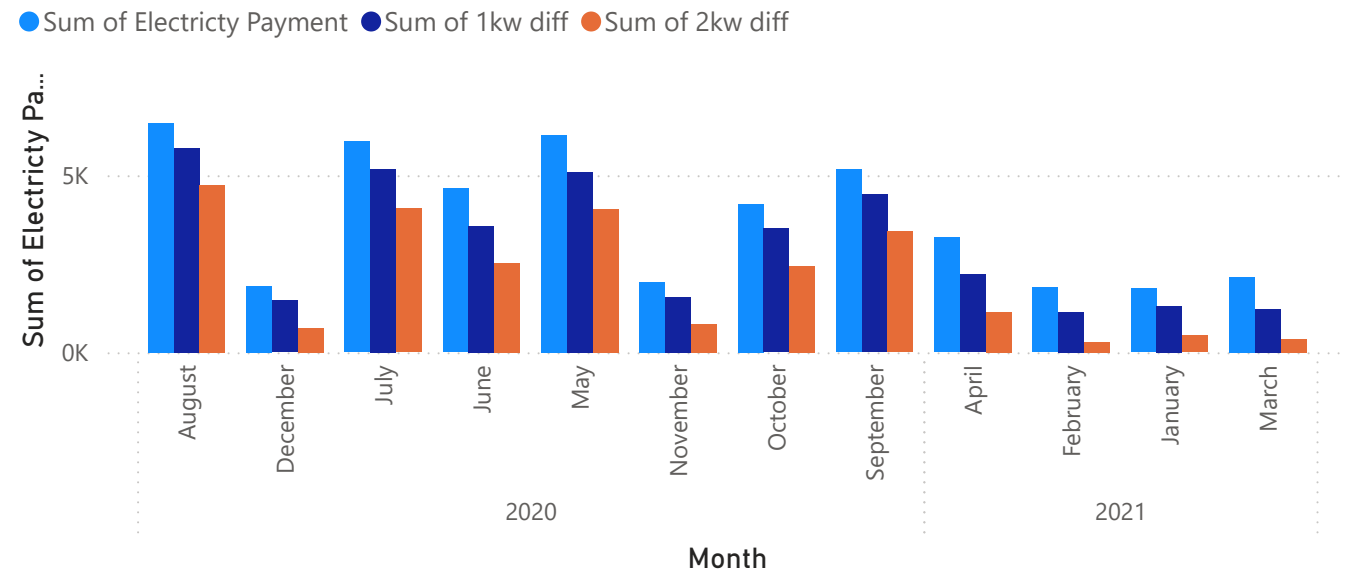


Reduction of Electricity Bills and expenditure with analysis

In this report , we will be analysing the expenditures done on the monthly basis for the electricity for a household from May 2020 to April 2021 . Further the report consists of overall electricity consumption on the monthly basis , with its cost cutting analysis and all the departments that comes under the extra costs above the actual usage , next for finding a way to conserve the energy I came up with the solution of Introducing Solar Panels , with the analysis of monthly cost for it ,how much difference it can make and what type and what type of load in Solar panel is needed to run a household with the current data. The report contains the exact data derived from the bills and all the analysis is done with systematic and reasonable calculations. Here the supplier of the electricity is Torrent Power Corporation. Below is a graph of the electricity usage ,usage with 1KWh solar panel , next is with 2KWh solar panel. We observed that using solar panel can bring so much difference in the total expenditure that we will see further.

Year	Month	Sum of Electricity Payment	Sum of 1kw diff	Sum of 2kw diff
2020	August	6474	5774	4724
2020	December	1882	1462	692
2020	July	5949	5179	4059
2020	June	4626	3576	2526
2020	May	6145	5095	4045
2020	November	1987	1567	797
2020	October	4192	3492	2442
2020	September	5158	4458	3408
2021	April	3247	2197	1147
2021	February	1833	1133	293
2021	January	1805	1315	475
2021	March	2127	1217	377
Total		45425	36465	24985

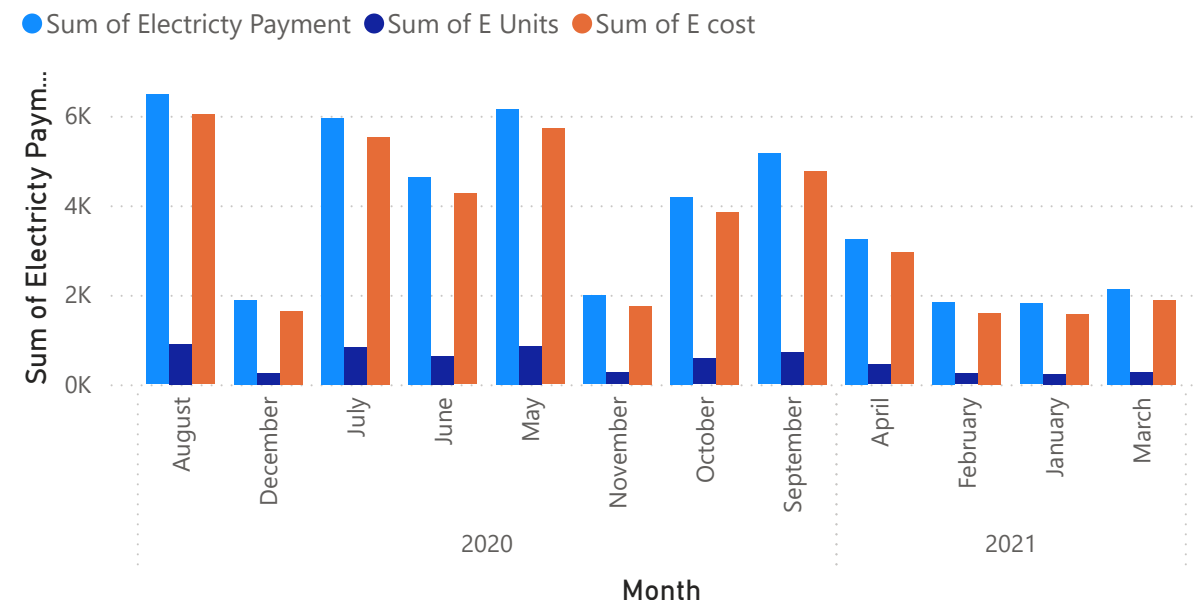
Sum of Electricity Payment, Sum of 1kw diff and Sum of 2kw diff by Year and Month



Overall Electricity Consumption

Year	Month	Sum of Electricity Payment	Sum of E cost	Sum of E Fixed Charge	Sum of E Duty cost
2020	August	6474	6,029.67	153	291.33
2020	December	1882	1,644.31	153	84.69
2020	July	5949	5,528.30	153	267.71
2020	June	4626	4,264.83	153	208.17
2020	May	6145	5,715.48	153	276.53
2020	November	1987	1,744.59	153	89.42
2020	October	4192	3,850.36	153	188.64
2020	September	5158	4,772.89	153	232.11
2021	April	3247	2,947.89	153	146.12
2021	February	1833	1,597.52	153	82.49
2021	January	1805	1,570.78	153	81.23
2021	March	2127	1,878.29	153	95.72
Total		45425	41,544.88	1836	2,044.12

Sum of Electricity Payment, Sum of E Units and Sum of E cost by Year and Month



Analysis of the above data (2020)-

1. The graph above represents the data of the electricity usage with units and the amount of payment done monthly from May 2020 to March 2021
2. Through the above graph if we come to year 2020 we notice peak usage every month
3. As the data from May 2020 to October 2020 Covid-19 protocols were being followed all over India during which everyone was restricted at homes , and as a result more the people more the usage at home and more the appliance would be used.
4. Here I am mentioning few extra usages that were being done during these months - using washing machines to wash clothes and avoid if any infection coming through clothes using steamers to immune our respiratory systems , electric geasers for hot water availability
5. November and December comes with a little bit relief because at that time some relief for offices and schools was given from the strict guidelines, so the usage went drastically down there

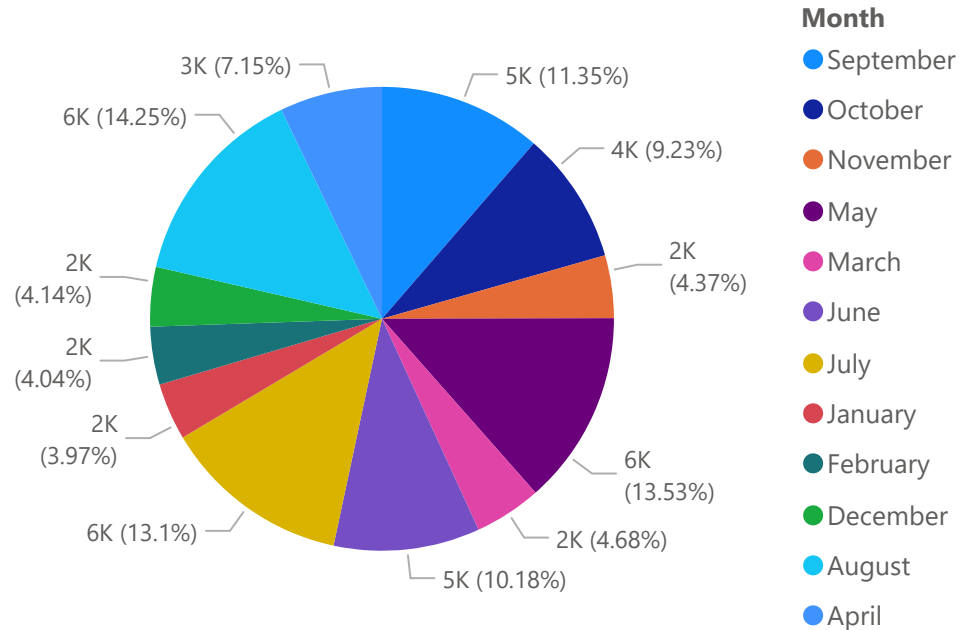
Analysis of the above data for year 2021-

1. From the data presented above the graph it normal , no sudden peak usage or anything , just usual usage

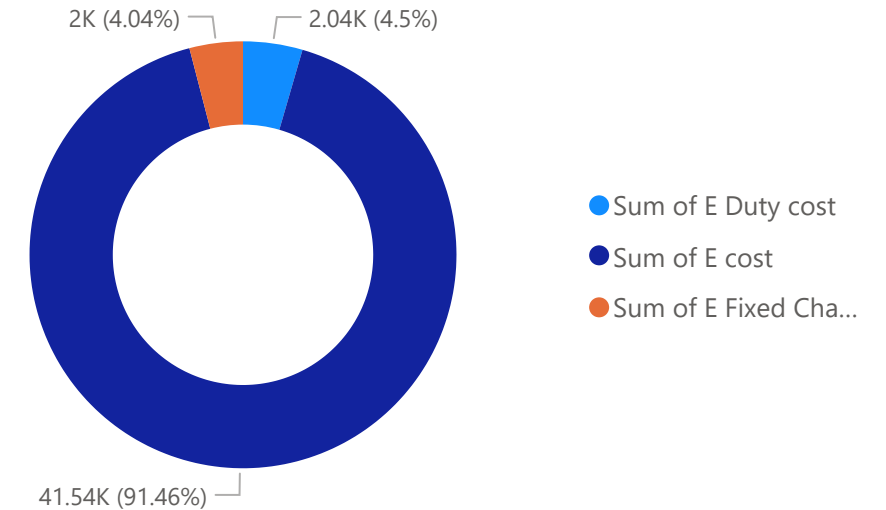
Overall Cost Breakup

Year	Month
2020	August
2020	December
2020	July
2020	June
2020	May
2020	November
2020	October
2020	September
2021	April
2021	February
2021	January
2021	March

Sum of Electricity Payment by Month



Sum of E Duty cost, Sum of E cost and Sum of E Fixed Charge



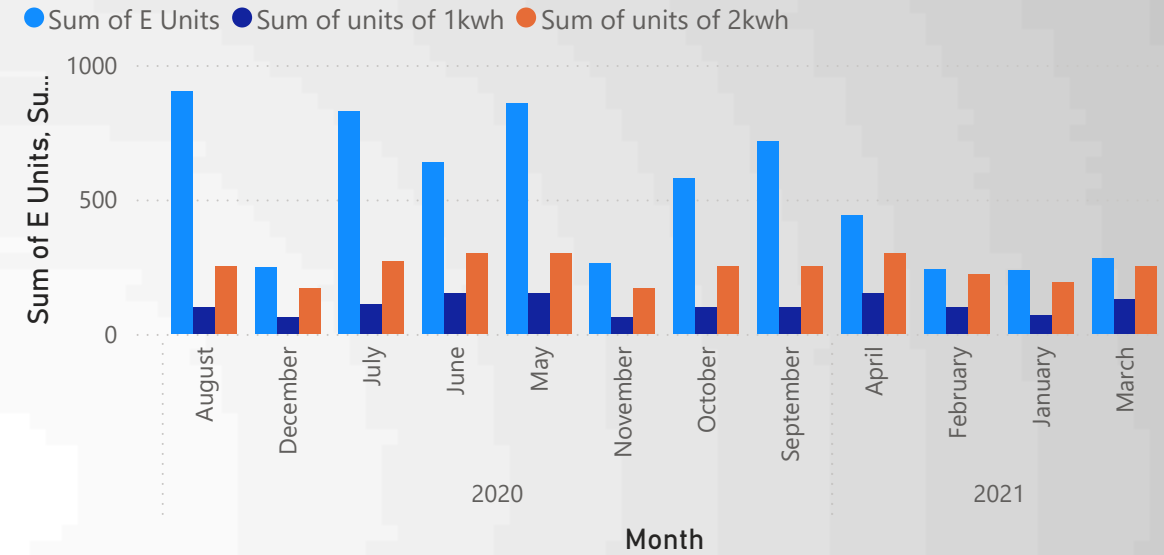
Analysis of the above data using Pie Chart and Donut Chart -

- According to the above data we can do the analysis no the cost usage on the monthly basis
- The data above shows that the maximum usage was done in May 2020 , July 2020 and August 2020 consisting 38.03% of the annual payment and 2.85% of the extra charges that include the duty costs and fixed charges
- After the analysis the data according to the weather during the winter months the overall data depicts a total of Rs. 11.94k and for the hot months it goes to Rs. 33.6k ,wand therefore we obtain the ration of usage of winters to summers ,i.e. approximately 1:3
- As per the above donut graph out of the total payments done 8.54% is the extra cost given in the form of fixed charges and duty charges i.e. a total of Rs. 4.04k amount has been paid out of Rs. 45.54k

Energy Saving Tips - Introducing Solar-Panels

Year	Month	Sum of E cost	Sum of 1kw diff	Sum of E Units	Sum of units of 1kwh	Sum of units of 2kwh
2020	August	6,029.67	5774	903.00	100	250
2020	December	1,644.31	1462	247.00	60	170
2020	July	5,528.30	5179	828.00	110	270
2020	June	4,264.83	3576	639.00	150	300
2020	May	5,715.48	5095	856.00	150	300
2020	November	1,744.59	1567	262.00	60	170
2020	October	3,850.36	3492	577.00	100	250
2020	September	4,772.89	4458	715.00	100	250
2021	April	2,947.89	2197	442.00	150	300
2021	February	1,597.52	1133	240.00	100	220
2021	January	1,570.78	1315	236.00	70	190
2021	March	1,878.29	1217	282.00	130	250
Total		41,544.88	36465	6,227.00	1280	2920

Sum of E Units, Sum of units of 1kwh and Sum of units of 2kwh by Year and Month



Introduction to Solar Panels-

Production of electricity from solar panels is directly proportional to the amount of sunlight received on the solar panel

Observing the data monthly we can see that how the units of electricity produced by two different types of solar panel that is 1KWh solar panels and 2KWh solar panels

In peak summer months 1KWh solar panel generates approximately 130-150 units per day and 2KWh solar panel generates approximately 250-300 units per day

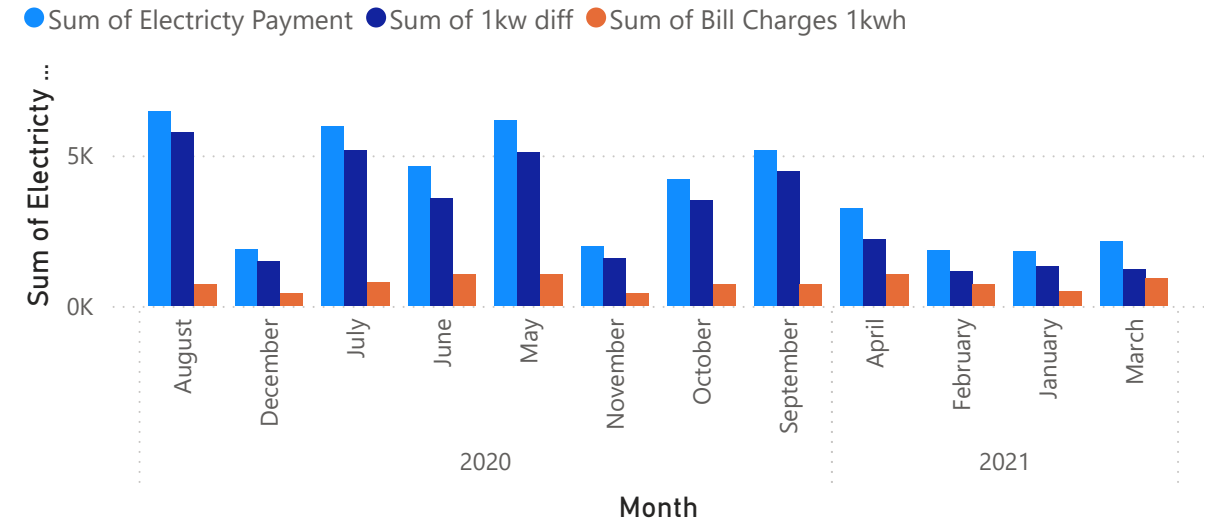
From the above table a usage of a household from May 2020 to April 2020 total units usage is 6227 and after using 1KWh solar panel we can bring it down to 4947 and similarly for 2KWh solar panel it will be 3907 units

With the cost of Rs.7 per unit we have a yearly expenditure of Rs.41,544.88

1KWh Solar Panel Analysis

Year	Month	Sum of Electricity Payment	Sum of 1kw diff	Sum of Bill Charges 1kwh
2020	August	6474	5774	700
2020	December	1882	1462	420
2020	July	5949	5179	770
2020	June	4626	3576	1050
2020	May	6145	5095	1050
2020	November	1987	1567	420
2020	October	4192	3492	700
2020	September	5158	4458	700
2021	April	3247	2197	1050
2021	February	1833	1133	700
2021	January	1805	1315	490
2021	March	2127	1217	910
Total		45425	36465	8960

Sum of Electricity Payment, Sum of 1kw diff and Sum of Bill Charges 1kwh by Year and Month



Here we are introducing 1KWh Solar Panel and from the above graph we can derive the following conclusions-

- The above graph denoted with the blue color shows the expenses for the normal usage
- The navy color shows the reading of the expenses after applying a 1KWh Solar Panel
- So from the differences we can derive that if we introduce a solar panel with more KWh reading we can bring the expenses more low
- The orange colors bars , they represent the saving done each month

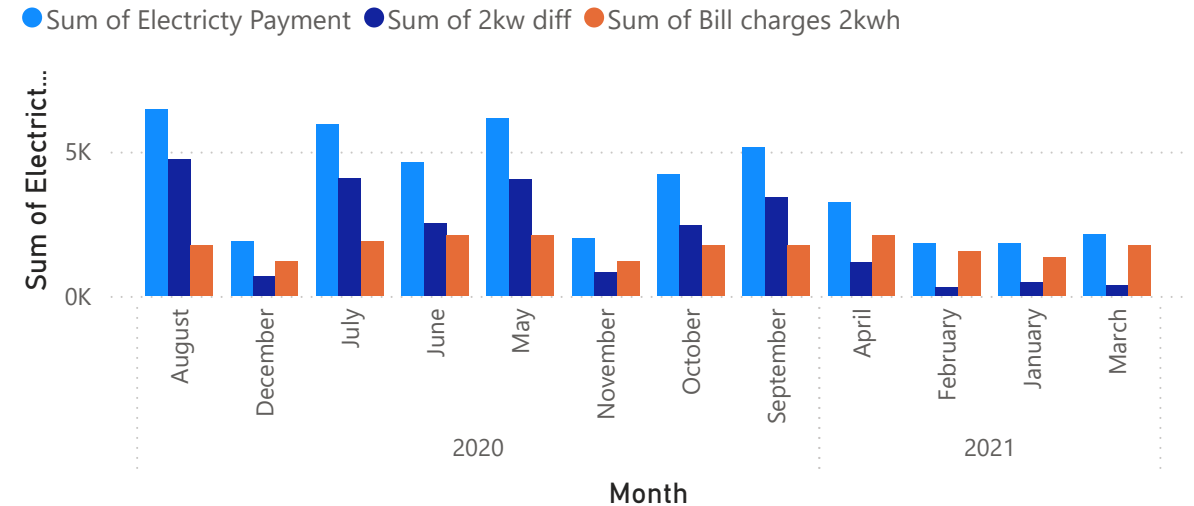
Now lets from the above graph we can understand the overall cost breakup after applying the 1KWh Solar Panel-

- Total expense with normal electricity comes with a total of Rs. 45425 which after applying 1KWh solar panel comes down to Rs.36465 and this data is without including the installation cost
- For installation the cost is approximately Rs. 75000
- Observing from the above analysis in one year of spam we get to save Rs. 8960 and within next 8 years and 4 months we will recover all the cost of the investment done in the first stage
- As per the government rules according to usage subsidiy for installing solar panels is also provided which will result in the ivestment recovery in much lesser time
- The last bar graph shows the total expense that is reduction from the bills after applying the solar panels

2KWh Solar Panel Analysis

Year	Month	Sum of Electricity Payment	Sum of 2kw diff	Sum of Bill charges 2kwh
2020	August	6474	4724	1750
2020	December	1882	692	1190
2020	July	5949	4059	1890
2020	June	4626	2526	2100
2020	May	6145	4045	2100
2020	November	1987	797	1190
2020	October	4192	2442	1750
2020	September	5158	3408	1750
2021	April	3247	1147	2100
2021	February	1833	293	1540
2021	January	1805	475	1330
2021	March	2127	377	1750
Total		45425	24985	20440

Sum of Electricity Payment, Sum of 2kw diff and Sum of Bill charges 2kwh by Year and Month



Here we can see that we have the data of the monthly electricity expense with the monthly production of electricity using solar panels of 2KWh with the difference that is provided by the solar panel

- The blue bar represents the total expense of the month
- The navy color bars show us the the expenses that will be done with a 2KWh solar panel
- The orange bar represents the differences of the expenses that occurred after introducing the 2KWh solar panel

Now let's from the above graph we can understand the overall cost breakup after applying the 2KWh Solar Panel-

- Total expense with normal electricity comes with a total of Rs. 45,425 which after applying 2KWh solar panel comes down to Rs.24,985 and this data is without including the installation cost
- For installation the cost is approximately Rs. 1,70,000
- Observing from the above analysis in one year of span we get to save Rs. 20,440 and within next 8 years and 4 months we will recover all the cost of the investment done in the first stage
- As per the government subsidy rule also applies here
- The last bar graph shows the total expense that is reduction from the bills after applying the solar panels