

SUSTAINABILITY HORIZON

Quarterly Newsletter of
Centre for Excellence in Sustainable Development, Goa Institute of Management
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(Image source: Freepik.com)

EDITORIAL

Shri Nitin Gadkari once said that it is his dream to promote, nurture and innovate different options for alternate fuels; we found it apt to put his thoughts via this newsletter in the readers' hands. Alternative fuels appear to be the way of combating climate change and protecting health of the Mother Earth. The increasing use of alternative fuels will reduce the use of fossil fuels thereby reducing waste and emissions thus proving to be environmentally friendly. This philosophy of alternate fuel usage is also supported by UN and Clean Development Mechanism (CDM) on various project fronts and standalone projects.

It gives me immense pleasure to present to you this issue of "Sustainability Horizon" for the month of July 2022 (Volume 2, Issue 3). The central focus of this issue is **Alternate fuels**. We have been trying hard to cover all the aspects of this topic, but it was a herculean task since there are a host of such fuels, issues in their usage as well as innovations happening in this area. The Central government has also been very proactive and has taken many measures to switch to alternate fuels. It is apparent that we are moving slowly and steadily towards this global solution. This issue includes articles about three practitioners from this field. One of them is a case study- cum-dialog from Goan entrepreneurs Mayuri & Mandar Bhate who have demonstrated a fantastic real case of alternate fuels through their charcoal briquettes. The article by Dr. Satish Nair on Green Hydrogen space makes one think about the path less travelled. An interview with Mr. Sanjeev Joglekar from the Goa Energy Development Agency about biofuels makes our gray cells multiply into 4th dimension and specially so when it comes to God's small state Goa. The article from Amit Tewari sheds light on Alternate Aviation fuels. The article by Prof Avik Sinha has constructively evaluated the aftereffects of the want of innovation in the energy sector. He points out few policy measures which are a need of the hour. In his thought-provoking article on electric vehicles, Mr. Lewlynn de Mello puts forth facts that show how small efforts will have the snowball effect. Although in this issue we have only 2 student articles, this was for the want of space for other important topics to be covered. The student articles, albeit being short, leave an impact and make us ponder about the gravity of the need for alternate fuels.

With all the efforts highlighted in the newsletter, I wish to see India become the global leader in the area of alternate fuels. On the whole, this issue will not allow you to keep it down before you finish reading it fully. Points raised in all the articles have strong components of practicality and applicability. If taken seriously and implemented, we will save lots of conventional fuels and thereby protect Mother Earth from devils of climate change, ozone layer depletion and global warming.



**Prof. Vithal
Sukhathankar**

Associate Professor
Information Technology &
Operations Management,
Goa Institute of Management

TRENDS IN SUSTAINABILITY RESEARCH

The COP26 Summit has fired a spark among all the nations to encounter the environmental degradation issues. Bringing forth energy transition might prove to be a viable solution to this problem, besides strengthening the environmental governance. Now, achieving and measuring the energy transition might be a critical task. The main reason behind this is the demand and supply side considerations of energy transition yielding different outcomes. The demand side considerations might indicate the system performance and transition readiness of a nation. An initial attempt in this pursuit has been made by the World Economic Forum. The Energy Transitions Index developed by them attempted to capture the policy dimensions concerning the energy transition [1]. Despite capturing these dimensions, the index received academic criticisms for its constituents, leading to the modification of this index [2].

Even in the modified form, the new versions of the index failed to capture the basic essence of the energy transition, i.e., how the countries are achieving a better and efficient source energy. The newly developed Energy Diversification Index made an attempt to fulfill this gap [3]. However, the major problem with this index has been its focus on aggregation/segregation of sources, rather than prioritizing them. A weighted approach (e.g., Lilien Index) might be able to give a proper indication in developing such an index.

REFERENCES

- [1] Singh, H.V., Bocca, R., Gomez, P., Dahlke, S., Bazilian, M., 2019. The energy transitions index: An analytic framework for understanding the evolving global energy system. *Energy Strategy Reviews*, 26, 100382.
- [2] Neofytou, H., Nikas, A., Doukas, H., 2020. Sustainable energy transition readiness: A multicriteria assessment index. *Renewable and Sustainable Energy Reviews*, 131, 109988.
- [3] Gozgor, G., Paramati, S.R., 2022. Does energy diversification cause an economic slowdown? Evidence from a newly constructed energy diversification index. *Energy Economics*, 109, 105970.



Prof. Avik Sinha

Associate Professor
General Management & Economics,
Goa Institute of Management



Lewlynn de Mello

Sr. Officer Accreditation,
Goa Institute of Management

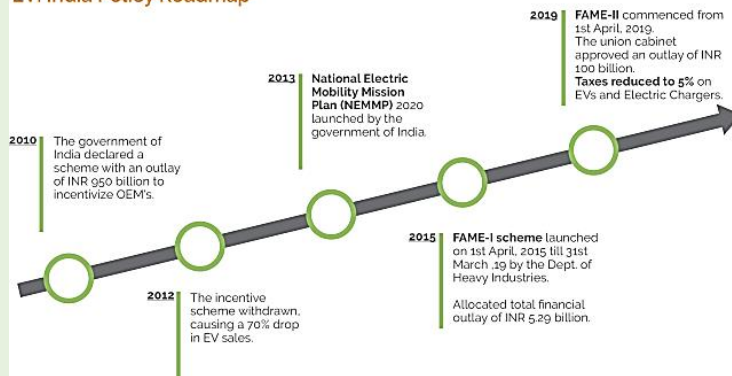
ELECTRIC VEHICLES: HOW ENVIRONMENTALLY SUSTAINABLE ARE THEY?

With the rising prices of petroleum and natural gas products, there has been a boom in sales of electric vehicles in India. Electric vehicles have been championed as a sustainable alternative to fossil fuel consuming internal combustion engines (ICEs). But are electric vehicles sustainable and environmentally friendly? To answer this question, we need to look at this from 2 perspectives: (1) Generation of electricity, and (2) Lithium mining for the batteries. Let's start with the how electricity is generated in India. According to the Ministry of Power, Government of India, 52.8% of electricity is generated via Coal or Lignite power plants.

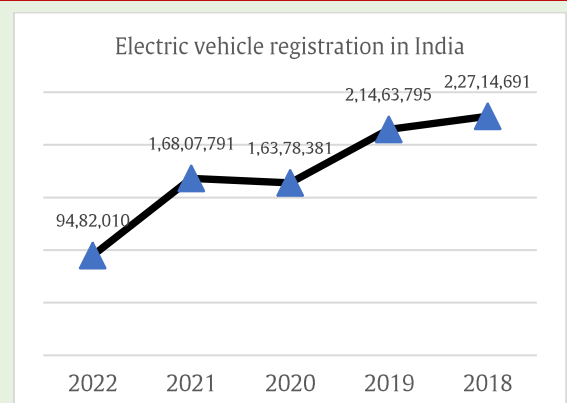
Another 6.3% is generated via Gas or Diesel. That means that around 60% of India's electricity is generated via fossil fuels (as on 31.3.2022) and hence is not sustainably generated. Next, let's talk about how, one of the key elements in the batteries, Lithium is mined. One method of mining Lithium from salt deserts requires huge amounts of groundwater to be pumped out from deep wells, and estimates show that almost 2 million litres of water are needed to produce one ton of lithium. In Chile, lithium mining and other mining activities consumed 65% of a region's water [1], causing groundwater depletion, soil contamination and other forms of environmental degradation, leaving the indigenous quinoa farmers and llama herders to compete with miners for water in one of the world's driest regions. To conclude I will say that despite the fact that electric vehicles have a supply chain that is not sustainable and that the electricity is produced via fossil fuels in India, I see their adoption and the increased interest in their development as a step in the right direction. However, if we are not aware of the potential environmental damage, well-meaning technologies such as electric vehicles can lead to, we may be headed on a treacherous path.

REFERENCES: [1] Rachid Amui (2020). "COMMODITIES AT A GLANCE - Special issue on strategic battery raw materials", *United Nations Conference on Trade and Development*. https://unctad.org/system/files/official-document/ditcom2019d5_en.pdf

EV: India Policy Roadmap



(Source: <https://jmkresearch.com/ev-central-policy-tracing-key-milestones/>)



Source of data: <https://vahan.parivahan.gov.in/>

FOSTERING COLLABORATIVE INNOVATION IN THE GREEN HYDROGEN SPACE

There is a rich body of research on collaborative innovation and its network involving stakeholders such as corporate entities, small enterprises, academic institutes, research centres, government bodies and other players. Research has shown that innovation performance of collaborative innovation is better than that of independent innovation in emerging economies like India and China [1]. Since such collaborations can occur at any stage of a company/industry value chain, the concept of collaborative innovation attains significance in the context of this issue's theme: 'Alternate fuels and sustainability'. India has recently upped its ante globally in renewable energy and alternative fuels. Two recent developments make India's forays notable:

- India taking the lead in the formation of International Solar Alliance;
- India 'being an early adopter will help the country play an important role in green hydrogen's global supply chain' [2]

Among all the alternative fuels, green hydrogen is acknowledged as most important for countries in their quest to achieve their climate targets. Its potential and implication have been recognized by India, and last year the **National Hydrogen Energy Mission** was launched by our Prime Minister who made a significant remark on the occasion "Of every effort being made by India today, the thing that is going to help India with a quantum leap in terms of climate is the field of green hydrogen" [3]. India 'aspires to become a global hydrogen hub and net exporter' [4]. The 'aspiration' is tempered by the constraint of budget; a challenge for any developing nation. This means we cannot merely adopt the practices of the 'developed West' but we must devise our own ways if we have to sustain the lead while grappling with the constraints. Taking the two topics above - the significance of collaborative innovation as well as India's foray into the green hydrogen space - together, the following proposition is put forth for consideration:

Initiatives fostering collaborative innovation in the green hydrogen space will help India achieve energy security and Net Zero targets. The 'collaborative innovation' here refers to judicious involvement of stakeholders to guide, mentor and fund entrepreneurs and small enterprises and also play an active role in the co-development process. The proposition assumes importance in light of the challenges of producing, storing and transporting 'green hydrogen' including the costs involved.

Role of academic institutions fostering sustainability initiatives:

The proposition put forth here can be subjected to research (mainly exploratory in nature). Expert opinion surveys of policymakers and energy domain experts as well as in-depth interviews of players in the hydrogen / alternative fuels space can provide insights into the actionability of the proposition, especially the point about fostering collaborative innovation in order to maintain India's edge over other nations. Other 'insight inducing' activities can include Conclaves, Thinktank deliberations, Roundtables (and similar variants of focus group discussions).

The output: Policy/White papers to aid the two significant stakeholders in the Indian entrepreneurial ecosystem, the government and the corporate entities, can be one of the outputs of the researches suggested in the preceding paragraph. Co-developing position/policy/white papers along with the stakeholders may prove facilitatory during project acceptance and implementation.

Initial step: Research/academic institutions (housing such centers of excellence as the CESD) should initiate action by formulating research project proposals to be put up to the policy makers, academic regulators and corporate houses. Research scholars at the Masters & Doctoral levels and experts at the technology incubation centers can be actively engaged in the proposal formulation and exploratory research stages.

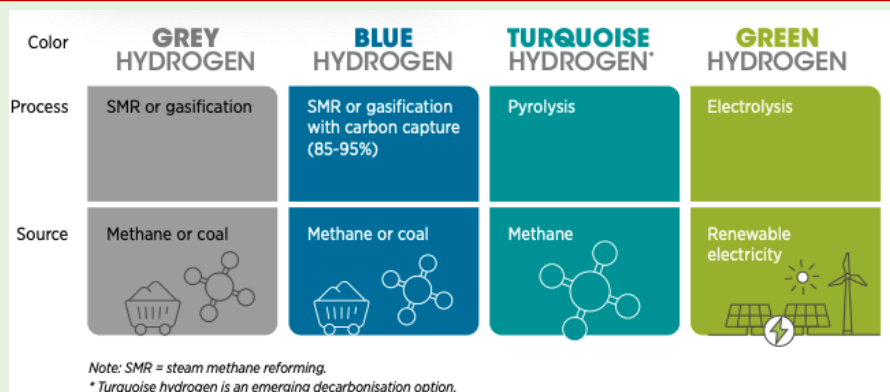
REFERENCES

- [1] Pai, Da-Chang, Tseng, Chun-Yao & Liou, Cheng-Hwai. (2012). Collaborative Innovation in Emerging Economies: Case of India and China. *Innovation: Management, Policy & Practice*. 14. 467-476
- [2] Agarwal, O P (2022). India's Global Ambition in Green Hydrogen. In *Outlook Business*, May (p. 28)
- [3] Bhatnagar, Neha (2021, Aug 20). Green hydrogen promise. *Powerline* <https://powerline.net.in/2021/08/20/green-hydrogen-promise/>
- [4] Tikoo, R, Thakur, N & Ray S (2022). Shades of New Energy. In *Outlook Business*, May (pp. 16-24)
- [5] FuelCellWorks (2020, Jan 9). 5 reasons why hydrogen is the fuel of the future. FuelCellWorks, <https://fuelcellworks.com/news/5-reasons-why-hydrogen-is-the-fuel-of-the-future/>



Satish K. Nair, PhD

Management &
Entrepreneurship Academic
Ahmedabad, Gujarat



Types of hydrogen (Source: [World Economic Forum](#))

National Hydrogen Mission

The National Hydrogen Mission was launched on India's 75th Independence Day (i.e. 15th August, 2021). The Mission aims to aid the government in meeting its climate targets and making India a **green hydrogen hub**. This will help in meeting the target of production of 5 million tons of Green hydrogen by 2030 and the related development of renewable energy capacity.

(Source: [PIB, GoI](#))

ENERGY INNOVATION FOR ALTERNATE FUELS: DARKNESS BENEATH THE LAMP

With the rise in the economic growth, the demand of energy is rising in the industrial, commercial, and household sectors. As the fossil fuel-based energy causes a serious damage to the environmental quality by means of ambient air pollution, a transition in the energy sources is required. This energy transition might be achieved through bringing energy efficiency or discovering alternate fuels. The discourse of the COP26 Summit has stressed more on the development and discovery of alternate fuels, which are clean and renewable. Now, this process involves energy innovation, which is an integral part of implementing the alternate fuel solutions. Once these solutions are in place, it is beyond any doubt that the nations will achieve unprecedented economic growth.

However, these energy innovations might bring forth a hidden curse. As these innovations are largely automated in nature, so a growth in the acceptability of these solutions might gradually start replacing labors. Following the classic “Capital-Labor Substitution” principle of Arrow et al. (1961), it is not hard to assume that the infusion of capital towards the boosting of the energy innovation solutions will eventually create an unemployment issue. This issue might rise from two directions: (a) the demand of labors in the development and deployment of the energy innovation solutions will gradually fall, and (b) lowering demand of the fossil fuel-based energy solutions will create a labor surplus in the mining and fossil fuel-based energy generation industries. Coexistence of these conditions will create unemployment, and consequentially, a social imbalance. Moreover, even though the nation might be able to achieve economic growth short-run, a shrinkage in the demand might appear in the long-run. Now, this imbalance might become severer from gender perspective. The research and development industry in the European countries is already encountering a decline in the female participation. As a result, not only the cognitive diversity in the science is gradually on the decline, but also the violence against women is on the rise. A lagged effect of this very phenomenon is also visible on the rising gender wage gap. As a whole, a social imbalance might be created because of the seamless rise in the energy innovations, and the core reason behind this is the rising unequal distribution of wealth among the citizens. A recent study by Sinha et al. (2022) has already reflected upon this situation. Proactive policy measures are necessitated by the policymakers to internalize these negative social externalities of innovation. Putting a limit on layoff, rehabilitation of labors, making the public administration free from corruption, and letting the voice of the citizens heard – these are some of the possible policy measures to be taken up by the policymakers to stop this from happening.

REFERENCES:

- [1] Arrow, K.J., Chenery, H.B., Minhas, B.S., Solow, R.M., 1961. Capital-labor substitution and economic efficiency. *The Review of Economics and Statistics*, 225-250.
- [2] Sinha, A., Adhikari, A., Jha, A.K., 2022. Innovational duality and sustainable development: finding optima amidst socio-ecological policy trade-off in post-COVID-19 era. *Journal of Enterprise Information Management*, 35(1), 295-320.



Prof. Avik Sinha
Associate Professor
General Management & Economics
Goa Institute of Management

BIOFUELS: A PROMISING OPTION FOR BECOMING ENERGY “ATMANIRBHAR”

Apoorva Apte from the CESD team had the opportunity to interact with Shri Sanjeev Joglekar, Member Secretary, Goa Energy Development Agency (GEDA) about the prospects that biofuels offer for Goa. This interaction brought out several key aspects that are essential to be addressed in order to mainstream their use. This article provides excerpts of this conversation.

Energy consumption patterns

Analysis of the sector-wise energy consumption yields a surprising insight that the transport sector accounts for the highest share (~65%) of total energy consumed in Goa. Thus, planned efforts towards improving sustainability in transportation become imperative in order to effectively address the sustainability agenda.

Alternative fuels for the transportation sector

Two alternatives to achieve this include shifting to electric vehicles (EV) or to biomass-based fuels like ethanol blending, biofuels, compressed biogas (CBG), etc. While the use of EV prima facie appears to be an attractive alternative, the fact that Goa imports around 73% of its total energy share from fossil fuel-based power plants undermines the advantages offered. A more sustainable solution is to ensure that the energy to charge EVs is derived from renewable energy sources, which requires large capital costs and experienced vendors. There is a limited avenue for common people to contribute and benefit from this. If we consider biomass-based fuels, CBG can fuel commercial vehicles, while ethanol-blending and biofuels can be used for two-wheelers. With a shift to biomass-based fuels, there is an immediate benefit to farmers since they can grow and supply biomass, thus making them an important stakeholder in the value chain. More so, even fallow lands and unused fields could be effectively used. With the easy availability of water in Goa, this proposition becomes even more attractive.



Sanjeev Joglekar
Member Secretary,
Goa Energy Development Agency

Necessity to bridge the gaps for harnessing the potential of biofuels

While the State is attempting to mainstream the use of biofuels by drafting the Goa Biofuels policy, there are several aspects that need to be technically and holistically addressed including:

- Identifying specific oil-seeds which can be profitably grown in Goa considering the soil and climatic conditions
- Investigating the correct fuel-mix for the State taking into account the present and future energy consumption patterns
- Conducting feasibility studies for biofuel plants, including the yield, costs, etc.
- Creating the necessary robust supply chain linkages
- Developing an appealing case about the prospects of biofuels which can be pitched to farmers

Thus, biofuels do offer promising prospects to achieve self-reliance in energy production (becoming energy “Atmanirbhar”) and also to achieve sustainable livelihood generation. The State of Goa is on the lookout for technical and managerial inputs to put all blocks together and create a convincing case.



Amit Tewari
CEO, Graphnile

SUSTAINABLE AVIATION FUELS (SAF): A SOLUTION WITH CHALLENGES

There is no doubt that climate change is a great challenge for our time. Despite the organization's statements that ESG is priority, when it comes to acting, other priorities continue to surpass ESG efforts. The aviation industry has also announced aggressive ESG targets in recent years. It is important for airlines to source more sustainable fuel and become less reliant on traditional jet fuel in order to achieve many of these goals.

“Sustainable aviation fuels represent the most meaningful solution currently available to reduce climate impact for the “hard-to-decarbonize” aviation industry” (Sara Bogdan, Head of Sustainability and ESG for JetBlue).

In 2011, the aviation industry contributed 3.5 percent to total human-caused warming, according to a study published in the journal - Atmospheric Environment in January 2021, and the same percentage likely applies in 2018. If no new policies are developed, global aircraft CO₂ emissions are expected to triple by 2050 as a result of increased passenger airline travel and air freight. The CO₂ emissions from jet fuel consumption are constant regardless of flight phase (3.16 kilograms per kilogram of fuel consumed). CO₂ is an extremely powerful greenhouse gas due to its long lifetime in the atmosphere.

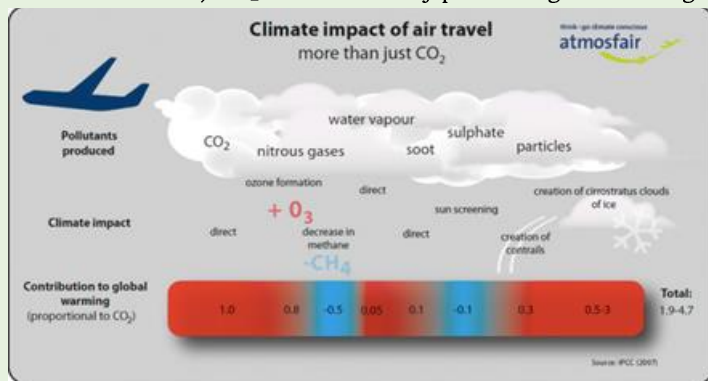


Fig 1: Climate impact of air travel (Source: <https://www.eesi.org>)

Fig 1 presents the range of warming from contrail-induced cirrus clouds, identified as cirrostratus. The atmospheric conditions that produce and sustain contrails vary over time and space. Research is underway to fully understand the climate impact of contrail-induced cirrostratus clouds.

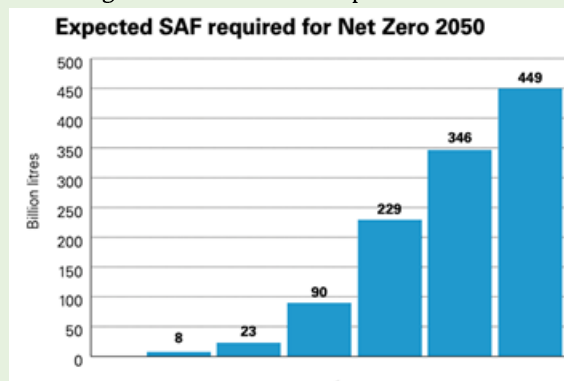


Fig 2: Expected SAF required for net zero 2050 Source: <https://www.whitecase.com>

As shown in Fig 2, achieving net zero by 2050 will necessitate a significant increase in the supply of expected sustainable airline fuel, which presents a compelling opportunity for developers and financiers. In spite of the need for large quantities of sustainable jet fuel at reasonable prices, sustainable jet fuel is in short supply.

International Air Transport Association (IATA) outlined a highly ambitious roadmap that states that if 65 % of projected emissions are cut using sustainable fuel by 2050, then aviation will be net-zero. It would take a 449-billion-liter production capacity per year to meet that demand and the SAF plants will need to reach the production of 5 billion liters of fuel by 2025 from 125 million liters in 2021 which is under 1%. IATA believes that SAF production and utilization will reach a tipping point by 2030 with effective government incentives.

References:

- [1] (EESI, E. (2022). Issue Brief | The Growth in Greenhouse Gas Emissions from Commercial Aviation (2019, revised 2022) | White Papers | EESI. Retrieved 20 June 2022, from <https://www.eesi.org/papers/view/fact-sheet-the-growth-in-greenhouse-gas-emissions-from-commercial-aviation>
- [2] United Nations (2022). The Role of Fossil Fuels in a Sustainable Energy System | United Nations. Retrieved 20 June 2022, from <https://www.un.org/en/chronicle/article/role-fossil-fuels-sustainable-energy-system>

EXPLORING BIO-BRIQUETTES AS A SUSTAINABLE FUEL CHOICE

Interacting with entrepreneurs who are striving to make an impact in the field of sustainability is always inspiring.

While coconut shells are found in abundance in the State, few have ventured into energy recovery from this resource. The CESD team had the opportunity to interact with Ms Mayuri Bhate and Mandar Bhate from “EcoTopia”, a Company that makes coconut-shell charcoal briquettes in Goa. This article by Apoorva Apte provides excerpts of this interaction.



Mayuri and Mandar Bhate, Founders, EcoTopia

What was the thought that led to the development of EcoTopia’s product portfolio?

We were one of the first manufacturers of arecanut leaf tableware in Goa. However, due to the higher pricing, sales were not picking up. The idea of getting into the business of briquettes emerged when we were brainstorming about various innovative models to boost sales, such as buy-back of used plates. While researching on ways of disposing used plates, we stumbled upon the fact that coconut shells are one of the richest sources of carbon, and resultantly, the charcoal made from these shells has a good calorific value. The idea clicked and these charcoal briquettes now form the major part of our product portfolio. Later, we also developed a product called a “portable barbeque kit” that uses these charcoal briquettes, and is very convenient for outdoor parties. We are very careful in our choice of materials (including packaging) and attempt to reduce the carbon footprint of products as far as possible.

Can you please briefly describe the process of making briquettes? What advantages are offered by these briquettes as compared to the usual wood briquettes?

We collect coconut shells from industries, hotels and the waste management plants. The next step is charring the shells and powdering, which is presently outsourced because it requires installation of high-cost equipment. We then convert the powdered char into briquettes by extrusion, which are then dried and packed. While wood briquettes have a higher calorific value, the raw material is wood which is a valuable resource as against coconut shells, which are considered as “waste” by many. Thus, by using coconut shells for charcoal-making we are actually avoiding deforestation and deriving value out of waste. Also, scaling up is also possible especially in a state like Goa, because the raw material is available in plenty.

What are the typical challenges that you face in this business?

As goes for any other eco-friendly product, creating consumer awareness and demand is a major challenge, since there is always a comparison against conventional products in the market. Another factor is the availability of labour. Since our operations are still scaling up, product delivery is also sometimes a challenge considering the small quantities and long distances. To become self-reliant, we need access to funds so that we can set-up the necessary equipment and build our team. Finding appropriate sources of funding has also been a challenge.

Where do you see your venture in the near future?

We are exploring export opportunities, pan India distribution and also wish to venture into other eco-friendly products.

What are two things that you think would help businesses like yours scale up?

As goes with most start-ups, availability of funds will really help us improve and scale up our operations. Also, information about various government schemes that benefit start-ups can avail of, shall prove very useful for us.

Fact Corner: Biomass power

The Ministry of New and Renewable Energy (MNRE), GoI has been promoting Biomass Power and Bagasse Co-generation Programme with the aim to recover energy from biomass including bagasse, agricultural residues such as shells, husks, de-oiled cakes and wood from dedicated energy plantations for power generation. More than 550 Nos of Biomass IPP and Bagasse Cogeneration based power plants with aggregate capacity of 9373 MW have been installed in the country upto December, 2020. The MNRE has also set up the [BioUrja Portal](#) to facilitate the online submission of proposals to avail Central Financial Assistance (CFA) for projects that are eligible under the following the schemes:

- “Energy generation from Urban, Industrial, Agricultural Wastes/Residues and Municipal Solid Waste”
- “Biomass-based Cogeneration in Sugar Mills and Other Industries in the Country” schemes

BIOFUELS: WAITING FOR THEIR TIME

There is a continuous rise in the demand for energy as India grows manifold. As demand for energy rises, fossil fuel reserves are steadily depleting. The lack of renewable sources of energy and the ever-growing energy consumption is to blame for the emphasis on nonrenewable conventional fossil fuels, gas, and, most importantly, petroleum on a global scale.

It is known that the combustion of fossil fuels produces more greenhouse gases, which raises global temperatures. Thus, alternative and advanced fuels are urgently needed to address these issues. The best biomass fuels include biogas, bioethanol & biodiesel. However, new fuels are emerging that have the potential to reduce nonrenewable fuel consumption and pollution. Because it is made from renewable resources, biodiesel is environmentally friendly. It can be an effective alternative to petro-diesel fuel whilst also reducing pollution.

In addition to biodiesel, hydrogen is also a clean energy source with an enormous ability to reduce reliance on foreign energy sources. Renewable fuel manufacturing and use have a significant impact on economic growth, as well as creating a cleaner environment, reducing toxic gases, and eventually achieving sustainability.

But are there any challenges in the usage of renewable energy in India? In my view, the government policies, political pressure, ageing infrastructure, corporate influence, production cost and the existing market context work against its mass acceptance.

Talking about the financial aspect, power distribution companies (DISCOMs) which are majorly owned by the state governments are in poor financial shape. Such DISCOMs purchase almost all renewable energy, resulting in highly protracted and unsustainable billing cycles. Hence, this creates one more roadblock in the acceptance of alternate fuels.

Thus, with all the challenges sweet-faced by biofuels and their slow acceptance in India, to succeed in the Net-Zero 2070 goal: biofuels are awaiting their time.



Anuj Singhal
PGDM-BIFS, 2021-23



Shishir Trivedi
Research Scholar, FPM,
Goa Institute of Management

REDUCING EXTREME POVERTY THROUGH GREEN ECONOMY

According to UNDP's recent research, for every dollar pledged to deal with the climate crisis for the poor, 4 dollars are spent on fossil fuel subsidies.

However, failing to engage in green recovery risks hurting human health, increasing food insecurity, and increasing the frequency of disasters. By 2100, climate change, in addition to pollution and zoonotic illnesses, is expected to have a considerable impact on mortality. Air pollution is already the world's leading environmental health threat, with an estimated 8 million premature deaths per year.

As per research, investing in green recovery – from renewable energy availability to more forested land area – can reduce extreme poverty by 15% when compared to a pre-COVID baseline. Habitat restoration, reforestation, coastal protection, and invasive species removal are all examples of nature-based solutions that produce jobs at a pace that is more than ten times that of fossil fuels. For example, Costa Rica, demonstrates the need of investing in nature and climate-friendly solutions for green growth. Green programmes received 0% of the country's \$2.54 billion COVID recovery fund. A closer examination of the data reveals the whole picture. Nearly all of the country's population now has access to renewable energy, and deforestation has been reversed, with forest covering more than half of the country's area, compared to only 26% in 1983. The government has analysed its natural capital to see how it may better utilise natural resources such as forests, which contribute roughly 2% of GDP in the form of lumber, other forest products such as nuts, and commercial activity involving these items. Rather than stifling progress, green investment has allowed Costa Rica to invest more in social and economic resilience while posing minimal environmental risks.

REFERENCES:

[1] Mora, P. (2022). Why it pays to go green | UNDP. Retrieved 20 June 2022, from <https://feature.undp.org/why-it-pays-to-go-green/>

[2] Association, R. (2022). Annual Ethanol Production. Retrieved 20 June 2022, from <https://ethanolrfa.org/markets-and-statistics/annual-ethanol-production>

Quotable quotes

“Once the renewable infrastructure is built, the fuel is free forever. Unlike carbon-based fuels, the wind and the sun and the earth itself provide fuel that is free, in amounts that are effectively limitless” --- Al Gore

“The shift to a cleaner energy economy won't happen overnight, and it will require tough choices along the way. But the debate is settled. Climate change is a fact.” --- Barack Obama

ABOUT THE CENTRE

The Centre for Excellence in Sustainable Development (CESD) was officially formed in July 2018 to contribute to GIM's quest for environmental sustainability. The Centre started working with three core objectives in mind:

1. KNOWLEDGE CREATION

- To develop a model institute for green campus in India and transform GIM community into a more sustainable community. At the same time, use these processes for action research in the field of sustainable development.
- To help develop knowledge through research in the aforesaid fields.

2. KNOWLEDGE DISSEMINATION

- To increase awareness about green living and sustainable development in the community around us
- To carry out activities to try to reduce the carbon footprint of the state of Goa and India as a whole.

3. KNOWLEDGE APPLICATION

- To develop a resource Centre for sustainable development at GIM for imparting training, providing consultancy and participating in policy making.
- To contribute to the development of start-ups and ventures for sustainable development at the grassroots level.

CESD believes that every graduate of GIM should be a sustainability ambassador and every employee should be a part of GIM's journey towards environmental sustainability. Over the next few years, Centre plans to contribute towards SDGs 6,7,11,12 and 13 of the United Nations.

RECENT PROJECTS AND ACTIVITIES OF CESD

Environmental Sustainability at GIM:

- "No more use-and-throw" campaign to reduce the use of paper cups at various points of consumption, by switching to more sustainable, reusable alternatives. This campaign shall save around 96000 paper cups from going to the landfill in a year.
- Students project: Study of waste management practices of 30 national and international higher education institutes

Stakeholder interactions:

- Coffee table book on floral biodiversity of the GIM campus
- Documentation of faunal diversity found on the campus by partnering with Goa State Biodiversity Board and other field experts
- Sustainability Report for GIM based on the GRI framework

International Activities:

- CESD worked an international project, Responsibility and Innovation via Social and sustainable Entrepreneurship (RISE) funded by Finnish National Agency, EDUFI, that aims to co-develop a curriculum for partner HEIs for capacity building in the field of social and sustainable entrepreneurship.
- CESD is a member of The Sustainability Centers Community (SCC). SCC is an engaged, virtual community of more than 150 sustainability centers from around the world
- Project on Landscaping of SDG Training in India: This project funded by the German Development Institute was on discovering the role of government and private training institutes in localizing the SDGs in India. Prof. Avik Sinha was a core team member.

GIM was declared a "Highly Commended - Sustainability Institute of the year" in the International Green Gown Awards 2022. This is a reassurance of our collective efforts towards sustainability. It was very inspiring to see the sustainability initiatives taken by institutions across the world as it gave us hope that together, we can contribute to building a sustainable future. The CESD team worked hard towards realizing this accomplishment.

(See GIM's finalist listing [here](#)).



MEET THE CESD TEAM

CHAIR PROF. ARPITA AMARNANI

Email: arpita@gim.ac.in

Contact No: 0832-2366 755

MEMBER S PROF. VITHAL S. SUKHATHANKAR

Email: visukh@gim.ac.in

Contact No: 0832-2366 724

PROF. AVIK SINHA

Email: avik.sinha@gim.ac.in

Contact No: 0832-2366 749

PROF. AJAY VAMADEVAN

Email: ajay.vamadevan@gim.ac.in

Contact No: 0832-2366 700

PROF. PURVENDU SHARMA

Email: purvendu@gim.ac.in

Contact No: 0832-2366 720

PROF. MUNEEB UL LATEEF BANDAY

Email: muneeb@gim.ac.in

Contact No: 0832-2366 742

MS. APOORVA APTE

Email: apoorva@gim.ac.in

Contact No: 0832-2366 922



Please visit us [here](#) or scan the QR Code

For Newsletter or Centre related queries, please write to us at sustainability@gim.ac.in.

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