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NCAP SERIES

REVIEW OF ACTION PLAN FOR CLEAN AIR

AMRITSAR

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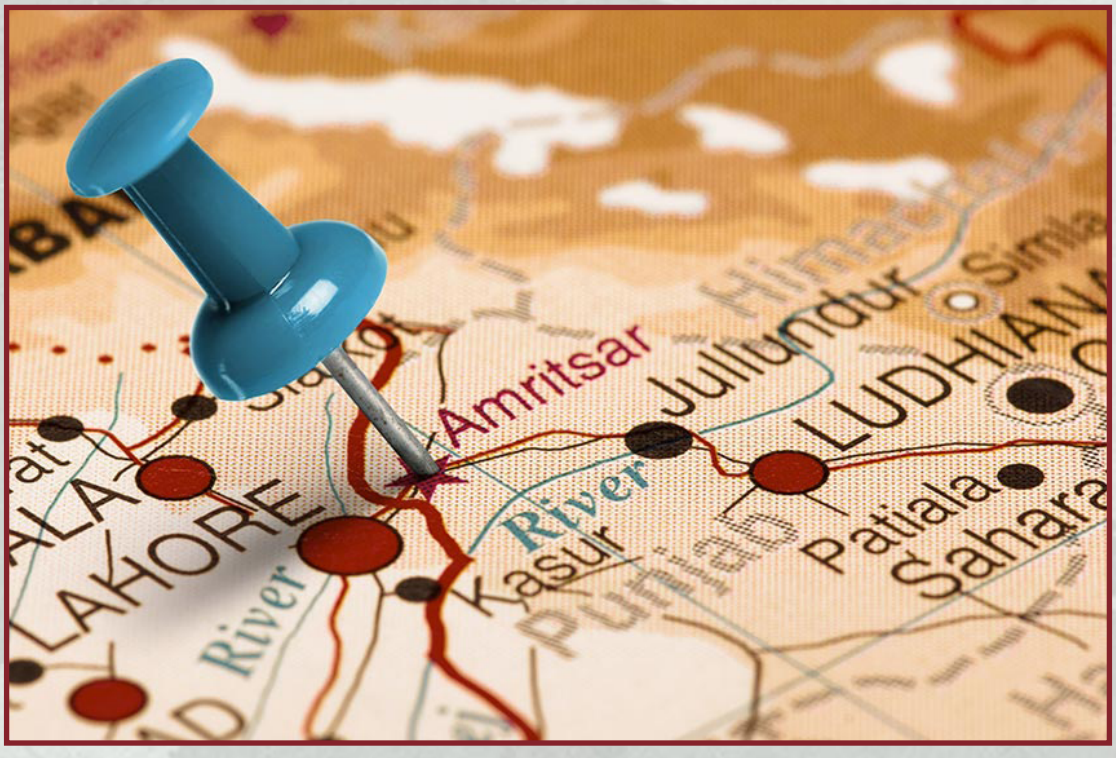
Introduction

The city of Amritsar built around the Golden Temple is representative of Sikhism world over. Founded by Sri Guru Ramdass, the fourth guru of the Sikhs in about 1574 A.D., the city gets its name from the Amrit Sarovar built by Guru Ramdass. Since then the city has inspired spirituality and simple living among millions. However, Amritsar has also made it to the list of most polluted cities in the world.

The Central Pollution Control Board (CPCB) has identified a list of polluted cities, which refers to cities which violate standards prescribed by the National Ambient Air Quality Standard (NAAQS, 2009). The identification is based on the ambient air quality data obtained under the National Air Quality Monitoring Programme (NAMP) during the period of 2011-2015[01]. In 2018, a total of 102 cities were identified as "non-attainment cities" in India based on the non-compliance to the NAAQS 2009.

The city is spread over an area of 170 sqm with a population of 11.3 lakh individuals (2011 census). The current population as per independent estimates and projections is around 21 to 25 lakhs[02].

Being a spiritual capital for the Sikhs, the city sees frequent inter-city bus traffic from cities across Punjab and the northern parts of India. The city's location on the arterial Grand Trunk Road only adds to its pollution woes. A 2013 study on the JNNURM cities by the Centre for Research in Rural and Industrial Development (CRRID) had put the vehicular density in Amritsar at 751,371[03]. This translated to 7044 cars per 1 lakh population[04]. There are no such studies available in the public domain for the period between 2015 to 2021.



01. Chapter 5 of National Clean Air Programme – Non Attainment Cities
02. Official Website of Amritsar District - https://amritsar.nic.in/.
03. The State of Cities in North-Western India: A Case of Selected JNNURM Cities (Study Focus City: Amritsar), March 2013, Centre for Research in Rural and Industrial Development (CRRID) - https://hudco.org/WRITEREADDATA/Amritsar%20Study.pdf
04. Too many vehicles cause chaos on roads in Amritsar: study, Hindustan Times, June 23 2014

The World Air Quality Report released by IQ Air in 2018 had listed Amritsar as the 57th most polluted city in the world[05]. The city's ranking improved subsequently to 124 in 2020 only to deteriorate to 77 in 2021. The main sectors contributing to the poor air quality as per a source apportionment study (of PM10) conducted by IIT Delhi in 2013 around the Golden Temple include industry 32%, road dust 47%, vehicles 7%, crop burning 0.4%, Kitchen 11%, Tandoor 1.6% and D.G Sets 1%[06]. The spike in road dust concentrations has been attributed to increased construction activities such as BRTS, flyovers etc., in the action plan. The Punjab Pollution Control Boards' "likely" revised assessment presented in the action plan document in 2019 (based on its experience) puts the contributions as follows - industry 20%, road dust 25%, vehicles 30%, biomass and garbage 10%, C&D waste 10%, others 5%. – year of study? Is it worth looking into why or how vehicles here are 30% as opposed to 7% in the previous study?

General Observations

The action plan presents a series of interventions across sectors. This section attempts to review the interventions in context of their efficacy from a scientific and public policy point of view. The activities have been broken down through representative codes such as CVE – control of vehicular emissions, CRD – control of road dust, CBGB – control on burning of garbage and biomass and so on. The interventions have been divided in to short term referring to activities to be carried out during next 6 months, medium term referring to activities to be carried out during next 2 years and long term referring to activities to be carried out in more than 2 years.

Action Plan Snapshot – The Key Interventions of the Amritsar City Action Plan

- Improving Ambient Air Quality infrastructure
- Developing a source apportionment study
- Initiating a Graded Response Action Plan during peak pollution events
- Road widening to mitigate vehicular pollution
- Developing a Bus Rapid Transit System
- Procuring mechanical sweepers and road sprinklers for road dust management
- Road paving and laying for dust management
- Technology upgradation for brick kilns
- Conversion to cleaner fuel for industrial units
- Construction and Demolition waste management
- Air purification equipment installation

05. Chapter 5 of National Clean Air Programme – Non Attainment Cities
06. Action Plan for Clean Air, Amritsar, Directorate of Environment and Climate Change Department of Science, Technology and Environment, Government of Punjab, 30 April 2019 (Annexure A)

CAAQMS

In terms of monitoring, the city hosts one Continuous Ambient Air Quality Monitoring Station (CAAQMS) located at the Golden Temple reporting on all the criteria pollutants and 3 manual monitoring stations testing for PM10, SO2 and NO2. The action plan only proposes to marginally expand the monitoring network by adding 3 CAAQM stations at the cost of 30 lakhs by the ned of March 2020. The latest CAAQMS list of the Central Pollution Control Board does not list any additional stations in Amritsar as of September 2021.

An independent air quality assessment of 13 locations across Amritsar carried out by the Smart City Mission in November 2020 identified the ISBT bus stand as the most polluted locality[07]. The average amount of PM10 and PM2.5 in the air during weekdays was recorded at 130.2 and 91.0 respectively and 108.6 and 71.3 on a Sunday. In December 2020, the Punjab Pollution Control Board (PPCB) invited e-tenders to install 4 more CAAQMS in the city by 2021[08]. However, according to an assessment carried out by Urban Emissions' APNA Program Amritsar requires at least 18 continuous air monitoring stations to statistically, spatially, and temporally, represent the mix of sources and range of pollution in the city[09].

Source Apportionment

The document developed by the Directorate of Environment and Climate Change, uses the findings and recommendations of the source apportionment study of 2013 by IIT Delhi to define the problem and also seek remedial measures. While the study found road dust resuspension and industrial emissions as the two key sources of pollution, the action plan attributes the spike in road dust concentrations to increased construction activities during that period. The revised assessment (presented in the city action plan document) "as per the experience" of the PPCB puts vehicular emissions as the top source. Despite this analysis, the action plan allocates a sum of Rs.5 lakh for a formal source apportionment study and a sum of 1 crore for a second study by the Punjab State Council for Science and Technology (PSCST) and The Energy Resource Institute (TERI). There is no clarity on how these new studies will contribute to the mitigation planning especially when the major sources such as vehicles and industry are likely to remain constant.

Credit: Biplov Bhuyan-Hindustan Times

07. Particulate matter levels found high at Amritsar ISBT: Study, The Tribune, 28 May 2021
08. Punjab Pollution Control Board, 22 December 2020 - https://ppcb.punjab.gov.in/sites/default/files/documents/Corrigendumforextension22.12.2020.pdf
09. Urban Emission Amritsar City Action Plan - https://urbanemissions.info/india-apna/amritsar-india/

GRAP – A failed proposition

The action plan also proposes to employ a Graded Response Action Plan (GRAP) inspired by the Delhi experience. The limitations and failure of the Delhi GRAP approach have been discussed by several experts. A detailed analysis by LIFE of the air quality data from Delhi's expansive network of monitors showed that the levels of particulate matters remained high through most of the year[10]. In effect, GRAP had not led to any change in Delhi's air quality even after more than four years of its implementation. In order for programs like GRAP to succeed, the action points such as closure of industrial or construction activities, road sweeping and water sprinkling would have to be implemented all year round. The GRAP section of the action plan also lists activities like stopping open burning of garbage, strict enforcement of pollution control regulations for industries and construction sector as interventions. Notwithstanding the fact that such laws technically need to be enforced throughout the year.

Control on Vehicular Pollution

This section has 12 action points ranging from the simplistic like public awareness on polluting vehicles to the extravagant – creating parking infrastructure at the cost of 56.02 crores. None of the action points seem to target the root cause of vehicle density in the city. The only logical way to address the issue of vehicle pollution is to reduce the number of vehicles plying on the city roads. According to the action plan, at present about 8,09,705 vehicles (heavy transport vehicles, LMVs, cars & jeeps, two wheelers and three wheelers) are plying on the roads of District Amritsar. As per the latest data on the Vahan dashboard, the current number of vehicles in the city stands at 11,70,001[11]. Among these are the large fleet of unregistered auto rickshaws. As per one report[12] , around 50,000 auto-rikshaws are operational in the city whereas only 8,479 are registered with the Regional Transport Offices.. This combined with the ever increasing fleet of vehicles in other categories has dragged the city's air quality down significantly.

Further, National Highway NH-1 passes through Amritsar also contributes to air pollution. However, similar to all the other city action plans, the Amritsar plan shies away from providing any roadmap to arrest the unchecked growth of vehicles.

A major portion of the budgetary allocation under this sector has been dedicated to developing parking infrastructure in order to prevent parking in undesignated locations at the cost of 56.20 crores. Research has demonstrated that parking convenience in cities leads to increased car ownership[13]. Moreover, with ever increasing sale of vehicles in Indian cities, parking infrastructure will always remain inadequate. In his book' Re-Thinking a Lot', Massachusetts Institute of Technology professor, Ben-Joseph wrote, "Generous parking requirements and low parking prices tend to discourage infill development[14] and encourage sprawl. As a result, it tends to increase per capita vehicle ownership and use and reduces the viability of other modes such as walking, cycling and public transit[15]."

10. Rakesh Kumar Singh, Grappling with Air Pollution, How the GRAP has failed to Clean up the Air, LIFE 2021
11. Vahan Dashboard as accessed on 20 September 2021
12. 8,479 autos registered with RTO, but around 50K run on Amritsar roads, The Tribune, March 11 2021
13. Petter Christiansen, Øystein Engebretsen, Nils Fearnley, Jan Usterud Hanssen, Parking facilities and the built environment: Impacts on travel behaviour, Transportation Research Part A: Policy and Practice, Volume 95, 2017,
14. Infill development refers to the construction of buildings or other facilities on previously unused or underutilized land located within an existing urban–or otherwise developed–area.
15. Rethinking a Lot, The Design and Culture of Parking, Eran Ben-Joseph, MIT Press, 2012.

The other interventions with budgetary allocation include widening of 7kms of the outer circular roads stretch at the cost of 14.7 crores and construction of 2 flyovers at Ram Tirath and Ghanupur Kale at the cost of 4.97 crores. The logic offered for this is the decongestion of road. A recent report by the American policy think tank, 'Transportation for America', has found that the practice of expanding roads or building new ones to curb congestion has resulted in billions of dollars in wasted spending and has made congestion worse on city street. Between 1993 and 2017, the United States added 42% more roads in the 100 largest urbanized areas and saw congestion increase by 144%[16].

An amount of 1.5 lakhs has been allocated for earmarking yellow lines to designate roadside parking on 6 roads and installation of 40 number of Parking sign boards. There is also a proposal to phase out commercial vehicles 15 years and older. However, the action point lacks budgetary allocation, milestones or target dates as the issue is being examined legally.

Unlike other city action plans, Amritsar is the least ambitious on the issue of public transport. The existing bus network in Amritsar; BRTS (Bus Rapid Transit System) and City Bus Network, have a limited coverage. While these interventions have moderately improved commuter conditions, further steps are necessary for this system to function effectively and make it economically viable. In 2017, the city bus service project was brought to a halt following losses amounting to 2 crores owing to the unchecked growth in illegal auto-rikshaws in the city. Furthermore, the BRTS model itself has been questioned after the failure of the Delhi BRTS mainly due to the poor planning prevalent in Indian cities[17]. The Amritsar BRTS also faced similar issues. Since its initial run in 2016 under the SAD-BJP led government, the project failed to achieve its goal of displacing cars from the city roads following which the current Congress led regime infused an additional 600 crore in 2018[18].

16. The Congestion Con, Transportation for America, March 2020
17. Why Did Bus Rapid Transit Go Bust in Delhi, Bloomberg, December 20 2016
18. Amritsar BRTS to be revived soon, Hindustan Mines, March 21 2021 https://www.hindustantimes.com/cities/chandigarh-news/amritsar-brts-pmidc-mulls-fare-cut-golden-temple-airport-link-101616270138235.html

Control of Road Dust

The issue of road dust management in Indian cities is challenging and city administration has often employed end of pipeline interventions that provide a sense of action but in reality provide negligible relief from pollution and sometimes lead to other problems. Amritsar is no different. The interventions proposed includes repairing of pot holes on a 4 km stretch of road at the cost of 12 lakhs. There is no explanation as to why routine road maintenance jobs have been included into a city action plan.

Furthermore, an amount of 2.10 crores and 20 lakhs has been allocated for mechanical sweepers and water sprinklers respectively. The plan proposes to procure 2 mechanical sweepers to cover a stretch of 55.07 kms. The plan provides no details on the roads where these machines will run or the kind or technology they will use or the scientific assessment behind the decision. Studies have shown that mechanical sweeping often contributes to the local pollution load by resuspending particulate matter and contributing to the diesel emissions. A detailed assessment on the efficacy of mechanical sweepers by LIFE provides several arguments on the issue[19]. Water sprinkling can be useful in dust suppression however, there is no clarity on how often the two sprinklers that the city proposes to procure will operate especially during extremely dry north Indian summers and winters or how water will be procured.

An amount of Rs.15 lakhs has been allocated for 3 water fountains on Circular road. There is no explanation as to how such installations can arrest air pollution.

The remaining budget amounting to 75.76 crores has been allocated for road laying (kucha to pucca) road re-carpeting and paving with interlocking tiles. While road paving is an effective road dust suppression technique, including such regular city maintenance projects in a city action plan is questionable.

19. Swept Under the Carpet, Rethinking Investment on Mechanical Sweepers, Legal Initiative for Forest and Environment (LIFE) - https://thelifeindia.org.in/swept-under-the-carpet/

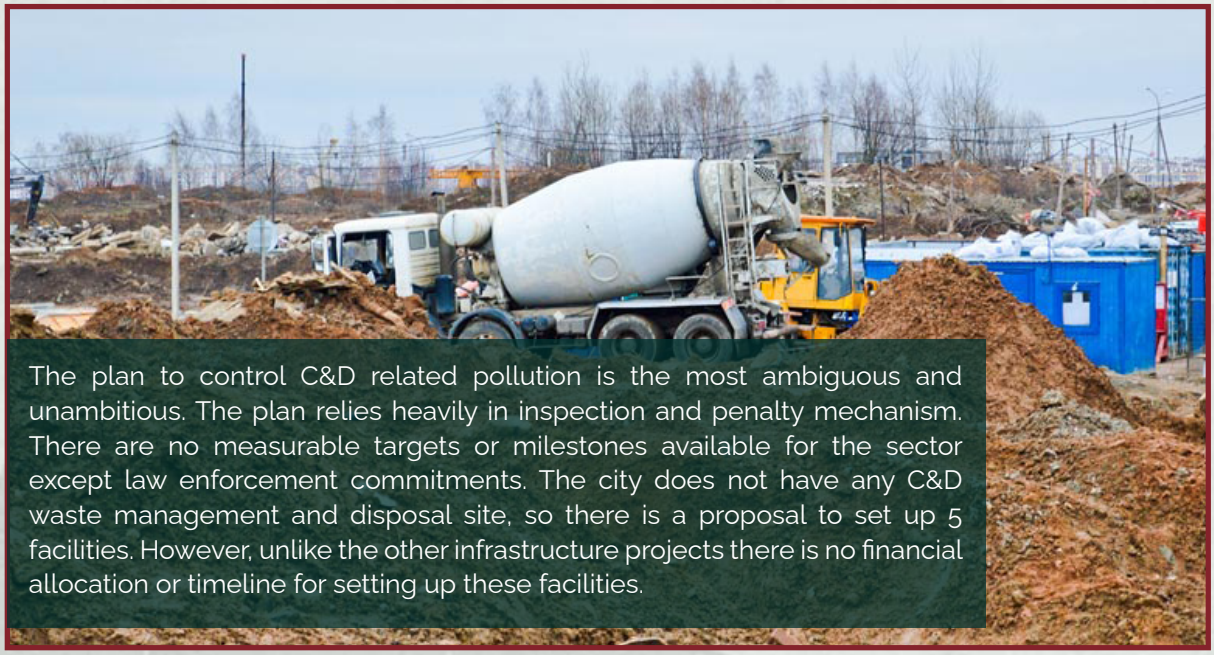
Control on Industrial Emissions

This sector has only a few suggested interventions with no budgetary allocation since most investments are expected to be made by the plant owners. Brick making is one of the key industries in the region and also a significant source of pollution. There are 38 brick kilns operating in a radius of 5kms of the city all of which use the conventional technology. The action plan proposes to convert the remaining 28 kilns to the Inducted Draft Technology by 30 September 2019. It should be noted here that the September deadline was set by the PPCB as an extension after it failed to enforce the NGT directive banning the use of conventional technology after January 31 2019[20]. There is no information available on the PPCB website on the current status of brick kilns that have adopted the new technology.

There is also a proposal in the action plan to convert 95 industries that use pet coke and rice husk as fuel to CNG or PNG[21]. However, the deadline for implementation is subject to the laying of pipeline by the company. Similarly, the proposal to shift polluting industries to designated industrial areas has been left to the wisdom of city master planners and by-laws.

19. See PPCB Circular dated 7.11.2017 wherein the board had ordered conversion to new technology by 31.3.2019 based on discussions with the Punjab Brick Kiln Association. NGT advanced this date to 31.01.2019 when hearing the matter of Anil Kumar Vs Union of India O.A No.718/2017.
20. See Annexure G of Action point 1

Control of Construction and Demolition Activities



The plan to control C&D related pollution is the most ambiguous and unambitious. The plan relies heavily in inspection and penalty mechanism. There are no measurable targets or milestones available for the sector except law enforcement commitments. The city does not have any C&D waste management and disposal site, so there is a proposal to set up 5 facilities. However, unlike the other infrastructure projects there is no financial allocation or timeline for setting up these facilities.

Diesel Generator pollution

To address the issue of increased use of D.G Sets in the city, the plan proposes to install a GIS substation and 2 transformers at a cost of 13.5 crores. There is a huge question regarding the relevance of this intervention since the state of Punjab is often faces seasonal power crisis[22]. Several districts in the state including Amritsar faced long power cuts in the summer of 2021[23].

22. 14-hour outages: Major power crisis in Punjab as demand rapidly shoots up, Times of India, July 2 2021-http://timesofindia.indiatimes.com/articleshow/84054097.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst

23. Punjab: 11 Districts Face Power Cut For 10-15 Hours Daily Amid Heatwave, News 18, July 1 2021 - https://www.news18.com/news/india/punjab-11-districts-face-power-cut-for-10-15-hours-daily-amid-heat-wave-3914684.html

Municipal Waste Mismanagement

On the issue of waste management, while the action plan acknowledges the open burning of municipal waste, it only focuses its action on the dump site management with measures like smoothing the traffic flow at the Bhagtanwala dumpsite, provide a green belt around the site and development of a scientific landfill. These measures are cosmetic to say the least, since the plan makes no commitment to implement the provisions of the MSW Rules 2016 that among other directives recommends the closure of unscientific dumpsites.

False Solutions

It was surprising to learn during the course of this research that the Municipal Corporation of Amritsar and the PPCB have also engaged in projects which are complete deviations from the commitments made under the action plan. In April 2021, the Municipal Corporation of Amritsar installed wind augmentation and air purifying units 'WAYU' at major traffic junctions of the city under NCAP at a cost of 85 lakhs and fog cannons at the cost of 70 lakhs[24].

24. WAYU units, green buffers to tackle Amritsar's pollution pangs, The Tribune, April 10 2021 - https://www.tribuneindia.com/news/amritsar/wayu-units-green-buffers-to-tackle-amritsars-pollution-pangs-237171

Conclusion

Overall the city action plan of Amritsar is replete with proposal that are bound to fail the city's ambition for clean air. One of the key areas of intervention is the vehicular pollution and this is where the plan is unambitious. The NGT's directive in the application no. 681 of 2018 to carry out carrying capacity in non-attainment cities to assess their capacity to hold more vehicles is relevant. There are several missed deadlines in the plan that require attention.

The government needs to invest in more CAAQM stations. As mentioned in the introduction, the city needs at least 18 stations. The issue of brick kiln technology shift needs to be addressed urgently without any further delay or extensions. Open burning of waste is a persistent issue which reflects on the poor implementation system in the city. One way to achieve this is by developing an integrated solid waste management system that aims at safe and scientific handling of waste from homes to recovery sites. This should include the closure of the Bhaktanwala waste site. On the issue of public transport, the city needs to focus its current investments towards upgrading existing bus network in addition to toying with proposal like CNG buses. The government could also consider expanding the city's auto rickshaw network and transitioning it towards cleaner fuel.

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