

Country Presentation

Knowledge Sharing Workshop on Modern Techniques
including Renewable Energy Auctions for
Economizing Renewable Tariffs



9 – 10, May 2018

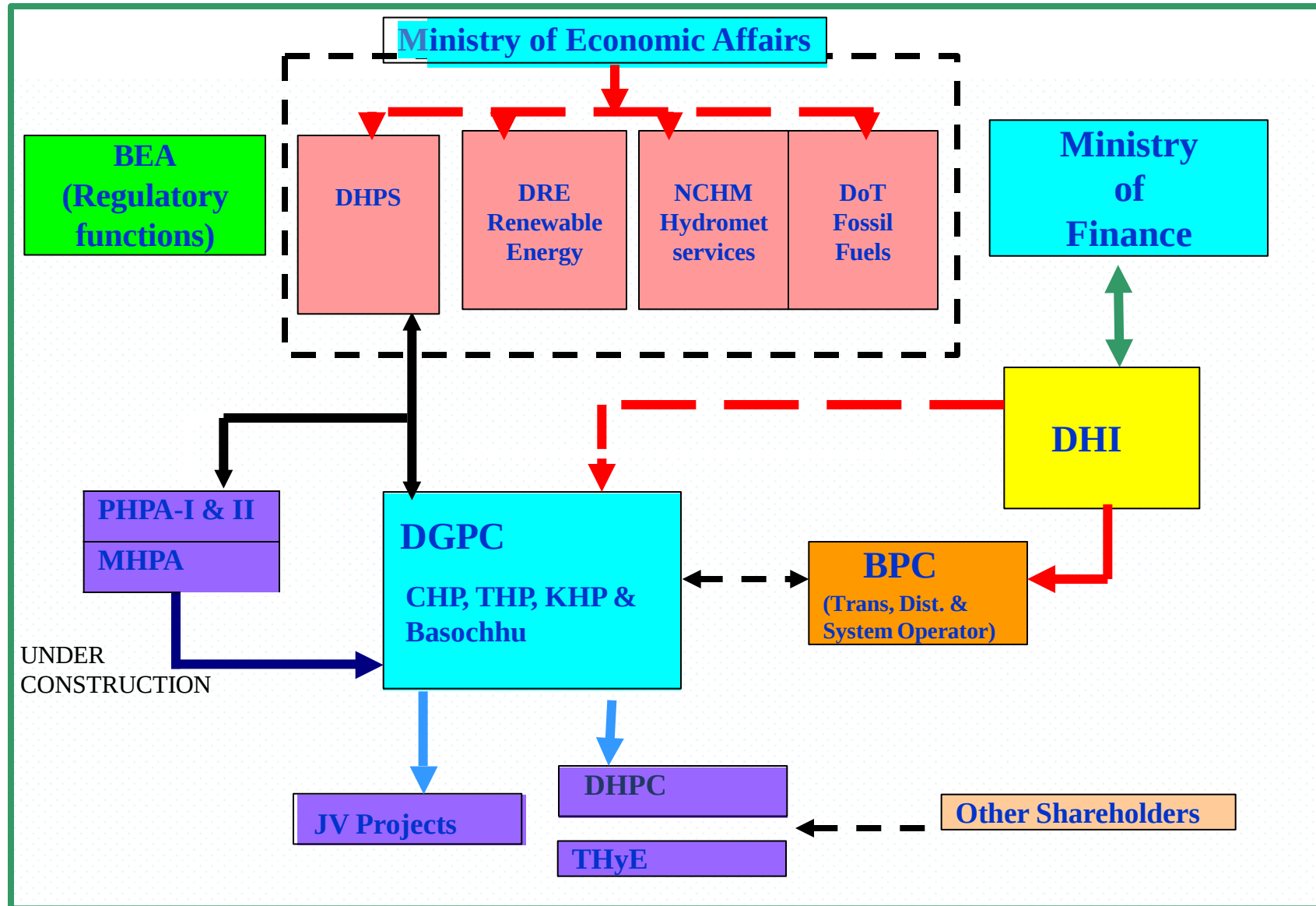
Presentation Outline

1. Sector Reforms
2. Energy Sector Structure
3. Hydropower Potential
4. Role of Hydropower
5. Existing Plants & Projects under construction
6. Generation & Domestic Demand
7. Renewable Energy in Bhutan
8. Opportunities & Challenges

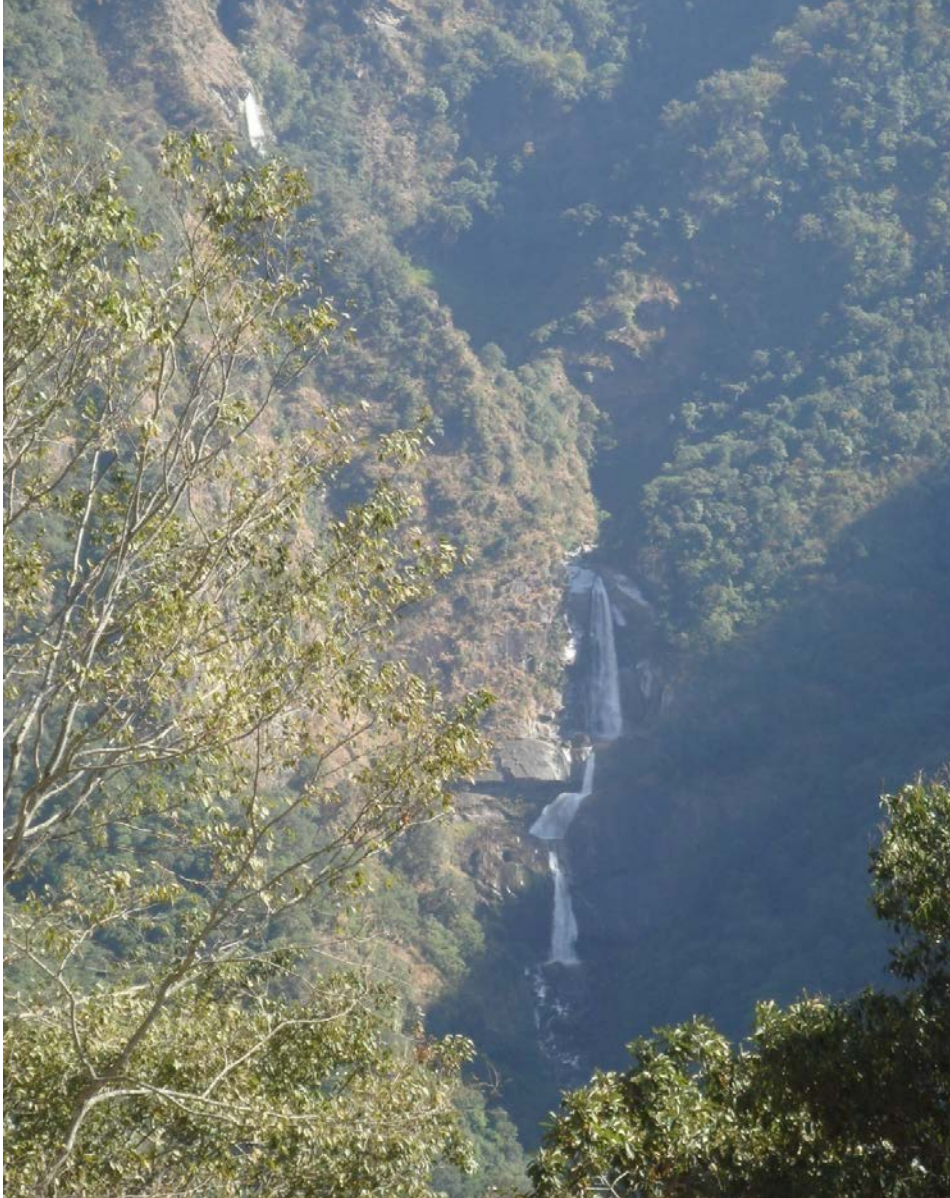
Energy Sector Reforms

1. Electricity Act in July 2001
2. Power Sector was restructured in 2002
3. DoE –Responsible for developing the long term policies and plans for the energy sector
4. BPC –Transmission & Distribution of electricity & supply functions and also acting as a National System Operator
5. BEA- Responsible for Regulation, became fully autonomous in January 2010
6. DGPC (Established in Jan 2008) – O&M of all existing hydropower plants owned by RGoB and also tasked with responsibility of developing projects on its own or through JV on behalf of RGoB
7. DoE unbundled into (DHPS, DRE & DHMS) in 2011
8. DHPS – Nodal Agency for Hydropower Sector>25MW
9. DRE– Nodal Agency for Renewable Energy

Energy Sector Structure



Hydropower Potential



The steep and rugged Himalayan topography and swift rivers promise huge hydropower potential

- ❑ 30,000 MW potential
- ❑ 23,325MW (64 sites of >25MW) techno-economic potential viable for development

Role of Hydropower in the Bhutan's Economy

- ❖ Prior to harnessing of hydropower, Bhutanese economy almost entirely dependent on foreign aid.
- ❖ Hydropower is a Strategic National Resource and main driver of economic growth.
 - i. By providing safe, reliable, affordable and abundant electricity to improve the lives of all Bhutanese and drive industrial growth
 - ii. Surplus power shall be exported to enhance government revenue.
- ❖ Earnings from this sector ploughed back into the social & industrial sectors.

Hydropower Plants Under Operation

Sl. No.	Power Plant	Installed Capacity (MW)	COD
1	Chukha HPP	336.00	1986-88
2	Kurichhu HPP	60.00	2001-02
3	Basochhu HPP (Upper Stage)	24.00	2001
4	Basochhu HPP (Lower Stage)	40.00	2005
5	Tala HPP	1,020.00	2006-07
6	Dagachhu HPP	126.00	2015
7	Micro/Mini (20 Nos.)	8.00	
	Total	1,614.00	~7%



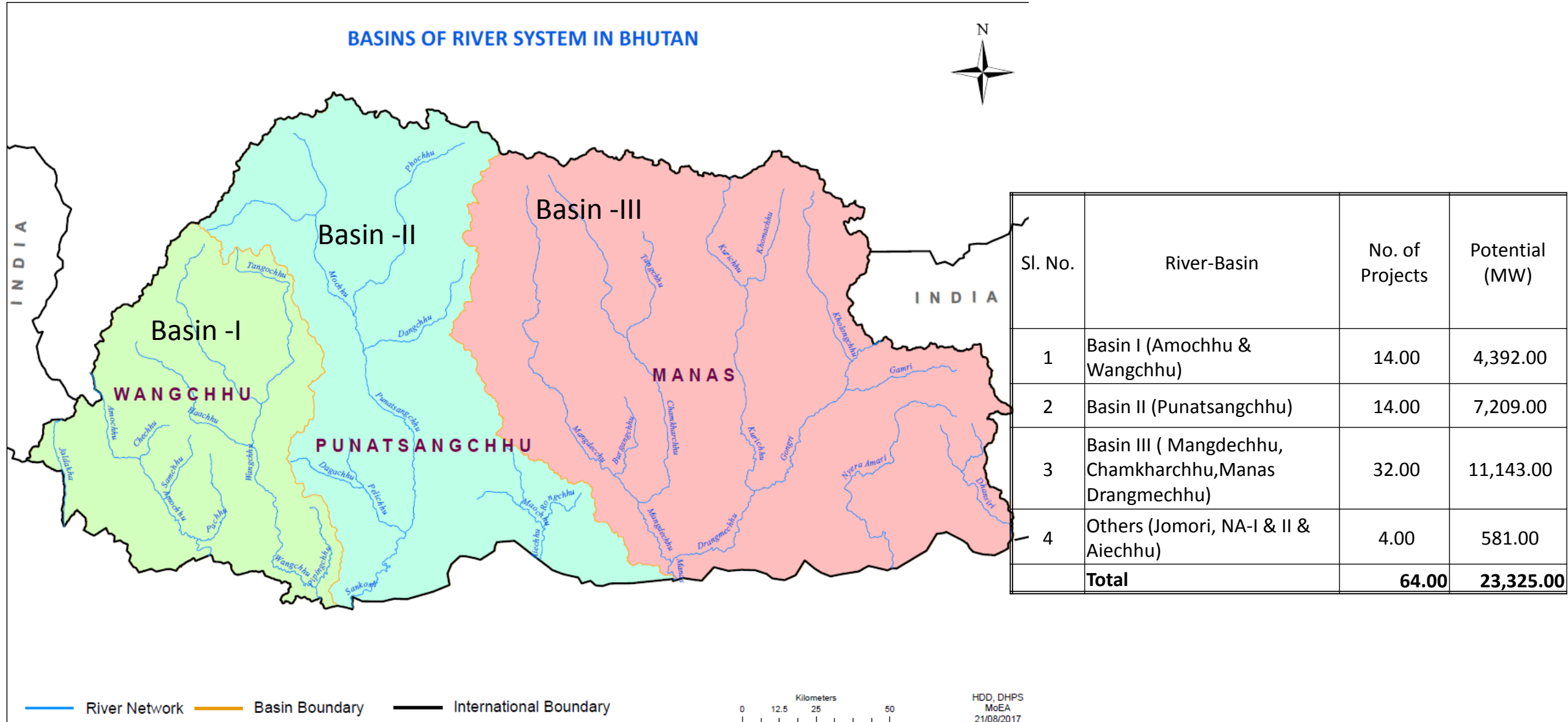
Projects Under Construction

Sl. No.	Power Plant	Installed Capacity (MW)	Generation (MU)
1	Punatsangchhu-I	1,200.00	5,700.00
2	Punatsangchhu -II	1,020.00	4,000.00
3	Mangdechhu	720.00	2,900.00
4	Kholongchhu	600.00	2,599.00
5	Nikachhu	118.00	492.00
	Total	3,658.00	15,691.00

Power Generation & Domestic Demand

- Annual Generation – 7,948MU
- Domestic Load – 2,084.69MU
- Total number of customers -177,151
- Rural Electrification coverage ratio -99.95%
- National Coincidental load – 335.87MW
- ~70% of generation exported
- Transmission route length – 1,102.074km

River Basins & Hydropower Potentials



Renewable Energy

- Dedicated Department formed in 2011
- To promote viable renewable energy resources and technologies
- to broaden the energy supply mix by exploring other forms of clean and renewable energy sources that will supplement, in particular, hydropower generation shortage faced during the lean season.
- Supply side management: through applied research, development, capacity building, demonstration projects, and devising appropriate incentive schemes while actively
- Demand side management: Energy conservation and efficiency measures, advocacy, energy auditing etc.

Opportunities

- ❖ Renewable, Clean form of Energy
- ❖ Reduction in GHG emission
- ❖ ~ 30,000 MW Potential
- ❖ Benign environment (political, social & physical/techno- economic)
- ❖ Business development opportunities (Energy Companies, Construction Industries, Equipment, Support services, etc.)
- ❖ **Huge opportunities** for import and export of power due to prevailing demand supply balance in addition to **resource and demand complementarities** within the region
- ❖ CB power exchange would provide the region with an opportunity for better price signals and would support a competitive power market.

Challenges

1. Socio-Economic:

- ✓ Resources constraints (capital intensive, skills & technology !)
- ✓ Risks (long gestation, weather, geology, seismology)
- ✓ Market (pricing, competition)
- ✓ Transport cost (land locked !)

2. Environment

- ✓ Constitutional Environment Mandate (60%) forest cover versus growing population/development needed
- ✓ Fragile mountain eco-system and extremely vulnerable to adverse impact to climate change;
- ✓ Lacks capacity to respond to adverse impacts of climate change;



THANK YOU