

中联创业管理顾问

Z&L Vanguard Management Consulting Co., Ltd.

Photovoltaic (PV) System Investigation Report 2005

**Z&L Vanguard Solar
Photovoltaic System Project**



- **Project Background**
- **Analysis of Field Investigation**
- **Clients Profile and Marketing Information**
- **Conclusion and Recommendation**

The Residential Solar Photovoltaic (PV) System User Investigation Report, 2005 Is Based on the Followings:

- In order to effectively increase supply of electricity in an environmentally sustainable way and improve access of isolated rural area residents to electricity services, and therefore to promote the continuous economic and social development of China, the State Development and Reform Commission and the World Bank are applying joint efforts to carry out the Renewable Energy Development Project for China.
- The residential solar PV system user investigation report for 2005 mainly targets Baiyu County and Dege County in Sichuan Province. The investigated companies are Qinghai Solar Power, Qinghai Tianpu, Xining New Energy, Xining Dawa, Xining Gesang, Xining Tianyu, Shixingguangfu (previously known as Xining Jintaiyang), Xining Yueguang, Beijing Jike, Gansu Shengguang and Sanyang Natural Power. The investigation covers from the number of PV systems sold by each companies to basic data like the user names, serial numbers of the battery boards, power and the like.

Main Objectives of the Project:

- Conducting field research with sales information of the PV system provided by the PV Project Office to confirm the sales condition of each PV company.
- Finding out clients satisfaction on things like the usage, quality and maintenance the product in order to provide reliable reference for the development and execution of the project.



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The PV system user investigation samples are defined as follows:

1、 Valid Sample

- Find the persons on the list or find qualified interviewees. Interviewer must see the systems or sales record tables in person, and complete the questionnaires.
- After thorough investigation, when the predetermined interviewee on the list is unavailable or the interviewee has no PV system the interviewer should consult the village leader and complete the questionnaire.
- Locate solar PV system users not on the list if circumstance allows such.

2、 Invalid Sample

- Questionnaire cannot be completed as required. The interviewer should make note in detail the causes of incompleteness. The number of invalid samples will be added up in the end.
- As the project instructed, the interviewers should investigate 25 valid samples for each PV company, or collect 50 samples.

3、 Rules about Checking the Sample

- One PV system is considered as one valid sample, but each surveyed user can represent no more than 5 valid samples.
- Carefully record the serial number of each battery board if more than one board exist on the system.

Description of the Investigation

This solar PV system investigation adopted field research and questionnaire as research methods, it included:

Field investigation conducted with 12 appointed companies.

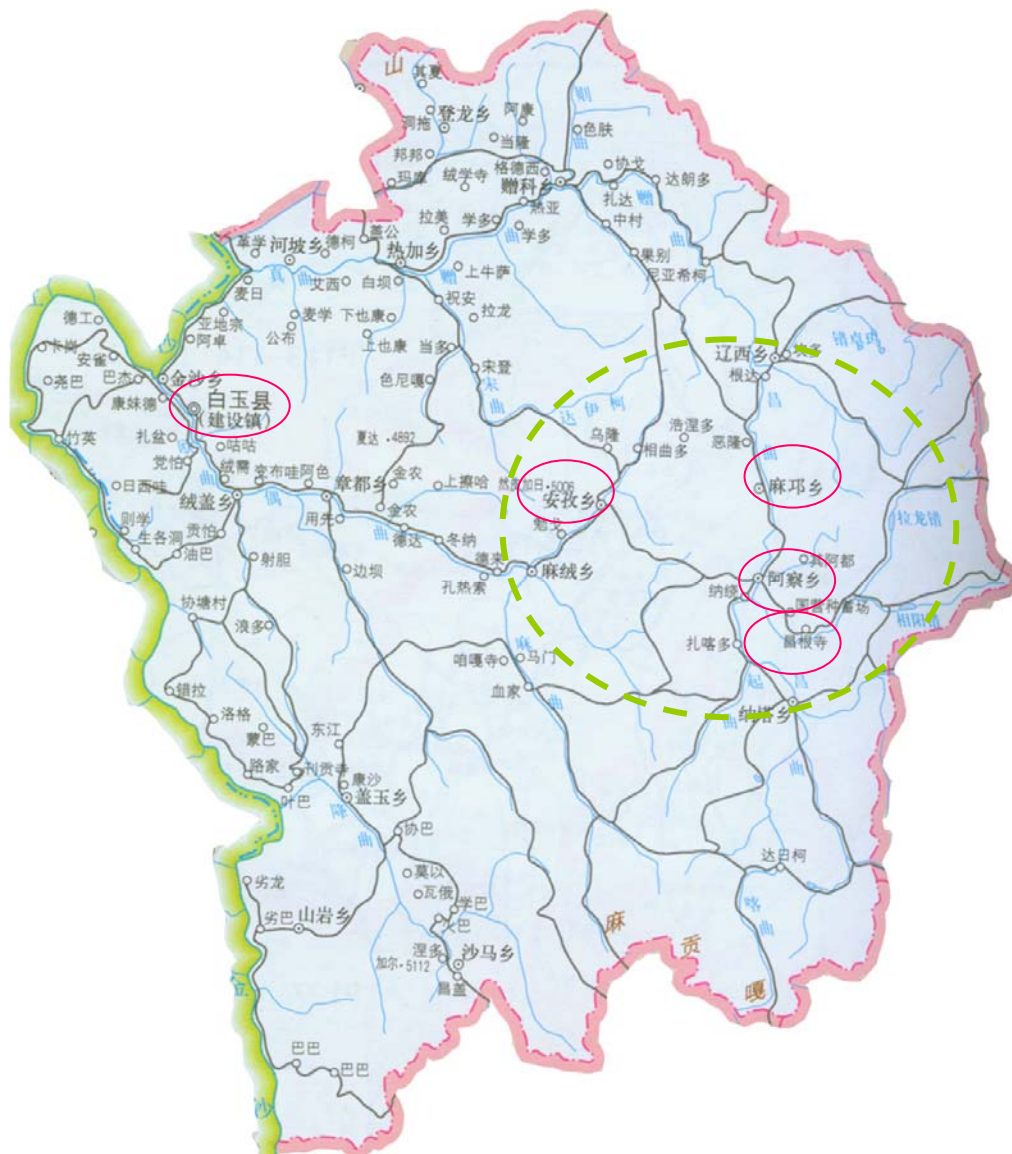
Conducted a 34 days field investigation based on basic information of system users provided by the PV Project Office and the geographical distribution of local users.

The investigation was conducted face to face at the residents' homes with questionnaires. The interviewers asked the interviewees questions in plain language and recorded the answers on the questionnaires. The interviewers also took photos of the interviewees and their PV systems.

Areas selected for investigation were: Zhuqing village, Mani village, Axu village, Langduo village, Yulong village, Cuoia village and Wogong village in Dege county ; Yaqing Temple, Nata village, Maqiong village, Acha village, Anzi village in Baiyu County. Details are shown in the subsequent figures. The distance from Wentuo to Gengqing village is similar to other areas, but we can not reach there due to the bad weather and difficult road condition.

Execution duration: From August 27 to September 29, 2005

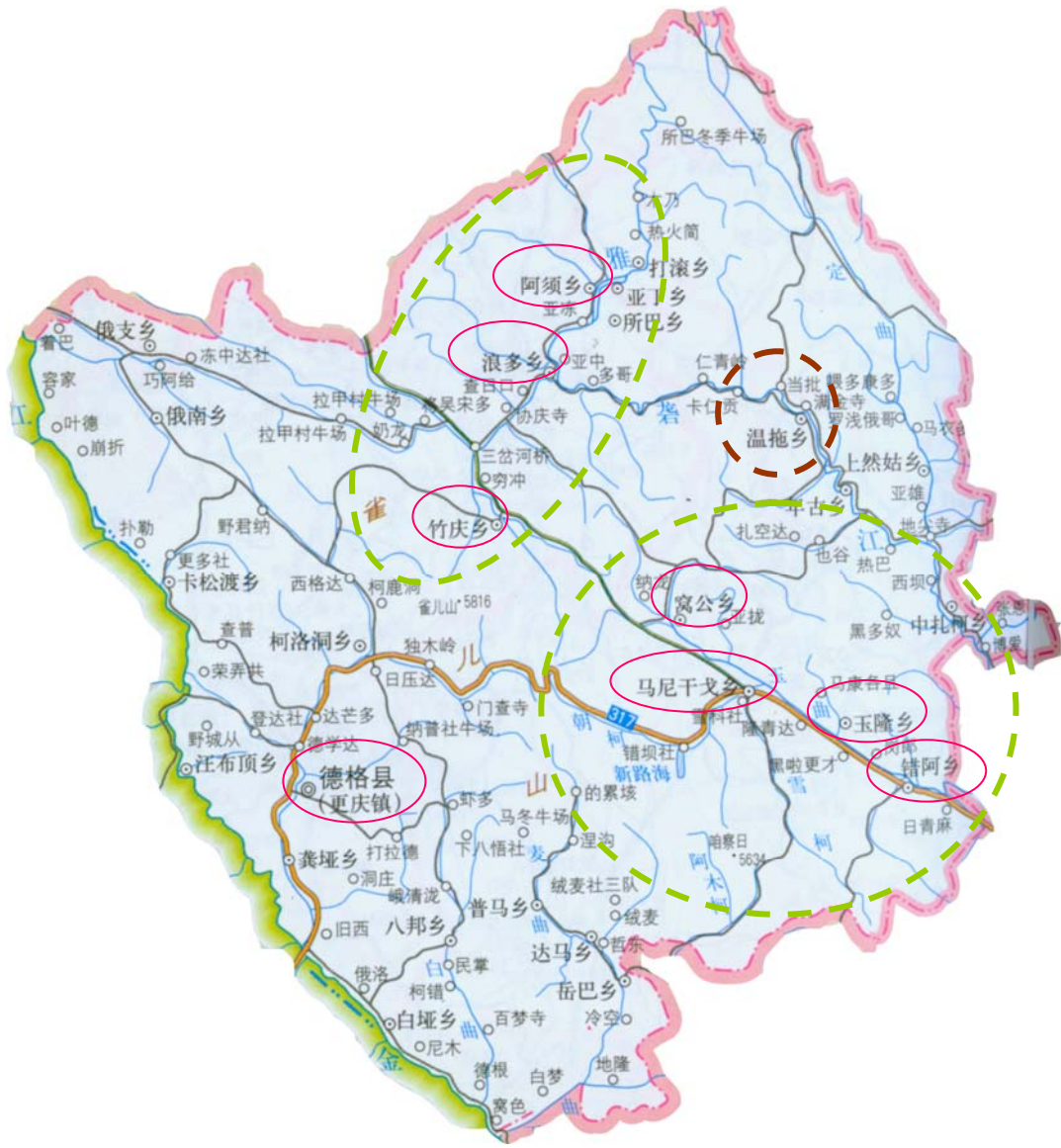
Description of Research Methodology



On the left is a map of Baiyu county where part of the investigation took place. Baiyu county is sparsely populated with an area of 40,000 square kilometers. It will take all most a year to make a thorough investigation. We selected Zhangtai, where there's more solar energy being used, to be the region to proceed with the survey.

As shown in the map, the area within the green dotted line is the area where the investigation took place. The area within the red ovals represent where the county or village governments are located.

Description of Research Methodology



The map on the left is the investigation area of Dege county. Dege and Baiyu have similar geographical and populational characteristics. We selected Axupian and Manipian regions to carry out the investigation.

The areas within the green dotted line are investigation regions. The areas within red ovals are where the capitals of the visited counties located. The area within the brown dotted line is the Wentuo county.

Description of PV Company Investigation

This project has collected 236 samples in 12 villages of two counties. All samples are accompanied with photos of the interviewees and their PV systems.

The investigation was restricted in some ways due to complex geographical circumstances and adverse weather conditions.

There are 12 PV companies involved in this investigation. Only five PV companies' samples have been investigated successfully with the total agreed quantity, the rest seven failed to do so. Gansu Shengguang Solar Energy Co., Ltd. came up with no samples, which means no qualified user in the investigated region could be found. 23.8% Solar PV system users on other eleven companies' lists were found.

The result of the investigation shows that, there is less than 10% of 9 companies' sales record paper that could be found except of Beijing Jike and Qinghai Power Company that more than 20% of sales record papers are preserved.

Around 30% of the surveyed users kept warranty cards and manuals.

142 samples' Serial numbers were found on battery boards, which occupied 90.3% of all samples.

- **Project Background**
- **Analysis of Field Research**
- **Clients Profile and Marketing Information**
- **Conclusion and Recommendation**





- **Clients Profile**
- **Knowledge of Products**
- **After-Sales Service**
- **Appraisal of User Satisfaction**
- **Channel Analysis**
- **Usage of PV Products**
- **Ownership of Electric Appliance**
- **Appraisal of PV products**

Note: The figure in this part refers to percentage without special indication.

Clients Profile and Marketing Information: Clients Characteristics (I)

Figure: Gender Distribution (Sample:236)

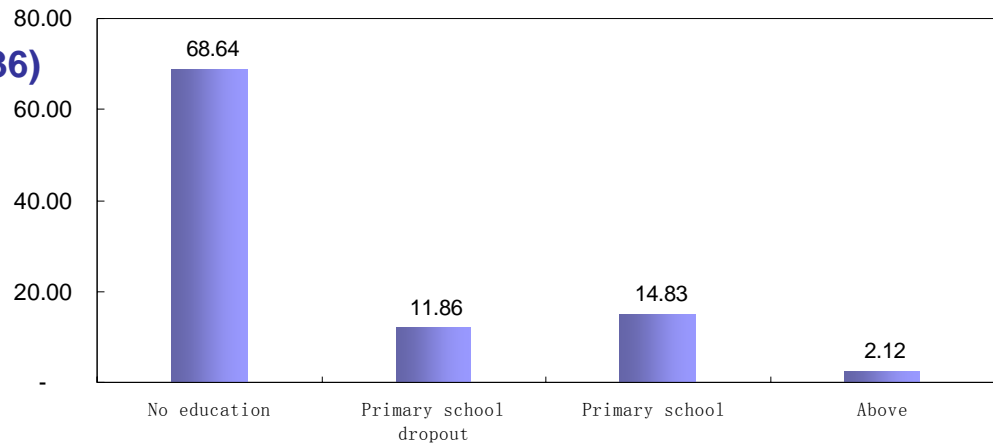
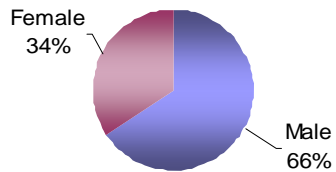


Figure: User Education (Sample:232)

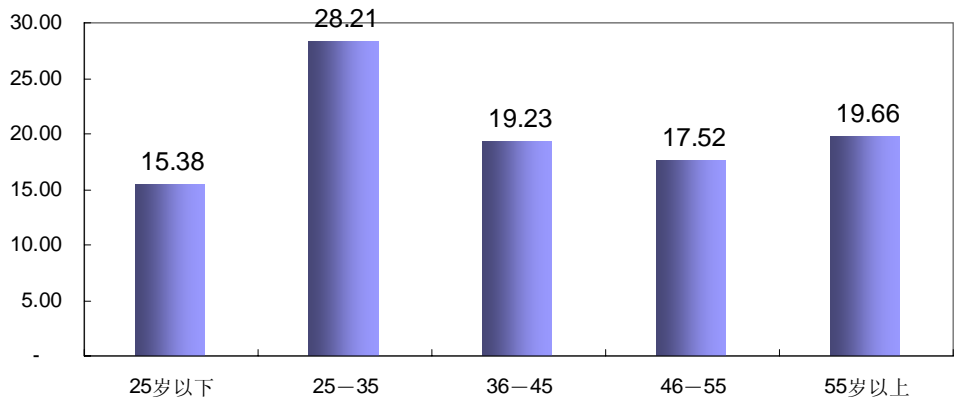


Figure: Age group (Sample:234)

- 66% of interviewed users are male.
- Most of interviewed users are among 25-35 years of age, up to 28.2%, while users in other age group can also reach 20%.
- Users in the surveyed region have little education. 68.8% of them have no education.

Clients Profile and Marketing Information: Clients Characteristics (II)

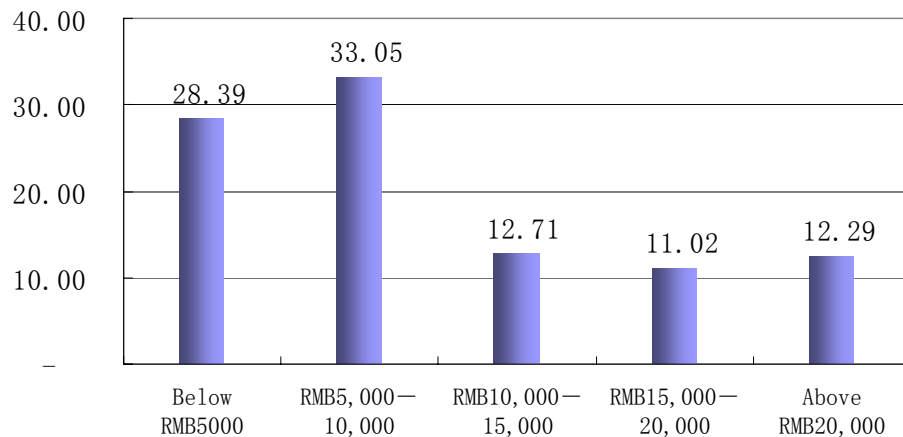


Figure: Income (Sample:236)

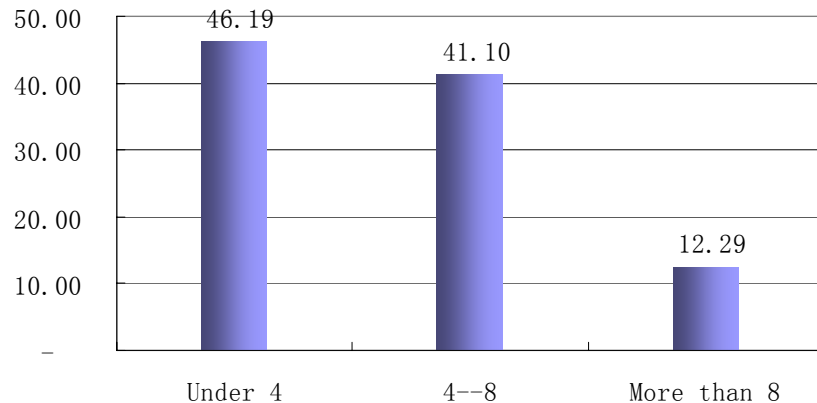
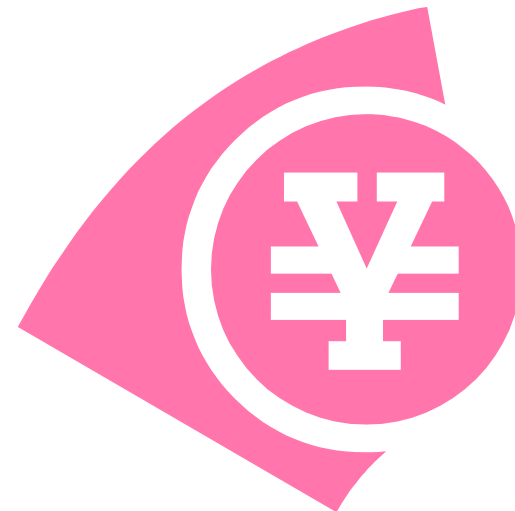


Figure: Family Members (Sample:235)

- 62% of interviewed users have an annual income of less than RMB 10,000yuan.
- Most families has four members, up to 46%. 41% of families have members between 4 and 8. The number of people in families tend to decrease, while the annual income per person tends to increase.



Clients Profile and Marketing Information: Clients Characteristics (III)

Figure: Area where users live (Sample:236)

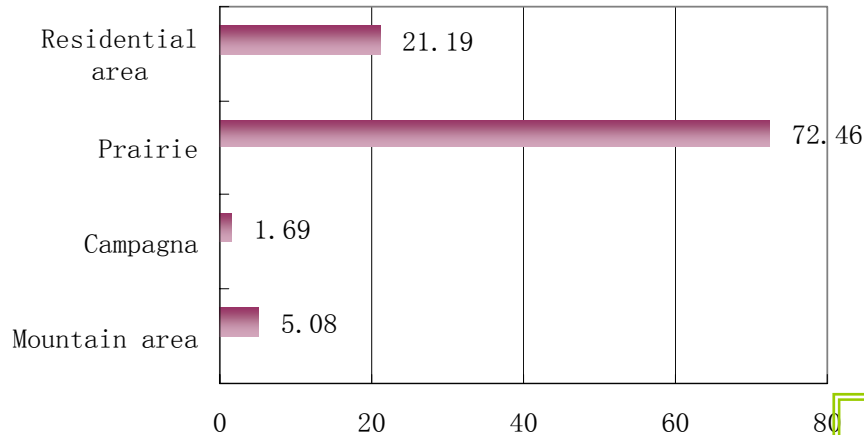


Figure: Distance to the nearest county (Sample:236)

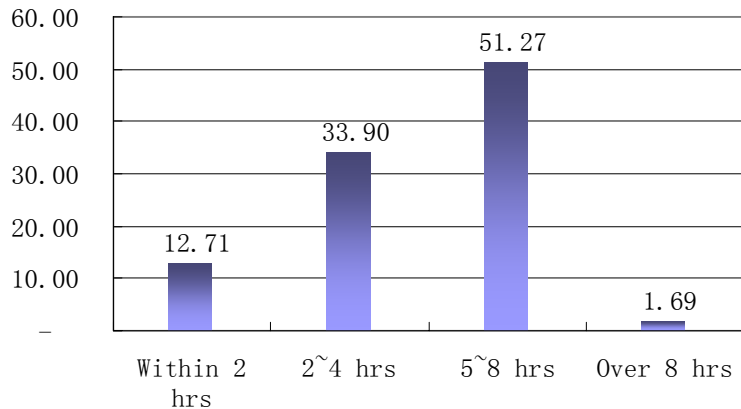
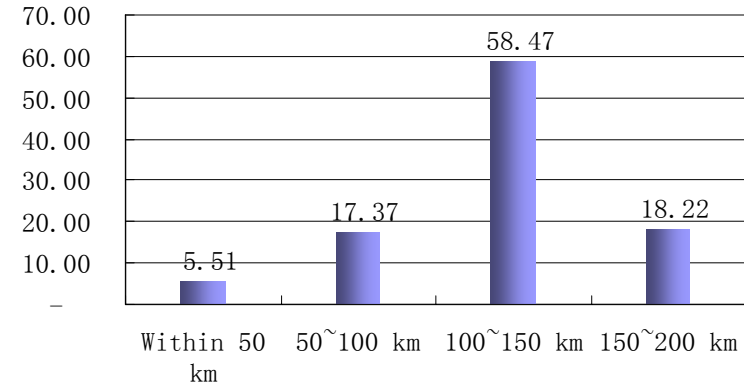


Figure: Time spent to get to the nearest county (Sample:235)

- Most users, up to 73%, live in the prairie, and the next living area is the residential area.
- Only 5% of the users live within 50 kilometers from counties, most users (58.5%) live 100-150 kilometers away from counties.
- It takes 5-8 hours to get to the nearby county.
- 88.56% of users chose automobiles for transportation. 9.75% chose motors, only 1.27% chose man-driven vehicles, animal-driven vehicles and tractors.
- The survey shows, up to 12.8% of users need to transfer to get the nearest county, generally from man-driven vehicles or animal-driven vehicles to automobiles.

Clients Profile and Marketing Information: Clients Characteristics (IV)

Time of Purchasing (Year/Month)	Quantity	Percentage (%)
02/01~02/06	89	38.36
02/07~02/12	41	17.67
03/01~03/06	23	9.91
03/07~03/12	35	15.09
04/01~04/06	7	3.02
04/07~04/12	17	7.33
Since 2005	20	8.62

● Planting, handicraft and transportation each only accounts for less than 1% of local industry.

● Stockbreeding still plays the most important role, 75% of the interviewed users are in this industry.

● 89 users(38.36%) bought their solar PV systems before June 2002.

● 20 users(8.62%) bought their solar PV systems since 2005, as shown in the Figures.

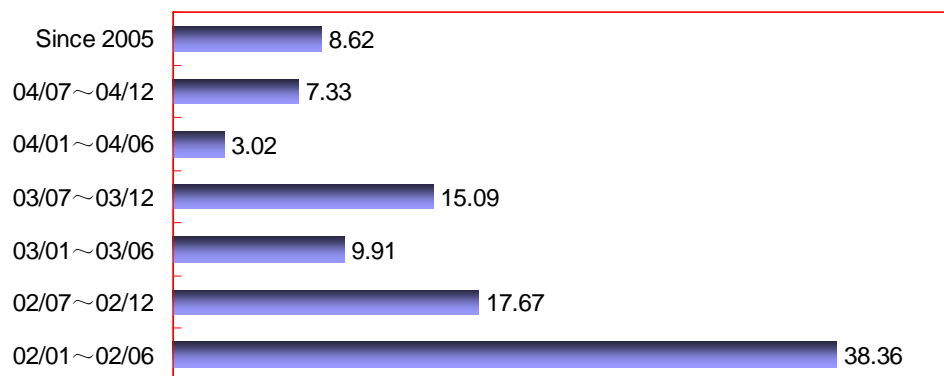
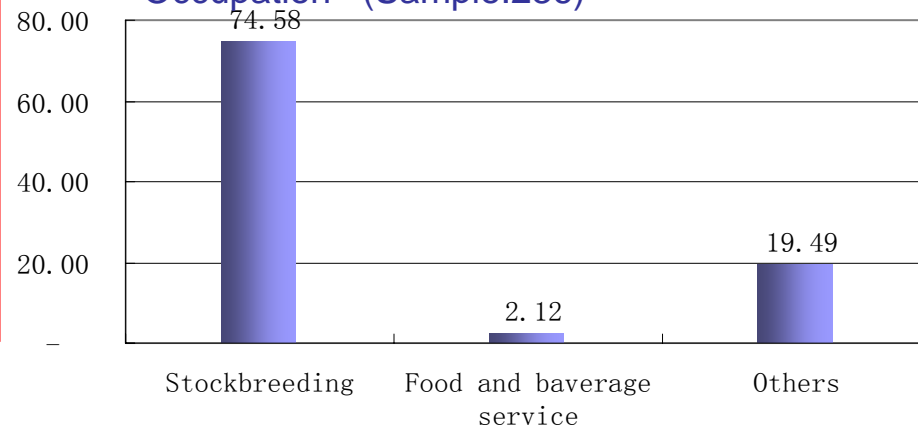


Figure: Time of Purchasing (Sample:232)

Figure: Characteristics of User Occupation (Sample:236)





- **Clients Characteristics**
- **Knowledge of Products**
- **After-Sales Service**
- **Appraisal of User Satisfaction**
- **Channel Analysis**
- **Usage of PV Products**
- **Home E-Appliances**
- **Appraisal of PV Products**

Clients Profile and Marketing Information: Knowledge of PV Products (I)

Name of PV Company	Data Form	Family Savings	Government Subsidies
Qinghai Power	Frequency	26	
	Line Percentage	78.79%	
Xining Tianpu	Frequency	23	
	Line Percentage	100%	
Xining New Energy	Frequency	14	
	Line Percentage	100%	
Xining Power Center	Frequency	42	4
	Line Percentage	95.45%	5.55%
Xining Gesang	Frequency	22	
	Line Percentage	100%	
Xining Tianyu	Frequency	29	
	Line Percentage	100%	
Shixin (former Jintaiyang)	Frequency	24	2
	Line Percentage	92.3%	7.7%
Xining Yueguang	Frequency	7	
	Line Percentage	100%	
Beijing Jike	Frequency	13	5
	Line Percentage	72.3%	27.7%
Sanyang Natural Energy	Frequency	5	
	Line Percentage	100%	

Sources of Financing:

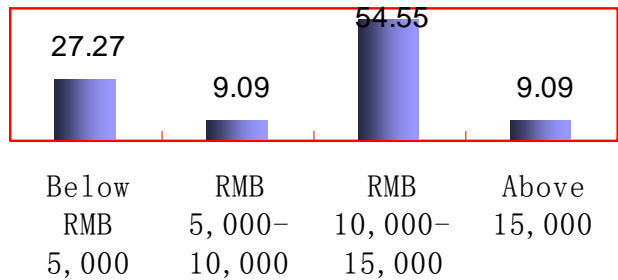
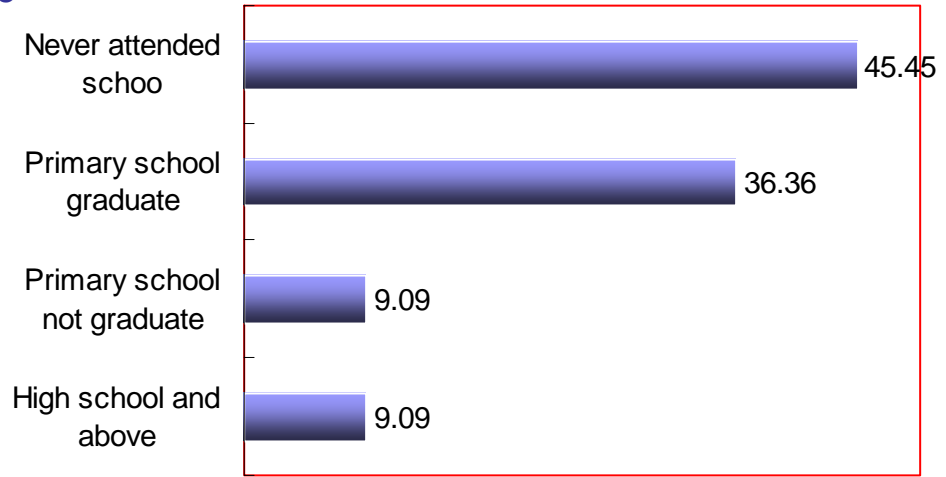
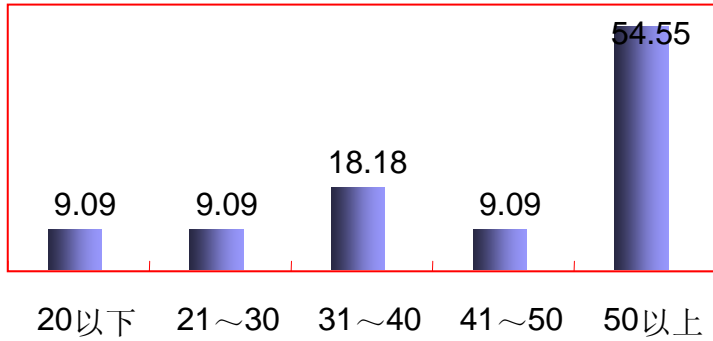
- Apart from savings, government subsidies and loans from friends, 7 users of Qinghai Power Company sought a unique source of financial supported by Tibet-Lama's contribution.
- Amongst the 236 valid samples, most users(92%) purchased the solar PV systems with family savings, 11(5%)received government subsidies, the rest 7 users were sponsored by Lama.
- 216 (91.5%)of the surveyed users were individual buyers.
- Sources of finance for users of each PV company are shown in the figure on the left. Information about the 11 people who received government subsidies is shown below.

Government Subsidies(RMB)	Number of People	Percentage (%)
500	2	18.2
600	1	5.6
700	3	27.3
1000	4	36.4
1400	1	5.6
Total	11	100

Clients Profile and Marketing Information: Knowledge of PV Products (II)

Summary (Sample: 11) :

- Among the 11 who received government subsidies, eight are male, 2 are female, (as shown in the figure on the right) :
- The 11 users aged between 14 and 65, more specifically, 6 of them are above 50, up to 54%, while 1 or 2 in other age groups.

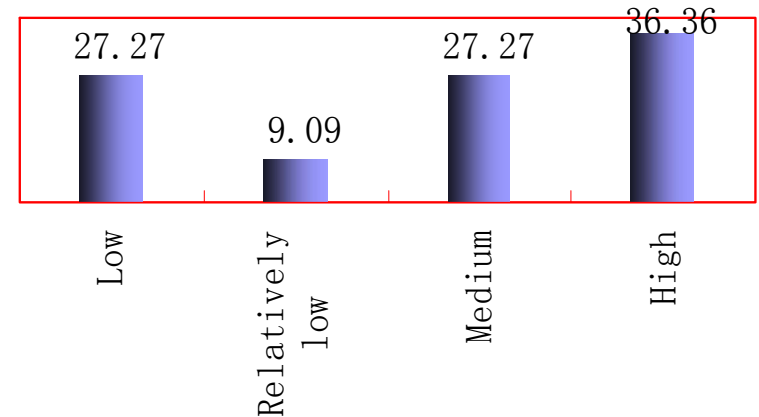
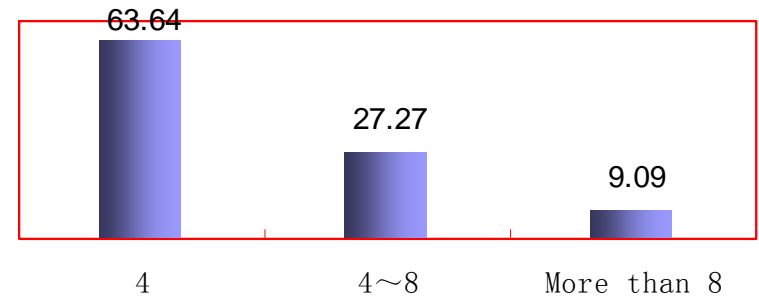


- Similar to other PV users, among those who subsidized by the government, 81.81% received no education or only attended primary school.
- 6(54.55%)out of the 11 users made an annual income between RMB 10,000-15,000, amongst the rest, 3 made below RMB 5,000.

Clients Profile and Marketing Information: Knowledge of PV Products (III)

Summary (Sample: 11) :

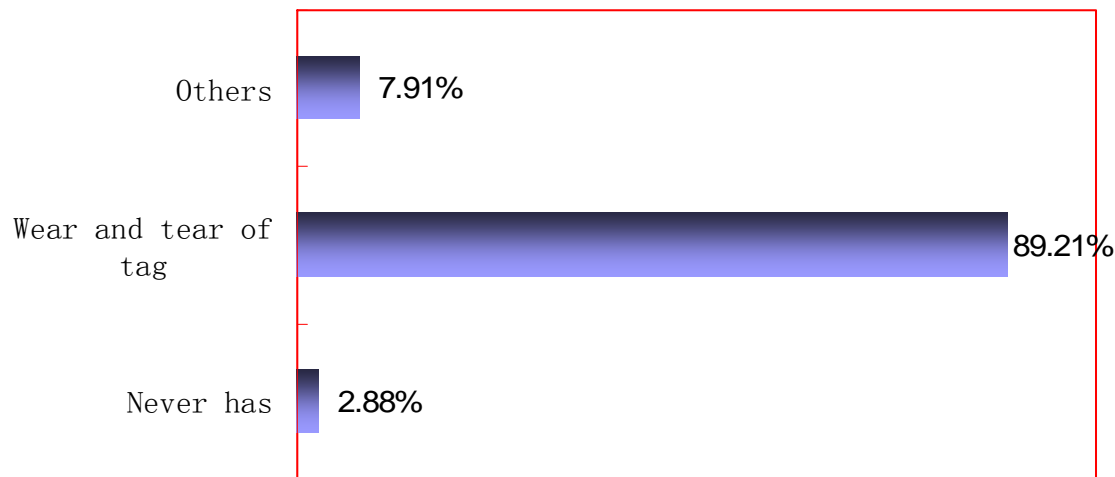
- 7(63.04%) of the 11 users live in a family whose population is 4 or below.
- From the data above, we may find the 11 people received government subsidies are not amongst the poorest. 36.36% of them have relatively high incomes.
- 7 of the 11 users live in the prairie, up to 63.04%. The rest four live in the residential area.
- The 11 users' job proportionally distributed in stockbreeding, transportation, service business.
- Most counties are within 100-150 kilometers. All the users choose to take auto cars, selected by 8 users(72.73%),or motorcycles,
- Amongst the 11 users, 5 took products from Xinnengyuan, 4 from Dawa and 2 from Shixinguangfu.



Clients Profile and Marketing Information: Serial Number of Solar Battery Board

Condition of Serial Numbers:

- The serial numbers on the solar battery boards of all the 12 PV companies were damaged in variant degree.
- Most serious cases were Xining New Energy and Sanyang Natural Energy, 60% of the serial numbers were damaged.
- The main reason for the damage was wearing and tearing through long time usage.
- According to the interviewers, 8 users had torn down the serial numbers on the battery boards
- Another thing to be noted is that three users' system were broken and no longer in use.
- Additionally, we also copied the power of the battery board, some of which were to obscure to read.



Clients Profile and Marketing Information: Analysis of Product Power

- The questionnaire required to collect all the power owned by the valid users, but we only acquired information of 69 users for different reasons
- Only 5 of the interviewed users owned 20 Watt systems. The lowest power was 10 Watt, owned by a larger number of 17 users, up to 25%.
- The average power was 14.41 Watt.

Watt	Number	Percentage (%)
10	17	25.00
12	9	13.24
15	1	1.47
16	26	38.24
17	7	10.29
18	3	4.41
20	5	7.35



Lowest Power 10W, 25%

Highest Power 20W, 7.35%

Average Power: 14.41W

Clients Profile and Marketing Information: Analysis of Product Price

The price distribution of the solar PV system bought by the consumers are as follows:

- The cheapest solar PV Product is RMB 110, while the most expensive one goes to RMB 3,000.
- Most products bought are between the price range of RMB 110-1,500, up to 91.30%. Products bought at above RMB 1500 are Less than 10%.
- Price between RMB 1,250-1,500 and price between RMB 500-750 are most popular ones, up to 29.57% and 22.61% respectively.

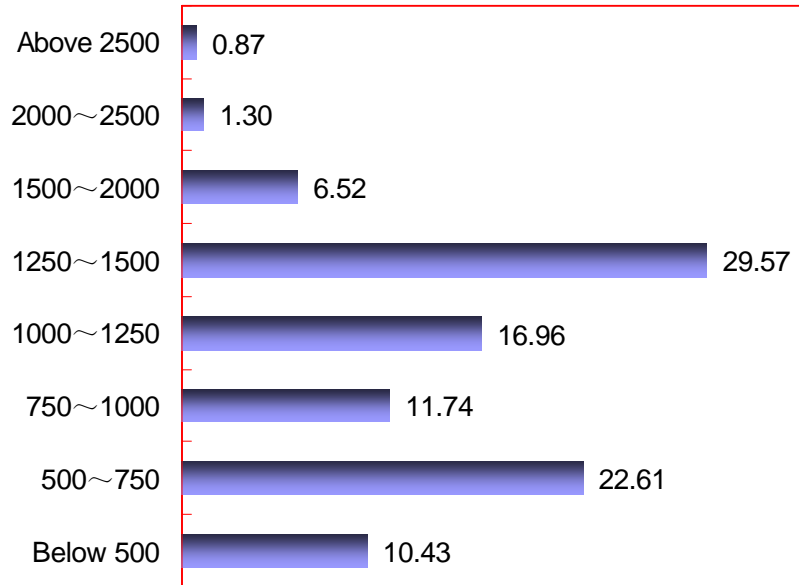


Figure: Price of PV Product (Sample:230)

Clients Profile and Marketing Information: Knowledge of PV Products

Knowledge of PV system users about the bundling of solar PV products:

- Feedback from the 232 users regarding this topic are shown in the figure on the right.
- Only 1.7% of the users didn't know about the bundling of solar PV system.
- But 95.32% of the users didn't get attached home electronic appliances like recorder or radio when purchasing the PV systems.

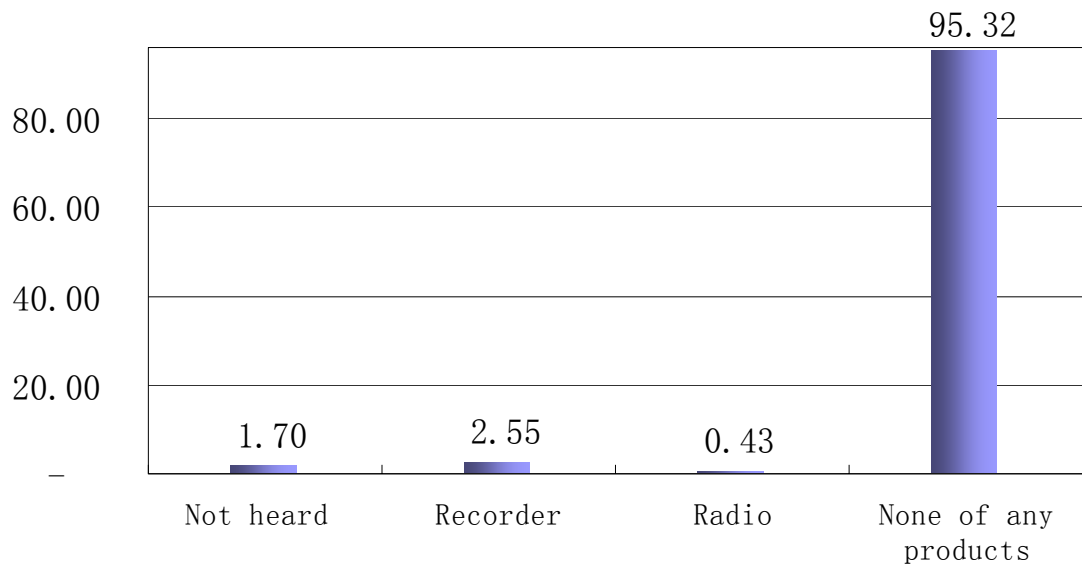
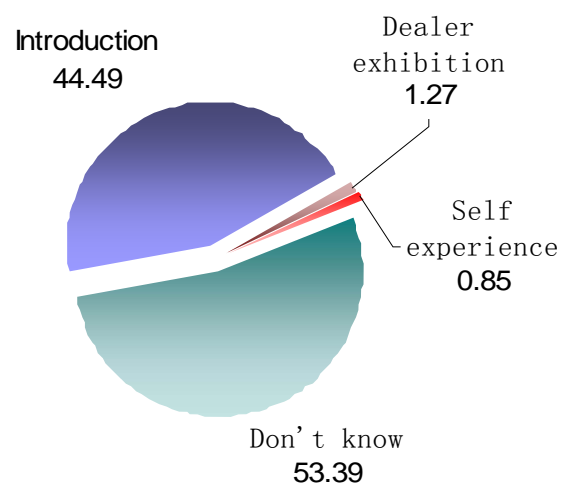


Figure: Knowledge about PV products bundling (Sample: 232)

Clients Profile and Marketing Information: Knowledge of PV Products



- The investigation shows, As many as 89.69% of users didn't know about government subsidies.

- 45% of users claimed they knew about the policy of government subsidies through introduction of others, and 1% through deals' exhibitions or out of own experience.

- More than half of surveyed users had no knowledge of government subsidies or had no access to obtaining such information. It is reasonable for the government and related parties to pay more attention to informing people of the policy about acquiring subsidies from the government and related international organizations, therefore to improve the quality and possibility of service for people in remote areas.

Clients Profile and Marketing Information: Knowledge of PV Products

Suppose the government subsidizes 80% of what the products cost, individuals only cover the rest 20%, the intention of potential consumers to buy products over RMB 1,000 is shown in the figure below.

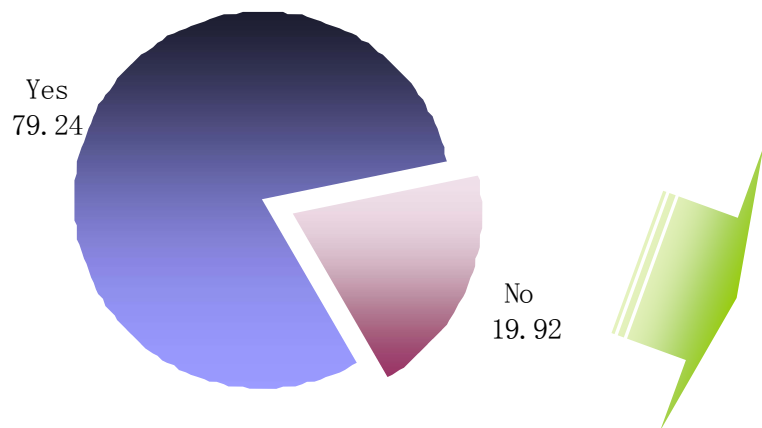
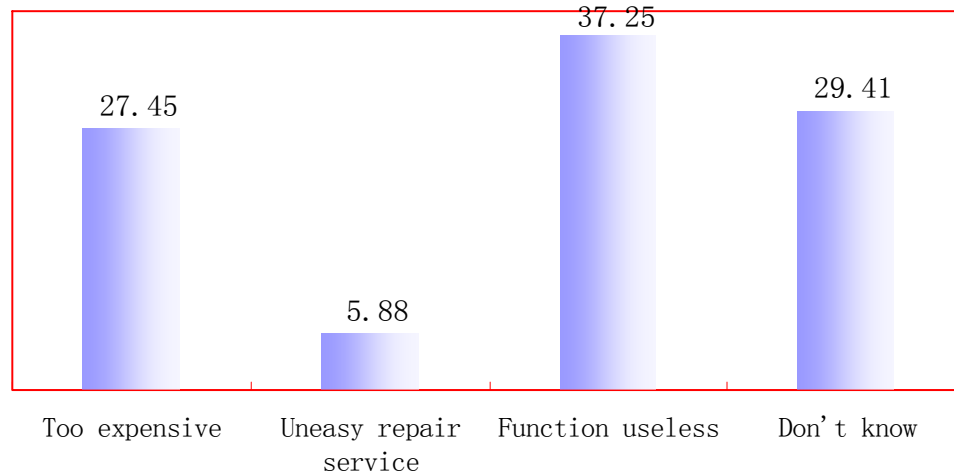


Figure: Intention to buy products over RMB 1,000 (Sample:235)

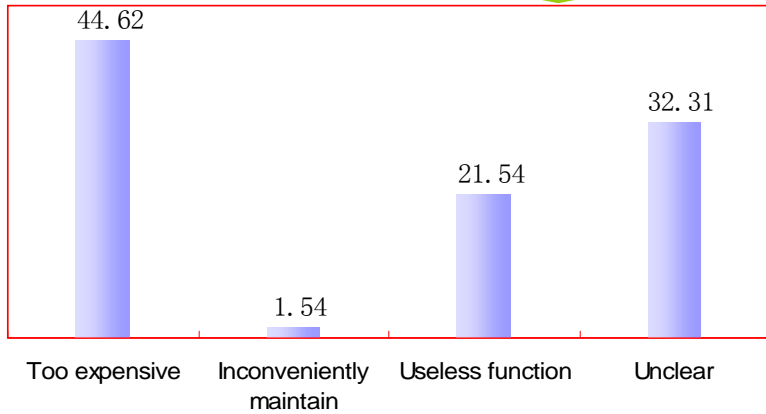
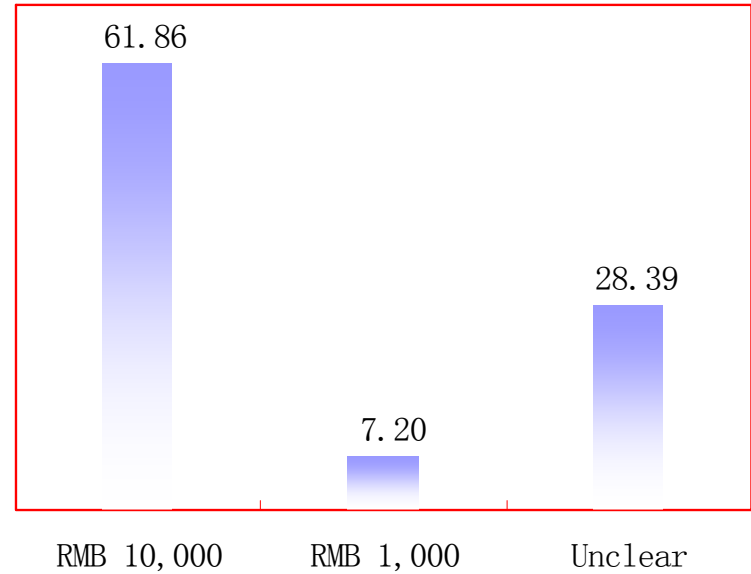
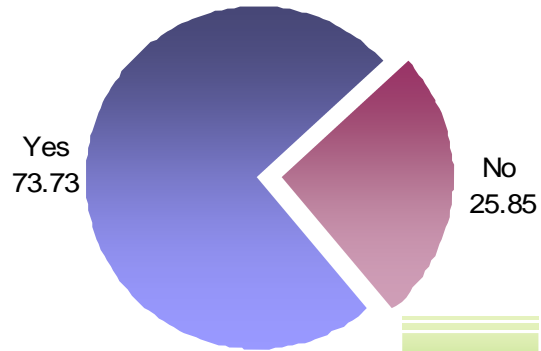
Main factors that people are unwilling to buy products over RMB 1,000:

- 37.25% users don't think the PV system function useful. They will consider more about the system function if they can afford the cost.
- Reasonable price is a major concern for low income group.
- People worry about repair and maintenance, demanding better after-sales service.



Clients Profile and Marketing Information: Knowledge of PV System

For products over RMB 10,000, suppose the government will cover 80% of the price, the purchasing intents are listed below.



The price and function are the main concerns for not purchasing the products over RMB 10,000.

- 44.62% of the interviewees cannot afford the price.
- 21.54% of the interviewees only use the system for illumination and consider other functions useless.
- The figure above shows the comparison of different prices.

Figure: Purchasing intentions for products over RMB 1,000 (Sample: 235)



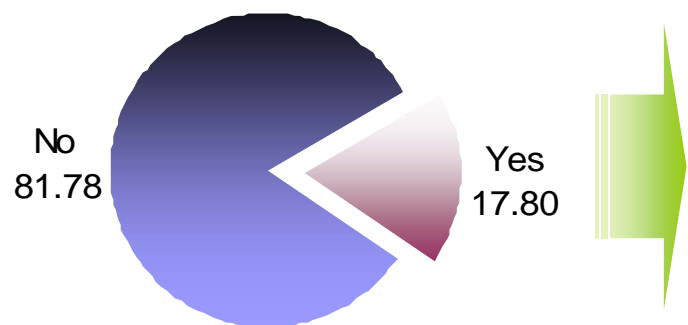
- **User Profile**
- **Knowledge of PV System**
- **After-sales Service**
- **Satisfaction of PV System**
- **Channel Analysis**
- **Usage of PV System**
- **Ownership of Electric Appliance**
- **Evaluation of PV System**

Clients Profile and Marketing Information: After-sales Service (I)

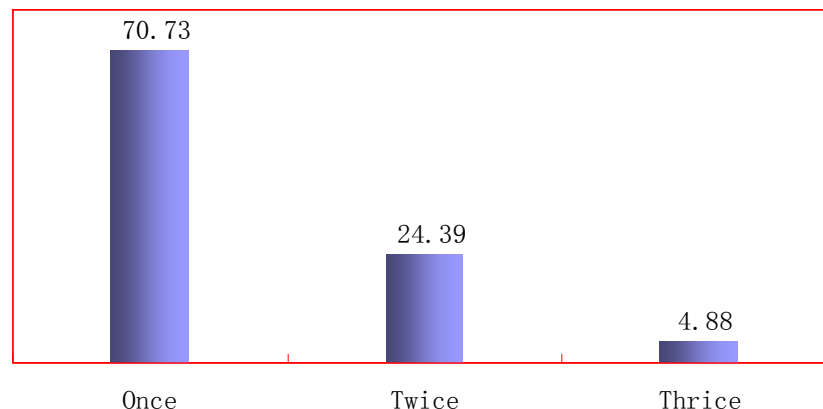
The solar PV system includes the controller and battery. It is easy for most users to install themselves. In the 236 questionnaires, there are 233 valid answers, and only one user asked for technical support.

The quality of PV system is acceptable to the users. Within the 236 valid samples, except that one person has not answered this question, 81.78% of the 235 samples did not encounter any problems listed in the questionnaires.

Among users met with problems during the usage, 71% only met once, as shown in the figure below.



With or Without Trouble (Sample:235)



Times of Problems occurred

Clients Profile and Marketing Information:

After-sales Service (II)

The most frequently encountered malfunctions are listed below:

- 72% of the users did not encounter problems during usage.
- In the users encountered troubles during usage, 11% have changed the battery.
- In the investigation, the dealer revealed that the most changed part was battery, and the users needed to wait for a long time because dealers could only notify the factory after they got the old one.
- The short using time of fluorescent light is another trouble needs to be solved.

Equipment Malfunctions	Frequency (%)
No	71.19
Accumulator	11.11
Fluorescent Light	11.52
Battery Board	1.23
Controller	0.41
Connection Wire	1.65
Plug	2.88

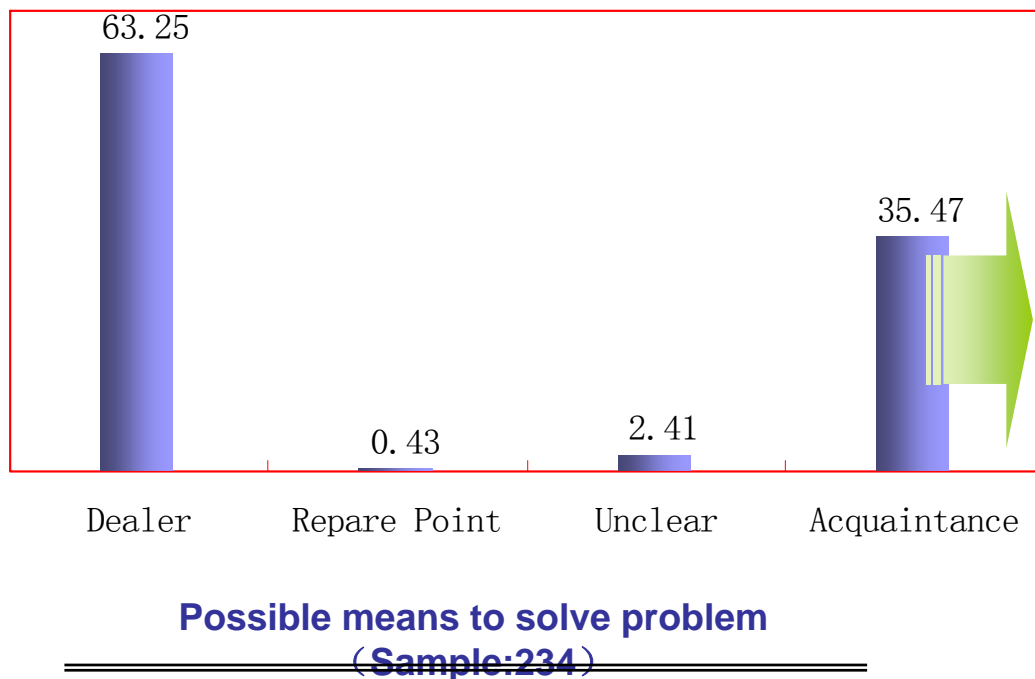
Troubles during usage for PV system:

- About 78% of the users did not encounter any trouble during the usage.
- 15% of the users encountered accumulator malfunction during usage.
- The bulb broke down frequently, bulb life should be prolonged, and the users need to have some backup.

Troubles During Usage	Frequency (%)
No	77.18
Accelerator	14.52
Plug of Controller	1.24
PV Cut off Too Early	0.41
Bulb Out of Work	3.32
Bulb Connection Wire	1.24
Other Troubles	0.83
Connection of Plug	1.24

Clients Profile and Marketing Information: After-sales Service (III)

The investigation shows that users care about the after-sales service a lot. The rate of satisfaction for after-sales service is pretty low due to the limitation of transportation. The users have to contact the dealer first when they encounter some quality problems of the system. The details are listed as below.



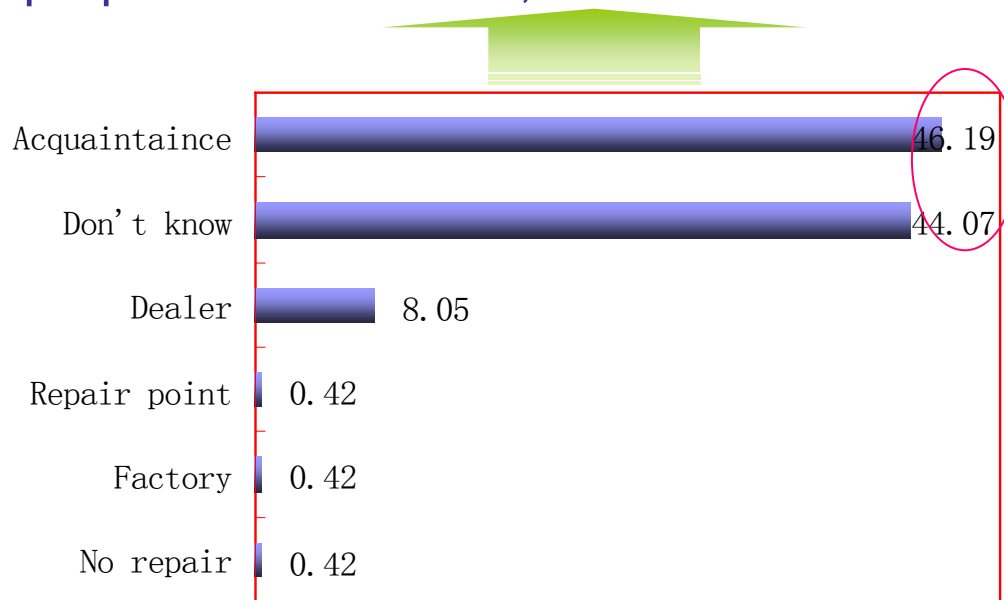
35.47% of the users will ask acquaintances for help when they encounter problems. It is said that geography and culture influence the habits of the usage.

It is impossible to improve the rate of satisfaction for after-sales service without providing home service.

Clients Profile and Marketing Information: After-sales Service (IV)

There are several means to resolve the problems encountered during usage, such as asking help from acquaintances, dealers, repair shops, manufacturers or do not repair.

Asking for help form acquaintances is the major source, the proportion is 46.19%, also a lot of users do not know where to get help.



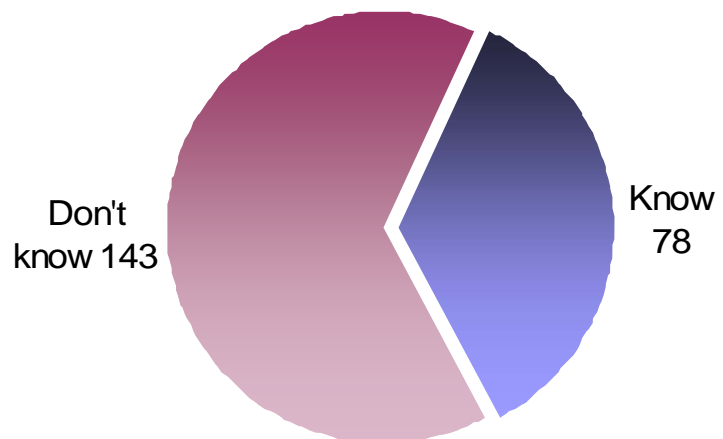
Sources for Repair (Sample:235)

Due to the limitation of the rural area conditions, the solar PV system was spread wildly. But it is hard for the current users to accept other related PV products.

We consider that it is the best time to improve the after-sales service now.

Clients Profile and Marketing Information: After-sales Service (V)

- Most of the users don't know the location of the repair shops. The reasons are the users do not go to town frequently and the manuals or warranty cards usually do not list the repair shops clearly.
- 78 users, about 35%, who know the location of the repair shops. But the distance is usually from 50 to 100 km. It is inconvenient for users to take a whole day for transportation, some users even need to transfer several times.



	Number of Person	Proportion (%)
Within 50 Km	1	1.28
50-100 Km	47	60.26
100-150 Km	29	37.18
Over 150 Km	1	1.28
Total	78	100.00

Location of repair shop (Sample:221)

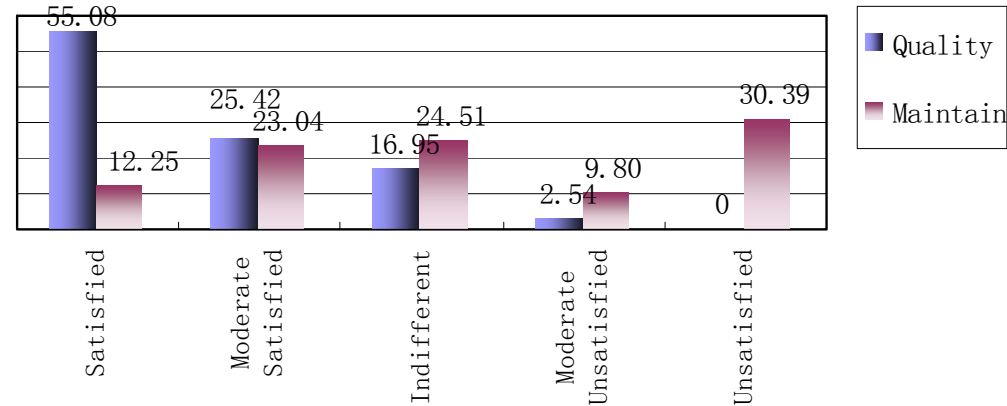


- Clients Profile
- Knowledge of PV system
- After-sales Service
- Satisfaction of PV system
- Channel Research
- Usage of PV system
- Ownership of Electric Appliance
- Evaluation of PV system

Clients Profile and Marketing Information: General Satisfaction

Measure Scales:

To assess the rate of satisfaction, we set five levels: satisfied, moderate satisfied, indifferent, moderate unsatisfied, unsatisfied. The corresponding marks are 5, 4, 3, 2 and 1.



The users were satisfied with the quality of solar PV system, and the average score is 4.33. All the interviewees answered this question in total of 236 questionnaires, among which 55% were satisfied and no one was unsatisfied.

The users were unsatisfied with the repair service. Within the 204 questionnaires, 12.25% were satisfied and 30.39% were unsatisfied, the average score is 2.77. As a matter of fact, many users did not get repair service or need to wait for a long time when they encountered problems during usage.

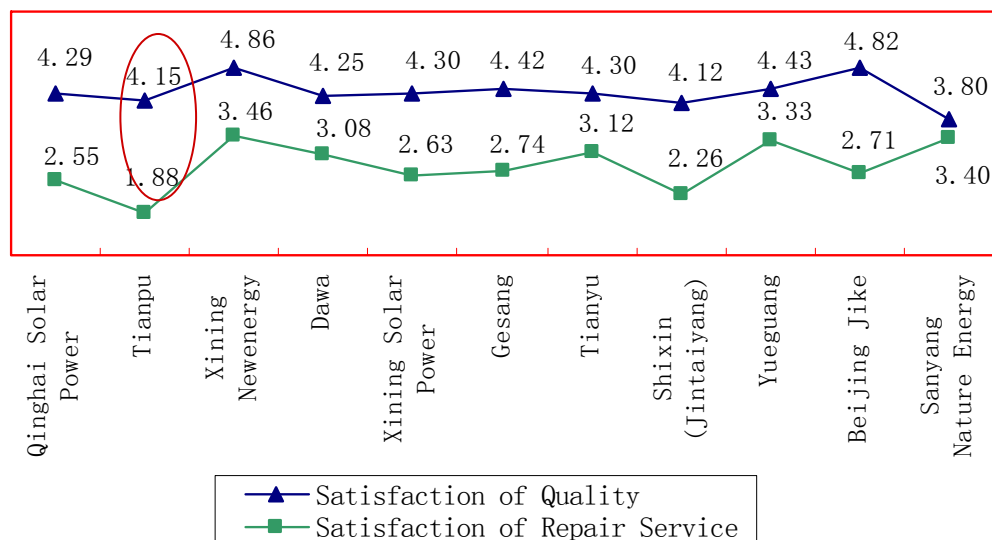
Clients Profile and Marketing Information: Satisfaction to PV Company

The satisfaction scores are similar among the 11 PV companies.

With regard to quality, except that one company is the lowest of 3.8, others are around 4.3, and there are two companies getting the highest score of 4.82.

With regard to repair service, except that one company has the lowest score of 1.88, others are around 2.7.

Viewing from two aspects-repair service and quality, some company should pay more attention to them



Measure Scales:
 To assess the rate of satisfaction, we set five levels: satisfied, moderate satisfied, indifferent, moderate unsatisfied, unsatisfied. The correlate marks are 5, 4, 3, 2 and 1 score.

- User Profile
- Knowledge of PV system
- After-sales Service
- Satisfaction of PV System
- Channel Research
- Usage of PV System
- Ownership of Electric Appliance
- Evaluation of PV System

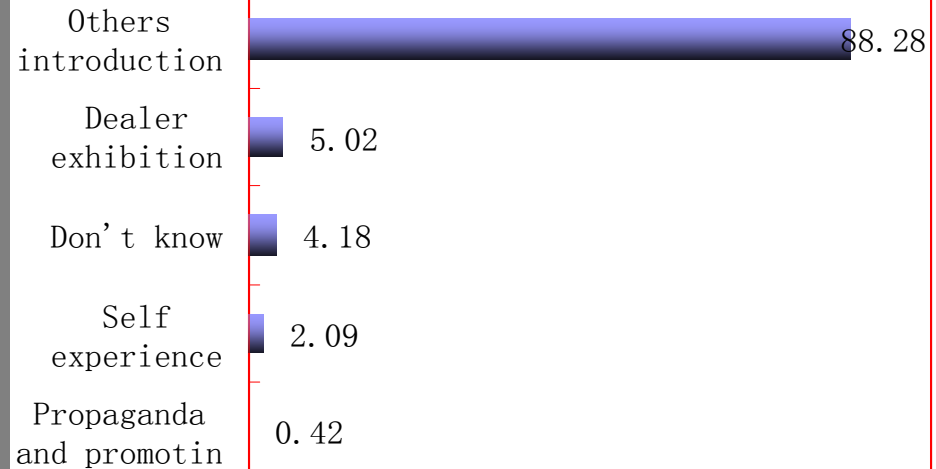


Clients Profile and Marketing Information: Propaganda Channel

Original Questions:

How do you get to know the solar PV system?

1. Out-door advertisement
2. Introduction by others
3. Promotion activities
4. Information brochure
5. Dealer exhibition
6. Through own experience
7. Radio



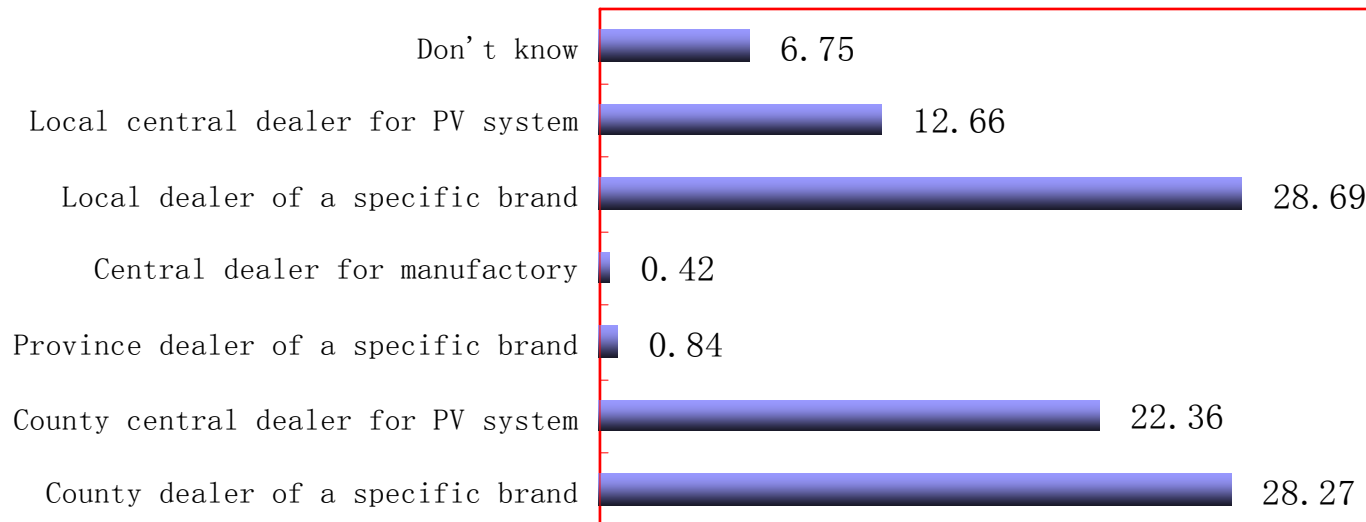
As shown in the investigation, most of the users got to know the solar PV system from others' introduction, the proportion is 88.28%. The total of all other methods is less than 10%. There is no one who mentioned the means of outside advertisement, information brochure and radio.

Users had few channels to get to know the PV system due to the insufficient advertisement from the PV Project Office and the companies. To our knowledge, the PV Project Office had made some information brochures, but if could not reach the final users. So something should be done to solve the problem.

Clients Profile and Marketing Information: Channel of Purchasing

From the results of the investigation, the major channel for purchasing is local and county dealers, each accounts for around 28%.

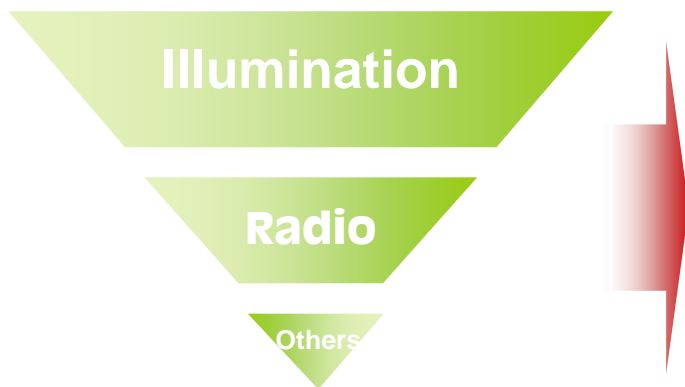
The dealer of manufacturer and province dealer were seldom mentioned in the survey, both less than 1%. It was limited by the living habits and geographical conditions. the residents move from place to place with the season change and the transportation is limited. The desirable situation is that dealers are mobile according to the user's needs while still maintain the fixing repair shops.



- Clients Profile
- Knowledge of PV System
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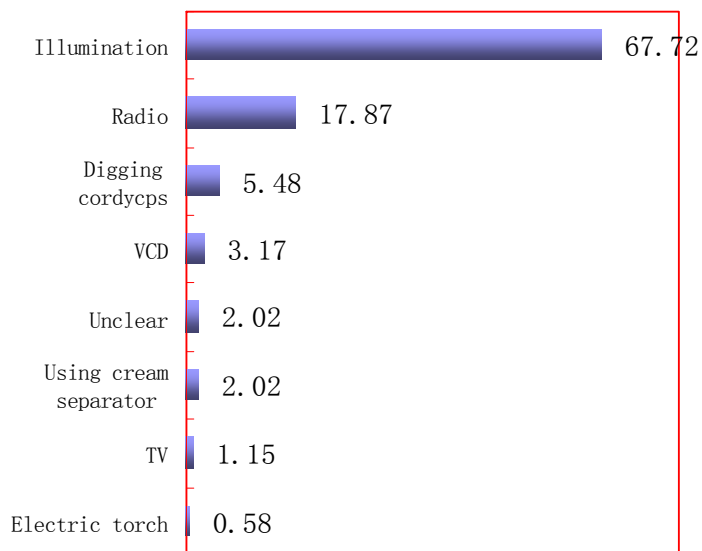
Usage of PV System



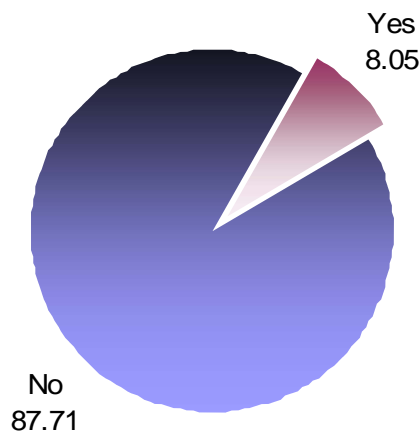
Illumination is the major usage of PV system, the proportion is 67.72%.

Radio is the second important purpose of the usage of PV system, and the proportion is 17.87%.

Total of all other usage is less than 15%.



Usage of PV System

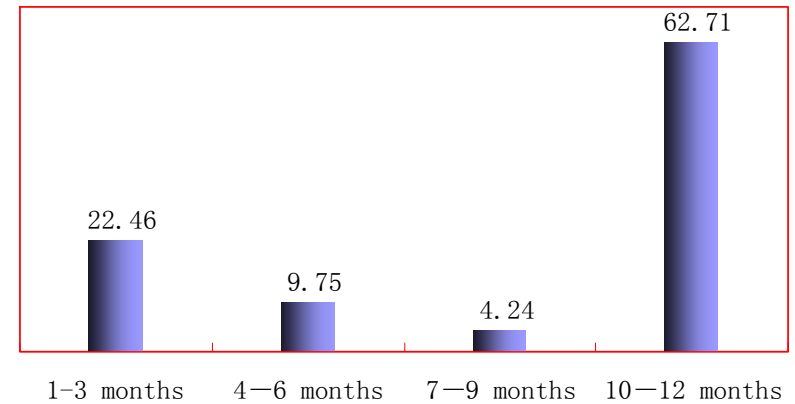


Using Other Electric Appliance

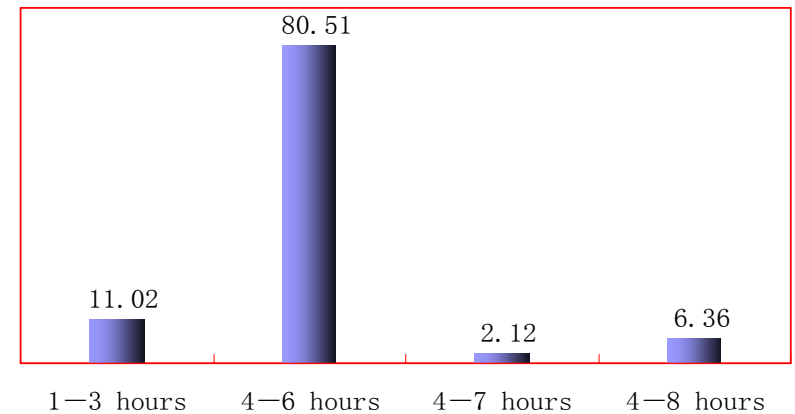
Usage of PV System (II)

For almost all the users, solar PV system is the only source of illustration, there is no other means to supply electricity.

62.71% of PV users use the system for 10 to 12 months per year, and 80.51% users run the system 4 to 6 hours per day.

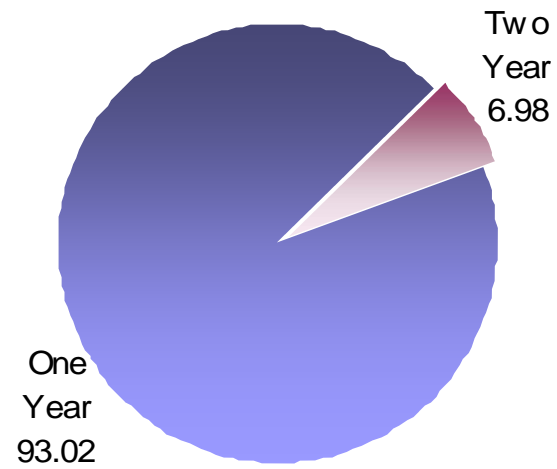
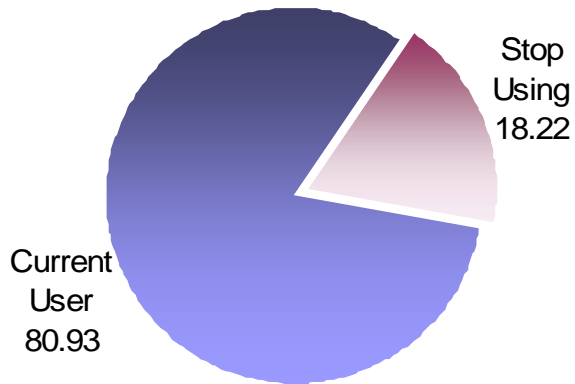
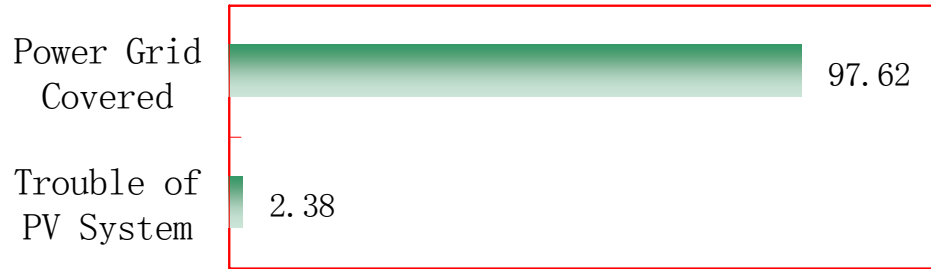


Month of Usage a Year



Hours of Usage a Day

Usage of PV system (III)



- Clients Profile
- Knowledge of Product
- After-sales Service
- Satisfaction of PV System
- Channel Research
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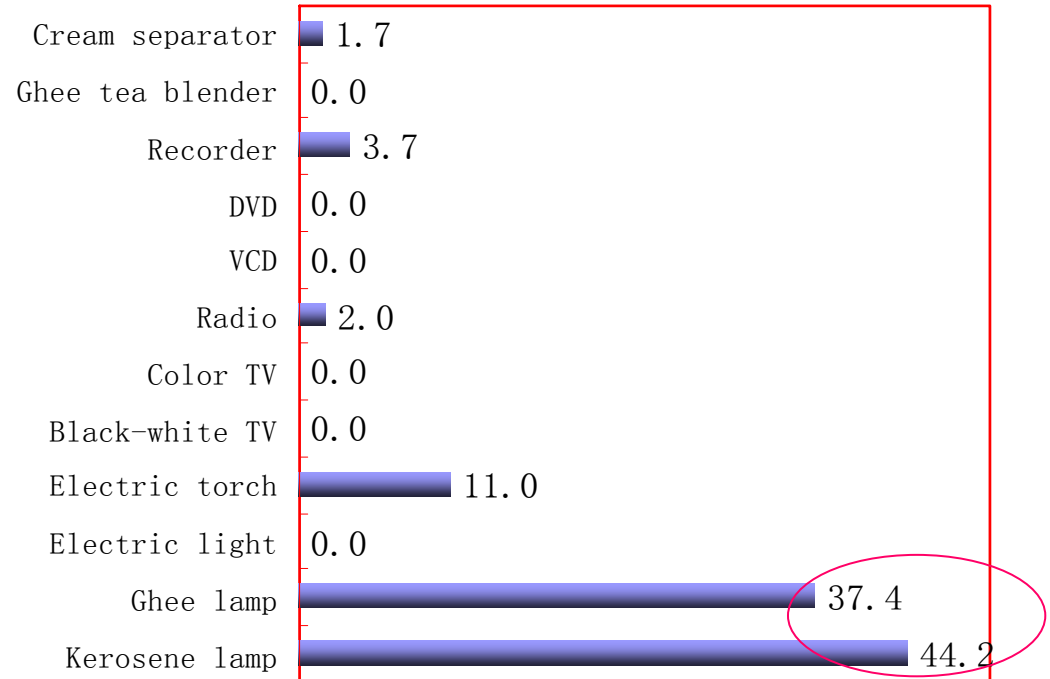
Ownership of Electric Appliance (I)

Kerosene and ghee lamp were used before the PV system.

Recorder and radio are the bridge for the residents to communicate with outside.

Cream separating is manually done before using the PV system.

No electric light, TV, VCD and DVD used before using the PV system.



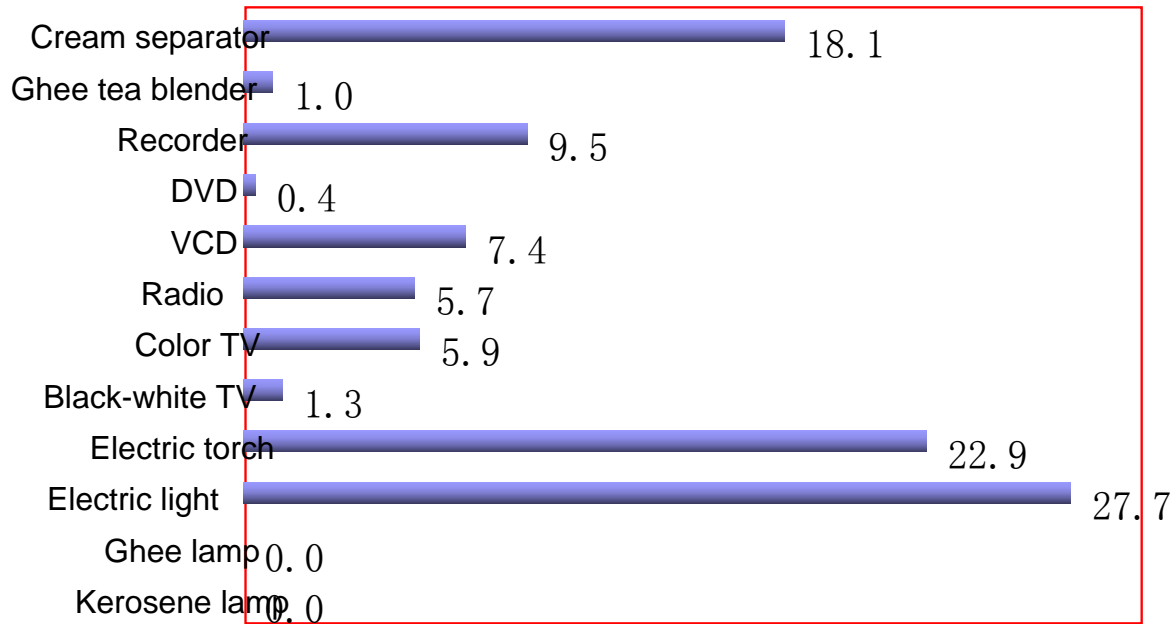
Ownership of Electric Appliances before Purchasing PV System

Ownership of Electric Appliance (II)

Electric light is the major equipment for daily illumination.

Ownership of ream separator and ghee blender increasing rapidly

Usage of TV and VCD is on the rise.



Ownership of Electric Appliance after Purchasing PV System

Ownership of Electric Appliance (III)

Ownership of electric appliance under RMB 100:

Price (RMB)	Kerosene lamp(%)	Ghee lamp(%)	Electric light(%)	Electric torch(%)	Radio(%)	VCD(%)	Recorder (%)
1~5			0.4	0.4			
5~10	0.4	0.4	0.4	0.03			
10~20	0.4	0.4					
20~50					1.1		
50~80					5		7.6
80~100					1.1		1.5

Ownership of electric appliance under RMB 1,000:

Price (RMB)	Black-white TV (%)	Radio (%)	VCD (%)	DVD (%)	Recorder (%)	Ghee blender(%)	Cream separator (%)
100~200		1.1			1.1	0.4	
200~300	0.4	7.6	1.1		4.96	1.1	7.6
300~400			2.7	0.4	7.6		4.6
400~500	0.4		1.5			7.6	14.5

Ownership of Electric Appliance (IV)

Ownership of electric appliance over RMB 1,000:

Price (RMB)	Black-white TV(%)	Color TV(%)	VCD(%)	DVD(%)	Electric torch(%)
500~600	0.4		3.8	0.4	12.6
600~700			3.1	0.4	2.3
700~1000		0.4	1.5	0.4	
1000~2000		3.8			
2000~3000		3.8			
Over 3000		4.2			

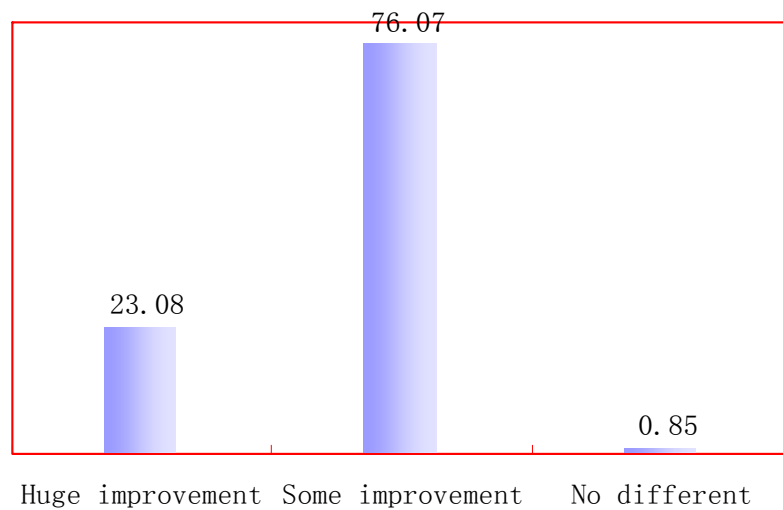
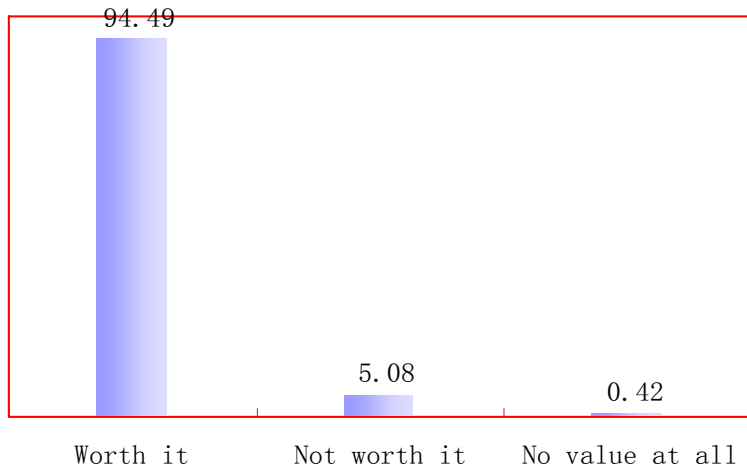
Daily usage time of electric appliance:

Time (hrs)	Gheela mp (%)	Electric torch (%)	Black-white TV(%)	Color TV (%)	Radio (%)	VCD (%)	Recorder (%)	Cream separator (%)
1	1.67	6.67			3.33	1.67	13.33	30
2		0.83		0.83		5	11.67	1.67
3	2.5	0.83		5		0.83	5	
4	4.17		0.83	1.67				
5	0.83			0.83				
6							0.83	

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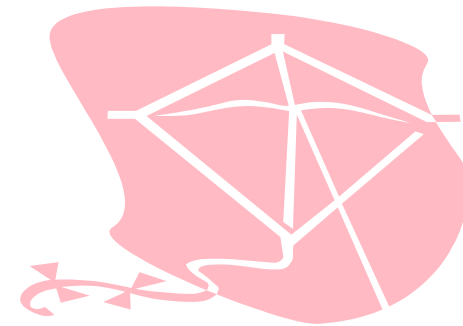


Evaluation of PV system



The PV system brings light to the rural areas residents, so it is worth purchasing.

The investigation shows that as limited by the income, the purchased PV systems do not have enough power to support many usage of electric appliances except for illumination.



- **Project Background**
- **Analysis of Investigation**
- **Analysis of PV Company Investigation**
- **User Profile and Marketing Information**
- **Conclusion and Suggestion**



- In Dege and Baiyu county, many areas along the road from Sichuan to Tibet were covered by the power grid, therefore, lots of people stopped using the PV systems and sold them to other areas or the systems were bought by the government.
- As a living habit, the users usually move to other places three times a year. In winter, they will gather along the road, and in spring or summer, they will move far away and become separate from each other.
- The project duration is from Aug. 27 to Sept. 29, 2005, which was the raining season, which limited the investigation. And the residents are separated in the whole Tibetan area, it needs at least half a year to survey even a single county . So we chose the areas along the road where can be reached by cars.
- The investigation shows that in most areas where the power grids do not cover, residents have solar PV systems.

Conclusion and Suggestion: Sale Registration

- Requested by the PV project, the user who purchased the solar PV systems must fill in the form-“National Economic Commission/World Environmental Fund/World Bank, China Renewable Energy Development Project, Sale Registration”. The content includes: company name, dealer name, user address, ID number, system name and related information. But it was restricted by their education (69% of users had not attended school), so there was a big shortage of filled forms which biased the information collected.
- With regard to system information, we suggest the company design a form about the name of product and related information, then the dealer and consumer need to sign the form when they sell or purchase the product.
- For the user information, we only need the customer's name and fixed address.
- The idea is to simplify the process, if the dealers fill in the form carefully, the PV project will provide the authentic information as evidence for the donations plan of PV Project Office.

Without filling in the “Sale Registration” form



Shortage of user information

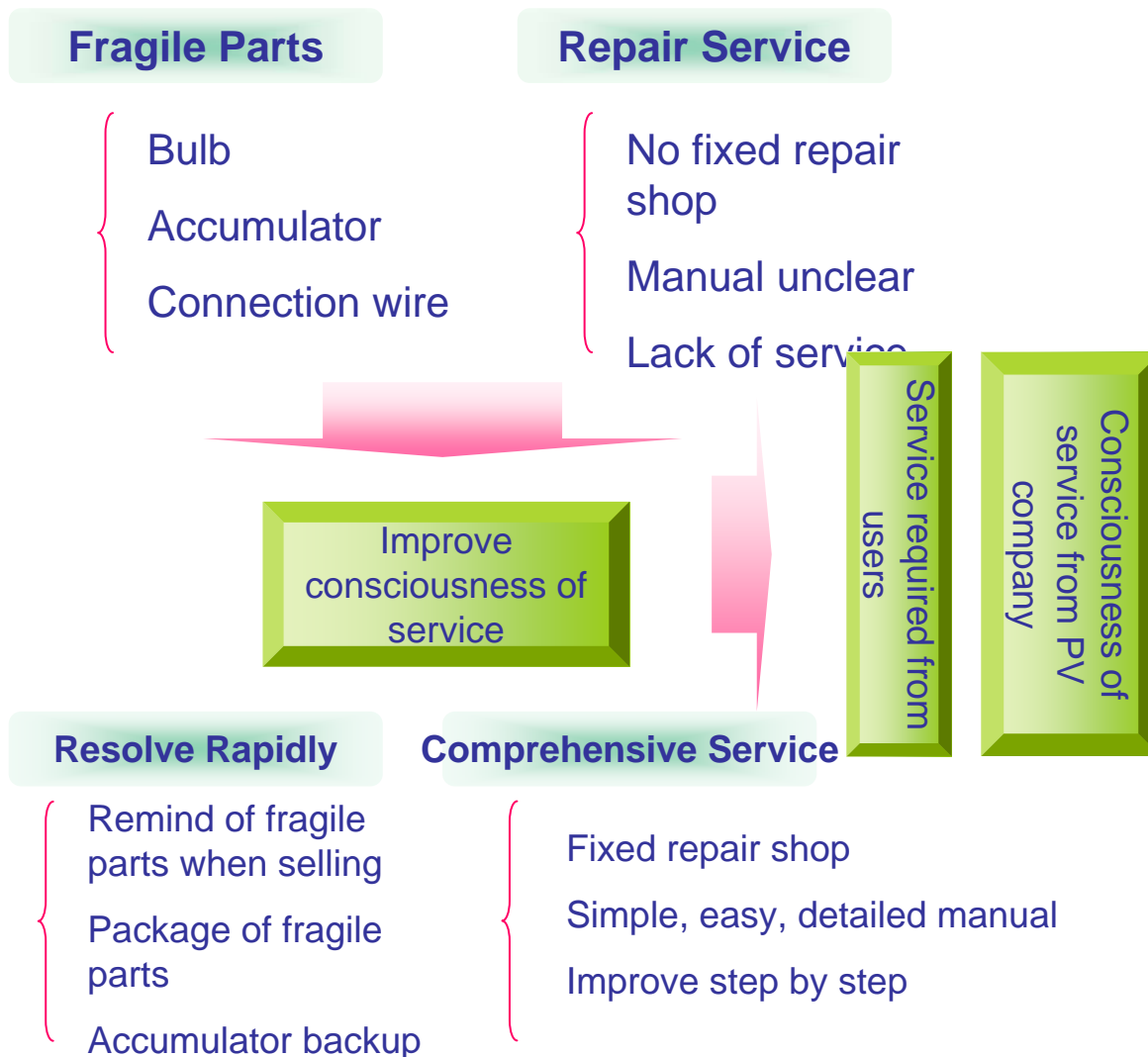


Defective reports from PV companies



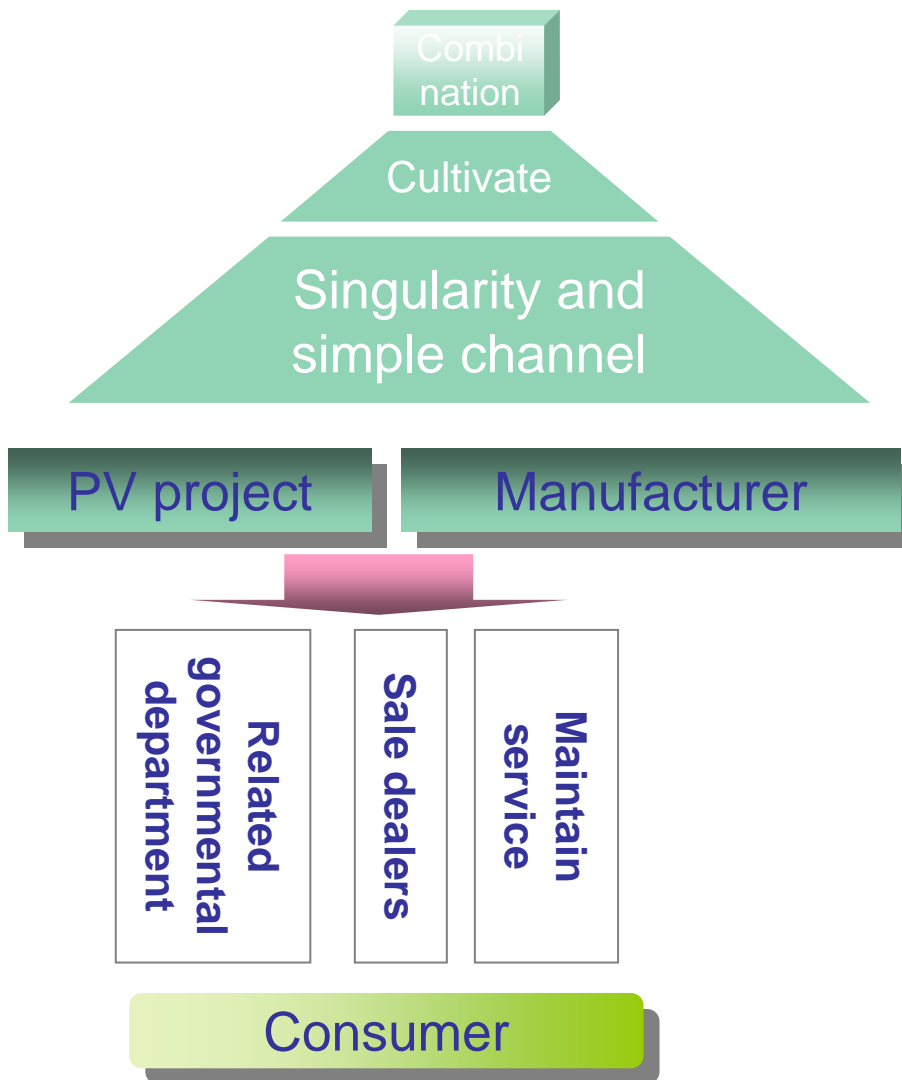
Lack of reference for donation

Conclusion and Suggestion: After-sales Service

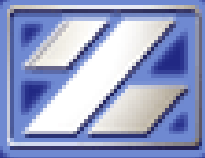


- The battery of PV system break down frequently, repair is time consuming and also delay the usage.
- The service provided by PV company is far from perfect. The motivation of market development is from the users, but the satisfaction scores are under 3 out of 5. This should be highly regarded.
- The impetus of market development is the need of the users, not the system price.

Conclusion and Suggestion: Channel



- With the competition becoming more fierce, enterprises need to put more efforts and become more specialized.
- The purpose of the development for channel, whether for sale or service, is to meet the needs of the consumers.
- First of all, the “service” is a responsibility, for which the enterprise should consider it as their work. Secondly, it can be considered as an investment for better sales, because that is the rudimental work for custom service.
- The rural area residents have few knowledge about the PV system. We need the support from all the people to improve the supervision system and enhance the consciousness of service.



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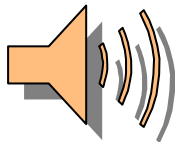
Project Director: Sun, Yanmei

Project Manager: Li, Ning

Research Manager: Yan, Yuan

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Thank you!



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