

# NEPAL'S HYDROPOWER: Today and Tomorrow

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# Present status: An encouraging scenario

- Energy consumption and sources
  - National energy consumption about 178,000,000 MWh in 2022
  - Still 65 % dependence on forest and agricultural residue for energy
  - Fossil fuels contribute about 28 % of energy consumption
- Forest resources and fossil fuel consumption not sustainable as sources of energy
- Grid electricity provides about 5 % of Nepal's energy needs
- Hydropower generation growth:
  - Installed capacity about 3000 MW, 2/3 of which is owned by private developers
  - About 250 projects in various stages of development: about 10000 MW capacity
- Focus on transmission lines: Thousands of km under construction
- Markets: Both domestic and cross border markets available with big appetite
  - Nepal exports surplus energy for about half of the year, and imports the other half
- Financing: Presently Nepali banks and investors are heavily invested ~ Rs. 1430 billion
  - Over 5 million public investors have stake in the industry

# Challenges / Hindrances in the sector

- Policy and regulations
  - Delayed legislation: Electricity Act
  - Policy for building 28000 MW by 2035 still not official
  - Conflicting and unclear policies
  - Unclear policies open for interpretation by different office
- Administrative hindrances
  - Complex and time consuming approval processes
  - Authority between ministries and departments unclear
  - Federalism and authority of various levels of governments

# Hindrances/Challenges

- Transmission lines and other infrastructure
  - Inability to complete construction of transmission lines on time
  - Inadequate capacity of existing lines
  - Cross border lines insufficient
  - Other infrastructure
    - Roads, bridges
    - Communication system including high speed data transfer systems
    - Technical support systems
- System balance
  - Grid dominated by run-of- river hydro
  - Peaking stations will not come any time soon
  - Management of daily peak demand and seasonal imbalance is challenge

# Risks/challenges

- Financial challenges
  - Availability of cash for developing 28500 MW in next 11 years
  - Cheap and abundant cash is required
  - Lengthy process for raising cash from public
- Inability to attract foreign investments: FDI required to meet national aspirations
  - Competition with other nations also searching for Foreign funds
  - Incentives required
  - Risk sharing mechanism with investors
- Markets
  - Domestic market: Over 91 % of country already has access to electricity
    - Investment required to expand energy consumption in this market
    - Capacity of consumers to pay for service is limited
  - Cross border markets
    - Geopolitical considerations (from both sides)
    - Fair and transparent trading agreements still not in place
    - Uncertainty of access to the market: project by project decision
    - Lacking rules and regulations in Nepal

# Opportunities for Growth and Investment

- Financial services, tools for financing
- Engineering, retrofitting, repair and maintenance services
- Construction and structural works
- Trading of electricity
- Energy intensive industries: EVs, Appliances, heavy manufacturing
- “High Value” Energy projects
  - Solar PVs complementing hydro plants
  - Hydrogen and its derivatives
  - Daily and seasonal storage projects
  - Pump storage hydro projects

# Way Forward

- Need to move away from traditional fuels as well as imported fossil fuels
- Enact timely legislation and policies: harmonized and clear policies for the entire sector, including transmission line
- Build adequate infrastructure especially transmission lines substations, roads, bridges- all of which will make power generation quicker and less expensive
- Create markets in country: identify sectors and invest in the transmission and distribution, encourage energy intensive industries
- Cross border trading: Develop legislation, regulations and guidelines, get private sector engaged
- Seek adequate funds that are cheaply available
- Make the sector investment friendly:
  - remove administrative hurdles, one window policy,
  - Ease processes for land acquisition, forest clearance, licensing, approvals etc.,
    - Digitize processes for application, approvals