INDUSTRY STATUS REPORT

BASED ON THE FIRST COMPREHENSIVE QUARTERLY INDUSTRIAL SURVEY OF NEPAL

THE FIRST EDITION

SEPTEMBER 2021

CONFEDERATION OF NEPALESE INDUSTRIES

ACKNOWLEDGMENTS

The Industry Status Report (ISR) was conceptualized by Dr. Biswo Poudel, the incumbent Vice Chairman of the National Planning Commission of the Government of Nepal. We express gratitude to CNI President Vishnu K. Agarwal for his continual support to CRC. The CNI Office Bearers also deserve appreciation for facilitating the dissemination of the survey. We extend further thanks to Vice President Birendra Raj Pandey for constant encouragement, and the CNI Members who put aside time to be part of the survey.

Finally, we would like to thank Commissioner Dr. Ram Prasad Dhital (Electricity Regulatory Commission), Professor Amrit Nakarmi, Mr. Ashish Garg and Mr. Gyanendra Lal Pradhan for making this edition of the ISR rich with energy-sector insights.

About Industry Status Report

The Industry Status Report (ISR) provides a comprehensive analysis on the state of various industries in Nepal, leveraging an in-house industry survey. The absence of periodically available primary data on Nepali industries, either with the Government of Nepal or with private sector associations, has hindered targeted policy interventions. This report was produced as an effort to let the data speak for itself and promote evidence-driven policymaking. The survey will be carried out on a quarterly basis to tease out changes across critical variables that either promote or stifle growth in industries.

The First ISR

The First ISR is based on a survey of 47 industries. It was carried out from August 9 to September 17, 2021 and collects the information on the fourth quarter of the Fiscal Year 2077/78 i.e. Baisakh-Asar of 2078.

Apart from the quarterly survey, each ISR will also cover one industry sector in depth. This edition focuses on the energy sector for the following reasons: energy is a major input for industries; Nepal has a comparative advantage in this sector; and the transition from carbon-based to clean energy is critical in the country's efforts to adapt to climate change.

What does the survey cover?

- **Business Performance:** industry capacity utilization, revenue trends, expenses (land, transport and salary), demand in domestic market and market competition, trade
- **Finance:** interest rates, share of loan, access to finance, NRB COVID-recovery loans
- **Skills and Employment:** employment, salary, hire and lay-off, skills gap & training, employee retention, share of non-Nepali workers
- **Industrial Ecosystem:** regulation and industry administration, utilities, transportation and infrastructure
- **Business Outlook:** confidence in the industrial sector, new investment plans

KEY STATISTICS (Q4 2077/78)

No of industries:
47

Total employees:
19,237

Average employment per company:
397 (7, 4300)

Share of non-Nepali workers:
8.3% (0, 90)

New employment:
814 (0, 369)

Average age of industry:
20.8 (0, 57)

Average operational capacity utilization :
64.8% (8,100)

Average share of loan:
48.1% (0, 100)

Average interest on loans:
7.8% (0, 17)

Salary as a share of total cost:
19.3% (1, 70)

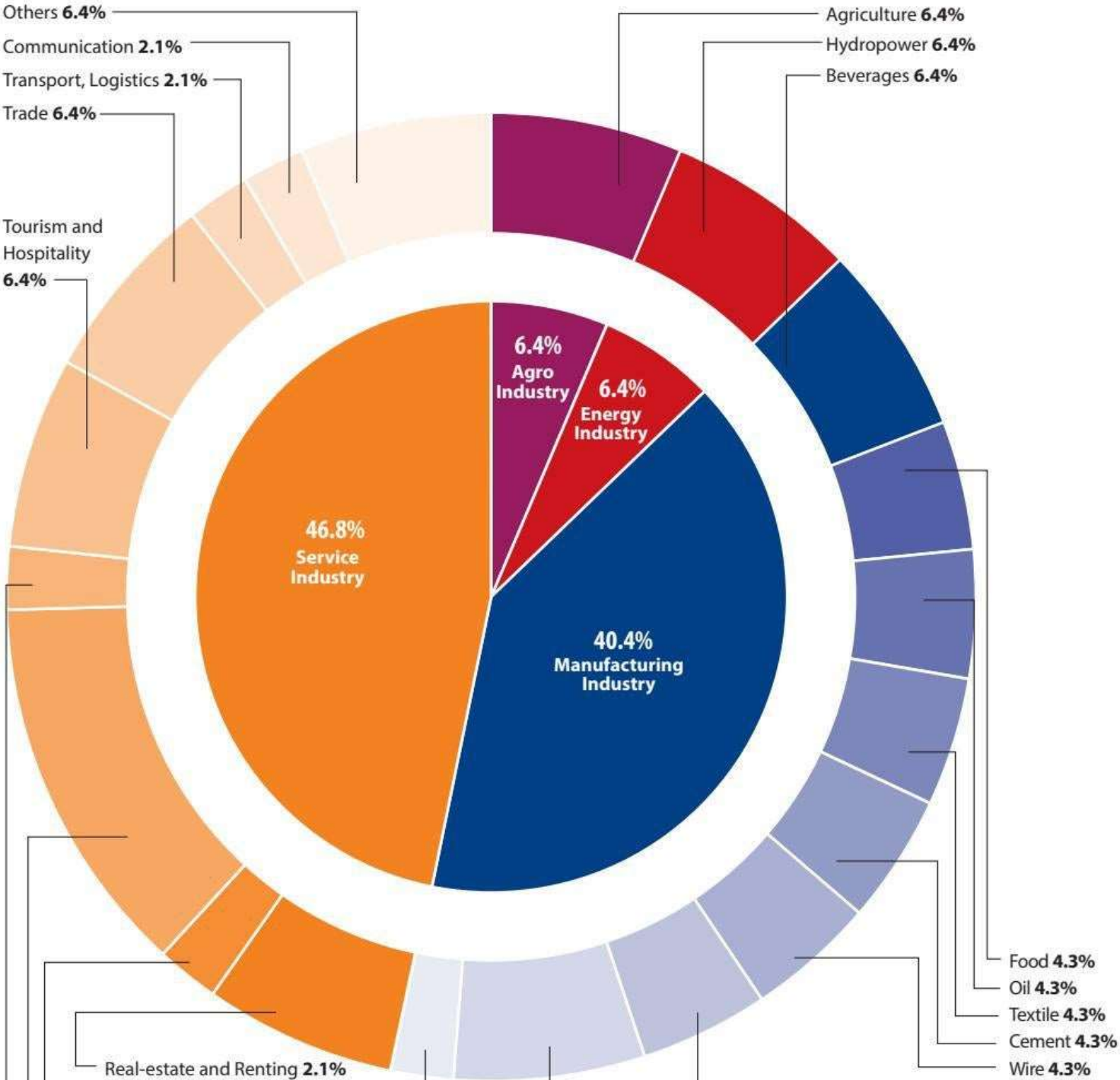
Average revenue growth rate:
8.0% (-89, 200)

Average share of imported raw materials by the manufacturing/ agro industries:

	47.4% / 42.7%

Note: Values in the parenthesis are the lowest and highest value for each observation.

COMPOSITION OF THE INDUSTRIES SURVEYED



SURVEY METHODOLOGY

The First Industrial Status Report is based on a survey of 47 industries. The respondents are categorized under the Nepal Standard Industrial Classification (NSIC) Code for the purpose of the survey and further aggregated into four distinct industrial sectors: agro industry, energy industry, manufacturing industry, and service industry. The sample was drawn from CNI membership and is almost proportional to the actual share of all registered industries in Nepal. For illustration, 5.8% of the total industries registered in Nepal belong to agro sector and 6.4% of the ISR survey sample is from agro industry (table below).

Respondents were asked 50 questions, depending on their respective industries, using a survey platform called KoBoToolbox. Further analysis of the data was completed using Stata. The survey questions are available online.

No questions were mandatory except the name of the industry and respondent. The basic assumption in this report rests on the fact that the respondents have provided correct information.

THE UNIT OF ANALYSIS

The unit of analysis is one industrial establishment.

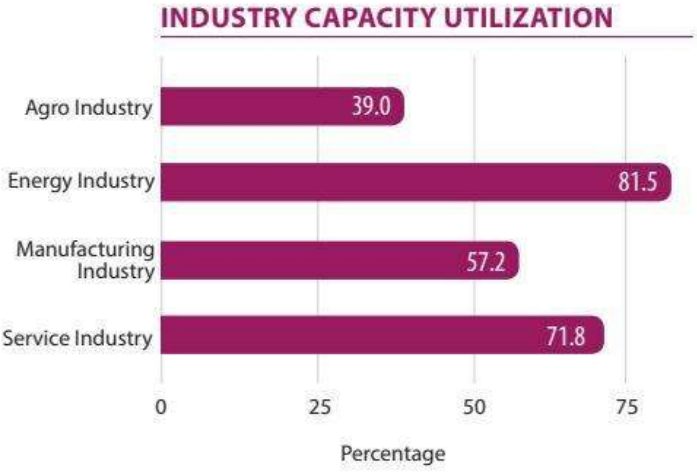
Composition of Industries (in percentage)

Sectors	Registered in Nepal[1]	ISR Survey Sample
Agro Industry	5.8	6.4
Energy Industry	5.1	6.4
Manufacturing Industry	38.3	40.4
Service Industry	50.8	46.8
Total	100.0	100.0

[1] Calculated from the data provided in Industrial Statistics (2019/2020) published by the Department of Industry (DoI).

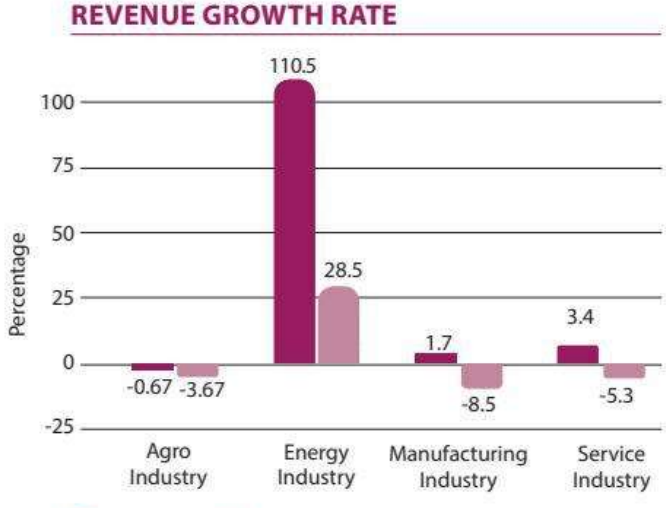
BUSINESS PERFORMANCE

Measuring performance is a vital part of monitoring the growth and progress of any business. This section summarizes the performance of industries within key variables in Q4 2077/78.



INDUSTRY CAPACITY UTILIZATION

On average, industries were operating at **64.8%**. The energy industry was the most operational at 81.5%, followed by the service industry at 71.8%, manufacturing at 57.2% and agro at 39.0%. The impact of the pandemic was visible in the capacity utilization rate of industries in **Q4 2077/78**.



REVENUE TRENDS

In **Q4 2077/78**, there was an **8.0%** growth in revenue whereas in **Q4 2076/77,** the average growth rate was **-4.7%**. This shows that the industries, on average, are in a better position than last year.

The relative growth in revenue during **Q4 2077/78** can be attributed to the gradual recovery from the pandemic. The highest growth was observed in the energy industry.

EXPENDITURE UNDER MAJOR HEADINGS

Land and Rent Expenditure

With 21% of expenditures as a share of total costs on land or rent, the agro industry was the highest, the service industry followed with 6.8% and the manufacturing sector with 3.7%.

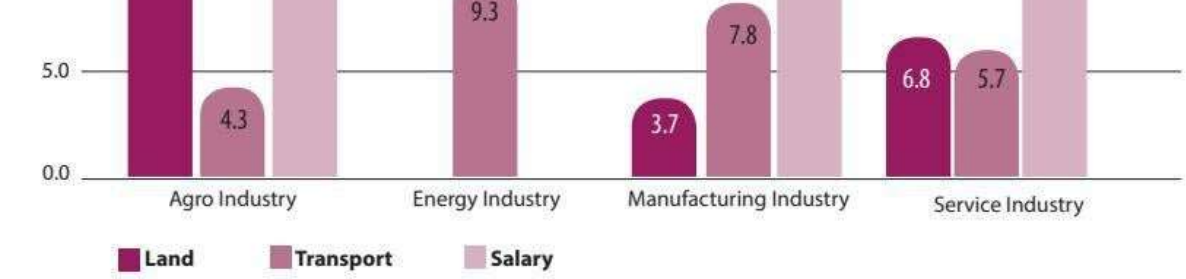
Salary Expenditure

The service industry spent the highest on salary at 25.4% of total expenditures, whereas the manufacturing, agro and energy industries spent 13.6%, 13.0% and 9.3% on salary and wages.

Transportation Expenditure

Out of the total expenditures incurred in running businesses, the manufacturing industry spent the highest on transportation with 7.8%. Agro and the service industry spent 4.3% and 5.7%, respectively.

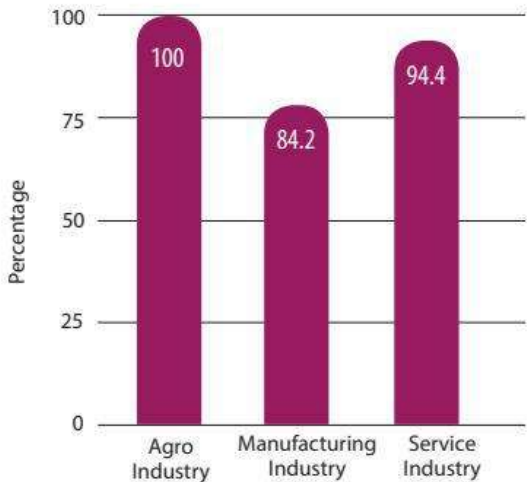
SHARE OF TOTAL EXPENDITURE



DOMESTIC MARKET DEMAND AND MARKET COMPETITION

The demand for goods and services produced by Nepali industries was encouraging in **Q4 2077/78**. **91.1%** of respondents stated that there is enough demand for their goods and services in the Nepali market, while 9.9% of them answered otherwise. The agro industry responded that 100% of their goods are in demand in domestic markets, whereas the manufacturing industry reported demand to be at 84.2%.

DOMESTIC MARKET DEMAND



94.9% of the industries surveyed responded that their goods are competitive in the market in relation to imported goods, which provides an optimistic outlook for domestic industries. All of the agro industry respondents said that their products are competitive, and 94.1% of the manufacturing industries responded similarly. There was one exception, the wire and electricity manufacturing industries, who responded that their products are not competitive when compared to foreign products.

OBSTACLES TO ACCESSING DOMESTIC MARKET

While the industries surveyed experienced good performance during **Q4 2077/78**, they still had some difficulties in accessing domestic markets.

The following table highlights the major obstacles (in ascending order for the manufacturing and agro industries):

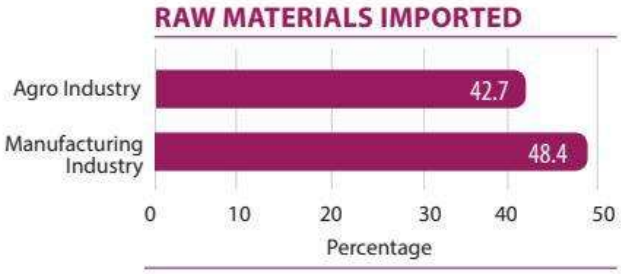
Manufacturing Industry	Agro Industry
▪ Excess Competition Affecting Price Margins ▪ COVID Pandemic ▪ Consumer Bias for Foreign Goods/ Services	▪ Consumer Bias for Foreign Goods/ Services ▪ Excess Competition Affecting Price Margins

Other difficulties included establishing the credibility of Nepali goods and the reluctance of retailers to sell Nepali products.

SHARE OF RAW MATERIALS IMPORTED

According to the survey data, Nepal's agro and manufacturing industries relied heavily on foreign raw materials during **Q4 2077/78**. Both industries imported roughly one half of the raw materials used in the production process. The survey further illustrates how a huge portion of raw materials are sourced from abroad.

Such industries are vulnerable to external shocks, such as changes in the value of Nepali rupees against foreign currencies as well as shocks to foreign trade. There is an urgent need for these industries to have access to domestic sources of necessary raw materials to strengthen the backward integration of industries.



IMPORT DUTIES

On average, the agro industry paid 13.7% and 18.0% in import tariffs on raw materials and finished products during

Q4 2077/78, respectively, which is consistent with the government's policies.

In the case of the manufacturing industry, there was an average of 10.7% import tariffs on raw materials and 5.8% tariffs on imported finished goods. This is contrary to the government's intention to promote industrialization in Nepal.

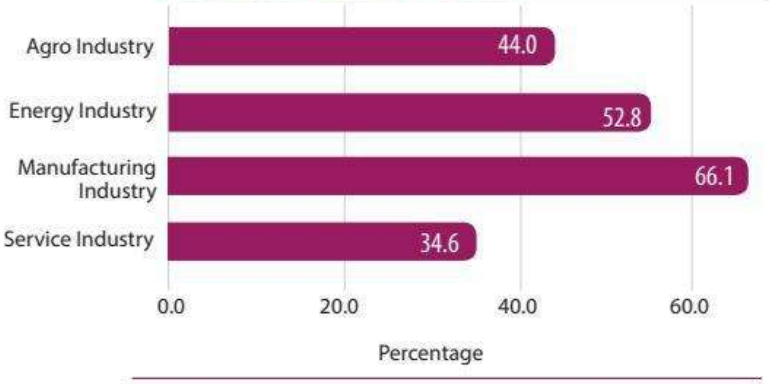
The economic rationale is simple: if there is no difference between import duties

on finished imported goods and raw materials, then local businesses won't be encouraged to participate in the manufacturing industry. The arduous process of converting raw materials into finished products is a disincentive for Nepali industries to invest time and resources into manufacturing.

FINANCE

This section provides insights into the ability of industries to access credit, the share of loans in working capital, NRB COVID-recovery loans, and prevailing interest rates.

AVERAGE SHARE OF LOANS



AVERAGE INTEREST RATE ON LOANS

Sector	Interest rates
Agro Industry	8.3
Energy Industry	7.4
Manufacturing Industry	7.7

WORKING CAPITAL LOANS

On average, **48.1%** of the working capital of the industries surveyed came from credit lines. The manufacturing industry reported the highest percentage at 66.1%, followed by energy, agro, and the service industry with 52.8%, 44.0% and 34.6%, respectively.

The Vulnerability Measure: This measure helps assess the vulnerability of industries to fluctuation in interest rates. The higher share of loans for a given industry brings more financial burden when interest rate changes. For illustration, with the largest share of loans among all industry sectors, the Vulnerability Measure shows that manufacturing industries are the most vulnerable.

Service Industry	8.4

INTEREST RATES

The average interest rate on loans was reported at **7.8%**. The agro industry had the highest average interest rate at 8.3%, while the energy industry had the lowest at 7.4%.

NEPAL RASTRA BANK COVID-RECOVERY LOANS

Nepal Rastra Bank set up the Business Continuity Loan Facility and Refinance Facility for businesses to mitigate the difficulties resulting from the pandemic.

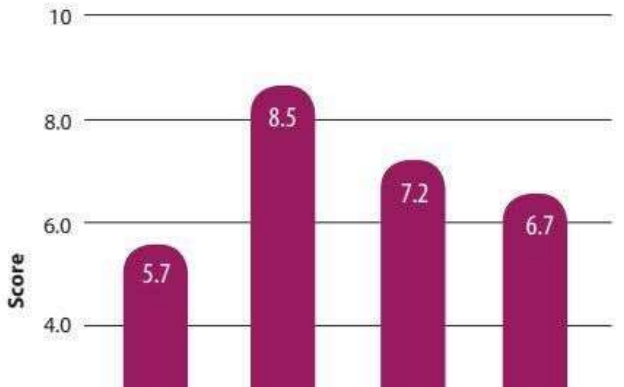
PERCENTAGE OF INDUSTRIES THAT RECEIVED THE COVID-RECOVERY LOANS

Sector	NRB Business Continuity Loan	NRB Refinance Facility
Agro Industry	33.3	33.3
Manufacturing Industry	-	44.4
Service Industry	11.0	21.5

Survey results show that only **13.2%** of industries took advantage of the Business Continuity Loan, and **31.2%** of respondents utilized the Refinance Facility.

Industrial cluster specific breakdown of the responses shows, 11.0% and 21.5% of the service industry respondents utilized the continuity and refinance loan facility respectively.

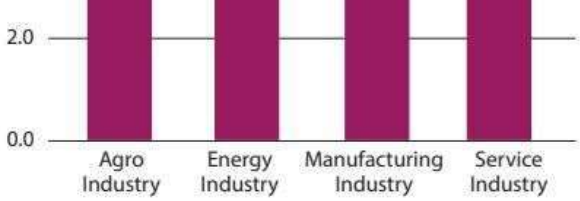
SCORE ON EASE OF ACCESS TO FINANCE



ACCESS TO FINANCE

When asked to rate the access to finance for business operations on a scale of 1 to 10, (with 1 being the lowest and 10 being the highest), the energy sector stood in the first position with a score of 8.5, whereas the agro sector stood in the least position with a score of 5.7.

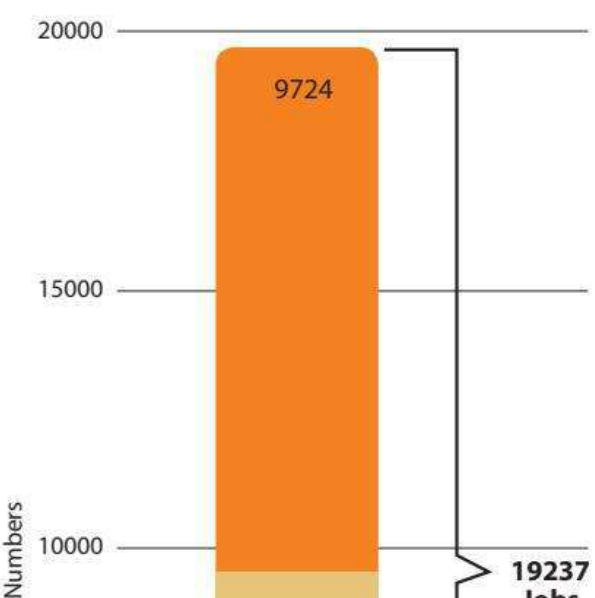
The agriculture sector appears to have the least amount of working capital coming from credit lines as well as the lowest score on access to credit. This does not bolster an optimistic outlook for the agriculture industry moving forward, and the data from the survey seen here can hopefully result in effective shifts in policymaking to address these issues.



SKILLS AND EMPLOYMENT

This section highlights the trends in employment and employee skills in the industries surveyed.

EMPLOYMENT IN SURVEYED INDUSTRIES



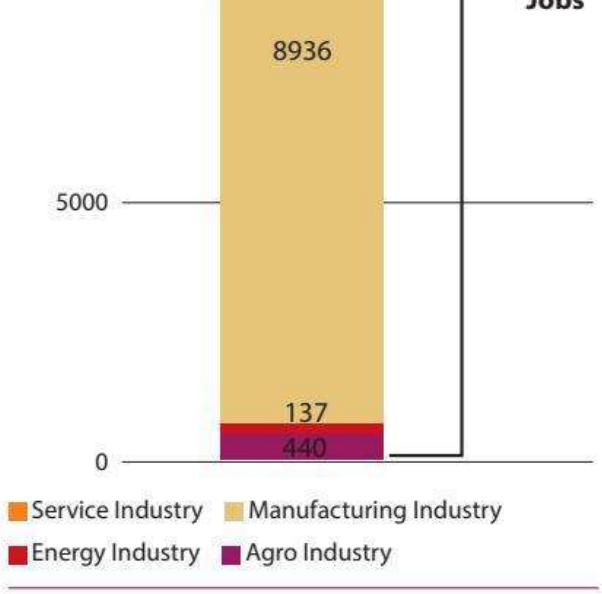
EMPLOYMENT

The industries surveyed employed **19,237** staff in total. On average, an industry establishment employed 397 individuals with a range of 7-4300.

The sector employing the most people was the service industry, followed by manufacturing, agro and energy industries.

HIRING AND LAYOFF

In **Q4 2077/78,** the survey respondents generated **814** jobs. Interestingly, the service industry generated 68.2% of



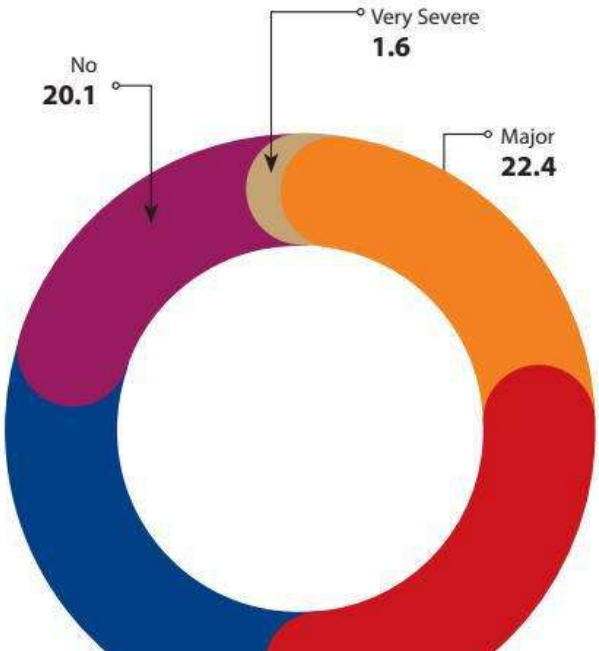
all employment even though it only comprised 46.8% of the total sample. The second highest employment generating sector was the manufacturing industry with 28.5%. During the same time period, **470** employees from the respondent industries were laid off due to the COVID-19 pandemic. The service industry and manufacturing industry were net employment creator sectors. The remaining industry sectors laid off more staff than they hired. On average, **59** individuals applied for one entry-level job during **Q4 2077/78**. This highlights a sharp asymmetry that exists between demand and supply of job opportunities in the Nepali job market.

EMPLOYEE RETENTION

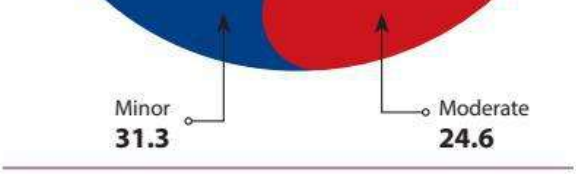
In response to questions about retaining employees, 31.3% of respondents across all sectors stated that retention was a minor problem, and 22.4% reported that retention was a major hassle. 24.6% considered retention to be a moderate obstacle, and 20.1% of the respondents stated that retention was not an issue. Only 1.6% stated that retention was a very severe problem for their business.

For the agro and energy industries, retaining employees is not a major concern. For the manufacturing industry, 51% of the respondents said that they have minor to moderate difficulties in retaining employees, while 76% of the

IS RETAINING EMPLOYEES AN OBSTACLE TO SMOOTH OPERATIONS?



respondents from the service sector said that they have minor to major obstacles in retaining employees.

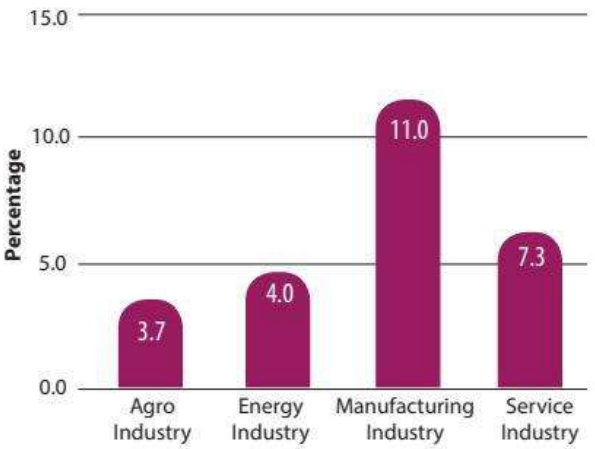


NON-NEPALI WORKERS IN NEPALI LABOUR MARKET

Of the industries surveyed, there was a reported average of **8.3%** employees in the labor market are non-Nepali.

The manufacturing sector had the highest share of non-Nepali workers at 11.0%, followed by the service industry at 7.3%. The agro sector had the lowest non-national workforce at just 3.7%.

SHARE OF NON-NEPALI WORKERS



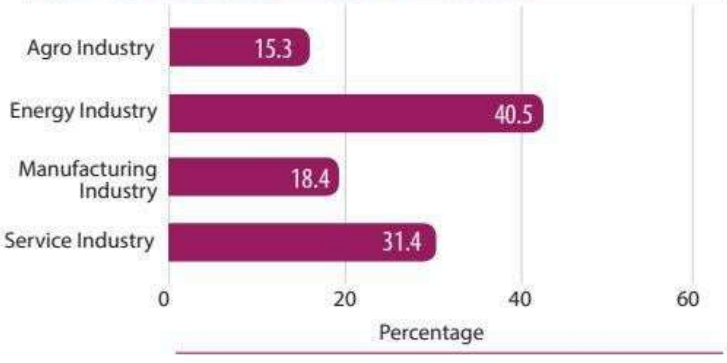
SKILL GAP AND TRAINING

The survey results show that across sectors, **25.9%** of employees received training during **Q4 2077/78,** yet only **4.5%** of respondents reported that there were no skill gaps in their industries.

The energy sector outperformed the other sectors in regards to training, with 40.5% of the total workforce receiving some form of training during **Q4 2077/78**, followed by the service sector with 31.4% of employees receiving training.

Reporting on skill gaps, 100% of the agro industry respondents stated that their

EMPLOYEES THAT RECEIVED TRAINING



employees lack technical and professional skills. Likewise, survey results show that technical and soft skills are also major gaps in manufacturing (64% and 50%, respectively) and the service industry (54% and 57%, respectively). Closing these gaps is essential in order to realise the optimum potential of all industries.

WHAT ARE THE SKILL GAPS YOU EXPERIENCE AMONG EMPLOYEES IN YOUR INDUSTRY?

The Gaps	Agro Industry	Energy Industry	Manufacturing Industry	Service Industry
Technical Skills	100	0	64	54
Soft Skills	66	50	50	57
Professional Skills	100	50	36	29

(Note: In percentage)

INDUSTRIAL ECOSYSTEM

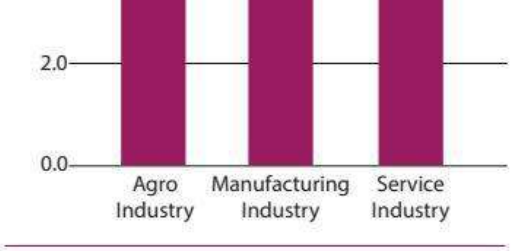
This section focuses on the various aspects of the regulatory environment, state-provided utilities, transportation and infrastructure that have a direct bearing on the competitiveness of industries.

QUALITY OF ELECTRICITY

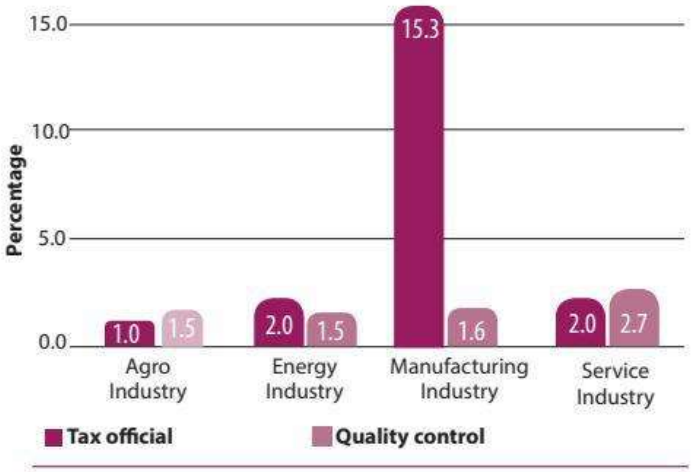
PUBLIC UTILITIES

Electricity

On average, industries experienced **8.8** power outages per week during **Q4 2077/78**. The highest number of outages was experienced by the agro industry at 25 outages per week, followed by 8.4 and 3.9 outages in the manufacturing and service



NUMBER OF VISITS BY GOVERNMENT EMPLOYEE



industries, respectively.

Due to this high number of power outages, **69.7%** of the respondent industries were compelled to deploy a generator. The use of generators has led to a **4.9%** increase in the monthly operation costs of the industries surveyed. This was further reflected when industries were asked to rate the quality of electricity as well. When asked to rate the quality of electricity provided, based on voltage fluctuation and frequency of power tripping on a scale of 1 to 10 (with 1 being the lowest and 10 being the highest), the average rating was **6.8.**

Other utilities, such as water supply and internet connection, were not major areas of concern based on the survey results.

REGULATIONS

This sub-section captures the period of time that different administrative procedures at the Department of Industry take from the industry survey. The average responses were as follows:

Administrative Procedures	Number of Days
Company Registration	13.6
Application for Increment of Electricity	41.6
Relocation	53.4
Extension of Operation Date	28.4

Rating of Online Government Service

Although the government has been prioritizing digitization of the economy, the survey results reveal that respondents on average were not satisfied with the quality of online services provided by various public entities. When asked to rank the quality of services on a scale of 1 to 10 (with 1 being the lowest and 10 being the highest), the average score of the respondents was **4.6**. The average sector responses were as follows:

Sector	Rating Score (out of 10)
Agro Industry	4.0

Meeting Tax Officials

During **Q4 2077/78**, manufacturing industries were required to meet with tax officials **15** times on average. The cumbersome procedures involve the frequency of tax payments and mandatory contributions, and the number of agencies involved.

Visits by Quality Control Officials

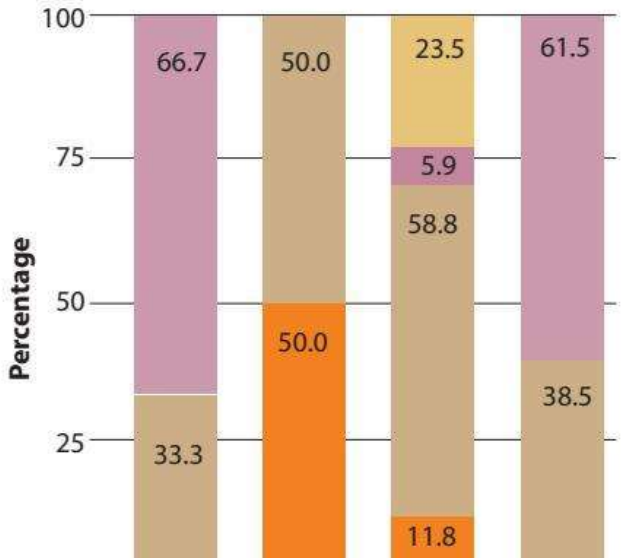
The survey responses show that there were very few visits from quality control officers to assess the quality of goods and services produced by the industries, with an average visit of **2.1** times per quarter.

Energy Industry	4.5
Manufacturing Industry	4.2
Service Industry	5.0

Environmental Compliance

When asked if environmental compliance is an obstacle to their industry, the most commonly recorded answer across all sectors was that it represented a moderate obstacle. The agro industry (66.7% of respondent) reported that environmental compliance was a minor obstacle in the operation of business. 50% of the energy industry stated it was a major obstacle. For the manufacturing industry, environmental compliance was a moderate obstacle, reported at 58.8%, whereas it was a minor obstacle for the service industry, reported at 61.5%.

IS ENVIRONMENTAL COMPLIANCE AN OBSTACLE TO YOUR INDUSTRY?



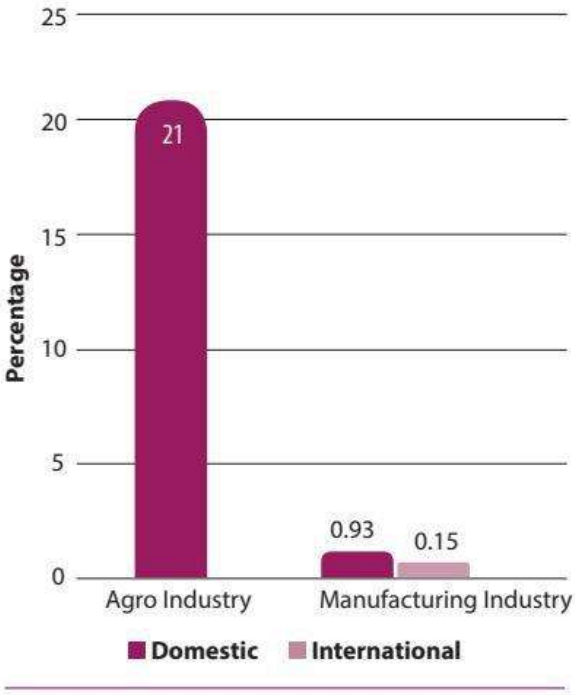
TRANSPORTATION, TRADE, AND LOGISTICS

Percentage of Goods Lost During Transport and Storage

Transport and storage of goods is still an obstacle for the industries surveyed. Given the nature of agricultural goods and the infrastructure of the country, one-fifth of the goods produced by the sampled agro industry were damaged during domestic transportation and storage. For the sampled manufacturing industry, the share was less than one percent during domestic transportation and transit and

0.15% during export. This highlights the need for better transportation and logistic infrastructures for realising industrial-led economic growth in Nepal.

PERCENTAGE OF GOODS LOST DURING TRANSPORT AND STORAGE



Major Challenges

Among the specific challenges that the respondents wanted resolved, the quality of roads was unanimously the biggest concern across all industrial sectors. For the agro industry, road blockage was another big concern, given the perishable nature of their products. In the case of the manufacturing industry, the trucking syndicate was the second biggest concern. Arbitrary pricing of transportation and logistics was the second biggest concern for the service industry.

Agro Industry	Manufacturing Industry	Service Industry
Quality of roads	Quality of roads	Quality of roads
Road blockage	Trucking syndicate	Arbitrary Pricing

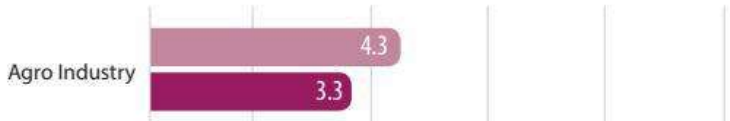
BUSINESS OUTLOOK

This section presents the confidence outlook of surveyed industries regarding their own business and for the industrial sectors as a whole for Q1 2078/79. Compared to earlier sections, this is the only forward-looking segment in the report.

THE CONFIDENCE MEASURE

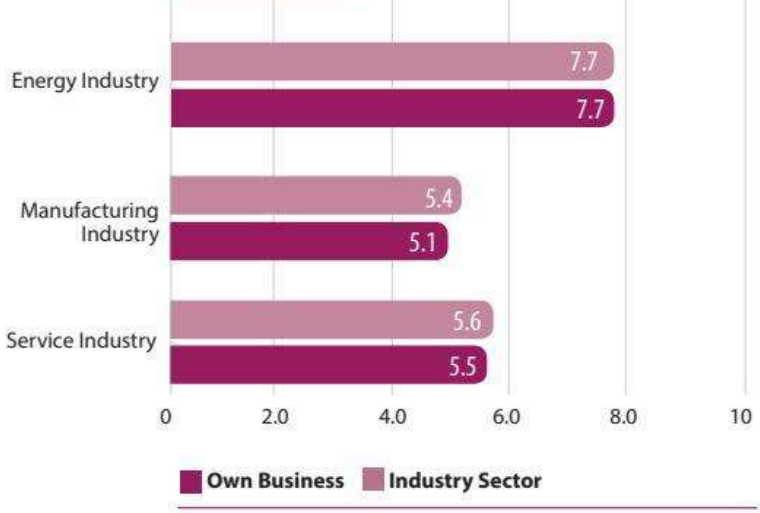
On the whole, industries reported a moderate outlook towards their own business as well as their industry sectors for **Q1 2078/79**. When asked to rank the favorability for their

HOW FAVORABLE IS Q1 2078/79 FOR YOUR OWN BUSINESS AND INDUSTRY SECTOR?



business on a scale of 1 to 10 (with 1 being the least favorable and 10 being the most favorable) in terms of revenue and investment opportunities, regulatory environment, access to finance, labor and better utility facilities, the average score across sectors was **5.6**.

The energy industry appears to be the most optimistic with a score of 7.7. It was also the sector least affected by the pandemic. When asked about the favorability of their respective industry sectors, manufacturing and service reported similar scores, close to the average.

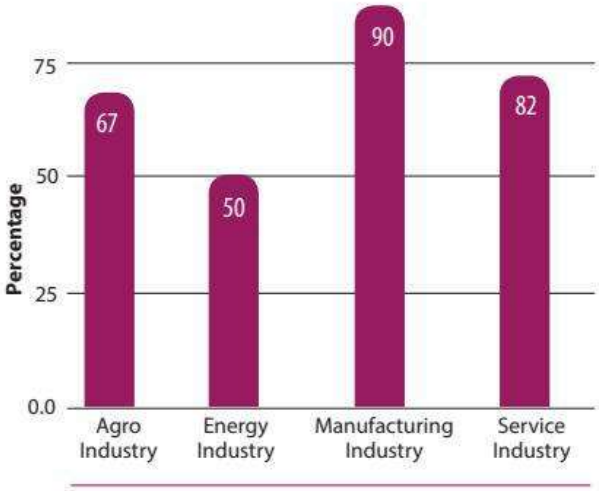


NEW INVESTMENT PLANS

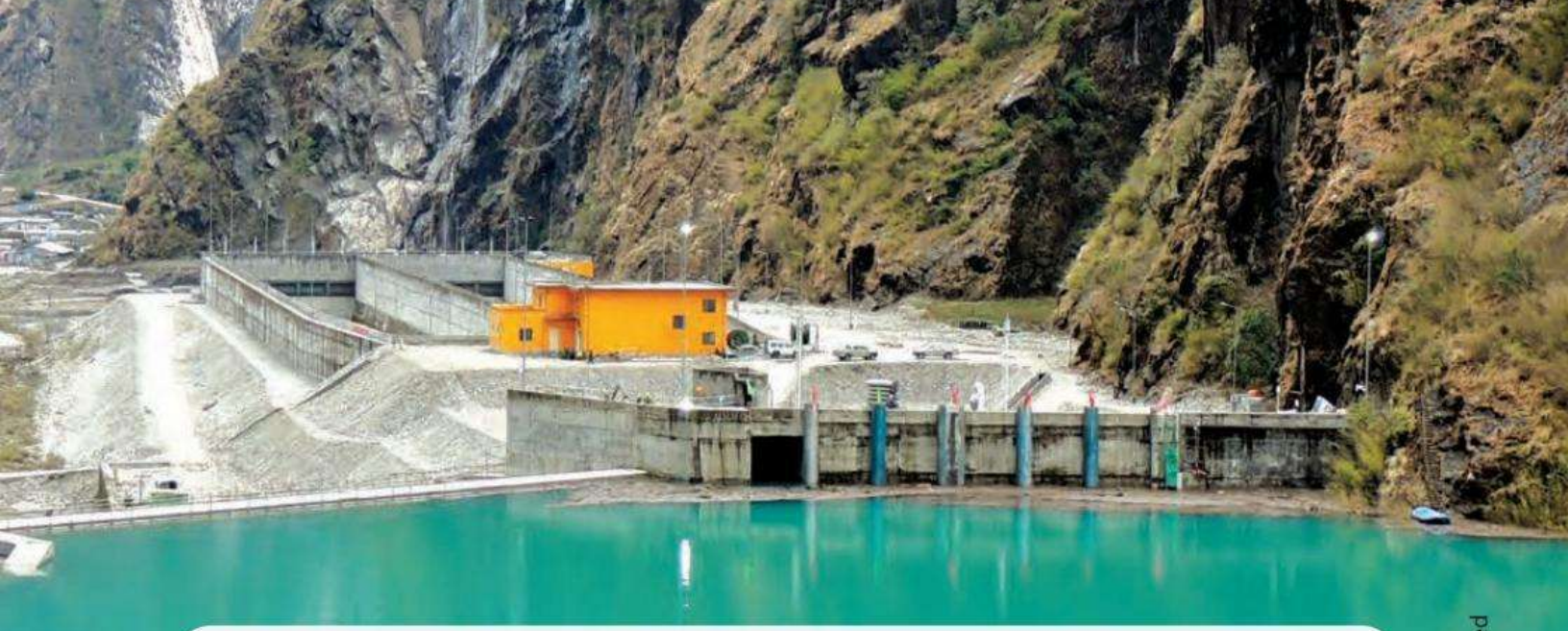
New investment plans are an indicator of how optimistic a business is for the future. **83%** of the respondents across sectors plan to expand their business during **Q1 2078/79**. This reflects the business confidence in their industries and could be influenced by the increase in the vaccination rate and the recovery of the economy from the pandemic.

The manufacturing industry was the most enthusiastic at 90% who intend to expand their investments in **Q1 2078/79**, whereas 82% of businesses in the service industry and 67% of businesses in the agro industry plan to make new investments.

INVESTMENT PLANS Q1 2078/79



ENERGY INDUSTRY: A GLANCE



- Economically feasible hydropower production capacity: **42000MW**
- Economic potential for solar power: **1829 MWp**
- Current installed capacity: **1458MW**
- Government's energy target for the next 10 years: **15000MW**
- Investment needed to realise the targeted energy in 10 years: **USD 27 billion**
- Total energy consumption in FY 2020/21 was **7,319 GW/h**
- Total energy import: **2,826.21 GWh**
- Total energy export: **44 GWh**
- Gross revenue generated from energy sales (FY 2020/21) **NRs 71,282.49 million**
- Total power produced by Independent Power Producers (IPPs): **3,241 GWh**
- IPPs-owned projects in operation: **108** with a combined installed capacity of **814.65 MW**

Source: NEA

Photo Credit: Upper Tamakoshi Hydropower Limited

Upper Tamakoshi Hydroelectric Project

KNOW YOUR STAKEHOLDERS

MINISTRY OF ENERGY, WATER RESOURCES AND IRRIGATION

Forms laws and policies and oversees all other entities.

KEY ENERGY SECTOR ENTITIES

WATER AND ENERGY COMMISSION SECRETARIAT	Formulates policies and planning of projects in the water and energy resources sector.
DEPARTMENT OF ELECTRICITY DEVELOPMENT	Implements governmental plans and policies related to power and energy.
ELECTRICITY REGULATORY COMMISSION	Ensures the generation, transmission, and distribution of electricity in a transparent and systematic manner.
NEPAL ELECTRICITY AUTHORITY	Generates, transmits, and distributes electricity.
ALTERNATIVE ENERGY PROMOTION CENTRE	Promotes renewable energy through increased access.
INDEPENDENT POWER PRODUCERS	Invests in generating and trading electricity.
NATIONAL ASSOCIATION OF COMMUNITY ELECTRICITY USERS	Promotes rural electrification through small power projects.
MULTILATERAL AGENCIES	Finances projects through grants and soft loans.

KNOW YOUR STAKEHOLDERS

IN CONVERSATION WITH AN ERC COMMISSIONER

Dr. Ram Prasad Dhital is one of the commissioners of the Electricity Regulatory Commission (ERC). Formerly, he was the Executive Director of Alternative Energy Promotion Center (AEPC).

ERC: An Introduction

Section 14 of the Electricity Regulatory Commission Act, 2074 ("ERC Act") has vested on the ERC the quintessential duty of maintaining competition in the electricity market. The statutes governing the sector have been envisioned to allow any citizen of the country to contribute to the generation, transmission, distribution and trade of electricity as well as to bring in foreign investment for the same.

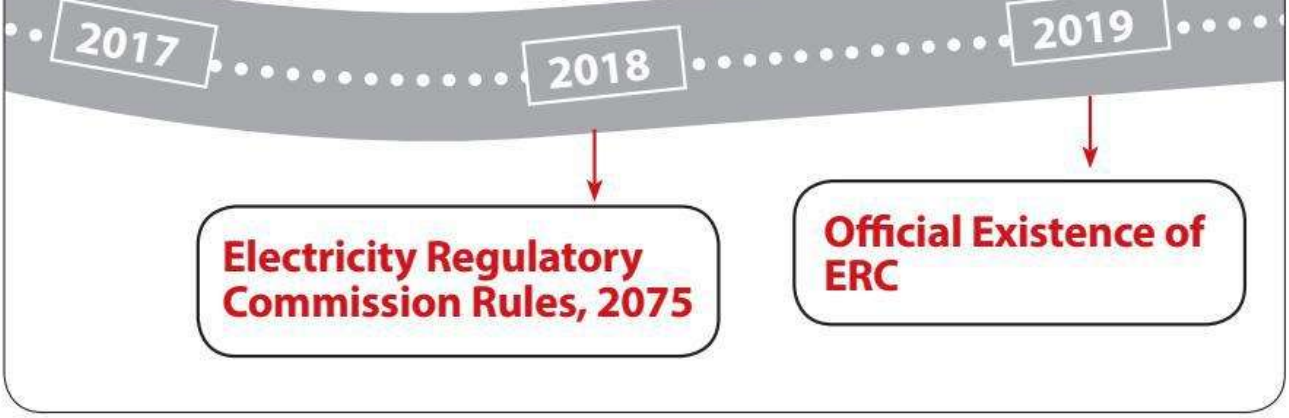
ERC, as the sector regulator, has key responsibilities to ensure the following: monopolistic elements are discouraged; consumer interest is protected; a competitive environment is maintained in determining consumer tariff and power purchase rates; syndicates are deterred; and mergers, acquisitions, takeovers, purchases of plants, transfers of licensees and their projects are regulated properly. In addition to these, any disputes between power producers and off-takers or consumers and utility are to be resolved as per internally accepted modalities. Any organization or person involved in the aforementioned activities falls under the regulatory shadow of the ERC.

Instruments launched by the ERC since its formation

1. By-laws on Power Purchase Sale and Conditions to be Fulfilled by Licensees, 2019
2. Directives on Public Issuance of Shares by Electricity Related Companies, 2019
3. Directives on Fixation of Electricity Consumers Tariff, 2019
4. Directives on ERC Conduct of Public Hearing, 2020
5. Directives on ERC Licensee's Merger, Amalgamation, Purchase of Share, Transfer, Acquisition, Takeover, 2020.

Power Wheeling

The ERC Act has bestowed the duty of fixation of transmission and distribution wheeling charges within the ERC's jurisdiction. The ERC is currently preparing a consolidated instrument to lay down the procedure on the determination of



power wheeling charges based on ERC Act 2017 and Rules 2017. Furthermore, the open access provision is expected to be introduced by the new Electricity Act (currently the bill is tabled at the National Assembly), which will pave the way for the implementation of wheeling charges for transmissions and distribution.

Power Purchase Rate Determination	Tariff Determination
The ERC determines the Power Purchase Rate between the generation licensee and the power purchaser according to the procedures prescribed in *Bylaws on Power Purchase Sale and Conditions to be Fulfilled by Licensees, 2019.*	*Directives on Fixation of Electricity Consumers Tariff, 2019* of ("Tariff Directive") of the ERC has laid down detailed procedure on fixation of consumer tariff.

Challenges of ERC

Specifically, the challenges of ERC are two-fold. The first one is to make the electricity sector accustomed to a regulator, because we are only a new entity. We should also be mindful of the fact that new entities could face a regulatory capture from stronger agencies.

The second challenge is to further the organizational capacity of the ERC to its full potential. The ERC must realize its full organizational capacity to stand prepared for the increased flow of power supply, given that it is currently functioning with a limited number of human resources.

Additionally, electricity generation is projected to increase manifold, and the ERC as a sector regulator must maintain oversight of the infrastructure required for both power transmission and distribution. It is well known that unreliable transmission networks are the major challenge of the electricity sector as a whole.

Koshi Corridor 220 kV Transmission Line Project Photo Credit: Nepal Energy Forum

Worst-case Scenario for Nepal's Energy Sector

If utilized to its optimum capacity, Nepal's electricity sector alone has the capacity to be a major contributor to the nation's GDP. The government, state agencies, power producers, distributors, along with ERC should constantly strive to bring further clarity in their own functions and responsibilities.

To visualize a 'worst-case scenario', Nepal resides in a geographically and geopolitically delicate region. Therefore, first, it is essential to disaster-proof our power projects and infrastructures. Proper studies and precautionary measures should be taken to prevent such disasters. Finally, the leadership should also be aware of the difficulties in project implementation caused by the politicization of the power projects which can be an obstacle to the aspiration of the country to be a regional leader in energy.

DECARBONIZING THE ECONOMY AND ENERGY TRANSITION

Professor Amrit Nakarmi is on the Advisory Panel of the Energy Development Council, and Coordinator of Energy Systems Planning Analysis, Center for Energy Studies, Institute of Engineering, Tribhuvan University.

In contrast to industrialized countries, households and end-users release the majority of greenhouse gases (GHGs) in Nepal. Nepali industries have a negligible carbon footprint, significantly below one percent of total global carbon emissions. On the whole, the country emitted 32 MtCO2e in 2011, although the current figure in 2021 will be much higher.

What Does Energy Transition Mean?

Energy transition refers to the energy sector's shift from fossil-based systems of energy production and consumption, including oil, natural gas and coal, to renewable energy sources like hydropower, wind and solar. In the long run, Nepal should aspire to achieve net-zero emissions by identifying feasible options for transitioning into a low carbon economy.

However, it is alarming that the share of petroleum imports continues to dwarf goods exported from Nepal. We have to put in place the right incentives for households, industries, and transport systems to adopt cleaner forms of energy.

The Current Energy Scenario

Between 2013 and 2015, electricity sales growth averaged 7% and then grew to 20% between 2017 and 2019. The energy mix in 2019 for biomass was 69%, petroleum products 17%, coal 7%, electricity 4 %, and renewables 3%. Sectoral consumption in 2019 was as follows: residential 75%, industrial 10%, transportation 10%, commercial 4%, and agriculture 1%.

Reducing emissions at the household level is critical to achieving Nepal's goals of a low-carbon based economy. For the last couple of years, due to enhanced technological innovation, the thermal efficiency of electric cooking stoves, such as induction cooktops, has improved tremendously to more than 80%, whereas LPG cooking stoves remain at around 50-60%, and traditional firewood cooking stoves stand around 10%.

The Government of Nepal's Long Term Strategy (LTS) to Mitigate GHG Emissions

Nepal submitted the first nationally determined contributions (NDCs) in 2016 and then the second NDC in December

2020. While the first one aimed at reducing the use of carbon-based fuels

energy is a priority for the government in the long term.

in the transport sector by 50% by 2050, the second one targeted decreasing fossil fuel dependency by 9% and ensuring 15% of total energy is supplied through clean energy sources. NDCs are a core component of the Paris Agreement. The global agreement requires each country to prepare, communicate and maintain successive NDCs that it intends to achieve.

Additionally, the government introduced Nepal's Energy Sector Vision 2050, National Renewable Energy Framework 2074, National Climate Change Policy 2076 and National Energy Efficiency Strategy 2075. The existence of such a list of policies indicates that the issue of clean

Investment Needs

Massive investments are required to decrease GHG emissions and achieve Nepal's vision for a decarbonized economy. With existing mechanisms in place, it would take 20% of the national GDP by 2030 and 12% by 2050. With additional mechanisms, the investments required will be 23% of the GDP in 2050. Additional measures entail the use of 100% electric cooking, electric boilers, and a dramatic electrification in industry, transport, agriculture, and other commercial sectors.

Devighat Electric Project in Nuwakot.

Photo Credit: Nepali Times

THE PRIVATE SECTOR LEADS THE WAY FORWARD

THE PRIVATE SECTOR LEADS THE WAY FORWARD

Mr. Ashish Garg is the Senior Vice-President of the Independent Power Production Association of Nepal (IPPAN). He is the founder of Clean Developers Nepal Private Limited.

IPPAN: An Introduction

Nepal's power sector has made a paradigm shift in the last five years with power generation of from a meager 1000 MW to the current 2000 MW, leading up to 7000 MW by 2025. Currently, the private sector of Nepal contributes 60% of the total power generation, and this will increase to 80% by 2025. With 400 member organizations, IPPAN represents 90% of private sector power producers. As not many public sector projects are being planned, the private sector should lead the way in generating power for Nepal. In this way, the role of IPPAN will be stronger in the months and years to come.

Per Capita Consumption of Electricity

Currently, 87% of Nepali households have access to power, and the rest are connected to solar or micro-hydro. However, power consumption has not increased along with the increase in access for two main reasons. One is that rural households have limited means to pay for their power bills, and the second is that there has been a revolution in energy-efficient electrical gadgets and appliances.

Furthermore, the industrial demand for power has been suppressed due to transmission line constraints. For instance, Hongshi Cement wants 30MW, but there is no connection. So the current power consumption of 600 MW (40%) may double in industries, but any increase thereafter would be only 10-15% growth due to the slow nature of industrialization in the country, the high cost of doing business, and the lack of real competitive strength.

Tariff

Reduction in tariffs is a must to make the domestic industry competitive. The cost of power generation is less than Rs. 5 per kWh, i.e. the rate at which the private sector sells to Nepal Electricity Authority (NEA). NEA, in turn, adds 100% margin and sells at an average cost of Rs. 10 to consumers. NEA needs to charge for wheeling on cost and supply at Rs. 6-7 per kWh to the industry.

Household tariffs are political and social-driven tariffs, which should be subsidized by the state exchequer rather than loading on the industry. NEA is more of a public organization, and if driven by a motive for profit, the entire energy sector would suffer higher tariffs and lower consumption. Reduced power tariffs will

drive industrial competitiveness and lead to better overall well-being in the sector.

Hydropower vs Solar or Hydropower and Solar

Solar batteries are a serious threat to the advantages of hydropower, and it is expected that, by 2025, solar batteries will be an affordable storage medium. Hydropower is renewable energy that provides a 24-hour consistent power supply. However, considering the environmental hazards, impacts of climate change, and long construction and gestation periods, hydropower may lose its position to solar energy in a medium turn. In the context of Nepal, solar is complementary to hydro and could provide a good energy mix.

NEA and PPA

NEA is unbundling, and already seven entities have been incorporated to take over NEA's business, including Vidyut Utpadan Company Limited, Rashtriya Prasaran Grid Company Limited, etc. It is just a matter of time before the NEA is phased out. This will help bring in competition and a much more focused approach to generating and managing power in Nepal. Unbundling NEA and making a more efficient and stronger power sector is the need of the hour. The signing of the PPA should go on, since currently, the pace of hydropower development has stopped as there has been no PPA for the last year.

The Worst-case Scenario for the Private Sector

If not addressed, increased energy generation but disproportional enhancement and improvement of national and cross border transmission and distribution infrastructure will pose major challenges in the near future. The inability to increase consumption and find markets for exports is also a threat. In other ways, the worst-case scenario for the private sector would include an increase in tariffs, with no reasonable explanation, and the non-availability of adequate and good quality power. These situations would not only affect the private sector but also the economy as a whole and the industrial investment climate of Nepal.

ENERGY SECTOR – A VISION

Mr. Gyanendra Lal Pradhan is Chair of the Energy Development Council at CNI (and an NC Member), Executive Chairman at Hydro Solutions, SAARC CCI Council on Climate Change, Energy and Water Resources, and CACCI Asian Council on Water, Energy, and Environment.

Double-digit economic growth is only possible through the aggressive development of domestic hydropower. Nepal foresees a ten-fold increase in the generation of hydroelectricity in the next ten years. However, there is much due diligence still needed to be carried out before the country can efficiently absorb so much electricity domestically or export it. Domestic consumption translates to a broader application of the use of electricity in households. Whereas for industries, it means replacing machinery that runs on carbon-based fuels to those that can be run on electricity.

Household Consumption

Nepal can aim to replace the NPR 36 billion worth of gas imports by shifting to electricity-based cooking. Electricity is the cleanest and cheapest form of energy for cooking. For each cylinder of gas, the government provides a subsidy of around NPR 235. This subsidy should be reduced and gradually removed to encourage people to shift to electricity-based cooking. It is not a good strategy to provide subsidies for imported gas but not on tariffs of domestically-generated electricity.

Cross-border Trade

While domestic consumption should be the first priority, Nepal's vast hydropower resources make the export of power inevitable. Prosperity through exports has no alternative. There will likely be high demand for electricity in India as economic activity increases after the pandemic subsides. To bring balance to foreign trade, it is quite impressive that the earnings Nepal can make through one large hydropower project would be equal to all of the current earnings from exports.

Furthermore, industries producing chemicals, iron and steel, pulp and paper, fertilizer and the refining sector use a lot of energy. The government should deal with these potential energy-intensive industries that seek to set up factories in northern India. It is quite commendable that Bhutan exports 1615 MW of power to India, accounting for 25% of its GDP. Given that the energy sector of Nepal has been growing in the past few years, Nepal can certainly leverage its own natural resources for the prosperity of the nation.

Infrastructure

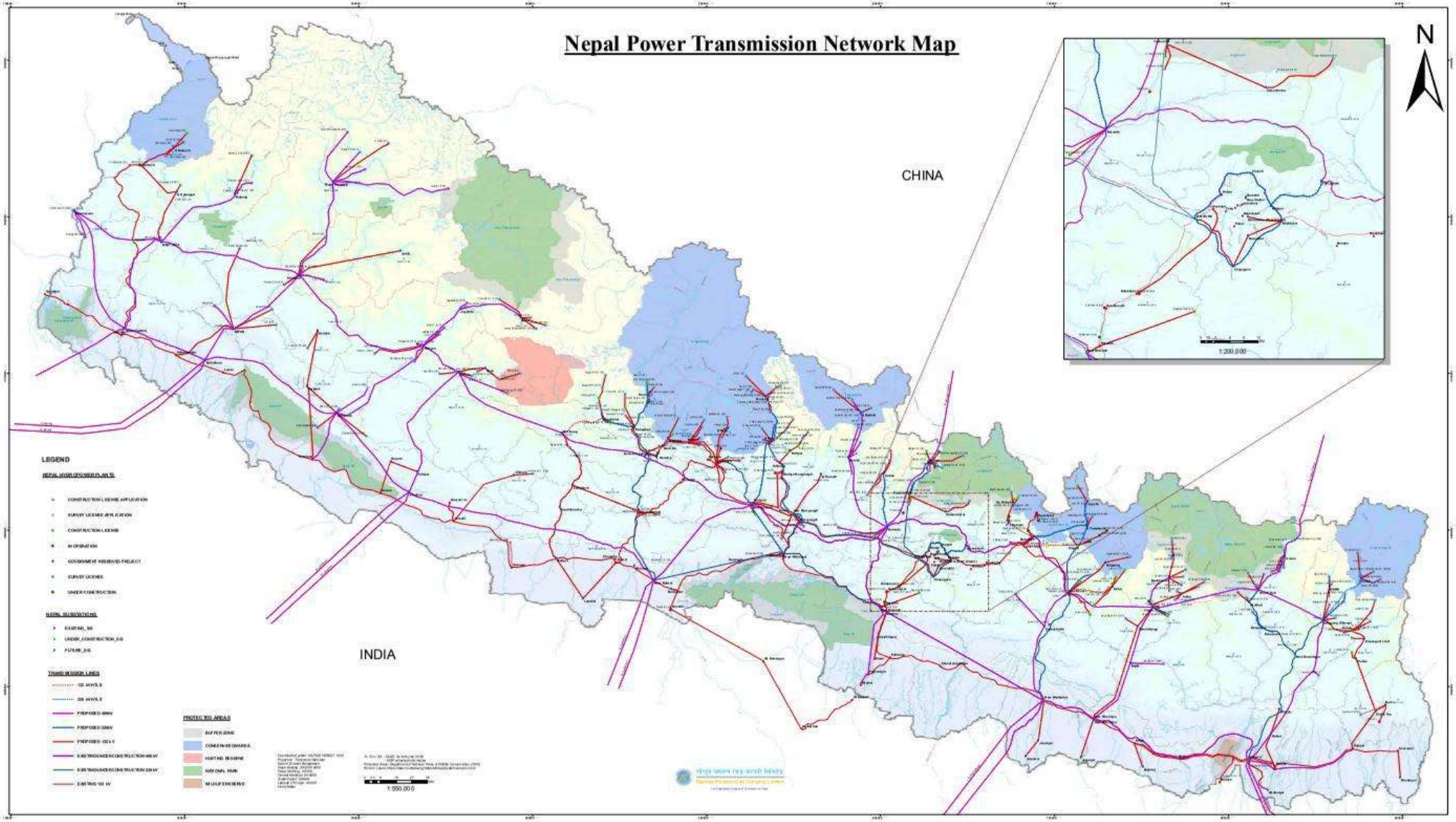
A ten-fold increase in electricity generation translates into the need for

a dramatic transformation of electricity infrastructure, including the construction of substations, transmission lines, and distribution systems to provide households and industries access to improved quality as well as higher amounts of electricity consumption. Nepali industries already manufacture transformers, aluminum and copper wires, protection systems, like household fuses, and concrete and steel poles. As electricity infrastructure is upgraded, the Nepal Electricity Authority should ensure that Nepal-produced equipment is used. This would help Nepali industries design long-term plans to expand industrial production capacity and encourage the establishment of new industries.

Suggestions to Increase Generation

Loans should be provided at a base rate for the entire loan tenure to peaking run-of-the-river (PROR) and storage-based hydropower projects. These projects take decades to build. PROR and storage-based projects have been prioritized by the 15th Five Year Plan as well. Furthermore, the fertilizer plant the government is aiming to establish should be electricity-based. All the railway projects the government is in the process of building should also be based on electricity. Janakpur Rail, which is set to operate, is based on diesel and is a shortsighted, unfortunate decision. It is imperative that the Birgunj-Kathmandu rail should be electricity-based. It will reduce NRP 50-60 billion worth of diesel and spare parts annually.

Hydropower energy is at the heart of the Make in Nepal campaign. It has the potential to make up for the huge trade-deficits we face today. Also, why not reap the transformational benefits associated with hydropower development? Including high environmental dividends, irrigation and flood-control prospects, and 90% value addition in the country. With the right commitment for the future, hydro-based electricity can power the nation.


Nepal Power Transmission Network Map
N
CHINA
INDIA
LEGEND
NEPAL HYDROPOWER PLANTS
CONSTRUCTION LICENSE APPLICATION
SURVEY LICENSE APPLICATION
CONSTRUCTION LICENSE
IN OPERATION
GOVERNMENT RESERVED PROJECT
SURVEY LICENSE
UNDER CONSTRUCTION
NEPAL SUBSTATIONS
EXISTING_SS
UNDER_CONSTRUCTION_SS
FUTURE_SS
TRANSMISSION LINES
132 kV(+S.S
220 kV(+S.S
PROPOSED 400kV
PROPOSED 220kV
PROPOSED 132 k.V
EXISTING/UNDER CONSTRUCTION 400 kV
EXISTING/UNDER CONSTRUCTION 220 kV
EXISTING 132 kV
PROTECTED AREAS
BUFFER ZONE
CONSERVATION AREA
HUNTING RESERVE
NATIONAL PARK
WILDLIFE RESERVE
1:200,000
1:950,000

About CNI

The Confederation of Nepalese Industries (CNI) was established by the captains of Nepal's industrial and corporate sector on April 17, 2002. Its core mandate is to help enhance the business environment for the private sector.

It has a membership base consisting of nearly all of the big corporate houses of Nepal, Nepali blue-chip companies, joint venture companies, etc. spread across a wide and diversified spectrum of industries.

About CRC

CNI Research Cell (CRC) was established due to a dearth of well-informed research on Nepali industries, especially based on periodic primary data. It aspires is to generate and disseminate evidence-based research and to be a trusted development partner of the Government of Nepal. The data and research generated by CRC is transparent, unbiased and will be kept confidential. The team consists of Research Director Mr. Nirnaya Bhatta and Research Officers Mr. Pratap Adhikari and Ms. Astha Wagle. We would like to extend special thanks to Ms. Sriya Pradhan who was in the team while designing the ISR survey.

CONFEDERATION OF NEPALESE INDUSTRIES