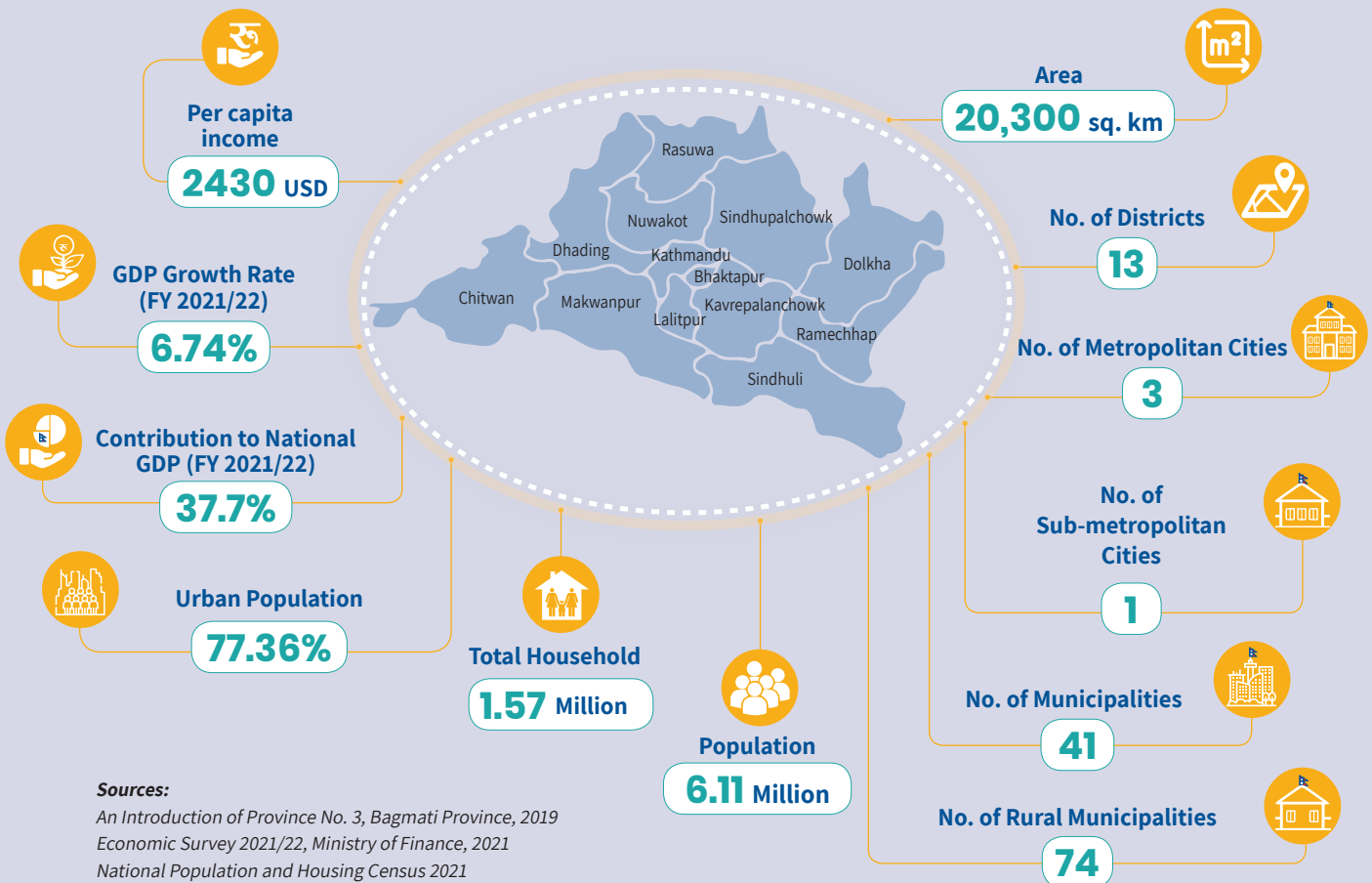


# Energy Factsheet Bagmati Province

March 2023



## Bagmati Province



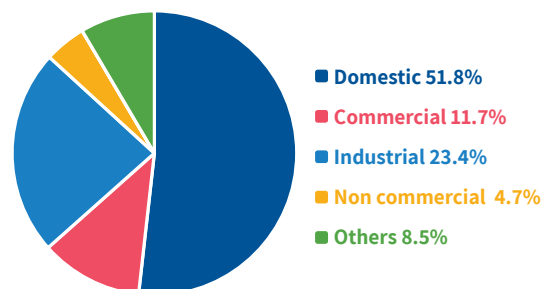
**Sources:**

An Introduction of Province No. 3, Bagmati Province, 2019  
Economic Survey 2021/22, Ministry of Finance, 2021  
National Population and Housing Census 2021  
SDG baseline report of Bagmati Province

## Energy in Bagmati Province

Bagmati province is the largest producer of hydroelectricity with a total generation of 1060.85 MW.<sup>1</sup> Water-Energy Commission Secretariat (WECS)'s Gross Hydropower Potential of Nepal 2019 report shows out of a total of 72,544 MW, Bagmati province has a gross hydropower potential of about 10,568 MW, which is 14.6% of the total hydropower potential. The province is also the largest consumer of electricity. The current per capita electricity consumption is 260 kWh<sup>2</sup>. In 2020/21, the province consumed 2249.8 GWh, which is 30.9% of the total electricity consumption in Nepal. The domestic sector, the largest electricity consumer, consumes 51% of the electricity in the province, followed by industrial (23.4%) and commercial (11.7%) sector.

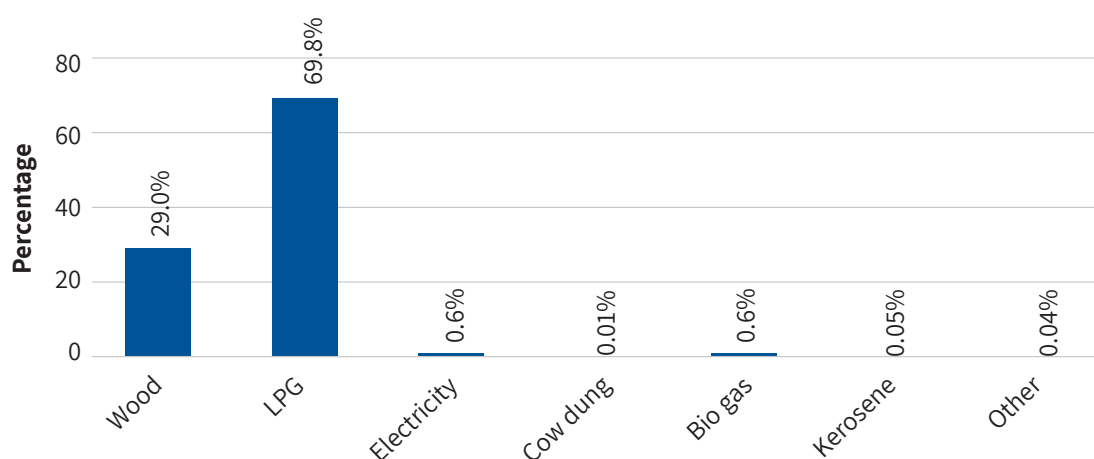
However, the overall energy consumption of Bagmati province is largely dominated by fuel-based energy and biomass. The population census 2021 shows Liquefied Petroleum Gases (LPG) is the primary fuel for cooking followed by solid firewood. The majority of households, usually use LPG as the main type of fuel for cooking. The following chart shows the number of households by types of fuel used for cooking in Bagmati province.



**Figure 1:** Electricity Consumption in Bagmati Province in FY 2020/21

*Source: Nepal Electricity Authority, 2021*

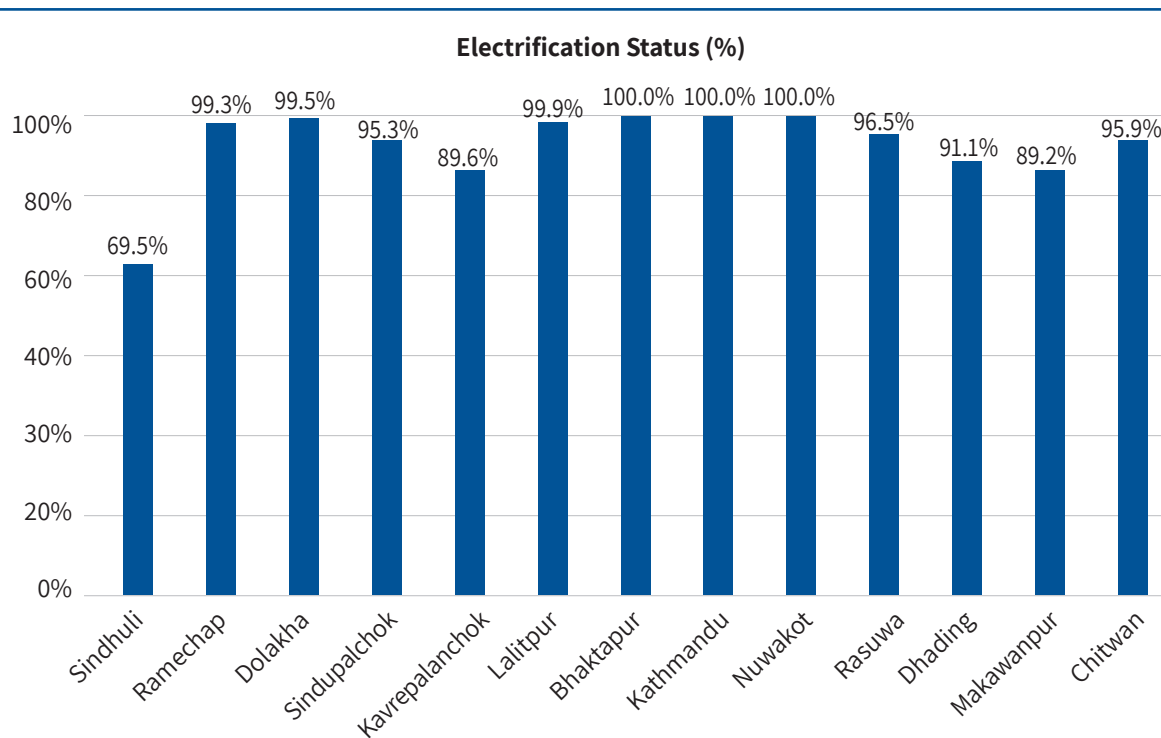
Out of 119 local governments in the province, 60 are fully electrified, only one rural municipality has no electricity and the remaining are partially electrified. In total 97.05% of the population has access to the electricity in which 95.91% are connected to the national grid while 1.14% of the population has access to off-grid electricity.<sup>3</sup> The population census 2021 shows that most households (97.3%) in the province use electricity as the main lighting while 2.3% solar, 0.1% kerosene, 0.1% bio gas and 0.2% other sources. The figure 3 shows the status of access to electricity in districts of Bagmati Province.



**Figure 2:** Household energy consumption for cooking

*Source: Population Census, 2021*

1 <https://www.doed.gov.np/license/54>  
 2 Annual Report 2020/21, Nepal Electricity Authority, 2021  
 3 'Annual Report 2020/21', Nepal Electricity Authority, 2021



**Figure 3:** Electrification status by districts in Bagmati province

**Source:** Year Book (2020/21), Distribution and Consumer Services Directorate, NEA

## Hydropower Project

According to the Department of Electricity Development, energy generation licensing data, until 2021, there are 109 hydropower projects with an installed capacity of 7,484.93 MW under different phases of licensing and study in the province (more details in the table 1 below).

## Micro and Pico Hydro

Micro-hydro and Pico hydro are small-scale hydro-power system that generates electric power below 100 kW and 1 kW capacity respectively. More than 2,300 MHPs, with an installed capacity of about 38 MW have been constructed in Nepal. The Energy Sector Synopsis report stated that Nepal has the potential to develop more than 50 MW of hydroelectricity from micro-hydropower plants. Bagmati province contributes 14% of the total installed shares of MHP.

**Table 1:** Expected hydropower projects in Bagmati Province

S.N.	Status of the Project	Number	Installation Capacity (MW)
1	Hydropower projects with construction license	67	2384.82
2	Hydropower projects that have applied for a construction license	5	108.06
3	Hydropower projects with survey license	31	1505.93
5	Projects being studied by the Government of Nepal	6	3486.12
<b>Total</b>		<b>109</b>	<b>7484.93</b>

**Source:** Department of Electricity Development, 2021

## Solar

Nepal has a huge potential for solar energy with an average of 300 sunny days per year and 6.8 sunshine hours per day.<sup>4</sup> The hilly mountain of Bagmati province has a high potential for solar energy generation. According to the Energy Sector Synopsis Report 2021/22, out of 0.9 million residential Solar PV systems installed, Bagmati Province shares around 12.4% of total PC systems.

Similarly, 11 solar projects with an installed capacity of 55.26 MW are in different phases of licensing in the province. In addition, 25 MW of solar power plant is under construction by the Nepal Electricity Authority (NEA) in Nuwakot of which around 10 megawatt has already been connected to the grid.

**Table 2: Expected solar projects in Bagmati province**

S.N.	Status of the Project	Number	Installation Capacity (MW)
1	Solar projects with construction license	3	14.77
2	Solar projects with the application for a construction license	2	9.59
3	Solar projects with survey license	2	10
4	Solar projects with the application for survey license	2	10.9
5	Projects being studied by the Government of Nepal	1	10
<b>Total</b>		<b>11</b>	<b>55.26</b>

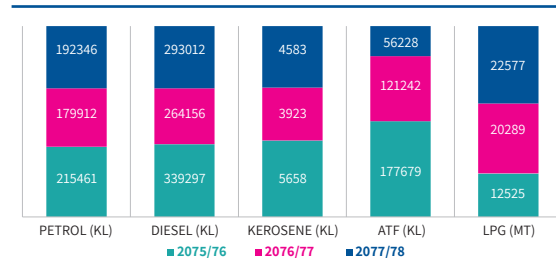
**Source:** Department of Electricity Development; Nepal Electricity Authority, 2022

For other renewable energy technologies such as domestic biogas plants, this province has the largest share of 25.9% followed by institutional large biogas with a share of 24% in the country. The supply potential of the province for agri-residue is 55,795 ('000GJ) i.e. 12.6% share and animal waste is 15,581 ('000GJ) i.e. 15.1%.

## Fossil fuel consumption

In FY 2020/21, 28% of the total sales of petroleum products (Petrol, Diesel, Kerosene) in the country was consumed in Bagmati Province. Approximately one-third of the petroleum products consumed in the transport sector is consumed by vehicles registered in the Kathmandu Valley (Bagmati Zone) alone, this represents 50 % of the national petrol consumption and 27 % of the national diesel consumption in the valley.<sup>5</sup>

The below graphs show the sales of petroleum products in Bagmati province in the last three fiscal years.



**Figure 4:** Petroleum products sales in Bagmati Province

**Source:** NOC, 2021; DOC, 2021; Data Extracted from Nepal Energy Sector Synopsis Report, 2022

## Provincial Policies and Plans

Nepal's "Long-term Strategy for Net-zero Emissions" aims to achieve net zero emissions by 2045. The second Nationally Determined Contributions (NDC) targets to generate 15,000 MW of clean energy by 2030, of which 5-10 % will be generated from mini and micro-hydro power, solar, wind, and bio-energy, and ensure 15% of the total energy demand is supplied from clean

4 Poudyal, R. et al., 2019. Mitigation the current energy crisis in Nepal with renewable energy sources.

5 Sadavarte, Pankaj, Maheswar Rupakheti, Prakash Bhawe, Kiran Shakya, and Mark Lawrence. 'Nepal Emission Inventory – Part I: Technologies and Combustion Sources (NEEMI-Tech) for 2001–2016'. *Atmospheric Chemistry and Physics* 19, no. 20 (18 October 2019): 12953–73. <https://doi.org/10.5194/acp-19-12953-2019>.

energy sources. It also targets to use electric stoves as the primary mode of cooking in 25% of households by 2030; and install 500,000 improved cookstoves, 200,000 household biogas plants, and 500 large-scale biogas plants by 2025. On transportation, targets are to increase sales of e-vehicles to cover 90% of all private passenger vehicle sales, including two-wheelers and 60% of all four-wheeler public passenger vehicle sales (excluding electric-rickshaws and electric-tempos) and construction of 100 km of electric railways by 2030. These targets are aligning with the Ministry of Energy, Water Resources and Irrigation's Energy White paper published in 2018.

Bagmati province is implementing "Ujyalo Bagmati Province Programme" to connect all households with electricity. It has formulated "Alternative Energy Subsidy Operational Procedure, 2020" to support the renewable energy program in the province. The province has also drafted Energy Strategy and Action Plan.

Electricity access to 100% population, promotion of improved cooking stoves, solar energy, micro-hydro, biogas, and solar water lifting technologies are the priority activities in the five-year periodic plan (FY 2019/20 -2023/24) of the province. The details of the periodic plan are listed below:

**Table 3: Provincial Five Year Periodic Plan Targets**

Targets And Indicators	2018/19	2023/24
Improved cooking stoves (no.)	500	3000
Solar street lights (no.)	100	2,000
Solar water lifting for irrigation and drinking water/groundwater irrigation lifting (no.)	-	100
Micro-hydro generation (kW)	-	1,200
Biogas installation (no.)	-	2,500
Domestic solar light (households)	500	3,500
Household electric access (%)	98.2	100

The province has announced the phasing out of fossil fuel vehicles by 2028. The provincial government has planned to operate 352 electric coach buses, and 704 electric city buses and build 102 charging stations with

408 charging ports by 2030. In the province "Electric Transport Mobility Strategy" is currently being drafted.

Bagmati province's Sustainable Development Goals (SDGs) target to decrease reliance on traditional biomass-based energy sources and increase the generation of hydro-electricity. The details of the SDGs energy related targets on energy are listed below:

**Table 4: Bagmati Province SDGs Targets on Energy**

Targets And Indicators	2019	2023	2030
SDG 7: ensure access to affordable, reliable, sustainable and modern energy for all			
Proportion of population with access to electricity	98.16	100	100
Electricity consumption (kWh per capita)	245	1,094	1,598
Households using solid fuel as primary source of energy for cooking (percent)	38.7	26.84	17.89
Proportion of population with primary reliance on clean fuels and technology for cooking	60.82	75	85
People using LPG for cooking and heating (percent)	60.8	78.12	95.2
Installed capacity of hydropower (MW)	481	2,000	3,500

*Source: Province Policy and Planning Commission, Bagmati Province, 2020*

## Provincial Governance Structure:

The **Ministry of Water Supply, Energy, and Irrigation** is a focal government agency responsible for advancing the province's policy, plan, and coordination in energy-related work. There is an energy division under the ministry for execution of energy activities. The division needs to strengthen further with dedicated human resources and the budget to meet the ambitious energy-related targets of the province.



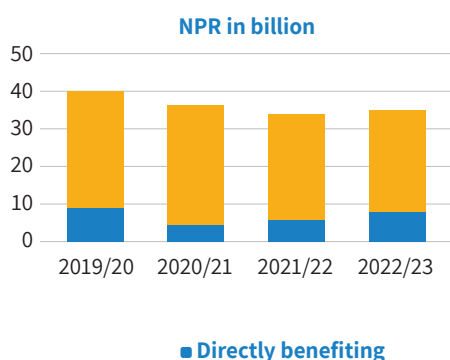
**Provincial Policy and Planning Commission** is responsible for formulating long-term policies and plans, monitoring and evaluation, and coordinating among the province's federal and local governments on development, including energy-related matters. **Provincial Sustainable Development Goals Coordination Committee** is formed to implement and monitor the activities related to SDGs implementation in the province.

**Ministry of Forest and Environment** is an important governmental agency that works on climate change. The **Provincial Climate Change Coordination Committee** envisioned in National Climate Change Policy is yet to be formed to integrate and coordinate climate change works of the sectoral ministries.

## Climate Change Budget of Province in FY 2022/23

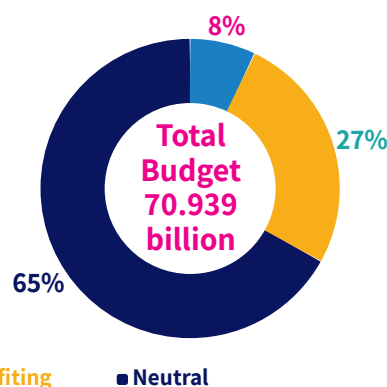
In FY 2022/23, 8% of the total budget was allocated as climate change directly benefiting and 27% as climate change indirectly benefiting in Bagmati province. The climate change relevant budget allocation trend shows that in the last four years, the indirectly benefiting (relevant) budget is almost constant while the directly benefiting (highly relevant) is slightly increasing.

The below pie chart shows the climate change budget allocation in FY 2022/23 and bar graph shows the climate change budget allocation trend in the last four years.



**Figure 5:** Trend of climate change benefiting budget of Bagmati Province

*Source:* Budget speech of Bagmati Province, FY 2022/23



**Figure 6:** Climate change budget of Bagmati Province of FY 2022/23

*Source:* Budget speech of Bagmati Province, FY 2022/23

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