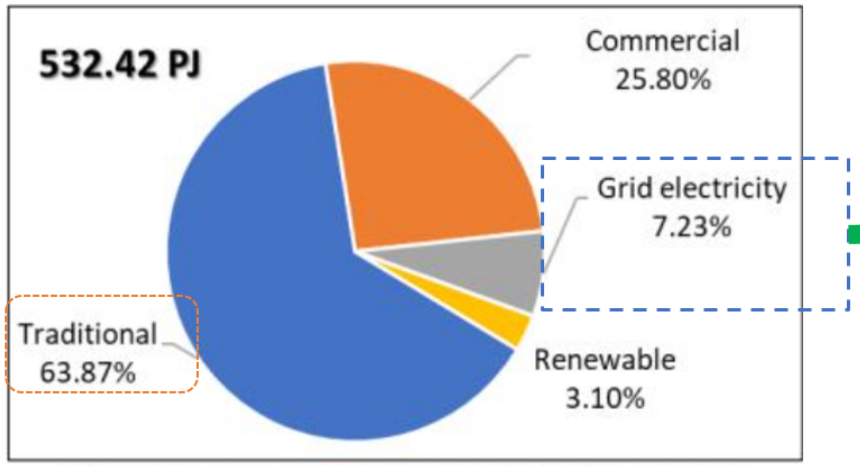
22-23 May 2025 • Paro, Bhutan

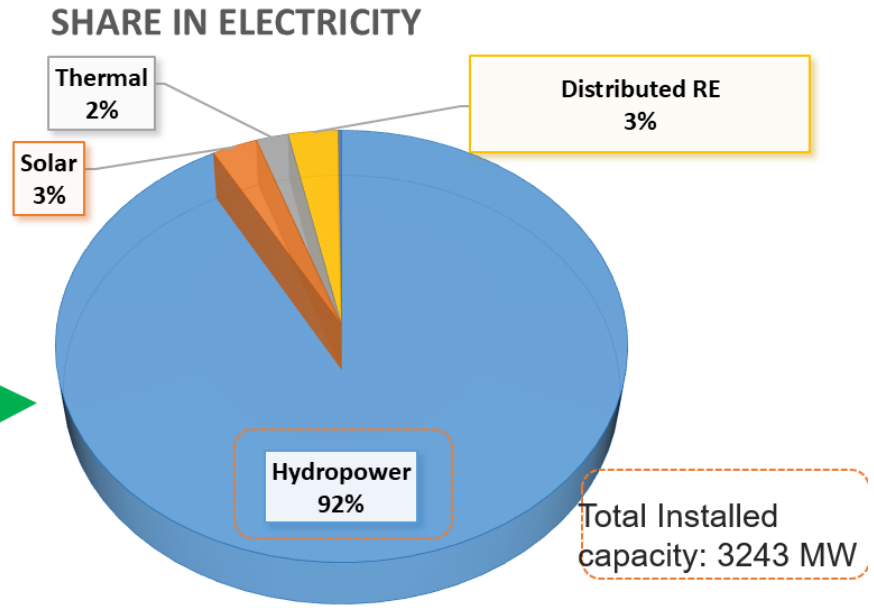
Presentation Outline

- Introduction to AEPC and Key Accomplishments
- Last Mile Electrification Initiative and Status
- Productive Energy Use Initiative
- Case Study – Chukeni Khola Mini Hydro (998kW)
- Opportunities and Way Forward

Background on Nepal's Energy Sector

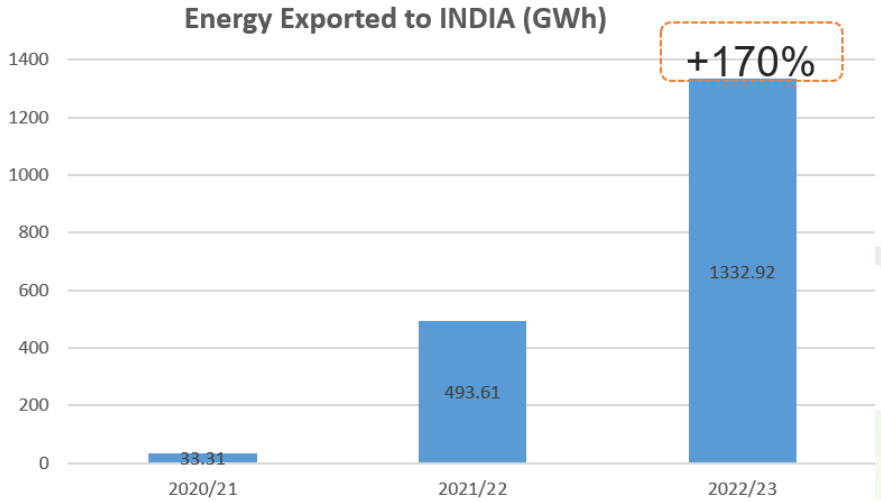
Nepal's Energy Consumption by Fuel Type





All petroleum products are 100% imported;

USD 3.5 Billion annually spent to import fossils

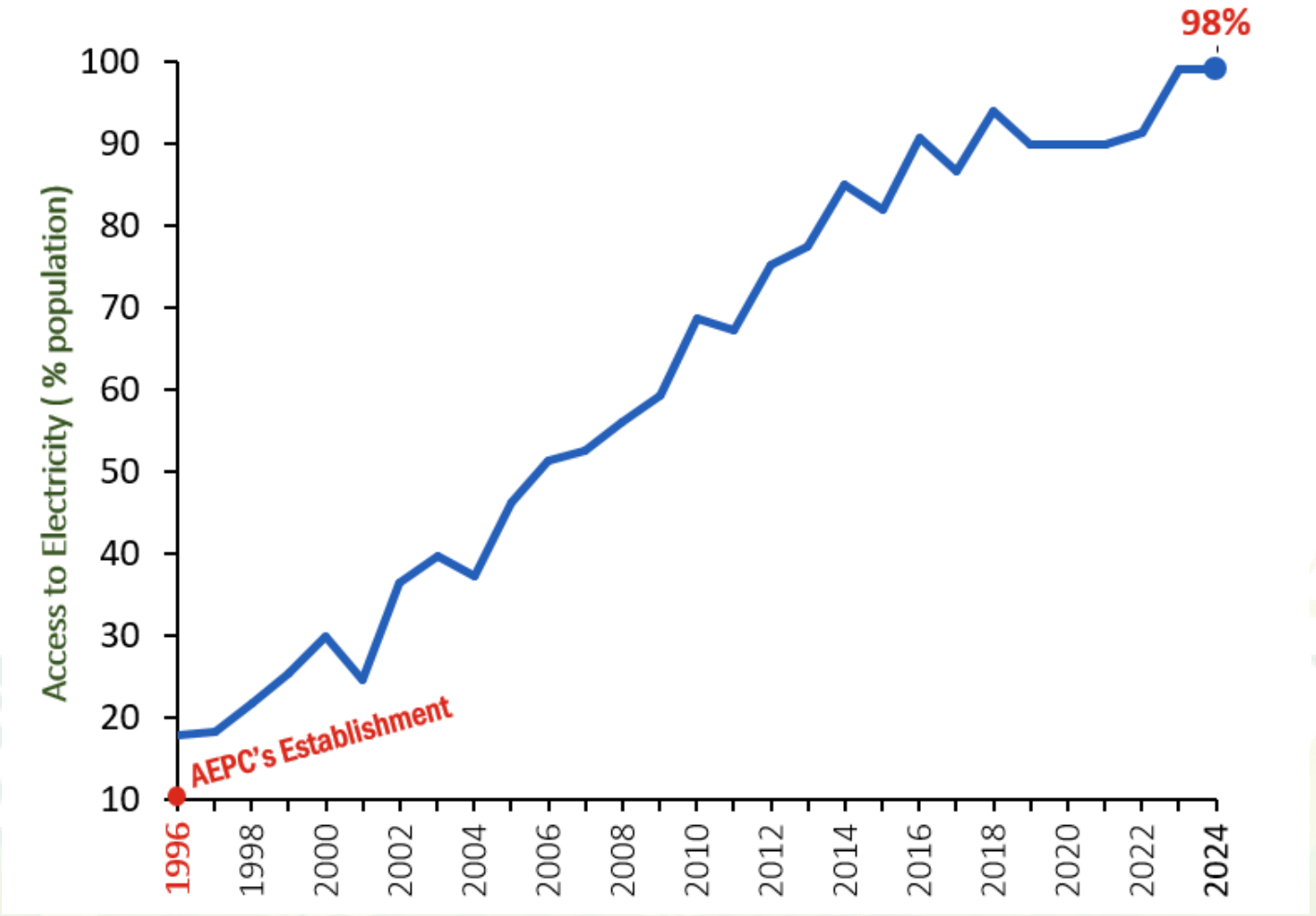


Source: MoF 2024, WECS 2024, NEA 2024

Source : World Bank

Background on Nepal's Energy Sector

Significant Progress on Electricity Access



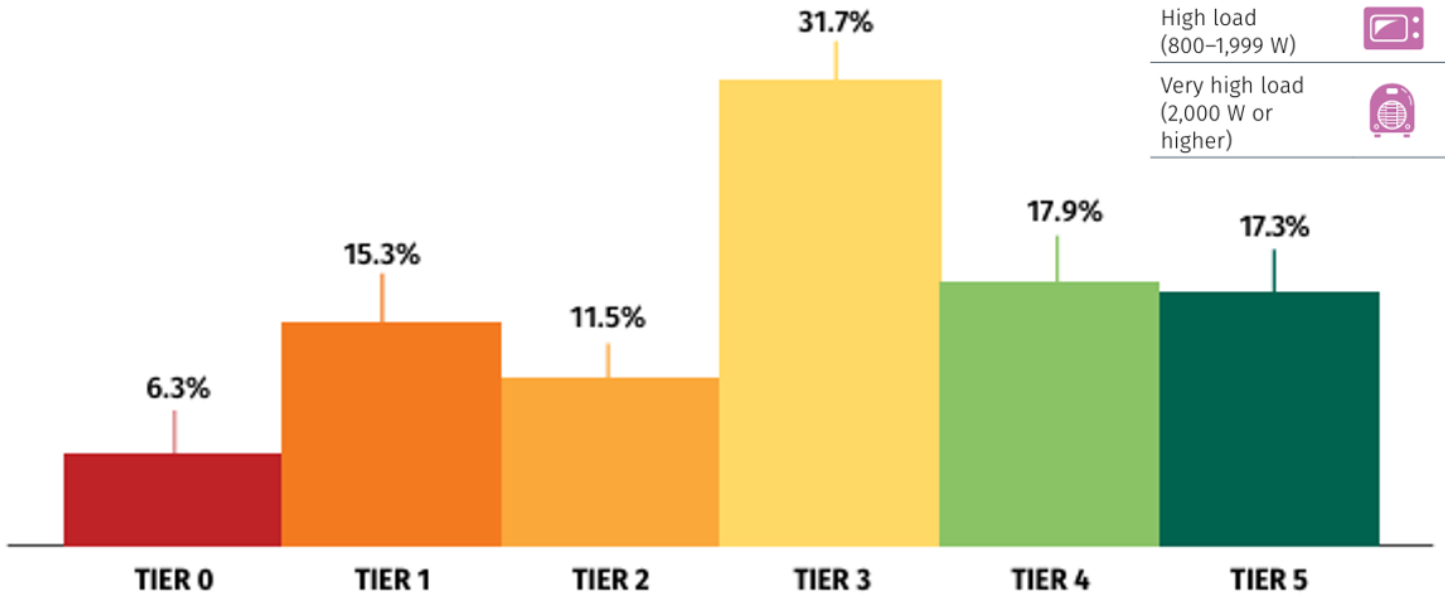
Source : World Bank

Background on Nepal's Energy Sector

Redefining Electricity Access through Multi-Tier Framework (MTF):

Improved electricity access (95% from grid, 3% from isolated RE systems by now- NEA) → About 33% have electricity access below Tier 3

Load level	Indicative electric appliances	Capacity tier typically needed to power the load
Very low (3–49 W)	Task lighting, phone charging, radio	TIER 1
Low (50–199 W)	Multipoint general lighting, television, computer, printer, fan	TIER 2
Medium (200–799 W)	Air cooler, refrigerator, freezer, food processor, water pump, rice cooker	TIER 3
High load (800–1,999 W)	Washing machine, iron, hair dryer, toaster, microwave	TIER 4
Very high load (2,000 W or higher)	Air conditioner, space heater, vacuum cleaner, water heater, electric cookstove	TIER 5



Source : World Bank

Nepal: Beyond Connections - Energy Access Diagnostic Report Based on the Multi-Tier Framework
The World Bank (2019), https://energydata.info/dataset/nepal-multi-tier-framework-mtf-survey/resource/959e3691-7362-489b-802a-5c74f1c4c92e

Alternative Energy Promotion Centre (AEPC)

Alternative Energy Promotion Centre

01 Established: 3rd Nov 1996

02 Under the Ministry of Energy, Water Resources and Irrigation (MoEWRI)

03 Governing Board led by Hon. Minister with public, private, civil society and financial sector membership

04 **4.1**. Mandated for the promotion and development of **Renewable Energy & Energy Efficiency**
4.2. Direct Access Entity to Green Climate Fund (since Feb. 2019)

AEPC is committed to enhancing capacities across various stakeholders, driving sustainable energy development.

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AEPC's Key Accomplishments

- >500 companies; >40,000 jobs
- New initiatives and business models for PPP - *Reverse auctioning, Best Available Technology (BAT), Incentive to Energy Services, SECF etc.*

Benefitting more than
3.65 Million
Households
From Over
96 MW
RETs

In the last 28 Years of AEPC, **Renewable Energy Mix growth achieved from 0.015% in 1996 to 3.1% in 2024**

8 CDM Projects registered in UNFCCC;
1 voluntary carbon project under VERRA
6.59 Million ER units generated
>USD 35 Million Carbon Revenue Generated till date

Cumulative Achievements till date

SN	Technologies	Unit	Achievement
1	Micro/Mini Hydro	kW	40,253
2	Solar Home System	Nos.	996,647
3	ISPS	Nos.	4,332
4	Solar Mini grid Solar/Wind Min-grid System	Nos.	3,097
5	Urban Solar Home System	kW	13,027
6	Solar Pump	Nos.	3,691
7	Portable Metallic Stoves	Nos.	132,211
8	Induction Cook Stove	Nos.	59,385
9	Domestic Biogas	Nos.	450,770
10	Institutional, Urban and Commercial Biogas Plant	Nos.	369
11	Productive End Use	Nos.	1,766
12	Solar System for Religious Places	Nos.	4,758

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Last Mile Electrification Initiative and Status

- Joint task force team of NEA and AEPC in the leadership of Ministry to cater un-electrified HHs and to prepare action plan- July 2022

S.N.	Province	Non Electrified		Electrification from AEPC		Electrification from NEA	
		Ward Number	Household Number	Ward Number	Household Number	Ward Number	Household Number
1	Koshi	84	112,272	18	6,326	66	**105,946**
2	Madhesh	0	3,759	0	0	0	**3,759**
3	Bagmai	22	50,906	0	0	22	**50,906**
4	Gandaki	19	16,444	12	2,246	7	**14,198**
5	Lumbini	19	41,667	0	0	19	**41,667**
6	Karnali	287	181,311	141	63,302	146	**118,009**
7	Far West	108	118,278	63	25,504	45	**92,774**
Total:		**539**	**524,637**	**234**	**97,378**	**305**	**427,259**

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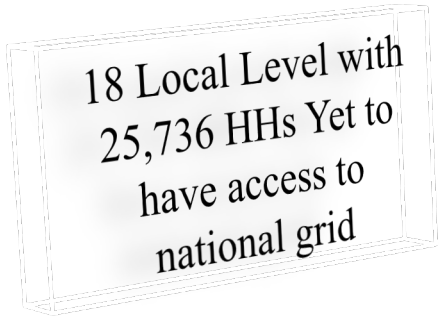
Last Mile Electrification Initiative and Status



SN	Province	District	Local Government	HHs Census 2022	AEPC Projects Covering HHs	Remaining HHs
1	Gandaki	Gorkha	Chumnubri	2,068	202	1,866
2	Gandaki	Manang	Narpabhumi	126	0	126
3	Karnali	Dolpa	Dolpobudha	543	329	214
4	Karnali	Dolpa	Se-Phoksundo	861	445	416
5	Karnali	Dolpa	Jagdulla	601	0	601
6	Karnali	Dolpa	Mudkechula	1,190	473	717
7	Karnali	Dolpa	Kaike	916	0	916
8	Karnali	Dolpa	Charka Tangsong	320	127	193
9	Karnali	Mugu	Mugum Karmarong	1,372	155	1,217
10	Karnali	Mugu	Soru	2,581	823	1,758
11	Karnali	Mugu	Khatyad	3,525	3,156	369
12	Karnali	Humla	Sarkegad	2,205	1,031	1,174
13	Karnali	Humla	Chankheli	1,193	133	1,060
14	Karnali	Humla	Adanchuli	1,480	975	505
15	Karnali	Humla	Taajakot	1,158	212	946
16	Far West	Bajura	Goumul	1,716	0	1,716
17	Far West	Bajura	Saipal	447	147	300
18	Far West	Baitadi	Shivanatha	3,434	0	3,434
Total				**25,736**	**8,208**	**17,528**

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Last Mile Electrification Initiative and Status

- AEPC received demand for 17,292 HHs electrification via Public Notice- June 2024
- 10,661 HHs falls under AEPC's working area

SN	Province	No. of Households (HHs)		
		Total	HHs under AEPC Working Area	HHs under NEA Working Area
1	Koshi	4,939	1,900	3,039
2	Madhesh	185	-	185
3	Bagmai	58	58	-
4	Gandaki	558	36	522
5	Lumbini	1,268	369	899
6	Karnali	7,104	5,996	1,108
7	Far West	3,180	2,302	878
	Total	**17,292**	**10,661**	**6,631**

Last Mile Electrification Initiative and Status

- Number of households without access of electricity grid remains in 18 municipalities : **17,528**
- Following AEPC notice, demands received from additional number of households (from local levels outside of those 18 municipalities!) For electrification : **10,166** (micro/mini hydropower and solar energy)
- Total households to be electrified through the AEPC = (17,528+10,166) = **27,694**
  - ✓ Households that remain to be electrified can be electrified through micro/mini hydropower, solar mini grids, and solar home systems

- ➢ Estimated budget for electrification through off-grid solutions via AEPC is about **25 Million USD**
- ➢ Securing necessary resources for implementation of the action plan and advancing its implementation

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Productive Energy Use Initiative

- Sustainability issue of installed RETs: MHPs, Solar-Wind Minigrids
- Plant Load Factor of MHPs: < 25 %

- To promote productive energy use (PEU):
  - Provisioned subsidy/grant for MSMEs in Renewable Energy Subsidy Policy
  - Integrated in AEPC's structure as a section

AEPC's strategy:

- Promotion of MSMEs with RE consumption;
- MSMEs as source of income and employment emphasizing on poor, women and DAG;
- Value addition to local resources as well as indigenous skills;
- Entrepreneurship and skill development trainings for entrepreneurs;
- Linkages with market, financial services and other business development services;

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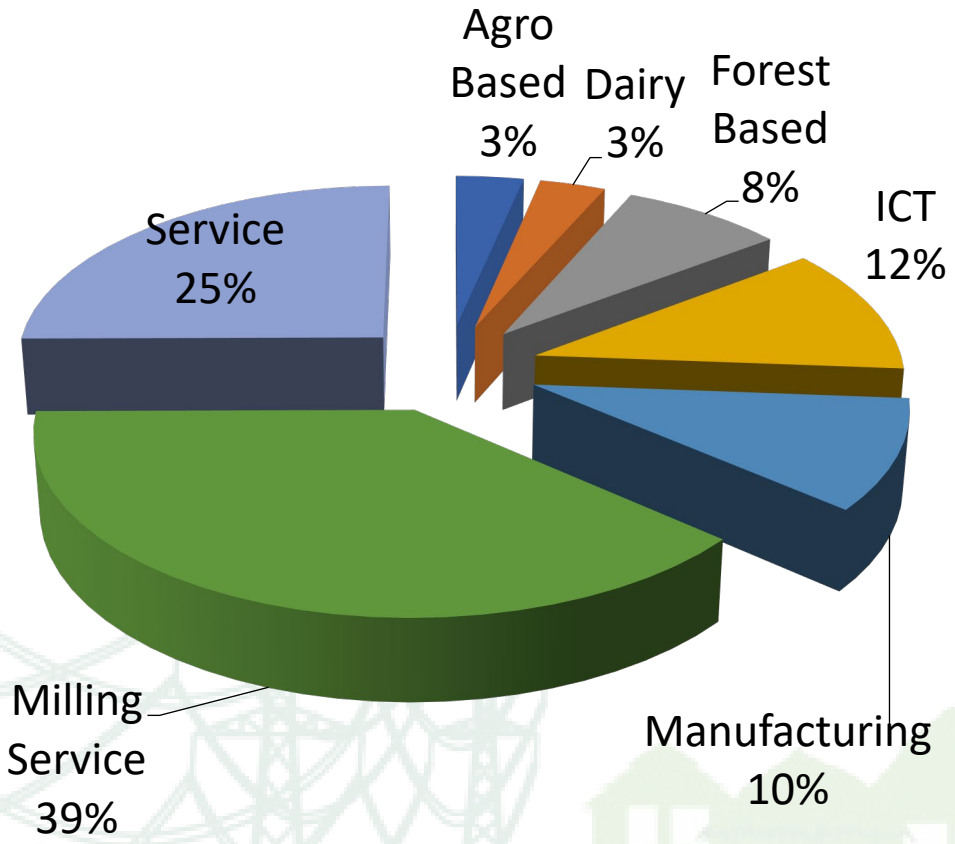
Productive Energy Use Initiative

Types of MSMEs Supported



- **Forest Based:-** Furniture, Nepali Paper (Lokta), Herbal Oil etc.
- **Agro-based:** Coffee, ingredients , Tea etc
- **ICT:** Computer and FM
- **Service:** Beauty Parlor, tailoring, Fresh house, Poultry, Photocopy, Money transfer, Printing Press etc
- **Dairy:** All dairy related service
- **Manufacturing:** Bakery, Stone Cutting, Blacksmith workshop, Grill, Block, Bee, Noodle etc
- **Milling service:** Hulling, grinding and Expelling etc

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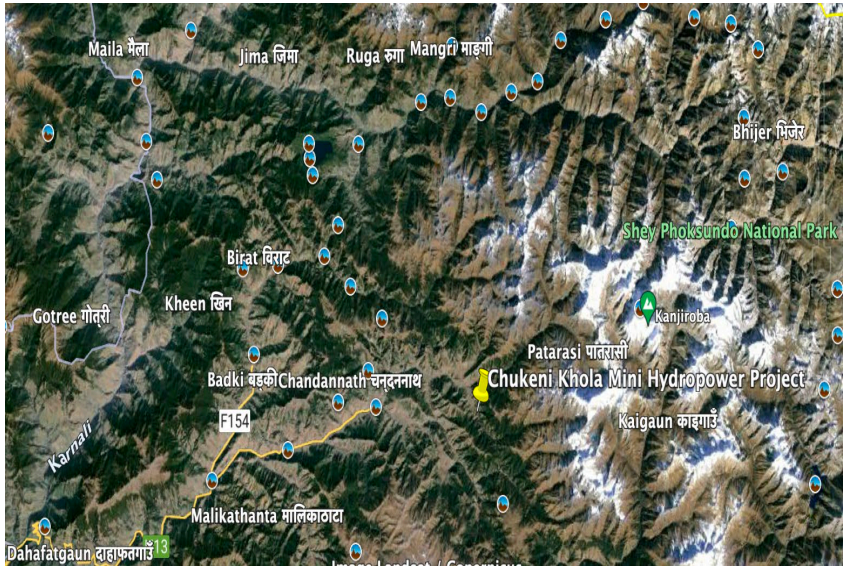
Case Study – Chukeni Khola Mini Hydro (998 kW)

Chukeni Khola Mini Hydropower Project (Chukeni Khola MHP): developed with support ADB/SASEC

- Location: Patarashi Rural Municipality, Jumla, Karnali Province
- Capacity: 998 kW (Head: 127.15m, Flow: 1000 lps)
- Total Beneficiary Households (HHs): 5,664
- Female Headed HHs: 223
- Disadvantaged Group: 646

Institution: Chukeni Khola Electricity Cooperative Limited is the developer of Chukeni Khola MHP; there are 3,453 shareholders: 2073 men and 1,380 women



Case Study – Chukeni Khola Mini Hydro (998 kW)

Access to Finance: Women specially from the marginalized groups are encourage to participate in saving and credit groups

- Number of Saving & Credit Groups: 100 (all women)
- Members – 1,897 all women
- Saved Amount – NPR 6,009,977
- Investment Amount – NPR 5,508,000
- Number of Borrowers – 173 (all women)
- Income from Activities (IGA) – NPR 9,527,939
- Types of IGA – poultry, goat rearing, vegetable farming, grocery shops etc.

Mini/Micro Hydro Operated Lift Irrigation (MHOLI):

- Two systems have been installed with technical and financial support
- Provides water to apple orchards for about 11 hectares land of 95 HHs

E-cooking: Electric cooking has been promoted with financial assistance to wean away women from firewood for cooking.

- Electric cooking appliances were distributed at a subsidized rate to 131 households of which 39 are women headed and 18 belong to marginalized groups.

Capacity Development: 441 women and 80 men have benefited from different capacity development support

Innovation: To utilize electricity at night,

- Low Wattage Water Boiler was locally designed and fabricated..
- To reduce firewood consumption in the productive sector, noodle steamer and dryer was locally fabricated and tested

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Opportunities and Way Forward

- **Enhancing legal and regulatory framework:** enactment of Renewable Energy and Energy Efficiency Bill and associated regulations;
- **Ensuring universal electricity access:** around 98% electrification but the last mile is not easy!;
- **Promoting clean cooking:** major challenge for Nepal (>51% solid biomass; > 44% LPG); need to continue promoting ICS & biogas but establish e-cooking as the ultimate clean cooking solution;
- **Distributed RE and energy mix:** DRE in commerce & industry, grid connection of mini grids, RE for disaster risk reduction/management; improving reliability and quality;
- **Energy transition and resilience**: e-mobility, e-cooking, industrial energy transition, green hydrogen, energy efficiency; resilience planning and development;
- **Innovative business models:** adoption of innovative business models – PPP, ESCOs, special purpose vehicles, special incentives, green bonds etc;
- **Finance**: international & national, public & private; climate & carbon finance; market-based approach with viability gap funding, e.g., Sustainable Energy Challenge Fund (SECF);
- **Capacity development and R&D**: Capacity development of PGs, LGs, private sector, all national institutions; collaboration with academia and research institutions

Thank you!

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