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# Navigating the Future of Energy Law: Legal Frameworks, Policy Challenges, and Sustainable Transitions

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**ABSTRACT**

*"The relationship between the importance of building a society with dignity of life and national economic development which will result in people living in a clean and green environment without pollution, having prosperity without poverty, peace without fear of war and a happy place to live for all citizens of nation."*

*— Dr. APJ Abdul Kalam*

The paper discusses the interface of the present Environment law with the ever-growing energy law in India. Environment law today predominantly consists of the Air Act[2], Water Act[3], Environmental Protection Act[4](umbrella legislation) and the Forest Act[5].The Energy law regime in India is deeply characterized by the Electricity Act[6]. The Electricity Act, 2003 opens the door to immense possibilities in unleashing competition and trading, but at the same time opens a new area of policy risk, which it is supposed to mitigate. The act has an enabling framework to introduce competition in generation, and privatization in distribution, but work in terms of addressing transition issues remain undone.[7] Both streams of law lay emphasis upon having a future that can sustain at the present conditions, if not better and certainly not worse.Environment law puts it forward in terms of preexisting norms and energy law speaks of the same in terms of what has been produced and transmitted and what is to further entail. What we are talking about is the nature and application of energy production and effects it has on the environment,with reference to renewable energy and sustainable development. Then extpoint of discussion that emerges is of overlap of the two laws, *i.e.* environmental concerns raised by energy production. Lastly, this paper seeks to justify and provide plausible solutions to the dearth of legislation in this field and a humble advice for the procurement and establishing of a statutory frame work in keeping with this goal.

***Keywords:*** *Environment Law, Energy Law, Electricity Act 2003, Sustainable Development, Policy Risk, Regulatory Interface.*

## 1. INTRODUCTION

"There is no life without light."

— S. R. Krishnamurthy Iyer[8]

According to an IMF report, global energy subsidies—especially for fossil fuels—exceeded five trillion dollars in 2014.[9] This staggering figure underscores the economic scale of fossil-fuel dependence and its policy implications. Meanwhile, Indian environmental jurisprudence has evolved significantly over the past two decades, firmly recognizing the right to a clean environment as part of the constitutional guarantee to life under Article 21.[10] Within this legal landscape, energy law has emerged as a framework governing how energy resources are accessed, distributed, and regulated across private entities, governments, and even between States.[11] Although energy production was once synonymous with pollution-heavy sources, recent trends show a marked shift toward cleaner, renewable alternatives.

**Energy**

"*The average cost of power generation compares quite favorably with new coal/thermal/gas based projects and captive diesel gen sets. While in future the cost of renewable energy sources might decline, the cost of conventional energy law sources is bound to rise up"*[12]

Energy comprises of primary, secondary and subsidiary sources, and hence energy should not be restricted to the primary sources only. Electricity, though a secondary source, is easily harnessed and is the most important source of energy, being the most legislated upon one as well.[13] Light is life and clean energy development can provide a valid ground for generation of income in the International arena.[14]

In the 1990s, global environmental problems, among other nations came to be highlighted worldwide. Nearly 60% of all Carbon Dioxide emissions that account for great portion of greenhouse gasses are originating from energy consumption.[15] International Energy Agency projections reveal that about 90% of the primary energy production in future would come from transitioning and developing countries as against 60% in the last three decades.[16] This happens because many developing and least-developed nations are well endowed with natural resources. The point here is that energy is necessary and it consumes resources, either which are a part of nature or whose synthesis is harmful for the nature. Therefore, either way, there is bound to be some adverse effect on the ecosystem. Now the question that arises is,whether the environment is worth risking in order to establish a better future, and if yes, then to what extent?

## 2. GENERAL JURISPRUDENCE BEHIND SUSTAINABLE DEVELOPMENT

As defined by the Brundtland Commission, "sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.".[17]In the landmark case *MC Mehta v Union of India*[18]the Supreme Court of India contextualized sustainable development for the Indian legal system, identifying key elements such as the precautionary principle and the polluter pays principle. The former urges authorities to anticipate environmental harm and act proactively, while the latter holds that if environmental damage occurs, the entity responsible should bear the cost of remediation..[19]These principles now serve as foundational pillars in India's approach to environmental governance.

Also known as the *Shriram Gas Leakage Case*[20], it raised an enormous question on the practice and liability of big houses that are carrying out actions related to the public welfare. Though this case had the question of hazardous commodities'disposal and the question of absolute liability it attracts answered, this case is relevant in our scenario for the reason that it involved the question relating to something intrinsically related to public,just as is the case of energy producing entities. Enquiry of the same can be done under the following principles: **State action principle**

Under this principle if the body doing the particular work is involved in doing a work which also happens to fall under public policy,then the principle we have borrowed from the US jurisprudence will come into picture and the polluter will have to pay.

**Absolute liability**

The rule in *Rylands v Fletcher*[21]provides that a person who for his own purpose brings to his own land something so dangerous that is likely to injure the surroundings he/she is liable for compensation. The rule was considered to be inapplicable in today's economy.

**Deep pocket theory**

The principle laid down in Rylands v Fletcher[21] holds that when an individual brings onto their land a hazardous substance that escapes and causes harm, they may be held strictly liable for the damage caused, regardless of intent or negligence. However, this rule has faced limitations in modern industrial contexts where risks and impacts are more complex.

The Deep Pocket Theory, often invoked in environmental litigation, suggests that liability and compensation should be proportionate not just to the harm caused but also to the financial capacity of the polluter. This ensures that powerful entities cannot escape accountability due to their economic dominance. In contemporary legal and policy discourse, it has been observed that emphasis has increasingly shifted toward the 'sustainability' aspect of development, sometimes at the cost of equitable progress.

## 3. APPLICABILITY ON THE SAME PARALLEL

Much like the build of Intellectual Property law and Competition Law, which are joined by the final objective of consumer satisfaction[22], Energy law and Environment law shall be read in accordance for the very reason of the utility towards a sustainable future. The moment we merge the concepts of energy law and environment law into one and think about it in the terms of its utility according to the sociological school of law, the most obvious choice that comes to mind is that of renewable energy. The direction of renewable energy is not only progressive, but also beneficial.

## 4. RENEWABLE ENERGY

In an effort to encourage the use of cleaner energy, the Rajasthan Electricity Regulatory Commission (RERC) introduced regulations in 2007 and 2010 mandating that captive power producers and open access consumers procure a minimum share of their electricity from renewable sources. These mandates align with constitutional and legislative objectives—particularly Article 21 of the Indian Constitution, which guarantees the right to a healthy environment—as well as the broader goals of the Electricity Act and the National Environment Policy.[23]The rationale behind these renewable purchase obligations is rooted in public interest, aiming to reduce environmental harm and promote sustainable energy practices.

A draft resolution by the name of National Renewable Energy Bill, 2015[24] has been compiled. The Bill seeks to familiarize the sense of 'energy' that carries the connotation of yesteryears and mold it into new spheres, and the purpose of this proposed act is to promote the production of energy through the use of renewable energy sources in accordance with climate, environment and macroeconomic considerations. This Act shall in particular contribute to ensuring fulfilment of national and international objectives on increasing the proportion of energy produced through the use of renewable energy sources.[25]It mandates a national policy for renewable energy,which shall come within 6 months of the Act coming into force.[26]

Integrated Energy Resource planning (IERP) is a strategic plan for securing reliable and cost- effective energy resources. The plan is an exhaustive, research-based examination of potential risks and opportunities in procuring future energy supplies.Such a planning exercise will examine all available energy-resource options, including supply side as well as demand side options and evaluate all resources to maximize energy, environmental, and economic security[27]

The terms 'energy' and 'power' have no wide legal connotation attached to them, courtesy their absence from the Black's Law Dictionary, yet in the common parlance, both these words can be used interchangeably.

The definition of 'power' as provided by the Factories Act, 1948 is very restrictive, and does not take any such power which is not mechanically transmitted or is produced by human or other organic means.[28] Considering the source of the authority, we can also say that this definition presumes that 'power' and in turn 'energy' can arise only from a place of the same genus as 'factory',hence leaving the greater lot of renewable energy sources to no avail under its ambit.On the other hand,the Electricity act provides for the definitions of'electricity'[29]which is only

electrical energy and no other. This definition again leaves the likes of biogas, solar energy and tidal energy till a great extent.

A separate creation was done in the direction of renewable energy in the form of a different executive head of the government in the year 1992. Earlier the same was known by the name of Ministry of Non-Conventional Energy. The Ministry of New and Renewable Energy (MNRE) is the nodal Ministry of the Government of India for all matters relating to new and renewable energy. The broad aim of the Ministry is to develop and deploy new and renewable energy for supplementing the energy requirements of the country.[30] Following are the different types of new and renewable energies available to us, and their analysis on the fronts of development of laws, technology and effects on society:

## 5. SOLAR ENERGY

As a freely available and abundant natural resource, solar energy holds enormous potential for meeting growing energy needs sustainably. Although the technology required to harness it may involve upfront investment, the long-term environmental and economic benefits far outweigh the costs.[31]

Recognizing this potential, the Ministry of New and Renewable Energy (MNRE) launched the *Solar Cities Programme* to promote renewable energy adoption in urban settings. The initiative aims to assist municipal bodies in developing strategic road maps to transform their cities into solar-powered hubs, integrating clean energy into infrastructure, governance, and public-private partnerships.[32] The Goal of the program is to promote the use of Renewable Energy in Urban Areas by providing support to the Municipal Corporations for preparation and implementation of a Road Map to develop their cities as Solar Cities. The objective of the programme is to oversee the implementation of sustainable energy options through public - private partnerships.[33]

We are blessed with Solar Energy in abundance at no cost. The solar radiation incident on the surface of the earth can be conveniently utilized for the benefit of human society. One of the popular devices that harnesses the solar energy is solar hot water system.[34]

## 6. BIOENERGY/BIOGAS

Biogas represents a renewable and locally accessible source of energy, already in use but continually evolving with technological innovation. One complementary environmental strategy often discussed alongside biogas is large-scale afforestation, aimed at reducing atmospheric carbon dioxide levels. While tree planting offers environmental benefits, experts caution that this solution only temporarily delays the impacts of emissions, as forests take decades to mature and absorb $CO_2$ effectively.[35]Moreover, methane—a key component of biogas—is significantly more potent than carbon dioxide as a greenhouse gas, making its controlled use both a challenge and an opportunity for climate mitigation.[36]

The Indian authorities have also taken into account the utility of the same in the village community. Indian government provides subsidy in the sphere of biogas generation. The plants that are purchased can be purchased in the subsidy brackets of Rs 60,000[37], Rs 52,500 and Rs 45,000 depending upon the capacity of the biogas plant.[38]

## 7. HYDRO ELECTRICITY

In the United States, only a small fraction of dams—around 5%—are primarily used for hydroelectric power generation, with the majority serving other functions such as recreation or irrigation[39,40].

India is blessed with immense amount of hydroelectric potential and ranks 5th in terms of exploitable hydro-potential on globalscenario,and has a better perspective towards

hydroelectricity. As per an assessment made by CEA, India is endowed with economically exploitable hydro power potential to the tune of 1,48,700 MW of installed capacity.[41]

Despite its classification as a renewable energy source, hydroelectricity has been criticized for its significant ecological footprint. The construction of large dams can drastically alter river ecosystems, disrupt natural sediment flow, and displace communities. In fact, some studies suggest that, on a per-unit basis, the environmental impact of hydroelectric projects may exceed that of other renewable sources such as solar or wind energy.[42]Building a hydroelectric projectbtakes a few years,changes the surrounding geography and disturbs the biological balance. It is self-explanatory that the same ends up distorting the natural river routes. No silt in the previous agricultural areas is another one of the problems.

## 8. REQUISITE OF THE GREENER FORM

"*Energy is allowed to influence income growth indirectly by capital accumulation through input substitution*."[43]

It is of utmost importance and urgency to have an alternate greener source of energy; we must move on to the requirement of why does it also need to be renewable.When we talk about environment conservation,we mean to say that there must be(1)sustainable development and(2) leaving the environment undisturbed until the extent possible. Therefore, once we start talking about conservation,we end up focusing on both the points in a quasi-negative way. If we conserve are source for its use in upcoming times,we do not cut down on the effective use of the.resource, but rather use it in the future and hence pollute further in the future. Therefore in the present we live in an environment cleaner than the one we would have had (had we used the resources), and hence it is closer to sustainable development.

## 9. MOVING AWAY FROM CONVENTIONAL OIL USAGE

The International Energy Agency (IEA) projected in its 2006 report that fossil fuels would continue to dominate global energy demand, accounting for nearly 77% of the anticipated growth between 2007 and 2030, particularly in developing and transitional economies.[44]

This reliance has raised serious concerns regarding environmental degradation and long-term energy security.In response to such concerns, both international and domestic frameworks have evolved to incorporate sustainability into energy governance. Global initiatives, such as the UN Global Compact, promote human rights and environmental responsibility, while the oil industry has adopted voluntary disclosure and sustainability reporting.India has also taken several institutional steps to promote energy efficiency. The Petroleum Conservation Research Association (PCRA), originally set up as the Petroleum Conservation Action Group in 1976, was later formalized as a registered society under the Societies Registration Act.[45-47]

It functions under the Ministry of Petroleum and Natural Gas to implement fuel-saving strategies. Later, the Energy Management Centre (EMC) and the Energy Conservation Cell under the Ministry of Power were established to integrate conservation policies at the national level.[48-49]These efforts illustrate India's gradual shift toward structured and policy-driven energy sustainability.

.Scholars have made numerous proposals,falling under the scope of soft law like laying down comprehensive voluntary codes,[50]formulation of a'natural resource charter',and setting international standards for environment related governance.[51]

Hence, the first action must be to stop using oil in the way we have been using until now. Even though we have not developed a lot of tech in DE-polluting the effects of coal and its subsequent energy,oil. has been as major and an equally potent polluter. If a move from the conventional'oil' is *easier said than done*,we have a call to make sure that until it is done,we act in away that does not hamper the environment so utterly.

## 10. EFFECTIVE OVERLAP

Given the functional relationship between environmental and energy laws, it becomes clear that activities governed by one legal regime often fall within the regulatory ambit of the other. For example, while environmental laws aim to safeguard natural resources and prevent pollution, many of the entities regulated under energy law—such as power plants, transmission networks, and fuel processors—are directly responsible for environmental impacts. As such, any comprehensive legal

framework for energy production must also account for environmental consequences, and vice versa. This mutual dependence highlights the need for integrated regulatory strategies that balance development objectives with ecological responsibility.

## 11. DEFINITIONS

The Environment (Protection) Act, 1986 does not explicitly refer to power plants or energy-producing facilities. Instead, it uses broad terms such as "pollutants," which apply regardless of their source.[52]This general framing makes it challenging to determine whether liability should be imposed primarily at the stage of energy generation—where emissions and waste are directly produced—or at the stage of energy use, where environmental harm may be more diffuse but still significant. A more rigorous and holistic approach would be to recognize liability at both ends, ensuring that energy producers and users alike are held accountable for environmental degradation.

Electricity Act defines'generating station'as any place that generates electricity.[53]This definition restricts the coverage of non-electrical sources from coming under the ambit of the only comprehensive piece of energy legislation at hand.However, since the super set is the domination of the environmental laws, we can still count on the environment legislation.

General rules of establishing structures of energy productionare that:

- No industrial plant can be established without the permission of the State Board established under the Air Act.[54]
- No person running an industry shall exceed the standards set up by the StateBoard established by the Air Act.[55]
- No person can discharge effluents in any stream unless there is a sanction from the statutory body.[56]
- Disposal of wastes in a proper manner is also required under the present law,and the same can be regulated according to the needs of the state government.[57]

The Water Act uses the expression 'trade effluent', which means any matter discharged in water that comes from non-domestic sources.[58] Unlike the Air Act, Water Act does not make sure that pollutionofwaterordischargeofeffluentsinwateratanypointoftimeateverypointinthestate is prohibited. At times, the area of operation of the Water Act can even be restricted.[59]

By and by, the Environmental Protection Act on the other hand provides a scope for wider interpretation, as the expression of 'occupier' is any person who is under the charge of handling any factory or premises.[60] This brings us to the definition of 'factory'. The same must be established if we have to imply any liability on the government for polluting through powerplants.

Current environmental legislation in India, including the Environment Protection Act and the Air Act, does not explicitly list power plants as a separate category of polluting installations. Instead, these laws refer broadly to "industrial plants" and "chimneys" as sources of pollution[61-62]Although terms like "factory" and "plant" are often used interchangeably in everyday language, their legal definitions differ. For example, the Factories Act, 1948 defines a factory based on the number of workers employed and the use of power in manufacturing processes.[63]This definition may not adequately encompass all forms of energy production facilities, especially those involving non-manufacturing processes like solar farms or wind turbines. Consequently, many renewable or non-conventional energy sources remain outside the strict purview of traditional regulatory categories.

Nuclear energy production facilities are often classified as "plants" and thus fall within broader industrial categories relevant to environmental regulation. A notable case in this context is *G. Sundarrajan v Union of India*[64],where the petitioners challenged the environmental safety and constitutional validity of the Kudankulam Nuclear Power Plant in Tamil Nadu. Although the Supreme Court upheld the plant's operation, it emphasized the state's responsibility to ensure strict adherence to environmental safeguards and radiation safety protocols in compliance with Article 21 of the Constitution.This judgment highlighted the judiciary's reluctance to interfere with technical policy decisions, while simultaneously underscoring the importance of balancing developmental needs with ecological protection.[65]In the global context, concerns over nuclear disasters—such as Chernobyl and Fukushima—have led several countries to reassess or phase out their nuclear energy programs, prioritizing safer and more sustainable alternatives.[66]

## 12. DEFENCE

The Environmental Protection Act acts as an interface between the governments at the Central and at the State levels,as is exemplified by Section 3 of the Environmental Protection Act,which says that in the ambit of environment,where the State has the power to make/draft laws,even the Centre can take certain actions.The act also enumerates the principles of sovereign immunity and liability of governmental officials, in the reverse order in its provisions.[67]

Under current legal frameworks such as the Public Liability Insurance Act, 1991, and the Environment (Protection) Act, 1986, certain exemptions apply to government officials in cases involving accidents caused by hazardous substances.[68-.[69]Specifically, departmental heads may only be held liable if it is proven that the accident occurred with their knowledge or

due to their negligence. This creates a high threshold for accountability, particularly in complex energy production operations involving multiple layers of administrative control.

Another significant limitation lies in the mechanism for initiating legal proceedings. Courts generally act only when complaints are filed by affected individuals or referred by authorized government agencies.[70]In practice, this procedural gate keeping can hinder timely redress, especially when the source of pollution is a large-scale facility like a power plant- can further dilute environmental accountability unless judicial oversight remains robust.[71]

## 13. CONCLUSION

The interaction between energy law and environmental law reveals a growing interdependence that, while not always explicitly codified, is becoming increasingly evident in practice. As the demand for energy continues to rise and environmental concerns become more pressing, legal frameworks must evolve to ensure that both objectives—development and sustainability—are addressed in a balanced manner.

This paper argues that a transition toward renewable energy is not only environmentally necessary but legally imperative within the broader framework of sustainable development. The jurisprudence principles of precaution and accountability must apply equally to government-led energy initiatives as they do to private enterprises.

Ultimately, ensuring environmental protection in the energy sector requires not just legislative reform, but also an integrated policy approach that aligns energy production with ecological preservation. A sustainable future demands that energy development be both legally accountable and environmentally responsible.Balancing “sustainability” and “development” within sustainable development requires clarity: if sustainability is prioritized, even government-run energy production must be held accountable for environmental harm. If development is emphasized, certain ecological costs may be tolerated for future growth. Resolving this tension—especially where sovereign immunity is claimed—requires legislative or judicial action.

In essence, the absence of detailed regulations should not obstruct responsible energy governance. Sustainable development offers a guiding principle to ensure that access to natural resources like water and wind is legally safeguarded, aligning energy law with environmental protection.

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