MEDIA BRIEFING NOTE

About 50 per cent of south Indian cities reeling from high particulate pollution, says joint CSE-KSPCB meet on air pollution

Bengaluru among 14 cities which are in the 'high' bracket. May slip into the 'critical' category if immediate steps are not taken

- **Joint briefing by Centre for Science and Environment (CSE), New Delhi and the Karnataka State Pollution Control Board (KSPCB) presents alarming facts.**
- **CSE analysis says Bengaluru and other cities in the southern region need second generation action, including scaling up of public transport, integrated multi-modal transport options, car restraints and walking for clean air**

Bengaluru, March 22, 2013: For cities in the states of Karnataka, Tamil Nadu, Andhra Pradesh and Kerala, improving urban air quality and protecting sustainable urban commuting practices are some of the toughest challenges. Bengaluru and other cities in the south need second generation action, including technology leapfrog, scaling up of public transport, integrated multi-modal transport options, car restraints and walking for clean air.

This analysis emerged out of a media briefing workshop conducted here today jointly by the New Delhi-based research and advocacy organisation, Centre for Science and Environment (CSE) and the Karnataka State Pollution Control Board (KSPCB).

Speaking on the occasion, Anumita Roychoudhury, executive director-research and advocacy of CSE said: "Half of India's urban population breathes air laced with particulate pollution that has exceeded the standards. As much as one third of our population is exposed to critical levels of particulate pollution. Smaller and more obscure cities are amongst the most polluted. Today's meeting was organised to find solutions to these daunting air pollution and mobility challenges facing our cities. This is part of the effort to engage to share lessons from other cities to chart the future course of action."

Speakers at the briefing included – besides Roychowdhury – H P Prakash, member secretary, KSPCB; Vaman Acharya, chairperson, KSPCB; H Paramesh, director, Lakeside Medical Centre and Hospital; and C G Anand, chief mechanical engineer, Bangalore Metropolitan Transport Corporation, among others.

At the workshop, CSE presented a set of findings and its analysis of the state of air pollution and urban mobility. The highlights are:

Air pollution crisis in the region
- **Close to 50 per cent of cities in south India are reeling under high particulate pollution.** An analysis of air quality data from the Central Pollution Control Board (CPCB) indicates that about 47 per cent of the cities monitored in Karnataka, Tamil Nadu, Andhra Pradesh and Kerala exceed the ambient air quality standards for PM10 (particulate matter 10). Three cities (Tuticorin, Vijaywada and Hubli-Dharwad) have critical levels of PM10, 14 (including Bengaluru, Nalagonda, Kurnool, Salem and Guntur) have high levels and about 17 cities (including Chennai and Thiruvananthapuram) have moderately high levels.
- **NO2 – nitrogen dioxide -- is an emerging problem.** Ten cities including Bengaluru, Mysore, Coimbatore, Salem, Madurai, Hyderabad, Thiruvananthapuram, Nalgonda and Patancheru indicate rising NO2 levels. There have been years when Bengaluru has crossed the standards.

- **There is a multi-pollutant crisis waiting to break out – benzene and ozone levels might be growing**. Available data points to high levels of other toxic gases. In Bengaluru and Hyderabad, benzene levels have gone up, while ozone levels have begun to exceed standards during summer months in Hyderabad. Data for other cities is not available, but the growing dieselization in the region is expected to add toxic diesel particulate matter to the air we breathe at a higher rate.
- **Some locations inside the cities can be called pollution hotspots**. In **Hyderabad**, out of nine monitoring locations, eight exceed the annual average standard for PM10. Out of the total locations monitored, four have critical levels – they also exceed the 24-hourly average standard by more than 50 per cent of the days monitored. CITD Balanagar, Uppal, Charminar and Paradise are some of the pollution hotspots in Hyderabad. In **Bengaluru**, of nine locations, three show over 50 per cent exceedance of the PM10 24-hourly standard. Seven locations out of nine exceed the annual average standard. Of the total locations, three are critically polluted – these include Graphite India, Yeshwanthpura Police Station etc. In **Chennai**, of six locations, three exceed the standard and the levels fall in the 'high' zone. These locations – Thiruvottiyur, Government High School at Manali and Akthivakkam -- also exceed the 24-hourly average standard 22 per cent of the monitored days.
- **Mixed trends in cities.** Between 2005 and 2010, available data shows mixed trends in cities. Some have shown significant increase, some stabllisation, and others improvement. Cities of **high increase** in PM10 levels include Salem (+107 per cent), Tuticorin (+86 per cent), Coimbatore (+63 per cent), Hubli-Dharwad (+46 per cent), Bengaluru (+41 per cent) and Kottayam (+21 per cent). Cities of **moderate change or elevated levels** include Hyderabad, Chennai, Kochi, Belgaum, Madurai, Mysore and Gulbarga. Cities where PM10 levels have **declined** include Palakkad (-78 per cent), Hassan (-59 per cent), Mangalore (-46 per cent), Kozhikode (-37 per cent), Thiruvananthapuram (-34 per cent), Vishakhapatnam (-23%) among others. Bengaluru, Salem, Hyderabad, Nalgonda and Patancheru have relatively high levels of PM10 and they also appear in the moderate category for NO2.
- **Kerala has the cleanest cities in the country**. Of the 180 cities monitored in the country for SO2, NO2 and PM10, only two -- Mallapuram and Pathanamthitta in Kerala -- meet the criteria of low pollution (50 per cent below the standard) for all air pollutants. But other cities in Kerala are now falling victim to moderate to high pollution levels. These include Thiruvananthapuram, Kottayam, Kollam, Wayanad, Alappuzha etc.
- **Particulate levels in southern cities are generally lower than other regions, but still a cause for concern.** Though the overall particulate levels are comparatively lower than the other regions in the country, they are much above the WHO guidelines. Also, the global assessments that are now available from the Global Burden of Disease estimates show that most of the health effects occur at lower levels. South Indian cities have several local pollution hotspots, and road side exposures are also high. Annual averages do not help to address the risks. Air quality monitoring would need to address these challenges and issue health advisory to people. There is absolutely no reason to think that the risk in these cities is lower. In fact, a 2011 health study in Chennai and Delhi demonstrates this: in Chennai, 0.4 per cent increase in risk per 10-µg/m3 increase in PM10 concentration, and in Delhi, 0.15 per cent increase in risk per 10-µg/m3 increase in PM10 concentration. Chennai shows higher impacts.

Vehicles are a special problem
- **High exposure to vehicular fumes.** Vehicular emissions contribute to significant human exposure. Pollution concentration in our breath is 3-4 times higher than the ambient air concentration. In densely populated cities, more than 50-60 per cent of the population lives or works near the roadside where pollution levels are much higher. This is very serious in low income neighbourhoods located close to roads. Poor have a higher prevalence of some underlying diseases related to air pollution and proximity to roadways increases the potential health effects. Road users, public transport users, walkers and cyclists are the most exposed groups – they are also the urban majority.
- **Vehicles contribute hugely to air pollution.** In Bengaluru, vehicles contribute 41 per cent of the particulate and 67 per cent of nitrogen oxide levels in the air. In Hyderabad,

vehicles contribute 47 per cent of the particulate matter. In Chennai, vehicles contribute 14 per cent of the particulate matter and 68 per cent of nitrogen oxides.

- **The new shocker -- diesel emission is a class 1 carcinogen**. The International Agency for Research on Cancer (IARC), a wing of the WHO has said that diesel engine exhaust can certainly cause cancer, especially lung cancer, in humans. This finding comes at a time when India has failed to adopt a clean diesel road map, prevent use of under-taxed and under-priced toxic diesel in cars, and reduce its overall consumption in all sectors. Governments in Europe, the US, Japan and other countries are leapfrogging to clean diesel. Diesel is considered relatively cleaner when advanced emissions control systems are used with diesel fuel with 10 ppm sulphur content. But the diesel sulphur level in India is as high as 350 ppm. Only a few cities have 50 ppm sulphur diesel – which is five times higher than the global benchmark.

- **Need stringent technology roadmap:** It is extremely worrying that even after the implementation of the Auto Fuel Policy in 2010 which introduced Bharat Stage III in the country and Bharat Stage IV in 13 cities, the government of India has not set the next target for moving quickly to Euro VI emissions standards. Therefore, new automobile production and investments in the country are not even linked to any further commitment to improving vehicle technology and fuel quality. This will significantly delay adoption of clean diesel technology in the country and add to the toxic risk. In fact, by the end of the 12th Plan, the so called modern diesel technology in India will be 17 years behind Europe! Cities need early timeline for introduction of Euro V and Euro VI emissions standards.

Mobility crisis

Cities are paying a very high price for congestion. Traffic jams lead to fuel wastage, more pollution and serious economic losses. A normal commuting time has increased significantly during peak hours. On many arterial roads the traffic volume has exceeded the designed capacity and the service level of the road. A quick glance at the city development plans and other sources bring out the nature of mobility crisis in the cities.

- **Bengaluru:** CSE analysis of motor vehicle registrations in Bengaluru indicates that more than 1,200 vehicles are registered every day; of these, 250 are cars and close to 900 are two-wheelers – thus, two-wheelers and cars make up 90 per cent of the total registered vehicles. The vehicle stock in Bengaluru is half of that of Delhi, but the city is already badly gridlocked. Travel speed has dropped to 15 kmph during peak hours, there are no parking spaces left. Traffic on most roads is 2.5 times higher than the capacity. An average citizen of Bengaluru spends more than 240 hours stuck in traffic each year resulting in loss of productivity, reduced air quality, reduced quality of life, and increased costs of goods and services. Travel by public transport is falling -- the present modal split of 54 per cent in favor of public transport is estimated to fall to 49 per cent by 2025.

- **Chennai:** Vehicle population in this city has increased from less than 5 lakh in 1991 to over 30 lakh now. Cars and two-wheelers make up approximately 75 per cent of the total vehicular fleet on road. Two-wheelers, in fact, have seen a phenomenal growth from 4 lakh in 1991 to 21.6 lakh in 2009. Average vehicles per household have increased from 0.25 to 1.26, indicating significant motorisation. An average of more than 800 new two-wheelers are registered every day in the city -- if we consider two-wheelers, then personal motorization in Chennai is higher than that of Mexico city.

- **Hyderabad:** About 9-10 per cent of the city's total area is under roads. Average peak hour journey speeds can be as low as 12 km/h, resulting in delays at intersections, waste of time and energy, and high emissions. The vehicle density in Hyderabad is 720 vehicles per km of road (passenger car units per km of road) compared to 290 in Chennai and 240 in Mumbai.

- **Cities of south India should learn from Delhi's experience** -- Delhi has not been able to solve its problem of pollution and congestion by building more roads and flyovers for cars. Delhi is most privileged to have more than 21 per cent of its geographical area under road space, and has built the maximum roads and flyovers. Yet its roads are totally gridlocked. Peak hour traffic has even slumped to below 15

km/hour. Cars and two-wheelers in Delhi occupy 90 per cent of the road space but meet less than 20 per cent of the travel demand. At the national level, more than 70 per cent of the investments have been made in car-centric infrastructure including flyovers and road widening. The investment in pedestrian and bicycle infrastructure is not at the desired scale. In Bengaluru, out of the total plan outlay on transportation and traffic, the share spent on pedestrian facilities is a meager 0.6 per cent.

- **There is a severe parking space crisis**. Not only are vehicles taking over roads, but also the urban space to meet the insatiable demand for parking. It is estimated that in Hyderabad, the land requirement for parking is more than 100 football fields a year (based on cars registered during 2006-07). In cities like Bengaluru and Chennai, about 17-23 per cent of the road length is being used for parking; in other relatively smaller cities, over half of the road length is being used for parking.

Impacts – health, global warming
The latest Global Burden of Disease report has ranked air pollution as the fifth largest killer in India. Several studies have been carried out in Hyderabad, Bengaluru and Chennai on health impacts of air pollution, and stunning evidences are available of health impacts on traffic policemen who are directly exposed to traffic pollution in these cities.

In 2008, the KSPCB along with Enzen Global had released the Greenhouse Gas Inventory of Karnataka. This showed that emissions of both greenhouse gases and health-damaging local air pollutants have been increasing in Bengaluru. Two-wheelers accounted for 56 per cent of the carbon monoxide emissions; local air pollutants and heavy-duty diesel vehicles accounted for 60 per cent of the carbon dioxide emissions. Without interventions, the levels of particulate matter, carbon monoxide and carbon dioxide are expected to double over the next decade. According to the report, petrol and diesel consumption increased during the assessment period (1997-98 to 2005-06).

Challenges of bus reforms in southern cities
Buses will play a crucial role in the mobility transition in the big and medium rung cities. Cities need well managed, well organised modern buses that deliver efficient public transport services at affordable rates. A bus occupies twice the road space taken by a car, but carries 40 times the number of passengers. The bus can displace anywhere between 5 and 50 other vehicles and allow enormous oil and pollution savings.

In 2005, the Asian Development Bank had estimated for Bengaluru that an increase in bus share to 80 per cent will save about 21 per cent of the fuel consumed in the base case; lead to 23 per cent reduction in total vehicles, free up road space equivalent to taking off nearly 418,210 cars from roads, reduce CO_2 emissions by 13 per cent, and bring down PM levels by 29 per cent and NOx by 6 per cent.

The bus stimulus scheme of the JNNURM programme has catalysed central government investment in bus rolling stock. Bengaluru, Chennai, Mysore, Coimbatore, Vishakapatnam and Puducherry are some of the key beneficiaries under the programme. However, bus reforms and investments are just not about buying new buses, but also about efficient deployment of reliable and attractive services. Cities require immediate improvement in service level in terms of frequency, reliability, coverage, reliable information, ticketing system, signaling, etc.

New barriers: Fuel trap for bus transport
- **Bus pays higher price for diesel than cars:** For cars, diesel prices are increasing slowly – 50 paise at a time. But for bulk buyers like buses, this has been hiked by 10 per cent. High fuel costs are a very important input of operations -- in Chennai, fuel cost is 29 per cent of the total operational costs. In Bangalore, it is 38.6 per cent. Delhi has big bus fleet but comparatively lesser fuel costs mainly due to the use of cheaper CNG. But CNG cost has gone up three times since 2002. Addressing fuel cost of the bus agency is necessary. Over a period of time, the higher price for diesel would lead

to increase in fares. This, in turn, will lead to steady erosion of ridership and switch to two-wheelers whose operational cost is as low as Re 1 to Rs 2 per km.

- **Buses pay more taxes than cars:** A CSE review shows that almost all state governments tax buses higher than cars. The Bangalore Metropolitan Transport Corporation (BMTC) pays taxes to the tune of Rs 1.65 per kilometer, which amounts to approximately 10 per cent of its total variable costs. Additionally, taxes on inputs required in the bus service like spare parts, tyres, tubes etc amount to another 2 per cent.
- **Poor fuel economy of buses leading to fuel guzzling and adding to fuel costs:** The BMTC has carried out detailed assessment of the trends in fuel economy over time. The analysis shows that while moving from Euro II to Euro III technologies, the increase in power, torque, and performance – without fuel economy norms – has ed to fuel economy penalty. To this is added the problem of idling, frequent acceleration and deceleration on congested roads. This costs huge money to the bus company. Bus transport corporations are looking at many ways of reducing fuel consumption. A recent study by CAI Asia shows that by reducing idling by 10 minutes, the BMTC can save 100 litres per bus or Rs 3 crore annually. Also, with the help of improved drivers training and maintenance, a saving of Rs 23 crore annually is possible.

Southern cities have begun to act
Most of the key cities in the region have already initiated their first generation action. They have phased out leaded petrol, introduced Bharat Stage III standards and Bharat Stage IV standards, introduced LPG in small vehicle segments like the autos and taxis, notified lubricant standards for two-stroke engines, bypassed heavy duty trucks during day hours, strengthened pollution control efforts in other sectors and so on.

This first generation action has helped many of the cities to stabilize their air pollution problem. But they are in danger of losing the gains as particulate pollution levels are once again rising and are elevated and newer pollutants like nitrogen dioxides are also rising steadily. The cities now face the second generation challenge.

Despite growing dependence on cars, walking and cycling and public transport still dominate travel in southern cities. In Bengaluru, Chennai, Hyderabad and Kochi, walking, cycling and public transport trips make up 73-76 per cent of all road trips -- Kochi has the highest share with 78 per cent. Car trips form only 8-10 per cent of the total trips in these cities. The share of formal public transport is the highest in Kochi at 51 per cent, followed by Bengaluru at 35 per cent and Chennai at 31 per cent.

This is the low-polluting and low-carbon mobility paradigm that the world is trying to achieve today to be more sustainable. Cities must be made conscious of this strength. But alarming trends are coming up -- a study conducted by Wilbur Smith Associates for the Union ministry of urban development indicates that cities like Bengaluru are already reaching the tipping point where car trips are over-running walking and cycling trips.

What should we do?
- **Make livable cities to cut toxic emissions.** Our cities still have the chance to plan their future growth differently and avoid the path of pollution, congestion and energy guzzling. More road space is not the answer. Cities need to make maximum investment in redesigning their existing road space and travel pattern and achieve compact urban form to provide the majority of the people affordable and efficient mode of public transport that can be an alternative to personal vehicles. Reducing personal vehicle usage, upgrading public transport, walking and cycling, and leapfrogging vehicle technology are the key options left for us. Plan cities for people, not vehicles. Design roads for public transport, cycling and walking, not cars.
- **Strengthen air quality, health monitoring and risk communication**. Review the monitoring network keeping in mind the growth in pollution, population exposed and newer challenges like ozone, PM2.5 etc. Strengthen monitoring, deploy air quality

forecasting modes, implement an air quality index system and health advisory for informing people about ill effects of poor air quality.

- **Tighten fuel quality and emissions roadmap to ensure that pollutants are cut at source**. Introduce Euro V and Euro VI on a nation-wide basis with an early timeline. Strengthen emissions checks on in-use vehicles.
- **Scale up and accelerate bus transport reforms.** Integrate public transport and non-motorised transport like cycling, walking and para-transit systems.
- **Build pedestrian infrastructure**. The government should mandate pedestrian plans and make it conditional to infrastructure funding. Investments must be linked with explicit pedestrian and cycling plans. The relevant laws will have to be harmonised and strengthened for more direct legal protection of pedestrian space and rights. We need a comprehensive Road Users Act for targeted pedestrianisation; segregation of space by users; a system of penalty to prevent encroachment in pedestrian space; prevent usurpation of pedestrian space for motorised traffic without proper justification. Implement walkability audits. Public transport plans must include pedestrian plan for multimodal integration. We need a zero tolerance policy for accidents.
- **Enforce parking controls, rationalise parking charges on cars**. Experience from around the world shows that parking controls, parking pricing along with taxes top the list as the first generation car restraint measures worldwide.
- **Use tax measures to discourage personal vehicle usage and inefficient use of fuels**

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