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Green Habits of Clean Energy Technology: Policy Framework

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Abstract:

The present paper, Green Habits of Clean Technology: Policy Framework is prepared with the objectives to understand the How Advanced Clean Energy Technologies need be routine Habits necessity, present issues and their effects on Environment Education. This research paper tells Renewable Energy, Internet of Things, Data Analytics should utilize to Bring New Policy Framework as Green Habits to Each and Every Individual, with special emphasis on Coal Sector issue. How to Analyse Real time Data Analytics to improve Environmental Education through Policy Framework and it also includes Practical Analysis of Renewable Energy, Internet of Things, Data Analytics. Also, Policy Frame work as Solution -Theoretical and Practical approach to complex decision makings, Social Inclusion, Economics of Green Habits, Investment Model, Skill Development, Self-Reliant Growth, Action Plan, Strategies, Global Funding Facilities, Review of International convention, Indian Government Initiatives. Policy Framework is the most essential tool to have legal action to Environmental issues. Rapid Growth Experienced by India Now challenges also emerged. Tension between Economic Development and Environment is Central challenge. The research came with recommendations for Policy Effectiveness. It is hoped that Potential Policy Framework able to Teach "Green Habits" -Desirable Change, Outcome to Achieve our Sustainable Development Goal to Promote prosperity while protecting our planet.

Keywords: Green Habits, Renewable Energy technologies, Policy Framework, Environmental Education.

Introduction:

The present paper, 'Green Habits of Clean Energy Technologies: Policy framework' prepared with the objectives to understand how advanced clean energy technologies need to be routine habits necessary to protect our environment. Also it focuses on practical discussion about renewable energy, internet of things and data analytics, green habits, concept of policy framework recommendations. Energy is a principle factor in life of any organism which is exhibiting on earth. Humans are using different forms of energy for various purposes. The energy which is used by humans for survival mostly obtained from conventional energy sources.Different reports show that these conventional resources are gradually declined due to over exploitation by humans. The Brundtland Report, 'Our Common Future' published in 1987 by the United Nations World Commission on Environment and development, coined the term 'sustainable development' and defined it as "development that meets the needs of present without compromising the ability of future generations to meet their own needs." To achieve such kind of development, the action plans and strategies were formed in United Nations Conference on environment and development which was held in Rio de Janeiro in 1992. Out of 16 SDGs, SDG7 is related to affordable and clean energy and SDG12 is related to responsible consumption and production. Study shows the failure to achieve goals of supply of affordable

and clean energy as well as it is stated that, "unstable production and consumption and the accelerated loss of marine, terrestrial and freshwater biodiversity affecting the other SDGs like responsible consumption and production (SDG12), climate action (SDG13), life below water (SDG14), life on land (SDG15)" (Sustainable Development Report 2021). The pattern of energy consumption and production directly affect the climate change phenomenon. The reduction in energy consumption is in top priority, to reach the estimated emission reduction potential energy consumption must be reduced by 12.5 percent globally (UNEP 2020). To understand the developmental goals of any economy, the energy sector plays a vital role (IEA 2015). Also the same report states that there will be drastic increased in electricity demand of India by 2040 i.e. from present capacity of 30 GW to more than 1000 GW. Central Electricity Authority (CEA) 2017 report gave Energy mixed by installed capacity in India in 2017, according to which 18 percent of energy must be obtain by renewable resources but the report of BP energy outlook 2018 says that the contribution of renewable resources contributed only 2 percent in energy production in the year of 2016. It was seems to very difficult to achieve desirable ups in renewable energy production but report released by BP in 2020 (Energy Outlook 2020-India) showed the increased in utilization of renewable resources i.e. 22% and 69% of total primary energy in 2050. The technologies which are renewable, less harmful and friendlier to environment by which the global community can be powered are called as clean energy technologies. Solar, wind, water, geothermal, bio-energy, natural gas and nuclear power are considered as clean energy sources (RTI Internationals).

The policy must be mould clean energy technologies with routine habits to achieve energy security. A green Habit Policy is a statement about our individual as well as organizational commitment to sustainable and environmental management. This is compulsion to everyone as High priority to Environment, Developing Clean Technologies at Local Level to be self dependent. Every year international Environmental Performance Index is released. This index consist data regarding to green performance of countries worldwide. The top10 green countries are mentioned below showing their renewable energy contribution and target by 2020 towards the sustainability. In same index India stood at 176th out of 179 countries. It's cleared that we are far away to be a 100 percent green country.

Environmental Performance Index -More Sustainable and Greener			
Sr. No	Name Of Country	Renewable Energy Contibution	Traget by 2050
1	Switzerland	59.6% Hydro+31.7% Nuclear +5% Thermal	To Increase renewable Energy
2	France	78% Nuclear Power	32 % RE BY 2030 , Carbon Neutrality by 2050
3	Denmark	72% Renewable (Wind ,wood, Solar)+28% NRE	100% Renewable Energy
4	Norway	90% Hydro Power project	100% Renewable Energy
5	Ireland	44% Gas and Oil Based	To Increase renewable Energy
6	SWEDEN	54% Renewable	100% Renewable Energy by2040
7	UK	40.2% Renewable	100% Renewable Energy by2035
8	Luxembourg	11% Renewable	25% Renewable Energy by2030
9	Austria	77% Renewable	100% Renewable Energy by2030

Source: Environmental Performance Index 2018.

Study analysis and Findings:

Conceptual Clarity of Definitions: (NCERT s, NIOS Books)

1. Energy: Energy is Fundamental form of living for all Living Beings
2. Energy: Energy is associated with Electrical Current -Drift of Electron
3. Energy: Energy is property of matter that can be converted in Heat, Work or Radiation etc
4. Technology: Practical application of scientific knowledge with specific purpose is Technology
5. Clean Energy: Clean Energy is Energy that comes with Zero Emissions and Renewable sources
6. Clean Energy Technology: Any process, Product or Services which reduces negative impact on Environment through significant efficiency improvements.
7. Energy Efficiency: Energy Efficiency means to utilize less energy in performing same task.
8. Energy Security: Energy security means uninterrupted avability of Energy Resources
9. Decarbonization: Decarbonization means Reduction in Carbon
10. Green House Gas: Gas that absorbs and emit radiant energy within thermal infra range causing green house effect
11. Climate Change: Climate change describes as change in average condition like temperature and rainfall in a region over a long time.
12. Renewable Energy: Renewable Energy is form of Energy that is not depleted like Solar /Wind
13. Conventional Energy:Conventional Energy is form of Energy that is depleted like Thermal

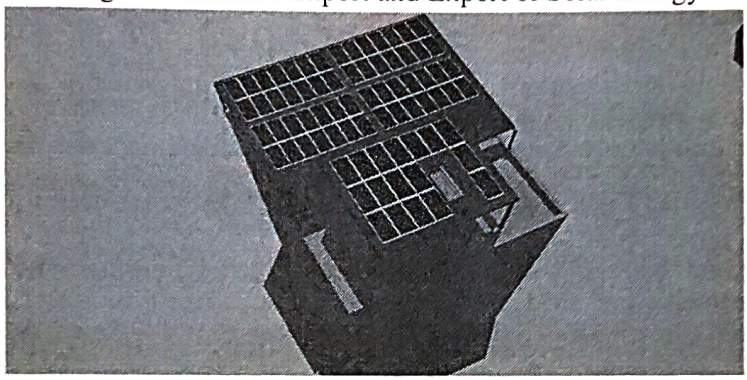
Clean Energy Technology: Energy Transition and Practical observations:

Entire world is committed to Paris Agreement 2015.Maintaining and Reducing temperature below 1.5 to 2 Degree Centigrade. Focus on Reducing C02 Emissions. Currently India is 3rd largest emitter in the World. China (30 %), USA (12 %) emissions. Phasing out coal-based generation by almost 50 % by 2030 as committed by world and India. Production of 500 GW RE power as committed by GOI at COP 26 held in Glasgow recently. Reduction in CO2 emission by 1BT by 2030.Increase in Forest cover by 33 %. (In Bhutan Forest Cover is 72 %) (FAO Data)
India is the second largest population in world and Economy growing at rate of 8% in last decade and average 6 % after Independence. After LPG model our economy accelerated when we arerising to $5Trillion GDP. Naturally demand of Energy will be increased means to drive our Economy We need more Energy security and More Resource Planning. Presently India is the fourth largest Energy producing country in World.

In Today Context: 1.383 Twh Energy productions In India (75.38% Fossil Fuels, 21.16 RE) Residence-24 %, Industrial- 42 %, Agriculture-17.67 %, Commercial- 8 %. . India is the second largest importer of Crude oil after China: 82.85 % Crude Oil Imports, 45.3 % LNG /Natural Gas, average 73.3B$ we pay import bills ever year. Yet we are consuming forest wood as fuel

India can be Sustainable Nation? Can we provide -Right to Energy ? Yes, we have capacity and capability to strengthen our Energy policy. (Our Research Project SOP)

1. Solar Energy: We have set Our RE target 450 GW by 2030. So, financing this energy Transition is most important parameter. Energy transition due to existing barriers faced by traditional lenders. We need alternative sourcing of capital.
2. Working Principle: Solar Cells works on Principle of Photovoltaic effect when Temperature raises above 20+ degrees certain materials absorb Photos and release Free Electrons. This effect converts solar energy directly to DC Electricity
3. DC to AC Conversion: DC Electricity converted to AC using Solar String Inverter.
4. Solar Net Metering: We measure Import and Export of Solar Energy.



Source: Optimization of tilt angle, Solar Modules design, development in Sketch up Software

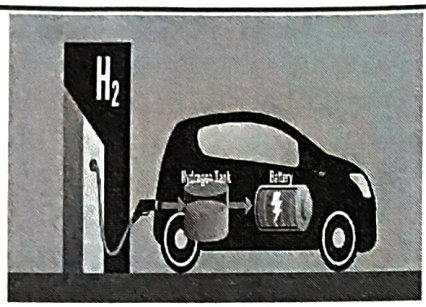
Hydrogen as Fuel:

Hydrogen Fuel with the highest specific energy 33.3 Kwh /Kg as against 11.8 Kwh /Kg of Diesel. Carbon Neutral Fuel if generated from RE Sources -Potential to substitute conventional fossil fuels. When we use Fuel Cells, generate Energy with 50% efficiency (conventional Engines have efficiency of 25%). Zero Emission of Pollutants. Output is Electrical Energy and Water Vapor.

Pathways of Hydrogen Generation:

1) Natural Gas- Stem Methane Reformation
2) Water Electrolysis
3) MSW-Gasification
4) Hydrogen From Biomass
5) Methanol Reformation from Coal

Entire world is moving towards Hydrogen as Fuel Technology as Clean Technology. Hydrogen Council formed in 2017. $1.7 B invested in development of FCEVs and related technologies .Investment surged 34% to $ 30.7 Trillion over past two years (KPIT). Top Names Blackrock, Amundi, ASR Netherland NV, Calpers, Harward university, PIMCO, Breakthrough Energy Ventures, Pictete Asset Management. For India its golden opportunity to overcome issues of High Import Bills, Diesel consumption in Public transports. Pollution (3rd largest Emitter of Co_2, 10 out of 20 most polluted cities in India, Low Income of Farmers -as Agricultura dependent and 85% farmers have land below 5 Acre, Have income 17000 INR /Acre). Hydrogen ecosystem can address these challenges. We can achieve SDG goal by means of Hydrogen as Fuel -Clean Energy Technology. We have to develop policy to develop technologies at local level



Internet of Things:

India is the Global leader in Software Technologies. Industry 4.0 brought several opportunities for us. It is disruptive technology of connected network devices digitally so data can be available anywhere with high level of security.

Data Science/Data Analytics:

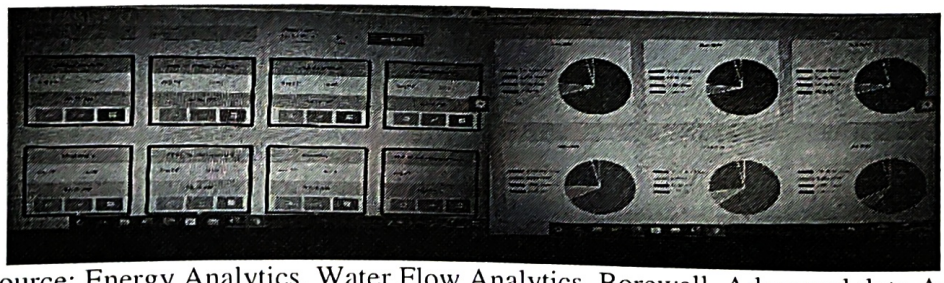
This Generated Data, Data Analytics powerful information useful to help to reduce cost of production,

optimization of Energy utility, reduce losses, increase productivity and Efficiency. Data is Oil of 21st century.

Source: Gateway and Antenna for Data collection, Digital Displays with RS 485 for Data Transmission.

CGWA Rule:

In Order to Increase Ground water Table and have limit on Ground water extraction. On 7th September 2021 CGWA issues notice for Borewells application to share Real Time data of Extractions.



Source: Energy Analytics, Water Flow Analytics, Borewell, Advanced data Analytics

To step ahead, government of India under the MoEF&CC released a document in the year of 2020 titled Green deeds and habits for sustainable environment which aimed to bring about mass environmental awareness among society. The themes which are given in above documents are- efficient waste management, energy conservation and promoting renewable energy, control pollution, biodiversity conservation, resource efficient practices, sustainable water consumption, plantation and greening, healthy habits.

Meaning of Environmental Policy: It is commitment of an organization or Government to the laws, regulations and other policy makings concerning Environmental issues

Sustainable Goal on Energy No-07: Affordable and Clean energy. Energy is the most powerful parameter to reduce emissions to protect our environment.

Present Indian Government Policies, ACT, Rules , Programs by Ministry of Environment, Forest and Climate Change (MoeFCC) for Planning, Coordination, promotion, overseeing implementation. Associated with UNEP Programmers, ICIMOD, UNCED, CSD, GEF, ESCAP. India ratified UNFCC in 2016 .India enacted Biodiversity Diversity Act 2002, National Biodiversity Action Plan 2008.Indian wild Life protection act 1972, National Forest Policy 1988, Environment Protection act 1986, Foreign Trade development and regulation act 1992 ,Air pollution control act 1981, National Environment Policy 2006, Solid Waste management rule2016, Plasticwaste management rule 2016, Construction demolition act 2016.

International Convention like Basel Conventions, Rotterdam Conventions, Stockholm Conventions, Conservation of Wetland, Ramsar Conventions, Wetland conservation and management rules 2010, Eco Task Force, National Mission for Green India, Global Learning and observations to Benefit the Environment (GLOBE), Climate change action Plan-National and State Plans, National adaption Funds for Climate Change, Paris Agreement International cooperation and sustainable development. For Energy India Government had taken following

Steps:

1) National Solar mission
2) National Solar Mission for enhanced Energy Efficiency, BEE Programs.

Our main focus is Green Habits of Green Energy Technology: Policy Framework.

Global investment in clean energy technology increasing, Investors are concern about oil and gas sector, Indian private sector in association with Indian government increasing research and development funds in clean energy technology e-EVS, Automobile sector, Smart City Initiatives, Eco Pharma, Organic farming etc.-We need strong steel frame work from Field level to strengthen our system, strategies to achieve goal of SDG by 2030.

Meaning Of Green Habits: A green Habit is policy statement about our individual as well as organizational commitment to Sustainable development and and environment management. This is compulsion to every one as High Priority to Environment, developing clean technologies at Local level to be self-sustainable -Atmanirbhar Bharat.How you measure Output: Change in Habits to Green Habits will results in Change in attitude to Bring Happy World Ahead-Vasudeva kutumbakam -The world is One Family

What Major Steps We Have to Take:

1. Like CSR Act – Compulsion commitments to Environment Government initiatives with Public Participation
2. Motivation to Each Individuals to recall-Environment is My Responsibility

3. Strategies and Planning of Each emission or Polluting agent to Have Eco friendly solutions to Industry,Commercial, Agriculture and Residential areas
4. In order to Improve quality of Sustainable Life –Clean Energy Technology Practices need to adopt
5. Complete Health Monitoring of all Natural Resources –Water, Soil, Forest Cover etc so Real Time Data analytics will guide us for Decision making Parliament to Village Level
6. Gram Panchayat asSustainable Model of National development to achieve SDG Goal

Way Forward:

This Research Paper "Green Habits of Clean Energy Technology: Policy Framework" discussed Basic Fundamentals, Present issues and Future Challenges with Clean Energy Technology as Solution .In Terms of Policy Framework "Green Habits" as Compulsion to Every one as recommendations

1. Present Policy analysis, specialization of New alternatives, Recommending Policy actions, Monitoring Policy Outcome, Evaluating Policy Performance, Skill Development etc
2. Socio –Economical Approach to Reach Common man –Poverty, Hunger, Environmental Hazards, Migration Issues, Women Empowerment etc to Bring Social Justice to achieve our SDG Goals by 2030

It is hoped that Potential Policy Framework able to Teach "Green Habits" -Desirable Change, Outcome to Achieve our Sustainable Development Goal to Promote prosperity while protecting our planet.

References:

1. https://www.rti.org/focus-area/clean-energy-technology
2. https://powermin.gov.in/en/content/power-sector-glance-all-india
3. https://worldpopulationreview.com/country-rankings/greenest-countries
4. https://www.visualcapitalist.com/greenest-countries-in-the-world/
5. https://www.nrel.gov/international/india-renewable-energy-integration.html
6. IEA, Global energy-related CO2 emissions, 1990-2021, IEA, Paris https://www.iea.org/data-and-statistics/charts/global-energy-related-co2-emissions-1990-2021
7. IEA (2015), World Energy Outlook 2015, IEA, Paris https://www.iea.org/reports/world-energy-outlook-2015
8. BP. 2018.*BP Energy Outlook: Country and regional Insights-India*. https://www.bp.com/content/dam/bp/en/corporate/pdf/energy-economics/energy-outlook/bp-energy-outlook-2018-country-insight-india.pdf.
9. https://wedocs.unep.org/20.500.11822/34917
10. NCERT,NIOS, ICSE Boards Website ,Academics Books

11. India year Book

12. EPW

13. The Print

14. The Hindu

15. KPIT Discussions on Clean Energy

16. India Year Book

17. MoEFCC Website

18. NitiAyog Policy Discussions

19. Credit Guarantee Fund Trust for Micro and Small Enterprises. 2020. ""About Us"." Accessed on 25 June 2020. https://www.cgtmse.in/

20. UDDAN Scheme

21. Frankfurt School-UNEP Centre/BNEF. 2020. Global Trends in Renewable Energy Investment 2020, Accessed on 25 June 2020. http://www.fs-un ep-centre.org

22. ReNew Power. 2015. "ReNew Power Opens Up Bond Market for Renewable Energy Projects by Launching the First Ever Infrastructure Bond Issuance Credit Enhanced By IIFCL

23. IREDA. 2017. "Financing Norms and Schemes." Accessed on 26 June 20. https://www.ireda.in/doc/Annex ure_I.pdf

24. GOI, MOEFC. 2018 ""India's Intended Nationally Determined Contributions—Towards Climate Justice." Accessed on 25 June 2020 http://moef.gov.in/wp-content/up loads/2018/04/revised-PPT-Press-Con ference-INDC-v5.pdf

25. The Economic Times. 2020, "Budget 2020: Rs 22,000 Cr Outlay for Power, Renewable Energy Sector in FY21: FM." Accessed 25 June 2020. https://energy.economictimes.indiatimes.com/news/power/ budget-2020-rs-22000-cr-outlay-for-power-re newable-energy-sector-in-fy21-fm/73836155

26. RS TV Debate and Discussions