INDIA

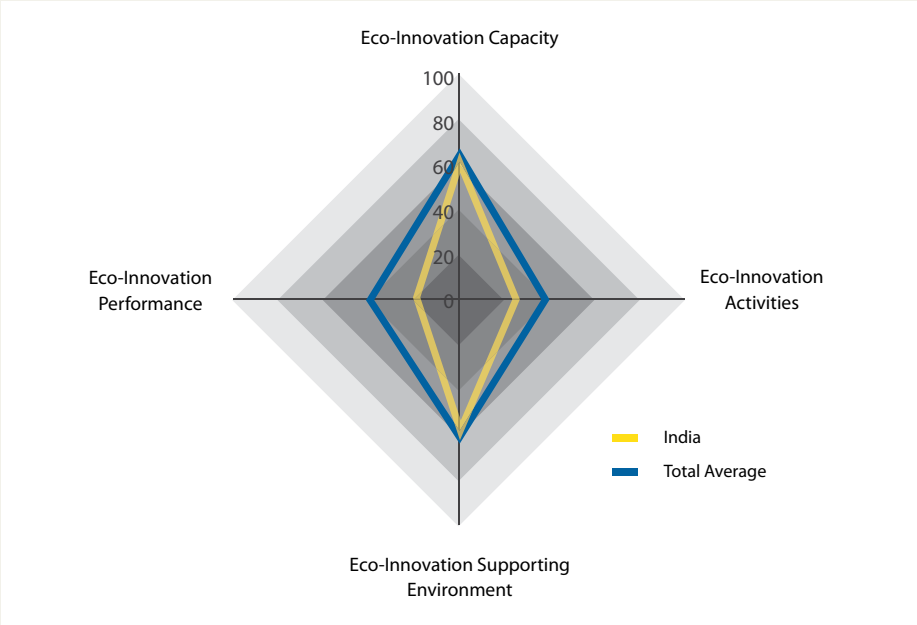

Fig. 12 Result analysis of India

Country Result & Analysis

India's total eco-innovation score is 41 out of 100, which is below the average of ASEI. In regards to "eco-innovation capacity", India shows low score in "country's economic competitiveness", "general innovation capacity", "jobs in green technology industry" and "level of awareness on sustainability management", though the country's "Value of Investment in Green Technology SMEs" is higher than average. In the area of "eco-innovation activities", India performs below average in "number of green patents", "number of green technology SMEs at early stage" and "turnover size of environmentally friendly companies". India performs low in the "level of environmental management" and the "level of commercialized green technology SMEs". In ASEI, India shows an average level in terms of "eco-innovation supporting environment" described by an average level in investment "maturity of green technology industry", country's "commitment to international environmental agreements", and "level of environmental laws". The country's "eco-innovation performance" falls below average particularly the country shows low score towards "energy sustainability", "CO2 emission intensity" and "water consumption intensity". India's "level of environmental impact on society" also falls below average. Yet, for the size of its economy, India's green industry market size looks promising. Overall, India ranks below average on the ASEI index.

India's Key Eco-Innovation Environment

Eco-innovation is a new concept for India, and like China, India has no direct programmes or policies that stimulate eco-innovation at the national or industrial levels. Among various instruments that can be applied to mobilize eco-innovation, development and commercialization of renewable energy and green technology are most strongly emphasized in India. Like China, mix of environment, technology and innovation policy measures and programs are building a firm foundation to develop the capacity needed for eco-innovation to emerge in various industry sectors in the next ten years.

Roadmap for Increasing Renewable Energy

In 2008, India announced its first National Action Plan on Climate Change (NAPCC) as an action to promote and enhance energy efficiency in India. Although India has set its mission, India still lacks in providing the necessary environment and infrastructure to stimulate the related activities. The Ministry of New and Renewable Energy (MNRE) of India is acting as one of the main bodies to mobilize activities that enhance national energy efficiency such as harnessing renewable power, distributing renewable energy in rural and urban areas, utilizing renewable energy in industrial and commercial applications, developing alternative fuels and applications and developing new eco-innovative technologies, products and services. The MNRE announced the Strategic Plan for New and Renewable energy sector (2011-2017), providing a roadmap to stimulate the growth of renewable energy technologies and related market. MNRE recently set up a Solar Energy Center and a Center for Wind Energy Technology in Chennai to provide technical support in developing solar and wind energy. In addition, to finance renewable energy projects, India has set up a separate financing institution focused on renewable and energy efficiency; the Indian Renewable Energy Development Agency (IREDA). India possesses high potential in developing green technologies, eco-entrepreneurships and awareness on environmental issues. Governmental bodies like MNRE are taking a leap forward transform this potential to actual activities that can demonstrate eco-innovation at a more practical level.

Specific Focus on Alternative Fuel: Biofuel

India is seeing biofuel as a future alternative fuel to tackle energy vulnerability. India is developing biofuel solely based on non-edible feedstock and oilseeds from degraded forest and wastelands that are not suited for agriculture. This is because India is putting its effort to avoid the conflict between development of alternative fuel and food security. In 2008, the Indian Government announced its National Biofuel Policy which aims to meet 20 percent of India's diesel demand with fuel derived from plants or indigenous biomass feedstock. The proposed target is 20 percent blending of biofuels from bio-diesel and bio-ethanol by 2017[52]. Due to increasing concerns towards urbanization, growing energy demand and growth of the automobile industry, more biofuel will be needed in the future. India's effort towards the production of biodiesel and of its commercialization provides a larger room to increase its eco-innovation activities focused on alternative energy development.

Efforts to Enhance General Innovation Capacity

In 2010, Indian government declared the year as 'a Decade of Innovation', and a roadmap 2010-2020 for innovation, the Roadmap for Inclusive Innovation, was announced. Indian government is aiming to use its innovation capacity to reduce poverty and disparity. India has 300 million people below the poverty line and eco-innovation can be a solution for tackling the social and environmental challenges. In a recent report from the Office of Advisor to the Prime Minister, it illustrates that Indian government's understanding of innovation is broad; innovation is seen as "new and unique applications of old technologies, using design to develop new products and services, new processes and structures to improve performance in diverse areas, organizational creativity and public sector initiatives to enhance delivery of services"[53]. The country is starting to understand that innovation can come across all sectors in any types. This recently emerged holistic and flexible understanding of innovation will provide a firm foundation where eco-innovation can emerge. There are several government initiatives such as the NMITLI (New Millennium India Technology Leadership Initiative), TePP (Techno-Entrepreneurs Promotion Programme), the National Innovation Foundation, TDB (Technology Development Board), HGT (Home Grown Technology Programme), TDDP (Technology Development and

[52] *Ministry of New and Renewable Energy (MNRE), http://www.mnre.gov.in/information/policies-2/*

[53] *Public Information Infrastructure & Innovation (2011), Towards a more inclusive and innovative India*

Demonstration Programme), GIAN (the Grassroots Innovation Augmentation Network) and SBIRI (the Small Business Innovation Research Initiative) that enhances general innovation capacity of India, which eventually increase the capacity for eco-innovation. To implement the Roadmap for Inclusive innovation, the Indian government established the National Innovation Council (NIC), State Innovation Councils (SIC) and Sectoral Innovation Councils. The Roadmap for Inclusive Innovation is crucial for India's future in promoting innovation in various sectors including environment, water, transport, sanitation, commerce, manufacturing, products, biotech, materials, nanotech, design organization etc. Such governmental focus on "inclusive innovation" may generate more local-friendly eco-innovation solutions and products that can address both social and environmental challenges in India.

Eco-innovation case studies

CASE STUDY 1

Biotech India

Biotech is a pioneer company in producing biogas energy from waste since 1994. Biotech manufactures and installs plants which convert gas out of organic waste or landfills to the available form of energy. For exploiting further potential of generating biogas from waste, Biotech has settled R&D collaborations and partnerships with foreign institutions and universities. With the support of local governments, Biotech is cooperating with Ministry of Non-conventional Energy in order to contribute to community's environmental health improvement and help feed local energy needs. To set up the biogas plant in communities, institutions or houses, Biotech goes through the process of consultancy, feasible study, conception and project implementation. Biotech also provides technology transfer and technological advice wherever it is needed. Biotech's biogas energy generation brings environmental effects as a solution for waste and GHG problems in India.

http://www.biotechindialtd.com

CASE STUDY 2

Mera Gao Micro Grid Power

Mera Gao Power (MGP) provides electricity to off-grid rural villages in India through solar micro-grid system. One solar micro-grid unit can provide 50 households with electricity. MGP's grid uses low bolt DC power and uses aluminum wiring instead of copper wiring. Each household can use 2 LED light and mobile phone charging service every night at lower cost than kerosene for lanterns. The service helps people study or work even after dark bringing improvements to learning performance and households' income. Without doubt, it comes with positive environmental effect for solar energy's replacement to fossil fuel. MPG's innovative business model, together with the falling price of solar panel and LED bulb, made it possible to provide solar electricity service at such a low cost targeting low income families in India. The use of larger-scale generation and storage systems minimizes the cost burden on each household in India. MGP's micro-grid technology aims to distribute to 50 villages by end of 2012, and 1,000 to 2,000 villages by 2016. The company received grants from USAID as seed capital and is continuously proving to be a sustainable business model. MGP's micro-grid technology was selected as one of the 10 Emerging Technologies 2012 in MIT Technology Review.

Source: http://meragaopower.com

CASE STUDY 3

Wipro

Wipro is a leading global IT company based in India, established in 1945. The company has been pioneering many innovations particularly in environmental management system. It was chosen as the top five greenest electronics companies in 2010, by Greenpeace. Wipro proactively manages the hazardous chemicals. Wipro introduced 100 percent recyclable toxic-free green-ware desktop models which eliminated chemicals with hazardous properties and launched PVC/BFR-free products. Furthermore, Wipro identified 21 chemicals that may threaten the safety of employees and the environment in the future, applying Wipro's Chemical Precautious Policy. In terms of efforts for greenhouse gases reduction, Wipro tries to make greener manufacturing processes and greener products. In process, it uses alternative sources of energy including wind and solar power. The company uses an intelligent Automated Power Management system which helps power savings, measurement of carbon reduction and implementation of customer organization's green goal. As for products, Wipro developed a solution designed to reduce the carbon footprint in telecom test labs, which helped the equipment manufacturers to make their product development process greener.

Source: http://www.wiprogreentech.com