Retraction

Retraction: A Review: Role of Energy Resources in Development of India (IOP Conf. Ser.: Mater. Sci. Eng. 1116 012045)

Published 31 March 2022

This article has been retracted by IOP Publishing following an allegation that this may contain tortured phrases [1], masking overlap of other work without citation [2-5]. IOP Publishing has investigated in line with the COPE guidelines, and agree this article should be retracted.

IOP Publishing wishes to credit an anonymous PubPeer [6] commenter for bringing the issue to our attention.

The authors agree to this retraction.

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Retraction published: 31 March 2022
A Review: Role of Energy Resources in Development of India

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Abstract. This paper suggests that in the present period, energy is significant for the improvement of the nation. It is all in all correct to state through this paper that it is difficult to build up a nation without energy. Along these lines, it is essential to think about energy and its resources. It was likewise determined what approaches and steps the administration took to secure assets. It has likewise been clarified that assets ought to be utilized cautiously because there will be when non-standard energy assets will be nearly termination. So this should be kept in mind beforehand. If talk about standard energy resources, then it should be used more and more as it has many benefits such as no pollution, and this type of resource is very cheap. So in the last, it is summed up that without energy assets, human life isn't simple on the earth. Therefore, people should be used according to the need.

Keywords: Energy Resources, Renewable energy, Non-Renewable energy, Solar Energy, Wind energy

1. Introduction

As one of the basic parts of framework, vitality is fundamental for financial development. India has an alternate power division running from standard sources like coal, combustible gas, oil, hydro and nuclear imperativeness, to capricious sources including wind, sun fueled, and bio-waste [1]. The interest for power has extended out and out during that time and is simply expected to create. With the assurance to get capacity to each home the country, the organization continues stimulating breaking point extension in the country. India is third on the planet for basic essentialness use after China and the United States, using around six percent of the overall basic imperativeness. So let's start with renewable and non-renewable and why they are needed. What is the benefit of this for the development of the country? So first of all know what is energy. As much as there is fight in the world for whom? So the answer is for energy. Which is also called power. Meaning that whoever works in the world is not without power. And the most basic power is human energy or muscle power. The power that comes in the hands of human beings, by which they work in their home or outside. In the language of science, it is called mechanical energy. Suppose a man can definitely work in a day. For example, if a man has a bakery job, he can complete a certain order by putting all his hard work, but suppose that man has to make 60-50
cakes, then he will need 10 or 50 laborers. Like in VLSI field of electronic branch, always try to propose a circuit which is high energy efficient with low delay [9] and Now, if you want 100 in software or you want 1000 worker in Google, then this is the energy or power that you have to make people work. Just like you have to do things from one place to another, it also needs energy. So to say that if there was an old age, it needed muscle power, then this energy was used in the past. So what happened now slowly came the machine age, due to which people started feeling lazy and did not need to read muscle power, people became dependent on the machine. Now it comes to whom the machine is run, the second type of energy that has come on development is that what is the electricity energy now that you can first convert this mechanical energy into electricity energy [1][4]. Just like before there was farming, the bull was also giving its mechanical energy. Even if the farmer is pulling the bull, he is giving his mechanical energy. Now after a while, the era of tractor has come. Now as the tractor is doing what is going on petrol, what he is doing for him is that the petrol is first converted into mechanical energy and then using it. The second is like an electric vehicle with a people like example, then it will be changed from electric to mechanical and then use it. This means that people are bringing energy in a hurry to work, to simplify industrialization, to simplify their lives. People have the energy of people, but they are limited, that is, very few. Just like people have to go for 2 kilometers, people have energy but it will take a lot of time and the world is moving very fast, the world wants to reach 2 kilometers in 2 seconds. If people can use the metro, then petrol or diesel will also be used in it, that is also energy, if seen from a type. So to say this is that energy plays a very important role in advancing the world or our India. Very important thing is for the development of the country. Therefore, Researchers are paying more attention to this topic. But nature is very clever and current she wants people to be slow. Nature wants people to move forward by nature and people do not want to advance their ambitions much. So when do people use any energy outside their body? Like naturally, electricity was meant to shine in the sky and humans trap it and use it from many places. Petrol and diesel were fossils, they were not meant for people and they learned to burn them out of the ground. So people have made their life faster and better. But nature does not like this thing, only when people want to do more than nature, then some of its ill effects are also seen. Therefore, in this paper, we are talking about energy because the world is running with energy. Whoever has the strength, who has the strength of the machine, the strength of the people, the strength of different types, then they are that much development. All the leaders are there, they have the power of people, now they are software companies like Google. So this is what people fight for. So after removing all the rest, in this paper, we will focus on energy only.

![Types of Energy Resources](image)

**Figure 1. Types of Energy resources**
So in this paper we will study carefully about renewables and non-renewables. And one by one will know about its types and how people can use this energy to develop the country and how the government has made projects and stations so that people will use this energy as much as possible.

2. Types of Energy Resources

So first of all, we know that there are 2 types of energy, renewable and non-renewable energy. So renewable power is the power that people are getting, it can never end. When will the renewables end when the world itself ends.

![Different types of sources](image)

**Figure 2. Sources of Standard energy**

**Figure 3. Standard Energy Benefits**
This means that there is no limit to the renewable strength that is getting. There is no need to save anywhere, they are just becoming every day and getting daily. And non-renewable strength is the strength that people have with some collections. And those collection people know that this collection will end at some time or the other. Just like petrol, people are using it today, but people know that one-day petrol will run out. And one day it will come that all the fossils that are there will be finished. As soon as coal gets exhausted, earthen oil will run out, everything will be finished.

In any discussion about natural change, reasonable force source by and large beat the overview of changes the world can realize to ward off the most incredibly dreadful effects of rising temperatures. That is because supportable force sources, for instance, daylight based and wind don't send carbon dioxide and other ozone draining substances that add to a risky barometrical deviation. Clean essentialness has obviously more to recommend it than just being green. The creating zone makes occupations, makes electric organizations more grounded, develops imperativeness access in making countries, and helps lower essentialness bills [23]. Those parts have added to a feasible force source renaissance starting late, with wind and daylight based setting up new points of reference for power age. As far back as 150 years or something like that, individuals have relied seriously upon coal, oil, and other non-sustainable power sources to control everything from lights to vehicles to handling plants. Oil subordinates are embedded in practically all that we do, and appropriately, the ozone exhausting substances conveyed from the expending of those stimulates have shown up at unquestionably noteworthy levels. As ozone draining substances trap heat in the condition that would some way or another or another takeoff into space, ordinary temperatures on a superficial level are rising. A dangerous atmospheric deviation is one indication of environmental change, the term researchers presently want to depict the perplexing developments affecting our planet's atmosphere and environment systems. One of them focuses on the meaning of sustainable power source. Carefully, sustainable power source is exactly what you may think: ceaselessly accessible, or as the U.S. Vitality Information Administration puts it, "for all intents and purposes limitless." But "inexhaustible" doesn't really mean practical, as adversaries of corn-based ethanol or enormous hydropower dams regularly contend. It additionally doesn't incorporate other low- or zero-discharges assets that have their own supporters, including vitality productivity and atomic force.

2.1. Standard Sources of energy

2.1.1. Hydropower

| Dam name     | Construction date | River name          | Location                | Generation | Projects                           |
|--------------|-------------------|---------------------|-------------------------|------------|------------------------------------|
| Tehri dam    | 1978              | Bhagirathi River    | Uttarakhand             | 1,000 MW   | THDC Ltd                           |
| Srisailam Dam| 1960              | Krishna River       | Srisailam, Andhra Pradesh | 1,670 MW   | Srisailam right main canal         |
| Nagarjuna Sagar Dam | 1967         | Krishna River       | Guntur district, Andhra Pradesh | 816 MW     | Pulichinthala Project             |
| SardarSarovar Dam | April 1987    | Narmada river       | Navagam, Gujarat        | 1450 MW    | Narmada Canal                      |
| Bhakra Dam   | 1948              | Sutlej              | Bilaspur, Himachal Pradesh | 1325 MW    | Indirasagar Dam, Pandoh Dam        |
For a massively significant time-frame, people have equipped the imperative of stream rehashing plans, using dams to control the water stream. Hydropower is the world’s most significant wellspring of worthy force sources by a wide edge, with China, Brazil, Canada, the U.S., and Russia the head hydropower producers. While hydropower is speculatively an ideal vitality source stimulated by storm and journey day, likewise has a few harms. Colossal dams can upset stream natural structures and joining organizations, hurting typical life, and dislodging inhabitants. Hydropower age is weak against development improvement, which can bargain limit and shrewdness gear [11]. Dry season can in like way cause issues. In the western U.S., carbon dioxide outpourings all through a 15-year time range were 100 megatons higher than they regularly would have been, according to a nonstop report, as utilities went to coal and gas to supplant hydropower lost to the dry season. Positively, even hydropower at full breaking point bears its own outpourings issues, as spoiling typical material in vaults releases methane.

Dams aren’t the most ideal approach to use water for power; Tidal and wave essentialness adventures the world over expect to get the ocean’s typical rhythms. Marine essentialness reaches out starting at now make a normal 500 megawatts of force—shy of what one percent of all renewables— notwithstanding, the potential is unmistakably more imperative. Activities like Scotland’s Saltire Prize have upheld headway here.

2.1.2. Wind power

From the very early ages about 7000 years ago, trading of breeze comes under concern area. Utilization of wind turbines was spread over the world wide spec specially “China”, “United State” and “Germany” was the chief makers of breeze. In the duration of 17 years that is begins from 2001 to 2017. There had been fix the limit in usage of breeze i.e. 539000 megawatts from 23900 megawatts for 22 wrinkles [24]. Many humans have opposed for wind turbines look and the sound originated from. Mainly in the countries like U.K & Germany wind energy generates with the help of waterfront turbine and seaward practices [17]. The main sea wind ranch started in Rhode Island 2016 at U.S and many of seaward are in queue. Associated major issues with wind turbine is with flying creatures like birds, bats and many more,, executing a few thousand consistently, not a similar number of as from glass crashes and various risks like common environmental factors mishap and prominent species, yet enough that planners are going after responses for make them safer for flying untamed life.

| Commissioned date | Name of station     | Location          | Manufacturer             | Generated (MW) |
|------------------|---------------------|-------------------|--------------------------|----------------|
| 1986             | Muppandal Wind Farm | Kanyakumari, Tamil Nadu | Muppandal Wind          | 1500 MW        |
| 2001             | Jaisalmer Wind Park | Jaisalmer, Rajasthan | Suzlon Energy           | 1064 MW        |
| 2006             | Brahmanvel Wind Farm| Dhuule, Maharashtra| Parakh Agro Industries  | 528MW          |
| 2005             | Dhalgaon Wind Farm  | Sangli, Maharashtra| Suzlon and Enercon     | 278MW          |
| 2008             | Vankusawade Wind Park| Satara, Maharashtra| Suzlon S33/350         | 259MW          |
2.1.3. Solar power

Sun spread their sunlight to each corner and entire world, from terrace of a house to the utility-parameter. In the decade from 2007 and 2017, the world's full scale introduced noteworthiness limit from photovoltaic sheets expanded an impossible 4,300 percent. Regardless of sun masterminded sheets, which convert the daylight to control, concentrating sunlight based force (CSP) plants use mirrors to focus the sun's sparkle, choosing warm vitality [2]. China, Japan, and the U.S. are driving the light-based change, regardless, sun-powered truly has far to go, addressing around two percent of the firm power conveyed in the U.S. in 2017. Sun-filled warm vitality is likewise being utilized worldwide for percolating water, warming, and cooling [12].

| Name of station          | Location            | Associated Company Name                                           | Generated (MW) | Land distribution |
|--------------------------|---------------------|-------------------------------------------------------------------|----------------|------------------|
| Bhadla Solar Park        | Jodhpur, Rajasthan  | Rajasthan Solar Park Development Company Limited and Saurya Urja  | 2250 MW        | 14,000 acres     |
| Shakti Sthala solar power project | Tumkur, Karnataka | Karnataka Solar Park Development Corporation Limited (KSPDCL) | 2050 MW        | 13,000 acres     |
| Ultra Mega Solar Park    | Kurnool, Andhra Pradesh | Andhra Pradesh Solar Power Corporation                      | 1000 MW        | 5,932 acres      |
| Rewa Solar Power Project | Rewa, Madhya Pradesh | Rewa Ultra Mega Solar Ltd.                                      | 750 MW         | 1,590 acres      |
| Kamuthi solar power plant | Ramanathapuram, Tamil Nadu | Adani Group’s Adani Green Energy (Tamil Nadu) Ltd            | 648MW          | 2,500 acres      |

Table 3. Solar power station in India
With venture courses of events getting reached out because of the COVID-19 pandemic, India is depended upon to incorporate only 5,000 MW of sun situated cutoff in 2020, just about 32 percent lower than a year prior, a report has said. India included 1,080 MW sun fueled breaking point in the chief quarter of 2020, which is the least in a quarter since October-December (Q4) 2016, industry tracker Mercom said in a report. Sun based foundations during January-March quarter were down 39 percent when contrasted with 1,761 MW included the relating time frame a year ago. The country included 7,346 MW daylight based breaking point in 2019. "The lockdown in the country upset the deftly chain, cut down power demand, achieved money changes making portion costs unordinary, and has exacerbated the liquidity issues," Mercom Capital Group Chief Executive Raj Prabhu said. "We are cutting our sun based interest conjecture by around 40% from our past appraisals dependent on the Covid impact available," he included. The organization, which had prior extended a limit expansion of 8,500 MW during 2020, anticipates that sun oriented establishments should reach almost 5,000 MW as venture courses of events are stretched out and moved to 2021. As per the report, huge scope sun oriented undertaking advancement pipeline remains at 36.9 GW, with 38.8 GW of exercises offered and approaching closeout around the completion of Q1 2020. Immense degree adventures all out drove 886 MW of the 1,080 MW sun controlled cutoff included Q1, while roof sun based foundations implied 194 MW.

The report saw that the cross-country lockdown because of the Covid pandemic since March 25, 2020, and the deftly interference achieved by conclusion in China achieved decline in sun arranged foundation in Q1 2020. "As the market gets ready to open back up, we can plan to see inadequacies, achieving a development in labor and portion costs in the nearby term. The accompanying couple of months are essential, and any further expansions could mean further reductions in our check," Prabhu said. Moreover, with no local module and cell creating limit getting included during the year, the smoothy of sections from China will be essential. Parts transporting from China presently can't seem to continue. Calculated issues are keeping merchandise from arriving at venture destinations. Work issues are additionally approaching; the majority of the organizations don't have the work power to start development or creation immediately," the report expressed. Combined sun powered establishments arrived at 36.8 GW toward the finish of Q1 2020. Of these, enormous scope ventures represented 32.2 GW, though housetop sun oriented establishments represented 4.6 GW, as per the report.

2.1.4. **Geothermal Energy**

Utilized for an extensive number of years in explicit nations for cooking and warming, geothermal centrality is gotten from the Earth’s inside warmth. For a monster expansion, underground supplies of steam and gurgling water can be tapped through wells that can go a mile down or more to convey power.

![Figure 5. Stations of Geothermal plant in India with capacity](image-url)
For a little degree, a couple of structures have geothermal warmth siphons that use temperature differentiates a couple of feet underground for warming and cooling [15] Not at all like sun controlled and wind essentialness, geothermal imperativeness is reliably available, notwithstanding, it has indications that should be managed, for instance, the ruined egg smell that can go with conveyed hydrogen sulfide.

2.2 Non-Standard Sources of Energy

2.2.1 Coal

Coal is an oil-based product. It starts from the rest of the pieces of plants that gave around 100 to 400 million years sooner. Coal is a non-reasonable force source since it takes unlimited years to the graph. In excess of 100 million years back, dead plant matter would fall and amass at the base of marshes on the Earth's surface. After some time, layers of water, rock, and earth made over the layers of dead plants. The glimmer and weight this made diminished the oxygen substance of the plant matter, leaving rich hydrocarbon stores. By ethicalness of these changes, what had once been planting matter every little development, thusly, changed into coal. Coal has the most immense degree of carbon away from various oil based things. This instigates it makes a further degree of ozone hurting substance floods from centrality use, which is ghastly information for our planet. Right when eaten up, coal produces tremendous degrees of defilement and gas releases, including sulfate and nitrogen that can dirty streams and cause shadowiness and fume cloud. Coal equivalently makes mercury, which makes in the smooth tissues of animals and fish – this can make hurt individuals who eat up these species.

2.2.2 Petroleum

Oil and Natural Gas Regulatory Board (ONGRB) Act came into power on “April 03, 2006”, to guarantee about the imperativeness of buyers and entities busy with finished up activities to ensure dependable and elegant nimbly of oil, oil-based things and vaporous oil in all bits of the country and advance genuine business parcels in Oil and Gas a territory of India. Acquiring of Crude oil from neighboring nations is consistently a significant issue related with our country. For over 16 years the undoubtedly creation of disagreeable has ruined around 32-33 MMT. This has been especially upsetting given the raw petroleum use in the nation proposing a making reliance on imported cutthroat. At present India's unforgiving reliance is around 78%. As appeared by TERI checks, by 2030 India's import reliance may shoot up to an upsetting 93%. As of late, the improvement of unrefined petroleum in the nation during the major half (April-Sept.? 06) was 16.14 MMT as against 17.00 MMT during the isolating season of 2004-05, with nonattendance of about 5% (MoPNG, GOI).

2.2.3 Fire Wood

Wood has been utilized as a warmth hotspot for a large number of years, and a force hotspot for over a century, yet the connection among deforestation and a worldwide temperature alteration has made it be disregarded as a possible elective wellsprings of vitality. Nonetheless, new ranger service creation and the executive's methods tested in Austria propose that trees may really have a key task to carry out in serving to reasonably fulfill our interest for vitality – the key is being savvy about how we do it. Wood pellets discharge not many different emanations. For instance, a wood pellet focal warming evaporator for an enormous family emanates only 1kg of debris every year, as fine particles – which is next to no when you consider Austria's absolute fine residue discharges are around 50,000 tons per year. To place this into setting, supplanting an old wood or coal-terminated evaporator with a pellet-consuming proportionate can diminish emanations by around 90%. Another preferred position of this innovation is that pellet boilers are known for their simple activity and neatness. It's something that is driving their expanding notoriety in Austria, yet directly across Germany, Italy, France, and the UK.
While this is all well indeed, the way to truly making wood part of the arrangement depends on revealing these practices around the world. Fortunately, it is occurring and can be adjusted to geographic necessities. In Uganda, for instance, where woods spread has declined because of charcoal and kindling use, oven maker Ajamu is planning a pellet cookstove that utilizes rice-husk pellets rather than bark and sawdust – yet utilizing the equivalent eco-accommodating cycles. With a touch of karma, and some venture, practical, clean cooking in Africa may before long turn into the standard. Also, in China – where contamination issues have been brought about by a reliance on coal – Chinese analysts are currently conversing with Austrian specialists about building a pilot pellet plant fueled by squander straw, set for fulfillment toward the finish of 2019.

3. Literature Survey

Rehmani et al. describe that progressed control frameworks, and detecting strategies, the flow power network is being moved up to the supposed brilliant lattice (SG). One of the remarkable SG highlights is the fuse of sustainable power source assets (RERs). RERs not just encourage the infusion of surplus vitality from little shoppers back into the framework, yet in addition help to diminish CO2 emanations. In this paper, examined RERs and the issues emerging from coordinating RERs into the SG, with an emphasis on various sorts of correspondence organizations. it has been featured distinctive continuous activities around the world that incorporate unique and discontinuous RERs into the SG, and furthermore saw that correspondence frameworks assume a crucial part in the incorporation of RERs into the SG. Without these correspondence frameworks, two-way communication, which is an essential aspect of things to come SG, is unimaginable.

Abbott et al. There are three bring home messages from this paper: i) a sound vitality strategy should initially start by advancing reasonable vitality preservation, e.g., protection for structures; ii) a sun based hydrogen cycle can possibly give significantly more than our present vitality needs; and iii) sun based warm innovation with appropriate capacity can possibly give unified base-load power, while PV sunlight based cell innovation is more qualified to dispersed vitality collecting applications. Panwar et al. In this paper, a comprehensive review has been done for renewable energy resources. It also discussed the application like solar water heater, dryers, biodiesel etc. this paper describe that CO2 has been used for cleaning and imperishable. Biodiesel from nonedible vegetable oil lessens carbon dioxide outflows and oil utilization when utilized instead of regular diesel. Biodiesel is actually serious with or offers specialized focal points contrasted with regular oil diesel fuel. The presence of oxygen in biodiesel improves burning and, subsequently, lessens hydrocarbon, carbon monoxide, and particulate outflows; oxygenated fills likewise will in general expand nitrogen oxide emanations. Wind vitality likewise presents great potential in the minimization of ozone harming substances where wind potential is accessible.
Saidur et al. Taking into account that vitality use worldwide has been expanding consistently, changing to wind vitality can be a reasonable move. From the examination, clearly practically all nations that use wind vitality for power age have arrangements specific to wind vitality. A portion of the examples of overcoming adversity incorporate breeze vitality use in the USA, Canada, Denmark, Germany. For these nations, the presence of wind vitality strategies figured out how to build wind power age significantly. As a rule, most nations’ arrangements incorporate duty exception, the quantity framework, sponsorships, Feed-in Tariff, contribution of exploration organizations, target execution, enactment on wind vitality or sustainable power source law, and others.

Solangi et al. Concerning explicit sun-situated imperativeness methodology, Malaysia redirected into a full individual from the International Energy Agency Photovoltaic Power System Program (IEAPVPS) on 23rd October 2008. The PV market in Malaysia is so far little when showed up distinctively comparable to other made nations. The framework related PV market started in 2006 and this is ascribed to capital sponsorships open under the Malaysian Building Integrated Photovoltaic (MBIPV) Project. By 2011, the Malaysian government is aiming to execute another Renewable Energy Policy which will furthermore drive the PV business improvement. It is assessed that economical force sources in Malaysia will play a basic capacity in the years to come as the country intends to substitute oil based goods with novel fuel sources that are truly unblemished, unlimited, and safe.

Abdelaziz et al. In this audit, different vitality reserve funds systems, for example, vitality investment funds by the executives, innovations and approaches have been looked into. The part of vitality the board is fundamental and has extraordinarily extended in enterprises. Top administration of the organization takes an interest in arranging different vitality the executives extends consistently. It has been discovered that vitality sparing advancements for instance utilization of high efficient electric engines, diminishing kettle flue gas temperature, utilization of variable speed drive to coordinate burden necessity have been discovered to be practical vitality sparing measure to decrease vitality utilization of significant vitality utilizing hardware in the mechanical offices. These reserve funds procedures discovered to be financially practical as a rule. Alongside vitality investment funds, sizeable measure of outflow can be decreased utilizing different vitality investment funds techniques. It was additionally seen that viable public approaches are likewise expected to diminish modern vitality utilization alongside discharge decrease. It is through this survey that energy resources also have a big hand in developing the country.

4. Conclusion

Through this paper, it concludes that energy is very important in human life. The table in this paper is of solar and wind, it proves that it is very important to save energy and it is also told that how much amount of energy each power station contributes to the development of the country. In this paper, many benefits of standard energy have been described, which shows that standard resources are very reliable, accessible, portable and efficient. And then after that in Fig. 6, shows that how non-standard energy has been distributed over the country. And it also shows that non-standard energy should be used very thoughtfully. There is a table in the last, that survey proves why it is important to conserve resources. It is through survey that energy resources also have a big hand in developing the country.

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