[Syed Akhtar Ali](https://www.thenews.com.pk/writer/syed-akhtar-ali)

December 11, 2020

**The smog season**

Smog is back, in parts of Sindh and almost all of Punjab. Smog causes ENT sicknesses, can worsen existing heart and lung problems and causes eye irritation. It also leads to traffic difficulties.

There are three causes of smog: traffic, industries and agro-waste and municipal waste burning. Of agro-waste, rice stubble burning is a major issue which we will discuss later in detail. On the traffic issue, the government has taken a major step of converting to EURO-V petrol and diesel. EURO-V is a low sulfur fuel. However, sulfur-based Sox is only part of the problem. Smog is caused by NOx which requires Catalytic Converters (CC) fitted in vehicle engines to absorb or neutralize it.

Policies may be introduced to encourage installation and maintenance of catalytic converters. Reportedly, our car-technicians remove CCs when some faults start appearing in engine performance. Replacement of converters is expensive and thus even newer models start running without NOx controls. In most parts of Europe, Japan and North America, there are stringent taxes and fines to control NOx exhaust of automotive vehicles. The same may not work here but supply side measures may be able to reduce NOX levels.

There are other measures like ethanol-added fuels which reduce NOx level and other pollutants that cause smog. E-5 and E-10 petrol (containing 5-10 percent ethanol) is used widely in both developing and developed countries. We produce and export ethanol. Using ethanol may reduce exports but may reduce imports by the same amount or even more. Steps were taken some two decades back in this respect but failed due to mere insensitivity. All kinds of objections were raised to undo the initiative. The same mindset opposed the introduction of EURO-V petrol and diesel. Fortunately, the present government stuck to its policy. Today, cleaner low sulfur fuel is available at the same price and high RON petrol is even cheaper than earlier days.

Brick kilns and other SMEs emit a lot of smog-causing pollutants. A limited success has been achieved in introducing low-pollution zig-zag technology in brick kilns. Poverty and unemployment issues do not let governments take harsh steps against SMEs except for ordering closure in specific seasons. Consumers can discourage such products and factories. Product labeling and international environmental NGOs may help create market incentives for industries to take at least some partial measures. Some highly polluting processes and industries can be banned outright. Such industries abound around Lahore and other industrial towns of Punjab.

Indian Punjab alone produces 20 million tons of rice stubble, most of which is burnt in a month in October. A recent study in Pakistan estimates stubble burning at some two million tons, which appears to be an underestimation for a six-million-ton annual production of rice. In the autumn when rice is harvested on both sides of the border, the stubble has to be cleared within fifteen days or a month, in order to be able to sow a new crop. Both volume and time enhance the intensity of the problem. In the circumstance, the cheapest and fastest way is to burn the stubble.

Rice stubble is a liability and its burning is inconvenient and wasteful. There are a number of options to deal with it; biomass briquettes are one option. Densification reduces volume reducing transportation costs and increases volumetric calorific value. It also slows down burning; raw biomass burns too fast making it uncontrollable and wasteful. Also, storage becomes easier reducing volume requirements and increasing stack-ability.

A relatively new development is efficient gasifier stoves which enable burning of the biomass without causing smoke. This would enable even urban dwellers to use biomass stoves to cook food and heat their houses. Traditionally, biomass has been used in rural areas only. In the next two to three years, as gas shortage is being forecast, biomass gasifier stoves can provide some solace for urban areas. The government may consider providing subsidies in this respect, at least as much as it is subsidizing domestic gas tariffs. Low interest rates and credit availability can expand their usage.

Ethanol production from rice stubble is yet another option. Traditionally, first-generation technology utilized food grains. However, producing ethanol from Cellulosic materials like rice straw is a relatively new phenomenon. Rice straw can now be converted into biogas and bio liquid fuels. In Italy, Romania, US and Brazil, rice straw is utilized in producing bio-ethanol. Ethanol is mixed with gasoline without affecting engine performance or requiring modification. It is time to examine the feasibility of a similar bio-refinery in Pakistan. However, varying and low oil prices have put all such proposals into question. Bio-char (a fertilizer) can also be produced from rice straw and other agricultural waste.

Only, 20 percent of the population in Pakistan has access to piped gas. In other areas, charcoal, LPG and kerosene are used which are much more expensive. Pakistan is an agricultural country producing a lot of biomass and bio-waste including rice stubble; the latter being one of the major sources of smog. Punjab does not have any gas resource at all; it can have biogas.

Gas and bio-CNG is another option and attractive enough in the context of falling local gas production. Agri-biomass including rice straw is often mixed with sewage to produce biogas. This partly solves the sewerage issue as well. Unfortunately, not much development has taken place in Pakistan with respect to biogas, although an initiative had been launched as early as the 1980s. Many countries including India and China have installed millions of biogas units while in Pakistan it may not have exceeded 10,000 units or even less.

The European Union has targets of having 20 percent of the pipeline grid to be supplied out of biogas. In Germany, the Netherlands and Denmark, large-scale installations have been installed. India and China have started activities in this respect as well. India plans to install 5000 bio-CNG plants in the near future. Already, there are scores of such plants selling CNG at competitive rates. It is no more a negligible activity. It may today cost more than $25 million to install a clean biogas facility producing more gas than a typical gas field does in Pakistan. Rice stubble can be burnt in such facilities which can finance stubble collection which farmers find unaffordable. Biogas (and even biofuel) facilities can internalize and integrate stubble collections.

An initiative in this respect is highly recommended; gas companies may be encouraged to act in this respect. After all, expensive LNG-Air-Mix plants have been installed by these companies at the exorbitant production cost of Rs4000 per MMBtu. Fortunately, the current government has done away with this scheme except the approved or under-implementation projects. Around 1000 community-based biogas plants and 100 bio-CNG may be targeted as a replacement of LPG-Air Mix Plants. Biogas would certainly be cheaper – in fact, competitive.

The writer is a former member of the Energy Planning Commission and author of ‘Pakistan’s Energy Issues: Success and Challenges’.

Email: akhtarali1949@gmail. com