

10. Energy and Forestry

Energy

- 10.1. Energy consumption in fiscal year 2008/09 increased by 3.12 percent as compared to fiscal year 2007/08 totaling 9,396 Tons of Oil Equivalent (TOE). Consumption during first eight months of the current fiscal year has reached 7,953 TOE.
- 10.2. Consumption ratio of traditional, commercial, and renewable sources of energy in the fiscal year 2008/09 that stood at 87.1 percent, 12.2 percent, and 0.7 percent respectively, changed nominally to 87.3 percent, and 12.0 percent with no change in the share of renewable energy during first eight months of the current fiscal year 2009/10. It proves the persistent high dependency of Nepalese economy on conventional energy sources.
- 10.3. Of the total conventional energy consumption in fiscal year 2008/09, share of fuel wood, agricultural residues and livestock residues that stood at 89.2 percent, 4.2 percent, and 6.6 percent respectively with no change in consumption ratio of these sources during first eight months of fiscal year 2009/10. Of the total commercial energy source consumed in fiscal year 2008/09, Petroleum products (POL), coal, and electricity had respective shares of 67.5 percent, 15.9 percent, and 16.6 percent. Minor change, has however, is observed in the consumption of these commercial energy sources during first eight months of the current fiscal year 2009/10, with shares of 65.8 percent for POL, 16.3.percent for coal, and 18.0 percent for electricity consumption.

Coal

- 10.4. Consumption of coal in fiscal year 2008/09, as compared to the previous fiscal year, totaled 181 TOE came down by 6.3. Similarly consumption came down 17.0 percent to 155 TOE during first eight months of the current fiscal year 2009/10 as compared to the corresponding period of fiscal year 2008/09.

Electricity

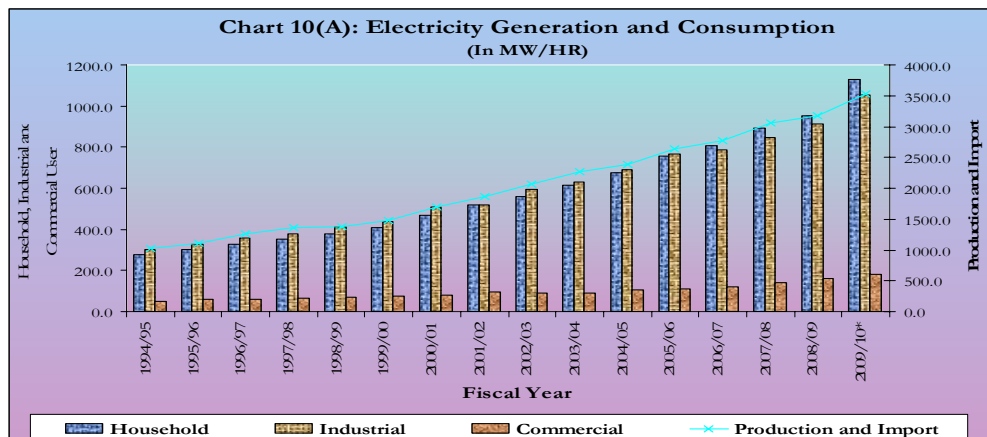
- 10.5. Capacity to generate electricity from various projects has reached 661 Megawatts (MW) by the end of fiscal year 2008/09. Of the total hydropower so generated, 655 MW is connected to the national grid, while rest of the energy generated from small hydropower stations and not connected to the national grid have been providing electricity services at local levels. The total electricity generated has reached 714 MW including 53.41 MW from thermal power stations and 100 KW from solar plants.
- 10.6. By first eight months period of fiscal year 2009/10, Middle Marsyangdi Hydropower Project (79 MW) built under the German Government assistance has been commissioned, started commercial production, and connected to national grid. Similarly, construction of several other projects, i.e., Chameliya Hydropower Project (30 MW) in Darchula of Far-West Region, and Kulekhani III (14 MW) in Makwanpur, and Upper Trishuli 'A' (60 MW) in Rasuwa/Nuwakot district are underway. Domestic investment has been garnered to build Upper Tamakoshi Hydropower Project, the project is transformed into a company, and construction of access road and other works is started.
- 10.7. The growing trend of private sector enthusiasm in electricity generation has been satisfactory in fiscal year 2009/10 like in previous years. Hydropower Projects under construction in the private sector are being completed and brought into operation in series. In the process, construction of two projects namely Pati Khola (0.996 MW), and Seti II (0.979 MW) have started generating electricity after completion. Hydropower projects expected to be completed by the end of this fiscal year and start generating electricity are Ridi Khola (2.4 MW); Upper Handi Khola (0.991 MW); Lower Piluwa Khola (0.99 MW); and Mai Khola (2.4 MW). Likewise, Power Purchase Agreements (PPAs) have been concluded by the end of previous fiscal year for purchase of 121 MW from 21 projects.
- 10.8. In the process of extension of power grid, 2044.66 Km circuits Km. of 132 kV high voltage transmission lines, 357.96 circuits Km. of 66 kV lines, 9.7 Km. +circuits Km. of 66 kV underground lines, and 2550.5 Km. of 33 kV lines are already in operation by the end of fiscal year 2008/09. In the process of construction of 132 kV 'Ringmen' transmission line for capacity enhancement in Kathmandu valley to cope with ever-growing urbanization, construction of 132 kV Thankot-Chapagaun-Bhaktapur transmission line under the ADB assistance is in the final stage of

completion. Construction of a (75 Km) 220 kV transmission line is ongoing with the World Bank (IDA) assistance for transmission of electrical energy from the existing Khimti hydropower station and future projects in the periphery. Construction of two 220 kV transmission lines carrying high importance, namely Hetauda - Bharatpur and Bharatpur - Bardaghat are underway. Similarly, construction of 33 kV transmission lines are ongoing including Ilam-Phidim-Taplejung (90 kM), Sitalpati-Musikot (50 kM), Buipa-Okhaldhunga (33 kM), Chhinchu-Rakam-Jajarkot (70 kM), Ghorahi-Holeri (45 Km), Udipur-Besisahar-Manang (90 Km), Dipayal-Sanfebagar - Manma-Jumla (155 Km), and Dhankuta-Hile-Leguwa-Bhojpur (40 Km). Studies and preparatory works are underway for construction of 400 kV transmission lines at three different points between Duhabi-Jogbani, Butwal-Sunauli, and Dhalkebar-Bhittamod under the understanding reached between Nepal and India for enhancing the power exchange capacity of these countries. Out of the planned three transmission lines, works are underway for construction of Dhalkebar - Bhittamod transmission line with the target to complete it by FY2012/13.

- 10.9. Government of Nepal and Nepal Electricity Authority (NEA) are carrying out extension of electricity distribution in all electricity accessible districts from their own financial resources. Besides, electrification is complete in additional locations of 27 districts under the assistance of Asian Development Bank (ADB). Electrification started in additional locations of Bhaktapur, Lalitpur, Nuwakot, Dhading, and Kavrepalanchok districts through the World Bank assistance is continued with the target of completion by fiscal year 2010/11.
- 10.10. In the process of extension of electricity facility, electrification in 106,000 households has been completed in participation of 107 Community-based Organizations (CBOs) under the Participatory Community Rural Electrification Program. Work is underway with the target of connecting additional 50,000 households with such facility.
- 10.11. Various activities on hydropower development related feasibility studies and preparation of detailed study reports are underway. Studies for identification of other feasible projects towards meeting the energy demand are also continued. Efforts are underway for garnering resources for detailed study of storage type 128 MW Upper Seti Hydropower Project seen attractive from the perspective of coping with present imbalance of demand and supply in the national electricity system caused by seasonal

variations. Feasibility study of Upper Trishuli (B) hydropower project is ongoing. Prequalification for construction of Rahughat Hydropower Project through Indian assistance is in final stage. Detailed studies are initiated on some other attractive projects like Aandhikhola, upper Arun, Tamor and storage type projects.

- 10.12. Out of the 3,130.77 Gega Watt Hours (GWH) of electricity supplied in fiscal year 2008/09, 1,798.61 GWH came from hydro-electricity generation, 9.06 GWH from thermal, 925.74 GWH purchased from the private sector, and 356.45 GWH was imported from India. Of the total electricity thus supplied in the same year, domestic consumption totaled 2290.21 GWH, while 61.5 GWH was exported to India. According to estimates for fiscal year 2009/10, availability of electricity will total 3,537.434 GWH comprising 2,828.934 GWH from hydropower plants, 14.5 GWH from thermal plants, and 684.0 GWH import from India. Of the total availability, 2,666.6988 GWH will be consumed domestically and 54.0 GWH export to India.
- 10.13. Calculation of sector wise energy consumption in fiscal year 2008/09 shows, industries consumed 37.37 percent, household 42.52 percent, commerce 6.6 percent, non-commerce 4.6 percent and others 9.2 percent. In this fiscal year, consumption by sector is estimated at industry 38.1 percent, household 41.70 percent, commerce 6.70 percent, and the remaining 13.44 by other sectors.
- 10.14. The numbers of electricity consumers are growing annually. By the end of fiscal year 2008/09, the number of customers grew by 10.0 percent totaling 1,677,000. In fiscal year 2009/10 total number of electricity customers is estimated to reach to 1,879,000 with 12 percent growth.



* Estimates of Mid-February

Petroleum Products (POL)

- 10.15. Consumption of Petroleum Products (POL) in fiscal year 2008/09 stood at 729,621 Kilolitres (KL) recording a growth of 16.2 percent. Consumption of LP gas also rose by 19.6 percent reaching 115,813 Metric Tons (MT) during this period. Consumption of these two products in first eight months of fiscal year 2008/09 had totaled 431,745 KL, and 73,618 MT respectively. Consumption of POL products during the same period of the current fiscal year 2009/10 recorded a surge of 29.3 percent totaling 558,114 KL, and that of LP gas also rose notably by 17.4 percent totaling 86,403 MT.
- 10.16. Diesel, kerosene, petrol, and aviation fuel occupy major shares in consumption of POL products. As such, diesel, kerosene, petrol, and aviation fuel consumed in fiscal year 2008/09, except LP gas, shared 63.9 percent, 9.6 percent, 17.1 percent, and 9.4 percent respectively. Observation of consumption of these items during first eight months of the current fiscal year 2009/10 reveals that the proportion of diesel, petrol, kerosene, and aviation fuel consumed stood at 59.8 percent, 17.6 percent, 11.5 percent, and 11.1 percent respectively.
- 10.17. Nepal Oil Corporation (NOC) is engaged in sale/distribution of POL products in required quantities throughout the country by importing and storing as necessary. Homework is underway for the supply of POL products by laying pipeline between Raxaul depot of Indian Oil Corporation in India, and Amlekhganj depot of NOC in Nepal for facilitating distribution of petroleum products. In addition to capacity enhancement of existing depots and construction of new depots, initiation is made for implementation of recommendations of various Commissions /Committees for structural reforms.

Alternative Energy

- 10.18. The Government of Nepal has established Alternative Energy Promotion Center (AEPC) with multiple objectives. These objectives include energy supply in rural areas through sustainable development of alternative/renewable energy technology; improving socio-economic condition of rural people through operation of cottage industries and micro-enterprises by using energy technology; maintaining regional balance; and reducing the environmental impact observed in rural areas due to destruction of forests. In order to meet these objectives, the Center has been carrying out a number of activities including necessary help and

advisory services to the government in developing policy on alternative energy technology; preparing short and long-term plans; implementing programs by maintaining coordination with energy related organizations/institutions; and maintain quality control, monitoring and evaluation etc.

- 10.19. Rural Energy Fund is established and is in operation under the AEPC for mobilization of financial resources in a well-managed, simplified, and efficient manner, and for maintaining coordination with banks for arranging loans. Establishment of the Fund has enhanced access of people to new and sustainable energy systems in rural areas not connected by the national transmission grid thereby improving their living condition through improvement in their health and education and direct support to income generation and employment. Likewise, the center with the help of KfW of Germany, has established a credit unit and arranging credit flows. The Government has been providing subsidy, and customs duties and VAT exemption on imports of renewable energy related equipment.

Table 10(a) : Status of Alternative Energy in Nepal

<i>S.N.</i>	<i>Activities</i>	<i>Progress in first 8 months of FY 2009/10</i>
1.	Solar Dryer/Cooker distribution (Nos.)	300
2.	Gobar Gas Plants Installed (Nos.)	27000
3.	Improved (iron) Cooking Stoves Installed	8000
4.	Improved (clay) Cooking Stoves Installed	60000
5.	Home Solar Energy System Installed (Nos.)	50000
6.	Improved Water Mills Installed (Nos.)	1400
7.	Micro Hydro Electricity Production (Kilowatt)	300

Source: Alternative Energy Promotion Center

Forestry

- 10.20. Objectives of the forestry policy of the Government of Nepal are to ensure regular availability of timber, wood, fodder, and other forest products through development and implementation of sustainable forestry development program in people's active participation; contribute to agricultural production through effective coordination between forestry and agricultural system; and protect the country's land area from soil erosion, flood and landslides, desertification, and other environmental imbalances.

- 10.21. Forest areas are managed and operated with the following objectives: (i) Maintain ecological balance through scientific management of forests, plants, watersheds, conservation of biodiversity, and protected areas; and at the same empower ultra poor and voiceless communities socio-economically by ensuring their access and rights to forestry products through sustainable enhancement of forest resources; (ii) Promote domestic and export markets by creating employment opportunities through the promotion of forestry products based industries and businesses; and (iii) support in poverty reduction and creation of equitable society through judicious distribution of forestry products by raising level of income of men and women belonging to ultra poor Dalits, Adivasis (Ethnic tribes), Janajatis (indigenous people), Madhesis, depressed, physically challenged, and the people of other backward communities.
- 10.22. Strategies adopted in the management of forests are:
- Conservation of biodiversity and genetic resources including forests, plants, insects, wildlife;
 - enhance people's participation with special emphasis on soil and water resource conservation in the Siwalik area, and scientifically manage the government managed forests;
 - conduct test on scientific management of partnership forestry through selection of appropriate area of the national forest and formation of group of local people;
 - make timber and wood (raw materials) available to timber-based industries;
 - make necessary arrangement that agencies, organizations or entrepreneurs, who will be handed over leasehold forestry ensure appropriate management of forest, wildlife and plants with special emphasis for expansion of eco-tourism;
 - strengthen plant research, monitoring and evaluation, and information and data flow system;
 - enhance livelihood opportunities for ultra poor (below the poverty line) through expansion of leasehold forestry;
 - expand community, leasehold, and partnership forestry; and
 - enhance participation and access especially of ultra poor, women and *Dalits*, to such forests, sustainable manage Non-Timber Forestry Products (NTFP), make proper utilization, promote the private sector investment, and promote export (of forestry and NTFP) products.

Box 10 (a): Policy and working policy adopted in the Management of the Forestry Sector

- Effectively manage already formed and community forests to be formed in future by strengthening capacities of forest user groups.
- Enhance participation of women, *Dalits*, and marginal groups.
- Develop and expand forestry technology through establishment of forestry management demonstration plots in public participation.
- Develop, manage, and make proper utilization of private trees, plants, and forests.
- Provide the marginal groups opportunity for managing community forests.
- Encourage private sector participation for keeping high value wildlife and birds through appropriate legislative arrangement.
- Manage the supply timber and woods to the people.
- Increase the number of community forest user groups of the people below the poverty line and make them effective.
- Make the process of handing over leasehold forestry for eco-tourism transparent and simple.
- Prepare inventory of herbs and non-timber forest products available in all types of forests and integrate them into Action Plans
- Form partnership forests in the periphery of the government managed forest, and also manage such (partnership) forest on pilot basis.
- Raise public awareness, and conduct study and research on forest, plants, bio-diversity, soil conservation and watershed management for development and expansion of forest related technologies.
- Prepare and adopt Monitoring & Evaluation Manual.
- Develop and adopt information and data flow system.
- Implement participatory, integrated Monitoring and Evaluation process.
- Adopt bottom up planning process.
- Conduct effectiveness evaluation of the forestry sector program through independent agencies.

Box 10 (b): Forest Resource Data

Forest Area	4.27 Million Ha. (29 percent)
Bush and Shrubs	1.56 Million Ha. (10.5 percent)
Total Stem Volume	388.0 million Cubic Meter
Shorea Rubusta (Sal) in Total Volume	28 percent
Total Biomass	429 Million Ton
Average Stem Volume	178 Cubic Meter per Ha.
Average Number of Trees	408 per Ha.

Source: Nepal Forest Resource Report, 1999; Forestry Research and Survey Department.

- 10.23. Ministry of Forests and its related departments have continued to carry out various projects and programs every fiscal year through domestic resource and foreign aid 6 primary and 6 support programs as set by the Forestry

Development Master Plan for long-term development of the forestry sector. Altogether, 32 programs and projects are ongoing in various districts including National and Leasehold Forestry, Community and Private Forestry, Ecological system and Genetic Resources Conservation, Soil Conservation and Watershed Management, Herbs and Aromatic Plants, and other forestry products related programs.

Box 10(c): Forestry at a Glance	
Community forestry	
Number of Community Forest User Groups	14,686
Area of Handed Over Community Forests	1,233,012 Ha.
Number of Beneficiary Household	1,661,482
Number of Women managed Community Forests	795
Leasehold Forestry	
Number of Leasehold Forests User Groups	4,523
Area of Handed Over Leasehold Forests	19,938 Ha.
Beneficiary Households of Leasehold Forests	37,703
Partnership Forestry	
Demonstration Program Operating Districts	Bara, Parsa, Rautahat, Mahottari
No. of Partnership Forests	4
Areas of Partnership Forests (Ha)	8,675 Ha.

Source: Ministry of Forests and Soil Conservation

- 10.24. So far, 14,686 Forest User Groups (FUGs) covering 1,233,012 hectare forest area has been formed by mid-March 2010 under the Community Forestry Program including 489 FUGs formed in fiscal year 2008/09. The program has benefited 1,661,482 households.
- 10.25. So far 19,978 hectare forest has been handed over to 4,523 FUGs formed under the Leasehold Forestry and Livestock Development Program by Mid-March of 2010 including 724 FUGs formed in fiscal year 2009.08.09. The program has benefited 37,703 households.
- 10.26. The forest development guidelines, 2065 (2008) is amended with the provision of scientific management of forests through saplings production, and woods collection to maximize benefits to the people being ignored by the forestry sector. Such a provision also forms the part of forest management work plan.

Annual Progress Status for the Fiscal Year 2008/09

Community forests (Community Forestry Program, Livelihood and Forestry Program, Dolakha Ramechhap Community Community Forestry Program)	
Community Forest Users' Group (Nos.)	750
Work Plans Prepared (Nos.)	683
Handed Over Forests (Nos.)	219
Forest Work Plan Reviewed (Nos.)	1911
Leasehold Forests formed withing Community Forests	70
Leasehold forestry	
Leasehold Forest Users' Groups (No.)	724
Work Plans Prepared (No.)	724
Work Plan Preparation Workshop/Seminars (No.)	3943
Identified Clusters (No.)	83
Partnership Forestry	
Pilot Project District	Mahottari
Partnership Forest Groups (No.)	1
Partnership Forest Area (Ha.)	2006
Soil and Water Conservation Program	
Community Resource Management Plan Implemented (No.)	198
Natural Disaster Mitigation - gorge/ landslide (No.)	231
Water Source Conservation (No.)	181
Income Security Program for Ultra Poor (Households)	250

- 10.27. Policy is adopted for establishment and expansion of protected areas as necessary for conservation of biodiversity by ensuring representation of the ecological systems emerging in the nation.
- 10.28. The following activities are carried out for biodiversity conservation through effective people's participation:
- prepare and implement management plans for sustainable conservation of biodiversity in protected areas (including buffer zones);
 - protect, nurture, and improve habitats of rare species of wildlife for their protection;
 - identify wildlife corridors and connectivity, protect, and manage them; and
 - Manage ecological processes in their natural way by conducting studies and research while encouraging sustainable utilization of natural resources with effective people's participation.

- 10.29. Nepal is effectively implementing International Treaties/ Conventions on biodiversity and environmental protection such as CBD, CITES, Ramsar as a Party to such Treaties/Conventions.
- 10.30. The policy to permit NGOs and individuals is being periodically updated whereby allowing them keep wildlife and conduct research for enhancing their income generation opportunities while protecting, nurturing and utilizing them properly in a sustainable manner.

Table 10(b): National Parks at a Glance

<i>S.N.</i>	<i>National Parks</i>	<i>Declared Year</i>	<i>Area (Sq. Km)</i>
1	Chitwan National Park	1973	932
2	Langtang National Park	1976	1,710
3	Sagarmatha National Park	1976	1,148
4	Rara National Park	1976	106
5	She-Foksundo National Park	1984	3,555
6	Khaptad National Park	1984	225
7	Bardiya National Park	1988	968
8	Makalu Barun National Park	1991	1,500
9	Shivapur National Park	2002	144
Total			10,288

Table 10 (c): Wildlife Reserves at a Glance

<i>Reserves</i>	<i>Declared Year</i>	<i>Area (Sq. Km)</i>
<i>Shuklaphanta Wildlife Reserve</i>	1976	305
<i>Koshi Tappu Wildlife Reserve</i>	1976	175
<i>Parsa Wildlife Reserve</i>	1984	499
<i>Dhorpatan Game Reserve</i>	1987	1,325
Total		2,304

Table 10 (d): Conservation Areas at a Glance

<i>Conservation Area</i>	<i>Declared Year</i>	<i>Area (Sq. Lm)</i>
<i>Annapurna Conservation Area</i>	1992	7,629
<i>Kanchanjangha Conservation Area</i>	1997	2,035
<i>Manaslu Conservation Area</i>	1998	1,663
Total		11,327

Table 10(e): Buffer Zones at a Glance

<i>Buffer Zone</i>	<i>Declared Year</i>	<i>Area (Sq. Km)</i>
<i>Chitwan National Park</i>	1996	750
<i>Bardiya National Park</i>	1996	328
<i>Langtang National Park</i>	1998	420
<i>She-Foksundo National Park</i>	1998	1,349
<i>Makalu-Varun National Park</i>	1999	830
<i>Sagarmatha National Park</i>	2002	275
<i>Shuklaphanta Wildlife Reserve</i>	2004	243.5
<i>Koshi Tappu Wildlife Reserve</i>	2004	173
<i>Parsa Wildlife Reserve</i>	2005	298.17
<i>Rara National Park</i>	2006	198
<i>Khaptad National Park</i>	2006	216
Total		5,079.67

Source: Ministry of Forests & Soil Conservation