PROJECT REPORT

OF

WINDSHIELD WIPER MANUFACTURING UNIT

PURPOSE OF THE DOCUMENT

This particular pre-feasibility is regarding Windshield Wiper Manufacturing Unit.

The objective of the pre-feasibility report is primarily to facilitate potential entrepreneurs in project identification for investment and in order to serve his objective; the document covers various aspects of the project concept development, start-up, marketing, finance and management.

[We can modify the project capacity and project cost as per your requirement. We can also prepare project report on any subject as per your requirement.]

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PROJECT AT GLANCE

1	**Name of Proprietor/Director**	XXXXXXXX	
2	**Firm Name**	XXXXXXXX	
3	**Registered Address**	XXXXXXXX	
4	**Nature of Activity**	XXXXXXXX	
5	**Category of Applicant**	XXXXXXXX	
6	**Location of Unit**	XXXXXXXX	
7	**Cost of Project**	17.32	Rs. In Lakhs
8	**Means of Finance**		
i)	**Own Contribution**	1.73	Rs. In Lakhs
ii)	**Term Loan**	13.05	Rs. In Lakhs
iii)	**Working Capital**	2.54	Rs. In Lakhs
9	**Debt Service Coverage Ratio**	2.35	
10	**Break Even Point**	0.32	
11	**Power Requiremnet**	10	KW
12	**Employment**	8	Persons
13	**Major Raw Materials**	Rubber compounds	

14 Details of Cost of Project & Means of Finance

Cost of Project **Amount in Lacs**

Particulars	Amount
Land	Owned/Leased
Building & Civil Work	Owned/Leased
Plant & Machinery	13.00
Other Misc Assets	1.50
Working Capital Requirement	2.82
Total	**17.32**

Means of Finance

Particulars	Amount
Own Contribution	1.73
Term Loan	13.05
Working capital Loan	2.50
Total	**17.32**

1. INTRODUCTION

A vehicle's wiper system is an integrated system for removing rain, snow, ice, and debris from the glass or windshield. It has a significant impact on visibility and the safety of passengers and the vehicle. It is a legal necessity in every automobile. It's in nearly every vehicle, including cars, trucks, railroad engines, and cabin-equipped boats. Pivot - left or right-hand drive, sequential sweep, single blade arm, mono blade, pantograph system, and twin windscreen wiper arms are some of the types of wipers used in automobiles. The functioning of almost all present wiper mechanisms is powered by an electric motor. Pneumatic drives are also utilized to drive wiper arms in some situations.

COMPONENTS OF WINDSHIELD WIPER

Windshield wiper system consists of several components which are as follows-

- Wiper motor- It powers the wiper mechanism's connections, causing the wiper blade to travel over the windscreen. The motor is linked to the windshield wiper arm. The wiper arm begins to move back and forth when the motor is switched on. It drags the blade over the windshield as a result at a speed set by the switch.

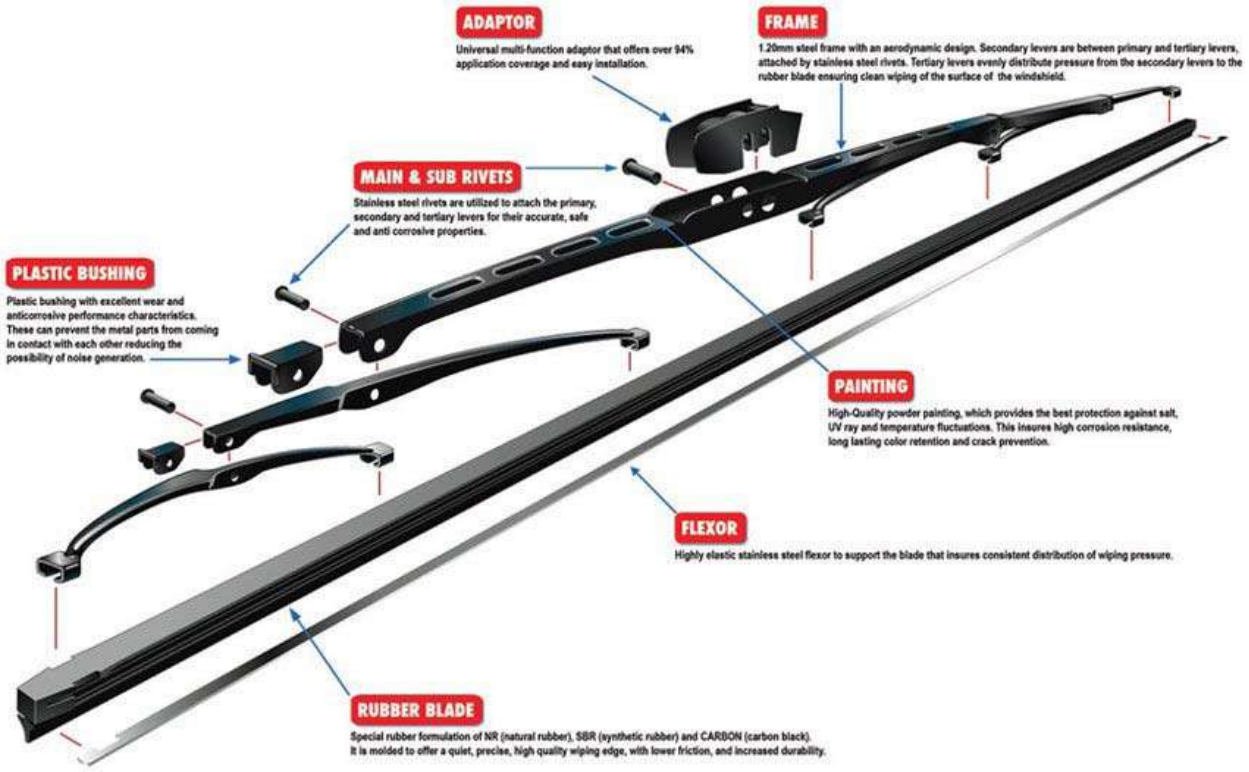
- Wiper arm - The wiper arm acts as a connection between the blade and the motor. It is pivoted at one end (connects to the wiper motor) and the other end is connected to the wiper blade.

- Linkage -Linkage has two primary purposes. Firstly, it keeps the wiper arm and blade in place and ensures optimum blade-to-windscreen contact. Second, it transforms the rotational motion generated by the motor into a usable format. It uses a worm gear to do this. Worm gear decreases the speed of the motor's output shaft and transforms it to the torque needed to operate the wiper arm.

- Wiper blade - The blade is the portion of windshield wiper that cleans it. It's a rubber and plastic piece that attaches to the wiper arm. At all times, the rubber portion is in touch with the windshield. The backing is made of plastic, and it attaches to the wiper arm. On activating the windshield wiper system, wiper blades are dragged back and forth over the windshield by the wiper arms. The rubber portion cleans the windshield of moisture and dirt. This keeps the driver's vision intact. A decent rubber blade will wipe the water away from the windshield without leaving any streaks or marks. The wiper arm's design, which applies equal pressure across the length of the rubber blades through the wiper arm, is also responsible for the streak-free functioning.

- Windshield washer pump – the windshield cleaning system contains two major components i.e. windshield washer fluid reservoir and windshield washer pump. The washer fluid is kept in the reservoir. When the pump is turned on, it pulls fluid from the reservoir and sprays it over the windshield.

Figure shows various components of windshield wiper system



2. PRODUCT DESCRIPTION

2.1 PRODUCT USES

The following are the uses of the windshield wiper system:

1. The wiper cleans the front and rear windshields of the vehicle
2. Removal of water and snow
3. Removal of dirt

2.2 PRODUCT RAW MATERIAL

Wiper blade is usually made up of rubber compound. There are three different combinations of rubber compound used for blade material i.e. natural rubber, synthetic

rubber, natural-synthetic rubber. The characteristics of rubber are crucial for wiping quality at various temperatures. Because rubber stiffens as it becomes cold, it's the most difficult to obtain a high wiping quality at the coldest temperatures.

Galvanized steel is used for the connecting and driving links, as well as the pivots that move the wipers. Galvanization is the process of coating steel with zinc to protect it from corrosion. Galvanized steel is also used for the wiper suspension and claws. Small parts of wipers, including as washers, screws, nuts, springs, motor and brackets, are made of steel. Aluminium is used for manufacturing of blade frame.

A pivot socket, a spring steel sheet, two end ferrules, and a rubber strip are the main components of a windshield wiper blade. The spring steel sheet is an important component of the wiper blade because it creates dispersive pressure, which ensures that all portions of the blade can carry average load equally, making the windscreen scratch and rain-resistant.

The process elaborates different raw material preparation aspects, but production unit under discussion uses steel & rubber sheets along with rest of the parts of wiper assembly i.e. rubber compounding & it's respective sheet manufacturing is outsourced.

2.3 MANUFACTURING PROCESS

Following are the steps for manufacturing of rubber blades-

1. Preparation of rubber compound - A two-roller mill or an internal mixer is used for mixing of different rubber compounds. In the case of an internal mixer, it can be done in a single-stage or double-stage mixing, with the master batch being finished on a two-roll mill after it has been created in the internal mixer.
2. Shaping of rubber blades - The blades can be prepared by compression moulding or extrusion process.
3. Curing of rubber blades – After shaping curing is done to get desired mechanical properties using LCM or a microwave.

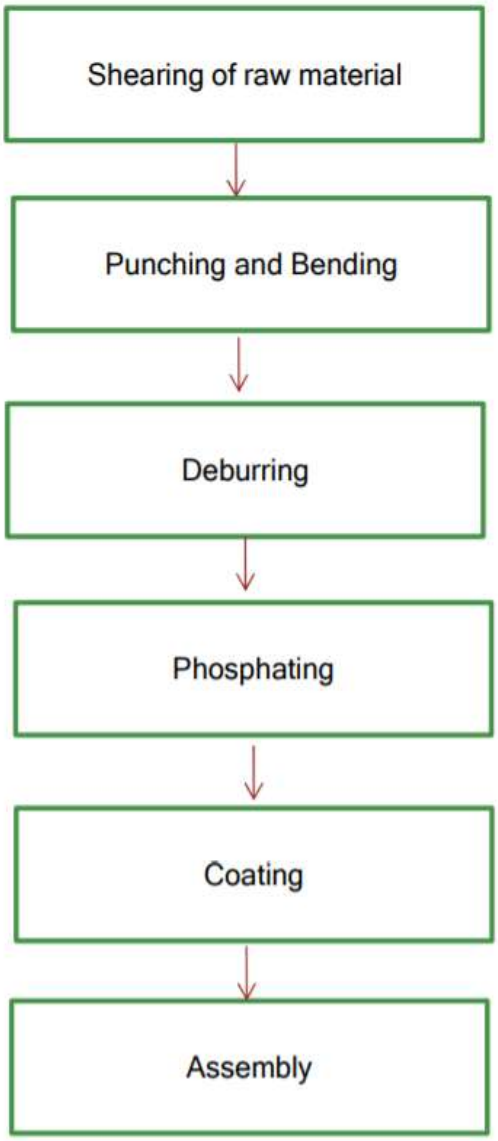
4. Cutting and trimming – cutting and trimming is required to give rubber blades final shape and size. It is also done for deburring purpose.
5. Surface treatment – polymer is used for surface coating of blades.

Steps involved in assembly of different components of windshield wiper system-

1. Pivot shaft assembly - The shaft assembly consists of the pivot shaft and a rubber washer, metal washer, nut, nut cap, knurled driver, washer, and acorn nut. The wiper arm will sit on the knurled driver, which will prevent it from moving off the shaft, and the washer and acorn nut will maintain the arm in place. A washer and spring clip are then used to attach the pivot shaft to the small connecting link. Depending on the configuration of the pivot and link, a pin on the pivot shaft can be placed in one of three pin positions when the shaft is linked to the link.
2. Steel bracket - A U-shaped galvanized steel bracket is attached to the tiny connecting link on the lone pivot shaft with two shaft screws for a single-arm wiper design. The drive link will be connected to the opposite end of the bracket later. In a system with two wipers, the passenger-side wiper's small connecting link is attached to the end of the longer connecting link with shaft screws through a bracket. Similarly, a bracket is affixed to the other end of the longer connecting link on the small connecting link for the driver's side wiper.

3. Electric motor – the drive link is attached to the motor in this step. Motor consists of worm gear reduction mechanism and other linkages. The drive link must be properly fastened on the cam (drive arm) at the end of the gear shaft not only for the wiper to sweep correctly but also to park in the exact place under the vehicle moulding.
4. Spacer washers are inserted if necessary between cam and driving shaft.
5. Linkages constructed of springs are added to connect each pivot shaft to the driving link in the final phases of constructing the windshield wiper system. The pivots are linked to the wiper arms and blades. The wipers are likewise placed in their park positions, and the starter on the motor is adjusted to the park position.

FLOW CHART OF THE PROCESS



3. PROJECT COMPONENTS

3.1 Land & Building

The land required for this manufacturing unit will be approx. around 1300 square feet. Land Purchase and Building Civil Work Cost have not been considered as part of the cost of project. It is expected that the premises will be on rental and approximate rentals assumed of the same will be Rs.20,000 per month.

3.2 Plant & Machinery

- **Centre Lathe machine:** This is required for cutting and trimming purpose.

- **Power Press :** Power press are required for compression moulding of rubber blade. Rubber material is forced through a set of dies using power press to get the semi-finished rubber blade. A power press with punching tool is used to punch out semi-finished links.

- **Cylindrical Grinder Machine:** The cylindrical grinder is a type of grinding machine used to shape the outside of an object.

- **Pillar Drilling Machine:** A pillar drill is a free standing machine that uses a motor to rotate a drill bit.

- **Guillotine Shearing Machine:** The machine used is called a squaring shear, power shear, or guillotine. The machine may be foot powered, less commonly hand powered, or mechanically or hydraulically powered.

- **Hydraulic Press Brake Machine:** Hydraulic press brakes are used to bend and fold metal by pressing it into a die. These presses are designed for both specialized sheet metal work and continuous production applications.

- **Metal Cutting Bandsaw Machine**: A bandsaw (also written band saw) is a power saw with a long, sharp blade consisting of a continuous band of toothed metal stretched between two or more wheels to cut material.

- **Scroll Bender Machine**: For bending scrolls, eyes, spiral shapes and other complex shapes from round, square and flat bar in one operation.

4. LICENSE & APPROVALS

Basic registration required in this project:

- MSME Udyam registration
- GST registration
- NOC for fire safety board
- NOC from Pollution Control Board
- Trade License
- Factory License
- Import/Export License
- Choice of a Brand Name of the product and secure the name with Trademark if required.

PROJECTED BALANCE SHEET **(in Lacs)**

PARTICULARS	1st year	2nd year	3rd year	4th year	5th year
Liabilities					
Capital					
Opening balance		2.45	4.39	6.46	8.75
Add:- Own Capital	1.73				
Add:- Retained Profit	2.72	4.44	5.57	6.79	8.40
Less:- Drawings	2.00	2.50	3.50	4.50	6.00
Closing Balance	**2.45**	**4.39**	**6.46**	**8.75**	**11.15**
Term Loan	11.60	8.70	5.80	2.90	-
Working Capital Limit	2.54	2.54	2.54	2.54	2.54
Sundry Creditors	0.44	0.52	0.60	0.70	0.80
Provisions & Other Liability	0.20	0.24	0.29	0.80	0.96
TOTAL :	**17.23**	**16.39**	**15.69**	**15.69**	**15.45**
Assets					
Fixed Assets (Gross)	14.50	14.50	14.50	14.50	14.50
Gross Dep.	2.18	4.02	5.60	6.93	8.07
Net Fixed Assets	**12.33**	**10.48**	**8.90**	**7.57**	**6.43**
Current Assets					
Sundry Debtors	1.00	1.24	1.44	1.67	1.91
Stock in Hand	2.26	2.65	3.08	3.54	4.04
Cash and Bank	0.90	1.02	1.17	1.71	1.77
Loans & Advances /Other Current Assets	0.75	1.00	1.10	1.20	1.30
TOTAL :	**17.23**	**16.39**	**15.69**	**15.69**	**15.45**

PROJECTED PROFITABILITY STATEMENT **(in Lacs)**

PARTICULARS	1st year	2nd year	3rd year	4th year	5th year
Capacity Utilisation %	**40%**	**45%**	**50%**	**55%**	**60%**
SALES					
Gross Sale					
Windshield Wiper	42.86	53.06	61.85	71.48	82.02
Total	**42.86**	**53.06**	**61.85**	**71.48**	**82.02**
COST OF SALES					
Raw Material Consumed	18.82	22.25	25.92	29.83	34.27
Electricity Expenses	1.68	1.76	1.85	1.94	2.04
Depreciation	2.18	1.85	1.57	1.34	1.14
Wages & labour	6.72	8.40	10.25	12.40	14.26
Repair & maintenance	1.07	1.33	1.55	1.79	2.05
Packaging	2.14	2.65	3.09	3.57	4.10
Cost of Production	32.61	38.24	44.23	50.87	57.86
Add: Opening Stock	-	1.63	1.91	2.21	2.54
Less: Closing Stock	1.63	1.91	2.21	2.54	2.89
Cost of Sales	30.98	37.96	43.93	50.54	57.51
GROSS PROFIT	**11.89**	**15.10**	**17.92**	**20.94**	**24.51**
	27.74%	**28.46%**	**28.97%**	**29.29%**	**29.88%**
Salary to Staff	3.48	4.00	5.00	5.90	6.85
Interest on Term Loan	1.28	1.13	0.81	0.49	0.17
Interest on working Capital	0.28	0.28	0.28	0.28	0.28
Rent	2.40	2.76	3.17	3.65	4.20
Selling & Administrative Exp.	1.71	2.39	2.78	3.22	3.61
TOTAL	**9.16**	**10.56**	**12.05**	**13.54**	**15.11**
NET PROFIT	2.73	4.54	5.87	7.40	9.41
Taxation	0.01	0.10	0.30	0.60	1.01
PROFIT (After Tax)	2.72	4.44	5.57	6.79	8.40
	6.37%	**8.56%**	**9.49%**	**10.35%**	**11.47%**

PROJECTED CASH FLOW STATEMENT **(in Lacs)**

PARTICULARS	1st year	2nd year	3rd year	4th year	5th year
SOURCES OF FUND					
Own Margin	1.73				
Net Profit	2.73	4.54	5.87	7.40	9.41
Depreciation & Exp. W/off	2.18	1.85	1.57	1.34	1.14
Increase in Cash Credit	2.54	-	-	-	-
Increase In Term Loan	13.05	-	-	-	-
Increase in Creditors	0.44	0.08	0.09	0.09	0.10
Increase in Provisions & Oth labilities	0.20	0.04	0.05	0.51	0.16
	-				
TOTAL :	**22.86**	**6.51**	**7.57**	**9.34**	**10.81**
APPLICATION OF FUND					
Increase in Fixed Assets	14.50				
Increase in Stock	2.26	0.40	0.42	0.46	0.50
Increase in Debtors	1.00	0.24	0.21	0.22	0.25
Repayment of Term Loan	1.45	2.90	2.90	2.90	2.90
Loans & Advances /Other Current Assets	0.75	0.25	0.10	0.10	0.10
Drawings	2.00	2.50	3.50	4.50	6.00
Taxation	0.01	0.10	0.30	0.60	1.01
TOTAL :	**21.97**	**6.39**	**7.43**	**8.79**	**10.75**
Opening Cash & Bank Balance	-	0.90	1.02	1.17	1.71
Add : Surplus	0.90	0.12	0.15	0.55	0.06
Closing Cash & Bank Balance	**0.90**	**1.02**	**1.17**	**1.71**	**1.77**

CALCULATION OF D.S.C.R

PARTICULARS	1st year	2nd year	3rd year	4th year	5th year
CASH ACCRUALS	4.90	6.29	7.14	8.13	9.54
Interest on Term Loan	1.28	1.13	0.81	0.49	0.17
Total	6.18	7.42	7.95	8.62	9.71
REPAYMENT					
Instalment of Term Loan	1.45	2.90	2.90	2.90	2.90
Interest on Term Loan	1.28	1.13	0.81	0.49	0.17
Total	2.73	4.03	3.71	3.39	3.07
DEBT SERVICE COVERAGE RATIO	**2.26**	**1.84**	**2.14**	**2.54**	**3.16**
AVERAGE D.S.C.R.					**2.35**

REPAYMENT SCHEDULE OF TERM LOAN							
					Interest		11.00%
Year	**Particulars**	**Amount**	**Addition**	**Total**	**Interest**	**Repayment**	**Closing Balance**
1st	Opening Balance						
	1st month	-	13.05	13.05	-	-	13.05
	2nd month	13.05	-	13.05	0.12	-	13.05
	3rd month	13.05	-	13.05	0.12	-	13.05
	4th month	13.05	-	13.05	0.12		13.05
	5th month	13.05	-	13.05	0.12		13.05
	6th month	13.05	-	13.05	0.12		13.05
	7th month	13.05	-	13.05	0.12	0.24	12.81
	8th month	12.81	-	12.81	0.12	0.24	12.57
	9th month	12.57	-	12.57	0.12	0.24	12.33
	10th month	12.33	-	12.33	0.11	0.24	12.08
	11th month	12.08	-	12.08	0.11	0.24	11.84
	12th month	11.84	-	11.84	0.11	0.24	11.60
					1.28	**1.45**	
2nd	Opening Balance						
	1st month	11.60	-	11.60	0.11	0.24	11.36
	2nd month	11.36	-	11.36	0.10	0.24	11.12
	3rd month	11.12	-	11.12	0.10	0.24	10.88
	4th month	10.88	-	10.88	0.10	0.24	10.63
	5th month	10.63	-	10.63	0.10	0.24	10.39
	6th month	10.39	-	10.39	0.10	0.24	10.15
	7th month	10.15	-	10.15	0.09	0.24	9.91
	8th month	9.91	-	9.91	0.09	0.24	9.67
	9th month	9.67	-	9.67	0.09	0.24	9.42
	10th month	9.42	-	9.42	0.09	0.24	9.18
	11th month	9.18	-	9.18	0.08	0.24	8.94
	12th month	8.94	-	8.94	0.08	0.24	8.70
					1.13	**2.90**	
3rd	Opening Balance						
	1st month	8.70	-	8.70	0.08	0.24	8.46
	2nd month	8.46	-	8.46	0.08	0.24	8.22
	3rd month	8.22	-	8.22	0.08	0.24	7.97
	4th month	7.97	-	7.97	0.07	0.24	7.73
	5th month	7.73	-	7.73	0.07	0.24	7.49
	6th month	7.49	-	7.49	0.07	0.24	7.25
	7th month	7.25	-	7.25	0.07	0.24	7.01
	8th month	7.01	-	7.01	0.06	0.24	6.77
	9th month	6.77	-	6.77	0.06	0.24	6.52
	10th month	6.52	-	6.52	0.06	0.24	6.28
	11th month	6.28	-	6.28	0.06	0.24	6.04
	12th month	6.04	-	6.04	0.06	0.24	5.80

					0.81	**2.90**	
4th	Opening Balance						
	1st month	5.80	-	5.80	0.05	0.24	5.56
	2nd month	5.56	-	5.56	0.05	0.24	5.32
	3rd month	5.32	-	5.32	0.05	0.24	5.08
	4th month	5.08	-	5.08	0.05	0.24	4.83
	5th month	4.83	-	4.83	0.04	0.24	4.59
	6th month	4.59	-	4.59	0.04	0.24	4.35
	7th month	4.35	-	4.35	0.04	0.24	4.11
	8th month	4.11	-	4.11	0.04	0.24	3.87
	9th month	3.87	-	3.87	0.04	0.24	3.63
	10th month	3.63	-	3.63	0.03	0.24	3.38
	11th month	3.38	-	3.38	0.03	0.24	3.14
	12th month	3.14	-	3.14	0.03	0.24	2.90
					0.49	**2.90**	
5th	Opening Balance						
	1st month	2.90	-	2.90	0.03	0.24	2.66
	2nd month	2.66	-	2.66	0.02	0.24	2.42
	3rd month	2.42	-	2.42	0.02	0.24	2.18
	4th month	2.18	-	2.18	0.02	0.24	1.93
	5th month	1.93	-	1.93	0.02	0.24	1.69
	6th month	1.69	-	1.69	0.02	0.24	1.45
	7th month	1.45	-	1.45	0.01	0.24	1.21
	8th month	1.21	-	1.21	0.01	0.24	0.97
	9th month	0.97	-	0.97	0.01	0.24	0.72
	10th month	0.72	-	0.72	0.01	0.24	0.48
	11th month	0.48	-	0.48	0.00	0.24	0.24
	12th month	0.24	-	0.24	0.00	0.24	-
					0.17	**2.90**	

DOOR TO DOOR	60	MONTHS
MORATORIUM PERIOD	6	MONTHS
REPAYMENT PERIOD	54	MONTHS

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