



## YOUTH FORUM

Efforts towards a greener New Delhi:  
The Odd-Even Plan and its aftermath

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# Efforts towards a greener New Delhi: The Odd-Even Plan and its aftermath<sup>1</sup>

## Introduction

With the development of industrial production in the past 200 odd years, our dependence on energy sources dug from the ground has grown exponentially. Known as ‘fossil fuels’, these sources have originated from the decayed remains of plants and animals. Generation of fossil fuels is an activity which occurs at an everyday level, but we are using fossil fuels stored over hundreds of millions of years in a few hundred years. Moreover, fossil fuels harm the environment by releasing harmful gases as well as increasing the temperature of earth’s surface, hence harming its biodiversity. The aforementioned factors necessitate the need for some serious reduction in our fossil fuel usage.

This report aims to understand the policies undertaken in New Delhi to reduce petroleum products, focusing on the odd-even plan and the subsequent environmental concerns in the city. The project included a detailed quantitative and qualitative survey of over 150 people and their responses regarding their vehicle ownership, their travel patterns and their opinions about the plan. Through the survey, it depicts how the different identities of the respondents was instrumental in their responses to the plan. This study shows class as the primary point of difference among the respondents towards their understanding of the odd-even plan. It argues that such differing positions must be transcended as a society to make New Delhi a greener city.

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# **1. Background of the study**

## **1.1 Policies in favour of alternative and renewable energy in New Delhi – a brief overview**

Delhi is the national capital of India, is jointly administered by the central and the state governments. It accommodates approximately 167.5 lakh people (2011 Census of India). The haphazard growth of the population are deteriorating the environment. There has been highly unplanned development of industries and factories. This section would discuss the steps taken by the state government of Delhi through policies, legislations, and judgements to bring about alternative and renewable forms of energy. Our main focus of study will be the CNG and solar energy policies; we will also look at other policy decisions in brief which aim to diversify Delhi's sources of energy as well as the effectiveness of such measures.

### **1.1.1 Compressed Natural Gas (CNG)**

In the 1990s, Delhi had come to be one of the most polluted cities in the world. The number of Delhi's vehicles had exceeded the combined vehicle count of Chennai, Mumbai and Kolkata and vehicular emissions contributed to around 60% of the total air pollution. [Wakdikar, 2002] The process of transformation of fuel from Diesel to CNG began as a result of the initiation of "judicial activism", where the courts enabled any public spirited citizen to move the courts on behalf of any person(s) who may not have the social and financial capacity to move the courts themselves. A Public Interest Litigation (PIL) filed in 1996 by an environment activist lawyer MC Mehta in the Supreme Court of India. As a result, the Supreme Court set up the Environment Pollution (Emission and Control) Authority, on whose recommendation orders were issued in 1998 to phase out vehicles of 10 years running and for public transport buses and auto rickshaws to switch over to the fuel mode of CNG by 1st April 2001. [Mehta 2001]

Despite widespread protests by the locals, the policy was fully implemented some months later and has since then earned the approval of the population. [Narain and Bell, 2005] CNG has a significantly lesser emission; to be more precise, compared to petrol and diesel, it emits CNG vehicles emit 40% less of nitrous oxide, 90% less of hydrocarbons, 80% less of carbon, and 25% less of carbon dioxide (a major greenhouse gas). Also, its engine emits lesser noise as compared to a diesel engine, which proves CNG to be the better fuel. However, one must remember that public transport constitutes a minimal percentage of the total vehicle population and hence puts to question the effectiveness of the CNG. Also, it is worth noting that trucks are the single largest polluters of the city's environment. About 50,000 trucks pass through or ply in the capital every day which exclusively run on diesel. They cannot be converted to CNG mode as they frequent other cities as

well. [Wakdikar, 2002] Further, critics have also noted the lack of a follow-up second generation reform plan, seeing that the resulting improvement in air quality has been a temporary, if not fleeting improvement.

### **1.1.2 Solar energy**

During September 2015, the government had released the Delhi Solar Energy Policy draft which highlighted the measures that would be taken for the government for bringing about a favourable condition for increased usage of solar energy. The policy notes that India requires an urgent increase in renewable energy to combat climate change, reduce air pollution, and enhance energy security. Hence the government of NCT (National Capital Territory, Delhi) intends to rapidly develop renewable energy sources and reduce its current dependence on unsustainable and centralised fossil fuel energy. Factors like Delhi's landlocked position, high cost of land and shortage of land within its borders combined with 300 days of sunshine makes rooftop solar energy its primary sources of renewable energy. The report estimates that the sum total of rooftop space available for solar panels to be 31 km<sup>2</sup>, giving Delhi a solar energy potential of 2.5 GW (annually approx. 3,500 million kWh). Of this potential, the report assesses 26% of the rooftops to be in the government/public sector, 25% in the commercial/ industrial sector, and 49% in the domestic sector. The report states that energy distribution companies (DISCOMS) pay more to meet short-term demand surges, hence raising the average cost of power. Delhi's peak energy demand period generally matches the generation curve of solar systems, which can help reduce peak demands. Also, energy produced by rooftop solar systems is usually consumed adjacent to the point of generation which helps in minimizing transmission and distribution losses. Such decentralized consumption of energy also reduces the challenge of planning distribution avenues in congested and highly populated areas. [Delhi Solar Energy Policy, 2015] Hence the government of Delhi intends to incentivise rooftop solar power through tax exemptions, waivers and subsidies, promote net-metering and grid connectivity for all solar plants, and encourage public private partnerships in order to develop solar energy as a part of an overall strategy of providing a pollution free source of power. Since solar energy is yet to gain mass consumption, establishing its effectiveness becomes an onerous task.

### **1.1.3 Odd-even plan**

The Delhi High Court, in December 2015, noted that the city has become a "gas chamber" especially during winters and asked the city's government to submit plans on managing pollution. [EPW, 2015] The CNG plan had not translated into effective reduction in the pollution levels. The Delhi government, in response, adopted China's model of road-space rationing for 15 days each in January and April 2016 to ease its air quality which had reached alarming levels in the recent years. The

government proposed to have cars and two-wheelers with odd/even numbers run on alternate days, with relaxations for CNG vehicles, women, medical emergencies, VIPs and so on. This was known as the odd-even plan. This received a variety of reactions from the policymakers and the general public.

The Energy Policy Institute of the University of Chicago studied the air pollution levels across Delhi and NCR from November to January and concluded that pollution levels had dropped to an average of 11% in Delhi during the implementation of this scheme, reaching 20% reduction at one point of the day. However, the study also points out that in the long run, people might start buying second cars and finding other ways of undermining the plan. Suvojit Chattopadhyay, on the World Bank website, has written that the odd-even plan was a '*worthy public policy experiment*' with wide public engagement, increased awareness about pollution and scrutiny and data-driven results. He also agrees with the University of Chicago report about misuse in the long term; however, he is hopeful of people refraining from using old vehicles or indulging in other polluting practices because of awareness.

Critics contend that a the road rationing system in Mexico City shows that the rich would go ahead and buy another car, and that cars occupy valuable real estate at a pittance, and hence the odd-even policy is insufficient to make lasting changes. The odd-even policy does seem to be a good start; however, it must precede other measures like improvement of public transport, taxing legal parking areas, and finally, better urban planning. Climate Home, an online news agency, calls the odd-even policy as a quick fix to address a systemic problem. Factors like unfavourable geography and the burning of crops in neighbouring states are outside the control of the Delhi government and hence, rationing cars, which only contribute 10% to particulate matter, did not lead to a substantive reduction in pollution. The article, written by Siddharth Singh, also makes the interesting observation that though air pollution did not change much, behavioural changes at the level of the citizenry can be brought about with political will. It is this behavioural aspect that we aim to understand in the following study.

## **2. Proposed study**

Based on preliminary secondary research, we conclude that while many policy institutes have come up with mixed conclusions on the effects of the odd-even plan on the environment, there has been no extensive study of the opinion of the public in this regard. While surveys have had questions on rating of the policy and whether it should be continued, the social factor of analysis has been missing. This study proposes to fill this research gap by analysing the respondents on the basis of class, age, gender and so on. The study aims to understand the various sociological dimensions that inform the different responses to the plan. Hence, it is necessary to understand the nature and scale of social influence among the people to arrive at holistic conclusions. By studying these differences, we aim to understand how policy affects different sections of the society in a different manner, in accordance to their immediate contexts and problems.

The hypothesis that we have on the basis of the field study is as follows –

1. There is much differentiation amongst the respondents with regard to the odd-even plan and its benefits.
2. The differences are due to the situated nature of an individual in the society.
3. Class has been the most prominent factor with respect to the opinions on the odd-even plan.

### **2.1 Research methodology**

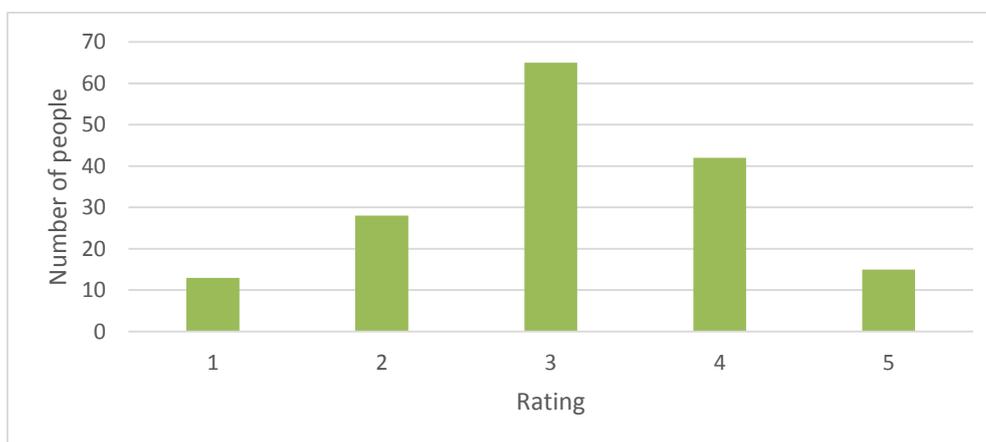
The method used in this study is quantitative. Questions based on Likert-type scale and based on clear categories have been asked to get an understanding of the respondent's class, age level, gender, vehicle ownership pattern, commute and so on. A few subjective questions have also been asked, which have been quantified by using the key words and checking their frequency of occurrence. Surveys were taken from 163 respondents in simple random methods at various locations across Delhi.

The survey was taken between January and April of 2016, and a follow-up of the study after the enactment of the second round of the plan could not be done due to time constraints. Even though the sampling was random, there is every chance of the respondent group being homogenous because of the inherent human biases in approaching people. We have tried to overcome this particular problem by encouraging the team to approach people out of their familiar zone.

### 3. Findings and inferences

The approval rating of the plan has been taken as the central concern of this section. The average approval rating given for the Odd-Even plan was 3.10 on the Likert-type scale of 1 to 5, 1 referring to the least approval and 5 referring to the most. The number-wise break-up of the rating is given in the chart below –

**Chart 1: Rating of Odd-Even plan**



Source: Youth Forum survey

#### 3.1 Gender

There were 94 women and 69 men in the survey. On doing a gender-wise break-up of the ratings to the odd-even plan, the study finds that women gave the plan a rating of 3.08 on an average and men rated it at 3.14 out of 5. This difference is almost negligible given the high numbers of responses.

#### 3.2 Age

The age-wise break-up of the respondents is as follows –

**Table 1: Ages of respondents**

Less than or equal to 25	Between 26 and 45	Between 46 and 65	Above 65	Total
92	53	17	1	163

Source: Youth Forum survey

The ratings of the corresponding age groups was as follows –

**Table 2: Ratings of the respondents based on age**

Less than or equal to 25	Between 26 and 45	Between 46 and 65	Above 65
3.28	2.92	2.88	1

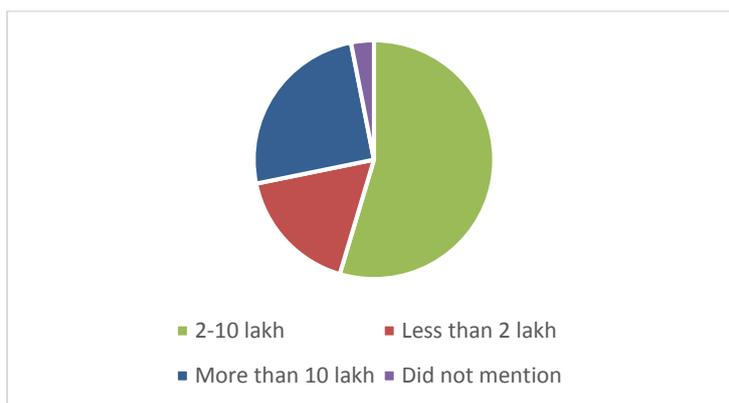
Source: Youth Forum survey

We can observe a steady decline in the ratings with progress in age. 82% of the age group of less than or equal to 25 were students, and only 19% of students used only private vehicles to travel. The rest of the students used a mix of private and public vehicles, entirely public vehicles or walked/cycled to their educational institutions. According to the study’s hypotheses, it was found that the reason behind this decline was related to the availability of money – People less than 25 years generally do not earn money or at least as much money as the older generations; this affects their mobility preferences. Because students use more public transport, they are likely to see the benefits of the program, rather than older respondents who travel by private transport and bear the brunt of owning a diesel/petrol car.

### 3.3 Class

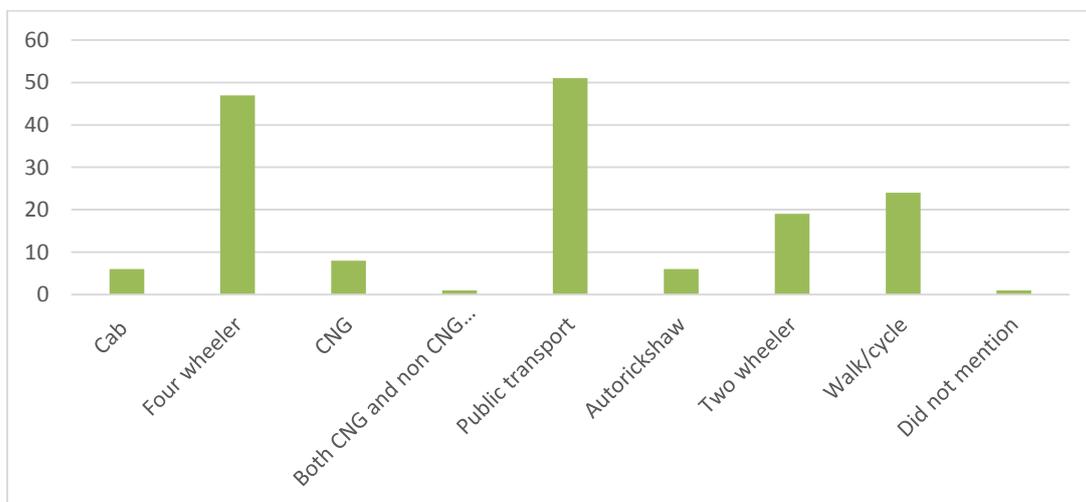
Even as the age category betrays a class element, the study moves on to studying the class-based responses as such. The incomes and everyday vehicle preferences of respondents were used for understanding the class element in the responses.

**Chart 2: Incomes of respondents**



Source: Youth Forum survey

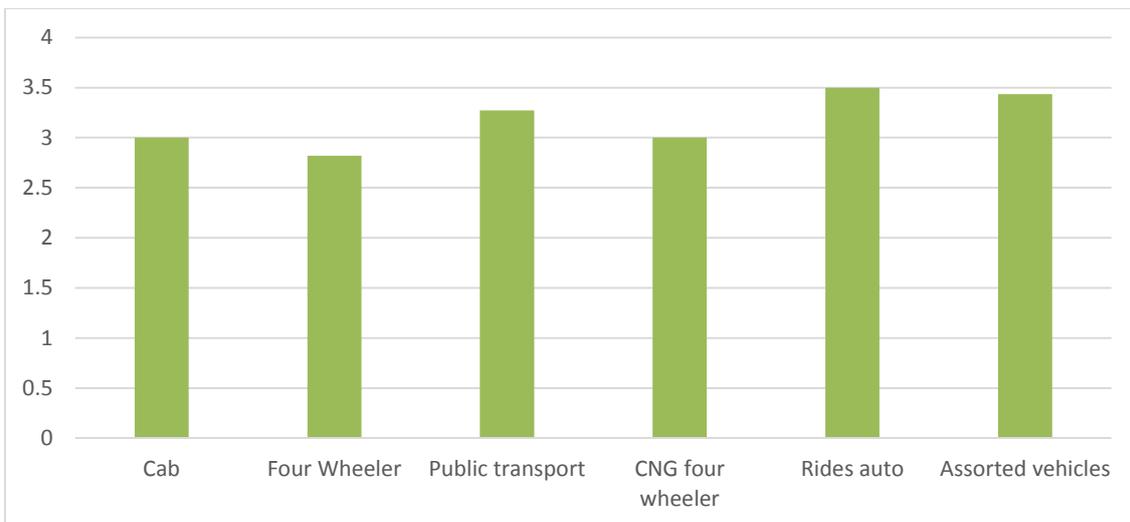
**Chart 3: Every travel preference of respondents**



Source: Youth Forum field survey

The next question to be explored was the ratings of people based on their incomes and everyday vehicle usage. Our findings on this front were as follows –

**Chart 4: Rating for Odd-Even based on everyday vehicle usage**



*Source: Youth Forum field survey*

The people who traveled by auto rickshaws and public transport had given the greatest rating to the plan. We have not considered the assorted vehicles section because of its diversity and the fact that the respondents would have chosen a vehicle suitable to them during the implementation of the plan, which explains the high ratings. The auto rickshaw users and the public transport users have been satisfied because of the reduction in the traffic. This is followed by cab and CNG four wheeler users who have given it an average rating of 3. The lowest rating is given by the users of four-wheelers because of the inconvenience faced by them, of being unable to travel in their car whenever possible. These responses clearly highlight a class bias on the part of all respondents.

**Chart 5: Income based ratings**



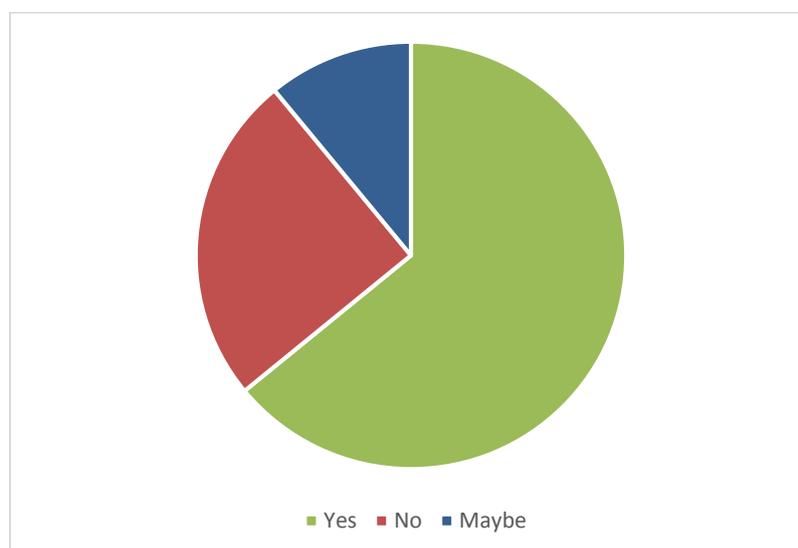


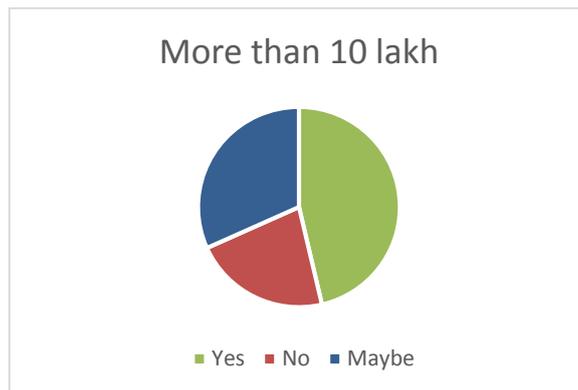
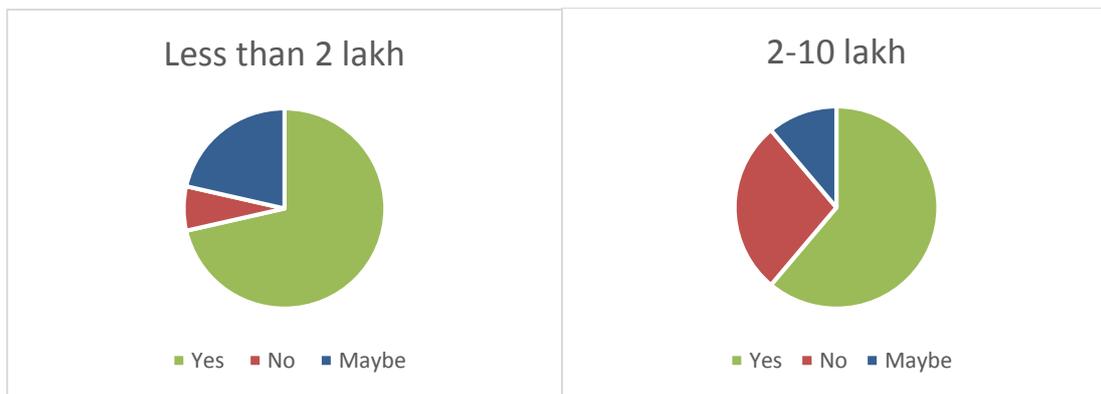
Source: Youth Forum field survey

The above charts show that people with incomes of less than 2 lakh have a great approval rate; interestingly, no one has given the plan a rating of 1. The people with an income of 2-10 lakh have given an average rating, with 2, 3, and 4 dominating the chart. The people with a much higher income of more than 10 lakhs have given both less and more than 3. The study understands these categories as lower, middle and higher income categories. People belonging to the lower income group have not given the lowest rating, which informs us about their positive opinion of the plan. The middle income group has given an average rating, with 2, 3, and 4 dominating the chart. This reflects an ambivalent stand towards the policy, almost a confusion on whether to support the policy for the environment or condemn it because of the inconvenience caused. The high income group sees the highest percentage of 1 ratings among all income groups, as well as a good number of 3 and 4 ratings. The response chart shows that many people of the high income group could afford cabs every day or had two cars (one odd and one even numbered) or a CNG car to escape the situation. Some people of this group also complained that it was inconvenient for them to take out one car a day.

The question of whether the respondent would want another round of odd-even plan was analysed on a class basis. The response was as follows –

**Chart 6: Another odd-even plan**





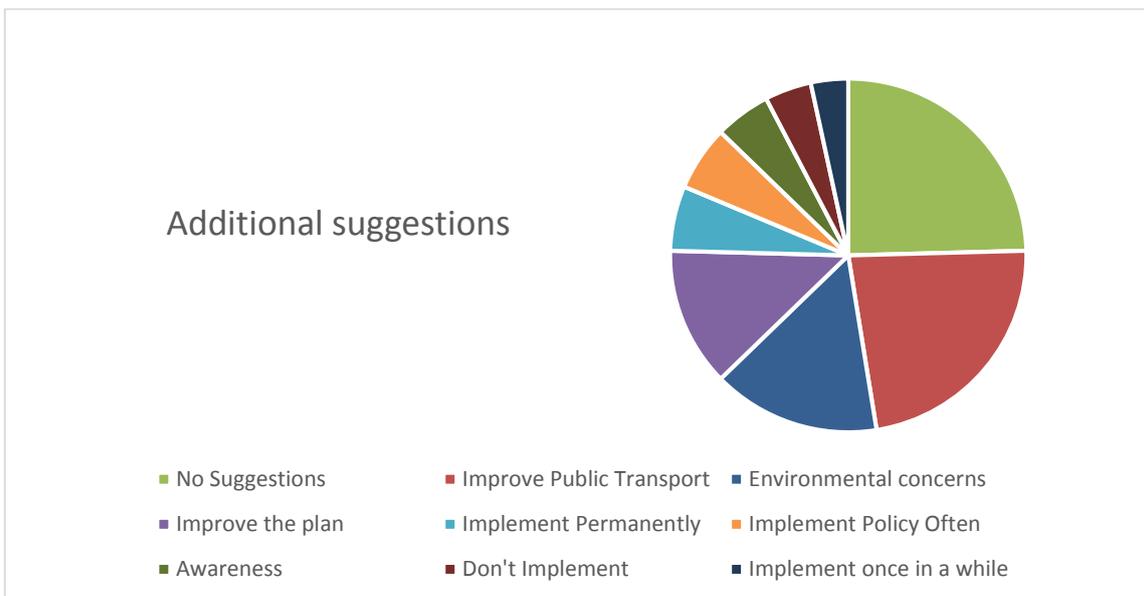
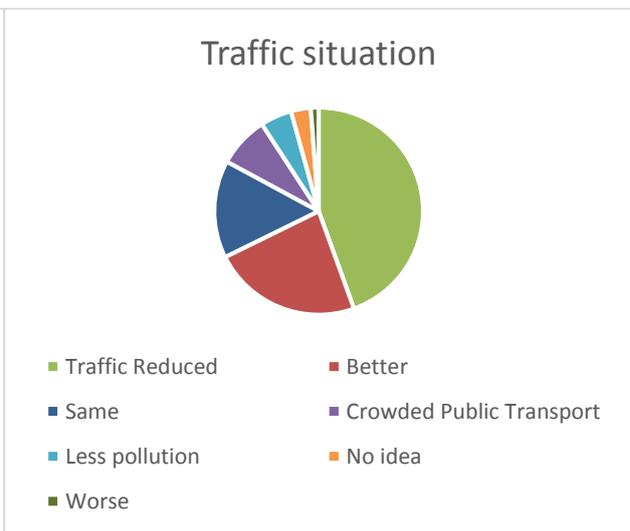
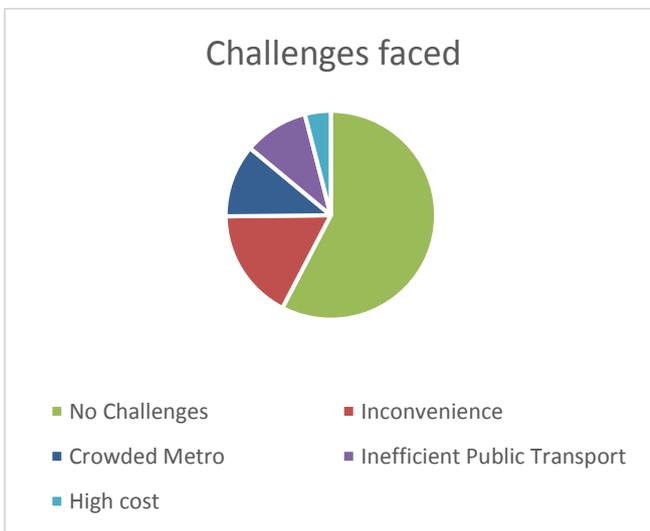
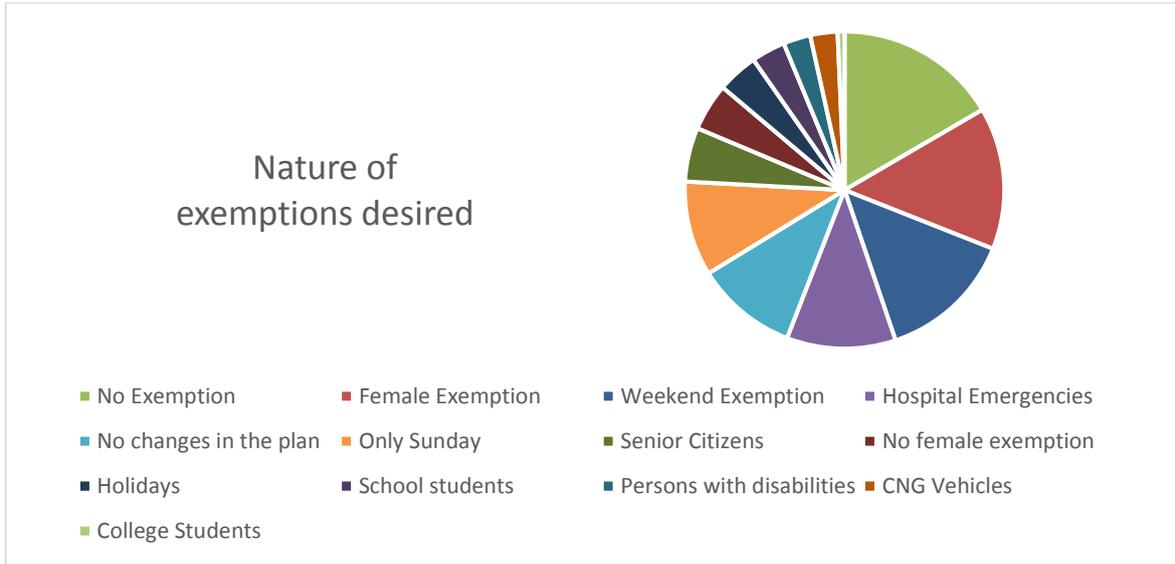
Source: Youth Forum field survey

As we can see, a single chart indicating the overall readiness of respondents for another round of Odd-Even does not reveal the class biases that the following chart shows. The ‘Yes’ response has steadily decreased over increase in one’s individual/family income, indicating the unwillingness of the economically more advanced group’s unwillingness to participate in an environment-friendly policy because of their minor inconveniences. The ‘No’ and the ‘Maybe’ responses back our initial findings about the middle class respondents being less open to the policy, in comparison to even those with a much larger income.

### 3.4 Other opinions

The questionnaire on the Odd-Even plan included four subjective questions – the nature of exemptions desired by the respondent, challenges faced, the traffic situation, and additional suggestions to the Odd-Even plan. These questions were asked to detect a possible shift from the class divisions seen in the previous section and inquire into the possibility of an all-round agreement on the nature of the plan. The responses for them are given below –

**Chart 7: Subjective opinions on the Odd-Even plan**



Source: Youth Forum field survey

The data suggests that respondents are still willing to engage with the idea of an environmentally friendly plan, in spite of social differences. In the section of nature of exemptions, various ideas have come in to improve the plan. Even if many of the suggestions were already a part of the plan, it was interesting to observe the preferences of the respondents with regard to the provisions of the plan. In the question of challenges faced, more than half the respondents felt that there was no substantial challenge. Some complained about the inefficiency of public transport and rising costs. Others felt that the plan was an inconvenience. The answers to this question betrayed the same kind of class bias as seen in the previous section. However, the same set of people largely agreed on the fact that transport was reduced; very few respondents commented on the crowded nature of public transport. Finally, the question on additional suggestions saw ideas to improve the plan like environmental awareness and improvement of public transport.

## **Conclusion**

This novel study on the social analysis of the Odd-Even plan has proved its hypotheses; it is proved that there is much differentiation amongst the respondents with regard to the odd-even plan and its benefits, and that these differences are due to the situated nature of an individual in the society. Class has been proved to be the most prominent factor with respect to the opinions on the odd-even plan. Examples from the responses include a 41 year old car-owning man who felt that two wheelers and CNG must not be exempted. He had to get an old car serviced entirely and use both the cars, which he felt was an inconvenience. The fact that CNGs and two wheelers are less polluting did not matter to him; it was the inconvenience he faced that was more important over and above the environment. However, the responses in the subjective section show us that not all hope is lost; people are still ready to suggest changes and engage further with the public policy experiment that is the Odd-Even plan. For example, Piyush Singhania, a college student said the following – “Initially I did not know much people, so carpooling was not a problem. Now they are my friends, so I carpool. The plan is good, but the implementation should be proper.” This suggests that people do get used to lesser comforts and adapt to the plan.

Social cohesion is built on transcending personal context and working as a community to solve collective problems. The Odd-Even plan presents such an opportunity to the residents of Delhi. This study hopes that further work is done in this regard and brings about a more well-informed citizenry.

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## Appendix – 1: Questionnaire

Name -

Age -

Gender -

1. Annual income (answer with parent's or spouse's income if you are not currently employed) \* -  
**Less than 2 lakh / 2-10 lakh / More than 10 lakh**
2. What vehicle(s) do you own? - **Two wheeler / Four wheeler private / Both two wheeler and four wheeler (specify whether CNG or other fuel) / Four wheeler (CNG) / Heavy vehicle / Auto / Other:**
3. Professional background – **Student / Public sector professional / Private sector professional / Private business / Transport business / Other:**
4. How do you travel every day? - **Walking/cycling / Two wheeler / Four wheeler / Four wheeler (CNG) / Cab / Public transport / Other:**
5. Did your vehicle come under the aegis of the odd-even plan? – **Yes/ No**
6. If yes, how did you travel in the days when your vehicle was not allowed to ply? – **Metro / DTC bus / Carpool / Work from home / Cab / Another car / Other:**
7. If not, which category of exemptions do you come under? - **CNG / Female traveller / Differently abled / Two wheeler / VVIP / Other:**
8. Did your expenses increase with the odd-even plan? - **Yes / No / Maybe**
9. How did you find the traffic situation during the days of implementation of the plan?
10. How would you rate the plan? \* - (Very bad) 1 / 2 / 3 / 4 / 5 (Very good)
11. The odd-even plan is scheduled to be implemented again on April 15th, 2016. Would you like this to happen? – **Yes / No / Maybe**
12. For how long do you want it to be in place? – **Never / Once a month / Once a week / Every day except Sunday / Other:**
13. According to you, what categories should be exempt from the odd-even plan?
14. What challenges did you face during the implementation of the odd-even plan?
15. Do you have any other suggestions?