INTERNATIONAL JOURNAL FOR LEGAL RESEARCH AND ANALYSIS

Open Access, Refereed Journal Multi Disciplinary
Peer Reviewed

www.ijlra.com

ISSN: 2582-6433

DISCLAIMER

No part of this publication may be reproduced or copied in any form by any means without prior written permission of Managing Editor of IJLRA. The views expressed in this publication are purely personal opinions of the authors and do not reflect the views of the Editorial Team of IJLRA.

Though every effort has been made to ensure that the information in Volume II Issue 7 is accurate and appropriately cited/referenced, neither the Editorial Board nor IJLRA shall be held liable or responsible in any manner what sever for any consequences for any action taken by anyone on the basis of information in the Journal.

ISSN: 2582-6433

EDITORIALTEAM

EDITORS

Dr. Samrat Datta

Dr. Samrat Datta Seedling School of Law and Governance, Jaipur National University, Jaipur. Dr. Samrat Datta is currently associated with Seedling School of Law and Governance, Jaipur National University, Jaipur. Dr. Datta has completed his graduation i.e., B.A.LL.B. from Law College Dehradun, Hemvati Nandan Bahuguna Garhwal University, Srinagar, Uttarakhand. He is an alumnus of KIIT University, Bhubaneswar where he pursued his post-graduation (LL.M.) in Criminal Law and subsequently completed his Ph.D. in Police Law and Information Technology from the Pacific Academy of Higher Education and Research University, Udaipur in 2020. His area of interest and research is Criminal and Police Law. Dr. Datta has a teaching experience of 7 years in various law schools across North India and has held administrative positions like Academic Coordinator, Centre Superintendent for Examinations, Deputy Controller of Examinations, Member of the Proctorial Board

Dr. Namita Jain

Head & Associate Professor
School of Law, JECRC University, Jaipur Ph.D. (Commercial Law) LL.M., UGC-NET Post Graduation Diploma in Taxation law and Practice, Bachelor of Commerce.

Teaching Experience: 12 years, AWARDS AND RECOGNITION of Dr. Namita Jain are - ICF Global Excellence Award 2020 in the category of educationalist by I Can Foundation, India. India Women Empowerment Award in the category of "Emerging Excellence in Academics by Prime Time & Utkrisht Bharat Foundation, New Delhi. (2020). Conferred in FL Book of Top 21 Record Holders in the category of education by Fashion Lifestyle Magazine, New Delhi. (2020).Certificate of Appreciation for organizing and managing the Professional Development Training Program on IPR in Collaboration with Trade Innovations Services, Jaipur on March 14th, 2019

ISSN: 2582-6433

Mrs.S.Kalpana

Assistant professor of Law

Mrs.S.Kalpana, presently Assistant professor of Law, VelTech Rangarajan Dr.Sagunthala R & D Institute of Science and Technology, Avadi. Formerly Assistant professor of Law,Vels University in the year 2019 to 2020, Worked as Guest Faculty, Chennai Dr.Ambedkar Law College, Pudupakkam. Published one book. Published 8Articles in various reputed Law Journals. Conducted 1Moot court competition and participated in nearly 80 National and International seminars and webinars conducted on various subjects of Law. Did ML in Criminal Law and Criminal Justice Administration.10 paper presentations in various National and International seminars. Attended more than 10 FDP programs. Ph.D. in Law pursuing.

Avinash Kumar

Avinash Kumar has completed his Ph.D. in International Investment Law from the Dept. of Law & Governance, Central University of South Bihar. His research work is on "International Investment Agreement and State's right to regulate Foreign Investment." He qualified UGC-NET and has been selected for the prestigious ICSSR Doctoral Fellowship. He is an alumnus of the Faculty of Law, University of Delhi. Formerly he has been elected as Students Union President of Law Centre-1, University of Delhi. Moreover, he completed his LL.M. from the University of Delhi (2014-16), dissertation on "Cross-border Merger & Acquisition"; LL.B. from the University of Delhi (2011-14), and B.A. (Hons.) from Maharaja Agrasen College, University of Delhi. He has also obtained P.G. Diploma in IPR from the Indian Society of International Law, New Delhi. He has qualified UGC – NET examination and has been awarded ICSSR – Doctoral Fellowship. He has published six-plus articles and presented 9 plus papers in national and international seminars/conferences. He participated in several workshops on research methodology and teaching and learning.

ISSN: 2582-6433

ABOUT US

INTERNATIONAL JOURNAL FOR LEGAL RESEARCH & ANLAYSIS ISSN- 2582-6433 is an Online Journal is Monthly, Peer Review, Academic Journal, Published online, that seeks to provide an interactive platform for the publication of Short Articles, Long Articles, Book Review, Case Comments, Research Papers, Essay in the field of Law & Multidisciplinary issue. Our aim is to upgrade the level of interaction and discourse about contemporary issues of law. We are eager to become a highly cited academic publication, through quality contributions from students, academics, professionals from the industry, the bar and the bench. INTERNATIONAL JOURNAL FOR LEGAL RESEARCH & ANALYSIS ISSN 2582-6433 welcomes contributions from all legal branches, as long as the work is original, unpublished and is in consonance with the submission guidelines.

ISSN: 2582-6433

RIGHT TO ACCESS SUSTAINABLE TECHNOLOGIES: A HUMAN RIGHTS BASED APPROACH

AUTHORED BY - ASMITA SHRIVASTAVA

ABSTRACT

The urgent requirement for sustainable solutions in industries including waste management, energy, water, and agriculture has been brought to light by the growing severity of climate change, environmental degradation, as well as socioeconomic disparity. Access to this type of technology is becoming a basic human rights issue rather than just a developmental goal. With a focus on the relationship between environmental justice, technological equity, and international human rights law, this research paper examines the idea of the right to access sustainable technology from a human rights perspective.

The first section of this paper defines sustainable technologies and discusses their importance in accomplishing global sustainability objectives, especially in light of the Sustainable Development Goals (SDGs) framework established by the United Nations. Then, by connecting it to already-established rights like the right to development, the right to health, and the newly emerging right to a healthy and clean environment, it explores the normative underpinnings of the right to access such technologies.

Accessibility issues are given a lot of attention, especially the difficulties presented by financial limitations, technology monopolies, and intellectual property rights (IPRs) in the Global South. Public interest and global sustainability are taken into consideration while discussing the function of the TRIPS Agreement and the necessity of adaptable IPR regimes. The promise and difficulties of enforcing this right are demonstrated by case studies from Africa, India, and international climate partnerships.

In order to shape national and international technology policies, the paper ends by arguing for a rights-based framework that takes into account the concepts of equity, participation, responsibility, and non-discrimination. Achieving climate justice and guaranteeing inclusive and equitable development for current and future generations depend on acknowledging access to sustainable technologies as a human right.

ISSN: 2582-6433

Keywords: *Environmental justice, Technology access, Intellectual property rights, Sustainable technologies, Human rights-based approach.*

INTRODUCTION

With the objective of promoting a green economy and fighting climate change, sustainable technologies in the 21st century combine environmental solutions with digital innovation. Cloud computing, the Internet of Things (IoT), and artificial intelligence (AI) are examples of technologies that help in improving resource efficiency, optimizing energy and water use, and promoting waste management and sustainable agriculture. AI simplifies waste and energy production processes, while IoT enables precision farming. The negative environmental impact of IT operations has been reduced via cloud computing. Advanced recycling and sorting technologies, waste-to-energy systems, renewable energy sources, and blockchain for transparent, environmentally friendly supply chains are some of the major innovations. By minimizing carbon emissions, enhancing resource management, and fostering social fairness through improved access to clean water, healthcare, and other necessities, these technologies assist in addressing urgent global issues. Significantly allowing companies to incorporate environmental responsibility into their business models, sustainable technologies additionally encourage economic growth. By increasing the reuse of resources and reducing waste, they promote the concept of the circular economy. The development of green products and services encourages corporate innovation. Governments, businesses, and international organizations must work together to successfully implement these technologies. After taking into consideration all factors, the combination of sustainability initiatives and digital innovations is forming a future that strikes a balance between economic development and environmental preservation, establishing the groundwork for a robust and inclusive global society.

In an attempt to achieve environmental justice, technological equity, and inclusive development, this study intends to investigate the right to access sustainable technologies from a human rights perspective. It investigates how globally acknowledged human rights like the right to development, health, and a clean environment interact with sustainable development. The ICESCR, UDHR, TRIPS Agreement, and Paris Agreement are among the international legal and policy frameworks that are critically examined in this study to determine the extent to which they support equitable access to technology. The legal and structural barriers that obstruct access, particularly in developing countries, are specifically emphasized. These

ISSN: 2582-6433

include funding inequalities, intellectual property laws, and technological monopolies. Using an interdisciplinary approach, the research highlights local and global issues by incorporating comparative case studies and relying on environmental studies, development policy, and international law. Recommending a rights-based framework for inclusive and environmentally friendly technology governance is the ultimate goal.

CONCEPTUAL FRAMEWORK OF SUSTAINABLE TECHNOLOGIES

Innovations giving priority to conservation of natural resources and promoting economic and social development by reducing negative effects on the environment come under the definition of sustainable technology. It gives strong emphasis on prevention (avoiding environmental damage), substitution (use of renewable and biodegradable materials), and efficiency (optimizing energy and use of resources). Several examples are solar power, LED lighting, green buildings, carbon capture technologies and electric transport.[1] Sustainable technology has numerous benefits for businesses. It helps in minimizing the risks associated with environment and helps in enhancing the outcomes of the project by using renewable resources and eco-friendly projects. It attracts long term investments for businesses and boosts profitability by reducing costs and improving the efficiency of resources. It helps in building a strong reputation of the business and making it successful in the long run.

SUSTAINABLE TECHNOLOGIES IN THE CORPORATE SECTOR

Sustainable technology plays an essential role in developing ethical business practices in today's business environment. By guaranteeing the effective use of resources and protecting them for future generations, it allows businesses to expand while reducing their negative effects on the environment. Innovations that are supporting environmentally friendly practices with an emphasis on waste reduction, low emissions, and energy efficiency are referred to as sustainable technology. The main objective is to provide solutions that respect ecological boundaries, even though no technology is entirely sustainable. Companies that are using sustainable technologies more and more in order to meet stakeholder and customer demands, adhere to the legislation, enhance their image in the corporate sector, and minimize their impact on the environment. Reduced operating costs, enhanced public perception, regulatory compliance, and chances for innovation and market expansion are some of the major

[1] **Rubicon Technologies, Inc.**, *What Is Sustainable Technology?*, Sustainability Hub (Apr. 26, 2021), https://www.rubicon.com/sustainability-hub/articles/what-is-sustainable-technology/

ISSN: 2582-6433

advantages of sustainable technologies.[2]

A broad spectrum of inventions intended to reduce the environmental effect while increasing efficiency are examples of sustainable technology in business practices. Electronic signatures reduce the amount of paper used and expedite the documentation process, which helps to save resources and lessen deforestation. While its own environmental impact is still being assessed, artificial intelligence (AI) is essential for improving energy efficiency and streamlining corporate operations. Widespread usage of solar panels reduces dependency on fossil fuels and greenhouse gas emissions by producing clean, renewable electricity. By minimizing the need for significant physical infrastructure, cloud computing additionally supports sustainability; when it is fueled by renewable energy, it transforms into an even more effective and environmentally responsible option. Furthermore, companies can reduce waste and make more responsible use of resources by using green technologies like automatic recycling systems, sustainable agricultural methods, and sophisticated water management tools. When taken as a whole, these technologies not only promote environmental preservation but also significantly lower CO_2 emissions and tackle global issues like pollution and climate change.

LEGAL FOUNDATIONS: INTERNATIONAL AND REGIONAL FRAMEWORKS

The role of ICESCR in Sustainable Development Goals

The International Covenant on Economic, Social and Cultural Rights (ICESCR), enacted in 1966, is an important international treaty that mandates its signatory governments to work towards guaranteeing rights such as the right to education, health, and labor.

The ICESCR continues to be relevant today with addressing challenges like poverty, inequality, as well as housing crises by way of provisions like the right to an adequate standard of living (Article 11). It additionally corresponds to the United Nations' Sustainable Development Goals (SDGs), when rights like the right to education (Article 13) along with health (Article 12) are essential to achieving the SDGs. Furthermore, the ICESCR provides a crucial framework for addressing the human rights consequences of climate change, which include food insecurity as well as displacement, by focusing on the right to health and an

[2] **What Is Sustainable Technology?**, *ESADE Beyond*, last visited Aug. 11, 2025, https://www.esade.edu/beyond/en/what-is-sustainable-technology/.

ISSN: 2582-6433

adequate standard of living.

Regardless of its significance, the implementation of the ICESCR faces difficulties, especially inadequate monetary assets, a shortage of political will among some states, including the difficulty of harmonizing individual rights with societal benefits. To enhance its impact, approaches include fostering international cooperation as well as solidarity, strengthening civil society as well as other non-state actors to hold governments accountable, particularly using innovative technologies to better monitor overall realization of these rights.[3]

United Nations Framework Convention on Climate Change (UNFCCC)

Minimizing harmful human interference with the climate is the primary objective of the 1992 United Nations Framework Convention on Climate Change (UNFCCC). The historic 2015 Paris Agreement as well as the 1997 Kyoto Protocol built on this foundation, bringing all nations together with the common objective of keeping the rise in global temperatures well below 2 degrees Celsius, and ideally within 1.5 degrees. Member countries gather yearly at the Conference of the Parties (COPs) along with various technical meetings to expand on these objectives. UN Women, which strives to guarantee that a gender perspective is incorporated in climate negotiations, is a significant participant in these sessions.As part of its mission, UN Women prepares gender-focused technical documents, provides delegates with onsite support, raises awareness of gender issues through panels and side events, and assists women and girls from developing nations in attending these meetings. In order to ensure that global climate action is both equitable and successful, this involvement is essential.[4]

The Paris Agreement

A legally binding international agreement that was adopted in 2015 and put into effect in 2016, the Paris Agreement brings together 195 countries to fight climate change. Its main objective is to prevent significant climatic consequences by keeping the increase in global temperature to "well below 2°C" over pre-industrial levels, with a target of 1.5°C. Under the framework of the agreement, nations submit Nationally Determined Contributions (NDCs) on a five-year cycle of increasing ambition. National climate action plans, or NDCs, outline how each nation

[3] Sarah Lee, *The Role of ICESCR in Modern Human Rights*, NUMBER ANALYTICS (June 18, 2025), https://www.numberanalytics.com/blog/role-of-icescr-in-modern-human-rights.
[4] United Nations Framework Convention on Climate Change, UN WOMEN, https://www.unwomen.org/en/how-we-work/intergovernmental-support/climate-change-and-the-environment/united-nations-framework-convention-on-climate-change.

ISSN: 2582-6433

will cut greenhouse gas emissions and prepare for climate change. Countries are also encouraged to develop Long-Term Strategies (LT-LEDS) in order to provide a longer-term perspective.[5]

A framework for global assistance is also provided by the Paris Agreement, whereby rich countries provide developing and vulnerable states with financial aid, technology transfer, and capacity-building support. An enhanced transparency framework (ETF) mandates that, beginning in 2024, nations report on their climate initiatives and assistance received in order to monitor progress. In order to evaluate our joint accomplishments and inspire more ambitious future initiatives, this data will be used in a Global Stocktake. The accord has already sparked the creation of new markets and low-carbon solutions worldwide, although additional effort is required.

REGIONAL FRAMEWORKS

1. African Charter on Human and People's Rights

One of the most important frameworks for encouraging sustainable technological development in Africa is the African Charter on Human and Peoples' Rights, or African Charter. By defending two fundamental rights—the right to progress (Article 22) and the right to a healthy environment (Article 24)—it creates a moral and legal basis. In order to ensure that development benefits both current and future generations, the Charter requires that technical advancement be pursued in a way that minimizes environmental impact. According to the African Commission on Human and Peoples' Rights, the Charter mandates that environmental considerations be incorporated into all development programs.

In addition, the Charter promotes cooperation and solidarity among African countries (Article 12), which facilitates the exchange of resources and expertise to develop sustainable technologies. In order to prevent African nations from being at a disadvantage in their quest for sustainable development, it also tackles the problem of economic exploitation and promotes fair access to resources and technology. In the end, the African Charter offers a thorough framework for guaranteeing that technological developments in Africa result in a more prosperous and sustainable future for everyone.

[5] United Nations Framework Convention on Climate Change, *The Paris Agreement*, UNFCCC, https://unfccc.int/process-and-meetings/the-paris-agreement (last visited Aug. 12, 2025).

ISSN: 2582-6433

2. European Convention

The European Union is starting on a new era with the 2024–2029 term, which will be devoted to enacting policies at the intersection of industrial development, technology, and sustainability. The Clean economic Deal, which aims to increase economic competitiveness while maintaining environmental obligations, will likely be the focus of the incoming European Commission's practical approach. With capabilities like artificial intelligence (AI), machine learning, along with quantum computing ready to improve resource efficiency and propel the green transition across multiple industries, digital technologies play a pivotal role in this strategy.[6]

In order to combine digital and environmental goals, the Information Technology Industry Council (ITI) suggests a number of important steps. Legislators should take a comprehensive approach to product regulations that takes durability and the ability to be repaired into account, streamline the regulatory environment to avoid obstacles to technology adoption, and digitize compliance reporting to lessen administrative strains. In order to optimize AI's potential to lower carbon emissions, the EU should also encourage its use and fund green technology research and development. To accomplish its sustainability objectives and maintain its position as a worldwide leader in the green transition, the EU will need to adopt an integrated strategy that emphasizes workable and cohesive policies.

3. Inter-American System

By serving as a forum for regional collaboration and policy formation, the Inter-American System—led by the Organization of American States (OAS)—promotes sustainable technology. The Paris Agreement and the 2030 Agenda for Sustainable Development are in line with the OAS's activities through its Inter-American Program for Sustainable Development (PIDS). The Inter-American Guidelines on Data Governance and AI provide a framework for the system, which promotes the use of open data and AI technology to address issues in human rights, democracy, and sustainable development.

The Organization of American States supports the development of innovative projects that employ cutting-edge technology, encourages access to sustainable energy, as well as assists member states in creating climate-resilient strategies through a variety of channels. Along with highlighting the value of cooperation and governance, the Inter-American System facilitates

[6] Gabriele Favarò, *The Future of Tech and Sustainability in the EU: ITI's Vision for the 2024-2029 Mandate*, ITIC (Oct. 29, 2024), https://www.itic.org/news-events/techwonk-blog/the-future-of-tech-and-sustainability-in-the-eu-itis-vision-for-the-20242029-mandate.

ISSN: 2582-6433

international cooperation on sustainable development concerns through meetings along with specialized committees. With the Inter-American Court of Human Rights reaffirming the protection of human rights within the context of climate change and environmental protection, this all-encompassing approach guarantees that the interrelated economic, social, and environmental aspects of development are addressed.

The principle of extraterritorial obligations and technology transfer

The objective of global sustainability is closely linked to the ideas of technology transfer and extraterritoriality. Extraterritorial operations are when a country enforces its laws and rules outside of its borders, especially when it comes to resource management and environmental preservation. This has the power to force global firms to embrace sustainable practices, whether they are related to resource management, human rights, or climate change. This strategy provides a strong incentive for businesses, wherever they may be, to follow more stringent environmental laws.

In order to encourage sustainable development, technology transfer is a method of sharing technologies, knowledge, and skills—often from developed to poor nations. This involves exchanging knowledge in fields like water treatment and renewable energy, which strengthens local capabilities and tackles global issues. These two ideas are symbiotic: technology transfer offers the expertise and knowledge required to successfully apply extraterritorial legislation, while extraterritorial regulations can encourage businesses to bring sustainable technologies to their overseas operations. This two-pronged strategy aids in meeting global environmental goals and ensuring that the advantages of sustainable development are distributed fairly.

BARRIERS TO ACCESS SUSTAINABLE TECHNOLOGIES

1. Social and Cultural Barriers

A major obstacle may be a lack of knowledge and comprehension regarding the advantages of sustainable technologies. The benefits of sustainable solutions for the environment and the economy are just not well known. The resistance to change and hesitation to embrace new technologies might result from this ignorance. The adoption of sustainable technologies might also be hampered by cultural customs and conventions. For instance, encouraging energy conservation and waste reduction may be challenging in a culture that values materialism and wastefulness. Adoption of sustainable solutions might also be hampered by a preference for

ISSN: 2582-6433

conventional methods or opposition to innovative technologies.

2. The Challenge of Systemic Inertia

The adoption of innovative, sustainable technology is frequently hampered by contemporary industries and infrastructure. The fossil fuel sector, for instance, has a strong stake in preserving the current status and may aggressively oppose laws and programs that support renewable energy. In a comparable way, established industrial procedures and supply chains are frequently tailored for traditional technology, which hinders the adoption of sustainable alternatives. This systemic inertia may appear in many forms, such as sponsoring studies that challenge climate science, advocating to undermine environmental rules, and encouraging unsustainable the culture of consumerism. The use of products and services with an emphasis on sustainable, conscientious, and circular patterns is referred to as consumption.

3. Technological Limitations

Despite recent substantial advancements, there are still several limitations with sustainable technologies. For example, reliability of the grid is challenged by the short-term nature of renewable energy sources like wind and solar. Batteries and other energy storage devices are still somewhat costly and have a limited capacity. Limitations in infrastructure might also make it more difficult to implement sustainable solutions. The flood of renewable energy is becoming excessive for a number of the current power infrastructures, requiring significant alterations. In the same way, the absence of infrastructure for electric vehicle charging may deter people from using them.[7]

4. Market Failures and Externalities

Implementing sustainable technology can be severely restricted by market failures, including the disregard for the environmental consequences of pollution. It can be challenging for sustainable alternatives to compete when the price of a good or service does not accurately represent its genuine environmental effect. For example, gas is usually less expensive than environmentally friendly forms of transportation like electric cars or public transportation since it does not account for the costs of air pollution, climate change, or oil spills.Such externalities, or expenses that neither the producer nor the consumer take on, have the potential to alter

[7] Sustainability Directory, *What Are the Barriers to Sustainable Technology Implementation?*, SUSTAINABILITY DIRECTORY (Mar. 20, 2025), https://climate.sustainability-directory.com/question/what-are-the-barriers-to-sustainable-technology-implementation/.

ISSN: 2582-6433

market signals and deter investment in environmentally friendly technologies. The process of leveling up competition and advancing sustainable solutions need correcting these market failings through laws, carbon pricing, and environmental levies.

5. Regulatory and Policy Barriers

Regulations that are inconsistent or insufficient might breed uncertainty and deter investment in environmentally friendly technologies. Establishing sustainable initiatives can potentially be delayed or even prevented by bureaucratic obstacles and complicated permitting procedures. Furthermore, sustainable technology may find it challenging to compete with fossil fuels if there are unclear carbon pricing mechanisms in place. The adoption of sustainable technologies may also be hampered by the absence of government incentives like tax credits, subsidies, and feed-in tariffs. These incentives have the potential to level the playing field along with enhancing the economic attractiveness of sustainable solutions.

6. Supply Chain Vulnerabilities

A technology's supply chain determines the extent of its sustainability. Materials from areas with questionable labor and environmental standards are used in most of the sustainable technologies. For instance, lithium and cobalt, which are frequently mined in nations with lax environmental laws and human rights standards, are needed to produce batteries for electric cars. Maintaining the integrity of sustainable technologies requires ethical and sustainable supply chains. This calls for cooperation between businesses, governments, and civil society organizations as well as more openness, traceability, and due diligence across the supply chain.

CASE STUDIES ON SUSTAINABLE TECHNOLOGIES

1. Open source solar panel technology, India's solar push, African off-grid renewable energy projects

India offers a useful model for off-grid renewable energy initiatives, especially in Africa, because of its quick solar energy growth, which is fueled by both government regulations and technological advancements. With the help of aggressive goals, encouraging laws like net metering and subsidies, and the creation of expansive solar parks, India has effectively reached 100 GW of installed solar power. This rise has also been fueled by technological advancements such as floating solar farms and the falling cost of solar panels.

ISSN: 2582-6433

Significant lessons can be learned from this success for African countries looking to increase access to power. Africa can benefit from adopting solar by adopting India's expertise with policy frameworks and cutting-edge financing models, like pay-as-you-go and microfinance. Additionally, a local workforce qualified to install and maintain solar systems can be created by replicating India's emphasis on skill development.

Open-source solar technology is a significant game-changer in this process of knowledge sharing. Since they allow for local manufacture and customisation, open-source hardware and software can drastically lower the cost of solar systems. Along with encouraging international cooperation and knowledge exchange, this strategy gives communities the ability to create and modify technologies to suit their unique requirements. India's successful techniques and the strength of open-source technologies can be combined to create the way for the delivery of trustworthy and reasonably priced renewable energy to underprivileged people across the globe.

2. Tata Power's Rooftop Solar Program in India

Offering a variety of rooftop solar solutions for residential, commercial, and industrial clients, Tata Power is a significant player in the Indian rooftop solar market. Through programs like the "Ghar Ghar Solar" program, which offers financing options to lower upfront costs, the firm, via its affiliated company Tata Power Solar, makes solar energy more affordable and accessible. Additionally, they actively participate in the government's PM-Surya Ghar: Muft Bijli Yojana, which provides financial aid for solar installations in homes.

In addition to offering residential solutions, Tata Power Solar is a premier Engineering, Procurement, and Construction (EPC) firm for rooftop and large-scale projects. Additionally, they manufacture Tier-1 solar panels, guaranteeing premium parts for their systems. The first group captive solar plant for a residential society in India is one of the company's creative ventures. States like Gujarat, Maharashtra, and Rajasthan are leading the way in rooftop solar installations, and other major businesses like Fourth Partner Energy and Amplus Solar are also paying close attention to this industry.

3. Sustainable Technologies in Residential Buildings

Throughout a building's entire lifecycle, sustainable solutions for residential structures aim to minimize their negative effects on the environment and encourage resource efficiency. Energy

ISSN: 2582-6433

efficiency and renewable energy are two important categories into which these technologies can be divided. To reduce energy usage, this entails utilizing solar power through photovoltaic panels, geothermal heating and cooling systems, and high-performance windows and insulation. Energy efficiency is also greatly aided by smart building technology like Building Management Systems (BMS) and LED lighting with smart controls. For some people, a net-zero energy building—one that produces as much energy as it uses—is the ideal.

A further significant component is water conservation, which can be achieved by the installation of water-efficient fixtures and technology like rainwater collecting for purposes other than drinking. In order to minimize waste and a project's carbon footprint, sustainable building practices include recycled materials, sustainable wood, and even green concrete. Features like green walls and roofs additionally assist with stormwater management and insulation. Other crucial factors are biophilic design, which uses natural features to improve occupant well-being, and passive solar design, which uses a building's orientation for natural heating and cooling. Residential structures can become more resource-effective, ecologically friendly, and healthier places to live by incorporating these various technologies.

4. Interface's Sustainable Carpet Manufacturing

Interface, a multinational flooring company, started its sustainability journey in the 1990s and has since emerged as a leader in the production of sustainable carpet. The company's primary strategy is to employ renewable and recycled resources, reduce waste, and drastically lower its carbon footprint. One important endeavor is the development of a closed-loop manufacturing system, which significantly reduces landfill waste by enabling the recycling and reuse of resources.

Interface is also committed to material innovation, creating goods using novel materials derived from sustainable resources as well as recycled yarn and backing. They have effectively incorporated waste reduction into all phases of their production process through a variety of programs. Achieving carbon neutrality by lowering and offsetting emissions is a key corporate objective. Additionally, Interface consistently reports on its sustainability progress, demonstrating its strong commitment to transparency. Due to this commitment, the company's environmental effect has decreased, and it has also created a compelling case study for how companies can successfully incorporate sustainability throughout their core operations.

ISSN: 2582-6433

HOW TO OPERATIONALIZE THE RIGHT TO ACCESS SUSTAINABLE TECHNOLOGIES?

The right to access sustainable technology must be operationalized through a multifaceted strategy that prioritizes cost, accessibility, and capacity building. It is essential to prioritize the deployment of these technologies in underprivileged areas and invest in infrastructure that supports them in order to ensure equal distribution and accessibility. Facilitating the flow of technology from industrialized to developing nations can also encourage local adaptation and knowledge exchange.

Financial tools and incentives are used to improve affordability. This entails lowering upfront expenses through subsidies, creating creative financing schemes like small-scale loans, and emphasizing the financial savings and long-term economic advantages of utilizing sustainable technologies.

To make sure that individuals can utilize and maintain these technologies efficiently, capacity building is crucial. This entails offering educational and training initiatives to provide them the skills they need. In order to guarantee that programs are tailored to the unique requirements of the people they serve and to promote local ownership, community engagement is also essential. Another essential element of developing technologies for particular situations is funding regional research and development.

Ultimately, this process requires strong governance and policy. To promote adoption, governments should develop well-defined action plans, employ a mix of incentives and regulations, and set an example by implementing sustainable practices themselves. Establishing precise key performance indicators (KPIs) and carrying out frequent monitoring and assessment are crucial for tracking success while guaranteeing accountability and openness in all endeavors.

CONCLUSION

According to the research, a rights-based strategy is not only morally required, but also legally and ethically required to address the global sustainability concerns. Because sustainable technologies are inextricably linked to the realization of other acknowledged rights, such as the right to development, a healthy environment, and health, it is argued that access to them is a

ISSN: 2582-6433

fundamental human right. As we've shown, the contemporary environment is rife with important social, legal, and economic obstacles that exacerbate technological inequality and severely disadvantage the most vulnerable groups.

As a result, this paper concludes that a paradigm shift is required. Adopting a robust Human Rights-Based Approach (HRBA), international and domestic actors can systematically break down these barriers. This encompasses strengthening legal frameworks, promoting equitable technology transfer, and—most importantly—empowering communities to participate in the design along with implementation of sustainable solutions.To guarantee that the promise of an environmentally friendly future will not remain an exclusive privilege but rather a shared reality for everyone, the international community must acknowledge and institutionalize this right going ahead. This is the only way to make the transition fair and just.