

HOW CAN THE PRIVATE SECTOR HELP IMPROVE AIR QUALITY IN PAKISTAN?

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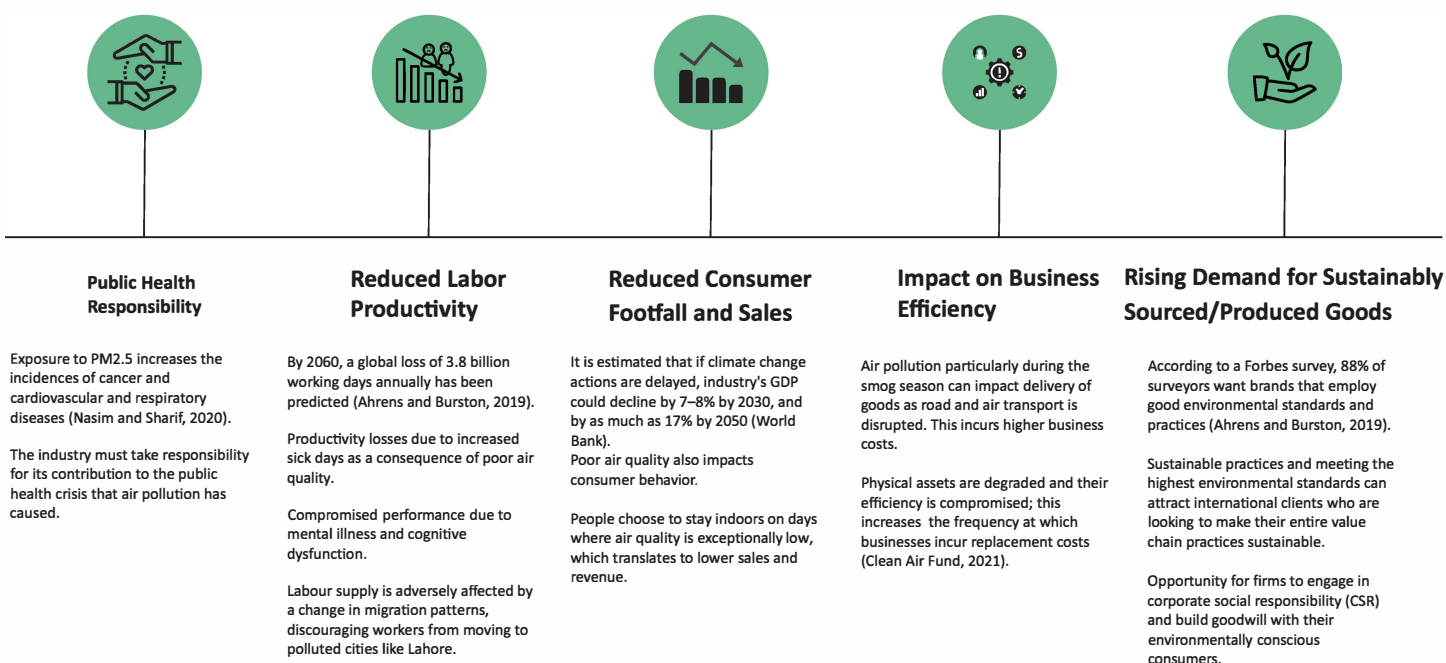
Introduction

Air quality has significantly deteriorated in Pakistan over the last decade. According to the Air Quality Life Index¹ Pakistan ranked as the 4th most polluted country in the world in 2022. Over the past five years, some larger cities such as Lahore and Karachi have regularly ranked as some of the most polluted cities in the world. The average particulate pollution in the country is 44µg/m³ as opposed to the World Health Organisation (WHO) guideline value of 5 µg/m³. This impacts the life expectancy of Pakistan's citizens by losing 2.7 years of their life².

Moreover, poor air quality results in a plethora of health, economic and social consequences such as: obesity, mental illness, cognitive dysfunction, lower labor supply and productivity, higher incidence of violent crime, and disruptive migration³. Hence, it is imperative that steps be taken to improve the quality of air in Pakistan.

A Cause of Concern for the Private Sector

Businesses may ask why improving air quality is their responsibility? Pakistan's industry does not emit more than 0.9% of the world's GHG emissions⁴, while the world has used the same fuel and industrial processes to build their economy that Pakistani businesses are now being asked to discontinue. Following is the case that highlights why Pakistan's private sector needs to contribute to reducing air pollution.



Mitigative and Adaptive Role of the Private Sector

The fundamental point is that clean air is good for business, and businesses stand to lose a lot from poor air quality. It is in the private sector's own best interest to adopt mitigative practices to lower their own emissions and carbon footprint. The private sector can also capitalize on the opportunity to fulfill their corporate social responsibility (CSR) and improve their business reputation by greening their operations. It is pertinent to note that the greening of business processes cannot be achieved overnight, and the transition will look very different for varying levels and nature of businesses. Therefore, when devising a clean air agenda, it is important for businesses to take a methodological approach to setting achievable goals in view of their resource and capacity constraints. A schematic representation of the agenda setting process is given below.

¹ Pakistan - Air Quality Life Index, Energy Policy Institute at the University of Chicago. <https://aqli.epic.uchicago.edu/country-spotlight/pakistan/>

² Michael Greenstone and Qing (Claire) Fan, Pakistan's Air Pollution Challenge & Potential for Longer Lives, EPIC 2019. <https://aqli.epic.uchicago.edu/wp-content/uploads/2019/02/Pakistan-Report.pdf>

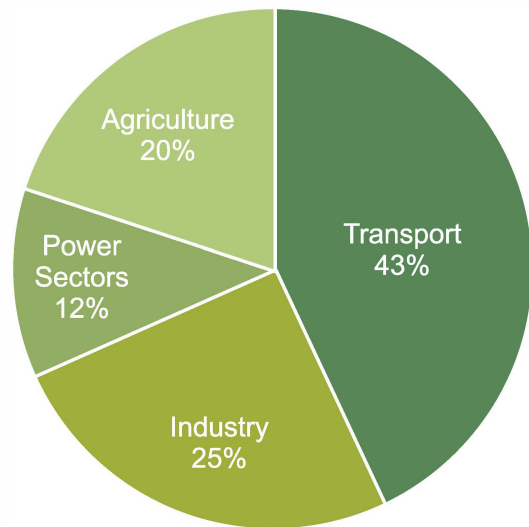
³ Sanval Nasim and Mahnoor Kashif, Punjab's Pollution Crisis: Information, Research and Policy Gaps, Pakistan Dialogues 2021. <https://mhrc.lums.edu.pk/punjab-pollution-crisis/>

⁴ Updated Nationally Determined Contributions 2021, Government of Pakistan. <https://unfccc.int/sites/default/files/NDC/2022-06/Pakistan%20Updated%20NDC%202021.pdf>

Figure 1: Schematic representation of process of developing a clean air agenda.



Figure 2: Sector contribution to total airborne emissions in Punjab.



Source: Food and Agriculture Organisation (FAO) (2018)⁵.

The contribution of various sectors to air pollution in Punjab can be seen in figure 2. It is imperative that swift and pertinent steps be taken to mitigate the adverse impacts of these sectors. Businesses can play a pivotal role in this effort through a number of actions by focusing on the following aspects.

Green Transport

Opting for EVs will cut long-run business operation costs.

It is believed that large-scale penetration of Electric Vehicles (EVs) will decrease dependence on fossil fuel for transportation. This has potential to lower the country's import bill and also reduce GHG emissions⁶. McKinsey has estimated that the cost of owning all types of EVs will be at par with their Fossil Fuel Vehicle (FFV) counterparts by 2030⁷. The rise in petroleum prices is expected to expedite EV uptake in the country.

- When purchasing vehicles for business use, it is worth investing in EVs. Although EVs require a higher initial investment than fossil fuel vehicles (FFVs), companies will save money in the long run. To ease the financial burden of this hefty investment, firms can transition gradually by replacing older vehicles in their fleets as they reach the end of their life⁸.
- In the next few years this transition will be even more critical for the logistics and transport sector; commercial vehicles of all sizes that transport passengers and cargo stand to gain the maximum benefit from better unit economics of EVs⁹.
- Charging infrastructure is expected to grow fairly rapidly to meet the requirements of the growing number of EVs. As the charging infrastructure grows, the range capacity of EVs will also increase.
- Firms should gradually encourage employees to opt for EVs by highlighting the monetary and environmental benefits of doing so. Jolta Electric and MS Group have introduced 70 cc style motorbikes into the Pakistani market. MG has EV options for consumers and in August 2022, Dice Foundation introduced NUR-E 75; Pakistan's first locally produced EV with a range of 210 km¹⁰.

⁵ FAO. Remote sensing for space-time mapping of smog in Punjab and identification of the underlying causes using geographic information system (R-SMOG). Islamabad 2020. <https://doi.org/10.4060/ca6989en>

⁶ NEPRA, Annual Report 2021-22. <https://nepra.org.pk/publications/Annual%20Reports/Annual%20Report%202021-22.pdf>

⁷ McKinsey, Global Energy Perspective 2019: Reference Case. 2019. [tinyurl.com/mr3e4cx4](https://www.tinyurl.com/mr3e4cx4)

⁸ Driving Sustainability in Transportation and Delivery: Everything You Need to Know About Green Transportation, OptimoRoute, 2022. <https://optimoroute.com/green-transportation/>

⁹ Pakistan: Electric Vehicles and Batteries Market Assessment. USAID 2021. https://pdf.usaid.gov/pdf_docs/PA00XXDK.pdf

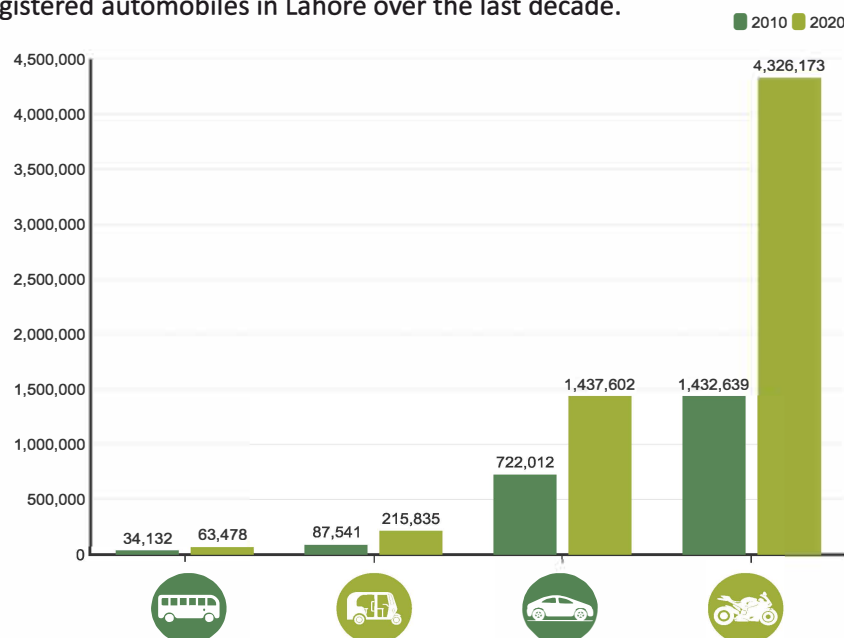
¹⁰ Muhammad Talal. Electric Vehicle you can buy in Pakistan. Samaa, 2023. <https://www.samaaenglish.tv/news/40014776>

Investment in sustainable transport is a business opportunity.

The private sector should consider investing in setting up sustainable projects such as EV plants and transport services. This can also be done in partnership with the public sector for which firms should remain on the lookout for PPP opportunities. The MoU between K-Electric and Shell¹¹ to set up charging stations is a prime example of PPP for EV facilitation. Setting up more of such initiatives and associated infrastructure is an opportunity to penetrate into an untapped market:

- I. **Set up EV charging stations:** Due to limited EV infrastructure there is a lot of range anxiety within consumers when considering making the switch to EV. Currently there are around a dozen fast charging stations in the country. There are plans to set up several more along motorways¹². Despite this limited infrastructure, a large market is open for EV batteries and related storage needs. This presents a viable business opportunity for private sector players to set up EV charging stations. Another opportunity is to set up battery swapping station similar to the successful model adopted by India¹³.
- II. **Set up EV manufacturing Plants:** EV global sales amounted to USD 6.6 billion in 2021. 10% of all global car sales were electric¹⁴. EV penetration remains low in Pakistan, with only about 2,000 fully electric cars and a few e-buses in Karachi and Punjab. This presents an opportunity for private firms to become pioneers in this emerging industry and become part of the EV global value chain.

Figure 3: Increase in registered automobiles in Lahore over the last decade.



Source: Climate and Environmental Crisis: A Ray of Hope Through Uptake of Electric Bikes¹⁵

Moreover, The National Electric Vehicle Policy provides several incentives such as sales tax cuts, no customs duty on import of plant and machinery, minimal customs duty on the import of EV parts, and no registration charges for electric vehicles¹⁶. It is worthwhile for more firms to consider setting up plants to manufacture motorcycles as the demand for this two-wheeler is much higher than all other forms of transportation. Plans to scale up to producing electric cars can be included in the inception phase but executed when the firm has the capacity to scale up operations.

¹¹ Shell Recharge – Shell's Offering for Electric Vehicle Charging. Shell. <https://www.shell.com.pk/motorists/shell-recharge.html>

¹² Jawwad Rizvi. 85 Locations identified for EV charging stations at motorways, 2022.

<https://www.thenews.com.pk/print/922257-85-locations-identified-for-ev-charging-stations-at-motorways>

¹³ Battery Swapping Policy. Government of India, 2022. https://www.niti.gov.in/sites/default/files/2022-04/20220420_Battery_Swapping_Policy_Draft.pdf

¹⁴ Global EV Outlook 2022. International Energy Agency, 2022.

<https://iea.blob.core.windows.net/assets/ad8fb04c-4f75-42fc-973a-6e54c8a4449a/GlobalElectricVehicleOutlook2022.pdf>

¹⁵ Maham Rasheed, Taram Nayab and Syed Hasan. Climate and Environmental Crisis: A Ray of Hope Through Uptake of Electric Bikes. Pakistan Dialogues 2022.

<https://mhrc.lums.edu.pk/climate-and-environmental-crisis-a-ray-of-hope-through-uptake-of-electric-bikes/>

¹⁶ National Electric Vehical Policy. Ministry of Climate Change. Government of Pakistan. 2019.

<https://policy.asiapacificenergy.org/sites/default/files/National%20Electric%20Vehicle%20Policy%20%282019%29.pdf>

Adopting green and sustainable practices helps build a reputation of an environmentally conscious business.

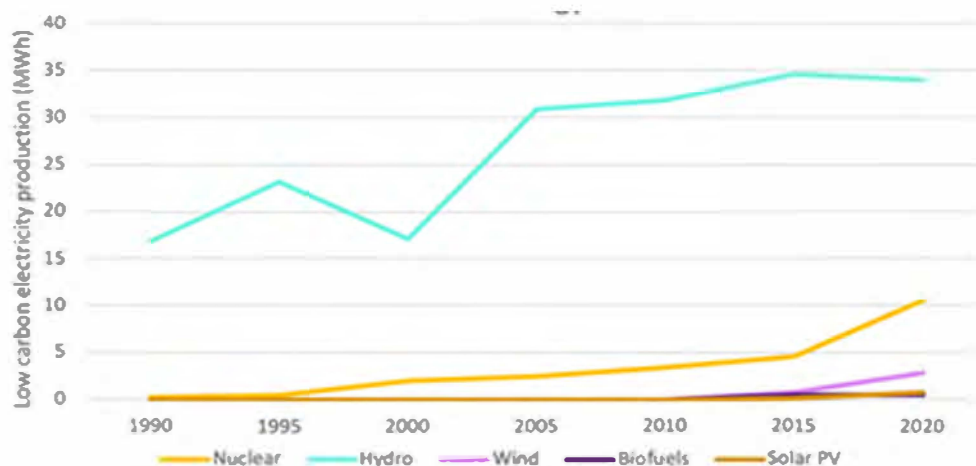
3. Adopt better in-house practices: The most immediate and financially viable step that firms can take is to adopt better inhouse practices. This can be done by:

- Providing transportation services for employees. This will act as a strong incentive for employees and reduce absenteeism, improve employee productivity, it will allow firms to hire diversified talent, as employees, especially women, who may not have access to safe and reliable transportation will be able to come into the office.
- Businesses should encourage employees to carpool.
- Regularly maintain vehicles to improve efficiency (properly inflate tyres, replace old worn-out tires timely, properly dispose of tyres)

Investing in smaller solar setups can save energy costs.

Switch to solar power: One way the industry can aid in improving air quality is through the use of renewable energy. Currently, Pakistan's grid is fueled by mostly fossil fuels (63%), partially hydroelectric power (25%) and less than 6% renewable energy. While Pakistan has a lot of potential in developing renewable energy, particularly solar, there has been limited progress. Overall, despite growth in installed capacity (GWh) by 260%, solar remains a small portion of the renewable energy mix (Figure 4)¹⁷.

Figure 4: Low-carbon energy sources



Source: International Energy Agency¹⁸

For Pakistan's industry the first step to going green is using clean energy to power their operations, for which solar is a feasible option. There are several reasons why a business would choose to do that:

- A. Firstly, cost – as technology improves, solar is becoming more and more affordable.
- B. Secondly, with the government's commitment to climate change visible through its “Alternative Renewable Energy (ARE) Policy 2019”, “National Electricity Policy 2021” and its international commitments, there are a likelihood of incentives that will help the industry reduce its energy cost if it goes green.

However, under the current macroeconomic situation, there are challenges in procuring imports and in the actual implementation of government incentives and policies. Hence, firms can choose the route that is most viable for them.

1. One option is to install **solar energy on rooftops and excess land** and not only power the company's own premises but also use net metering and give back to the grid. This can substantially reduce the electricity bill as the producer is paid back for the excess electricity produced. Setting up solar PV at a smaller scale like on rooftops has reduced in cost 10 times in the last decade, as competition has increased¹⁹. However, power is produced for only a few hours of the day, hence there is still a need to rely on other sources of power or install storage batteries which are expensive.

¹⁷ Allegra Saggese. How reforming energy systems can tackle climate risks: Evidence from Pakistan, 2023.

<https://www.theigc.org/blogs/how-reforming-energy-systems-can-tackle-climate-risks-evidence-pakistan>

¹⁸ Pakistan. International Energy Agency, 2021. [IEA \(2021\)](https://www.theigc.org/sites/default/files/2014/04/Ozturk-2014-Working-Paper.pdf)

¹⁹ Ilhan Ozturk. Working Paper - Energy Dependency and Security: The Role of Efficiency and Renewable Energy Sources. International Growth Centre, 2014. <https://www.theigc.org/sites/default/files/2014/04/Ozturk-2014-Working-Paper.pdf>

2. The second option and the more challenging one is to **establish a utility scale solar PV setup** which also allows selling to other entities. This brings its own obstacles, which includes whether transmission lines can carry the load produced from such setups. Generally, our grids are unable to absorb over 10 percent share of solar (although it varies from grid to grid). However, if a small plant is set up next to a feeder and produces 1-2MV, the grid will be able to absorb that. More importantly due to the current long term thermal contracts that the government has entered with IPPs, DISCOs are reluctant to buy power from solar plants, while NEPRA is reluctant to provide too many licenses. Hence a more optimal option is to keep solar plants at a small scale where investment is feasible and the return can be actualized²⁰ with a payback of fewer than four years, while protecting against inflation and tariff escalation²¹.
3. Another possibility that can be considered is **installing Concentrating Solar Power (CSP) plants** as an alternative to photovoltaic technology due to their high-capacity factor. By complementing it with low-cost thermal energy storage, CSP can provide renewable power at most times of the day. This solves the challenge of generating electricity even when the sun is not shining²².
4. For smaller enterprises, **community solar setups are an innovative route**. Small enterprises can buy or rent from a larger plant which for example is setup near an industrial zone. Due to economies of scale, the cost per KW is lower (can be 15-20 percent lower). In return for their purchased equity, the industry could get almost free electricity (besides maintenance and distribution costs)²³.

Industries with agriculture linkages can take advantage of biomass or biogas as an energy source.

Invest In biogas/biomass: Another green alternative to solar is using biomass or biogas which may not be able to provide power throughout the year but can be used in a hybrid model, paired with other sources when unavailable. One such example are Bagasse plants that have been successfully powering sugar mills in Pakistan. Similarly, other agriculture residue can be explored to see if it can be used to generate power.

For the meat industry, biogas is an option. Cattle colonies large enough to produce substantial manure can be used as a source to power biogas plants which can provide enough power to meet the industry's own needs. However, in the absence of a formal policy for biomass/biogas, it becomes difficult to determine energy prices and obtain permits²⁴. In such cases leveraging PPPs can prove to be beneficial for both the public and private sector in negotiating and overcoming these challenges. Moreover, there is a need for more research and development to improve conversion technology.

Industrial Emissions

Reducing industrial emissions allows efficiency gains as well as potential entry into the global value chain.

Industrial emissions contribute substantially to the air pollution in Pakistan. A number of initiatives can be taken by private sector players to reduce these emissions and better manage industrial waste:

- Firms that opt to burn their waste in order to produce energy for their other operations, should do so with caution, as burning heavy metals and dioxins can release poisonous gases on combustion. Additionally, all ash resulting from combustion must be properly disposed of²⁵.
- Several industries, including brick kilns, steel re-rolling, steel recycling, and plastic molding, also contribute substantially to urban air pollution through use of outdated machinery and poor quality or waste fuels. Firms should invest in new, green technologies²⁶ along with choosing better quality fuel with a lower sulfur content to power their generators and machinery. This increases the efficiency of processes, prolongs the life of physical assets, and improves productivity of business assets²⁷.

²⁰ Ali Khizar. Solar Power – Trend with care. Business Recorder, 2022. <https://www.brecorder.com/news/40195669>

²¹ Ahmer Syed. The Power of Community Solar. DAWN, 2023. <https://www.dawn.com/news/1737911/the-power-of-community-solar>

²² Farrukh Mian. How Pakistan should meet clean energy challenges. DAWN, 2019. <https://www.dawn.com/news/1460321>

²³ Ahmer Syed. The Power of Community Solar. DAWN, 2023. <https://www.dawn.com/news/1737911/the-power-of-community-solar>

²⁴ Wajahat Tareen, et al. Present Status and Potential of Biomass Energy in Pakistan Based on Existing and Future Renewable Resources. Sustainability, 2019. [10.3390/su12010249](https://doi.org/10.3390/su12010249).

²⁵ Solid Waste Management Sector in Pakistan: A Reform Road Map for Policy Makers. Asian Development Bank, 2022. <https://dx.doi.org/10.22617/TCS220086-2>

²⁶ Ning Ma, et al. Can Green Technological Innovation Reduce Hazardous Air Pollutants? —An Empirical Test Based on 283 Cities in China. National Library of Medicine, 2022. <https://doi.org/10.3390%2Fijerph19031611>

²⁷ Air Pollution and its Impact on Business: The Silent Pandemic. Clean Air Fund, 2021.

https://www.cleanairfund.org/wp-content/uploads/01042021_Business-Cost-of-Air-Pollution_Long-Form-Report.pdf

- Adherence to global emission standard will also increase the export competitiveness of products as well as allow entry into global value chains particularly those looking to make their value chains green²⁸.

Research and Development

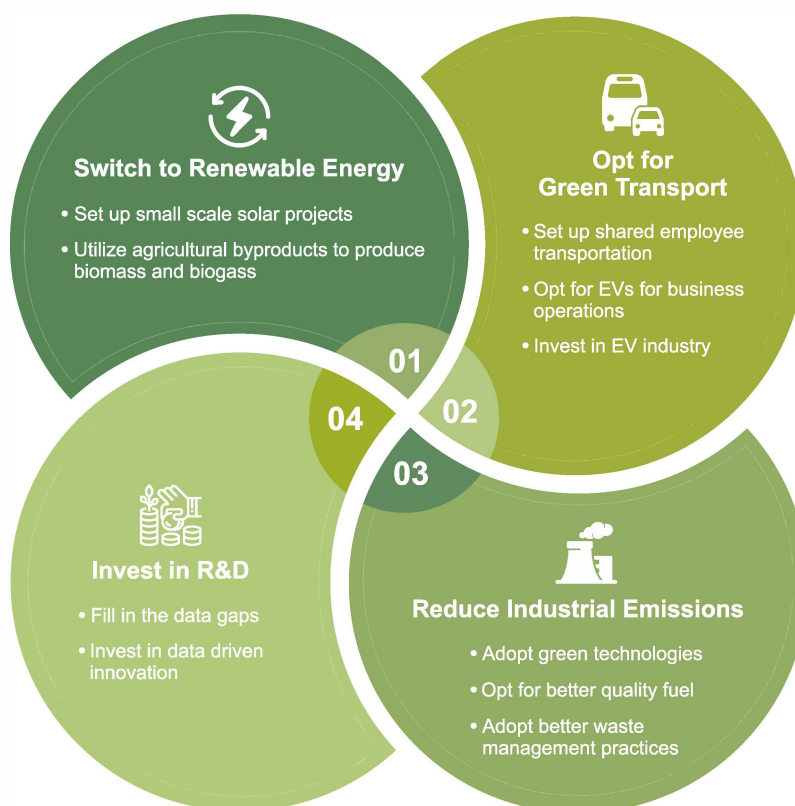
Businesses can be forward looking and invest in green technology and clean energy early to make meaningful gains.

Global trends indicate that green technology and clean energy is the way forward.

- This means thinking long term and investing in R&D as well as collaborating across sectors to explore this market and develop innovative solutions to the air quality crisis. One example is IKEA which used rice straw, otherwise burnt, as a raw material for its new furniture line. Hence, a byproduct was re-purposed and turned into a profitable venture²⁹. Another example is of Exxon Mobil which is collaborating with think tanks and IT universities in India to come up with innovative low emission technology solutions³⁰.
- R&D should also encompass data. The private sector can partner with the government to help fill the data gap by not only designing low-cost sensor technologies to measure air quality data but to also help analyze it. Firms can start by monitoring their own emissions and sharing this data to help the government use it in combating the air pollution crisis.

Key Takeaways

What can the private sector do?



²⁸ The Punjab Clean Air Action Plan. Environmental Protection Department. Government of Punjab. https://epd.punjab.gov.pk/system/files/Annex%20D2%20Punjab%20Clean%20Air%20Action%20Plan_0.pdf

²⁹ Aparna Roy, Tanushree Chandra and Aditi Ratho, "Finding Solutions to Air Pollution in India: The Role of Policy, Finance, and Communities," *ORF Special Report No. 120*, Observer Research Foundation 2021. <https://www.orfonline.org/research/finding-solutions-to-air-pollution-in-india-the-role-of-policy-finance-and-communities-74311/>

³⁰ India's Private Sector Joins the Battle Against Air Pollution. BBC. <https://www.bbc.com/storyworks/future/powering-innovation-india/can-indias-private-sector-fight-an-environmental-crisis>



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