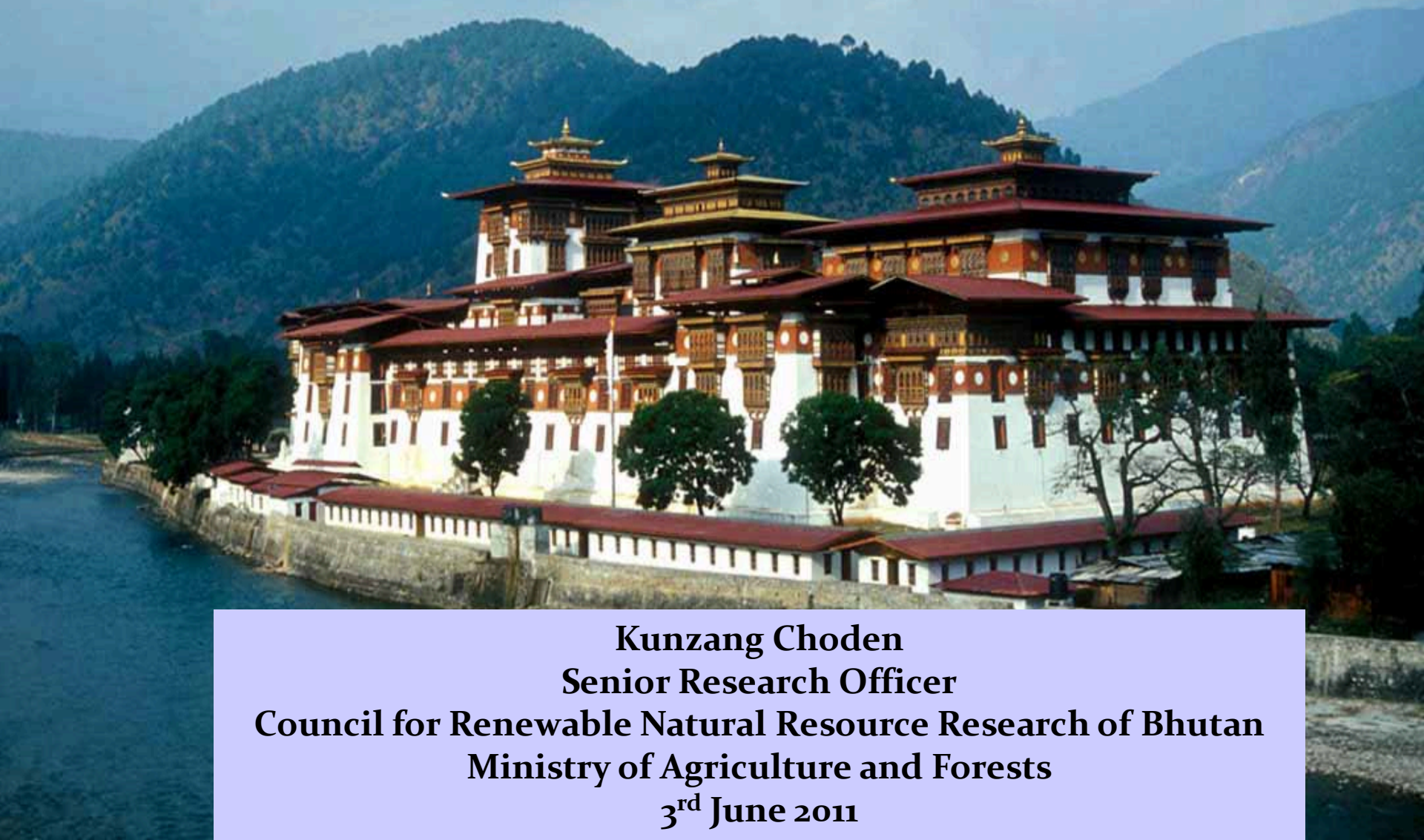


Status of Bioenergy Sector in Bhutan



Kunzang Choden
Senior Research Officer
Council for Renewable Natural Resource Research of Bhutan
Ministry of Agriculture and Forests
3rd June 2011



Outline

- Background of Bhutan
- Energy Resources
- National Energy Policy
- Biomass Resources
- Ongoing Initiatives in Bioenergy
- Issues and Challenges
- Opportunities

Background

- Located in Eastern Himalayas
- Population (2010): 0.7 million
- Area: 38,344 km²
- Forest cover (1995): 72.5%
- Rural population: 69.1% (2005)
- Capita GDP (2009): U\$1875

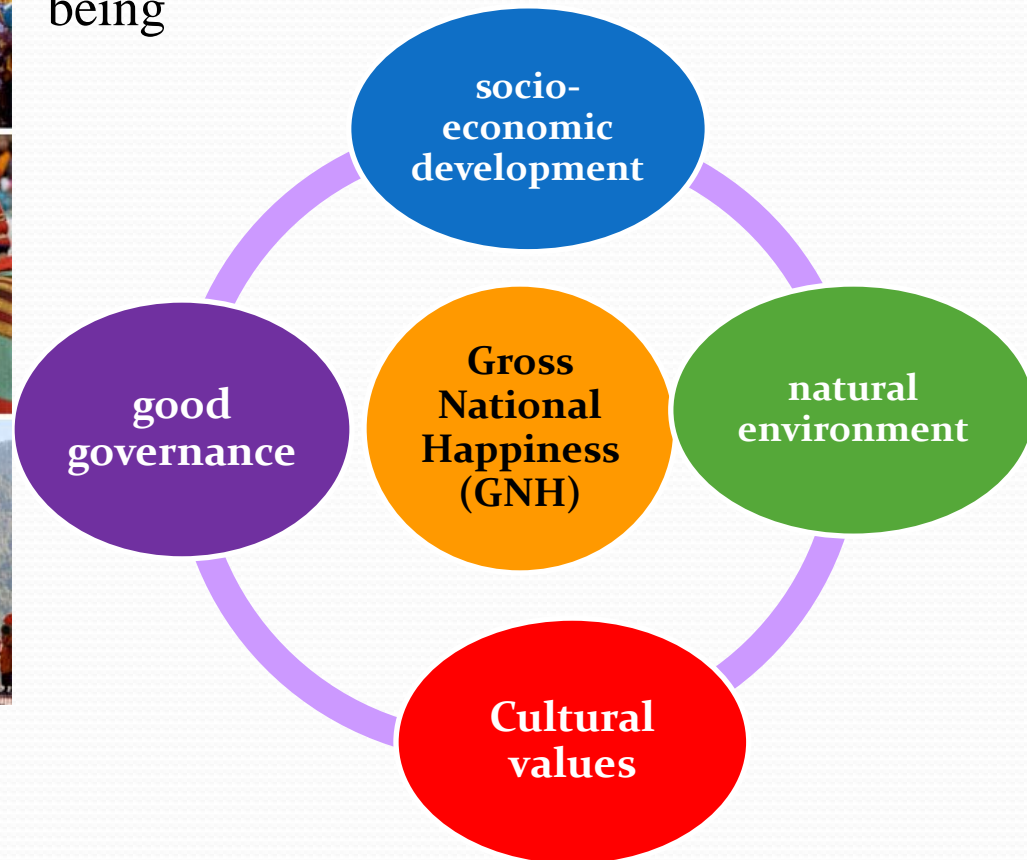


Development philosophy

- Propounded by 4th King in the late 1970s
- $GNH > GDP$
- Balance between material and spiritual well being



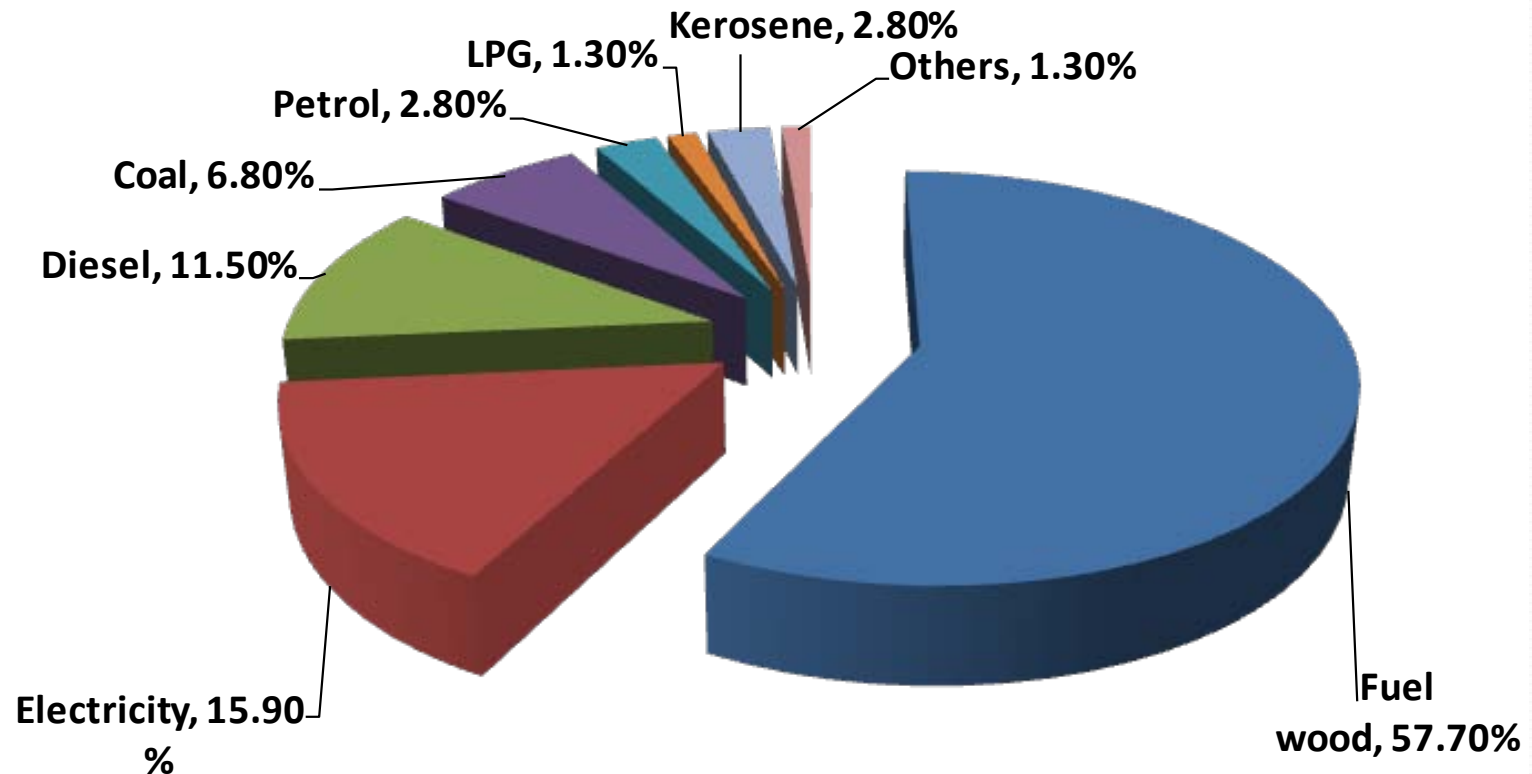
Snapshots from Bhutan



Energy Resources in Bhutan

- Bhutan is rich in natural resources
 - Hydro
 - Biomass
- Both these energy resources has important role in the country's economy.
 - hydropower - economic sustainability
 - biomass - primary energy demands & energy security concerns.

Bhutan Energy Supply

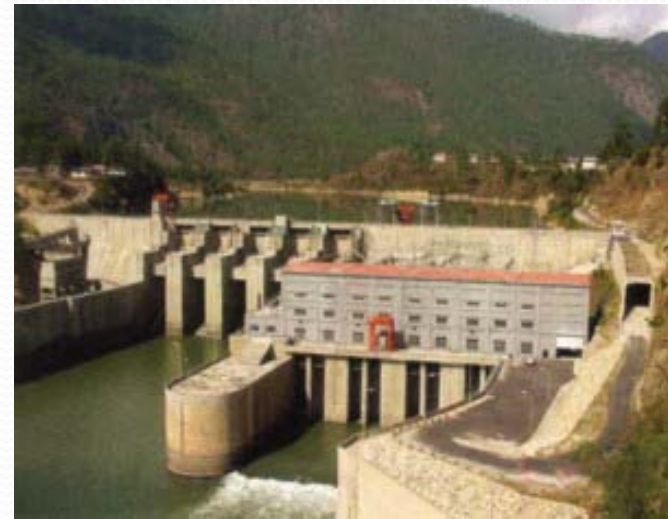
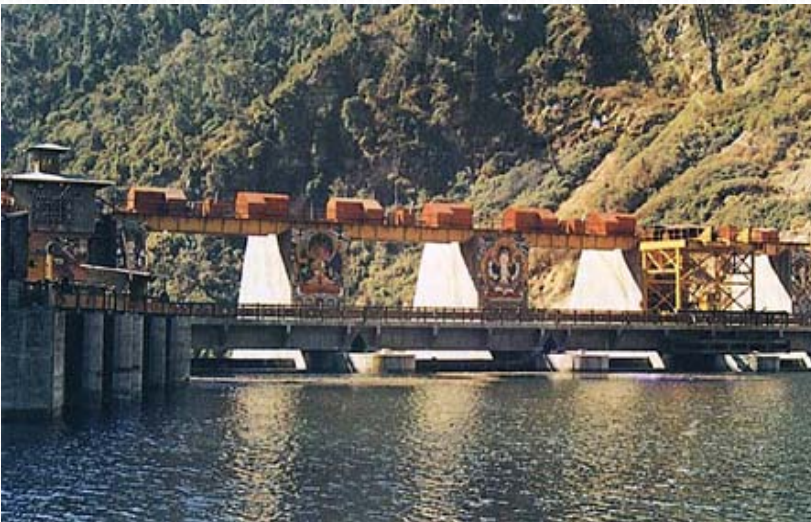


Source: Bhutan Energy Directory, 2005

Energy Sector

- **Hydropower**

- Hydropower potential – 30,000 MW
- Installed capacity: 1480 MW (Large hydro power projects)
- Abundant hydropower potential
- Hydropower is the main driver of country's economic growth
- 40% of Country's revenue and 12% of GDP



Hydro power dams

National Energy Policy

- Policies

- Hydropower Policy
- Draft Renewable Energy Policy
 - Energy Security and diversification of the energy base through solar, wind, mini hydro and biomass.

- Plans

- Electrification for all by 2013
- 10,000 MW by 2020 (large hydropower)



Biomass resources in the country

Animal dung, 0.70%

Municipal solid
waste, 1.30%

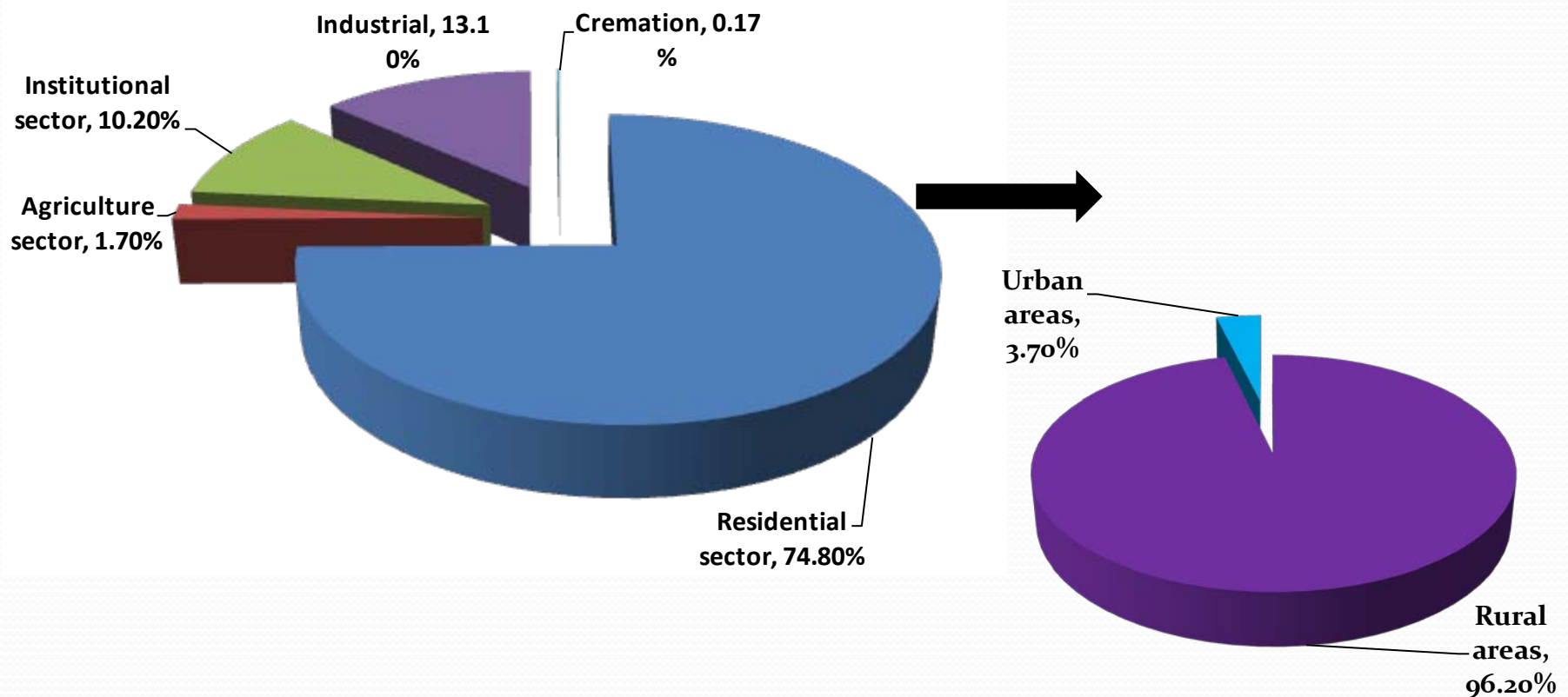
Crop
residues, 21.10%

Fuel wood , 76.90%

- Fuel wood from forest is the main source of biomass.
- Per capita biomass consumption standing at 1.14 tonnes

Fire wood

- Bhutan consumed 724,597 tonnes / 992,596 m³ of firewood during 2005 (Energy Directory, 2005)
- Per capita consumption – 1.92 m³ (NEC, 2004) One of the highest in world



Bioenergy status in Bhutan



Construction of Biogas Plant



Bhutan Biogas Project

- Target- 1600 plants within three years
- Department of Energy & Department of Livestock
- Technical assistance - SNV
- Funded by- ADB.

Fuel efficient cook stoves



Fuel efficient cooking stoves

- **Renewable Energy Division**

- Distribute 20,000 biomass fuel efficient cooking stoves.
- Support from Global Environment Facility (GEF)
- Provision of energy services in rural areas.

Briquette factory



Briquette manufacturing process



- Efficiency of traditional use of biomass, predominately fuel-wood, for energy.
- Reduce the pressure on natural forest for fuel wood.
- Reduction of the CO_2 emission to the atmosphere.
- Processing and utilization of biomass waste (including wood waste and agricultural residues).

Issues and Challenges

- Lack of National Bioenergy Policy.
- Lack of Institutional coordination among the relevant agencies (MoAF, MoEA).
- Lack of Financial support – schemes to private.
- Limited Technology knowhow
- Biofuel production in Bhutan- limited by non availability of mass cultivable land, difficult mountain terrain, inaccessibility etc
- Environmental concerns (reduction of forest cover, loss of biodiversity)
- Food security

Opportunities

- Enabling bioenergy policy statement
 - Subsidy mechanism
 - Tax incentives
 - Promotion in rural and poor sections of society to reduce poverty and for income generation
- National initiatives
 - Resource and technology assessment
 - Feasibility studies
 - Pilot projects
 - Awareness and outreach programs
- Regional networking
 - Technical Assistance for national initiative
 - Sharing of best practices
 - Technology transfer



Thank You