



ANALYSING INDUSTRIAL FUEL POLICY IN DELHI AND NCR STATES





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1. INTRODUCTION AND BACKGROUND

Even though the fight against air pollution in Delhi NCR has been on since the 1990s, air pollution in this region is still a major concern. Some of the world's most polluted cities in the world can be found in this region. There are several key sources of pollution that are responsible for this situation—stubble burning, vehicular emissions, waste burning, etc. Due to large-scale industrialization, industrial emissions have also become one of the key contributors to the menace of air pollution in the region.

A study conducted by the Centre for Science and Environment (CSE) on air pollution from major industrial clusters in Delhi NCR found that a majority of industries have not switched to cleaner fuel. While some industrial areas still do not have gas pipelines and many regions still face the issue of power cuts, most areas have gas pipelines and almost all the areas have electricity available in their regions. One major reason observed for the reluctance to switch to cleaner fuels was the lack of an integrated and robust industrial fuel policy in the NCR states which brings together all relevant stakeholders on one platform and ensures rapid and sufficient delivery of cleaner fuel to all industrial areas. This made it essential to look deeper into the existing industrial fuel policies in these states to understand in detail the roadblocks to having a clean fuel policy that strictly implements the use of cleaner fuel in all the industries in these areas.

The two major cleaner fuels currently available as options are **natural gas** and **electricity**. Their adoption by the industries is increasing gradually but not at the pace it should be to curb air pollution in the region. The current status and trend of both these cleaner fuels have been discussed below briefly.

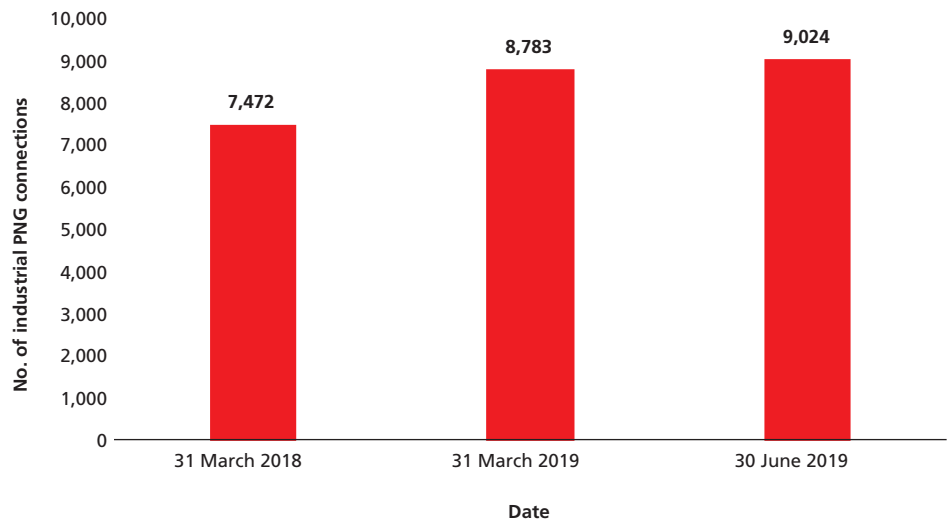
NATURAL GAS

The number of industrial piped natural gas (PNG) connections in India was 7,472 as of 31 March 2018. The number went up to 9,024 connections by 30 June 2019 (see *Figure 1: Gradual but slow increase in number of industrial PNG connections in India*). Although the connections have gone up, they are still very less compared to the total number of industries in the country and the share of them still using coal. Even the share of natural gas in the overall energy mix has decreased from 10 per cent in 2010 to around 6.5 per cent in 2018.

China's gas consumption went up by an astonishing 18 per cent¹ in the last year largely due to the environmental policies establishing emission reduction targets to improve air quality and requiring industries to switch from coal to gas. Recent developments, like the opening of "Power of Serbia" pipeline to China from Russia and the creation of a state owned holding company to own and manage the country's oil and gas transmission and distribution infrastructure, have supposedly furthered the growth of natural gas consumption in the country. This state owned company aims to increase sources of gas supply, develop a broader gas market and encourage private investment which could also bring down the delivered cost of natural gas and make it even more competitive with coal and oil.² China's industrial gas consumption grew from 43 billion

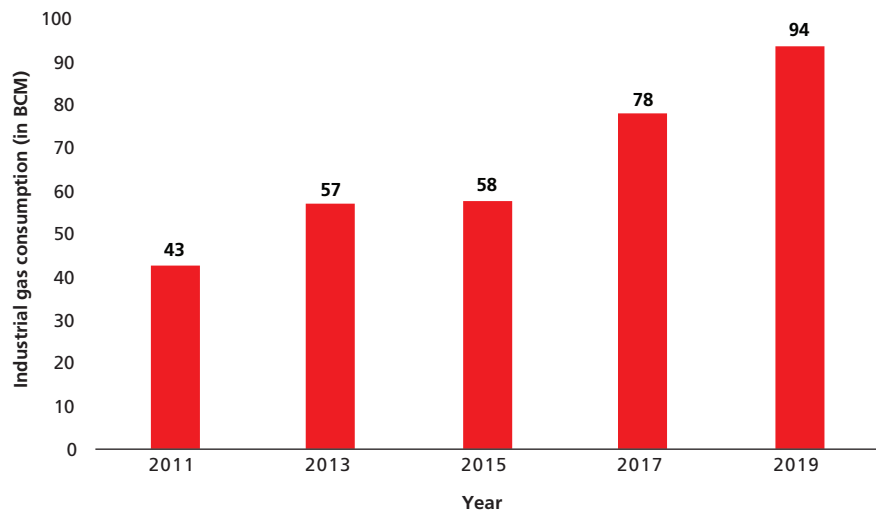
cubic meters (BCM) in 2011 to 94 BCM in 2019 (almost doubled itself) whereas India’s industrial gas consumption just went up from 22.4 BCM in 2012–13 to 27.6 BCM in 2018–19 (see *Figure 2: Growth of industrial gas consumption in China* and *Figure 3: Growth of industrial gas consumption in India*). This raises a question about what is lacking in the fuel policies and the ground level-conditions of India, especially in the region of Delhi NCR where polluting fuels like coal are still so rampantly being used and the share of industries using natural gas is so low (see *Table 1: Share of industries using coal vs cleaner fuel in Delhi NCR*).

Figure 1: Gradual but slow increase in number of industrial PNG connections in India

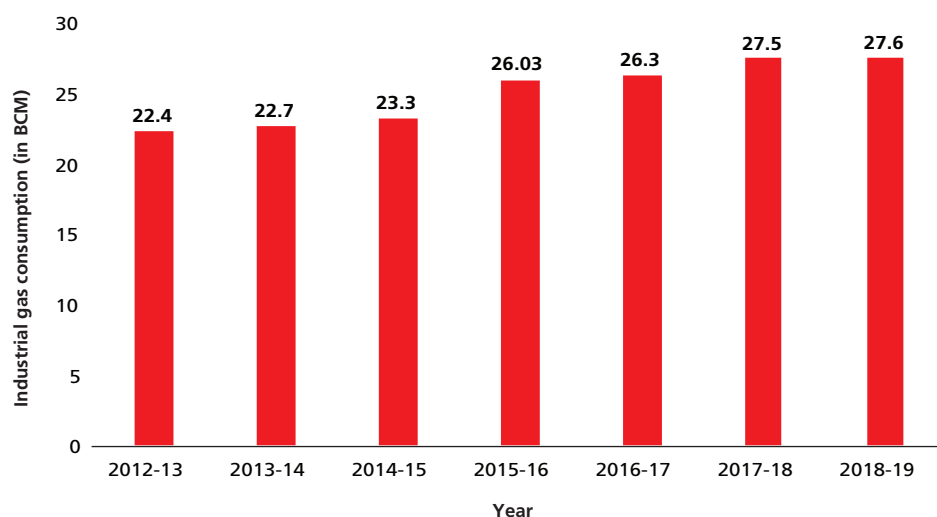


Source: PNGRB Annual Report, 2018–2019

Figure 2: Growth of industrial gas consumption in China



Source: International Energy Agency³

Figure 3: Growth of industrial gas consumption in India

Source: Indian Petroleum and Natural Gas Statistics, 2018–19⁴

Table 1: Share of industries using coal vs cleaner fuel in Delhi NCR

Region/District	Total no. of air polluting industries	Percentage of industries using coal	Percentage of industries using cleaner fuel (gas or electricity)
Bhiwadi	328	24%	17%
Alwar	156	37%	13%
Jaipur	1,261	23%	4%
Ghaziabad	146	86%	1.3%
Gurugram	125	19%	9%
Faridabad	948	17.5%	8.5%
Panipat	231	56.2%	1.7%
Sonipat	390	23%	14%

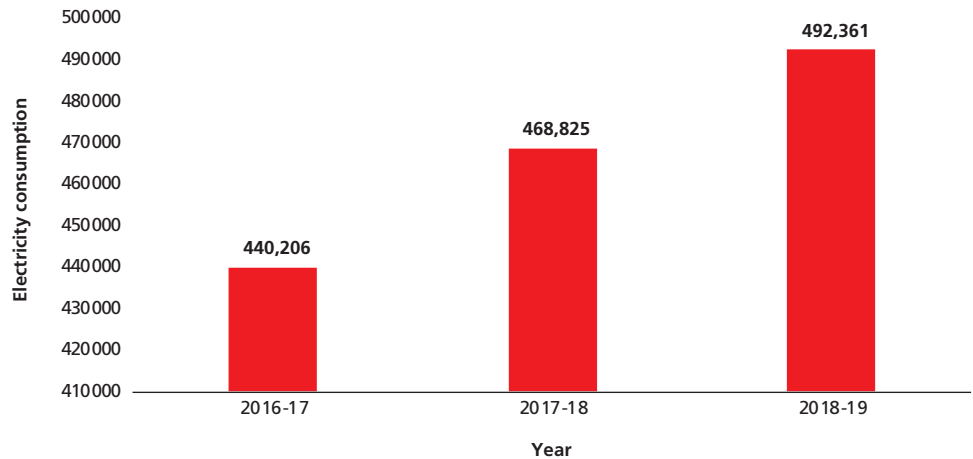
Source: CSE report on “Assessment of industrial air pollution in Delhi NCR”, 2020

ELECTRICITY

The amount of power consumed by the industrial sector in India has also grown over the years, from 110,844 GWh in 1991–92 to 492,361 GWh in 2018–19. The overall share of electricity consumption by the industrial sector was around 74 per cent in the 1960s but it has gone down in recent years to 41 per cent. Electricity consumption in the industrial sector grew most rapidly (at a rate of 11.57 per cent) between 1960 to 1970. After that, the rate of growth drastically fell down to 4.43 per cent between 1990 to 2000, followed by a high rate of growth of around 10.36 per cent between 2000 to 2010, which was again followed by a sudden drop to 4.7 per cent between 2000 to 2017. The rate of growth from 2000 to 2017 clearly shows that more needs to be done to shift a larger number of industries towards using electricity as their major source of fuel. Although there is a gradual increase in electricity consumption by the industrial sector in India (see *Figure 4: Electricity consumption (in GWh) of the industrial sector in India*), there is no surety about whether the industries consuming electricity are actually using it as a fuel for their production processes or just for basic power

requirements. One of the major reasons cited for low usage of electricity as a major fuel in industries is the non-continuous supply of electricity to industrial areas and high price of electricity compared to other contemporary polluting fuels.

Figure 4: Electricity consumption (in GWh) of the industrial sector in India^{5,6}



Source: SAARC Energy Centre & Central Electricity Authority, 2018–2019

The Air (Prevention and Control of Pollution) Act was passed by the parliament in 1981 and amended in 1987. Under point no. 19 of ‘Power to declare air pollution control areas’, this Act mentions that:

If the State Government, after consultation with the State Board, is of opinion that the use of any fuel, other than an approved fuel, in any air pollution control area or part thereof, may cause or is likely to cause air pollution, it may, by notification in the Official Gazette, prohibit the use of such fuel in such area or part thereof with effect from such date (being not less than three months from the date of publication of the notification) as may be specified in the notification.

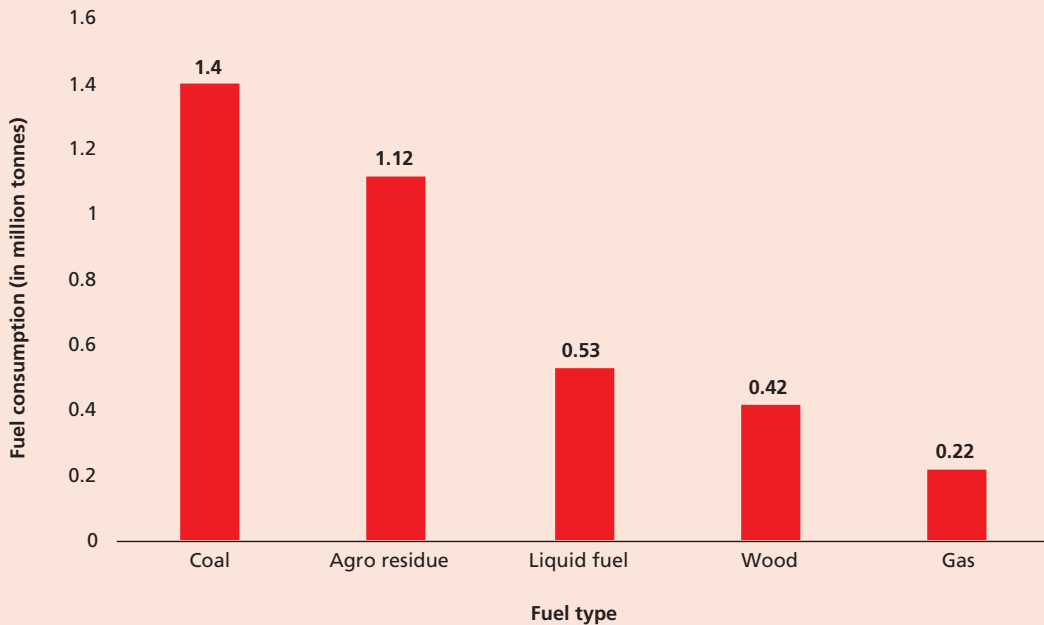
The above lines clearly show that state government has the power to put out a list of approved fuels and also to prohibit the use of any fuel which may cause air pollution by a notification in the official gazette on the advice of the State Pollution Control Board (SPCB).

Majority of the NCR states have released a list of approved fuels but some questions that come up are: Are all the fuels in the approved lists non-polluting? If they are polluting, why have they not been prohibited? Why are the industries not switching to cleaner fuels at a higher rate like they are in China? These and many such questions ought to be answered in this paper.

Coal is still the king of fuels in Delhi NCR

The recent study conducted by CSE on industrial hotspots in the districts of Alwar, Bhiwadi, Sonipat, Panipat, Faridabad, Gurugram, and Ghaziabad in Delhi NCR clearly showed that coal is still the most consumed fuel (quantity-wise) in these districts altogether. Around 1.41 million tonnes of coal is still being consumed annually by the industries in these seven districts compared to 0.22 tonnes of natural gas yearly. The second most consumed fuel in these districts altogether is agro residue with a consumption figure of around 1.12 million tonnes annually. The study clearly highlighted the low usage of natural gas in the seven districts.

Graph: Total annual fuel consumption by industries in seven districts of Delhi NCR



Source: CSE report on "Assessment of industrial air pollution in Delhi NCR", 2020

2. INDUSTRIAL FUEL POLICY IN DELHI NCT

2.1 BACKGROUND

No areas of Delhi NCT were included in the CSE study on industrial air pollution. But, it is still essential to understand the story of industrial fuel policy being followed in Delhi as it is because of the overall air pollution concerns in the national capital that the whole of NCR is under the radar of air pollution abatement strategies.

In 1993, compressed natural gas (CNG) had become available in Delhi at three filling stations for industrial and domestic users. In 1995, a lawyer filed a case in the Supreme Court with respect to the health risks caused by air pollution emitted from on-road vehicles. In 1996, CSE also released a report on urban air pollution which found that vehicles were responsible for almost 64 per cent of the emissions and concluded that it would press for cleaner fuels and rapid introduction of EUR II standards. In *M.C. Mehta vs Union of India* case, the Supreme Court gave a directive in 1998 that all buses, three wheelers and taxis had to switch to CNG by 01 April 2001. It also directed that 70 CNG refuelling stations be made available along with financial incentives for the vehicles to convert. In 1999, the Supreme Court ordered the government to impose the EUR II standards for gasoline engines by the year 2000 for all new car sales.

The deadline for April 2001 was not met by the government and, therefore, in April 2002, the Supreme Court gave a remarkable directive which imposed a financial penalty on the government for wasting the court's time and additionally added a daily penalty of Rs 1,000 for each diesel bus which was on the road. Consequently, by 01 December 2002, the last diesel bus had disappeared from the roads of Delhi.⁷

With time, the population, number of vehicles, industries, etc. increased manifold and the air quality of the city was again deteriorating rapidly. Over the years, Delhi and its surrounding cities again topped the list of polluted cities in the world. The situation again demanded for a clean fuel drive in the region and this time for the industries.

Once the pressure was built by regulatory bodies like EPCA in the last few years, almost all the registered industries in NCT had to switch to cleaner fuel. According to Delhi Pollution Control Committee (DPCC), there are around 50 industrial areas with around 1,555 small and large registered fuel consuming industries in the NCT, out of which around 1,200 have already shifted to PNG and the rest either do not have the connections (even though the gas lines are there) or the gas lines have not reached them. According to the DPCC, lines have reached 47 industrial areas out of 50 in NCT. Only Karawal Nagar, Anand Parbat, and Jawahar Nagar industrial areas are still to be connected to the gas infrastructure. IGL recently reported that the main gas pipeline has already been laid down in the Anand Parbat Industrial Area and now they are in talks with the industries there to switch to gas.

No specific state government policy for industrial fuels could be found in place except the list of approved fuels. This list of approved fuels notified by DPCC in 2018 acted as a major game changer by removing coal and other major polluting fuels from the list and thus pushing the industries to switch to cleaner fuel. The list has been presented and discussed in the next section.

2.2 APPROVED FUELS

The DPCC issued a list of approved fuels on 16 December 2017 in various newspapers, inviting suggestions/objections within 60 days from the date of issue of the said public notice. The suggestions submitted were considered by the committee constituted by DPCC vide office order dated 15 February 2018. Finally on 29 June 2018, the chairman of DPCC with the approval of the Hon'ble Lt. Governor of NCT of Delhi approved the list of approved fuels (see *Table 2: List of approved fuels for Delhi NCT*).

Table 2: List of approved fuels for Delhi NCT

Sr. no.	List of approved fuels
1.	Petrol (BS VI with 10 ppm sulphur) as per the notification of Government of India as amended from time to time
2.	Diesel (BS VI with 10 ppm sulphur) as per the notification of Government of India as amended from time to time
3.	Liquid petroleum gas (LPG)
4.	Natural gas/CNG
5.	Aviation turbine fuel
6.	a) Firewood for crematoriums and for other religious purposes b) Wood charcoal for tandoors and grills of hotels/restaurants/banquet halls/eating houses having emission channelization/control system c) Wood charcoal for use in ironing clothes
7.	Biogas
8.	Refuse derived fuel (only for waste–energy plants)
9.	Any other clean fuel notified by the govt of NCT of Delhi/Govt of India subsequent to this notification

Note:

- Besides the fuels mentioned above, coal with low sulphur content (less than 0.4%) permitted for use in thermal power plants only.
- All other fuels will be deemed “unapproved” and so disallowed for use in NCT of Delhi.
- Existing industries/units shall convert/switch over to the above mentioned approved fuels within 90 days from the date of issue of this notification.⁸

Source: DPCC, 2018

The list of approved fuels for NCT shows that the choice of fuels has been made very carefully and popular fuels like coal and agriculture based waste are not under the approved category (unlike in the neighbouring states). The decision of permitting low sulphur coal to be used in power plants shows that while the government acknowledges that India has become the largest contributor of SO_x in the world, it also recognizes the current dependency of our country and the region on coal based thermal power plants (TPPs) which are deemed essential to meet power demands.

2.3 INITIATIVES TO MOVE TOWARDS CLEANER FUEL

The switching of industries to cleaner fuel has been a major change and achievement in the recent years. Some of the significant initiatives taken in the region to propagate cleaner fuel amongst industries are:

- **Banning coal:** The first and foremost initiative is that coal has been removed from the list of approved fuels. The only exception made is for low sulphur coal in power plants.
- **Providing gas supply infrastructure:** Gas has been made available in 47 out of 50 industrial areas of NCT through IGL, thus facilitating the drive to make industries switch to cleaner fuel.
- **Enforcing the use of a cleaner intermediary fuel:** The DPCC claims to have ensured that industries which have not or have been unable to switch to PNG use a cleaner intermediary fuel like LPG until they make the switch.
- **Incentives/subsidies to switch to cleaner fuel:** The DPCC also came up with some subsidies to switch to cleaner fuel. The major subsidy declared by DPCC was a one-time incentive for industries that switched to natural gas. Industries which consume less than 500 SCM/day of gas would be given a one-time subsidy of fifty thousand and industries using more than 500 SCM/day would be given a one-time subsidy of one lakh rupees. Along with this subsidy, the DPCC also declared a subsidy on electrical tandoors for restaurants and hotels.

2.4 ISSUES AND ROADBLOCKS

Some of the major roadblocks in having a clear industrial fuel policy and industries not being able to shift to cleaner fuel entirely are:

- **Unaccounted number of fuel using illegal industries:** Although the registered industries have switched to cleaner fuel, there are a large number of illegal fuel using industries and areas in NCT. Some of the non-confirmed areas where industrial activity is taking place are Shiv Vihar, Mustafabad, etc. A number of illegal industries have also been detected in official industrial areas like Anand Parbat, Naraina, Okhla, New Mandoli Industrial Area, Wazirpur, and others. There are no records of these mostly small scale industries which are often located in areas where land use is largely residential or agricultural, thus making them tough to locate and monitor. DPCC says that the municipality and the electricity department should take action against these setups which are running on non-industrial land.
- **Industries on Delhi's borders, operating from neighbouring states but polluting Delhi:** There are a number of legal and illegal industries which lie in very close vicinity of the borders of Delhi and are operating from neighbouring states but their emissions are polluting the air inside NCT.
- **Illegal supply of coal and other polluting fuels in the NCT:** Although coal has been banned in the Delhi NCT region, a few cases of illegal usage of coal in industries have come up from time to time in different areas of Delhi. The presence of illegal industries is another catalyst which promotes this illegal supply of coal for industries in Delhi NCT. It is one of the major reasons

due to which many industries still refrain from using gas as a fuel. This supply of imported coal is coming to Delhi majorly from different ports of Gujarat like the Kandla port. With respect to Indian coal, Mughalsarai and Varanasi are two of the major secondary market hubs in North India where coal black marketing also takes place and these markets could be the possible sources of illegal coal procurement being done in Delhi. The DPCC says that the use of coal and other polluting fuels is almost nil in Delhi and that if anybody burns coal it is easily recognizable due to the smoke and is reported promptly. A big question that comes up is about the steps being taken by the DPCC to control any illegal supply of coal in the region through roads or rail.

- **The high price of gas compared to coal and other fuels:** Although Delhi has reduced its VAT to just five per cent, gas is still not cheaper than other polluting fuels. Even though a majority of industries have shifted to cleaner fuel, the fuel price issue still resonates amongst the industries. This high price also gives way to black marketing of coal and other cheaper polluting fuels. The major reason is the non-inclusion of gas under GST (leading to VAT applicability of two states) and a lack of other efforts which need to be made to make cleaner fuel cheaper.
- **Lack of a comprehensive industrial fuel policy:** Unfortunately, the industrial fuel policy is restricted to a list of approved fuels in the region. An overall comprehensive industrial fuel policy needs to be developed which shall address significant matters related to implementation of cleaner fuel for industries and would bring together multiple stakeholders like the government, industrial development authorities (which are responsible for facilitating the infrastructure), PNGRB, concerned gas distribution companies, industrial associations, and the DPCC.

3. INDUSTRIAL FUEL POLICY IN RAJASTHAN

3.1 BACKGROUND

Industrial development has been happening in Rajasthan since the 1950s. Currently, the state has 347 RIICO industrial areas spread across 48,399 acres of developed industrial land with more than 40,000 units in production. It is the largest producer of metals like zinc, lead, and silver and second largest producer of copper in the country. It is also the second largest producer of milk, oil seeds, crude oil, and many other products.⁹

Having one of the biggest industrial infrastructures in the country, the government of Rajasthan also came up with an industrial development policy. In the industrial development policy of the state for 2019, under the section of environment protection and sustainable industrial development, issues like waste management, water/energy conservation, and rain water harvesting are mentioned but air pollution or a clear fuel policy for industries finds no mention in the document.⁹

Looking for some kind of fuel policy for industries, one comes across a few official orders on fuel by the Rajasthan State Pollution Control Board (RSPCB). The main one is the list of approved fuels which has been discussed in the next section. Apart from these orders, no specific industrial fuel policy was found on the RSPCB website.

3.2 APPROVED FUELS

Exercising the powers under the Air Act 1981, and on the recommendation of a committee constituted for the same, RSPCB declared the 'approved fuels' in the territorial jurisdiction of the state of Rajasthan by releasing a list on 22 January 2019 (see *Table 3: List of approved fuels for Rajasthan*).¹⁰

In an order by RSPCB, dated 27 December 2017, the regional officers of RSPCB were directed to ensure that pet coke and furnace oil are not used by any industry. They were told to take strict action against any industry found violating the order. Later, according to an order by RSPCB, dated 22 January 2018, based on the notification issued by the MoEF&CC on 19 January 2018, lime kiln industries and cement plants were permitted to use pet coke as a fuel in accordance with certain provisions like—the unit must not store more pet coke than it requires for three months, pet coke must be procured from registered producers and dealers, no trading of pet coke shall be done by the unit, and the pet coke purchased and consumed by the unit every month should be reported to the RSPCB. Pet coke and furnace oil were not included in the list of approved fuels which was released in 2019 but polluting fuels like coal/coke/lignite and kerosene were.

Table 3: List of approved fuels for Rajasthan

Sr. no.	List of approved fuels
1.	Petrol (MS) including branded MS (as per the notification of Govt of India as amended from time to time)
2.	Diesel (HSD) including branded HSD (as per the notification of Govt of India as amended from time to time)
3.	Kerosene (SKO) (as per the notification of Govt of India as amended from time to time)
4.	LPG/propane/butane
5.	Natural gas/CNG/PNG/LNG
6.	Aviation turbine fuel
7.	Firewood/wood charcoal
8.	All types of biofuel/biogas
9.	Refuse derived fuel (from waste to energy plants)
10.	Coal/coke/lignite
11.	Biomass/agriculture refuse and/or briquettes made from biomass/agriculture refuse
12.	Dung cake
13.	Waste suitable for co-processing in cement kilns approved by CPCB
14.	LDO/LSHS/naphtha
15.	Hydrogen/methane

Source: RSPCB, 2019.

3.3 INITIATIVES TO MOVE TOWARDS CLEANER FUEL

There are a few initiatives taken by the state government of Rajasthan and the RSPCB towards cleaner fuel for industries:

- RSPCB's direction to industries to switch to PNG in Bhiwadi:** The RSPCB put out a notice on 02 March 2019 directing all industrial units in Bhiwadi to shift to piped natural gas by 31 March 2019. Although the industries resisted due to non-availability of gas supply infrastructure in all areas, high price of natural gas, and high capital investment in boilers, a large number of industries in Bhiwadi did end up switching to natural gas.
- Making PNG available in selected districts:** As per the gas infrastructure map by PNGRB, three districts/regions of Alwar, Kota, and Bharatpur in Rajasthan have existing gas infrastructure covered under the eighth round of laying down of gas pipelines. Although, in districts like Alwar not all industrial areas have been covered. Eleven districts (Jaipur, Bundi, Bhilwara, Dholpur, Chittaurgarh, Udaipur, Jodhpur, Barmer, and Jaisalmer) will be covered with gas supply infrastructure in the ninth round (with its deadline of 30 September 2026) and seven districts (Ajmer, Pali, Rajsamand, Sirohi, Jalor, Durgapur, and Banswara) will be covered in the tenth round of laying down of gas pipelines which has a deadline of 31 March 2029.¹¹ The rest of the 12 districts out of the total 35 districts in the state are still not in the coverage plan for natural gas.
- Bringing in a new renewable energy policy by the state government:** The Rajasthan state government is about to bring in a new renewable energy policy to harness solar, wind, and biomass energy to work towards producing green energy and developing pollution free industries. Currently, the state's renewable energy production capacity is 1,600 MW which saves up to 5

lakh tonnes of coal every year. This brings in the scope of increasing the use of clean energy in industries as well.

3.4 ISSUES AND ROADBLOCKS

Some of the major roadblocks in having a clear industrial fuel policy and industries not being able to shift to cleaner fuel entirely are:

- **The high price of gas compared to coal and other fuels:** The prime reason for which industries are unwilling to switch to PNG is its higher price compared to other fuels like coal. This high pricing of gas is the result of non-inclusion of gas under GST. Due to this, VAT is being charged on natural gas once in Gujarat and then again in Rajasthan, which makes the price of PNG comparatively higher. The Rajasthan government is charging 10 per cent VAT currently on natural gas which is added on to the 15 percent VAT already charged by the Gujarat government. The industrial PNG price in Bhiwadi ranged between Rs 38–40/SCM as of October 2020.
- **Lack of a comprehensive industrial fuel policy:** Unfortunately, the industrial fuel policy in Rajasthan is restricted to the list of approved fuels in the region (that too includes a lot of polluting fuels). An overall comprehensive industrial fuel policy needs to be developed shall have a well defined implementation plan for cleaner fuel in industries and shall include the role of multiple stakeholders like the industrial development authorities (which are responsible for facilitating the infrastructure), PNGRB, gas companies, industrial associations, and the pollution control board. All these stakeholders are currently working in silos under a lot of uncertainty about each other; they need to be brought together on a common platform under a comprehensive state fuel policy.
- **Lack of a well-defined analysis and criteria behind the approved fuel list:** The approved fuel list of Rajasthan seems to lack in-depth analysis or a set of clearly defined criteria. Polluting fuels like kerosene, naphtha, and coal have been approved across the state without considering the carrying capacity of different regions. It seems that only pet coke and furnace oil have been excluded based on the Supreme Court order. All the other major fuels have found a place in the approved list irrespective of any considerations of their emissions, availability in regions, or the carrying capacity of different regions in the state.
- **Current non-availability of gas infrastructure in major industrial districts and areas of Rajasthan:** Currently, only three out of 35 districts in Rajasthan have a gas supply infrastructure. Cities and towns with large numbers of air polluting industries still do not have gas supply infrastructure. Even in these three districts, not all major industrial areas have accessibility to gas supply, for ex: MIA is the biggest industrial area in Alwar district after Bhiwadi region, but the gas supply infrastructure is only limited up to Bhiwadi and Neemrana industrial areas.
- **No intermediary cleaner fuel is mandated:** All the industrial areas in the state which have a substantial amount of air polluting industries and no gas supply infrastructure should be made to switch to intermediary cleaner fuels based on their availability in the area. No such intermediary cleaner fuels have been shortlisted and mandated by the state board for such industrial areas.

- **Litigations between gas distribution companies:** Even amongst the few areas which have existing gas pipelines, there are often points of conflict between the gas companies which are responsible for laying down the pipelines and providing gas connections. This conflict occurs due to the confusion in the allotment of areas which have to be covered by them respectively. In Alwar district, Harayana City Gas Distribution Pvt Ltd was assigned the region of Bhiwadi whereas Torrent Gas Pvt Ltd was assigned the rest of the district. The lack of clarity in the regions assigned led the two companies to the courts, which ultimately stopped the work of laying down the pipelines. These sort of conflicts need to be avoided as much as possible by providing a clear mandate to all stakeholders involved.
- **Easy transportation and availability of coal:** Coal as a fuel is cheaper and easily available within a stipulated time, which makes it a much more preferred fuel compared to natural gas. One of the industry owners said that coal is available at just one call and within a short notice. It is flexible for industries as they can order the amount they want to use and not procure at all if the industry is unable to run due to any unavoidable circumstances.
- **Mandatory charges by gas companies even without usage:** The gas companies usually charge some amount from industries every year/month for the continued supply of gas. The industries which are inoperative during a certain time period also need to pay these charges in order to keep continuing their supply of gas. This has been claimed by industries as one of the reasons that definitely pushes them to use coal as it can be procured whenever they need and can be used and stored as per their own convenience, hence preventing them from paying extra.
- **Continuous capital cost investment and no incentive for fuel switch:** Industries in areas like Bhiwadi have expressed concerns over large amounts of continuous capital investments due to change in policies at short durations. Post the banning of pet coke and furnace oil, many industries invested in infrastructure (including boilers) to be able to use coal as a fuel. They (especially large scale industries) also went ahead and installed APCDs like wet scrubbers and cyclones to control air pollution. Now, with the pressure on them to switch to PNG, they feel they will have to invest large sums of money again without any incentives or support from the government. This seems to be a big burden on the industries and they have been demanding for incentives from the state government.
- **No mention of clean fuel in the state industrial development policy:** The Rajasthan Industrial Development Policy 2019 makes no mention of clean fuel or making industries switch towards clean fuel. This reduces the significance of the issue of industrial air pollution which needs to be tackled with immediate effect.

Figure 5: Gas infrastructure map of India, 2019

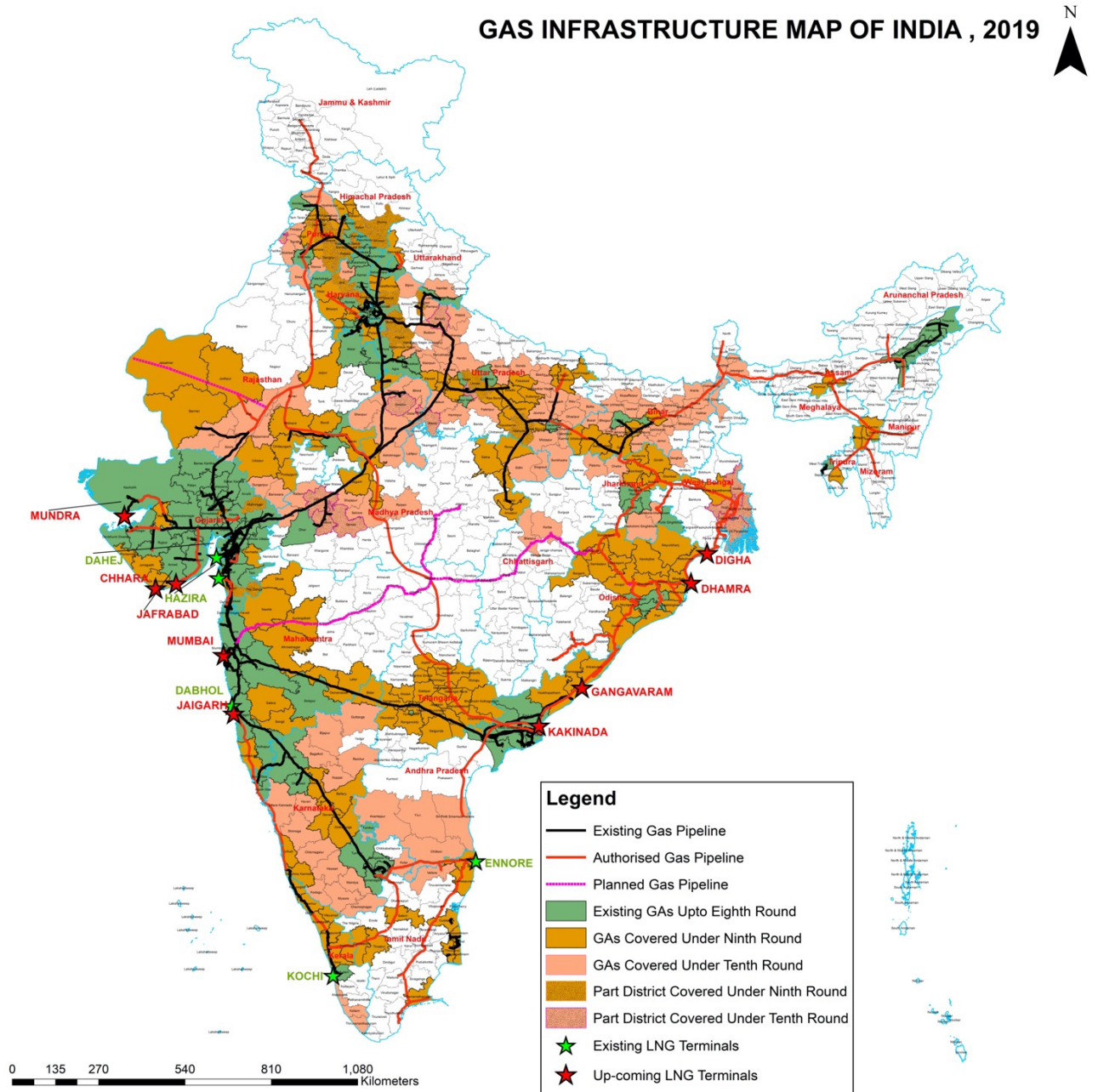
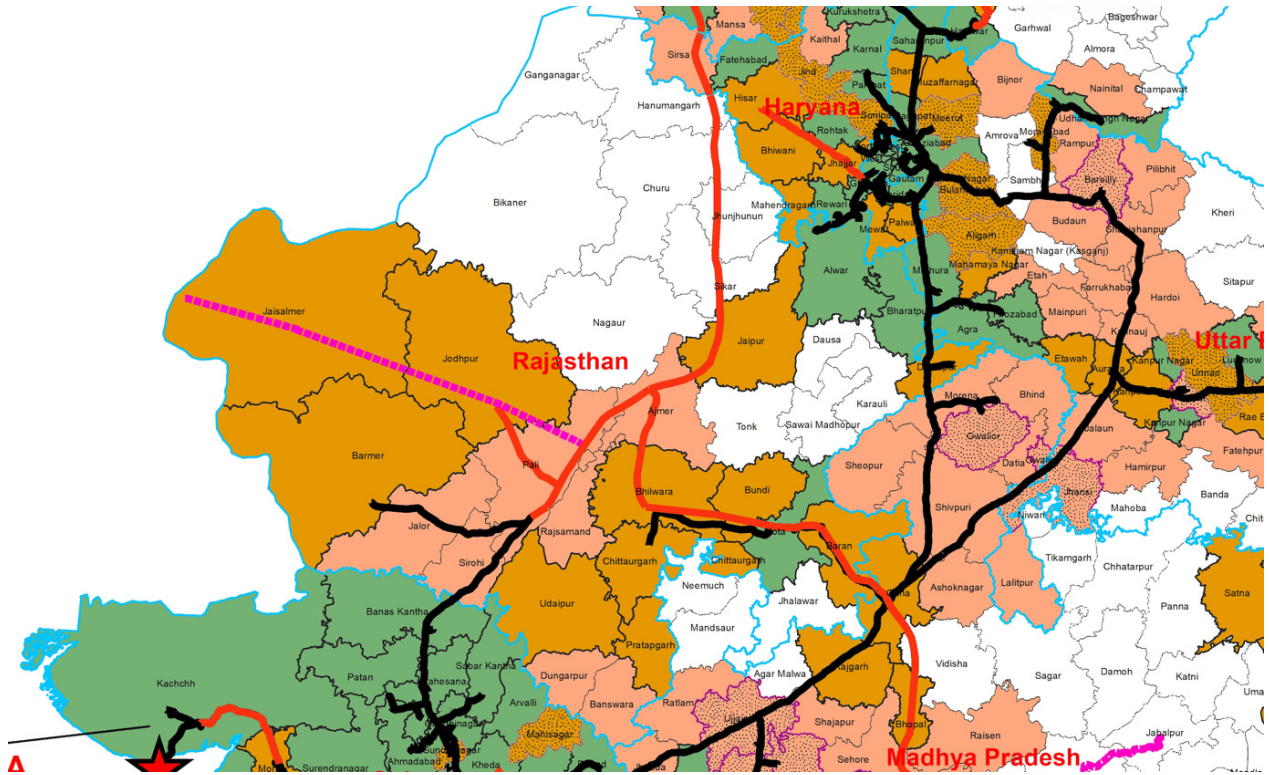


Figure 6: Gas infrastructure map of Rajasthan, 2019



Source: PNGRB, 2019

4. INDUSTRIAL FUEL POLICY IN HARYANA

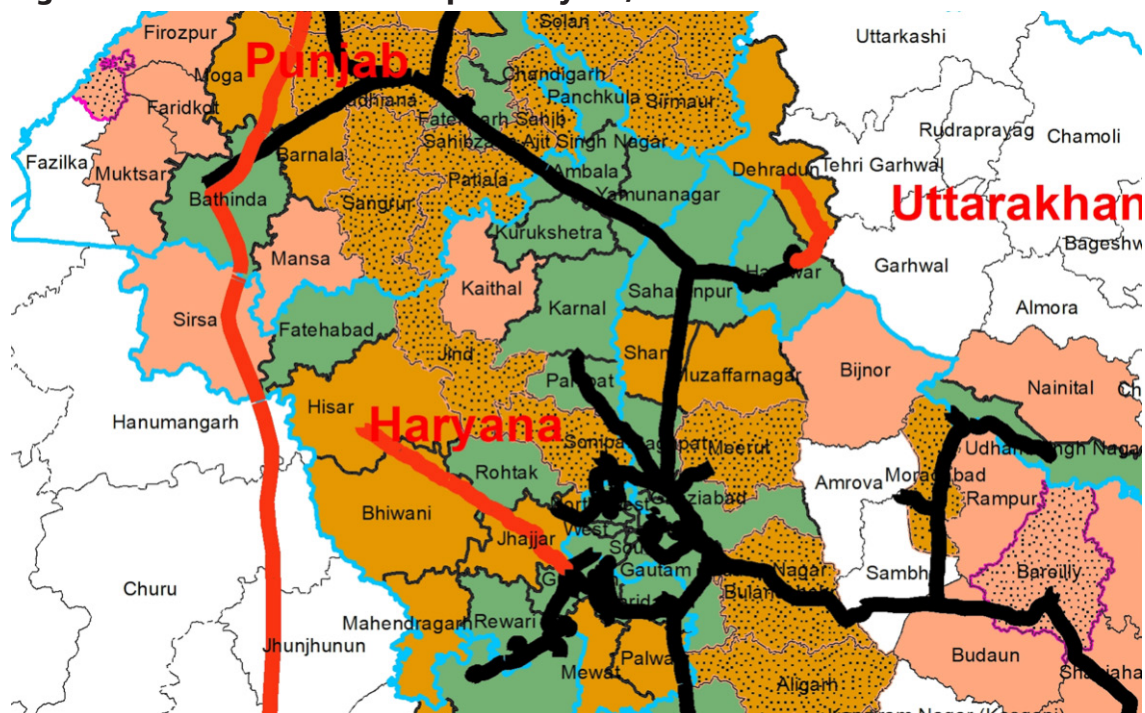
4.1 BACKGROUND

Haryana is one of the most industrialized states in the country. The state has been a leader in the manufacture of products like cars, two-wheelers, tractors, textiles, scientific instruments, footwear, etc. The state manufactures almost 80 per cent of mobile cranes, 52 per cent of excavators, 48 per cent of cars, 39 per cent of two wheelers, and 11 per cent of tractors produced in India. There are around 1,670 large and medium enterprises and more than 90,000 MSMEs operating in the state.¹²

The state of Haryana has twenty-two districts in total and nearly 40 per cent¹³ of the state comes under Delhi NCR which subsequently leads to a big influence of the policies in Delhi on the policies being framed for the state of Haryana, especially with respect to environmental pollution. It is mandatory for the Haryana state government to work in proper coherence with the government and regulatory bodies in the national capital.

The Industrial Investment and Business Promotion Policy was released by the Government of Haryana in 2015. Under the section of industrial infrastructure development, the policy mentions that a gas distribution network in all areas of the state should be developed to effectively service the consumers in domestic, commercial, industrial, and transport sectors. The state policy mentions gas as a cheaper and preferred fuel over motor spirit, naphtha, and diesel. The document mentions that the a distribution network has already been taken up in Faridabad and Gurugram and that the government has taken up the matter with PNGRB to cover the entire state in the shortest time frame. It further mentions that the state government has allowed Gas Authority of India Limited (GAIL) to lay the gas pipelines within the tariff zone of Dadri-Bawana-Nangal natural gas pipeline, which would facilitate the supply of natural gas to industrial units in Yamuna Nagar and Jagadhari.

The PNGRB gas infrastructure map of 2019 shows that out of the 22 districts of Haryana, the districts of Panchkula, Ambala, Gurugram, Faridabad, Panipat, Yamuna Nagar, Kurukshetra, Fatehabad, Rewari, and Rohtak have existing gas infrastructure whereas Hisar, Bhiwani, Mahendragarh, Jhajjar, Jind, Sonipat, Mewat, and Palwal will be covered in the ninth round of laying down of gas pipelines. Sonipat and Jind will only be covered partially in the ninth round. Only the district of Kaithal and Sirsa will be covered in the tenth round of laying down of gas pipelines. Unlike UP and Rajasthan, all districts of Haryana are to be covered by gas pipelines by the tenth round.

Figure 7: Gas infrastructure map of Haryana, 2019

Source: PNGRB, 2019

4.2 APPROVED FUELS

In pursuance of the provisions of the Air Act, 1981, the state of Haryana declared a list of approved fuels on 11 December 2018 (see *Table 4: List of approved fuels for Haryana state*).¹⁴

Table 4: List of approved fuels for Haryana state

Sr. no.	List of approved fuels
1.	Petrol (as per the norms prescribed by Govt of India from time to time)
2.	Diesel (as per the norms prescribed by Govt of India from time to time)
3.	LPG and PNG for domestic and commercial use
4.	Natural gas/CNG for vehicles
5.	PNG and LPG for boilers, furnaces, lime kilns, and thermic fluid heaters
6.	Aviation turbine fuel
7.	Coal for boilers, furnaces, thermic fluid heaters, lime kilns, and brick kilns
8.	LSDf for boilers, furnaces, lime kilns, thermic fluid heater, and incinerators
9.	Biomass/agriculture refuse such as rice husk, mustard husk, bagasse, almond husk, and walnut husk either in the form of briquettes or loose to be used in boilers, furnaces, and brick kilns
10.	Firewood and dung cake for domestic use, crematoriums, and for other religious purposes
11.	Wood charcoal for use in cloth ironing
12.	Biogas, bio fuel, and charcoal
13.	Refuse derived fuel for power plants, cement plants, and waste-energy plants

Source: HSPCB, 2018

Based upon the Supreme Court order in January 2017, the list of approved fuels in Haryana does not include pet coke and furnace oil. Although coal is still an approved fuel, kerosene has not been included in the list.

4.3 INITIATIVES TO MOVE TOWARDS CLEANER FUEL

Haryana has made better progress than the other two states of NCR (Rajasthan and UP) in terms of access to cleaner fuel. There are a few initiatives taken by the Haryana state government and Haryana Pollution Control Board towards cleaner fuel for industries, which are:

- **Declaration of an approved fuel list:** HSPCB has released a list of approved fuels under which it clearly bans pet coke, furnace oil, and kerosene. This can be acknowledged as one of the first steps towards moving to cleaner fuel.
- **Large and rapid coverage of the gas infrastructure in the state:** More than **50 per cent of the districts** already have gas infrastructure (covered in the eighth round). This shows the fast pace with which cleaner fuel is being made available in the state. Inclusion of its major areas in NCR is also one of the reasons for the rapid growth.
- **Early state industrial policy addressing cleaner fuel:** The Haryana Industrial Investment and Business Promotion Policy was **released in 2015** and the policy mentioned provision of a natural gas pipeline network across all the areas in the state. Compared to the other two NCR states, this policy had come into place much earlier.
- **Detailed air quality action plans for Gurugram and Faridabad with targets:** Detailed air quality action plans were approved by the Haryana state government in 2019 which had set up an **aim of reducing PM_{2.5} and PM₁₀ by 35 per cent by 2022**. The regional officers of HSPCB in Faridabad and Gurugram were appointed as nodal authorities to implement the plan. The plans were prepared in accordance with the National Clean Air Action Programme and the 2018 NGT order which directed states to prepare action plans for non-attainment cities. The plan was prepared in consultation with a wide range of stakeholders including Municipal Corporations, National Highways Authority of India (NHAI), HSIIDC, Public Health Engineering Department (PHED), Public Works Department (PWD), etc. The action plan also proposes health impact assessment of Gurugram. There are nine objectives prescribed for industries, such as the adoption of cleaner technology in brick kilns, ensuring adherence to emissions standards, ensuring the use of legal fuels, installation of air pollution control devices in industrial units, and a state-wide ban on tyre pyrolysis plants.

4.4 ISSUES AND ROADBLOCKS

Some of the major roadblocks in having a clear industrial fuel policy and industries not being able to shift to cleaner fuel entirely are:

- **Lack of a comprehensive industrial fuel policy:** The industrial fuel policy in Haryana is restricted to the list of approved fuels in the region and brief mention of cleaner fuels. A comprehensive industrial fuel policy needs to be developed which shall include a clear implementation plan along with well defined roles of multiple stakeholders like the industrial development

authorities (which are responsible for facilitating the infrastructure), PNGRB, gas companies, industrial associations, and the pollution control board. All these stakeholders are currently working in silos; they need to be brought together on a common platform under a comprehensive state industrial fuel policy.

- **Lack of well-defined analysis and criteria behind the approved fuel list:** Even though the approved fuel list of Haryana seems to exclude more polluting fuels compared to Rajasthan, polluting fuels like coal are still approved across the state without any consideration of the carrying capacity of different regions or fuel availability in different regions. There seems to be a lack of in depth analysis or a well defined set of criteria behind the finalization of the approved fuel list.
- **Non-availability of natural gas infrastructure in many industrial areas including districts which are marked green in the PNGRB map:** Currently, the existing gas pipeline is only available in some districts of Haryana like Panchkula, Ambala, Gurgaon, Faridabad, Panipat, Yamuna Nagar, Kurukshetra, Fatehabad, Rewari, and Rohtak. Although, even in these districts not all industrial areas have access to gas supply pipelines. A gas line has been authorized to pass through the districts of Rohtak and Bhiwani through Hisar.
- **Low rate of PNG switch of industries in the state:** Even with the presence of gas infrastructure, industries are not adopting gas as a fuel. Out of the total 948 air polluting industries in Faridabad, only 81 industries are using gas and 11 industries are using electricity as a fuel. Similarly, out of 125 air polluting industries in Gurugram, only around 11 industries are using gas. In the Panipat district, out of 231 air polluting industries, only 4 industries have switched to natural gas.
- **Polluting fuels like coal are still approved (even in the NCR districts):** With easily available and cheaper fuels like coal still being approved, they become much more lucrative for industries, thus slowing down the process of industries switching to PNG.
- **No intermediary cleaner fuel is mandated:** All the industrial areas in the state which have a substantial amount of air polluting industries and no gas supply infrastructure should be made to switch to intermediary cleaner fuels based on their availability in the area. No such intermediary cleaner fuels have been shortlisted and mandated by the state board for such industrial areas.
- **Continuous capital cost investment and no incentive for fuel switch:** The industries have expressed concerns over large amounts of continuous capital investments due to changes in policies at short durations. Post the banning of pet coke and furnace oil, the industries invested in infrastructure (including boilers) to use coal as a fuel. They (especially large scale industries) also went ahead and installed APCDs like wet scrubbers and cyclones to control air pollution. Now with the pressure on them to switch to PNG, they feel they will again have to invest large sums of money without any incentives or support from the government. This seems to be a big burden on the industries and they have been demanding incentives from the state government.

- **The high price of gas compared to coal and other fuels:** The prime reason for which industries have been unwilling to switch to PNG is its higher price compared to other fuels like coal. The major reason for this high pricing of gas is the non-inclusion of gas under GST. Due to this, VAT is being charged on natural gas once in Gujarat and then again in Haryana. The Haryana government is charging 5.3 per cent VAT on natural gas¹⁵ which is added on after the 15 per cent VAT charged by the Gujarat government. The industrial PNG price in Haryana by IGL is Rs 31.63/SCM as of October 2020.
- **Mandatory charges by gas companies even without usage:** Gas companies usually charge some amount from industries every year/month for the continued supply of gas. Industries which are inoperative for a certain time period also need to pay these charges in order to keep continuing their supply of gas. This has been claimed by industries as one of the reasons that definitely pushes them to use coal as it can be procured whenever they need and can be used and stored as per their own convenience, hence preventing them from paying extra.
- **Conflicts between gas distribution companies:** There had been a court case between Haryana Gas Distribution Ltd and Indraprastha Gas Ltd over the issue of who would be supplying gas in the district of Gurugram. Conflicts like these further delay the expansion of cleaner fuel infrastructure in critical cities and regions. Therefore, PNGRB should come up with clear mechanisms to avoid such conflicts in the future and endeavour to resolve the ongoing ones.

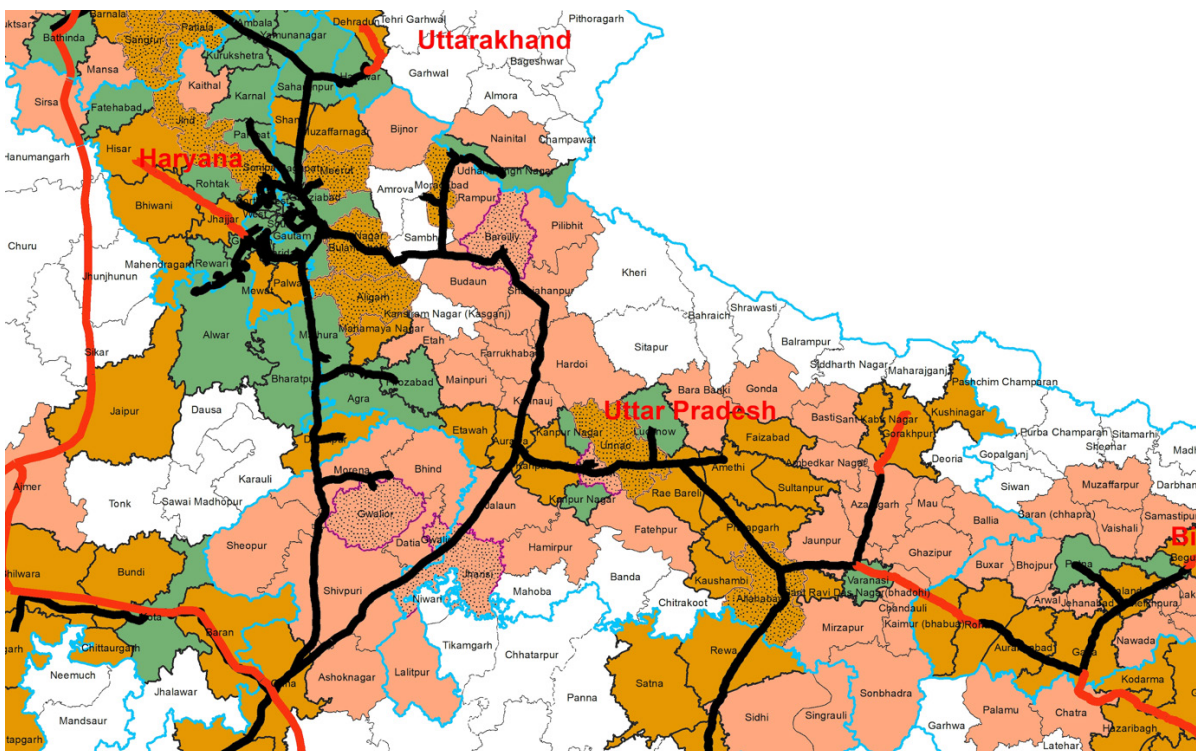
5. INDUSTRIAL FUEL POLICY IN UTTAR PRADESH

5.1 BACKGROUND

A draft state fuel policy for Uttar Pradesh has been prepared by the Uttar Pradesh Pollution Control Board (UPPCB) and submitted to the UP government to be officially published. Until it gets published officially by the state government, the board officials are abstaining from disclosing much information about the draft policy. The officials of the board did share that initiatives to move industries towards cleaner fuel have been taken in certain regions of the state.

If we look at the gas infrastructure map of Uttar Pradesh prepared by the PNGRB for 2019, we get to see that out of the total 75 districts in the state, gas supply infrastructure exists in Agra, Firozabad, Mathura, Baghpat, Saharanpur, Gautam Budh Nagar, Ghaziabad, Kanpur, Lucknow, and Varanasi. Around 14 districts, mostly on the eastern side of the state, are not planning for gas infrastructure coverage even in the ninth or tenth round (see *Figure 8: Gas infrastructure map of the state of Uttar Pradesh, 2019*).

Figure 8: Gas infrastructure map of the state of Uttar Pradesh, 2019



Source: PNGRB, 2019 (link: https://www.pngrb.gov.in/pdf/FinalGasFullDistric-Map_14-02-2020.jpg)

The Industrial Investment and Employment Promotion Policy of the state, released in 2017, specifically mentions that a gas grid will be developed in the state. It mentions that the prominent industrial areas will be identified and included in the gas grid map by coordinating with GAIL and other oil companies.

5.2 INITIATIVES TO MOVE TOWARDS CLEANER FUEL

Although the state policy on fuel is still not published, the UPPCB has been taking steps for moving industries in the state towards cleaner fuel. Some of the steps that can be mentioned are:

- **UPPCB direction to industries to switch to PNG in NCR:** In August 2019, the UPPCB directed all industries in areas having PNG supply in NCR, including Ghaziabad and Gautam Buddha Nagar districts, to shift to PNG within 15 days. The industries protested against the order as they felt 15 days were far too less
- **Strict compliance in Taj Trapezium Zone (TTZ):** The districts of Agra, Firozabad, Etah, Hathras, Mathura, and Bharatpur (in Rajasthan) come under the TTZ which has a defined area of around 10,400 sq km. The Supreme Court had earlier banned the use of coal/coke in industries located in this zone and directed the industries in this zone to switch over from coal/coke to natural gas or relocate outside the TTZ.¹⁶ Recently, in December 2019, the Supreme Court allowed those industrial units to operate which do not spread pollution and are in compliance with the rules. The ban on operation of heavy industries in the region is still continuing.

Keeping the above in consideration the UPPCB has made it mandatory for every industry in Agra district to use PNG as fuel. Green Gas Limited has provided the gas supply infrastructure in the cities of Agra and Lucknow. As per a UPPCB official, there is also some subsidy in the rates of PNG for industries in Agra.

- **Subsidy on natural gas in Agra region:** Due to a Supreme Court order, a certain amount of natural gas is provided to industries in Agra on a subsidized rate. On exceeding the permissible quantity, market rate is applied. A similar subsidy is being planned by UPPCB for the NCR districts to promote natural gas as a fuel in NCR region.
- **Presence of gas supply infrastructure in major districts:** The PNGRB gas infrastructure map of 2019 shows existing gas supply infrastructure in Agra, Firozabad, Mathura, Baghpat, Saharanpur, Gautam Buddh Nagar, Ghaziabad, Kanpur, Lucknow, and Varanasi. Except some districts in eastern UP and three districts in the west (altogether 14 districts), all other regions and districts of the state would be fully or partially covered under the proposed ninth and tenth rounds of laying down of gas infrastructure.
- **Addressing cleaner fuel in state industrial development policy:** The Industrial Investment and Employment Promotion Policy of the state, released in 2017, also mentions that a gas grid will be developed in the state. It mentions that prominent industrial areas will be identified and included in the gas grid map by coordinating with GAIL and other oil companies engaged in laying the proposed natural gas pipeline.

5.3 ISSUES AND ROADBLOCKS

Some of the major roadblocks in having a clear industrial fuel policy and industries not being able to shift to cleaner fuel entirely are:

- **Lack of a comprehensive industrial fuel policy:** A comprehensive industrial fuel policy needs to be developed which shall include the role of multiple stakeholders like the industrial development authorities (which are responsible for facilitating the infrastructure), PNGRB, gas companies, industrial associations, and the pollution control board. All these stakeholders are currently working in silos; they need to be brought together on a common platform under a comprehensive state fuel policy.
- **The high price of gas compared to coal and other fuels:** Gas is costlier than other polluting fuels like coal. The major reason for this high pricing of gas is the non-inclusion of gas under GST. Due to this, VAT is being charged on natural gas once in Gujarat and then again in Uttar Pradesh. The UP government is charging 10 per cent VAT on natural gas which is added on after the 15 per cent VAT charged by the Gujarat government. The industrial PNG price in Ghaziabad and Noida by IGL is Rs 31.63/SCM as of October 2020.
- **Mandatory charges by gas companies even without usage:** Gas companies usually charge some amount from industries every year/month for the continued supply of gas. Industries which are inoperative for a certain time period also need to pay these charges in order to keep continuing their supply of gas. This has been claimed by industries as one of the reasons that definitely pushes them to use coal as it can be procured whenever they need and can be used and stored as per their own convenience, hence preventing them from paying extra.
- **Large parts of the state still not planned for gas infrastructure:** Almost 14 districts in the state, mostly on the eastern side of the state, have not even been put in the planning for gas infrastructure in the ninth and tenth rounds of laying down of gas pipelines. If not for industrial purposes, then at least for domestic purposes the infrastructure needs to be spread across all parts of the state as soon as possible.
- **Non-availability of natural gas infrastructure in many industrial areas even in districts which are shown with existing gas infrastructure:** Currently, the existing gas pipeline is only available in some of the districts of Uttar Pradesh— Agra, Firozabad, Mathura, Baghpat, Saharanpur, Gautam Buddha Nagar, Ghaziabad, Kanpur, Lucknow, and Varanasi. Although, even in these districts, not all industrial areas have access to gas supply pipelines. For example the Roop Nagar and Arya Nagar industrial areas (one of the most polluted areas) in Ghaziabad district are still not connected with gas pipelines.
- **No intermediary cleaner fuel is mandated:** All the industrial areas in the state which have a substantial amount of air polluting industries and no gas supply infrastructure should be made to switch to intermediary cleaner fuels based on their availability in the area. No such intermediary cleaner fuels have been shortlisted and mandated by the state board for industrial areas.

- **Delay in release of the list of approved fuels leading to continued usage of polluting fuels:** The state has still not been able to release its list of approved fuels, whereas all other NCR states have done it already. This delay has allowed the unchecked use of polluting fuels in various parts of the state.
- **No subsidy and incentive in NCR districts:** The subsidy on natural gas in the Agra region really did help industries in switching almost entirely to natural gas and similar incentives are required in the NCR districts of the state to make cleaner fuel preferred over unclean ones.

6. CONCLUSION AND OVERALL RECOMMENDATIONS / WAY AHEAD

The industrial fuel policies of Delhi NCT and the states of Rajasthan, Uttar Pradesh, and Haryana have been analysed in this report. The analysis clearly shows that the Delhi NCT region has been successful to a certain extent in achieving industrial fuel transition. The way ahead or recommendations for the region of Delhi NCT are a bit different from the rest of the NCR states as the fuel policy in Delhi NCT has much more clarity and has been successful in switching a majority of the industries to cleaner fuel compared to the other NCR states. It is also a challenging task for the NCR states as they are much bigger in area and also have industrial areas which are different in number and locations and therefore might require different strategies. Although the way forward for all the other NCR states is based on some common steps that need to be taken to bring in effective industrial fuel policies.

Therefore, the report gives some specific recommendations for the Delhi NCT and some common recommendations/steps for the three NCR states which shall be applicable to all of them in order to have robust industrial fuel policies in each state.

The recommendations for the Delhi NCT area are:

- **Ensure either legalization and fuel switch or closure of illegal industries:** Those industries which can come under the ambit of legality should be made to do so and the rest of the illegal industries should be identified, demarcated, and closed down with immediate effect.
- **Cheaper price for cleaner fuels:** Inclusion of gas under GST should be done to make cleaner fuels cheaper. This will lead to cutting down of any form of illegal supply of polluting fuels and would motivate the leftover industries to switch to cleaner fuel.
- **Need for setting responsibility and a check mechanism to control the entry of illegal fuel in NCT:** The DPCC along with other concerned authorities should devise a mechanism to control the entry of illegal fuel in NCT and the responsibility for ensuring the same should be specified.

Common recommendations for the states of Rajasthan, Haryana, and Uttar Pradesh to develop an effective fuel policy are:

- **A common and comprehensive fuel policy for Delhi NCR:** Some of the most polluted cities are located in the NCR and the pollution from them adds to the pollution in the national capital. To be able to preserve the air quality in the national capital and the significant cities around it, it is essential

to have a common fuel policy in the whole of NCR. Currently, polluting fuels like coal are banned in the national capital but freely used beyond its borders in neighbouring cities which ultimately makes the situation no better. Disparity in many such policies is restraining the possibility to achieve clean air in NCR and, therefore, if all states involved can agree to a common comprehensive fuel policy for the whole region, that can bring about significant change in the region with respect to air pollution.

The fuel policy should also be comprehensive in nature i.e. it should bring all the stakeholders under one umbrella. Under the policy, all stakeholders should have well-defined duties along with a common platform to communicate and coordinate without any hassle. This would let them understand how their tasks are inter-dependent and how subsequently many issues can be resolved quite easily if all of them work in a well-coordinated way under the umbrella of this comprehensive policy.

- **An effective plan for illegal industries:** The issue of illegal industries is such an important one that if not planned and dealt with, it can derail the whole effort of trying to reduce industrial pollution. A clear cut plan should be devised for illegal industries in Delhi NCR if the battle for industrial pollution has to be won in the true sense.
- **Removal of polluting fuels from the approved list of fuels (like done in Delhi):** The states of Rajasthan, Haryana, and Uttar Pradesh should remove polluting fuels like coal and others from their list of approved fuels and push industries to switch to cleaner fuel. The infrastructure and supply of cleaner fuel still does not exist in most parts of the states and industries in such regions should switch to intermediary cleaner fuels (ex: LPG, agro waste, etc.) based on the availability of fuels in the region.
- **Ensure adequate infrastructure and supply of cleaner fuel and intermediary fuels:** Before declaring usage of cleaner fuels or intermediary cleaner fuels mandatory, it is essential to ensure the availability of these fuels. In bigger states like Rajasthan and Uttar Pradesh, especially in the case of intermediary fuels, it is important to see if that fuel can easily be available in various regions and therefore different intermediary fuels can be declared for different regions based on the availability and cost affordability until gas infrastructure reaches them.
- **Making cleaner fuel cheaper than polluting fuels:** The current cost of PNG is almost 2 to 2.5 times higher than that of coal. The major reason for this high pricing of gas is the non-inclusion of gas under GST. Due to this, VAT is being charged on natural gas once in Gujarat and then again in the NCR states which raises the price of PNG. Apart from coal, other fuels like LSHS are also available cheaply, which ultimately makes natural gas a non-preferred fuel amongst industries. To change this, inclusion of natural gas under GST is a must and shall be done to promote cleaner fuel in Delhi NCR.
- **Improvement in electricity supply and cost for industries:** A lot of industries are willing to use electricity but the charges are often too high to choose it as a viable option. In many areas, electricity charges are much higher for industries than other sectors, thus being a disincentive for switching to electricity. Electricity charges should be reduced for industries to encourage more of them to switch to electricity as a fuel. Along with this,

state governments also need to ensure continuous supply of electricity to industries, without which the industries would be forced to use DG sets which would increase air pollution even more.

- **Incentives/subsidies for industries for switching to cleaner fuel:** As discussed earlier, the high price of gas and electricity and the capital cost investment involved in switching to natural gas acts as a burden on the industries making them reluctant to switch to cleaner fuel. As in the case of Delhi NCT and Agra, states should provide some form of incentives to the industries for switching to cleaner fuel. These incentives can be financial subsidies or even consent fee based benefits. Such efforts would surely motivate the industries to switch to cleaner fuel as has been seen in the case of Delhi NCT.

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Given the severity of pollution in the region, a majority of the NCR states have released a list of approved fuels. Yet, most of the industries here have not switched to cleaner fuels. One major reason observed for the reluctance to switch to cleaner fuels was the lack of an integrated and robust fuel policy which brings together all relevant stakeholders on one platform and ensures rapid, affordable, and sufficient delivery of cleaner fuel to all industrial areas. This paper studies the roadblocks preventing a clear fuel policy that would lead to a smooth transition of industries to cleaner fuel. Some questions being answered in the paper are: Are all the fuels in the approved lists non-polluting? If they are polluting, why have they not been prohibited? Why are industries not switching to cleaner fuels at a higher rate?



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