**Gender Budgeting in the Era of Environmental Degradation**

**Swati & Shahar tanjila[[1]](#footnote-1)**

**Abstract**

*This essay discusses the governance of sustainable development with a special emphasis on the Indian energy industry. This essay begins by exploring what is meant by and how people view sustainable development. The study also analyses whether sustainable development has advanced to the point where it can be called a legal principle or if it is still only a notion. The majority of industrial and commercial wealth creation depends on energy, which is essential for enhanced social and economic well-being. This essay aims to investigate India's energy difficulties, the causal relationship between energy and economic progress, and the environmental sustainability of the country's many millions of underprivileged citizens. Sustainable development and attempts to fight poverty are centred on energy. It has an impact on components of that development are necessary for a nation to develop. A key enabling factor for attaining sustainable development is obtaining energy. This paper's objective is to propose one strategy for the energy sector's sustainable growth specifically at the national level and describe how to use it successfully. It also serves as a jumping-off point for the creation of a more complete and widely accepted set of energy indicators relevant to sustainable development. India should prioritise comprehensive energy policy, a diverse fuel mix, clean technology, R&D, energy efficiency, raising awareness, and bolstering national and local governance for sustainable development.*

**Keywords**–Development, Economic growth, Energy, India, Sustainable Development.

**Introduction**

Around the world, sustainable development has been defined and understood in a wide variety of ways. The Brundtland Report, titled "Our Common Future," offered a commonly recognised but imprecise definition, definingdevelopment which is sustainable as "progress whichfulfils the requirements without sacrificing the capacity of subsequent generations to meet their own demands." Some claim that the ambiguity in the Brundtland Report's definition is effective because it allows stakeholders—individuals or organisations with an interest in sustainable development—to adapt the definition's core principles to their own unique situations.[[2]](#footnote-2)A definition that is very prescriptive would not be able to adequately address the variety of situations. For economic and social growth, energy is a crucial input. India ranks accounting for roughly 5% of global annual energy consumption. India has advanced quickly in the last few years toward economic independence. It is now necessary to use more energy as a result of the impressive advancements propagated in the areas of manufacturing, agro, networking, transportation, and other industries.

“India will require a proportionate intake of energy, mostly in the form of If it is to achieve the desired GDP growth, commercial energy in the form of coal, oil, gas, and electricity is required. However, India's fossil fuel reserves are limited. The known reserves of oil and natural gas may only last roughly 18 and 26 years, respectively, at the current reserves to production ratio. As a result, we must focus on a sustainable approach to energy consumption.[[3]](#footnote-3)”

In general, technology is used to increase energy efficiency, such as through the installation of high-efficiency furnaces, compact fluorescent lights (CFLs), and improved insulation. By altering behaviour, such as turning off lights when not in use, utilising home appliances in a different way, carpooling, and other measures, one can conserve energy.

“There are several sources of information on energy efficiency and conservation that concentrate on how much energy is used by both buildings and autos.”Click on the links below to learn more about the many energy conservation and efficiency techniques that can be applied.

The industrial sector is one of India's largest energy consumers, making it the ideal target for initiatives to improve energy efficiency. To encourage energy efficiency in industries, a variety of research and development activities are conducted, technologies are created, and energy-saving measures are implemented.

“In India, the renewable energy sector has expanded dramatically during the past four years, including for the production of electricity from renewable sources. Solar photovoltaic power has grown by 200 percent, biomass/co-generation power by 234 percent, and wind power by 96 percent in grid-connected systems with installed capacities in the MW range. A 26% increase has been noted in small hydropower. Solar home lighting systems, solar lanterns, and solar photovoltaic water pumps have all increased significantly—even for distributed systems—by 300 percent, 99 percent, and 196 percent respectively. The renewable energy sector has experienced amazing growth, especially for uses that were previously thought to only be served by large electricity companies. Another key application for electrifying 20,000 isolated and undeveloped villages and hamlets by 2007 and all of their families by 2012 is the utilisation of renewable energy systems.[[4]](#footnote-4)”

**Energy in India: Current Scenario**

“India has one of the greatest initiatives in the world for implementing renewable energy systems and products, and it also has a substantial quantity of renewable energy resources. India is the sixth-largest energy user in the world, using around 5% of the total energy consumed globally each year.[[5]](#footnote-5)India is a big consumer of energy resources due to its high rates of economic growth and population, which makes up over 17% of the global total. India is the second most populous country in the world, with 1.17 billion inhabitants. India's need for energy is still growing in spite of the world financial crisis. The percentage growth in electricity consumption that coincides with 1 percent of economic growth in India decreased from roughly 3.14 percent in the 1950s to 0.97 percent in the 1990s.[[6]](#footnote-6)”

“Energy is the main force behind economic expansion and is essential to maintaining a contemporary economy and culture. The long-term supply of energy from sources that are affordable, accessible, and secure will have a substantial impact on future economic growth. When it comes to producing enough energy of the appropriate quality in diverse forms in a sustainable manner and at reasonable costs, India has enormous hurdles. India's current energy needs increase by about 0.75 percent for every 1% of economic growth.[[7]](#footnote-7)One scenario examined by the Indian Planning Commission, which coordinates long-term policy, predicted that this figure might drop to 0.67 percent between 2021–2022 and 2031–2032.[[8]](#footnote-8)If India is to end poverty and achieve its human development goals, it needs to maintain an economic growth rate of 8 to 10 percent for the next 25 years. India must, at the very least, increase its primary energy supply by three to four times and its electricity generation capacity/supply by five to six times from their 2003–2004 levels in order to deliver a sustained growth rate of eight percent through 2031–2032 and to meet the lifeline energy needs of all citizens. With 2003–2004 as the baseline year, India would need to increase its commercial energy production by 5.2 to 6.1 percent yearly and its overall primary energy supply by 4.3 to 5.1 percent. The existing capacity of roughly 1,60,000 MW, including all captive plants, must expand to nearly 8,00,000 MW by 2031–2022. India's efforts to increase its level of human development and meet its economic growth objectives depend critically on finding solutions to the country's energy problems.[[9]](#footnote-9)”

**Energy Conservation and Energy Efficiency**

“Coal-fired power plants in India produce more than two thirds of the country's electricity.”There is no way of knowing when the environmental risks will quit polluting the air. On the other hand, industrialization is consuming an increasing amount of energy. Energy conservation and environmental protection are interrelated issues. The conventional energy resources of India are finite, so we must create all practical and affordable alternatives. Energy efficiency and conservation are without a doubt India's most significant virtual energy supply sources for the next 25 years.[[10]](#footnote-10)

* **Conservation of Energy**

Energy conservation is sufficiently economical. Every area of the economy has room to increase energy usage efficiency. To encourage businesses to take energy-saving measures, the Indian government has made a number of fiscal concessions, and IDBI offers lenient loan terms for such actions. Industrial managers will pay more attention to energy conservation. Energy conservation has a lot of room to grow in other industries as well. The majority of renewable technologies are appropriate for decentralised, small-scale energy production. Energy policy coordination and execution oversight are not the purview of any government organisation in India. An appropriate arrangement might be a distinct department of energy under the cabinet secretariat. In short, we need to search for ways to conserve energy and raise our awareness of the seriousness of the current energy situation.

“The capacity to perform work is energy. Man has excelled at harnessing the power concealed in non-renewable energy sources like coal, oil, and gas as well as renewable energy sources like solar, wind, water, and biomass, in addition to using his own physical energy. Daily increases in energy demand need the construction of new power plants, which comes with risks. The non-renewable resources are quickly running out because of extensive use in such plants. Additionally, their vast consumption adds to the contamination of the air and water, making it necessary to practise energy conservation in order to leave a better planet for future generations. The ecology has suffered as a result of the significant amount of fossil fuels used due to the rising demand for electricity. Energy saving and effective use are of the utmost importance in this situation. By implementing demand side management and end-use energy efficiency policies across India, it is predicted that close to 25,000 MW might be saved. Since one unit of energy saved at the consumption level reduces the requirement for new capacity production by 2.5 to 3 times, energy efficiency and conservation take on even greater significance. Furthermore, achieving such savings through energy efficiency can be done for less than one-fifth the price of adding new capacity. Therefore, in addition to reducing the consumption of fossil fuels, energy efficiency would considerably support our efforts to meet the demand for power.[[11]](#footnote-11)”

* ***The Energy Conservation Act, 2001***

“In October 2001, the Energy Conservation Act became law. Energy efficiency can be improved through standards and labelling for appliances, energy conservation building codes, energy consumption standards for designated consumers, certification and accreditation of energy auditors and energy managers, dissemination of information and best practises, capacity building, and establishment of EE delivery systems via public-private partnerships (ESCO) route. BEE was established as the nodal statutory body to carry out these tasks. The Act establishes State Designated Agencies (SDAs) in the states and the Bureau of Energy Efficiency (BEE) at the federal level. SDAs have been established in 30 states and union territories so far.[[12]](#footnote-12)”

* **Energy Efficiency**

The "low hanging fruit" for carbon emissions reductions and sustainable development is generally regarded as being energy efficiency. It's the triple danger of reduced energy use, running expenses, and climate change mitigation. While there are many chances for energy efficiency in the United States, India faces its own special set of challenges due to its high need for raw energy. India's GDP is expanding at the second-fastest rate in the world. In the next two decades, with units using low-BTU local coal to supply the majority of it. The first concern is just producing energy in the first place, as between 40 and 50 percent of Indians lack access to electricity. Better still if it can be done effectively to reduce expenses and contribute to reducing the growing environmental issues. According to the EIA, India is more energy-efficient than the U.S. on a per-capita basis, using only 15.9 million BTU. According to the Indian government, following better housekeeping practises can still save 5–10% of energy, while simple expenditures like demand controls, energy-efficient appliances, and low-cost retrofits can save another 10%–15% of energy.

“The industrial sector, which uses nearly half of all the commercial energy available in India, will have to make the significant reductions, though. In fact, energy-intensive businesses including those that produce fertilisers, aluminium, textiles, cement, iron, and steel account for 70% of the sector's demand.[[13]](#footnote-13)About 15 to 25 percent of this energy use is preventable, and there are incentives in place to change behaviour and utilise energy more wisely. The cost of electricity is one of the highest in the world for Indian industry.[[14]](#footnote-14)A lot of people utilise pricey backup diesel generators since the grid's supply of power is unstable and of poor quality. According to data from the Indian Ministry of Power, the investment potential for energy savings amounts to US$9.8 billion with yearly savings of 183.5 billion kWh. These energy savings would result in an annual reduction of CO2 emissions of 148.6 million tonnes. With increased investment, the amount of savings increases even further.[[15]](#footnote-15)”

**Energy Conservation vis-a-vis Energy Efficiency**

“Energy efficiency and conservation of energy are two different but related ideas. When growth in energy consumption is reduced, as measured in physical terms, energy conservation is achieved. Therefore, energy conservation may be the outcome of a number of procedures or advancements, such as a rise in production or technological advancement. However, energy efficiency is attained when the energy intensity of a particular product, process, or area of production or consumption is reduced without compromising output, consumption, or comfort levels. Promoting energy efficiency will help with energy conservation and is therefore a crucial component of policies that promote energy conservation.”

One common misconception is that energy efficiency is a resource like coal, oil, or natural gas. By protecting the resource base and lowering pollution, it adds economic value. For instance, using Compact Fluorescent Lamps (CFLs) instead of conventional light bulbs will reduce the amount of energy needed to light a space by 1/4. Additionally, pollution levels drop by the same amount.[[16]](#footnote-16)

**Institutional Framework for energy efficiency in India**

“In the Fuel Policy Committee Report from 1972, the significance of energy efficiency was acknowledged, and this trend persisted in the years that followed. The national petroleum conservation initiatives created by the country's oil firms with funding from the Petroleum Conservation Research Association (PCRA) expanded during the 1970s. Leading the charge was the Indian Oil Corporation Ltd., with early technical assistance coming from the National Productivity Council (NPC). In the 1980s, India's efforts to promote and develop energy efficiency training and extension services received technical support from bilateral collaborations with organisations like the Department for International Development, UK (DFID), German Federal Ministry for Economic Cooperation and Development (BMZ), and the United States Agency for International Development (USAID). The goal was to increase institutional capacity, give energy audit diagnoses, and raise awareness. The Association of Indian Engineering Industries (AIEI), later renamed the Confederation of Indian Industries (CII), the Energy and Resources Institute (TERI), and the Industrial Credit and Investment Corporation of India (ICICI) were some of the first domestic organisations to pursue the design and delivery of energy efficiency services back in 1964, well before the energy crisis, and were in charge of some of the early energy efficiency projects.”

* **Bureau of Energy Efficiency (BEE)**

“On March 1st, 2002, the Indian Government established the Bureau of Energy Efficiency (BEE) in accordance with the terms of the Energy Conservation Act, 2001 (Website: http://www.bee-india.nic.in). The major goal of the Bureau of Energy Efficiency is to help establish policies and strategies that will reduce the energy intensity of the Indian economy, with a focus on self-regulation and market principles, under the framework of the Energy Conservation Act, 2001. All stakeholders must actively participate in order for this to be accomplished, which will lead to an accelerated and sustainable adoption of energy efficiency across all sectors.”

* **PCRAPetroleum Conservation ResearchAssociation (PCRA)**

“The Petroleum Conservation Research Association (PCRA) was established by the Indian government in 1978 in recognition of the significance of energy conservation. PCRA is still actively promoting fuel-saving measures for petroleum and serves as a think tank for the government, recommending policies and plans for environmental protection and petroleum conservation aimed at reducing over-dependence on oil.”

**Government Policies Affecting Energy Efficiency in India**

“Six significant initiatives were introduced between 1980 and 2005:

1. disclosure of company-level data on energy efficiency;
2. Equipment that reduces energy consumption and pollutants is subject to accelerated depreciation;
3. creating the Energy Management Center under the Ministry of Energy;
4. removing pricing and output restrictions in order to increase industrial competition;
5. Reforms to energy prices to direct energy efficiency projects and boost global competitiveness; and
6. adoption of the 2001 Energy Conservation Act and the 2003 Electricity Act.”

“The Bureau of Energy Efficiency (BEE), a statutory entity within the Ministry of Power, was established as a result of the Energy Conservation Act. Through energy audits, BEE actively promotes, oversees, finances, and keeps track of economic initiatives to conserve energy. It also has the legal power to enact binding energy efficiency rules, but it hasn't done that yet.”

The issues highlighted above point to the direction of sustainable development. For many geographical regions, there is no perfect single answer. The main issue at hand is how quickly we can persuade governments and citizens to switch from conventional ways of living to environmentally friendly ones. By addressing today's environmental issues and adhering to the sustainable development route, rapid progress is achievable.[[17]](#footnote-17)

**Conclusion**

Sustainable development is arguably the most difficult task humanity has ever undertaken, and attaining it calls for immediate local, regional, and global attention to the core problems. It is common knowledge that a sustainable energy source combines three factors: supply security, economic viability, and environmental preservation. Additionally, long-term planning security was necessary for investments in power plants with operating lifespans of 25 years or longer; this security could not be risked by political representatives due to politically expedient tactical considerations. We must make a commitment to looking for energy solutions that will lead the globe toward sustainable development. According to our assumption, achieving sustainable development also entails working to maintain the open economic conditions that permit countries to lift themselves out of poverty. The most accurate measure of sustainability will be the absence of poverty. The primary contribution of energy specialists to the world conference on sustainable development this year will be to use environmentally friendly renewable energy sources.

*Proposed Guidelines for Policy Makers in India*

1. Government agencies, businesses, the public sector, academic organisations, etc. should actively promote renewable energy sources.
2. creation of a national organisation to raise general public knowledge of renewable energy.
3. ambitious objectives for non-traditional power sources' electricity generation.
4. Every government office will have energy-saving and renewable energy producing systems installed to motivate and excite citizens.
5. Use of big battery energy storage systems is restricted.
6. Solar water heating systems must be installed as a requirement in all urban homes and businesses.

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