

NEPAL POWER INVESTEMENT SUMMIT 2018

Prospects of Renewable Based Distributed Generation in Nepal

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Presentation Outline

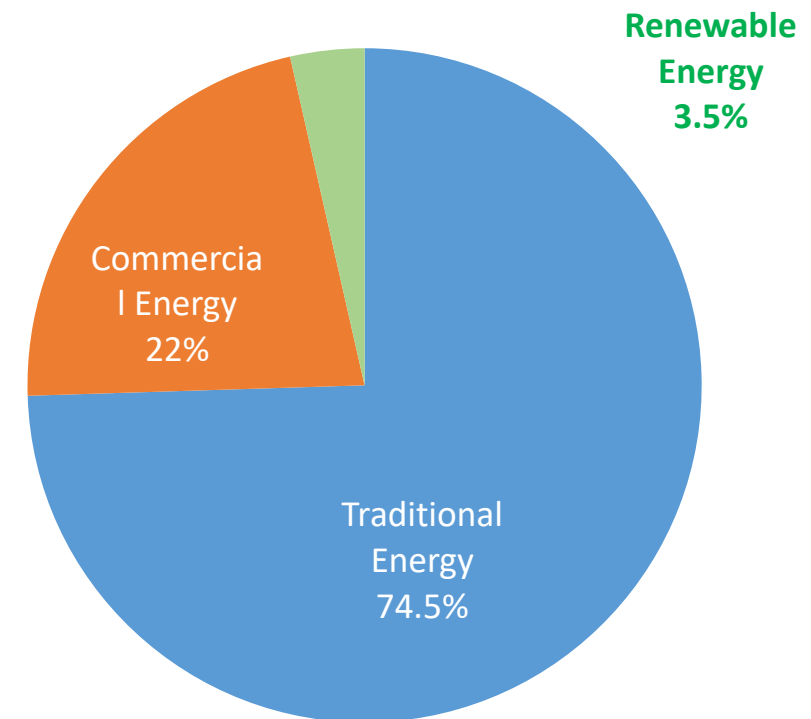
- Context of Energy in Nepal
- The Changed Structure
- Cost of Solar PV and Wind
- Experience from Nepal
- Opportunities Ahead

NEPAL POWER INVESTEMENT SUMMIT 2018

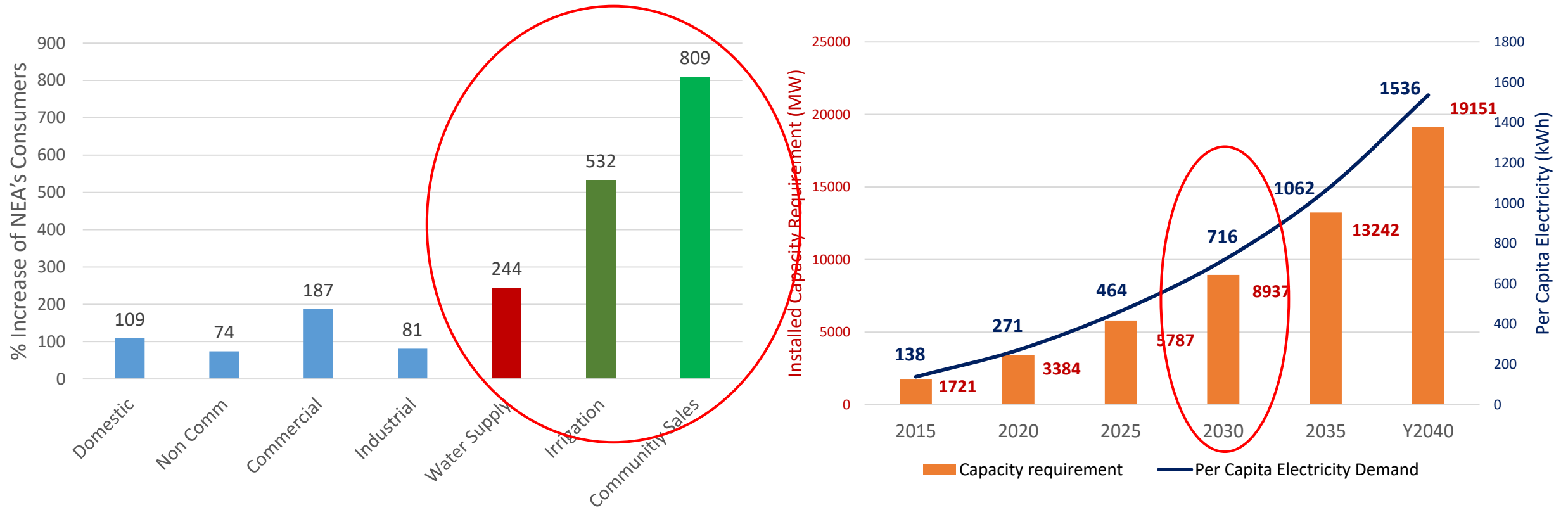
Context of Energy in Nepal

Despite Huge Resources, the Country has A strong dependence over Traditional Fuels

- Nepal has an Economical Potential of about **42,000 MW** of Hydropower Electricity
- SWERA estimates a potential of
 - **3000 MW** from Wind,
 - **1830 MW** from Solar PV and
 - Additional **2100 MW** from grid connected PV



Increasing Electricity Demand for Water Supply, Irrigation and Community Sales



Huge Increase in Water Supply, Irrigation and Community Sales

Require over 9 X the Capacity

Energy Security and Cooking

एल. पी. ग्यासको बढ्दो प्रयोगले खाना पकाउन प्रयोग हुने इन्धनमा मट्टितेलको प्रयोग अत्यन्त न्यून हुन गएको छ। यसले गर्दा मट्टितेलको बिक्री दिनानुदिन घट्दै गईरहेको छ भने एल.पि. ग्यासको उपभोग दर बार्षिक करिब १५ प्रतिशतको हाराहारीमा बढ्दै गईरहेको छ ।

ख. भविष्यमा गर्नुपर्ने कार्यका सम्बन्धमा सञ्चालक समितिको धारणा
अ. निगमका भावी कार्यक्रम

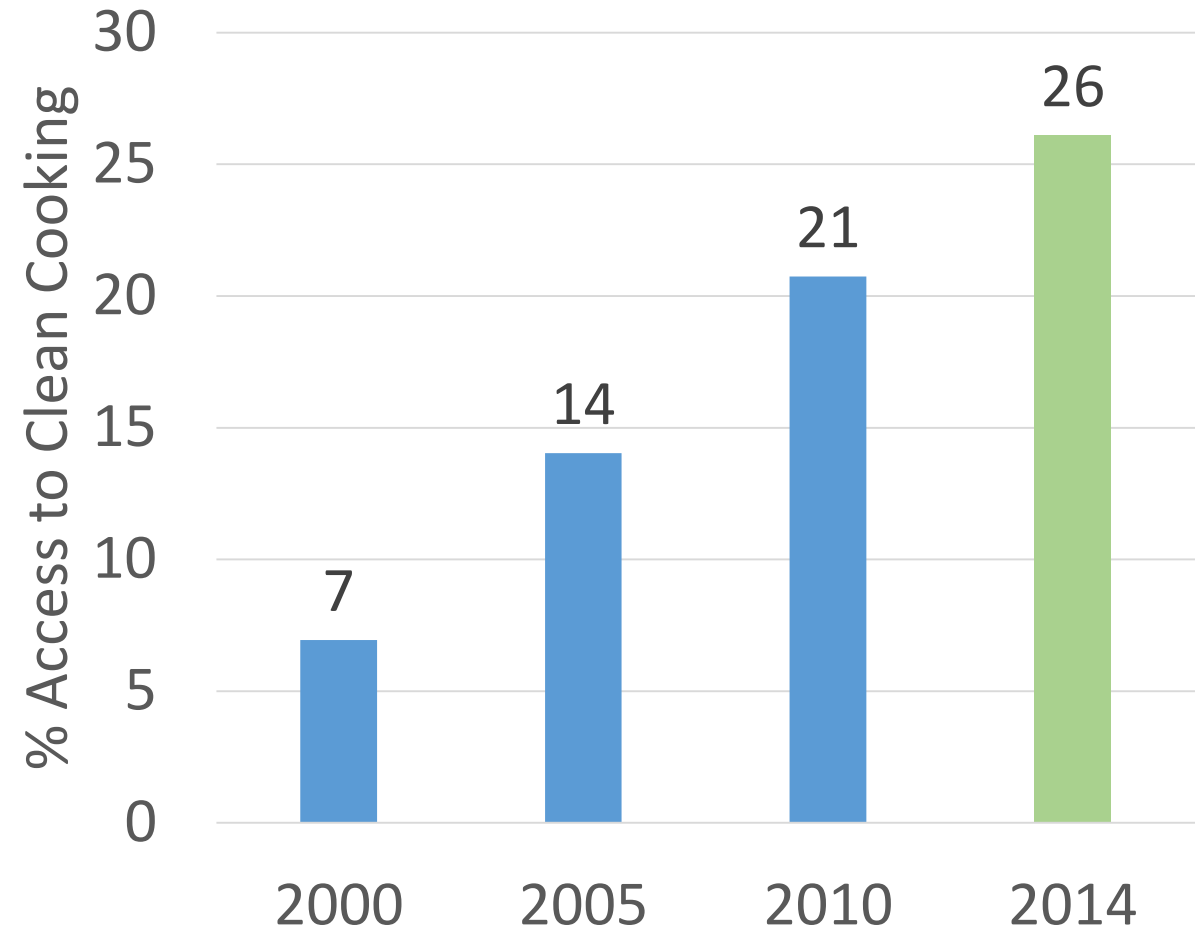
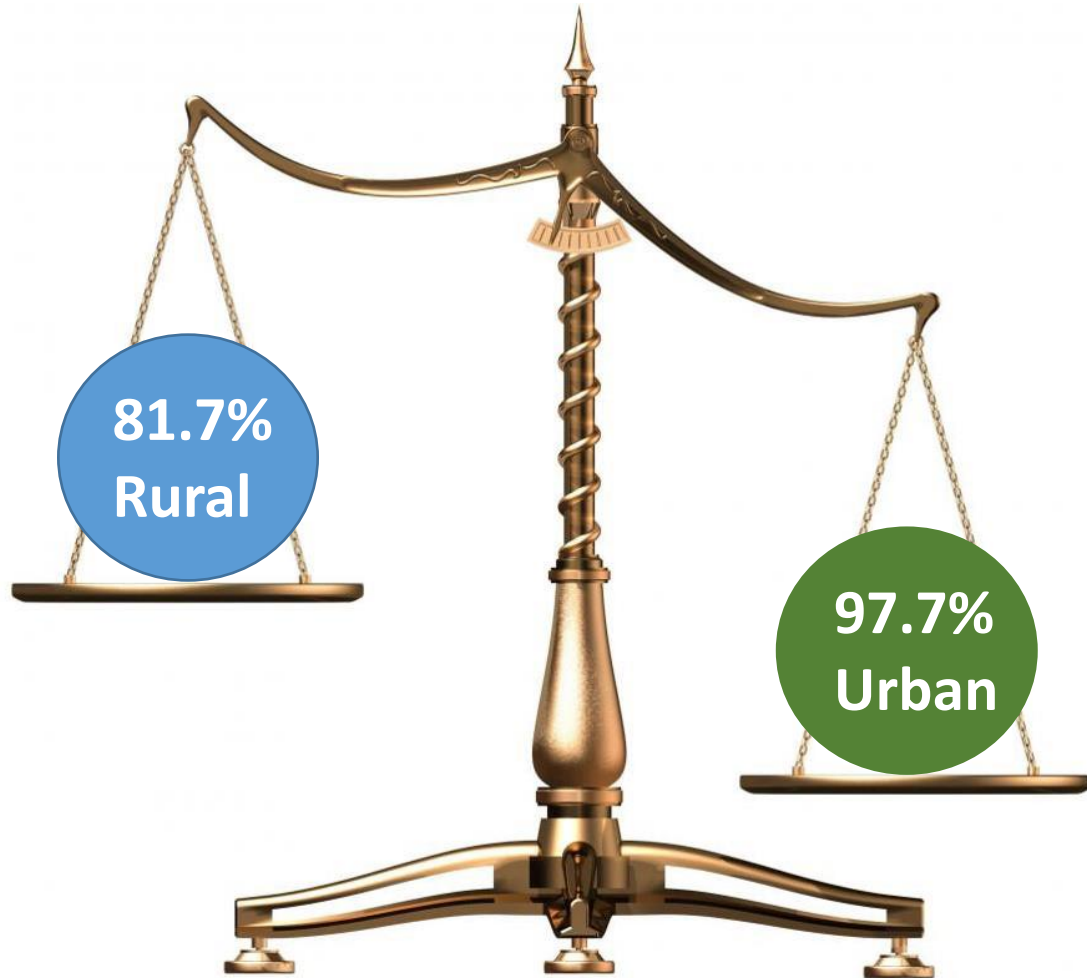
१. पेट्रोलियम पदार्थको आयातलाई विविधिकरण गर्नुका साथै नवीकरणीय उर्जाको उत्पादन बढाई आयात प्रतिस्थापन र उर्जा सुरक्षा कायम गरिनेछ ।
२. प्राकृतिक प्रकोप र विपत्तीको सम्भावनालाई मध्यनजर राखी हालको भण्डारण क्षमतालाई क्षेत्रगत आधारमा वृद्धि गरिनेछ ।

(Nepal Oil Corporation 2016)

About two thirds of Households (66%) still use solid fuel for cooking and is more common in rural household (88%) than urban (52%)

(Nepal Demographic and Health Survey 2016)

Access to Electricity and Clean Cooking Needs Stronger Focus and Commitment



(Source: 2017 The World Bank and the International Energy Agency)

Motivation from Changing Structure

Mandates from the Constitution 2015 and Local Governance Operational Act 2017

“The state shall pursue a policy of developing and producing **renewable energy**, ensuring cheap, easily available and dependable supply of energy, and making an appropriate use of it to meet the basic needs of the citizens.”

घ. खानेपानी, साना जलविद्युत आयोजना, वैकल्पिक उर्जा

- (१) स्थानीय खानेपानी सम्बन्धी नीति, कानून, मापदण्ड, योजना, कार्यान्वयन र नियमन,
- (२) खानेपानी महसुल निर्धारण र खानेपानी सेवा व्यवस्थापन,
- (३) एक मेगावाट सम्मका जलविद्युत आयोजना सम्बन्धी स्थानीयस्तरको नीति, कानून, मापदण्ड, योजना तर्जुमा, कार्यान्वयन, अनुगमन र नियमन,

ग. विद्युत, खानेपानी तथा सिँचाइ जस्ता सेवाहरू

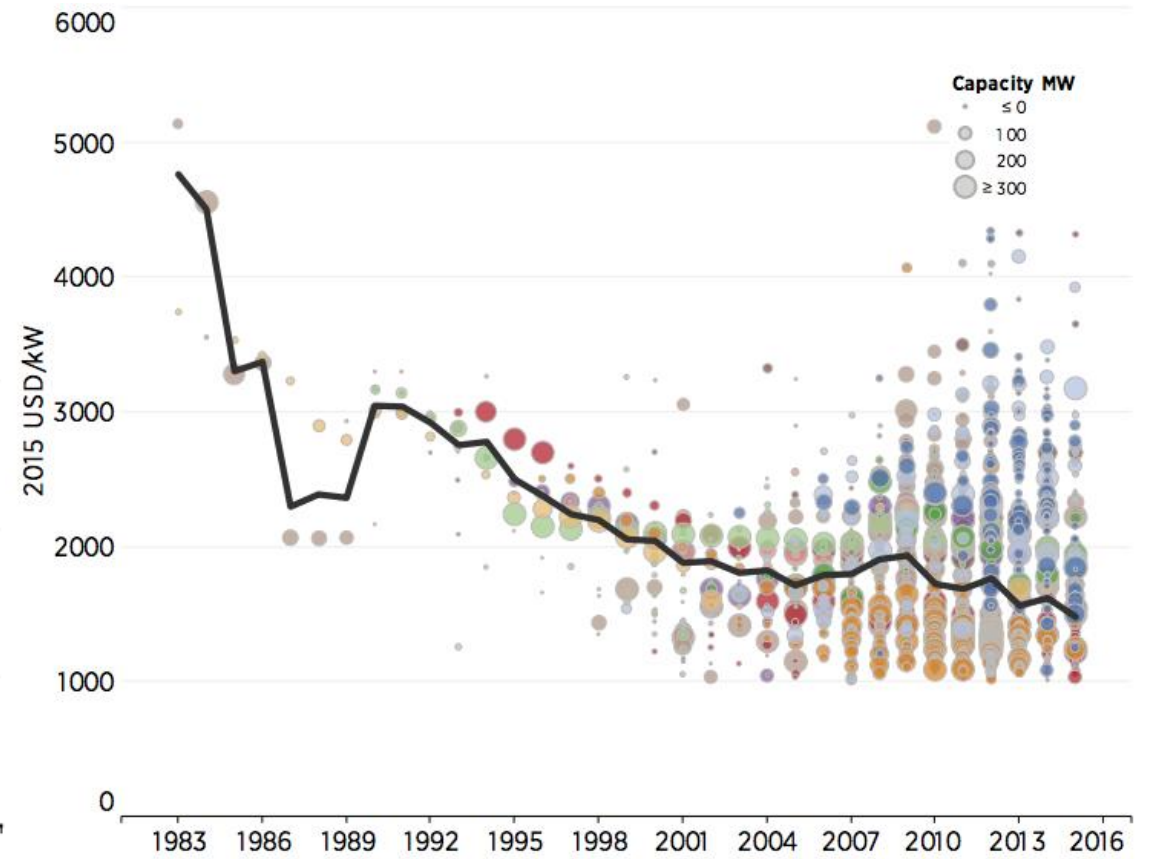
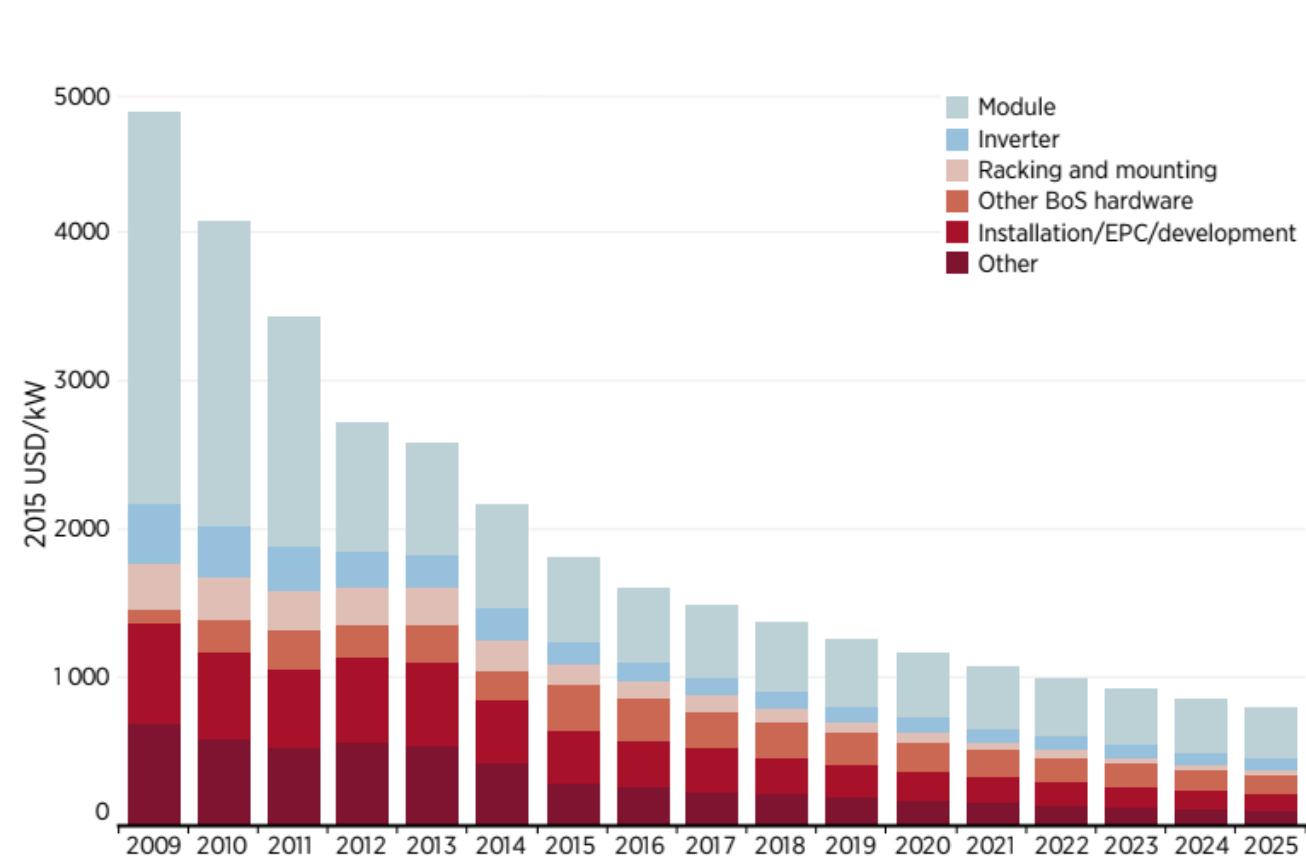
- (१) विद्युत वितरण प्रणाली र सेवाको व्यवस्थापन,
- (२) खानेपानी महसुल निर्धारण र खानेपानी सेवाको व्यवस्थापन,
- (३) स्थानीय साना सतह तथा भूमिगत सिँचाइ प्रणालीको सञ्चालन तथा मर्मत सम्भार, सेवा शुल्क निर्धारण र सङ्कलन सम्बन्धी व्यवस्थापन।

(४) स्थानीय तहमा वैकल्पिक ऊर्जा सम्बन्धी नीति, कानून, मापदण्ड, योजना तर्जुमा, कार्यान्वयन नियमन.

(५) स्थानीय विद्युत वितरण प्रणाली र सेवाको व्यवस्थापन, सञ्चालन र नियमन,

Increasing Affordability & Quality of Technologies

Falling Prices of Solar PV and Wind Systems



Continued Reduction in Solar & Wind Cost While Improvement in Capacity Factor

	Global weighted average data								
	Investment costs (2015 USD/kW)		Percent change	Capacity factor		Percent change ²	LCOE (2015 USD/kWh)		Percent change
	2015	2025		2015	2025		2015	2025	
Solar PV	1 810	790	-57%	18%	19%	8%	0.13	0.06	-59%
CSP (PTC: parabolic trough collector)	5 550	3 700	-33%	41%	45%	8.4%	0.15	0.09	-37%
CSP (ST: solar tower)	5 700	3 600	-37%	46%	49%	7.6%	0.15	0.08	-43%
Onshore wind	1 560	1 370	-12%	27%	30%	11%	0.07	0.05	-26%
Offshore wind	4 650	3 950	-15%	43%	45%	4%	0.18	0.12	-35%

A Strong Experience in Renewable Energy

Delivery of RE Services through AEPC

- Central Agency for RE Promotion
- Member Secretary for Access component (*SEforAll*)
- Strong Partnership in Development
 - UNDP/GEF RERL, GIZ RERA, ADB SASEC, WB SREP
- Strong Private Public Partnership-
 - Reverse auctioning, Best Available Technology (BAT), Incentive to Energy Services etc.

Benefitting More than

3.6 Million

Individuals

From Over

35 MW

RETs



In the last 20 Years of AEPC,
Renewable Energy Mix

Growth increased from 0.15% in 1996 to 3 % in 2017

1500 %



AEPC is pivotal in providing energy access for

- Electricity, Drinking Water, Irrigation & MUS
- MSME for Local Development
- Clean Cooking
- Overall Support for Rural Energy Development

Rich Experience in Diverse RETs in Nepal

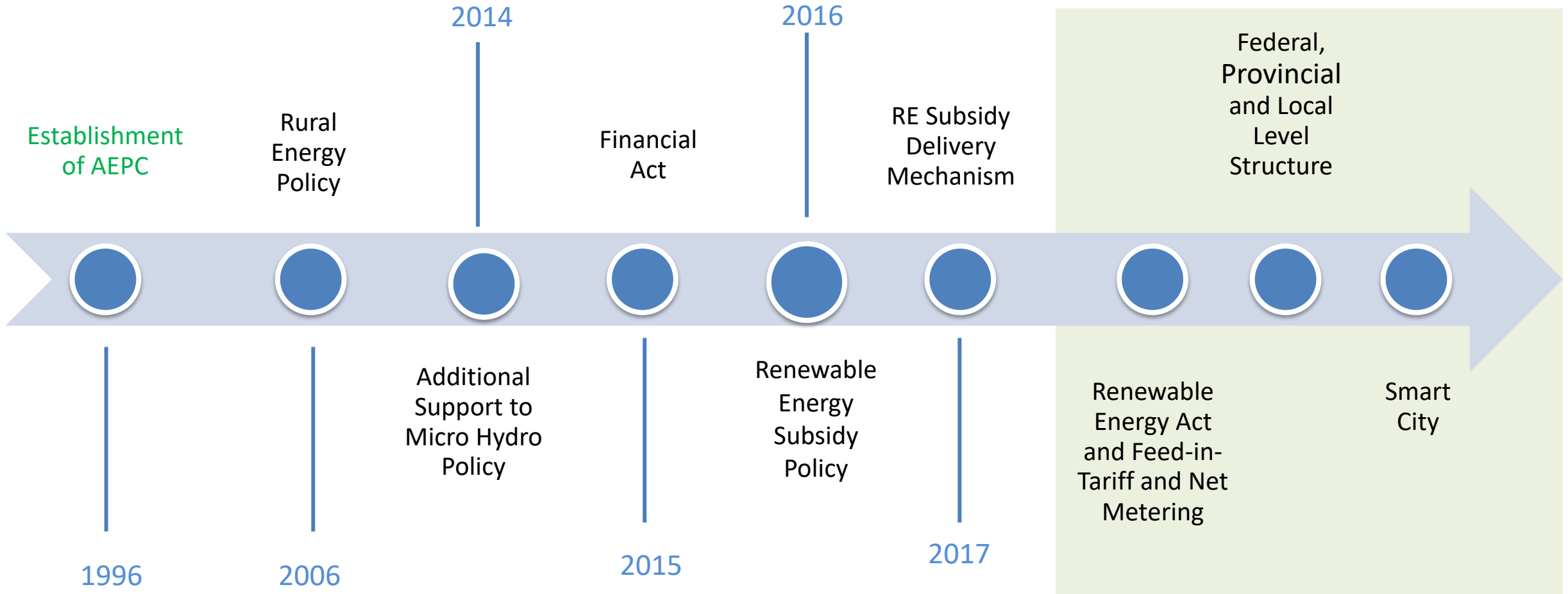
- Mini/Micro Hydropower Plants and Community Electrification
- Solar PV- Utility Scale, Mini Grid, Institutional and Home System
- Solar PV Pumping System- Irrigation, Drinking and MUS
- Biogas and Improved Biomass
- Wind, Hybrid and Grid Connected System



Understanding of RET for Development

Dimension of sustainability	Addressing the drivers of vulnerability	Building response capacity	Managing climate risk	Confronting climate change
Economic	RETs for creating micro-enterprises , employment and increase income RETs for irrigation, higher agri production and ensure food security			
Social	RETs for energy access and security Access to knowledge, social mobilisation and constructive participation RETs to reduced school drop out, increase completion years RETs to reduce women's respiratory diseases, enhance health, hygiene RETs to support Gender and inclusion issues and empowerment			
Environment	RETs to improve soil fertility and soil and water conservation		RETs to reduce GHGs emission	

Guidance through Policies

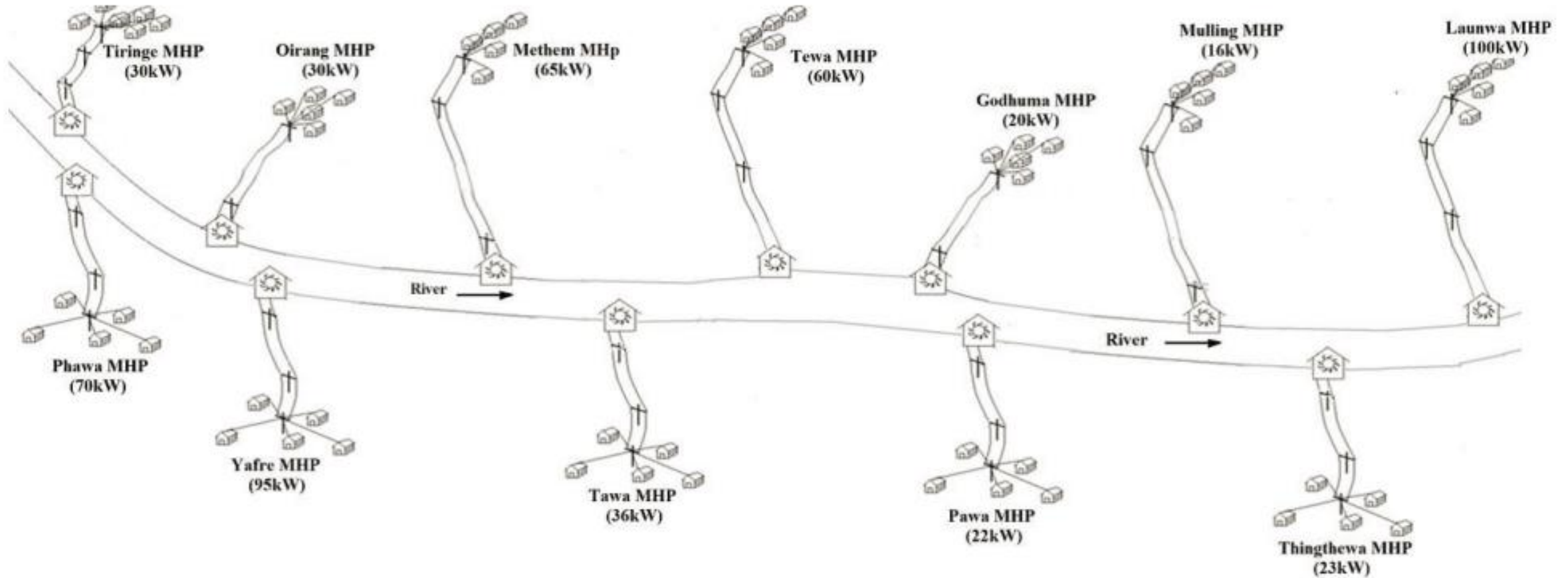


Opportunities Ahead

Grid Connection of Distributed Renewable Energy Technologies



Mini Grid Network connecting Isolated MHPs



Nepal has over 2000 Micro Hydro Power Plants

Distributed 1 MW Scale Mini Hydro and Alternative Generation Technologies



RE for Rural Farming and Irrigation



Energy Mix for a Energy Security

- Balance Energy Demand with Supply from Energy Sources including Distributed Renewable Energy Sources
- Adequate, Available, Accessible and Affordable Energy from Distributed Sources would reduce cost of transmission and improve energy security at Local Level
- Provide opportunity for Local Government to increase revenue sale of electricity
- Fully utilize the existing isolated MHPs to connect and become a important economic asset



A Giant Opportunity for Renewable Energy

- Direct and Strong Roles and Responsibilities for implementation and expansion of RE at Local Level
- A strong commitment for connecting Distributed Energy Sources through Sub-Stations at all Local Level
- Untapped Renewable Energy Sources and Increasing Energy Demand
- Provision of Banks at all Local Level increasing the potential for a Strong Financial Linkage
- RETs becoming for Affordable, Accessible with improved Quality
- Stronger Private Sector, Skills and Employment



THANK YOU

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