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INTERCONNECTEDNESS BETWEEN LAW, LOGISTICS, AND MANAGEMENT (LLM)

STRENGTHENING THE LAST MILE FOR A STRONGER BHARAT

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From achieving sustainable developmental goals through sustainable reforms and evolving capabilities from an individual level to the organizational level, India has broken out of the shackles of low ambitions. Being a signatory to the 2030 agenda for sustainable development adopted by the UN, we are focusing on the spirit of the SDGs towards creating a peaceful, sustainable society and leaving natural assets for the younger generations from whom we inherit them during our lifetimes.

With an exponential increase in climate crisis, energy crisis, and food crisis, new vulnerabilities are occurring more frequently in global trading systems, while each nation is working to increase the resilience of its infrastructure and governance systems. India is no exception to that. However, we as a nation realize that it is only possible when Global challenges are aimed to be dealt with without Borders, to ensure sustainable development and growth while giving value to each life on earth. Given the interdependence in the energy field that the author is focusing on in the paper for explaining concepts and application, it is inevitable that issues arising from it are dealt with in a manner that takes into account the globalized village (Vasudev kuthumbukum).

Vacuum of a global leader with a futuristic vision in the past two to three decades. Shri Narendra Modi (Making of Digital India MODI), has filled that vacuum by being a visionary and leading the world by not dominating over other nations but by extending support to any nation who came looking for it for its development and growth or in times of natural calamities.

From completely solar-powered villages to the sanctions imposed on Russia; the current geopolitical scenario has reflected quite clearly that energy makes the backbone of any nation's development or growth, and we have seen the developed nations suffer majorly because of supply chain interruptions. The aim of the paper is to reflect to its readers that we as responsible citizens at various posts ensure that we do not commit the same mistakes as Karl Marx pointed out, Lessons from past failures can help in Confronting crises across the world pertaining to

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Regulation, De-Regulation, and Re-Regulation globally while providing Regulatory compliances and Standards for a Resilient Indian Energy Sector.

If we go back to the introduction of the Industrial Revolution and thereafter the strides in development in all fields from micro to macro, heavy to small, IT to quantum, conventional to non-conventional, energy in various forms has helped in replacing the age of horse carts, lanterns and candles to ushering in the age of digitalization and artificial intelligence and superintelligence. The Energy Sector has transformed the world and is continuously trying to improve the quest for the betterment of mankind by setting new standards for functioning, operation, and regulation in all sectors.

When we talk about logistics and the definition of logistics in the National Logistics Policy, 2022⁴, it is by letter and spirit applicable to the power sector.

In accordance with section 2 of the National Logistics Policy, 2022, 'Logistics' means Transportation & handling of goods (Electricity) between points of production (Generating Companies /Renewable /Non-Renewable /Conventional /Non-Conventional/ IPPs/ Captive Generators) and consumption (Distribution companies/ Agricultural Consumer/ Industrial Consumer/ Domestic consumer/ Government organizations/ Educational Institutions/ Hospitals Etc.), storage (ESS/ Batteries/ power backups), value addition and allied services.

The logistics infrastructure comprises nodes and connections (SLDC/RLDC/NLDC), more recognizable as ports, stations, Multimodal Logistics Parks (MMLPs (Energy Trading Companies/ Indian Energy Exchange/ Energy Exchange Platforms/ Energy Banking systems), warehouses, and other business premises, connected by roads, railways, shipping, inland waterways, air routes, pipelines, etc., that are used by a wide range of carriers (High Tension and Extra High Tension, Low tension wires and other infrastructure with substations and transformers) The infrastructure has been given open access to use by utilities and consumers on prior permissions from the Regulator and paying of transmission charges, wheeling charges and surcharge if applicable. The most recent development of giving priority of use to infrastructure is with green energy producers or consumers and it is called green energy open access and is regulated by the Green Energy Open Access Regulations, 2022 This system is operated under a framework through a workforce with a wide range of knowledge of skills and technologies. The framework under which the system is operating is a regulatory framework that is established by the Electricity Act, of 2003⁵ with its amendments read with the National Electricity Policies^{6,7} and National Tariff Policies^{8,9}.

With the reforms in the power sector in India, from supply-based reforms followed by efficiency-based reforms to now green energy-led reforms, it is observed that there is gradual progress in the electrification of towns, cities, and villages. Currently, the move is on electrification of the transport system. With the advent of the Internet of Things (IoT), the attempt has been successful for uninterrupted power in the metros, and with further improvement, the path of progress lies in the success of achieving a well-coordinated national grid with adequate transmission and distribution capacity to fulfill the energy requirements of the population and ensuring economic stability to all stakeholders. Also, the vision is to allow

⁴ Section 2 of National Logistics Policy, 2022 w.e.f. 28.09.2023

⁵ The Electricity Act, 2003 (36 of 2003) w.e.f. 26.05.2003

⁶ Section 3 of the Electricity Act, 2003 (36 of 2003) w.e.f. 26.05.2003

⁷ National Electricity Policy, 2005 (w.e.f.....

⁸Section 3 of the Electricity Act, 2003 (36 of 2003) w.e.f. 26.05.2003

⁹ National Tariff Policy, 2005 (w.e.f.....

all generating plants to generate their whole capacity to be able to export electricity to our neighboring nations.

Since the pandemic effect on the world, Electricity has been included in essential commodities, and energy security is now referred to as a benchmark of growth and development across the globe therefore equally important is its logistics management with securing healthy supply chains that are uninterrupted. COVID-19 has made everybody realize that power and the internet are the foremost necessities of the 21st century and energy security is an essential benchmark all nations are aiming at achieving.

According to the National Logistics Policy, 2022, the aim is to reduce the logistics cost in India to be comparable to global benchmarks be among the top 25 nations in the Logistics Performance Index Ranking, and transform into a nation that is making data-driven decisions based on forecasting after algorithm analysis, processing, and computations.

India's progress in the last decade from 2013-2023 has been, is phenomenal when it comes to executing policies and implementing reforms. The Digital India Initiative was executed with the 4Cs for successful implementation, which were conviction, commitment, coordination, and collaboration. This also led to the success of **JAM-** Jan-Dhan, Adhaar cards, and mobile banking facilitating (Financial Inclusion) / UPI Payment system and it helped in ease of business and ease of comfortable living in times of COVID and its positive impact was to leverage technological advancement. Apart from digital banking across the country, the transparency in transactions and the fight against corruption were also impacted by the Direct Benefit Transfer of subsidies and incentives. It also helped the government create and maintain a global digital health ecosystem.

The past reflects on how the powers have been used/misused globally by dominating and manipulating resource-rich States and taking over their Governance and Governments. Most human rights violation issues were faced by these dominated states for exploitation of their natural resources because they lacked the infrastructure to produce the same and populations of many Nation States to date are either recovering from humanitarian crises or still facing the brunt of such crises that were based out of oil and gas supply chains.

The author presents in the paper an analysis of the geographical, social, political, and regulatory setup of the electricity markets transition and the learning from the already experienced transitions discussed in the previous publication¹⁰ and an analysis of the electricity markets status quo and scope of prospective laws and policies.

Despite the heights achieved by the sector at this stage after putting in tremendous efforts by the central and state governments in policy implementation, there were major failures like exorbitant Distribution Losses/Commercial Losses due to inefficiencies of the Discoms in certain states. Also, a few Government Policies initially failed miserably at the Microlevel due to a lack of awareness at the end consumer level and no checking parameters set by the Government for the Discoms in policy implementation and these failures impacted the whole supply chain from tariff increases for consumers to non-repayment of debts to financial institutions or generator bills pending for long durations. Another colossal issue faced for many years now was Infrastructure Development without proper planning raising major issues like Fuel security concerns or Investment Concerns destabilizing the whole financial system in the long run.

¹⁰ Energy Sector Reforms- Supply Led/Efficiency Led/ Green Energy Led. Available at <https://www.ijser.org/journal-volume13-issue10-October-2022-edition-p5.aspx>

For Example, contrary to the green energy transition, projects aimed at thermal capacity addition with various aspects like ramping up coal production by both the public and private sector in a time-bound manner, increased participation of the private sector in coal production, and easing of the regulatory framework, clearances and approvals for allocation and development of coal blocks & gas infrastructure needed immediate attention and were addressed while formulating such reforms that eventually phase out thermal power plants. Presently the thermal generation capacity is on the line of risk for fuel security demand-supply gap, pending power purchase agreements with a significant gas-based capacity of more than 20,000 MW is idle due to the non-availability of gas.

Another illustration is Legacy PPAs between thermal power plants and distribution companies, and one more such illustration is the nonpayment of subsidy funds by the government under Section 65 of the EA, 2003. Subsidies promised to consumers but not provided to the company supplying electricity to the consumer affect the whole supply chain due to non-payment impacts clearance of bills and other financial obligations of the distribution company. Such issues need to be resolved before they can occur by forecasting and analyzing the trends of all the states and stakeholders as it makes the whole sector unsustainable.

Also, based on prior transitions implemented, delayed, and achieved in India and the discrepancies observed, the shift also has to focus on legislation and the reforms to be introduced in the legislation. The legal evolution needs to shift to a point where legislative or policy proposals are futuristic keeping precautionary legislations based on innovative research and development in technology to prevent future legal ramifications or implications because of risks not analyzed during the phase of architecturally laying down the green transition.

The objective of the research is to present in the most effective and precise way to examine the balance between ambitious pledges and realistic expectations at the national and global levels while ensuring innovative solutions in logistics and supply chain management like the Market for Solar /Wind Panels/Export Duty and Custom Charges for Panels vs. Incentivizing solar/wind panel manufacturing in India.

Further, the author thinks that it is imperative to enable risk mitigation and provide a paper that can promote analytical reading and correlation for more mass awareness regarding the responsibility that comes on each of us with our national leaders inspiring the world to follow Bharat by the visible results of a balanced economy when the world was facing an economic imbalance and show growth reflecting interconnectedness and setting an example of cooperation and support based leadership as opposed to financial domination for the generations to come.

Further, green energy is our collective interest as stated by Shri S. Jaishankar while addressing members of the International Solar Alliance on capacity building under the Indian Technical and Economic Cooperation programs¹¹ and is also working with other nations to address the global challenge of climate change particularly in line with the Paris Agreement¹² and the International Climate Negotiations.

¹¹ Hon'ble Prime Minister, Shri Narendra Modi, "India is a country which has always played a constructive role on the world stage. Our offer of development model is not based on give and take, but it is guided by the developmental requirements fo partner countries. Our focus has always been capacity building and resource development and strived for collective team work at all forums of our developmental partnerships,last accessed at [ITEC :Indian Technical and Economic Cooperation \(itecgoi.in\)](https://itecgoi.in) on 05.05.2023.

¹²To tackle climate change and its negative impacts, world leaders at the [UN Climate Change Conference \(COP21\) in Paris](https://unfccc.int/paris-agreement) reached a breakthrough on 12 December 2015: the historic [Paris Agreement](https://unfccc.int/paris-agreement).last accessed at [The Paris Agreement | United Nations](https://unfccc.int/paris-agreement) on 06.05.2023.

Energy is a highly capital-intensive industry; nations are welcoming investments for green energy development and are trying to make themselves secure in the present time in terms of energy security as all vertical supply chains start from the financial institutions/banks. The financial policies and the modes to recover the investments also need to be preventive with respect to the financing of the transition. Banks/ financial institutions are stepping up actions in relation to climate change and taking on an increasingly important role in supporting the energy transition. However, green logistics need to be properly planned for a successful value-creating supply chain.

Given the prominent role that the financial institutions play in the financial markets financing the energy and in influencing financing conditions, they can act as a powerful catalyst in addressing climate change. However, their involvement and the potential consequences need to be evaluated in light of the trade-offs that banks face.

The need for creating an upgraded infrastructure that is in synchronization with the digitally transformed infrastructure using Artificial Intelligence, Algorithms, and data analysis for operational and functional computation of business decisions and logistics management. The shift towards global markets and international contracts with a digital future shall be more transparent, easier to regulate, and more effective. Moreover, concealed facts and dishonest compliances may attract major legal implications ensuring the letter and the spirit of the law is followed. However, if disclosures are made and compliances are met systematically, the transition from manual to AI analysis of data will ensure a positive impact on the economy and retain the position of trust and growth in the energy economy.

Eventually, the transparency with technology taking over data analysis shall restore lenity and justiciability with the decision-making institutions and work without the ability of certain persons using their position or profession to manipulate the system in the interest of one individual over social equality and public welfare. The ability of the Statutory Institutions to respond to issues shall increase with the shift from corporate sustainability to environmental sustainability.

The major issues where strong regulatory and policy interference shall be required are

- a) Preparedness of Infrastructure from generators, transmission, and distribution utilities to each consumer's household by way of centralized control systems that are a part of the grid to protect the infrastructure from the solar blast radiations to prevent loss of infrastructure in cases of solar flares or any EMP radiations that can impact the system.
- b) Preparedness of all utilities in their corporate governance practices and work ethics from corporate sustainability to environmental stability. This shall include the approach from the top management to the last man working towards the environment, ecology, and the risk of climate crisis and ecological disasters. This may include awareness workshops, nature restoration activities, and diverting CSR or part of the CSR towards greening the planet.
- c) Preparedness of utilities for people going off the grid due to awareness, technological advancement, and innovation for sustainability.

As the transitions have been discussed with the inherent risks, the last part of the article is the issues that need legislation that focus on the RE of the Re-regulation.

With the phasing out of the coal thermal power plants and the technology and infrastructure becoming obsolete, REUSING and RESTORING the same should be a priority. Most thermal power plants are public assets and affect the taxpayers directly or indirectly. The legislative development needs to ensure that such infrastructure including land, machinery, and a lot of

capital is revamped with the use of technology. One of the ways may be to use thermal power plants with technological advancement to promote waste to energy and secure landmasses that are huge landfills in the present-day metropolitans. Singapore is a positive example to learn from where they have reached a state where the waste of its population is REUSED as a RESOURCE for the generation of electricity.

The other area that needs Regulatory interference is the silicon from solar panels that is completing its lifecycle. The Central Pollution Control Board has come up with Rules. However, understanding the interconnectedness at all levels and data availability with the Regulators and the utilities, Silicon Disposal Rules are another priority for legislative reforms in the transition keeping in mind the Vision of the Government and the targets of installing solar power infrastructure.

Now coming to the Productivity Paradox where an organization is considered a function of production and in India, humanitarian values ensure that human resources are skilled and not exploited as factors of production but efforts are made to improve the lifestyle and standard of living for all citizens of the country. Further, it is imperative to ensure that legal reforms with the spirit of justiciability and interconnected growth and development guide the Energy transition while fostering a sustainable human-machine nexus that works intelligently and the Digital transformation is embedded in the systems to ensure efficiency, efficacy, effectiveness, accuracy and ensure regulatory compliances for a value-creating sector ensuring healthy and sustainable supply chains. Legal reforms need to be preventive in nature based on analytics provided by forecasting models and algorithms rather than curative to resolve disputes or come into force after the losses have been incurred interrupting the complete supply chains.

The sector faces various regulatory and governance challenges from the micro to the macro level. A resilient infrastructure based on the three principles of architecture needs to be integrated including energy and technology to ensure we reach the goals we have set for ourselves for 2030, 2050, and 2070 in terms of climate, sustainability, and our impact on Mother Earth. Architecture by Vitruvius gave three principles of architecture¹³:

The author believes that when we are working on our energy sector transformation and digital transformation, we need to integrate them and apply the principles hereunder,

- A. *Firmitas*: Ensuring that the infrastructure we are building or working upon is firm, resilient, flexible, robust, and has the capacity to withstand external destructive forces like cyber-attacks, internal processes, employee resistance, international unrest, physical risks to infrastructure due to solar flares and EMRs. Further, we need to ensure that the infrastructure has structural strength, and stability and there is an increase in its scale of utility.

The analysis that needs to be updated periodically is the current strength of the system, the needed strength with the growth of utilities on the demand and supply side, and the needed transformation.

- B. *Utilitas*: Here while developing the infrastructure or ensuring its resilience, we also need to ensure how it will help the institution, organization, and nation in performance gain in accordance with the utilitarian approach. How will the infrastructure help in utility performance and how will it benefit computational growth in processing information for the utility's growth?

¹³ The Oxford handbook of Greek and Roman art and architecture. Marconi, Clemente, 1966—. New York. 2015. [ISBN 978-0-19-978330-4](https://doi.org/10.1017/9780199783304).

An example of this principle is the use of voice analytics in the banking sector wherein DBS Bank analysed the data collected under voice analytics and segregated the complaints and compliments with their reasons to analyze customer response. Such kind of infrastructures help organizations develop co-relation algorithm classification, hypothesis testing, and causality detection.

Similar infrastructures can be developed for detecting or preventing energy theft, unauthorized use of energy and prevent accidents due to energy leakage.

- C. Venustas This principle of ensuring a harmonious relationship of the infrastructure with its external environment is equally important when we are dealing with a sector that is interconnected to all other sectors and impacts each human life. The relationship of the infrastructure with its environment should be beautiful for the smooth functioning of all operations, i.e., it is embedded with its external surroundings. The current need to develop the physical infrastructure integrated with digital transformation should have a positive impact on its external environment which includes but is not limited to
- a) Broader Public
 - b) Customers
 - c) Regulatory Authorities
 - d) Government Authorities
 - e) Employees/Employers
 - f) Students
 - g) Etc.

Government or Organisational dilemmas in the transformation of digital architecture and operational semantics of an organization lie with issues like impact on employability, employee comfort with technological advancement, steady supply chains, logistics management in transitioning to a transformed system, etc. other than health and safety issues, like in automatic self-driven cars and the need for developing further infrastructure to prevent accidents. These developments will ensure sustainable infrastructure, resilient supply chains with technological advancement, a smooth transition into the new era of businesses and policy implementation while resolving the challenges of the logistics sector, and open scope for entrepreneurs and innovators to grow and excel. Therefore, the need for the development of integrated infrastructures applying all the principles of architecture shall help us develop resilient, steady, stable systems that will ensure **STRENGTHENING THE LAST MILE FOR A STRONGER BHARAT**.

An example of the more overlooked **Social Dimension** in the veil of corporate sustainability is the legislative reforms with policies and bills for the privatization of distribution business and segregation of supply from distribution business have been ignored. The government has been consistently working towards the electrification of a whole nation with the highest population at affordable costs to the end consumer. We have included this as a Universal Service Obligation (USO) under Sections 42 and 43 of the Electricity Act, 2003 under the duty to supply on request making it obligatory for the distribution company to provide electricity to the consumer who has filed an application. However, at certain times, the discom faces losses due to such connections that do not have the capacity to pay or are subsidized by the government hasn't paid for. The question that arises is, how long will the private sector companies follow USO and face losses when they are entering the business for profits?

Other risk factors are the efficiency of companies in transmitting energy or being able to recover their bills. All of this depends on the various capabilities from strategic capability,

financial capability, economic capability, and technical capability of the supplier and the consumer.

An analysis of legislative provisions and their interpretation as understood in theory and applicable in the industry to be a reasonable base is mandatory for such policy proposals or presentations toward the vision of a nation that has energy security and energy transition with the least impact on the ecosystem. Therefore, the RE should be open to various interpretations from REUSE/RECYCLE/REVIVE/REVOLVE/REGULATE/REREGULATE/REUNITE in our objectives to achieve sustainability.

The author thinks that it is also a necessity that we analyze and deal with the (ESG) Environment, Social, and Governance Regulations coming up across the world, and their applicability, impact, and implication analysis with preparedness. Regulation of ESG should come in line with the vision of sustainability and not as curative measures for another green eye wash from corporations leading us to a food and energy crisis. All sustainability models need expert analysis with horizontal and vertical supply chain sustainability to ensure the whole sector runs smoothly ensuring the national sustainability index rises.

Sustainability across the globe for a number of decades has depended on the energy security of a nation or its ability to manipulate energy resources and trade globally. To become a strong economy as we envision, we need to mostly revolve around fostering a sustainable and evolving human-machine nexus ensuring that interconnectedness is understood and actions implemented in line with that understanding, and trying to ensure that businesses and community leaders make the environment sustainable, aware and responsible end ensure more resilient supply chains and with the growth of our nation and its resolve for the near future and the goals set, it is also imperative to build a sustainable infrastructure and utilize and make accessible all existing infrastructure to ensure a smooth transition into the new era of businesses and policy implementation. We, as a nation have progressed and are now supporting other nations in their energy transition, production houses, and manufacturing units with the objective to fulfil our demand and aim towards export, hybrid ESS, working towards and achieving SDGs, and working with the national logistics policy,2022, G20 presided over and was beautifully led by India and our leaders with a stronger will than the strong vision.