

1           **“Towards A Sustainable Transportation System for the COVID-19**  
2           **Recovery Period”**

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4       **A White Paper by:**  
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24      ***Preferred Citation:** Verma et. al (2020), “Towards A Sustainable Transportation System for the COVID-19 Recovery Period”, Un-published White Paper, Transportation Engg. Lab., Dept. of Civil Engg., IISc Bangalore, India.*  
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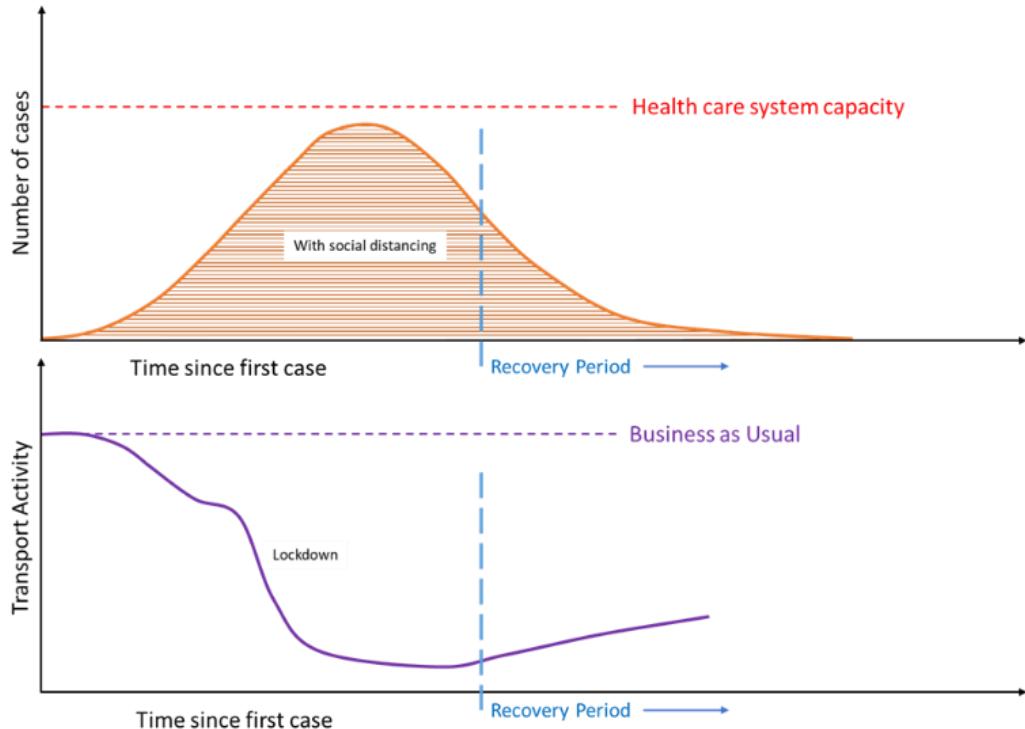
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28      **THEME OF THE WHITE PAPER**

29      Currently, the country is in lockdown till 14<sup>th</sup> April 2020 in an attempt to prevent the community spread  
30      of pandemic coronavirus COVID-19. The lockdown may further extend depending upon containment  
31      level. We have witnessed substantial portion of the population going into self-isolation. People from  
32      majority of employment sectors, educational and several other affiliated areas have adopted the Work-  
33      From-Home (WFH) option as a regular activity. Another major portion of the population that include  
34      migrant laborers, vendors are now returning to their native places. These scenarios have led to a huge  
35      amount of inter-nation and intra-nation travel. After the lockdown, we move into a recovery period, where  
36      people from all demography and strata will again start commuting to their daily work. In any case, if the  
37      transportation infrastructure is unable to meet the travel demand during that period, it may generate woes  
38      for common people as well as the government agencies. Along with the movement of people, proper  
39      mobility of essential food, freight and medical support has to be ensured. Thus, rises the need for efficient  
40      transportation planning and policy recommendations that not only serve the demand but do so while still  
41      ensuring sustainability in terms of environment, economy and resources.

42      **NEEDS OF THE HOUR**

43      India is currently between human-to-human spread and community spread phase of the Coronavirus. A  
44      major fraction of countries like us are under lockdown to prevent the spread. It is expected that after the  
45      end of the peak phase, we will move into post-peak phase, where the COVID-19 disease levels should

drop below peak observed levels. The pandemic activity should decrease followed by post-pandemic period, when the disease activity will return to normal levels. This post-peak phase or otherwise termed as the recovery period is critical since the arrival of another wave is probable. The outbreak intensity or the resurgence during recovery period is unpredictable, and we should take all possible steps and planning efforts keeping in mind this unpredictability. The transition to recover period will start somewhere during the second half of the COVID curve as shown (*Covid-19 is now in 50 countries, and things will get worse*, Feb 29<sup>th</sup> 2020 edition, The Economist). The figure also illustrates the way transport sector activity will be affected by this pandemic situation.



**Figure 1 Transport activity and COVID curve**

Transport sector serve as the nerves to any country and the importance of an efficient transportation infrastructure planning during the recovery and post-recovery stages goes a long way in dealing with the disease and related fear properly. It is very important for the public transit agencies to assure the commuters that using public transit is safe during this period. They also have to deal with a sudden rise in travel demand as the population so far in isolation will attempt to disperse and move back to their job/working locations. The major objective of transit agencies is meeting this travel demand while maintaining a safe environment for commuters. However, doing so will require additional investments on resources which might be a burden on the already constrained agencies.

In the current state of crisis, we have realized the importance of seamless movement of people and goods. Foreseeing the massive movement of people across the borders of different states post the announcement of lockdown, the planning should be done with clarity. India is a huge country with one-quarter of the population living below the poverty line. These people migrate to bigger cities to sustain their daily living. Surely, locking down cities without taking them into confidence would have made this already vulnerable population more anxious. To add to this lack of coordination between states, as was seen when one state announced complete lockdown and the other state announced transportation for these workers did not help the cause. Another important thing that comes up during the lockdown period is the sturdy supply of food,

medical supplies and other emergency goods to the population. Once we are able to flatten the curve (hopefully soon) and we are out of this lockdown, we need to be extra vigilant not to be caught up in this vicious circle again. This is especially true since most of the pharmaceutical companies are predicting a timeline of 12-18 months for vaccines to reach the mass population. During that time, it becomes very important that people maintain social distancing so that the curve keeps going downwards. However, this lockdown has hit our economy hard and has made our lives come to a standstill. Educational institutes are shut, IT firms are working at lower productivity and are reporting huge losses, small and medium businesses have taken a hit, daily wagers are not earning anything, etc. Hence, once the lockdown is over everyone would want to resume the normal business as soon as possible which would mean higher pressure on our already depleted transport network. Therefore, we believe it becomes imperative to come up with some policies to reduce the demand on the transportation network or gradually induce the demand into the network. This situation has to be overseen and planned accordingly and various transportation policies have to be developed for the safer mobility of the people and efficient transport of goods.

It is therefore of paramount importance that, agencies plan in advance to reformulate or reinvent their policies to meet the travel demand, safety and convenience standards within the existing constraints during this recovery period. Agencies should initiate transport planning for recovery period as operating public transport (buses and metro) with full capacity might be risky; on the other hand, increased usage of private transport might lead to other transportation issues such as traffic congestion, pollution, etc. Co-ordinated demand management is necessary for such situations. A comprehensive framework should be developed, and various scenarios should be assessed before implementation. The following section gives a brief overview of the points that can be thought of while drafting the policies

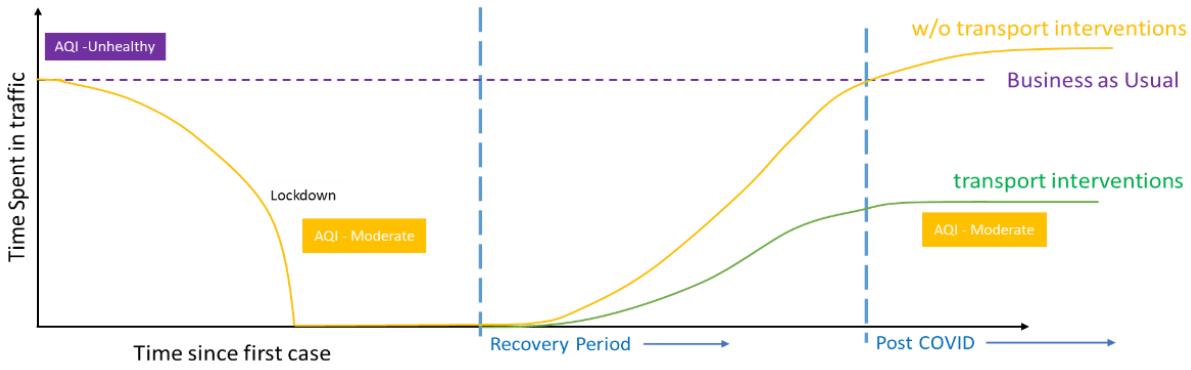
## **RECOMMENDATIONS AND SUGGESTIONS**

### **Regaining the Public Trust**

It's essential to let the public know that all transit agencies are aware of and concerned about their safety. This will involve communicating and educating the employees about the possible safety measures, regular surveillance and tracking of employees, carrying out extensive disinfection program of transit units and ensure social distancing policies within their workplace. These measures are very essential to re-gain the trust of the public and attract them towards using the public transit system again. Steps should be taken to create awareness and overcome the apprehension of the public to traveling in public transport for fear of higher chances of infection through advertising. Another possibility is to pass on the information regarding sanitization and other measures being carried out. Thus, psychologically assuring the public to ensure better acceptance of public transport vehicles. Agencies should ensure that social distancing norms are maintained inside the public transport vehicle during the recovery period as well.

### **Travel Demand Management**

The recovery period and post-recovery period might lead to an imbalance in demand and supply. The rush of traffic, inter-state as well as intra-state where people would want to return to their workplaces/educational institutions. Railways and long-distance buses would need to run special services to cater to the increased demand. However, maintaining social distancing in public transit and the fixed fleet size might pose difficulty for the operators in catering to the demand. The usage of private vehicles will rise and commuters may still be reluctant to use public transportation facilities. But these issues can be addressed through strategic interventions. These interventions are expected to increase the sustainability as illustrated in Figure 2.



1  
2 **Figure 2 Effect of transport interventions during the recovery and post-recovery period**

3 The social and economic characteristics in our country is highly heterogeneous. Highly skilled individuals  
4 can work from home. Whereas, most workers such as daily-wage laborers, people in the construction  
5 sector, transportation, and retail, which constitute a major portion of the workforce, can hardly work from  
6 home. During the recovery period, the highly skilled workforce as well as university affiliated students,  
7 academicians, major businesses can continue using the digital platform as a medium to continue their  
8 activities. This, in turn, would reduce the usage of private vehicles. Agencies should meet the travel  
9 demand of unskilled and lowly skilled workforce with priority. Migrant labor has been severely affected  
10 by the recent lockdown, with some of them having to travel hundreds of km on foot. For the immediate  
11 future, their employees (many real-estate companies among them, apparently) need to guarantee a safe-  
12 space for them during any lockdown in the immediate future. We have earlier read a lot about staggered  
13 work schedules to decongest our urban roads. Here, we can propose to stagger the resumption of normal  
14 business. For example, let migrant daily workers start first while every other institute or firm continues to  
15 work from homes and schedule accordingly. This might, however, be difficult to implement considering  
16 that every unit will be eager to hit the ground running.

17 ***Regional, Inter-city, Inter-state Transportation***

18 The primary question that the authorities must seek is “how many people actually need to opt for regional,  
19 inter-city or inter-state travel during the recovery period”. The government should immediately start  
20 identifying the different sections of people that may opt for such travel and start quantifying the respective  
21 travel demand. The agencies must get an approximate estimate of this travel demand. Only then, we can  
22 think of judiciously allotting the demand to different networks and modes. Also, identifying the travel  
23 demand by different sections will give an approximate estimate of the commuters’ willingness-to-pay and  
24 modal preference. For example, airlines may choose to ignore the travel demand of lower income groups  
25 as they will prefer to travel via train or bus. For ensuring social distancing, operators should run services  
26 half the capacity. This can be done in several ways. For example, a six-seater row in commercial aircrafts  
27 may carry 4 people, such that a distance of 1 seat remains between each traveler. Similar concept can be  
28 translated to buses. It is imperative that all unnecessary, leisure and vacation travels remain suspended.  
29 GOI should take an initiative to collect information from all the people who want to travel back to their  
30 job location. This should include origin, destination, preferred mode and tentative date of joining (if  
31 possible). Based on this data the entrusted authority can plan the interstate travel, controlling the demand,  
32 staggering the flow and scheduling the trains. The data can be collected using an online form or reporting  
33 to the local government body.

34 Air traffic demand has grown at a high rate in our country. Once aircrafts start running at half the capacity,  
35 the demand is expected to double during this period. Thus, sensible planning and monitoring will be  
36 required to control and manage the increased air traffic. The air service can be first opened for cities with

no or negligible new cases of COVID-19 i.e. that are safer to travel. Health forms can be used to keep track of passengers. Stepwise and coordinated demand management can be done based on different sections and type of travelers. Services should resume in phases for different tiers of cities. For example, tier-1 cities should resume air travel followed by tier-2 cities and remaining airports. In this way, air routes with higher demand should be opened first and the rest can follow later. Air traffic sectors can be dynamically optimized and expanded to accommodate more routes connecting the tier-1 cities. Also, all temporary no fly zones should be converted into temporary fly zones during this period. These interventions may be helpful in increasing the airspace capacity and in turn accommodate a greater number of flights. These changes must be done keeping in mind the workload of air traffic controllers and area control centers. Workforce and resources should be managed accordingly.

Since trains are the most preferred mode of travel in our country, government and affiliated agencies may need to put extensive focus on it. In trains, no more than 4 people should be allotted in an 8-seater cabin. However, such regulation can be applicable for reserved classes only. For unreserved classes, it will be a bigger challenge. A sensible way is through strict reinforcement. Such reinforcements should also forbid daily travelers from getting in reserved compartments. Adequate number of security personnel should be provided in every train to facilitate this. Any such regulations will reduce the capacity. In this scenario, agencies may think to replace AC classes (which has lesser capacity than sleeper) by sleeper classes in trains with higher demand. RAC should be done away with and no WL passengers should be allowed in. Because the maximum number of coaches in a train can be 24(ICF type)/22(LHB type), on a case by case basis, vary the number of reserved coaches and increase the number of unreserved compartments in popular trains to prevent overcrowding. As senior citizens are more vulnerable, separate coaches can be allotted for them during recovery period with limited seats. Agencies may also reduce the reservation window to 7-15 days to facilitate only the essential/urgent travel (and discourage people from travelling otherwise) till the situation gets back to complete normalcy. High demand corridors should be identified and rolling stock should be reallocated accordingly. The operators should increase stoppage time of any train to prevent panic and crowding of people near gate for getting in/out. This will also add to social distancing.

Similar strategies and interventions could be thought for bus travel. Buses can play an assisting role to trains during this period. Road networks running parallel to high demand train corridors should be identified and bus fleet should be reassigned to those networks. Such strategies may help in distributing the demand along the corridors. The norms for social distancing and safety should remain same. All bus stops along the corridor should be fixed and under strict reinforcement to avoid people forcefully boarding buses and disturb the social distancing norms. All these measures require rescheduling and redistribution of services and system characteristics. After that, stepwise demand allocation and management needs to be carried out. Thus, a strong governing body that communicates with all tiers of transportation, planning and administrative agencies may be established to plan, execute and ensure the discussed interventions. The governments must also plan to provide the appropriate subsidy/relief to operators, majorly private airlines and bus operators as, they will be concerned to run services under half the capacity (to ensure social distancing) and incur losses.

#### **40      *Urban Transportation***

In case of cities too, we may apply the concept of controlled demand management. For example, instead of opening the road space for the entire community at one time as it is risky, essential commuters can be segregated from work from home population and given priority in initial days followed by other sectors. Staggering of work hours for education and employment can also enable wise utilization of road space avoiding congestion. This way travel demand can be controlled. Recreational activities such as cinemas, parks, etc., can be restricted for the initial few days. The door-step delivery of essential goods can also be

1 extended for initial days to avoid a greater number of trips. In case the administration opts for a phased  
2 introduction of public transportation facilities for different segments of workforce, implementation should  
3 be done from the local perspective. Different cities in the country have different workforce composition  
4 with specific requirements which must be taken into account. Nevertheless, priority on the travel  
5 requirements of daily wage earners, laborers, low-income group people, etc. remains over those who can  
6 be in a position to carry out their work remotely, or from home itself. To achieve this, travel cards may be  
7 issued to a specific category of workers which could be used all across various modes of public transport  
8 available within the city. The fares may be regulated to favor people intending to travel longer distances,  
9 rather than very small distances. A possibility could be to increase the fleet size by collaborating with the  
10 private bus operators as well as IT company bus operators. The bus corporations already have the data on  
11 the demands from and to different parts of the cities. Combining it with the socio-economic data would  
12 suggest which routes to prioritize in the immediate future. Since the cities are already emptied of most of  
13 their tech workers and migrant labor, it would be possible to not cram the public transport as before.

14 WFH possess challenges and not possible for all the schools/colleges. Since many schools already have  
15 some kind of transport facilities available, the authorities could temporarily take control of them and also  
16 lend some additional buses to maintain social distancing. Strict guidelines must be provided for the schools  
17 before reopening them. Travel for small children may be minimized by encouraging formation of local  
18 citizen groups for teaching kindergarten children. Schools may be held in multiple shifts to minimize  
19 overlap of school timings with work timings of people. Wherever possible, online learning may be  
20 encouraged. It will be important to sensitize children to maintain social distance while being in the  
21 presence of other children. It is likely to be a challenge to convey the importance of and assist them in  
22 following, the guidelines of maintaining social distance. Dissemination of all the information related to  
23 the modified transportation policy should be conveyed in precise terms to the public via newspapers,  
24 television, radio, hoardings, banners, etc.

## 25 **Infrastructure Modifications and Improvements**

26 Agencies should start looking for better safety guidelines and regulations for crew members running the  
27 transit service. This should be maintained by Scheduling Department of respective Transit Services.  
28 Temporary testing facilities may be introduced for round the clock monitoring. Depending on the  
29 feasibility, testing could be done either for a random sample or for the total population. Agencies may also  
30 start issuing immunity passports. Immunity passports are for those people who have got the disease and  
31 have been cured. In this way, people who have been cured now have the antibodies and can get back to  
32 their normal life as much as possible. This is apparently being thought of in the UK (Myriam Toua, Apr  
33 3, 2020, *Immunity Passport: What is an immunity passport? Can I get one?* Daily Express). This should  
34 help the authorities in maintaining safety standard among commuters. Infrastructure modifications to  
35 existing major terminals and transfer stations facilitating regional travel may be limited due to lower  
36 flexibility of structures, routes and lack of resources. However, additional temporary security check-ins  
37 should be started at all airports as well as major bus and railway terminals. These terminals and transfer  
38 stations will also require additional deployment of security personnel to ensure proper reinforcement and  
39 discipline.

40 In cities, transit agencies may start implementing Smart card or QR-based ticketing (National Common  
41 Mobility Card) i.e. inter-operable transport cards with TAP AND PAY option. For example, both BMTC  
42 and BMRCL have closed-loop smart card system (two separate cards to travel in bus and metro) and online  
43 ticketing system which can be enforced as a mandatory option to travel in public transit during recovery  
44 period even if it is difficult to come-up with an open-loop system (common mobility card). These smart  
45 cards with tap and pay option can enable one to enter bus by simply tapping on the ticketing machines and  
46 to pass through metro automatic fare collection gates thus, avoiding queues in ticketing counters or

1 avoiding physical contact due to exchange of cash. Bus operators can enhance the existing handheld  
2 ticketing machines which can be fixed static at the entrance of buses so that when people enter can tap the  
3 card on the ticketing machine and then take the respective seats. The cards can be distributed through  
4 respective employment centers, or educational institutions which should be easy to download online  
5 through registration. The enforcement can be made mandatory for at least 30-45 days. However, the ease  
6 of use and distribution of this card to daily wage community is a challenge. For them, we can make use of  
7 kiosk centers similar to Akshaya centers as registration locations for smart cards and enforce distancing  
8 by using a token system. This will avoid physical interaction.

9 Agencies should identify the corridors for introducing temporary Bus-Priority Lanes (BPL). Major road  
10 corridors such as ring-roads, radial roads and other arterial roads where it is feasible to introduce BPL can  
11 be identified and these roads can be properly segregated using semi-mountable kerb stone line or marked  
12 (road marking) as per guidelines to ensure proper usage of BPL. It is also important to convey the corridors  
13 with BPL beforehand to road users. This measure might help in reducing the travel time and encourage  
14 people to use public transit. The demand can also be managed by increasing the frequency of the buses.  
15 Setting up temporary bus stations at optimum interval (say about 300m) based on the locality might help  
16 commuters to reach bus station by walking and can ensure social distancing. Again, the information should  
17 be properly conveyed to road users beforehand. Public transit can be operated with the occupancy level of  
18 50% considering both seating and standing capacity. Proper marking can be done inside the bus guiding  
19 the passengers and tapes can be used as barriers to maintain safe distance. The existing apps can be  
20 enhanced to give information on bus schedules, timetables and intervals using existing GPS in the bus.  
21 This way crowding in the bus stations can be avoided. Digitalization of connectivity might be important  
22 for seamless movement of people so as to keep the system moving. This should also make sure that people  
23 do not have to wait at stations and terminals. The situation also needs public transportation with lesser  
24 load factor so as to maintain social distancing, but we cannot afford to increase our fleet (nor we have the  
25 time to do that). This makes proper scheduling with higher frequency of operations very important.

## 26 **The Latent Challenges**

27 The lockdown will have permanent effects on the economy as workers will lose jobs from closing  
28 businesses eventually depressing aggregate demand. Firms more dependent on cash flows will lack  
29 liquidity that may lead to bankruptcies. This may create an imbalance between market demand and supply  
30 leading to a substantial destruction of economic surplus. It is said that ‘for health, isolation has positive  
31 externalities whereas for the economy, isolation has negative externalities’. Therefore, maintenance of  
32 regular cash flow and ensuring the mobility of stakeholders that are responsible for keeping the market  
33 stable is very essential. The government and affiliated transportation organizations must not forget this  
34 latent factor while preparing a comprehensive plan for the recovery period. Not only this, operation of  
35 transit system at reduced fixed occupancy levels can burden the service providers. Therefore, they should  
36 be given emergency fund support or waived from paying taxes for at least three months by which they  
37 will be able to regain their ridership. Additionally, the government must ensure that the smooth and  
38 uninterrupted flow of medical resources, food, and essential amenities must not get affected by any  
39 upcoming planning initiatives or policies.

## 40 **CONCLUSIONS**

41 The recovery period post lockdown is going to bring several challenges to government and transportation  
42 organizations. They include, managing the rising inter-city and intra-city travel demand, maintaining  
43 smooth uninterrupted flow of medical resources, food, and essential amenities. Public transport agencies  
44 have to also ensure that they regain the trust of public by ensuring all safety protocols such as social  
45 distancing to be followed in transit. These measures are crucial to deter people from using private vehicles

1 that may lead to increase in pollution and congestion creating further woes to administration. Planning  
2 efficiently and precisely well ahead in time is significant to establish a sustainable transportation system  
3 during this time. This white paper offers several insights into the points that should be kept in mind while  
4 drafting the policies. All the strategic interventions are broadly categorized into four sections. The first  
5 section discusses about possible ways that may be taken by agencies to re-gain the commuter trust and  
6 attract them back to public transit. This will involve informing the public that all safety norms are followed  
7 inside the workplace, in-transit and among employees. Steps should be taken to communicate these points  
8 effectively to the people through advertisement, news, television etc. The second section discuss the likely  
9 measures to manage the demand post lockdown. Focus is given on estimating the approximate demand  
10 for different sections of people, and allocating them on different modes of travel such as air, trains and  
11 buses accordingly. High demand networks should be identified and reallocation of existing fleet is needed  
12 during this period to manage the demand. Emphasis is laid on implementing staggered work-hours,  
13 staggered business schedules along with prioritizing the movement of unskilled and low-skilled  
14 workgroup. Simultaneously, initiating the movement of school children and staff through separate  
15 channels like school buses is advised. Third section explains several infrastructure modifications that may  
16 be incorporated as temporary measures to help implement the discussed interventions. Possible measures  
17 include, temporary Bus-Priority Lanes (BPL), temporary bus stations, markings for passengers to maintain  
18 safe distance and implementation of smart-cards or QR-based ticketing etc. The lockdown has imminent  
19 effects on economy. The fourth and final section advises the mobility of stakeholders responsible for  
20 keeping the market stable. Additionally, government should take the responsibility of subsidizing transport  
21 agencies through measures such as waiving of taxes, providing emergency relief fund to take the burden  
22 off them. Now lies a difficult task in front of all administrative agencies for resuming the normal day-to-  
23 day activities in a sustainable and systematic way. The discussed interventions should help them in this  
24 approach. However, executing these measures require strong integration between government and all  
25 levels of transportation agencies, which at this stage is needed more than ever.

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29 **White Paper Released on 10<sup>th</sup> April 2020**