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Food Science and Nutrition along with Special Contributions towards Renewable Energy Technology

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ABSTRACT: Recent efforts to increase the use of renewable energy sources have been driven by the following interrelated needs: to improve energy security and diversify energy sources, encourage sustainable economic development and protect the climate and the environment from the impacts of fossil fuel use. These motivations led to a step change in the development and deployment of a range of renewable energy technologies. In addition, policy interventions contributed to dramatic costs reductions of some renewable electricity technologies and the rapid deployment of these technologies. The source of renewable energy can be solar power, wind power, geothermal power, hydropower and biomass. Accordingly, technologies are diverse and can be differentiated by their nature – variable or dispatchable, centralized or distributed, direct or indirect and traditional or modern. Some renewable energy sources and technologies, such as traditional biomass that involves the direct – and often inefficient – combustion of wood and charcoal, are not considered “clean”.

I. INTRODUCTION

The primary objective for deploying renewable energy in India is to advance economic development, improve energy security, improve access to energy, and mitigate climate change. Sustainable development is possible by use of sustainable energy and by ensuring access to affordable, reliable, sustainable, and modern energy for citizens. Strong government support and the increasingly opportune economic situation have pushed India to be one of the top leaders in the world’s most attractive renewable energy markets. The government has designed policies, programs, and a liberal environment to attract foreign investments to ramp up the country in the renewable energy market at a rapid rate. It is anticipated that the renewable energy sector can create a large number of domestic jobs over the following years. This paper aims to present significant achievements, prospects, projections, generation of electricity, as well as challenges and investment and employment opportunities due to the development of renewable energy in India. In this review, we have identified the various obstacles faced by the renewable sector. The recommendations based on the review outcomes will provide useful information for policymakers, innovators, project developers, investors, industries, associated stakeholders and departments, researchers, and scientists.[1,2]

India cares for the planet and has taken a groundbreaking journey in renewable energy through the last 4 years . A dedicated ministry along with financial and technical institutions have helped India in the promotion of renewable energy and diversification of its energy mix.

II. DISCUSSION

The country is engaged in expanding the use of clean energy sources and has already undertaken several large-scale sustainable energy projects to ensure a massive growth of green energy.

1. India doubled its renewable power capacity in the last 4 years. The cumulative renewable power capacity in 2013–2014 reached 35,500 MW and rose to 70,000 MW in 2017–2018.

2. India stands in the fourth and sixth position regarding the cumulative installed capacity in the wind and solar sector, respectively. Furthermore, its cumulative installed renewable capacity stands in fifth position globally as of the 31st of December 2018.

3. As said above, the cumulative renewable energy capacity target for 2022 is given as 175 GW. For 2017–2018, the cumulative installed capacity amounted to 70 GW, the capacity under implementation is 15 GW and the tendered capacity was 25 GW. The target, the installed capacity, the capacity under implementation, and the tendered capacity are shown in Fig. 4.

4. There is tremendous growth in solar power. The cumulative installed solar capacity increased by more than eight times in the last 4 years from 2.630 GW (2013–2014) to 22 GW (2017–2018). As of the 31st of December 2018, the installed capacity amounted to 25.2122 GW.

5. The renewable electricity generated in 2017–2018 was 101839 BUs.

6. The country published competitive bidding guidelines for the production of renewable power. It also discovered the lowest tariff and transparent bidding method and resulted in a notable decrease in per unit cost of renewable energy.

7. In 21 states, there are 41 solar parks with a cumulative capacity of more than 26,144 MW that have already been approved by the MNRE. The Kurnool solar park was set up with 1000 MW; and with 2000 MW the largest solar park of Pavagada (Karnataka) is currently under installation.[3,4]

8. The target for solar power (ground mounted) for 2018–2019 is given as 10 GW, and solar power (Rooftop) as 1 GW.

9. MNRE doubled the target for solar parks (projects of 500 MW or more) from 20 to 40 GW.

10. The cumulative installed capacity of wind power increased by 1.6 times in the last 4 years. In 2013–2014, it amounted to 21 GW, from 2017 to 2018 it amounted to 34 GW, and as of 31st of December 2018, it reached 35.138 GW. This shows that achievements were completed in wind power use.

11. An offshore wind policy was announced. Thirty-four companies (most significant global and domestic wind power players) competed in the “expression of interest” (EoI) floated on the plan to set up India’s first mega offshore wind farm with a capacity of 1 GW.

12. 682 MW small hydropower projects were installed during the last 4 years along with 600 watermills (mechanical applications) and 132 projects still under development.

13. MNRE is implementing green energy corridors to expand the transmission system. 9400 km of green energy corridors are completed or under implementation. The cost spent on it was INR 10141 crore (101,410 Million INR = 1425.01 USD). Furthermore, the total capacity of 19,000 MVA substations is now planned to be complete by March 2020.

14. MNRE is setting up solar pumps (off-grid application), where 90% of pumps have been set up as of today and between 2014–2015 and 2017–2018. Solar street lights were more than doubled. Solar home lighting systems have been improved by around 1.5 times. More than 2,575,000 solar lamps have been distributed to students.

15. From 2014–2015 to 2017–2018, more than 2.5 lakh (0.25 million) biogas plants were set up for cooking in rural homes to enable families by providing them access to clean fuel.

16. New policy initiatives revised the tariff policy mandating purchase and generation obligations (RPO and RGO). Four wind and solar inter-state transmission were waived; charges were planned, the RPO trajectory for 2022 and renewable energy policy was finalized.

17. Expressions of interest (EoI) were invited for installing solar photovoltaic manufacturing capacities associated with the guaranteed off-take of 20 GW. EoI indicated 10 GW floating solar energy plants.[5]

18. Policy for the solar-wind hybrid was announced. Tender for setting up 2 GW solar-wind hybrid systems in existing projects was invited.



19. To facilitate R&D in renewable power technology, a National lab policy on testing, standardization, and certification was announced by the MNRE.

20. The Surya Mitra program was conducted to train college graduates in the installation, commissioning, operations, and management of solar panels. The International Solar Alliance (ISA) headquarters in India (Gurgaon) will be a new commencement for solar energy improvement in India.

21. The renewable sector has become considerably more attractive for foreign and domestic investors, and the country expects to attract up to USD 80 billion in the next 4 years from 2018–2019 to 2021–2022.[6]

III. RESULTS

Nutrition Sensitive Sustainable Agri-Food System – Foremost National Priority Recalling the unethically persistent hunger, malnutrition and abject poverty, in line with the recently announced Government's initiatives viz., Kuposhan Mukh Bharat, and National Nutrition Strategy : Vision 2022, and other related national and international developments, it is obvious that promoting growth and development in the agriculture sector is most crucial to alleviating hunger, poverty and under nutrition. In the life cycle approach it must be prevented as early as possible to avert irreversible deficits in development of individuals, societies, and the nation as a whole. Intergenerational continuity of high incidences of under nutrition are fraught with the epigenetic fixation of the malady. And, this inhuman development must be averted soon (Singh, 2015). Agricultural policy must focus to promote smallholder agriculture, especially their access to production resources, land entitlement, technology, knowledge, credit, market, and price realization. Access to clean drinking water and sanitation is equally important for accomplishing One Health.[7]

Agriculture for development is no longer limited to only agricultural production and food security. A paradigm shift is needed to pursue food security and comprehensive nutritional security - nutrition being the focus, and agricultural production should mean sustainable agri-food system. Thus, new policy options and actions should comprise:

- Make nutrition key goals of agriculture, and keep the smallholder farmer at centre stage
- Nutrition-specific allocation of adequate funds
- Collection of right data, deploy Artificial Intelligence for need-based specific interventions
- Scale-up and invest in carrying out proven and evidence-based solutions
- Undertake need-based diversification and intensification
- Tackle nutrition in all its forms, and adopt the One Health approach
- Raise awareness on nutrition
- Ensure effective implementation pathways [8]

IV. CONCLUSION

Access to modern energy can be defined as a household's ability to obtain an energy service, should it decide to do so. Access is a function of availability and affordability. For energy to be considered available to a household, the household must be within the economic connection and supply range of the energy network or supplier. Affordability refers to the ability of the household to pay the up-front connection cost (or first cost) and energy usage costs. A high up-front cost may discourage poor households from making a switch to a modern energy form.

Traditional forms of energy used for cooking and lighting in rural Nepal come mainly from cattle dung cakes, fuelwood and agriculture residues. However, since the early 1990s there has been an increased effort to utilize biogas produced from cattle manure, human excreta and vegetable wastes in anaerobic bioreactors. This has significant potential to generate income, improve livelihoods and save fuel costs. Today there are over 170,000 household biogas plants in Nepal, and the development of the sector owes a great deal to the Biogas Support Partnership (BSP), an independent non-profit organization has been financially supported.

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