UK INDIA
BUSINESS COUNCIL

UK-INDIA CLIMATE CHANGE COOPERATION: SUPPORTING INDIAN SMES TO GO GREEN

OCTOBER 2021

SUPPORTING BUSINESS SUCCESS

CONTENTS

PREFACE

I am delighted to introduce this report 'UK-India Climate Change Cooperation: Supporting Indian SMEs to go green' produced in partnership with the UK India Business Council.

This report, which considers how the UK and India can strengthen our collaboration on climate action, precedes the 2021 UN Climate Change Conference, COP26, which is the world's last chance for us to get on the path which avoids the most harmful climate change. It is the honour of the UK to serve as hosts, welcoming leaders from around the world to Glasgow in November.

Climate change is a global challenge, which requires global solutions. Working together on sustainable practices, investments and financing is essential to the future of our countries and the well-being of our citizens. We, as people and Governments, can learn from each other, and act together.

Our countries, the UK and India, are strategic partners. Over the last two decades, the UK has been the largest G20 investor in India and UK businesses in India are responsible for the employment of more than 416,000 people in India[1]. At the same time, India is one of the largest investors in the UK with over 840 Indian businesses, employing over 116,000 people here[2]. Our countries traded GBP 24 billion worth of goods and services in 2019 and have since cooperated on numerous occasions during the COVID-19 crisis to support each other in times of need.

We are seeing meaningful bilateral action on climate action already. Prime Ministers Boris Johnson and Narendra Modi agreed in May a 2030 Roadmap that will define our bilateral relationship for the next decade. The importance of climate cooperation to this reinvigorated relationship is no better demonstrated than its place as one of five key pillars to the 2030 Roadmap. We are acting together, for example the continuing Energy Dialogue between the UK Government and Government of India, which is cementing partnerships on offshore wind, hydrogen and solar.

At the 11th UK-India Economic and Financial Dialogue in September 2021, the UK announced action to help drive India's green growth, including a USD 1.2bn package of public and private investment in green projects and renewable energy. This includes a USD 1bn investment from CDC, the UK's development finance institution, in green projects in India, joint investments by both governments to support companies working on innovative green tech solutions, and a new USD 200m private and multilateral investment into the joint Green Growth Equity Fund which invests in Indian renewable energy. Both countries also welcomed the launch of the Climate Finance Leadership Initiative India partnership, which will mobilise private capital into sustainable infrastructure in India, including clean energy like wind, solar and other green technologies.

But we can do more. Almost 1 in 3 of the UK's largest businesses have signed up to the United Nation's Race to Zero campaign – the largest ever global alliance committed to achieving net zero carbon emissions by 2050, with many opting to go even faster. I welcome that leading businesses working in the UK-India corridor such as Rolls-Royce, Scotch Whisky Association, and Vodafone have already joined the campaign and encourage others to do so.

Together we can all make changes to address climate concerns. We are keen to see more British businesses turn this challenge into an opportunity and look forward to supporting them to realise their ambitions in India.

Alex Ellis
British High Commissioner to the Republic of India

[1] Grant Thornton, Britain Meets India Tracker
[2] Grant Thornton, India Meets Britain Tracker

1. INTRODUCTION

India, as the world's second most populous country and fifth largest economy, is a key player in the world's environmental outcomes. At the same time, India's growing population and expanding market is demanding more energy all the time. As a result, meeting existing demands for reliable and affordable energy is a challenge and one that is set to grow exponentially in the future. It will be crucial to act now by investing in clean energy infrastructure and environmental solutions to meet anticipated demand.

The UK is the first country to put the net zero commitment into legislation. While India founded the International Solar Alliance and is one of few countries on track to meet its Nationally Determined Contributions set at the Paris Climate Change Conference in 2015.

Climate action is an international issue and the UK and India, as two great partners, are stronger working together. The UK, as a leader in green technology and innovation, has the capability and commitment to support India's climate change goals, and there are great complementarities in the UK offering and India's needs.

The strengths of both countries' solar and wind sectors are well-known and are continuing to grow. Waste to energy solutions can help to address two significant problems. Hydrogen, too, can be a game-changer and is seeing increased cooperation. Similarly, EV and transport infrastructure will be key, again addressing a multitude of challenges. From governmental policy levers to tech-rich business solutions to sustainable finance, there is great scope to make a positive impact on the journey to Net Zero.

Currently it is Governments and multinational corporations that are predominantly leading on the energy transition. For SMEs there are generally greater constraints, both financial and practical, that mark a nuanced set of challenges in relation to climate change. This is magnified in the globalisation era wherein multinationals have access to resources from around the world whereas SMEs are, on average, less able to fully embrace modernisation and innovation.

Although the environmental footprint of SMEs may be low at the individual level, the aggregate impact of SMEs is enormous. In the fight against climate change then, it is vital to support SMEs to overcome these challenges and contribute to the energy transition. This report thereby seeks to develop the understanding of the challenges that SMEs in India face in being more environmentally sustainable and in contributing to the resolution.

2. EXECUTIVE SUMMARY

This report first outlines the renewable energy outlook amongst Indian SMEs, highlighting the opportunities and challenges they face in addressing environmental concerns. It then showcases a range of solutions that the UK can bring to the Indian market.

UK industry is already deeply invested in India, but the trade and investment relationship can be even stronger. Businesses want to offer solutions to support India's environmental goals and energy transition. Enabling greater trade, investment, collaboration and partnerships across SMEs will support the proliferation of technologies and infrastructure required to bring cleaner energy sources to all of India's population.

Products and services highlighted in the Case Studies in Section Five include:

- Power generation for cleaner and renewable energy solutions;
- Microgrid systems that combine environmentally friendly renewables and gensets with batteries and a control system for intelligent energy management
- Support via strategy development, market expertise, insights, and access to networks throughout the energy supply chain;
- Capital investment and banking services; and
- Emission mitigation through software and tools for identification, repair, prevention and ongoing reporting and management solutions.

In the final section of this report, we make five recommendations that we believe can help maximise India's journey to a sustainable economy with wider access to energy across the country. Here is a summary of those recommendations.

Recommendation 1: Widen access to finance and other support for the development of small-scale projects.

Sustainability projects may have large capital requirements and a long break-even cycle, so require the support of bank financing at affordable rates. SMEs, in particular, struggle with the financial costs of investing in environmentally sustainable solutions. Improving access to loans and grants will be needed in the short and long term. Recent financial investments announced at the UK-India Economic and Financial Dialogue are making progress in this area.

Recommendation 2: Establish stable regulatory frameworks that encourage and incentivise sustainable investment and practices.

Given the long-term nature of energy innovation, energy investment and energy infrastructure, stable policy and regulatory frameworks are essential to promote short- and medium-term behaviours. Policies should be designed to: ensure long-term energy security; make energy more efficient and affordable; and promote sustainable energy delivery and consumption.

Recommendation 3: Foster collaboration between business, government and academia.

There is an urgent need for collaborative research projects on energy technologies that could deliver the step-changes in performance for sustainable global energy usage. Business will continue to play

an important role in finding solutions, within its sphere of responsibility and in collaboration with other stakeholders, but governments, business and civil society should also partner to leverage resources.

Recommendation 4: India should become increasingly open to free and fair trade.

To be a manufacturing hub, India will need to be part of international supply chains, which will mean importing as well as exporting. If tariffs make manufacturing in India too expensive, investors will go elsewhere. If India does choose to use tariffs, it should do so by signalling how tariffs will increase over a period of years. This would give investors the incentive to create an Indian supply chain and the time to do it.

Recommendation 5: Put sustainability at the heart of trade and investment strategy.

If shaped properly, trading arrangements can help support the poor and protect the environment. Countries and trade blocs are cognisant of this fact and as such are increasingly integrating sustainability and human rights into their trade agreements and strategies. **E**nvironmental sustainability should be accounted for in the products and services that are traded and invested in. Finally, as well as fostering its own sustainable trade and investment strategy, India could use its global leadership role to encourage its international partners to do the same.

3. INDIAN CONTEXT – WORKING TOWARDS CLIMATE GOALS

Although India, on a per capita basis, is at the lower end of the world's greenhouse gas emissions, the sheer size of the country's population means that India's environmental competence is significant. The effects are already pronounced, for example. India is home to 22 of the world's 30 most polluted cities.

Action is being taken, however. At the Paris Climate Change Conference in 2015, India made several commitments to reduce the impacts of climate change as part of its Nationally Determined Contribution (NDC), a set of efforts by each of the 196 countries under the Paris Agreement to reduce national emissions and adapt to the impacts of climate change.

India's Nationally Determined Contribution:

- To lower emission intensity of GDP by 33-35% from 2005 levels;
- To establish more forests in order to eradicate 2.5 billion to 3 billion tonnes of carbon dioxide from the atmosphere;
- To obtain 40 percent of installed capacity for electricity generation based on non-fossil fuels.

India's emissions intensity (excluding the agriculture sector) in 2030 is expected to beat the 35 percent target and is in fact projected to be 37 percent below 2005 levels. Non-fossil fuel electricity generation is forecast to reach a 40 percent share of total generation in 2030[3], thus achieving the NDCs.

India has a target of 450 GW of renewable energy capacity by 2030, including an expansion of solar investments into the agricultural sector. In 2018, solar investments exceeded investments in coal for the first time – a welcome trend. The ramp-up of renewables in India can provide access to affordable power at scale, and quickly, with wind and solar increasingly affordable versus the increasing cost of coal fired power generation.

According to the Ministry of New and Renewable Energy, GoI, India's renewable energy has a share of 23 percent in the total installed generation capacity (369 GW), thanks to a 226 percent increase in the last five years.[4] Estimates by the Indian government, forecast a required investment upwards of USD 4.5 trillion over the next ten years to meet targets for renewable energy and urban sustainability.

[3] https://climateactiontracker.org/countries/india/
[4] https://mnre.gov.in/

4. THE CASE FOR SMES TO BE MORE ENVIRONMENTALLY SUSTAINABLE

Small and medium sized enterprises form the backbone of India's economy. With 63 million in the country, SMEs making up a large portion of the country's innovation, employment and industrial output. Around 31 percent of India's GDP is generated by SMEs, as well as 34 percent of Gross Value Added (GVA) and 40 percent of total exports. SMEs are estimated to employ 111 million people in India and thus are integral to the country's economy and society's livelihood too[5].

Accordingly, the impact that SMEs have on the environment, through the materials they use, the processes they perform, the livelihoods that depend on them, and the energy sources they use, have huge implications for India's environmental impact. It will therefore be critical to support the SME sector if India is to meet its climate change goals.

Many OECD countries have attempted to address this much needed support to the SME sector by implementing resources such as information-based tools and regulatory and economic incentives to stimulate SMEs towards greater environmental sustainability.

In the long-term, it is well accepted that acting in environmentally sustainable ways has widespread benefits for society. Yet, it must also be appreciated that green practices can impose a burden on SMEs. Compliance with regulation can be time consuming and technical. In consideration that SMEs generally have trouble accessing ample finance, the financial costs present a significant challenge, and implementing environmentally sustainable measures also requires certain managerial skills and technological understanding, which SMEs are often lacking. However, the silver lining is that while this is true to an extent, the perception around the costs and technicalities of environmentally sustainable solutions is often exacerbated. There are significant benefits to going green beyond the environmental benefits, both carrot (reward) and stick (punishment). The key reasons are grouped on the next page.

Infrastructural investment that seeks to address the environmental challenge brings two-fold benefits. In the short-term, it generates economic growth through its ability to create jobs and stimulate economic activity. In the longer-term, wider growth is created by improving connectivity and sustainability of practices throughout the economy. For example, by increasing transport accessibility for workers and individuals to travel, and for businesses to trade.

It is therefore important to understand what challenges are most off-putting to SMEs, which of the benefits outlined above are best regarded and appreciated by SMEs, make SMEs more aware of the potential solutions, and support them, through knowledge-sharing, enhanced financial support, improved market access, and other policy interventions, to actively pursue environmentally sustainable goals.

When long term impacts are hidden by short term results Government intervention is necessary, forcing firms to acknowledge the environmental impacts of their economic activities. But, where possible, demonstrating the economic benefits that environmental sustainability can accrue is most desirable as economic reasons tend to take priority and see greater adoption.

[5] Government of India, Ministry of Micro, Small and Medium Enterprises, Annual Report 2020-21

REASONS FOR BUSINESSES TO GO GREEN

Cost savings

Companies can reduce costs by using less energy and cheaper energy sources for the energy they do use. Raw materials and commodities can often rising in price too due to supply and demand changes, gradually being displaced by recycled alternatives. Installing environmentally friendly products and services now will save money in the long term. For example, solar panels can pay their initial cost off over time due to the cheaper electricity they generate. There are also cheaper alternatives to household appliances, such as LED lighting. Alternatively, as regulations and legal requirements increase, those companies that do not develop can incur significant costs through fines.

Attract investors and employees

Moreover, SMEs that are environmentally sustainable are likely to attract environment-minded investors and employees in the future. Numerous studies and polls have found that environmental concern is stronger amongst the younger population, translating into the best and brightest wanting to work for companies that are sustainable. Similarly, investors are cognisant of this growing trend and are aware of the need for green practices in the future. Investors thus consider firms' commitment to sustainability as well as economic performance in their investment criteria. Global ESG assets are on track to exceed USD 53 trillion by 2025 according to Bloomberg, representing more than a third of the USD 140.5 trillion in projected total assets under management[6].

Changing demand

SMEs can obtain new market opportunities thanks to growing consumer demand for environmentally sustainable products and services, and thus increase their market share and commercial revenue. As well as consumer demand, larger corporations (which tend to implement more environmental measures) are increasingly expected to work with environmentally sustainable businesses within their supply chains, thereby pressuring SMEs to follow suit.

Innovation and competitive advantage

Opportunities are growing in the services associated with greener manufacturing. Younger firms are particularly opportune for green innovations, as they can utilise newer technological or commercial opportunities that have been neglected by more established companies.

[6] https://www.bloomberg.com/professional/blog/esg-assets-may-hit-53-trillion-by-2025-a-third-of-global-aum/

THE VIEWS OF SMES IN INDIA

A sample of 77 Indian SMEs were interviewed to find out what they are currently doing to offset their impact on the environment and gather their views on environmental issues and available solutions, to see where the greatest challenges lie, and, importantly, where they most need support and in what form.

The SMEs interviewed predominantly operate in three sectors: advanced manufacturing and engineering; ICT; and financial and professional services. These three sectors were selected to provide a range of manufacturing and services sectors in order to explore and compare the challenges that SMEs face as a whole and on a sector level of varying energy and industrial requirements.

We found that the most common sources of information for the SMEs' management teams were from the media (43 percent) and Government sources (34 percent). A substantial number (16 percent) also utilised in-house knowledge and expertise.

Although climate change is an increasingly hot topic, detailed knowledge on its associated issues varies amongst the public. These issues include: 1) causes and effects of climate change; 2) the impact of industry on the environment; and 3) how to mitigate such impacts. That is, awareness of how business practices are impacting the environment, how environmental degradation and climate change are impacting society, and best practice to reduce harmful impacts.

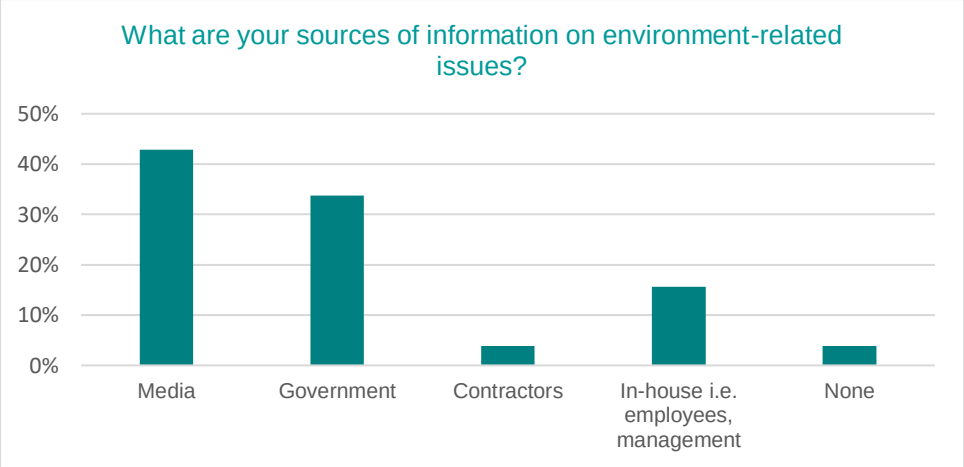

Figure 1

The low proportion of in-house employees as a source of information on environment-related issues suggests that environmental specialists are sparse amongst most SMEs. Additionally, there is an even lower proportion of contractors utilised by the SMEs.

In order to raise these issues, we would therefore recommend that the Government of India continues to provide the necessary information via its own sources and in the media. NGOs, think-tanks, and local citizen groups are active in India, voicing their concerns and objectives through the media too. Moreover, the Indian media itself is active and environmental issues are increasingly prominent across national and regional sources.

Most of the companies interviewed (91 percent) were aware of their company's carbon footprint. Of those, around 27 percent were also aware how that compares to industry averages.

It is important for organisations to not only be aware of their own carbon footprint, but others too. This enables them to benchmark their performance against industry averages, thus knowing if they are having a positive influence on the impact of industry on the environment and adjust their practices accordingly.

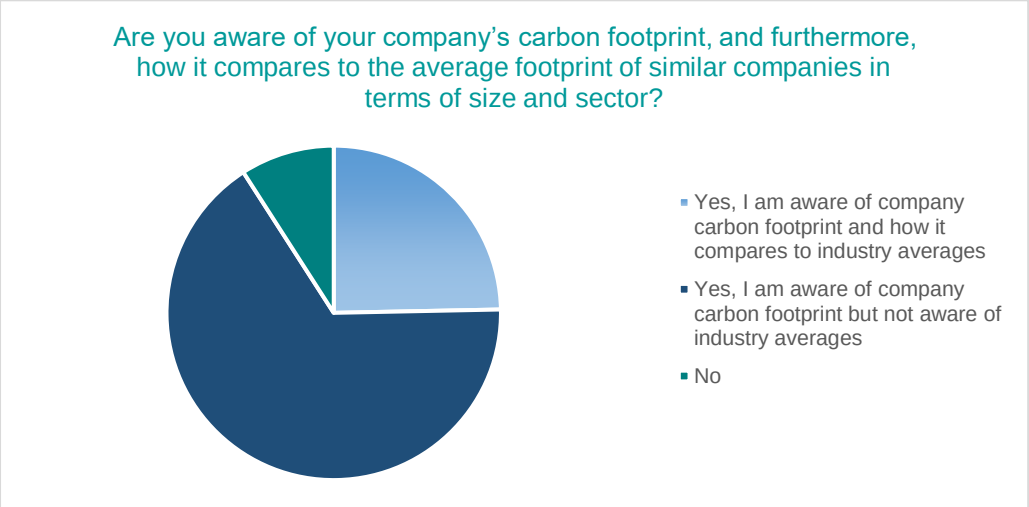

Figure 2

There are various Government-supported schemes that aim to incentivise businesses to be more energy efficient or use renewable energy. There were mixed results on whether the SMEs interviewed were aware of such schemes.

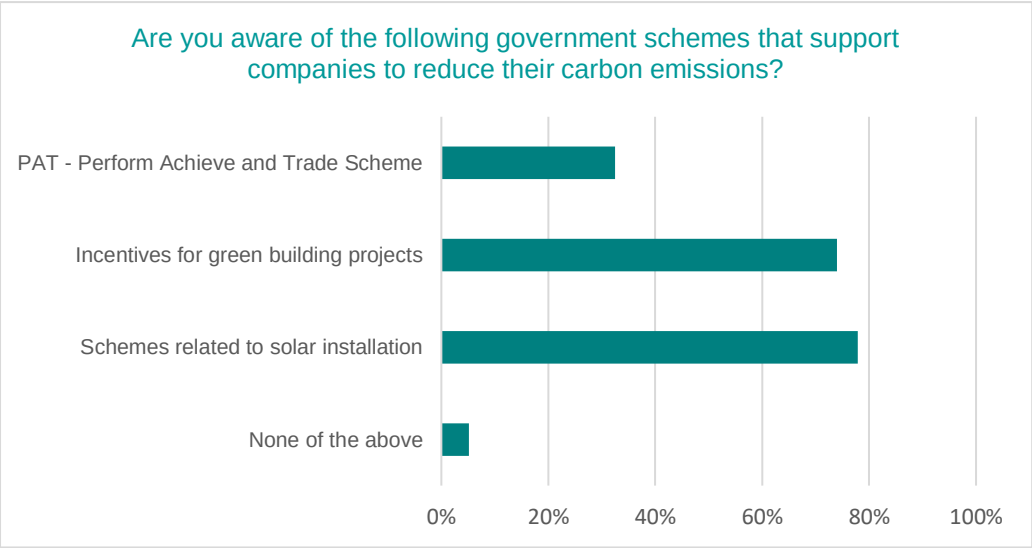

Figure 3

A basic level of awareness is evident, with only around 5 percent having never heard of such schemes. Schemes related to solar installation and for green building projects were widely held, as known by more than 70 percent of the sample.

However, beyond the most well-known schemes the level of awareness was relatively low, with approximately 1/3 of SMEs having heard of the Perform, Achieve and Trade (PAT) scheme, which aims to scale up energy efficiency in targeted, energy-intensive industries through market-based incentives and penalties. If facilities in the prescribed industries achieve energy efficiency gains beyond mandatory targets set under the scheme, they can sell these as credits, while those that underperform can buy those energy saving credits. Through this market-based approach, the scheme works to improve energy efficiency while simultaneously allowing for increased production and energy consumption to meet growing demands.

We also provided an 'other' option for SMEs to enter other schemes they were aware of, but received no inputs. This is despite the Government of India enacting several further initiatives to the cause. For example:

- The **4E (Energy to Efficiency) scheme** provides financial support to MSMEs to make climate and environment friendly investments. Specifically, the scheme provides part of the cost of (i) capital expenditure including for purchase of equipment/ machinery, installation, civil works, and commissioning for implementing energy efficiency measures. This aims to promote energy saving in MSMEs and development, up-scaling, demonstration and commercialisation of innovative technology-based projects.

- The **Sustainable Finance Scheme** offers funding for sustainable development projects that contribute energy efficiency and cleaner production but are not covered under the international or bilateral lines of credit. All sustainable development projects such as renewable energy projects, Bureau of Energy Efficiency (BEE) star rating, green microfinance, green buildings and eco-friendly labelling, are applicable for the scope of this scheme.

- The **Raw Material Assistance Scheme** also has the potential to support manufacturing SMEs to purchase products based on quality, accounting for environmental impact. The scheme gives financial assistance (credit) for procurement of raw materials up to 90 days and enables bulk supply arrangements for SMEs.

Such schemes are useful by helping to overcome some of the financial hurdles to greater energy efficiency and sustainability. The next section further addresses this, looking at the incentives required to increase take up of environmentally friendly business practices.

INCENTIVISING ENVIRONMENTAL ACTION

While every citizen, and relatedly company, is responsible for safeguarding the environment, government initiatives play a huge role in incentivising action. Being aware is one thing but incentivising take-up of Government schemes and generally environmentally sustainable methods is ultimately key. Accordingly, we looked at the benefits that SMEs consider to be the greatest reasons to be more environmentally sustainable.

Economic benefits came out as the greatest benefit (75 percent), reiterating the financial incentives to promote action. The next most significant benefits are interlinked – attracting environmentally-conscious customers (62 percent) and enhancing brand recognition and image (61 percent). The world is increasingly cognisant of the challenge of climate change and the need to take action. Consumers are making this clear as spending increases in environmentally sustainable products, such as electric cars and products made from recycled materials, and this phenomenon is well understood and accepted by companies around the world. By being more conscious of environmental sustainability, companies can continue to attract customers to their products and services. Relatedly, employees want to work for companies that are environmentally sustainable and as such must be considered by employers if they wish to attract the best and brightest.

Tax incentives and government subsidies were also popular, considered a significant benefit by more than half of the sample of SMEs, laying proof to the need for Government to play their part in incentivising businesses actions. Legal and regulatory preparedness was only thought to be significant by one-third of the SMEs, demonstrating that existing legal and regulatory requirements are not sufficient to enact environmental sustainability.

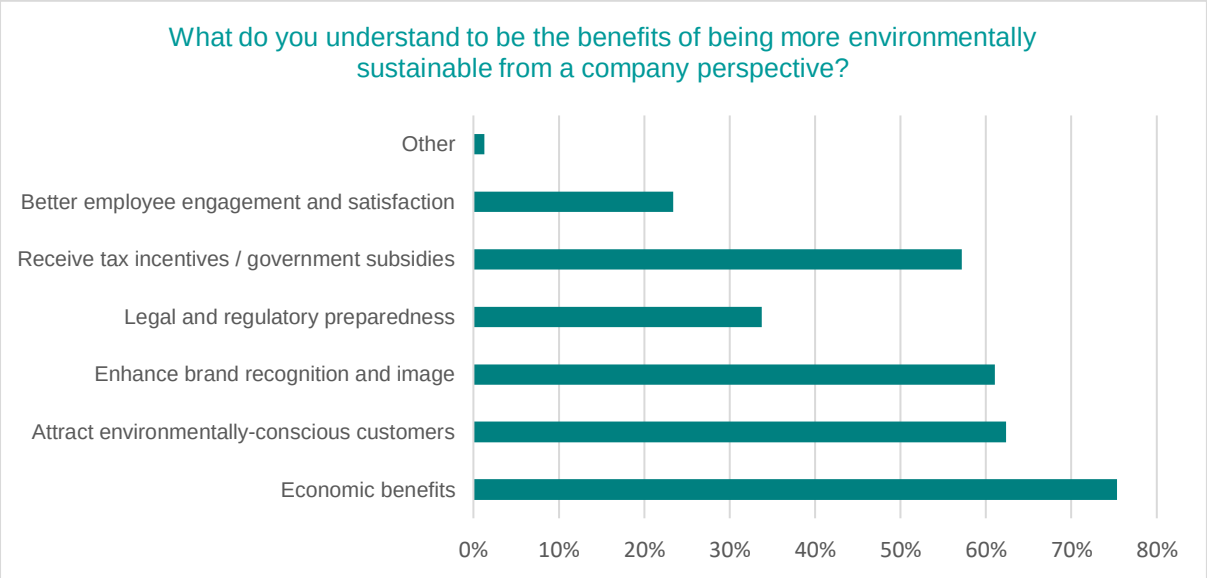

Figure 4

There has been an upward trend in terms of regulatory enforcement in India. For instance, various states have started to insist on the installation of continuous online emissions/effluent monitoring systems. This provides the State Pollution Control Boards (SPCBs) (one of the key regulatory oversights) the information to monitor the compliance of companies in their jurisdiction. Moreover, the

state high courts, the Central Supreme Court, and the various benches throughout India of the National Green Tribunal (NGT) closely monitor the implementation and enforcement of environmental laws. Other key regulatory authorities include: the Ministry of Environment, Forests and Climate Change (MoEFCC); the Central Pollution Control Board (CPCB) and the State Pollution Control Boards (SPCBs); and District Level Authorities (municipal corporations).

ONGOING ACTION TOWARDS ENVIRONMENTAL SUSTAINABILITY

So, how many SMEs have taken measures to reduce their carbon emissions?

Just 16 percent of the Indian SMEs sample are currently taking measures to reduce their carbon footprint.

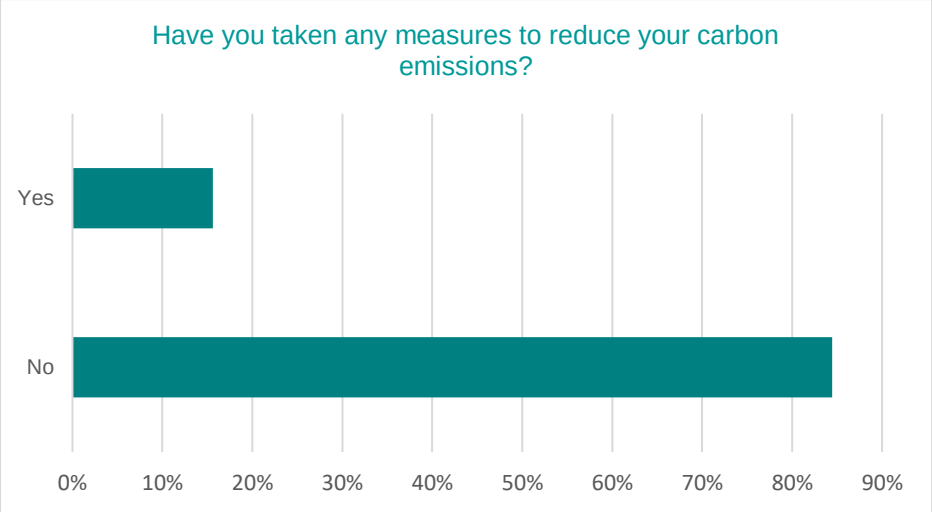

Figure 5

Of those who have taken measures, they included installation of solar panels to produce renewably sourced electricity, encouraging staff to use public transport and limit private transport use, and being more conscious of electricity usage.

This gap presents an enormous opportunity for companies that can offer support with affordable technology, innovative solutions and expertise to play a role in achieving a greater take up.

Regulations and financial incentives are one of several mechanisms to support such measures. Additionally, greater availability of affordable products and solutions, like electric vehicles and related infrastructure, battery storage, and smart meters, is another. The UK is home to a multitude of innovative solutions that can truly benefit Indian SMEs here. In section 4, we provide examples of the range of solutions available, from waste to energy, financing, and microgrid systems.

OVERCOMING CHALLENGES TO GO GREEN

We know that take up of measures to lower carbon emissions is generally low amongst SMEs in India. So, we looked at what challenges SMEs are facing to be more environmentally sustainable and relatedly the best way to overcome these challenges.

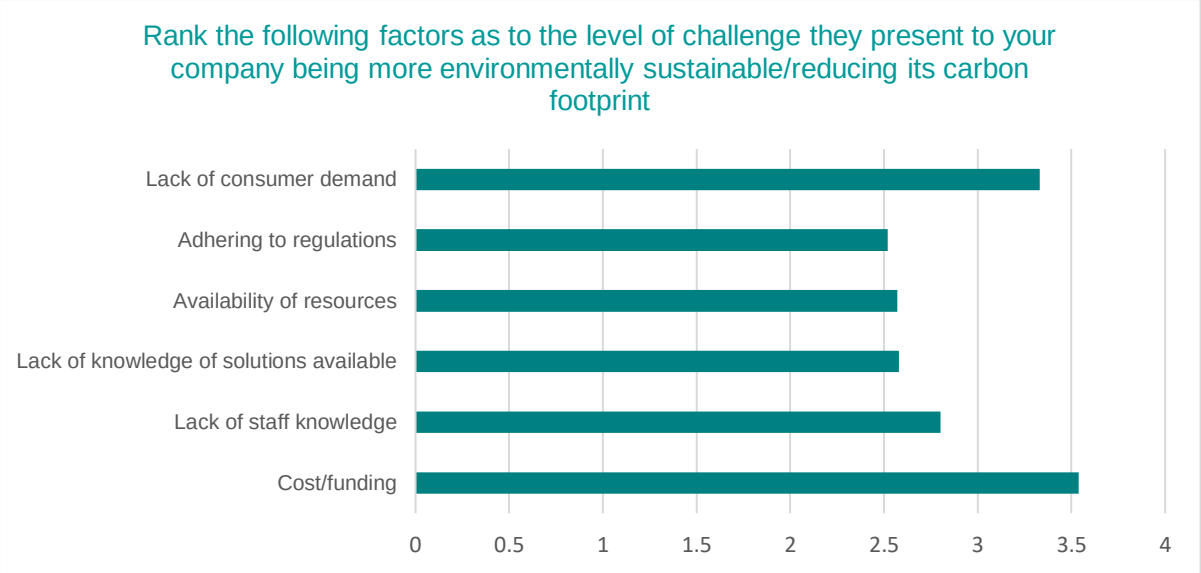

Figure 6

Two challenges stand out. Cost to the business and related funding issues were the greatest challenge regarded by the SMEs. Generally, environmental technologies entail higher costs in the immediate or short term while the benefits are realised in the longer term, hindering their adoption. Second, lack of consumer demand or pressure for consumers to be more environmentally sustainable were a proposed challenge to changing behaviours. For as long as customers are willing to buy a company's products and services, there is little incentive to spend resources on going green.

Yet, while that may be true now there are numerous studies that show that consumer behaviour is changing in favour of environmental sustainability. This is particularly true of the younger population, who are generally more concerned with climate change and its related impacts. That means as time goes on consumer demands and pressure are likely to grow. If companies are to be prepared and ultimately sustainable, changing practices now is likely to be more effective and financially-sound.

There is no doubt that the transition to net zero is essential, meaning more use of renewable energy sources and phasing out of fossil fuels. Acquiring solar panels now will save a firm money in the long-term through cheaper energy costs once the initial expenditure is cancelled. Support to acquire such cost-saving products in the first instance will be important.

Two other challenges related to knowledge and awareness – 1) staff knowledge of the significance of environmental degradation as a driving force to spur change, and 2) lack of awareness of the solutions that are available to make that change easier, cheaper and quicker.

To complement these findings, the SMEs were asked how they think they can most easily adjust their behaviours and practices to reduce their company's carbon footprint.

The SMEs felt that the easiest fixes they can make to their carbon footprint are more efficient use of resources and greater energy efficiency. These can be both achieved through behavioural changes such as being more conscious of production methods used and recycling, but also through clever devices like smart meters that control energy usage, as well as using tools and apparatus that are more energy efficient.

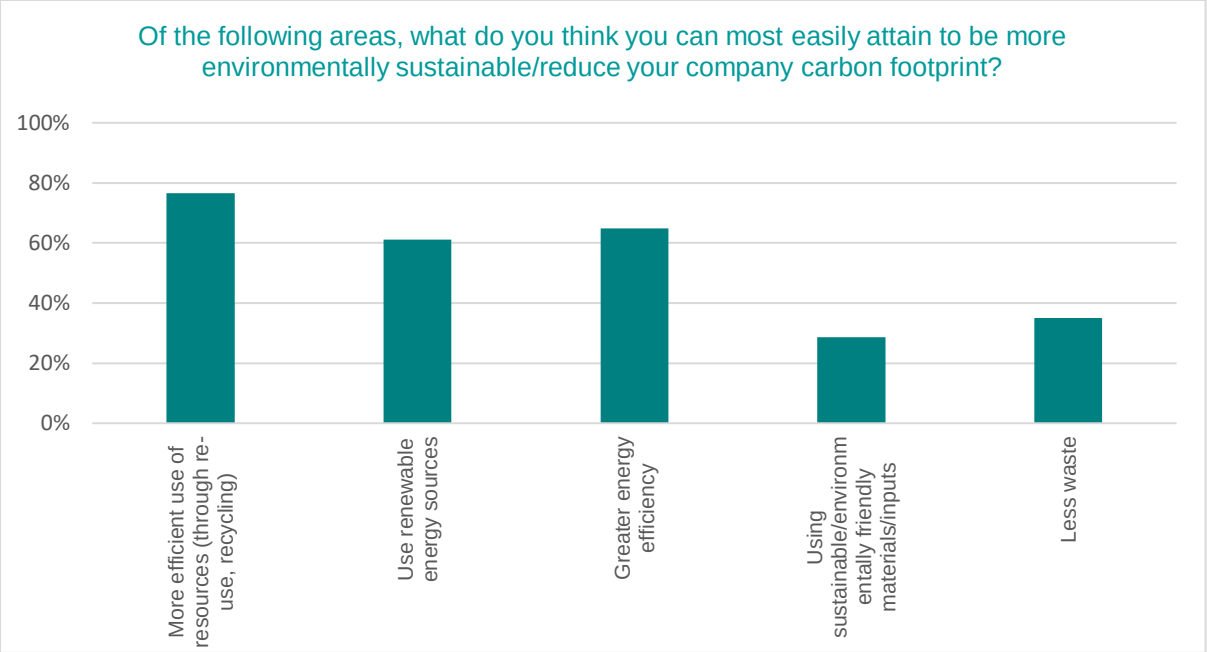

Figure 7

By far the most popular incentives to drive environment-friendly measures were financial, namely tax breaks and interest free loans and grants.

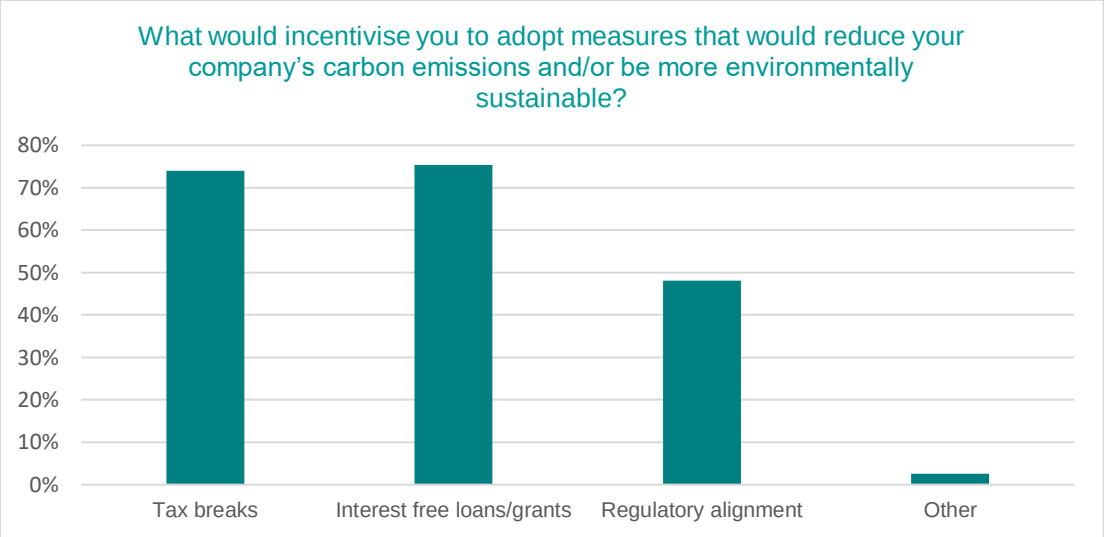

Figure 8

There are many strategies and instruments that should be used as part of a policy mix to promote environmental compliance and green business practices, including:

Regulatory tools: These can be a mixture of carrot and stick. For example, providing benefits to be more environmentally sustainable could include simplification of regulatory requirements for SMEs through standardised permits. On the other hand, general binding rules as well as other better regulation initiatives can force industries, and companies, to be so.

Financial incentives: grants, loans and tax incentives, as we have seen, are important for businesses to go beyond compliance and invest in green practices.

Information-base awareness and knowledge sharing: Disseminating guidance on environmental compliance and best practices directly to businesses and sector-specific bodies can help to develop knowledge and promote certain practices as standard.

All these tools should also look at industry from a holistic standpoint, encouraging supply chain pressure from larger companies and exerting it through green public procurement.

5. IMPLEMENTING AND INCENTIVISING SOLUTIONS

There are effective and affordable products and services that UK companies are innovating and keen to bring to the Indian market. Such is the range of products and services, it is important to think about what SMEs consider the most important factors when determining uptake.

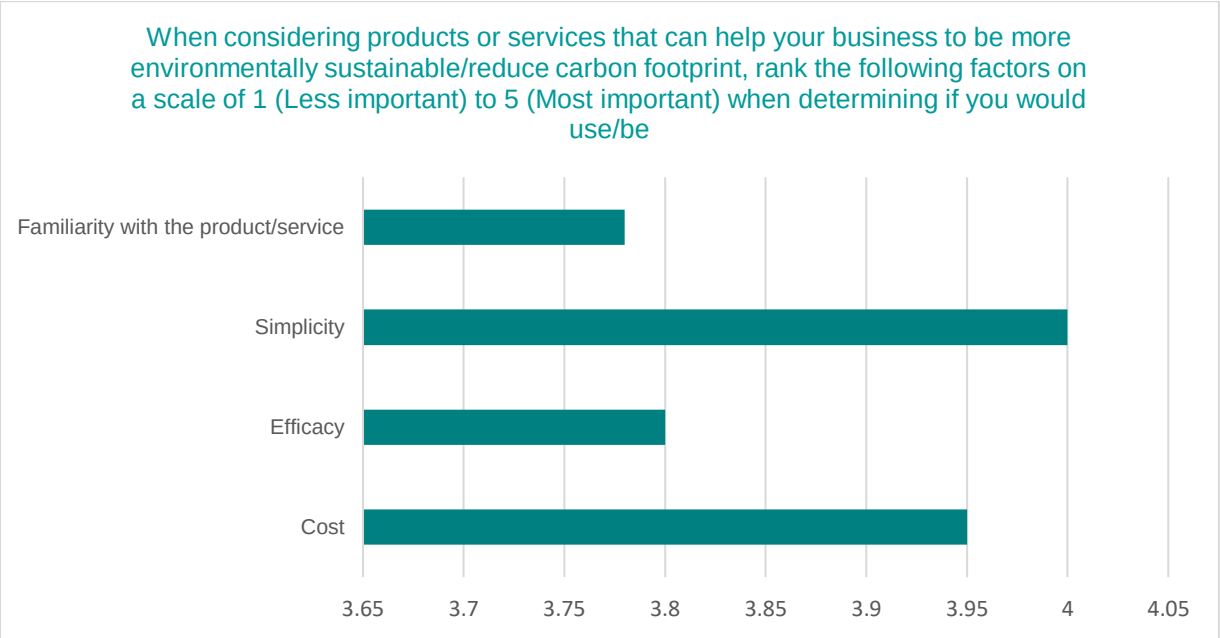

Figure 9

Interestingly, simplicity, meaning how easy a product or service is to understand, set-up and use, was the most important factor, even more so than cost. As our research has uncovered, knowledge of the issues that companies can address to be more environmentally sustainable is varying among SMEs, as well as awareness of the solutions at hand to help. Therefore, solutions that are simple and have tangible results may be more likely to be taken up by individuals and firms with limited knowledge of environmental practices.

Sensibly, efficacy is also considered a very important factor. Familiarity with carbon-friendly solutions will grow over time, just as solar panels are now universally recognised from less common knowledge just a few decades ago. But marketing and raising the profile of the products and services that already exist will also help to raise awareness and improve take up.

6. CASE STUDIES: THE UK OFFERING TO INDIA

This section covers a range of UK company case studies offering solutions to support the environmental goals and energy transition. This covers both companies active in India and those that can support other UK companies to engage in the Indian market.

Clarke Energy

Clarke Energy is an international specialist in embedded power generation. Operating in 27 countries, Clarke Energy has been providing comprehensive distributed power solutions in multiple industries as an authorised distributor and service provider for INNIO's Jenbacher gas engine division.

Clarke energy has provided such solutions to companies across various regions of India. These include to Embio Limited a leading manufacturer of bulk drugs using molasses as a main raw material. Fermentation is the core process used to convert molasses into drugs intermediate. This process generates significant amount of waste, which undergoes anaerobic digestion process, converting high strength wastewater into biogas. The digester, based on fixed film process, provides higher treatment efficiency. Initially, the generated biogas of approximately 15,000 m^3/day was being used to generate steam of approximately 85-90 tonnes per day, being used in process.

In 2016, Embio Limited, Mahad, decided to evaluate use of biogas for trigeneration (combined cooling, heat and power) application using reciprocating gas engine technology. Clarke Energy, having significant experience, expertise and project management skills secured the contract to design, supply, install, erect and commission 1.5MWe biogas-based power plant.

INNIO's product portfolio – for which Clarke Energy is an authorised distributor – includes highly efficient industrial reciprocating engines generating up to 10 MW of power each for numerous industries globally. The product line consists of Jenbacher and Waukesha brands, wherein both engines are running on single fuel, which is gas. The gensets 0.25 MW_e to 10.38MW_e (single machine) operate on natural gas, biogas, associated petroleum gas, coal bed methane, sewage gas, landfill gas, hydrogen, propane, producer gas (Syn. Gas), coke gas, blast furnace gas. Jenbacher gas engines offer high levels of fuel efficiency with lean burn combustion technology, durability, reliability and adhere to quality standards worldwide.

Operating since October 2017, the Jenbacher genset running in parallel to grid has significantly improved the conversion ratio. This facilitates the optimum utilisation of biogas generating 1.5MWe electricity with 869kg/hr of low pressure steam from the engine exhaust flue gases via a waste heat recovery boiler. Also chilled water is produced equivalent to 180 tonnes of refrigeration, using a hot water-fired Li-Br vapour absorption machine. Both steam and chilled water are utilised in the process.

Clarke Energy's offices in India provide 24/7 operation and maintenance services and Embio Limited signed a multi-year agreement for spare parts. The agreement enables them to boost productivity and maximise uptime, lowering their cost of ownership and preserving the value of Jenbacher gas engines.

"The installation has enabled us to reduce our dependability on the grid and our use of high-polluting fossil fuels. Gas generated through bio-digestion is renewable and Embio Limited in our own small way are helping our country reduce greenhouse emissions." Mr. R.K Prabhu – Executive Director & CFO – Embio Limited

Visit the Clarke Energy website.

Rolls-Royce India

Under its MTU brand, Rolls Royce offers a microgrid system that combines environmentally friendly renewables and gensets with batteries and a control system for intelligent energy management. Greater rollout of these cleaner energy systems can help SMEs in India, including those in remote locations, to access cleaner energy.

Microgrids are defined as small-scale power networks that can function autonomously or collaboratively with other power grids – often more ecologically, economically and reliably than traditional or renewable power supplies. This is because microgrids can include photovoltaic systems, wind turbines, hydro-electric plants, diesel gensets, and combined heat and power (CHP) modules to provide cleaner, more reliable energy to the communities who need them.

Microgrids can provide power to remote locations without access to a public grid or operate in conjunction with existing power networks to provide a supplemental, environmentally friendly supply of power to industrial complexes or local communities. MTU microgrid solutions range from stand-alone battery storage to fully integrated hybrid systems. These can be customised for all levels and size of utilisation:

1. Demand charge reduction: Reduce grid stability power demand by storing power and/or using gensets to lower demand charges which are typically based on the single highest grid stability power draw (in kW) per year.
2. EV charging integration: Enable business cases concerning electrification of the transportation sector by providing extra power during certain periods when charging of multiple vehicles exceeds the grid capacity. Match local renewable energy generation and car charging to provide true green charging.
3. Frequency regulation services: Provide services to grid system operators – via utility companies or energy traders – such as frequency containment reserve, frequency restoration reserve, etc. to support grid frequency.
4. Genset dispatch optimisation: Reduce genset runtime and boost genset efficiency by providing spinning reserve from batteries and intelligent load sharing between gensets and batteries whenever gensets are in operation.
5. Genset flexibilisation: Enable your gensets to accept large load steps and bridge startup times by adding battery storage. In this way, a genset power plant can be upgraded for off-grid operation or backup power.
6. Grid limitation management: Overcome consumer-side limitations on desired load increase due to limited grid connection capacities. Batteries and/or gensets can cover additional grid stability power loads.
7. Off-grid energy supply: Provide electricity in areas where no grid is available or reduce your fuel consumption (and hence electricity costs) for existing power plants in off-grid settings by adding renewable energy sources and storage.
8. Self-consumption and self-sufficiency: Put local power generation units such as solar arrays or CHP plants in place and use power ‘behind the meter’ instead of feeding it into the grid. Increase self-sufficiency even further by adding battery storage.

Visit the Rolls Royce MTU website.

Energy Systems Catapult

ESC brings together UK and Indian firms to utilise their products and services to improve energy systems for a greener, more sustainable future. ESC's support offering includes company strategy development, market expertise, insights, and access to networks throughout the energy supply chain.

Energy Systems Catapult, an independent centre of excellence that bridges the gap between industry, government, academia and research, was set up to accelerate the transformation of the UK's energy system and ensure UK businesses and consumers capture the opportunities of clean growth. Together with its partners, Connected Places and Satellite Applications Catapult (all funded by Innovate UK), Energy Systems Catapult launched a two-year joint initiative in India – the Innovating for Clean Air (IfCA) programme – providing opportunities for businesses to improve air quality monitoring and electric vehicle interventions.

The IfCA programme supports UK and Indian firms to develop innovations to improve air quality and tackle pollution at source in India (with initial programmes in Bengaluru) by addressing challenges related to charging infrastructure, grid management and the integration of renewable energy. This helps to bring a variety of stakeholders together and make use of their unique solutions to tackle challenges across the system. Through the programme the Catapults have worked with the Directorate of Urban Land Transport to pedestrianise a street in Bangalore – Clean Air Street – to showcase air quality and electric vehicle innovations, in addition to supporting UK and Indian organisations in developing pilot projects.

ESC can offer the following to support the clean energy transition AIMS of the Indian market:

- Access to UK supply chain and latest technology, products, business models and innovators in the UK energy sector.
- Insight of ways to unlock clean growth through access to expert advice, data and consumer preferences.
- Market expertise to navigate policy and regulation to support transitions and understand the UK market landscape.
- Strategy development - working with stakeholders to develop Net Zero pathways, models and tools to create an evidence base and inform decision making.

ESC can support Indian SMEs in a number of ways, for example, it can support export opportunities through: UK energy market analysis to showcase rival/partner firms in the sector; tailored business matching to find partners; bespoke support to Indian firms to understand how their offering fits in the UK energy sector and advice on their business plan/value proposition/digital strategy/how their technology fits in the wider UK energy system; and handholding support to try and develop a pilot project in the UK.

In addition, ESC can also support Indian firms by incorporating them in programmes like IfCA and giving them publicity as well as opportunities to trial and test their products in a risk-free environment.

ESC's UK-India Green Business Portfolio features 26 British and Indian companies who are bringing innovative approaches to improving air quality (AQ), measuring pollution levels, and reducing traffic emissions by accelerating the transition to electric vehicles (EVs).

Visit the Energy Systems Catapult website.

EnergyPro Asset Management Ltd

EnergyPro Asset Management, within the EP Group, brings global experience to businesses, investors and governments to deliver net zero and regenerative infrastructure. EP Asset Management provides a range of transaction services and connects impact driven companies and projects with capital.

EnergyPro Asset Management (EPAM) can connect UK companies with specific needs, customers and partners in India, develop a business plan for market entry, and then brings investment to execute on the specific plan. It is currently working to bring its 'ESCO' system to India.

The company has identified three key sectors in particular that UK companies can support the energy transition in India: cooling, e-mobility, and smart energy, all of which are priorities for the Government of India.

EPAM has a joint venture in the UK with Energy Efficiency Services Ltd (EESL) through which EESL has deployed more than GBP 60m into UK energy transition companies. The JV was named as the fastest growing Indian owned company in the UK in 2020.

With the support of the UK Department for Business, Energy and Industrial Strategy (BEIS), EPAM has developed a new business model, ESCO-in-a-box, which is specifically aimed at helping SMEs to reduce their energy use. The model is a licensable system that provides all the tools and resources that enables an organisation to establish itself as an Energy Service Company (ESCO) which can identify efficiency projects, develop them, and finance them under a simplified energy services agreement.

The ESCO system is currently being rolled out across the UK. With the support of funding from the German development agency, GIZ, and a local partner, EPAM are currently deploying ESCO-in-a-box in Kenya and have a lot of global interest in the model.

EnergyPro Asset Management is working on taking this 'shovel ready' system to India, having identified a local Indian partner to take on the system for India and had identified laundries (part of the textile industry) as a key market.

Visit the EP Asset Management website.

HSBC India

The Hongkong and Shanghai Banking Corporation Limited in India is an Indian subsidiary of UK-based multinational HSBC and offers a full range of banking and financial services through 26 branches across 14 cities in India.

HSBC is one of India's leading financial services groups, with around 39,000 employees in its banking, investment banking and capital markets, asset management, insurance, software development and global resourcing operations in the country. It is a leading custodian in India.

With its extensive reach across Asia, North America and Europe, HSBC has the capacity to offer complete banking and financial solutions to India's burgeoning economy. It has also formed a joint venture life insurance company with Canara Bank and Oriental Bank of Commerce. India is a priority market for the HSBC Group and it offers the complete suite of products across the following lines of businesses – Global Banking & Markets, Commercial Banking and Wealth & Personal Banking.

Sustainability projects often have large capital requirements and long breakeven cycles and thus need support of long-term bank financing at affordable rates. Moreover, HSBC, and indeed other UK banks and financial services companies, are geared to support India on its path to a more sustainable future while achieving high growth rates.

HSBC can support the Indian SME market to go green by:

- Evaluation of credit proposals for supporting a corporate in their journey to go green. A strong balance sheet and liquidity in India enables HSBC to support renewables (solar/wind) and EV projects
- HSBC will continue to partner UK anchor units and aid their progressive manufacturing plans, ecosystem buildout requirements across EV's, solar and renewables.

Visit the HSBC India website.

John Crane Inc

John Crane offers emissions identification, repair and mitigating, and ongoing reporting and management solutions for companies, giving them the necessary resources, data and technologies needed to ensure comprehensive methane management, thus minimising leaks, saving revenues and harm to the environment.

John Crane Inc's mission is to help industries like the oil and gas sector reduce their methane emissions. Better monitoring and accounting of methane emissions allows oil and gas companies, alongside other sectors, to find solutions to mitigate these emissions. Emissions are not just bad for the environment; they can also be a financial drain on a company's profits. It is estimated that 3-4 percent of global natural gas is lost to emissions, totaling USD 2-3 billion in lost potential revenue.

Its service is built around the principle of minimising the total volume of methane being leaked, rather than the total number of leaks, as quickly as possible. Methane emissions are highly skewed, with a few leaks emitting large amounts of methane, which means fixing those leaks has a greater overall impact.

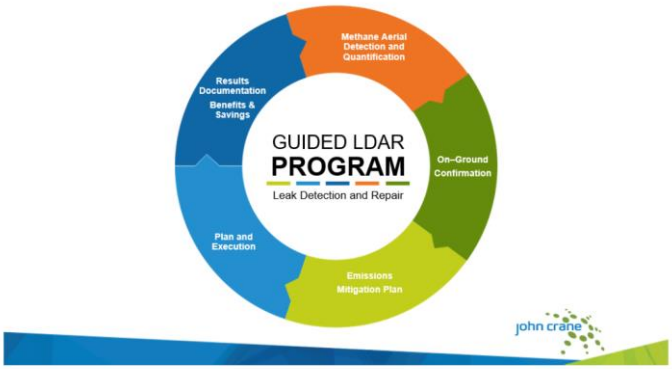

Figure 1: John Crane's end-to-end value proposition solution to reducing methane emissions

Since 2019, the company's technology partner has surveyed over 20,000 square miles, prevented more than 18.3 billion cubic feet of methane from being released into the atmosphere and conducted an unprecedented survey of every production facility and pipeline across the entire Permian Basin. This knowledge can be transferred to help the local Indian SMEs in the direction of going green.

Other aspects that John Crane can support SMEs are:

- Cost Effectiveness: Leak detection and repair (LDAR) with JC is twenty times less expensive than traditional, ground-based LDAR methods.
- Environment: Identifying and correcting the leaks not only allows for higher product retention, but also helps meet company emissions reduction goals and ensures compliance with air permits
- Safety: Aerial monitoring allows maintenance and operations employees to visit difficult-to-reach sites by foot less frequently and catches burgeoning leaks early before they worsen, reducing risk.

Visit the John Crane website.

Vidrona

Vidrona is an AI based predictive prescriptive analytics software company for utilities. Its AI and machine learning platform provides faster and accurate detection and prediction of faults to ensure greater lifetime of utilities, save costs, and reduce faults.

It is Vidrona's philosophy that to be more energy efficient, as well as storage, it is important to focus on the heartline of energy, namely the electrical evacuation systems (namely transmission and distribution systems). With focus on electrical transmission and distribution network systems, Vidrona offers analytics software platform for the utilities to ensure reliable, uninterrupted yet cheaper affordable electricity.

Vidrona's offering to India covers several sectors:

1) Energy Sector: Electrical Transmission & Distribution Companies
2) Railways – Over Head Electrical Transmission Lines
3) Telecommunication – Towers and predictive assets maintenance

Vidrona helps utilities to increase their return on investment by increasing the asset life of electrical transmission and distribution systems, through its suite of AI Analytics Software Platform for utilities (TSO, DSO & Renewable Energy, Railways) on the cloud. It helps customers to make their Operations and Maintenance activities simpler, more efficient and cost effective for clean energy.

Specifically, Vidrona helps to:

a) reduce the overall fault isolation and maintenance time (up to 7x faster);
b) reduces cost (up to 50 percent) in operation and maintenance;
c) preventive (up to 6 months in advance);
d) prescriptive maintenance with 99 percent accuracy;
e) actionable items with root cause analytics; and
f) fault Isolation with severity (following FMECA model)

Indian case study: BSES Rajdhani Power Ltd (BRPL), a New Delhi electrical utility company
The company started with a pilot project and signed partnership to engage on the use of artificial intelligence based predictive prescriptive analytics to help to optimise their Operation and Maintenance (O&M) activities, making them more efficient and cost effective. The project was a great success in India and was awarded a "Best Smart Grid Project in India" award under both segments as technology provider as well utility adopting latest technologies. By optimising the O&M activity, the project aimed at reducing the overall carbon footprint on the repair and maintenance as the BRPL O&M team already knew precisely where the faults were located and with their asset health detail on criticality, so an optimised and efficient maintenance was prepared reducing the cost and time.

Visit the Vidrona website

Shell India

Shell India is one of the most well-diversified international energy companies in India with over 9500 employees and presence across upstream, integrated gas, downstream, renewable energy, and deep capabilities in R&D, digitalisation, and business operations. Shell serves Indian customers through a fully-owned and integrate value chain – competitive supply from global liquefied nitrogen gas portfolio, regasification at its Hazira facility, and downstream customer sales.

A new scenario sketch by Shell (in partnership with The Energy and Resources Institute (TERI)), found that to reach a net-zero emissions energy system by 2050, India needs a suitable policy and innovation driven environment to deploy clean energy technologies on a massive scale. It requires more and faster deployment of large-scale solar, wind and hydro power to enable greater electrification across the country. It also requires the development of new fuels, such as liquid biofuels and biogas, as well as hydrogen produced from electrolysis. Energy efficiency must improve significantly, and carbon removals (from technology and nature-based solutions) will have a critical role in moving towards zero emissions.

Shell owns a Liquefied Natural Gas (LNG) regassification terminal at Hazira, Surat. In January 2021, Hon'ble Minister for Petroleum, Natural Gas and Steel Shri Dharmendra Pradhan virtually inaugurated Shell Energy India's first small-scale LNG supply infrastructure, a truck loading unit at its LNG terminal in Hazira. This will augment Shell's downstream customer offering to include supply of LNG via trucks across India, in addition to supply of R-LNG via pipeline.

Shell in India aims to become an integral part of India's growing clean and affordable energy system by providing a portfolio of solutions in energy and mobility, developing new business models enabled by strategic partnership with society and customers while making India an incubator for talent and technology.

In recent years, Shell has supported dozens of start-ups through two editions of the Shell E4 (Energising and Enabling Energy Entrepreneurs) programme, various modules of linking talent, technology, capital, and know-how to accelerate India's transition to a sustainable energy future. A total of 30 start-ups have graduated from Shell's E4 programme since its inception. The company aims to incubate at least 20-25 start-ups starting next year.

Visit the Shell India website.

7. RECOMMENDATIONS

India, at a national level, is making good progress on its climate change targets. The Government of India has sought to address the country's energy demands by investing in renewable energy sources, most notably wind and solar, and raising awareness into the importance of climate change and its impacts.

Yet, like most countries, this is just the beginning. The climate targets for 2030 will need to see greater acceleration if net zero is to be achieved by 2050. This report finishes with 5 recommendations that would support the race to net zero and bring prosperity to both the UK and India through greater trade and investment ties and sustainable development.

Recommendation 1: Widen access to finance and other support for development of small-scale projects.

Sustainability projects may have large capital requirements and a long break-even cycle. As a result, they often need support of bank financing at affordable rates. SMEs, in particular, continue to struggle with the financial costs of investing in environmentally sustainable solutions. As this report has discussed, at an aggregate level the impact of SMEs on the environment is large. SMEs are keen to play their part but are challenged by fiscal constraints. Improving access to loans and grants will be needed in the short and long term to help.

UK banks, as a global hub for financial services, including ESG investment, can support. Financial services players have acknowledged the importance of meeting the Paris climate goals and their respective regulatory bodies have highlighted the positive role that financial services can play in facilitating investment in a climate friendly manner. Classification of such projects under priority sector lending (PSL) will help banks to meet PSL targets and propel financing of such projects. In turn, this will help meet climate goals for the overall economy. With the UK hosting COP26 in November 2021, new, more ambitious goals must be met in the coming decades and will require financial backing.

On September 2nd, 2021, at the 11th UK-India Economic and Financial Dialogue, the UK announced action to help drive India's green growth, including a USD 1.2bn package of public and private investment in green projects and renewable energy. This includes:

- A USD 1bn investment from CDC, the UK's development finance institution, in green projects in India;
- Joint investments by both governments to support companies working on innovative green tech solutions; and
- A new USD 200m private and multilateral investment into the joint Green Growth Equity Fund which invests in Indian renewable energy.

Both countries also welcomed the launch of the Climate Finance Leadership Initiative (CFLI) India partnership to mobilise private capital into sustainable infrastructure in India, including clean energy like wind and solar power and other green technologies.

At the same time, the UK Chancellor, Rishi Sunak, and the Indian Minister of Finance, Nirmala Sitharaman, agreed to be ambitious when considering services in the upcoming UK-India trade negotiations expected to begin in late 2021, which could open up new opportunities for UK financial

firms and help more Indian companies to access finance in the City of London. The trade negotiations will be an important opportunity to see such ambition realised.

Recommendation 2: Establish stable regulatory frameworks that encourage and incentivise sustainable investment and practices.

Given the long-term nature of energy innovation, energy investment and energy infrastructure, stable policy and regulatory frameworks are essential to promote short and medium-term behaviour. Policies should be designed to: ensure long-term energy security; make energy more efficient and affordable; and promote sustainable energy delivery and consumption. To businesses, energy security means confidence in their ongoing ability to access reliable and affordable energy wherever they operate.

Recommendation 3: Foster collaboration between business, government and academia.

There is an urgent need for collaborative research projects on energy technologies that could deliver a step-change in performance for sustainable global energy usage. Business will continue to play an important role in finding solutions in collaboration with other stakeholders. But governments, business and civil society should also partner to leverage resources. Furthermore, this cross-cutting collaboration should take place at a bilateral level, sharing knowledge, expertise and innovation. Ongoing internationalisation of India's higher education sector through the National Education Policy is helping to pave the way for more UK-India university tie-ups in research.

Recommendation 4: India should become increasingly open to free and fair trade.

Due to challenges regarding the openness of India's market in the renewable sector and the push for 'Make In India' to bring manufacturing to India, UK firms in the renewable sector are increasingly focusing on 'design in UK and make in India'. This is partly caused by local competition and due to Government policy to achieve self-reliance.

To be a manufacturing hub, India will need to be part of international supply chains, which will mean importing as well as exporting. If tariffs make manufacturing in India too expensive, investors will go elsewhere. If India does choose to use tariffs, it should do so by signalling how tariffs will increase over a period of years. This would give investors the incentive to create an Indian supply chain and the time to do it. Manufacturers will, over time, develop an India-based supply chain. This will be a mix of bringing suppliers into India and helping existing indigenous manufacturers to enhance their offer.

India should also increase its efforts to expand trade and investment collaboration in Asia so that it can benefit from increasingly friction-free trade across the region, particularly with ASEAN, which is a region increasingly rich in consumers and manufacturers. By giving global manufacturers improved access to the whole of Asia, India will become an even stronger magnet for investors.

Recommendation 5: Put sustainability at the heart of trade and investment strategy

Whether it is through UN forums - the Sustainable Development Goals and COP26 - or discussions at the WTO, G7, or G20, sustainability issues are increasingly a feature of trade discussions. If shaped properly, trading arrangements can help support the poor and protect the environment. Countries and trade blocs are cognisant of this fact and, as such, are increasingly integrating sustainability and human rights into their trade agreements and strategies.

Sustainability covers a wide set of subjects, from environmental protection to social justice to human rights. The self-reliant goal and Make in India ambition will necessitate lengthy international supply chains. It will be critical that such supply chains are ethical, fair and inclusive, with a focus on corporate social responsibility at every stage.

Similarly, environmental sustainability should be accounted for in the products and services that are traded and invested in. Not only does this mean mitigating environmental degradation caused by harmful substances and bad production practices, but also investing in products that can support the fight against climate change such as renewable and green energy. India is already leading the way in production of solar energy and the Government of India can continue to advance this strength while simultaneously developing other climate-friendly solutions for economic growth.

Finally, as well as fostering its own sustainable trade and investment strategy, India could use its global leadership role to encourage its international partners to do the same.

Enabling greater trade, investment, collaboration and partnerships will support the proliferation of technologies and infrastructures required to bring greater, cleaner energy sources to all of India's population.