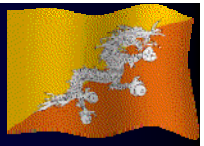

Energy Policy Country Report

by

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and

Satchi

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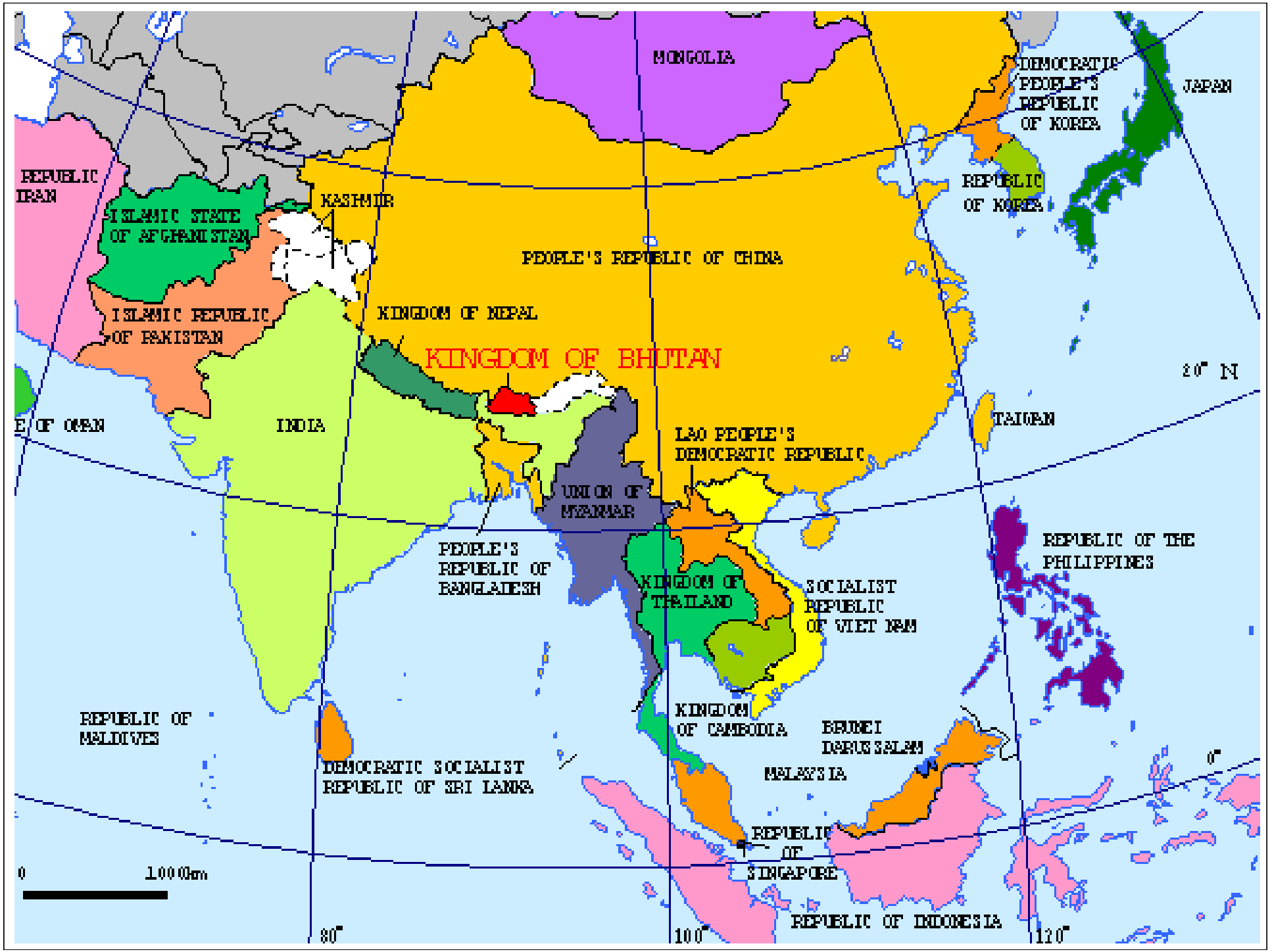
Thimphu: Bhutan.

Outline of the Presentation

- All about Bhutan – Physical, social & economic features
- Institutional set-up for management of energy resources.
- Status of development – Energy and hydropower
- Present Situation – Energy & Power and Development partners.
- Policy Initiative
- Constraints and bottlenecks currently being faced in formulating policies
- Challenges and Constraints
- Subjects that we would like to study


MONGOLIA
DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA
JAPAN
REPUBLIC OF KOREA
REPUBLIC IRAN
ISLAMIC STATE OF AFGHANISTAN
KASHMIR
PEOPLE'S REPUBLIC OF CHINA
ISLAMIC REPUBLIC OF PAKISTAN
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KINGDOM OF BHUTAN
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E OF OMAN
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TAIWAN
LAO PEOPLE'S DEMOCRATIC REPUBLIC
UNION OF MYANMAR
PEOPLE'S REPUBLIC OF BANGLADESH
REPUBLIC OF THE PHILIPPINES
KINGDOM OF THAILAND
SOCIALIST REPUBLIC OF VIET NAM
KINGDOM OF CAMBODIA
BRUNEI DARUSSALAM
REPUBLIC OF MALDIVES
DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MALAYSIA
0°
REPUBLIC OF SINGAPORE
0
1000km
REPUBLIC OF INDONESIA
80°
100°
120°

Physical & Socio-economic features of the Kingdom of Bhutan

Location: Southern slope of Eastern Himalayas , North-East of India and South of Tibet/China, 26°45'- 28°10' N Latitude, 88°45'- 92°05' East Longitude (land locked)

Area: 38,394 square kilometres

Altitude: Varying from 100 metres in the South to 7550 metres in the North

Forest/vegetation coverage: 72.5 %, snow capped mountain range in the North, Alpine trees in the mid range, deciduous/sub-tropical forest in the South.

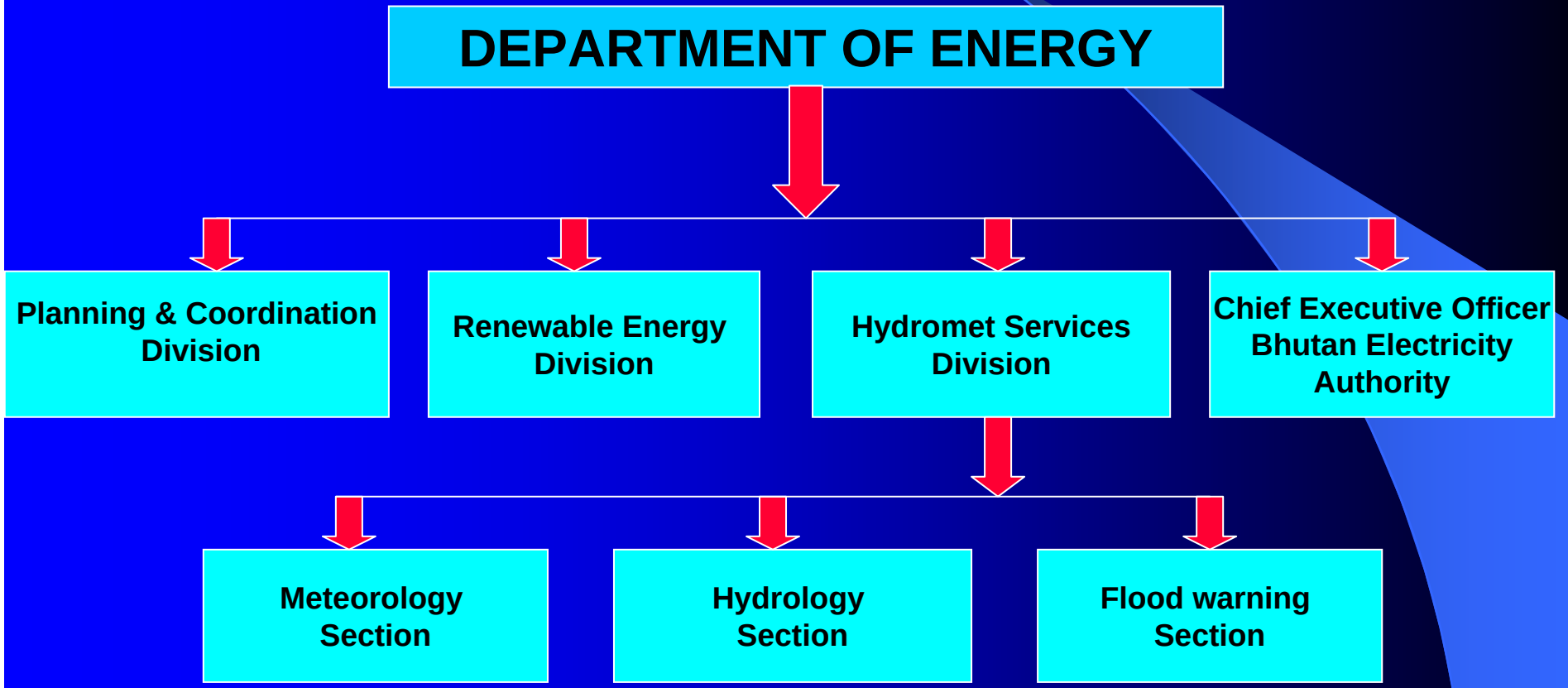
Physical & Socio-economic features (cont'd)

- **Sources of Revenue Income** : Hydropower, tourism, cement, oranges, apples, agro-fruit products, finished timber products etc.
- **Economy:** GDP –Nu. 54.15 billion, more than 70% people live on subsistence farming,
- **Food**: Stable diet is rice, cheese & chillies, meat curry.

Institutional Set-up of Energy Resources Management

- Under Ministry of Economic Affairs
- Electricity Policy, Planning and Utility functions (Generation, transmission & Distribution)
- Import of Fossil Fuels
- Under Ministry of Agriculture
- Fire-wood, food and animal power

Organogram (DoE) w.e.f. 1 July 2002



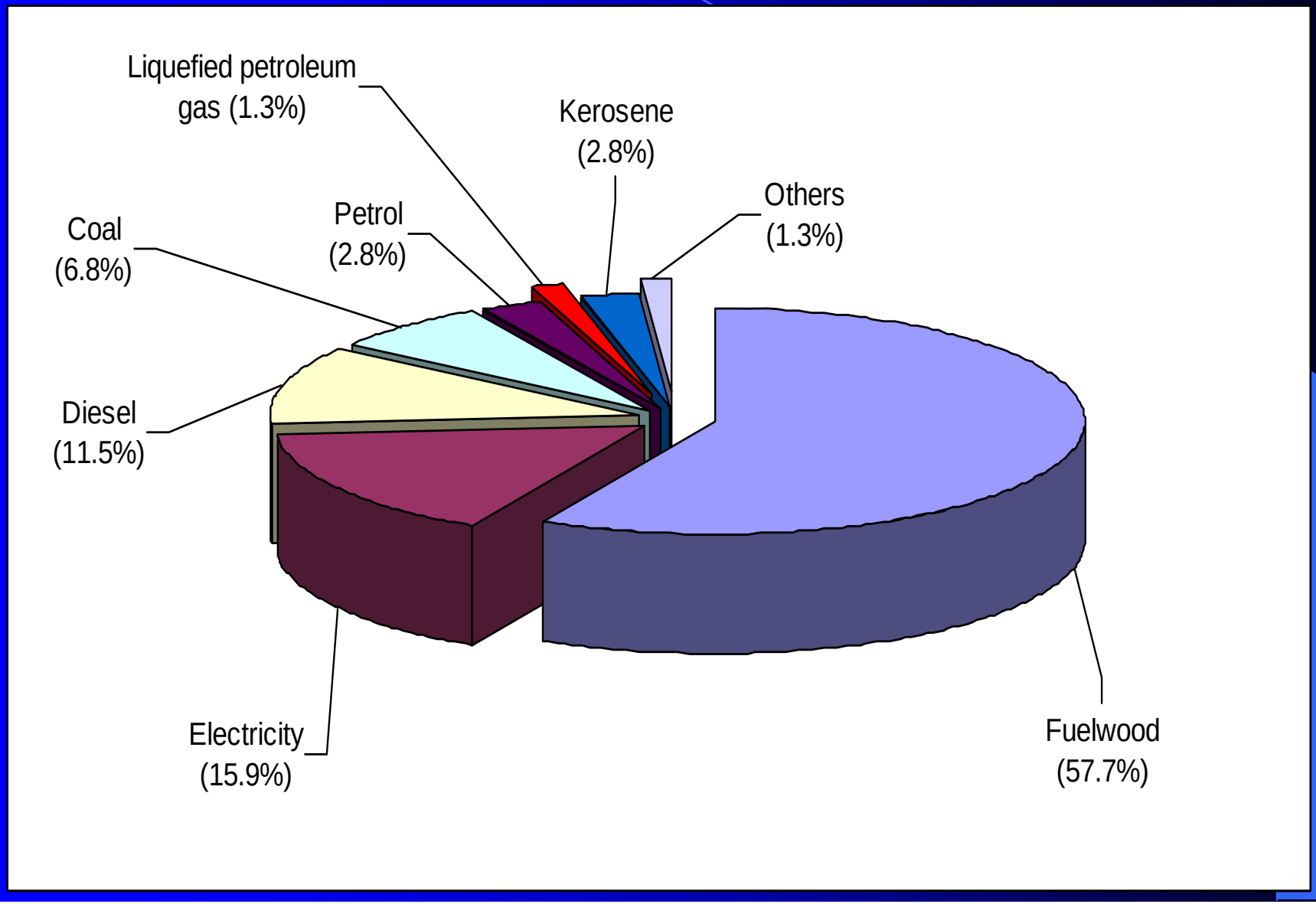
Vision and Mission of the DOE

- The DOE has the vision “to be a dynamic, high performing government agency, that effectively promotes hydropower development to achieve economic self-reliance and that fosters the sustainable use of other modern forms of energy in the kingdom”.
- The mission of the DOE is stated as to “Govern and facilitate integrated development of a sustainable and robust energy sector that drives the national economy and meets the demand for quality modern energy services of the Bhutanese society”.

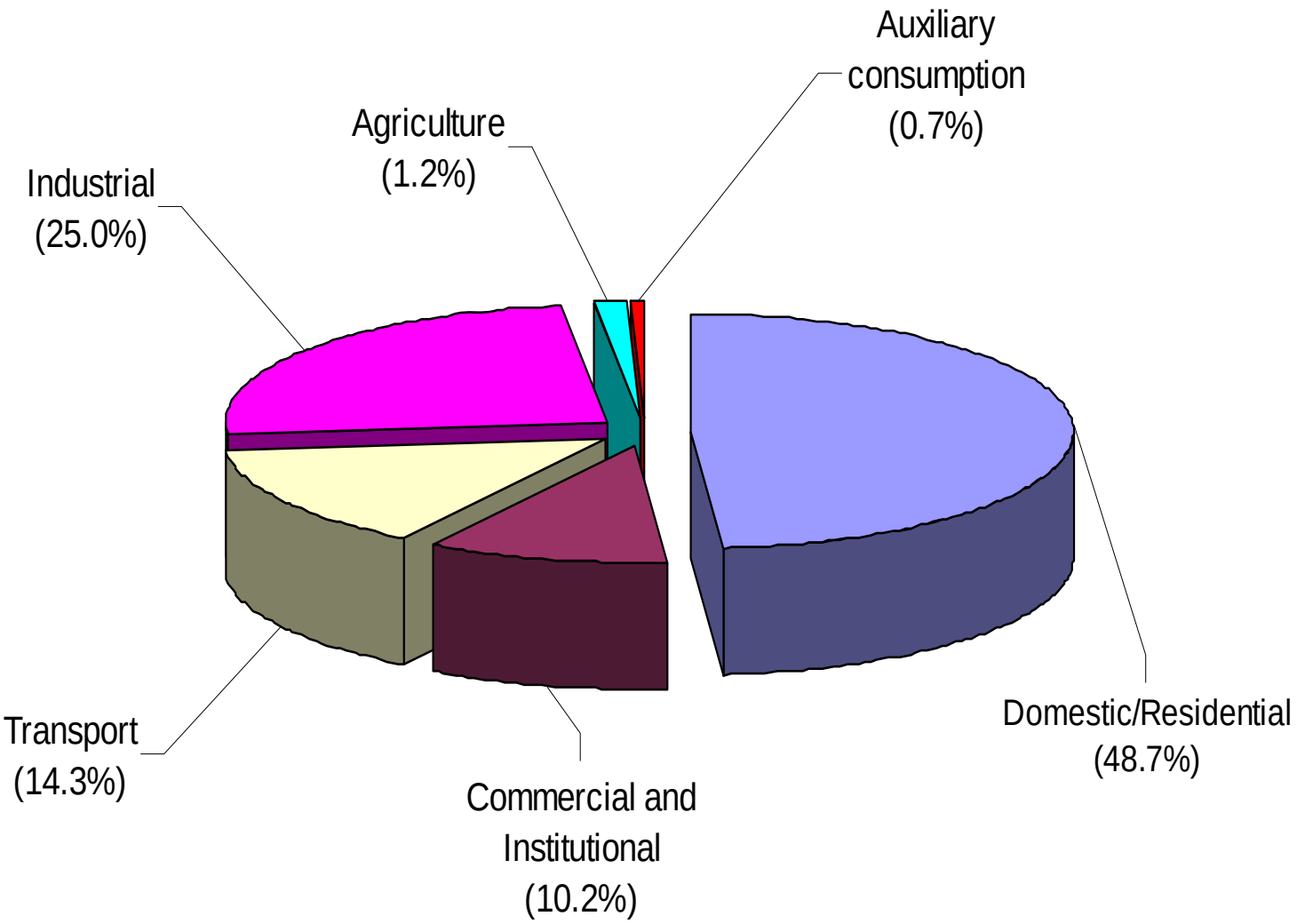
Energy Scenario (2005)

- Primary energy – Bio-mass-Fuel wood (724,597 tonnes in 2005) for lighting, cooking and heating
- Import of Kerosene (12,545 kl), Diesel (51,440 kl), Petrol (13,775 kl), LPG (44,72 MT) – increasing demand !

Energy Supply Mix



Sector -wise Energy Consumption



Status of Hydro Power Development

- Techno-economically feasible >10 MW, 76 sites= 23,760 MW (=100,000) GWh, 6 reservoir and 70 RoR
- Developed so far – 1488.17 MW (7416 GWh/Annum, 5% of potential)
- Small Hydro: 23 nos of 8.6 MW installed capacity Mini/Micro Hydels (8 kW-2200 kW), First plant commissioned in 1967.
- Solar PV installed – 0.045 MWp
- Diesel Power installed capacity-17.39 MW
- Total installed capacity – 1505.60 MW

Present Power Supply & Demand Situation

- Generation capacity = 1488.17 MW (6562 GWh in 2007-08)
- Total Export =5429 MU in 2007-08
- Total Import = 7.25 MU
- Power system demand =194 MW
- Total electricity consumers ~ 81181
- Per capita energy consumption – 1773.4 kWh
- Net revenue from electricity contributed 50% of country's revenue accounted for 22% of GDP

Major Development Partners

Project	Installed capacity-MW	Bilateral Assistance	Year of commission	Financing Mode
Chukha	336	GOI	1986-88	60% grant, 40% loan @ 5% interest rate
Kurichhu	60	GOI	2001-02	60% grant, 40% loan @ 10.75% interest rate
Basochhu Upper Stage	24	Austrian Govt.	2001	43% grant, 57% interest free loan
Basochhu Lower Stage	40	Austrian Govt.	2004	2.8% soft loan
Tala	1020	GOI	2006-07	60% grant, 40% loan @ 9% interest rate
Punatsangchhu -I	1200	GOI	2015 (under construction)	40% grant, 60% loan @ 10% interest rate

Development of 10,000 MW by 2020

Project	Installed capacity-MW	Estimated Project Cost (Mill Nu.)	Implementation Model	Expected year of commissioning
Punatsangchhu-1	1200	36,348	IG	2015 (Under construction)
Mangdechu	720	38,105	IG	2017 (Agreement signed)
Punatsangchhu-2	1000	42,301	IG	2017 (Agreement signed)
Sankosh Reservoir	4060	42,301	IG	2020
Kuri-Gongri	1800	79,200	IG	2020
Chamkharchhu-I	670	37,520	JV	2018
Amochhu Reservoir	620	39,680	IG	2017
Kholongchu	486	25,272	JV	2018
Wangchhu Reservoir	900	50,400	JV	2020
Bunakha Reservoir	180	12,240	JV	2020
Total	11,636	500,263		

Policy Initiative

- Bhutan Sustainable Hydropower Development Policy 2008
- Economic Development Policy (Draft)
- Captive Power Development Policy (Under formulation)
- Renewable Energy Policy (under formulation)

Bhutan Sustainable Hydropower Development Policy 2008

The key objectives of the policy are to:

- Mobilize funds and attract investments for accelerated hydropower development
- Enhance the revenue contribution to the Royal Government
- Contribute to socio-economic development
- Ensure domestic electricity supply security and reliability
- Ensure that the hydropower development is in accordance with the sustainable development policy of the Royal Government, keeping in view the fragile mountain ecosystem of the country
- Contribute towards development of clean energy to mitigate problems related to global warming and climate change.

Economic Development Policy (Draft)

The Economic Development Policy shall be the apex economic development policy of the country and shall be the guiding document for all ministries and agencies to stimulate economic development. The following are some of the important excerpts of the Economic Development Policy related to energy sector:

- The Royal Government shall strive to provide electricity to all households by the year 2013.

Economic Development Policy (Draft) – con'td

- Essential public institutions and services shall receive highest priority for supply of electricity.
- The development of hydropower shall be accelerated by promoting construction of projects and inter-linking of transmission grids to ensure energy security and reliability. The Royal Government shall strive to achieve a minimum power generation of 10,000 MW by 2020.
- While hydropower development shall be one of the main thrust of the government; an integrated approach shall be pursued to meet different energy needs in the most efficient manner

Captive Power Generation Policy (under formulation)

General objectives of Captive Power Generation Policy are:

- To reduce the gap between supply and demand for electricity, and to make best use of energy resources particularly in the lean generation/peak consumption period.
- To ensure energy security for industries and encourage sustainable industrial development

Renewable Energy Policy (under formulation)

The objectives of the policy are:

- Initiate exploration and development of RE resources.
- Institutionalize development of national and local capabilities for enhanced use of RE systems.
- Promoting efficient and cost-effective RE based commercial application by providing fiscal and non-fiscal incentives.

Renewable Energy Policy (under formulation) – cont'd

- Mobilize funds and attract investments, especially private sector, for RE development.
- Contribute to socio - economic development
- Enhance energy security.
- Establish the necessary infrastructure and institutional mechanism to carry out the mandates specified under various Acts and policies having an impact on RE.

Difficulties and bottlenecks currently being faced in formulating policies

While, the Renewable Energy Policy is under formulation, the following are some of the difficulties being faced by the Department in formulating the policy:

- Due to high initial cost
- Ineffective implementation framework at the implementation level
- Lack of resource assessment
- Lack of standardized technology
- Lack of capacity in long term planning
- Limited private sector involvement

Challenges and constraints

- DOE is currently understaffed
- Capacity of local contractors
- Limitations of National Environment Commission to handle EIA's and environmental clearances
- Renewable Energy is capital intensive

Subjects/topics that we would like to study are

- Energy policies of Japan and the world especially in the field of renewable energy
- Energy demand forecasting tool
- Energy scenario of the world
- Various technologies for energy generation

THANKS FOR YOUR KIND ATTENTION

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