2014
Vol 1, Issue 1

Industrial Vision

Vision for Industrial Empowerment



Industry/ Technology

Interview

Management / Enterpreneurship

Energy Renewable

Light- Hearted Revolution

Escalating Vs

Society of Industrial Engineering Student (Nepal)


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Date: 2070/10/10



Message from the Dean

I am delighted to write few words in this first annual magazine- "INDUSTRIAL VISION", a publication of Society of Industrial Engineering Students-Nepal(SOIES-Nepal) in collaboration with Department of Industrial Engineering, Thapathali Campus.

I feel very happy that SOIES-Nepal is publishing in a periodic way this publication containing different articles of teachers and students. I believe, such publications are the platform for dissemination of creative achievements of teachers and students of Industrial engineering discipline.

Our concern is the prosperous Nepal and this is possible only with increasing productivity through capable and competent work force. Institute of engineering (IOE) is, therefore, striving to produce brains who can contribute to the economic growth of Nepal. I believe, our students, through SOIES-Nepal and this publication, shall carryover this mission of IOE eventually contributing to the national development process.

The effort of the INDUSTRIAL VISION-publication of SOIES-Nepal is appreciating in this regards.

Institute of Engineering
Office of the Dean

Prof. Dr. (Er.) Bharat R. Pahari
[B.E.(civil), M.Sc. engg (Building), Ph.D.(quality of Engg Edu), Post Doc.(Quality Mgmt.)]

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फ्याक्स- ९७७-१-४२४७३४०

Date: 2070-10-15



Message from the Campus Chief

I am very pleased to write few words of appreciation for Society of Industrial Engineering Student – Nepal (SOIES-Nepal) for valuable and laborious job taken by them.

The attempt to publish the 1st industrial engineering magazine INDUSTRIAL VISION will certainly expose industrial engineering student to the competitive engineering environment. Besides the academic qualification and experience, this magazine will boost the ability of the student to be familiar with the real field.

I would also like to congratulate the magazine team for their constructive endeavor. I also hope similar effort in the near future.

.....

Dr. Hari Ram Parajuli

Campus Chief

Thapathali Campus, IOE,TU

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17th January 2014



Message from the President: FNCCI

I am immensely pleased to know that the Society of Industrial Engineering Student (SOIES-Nepal), Thapathali Engineering Campus is publishing a magazine 'Industrial Vision,' that reflects the current state of Industrial Engineering and its arenas in Nepal.

Industrial Engineering, the science that deals with technical and managerial aspects of running an industry, ensures the optimization of resource use, optimization, efficiency, and effectiveness of the integrated Industrial system. Industrial engineering plays a crucial role in the economic development of the country through the industrial revolution. I believe this magazine will create common platform for students, professionals, industrialists, and entrepreneurs to coordinate and communicate for the industrial development and empowerment.

I would also like to congratulate the magazine team for their efforts and successful attempts. I also hope similar new and innovative efforts from students and teachers of industrial engineering in the future too.

Suraj Vaidya
President

"स्ववियुको एउटै प्रतिबद्धता, विकसित नेपालको लागि दक्ष इन्जिनियरहरुको अग्रसरता"

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थापाथली क्याम्पस

स्वतन्त्र विद्यार्थी युनियन

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युवराज दाहाल
(९८५१०४७१३८)

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पुष्पराज पुडासैनी
(९८४११७०८२५)

सचिव
सरोज साह (विक्की)
(९८४९०३८९१५)

सह-सचिव
मनोज कुमार जिरेल
(९८४१७०६०६७)

कोषाध्यक्ष
उर्मीला महर्जन
(९८०३७००१४३)

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खड्ग बहादुर खत्री
(९८४९०७९१९२)
विशाल चौधरी

Date: 2014-02-04



Message from the President, FSU

I would like to extend my best wishes to SOIES family for the upcoming publication of 'Industrial Vision'. I also appreciate the organization for creating such innovative and creative circle in the campus.

As the replica of Industrial engineering technologies and strategies, this magazine will empower the industrial engineering to make the industrial advancement for the economic development in the country. Not only this, it will demonstrate our responsibility for transformation of the social values in a positive and creative way.

Lastly, I want to give assurance that free student union, Thapathali campus will always be with you to support your academic and professional activities. We will be glad to serve you in your each step. I am thankful to SOIES-Nepal for providing me an opportunity to express my views for the magazine.

Yub Raj Dahal
President, FSU
Thapathali Campus

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फ्याक्स- ९७७-१-४२४७३४०

Date: 2014-02-02



Message from the DHOD

It is an immense pleasure for me to admire Society of Industrial Engineering Students (SOIES-Nepal) for publishing an annual Industrial Engineering magazine 'Industrial Vision'.

I hope this magazine will be very helpful for Nepali industries to be updated with latest industrial technologies for the advancement of their systems and processes. Further it will be important for students, professionals, industrialists and entrepreneurs to coordinate and communicate for the industrial development and empowerment in the country.

I would like to congratulate the magazine team and wish them for further success.

.....

Er. Sudan Neupane

DHOD

Department of Industrial Engineering



Message from the founder president, SOIES-Nepal

I am very glad to write few words for the 1st industrial engineering magazine INDUSTRIAL VISION. I appreciate the work of SOIES-Nepal members and magazine team.

The publication of INDUSTRIAL VISION will certainly create a broad platform for the industrial engineering students to interact with industrialists and business houses. This will certainly amplify the value of industrial engineering and make industrial engineering familiar among the industries and industrial sector.

I also saw firsthand evidence that the practice could never be as successful and lucrative without the continuous hard work and perfect team work. I would like to congratulate the magazine team and the SOIES-Nepal for their success and best wishes to do better in near future.

Prakash Aacharya
Founder president
SOIES-Nepal



Words from President

Things happen when we believe them and, belief makes them happen. We ever dreamed of doing something creative after joining Industrial Engineering that would make industrial Engineers be known to the Industrial sector, especially of Nepal. Now, our common dream has come out as **Industrial Vision**.

Since its establishment, five batches of Industrial Engineers are already on their carrier path, yet only few industries have truly understood our potential. The reason we were foreign to industrial stakeholders, we realized, was our inability to present ourselves enough. So, we believe, this magazine would be the best platform for industrial engineering students to interact with the industrial sector and among themselves. This way, we will be able to preach our knowledge and technical skills, which could be applied for the optimization of industrial systems: both technical and managerial.

Now, I'm extremely jubilant and excited to state that SOIES-Nepal is publishing an annual magazine 'Industrial Vision': envisioning industrial engineering technologies and principles for the industrial Empowerment.

During the span of working for this magazine, our team had a hard-pressed time. But despite few motivational and many difficult things we had to face, **Industrial Vision** has finally launched its first issue.

I would like to express my sincere gratitude to the supporters, advisors and Professionals, and like to thank all my friends for their coordination, cooperation and helping hands for publishing such a valuable possessions.

Prakash JamarKattel
President
SOIES-Nepal



Industrial Vision: Platform Par Excellence

Like those who have learnt, learning people too needs exposure. Learners learning again in the way of "If we are not in the job, then let us talk." too is advantageous. Industrial Engineering students, enriching themselves everyday with the matters of energy, design and process optimization, material and workers management and likewise, ever build an atmosphere of thinking new within themselves. And if we talk about what we think, and think about what we talk, this cycle if repeated in a humble and cultured manner, leads us to something called 'the world of experiments.'

Experimenting with the thoughts and ideas—not merely these—but progressing them with industrial engineering techniques and tools, is certain to be of some value to the students. Engineering field is a place where progresses have domino effect. So, these values created among students are certain to make them authoritative 'think tanks' of national and global industrial environment.

This first issue of **Industrial Vision** has come out after a series of hard work, not only with the ideas of how to make it a success but also on why to bring it to the 'Industrial talk'. Nepalese industries not only belong to the industrialists but also to those who think about them. Changes in the industries, either that be in technical or managerial, are now not just of economic concern but synchronizing with the visionary ideas of Industrial Engineers they become more of a modern need for Nepalese industrial reform.

Platform provided by **Industrial Vision**, in its coming days, is sure to include all the advancements, problems, stakeholders and students, and best possible solutions to the problems, all following latest engineering knowledge, tools and techniques.

Industrial Vision team and those who helped us by providing their articles, we would say has taken a step – "That's one small step for [a] man, one giant leap for mankind," We hope this magazine would draw and present all of Industrial Concerns in its further issues.

Dipesh Nepal
Editor-in-chief

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INDUSTRIAL ENGINEERS

WHO WE ARE

We, Industrial Engineers, figure out how to make things better. We design processes and systems that improve quality and productivity. Industrial Engineering is the branch of engineering concerned with the efficient production of industrial goods as affected by elements such as plant and procedural design, the management of materials and energy, and the integration of workers within the overall system. Its underlying concepts overlap considerably with certain business-oriented disciplines such as Operations Management, while the engineering side tends to emphasize extensive mathematical proficiency and usage of quantitative methods.



What makes us Different?

Other engineering disciplines apply skills to very specific areas. The most distinctive aspect of industrial engineers is the flexibility of the work we fit. We work together with people in all levels within different types of business organization to make things better, faster, safer, and more rewarding. We help people to stay competitive and reap personal and professional satisfaction. We focus on the way products and services are made and performed: ensuring safe design, optimizing production, considering occupational safety and wise energy uses. Furthermore, a combination of these technical and business skills helps us to analyze, design, build, and manage systems to constantly improve productivity.

Masters at Workplace

We work and consult in every industry, including hospitals, communications, e-commerce, government, finance, food, pharmaceuticals, insurance, banking and transportation. Whether it's reducing time, for bank's customer, to get the service, scheduling operation of machines, developing a plan for distributing a product worldwide, or manufacturing superior automobiles – we work to make any and every systems better.
Industrial Engineers, thus integrate combinations of people, information, materials, and equipment to make innovative changes and provide excellence to systems. We make significant contributions in saving costs while making the workplace better for fellow workers. We work to make others work better.

Society Of Industrial Engineering Students Nepal was established in 2006 for the welfare of the students as well as to promote the activities of the Industrial Engineers for the development of Nepal.
it is as umbrella organization of industrial engineering students in Nepal. It is registered as an NGO to district



जगदम्बा सिमेन्ट इण्डष्ट्रिज प्रा. लि., रूपन्देही, नेपाल । प्रमुख कार्यालयः न्यौपाने टावर, तीनकुने, काठमाडौं, फोनः ०१-४१११५००, ०१-४१११५५०, ०१-४१११६३३, ईमेलः jcement@wlink.com.np । शुभश्री जगदम्बा सिमेन्ट मिल्स् प्रा. लि., पर्सा, नेपाल

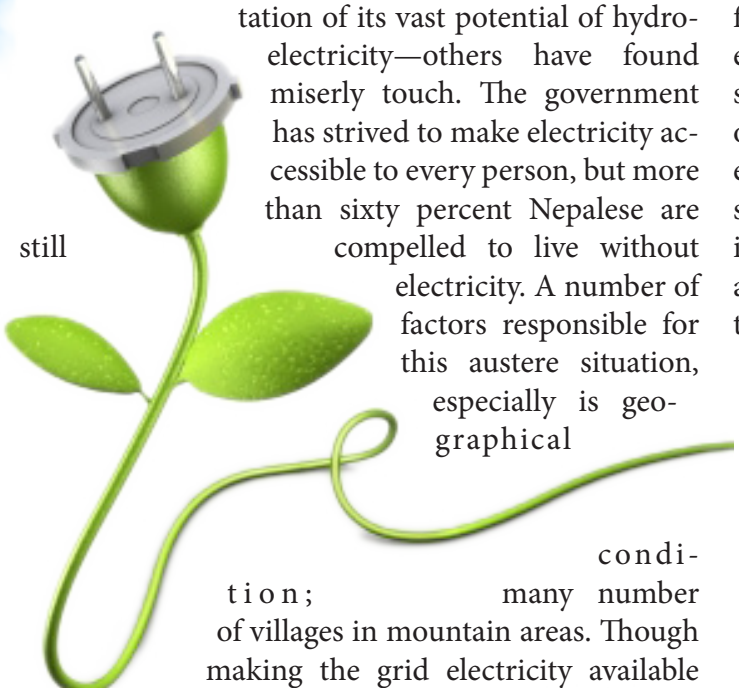
Technological Innovation

Ineluctable Step for Renewable Energy Development

Energy is indispensable component for socio-economic development of a country. Expected future growth of energy demand plays an important role in shaping technological innovations in renewable energy development to avoid dependency on global energy resources. Turning to renewable energy is the best alternative, since production of most part of energy relies on non-renewable sources of energy.

The fluctuation of oil price in the global-market directly influences the economy of energy-dependent nations. According to International Energy Agency, the world is still lagging to put the global energy system onto a more sustainable path. Global energy demand projection shows that it will grow by more than one-third by 2035. Consumption of fossil fuels has increased more than ever because of changing life styles—degradation has won over sustainable and conscious use. This scenario, if continues, will accelerate the vulnerability of climate change. Demand for coal has increased by half over the last decade, growing faster even than total available renewable energy. Despite the progresses achieved in the past years, nearly 1.3 billion people remain without access to electricity and 2.6 billion don't have access to clean cooking facilities (World Energy Outlook, 2012).

Metaphorically saying, Nepal has done a petite exploitation of its vast potential of hydro-electricity—others have found miserly touch. The government has strived to make electricity accessible to every person, but more than sixty percent Nepalese are still compelled to live without electricity. A number of factors responsible for this austere situation, especially is geographical condition; many number of villages in mountain areas. Though making the grid electricity available to those villages is not an impossible task but investments occurring in these projects, especially to NEA, are quite high—making investments to take existing loadshedding up to them.



Therefore, renewable energy is one of the apposite choice to mitigate the problems, but is unable to fully address those by existing technology; where technological innovation is crucial tool to shore renewable energy deployment. This tool is always linked to market opportunities and government policy. The rapid technological innovation plays vital role in cost reduction of renewable energy production and hence eases its commercialization. Market structure works as an important driver for innovation, for instance innovation in the bio-ethanol sector in Brazil was very much driven by low sugar market prices. In today's commercial market, innovation has not only become technology domain but also growing as a business realm.

"In today's commercial market, innovation has not only become technology domain but also growing as a business realm."

The issue of Renewable Energy is hot cake of today's market. But degrading status of conventional energy sources and current production trend of renewable energy have shown unsatisfactory results on fulfillment of global energy demand so far.

Hence, to overcome those barriers technological Innovation for renewable energy development is an inevitable step. The deployment of technological innovation over the renewable energy development has following benefits while delivering green jobs to the economy: mitigating climate change, promoting the sustainable energy development, commercialization of renewable energy into business domain, decreasing environmental impacts of energy supply, improving security of energy supply and use, decreasing health impacts associated with energy production and use, and fostering economic development and job creation.



Pratap Jung Rai
Industrial Engineer

Tata Nano : An Automobile Wonder

Good things come in small packages and today's technological world seems to be taking this a lot more literally. With smaller microchips, compact devices, iPads gradually replacing laptops, it looks as if small is the new large. The same can be said for automobile industry after the launch of the "World's Cheapest Car-Tata Nano", the name befitting its very compact infrastructure yet spacious interior, ultra modern yet cost effective features. The Tata Motors launched this range of cars as a result of the vision of the legendary tycoon Mr.Ratan Tata, owner of Tata Motors, whose dream to provide his country and its people an affordable luxury gave birth to one of the greatest feat in the history of automobile industry.

Cars and affordability don't normally come together but the Tata Motors, India's top industry with automobiles over the world and owning luxurious and sophisticated cars like Jaguar and land rover, made thispossible. Aspired to provide the average Indian an affordable yet much safer and comfortable commodity of transport, Tata motors decided to design a car which would sell for the same price as motorbike ensuring a huge market for sales in a country where only 1.5% own a car. The very idea of a car as affordable as a two wheeler, a 'people's car' earned Nano its USPas world's cheapest car.

Ratan Tata got mocked for this economically infeasible idea but the Tata Motors took it up as a challenge and delivered. The very journey from the proposed idea to the Nano entering the market was a trying

> "World's cheapest car… the cost was reduced by reducing cost of every individual component."

experience for the workers but an influential and impressive achievement for the whole automobile industry. A car with market value of $2500US is near to impossible for the amount of labor and materials it requires. But the Nano was built around the very initial figure without compromising its features. A mega factory with workshops and sky-bridges and a huge workforce tested the idea of this affordable car. The car design was deconstructed and again reassembled after reducing the costs. Many means were proposed and discarded to design the cost effective product. Fore.g. - The idea of car without doors was proposed for each door required at least two robots and manpower supervising it. But taking into notice the setbacks it would be causing in appearance and the whole sales figure, the idea was discarded. Constructive ideas with low cost production rates were approved and they put back the conventional methods to rest for better results. For e.g.-the engine normally at the front was put under backseat to make car spacious. The engine itself was highly cost effective for it used two cylinders than four which was traditional method but few modifications and addition of crankshafts removed the flaws for which the design was discarded for more than a century. A vigorous two years work still caused loopholes and their first prototype was 40% above budget. But the cost was reduced by reducing cost of every



individual component e.g. by using the cheaper but stable materials. The body of the car was steel because of the nature of roads and the pressure and possible damage it might face. The Nano was made for safer travel and keeping cost in mind they modified the collapsible steering column by making only a part of it so that in face of crash the front would bear much effect and the rear end with passengers would be safe. With all the construction rates highly reduced and the Nano design complete Tata Motors finally showed the world its achievement, a 'people's car' which looked modern and stylish yet could easily blend with the common man's need.

Though currently Tata Nano's USP has proven to be a setback in its sales as people hesitate to buy a cheap car, the very concept of an automobile industry owning luxury cars, expanding its market to the average people and catering to their needs is commendable. The Tata Motors are modifying Nano for other countries to suit the needs of the market there. Tata Nano launch was a very progressive strategy that not only ensured people's best interest but also provided a large market for expansion of the automobile technology.

In a populated fast growing country Tata Nano's launch was most appropriately timed. In Nepal, the populations are being more prone to technology and the industries should apply the strategy of Tata Motors: analyze the market needs and plan and design accordingly to assure economic stability in the field of industry. The industry should target the larger crowds and take into consideration their actual needs and have a long term vision for the products they would sell to the market.



Riti Newa
BIE 070

dustrial engineering is not basic engineerng but an
r diciplinary engineering "

"Facilitating Nepalese Businesses Become Globally Competitive"

FNCCI
(Estd. 1965)

FNCCI's Network

	Members	Number 2023 BS	Number 2070 BS (Poush)
A.	General		
	— District / Municipality Level Chambers	21	96
	— Commodity / Sectoral Associations	2	89
B.	Associate (Company, Corporation, Bank, Industry)	21	607
C.	Bi-national Chambers	–	20
	Total Members	44	812

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OCCUPATIONAL SAFETY & HEALTH

Workers often face health hazards like dust, noise, gas, vibration, extreme temperatures, and others in the workplace. These hazards can lead to accidents and other diseases. Work related accidents and diseases are common when employers assume little responsibility for the employee's safety.



The human, social, and economic costs associated with the occupational accidents and diseases are significant. Measures and strategies have been developed, and applied over years, to eliminate, control, or reduce occupational hazards at the source. Today, a separate discipline has emerged in this field, "Occupational Safety and Health" (OSH), which aims to prevent workplace death, injury, and illness.

According to International Labor Organization (ILO), more than 2.3 million people die of occupational accidents and work related diseases every year. Around 317 million accidents occur on the job annually. In Nepal, about 20,000 workers meet accident at work causing deaths of 200 workers each year. The effects of such accidents are undesirable for both the employees, and employers.

This scenario shows the necessity for the prevention and control of accidents so that people can accept the work. OSH is a science that helps in anticipation, recognition, evaluation, and control of hazards that arise in or from the workplace and have impacts on

workers, surrounding communities and the general environment. A hazard introduces the potential for an unsafe condition, possibly leading to an accident. Hazards do exist in any industry, and sometimes they are inseparable part of a process. So, they must be eliminated, controlled, or reduced whenever possible. According to their form and nature, hazard can be classified as Physical, Biological, chemical and psychological hazards

These hazards exist in workplace due to unsafe working conditions; lack of supervision and training; use of outdated technology and machineries; lack of proper maintenance and negligence by managers and staffs in safety rules.

The hazards should be identified so that they can be controlled. Hazards can be identified by Safety inspection, Complaints, Staff meetings, Observation and Record of past injury and illness



After hazards identification, the risk associated with each hazard has to be determined. A risk is the probability of a hazard to result in an accident. Risk assessment done by comparing the possibility of an accident to occur due to a hazard and its severity in terms of physical injury and costs. After risk assessment, hazard control steps carried out should be in the following order:

- Eliminate the hazard
- Substitute the hazard
- Isolate the hazard
- Use engineering controls
- Use administrative controls
- Use personal protective equipment

"In Nepal, about 20,000 workers meet accident at work causing deaths of 200 workers each year"

A healthy working environment not only ensures the safety of the workers but also enhances the overall productivity and quality of the product. It reduces employee injury and illness related costs including medical care, sick leave and disability benefit costs. It saves accident costs which include medical payments; compensation; overtime for replacement workers; production delays; product damage; training of replacements; accident investigation cost; equipment damages and business interruptions. It reduces employee turnover and increases their satisfaction. It creates a better image of the brand in outside world and helps to sustain business.

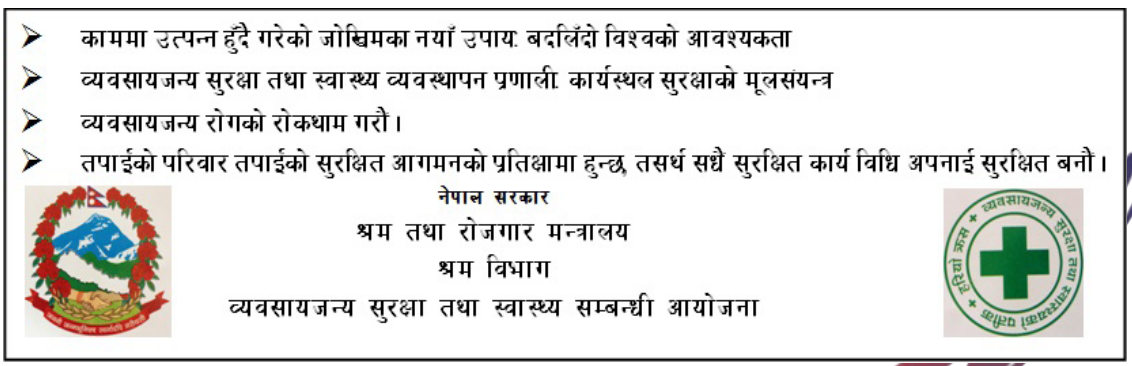
"The Occupational Health and Safety Act" which came into force in 1979, provides a legal framework to achieve safe and healthy workplace. The act sets out the rights and duties of all parties in the workplace. The employers have the greatest responsibilities for workplace health and safety. It also provides for enforcement of the law by workplace parties.

Since all the workplace parties are equally responsible for safe workplace, they should work together in policy formulation and implementation. Providing formal training and orientation to employees, managed workplace layout, proper maintenance of machineries, safety incentive programs, periodic situational survey and hazard analysis, use of modern technologies are the strategies applied in order to obtain and maintain a safe workplace:

Occupational safety and health is, thus important to promote physical, social, and mental well being of workers in all occupations. So, the implementation of safety measures in any process given should be due importance by related parties.



Anil Lama
BIE 067



Challenges of FDI in Nepal

Nepal has been emphasizing foreign investment by lifting the control on foreign investment and providing many facilities. The Foreign Investment and Technology Transfer Act 1992 was enacted in line with open and liberal economic policies. The aim of the Act is to attract and bring in foreign investment in the form of equity participation, direct investment in domestic production, reinvestment of the earnings derived from such investment, and transfer of technology, among others.

But, Nepal could not attract significant amounts of foreign investments. Traditional attraction i.e. cheap labor is becoming less important in investment decisions in the current world economic order. The country can no longer count on low labor costs alone but also needs high-quality, productive labor to sustain its comparative advantages. Multinational corporations looking to invest not only take for granted the presence of state-of -the art FDI (Foreign Direct Investment) policy frameworks and a range of business facilitation measures. They also seek a combination of cost reduction, larger markets, and 'created assets' that can help them maintain a competitive edge. Created assets include communications infrastructure, marketing networks, technology, and innovative capacity and are critical for enabling firms to maintain their competitiveness in a rapidly changing world. Most of these facilities are lacking in Nepal.



FDI in small economies normally concentrates on production for export. However, in Nepal's case, this is hampered by a lack of natural and human resources (as regards the latter, a scarcity of educated manpower and acute shortages of advanced managerial, accounting, and technical skills). With respect to infrastructure, Nepal does not compare favorably with many other developing countries in terms of power and water supply, telecommunications and transportation. Moreover, the country is geographically disadvantaged (land-locked) and cannot offer the cheap and efficient transportation facility as demanded by foreign companies.

> "The forced closures and threats of closure of companies hurt the commercial interests of foreign investors in Nepal."

The forced closures and threats of closure of companies (including foreign joint ventures) has continued to hurt the commercial interests of foreign investors in Nepal, deterring future investment in Nepal's economy, affecting the prosperity and opportunity of all Nepalese. Moreover, unfavorable labor laws and politicking of industrial sector by the political parties have had very bad impact in growth performance of business and industries over the years. Beside this, security is an underlying condition required to attract FDI. Political instability, poor policy, arbitrariness in dealing with companies, corruption and insecurity are the other reasons for prospective investors opting to stay out. Security is an underlying condition required to attract FDI.

कल इन्डिया...
मात्र रु. २.९० प्रति मिनेट
साथै कतार, साउदी अरेबिया,
यू.ए.इ., बहराइन र कुवेतमा फोन
गर्दा अब मात्र रु. १२ प्रति मिनेट ।
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Santosh Jha
BIE 067

NEPALESE INDUSTRIES AND ENERGY AUDIT

Energy Management Project, Ministry of Industry in co-ordination with Department of Industrial Engineering, Thapathali Campus, recently held a training, later aided with a field visit, especially targeted to the Industrial Engineers. While discussing along over energy status in Nepalese industries, the training led us to the depths of energy auditing and its techniques.



In Nepal, nearly 3500 industries have been running, including medium and large Industries, utilizing 3140000 million KCal (Approx.) of energy annually (Centre of Energy Studies). Devices and systems that are frequently used in the industries: Boilers, Furnace, Kiln, Motor Drives, etc. and related processes like melting, lightening, condensation, etc. needs huge amount of energy (requirements are currently met basically with NEA's electricity and DG Sets.)

Leakage of energy from those instruments, leakage in internal transmission within the industry, load shedding, and effect of fluctuating energy in instrument, inappropriate power-distribution system's techniques and time, unproductive and maximized use of energy are the major hurdles on energy use by industries: the direct consequences being increased production and operating costs, quality degradation and adverse effects in the environment—demoralization and ultimately dissolution of industries in some cases. Relying on these facts it is quite clear that Energy audit is bulging issue to be discussed which plays key role in Energy management in industries.

What actually is Energy Audit?

The Energy audit is the basis for decision making in the area of energy management. As per the Energy Conservation Act, 2001, Energy Audit is defined as "the verification, monitoring, and analysis of use of energy including submission of technical report containing recommendations for improving energy efficiency with cost benefit analysis and an action plan to reduce energy consumption". Energy audit thus helps industries to analyze their energy use and discover areas where energy can be reduced and waste can occur, and plan and practice feasible energy conservation method that will enhance their energy efficiency.

How is Energy Audit done?

Generally auditing is done in three steps of action:

In the Pre-auditing phase, the initial site visit and preparation required for detailed auditing is done. The auditors discuss with the site's senior management and then analyze the major energy consumption data with the relevant personnel.

In the audit phase, they analyze the historic data and collect the baseline data, prepare flow and process chart along the way they collect operating data and schedule of operation. Different parameters for energy efficiency measurement are measured with devices such as Multi-meter, Combustion analyzer, Fuel Efficiency Monitor, Contact thermometer, Infrared Thermometer, Water flow meter, tachometer etc. After this, sources of waste streams and energy wastages are identified. Along with this, Identification of energy conservation opportunities such as in the sector of fuel substitution, energy generation, energy distributions, energy usage by processes are defined. Their technical and economic feasibility is tested by various measures such as energy efficiency measure on safety, quality, production or process,



maintenance requirements and spares availability, cost benefit analysis, payback period etc. A number of potential energy saving prospects is thus identified. These measures are classified into categories such as low cost-high return; medium cost-medium return; high cost; high return and are reported and recommended to top level management.

At the post audit phase the suitable plan of reducing the energy use or the cost on energy is implemented, backed up by continuous monitoring.

Is Energy Audit really beneficial?

Here is an example of textile process industry that replaced furnace oil in boiler by agro-fuel (coconut chips) after the energy auditing.

Types of Fuel Firing		
Parameters	Furnace Oil Fired Boiler	Coconut Chips Fired Heater
GCV	10,200 KCal/kg	4200 KCal/kg
Avg. thermal Efficiency	82%	72 %
Heat duty	15 lakhs KCal / hr	15 lakhs KCal / hr
Operating Hours	25 x 12 x 24 = 7,200	25 x 12 x 24 = 7,200 hrs
Annual Fuel Cost	Rs.130 lakhs (7200 x 1800)	7200 x 700 = 50 lakhs

Annual Savings = 130 - 50 = Rs.80 lakhs
Additional Auxiliary Power + Manpower Cost = Rs. 10 lakhs
Net Annual Saving = Rs. 70 lakhs
Investment for new heater = Rs. 35 lakhs
Simple pay-back period = 6 months
(Source: Bureau of Energy Efficiency)



Dinesh Ayral
BIE 068

नेपालमा सौर्य ऊर्जा (Photovoltaic) प्रणाली कार्यान्वयन सम्बन्धी संक्षिप्त जानकारी

वैकल्पिक ऊर्जा प्रवर्द्धन केन्द्र नेपालमा नवीकरणीय ऊर्जा प्रविधिहरुको प्रवर्द्धन गर्ने केन्द्रीय निकायका रुपमा कार्यरत छ। नेपाल सरकारले अन्य माध्यमबाट विद्युतीकरण नभएका ग्रामिण क्षेत्रहरुमा सौर्य ऊर्जा मार्फत् विद्युत सेवा पुचाउने नीति लिएको छ। यस्ता सौर्य ऊर्जा प्रणालीहरुमा प्रयोग हुने सामान एवं उपकरणहरुको उत्पादन, आयात, गुणस्तर परिक्षण र जडान सम्बन्धी निम्न प्रक्रियाहरु रहेका छन्:

(क) उत्पादनको प्रारम्भीक परिक्षण (PIT): नेपाल फोटोभोल्टेक गुणस्तर मापदण्ड २०१३ (NEPQA 2013) मा उल्लेख भए अनुसार जडान हुने प्रत्येक नयां सौर्य ऊर्जा प्रणालीबाट विद्युत उत्पादन गर्न प्रयोग गरिने सौर्य पाता, व्याट्रि र अन्य उपकरणहरु आयात/ उत्पादन पछि नेपाल विज्ञान तथा प्रविधि प्रज्ञा प्रतिष्ठान अन्तर्गतको नवीकरणीय ऊर्जा परीक्षण केन्द्र (RETS) मा गुणस्तर परिक्षण गर्ने प्रावधान रहेको छ।

(ख) गुणस्तर परिक्षणमा पास भएका सौर्य ऊर्जा उत्पादनमा प्रयोग हुने सामान एवं उपकरणहरुमा आर्थिक अध्यादेश २०७० अनुसार भन्सार तथा मूल्य अभिवृद्धि कर छुट हुने व्यवस्था छ। आयात गर्न ईच्छुक सौर्य ऊर्जा कम्पानीको निवेदनको आधारमा भन्सार तथा मूल्य अभिवृद्धि कर छुट दिन वैकल्पिक ऊर्जा प्रवर्द्धन केन्द्रले सम्बन्धित निकायलाई सिफारिस गर्दछ।

(ग) उत्पादनको प्रारम्भीक परिक्षण (PIT) पास भई आयातीत सौर्य ऊर्जासँग सम्बन्धित सामान एवं उपकरणहरुको आयात/ उत्पादन पछि फाट्टफुट्ट रुपमा नमूना परिक्षण (Random Sampling Test- RST) गरिन्छ। RETS ले यस्तो परिक्षणमा पास भएका प्रणाली तथा उपकरणहरुको क्रम संख्या (Serial Number) सहित वैकल्पिक ऊर्जा प्रवर्द्धन केन्द्रमा पठाउँछ।

(घ) उपभोक्ताले प्रणाली जडान गर्ने कम्पनीबाट जडान गरिएको प्रणाली अनुसार १ वर्ष निःशुल्क बिक्रि पछिको सेवा सुविधा पाउँछन् साथै सोलार प्यानलमा २० वर्ष, चार्ज कन्ट्रोलरमा २ वर्ष व्याट्रिमा ३ वर्षको ग्यारेन्टीको प्रत्याभूति कम्पनीले दिनेछ। सोको लागि उपभोक्ताले आफ्नो घर वा संस्थामा प्रणाली जडान गर्ने कम्पनीमा सम्पर्क गनुपर्छ।

(ङ) RST पास भएका सामान एवं उपकरणहरु नेपाल सरकारको नवीकरणीय ऊर्जा अनुदान नीति, २०६९ र नवीकरणीय ऊर्जा अनुदान परिचालन कार्यविधि, २०७० अनुसार मान्यता प्राप्त कम्पनीहरु मार्फत् उपभोक्ताहरुको मागका आधारमा जडान हुन्छ। जडान गरेपछि तोकिएको ढाँचामा भरिएको अनुदान फारम केन्द्रमा बुझाएपछि मान्यता प्राप्त कम्पनीहरु मार्फत् नै अनुदान रकम उपभोक्तालाई उपलब्ध गराउने व्यवस्था रहेको छ। यसरी जडान भएका प्रणालीहरु मध्ये केन्द्रले हरेक वर्ष कम्तिमा १० प्रतिशतको फाट्टफुट्ट अनुगमन गर्ने प्रावधान छ।

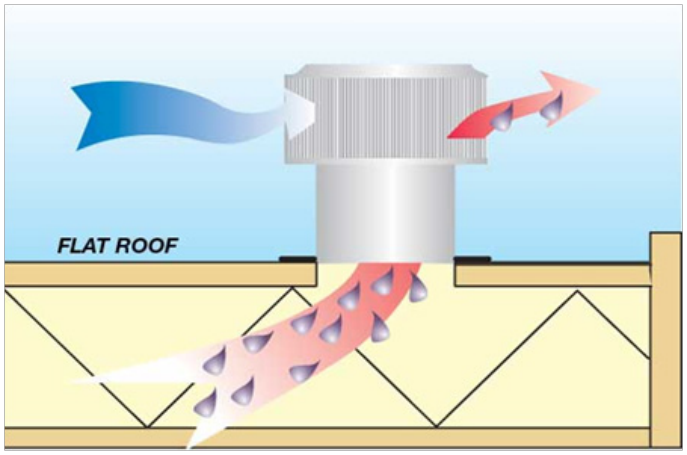
सौर्य ऊर्जा प्रणाली तथा अन्य नवीकरणीय ऊर्जा प्रविधि, प्रविधि जडान, अनुदान तथा अनुदान परिचालन प्रक्रिया, गुणस्तर नियन्त्रण र अन्य थप जानकारीका लागि जिल्ला स्तरमा जिल्ला विकास समिति अन्तर्गतको वातावरण, ऊर्जा तथा जलवायु परिवर्तन शाखा वा केन्द्रिय स्तरमा निम्न ठेगानामा सम्पर्क गर्न सकिने व्यहोरा जानकारी गराईन्छ:

नेपाल सरकार
विज्ञान, प्रविधि तथा वातावरण मन्त्रालय
वैकल्पिक ऊर्जा प्रवर्द्धन केन्द्र
खुमलटार, ललितपुर
फोन: ०१ ५५३९३९०, ५५३९३९१, ५५२२८८७, फ्याक्स: ०१ ५५४२३९७
ईमेल: info@aepc.gov.np , वेवसाईट: www.aepc.gov.np

Airvent Turbines: A perfect Ventilation solution for Nepalese Industries

Comparatively, Industrial structures are bigger than the residential one. The need of Ventilation arises to circulate sufficient amount of air to maintain a normal working environment inside the gigantic industrial buildings. Use of typical exhaust fans to maintain ventilation is common in most of the factories. But these obsolete fans are energy consuming and boisterous. Predominantly, for a power- starved country like Nepal where electricity is so scarce and expensive, Airvent turbines could be a boon since these devices requires no electricity at all.

Temperature rises quickly inside the majority of the industrial constructions mostly due to their metal roofed structure and heat produced by the machines inside it. Therefore, an effective exhaust system has to be maintained to develop a suitable working environment inside. Moreover, in the structures like go downs, warehouse, stores etc. for storing goods, the rise in temperature and lack of air circulation may damage the quality of those goods. Hence, air circulation is very crucial.



The electricity consumption by a single exhaust fan of 100 Watt seems to be considerably a smaller amount. But, think about a 100 number of such fans running 24 hrs a day in an industry, you might wonder because it consumes 10 units of electricity per hour and 240 units per day. With the average cost rate of electricity per unit as NRs 7 charge the price of electricity accounting NRs 1680 per day just to run the ventilating system. Unfortunately, we don't have continuous grid supply and flexibility to drive our exhaust system during the load shedding hours.

One solution to the encountered problem can be the Diesel Generator (DG). What's then? The operating energy cost it creates will be dramatically sore since per unit electricity cost for DG costs over NRs 30. Consequently, the overall running cost of your exhaust system increases by four folds. Furthermore, the noise produced creates issue of ergonomics in the industries. Thus, a more effective ventilation solution is a dire need and so Air Vent Turbines could be the best alternative.

Airvent Turbines are the best eco-friendly, cost effective and efficient ventilation devices being used around the world. In simple words, an air vent turbine is a wind turbine that has got a couple of metal vents or blades which use the natural force of wind and air pressure to spin at the wind speed and vent out the hot & stale air inside a structure. The pressure of the hot air inside the structure where it has been installed, further adds gear on its rotary motion. Due to the rotary motion, it pulls out the hot, humid and stale air inside. These devices are especially made round shaped and can be fitted at the roof top of industries, go downs or even on personal homes to provide an effective ventilation.

Airvent turbines are the best non-electric alternative to the traditional ventilation system because this choice offers you salvation from the high electricity charge and effect caused by load shedding problem.

Experiments have shown that, even a 12 inch diameter turbine can remove over 300 cubic ft of hot air per minute with a minimum wind speed of 5 miles per hour. And, the bigger sized turbines (18 inch or bigger) can remove over 1000 cubic feet of hot air per minute. Interesting fact is that even if there is no wind to drive the turbines, they still allow hot air to rise through the open flaps of the turbine.

Some major benefits of Airvent Turbines can be highlighted as:

- No electricity or any source of power required.
- Low- Installation cost (pay back within a year)
- Around the year ventilation
- Maintenance free (Aluminum or Stainless steel made)
- Eco-friendly (no carbon emission)
- Noise free quiet operation.



Surendra Sangachhen
Industrial Engineer

Hero





चित्रमा देखाइएका एसेसरीज यत्र बाइकसँग उपलब्ध नहुन सक्दछ ।

Hero 50 MILLION CELEBRATIONS

हाम्रा बाइकहरू टिकाउ छन् र अब वारेन्टी पनि त्यस्तै

तपाई चाहनु हुन्छ आफ्नो जीवनमा हरेक चीज बढी प्राप्त होस् - हिरो पूरा गर्छ त्यस्तो चाहनालाई आफ्नो विश्वस्तरीय गुणस्तरको आधारमा । अब हिरो पेश गर्दछ ५ वर्षे वारेन्टी, नेपालमै पहिलो पटक । यस्तो प्रस्तुति सम्भव छ मात्र हिरो जस्तो कम्पनीबाट जस्का ५ करोड बाइक विश्व सडकमा गुडी रहेका छन् ।

- अद्वितिय माइलेज
- भरपर्दो विश्वसनीयता
- बेजोड तथा आकर्षक बनावट
- किफायती संचालन र रेखदेख
- उच्चतम पुनर्बिक्री मूल्य

RIDE SAFE • ALWAYS WEAR A HELMET

*शर्तहरू छन् । वारेन्टी अवधिः ५ वर्ष वा मोटरसाईकलको लागि ७०,००० कि.मी./स्कूटरको लागि ५०,००० कि.मी. जुनसुकै पहिलो हुन्छ । १० जनवरी तथा त्यसपछि बिक्री भएका सबै नयाँ हिरो बाइकहरूमा यो वारेन्टी लागू हुनेछ । हिरो मोटो-कर्पका अधिकृत विक्रेता नेपाल जेनरल मार्केटिङ्ग प्रा. लि. तथा NGM का अधिकृत डिलरहरू मार्फत मात्र यो वारेन्टी प्रदान हुनेछ ।

रजिष्टर्ड कार्यालयः हिरो मोटो-कर्प लिमिटेड, ३४, कम्यूनिटी सेंटर वसंत लोक, वसंत विहार, नयाँ दिल्ली - ११००५७, भारत, वेबसाइटः www.heromotocorp.com
अधिकृत विक्रेताः नेपाल जेनरल मार्केटिङ्ग प्राइभेट लिमिटेड, ज्योति भवन, १९११, कान्तिपथ, जी.पी.ओ. बक्स नं. १३३, काठमाडौं, नेपाल

Kathmandu Valley Kantipath 4225377, 4266517 • Buddhabari 4104540, 4104541 • Kumaripati 5008710, 5008711 • Putalisadak 4435155 • Balaju 4361786 • Balkumari 5006184 Chabahil 4482395 • Tinkune 4466886 • Gyaneshwor 4428970 • Balkhu 4281908 • Jorpati 4912006 • Swoyambhu 4289737 • Bhaktapur 6613112 • Trisuli 561421 Gatthaghar 6638444

Outside of Valley Birtamode 543248 • Damak 581463 • Itahari 580066 • Biratnagar 524350 • Biratnagar 440470 • Dharan 526600 • Dharan 526522 • Inaruwa 561498 Gaur 521109 • Biratchowk 545227 • Rajbiraj 520442 • Bardibas 550552 • Lalbandi 501628 • Golbazar 540327 • Mircharya 550803 • Janakpur 523644 Jaleshwor 521095 • Lahan 560955 • Siraha 520442 • Chandranigahapur 540739 • Birjunj 529667 • Birgunj 522772 • Hetauda 9855060386 • Parsa 583199 • Baratpur 526697 • Narayanghat 532567 • Gaidakot 502399 • Kawasoti 541001 • Nawalparasi 521002 • Butwal 542725 • Bhairahawa 524290 • Bhairahawa 523930 • Pokhara 539389 • Pokhara 537333 • Baglung 520174 • Damauli 560477 • Kapilbastu 550160 • Dang 560262 • Nepalgunj 551598 • Surkhet 525196 • Tikapur 560426 Dangadhi 522484 • Attaria 551244 • Mahendranagar 520745 • Guleria 420608 • Waling 440610 • Tulsipur 520808



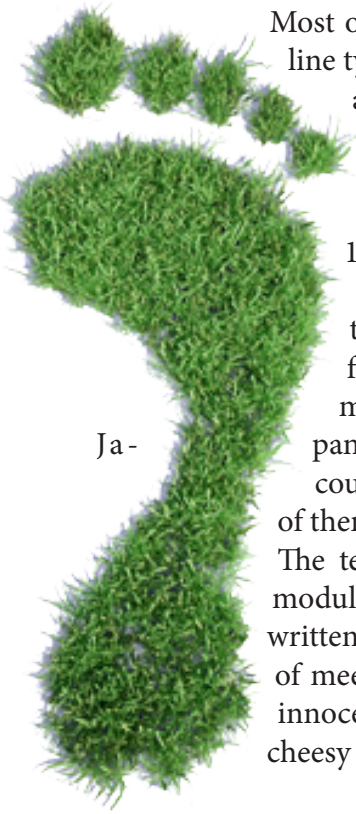
"Purchasing greener SBS is very complicated and almost not possible in a low trust market of Nepal"

Is your solar backup system promisingly green?

Not every solar backup system buyer is an engineer. It turns out that, they must be a sharp minded engineer to purchase green solar backup systems (SBS) in Nepal. After five years of my involvement in solar projects, I have come to learn that the whole process of purchasing greener SBS is very complicated and almost not possible in a low trust market like Nepal.

You won't believe there's a horrible situation in the market. Now I find wrong with everything, from SBS components to the installation process. Let's discuss in detail and start with the module.

Are they really what they say?



Most of the suppliers offer polycrystalline type module in the market, which are rated with certain efficiency (always written perfect in sticker back of module), and expected to meet minimum 12% efficiency but they barely satisfy the compliance. Comically, the sticker of most of the panel found in Nepal is seen either made in Germany or Italy, USA, Japan or the name of other developed countries whereas the reality is 99% of them are either from China or India. The testing authority of GON knows modules are not perfect as they are written in sticker, yet they get certificate of meeting the compliance. Buyers are innocent and easily cheated with this cheesy sticker.

What's wrong with hybridizing PV and Grid supply?

There's a big circus in market for hybridizing Solar PV with grid lines. Buyers choose to hybridize for two reasons: one reason is that the system price gets low as PV size decreases in hybridizing and another is that people want to get power even in bad weather days. Same reasons create opportunities to the suppliers to sell more systems in price competitive market. Some suppliers offer X price for Y capacity stand alone system whereas other offer X/2 prices for same promise capacity as Y so that client is compelled to choose hybrid systems. But the reality is that hybrid systems are not of promised capacity since solar panel current and inverter supply current are not of same nature and same strength. When there's grid line, only grid current goes to battery since it's stronger than solar current and solar PV current gets chance only if there's no grid line. Making the calculation, the chance of charging with solar PV in hybrid system goes down to only 40% of total production.

Devil on town

Common brand inverters found in Nepalese market is the main culprits behind Solar Backup Systems failure. They just have 70% -75 %, which ultimately consume major amount of the current produced by solar PV in system smaller than 200 Watt power in 24 hours. To simplify, let's say you have installed 200 WP panel which theoretically produce 55 ampere current in 5 hours of good sunshine, but your inverter make operational loss of 1.5 ampere (in 1500 VA) in a hour which amount to 36 ampere of loss in 24 hours . Now you have only 19 amperes left for use which is only sufficient to run 40 Watt light for five hours. Your expectation to run lights, TV, computers, etc. at a time become just a nightmare.

Towards zero



Parkash Acharya
Industrial Engineer

"The three powerful words starting from 'E' has always drawn my attention and driven my passion. Those three words which I always found completely sensible to dream, innovate, act and enjoy. I believe change can happen and I can take lead with/ for ENERGY-ENVIRONMENT-ENTREPRENEURSHIP."

Do small things make big difference?

Apart from solar module, battery, Charge Controller and Inverter, there are also small accessories like wires, LEDs, nut bolts, washers, etc. associated with the system which are even more vital to keep system effective.

DC wires used in the system must be of copper with good thickness. But buyers are quite unknown about the copper coated iron wires popularly supplied in the market. Technically, the resistance of iron wire is about seven times than that of copper wire of the same dimension. A potential difference of 10 V causes a current of 2A to flow through a copper wire but iron wire allow only 2/7 A to flow for the same potential. That means, we are losing 5/7 amount of current using copper coated iron wire.

Stainless steel alloys and other metal clamps, lugs, washers, nuts and bolts, etc. have also been known to cause problems with electrolysis and high resistance. There is a negative belief about latest LEDs with enough metal heat sink because people think the LEDs introduced earlier in the market didn't have any heat sink but had impressive brightness, which gave a thinking to Nepalese people that the first one was original one. In reality, LEDs are adversely affected with high temperature, so it needs enough metal heat sink.

Only proper installation guarantees good power output.It doesn't require an engineering certificate or education degree to sell and install solar backup system in Nepal. Because of propaganda about solar PV technology, system design and quality flows, buyers are confused about which one is right and which one is wrong.

It is very unpleasant to see some panels oriented to the west while they need to be inclined towards south. Sometimes they are placed in such a way that they come under shadow of tress, hay tower (Tauwa) or clothes while drying. This will stop panel producing enough energy as rated.

I wonder how many of the technicians are aware that battery produces harmful fumes shouldn't be strictly placed in closed room. They require good airflow. Some charge controller has pre-setting at 11V for cut-off while they need to be setup at 11.6V since early Voltage cutoff assures long life of battery. The supplier choose to cheat, for not listening to the "no light" complain by making low cut off Voltage setting and allowing the light even charge is low and weather is bad.

What now?

Here is the checklist to have greener, cleaner Solar PV backup systems.

1. Are your solar panels oriented towards south at 35 to 40 degrees inclination? Yes.
2. Are they not affected by any sheds and shadows? No.
3. Use magnet to identify if they are using really copper wire or iron wire with copper coating.
   Does it stick to wire? No.
4. To find out if the panels are not faked, go to their website and see whether such brands really exists or not? Yes.
5. Use of battery SS / Copper cable shoe and nut bolt. Yes.
6. Your backup systems are placed in an open space with enough airflow. Yes.
7. Do your LEDs have enough metal heat sink? Yes.
8. Avoid the backup system "culprit" inverter if your need is only light, and if you choose to run other gadgets, do not hesitate to pay more for high efficiency inverters. OK

It may be quiet complicated to entertain all queries at central level, so every district must have an energy unit to help simplifying the solar system installation process and assuring good SBS.

Prof. Dr. Govinda Raj pokharel



1)How do you define industrial engineering and what an industrial engineering graduate capable of?

Industrial engineering is defined as a branch of engineering dealing with the optimization of complex processes especially in the industrial sector. It is mainly related with the conceptualization, development, improvement, implementation and evaluation of integrated systems of money, human resources, knowledge, information, energy, materials, analysis and synthesis.

The industrial engineering encompasses mathematics, physics and social sciences together with the principles and methods of engineering design to innovate, specify, predict, and evaluate the results to be obtained from such systems or processes. In this regard, an Industrial Engineer must be capable to address the complex problems faced by the sector and come up with optimized solutions.

2)Being a mechanical graduate what influenced you to introduce Bachelor in Industrial Engineering in Nepal?

Mechanical engineering is a general subject. In our country, many people don't go for master degree and PhD but they serve directly to the sector after graduation. We need human resources that can focus on the complex problems even after the bachelor degree in our country to enhance our industrial base and economic development. That is why the idea of industrial engineering education concept came to our institute.

3)How far do you think your visualization for industrial engineering has been achieved since its establishment?

Nothing is perfect in this world. Despite narrow political interferences and vested influences which have very badly impacted our education system, we should be proud to see the progress achieved by our graduates so far. We could have done excellent but we should not be disappointed and depart from our objectives and goal. We should be optimistic; things will be better in future and we should be happy for whatever we have achieved so far. But we need to try for better, of course, by bringing all stakeholders together.

4)It has been 5 years since the first batch of industrial engineering has been graduated out, but still there is no call for vacancy for industrial engineers from the government. What do you think the reason behind this?

Here we are weak in lobbying and convincing government about the broader goal of having industrial engineers in Nepal. We have not been ableto convince the establishment that our badly suffered industrial sector needs capable industrial engineers, especiallythe from government side to guide and facilitate the sector. I Hope, one day we will



5)What further steps should be taken to improve the standard of industrial engineering?

Of course, better faculty, equipped lab, exposure to new and diverse industrial issues in theory and practical, and updated syllabus are the basic requirements to enhance the quality of our course.

6)At last few words to conclude, what do you suggest to industrial engineers, students and stakeholders?

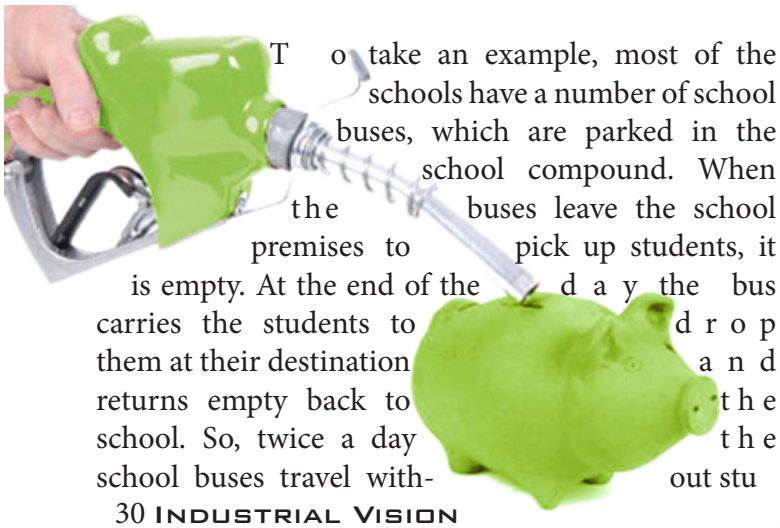
Be more dynamic, learn recent issues and development,and update yourselves with the latest technologies. Have more disciplined and organized Internship in the industries. Administration should extend their hands for further collaboration with industries so that the importance and utilization of IE can be recognized by the society.

Energy and traffic manag

(Save time,

The energy crisis in the country merits more than the necessary focus. We have often been discussing the energy catastrophe in our country, because of the vast difference between the supply and the existing demand. The country has been importing petroleum products from others countries and, at the same time, we have been importing vehicles and two-wheelers in large numbers from different countries. This has meant heavy use of foreign currency to pay for them. In this context, the country has limited number of roads, yet it is a matter of fact traffic management makes a dismal show. The need, therefore, arises to point out some of the issues regarding this.

It has been observed in our context that especially during the rush hours, the water tankers, school buses and solid waste carrying trucks have been playing every day of the week on the overcrowded roads. This results in severe traffic jam which ultimately leads to a great waste of fuel. With all types of vehicles, the big and small ones use the same narrow roads. Travelling in the city area is fraught with a great number of problems. In this context, the urgent need is to adopt and implement appropriate traffic management principles, the domino effect of which would lead to massive energy saving opportunity.



To take an example, most of the schools have a number of school buses, which are parked in the school compound. When the buses leave the school premises to pick up students, it is empty. At the end of the day the bus carries the students to drop them at their destination and returns empty back to the school. So, twice a day the school buses travel without students. That is to say the buses travel half of the time empty, and they add to the traffic jam twice a day with students in them and twice without students. Now, the question is: Is it necessary to park the buses inside the school premises? If they park the buses at the end of the day in the school compound, the reason obviously is security. We are familiar about the private school association, and it can work to arrange inter-school parking arrangements. The result will be that the schools concerned will be able to save much on fuel, operation, and maintenance costs and cities can have fewer jam leading to massive fuel saving that means saving on foreign currency and, of course, less air pollution.

Now, the traffic rules should be such that the water tankers and waste carrying trucks are not permitted to move in the core city area during rush hours. In this context, massive awareness programme is necessary among the schools, municipalitities, and water supply truck associations, and so on. Initiative could also be taken to make the office and school time different. That way the traffic on the roads at any given time would be lower than at present.

It is also essential to change the taxation of vehicles different. The higher capacity vehicles and two wheelers should be made to pay a higher tax. Within Kathmandu valley, as an engineer, the 200 cc two-wheelers and 3000cc luxury cars makes no sense but only result in over speeding and accidents. There are no such roads here for such vehicles to move with economy, which means that their fuel consumption and operating cost is higher. There are self-starting two wheelers these days, but no one turns off their engine during red light stoppage. These are simple ways to save on fuel resulting in less air pollution.

On the highways, the trucks ply with more than their carrying capacity, since there are limited numbers of checking. This has resulted in damaging the roads besides the lower life span. Moreover, much has to be spent on imported spare parts. It is a crime against the country. We should take strong action against them

Bhishma Pandit
Senior Energy Expart



by making relevant policies and rules. In this context, the regular traffic jam from Naubise to Kathmandu is due to worn out vehicles and the bad road conditions. It also adds to the loss of thousands of liters of fuel. What could be done is to allocate different timing for the cargo trucks and passenger vehicles for travel between Naubise and Kathmandu so that less traffic jams would be the result.

It is also necessary to allocate parking lots for the cargo trucks and buses in the Naubise-Kathmandu sector. Now, who will take the initiative in this context? I think not only the traffic police, but also the truck owners' association, driver associations and other transport associations should take the lead in resolving these issues. Again, massive awareness campaigns are necessary for the truck owners, drivers, traffic police and other stakeholders as well.

It is also necessary to come up with some slogans for saving fuel. The traffic police should go for proactive role to organize the training programmes for drivers in general. The municipalities should also fix the waste collection and disposal timing in such a way that the rush hours are avoided. These few suggestions would be the start for energy saving, optimum utilization of fuel, fewer spare part replacements for vehicles, and less air pollution, among others.

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Anthropocene

Doom in the Waiting

Thousands of years ago when ice age came to an end, human beings evolved as hunters, then farmers and now are builders of cities and civilizations. It marked an end to the Pleistocene epoch and initiated the Holocene epoch which boasted warmer and much stable climate for the humans to prosper. In general, epochs are subdivisions of Earth's geologic timescale. The transition from one epoch to the other is normally characterized by events such as mass extinction viz. dinosaur extinction, change in the composition of sedimentary rocks or shift from one climate paradigm to the other.

The belief of human beings that planet earth boasts an infinite source of resources and an infinite sink for our wastes have led to unchecked environmental degradation. Scientists believe that greed of humans coupled with lack of political motivation to address the burgeoning environmental issue has ultimately propelled planet Earth into a new epoch, the Anthropocene, in which the entire Earth-system processes and the balance of ecosystems are dominated by human activities.

The evolvement of Anthropocene was on the cards right from the onset of the first industrial revolution. The pace of industrial development never took a backseat with both companies and countries never willing to compromise on their growth for the sake of the environment. However, the situation now is such that the economic, social, cultural and political systems of the world are interconnected owing to globalization. This has led toexertion of sublime pressure to the environment which has ultimately instigated fundamental changes to the earth system.

Nevertheless, the same interconnectedness can work as a blessing as new ideas can be formed and proliferated quickly. A relatively new idea which has been patronized by most of the emerging economies is the transition to a green economy.The institutionalization of green economy will require investment in green technologies and sectors dominated by the poor such as agriculture and fisheries. Such actions have to be supported by national regulations, policies, subsidies and incentives for guaranteeing long term sustainability.

The prevailing economic world just revolvesaround the GDP. The only focus of the countries is to up the GDP and be a competitive and powerful force to reckon with. This model has surely helped to create jobs, stabilize economy and reduce poverty. However,environmental damage as a result of it is alarming and still more than two billion people in the world fall below the poverty line. So, it is highly imperative for the governments to recognize the limitations of GDP and complement it with measures of the five forms of capital; built, natural, financial, human and social capital (Fundamental Anthropocene, 2012).

In order to create a sustainable planet, collaboration among all the nations is a must. The issue of changing climate paradigm should be prioritized among all and the concept of green economy must be embraced for continual economic prosperity. If developed economies continue to uncheck Anthropocene, then the doom of human civilization is right on the doorstep with no one but the humans to blame themselves.



Shalabh Poudel
Industrial Engineer

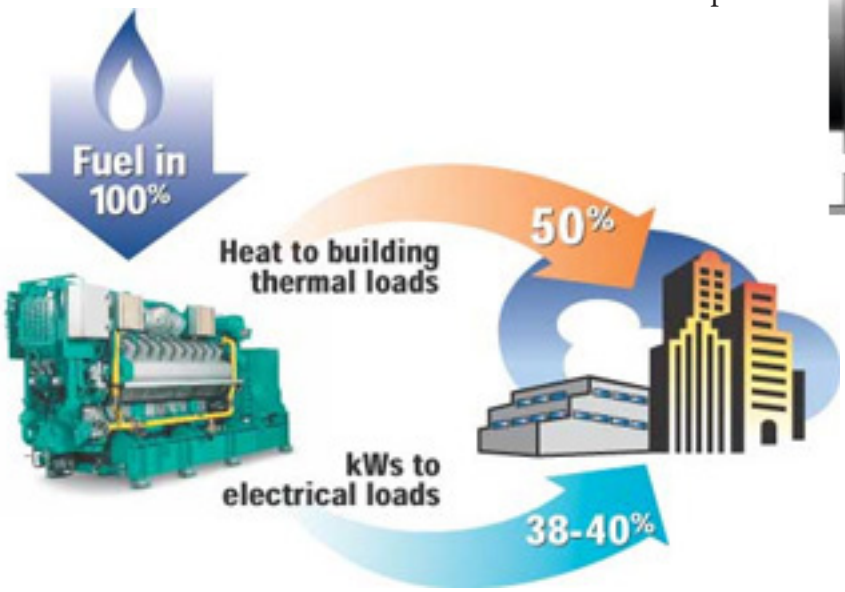


Prospects of Cogeneration in Nepal

Cogeneration is the thermodynamically efficient use of fuel to simultaneously generate electricity and heat both of which are used. Mechanically, it is the process of generating electricity by rotating a steam turbine by steam generated from combustion of waste industrial products like bagasse from sugar industries and rice husk. The phrase "Waste to Wealth" would be sufficient to define the whole mechanism economically.

Cogeneration may be a new technology in the context of Nepal but it has already been established as promising alternative source of energy in various parts of the world. The European Union (EU) has actively incorporated cogeneration in its Energy Policy Directives and as a result, EU generates 11 percent of its electricity using cogeneration. German Energy Bureau reported that 50 percent of country's total electricity demand could be provided through cogeneration. The plant provides substantial financial and environmental benefits due to lower emissions than conventional power plants.

Cogeneration is the concept of producing two form of energy from one fuel. Since the sugar mills in Nepal consume their own bagasse to run their mills during the crushing season and generate steam to run the boilers and turbines; they generate power to run their plants. Surplus energy can be exported to the grid. Sugar as main product and biogases (GCV=2270Kcal/kg) as free fuel, sugar mills can become self-sufficient in terms of energy as well as sell excess electricity to the grid. Co-generation will not only enable efficient usage of biomass but also generate electricity that can contribute in decreasing the ever-widening gap between electricity demand and supply. Promotion of cogeneration can be a win-win situation as it is the most viable option for improving power supply situation in the country while industrial consumers can generate electricity on their own to meet their power needs. As per Central Bureau 2012 statistics overall sugarcane production is 29,30,047MT and 74,7755MT bagasse is produced. Twelve plants with TCD capacity ranging from 500-5000 aggregating to 27,400 TCD produce sugar over 100-120 day season. According to FNCCI, 270 industries in Nepal are using boiler with cogeneration potential. The major operational problem with these industries is they are using 32bar,380°C boilers having a lower efficiency. Generating steam at a higher pressure and temperature in a co-generation system, adds just 10-20% on the fuel costs but is economical, since electrical energy, as by-product is produced enhancing overall efficiency significantly.



Illustrative Cogeneration Potential Indicators in Sugar Plants

Steam Parameters(bar/°C)	Steam Production (T/T bagasse)	Power Generation (kw/T bagasse)
21/340	2.50	227.3
32/380	2.43	286
42/400	2.40	313
45/440	2.33	328
67/480	2.27	378

87/510	2.24	401
110/535	2.21	427

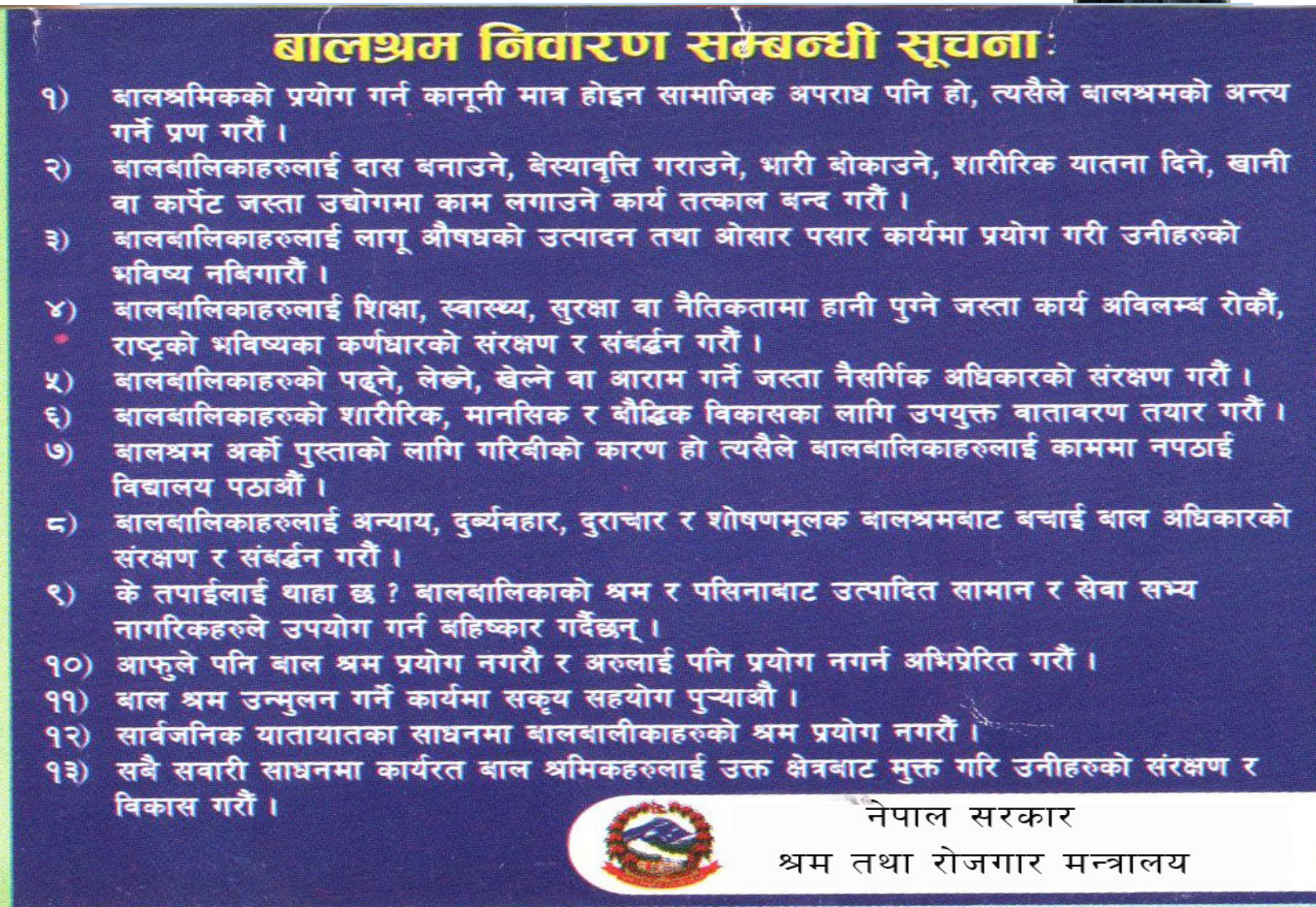
Upgrading to higher pressure, temperature boiler would generate larger power from same input amount of bagasse. A visit report of FNCCI to twelve sugar plant mills has also suggested that upgradation into energy efficient boilers as the best option to generate higher power. Upgradation to 87-bar steam based cogeneration system for one unit, 67-bar steam based cogeneration system for five units and 45-bar steam based cogeneration system for six units, with same level of bagasse consumption, the potential gross generation will be of order of 93MW of which 50.8MW of surplus power could be available to grid. Thus if all sugar mills in the country opt for higher pressure cogeneration they can add 50.8MW in crushing season and using rice husk (GCV=3410Kcal/kg) for two more months without any modifications, they add about 156MW in national grid.



Adapting to high pressure boilers and back pressure steam turbines would require trained manpower and certain disciplines. Nepal Electricity Authority (NEA) has not shown much interest in promotion of cogeneration since the production is only 3-4 months a year. But sugarcane crop season in Nepal is October to January which is dry season and which is when we face load-shedding as long as 16 hours a day. So, adding surplus power from sugar mills into national grid would be an easy way to reduce load-shedding for NEA than to go for temporary solutions like Diesel Plants or importing electricity from India. Upgradation to high pressure boilers would make sugar industries self-sufficient in energy and also enhance economy of whole nation as a whole. NEA should be aware of harnessing this tremendous power-potential of sugar industries and the government should encourage sugar mills to invest in this opportunity by providing certain financial and tax incentives.



Santosh Ghimire
BIE 068



Demand Side Management in Industrial Sector of Nepal

1.Introduction

This article analyzes current as well as forecasted energy consumption scenario and effective Demand Side Management (DSM) options with potential greenhouse gases (GHG) emission reduction in industrial sector of Nepal under different income growths scenario.

Energy is a crucial resource for nurturing economic and social development. Economic growth requires increasing amount of energy. Its rate of utilization is observed as a measure of the level of development achieved by a country. The production and consumption of energy affect the environment through emission of GHG and other wastes, which are responsible for climate change and other environmental issues.

2.Objectives and assumptions

The main objective of this research is to assess demand side management potential and estimate GHG mitigation potential in industrial sector of Nepal with following specific objectives:

1. Find out energy consumption pattern in industries in Nepal.
2. Forecast the energy demands and global warming potentials for future for different scenarios.
3. Determine the energy savings and GHG reduction potential within the industry
4. Formulate energy plan with scenarios as a basis for sustainable development of energy sources.

The assumptions and limitations in this research are

1. The study is limited to the manufacturing industries with NSIC code of Nepal.
2. The number of manufacturing establishments remains constant throughout planning horizon.

3.Data collection and compilation

In the beginning, the author reviewed the related literatures on energy consumption pattern in Nepal, application and usefulness of demand side management around the world and review of available energy models. Based on an end use approach of energy management, a survey with a list of questionnaires, which included questions about type and amount of fuel used in different end-uses, was carried out among 93 out of 3446 manufacturing industries for current energy consumption.

The primary data was collected in the hardcopy of questionnaire. The collected data was then compiled in Microsoft Excel Sheet so that it would be easier to read and handle and the sample data was projected for population size. Some of the important observations are summarized below.

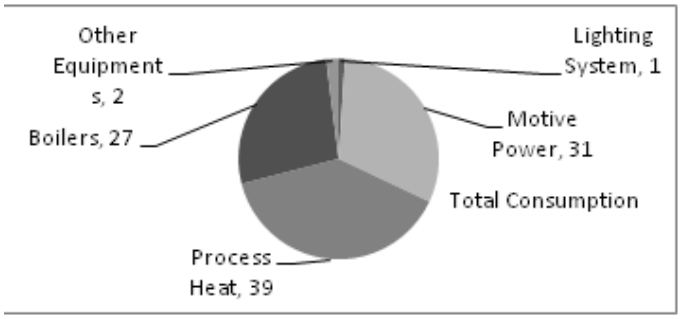


Figure 1: Share of end-use in energy consumption of industrial sector of Nepal, 2012

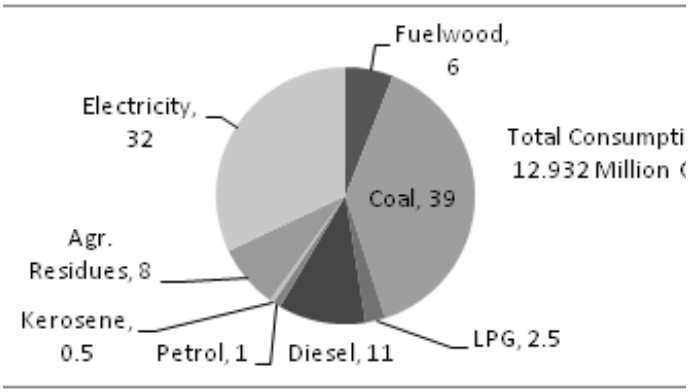
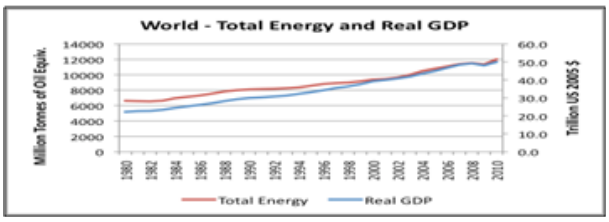


Figure 2: Share of fuel in energy consumption in industrial sector of Nepal, 2012

The primary data collected from the different manufacturing establishments was not enough for analysis. The secondary data includes share and Gross Value Added by different manufacturing categories in percentage, which was collected from National Account Statistics for fiscal year 2068/69, CBS.

4.Model development

Looking at the relationship between world GDP and world energy use it seems that decoupling is possible as shown in figure 3. So, in this research it is assumed that the change in energy consumption in industries is solely dependent on the Gross value added by manufacturing establishments and is directly proportional.



(Source: Grail Tverberg, 2011)

Figure 3: Relation between Total Energy and Real GDP

Based on the above assumption Industrial demand side management LEAP model was developed which is shown below in figure 4.

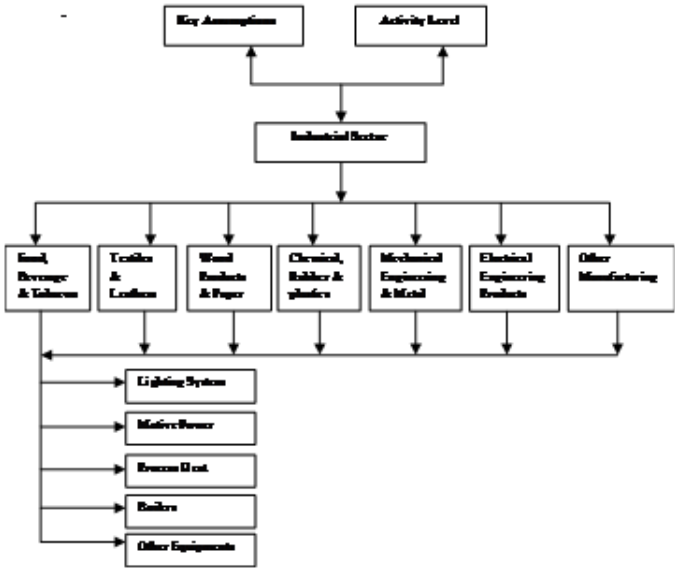


Figure 4: Industrial Demand Side Management Leap Structure

The collected data regarding energy consumption in different end use energy demand of manufacturing establishments in Nepal was fed into the LEAP energy model to forecast the future energy demand and conduct the demand side management simulation analysis.

Energy Demand = Energy Intensity*Activity Level

Energy intensity is the amount of energy used per gross value added by the respective manufacturing category in national GDP.

Activity Level is the gross value added by the respective manufacturing category in Nation GDP.

Energy demand changes with the change in energy intensity or activity level or both.

The chief key assumption included in this model is

1. Economic
   Industrial GDP

5.Scenario development and analysis

After feeding the collected primary and secondary data in Current Accounts of LEAP, the different planning scenarios were developed according to the objective of this research for forecasting the energy consumption and Global warming potential.

The assumptions made in forecasting all scenarios in this research are

The change in energy consumption in industries is solely dependent on the Gross value added by manufacturing establishments and is directly proportional.

The base year for the model is 2012 and a horizon of 20 years is used, thus modeling until 2032.

I. Growth rate scenario

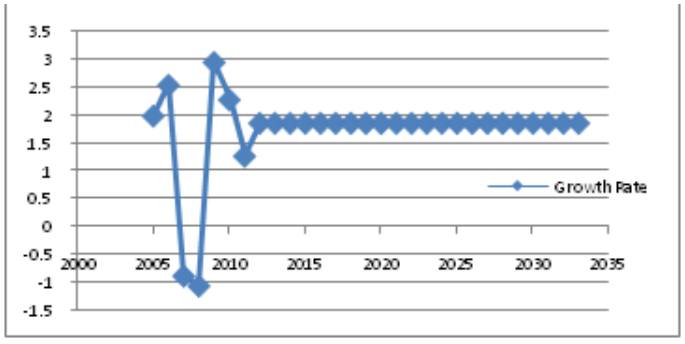


Figure 5: Forecasting of normal growth rate using single exponential smoothing

From figure 6, the energy demand is increased to 18.732 million GJ with normal growth rate, 23.356 million GJ with high growth rate and 14.288 million GJ with low growth rate scenario by the end of year 2032 from base year consumption of 12.932 million GJ.

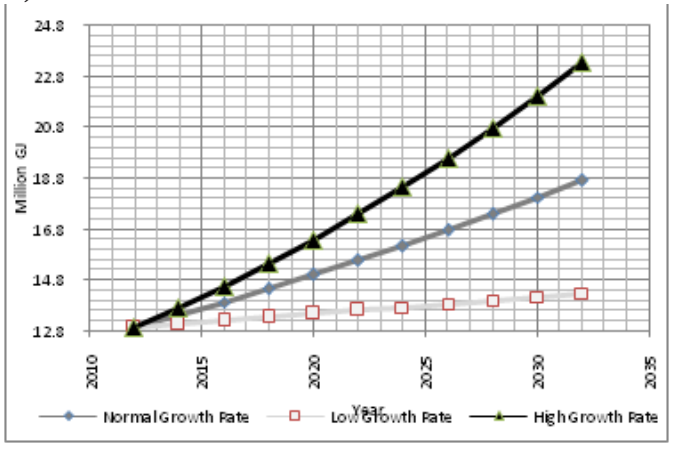


Figure 6: Comparison of Energy Demand of Different Growth Rate Scenario

From figure 7, the global warming potential is increased to 872.298 thousand metric tons CO2 equivalent with normal growth rate, 1087.635 thousand metric tons CO2 equivalent with high growth rate and

665.365 thousand metric tons CO2 equivalent with low growth rate scenario by the end of year 2032 from base year emission of 602.197 thousand metric tons CO2 equivalent.

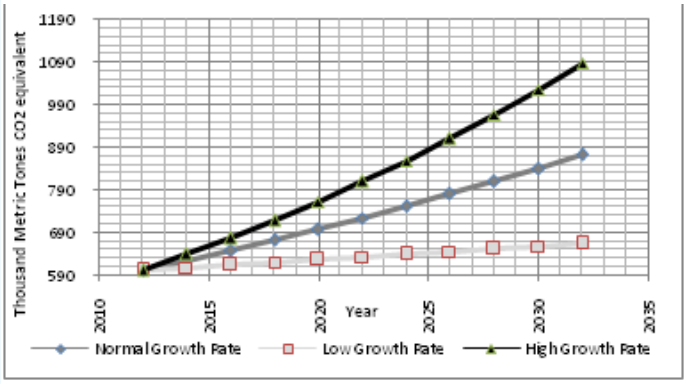


Figure 7: Comparison of Global Warming Potential of Different Growth Rate Scenario

II. Demand side management scenario

The assumptions made in forecasting this demand side management scenario are

The Growth rate of Gross value added by manufacturing establishments is 1.87 throughout the planning horizon.

Under this demand side management scenario, five different energy efficient systems were developed.

In Efficient lighting scenario, the energy consumption pattern is assumed to remain the same i.e. no new technology is introduced except CFL replaces other lighting system by the end of year 2020 to fulfill 90% energy demand and modeling is totally based on base year energy consumption.

In Efficient motive power scenario, the energy consumption pattern is assumed to remain the same i.e. no new technology is introduced except energy efficient motors replace all standard motors by the end of year 2020 and modeling is totally based on base year energy consumption.

In Efficient process heat scenario, the energy consumption pattern is assumed to remain the same i.e. no new technology is introduced except new energy efficient technology is introduced in all brick industries by the end of year 2020 and modeling is totally based on base year energy consumption.

In Efficient boilers scenario, the energy consumption pattern is assumed to remain the same i.e. no new technology is introduced except different above discussed techniques are adopted to increase the efficiency of boilers from 65% to 80% by the end of year 2025 and modeling is totally based on base year energy consumption.

In Efficient scenario, the energy consumption pattern is assumed to remain the same i.e. no new technology is introduced except CFL replaces other lighting system by the end of year 2020 to fulfill 90% energy demand. Energy efficient motors replace all standard motors by the end of year 2020, new energy efficient technology is introduced in all brick industries by the end of year 2020. Different above discussed techniques are adopted to increase the efficiency of boilers from 65% to 80% by the end of year 2025 and modeling is totally based on base year energy consumption.

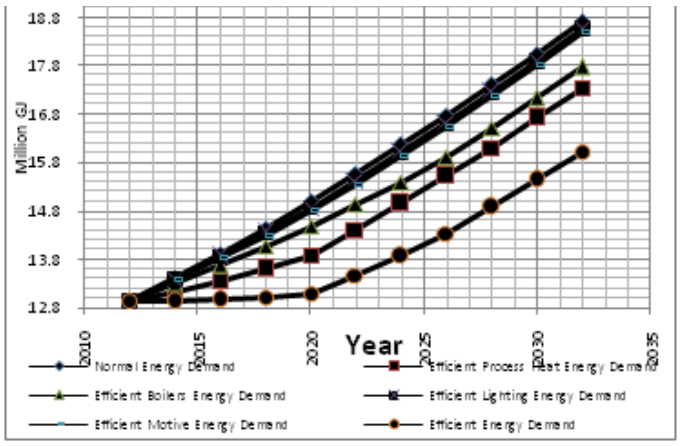


Figure 8: Comparison of energy demand of different DSM scenarios

Figure 8 shows significant amount of energy can be saved only in the year 2032. The amount of energy that can be saved is increasing every year, which suggests a huge amount of energy can be saved throughout the planning horizon when switched to all these efficient scenarios.

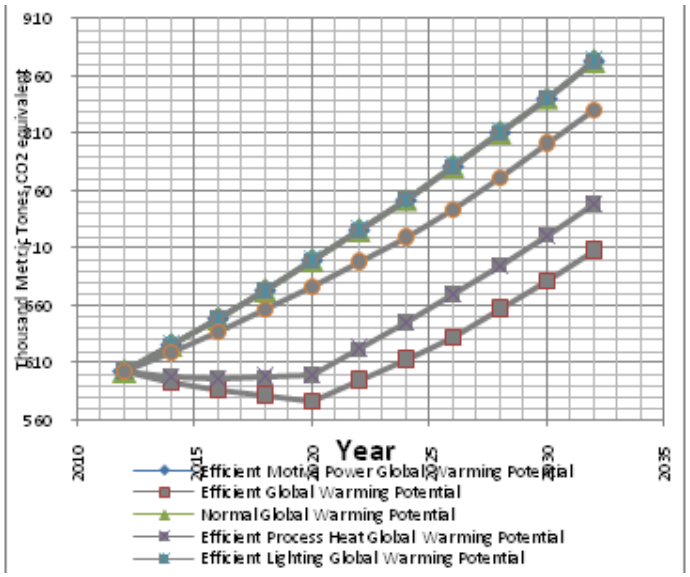


Figure 9: Comparison of global warming potential of different DSM scenarios

III. Sustainable scenario

The assumptions made in forecasting this scenario are

All other fuels are replaced by electricity by

the end of year 2025 and modeling is totally based on base year energy consumption and, the growth rate is 1.87.

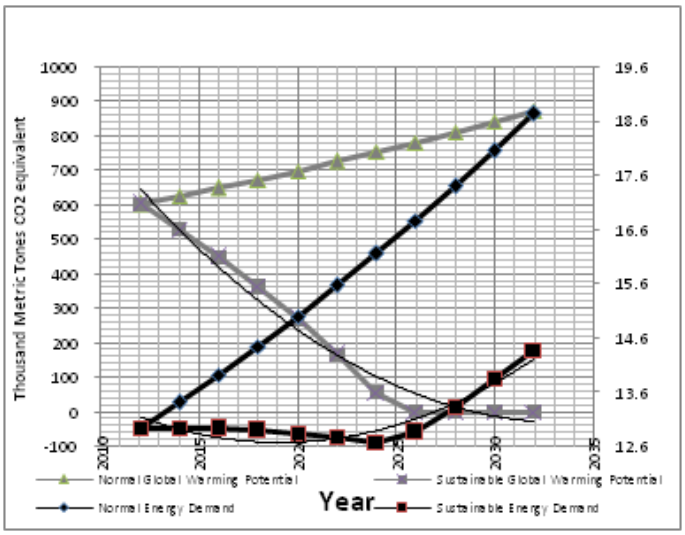


Figure 10: Energy demand and global warming potential of sustainable Vs normal growth rate scenario

This planning scenario is forecasted where all types of fuel are replaced by electricity. Electricity is considered as sustainable fuel since its environmental loading is negligible in comparison to other fossil fuels. From figure 10, the trend lines for both energy demand and global warming potential for both the scenario are different. This is because in this sustainable scenario the only fuel used is electricity which is efficient technology resulting in significant reduction of GHG emission. About 4.36 million GJ of energy consumption can be reduced only in the year 2032 and the amount that can be reduced is increasing every year, which suggests a significant amount of energy can be saved throughout the planning horizon. GHG emission reduces to zero after 2025 when all types of fuel are replaced by the end of 2025 with the investment which is justifiable with short payback period.

6.Conclusion

Manufacturing industries being the most important sector contributing to the GDP, demand side management would be the best approach to be adopted for energy savings and emission reduction. Here are the some of the important conclusions of this research.

The current total energy consumption was projected about 12.932 million GJ and for same consumption trend at normal growth rate of 1.87% which was forecasted by single exponential smoothing, the energy demand and global warming potential would be 18.73 million GJ and 872.29 thousand metric tons CO2 equivalent respectively by the end of year 2032. This would be 23.35 million GJ and 1087.63 thousand metric tons CO2 equivalent for high growth rate of 3 % and 14.28 million GJ and 665.36 thousand metric tons CO2 equivalent for low growth rate of 0.5%.

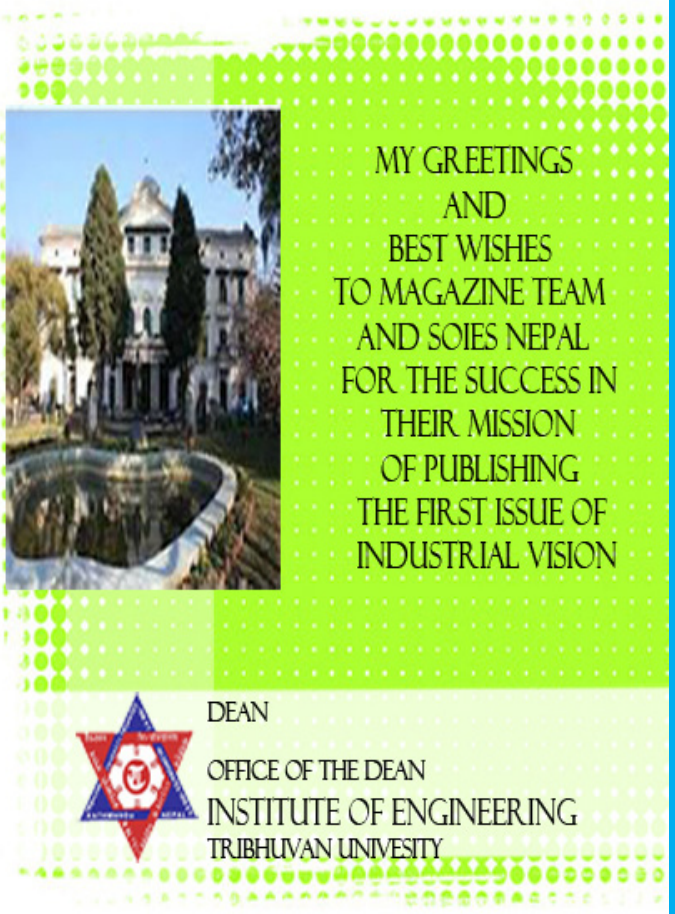
In efficient scenario like Efficient Lighting, Efficient Motive Power, Efficient Process Heat and Efficient Boilers, results show that a huge amount of energy can be saved and GHG emission can be reduced.

Likewise, in sustainable scenario in which all types of fuel are replaced by electricity, the GHG emission can be reduced to zero along with significant decrease in energy demand.

So, the finding suggests that it's worth adopting demand side management in industries with justifiable investment in the technology within a short payback period.



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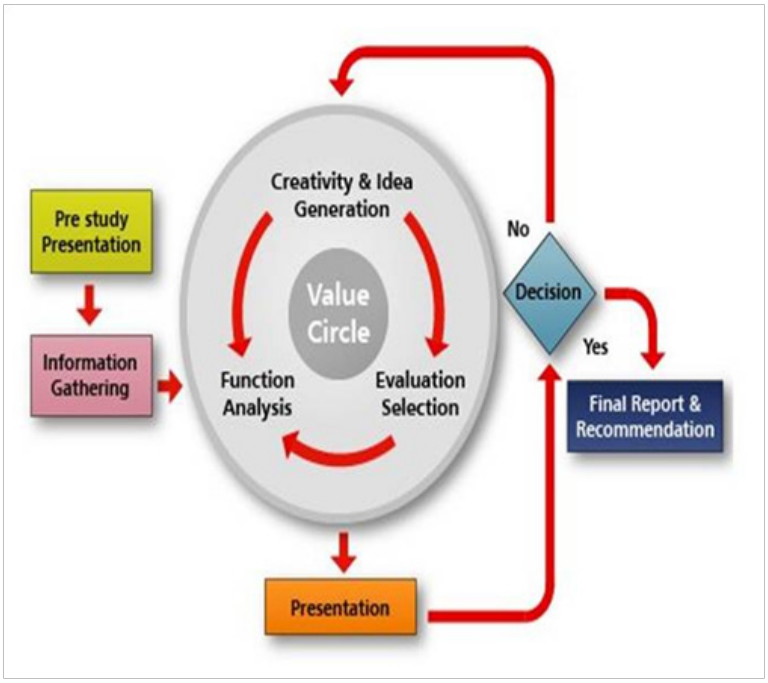
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Synchronize Value Engineering & Balanced Scorecard to Synergize Industrial Empowerment for National Development

Manufacturing of advanced products & services engulfing our surrounding and way of living has been possible only through advanced information, and automation technology; impacts are not only upon our daily lives but also in the national economy & development, because what we use we haven't been able to produce them.



Our national industrialization will move ahead in a progressive way and we'll be able to improve present and future economic value of every industry: only if they adapt to the effective technology & strategy-handling managerial tools and techniques. Regarding this key points, this article is mainly concerned with use of Value Engineering (VE) for present economic value improvement and Balanced Scorecard (BSC) for future economic value improvement.

Value Engineering & its role for Industrial Empowerment:

During World War II, there were shortages of skilled labour, raw materials, and component parts. Lawrence Miles, Jerry Leftow, and Harry Erlicher at General Electric Co., looked for acceptable substitutes. They noticed that these substitutions often reduced costs, improved the product, or both. What started out as an accident of necessity was turned into a systematic process, called value analysis (VA). Now it is also referred to as "value management", "value methodology" (VM), or "value Engineering" (VE). Simply, Value engineering (VE) can be defined as a systematic method to improve the "value" of goods or products and services by using an examination of function. Value, as defined, is the ratio of function to cost as mention below.

Value = Function/Cost

Where,

Value is the reliable performance of functions to meet customer needs at the lowest overall cost.Function is the natural or characteristic action performed by a product or service.Cost is the expenditure necessary to produce a product, service, process, or structure.

"their synchronized combination improves present and future economic value of the industry at a time"

Value can therefore be increased either by improving the function or reducing the cost. So, it is a technique in which the value of system's output is optimized by crafting a mix of performance (function) and costs. In more detail, the systematic and structural approach of VE consists of following six phases:

1. Information Phase: Gather information to better understand the goods or product & services.
2. Function Analysis Phase: Analyze the goods or product & services to understand and clarify the required functions.
3. Creative Phase: Generate ideas on all the possible ways to accomplish the required functions.
4. Evaluation Phase: Synthesize ideas and concepts to select feasible ideas for development into specific value improvement.
5. Development Phase: Select and prepare the "best" alternative(s) for improving value.
6. Presentation Phase: Present the value recommendation to the stakeholders.

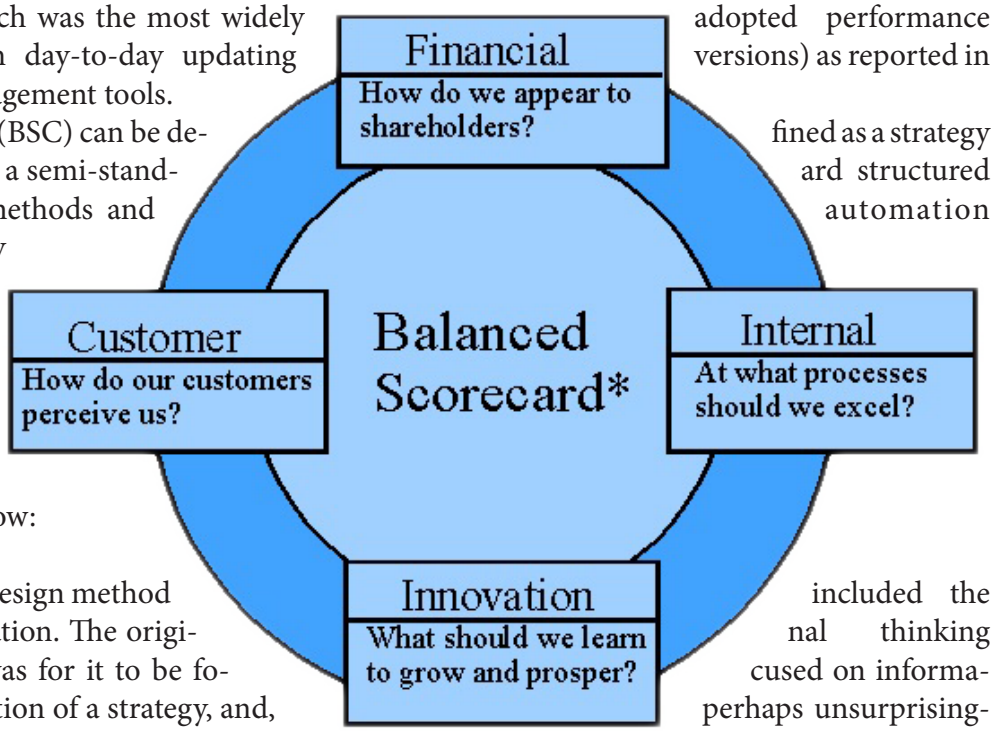
Adopting VE methodologies by any industry or business organization, it helps improve their value. It has many roles for industrial empowerment as well, and some of them are cited here:

- Maximize return of investment (ROI)
- Reduce costs & provided equal or better performance.
- Recently strengthen the national & global competitiveness.
- Promotes the substitution of materials and methods with less expensive alternatives, without sacrificing functionality.

Balanced Scorecard & its Role for Industrial Empowerment:

The origins of Balanced Scorecard can be traced back to 1990 when the Nolan Norton Institute, the research arm of KPMG, sponsored a one-year multi company study, "Measuring performance in the organization of the Future". They believed that reliance on financial performance-measures was hindering organizations' ability to create future economic value. After that, they developed a new performance-measurement model, called balanced scorecard (BSC), which was the most widely adopted performance management framework (with day-to-day updating versions) as reported in the 2010 annual survey of management tools.

Simply, the Balanced Scorecard (BSC) can be defined as a strategy performance management tool: a semi-standard structured report, supported by design methods and automation tools, which can be used by managers to keep track of the execution of activities by the staff within their control and to monitor the consequences arising from these actions. Four "perspectives" of BSC were proposed in the figure below:



After that, the next generation design method included the sustainable part of the organization. The original thinking behind a balanced scorecard was for it to be focused on information relating to the implementation of a strategy, and, perhaps unsurprisingly, over time there has been a blurring of the boundaries between conventional strategic planning and control activities and those required to design a Balanced Scorecard. This is illustrated well by the four steps required to design a balanced scorecard included in Kaplan & Norton's writing on the subject in the late 1990s:

1. Translating the vision into operational goals;
2. Communicating the vision and linking it to individual performance;
3. Business planning & index setting
4. Feedback and learning, and adjusting the strategy accordingly.

In this way, the balanced scorecard arises as management system also, acting as the best practice for contentious improvement of any product for more durable life cyclein following way:

- Introduce innovative products & services desired by targeted customer segments.
- Produce customized high quality products & services at low cost & with short lead times.
- Mobilize employee skills and motivation for continuous improvements in process capabilities, quality and response times; and
- Develop customer relationship that retain the loyalty of existing customer and enable new customer segments and market areas to be served effectively and efficiently.

Synchronizing VE & BSC for Synergized Industrial Empowerment:

Synchronized VE & BSC includes all the level of industrial organization, and their synchronized combination helps in synergizing Industrial Empowerment:

•There will be an effective performance in operational, tactical & strategic level of industrial organization.
•VE helps to improve present economic value & BSC helps to improve future value. So their synchronized combination improves present and future economic value of the industry at a time.

Role of Synergized Industrial Empowerment for National Development:
If industries are able to improve their performance, then national development is possible through synergized Industrial Empowerment:

- Success of one type of industry is supportable for other dependent and independent industries.
- Gradually ratio of export to import is increased, which is the most important thing to increase GDP.
- Industrial empowerment supports human resource development (HRD) and financial resource development (FRD) in such a way that they act as a supporting wing of each other.

Conclusion:
We should adopt synchronized VE & BSC to synergize Industrial Empowerment for national development. This type of activity, will emphasis on individual to holistic competency of our local, regional & national industries and their economy. As Industrial Engineers have fusion of both of management and technological knowledge and practices, we can synchronize both value engineering (VE) and Balanced Scorecard (BSC) in any industry in an effective way, which leads nation toward development along with peace & prosperity. So, being Industrial Engineer, we have to prove: "Industrial Engineers are for Development".

Man Bd. Sunuwar
Industrial Engineer

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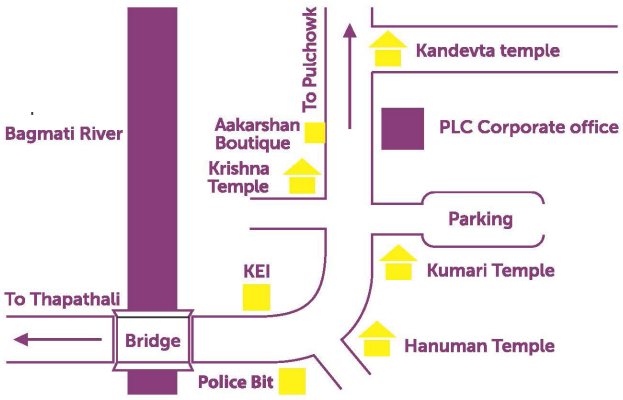
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Overview of Six Sigma

Six Sigma, pioneered by Motorola in 1986, is one of the most popular quality methods lately – a method to eliminate defects and the opportunity for defects. It is the rating that signifies "best in class", with only 3.4 defects per million units or operations (DPMO). Its concept works and results in remarkable and tangible quality improvements when implemented wisely.

The goal of Six Sigma is not to achieve six sigma levels of quality, but to improve profitability. Prior to Six Sigma, improvements brought about by quality programs, such as Total Quality Management (TQM) and ISO 9000, usually had no visible impact on a company's net income. In general, the consequences of immeasurable improvement and invisible impact caused these quality programs gradually to become the fad of the moment – unable to track the impact of quality improvements on profitability cannot know what changes need to be made to improve their profit margins.

"3.4 defects per million units or operations"

In contrast with other quality initiatives, Six Sigma recognizes that there is a direct correlation between the number of product defects, wasted operating costs, and the level of customer satisfaction. In short term, Six Sigma is a method to eliminate defects and the opportunity for defects. It utilizes a statistical unit of measurement to measure the capability of the process, then achieve defect free performance, and ultimately increase the bottom-line and customer satisfaction.

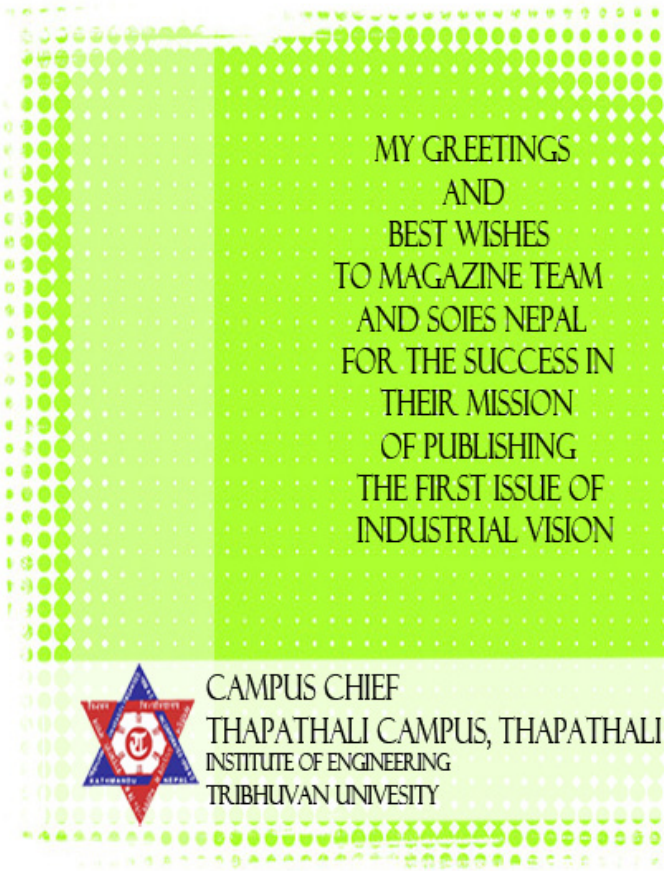
The approach drives the overall process of selecting the right projects based on an organization's business goals and selecting and training the right people to obtain the results. Improvement projects follow a disciplined process defined by a system of four macro phases: measure, analyze, improve, control (MAIC). By measuring the existing systems, valid and reliable metrics to help monitor progress towards the project goals are established. Customer expectations are defined to determine "out of specification" conditions and these are then analyzed to identify ways to eliminate the gap between the current performance of the system or process and the desired goal. The project team uses statistical analysis to examine potential variables affecting the outcome and seek to identify the most significant root causes. Then, they develop a prioritized list of factors influencing the desired outcome.



In the improvement phase, project teams seek the optimal solution and develop and test a plan of action for implementing and confirming the solution. The process is modified and the outcome is measured to determine whether the revised method produces results within customer expectations. Then, as a control method ongoing measures are implemented to keep the problems from recurring. Improved system by modifying policies, procedures, operating instructions, and other management systems are institutionalized.



Samir Babu Bhetwal
BIE 067

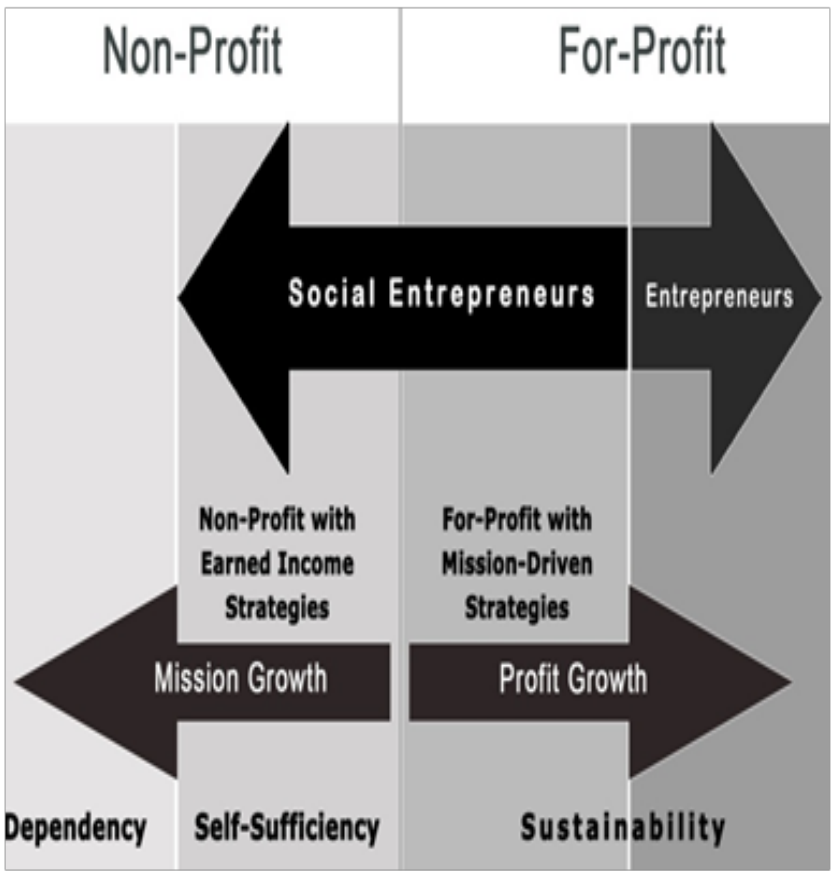


SOCIAL ENTREPRENEURSHIPS
Need of Today

Nepal is among the twenty poorest countries in the world; it's GDP per capita value is lagging at about three and six times the values of neighboring countries India and china respectively.'—hearing and reading this ever we feel tortured, and at the same time urge to change becomes stronger. A momentum to change this course can be mass engagement towards Entrepreneurship: an act of individuals who utilize their innovation, finance and business acumen to transform a new idea into a value added venture. Especially, 'Social entrepreneurship' can be the revolutionary idea for the overall enhancement of our nation.

What is social entrepreneurship? What differentiates the social entrepreneur?

There is not a universal single definition of Social entrepreneurship. However, it seems to be more suitable as a more social approach than profit-motive venturing, intended in creating innovative solutions to the social problems— economic dependency being major one. It strives to combine the heart of business with the heart of the community through the creativity of individuals. While a business entrepreneur might create entirely new industry for sole profit-motive purpose, a social entrepreneur develops innovative and ingenious solutions to tackle the social obstacles and then implements them on a large scale. Particularly, they generate solution in the fields of clean energy, eco-friendly technology, poverty reduction, education, medical and health care, social deprivation and isolation, sanitation, infrastructure, sustainable environmental development etc. to create values for 'people, planet and profit'.



Even a small innovating or humble beginning can lead and achieve the big things.' Our social entrepreneur Mahabir Pun proved this just by initiating his project as a computer teacher in remote village of our country and ultimately making the wireless network available in the remote areas of Himalayas of Nepal and promoting distance learning and online educational services in Nepal.

How do social entrepreneurs create value for 'people, planet and profit'?

Social entrepreneurs act as the change agents for society, seize opportunities others miss to improve systems, invent new approaches, and create solutions to change society for the betterment. Along with generation of monitory return from the proposed venture, they craft services to mitigate the joblessness and give rise the solution to maintain the sustainability of ecology.

Chiran Jeevi Poudel, founder of Seeing Hands Clinic, is providing employment and income opportunities for 15 visually impaired people in Nepal and raising awareness within the local community about what visually, impaired people are capable of achieving and earning.

Govinda Ghimire, founder of 'Alternative Herbal Pvt. Ltd.', focuses working completely depending on local raw material and provides training for people of seven districts for collection, production, and packaging of

products.

Prachanda Shakhya, founder of 'Nepal traditional handicraft training centre', provides training of ancient art-craft and culture and produce artisans of this field.

Some other names are: Tara Baskota Adhikari in promoting Nepali Agro World, Som Prasad Gauchan in socio-economic uplifting of working class people enabling Tea farming in the Bhotechaur village, Sindhupalchowk, Ujwal Thapa in heartening the Nepali youth towards the entrepreneurship as the founder of 'Entrepreneurs for Nepal', etc.

What are the values (achievements) of being a social entrepreneur?

Just imagine having an exciting and rewarding career that gives you a chance to make a living and earning, doing what you love while making society more economically independent and equipped with recent technologies.

There are chances that different volunteers and volunteering organization will support you to sustain your organization: intending the conservation of ecology and betterment of life of people. You may work on alternative energy solutions, make innovative eco-friendly machines or equipments or make new techniques in the field of education, health, women welfare, poverty etc., whatever, people will be benefited by your work. No joy can equal the joy you get from self satisfaction and other's appreciation besides the monitory compensation you earn.

Anil Chitrakar, an energy engineer and founder of the Environmental Camps for Conservation Awareness (ECCA), has been working specially in the areas of designing and spreading energy solutions across Nepal, restoring and recovering the built and living heritage in Kathmandu valley and lumbini, and implementing the national conservation strategy to preserve globally unique natural endowment. His experience in youngster group formation and self initiative has broad implications, as important for long term development as for education or the environment. As the unfathomable rewards, he is not only recognized and internationally awarded as the conservationist, environment leader, Global leader for tomorrow and senior Ashoka fellow in Nepal but also characterized as leading natural entrepreneurial actor who will always be encouraging and motivating to uplift our new hidden social responsibilities towards social entrepreneurship. The vividness in his face is the consequence of satisfaction and happiness, which he gain as a social entrepreneur is an unbeatable reward.

Why does the focus of social entrepreneurship need in Nepal?

The main factor is that the Nepali social service much more relies upon the International financial aid but it has made us cripple and politically indecisive to make sovereign decisions ourselves. So, being a social entrepreneur, we can bring back the power of decision making to ourselves: need of our own, way of our own.

There is nothing more powerful than a system-changing idea possessed in the hands of a social entrepreneur. Nurturing an innovating society requires shifts in mindsets, and social entrepreneurs will play a key role in helping enact these shifts. As the result of social enterprises innovation, there will be solution to the youth stumbling with brain drain and creation of employment opportunities to many people whom could lead and earn—many of those who might leave Tribhuvan International Airport for foreign employment.

> "Social entrepreneurs act as the change agents for society, seizing opportunities others miss, to create values for 'people, planet and profit"

The focus of Nepali worker on social enterprises will promote their standard of living along with national economic development.

What must be our roles?

Especially, people with science and engineering background can have a great deal to offer in these arenas to provide novel and inexpensive solutions to massive problems that plague the our country. This field inspires us to use our talent to do business, help others, change the lives of people, and preserve the planet. Now is the time for the growth of social entrepreneurship through the perception and innovation, not only to lead the enterprises what we have a passion for and we believe in but also fulfill responsibility towards our people, society and planet. Until and unless we won't wake up, there won't be change in any status of our nation. We need to be changed to change the whole nation. If we can believe the things, our mind can perceive those things then we can easily achieve those things.



Tirtha Rai Timilsina
BIE 067

Supply Chain Management
in Cash Crops (Potato)

Supply chain is a network of actors, resources and activities involved in the process of transferring raw materials into finished product and delivering it to costumers, yielding high consumer satisfaction, timely delivery of product, value addition, and profit optimization.

In context of Nepal, supply chain management is a new concept and found to be practiced in industrial sectors to some extent. However, in the agricultural sector, it seems unknown and unexplored. Cash crops are bough of Nepali market but their business is very tender and unmanaged because actors involved in supply chain are small weak firms or individuals who act for their own interests rather than for overall supply chain.

"Local traders have to compensate wholesalers for rotten potatoes, where as there is no compensation mechanism to back up local traders"

Most farmers and traders involved in cash crops belong to lower or medium class, and cash crop cultivation has been adopted in poverty reduction program too. If these actors co-operate with each other instead of struggling, supply chain management can build good possibilities for these actors as well as customers.

Findings below were made during a student's group-work on "A study on supply chain of potatoes within kalimati fruits and vegetables market".

Simple supply chain of potatoes is as follows:-



Supply chain of potatoes is based on quick delivery of product to the market. A common problem throughout the supply chain of potatoes is its quality and size. Local traders have to compensate wholesalers for rotten potatoes, where as there is no compensation mechanism to back up local traders. This problem has swiped out many local traders from the business.

Similarly, retailers have to face problems regarding quality and size of potatoes. Retailer's main costumers are general public, who purchase potatoes for kitchen use and prefer small size potatoes. Large potatoes rots in shop or has to be sold at lower prices as they are least preferred and left behind. In either case retailer has to bear loss. On the other hand, potato processing firms prefer large potatoes to use it as raw material. These firms are ready to invest 25% to 50% higher price for large size potatoes.

This single issue of quality and size causes problems at various level of supply chain. This causes loss and increased risk for retailers and local traders; similarly, potato processing firms gain low satisfaction. By introducing proper grading mechanism during the purchase of potato from farmers, this obstacle can be removed.

Grading and packaging of potatoes into large and small size increases consumer satisfaction and reduces loss to retailers. During the grading, rotten and damaged potatoes can be removed which will reduce risk for local traders. On the other hand, this grading system will generate profit to wholesalers and farmers.

Like in case of potato, supply chain management can be helpful for the actors involved, to tackle problems and explore new possibilities within the business of cash crops.



Amit Chapagain
BIE 067

Is Engineering only for Boys??

"If stereotypes are ignored then girls do equally well."

How many of you girls have faced this question: "keti vayera engineering??", or have met people who are pleased to hear that your brother is pursuing an engineering degree, and have a question mark on their faces when they hear that you are an engineering student. I know most of us have faced it and at that moment what comes in our mind is "Is engineering only for boys??" and "What has gender got to do with being an engineer?" To some extent it has, researches have shown that boys have better mathematical and spatial skills than girls have. But the fact is that: conclusions of a research once done is followed for years—people are unaware of the modified conclusions of that research or of further researches done; if stereotypes are ignored then girls do equally well.



In spite of good performance and participation of girls in the engineering sector in the last few years, negative stereotypes about girls do prevail. It's heard that girls aren't as good as boys are in math, or such works better suit to boys. Because of these, girls lose confidence or they don't want to be judged, and thus most of girls move away from this field after high school.

Whenever you think of a receptionist, a PR manager, a customer care staff, an administrative post you do see girls but why not a service engineer, a production manager, or a floor supervisor? Researches also have shown that people tend to view women in "masculine" fields like engineering as either competent or likable but not both. Such workplace-biasness is also something that has made girls hesitate to enter in such fields.

Few weeks ago, I had visited an auto workshop and found that the front desk officials were engineers (boys) and their duty was to listen to customers about their vehicle problem and prepare a job card accordingly. At that point of time what struck me was: what was needed for that kind of job? Mathematical or verbal skill? For your information, researches do have shown that girls are better at verbal and communication skills, so may be a girl engineer would be a better option for that post. But then may be no girl applied for it or among those who applied boys were better performers. What's my point behind talking about this incident is that unless girls having interest in such fields do not accept the challenge of competition to enter, just because of stereotypes and biasness, how are things going to change??

Now the thing is we can't clearly eradicate these stereotypes and bring revolution all of a sudden. But certainly, those girls pursuing BE have taken a step forward in doing that. And we have seen changes happening all around us as well: with girls performing well during their course study and at their workplaces, and then if you are an aspiring industrial engineer then it requires both spatial and verbal skills, so we are both: lucky and challengers. I have realized, basis of success is based on self-confidence, passion, dedication and effort, and less on innate talent or skills—social perception or gender quite doesn't matter.



Jyotir Nisha
BIE 067

Thinking Different

I am just a regular engineering student so there is a secure future out there if I pass my engineering and decide to do a job. Or, I have an option to fly aboard for further study: This is the trend of almost all of engineering students. But I don't want to do job nor do I want to fly aboard. Why should I work like a zombie from 10 to 5 for 6 days a week? And why fly aboard when there is more opportunity in Nepal than any part of the world; Nepal has lots of problems which are in fact opportunities.
Why not follow my dream for which I joined engineering: the dream to "make things"; to create something that makes difference, because at the end what counts the most is how happy I am in my life.



I won't listen to my parents if they ask me to get a job after engineering and be secure, nor to friends who might say: if I follow my dream I might not get rich or be as successful as my mates will be; because I don't want to blame anyone: society, friends or parents for the rest of my life for what I will do and what I may become.
My right part of brain sees problems but my left part of brain sees opportunities.

Problems

Political instability and politics

This is the biggest problem of all, for most of us. But has this problem stopped othersfrom doing business, or to be successful in our country.
Right part of my brain – "They were lucky and have power."
Left part of brain – "Don't believe those hearsay. Next time, when someone tells you something disappointing about doing business in Nepal, ask them sources from where they knew it. 95% of the times, they don't have any sources; that's all fabricated.
Let's be honest in business, so that we don't have to be member to any wing of political parties to hide our unethical works. Right Brain said, "Even if we are honest they may bother us,"
"Then let's fight back because we will have nothing to lose. Let's unite with those who are fighting for us, because if you stop believing what ill-natured show, and start using your own senses, you will find many good people in Nepal—or we can start business which are less effected by politics like agriculture or adventuresome sports."

Load Shedding

We have other natural method of generating energy. Using alternative source will not be suitable for big industry but most of us are not going to open industry with crores of investment but with few lakhs. For these industries, other sources of energy will be fine. Do some study, if you are not expert in that field, hire someone who is working on that field. Do some research, because you have all the information required at your fingertips.

Lack of capital

This is one of the biggest excuses we make, because we always make plans needing crores of investment. Business has to be started not just with one's sole investment; money from the pockets of other can be used too. Most of the successful businesses were started with capital less than 1 lakh. You can start from 3–4 lakhs.
Right brain – "From where are you going to get 3–4 lakhs?"
"2 lakhs from Family, 2 lakhs from friends and relatives."
I think anyone can collect this much amount if you have good ideas and ability to convince other people with your ideas. Even if you have some good business plan of crores and it has high rate of return established do-

ing detail study and you are experienced enough, then you will find investors. But it should be less risky; fact should be based on actual data.

Fear of failure

Right brain – "what if you fail?"

"You are asking me the wrong question. How can I fail in a country where everything is so cheap? People are nice and are mostly honest—just nice and honest, and no one wants to do hard work.

We may not be able to compete with china in manufacturing. Who can? No one can; still other countries have made this weakness their greatest strength, then why can't we? Simple answer is: we are idiots, who see fruits of others but don't have enough courage to plant one in our backyard."

Right brain – "What if…?"

"Ok you won and I lost? So, what if I lose 4 lakhs having earned experience of minimum 20 lakhs; I think I will still be in profit of 16 lakhs. After we fail once it's time to climb faster than before, so that we can fall better next time. Because life is like a roller-coaster, if we don't fall sometimes there is no learning in life. I will be successful not immediately but definitely."

Industrial Consciousness

1st year: Lullaby to Wake

Despite the number of students passing the semester exams were less, erratic and thus unsatisfactory, the hope of wearing yellow engineer's cap consolidate the end of every disappointing things. Now, Industrial matters: Industrial pollution, load shedding, labor union problems, more imports and less exports etc. were making real sense than before. Financial news at the end of television news were boring before or financial matters printed at the later pages of newspapers before were matters that mustached and elephantine bureaucratic people had concerns with. Now all this I began to feel at our hand.



Seeing electric cables dangling by the poles, transformers with strange plates nested on H-poles or LED lights at the front door of restaurants and inside microbuses, even when family talked to me on the phone, or on hearing about hackers making money, all those zigzags made by electrical teachers (electric teachers, electric guitars… huh?) and electronics teachers, and codes plotted by C-programming teachers (slowly progressing like bank robbers)on white board came before my eyes and made me believe, note making like galloping in the class, theory: High HP motors… next paragraph… printf ("Computer, please generate money and make it come out of disc-slot, and CPU please act like ATM machine!");… were real world issues.

Working on the machine section: operating lathe, vertical drills, milling, and shaping machines, one felt like being one of those engineers working on grand projects, seen many times on National Geographic and Discovery Channels. Tools cutting metals like butter and producing spiral chips (Like one formed when sharpening pencils) and unbelievable shapes and hands tainted with grease, coolant made oneself proud and gave feeling of doing something extraordinary. While on the fabrication section, welding using protective shield gave feeling of defending oneself from terrorists attack. Filing to make hammers were fun for some, for they made two: one for college and one for home sweet home. Even Campus 'Bandh's called for those real reasons difficult to find out even with the help of Secret Intelligence or Modern Sherlock Holmes could not discourage Industrial Engineering aspirers. Really!

2nd year: Walking Past labyrinths

Before candy, noodles, biscuits, wine bottles or any other consumer products were important only for their insides. Now, since we have to have presentations prepared from the 3rd semester, the back of the wrappers became important. Noting down the details about manufacturer, their factory location and phone numbers, and visiting FNCCI, CNI buildings and their websites to find out the industries, talking with plant managers, GMs, dropping the visit letters, visiting Government offices to get the data—all these developed self-confidence and induced practicability among us; factory, machines, workers, chimneys, compressors, boilers… all started functioning inside our brain: yes, these are my future companions. Making reports, counting and comparing the number of pages, the number of slides with other groups, working with friends who weren't close in the 1st year and making team effort—we learned to work with others and for common objective. Now, for us visiting Industries was like visiting a holy place, where we get the chance to meet the gods: machines.

Using AutoCAD, SPSS and some other purely professional software as a part of a course were things that were making us competent and 'smart-brain.' And though learning many subjects in a semester, at the end of each of them, we were left with something, which I would like to call 'Industrial Consciousness.'

3rd year: Systems Work In a System

With two batches of juniors, and a final year left I felt like: a man with World Heavy Weight Champion belt and a Tag Team Champion belt too. Advertisements, before boring, were now worth seeing and hearing once, without changing channels and frequencies, for their punch line were something we learned as technique to encroach the market; things when known become attractive.

Subjects like Energy Audit, PM, HRM, NPD, Supply Chain, Machine Design among many others led us to the depths of the industries and engineering works. At the end of 3rd year whenever we visited the industries for group work or during tour, almost all of us were able to name the common machines we saw and raise questions on them. Technical and Financial terms were now more heard of, since we were advancing, as an Industrial Engineering students, with two sides of an 'Industrial Coin': having technical side and managerial side.

Making business plan for an imaginary industry with all realistic approach filled us with confidence: We're ready to be an Entrepreneur. We had developed analytical skills, ability to reason: for changes; and the most important things an Industrial Engineering student must have: Respect for the Responsibility and Feeling of Authority to Change.

4th year: Approaching the Er. Addition

Now three junior batches: Heavy Weight, Tag Team and Light Weight Champion title too. Strength of Materials, often hated, AutoCAD, often unpracticed, Machine Design, often ignored, Supply Chain, often missed the class, Energy Audit, often came late… for 3 years I read 3 days per subject— Beware, do not possess these titles though: these are venomous possessions.

Now, in the fourth year, our brain is occupied with Final Year Project and OJT placements. Making CV, making it as heavy as possible: Took a kid by his hand and crossed him a busy street on date 17/05/2069.

Finally, I would like to thank you, who read this article patiently and friends, teachers, staffs of Thapathali Campus, photocopy 'pasal', 'khaja ghar', load shedding schedule, projector, black curtains of our famous 'Dark Room', library mams and all others who walked with 067 Batch together in this 4 years of excellent journey.



Dipesh Nepal
BIE 067

MY GREETINGS
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FSU-065
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I'M AN INDUSTRIAL ENGINEER

Yes, I'm an Industrial Engineer. As an Industrial Engineer, I'm about to share my experience before and after completing the BIE (Bachelor's Degree in Industrial Engineering).

After passing the IOE entrance, I was in dilemma: which faculty should I choose as my carrier, and which course is full of future securing prospects and extended scope. After a spell of thinking on my interests, and searching and reading about engineering options I had, finally I decided to join Industrial Engineering at Thapathali Campus, the only institution in the country providing Bachelor's Degree in Industrial Engineering. Now, I'm an Industrial Engineer, and I'm really satisfied with what I had chosen, because now I'm equipped with three powers: ability to think different and perform it on the real ground, being creative in what I do, and equipped personality.



Industrial Engineering: Applying engineering principles, technique of scientific management and maintenance to acquire a high level of productivity at optimum cost in the Industrial enterprises or also in other service sectors – a hybrid of technical and managerial knowledge and skills and "Jack of all trades." That sounds great, doesn't it aspiring Industrial Engineers? After getting degree, and understanding the works we have to perform in national or international platform, I'm quite confident.

From 2nd year onwards, report preparation and presentation on a particular topic, in every semester, strengthens us developing communication and presentation skills. Visiting Industries for the purpose above mentioned gave the opportunity to see and know the things that we actually do learn. SOIES-Nepal's and Departments' co-ordination with other institutions brought us the chance of attending training and seminars.

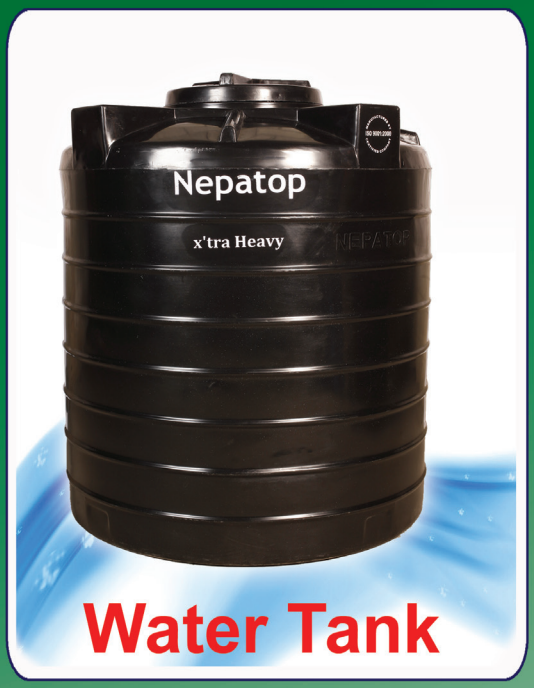
"Nepalese Industrialists and Industries haven't fully realized the benefit we can create for them"

Making a project of our own, applying our own innovative and gained skills, in the 7th semester polishes our practicability. And in the last semester, attending an OJT: 90 days of real-ground hard working and understanding in a particular productive enterprise, and preparing an OJT report on detail process, planning, maintenance, production, marketing or the system as a whole makes a strong foundation, for who we are and what we would soon become – an Industrial Engineering student and an Industrial Engineer. After completion of bachelor's degree, fresh engineer feels more convenient to involve in a job at any low to high scale industry as well as to pursue as an entrepreneur because of the course content and features of industrial engineering syllabus.

We were very happy at the time of getting mechanical engineering equivalence but from my one year experience I have realized that Industrial Engineering is the master of all engineering, which can apply all the engineering principles for advancement, championing technology and technique. At present scenario, Nepalese Industrialists and Industries haven't fully realized the benefit we can create for them, but number of placements we've found isn't disappointing at all. Government as well as private sector can rely upon us to penetrate the globalized market through unique products and technological reforms. Let's do something new to develop our beautiful country Nepal, please think different, please give some effort wherever you are and whatever you do; it's time to change.



Shabda Subash
Industrial Engineer



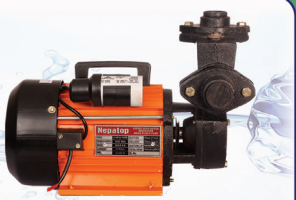
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