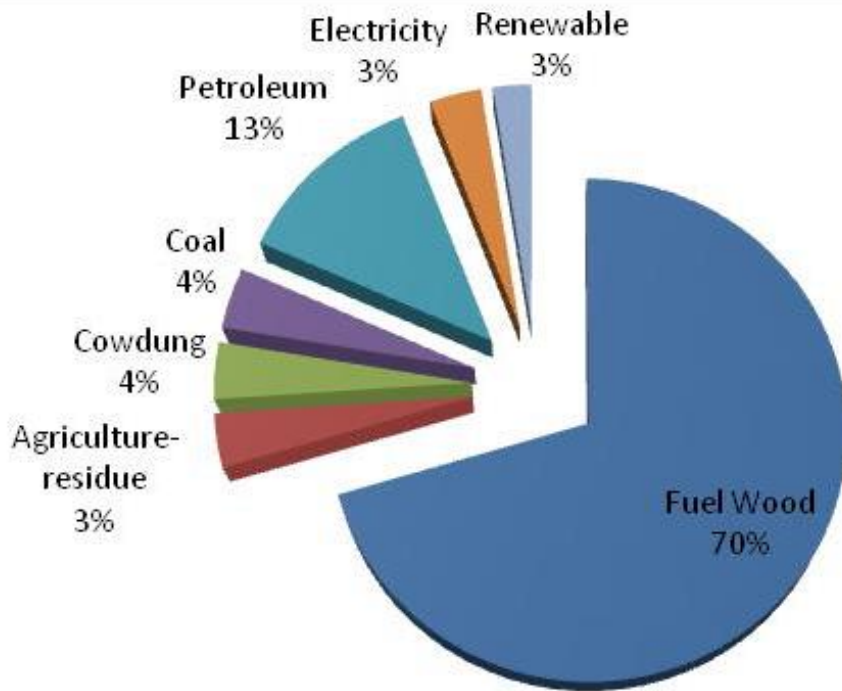


Energy Sector Plan and Road Map

Reference : White Paper (May 2018)
 Policy, Budget and Program Implementation
 Action Plan (FY 18/19)

Ministry of Energy, Water Resources and Irrigation
Workshop on Strategic Energy Sector Policies in Nepal
November 5-6, 2018, Gokarna Forest Resort

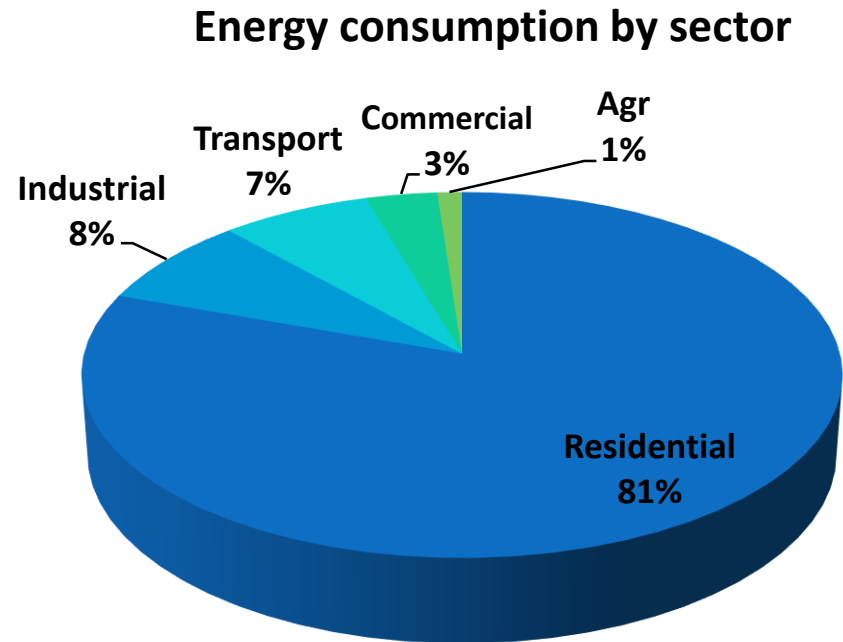
Nepal's Energy Consumption *(Fiscal Year 2015/16)*



Energy consumption by source 2014/15

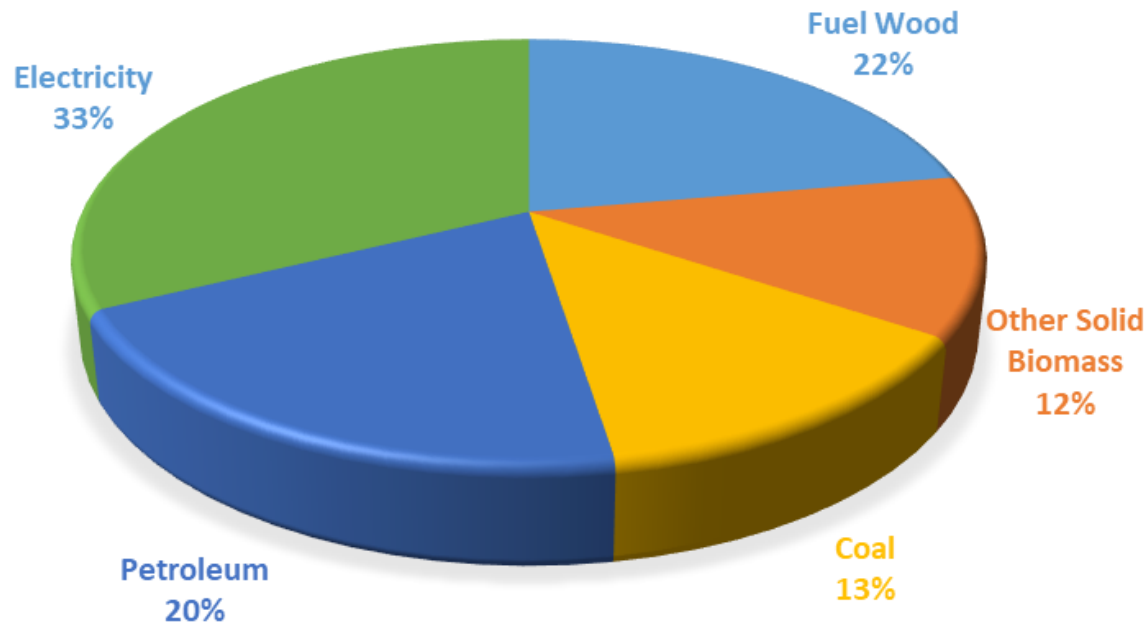
Total energy consumption = ~12 M TOE

Source: MoEn 2017, WECS, 2017



Very low clean energy consumption and comparatively high residential energy use reflect tremendous room for improvement in energy consumption pattern

Energy Consumption Future Outlook



2050, with GDP growth rate of 5.6% and certain policy intervention energy consumption would be of the order 17 M TOE.

Energy consumption by source

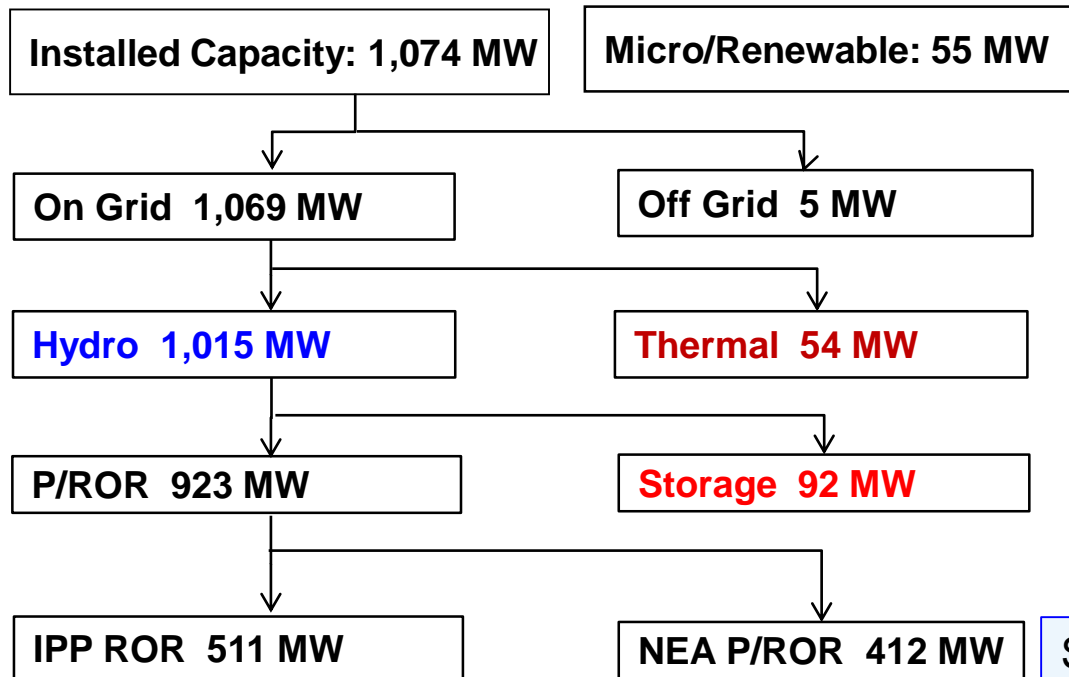
Source: MoWRI 2017, WECS, 2013

Key Indicators

- Electricity Access: 87%
(Grid: 69%; Off-grid: 18%)
- Consumption : 200 kWh/capita
- Installed Capacity : 1074 MW
- Peak Demand : ~1500 MW
- System Loss : 20.45%

- T/L length: 3538 ckt-km
- Substation capacity: 2618 MVA
- Distrib. Transformer: 25000 Nos.
- Distribution transformer capacity: 2675 MVA

Electricity Overview



Economic Hydropower Potential : ~42 GW

Electricity Supplied (2017) : 7058 Gwh
NEA : 2,308 Gwh
Purchase (IPP) : 2168 Gwh
C/B Purchase : 2582 Gwh
Electricity Import Capacity : 488 MW

IPP-Hydros :

Under Construction : 2.35 GW
Awaiting Financial Closure : 1.3 GW

Solar/ Wind potentials (SWERA, 2008):
Solar:2100 MW

- 6.8 sunshine hours/day
- solar insolation- 4.5 kWh/sq.m/day

Wind: 3,000 MW

Sector Plan

Reference Document :

White Paper on Energy, Water Resources and Irrigation Sector's Road Map for future, May 2018.

- ☐ Current Status of Energy/ Electricity Sector
- ☐ Problems and Challenges
- ☐ Future Course : Policy Roadmap; Working/Activity Roadmap

Policy, Budget and Action Plan Document, FY 18/19

- ☐ Long / Medium Term Achievement/Impact Indicator
- ☐ Current FY output indicator and implementation work plan
- ☐ Implementation Directives : Scope of work / Institution and Human Resources / Financial Arrangement / Result Management / Implementation Road Map/ Monitoring Plan

Note : Documents Available at www.moen.gov.np

Sector Plan and the Road Map

□ Targets :

- Per capita electricity consumption:
 - 700 kWhr (5 years)
 - 1,500 kWhr (10 years)
- Electricity Generation :
 - 3,000 MW (3 years)
 - 5,000 MW (5 years)
 - 15,000 MW (10 years) : 10,000 MW for domestic consumption; 5000 MW for trade
- Reduce System loss from 20.45 % to 15 % (5 years)
- Self sufficient in Electricity (3 years)
- Access to electricity 100 % (5 years)

Sector Plan

Policy and legal instruments to align the sector reform with 3 tiers of governance.

Formulation of overarching Water Resources Policy, Act, Regulation

Amendment of Renewable Energy Subsidy Policy and mobilization directives.

Amendment of Electricity Act, Regulation

Formulation of Renewable Energy Development Policy, Act,

Amendment of Nepal Electricity Act

Formulation directives, working procedures, regulations, etc for alternative and renewable energy for province and local level

Sector Plan

Policy instruments to mobilize funds

Long term investment instruments like Power Bond to mobilize scattered domestic capital.

Grant and concessional loan from foreign banks, FIs and DPs.

Private Sector Participation in Generation and T/L projects construction through PPP, BT, EPCF, model.

Hedge Fund or similar arrangement to cover currency risk

Policy instruments for market creation

Operationalising ERC Act and Regulations

Generation Mix:

- Storage 30-35%
- Peaking 25-30 %
- ROR 30-35%
- Alternate 5-10 %

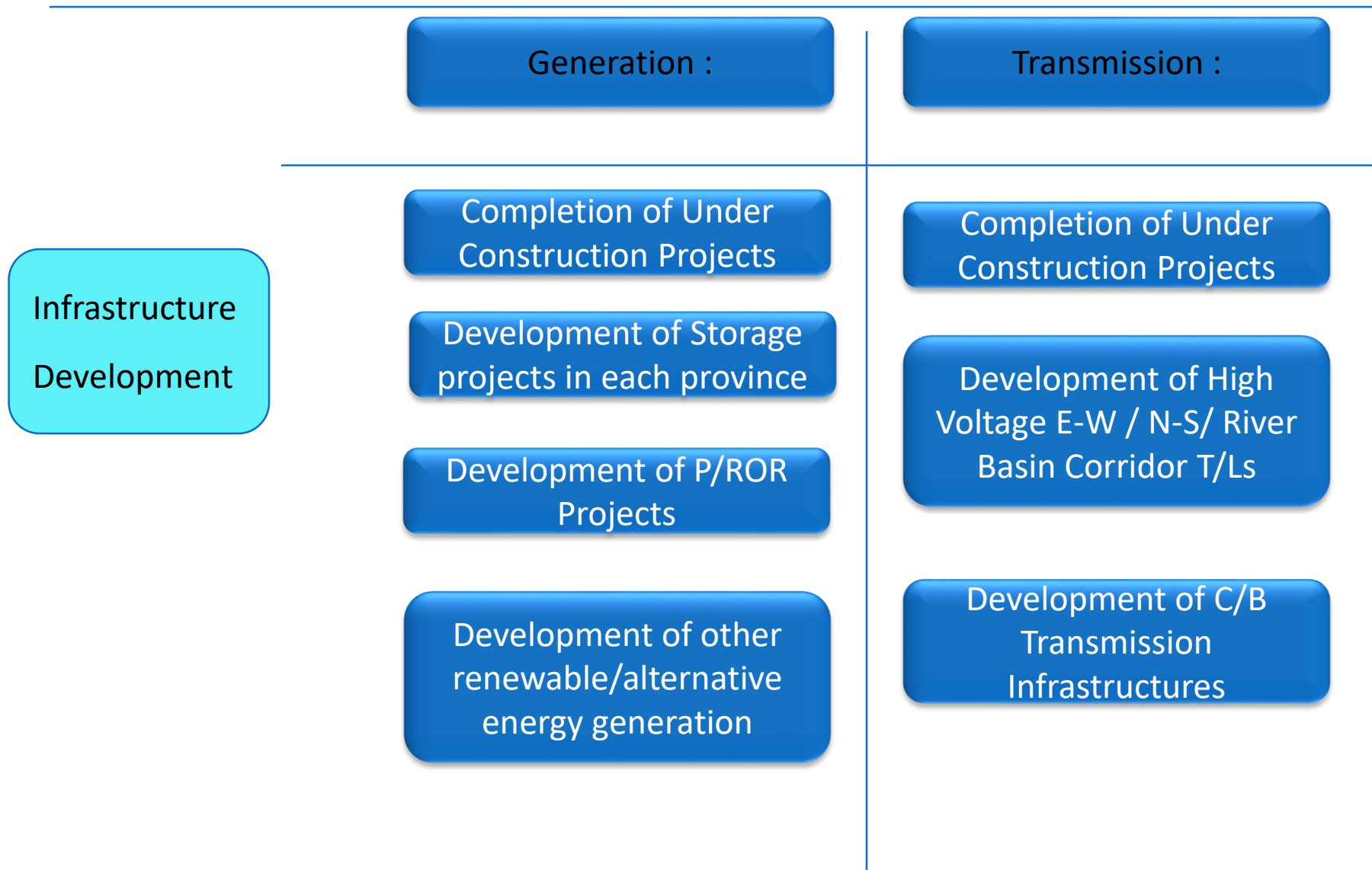
PPA – Take or Pay

Distribution Companies at Provinces

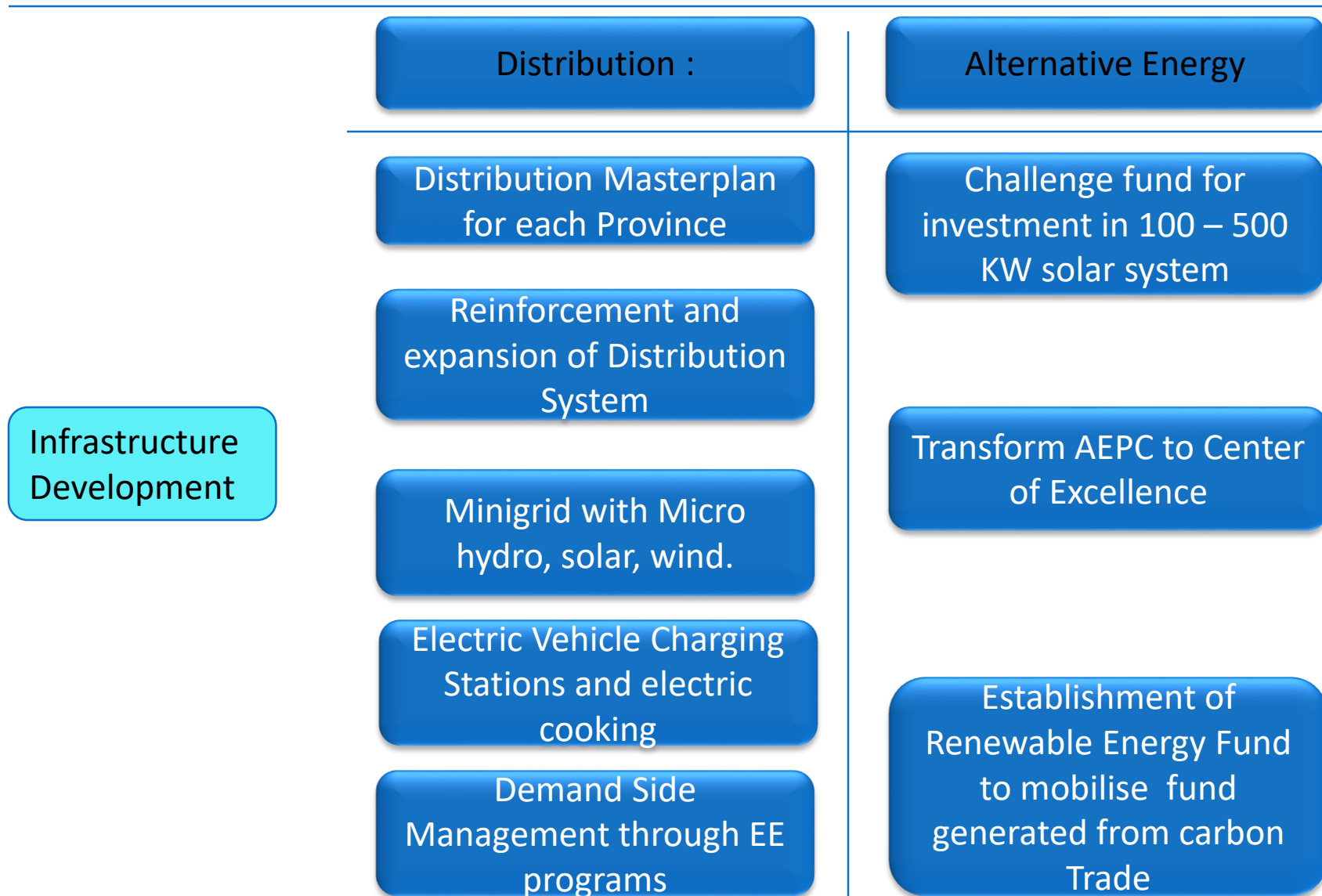
Market diversification
Multi buyer/Sellers

Bilateral, sub/regional connectivity

Sector Plan



Sector Plan



Road Map and Actions - Summary

1. Achieving Universal Access to electricity and clean cooking

Short Term (~1year)	Medium Term (~5 Years)	Long Term
EE Strategy	100 % Replacement of cooking gas by electricity	
Seasonal and TOD Electricity tariff for Industry, commercial and HH	Community and Rural Electrification Expansion in 16 M HH	
	Installation of 2 EV charging stations at each municipality	
RE Access to Grid through Net Metering and Net Payment		
Expansion of Waste to Energy in potential municipalities		
Modernization and reinforcement of Distribution System		
Implementation of Energy Efficiency Program		
Alternative/ Renewable Energy Technology Promotion		

Road Map and Actions - Summary

2. Strengthening Investment Planning and Project implementation

Short Term (~1year)	Medium Term (~5 Years)	Long Term
Completion of Upper Tamakoshi HEP, Kulekhani III HEP, Trisuli 3A HEP	Province wide Hydro Electric Projects Preparation	Implementati on of selected HEP.
200 MW Solar Projects Preparation in Province 2	Implementation of Solar Projects in Province 2	Begnas – Rupa Pump Storage as Pilot Project
Medium Scale project identification and provincial/local government share investment modality	Implementation of Tanahu Seti, Tamakoshi V	
Investment opportunity modality in attractive projects for each Nepali		

Road Map and Actions - Summary

2. Strengthening Investment Planning and Project implementation

Short Term (~1year)	Medium Term (~5 Years)	Long Term
Modality to acquire land on lease for ROW of T/Ls	<ul style="list-style-type: none">• Completion of 2nd C/B T/L and preparation of other C/B lines (Nepal –India)• Completion of 1st C/ B T/L (Nepal – China)	High Voltage T/L (N-S, River Corridors, E-W mid High way
Modality to compensate ROW affected people by offering preferential share in HP projects.		
BT Modality for T/L construction		

Road Map and Actions - Summary

3. Implementing Power Sector Market Reform

Short Term (~1year)	Medium Term (~5 Years)	Long Term
Operationalize ERC	Capacitate VUCL, RPGCL, PTC, HIDCL, ERC	Market Diversification with multi buyers and sellers
Distribution Master Plan for each Province .	Establishment of Distribution Company in all provinces	
Transmission Wheeling Charge		
Energy Banking with India	Bilateral, sub/regional power trade by developing / implementing bilateral, sub/regional connectivity arrangements	

Road Map and Actions - Summary

4. Improving Operational Efficiency

Short Term (~1year)	Medium Term (~5 Years)	Long Term
Distribution Master Plan for each province		
System loss reduction (15%) through reinforcement, modernization of Distribution System and employ measures to mitigate non technical loss.		
Application of Demand Side Energy Efficiency.		

Road Map and Actions - Summary

5. Establishing Legislative and Regulatory Framework

Short Term (~1year)	Medium Term (~5 Years)	Long Term
Formulation of overarching Water Resources Policy, Act, Regulation		
Amendment of Electricity Act, Regulation		
Amendment of Nepal Electricity Act		
Amendment of Renewable Energy Subsidy Policy and mobilization directives		
Formulation of Renewable Energy Development Policy, Act		
Formulation directives, working procedures, regulations, etc for alternative and renewable energy for province and local level		
Establishment and operationalization of ERC		

Brief History - Power Sector Development

~ 1990 : 225 MW (Pub)

1991-2001 : 98 MW (21PB; 77 PVT)

2001- 2010 : 321 MW (214 PB; 107 PVT)

2010 ~ : 371 (30 PUB, 341 PVT)

1950

Rana
Period

~ 1950

- Pharping 500 kw - 1911.
- Sundarjal 640 kw – 1934
- Chandrajyoti Bijuli Adda

Bilateral /
Multilateral

~90's

- Panauti 2.4 mw- 1965 RUSSIAN.
- T/ L 66 kv BHB, 11 kv Kathmandu Ring with 9 S/S AMERICAN
- Koshi and Gandak Agreement, Trisuli and Devighat HP,
- Sunkoshi 10 MW, 1972 CHINA
- Department of Electricity and Nepal Electricity Corporation : 1962
- Private and captive Generators and GON's SPV (Bikash Sa Samiti);
- KC, Kuilekhani, Marsyangdi Study : WB; Gandak Hetauda T/L ADB; (MBDs/ IFI for sector expansion)
- Need for stronger monopoly, NEA establishment 1984, other entities merged in NEA, NEA as GTD monopoly in planning, expansion and operation.
- Power Project Expansion ADB
- KG and Arun 3 (ADB/WB); tariff increment;

1990

Liberalization
and Pvt. Sector

1990~ 2015

- Electricity Act 1992 and subsequent instruments for pvt sector investment in G/T/D.
- ETFC
- FITTA
- EPA/EPR
- NEA continued as it is
- Hydropower Development Policy 2001
- Establishment of DoED
- Competition introduced in some generations

2015

Transition to
Federalism

Post 2015

- Three Tiers of government
- Overall Electricity Sector to be aligned with new structure
- Continued Pvt. Sector involvement
- Sector reform and market creation : Institution; Legal and procedures

Experience of more than a century in the sector reflects ample room for learning while departing from different transition during electricity development process.

THANK YOU !!