TOWARDS ZERO EMISSIONS MOBILITY: A STUDY ON URBAN PUBLIC AWARENESS, BEHAVIOR, AND DRIVERS

Project Initiator:

    Energy Foundation China

    Southern Weekly

Survey Support:

    Ipsos

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CONTENTS

Notes on Reading the Report

> Use circles or boxes to mark data with significant differences.

> The analysis dimensions covered in this report include: Age, Gender, City tier, Location of city, Behavior of Carbon Emission, Level of knowledge about carbon emission

>> The report divided the respondents into six age groups: 18-20, 21-30, 31-40, 41-50, 51-55, and 56-70. Since the respondents involved in this survey are aged 18-70, not all age groups of the post-2000s generation are covered, so the characteristics of the post-2000s generation are only for reference.

>> According to the city tier, the respondents were divided into 4 groups: super first-tier cities, new first-tier cities, second-tier cities, and third-tier and fourth-tier cities.

>> According to the location of cities , the respondents were divided into 4 groups: eastern cities, southern cities, central and western cities and northern cities.

>> According to their behavior and awareness, the respondents in this report were divided into: low level of knowledge and high carbon behavior group, general level of knowledge and high carbon behavior group, high level of knowledge and high carbon behavior group, low level of knowledge and low carbon behavior group, general level of knowledge and low carbon behavior group, and high level of knowledge and low carbon behavior group.

> This study investigated the public's behavior of carbon emission, transport policy feedback by means of group discussion and questionnaire survey and took the respondents' expression content and choice content as the source of report information.

> This study focused on exploring the public level of knowledge, driven factors of public's behavior, participation and feedback to relative carbon policy, and exploring the structural carbon reduction potential in public transport mode and improving the practice of zero-carbon transport policy and publicity.

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Research Review

Research Method

Qualitative Research

Focus Group

From a qualitative perspective, the public's views on low-carbon and environmental protection, deep-rooted reasons and dissatisfaction of transport choice, their choice and views on electrified vehicles, especially new energy vehicles, their perceptions and attitudes towards "carbon peaking and carbon neutrality" goals, feedbacks on policies related to low-carbon transport, and suggestions on the practice of zero-emission transport are deeply explored. Thus, a more comprehensive and comprehensive understanding of the public low-carbon transport status and driving factors.

Quantitative Research

Questionnaire Survey

Combined with qualitative research, quantitative data were used to examine the public's level of knowledge on topics related to low-carbon and zero-carbon transportation, the status quo of carbon values, the status quo of low-carbon behavior in transport and its driving factors, and explore how to improve the public's policy of practicing low-carbon and zero-carbon transportation and the potential of publicity.

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Research Method --- Qualitative Research

The Research Content

➢ Public perceptions of low-carbon and zero-carbon transport;

➢ Public commuting behavior and its driving factors;

➢ Public level of knowledge and attitude towards "carbon peaking and carbon neutrality" goals;

➢ Public feedback on specific policy scenarios;

➢ Public feedback on low-carbon and zero-carbon transport and services;

➢ Suggestions from the public on the publicity and practice of zero-carbon commuting.

Focus Group								
City	Shanghai (group of 6) 2 Groups		Beijing (group of 6) 2 Groups		Shenzhen (group of 6) 2 Groups		Haikou (group of 6) 2 Groups	
Residence	Urban area (within S20) group 1	Suburbs (Outside S20) group 2	Urban area (within 5 ring) group 1	Urban area (outside 5 ring) group 2	Urban area (inside pass) group 1	Suburbs (The pass refers to the two areas outside the special area) group 2	Urban area (Longhua District, Meilan District) group 1	Suburbs (Qiongshan district, Xiuying District) group 2
The distance between work and home	Within 10 km (3 persons) / 10 km Away (3 persons)	Within 20 km (3 persons) / 20 km Away (3 persons)	Within 15 km (3 persons) / 15 km Away (3 persons)	Within 30 km (3 persons) / 30 km Away (3 persons)	Within 8 km (3 persons) / 8 km Away (3 persons)	Within 15 km (3 persons) / 15 km Away (3 persons)	Within 6 km (3 persons) / 6 km Away (3 persons)	Within 12 km (3 persons) / 12 km Away (3 persons)
Vehicle ownership	There are 2 car-free people, 2 people who own new energy vehicles, and 2 people who own fuel cars	There are 3 car-free people, 1 people who own new energy vehicles, and 2 people who own fuel cars	There are 2 car-free people, 1 person who owns new energy vehicles, 1 person who owns fuel cars, and 2 people who have bought new energy vehicles and fuel cars	There are 2 car-free people, 2 person who owns new energy vehicles, 1 person who owns fuel cars, and 1 people who have bought new energy vehicles and fuel cars	There are 2 car-free people, 1 people who own new energy vehicles, and 3 people who own fuel cars	There are 3 car-free people, 2 people who own new energy vehicles, and 1 people who own fuel cars	There are 2 car-free people, 2 people who own new energy vehicles, and 2 people who own fuel cars	There are 3 car-free people, 1 people who own new energy vehicles, and 2 people who own fuel cars
Age	25-38	33-43	26-36	25-41	25-31	26-44	25-40	25-46
Gender	4male2female	3male3female	3male3female	4male2female	3male3female	4male2female	3male3female	3male3female

Research Method --- Quantitative Research

Sample Size: n=3500

Visiting Time: December 16 ~ December 130, 2021

Screening Conditions:

1. Interviewees aged 18-70

2. Education is high school or above (excluding high school; based on data from the National Bureau of Statistics of China: In 2019, China's population with high school diploma or higher accounts for about 15% of the total population. The purpose of setting the threshold for academic qualifications is to provide a leading role in the publicity and promotion of low-carbon related topics in China through the understanding of such people.)

Age Sample Size

Age	Sample Size
18-20 (students/non-workers)	150
21-30	600
31-40	1000
41-50	1000
51-55	600
56-70	150

* Notes for reading the data of quantitative report:

The percentage data in this Report are rounded off, therefore, for the single choice questions, it may be not 100% after plus and rounded up.

For example, 45.5%+54.5% = 100%, but the data is rounded to 46%+55%

Region and City tier Sample Sizes

	Super first-tier cities n=1000	Sample size	New first-tier cities n=1600	Sample size	Second-tier cities n=450	Sample size	Third and fourth-tier cities n=450	Sample size
East China n=850	Shanghai	250	Nanjing	200	Hefei	50	Taizhou(3rd)	45
	/	/	Hangzhou	200	Fuzhou	50	Zhoushan (4th)	45
South China n=900	Guangzhou	250	Dongwan	200	Foshan	50	Zhuhai (3rd)	45
	Shenzhen	250	/	/	Zhongshan	50	Meizhou (4th)	45
							Haikou (3rd)	45
Middle and west China n=900	/	/	Chengdu	200	Kunming	50	Yichang (3rd)	45
	/	/	Xi'an	200	Nanning	50	Yibin (4th)	45
	/	/	Wuhan	200	Lanzhou	50	Xianyang (3rd)	45
North China n=850	Beijing	250	Tianjin	200	Changchun	50	Luoyang (3rd)	45
	/	/	Shenyang	200	Shijiazhuang	50	Kaifeng (4th)	45

Sample Ratio Super first-tier : New first-tier : Second-tier : Third and fourth-tier=20 : 32 : 9 : 9

Status-quo of Public Cognition of Carbon-related Topics

Conclusions

- In China, 85% of the public have a **basic understanding** of the "carbon peaking and carbon neutrality" goals, and a higher **level of education** means a deeper understanding of such goals. The public hold that realizing "carbon peaking and carbon neutrality" goals mainly affects people's life in several aspects: **the shift of environmental protection mentality from the previous conscious and voluntary low-carbon practice to low-carbon practice under policy regulations and constraints**, **higher cost of living**, **change of mobility modes**, **restriction of water and electricity consumption**, etc.

- More than 50% of the public believe that **convenient urban infrastructure** and **beautiful and healthy natural environment** can create a sense of well-being. People with a high degree of low-carbon cognition put more emphasis on the happy experience brought by **natural environment**, while those with a low degree of low-carbon cognition care more about the sense of well-being gained from **work, life and consumption**.

- More than 50% of the public recognize the low-carbon value of **public transit** and **non-motorized transportation**; they also acknowledge the low-carbon value of **new energy vehicles (NEVs)** and **electric scooters**.

- Based on the cognition of low emissions mobility and actual mobility behavior, the respondents are categorized into six groups, namely (1) environmental laymen (with a low degree of low-carbon cognition and high emissions mobility), (2) free actionists (with an average degree of low-carbon cognition and high emissions mobility), (3) Potential New Energy Mobility Practitioners (with a high degree of low-carbon cognition and high emissions mobility), (4) unconscious environmentalists (with a low degree of low-carbon cognition and low emissions mobility), (5) low-carbon practitioners with further potential (with an average degree of low-carbon cognition and low emissions mobility), and (6) low-carbon pastoralists (with a high degree of low-carbon cognition and low emissions mobility). **Specifically, groups (4) and (5) account for the largest proportion, totaling 79%.**

- **The public's cognition of modes of low emissions mobility will affect their choice in real life.** The proportion of respondents with low-carbon behavior of taking public transit increases along with a higher degree of low-carbon cognition. Groups with a high degree of low-carbon cognition prefer to practice low emissions mobility.
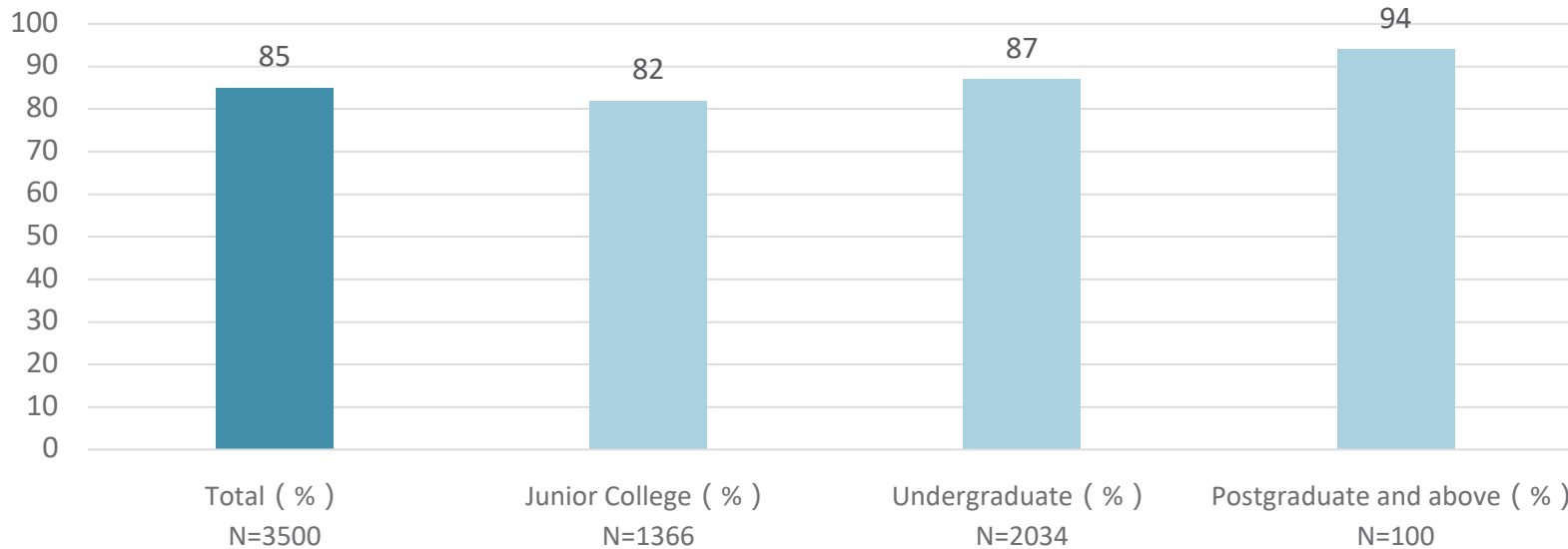
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In China, 85% of the public have a basic understanding of the "carbon peaking and carbon neutrality" goals, and a higher level of education means a deeper understanding of such goals.

Public understanding of China's "carbon peaking and carbon neutrality" goals

➢ The majority of the public said they were aware of China's announcement of the "carbon peaking and carbon neutrality" goals (85%), among which 61% were relatively aware, a quarter (25%) were very aware, and less than 15% said they were not very aware. There is little difference in the level of understanding between cities.

➢ Looking at the level of education, it is clear that the more educated the public is, the better informed they are about the "carbon peaking and carbon neutrality" goals.

➢ Combined with the qualitative research results, it can be found that the public has certain cognition of carbon. For example, more than 50% of the qualitative respondents said that they had heard of "carbon peaking and carbon neutrality". However, when digging into the specific policy content, the majority of the public did not understand it.

The public aware of China's "carbon peaking and carbon neutrality" goals

	Total（%）N=3500	Junior College（%）N=1366	Undergraduate（%）N=2034	Postgraduate and above（%）N=100
Value	85	82	87	94

The voice of interviewee：

"I heard about it in stock funds. A sign of human progress..."
——Mr. Zhu, Beijing Suburban (low-carbon commuters)

"Through the stock market know."
——Mr. Chen, Haikou Urban Area (high-carbon commuters)

"Never heard of..."
——Mr. Liu , Beijing Suburban (high-carbon commuters)

© 2022 Ipsos.   Source：F1. Understanding of the "carbon peaking and carbon neutrality" goals（4-5 points); Qualitative Interview
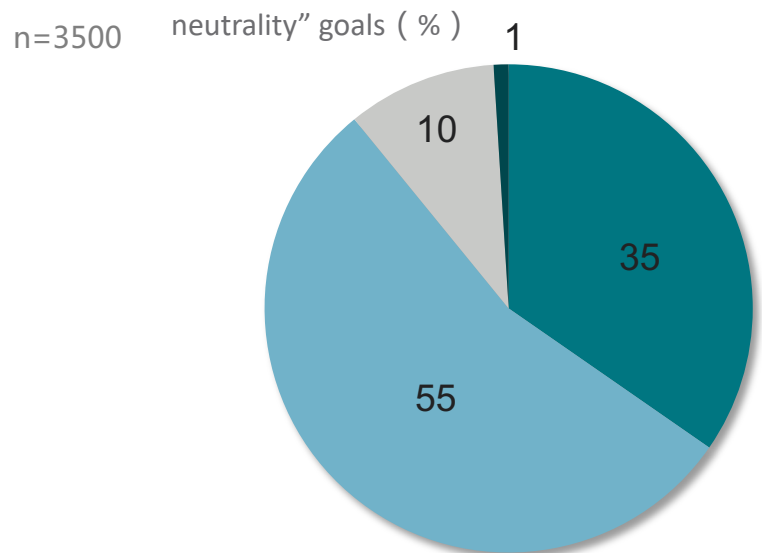
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The public hold a positive attitude towards "carbon peaking and carbon neutrality" goals and has a better understanding of the meaning behind "carbon peaking and carbon neutrality" goals.

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Public attitudes towards "carbon peaking and carbon neutrality" goals

➤ 55% of the public are moderately supportive of "carbon peaking and carbon neutrality" goals, and 35% are very supportive.

Public attitudes towards the "carbon peaking and carbon neutrality" goals（%）

n=3500

1
10
35
55

■ Extremely supportive   ■ Relatively supportive
■ Averagely supportive   ■ Unsupportive
■ Extremely unsupportive

The public's understanding of the meaning behind "carbon peaking and carbon neutrality" goals

➤ 58% of the public are moderately aware of the implications behind the carbon peak and carbon neutral goals, while 27% know very well.

Public's understanding of the "carbon peaking and carbon neutrality" goals（%）
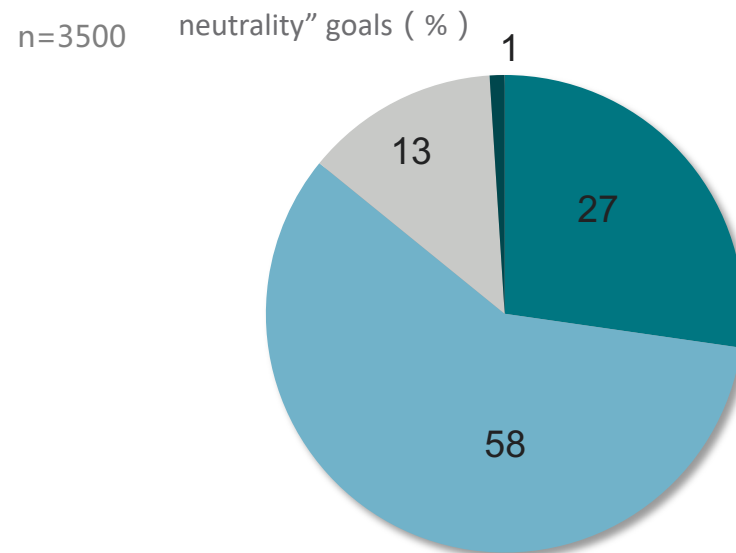
n=3500

1
13
27
58

■ Know extremely   ■ Know relatively
■ Know averagely   ■ Don't understand
■ Very little understanding

© 2022 Ipsos. Source：F2. Public attitudes towards "carbon peaking and carbon neutrality" goals；F3. The extent to which the public understands the meaning behind the "carbon peaking and carbon neutrality" goals

The public hold that realizing "carbon peaking and carbon neutrality" goals mainly affects people's life in several aspects: the shift of environmental protection mentality from the previous conscious and voluntary low-carbon practice to low-carbon practice under policy regulations and constraints, higher cost of living, change of mobility modes, restriction of water and electricity consumption, etc.

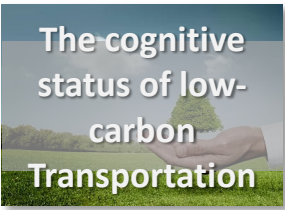## The impact of achieving "carbon peaking and carbon neutrality" goals on life

➢ The public think the impact of realizing "carbon peaking and carbon neutrality" on life is the shift of environmental protection mentality from the previous conscious and voluntary low-carbon practice to low-carbon practice under policy regulations and constraints (41%), and higher energy prices led to higher cost of living (39%), followed by the change of the mobility modes (38%) and a limit of life for water, electricity, etc (38%).
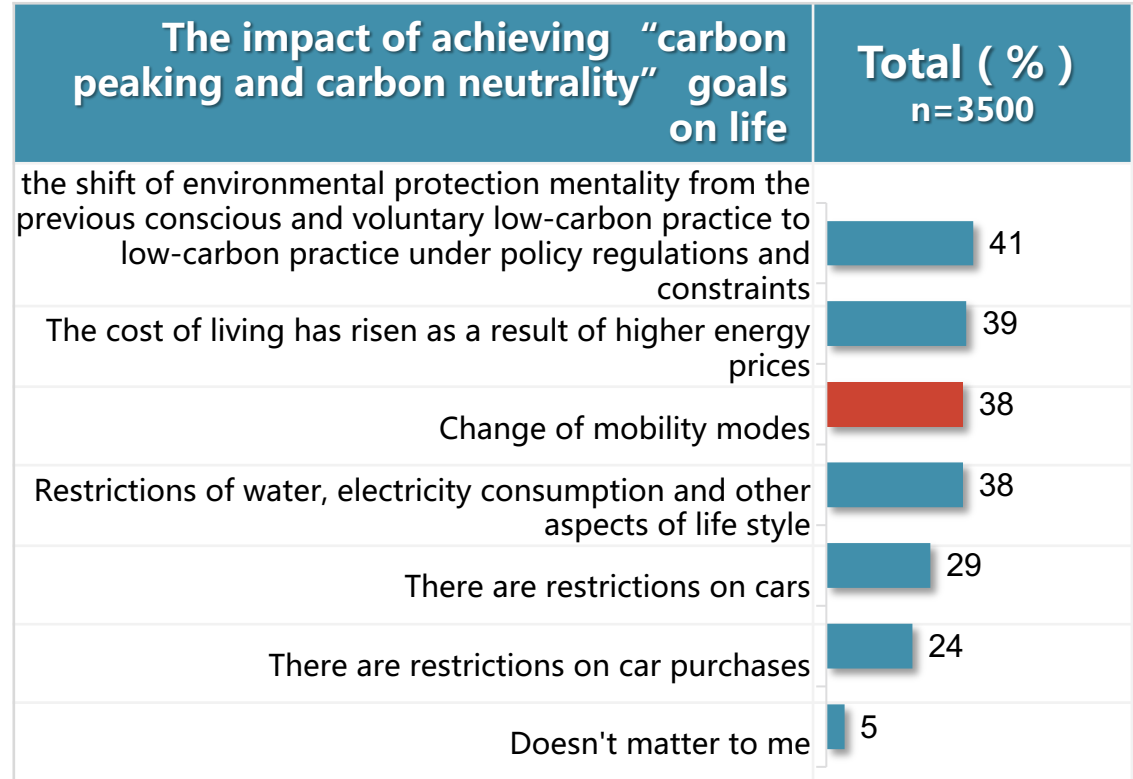
The voice of interviewee :

"No, I can adapt myself to the policy and situation in the future, such as using more shared bikes."
—— Mr. Lu, Shanghai Suburb (high level of knowledge & low carbon commuting)

"There must be an impact, and in the end the common people will pay…"
——Mr. Zhang, Beijing Suburb (general level of knowledge & low-carbon commuting)

The impact of achieving "carbon peaking and carbon neutrality" goals on life	Total (%) n=3500
the shift of environmental protection mentality from the previous conscious and voluntary low-carbon practice to low-carbon practice under policy regulations and constraints	41
The cost of living has risen as a result of higher energy prices	39
Change of mobility modes	38
Restrictions of water, electricity consumption and other aspects of life style	38
There are restrictions on cars	29
There are restrictions on car purchases	24
Doesn't matter to me	5

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More than 50% of the public recognize the low-carbon value of public transit and non-motorized transportation; they also acknowledge the low-carbon value of new energy vehicles (NEVs) and electric scooters.

Low-carbon Transportation in the Eyes of the Public

➢ Public transportation, walking, cycling, riding electric scooters and driving new energy vehicles are generally considered as low-carbon transportation.

Low-carbon Transportation	Total (%) n=3500
Public Transportation	62
Walking	56
Cycling	55
Driving new energy vehicles	47
Riding electric scooters	44
Carpool, hitch	25
Taking a taxi	17
Driving fuel cars	5

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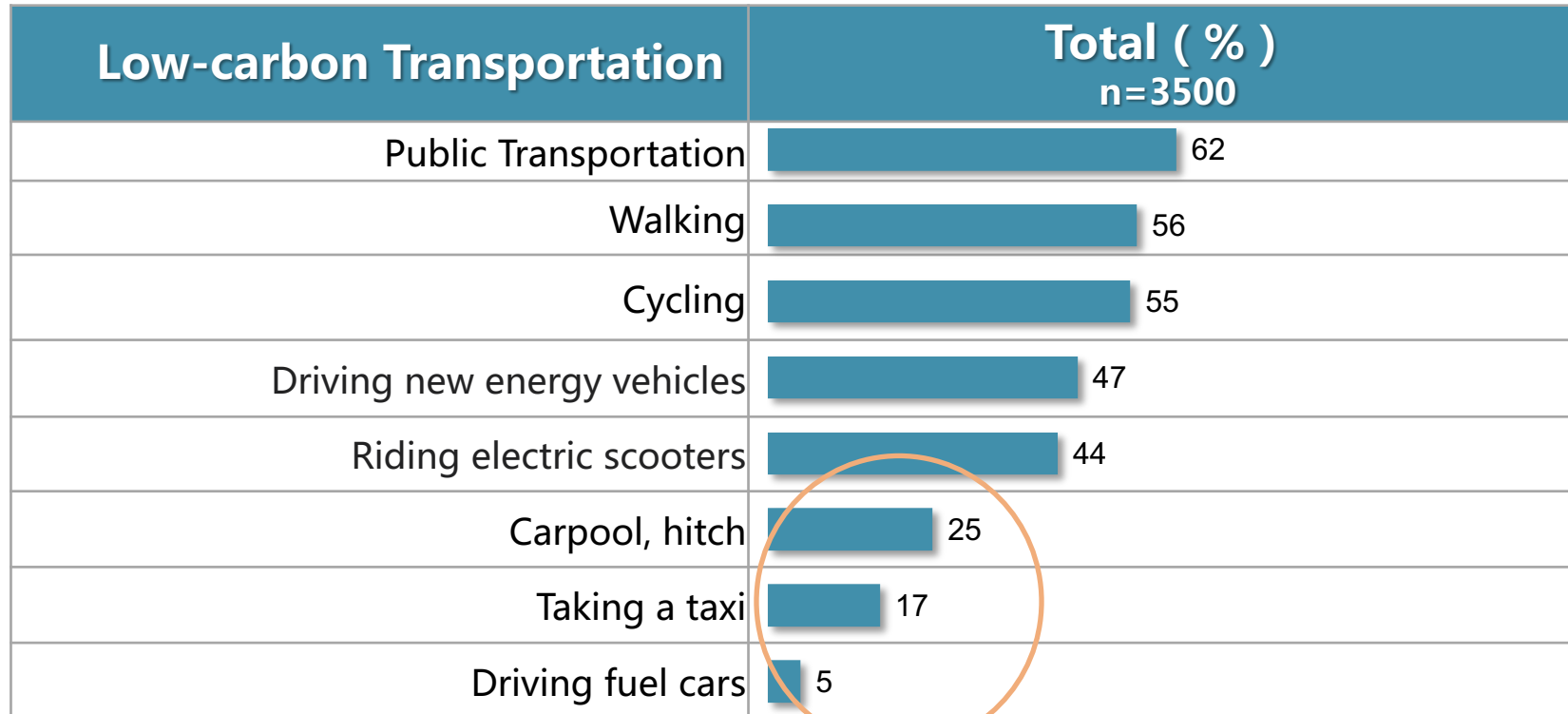
Classification methods for group portraits in terms of mobility-related carbon cognition

Based on the commuting modes of the respondents and the public's cognition of low emissions mobility, the groups are further categorized as follows:

Question B5 serves as the basis for behavior categorization (Options 1, 2 and 4 mean high emissions mobility, and options 3, 5, 6, 7, 8 and 9 mean low emissions mobility. The standard for categorization is based on the modes of low emissions mobility recognized by the public);

Questions B1-B3 (three questions in total) serve as the basis for cognition categorization (Answering no more than 1 question, 2 questions, and 3 questions correctly means low, average and high degree of cognition, respectively.)

B5. [Single choice] Which mobility mode do you choose most often for commuting between home and office place on workdays?

Show options in a random manner	Options•
Oil-fueled vehicle	1
Taxi	2
NEV	3
Carpooling and ride sharing	4
Bus	5•
Subway	6
Electric scooter (electric bicycle)	7
Bicycle	8
Walking	9
Other (please indicate here) _____	98

High emissions mobility

Low emissions mobility
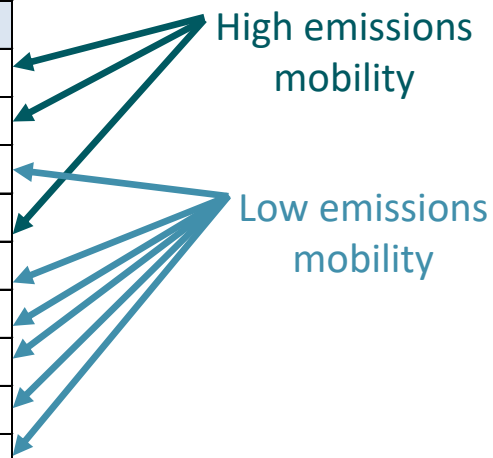
*The electrification of urban transportation is developing rapidly. In this survey, urban public transit means such as subway and bus are considered compliant with the dual concepts of low carbon and zero carbon, while NEV is considered compliant with the concept of relatively low carbon.

*Shared mobility is one of the mobility modes advocated to improve efficiency in China. However, the survey of cognition focuses on the "electrified" transportation means and the clear carbon emissions reduction, so carpooling and ride sharing are listed as relatively high-carbon behaviors during behavior definition.

Such definition of behaviors is similar to that of public cognition (see above).

B1. [Single choice] Do you think that electricity-driven vehicles, such as new energy electric vehicles, electric buses, subways, etc., are low-carbon transportation means? (Only the carbon emissions from the operation of these vehicles are considered, while those from early-stage electricity production are not considered.)

Show options in a rotating manner	Options•
I think so	1 ✅
I don't think so	2

B2. [Single choice] Which of the following transportation modes is not low-carbon?
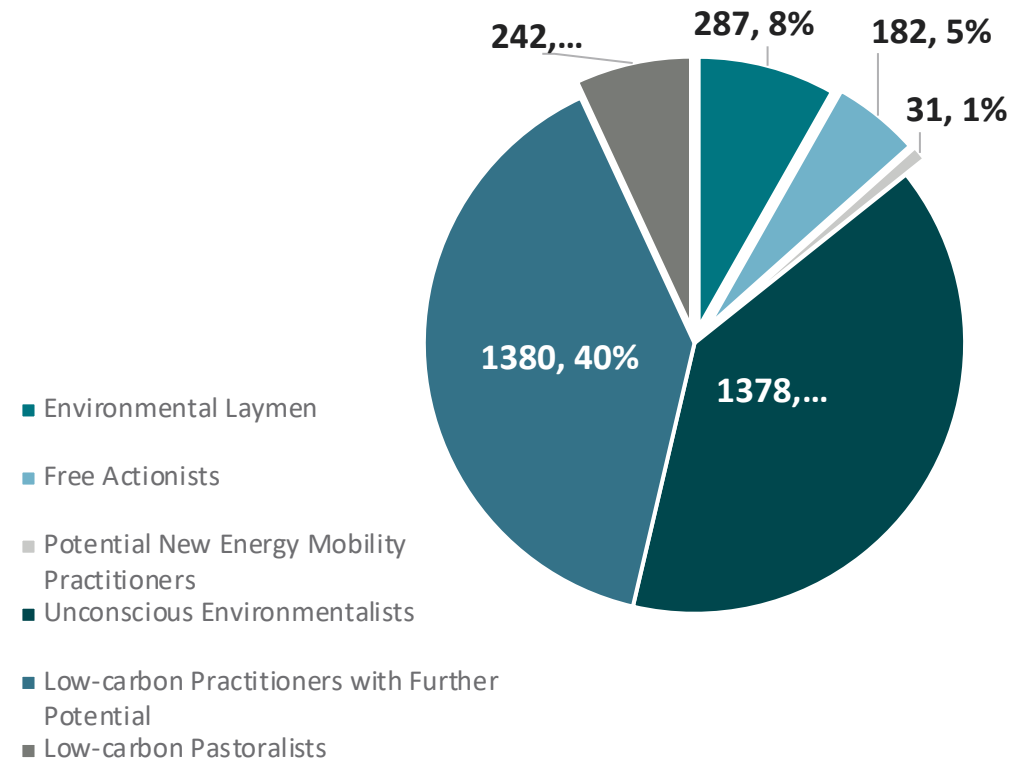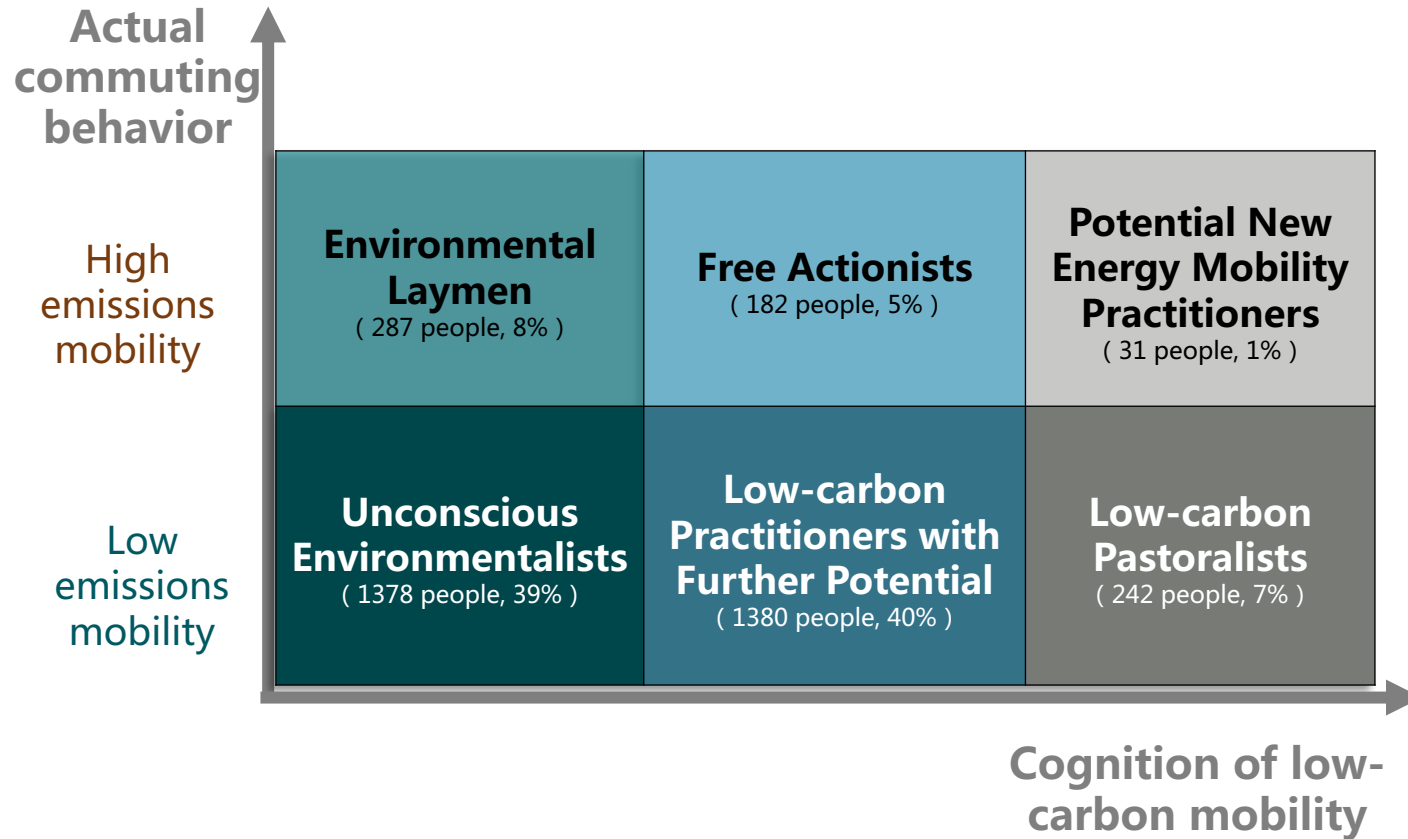
Show options in a rotating manner	Options•
P+R (P+R is an abbreviation for Park and Ride. A P+R parking lot refers to a parking site for transfer with "Park and Ride" function. Connected with public transit hubs, P+R parking lots are generally located at the periphery of the downtown, and charge low parking fees. In the morning, commuters drive to the P+R parking lot and park, and then go to workplace by subway; after work, they take the subway to the parking lot, and then drive home)	1
NEV	2
Carpooling	3
Motorcycle ✅	4
Public transit	5
All of the above modes are low-carbon	6

B3. [Single choice] If a transportation mode actively adopted during mobility can reduce the emissions of pollutants, which of the following pollutants reduced can be seen low emissions mobility?

Show options in a rotating manner	Options•
NOx	1
CO_2	2 ✅
CO and CO_2	3
CO	4
SO_2, NOx, $PM_{2.5}$ and PM_{10}	5

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Classification results for group portraits in terms of mobility-related carbon cognition

➤ Overall, the highest percentage of people adopt low carbon behavior; The group with low level of knowledge accounted for the majority (47%), followed by group with general level of knowledge.

➤ Low-carbon Practitioners with Further Potential and Unconscious Environmentalists accounted for the highest proportion, while Potential New Energy Mobility Practitioners accounted for the least proportion. In the group with high carbon behavior, the high level of knowledge is the least, and the low level of knowledge is the highest.

Actual commuting behavior

High emissions mobility

| **Environmental Laymen**
(287 people, 8%) | **Free Actionists**
(182 people, 5%) | **Potential New Energy Mobility Practitioners**
(31 people, 1%) |

Low emissions mobility

| **Unconscious Environmentalists**
(1378 people, 39%) | **Low-carbon Practitioners with Further Potential**
(1380 people, 40%) | **Low-carbon Pastoralists**
(242 people, 7%) |

Cognition of low-carbon mobility

Pie chart labels: 242,… ; 287, 8% ; 182, 5% ; 31, 1% ; 1380, 40% ; 1378,…

Legend:
- Environmental Laymen
- Free Actionists
- Potential New Energy Mobility Practitioners
- Unconscious Environmentalists
- Low-carbon Practitioners with Further Potential
- Low-carbon Pastoralists

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Basic Information of Six Groups

> Overall, the level of personal **education and income** is directly proportional to the awareness of low-carbon commuting; The household income of people with high carbon behavior is generally higher than that of people with the same level of knowledge. The Group of Potential New Energy Mobility Practitioners has the highest level of personal income and family income. The high carbon behavior is mainly concentrated among people aged 31-40.

(* This research is not a large-caliber research, so the income level of the research objects is generally high.)

Population Portrait	Environmental Laymen n=287	Free Actionists n=182	Potential New Energy Mobility Practitioners n=31	Unconscious Environmentalists n=1378	Low-carbon Practitioners with Further Potential n=1380	Low-carbon Pastoralists n=242
Gender	Male54% , Female46%	Male52% , Female48%	Male42% , Female58%	Male51% , Female49%	Male49% , Female51%	Male45% , Female55%
Education	Undergraduate52% , Junior College46% , Postgraduate and above2%	Undergraduate62% , Junior College37% , Postgraduate and above2%	Undergraduate84% , Junior College6% , Postgraduate and above10%	Undergraduate54% , Junior College44% , Postgraduate and above2%	Undergraduate61% , Junior College35% , Postgraduate and above4%	Undergraduate67% , Junior College30% , Postgraduate and above4%
City TOP3	Tianjin12% , Nanjing10% , Hangzhou8%	Beijing13% , Guangzhou12% , Shanghai7% , Xi'An7%	Beijing19% , Shanghai13% , Guangzhou13%	Hangzhou7% , Tianjin7% , Beijing7%	Shanghai9% , Guangzhou8% , Shenzhen7%	Shanghai14% , Guangzhou9% , Shenzhen8% , Beijing8%
Personal Income Level (average monthly RMB)	11385	13111.26	13225.81	11360.67	12504.53	12985.54
Household Income Level (average monthly RMB)	23022.65	24031.59	25161.29	22379.35	23116.85	23693.18
Vehicle ownership	Fuel Vehicle54% , New Energy Vehicle44% , Car-free18%	Fuel Vehicle69% , New Energy Vehicle28% , Car-free12%	Fuel Vehicle87% , New Energy Vehicle16% , Car-free10%	Fuel Vehicle48% , New Energy Vehicle41% , Car-free22%	Fuel Vehicle40% , New Energy Vehicle48% , Car-free27%	Fuel Vehicle53% , New Energy Vehicle38% , Car-free19%

 Source：S1. Gender ；S3. City ；S5. Education ；S6. Personal Income Level ；E1. Vehicle ownership

More than 50% of the public believe that convenient urban infrastructure and beautiful and healthy natural environment can create a sense of well-being. People with a high degree of low-carbon cognition put more emphasis on the happy experience brought by natural environment, while those with a low degree of low-carbon cognition care more about the sense of well-being gained from work, life and consumption.

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Public Value Orientation

➢ More than half of the public think convenient urban infrastructure (53 %) and beautiful and healthy natural environment (52 %) contribute to happiness in life.
➢ The public with high level of knowledge is more likely to obtain happiness from natural environment, social environment or urban infrastructure. However, the public with low level of knowledge mainly obtains happiness from individuals, such as cultural and consumption activities and income level.

What brings you happiness in life?	Total (%) n=3500	Environmental Laymen (%) n=287	Free Actionists (%) n=182	Potential New Energy Mobility Practitioners (%) n=31	Unconscious Environmentalists (%) n=1378	Low-carbon Practitioners with Further Potential (%) n=1380	Low-carbon Pastoralists (%) n=242
Convenient urban infrastructure	53	38	46	55	51	58	58
Beautiful and healthy natural environment	52	29	54	74	46	62	60
Work-life balance	46	46	49	61	42	48	54
A rich supply of cultural and consumer activities	41	41	42	29	42	40	40
High income	26	26	34	13	24	28	28
Humane policy	25	36	20	13	30	20	20
A positive social environment	19	11	21	35	13	25	26

The voice of interviewee :

"Want to achieve work-life balance (work overtime at intervals, but be sure to take time off for yourself)."
——Miss Sun Shanghai Urban Area (general level of knowledge high-carbon commuting)

"I feel happy when I come home and see my parents' cooking. Work-life balance."
——Miss Luo Shanghai Urban Area (low level of knowledge high-carbon commuting)

"More space at home, a slower pace at work, a wider range of personal interests; Get your finances in order to achieve work-life balance."
——Mr. Shen, Suburb of Shanghai (general level of knowledge high-carbon commuting)

"Spend time with your family and take your kids out on weekends."
——Mr.Zhai Beijing Urban Area (general level of knowledge high-carbon commuting)

Source : A1. Aspects that bring happiness; Qualitative Interviews

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The public's cognition of modes of low emissions mobility will affect their choice in real life. The proportion of respondents with low-carbon behavior of taking public transit increases along with a higher degree of low-carbon cognition. Groups with a high degree of low-carbon cognition prefer to practice low emissions mobility.

Low-carbon behaviors in life

➢ Saving electricity (49%) and taking public transit (38%) are the two low-carbon behaviors with the first and second largest proportions practiced by the surveyed public within the past three months.

➢ Energy conservation is the most common option for the public to practice low carbon concept. However, groups with a high degree of cognition of carbon emissions from mobility adopt the low-carbon behavior of taking public transit more frequently, while groups with a low degree of cognition prefer to pursue the low-carbon lifestyle such as abstaining from eating meat and choosing clothes made of environment-friendly materials.

Low-carbon behaviors within the past 3 months	Total (%) n=3,500	Environmental laymen (%) n=287	Free actionists (%) n=182	Potential New Energy Mobility Practitioners (%) n=31	Unconscious environmentalists (%) n=1,378	Low-carbon practitioners with further potential (%) n=1,380	Low-carbon pastoralists (%) n=242
Saving electricity	49	44	56	52	43	54	53
Taking public transit	38	15	38	52	28	48	57
Bringing shopping bags when shopping	36	24	29	42	32	42	48
Saving paper (double-sided printing, etc.)	29	27	34	29	27	32	29
Reducing usage of disposable tableware	29	32	21	10	34	26	30
Increasing vegetarian diet	24	35	24	13	27	21	19
Choosing clothes made of cotton, linen and silk	20	24	21	13	25	15	10
Garbage sorting	19	8	28	42	15	23	31
Afforestation	15	18	10	13	19	12	9

© 2022 Ipsos.   Source: A3. Low-carbon behaviors

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Status-quo of and Challenges to Mobility of the Public

Conclusions

➢ Among the modes of low emissions mobility recognized by the public, **public transit (36%)** and **NEV (16%)** are the two most frequently chosen modes. Although the public highly recognize the low-carbon value of **walking and cycling**, **the group that chooses these two modes in real life accounts for a relatively small proportion.** When it comes to commuting, the group that chooses **public transit for commuting (45%)** enjoys a higher proportion, and the group by **taxi, carpooling and ride sharing for commuting (9%)** occupies a slightly large share.

➢ Obstacles and challenges to mobility:

People by subway are often troubled by the **crowded mobility environment** and facilities **not safe enough** for disadvantaged groups, and those by bus are troubled by **long waiting time** and **poor comfort**.

People who drive for mobility often report the **difficulty in finding parking spaces**. For those who commute by oil-fueled vehicles, **traffic congestion** is the most unsatisfactory point, and for NEV owners, the **adequacy of public charging piles** is their biggest concern.

Long waiting time and threat to **personal privacy information** security on ride-hailing apps are the obstacles pointed out by the public in a concentrated manner.

For those who rely on non-motorized transportation means such as walking and cycling, they point out a protruding problem— **inconvenient access to sidewalks/non-motorways**.

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Among the modes of low emissions mobility recognized by the public, public transit (36%) and NEV (16%) are the two most frequently chosen modes. Although the public highly recognizes the low-carbon value of walking and cycling, the group that chooses these two modes in real life accounts for a relatively small proportion. When it comes to commuting, the group that chooses public transit for commuting (45%) enjoys a higher proportion, and the group by oil-fueled vehicle and taxi for commuting (9%) occupies a slightly large share.

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Modes of low emissions mobility recognized and most frequently chosen by the public

➤ Public transit is the mode of low emissions mobility most frequently chosen by the public, followed by NEVs, indicating a high degree of acceptance of NEVs among the public.

➤ Although the public highly recognize the low-carbon value of walking and cycling, they choose these two modes less frequently in real life.

Modes of mobility for commuting most frequently chosen by the public

➤ The bus is the mode of mobility for commuting most frequently chosen by the public, followed by NEVs.

➤ The bus witnesses a higher proportion and NEV a lower proportion along with the elevation of education background.

Most frequently chosen modes of low emissions mobility	Total(%) n=3,500
Public transit	36
NEV	16
Electric scooter	14
Bicycle	10
Walking	10
Carpooling and ride sharing	5
Taxi	3
Oil-fueled vehicle	2
No options applicable to me	3

Most frequently chosen modes of mobility for commuting	Total(%) n=3,500	College degree (%) n=1,366	Bachelor degree (%) n=2,034	Master degree and above (%) n=100
Bus	28	30	27	18
Subway	17	13	19	19
NEV	16	13	17	28
Electric scooter (electric bicycle)	12	12	12	11
Bicycle	7	8	6	5
Walking	7	8	6	8
Oil-fueled vehicle	5	4	6	4
Carpooling and ride sharing	5	6	5	6
Taxi	4	5	3	1

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Source: A8. Most frequently chosen modes of low emissions mobility ; B5. Most frequently chosen modes of mobility for commuting

People who drive for mobility often report the difficulty in finding parking spaces. For those who commute by oil-fueled vehicles, traffic congestion is the most unsatisfactory point, and for NEV owners, the adequacy of public charging piles is their biggest concern.

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Public perceived barriers of transport (driving fuel cars, NEVs)

➢ Traffic congestion (57%) and the difficulty of finding parking (55 percent) were the top complaints of people who commute by oil-fueled vehicles.
➢ The public who choose to drive NEVs are most dissatisfied with the lack of public charging piles (58%) and the difficulty of finding parking spaces (43%).。
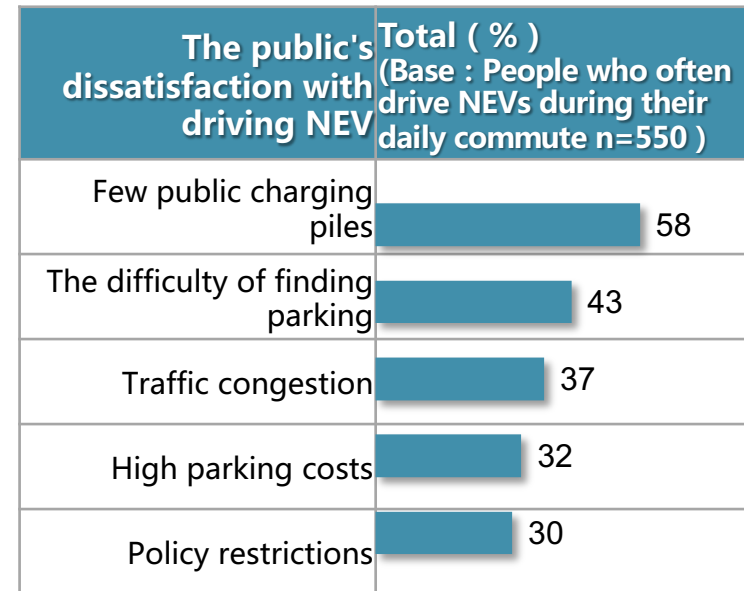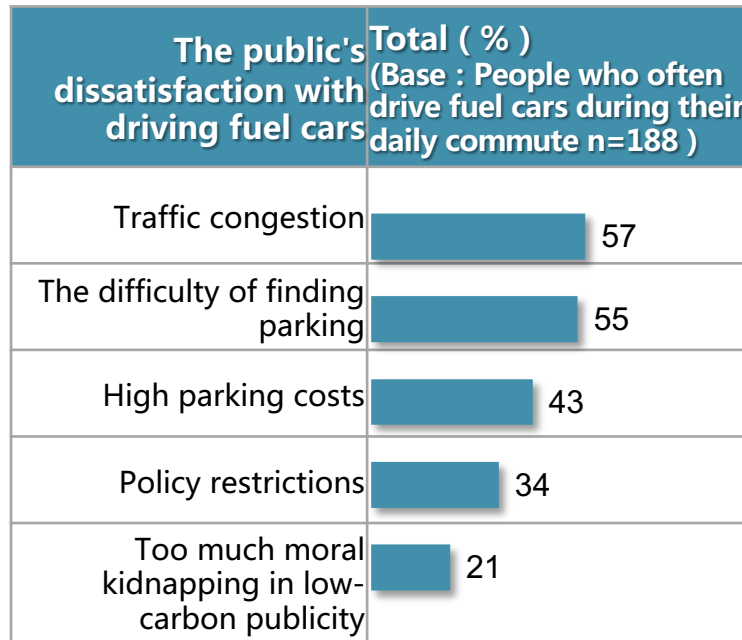
The voice of interviewee :

"Less street parking. If you go to the mall to park, there will be a situation of looking for cars and traffic jam, and it will take a long time to get out of the parking lot."
——*Mr.Chen, Kaikou Urban Area*
（ general level of knowledge &high-carbon travel ）

"Residential parking Spaces are often occupied, parking is difficult."
——*Mr.Wu, Shenzhen Urban Area*
（ general level of knowledge &high-carbon travel ）

The public's dissatisfaction with driving fuel cars	Total (%) (Base : People who often drive fuel cars during their daily commute n=188)
Traffic congestion	57
The difficulty of finding parking	55
High parking costs	43
Policy restrictions	34
Too much moral kidnapping in low-carbon publicity	21

The public's dissatisfaction with driving NEV	Total (%) (Base : People who often drive NEVs during their daily commute n=550)
Few public charging piles	58
The difficulty of finding parking	43
Traffic congestion	37
High parking costs	32
Policy restrictions	30

The voice of interviewee :

"There is concern about the endurance, but it is ok in the urban area, but it will be troubled if it exceeds 300 km, especially after it consumes more electricity on the highway. New energy is subsidized by the government - free parking within 2 hours a day is better if parking space can be found."
——*Miss.Wu, Suburb of Shenzhen*
（ high level of knowledge &low-carbon travel ）

"Charging is not convenient."
——*Mr.Li, Beijing Urban Area*
（ general level of knowledge &low-carbon travel ）

"Parking is expensive."
——*Mr.Chen, Suburb of Beijing*
（ high level of knowledge &low-carbon travel ）

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Source： B5. The most common way of commuting； B8. The ridicule of the public on the way to commuting; Qualitative Interviews

Long waiting time and **threat to personal privacy information security on ride-hailing apps** are the obstacles pointed out by the public in a concentrated manner. The public of carpooling generally believe that the problems of **high commuting costs** and **traffic congestion** are prominent.

Public perceived barriers of transport (taxi, carpool/hitch)

➢ The public who take taxis for their daily commutes are most dissatisfied with long waiting times (40%) and concerns about the safety of ride-hailing apps (35%).

➢ The public who carpool or hitch their daily commute are most dissatisfied with the high cost (38%) and traffic congestion (33%).

The public's dissatisfaction with taxi	Total (%) (Base : A person who takes a taxi for his daily commute n=134)
Taxi waiting time is too long	40
Taxi software is not safe (personal information is easy to leak)	35
Traffic congestion	33
Unsafe to take taxi (e.g. sexual harassment, etc.)	32
Too much taxi fare	27

The public's dissatisfaction with carpool/hitch	Total (%) (Base : A person who often carpools/hitchhikers during daily commutes n=178)
Carpooling can be more expensive than driving a car	38
Traffic congestion	33
Not suitable for long distance travel	32
Long wait time	30
Not suitable for group travel	29
Carpooling is not safe	29

 Source： B5. The most common way to commute ； B8. Public dissatisfaction with the way people commute

Crowded environment and **low safety of facilities for vulnerable groups** are common troubles for the public who commute by subway. **Long waiting time** and **poor comfort** are common troubles of the public who take buses.

Public perceived barriers of transport (subway, bus)

> The public who choose to take the subway for their daily commute are most dissatisfied with the fact that it is too crowded, not comfortable (44%) and not suitable for the disadvantaged (29%).
> Distribution of options for bus are scattered, with the TOP2 mainly focusing on long waiting time (29%) and poor comfort (28%). It is noteworthy that a large proportion of the public also believe that the current bus facilities are not friendly to the vulnerable groups.

The public's dissatisfaction with subways	Total (%) (Base : A person who takes the subway during his daily commute n=578)
It's too crowded and uncomfortable	44
The facilities are not suitable for the elderly, children and vulnerable groups. The design is unsafe or uncomfortable	29
Unreasonable line design, interchange, walk far	28
Not suitable for long distance travel	21
Long wait time	19
Not suitable for group travel	19
Heavily affected by the weather, ie hot, rainy, etc	18
The punctuality rate of public transport is not high	16

The public's dissatisfaction with buses	Total (%) (Base : A person who commutes by public transport n=978)
Long wait time	29
It's too crowded and uncomfortable	28
Unreasonable line design, interchange, walk far	25
The punctuality rate of public transport is not high	25
Traffic congestion	24
Bus stops lack of shelter from rain and sun and other humanized facilities	22
The facilities are not suitable for the elderly, children and vulnerable groups. The design is unsafe or uncomfortable	21
Heavily affected by the weather, ie hot, rainy, etc	20
Not suitable for long distance travel	20
Not suitable for group travel	18

Source： B5. The most common way of commuting ； B8. Public dissatisfaction with the way people commute

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Narrow sidewalks/non-motorways, obstructed lanes, etc., have become a major problem for the motorcyclist, cyclist and pedestrian public.

Public perceived barriers of transport(bicycle, walking, electric scooters)

➢ In addition to the objective factors that are greatly affected by weather and unsuitable for long-distance travel, the inconvenient use of sidewalks/non-motorized lanes is more prominent in slow traffic and motorcycle.

The public's dissatisfaction with bicycles	Total (%) (Base : People who ride bicycles during their daily commutes n=244)
Heavily affected by the weather, ie hot, rainy, etc	50
Not suitable for long distance travel	40
Pavement/non-motorway not easy to use (road narrow, occupied, etc.)	35
Not suitable for group travel	29
Parking is hard to find	24

The public's dissatisfaction with walking	Total (%) (Base : People who walk a lot during their daily commutes n=237
Heavily affected by the weather, ie hot, rainy, etc	49
Not suitable for long distance travel	43
Pavement/non-motorway not easy to use (road narrow, occupied, etc.)	31
Not suitable for group travel	22

The public's dissatisfaction with electric scooters	Total (%) (Base : People who ride electric scooters during their daily commutes n=413)
Heavily affected by the weather, ie hot, rainy, etc	38
Not suitable for long distance travel	35
Pavement/non-motorway not easy to use (road narrow, occupied, etc.)	28
The supporting facilities of the electric scooters are not perfect	27
Electric scooters/bicycle management is not standardized	26
Not suitable for group travel	26
Parking is hard to find	19

 Source：B5. The most common way of commuting；B8. Public dissatisfaction with the way people commute

The Drivers of Public Low-carbon Transportation

Conclusions

➤ Among the respondents, the car penetration rate is **up to 77%.** The public purchase cars mainly to meet the **needs of family (picking up children and other family members) (43%),** so the **composition of a family** exerts a great impact on the public's choice of mobility modes. The second reason for car purchase is to make mobility more **convenient (41%)** in some scenarios.

➤ When choosing modes of mobility for commuting, the group **embracing low emissions mobility** accounts for a relatively high proportion of 38%, which means that low emissions mobility is generally recognized and accepted by the public. Next drivers include **flexibility, efficiency, punctuality and high predictability of the mobility modes**.

➤ As to the groups with a high degree of low-carbon cognition, Potential New Energy Mobility Practitioners raise high requirements for **efficiency and comfort**; more than half of the low-carbon pastoralists embrace low emissions mobility, and highly recognize drivers of **convenience of low emissions mobility modes and the lowest commuting cost**, indicating that people in this group have converging ideas concerning low emissions mobility from cognition to recognition of the value. **The groups with a low degree of low-carbon cognition choose different drivers in a relatively scattered manner.** Relatively speaking, environmental laymen have the strongest demand for comfort, while unconscious environmentalists generally choose the drivers of embracing low emissions mobility and convenient and accessible public transit facilities. Free actionists provide more feedback on **flexibility, efficiency and comfort**, while low-carbon practitioners with further potential offer positive feedback on **embracing low emissions mobility, flexibility, efficiency, and convenient and accessible public transit facilities**.

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77% of the respondents own cars, signifying a high car penetration rate. The public purchase cars mainly to meet the needs of family (picking up children and other family members) (43%). The second main reason for car purchase is to make mobility more convenient (41%) in some scenarios.

Reasons for car purchase among different groups

➢ The top three reasons for the public to purchase cars include: meeting the needs of family (43%), making mobility more convenient (41%), and meeting the needs of work (33%). Therefore, the composition of a family will exert a great impact on the public's choice of mobility mode.

➢ In terms of public groups, the group with a low degree of low-carbon cognition purchases cars mainly as a hobby or a token of status; while the group with a high degree of low-carbon cognition buys cars primarily to meet the needs of family or make the mobility more convenient, which is perhaps the reason for this group to choose high emissions mobility.

Main reasons for car purchase	Total (%) (Base: respondents with cars, n=2,700)	Environmental laymen (%) n=236	Free actionists (%) n=161	Potential New Energy Mobility Practitioners (%) n=28*	Unconscious environmentalists (%) n=1,070	Low-carbon practitioners with further potential (%) n=1,009	Low-carbon pastoralists (%) n=196
Meeting the needs of family (e.g. picking up children and other family members)	43	35	55	75	36	47	56
Making mobility more convenient	41	31	47	64	36	44	53
Meeting the needs of work (e.g. business meeting, daily commuting)	33	32	40	39	31	34	35
Shortening mobility time	32	32	40	32	30	31	38
Being relatively low-carbon and environmental-friendly	31	22	19	14	28	38	28
Comfort	29	19	29	39	28	32	35
Hobby	17	23	12	4	21	14	11
Token of status (focus more on car brand)	16	23	17	4	19	13	10

*For reference only due to small sample size

Source: E2. Main reasons for car purchase

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When choosing modes of mobility for commuting, 38% of the respondents consider embracing low emissions mobility, which means that low emissions mobility is generally recognized and accepted by the public. The public attach more importance to comfort than economic performance and time cost.
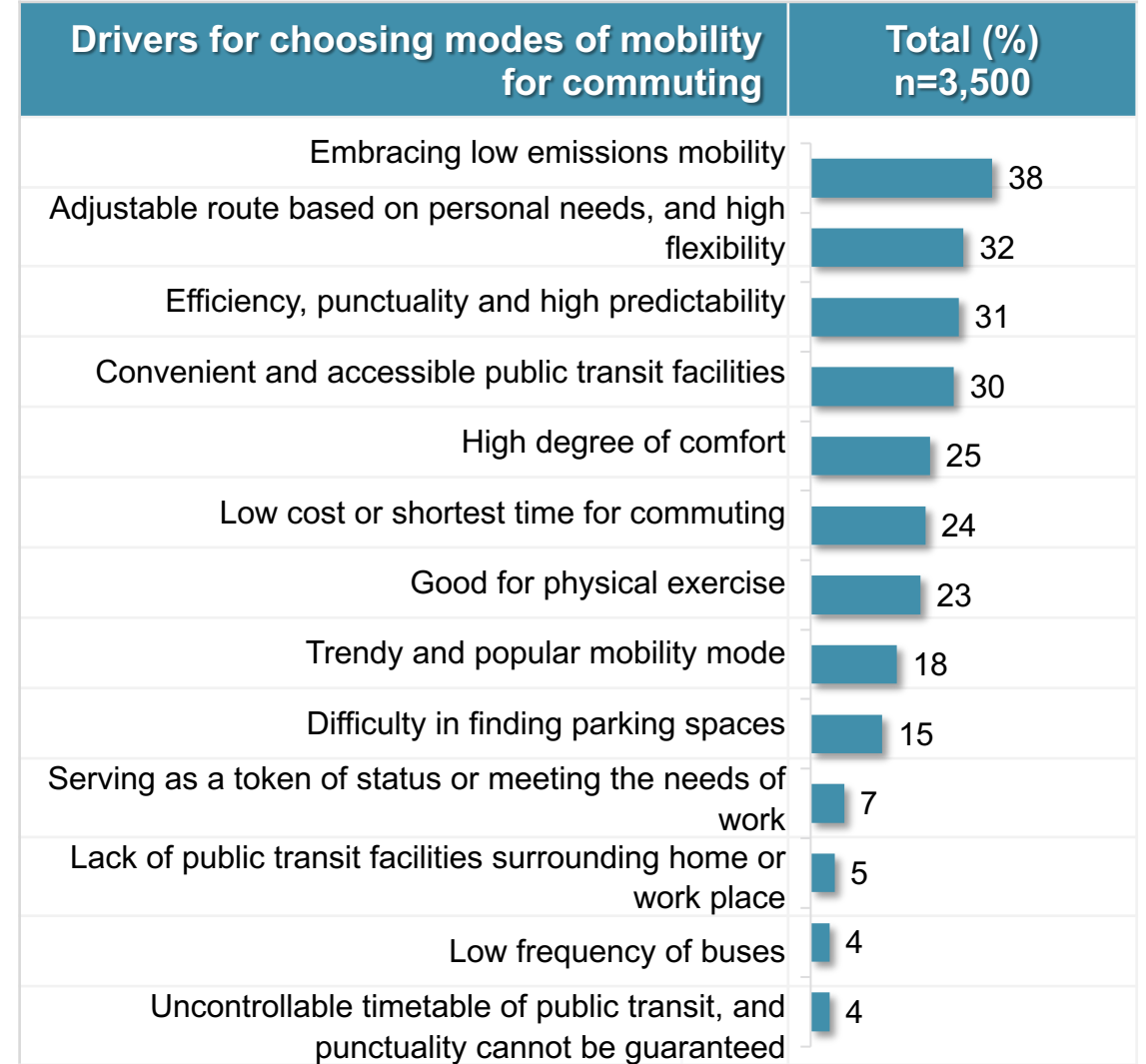
Drivers for choosing modes of mobility for commuting

➢ When choosing commuting modes, 38% of the respondents consider embracing low emissions mobility, 32% value flexibility—whether the route can be adjusted based on personal needs, and 31% pay attention to the efficiency, punctuality and high predictability of mobility modes.

➢ Among the drivers for respondents to choose commuting modes, embracing low emissions mobility accounts for the highest proportion. Then explore this issue in an in-depth manner. Respondents who choose this driver gain sense of well-being primarily from the beautiful and healthy natural environment. They choose low emissions mobility mainly for the purpose of consciously saving energy and resources. The top three most frequently chosen modes of low emissions mobility are public transit, NEV and electric scooter.

Voice of the respondents:

*"Zero emissions mobility will be chosen based on scenarios and situations by considering the **time cost** and **convenience of parking**. For example, in case of traffic congestion or inconvenient parking in the morning, I will choose zero emissions mobility. Ways to promote zero emissions mobility: through **national policy**, for instance, elderly mobility scooters and taxis will be replaced with pure electric vehicles... China is now vigorously promoting new energy electric vehicles in an effort to completely replace the oil-fueled ones, but a lot of people gain license plates by cheating."*
—*Mr. Shen from Shanghai urban area (with an average degree of low-carbon cognition and low emissions mobility)*

Drivers for choosing modes of mobility for commuting	Total (%) n=3,500
Embracing low emissions mobility	38
Adjustable route based on personal needs, and high flexibility	32
Efficiency, punctuality and high predictability	31
Convenient and accessible public transit facilities	30
High degree of comfort	25
Low cost or shortest time for commuting	24
Good for physical exercise	23
Trendy and popular mobility mode	18
Difficulty in finding parking spaces	15
Serving as a token of status or meeting the needs of work	7
Lack of public transit facilities surrounding home or work place	5
Low frequency of buses	4
Uncontrollable timetable of public transit, and punctuality cannot be guaranteed	4

   Source: B4. Drivers for choosing modes of mobility for commuting; qualitative interview

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Drivers for choosing modes of mobility for commuting

➢ Potential New Energy Mobility Practitioners enjoy solid economic foundation, so their cognition does not prevent them (in a tiny minority) from using oil-fueled cars with a high percentage. Seeing from the drivers, this group of respondents raises high requirements for efficiency and comfort. More than half of the low-carbon pastoralists embrace low emissions mobility, and highly recognize the drivers of **convenience of low emissions mobility modes and the lowest commuting cost**, indicating that people in this group have converging ideas concerning low emissions mobility from cognition to recognition of the value;

➢ The groups with a low degree of low-carbon cognition choose different drivers in a relatively scattered manner. Relatively speaking, environmental laymen have the strongest demand for comfort, while unconscious environmentalists generally choose the drivers of embracing low emissions mobility and convenient and accessible public transit facilities;

➢ Free actionists provide more feedback on flexibility, efficiency and comfort, while low-carbon practitioners with further potential offer positive feedback on embracing low emissions mobility, flexibility, efficiency, and convenient and accessible public transit facilities.

Drivers for choosing modes of mobility for commuting	Total (%) n=3,500	Environmental laymen (%) n=287	Free actionists (%) n=182	Potential New Energy Mobility Practitioners (%) n=31	Unconscious environmentalists (%) n=1,378	Low-carbon practitioners with further potential (%) n=1,380	Low-carbon pastoralists (%) n=242
Embracing low emissions mobility	38	25	17	16	35	46	51
Adjustable route based on personal needs, and high flexibility	32	30	45	26	30	33	29
Efficiency, punctuality and high predictability	31	23	40	58	29	32	33
Convenient and accessible public transit facilities	30	22	14	6	32	32	34
High degree of comfort	25	31	31	42	24	23	23
Low cost or shortest time for commuting	24	12	18	26	20	28	36
Good for physical exercise	23	29	14	3	24	23	18
Trendy and popular mobility mode	18	24	13	16	20	16	16
Difficulty in finding parking spaces	15	14	10	6	15	17	14
Serving as a token of status or meeting the needs of work	7	11	9	10	7	5	7
Lack of public transit facilities surrounding home or work place	5	8	13	26	5	4	4
Low frequency of buses	4	7	10	16	4	2	4
Uncontrollable timetable of public transit, and punctuality cannot be guaranteed	4	2	13	23	2	4	3

Source: B4. Drivers for choosing mode of mobility for commuting

Characteristics of six group portraits

"Environmental Laymen"　8%

With a low degree of low-carbon cognition and high emissions mobility

- This group does not have a specific cognition of low-carbon concept. Among those who regard low carbon as a "fashion", this group occupies the highest proportion.
- This group gains their sense of well-being mainly from the balance between life and work.
- Compared with low emissions mobility, they prefer to abstain from eating meat, choose clothes made of cotton and linen, and practice other low-carbon lifestyles.
- The proportion of people who accept modes of low emissions mobility is the lowest among all groups. This group puts more emphasis **on comfort, flexibility and status symbol** when choosing a mode of mobility.

"Free Actionists"　5%
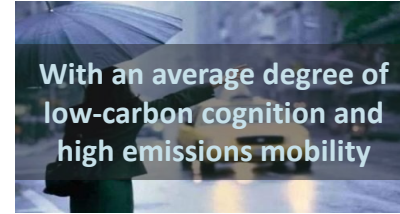
With an average degree of low-carbon cognition and high emissions mobility

- This group chooses high emission**s** mobility modes such as oil-fueled vehicle, taxi or carpooling for daily commuting.
- This group values **flexibility and efficiency** when choosing a mode of mobility.

"Potential New Energy Mobility Practitioners" 1%

With a high degree of low-carbon cognition and high emissions mobility

- This group has a high degree of low-carbon cognition, but they still choose the mode of high emissions mobility, such as oil-fueled vehicle, taxi or carpooling.
- They pay more attention to **efficiency, punctuality, high predictability and comfort**, and are also passively affected by such drivers as lack of public transit facilities surrounding home or work place, so they are high-carbon in terms of mobility. However, they lay more emphasis on low carbon in daily life compared with the groups with other degree of cognition.

"Unconscious Environmentalists" 39%
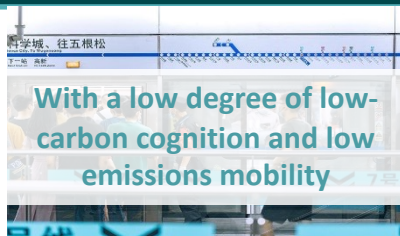
With a low degree of low-carbon cognition and low emissions mobility

- This group has a poor cognition of low-carbon concept, but they will choose modes of low emissions mobility for daily commuting largely due to the convenience and accessibility of public transit facilities.
- Compared with other groups, this group includes a larger proportion of members who choose to practice low-carbon behaviors due to the "influence of habits of surrounding people ".

"Low-carbon Practitioners with Further Potential" 40%
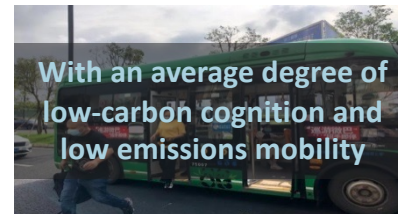
With an average degree of low-carbon cognition and low emissions mobility

- This group chooses modes of low emissions mobility for daily commuting.
- Among the reasons for low emissions mobility, the factor of "embracing low emissions mobility" accounts for a relatively large proportion, followed by convenient and accessible public transit facilities at the sites of commuting.

"Low-carbon Pastoralists"　7%
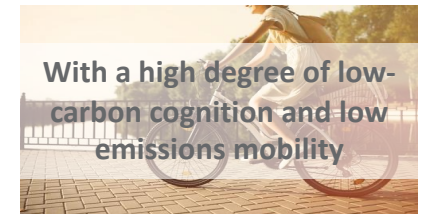
With a high degree of low-carbon cognition and low emissions mobility

- In this group, a high proportion of people choose low emissions mobility because they embrace it. In addition, low cost or the shortest time of commuting will also enable them to choose low emissions mobility.
- This group has the strongest willingness to adopt public transit or cycling for mobility.

Analysis of situational drivers - Policy of restrictive measures

Policy of Restrictive Measures—Conclusions

➢ The public generally have **a good understanding** of the concept of zero-emission zone or ultra-low-emission zone, and **88% of them support this policy**. The main reason behind is the effect of **improving air quality** and **reducing energy consumption** of this policy.

➢ When zero-emission zones are delimited in a region, **82%** of the public in this region will **choose NEV or public transit as an alternative mode of mobility**. Specifically, **the proportion of public choosing NEV as an alternative is slightly higher than that choosing public transit**. Potential New Energy Mobility Practitioners **prefer to drive NEVs** even if they comply with the policy on zero-emission zone. Environmental laymen will choose public transit more due to the likely reason of limited cognition or low acceptance of NEVs. A higher proportion of the groups with high-carbon behaviors will **not stop driving oil-fueled vehicles**.

➢ Regarding the region where the policy on zero-emission zone is executed, **66%** of the public hope that zero-emission zones **can be piloted and then expanded or can be implemented in a specific area**. This indicates that the public still generally take a wait-and-see attitude towards the implementation of zero-emission zone, even though they are willing to accept this policy.

➢ As cities gradually ban the sale of oil-fueled vehicles, the public are concerned about a series of mobility issues. **68%** of the respondents pay attention to the **issues related to the use of NEVs**, such as safety, endurance and infrastructure optimization.

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The public generally **have a good understanding** of the concept of zero-emission zone or ultra-low-emission zone, and **88% of them support this policy.**

Public understanding of zero emission zones

➢ More than half of the public (58%) say they are somewhat familiar with the concept of zero or ultra-low-emission zones, while more than one in five (22%) are very familiar with zero emission zones, and 5% feel they do not or very much understand zero emission zones.
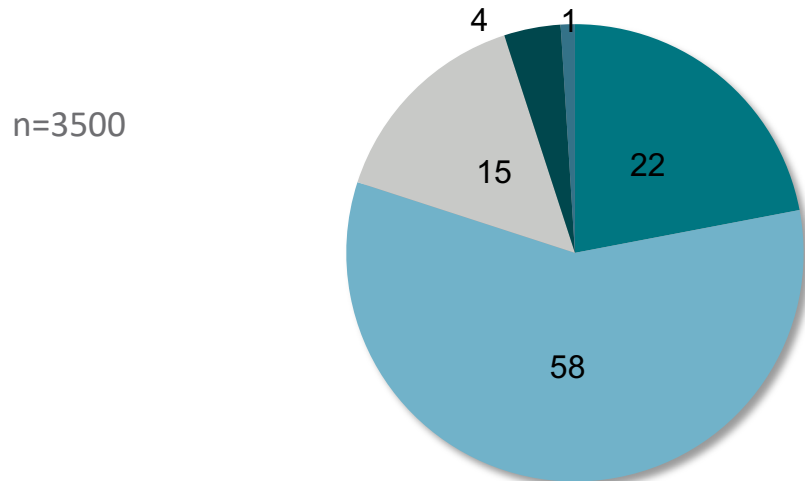
n=3500

4   1
15   22
58

■ Know extremely   ■ Know relatively
■ Know averagely   ■ Don't understand
■ Very little understanding

The public attitude in zero emissions

➢ The public is generally supportive (88%), with more than half of the public (59%) somewhat supportive of zero emission zones, another 29% very supportive and 1% unsupportive.
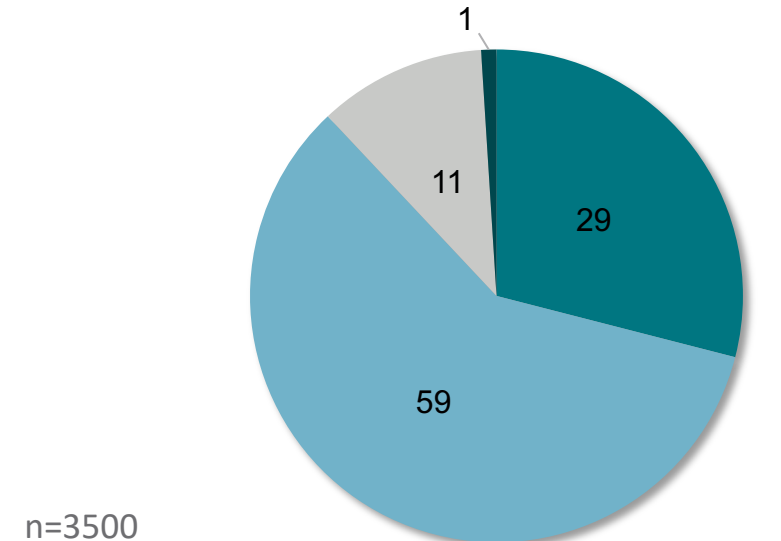
1
11   29
59

n=3500

■ Extremely supportive   ■ Relatively supportive
■ Averagely supportive   ■ Unsupportive
■ Extremely unsupportive

© 2022 Ipsos.   Source：E8. Public understanding of zero emission zones；E9. Public attitude towards zero emission zones (score 4-5)

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The main reason for the public to support zero-emission zones is that this policy will improve air quality and reduce energy consumption. As for the group not supporting this policy, they think that the current public transit system and infrastructure for NEVs cannot meet the needs of the public, and may cause inconvenience to daily life. Therefore, strengthening the development of public transit and infrastructure for NEVs may facilitate the implementation of zero-emission zones.

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Reasons for supporting zero-emission zones

➤ Among the reasons why the public support the implementation of zero-emission zones, this one accounts for the largest proportion— the implementation of zero-emission zones can reduce exhaust emissions, improve air quality and benefit health (34%).

Reasons for supporting zero-emission zones	Total (%) (Base: supporters, n=3,073)
Reducing exhaust emissions, improving air quality and benefiting health	34
Saving energy and reducing energy consumption	26
Improving mobility environment and easing congestion	23
Improving living environment	23
Healthier lifestyle	22
Improving public transit services and facilities	19
Lowering mobility cost	16
Conforming to development trend	15
I have an NEV	8
I don't have a car	5

Reasons for not supporting zero-emission zones

➤ Among the reasons why the public do not support the implementation of zero-emission zones, this one accounts for the largest proportion—the current public transit system and infrastructure for NEVs cannot meet the needs (54%).

Reasons for not supporting zero-emission zones	Total (%) (Base: objectors, n=39)
The current public transit system and infrastructure for NEVs cannot meet the needs	54
Causing inconvenience to daily life	49
Consciously practicing this policy without compulsory execution	23
Significantly affecting vehicle use by families	23
Being very satisfied with the current situation, there is no need to implement zero-emission zones	10
Accustomed to the present lifestyle, and unwilling to make changes	10
Concerned about the rising cost of logistics in the zone, which will lead to the increase in cost of living	10

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When zero-emission zones are delimited and parking fee for oil-fueled vehicles is raised in a region, 82% of the public in this region will choose NEV or public transit as an alternative mode of mobility. The proportion of the public buying NEVs is higher than that choosing public transit. But some still insist on driving oil-fueled vehicles.

Views of the public on zero-emission zone scenarios

➤ **Supposing that the region where you work or live is going to designate zero-emission zones, and the measure taken may be increasing parking fee for oil-fueled vehicles in such zones (e.g. double parking fee), how will you respond to this situation?** 82% of the public are willing to support the zero-emission policy by buying NEVs and taking public transit in this scenario. This result is consistent with previous analysis result of public attitudes towards zero-emission zones. It is worth noting that the proportion of the public choosing to buy NEVs is still higher than that choosing to travel by public transit, which means that there is still a great challenge in reducing the scale of high emissions mobility modes and encouraging the public's shift to public transit if transportation control continues in the future.

Views of the public	Total (%) n=3,500
Support the policy on zero emissions, and buy NEVs to replace oil-fueled vehicles	42
Support the policy on zero emissions, and take public transit to replace the use of oil-fueled vehicles	40
Reduce the driving frequency of oil-fueled vehicles, but will not completely stop driving oil-fueled vehicles	15
Be indifferent to the policy on zero emissions, and will still drive oil-fueled vehicles as usual	2
Be opposed to the policy on zero emissions and unwilling to cooperate with relevant measures	0

Voice of the respondents on zero-emission zones:

"The policy can be implemented first in **tourist attractions***, as long as it* **doesn't affect the life of the public.***"*
      —Mr. Jiao from Haikou urban area (with an average degree of low-carbon cognition and low emissions mobility)
The policy can be implemented in Hainan Island as the vehicles are used to travel to other places. But once the zero-emission zone is designated, I cannot drive to leave the island any more. I don't accept a **parking space** *for the car outside the island. It is inconvenient without a car at hand. It is just like I don't have a car. I can take high-speed trains for intercity travel, but there is no transportation means after I get off the train. In addition, the timetable of high-speed trains is fixed and inflexible, and charges will be collected when I return a ticket."*
      —Mr. Mo from Haikou urban area (with an average degree of low-carbon cognition and low emissions mobility)
"I support it. The zero-emission zone can be implemented within a small scope first and then **gradually expanded***...There should be supporting facilities, such as* **customized bus lines***, and* **shared NEVs***."*
      —Ms. Wu from Shenzhen suburb (with a high degree of low-carbon cognition and low emissions mobility)
"It will cause inconvenience. If the problems related to charging facilities and parking spaces are solved, zero emissions can be implemented."
      —Mr. Jiang from Shenzhen urban area (with an average degree of low-carbon cognition and high emissions mobility)
"I hope zero-emission zones **cover all areas;** *otherwise, this policy* **should not be implemented.***"*
   *—Mr. Liu from Beijing urban area (with an average degree of low-carbon cognition and high emissions mobility)*
"Zero-emission zones should be designated in some **remote** *areas to the greatest extent."*
      —Mr. Shen from Shanghai urban area (with an average degree of low-carbon cognition and low emissions mobility)
"The policy can be implemented in some **remote** *places, not in the downtown. I need ways to drive my car out..."*
      —Ms. Huang from Shanghai suburb (with an average degree of low-carbon cognition and high emissions mobility)

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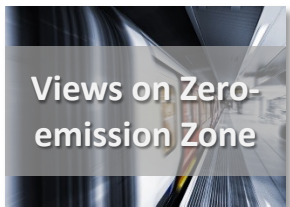
Potential New Energy Mobility Practitioners prefer to drive NEVs even if they comply with the policy on zero-emission zone; a higher proportion of the groups with high-carbon behaviors will not stop driving oil-fueled vehicles.

Views of the public on zero-emission zone scenarios

➢ Potential New Energy Mobility Practitioners prefer to drive NEVs even if they comply with the policy on zero-emission zone. Environmental laymen will choose public transit more due to the likely reason of limited cognition or low acceptance of NEVs;

➢ A higher proportion of the groups with high-carbon behaviors will not stop driving oil-fueled vehicles.

Views of the public	Proportion (%) n=3,500	Environmental laymen (%) n=287	Free actionists (%) n=182	Potential New Energy Mobility Practitioners (%) n=31	Unconscious environmentalists (%) n=1,378	Low-carbon practitioners with further potential (%) n=1,380	Low-carbon pastoralists (%) n=242
Support the policy on zero emissions, and buy NEVs to replace oil-fueled vehicles	42	26	36	61	43	46	40
Support the policy on zero emissions, and take public transit to replace the use of oil-fueled vehicles	40	45	35	19	42	38	46
Reduce the driving frequency of oil-fueled vehicles, but will not completely stop driving oil-fueled vehicles	15	23	25	13	13	15	12
Be indifferent to the policy on zero emissions, and will still drive oil-fueled vehicles as usual	2	6	3	0	2	1	2
Be opposed to the policy on zero emissions and unwilling to cooperate with relevant measures	0	1	1	6	0	0	0

*Notes: About rounding—Accurate figures are used for calculation and only integers are retained in the report, so there may be an error of ±1. It is hereby noted.

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Regarding the areas where the policy on zero-emission zone is executed, 66% of the public hope that zero-emission zones can be piloted first and then expanded or can be implemented in a specific area. **This indicates that the public still generally take a wait-and-see attitude towards the implementation of zero-emission zone, even though they are willing to accept this policy. The government can make the public more receptive to the implementation of zero-emission zone to a certain extent by** improving public transit infrastructure and services.

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Areas to have zero-emission zones expected by the public

➢ When it comes to the areas for designating zero-emission zones, 34% of the public expect to implement the policy throughout the city, accounting for the largest proportion, followed by "piloting in the urban area and then expanding".

Areas to have zero-emission zones expected by the public	Total (%) n=3,500
Implementing throughout the city	34
Piloting in the urban area and then expanding	27
Piloting in the suburb and then expanding	24
Implementing in scenic spots and surrounding areas	11
Implementing in industrial parks and surrounding areas	5

Government measures enabling the public to support zero-emission zones

➢ Nearly half of the public (46%) say that the government can enable residents/citizens to support zero-emission zones by vigorously improving the convenience, comfort and flexibility of public transit services, and 44% propose the measure of boosting the supply of infrastructure such as charging piles and parking spaces for NEVs in zero-emission zones.

➢ It can be seen that although the public generally support the implementation of zero-emission zone, they propose that the government should adopt some practical measures, and even some economic compensation, to facilitate the popularization of relevant policies.

Government measures enabling the public to support zero-emission zones	Total (%) n=3,500
Vigorously improving the convenience, comfort and flexibility of public transit services	46
Vigorously boosting the supply of infrastructure such as charging piles and parking spaces for NEVs in zero-emission zones	44
Offering subsidies to residents in low-emission zones for replacing oil-fueled vehicles with NEVs	41
Offering subsidies to residents in low-emission zones for taking public transit	38
Increasing the supply of public transit resources within low-emission zones and enhancing the efficiency of public transit connections between areas inside and outside of such zones	29
Improving the construction of parking lots in the connecting areas inside and outside of low-emission zones and encouraging the "Park and Ride" mode	27
Fully communicating with residents to jointly discuss the management policies and implementation schedule of low-emission zones	5

Source: E12. Areas to have zero-emission zones expected by the public; E14. Government measures enabling the public to support zero-emission zones

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As cities gradually ban the sale of oil-fueled vehicles, the public are concerned about a series of mobility issues. 68% of the respondents pay more attention to the issues related to the use of NEVs, such as safety, endurance and infrastructure optimization.

The public's biggest concerns over the ban on sale and driving of oil-fueled vehicles

➤ If cities gradually ban the sale and driving of oil-fueled vehicles, the public will pay most attention to the issues related to the use of NEVs, such as safety, battery endurance and infrastructure optimization.

The public's biggest concerns	Total (%) n=3,500
Issues related to the use of NEVs (e.g. safety, battery endurance and infrastructure optimization)	68
Issues related to the purchase of NEVs (e.g. license plates and subsidies)	44
How to deal with the existing oil-fueled vehicles	41
Impact on life during the transitional period (gradually adapting to the policy of returning and replacing oil-fueled vehicles)	34
How to improve the efficiency of public transit	14

Voice of the respondents on the ban on sale and driving of oil-fueled vehicles:

"Whether the subsidy can support the purchase of a NEV? The license plate also costs a lot of money. Will the value after replacement remain the same with the original value when I purchased it? And whether I can purchase a new license plate? Do I need to wait for another?"
  —Mr. Sun from Shanghai urban area (with an average degree of low-carbon cognition and high emissions mobility)

"I will not be affected. I will replace my oil-fueled vehicle with a NEV. It is inevitable."
  —Mr. Shen from Shanghai suburb (with an average degree of low-carbon cognition and high emissions mobility)

"Charging piles are not allowed in our community, so it's inconvenient for NEV charging."
  —Mr. Zhai from Beijing urban area (with an average degree of low-carbon cognition and high emissions mobility)

"I don't want to replace my oil-fueled vehicle with a NEV. My house can be replaced with another."
  —Ms. Yuan from Beijing urban area (with an average degree of low-carbon cognition and low emissions mobility)

"I support it. It's the necessary result of social development…"
  —Ms. Wang from Beijing suburb (with an average degree of low-carbon cognition and high emissions mobility)

"The prices fluctuate greatly during the transitional period…"
  —Mr. Xu from Shenzhen urban area (with an average degree of low-carbon cognition and high emissions mobility)

"It's inconvenient for me to return to my hometown."
  —Ms. Wu from Shenzhen suburb (with a high degree of low-carbon cognition and low emissions mobility)
"I'm OK with it if the infrastructure such as charging piles is put in place."
  —Mr. Chen from Haikou urban area (with an average degree of low-carbon cognition and high emissions mobility)

"I have learnt this news…It depends on the improvement of infrastructure. For example, the community should be required to install charging piles."
  —Mr. He from Haikou suburb (with an average degree of low-carbon cognition and low emissions mobility)

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Analysis of situational drivers - Economic incentive mechanism

90% of the public hold that carbon credits are attractive to some extent, while a few people think that carbon credits are unattractive mainly due to the low value of goods on exchange platforms and cumbersome exchange procedures.

Public attitudes towards carbon credits exchange

➢ 90% of the public consider that exchange for goods on such platforms as "carbon credits" and "carbon inclusion" can attract them to choose low emissions mobility. Specifically, respondents who consider it extremely attractive account for 27%, and those taking a neutrality attitude account for 10%. This indicates a relatively high degree of cognition of carbon value among the public, and incentive mechanisms like carbon credits can encourage the public to practice low-carbon behaviors to some extent.

n=3,500

- ■ Extremely attractive
- ■ Relatively attractive
- ■ Averagely attractive
- ■ Unattractive
- ■ Extremely unattractive
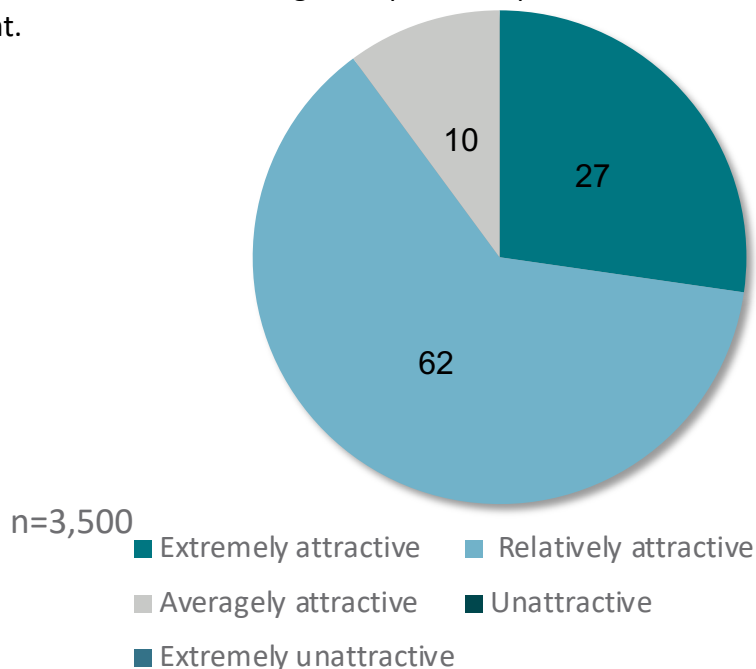
Reasons why the public consider carbon credits unattractive

➢ Reasons why the public consider carbon credits unattractive mainly include: extremely low value of goods on exchange platforms (42%), cumbersome exchange procedures (42%), and lack of diversity in the consumption platforms for credits exchange (37%).

Reasons why the public consider carbon credits unattractive	Total (%) (Base: the group considering carbon credits unattractive, n=19*)
Extremely low value of goods on exchange platforms, which is unattractive	42
Cumbersome exchange procedures	42
Lack of diversity in the consumption platforms for credits exchange	37
Carbon credits cannot solve the inherent problems of transportation modes for low emissions mobility (too crowded, prone to traffic jam, uncomfortable, etc.)	26
I will not change lifestyle due to carbon credits	21
I've never heard of and don't know the carbon inclusion or carbon credits	16
The gain is not proportionate to the efforts in carbon credits exchange	11

* For reference only due to small sample size

Source: F5. Whether carbon credits exchange is attractive (Scoring 4-5 points); F6. Reasons why the public consider carbon credits unattractive

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More than 40% of the public prefer price discount for low emissions mobility **among relevant incentive mechanisms, which reflects the further** economic reward for low-carbon practitioners. The second reward mechanism favored by the public is transforming behaviors of low emissions mobility into participation in environmental protection public benefit activities. In contrast, reward of concrete articles has a low ranking.

Reward mechanisms more favored by the public to encourage low emissions mobility

➢ In order to continuously encourage the public and people around to practice low emissions mobility, the top three advocacy or reward mechanisms favored by the public include: price discount for low emissions mobility (41%), reflection of environmental protection value (participating in public benefit activities) (38%) and participation in some experience activities (36%).

Voice of the respondents:

"I prefer the exchange for **daily consumer goods**, *and the exchange for public transit discounts is not encouraging enough."*
　　—*Mr. Wang from Haikou suburb (with a high degree of low-carbon cognition and low emissions mobility)*

"Food vouchers, consumer goods, supermarket vouchers, public transit vouchers, etc. Everything with **monetary value** *is OK."*
　　—*Mr. Mo from Haikou urban area (with an average degree of low-carbon cognition and low emissions mobility)*

"I also accept the exchange for **goods and subway discounts**.*"*
　　—*Ms. Wu from Shenzhen suburb (with a high degree of low-carbon cognition and low emissions mobility)*
"The cost of taking bus or subway can be reduced. For example, if the carbon value is reached this month, bus and subway fare will be halved next month. It can not only save money, but also encourage the public to **practice environmental protection**."
　　—*Mr. Wu from Shenzhen urban area (with an average degree of low-carbon cognition and high emissions mobility)*

"It depends on the specific enterprises. I hope to exchange for **concrete items** *or things that can be used in many places."*
　　—*Mr. Zhang from Beijing suburb (with an average degree of low-carbon cognition and low emissions mobility)*

"Discount of fees, credits exchange, etc. I expect some **concrete things** *and* **benefits I can actually utilize for consumption**.*"*
　　—*Mr. Song from Shanghai urban area (with an average degree of low-carbon cognition and low emissions mobility)*

Reward mechanisms more favored by the public	Total (%) n=3,500
Price discount for low emissions mobility: Discount for subway and bus annual cards, or exchange for tickets with mileage	41
Environmental protection value: Low emissions mobility mileage can be used to exchange for saplings or green plants for participation in public benefit activities, such as Ant Forest	38
Experience activities: Low emissions mobility mileage can be used to exchange for experience activities of entertainment, culture and art, and sports (e.g. tickets for concerts and sport facilities)	36
Advocacy of activities: Relevant authorities and organizations organize the public to participate in attendance or themed activities related to low emissions mobility on a regular or irregular basis	32
Practicing low carbon concept is the responsibility of every citizen, and everyone should act consciously. No reward mechanism is needed.	31
Reward of physical articles: Low emissions mobility mileage can be used to exchange for articles of daily use, food, etc.	31
Public education: Communities and schools regularly carry out fun educational activities related to low emissions mobility	27

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Analysis of situational drivers - Improvements in public transport services

# Improvements in public transit service—Conclusions

➢ 92% of the public say they are more willing to take a bus under the policy of "bus priority". Those less willing to do so are mainly concerned about the **comfort** and **efficiency** of buses.

➢ 80% of the public think it is convenient and practical to check the bus timetable on their mobile phone or the platform; **inaccurate vehicle arrival information** is the main reason that leads the public to complain about the inconvenience and impracticality of this service.

➢ Top four public expectations & recommendations around low-carbon transit infrastructure include **introducing policies that encourage low emissions mobility**, **increasing the service frequency and stops of public transit**, **enhancing the comfort of public transit**, **and providing adequate shared bikes.**
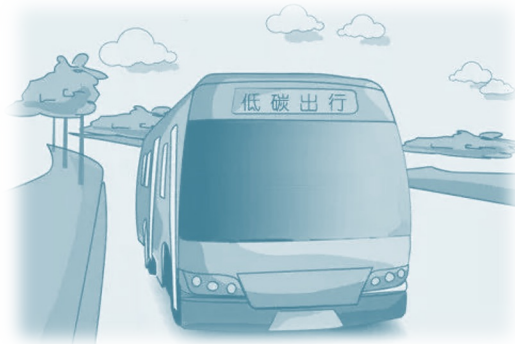
92% of the public say they are more willing to take a bus under the policy of "bus priority". Those less willing to do so are mainly concerned about the comfort and efficiency of buses.

Public attitudes towards bus mobility under the policy of "bus priority"

➢ If smart technology is used to introduce the policy of "bus priority", most buses can pass the traffic light on a priority basis through algorithm and CVIS (Cooperative Vehicle Infrastructure System), thereby reducing waiting time and congestions for buses and increasing the punctuality of the bus system. Then, 30% of the public say they are very willing to lean towards the bus; 62% say they are fairly willing to do so; while 8% remain neutral.

➢ According to previous analysis, currently 28% (this proportion approaches the proportion of the public who are very willing) of the public choose the bus for their commuting, so this policy can attract more public to consider the bus for mobility.

Whether willing to lean towards the bus service for mobility after policy introduction (%)
n=3,500
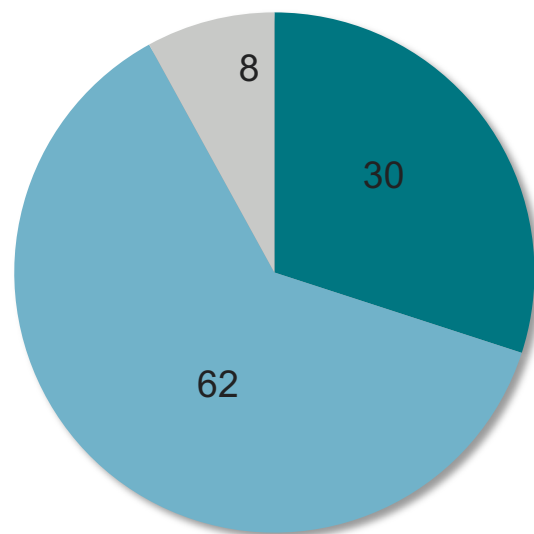
■ Very willing ■ Averagely willing ■ Neutral ■ Fairly unwilling ■ Very unwilling

Reasons for low willingness to take a bus under the policy of "bus priority"

➢ The options of the reasons for low public willingness to take a bus are highly scattered, with the top three reasons including crowded compartments and poor environments, lengthy time before arriving at the destination, and inconvenient mobility (limited lines available and multiple transfers needed).

Reasons for low willingness to take a bus for mobility	Total (%) (Base: the number of the public scoring 0-3 points for B11, n=283)
Crowded compartments and poor environments within the vehicles	35
Slow speed and lengthy time before arriving at the destination	34
Inconvenient mobility due to limited lines available and multiple transfers needed	34
Service frequency scheduling cannot be flexibly adjusted depending on peak hours	29
Highly exposed to weather or climate	29
Uncertain vehicle arrival time	28
Poor waiting environments	22

 Source: B11. Public attitudes towards bus mobility under the policy of "bus priority"(scoring 4-5 points);
B12. Reasons for low willingness to take a bus for mobility under the policy of "bus priority"
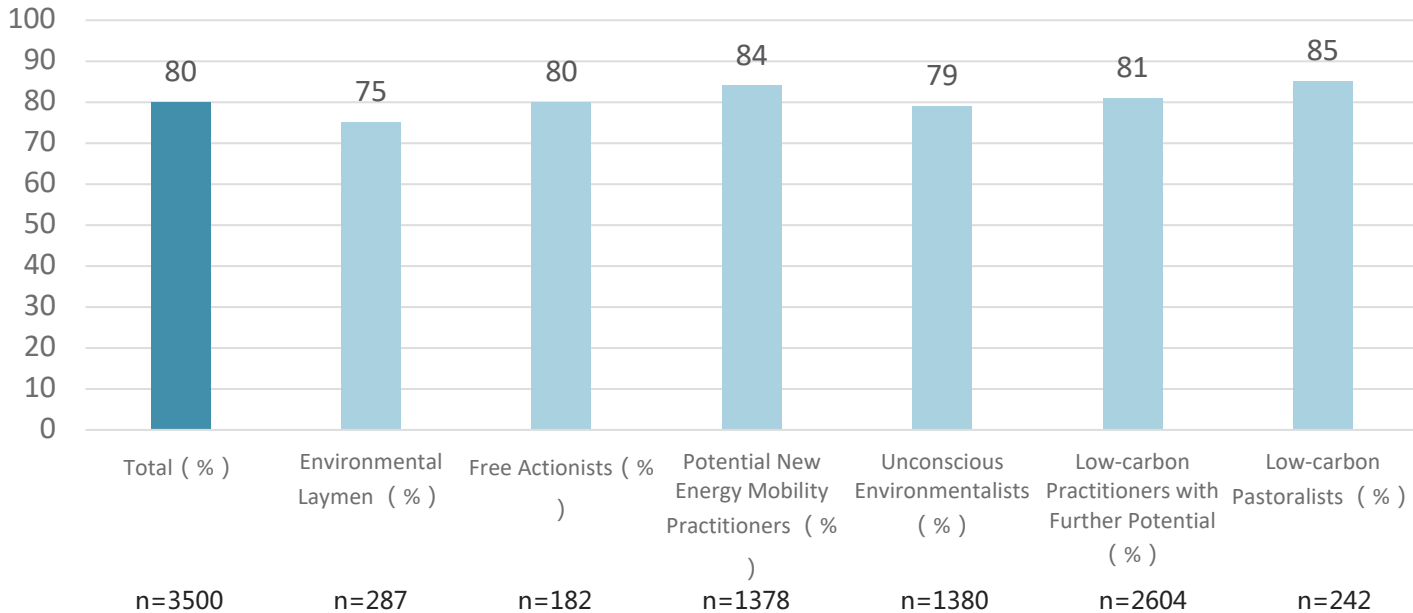
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80% of the public think it is convenient and practical to check the bus timetable on their mobile phone or the platform; inaccurate vehicle arrival information is the main reason that leads the public to complain about the inconvenience and impracticality of this service.

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Public attitudes towards checking bus schedules on mobile phones or platforms

➢ More than half of the public (55%) think it is convenient and practical to check bus timetables from mobile apps or station platforms, and a quarter think it is very convenient and practical.

➢ The service is also viewed positively by the more recognized public.

Reasons the public thinks bus schedules are inconvenient and impractical

➢ For the public, it is not convenient and practical to check the bus timetable on mobile phone or station platform because they think it is not accurate to query vehicle arrival information (38%).

Percentage of the public who think it is convenient and practical

	Total (%)
Total (%)	80
Environmental Laymen (%)	75
Free Actionists (%)	80
Potential New Energy Mobility Practitioners (%)	84
Unconscious Environmentalists (%)	79
Low-carbon Practitioners with Further Potential (%)	81
Low-carbon Pastoralists (%)	85

n=3500 n=287 n=182 n=1378 n=1380 n=2604 n=242

Reasons that the public considers inconvenient and impractical	Total (%)(Base: B13 < 3 n=58)
Bus arrival information is inaccurate	38
The app needs to be downloaded separately, occupying the phone's memory	36
App use is not smooth, App use is only for a single city, there is no national network	34
A bus schedule doesn't matter much. If you decide to take the bus anyway, it doesn't matter whether you know the waiting time or not	26
Less frequent use of buses, less opportunities to use	26

Source： B13. Public attitude towards bus timetables (score 4-5)； B14. Reasons the public thinks bus schedules are inconvenient and impractical

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Views on public transportation

> Top four public expectations & recommendations around low-carbon transit infrastructure include introducing **policies that encourage low emissions mobility**, **increasing the service frequency and stops of public transit**, **enhancing the comfort of public transit**, and **providing adequate shared bikes**.

Sample Size: n=3500

Voice of respondents on low-carbon transport suggestions :

"Buses can be discounted, but subways can't. The quality of security and security personnel needs to be improved, and the use of civilized language."
——Mr. Zhu Shenzhen Suburb（general level of knowledge &low-carbon behavior）

"You don't have to turn up the air conditioning too much when there are fewer people."
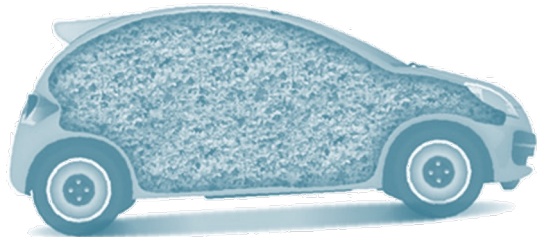——Mr. Feng Shenzhen Suburb（general level of knowledge &low-carbon behavior）

"There are more morning and evening rush hours. We will increase discounts for monthly passes and annual passes."
——Mr. Guo Shenzhen Suburb（general level of knowledge &low-carbon behavior）

Source：B10. Public suggestions on low-carbon transport infrastructure (open question); Qualitative Interviews

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Analysis of situational drivers - Promotion of NEVs

Promotion of NEVs—Conclusions

➢ The public are generally receptive to NEVs, **with close to 70% of them looking to buy an NEV for their next purchase.** Environmental laymen have a high proportion (11%) of choosing an oil-fueled vehicle for their next purchase, while those with a high degree of low-carbon cognition show more willingness to buy an NEV for their next purchase—evidently—improvement in cognition directly contributes to greater low emissions mobility of the public.

➢ The public remain worried about some of NEVs' issues, such as **range anxiety**, **charging convenience**, as well as **technical safety.**

➢ Over 50% of the public believe **regular battery safety testing and life testing** or **disclosure of the testing results** can—to some extent—make NEVs more acceptable.

➢ 55% of the public are in favor of changing **"charging station" to "swapping station"** for NEVs. The public hold that improvements in **the penetration rate of charging piles** and in **the endurance of NEVs** can spur people to actively buy NEVs, which echoes with public concerns about such vehicles.

The public are generally receptive to NEVs, with close to 70% of them looking to buy an NEV for their next purchase. Environmental Laymen have a high proportion (11%) of choosing an oil-fueled vehicle for their next purchase, while those with a high degree of low-carbon cognition show more willingness to buy an NEV for their next purchase—evidently—improvement in cognition directly contributes to greater low emissions mobility of the public.

Options for your next car purchase

➢ Sixty-nine percent of the public said they would consider new energy vehicles in their next car purchase, while only five percent of the public said they would consider fuel cars.

➢ From the perspective of the population, the proportion of Environmental laymen choosing fuel cars in their next car purchase is relatively high, while people with high level of knowledge are more willing to buy new energy cars next time. It can be seen that the improvement of awareness has a direct impact on improving the public's low-carbon behavior.

The next purchase of fuel cars or new energy vehicles
n=3500

5
26
69
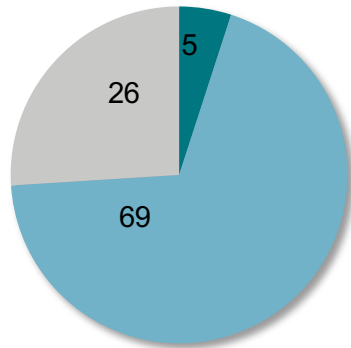
- Oil-fueled Vehicle
- NEV
- I have no plans to buy a car for now

Options for your next car purchase	Environmental Laymen (%) n=287	Free Actionists (%) n=182	Potential New Energy Mobility Practitioners (%) n=31	Unconscious Environmentalists (%) n=1378	Low-carbon Practitioners with Further Potential (%) n=1380	Low-carbon Pastoralists (%) n=242
Oil-fueled Vehicle	11	7	6	6	3	2
NEV	59	68	84	66	71	77
I have no plans to buy a car for now	30	26	10	28	25	21

 Source : E3. Options for your next car purchase

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**The public remain worried about some of NEVs' issues, such as range anxiety, charging convenience, as well as technical safety. Over 50% of the public believe regular battery safety testing and life testing or disclosure of the testing results can—to some extent— make NEVs more acceptable.**

How much the public accept NEVs

➤ The endurance of NEVs is a top concern for more than a half of the public (55%), followed by charging convenience (54%) and technical safety (44%).

➤ Over 50% (51%) of the public believe regular battery safety testing and life testing or disclosure of the testing results can make NEVs more acceptable; in addition, 50% of them think increased endurance range will make the public feel more assured.

Concerns about NEVs
n=3,500
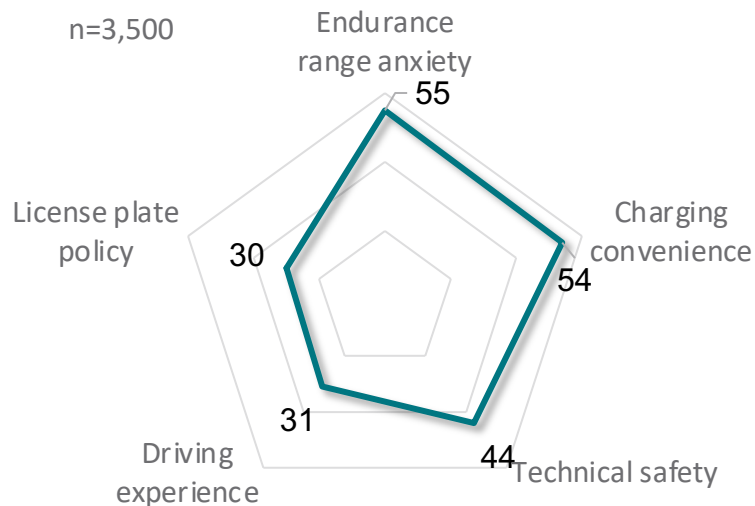
How much the public accept NEVs	Total (%) n=3,500
Regular battery safety testing and life testing or disclosure of the testing results	51
Increase in endurance range	50
Increase in charging piles	47
Official disclosure and communication of the investigation results of accidents of NEVs	39
Perfection of policies regarding license plates for NEVs	36

Voice of the respondents:

*"I am interested in NEVs, which **save costs**, but I will see whether they are technically mature."*
—Mr. Sun from Shanghai urban area (with an average degree of low-carbon cognition and high emissions mobility)

*"Over the coming years, I won't buy battery electric vehicles (BEVs) because they **don't make me feel safe**, and I will consider gas-electric hybrid cars."*
—Mr. Liu from Beijing urban area (with an average degree of low-carbon cognition and high emissions mobility)

*"The scrapped batteries are—literally—**environmentally-unfriendly.** So I won't buy an NEV just because of the favorable policy. I'm expecting a hydrogen car."*
—Ms. Gu from Shanghai suburb (with an average degree of low-carbon cognition and low emissions mobility)

*"Despite their improved endurance, I feel the NEVs remain technically **immature.** Many points are available for free charging and it's OK for me to charge my car at the fast-charging piles outside."*
—Ms. Huang from Shanghai suburb (with an average degree of low-carbon cognition and low emissions mobility)

*"I like driving an oil-fueled vehicle, but considering the higher costs and that I drive only within the urban area, an NEV is also acceptable……**Range anxiety, safety, and KERS (Kinetic Energy Recovery System)**-the braking experience is unpleasant……"*
—Ms. Wang from Shenzhen urban area (with an average degree of low-carbon cognition and low emissions mobility)

*"I am worried about **the range**, so that I cannot travel out of Beijing. **No charging points are available** in my hometown. My another worry is replacing the battery will harm the performance of the car."*
—Ms. Luo from Beijing suburb (with a high degree of low-carbon cognition and low emissions mobility)

*"At present, if you change your oil-fueled vehicle to an electric car, charging piles are available everywhere, even on the way back to your hometown; what's more, electric cars are **less costly**."*
—Mr. Chen from Haikou urban area (with an average degree of low-carbon cognition and high emissions mobility)

*"I will buy a gas-electric hybrid car because **charging piles are unavailable** in many places, including my community."*
—Mr. Tang from Haikou suburb (with an average degree of low-carbon cognition and high emissions mobility)

*"I will consider buying an NEV, **in response to the national call to mitigate environmental pollution.**"*
—Mr. Wang from Haikou suburb (with a high degree of low-carbon cognition and low emissions mobility)

 Source: E4. Public concerns about NEVs; E5. How much the public accept NEVs; qualitative interview

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55% of the public are in favor of changing "charging station" to "swapping station" for NEVs. The public hold that improvements in the penetration rate of charging piles and in the endurance of NEVs can spur people to actively buy NEVs, which echoes with public concerns about such vehicles.

What drives the public to buy an NEV

➤ The top three drivers that the public believe will prompt them to actively buy an NEV include changing "charging station" to "swapping station" for NEVs (55%), improvement in the penetration rate of charging piles (36%), and increase in the endurance of such vehicles.

What drives the public to buy an NEV	Total (%) n=3,500
Changing "charging station" to "swapping station" for NEVs	55
Charging piles enjoy a high penetration rate, with their quantity meeting demand	36
Increasing the endurance of NEVs	31
To protect the environment—for instance—to improve air quality	29
Policies offer NEVs privileged access to more parking spaces/more and more public parking spaces are dedicated to NEVs	29
Appreciating the sci-tech prowess of Chinese NEVs and home-made products	27
NEVs enjoy some price advantage compared with oil-fueled vehicles	26
Smart element of NEVs: integrating smart APPs, etc.	26
Sci-tech element of NEVs: a sense of the future	16
Fashion element of NEVs: a trend	10
I won't actively buy an NEV	2

Voice of the respondents:

*"Considering **endurance,** I bought a gas-electric hybrid vehicle."*
    —Mr. Feng from Shenzhen suburb (with an average degree of low-carbon cognition and low emissions mobility)

*"I like driving an oil-fueled vehicle, but considering the **higher costs** and that I drive only within the urban area, an NEV is also acceptable……"*
    —Ms. Wang from Shenzhen urban area (with an average degree of low-carbon cognition and low emissions mobility)

*"Buying an NEV is **making contributions to the nation.**"*
    —Mr. Zhang from Beijing suburb (with an average degree of low-carbon cognition and low emissions mobility)

*"Buying an NEV is **a trend.**"*
    —Ms. Zhu from Beijing suburb (with an average degree of low-carbon cognition and low emissions mobility)

*"I seek to **save costs**, and NEVs also represent **a future trend.**"*
    —Mr. Huang from Shanghai suburb (with an average degree of low-carbon cognition and low emissions mobility)

*"I am interested in NEVs, which **save costs**, but I will see whether they are **technically** mature."*
    —Mr. Sun from Shanghai urban area (with an average degree of low-carbon cognition and high emissions mobility)

*"I will choose an NEV, in response to the national call **to mitigate environmental pollution.**"*
    —Mr. Wang from Haikou suburb (with a high degree of low-carbon cognition and low emissions mobility)

Source: E6. What drives the public to buy an NEV; qualitative interview

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Potential for Intensifying Communication

Potential for intensifying communication—Conclusions

➤ Traditional media and offline publicity channels are less popular, as 91% of the public prefer to access information about low emissions mobility from **social media.**

➤ The channels from which the groups of people with a high degree of low-carbon cognition are willing to access information are relatively **diversified**, while the groups of people with a low degree of low-carbon cognition have **fewer channels** to access information and pay little attention to offline channels.

➤ The public generally believe, in the communication slogans, the mention of keywords related to **the next generation**, **national feelings**, as well as **the involvement of the public/everyone** can more easily create empathy with them.

➤ Moreover, according to the qualitative Voice of the Respondents, **the publicity on low emissions mobility intended for adults is insufficient**, which deserves attention.

Traditional media and offline publicity channels are less popular, as 91% of the public prefer to access information about low emissions mobility from social media.
The channels from which the groups of people with a high degree of low-carbon cognition are willing to access information are relatively diversified, while the groups of people with a low degree of low-carbon cognition have fewer channels to access information and pay little attention to offline channels.

The public's preferred access of information

The public's preferred access of information	Total (%) n=3500	Environmental Laymen (%) n=287	Free Actionists (%) n=182	Potential New Energy Mobility Practitioners (%) n=31	Unconscious Environmentalists (%) n=1378	Low-carbon Practitioners with Further Potential (%) n=1380	Low-carbon Pastoralists (%) n=242
Social media	91	93	85	90	92	91	93
Network media	27	26	27	29	28	28	24
Traditional media	43	35	43	52	44	44	42
Offline channels	40	30	45	61	35	44	52
Academic activity	2	2	4	0	2	2	1
Friends	8	8	16	10	7	8	14

 Source：B15. The public's preferred access of information

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The public generally believe, in the communication slogans, the mention of information related to the next generation, national feelings, as well as the involvement of the public/everyone can more easily create empathy with them.

Keywords testing

> The public rank the communication keywords including children/the next generation, national feelings, as well as the participation of everyone as the top three ones that can best empathize with them.

> Moreover, according to the qualitative Voice of the Respondents, the publicity on low emissions mobility intended for adults is insufficient, which deserves attention.

Voice of the respondents on the communication slogans:

*"Mention **relevant economic and personal interests.**"*
—Mr. Wang from Beijing suburb (with an average degree of low-carbon cognition and high emissions mobility)

*"**Relation to economy** will attract more attention."*
—Mr. Zhang from Beijing suburb (with an average degree of low-carbon cognition and low emissions mobility)

*"Take into account **personal gains.**"*
—Mr. Wu from Beijing suburb (with an average degree of low-carbon cognition and high emissions mobility)

*"Consider **enhancing the well-being of our future generations.**"*
—Ms. Wu from Shenzhen suburb (with a high degree of low-carbon cognition and low emissions mobility)

*"There is little publicity intended for **adults**; much publicity remains focused on students."*
—Mr. Sun from Shanghai urban area (with an average degree of low-carbon cognition and high emissions mobility)

*"Insufficient publicity, what I know mostly comes from my school days. **There are no memory points.** It's advisable to invite consumers to **interact**, instead of only taking a look. Advertise on bus stops, themed visiting social media."*
—Ms. Sun from Shanghai urban area (with an average degree of low-carbon cognition and low emissions mobility)

*"Such publicity is not available on **common media**. I recommend carrying out publicity by cooperating with Bilibili, Douyin, WeChat and Alipay; by inviting influencer hosts like Jiaqi LI and Viya to livestream...or by shooting vlogs and turning to we-media..."*
—Mr. Song from Shanghai urban area (with an average degree of low-carbon cognition and low emissions mobility)

*"**Communities and property management departments** should conduct collaborative publicity on the public starting from children, thus raising public awareness in this regard."*
—Ms. Fu from Haikou suburb (with an average degree of low-carbon cognition and high emissions mobility)

*"Whether on CCTV, network, Douyin, or on communities, there is very little publicity. If publicity and activities are everywhere, those who would like to take part in public benefit activities **can immediately find relevant organizations.** It will be fine."*
—Ms. He from Haikou suburb (with an average degree of low-carbon cognition and low emissions mobility)

*"**Conducting online publicity** on the young is a better idea, which can increase their awareness."*
—Mr. Wang from Haikou suburb (with a high degree of low-carbon cognition and low emissions mobility)

Communication slogans preferred by the public	Total (%) n=3,500
Embrace a green life, or your children/next generation will remain shrouded in smog	24
Achieving carbon peaking is the responsibility of China as a major power; and practicing low-carbon behaviors is mine as a Chinese	21
It takes everyone just a minor effort to protect our home and embrace a green life	19
Protect the world together with fellows on the day to practice low carbon	14
Embrace a green life to safeguard the last home for penguins	12
Low-carbon behaviors represent a global trend	10

 Source: C5. Communication slogans preferred by the public; qualitative interview

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Conclusions and Recommendations

The public have only superficial carbon cognition and remain somewhat anxious about the implementation of policies on low emissions mobility

Thanks to previous publicity efforts, the public have—to some extent—understood the national policies on carbon peaking and carbon neutrality goals and low emissions mobility; however, they lack a good understanding of the more profound implications behind such topics. They have demonstrated an attitude towards supporting the relevant national policies aimed at reducing carbon emissions, but remain anxious about policy enforcement, if no corresponding infrastructure is put in place for the policy to be implemented.

High low-carbon rate for commuting and diversified mobility demands

Due to a range of subjective and objective reasons, such as increased public awareness for low emissions mobility, relatively adequate public transit supply, and eased traffic jams, urban residents are showing a high low-carbon rate for commuting.
In addition to "punctuality", "high efficiency", "flexibility", and other basic commuting needs, the public have a strong demand for "comfort".
The public whose disadvantaged family members (including the elderly and children) rely on public transit, especially metro, for mobility have a strong demand, which directly influences the transportation means for family mobility.
The public who embrace low emissions mobility hold that vehicles such as electric scooters and bikes can also effectively meet the basic needs for mid- and short-distance commuting. Pushing for the introduction of the management standards for shared or non-shared electric scooters and bikes and strengthening urban non-motorway management can ease the connection demand and the pressure on mid- and short-distance mobility in tier-1 and tier-2 cities.

NEVs are more acceptable, but anxiety remains around their use

The public—whether they own a car or not—are generally willing to buy an NEV for their next purchase. However, when they use the vehicle, or given the policies on prohibiting the sale and driving of oil-fueled vehicles, the public remain anxious about issues such as **low availability of public charging piles**, **difficulty in parking**, **short endurance**, and battery **safety**. The public are generally in favor of changing **"charging station" to "swapping station"** for NEVs. However, before swapping, battery testing by the swapping provider becomes more important, lest the public are reluctant to replace battery for fear of "any dispute".

Because of weak public confidence in whether the policy on zero-emission zones can be implemented at present, the focus should be on building and publicizing an example of zero-emission zones.

While the public are willing to support the establishment of zero-emission zones to improve air quality and reduce energy consumption, they are less confident about whether such a policy can be immediately carried out. If zero-emission zones are established, a higher proportion of the public are willing to use an NEV as their alternative mobility mode, relative to those who take public transit. The reason is possibly that, the public—who struggle to judge the impact of the current zero-emission zones on transportation and remain dubious about the carrying efficiency of the current public transit system—are more inclined to resort to an NEV. Building and publicizing a highly replicable example of zero-emission zones is therefore the key to boosting public confidence.

To make the public more satisfied with bus service, the emphasis should be put not simply on efficiency and time, but on comfort as well

Under the policy of "bus priority", most of the public are willing to take a bus to "increase punctuality" and "reduce exposure to congestions". Nonetheless, the bus offers low comfort—that's why a few people still opt against it. In fact, compared with metro, the bus service enjoys more extensive lines, with bus stops closer to residential areas and commercial areas. After increasing the punctuality of the bus system, a few measures can be taken to improve the environment of buses, such as increasing seats, increasing service frequency, controlling passenger volume, and keeping the compartment clean and tidy. Or, customized bus lines—featuring fewer stops, direct lines, and an excellent environment—can be launched for specific commuting lines. Due to these potential measures, the bus may become the preferred commuting choice for urban residents, thereby alleviating the pressure on the metro system of large cities.

Communication of low emissions mobility is less effective

In the current communication of low emissions mobility, some people note that less emphasis is put on the publicity intended for adults. That's possibly because, in the previous publicity on low emissions mobility intended for adults, the general introduction of the social significance of low emissions mobility—or the kind of publicity with simple slogans—was ineffective, leading to little public perception, as a result of which much publicity was ignored amid huge amounts of network information and under the algorithm recommendation mechanism. Whether in terms of content, format, and communication mechanism, the communication of low emissions mobility should keep up with the times and strengthen relations with individuals.

Analysis of the drivers of value communication and focus for different (typical) groups

Environmental Laymen
This group of people are more willing to access information from some mobile social media providing fast access to information, such as Douyin/Kuaishou or other short-video platforms, Weibo, Toutiao, video platforms like Bilibili, WeChat Moments/groups. What matters to them more is the efficiency of accessing information as well as the interestingness of the content, so they hope to access fragmented, simple information when they use their mobile phone or computer on a day-to-day basis.

We can skillfully incorporate the publicity on low emissions mobility into day-to-day cultural and consumption activities, and correlate low emissions mobility with words such as comfort and day-to-day to correct wrong cognition, telling these environmental laymen "low carbon" is close to everyone's life and this "new fashion" represents a social trend instead of a luxury.

"Animal"can be repeatedly mentioned in the communication slogans. We can change the traditional publicity words of "altruism" to social recognition of individual behavior of low emissions mobility, thus allowing individuals to empathize more with the value of low emissions mobility. Or we can incorporate such empathy with the value of low emissions mobility into primary and secondary basic education.

Potential New Energy Mobility Practitioners
This group of people are more willing to access information from some traditional media, forum platforms, or network news media, such as sina.com, hexun.com, TV media, broadcast, newspapers/magazines, and forum platforms such as Zhihu. As what they pursue is the professionalism and depth of the accessed information, they routinely leave an uninterrupted block of time for reading or news and are willing to read long articles for the depth of relevant knowledge.

While Potential New Energy Mobility Practitioners enjoy a high degree of low-carbon cognition, the existing low-carbon transportation means can hardly meet their needs for efficiency, punctuality, predictability, and comfort. While communicating to this group of people, we can more easily touch them, if we emphasize the social value delivered by low emissions mobility and everyone's effort, illustrating the low-carbon alternatives to efficient, punctual, and flexible mobility options with professional data and cases, among others.

Analysis of the drivers of value communication and focus for different (typical) groups

Unconscious Environmentalists

Similar to environmental laymen, this group of people are more willing to access information from social media providing fast access to information. What matters to them is the efficiency of accessing information as well as the interestingness of the content, so they hope to access fragmented, simple information when they use their mobile phone or computer on a day-to-day basis. The difference is, they choose a larger proportion of traditional media and are willing to learn about low-carbon content from TV and broadcast.

While communicating to them, we should highlight the convenience of low-carbon transportation means.

However, as this group of people have a weak low-carbon awareness, we need to communicate the value and significance of low emissions mobility to them in a subtle manner, so that they can empathize more with low emissions mobility. In addition, we can combine low emissions mobility with the current policies of "National Fitness" and "Healthy China "to some extent, correlating "health" strongly with "low carbon".

Low-carbon Pastoralists

This group of people are more willing to access information from offline activities, such as offline public benefit advertising (public benefit advertising in metro/elevators), community publicity, academic activities (school lectures and professional academic exchanges). Preferring offline communication channels, they seek to learn about low carbon in their day-to-day life and put more emphasis on the interactivity in accessing information.

As low-carbon pastoralists empathize highly with the value of society and natural environment, while communicating to them, the emphasis on the social value delivered by low emissions mobility can evoke a sense of empathy and resonance.

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