



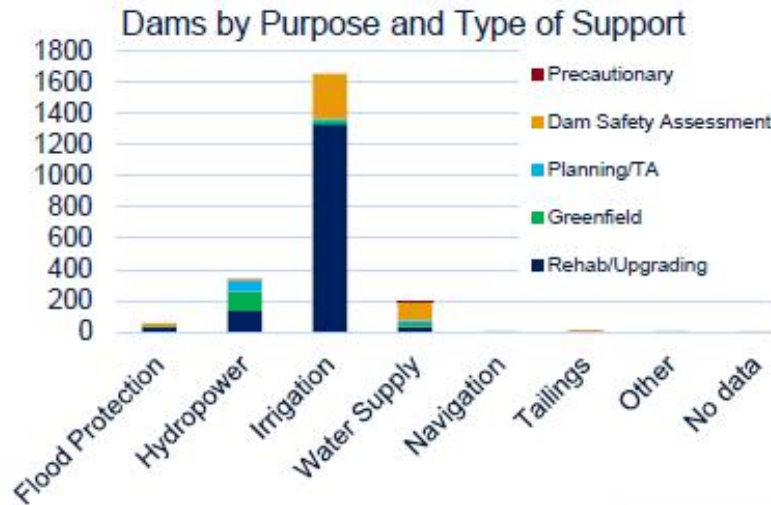
HYDROPOWER DEVELOPMENT AND REGIONAL INTEGRATION FOR NEPAL

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THE WORLD BANK

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World Bank Group Engagement in Hydropower

Where we are today



15 years of dam-related projects (approved FY04-17)

- 322 projects in ~ 90 countries
- Project costs US\$ 72 billion
- Bank Commitments >US\$ 38 billion



Where we want to be tomorrow

WATER & ENERGY SYSTEM SERVICES



Integration of renewables

- Integration of solar and wind backed up by hydro storage



Large range of low-carbon capacity available

- From kW to Gw in a single project
- Option to export electricity in regional grids



Operational flexibility and efficiency

- Fast startup and shut-down
- Highly efficient and adjustable output
- Part of resilient power systems



Storage and back-up

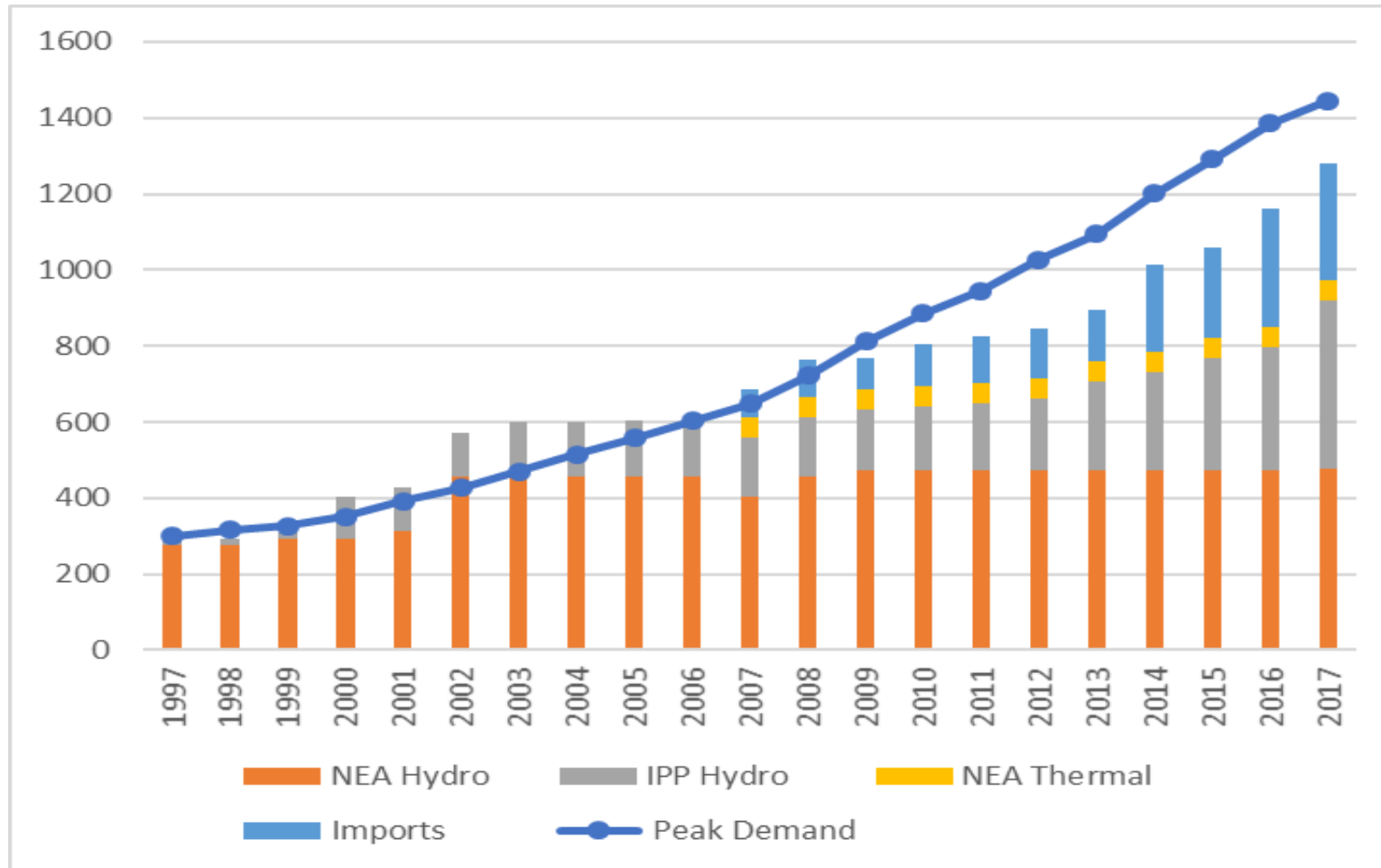
- Rapid availability and ancillary services
- Option to absorb surplus (pumped storage)



Multiple freshwater services

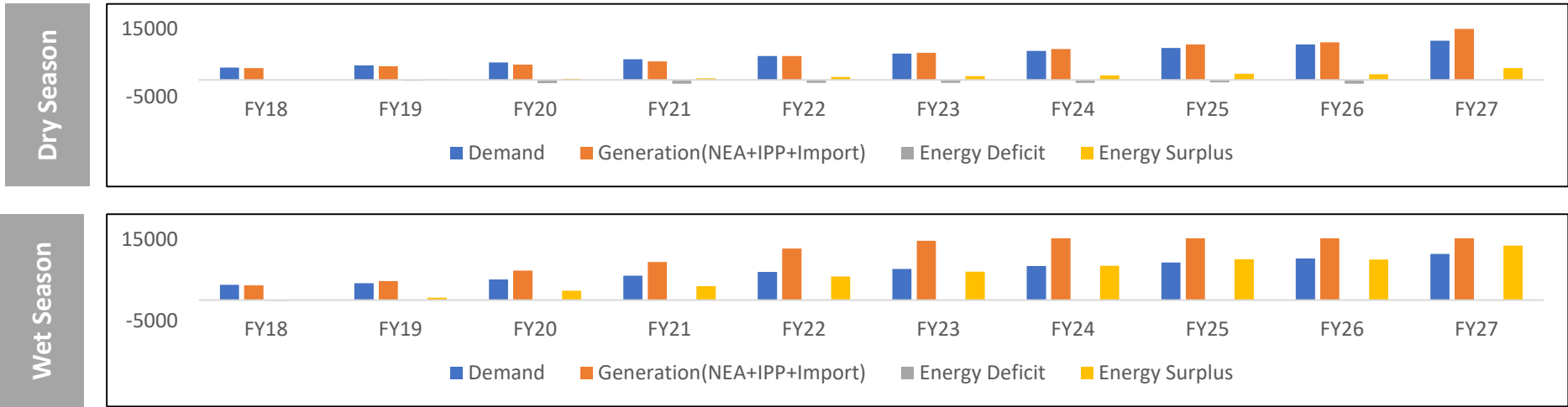
- Water supply, irrigation, navigation, tourism
- Climate change adaptation (flood and drought management)
- Safe dams that are part of an integrated river basin systems
- Rehabilitation of dams for safety, reliability and storage
- Addition of hydroelectricity in existing dams
- Extending the life of reservoirs: sustainable sediment management practices

Electricity Supply in Nepal: Past



Electricity Supply in Nepal: future Projection

MUs/Gwh	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27
Energy Generation (NEA+IPP)	4564	7344	11590	14652	19595	22389	25681	29517	31007	39680
Import	2505	1283	184	159	130	125	121	109	120	12
Energy Deficit/ Import	323	312	935	1075	876	901	831	736	1100	27
Energy Available	7392	8938	12709	15885	20600	23415	26633	30362	32227	39720
Energy Surplus / Export	0	548	2571	3868	6649	8083	9765	11783	11643	16894
T&D Loss	1504	1640	2205	2597	3162	3360	3555	3749	3658	4111
Sales	5887	6750	7933	9420	10789	11972	13313	14829	16927	18714



Future Capex and Investment - NEA

Around ~575 Bn NPR capital investment planned by NEA in next 10 years; additional 153 Bn NPR through its subsidiaries

(Mn NPR)	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	Total
NEA Owned											
Generation	4035	6163	1500	0	0	0	0	0	0	0	11698
Energy Efficiency	3000	2000	2000	2000	1500	1500	1500	1500	1000	1000	17000
Transmission*	12260	30979	36399	33202	30700	33767	27534	32115	47107	39223	323286
Distribution*	12678	16642	25168	17094	17443	17948	18425	18817	19652	19700	183567
Rural Electrification	3818	3818	3818	3818	3818	3818	3818	3818	3818	3818	38180
Total	35791	59602	68886	56114	53460	57033	51277	56250	71577	63741	573731
NEA Subsidiaries											
Capex in NEA Subsidiaries	24638	45932	38572	54991	128322	162142	176330	155219	106174	62271	954591
NEA's Share	2701	6811	7569	11072	22201	26323	26979	23749	16245	9527	153175

- Capex in generation sector is planned majorly through IPPs and NEA Subsidiaries; therefore NEA's capex is mostly concentrated in Transmission and Distribution system strengthening and augmentation

Approach: Maximizing Finance for Development

“Pursuing **private sector solutions** where they can help achieve **development goals**, and **reserving scarce public finance** for where it is most needed.” – *Development Committee Paper, 2017*

Maximizing Finance for Development:

MFD requires identifying the right investments, taking the financial risk to initiate them, and implementing them effectively and efficiently.

By leveraging the private sector..

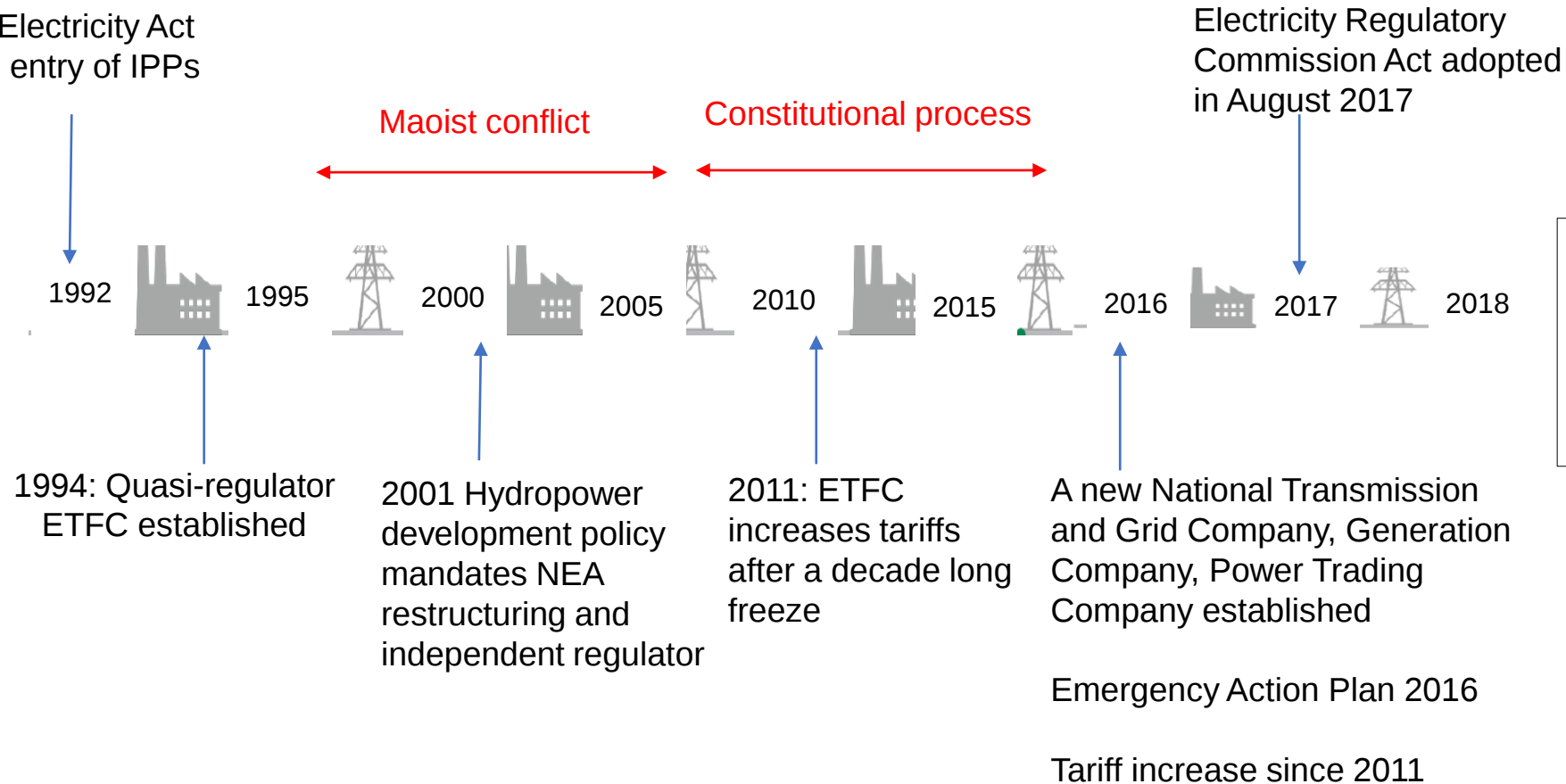
Creates imperative to leverage the private sector for economically beneficial, sustainable investments that contribute to development goals

... and optimizing the use of scarce public resources.

Public sector faces limitations in meeting this need, including in fiscal space, capacity, and governance

Reforms initiated in the early 1990's have been delayed by the long political transition in the country....

1992 Electricity Act allows entry of IPPs



Planned Reforms:

- New Electricity Act
- NEA restructuring/
- Unbundling
- Power trade

Barriers to Attract Investments in the Energy Sector

Governance and sector structure

- Overlapping roles of MOE, NEA, DOED create confusion
- Delayed implementation of NERC Act for tariff reforms
- Lack of new Electricity Act to govern reforms

Strategic planning

- Inadequate planning, underinvestment in generation, transmission, distribution
- Lack of least-cost generation expansion plan
- Lack of integrated river basin planning

Financial viability & operational performance

- Lack of creditworthiness of NEA
- Below-cost tariffs
- High losses in transmission and distribution

Investment environment

- Lack of standardized PDA and PPA to support international project financing
- Lack of transparent, rigorous licensing procedures
- Uneven playing field for IPPs due to NEA control
- Weak E&S policy framework

Public investment & financial management

- Weak institutional capacity for public procurement and contract management
- Weak project implementation capacity
- Lack of mechanisms to manage exchange risk on foreign-currency PPAs

Energy Sector MFD collaboration across the WBG

Upstream: power sector reforms, financial viability and sector planning

World Bank DPC1-3 (DPC1 in July 2018)

- Reduce losses
- Regularize tariff
- Increase sector investments
- Standardized/streamlined PPA and E&S procedures
- Strengthen generation and river basin planning

World Bank and IFC TA

- Joint Implementation Plan/power sector strategy identifying hydro as priority area for private investment
- Provided TA to NP on power sector reforms, G+T planning, financial viability, operationalization of NERC Act, E&S hydro guidelines

Downstream: WBG investments in G, T, and D

IDA projects enabling private sector/imports

- Cross border transmission lines (\$137m)
- Grid solar and distribution rehabilitation (\$130m)
- Biogas and minigrids (\$14.9 m total)

IDA/IFC Kabeli A Hydro (37 MW)

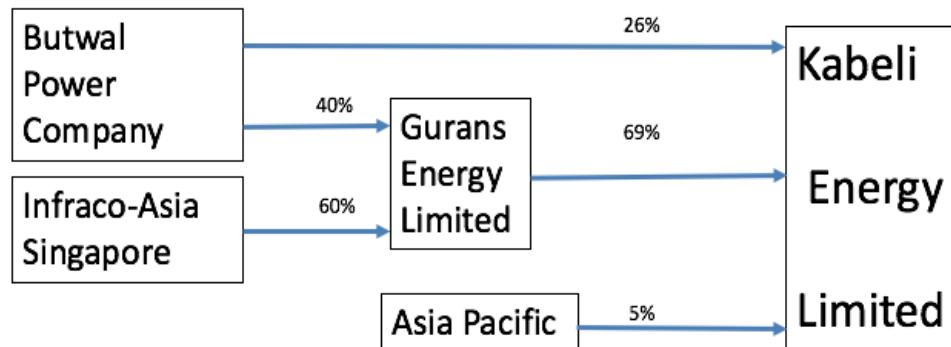
- **IDA** provided \$38 m on lent to private sector
- **IFC** provides \$40m co-financing

IFC/MIGA/IDA Upper Trishuli 1 Hydro (216 MW)

- **IFC** provides \$90m financing + mobilizing up to \$310m
- **MIGA** Political risk guarantee up to \$150m of sponsor's equity
- **IDA** partial risk guarantee and TA on foreign exchange risks

Kabeli A Hydro Debt Financing Structure

KABELI ENERGY LIMITED: Shareholding Structure

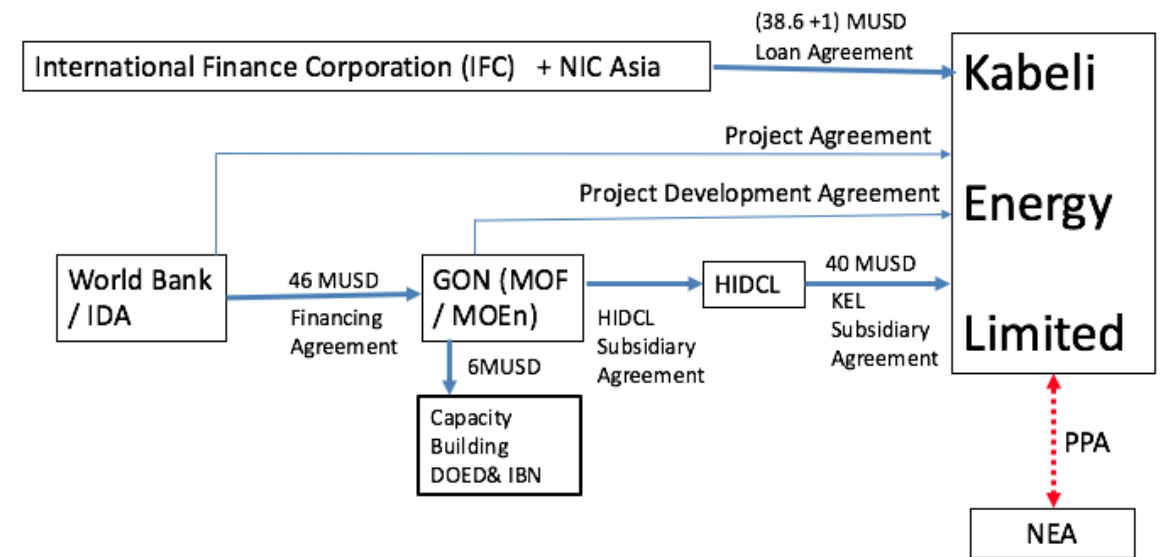


Ratio Equity/Debt = 20:80

Related Documents

JVA/SHA
MOA & AOA
Industry Registration
FDI permission/approval
PAN

KABELI ENERGY LIMITED (An SPC): 79.6 MUSD Debt Financing



Facilitating regional integration: Nepal-India Electricity Transmission and Trade Project

Components: (i) 400 kV Transmission Line (ii) 220 kV Transmissions, (iii) Substations, (iv) NEA Financial Management Information System support

Current Status:

- This particular project has contributed in reducing the load shedding hours by facilitation additional imports of 160 MW of electricity during the dry season.
- Transmission tower foundation works completed: 66% (792) in 400 kV, 69% (226) in one 220 kV line and 29% (246) in second 220 kV line
- Substations: Dhalkebar 95% completed, work has started with the new contractor and expected to be commissioned by September 2018.
- Bidding initiated for the remaining works for the Hetauda and Inaruwa substations and the Bharatpur-Bardaghat line, The Bid Evaluation report is submitted for the Bank's review.

Energy Sector MFD: Future Opportunities

Objectives	Short Term Measures	Medium/Long Term Measures
De-risk the sector through institutional and regulatory reforms	(a) make the NERC operational and submit the new Electricity Act to parliament for approval, (b) issue a roadmap for NEA restructuring, (c) approve the NEA financial viability plan, and (d) prepare and endorse a least cost generation plan	(a) complete NEA restructuring, (b) seek integration into the regional electricity market and/or establish a wholesale electricity market
Support large hydropower and renewable energy development	(a) Accelerate the construction of 3,000 MW domestic and export hydro projects under way (b) Implement a model large hydro project (c) Issue standardize PDA and PPA, and E&S guidelines (d) Carry out competitive power purchase (e) Establish FX risk management mechanism	(a) deepen the domestic capital market to increase availability of long tenor loans for hydropower projects (b) introduce nonrecourse project finance to the sector
Undertake timely investments in the country's transmission and distribution network to enable hydro and regional interconnections	(a) Increase investments in T+D (b) Implement the loss reduction master plan (c) Pilot smart meters	(a) countrywide adoption of smart meters (b) develop a transmission corridor (c) Consider PPP in T+D