Chapter 8

8. Conclusion and Further Work

8.1 Introduction

This chapter contains a discussion on the results obtained from the research and how the objectives are met. The future works can be done to continue this research for make the broader environment is also discussed.

8.2 Achievements of the objectives

Analyzing electricity consumption patterns should be an important factor in any country for planning future demands. The domestic sector is the most influential party. The highest percentage of consumers in Sri Lanka is in the domestic tariff category. So if we can analyze their pattern consumption of electricity in a timely manner. Many different factors affecting electricity consumption is mainly related to the high electricity consumption usage. The floor area of a house is also the factor effecting for high consumption. By analyzing monthly data the highest consumptions months are identified. This factor would be more important for the load balancing and the future demand of the area.

The knowledge of the energy conservation habits of using equipments can be taken as a good way forward. Most of the consumers in the sample are having energy conservation habits. But the awareness of electricity reading, tariff structure, bill calculation is not sufficient for better utilization of electricity. So awareness programs should be introduced to improve their knowledge.

Furthermore, different characteristics (size, number of occupation and the monthly income) will be related to the consumption pattern analysis in order to observe their effects on the final consumption. The income level is not a key factor for people to towards electricity consumption. People reluctant to give income level for such a questionnaire, so that reason may effected for identification of relationships between consumption and the monthly income level.
8.3 Further Work

This research is basically focused on domestic consumer group in Jaffna area. Sometimes behaviors of people towards electricity consumption may vary according to the different geographical areas. So it’s better to expand this research to other areas as well. The design of this research has a provision that can be adapted for any area, any province as well as entire country.

Apart from domestic category, there are consumers in other categories like General Purpose, Industrial Purpose, Religious and Charity purpose, Time Of Use (TOU). For the future expansion of this research, this can be apply for those categories as well to analyze electricity consumption patterns.

8.4 Summary

This chapter contained a conclusion and future works of this research. This chapter consists of a summary of this report. Also it contains explanations on problems encountered during implementation and further work to be done.
References


Appendix I

Web Application interfaces

Questionnaire Entering form

<table>
<thead>
<tr>
<th>General Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Account Number</td>
</tr>
<tr>
<td>Name of Account Holder</td>
</tr>
<tr>
<td>Average Consumption</td>
</tr>
<tr>
<td>Average Charge</td>
</tr>
<tr>
<td>House Type</td>
</tr>
<tr>
<td>No of Rooms available</td>
</tr>
<tr>
<td>No of people living</td>
</tr>
<tr>
<td>Children (0-6)</td>
</tr>
<tr>
<td>Children (7-12)</td>
</tr>
<tr>
<td>Children (13-17)</td>
</tr>
<tr>
<td>Children Spending week days</td>
</tr>
<tr>
<td>Adults Spending weekdays</td>
</tr>
</tbody>
</table>

Source Codes

Consumption Prediction

```csharp
using System;
using System.Collections.Generic;
using System.Data;
using System.Data.SqlClient;
using System.Linq;
using System.Web;
using System.Web.UI;
using System.Web.UI.WebControls;

public partial class consumptionreduceprediction : System.Web.UI.Page
{
    protected void Page_Load(object sender, EventArgs e)
    {
    }
    
    protected void Button1_Click(object sender, EventArgs e)
    {
        int start = int.Parse(from.Text.ToString());
        int end = int.Parse(to.Text.ToString());
        string sql1 = ""
        string sql2 = ""
        string sql3 = ""
    }
```
DataSet ds1 = new DataSet();
DataSet ds2 = new DataSet();
DataSet ds3 = new DataSet();

using (SqlConnection connection = ConStrings.GetConnection())
{
    sql1 = "select count(*) from researchdata where avg_consumption >" + start + " and avg_consumption <" + end + "";
    sql2 = "select sum(avg_consumption) from researchdata where avg_consumption >" + start + " and avg_consumption <" + end + "";
    sql3 = "select sum(avg_charge) from researchdata where avg_consumption >" + start + " and avg_consumption <" + end + "";

    SqlCommand cmd1 = new SqlCommand(sql1, connection);
    cmd1.CommandType = CommandType.Text;
    SqlDataAdapter ad1 = new SqlDataAdapter(cmd1);
    ad1.Fill(ds1, "consumption");
    int totalcount = int.Parse(ds1.Tables[0].Rows[0][0].ToString());
    totconsumers.Text = totalcount.ToString();

    SqlCommand cmd2 = new SqlCommand(sql2, connection);
    cmd2.CommandType = CommandType.Text;
    SqlDataAdapter ad2 = new SqlDataAdapter(cmd2);
    ad2.Fill(ds2, "consumption2");
    decimal totconsumption = Math.Round(decimal.Parse(ds2.Tables[0].Rows[0][0].ToString()), 0);
    tot_consumption.Text = totconsumption.ToString();

    SqlCommand cmd3 = new SqlCommand(sql3, connection);
    cmd3.CommandType = CommandType.Text;
    SqlDataAdapter ad3 = new SqlDataAdapter(cmd3);
    ad3.Fill(ds3, "consumption2");
    decimal total_charge = Math.Round(decimal.Parse(ds3.Tables[0].Rows[0][0].ToString()), 2);
    totcharge.Text = total_charge.ToString();
}

protected void predict2_Click(object sender, EventArgs e)
{
    using (SqlConnection connection = ConStrings.GetConnection())
    {
        DataSet ds4 = new DataSet();
        DataSet ds5 = new DataSet();
        string sql4 = "";
        string sql5 = "";
```csharp
sql4 = "select total from bill_cal where unit=" + int.Parse(reduced_consumption.Text) + " ";
SqlCommand cmd4 = new SqlCommand(sql4, connection);
smouth.CommandType = CommandType.Text;
SqlDataAdapter ad4 = new SqlDataAdapter(cmd4);
ad4.Fill(ds4, "consumption2");

sql5 = "select total_consumers from areas where area_code='16'";
SqlCommand cmd5 = new SqlCommand(sql5, connection);
smouth.CommandType = CommandType.Text;
SqlDataAdapter ad5 = new SqlDataAdapter(cmd5);
ad5.Fill(ds5, "consumption2");

int population=int.Parse(ds5.Tables[0].Rows[0][0].ToString());

t1.Text=(int.Parse(totconsumers.Text)*int.Parse(reduced_consumption.Text)).ToString();

t2.Text=(int.Parse(tot_consumption.Text)-
int.Parse(t1.Text)).ToString();

decimal charge =
decimal.Parse(ds4.Tables[0].Rows[0][0].ToString());

decimal total_charge = charge * int.Parse(totconsumers.Text);

t5.Text = total_charge.ToString();

t3.Text = (decimal.Parse(totcharge.Text) -
total_charge).ToString();

t4.Text = (int.Parse(tot_consumption.Text) -
int.Parse(t1.Text)).ToString();


```
Average Consumption analysis by type of house

```csharp
using System;
using System.Collections.Generic;
using System.Data;
using System.Linq;
using System.Web;
using System.Web.UI;
using System.Data.SqlClient;
using Microsoft.Reporting.WebForms;

public partial class individualConsumption : System.Web.UI.Page
{

protected void Page_Load(object sender, EventArgs e)
{
}

public DataSet AverageConsumption(int start, int end)
{
    string sql = "";
    DataSet ds = new DataSet();
    try
    {
        using (SqlConnection connection = ConStrings.GetConnection())
        {
            sql = "select count(avg_consumption)as count,house_type from researchdata where avg_consumption \geq\" + start + \" and avg_consumption \leq\" + end + \" group by house_type";
            SqlCommand cmd = new SqlCommand(sql, connection);
            cmd.CommandType = CommandType.Text;
            SqlDataAdapter ad2 = new SqlDataAdapter(cmd);
            ad2.Fill(ds, "consumption");
        }
    }
    catch (Exception ex)
    {
    }
    return ds;
}

protected void Button1_Click(object sender, EventArgs e)
{
    try
    {
    }
    catch (Exception eee)
    {
    }
}
```
private DataTable CreateDataTable()
{
    DataTable myDataTable = new DataTable();
    DataColumn myDataColumn;
    myDataColumn = new DataColumn();
    myDataColumn.DataType = Type.GetType("System.String");
    myDataColumn.ColumnName = "unit";
    myDataTable.Columns.Add(myDataColumn);
    myDataColumn = new DataColumn();
    myDataColumn.DataType = Type.GetType("System.Int32");
    myDataColumn.ColumnName = "count";
    myDataTable.Columns.Add(myDataColumn);
    myDataColumn = new DataColumn();
    myDataColumn.DataType = Type.GetType("System.String");
    myDataColumn.ColumnName = "one";
    myDataTable.Columns.Add(myDataColumn);
    return myDataTable;
}

private void AddDataToTable(string unit, int count, string one, DataTable myTable)
{
    DataRow row;
    row = myTable.NewRow();
    row["unit"] = unit;
    row["count"] = count;
    row["one"] = one;
    myTable.Rows.Add(row);
}

protected void btnView_Click(object sender, EventArgs e)
{
    DataTable myDataTable = CreateDataTable();
    DataSet ds = new DataSet();
    DataSet ds1 = new DataSet();
    DataSet ds2 = new DataSet();
    DataSet ds3 = new DataSet();
    DataSet ds4 = new DataSet();
    try
    {
        string units = ddlunits.SelectedItem.Value;
        if (units.Equals("1"))
        {
            ds = AverageConsumption(0, 30);
            if (ds.Tables[0].Rows.Count > 0)
            {
                for (int i = 0; i < ds.Tables[0].Rows.Count; i++)
            }
        }
    }
}
```csharp
{ 
    string unit = "0 to 30";
    int count =
    int.Parse(ds.Tables[0].Rows[i][0].ToString());
    string one = ds.Tables[0].Rows[i][1].ToString();
    AddDataTableToTable(unit, count, one, mydatatable);
}
}

ds = AverageConsumption(31, 60);
if (ds.Tables[0].Rows.Count > 0)
{
    for (int i = 0; i < ds.Tables[0].Rows.Count; i++)
    {
        string unit = "31 to 60";
        int count =
        int.Parse(ds.Tables[0].Rows[i][0].ToString());
        string one = ds.Tables[0].Rows[i][1].ToString();
        AddDataTableToTable(unit, count, one, mydatatable);
    }
}

d = AverageConsumption(61, 90);
if (ds.Tables[0].Rows.Count > 0)
{
    for (int i = 0; i < ds.Tables[0].Rows.Count; i++)
    {
        string unit = "61 to 90";
        int count =
        int.Parse(ds.Tables[0].Rows[i][0].ToString());
        string one = ds.Tables[0].Rows[i][1].ToString();
        AddDataTableToTable(unit, count, one, mydatatable);
    }
}

d = AverageConsumption(91, 120);
if (ds.Tables[0].Rows.Count > 0)
{
    for (int i = 0; i < ds.Tables[0].Rows.Count; i++)
    {
        string unit = "91 to 120";
        int count =
        int.Parse(ds.Tables[0].Rows[i][0].ToString());
        string one = ds.Tables[0].Rows[i][1].ToString();
        AddDataTableToTable(unit, count, one, mydatatable);
    }
}

d = AverageConsumption(121, 180);
if (ds.Tables[0].Rows.Count > 0)
{
    for (int i = 0; i < ds.Tables[0].Rows.Count; i++)
    {
        string unit = "91 to 120";
```
int count =
    int.Parse(ds.Tables[0].Rows[i][0].ToString());
    string one = ds.Tables[0].Rows[i][1].ToString();
    AddDataToTable(unit, count, one, mydatatable);
}
}

ds = AverageConsumption(100,9000000);
if (ds.Tables[0].Rows.Count > 0)
{
    for (int i = 0; i < ds.Tables[0].Rows.Count; i++)
    {
        string unit = "above 180"
        int count =
            int.Parse(ds.Tables[0].Rows[i][0].ToString());
        string one = ds.Tables[0].Rows[i][1].ToString();
        AddDataToTable(unit, count, one, mydatatable);
    }
}

if (units.Equals("2"))
{
    ds = AverageConsumption(0, 30);
    if (ds.Tables[0].Rows.Count > 0)
    {
        for (int i = 0; i < ds.Tables[0].Rows.Count; i++)
        {
            string unit = "0 to 30"
            int count =
                int.Parse(ds.Tables[0].Rows[i][0].ToString());
            string one = ds.Tables[0].Rows[i][1].ToString();
            AddDataToTable(unit, count, one, mydatatable);
        }
    }
}

if (units.Equals("3"))
{
    ds = AverageConsumption(31, 60);
    if (ds.Tables[0].Rows.Count > 0)
    {
        for (int i = 0; i < ds.Tables[0].Rows.Count; i++)
        {
            string unit = "31 to 60"
            int count =
                int.Parse(ds.Tables[0].Rows[i][0].ToString());
            string one = ds.Tables[0].Rows[i][1].ToString();
            AddDataToTable(unit, count, one, mydatatable);
        }
    }
}
if (units.Equals("4"))
{
    ds = AverageConsumption(61, 90);
    if (ds.Tables[0].Rows.Count > 0)
    {
        for (int i = 0; i < ds.Tables[0].Rows.Count; i++)
        {
            string unit = "61 to 90";
            int count = int.Parse(ds.Tables[0].Rows[i][0].ToString());
            string one = ds.Tables[0].Rows[i][1].ToString();
            AddDataToTable(unit, count, one, mydatatable);
        }
    }
}
if (units.Equals("5"))
{
    ds = AverageConsumption(91, 120);
    if (ds.Tables[0].Rows.Count > 0)
    {
        for (int i = 0; i < ds.Tables[0].Rows.Count; i++)
        {
            string unit = "91 to 120";
            int count = int.Parse(ds.Tables[0].Rows[i][0].ToString());
            string one = ds.Tables[0].Rows[i][1].ToString();
            AddDataToTable(unit, count, one, mydatatable);
        }
    }
}
if (units.Equals("6"))
{
    ds = AverageConsumption(121, 180);
    if (ds.Tables[0].Rows.Count > 0)
    {
        for (int i = 0; i < ds.Tables[0].Rows.Count; i++)
        {
            string unit = "121 to 180";
            int count = int.Parse(ds.Tables[0].Rows[i][0].ToString());
            string one = ds.Tables[0].Rows[i][1].ToString();
            AddDataToTable(unit, count, one, mydatatable);
        }
    }
}
if (units.Equals("7"))
{
    ds = AverageConsumption(181, 2500000);
    if (ds.Tables[0].Rows.Count > 0)
    {
        for (int i = 0; i < ds.Tables[0].Rows.Count; i++)
        {
            string unit = "Above 180 ";
        }
    }
}
int count =
int.Parse(ds.Tables[0].Rows[i][0].ToString());
string one = ds.Tables[0].Rows[i][1].ToString();
AddDataToTable(unit, count, one, mydatatable);
}
}

ReportDataSource datasource = new ReportDataSource("DataSet1", mydatatable);

ReportViewer1.LocalReport.DataSources.Add(datasource);

catch (Exception ex)
{
}

protected void Button1_Click1(object sender, EventArgs e)
{
DataTable mydatatable = CreateDataTable();
DataSet ds = new DataSet();
DataSet ds1 = new DataSet();
DataSet ds2 = new DataSet();
DataSet ds3 = new DataSet();
DataSet ds4 = new DataSet();

try
{
    string units = ddlunits.SelectedItem.Value;
    if (units.Equals("1"))
    {
        ds = AverageConsumption(0, 30);
        if (ds.Tables[0].Rows.Count > 0)
        {
            for (int i = 0; i < ds.Tables[0].Rows.Count; i++)
            {
                string unit = "0 to 30";
                int count =
int.Parse(ds.Tables[0].Rows[i][0].ToString());
                string one = ds.Tables[0].Rows[i][1].ToString();
                AddDataToTable(unit, count, one, mydatatable);
            }
        }
    }
}
ds = AverageConsumption(31, 60);
if (ds.Tables[0].Rows.Count > 0)
{
    for (int i = 0; i < ds.Tables[0].Rows.Count; i++)
    {
        string unit = "31 to 60";
        int count = int.Parse(ds.Tables[0].Rows[i][0].ToString());
        string one = ds.Tables[0].Rows[i][1].ToString();
        AddDataToTable(unit, count, one, mydatatable);
    }
}

ds = AverageConsumption(61, 90);
if (ds.Tables[0].Rows.Count > 0)
{
    for (int i = 0; i < ds.Tables[0].Rows.Count; i++)
    {
        string unit = "31 to 60";
        int count = int.Parse(ds.Tables[0].Rows[i][0].ToString());
        string one = ds.Tables[0].Rows[i][1].ToString();
        AddDataToTable(unit, count, one, mydatatable);
    }
}

ds = AverageConsumption(91, 120);
if (ds.Tables[0].Rows.Count > 0)
{
    for (int i = 0; i < ds.Tables[0].Rows.Count; i++)
    {
        string unit = "61 to 90";
        int count = int.Parse(ds.Tables[0].Rows[i][0].ToString());
        string one = ds.Tables[0].Rows[i][1].ToString();
        AddDataToTable(unit, count, one, mydatatable);
    }
}

ds = AverageConsumption(121, 180);
if (ds.Tables[0].Rows.Count > 0)
{
    for (int i = 0; i < ds.Tables[0].Rows.Count; i++)
    {
        string unit = "91 to 120";
        int count = int.Parse(ds.Tables[0].Rows[i][0].ToString());
        string one = ds.Tables[0].Rows[i][1].ToString();
        AddDataToTable(unit, count, one, mydatatable);
    }
}

ds = AverageConsumption(180, 900000);
if (ds.Tables[0].Rows.Count > 0)
for (int i = 0; i < ds.Tables[0].Rows.Count; i++)
{
    string unit = "above 180";
    int count = int.Parse(ds.Tables[0].Rows[i][0].ToString());
    string one = ds.Tables[0].Rows[i][1].ToString();
    AddDataToTable(unit, count, one, mydatatable);
}

if (units.Equals("2"))
{
    ds = AverageConsumption(0, 30);
    if (ds.Tables[0].Rows.Count > 0)
    {
        for (int i = 0; i < ds.Tables[0].Rows.Count; i++)
        {
            string unit = "0 to 30";
            int count = int.Parse(ds.Tables[0].Rows[i][0].ToString());
            string one = ds.Tables[0].Rows[i][1].ToString();
            AddDataToTable(unit, count, one, mydatatable);
        }
    }
}

if (units.Equals("3"))
{
    ds = AverageConsumption(31, 60);
    if (ds.Tables[0].Rows.Count > 0)
    {
        for (int i = 0; i < ds.Tables[0].Rows.Count; i++)
        {
            string unit = "31 to 60";
            int count = int.Parse(ds.Tables[0].Rows[i][0].ToString());
            string one = ds.Tables[0].Rows[i][1].ToString();
            AddDataToTable(unit, count, one, mydatatable);
        }
    }
}

if (units.Equals("4"))
{
    ds = AverageConsumption(61, 90);
    if (ds.Tables[0].Rows.Count > 0)
    {
        for (int i = 0; i < ds.Tables[0].Rows.Count; i++)
        {
            string unit = "61 to 90";
            int count = int.Parse(ds.Tables[0].Rows[i][0].ToString());
            string one = ds.Tables[0].Rows[i][1].ToString();
            AddDataToTable(unit, count, one, mydatatable);
        }
    }
}
AddDataToTable(unit, count, one, my datatable);

if (units.Equals("5"))
{
    ds = AverageConsumption(91, 120);
    if (ds.Tables[0].Rows.Count > 0)
    {
        for (int i = 0; i < ds.Tables[0].Rows.Count; i++)
        {
            string unit = "91 to 120";
            int count = int.Parse(ds.Tables[0].Rows[i][0].ToString());
            string one = ds.Tables[0].Rows[i][1].ToString();
            AddDataToTable(unit, count, one, my datatable);
        }
    }
}

if (units.Equals("6"))
{
    ds = AverageConsumption(121, 180);
    if (ds.Tables[0].Rows.Count > 0)
    {
        for (int i = 0; i < ds.Tables[0].Rows.Count; i++)
        {
            string unit = "121 to 180";
            int count = int.Parse(ds.Tables[0].Rows[i][0].ToString());
            string one = ds.Tables[0].Rows[i][1].ToString();
            AddDataToTable(unit, count, one, my datatable);
        }
    }
}

if (units.Equals("7"))
{
    ds = AverageConsumption(181, 2500000)*
    if (ds.Tables[0].Rows.Count > 0)
    {
        for (int i = 0; i < ds.Tables[0].Rows.Count; i++)
        {
            string unit = "Above 180";
            int count = int.Parse(ds.Tables[0].Rows[i][0].ToString());
            string one = ds.Tables[0].Rows[i][1].ToString();
            AddDataToTable(unit, count, one, my datatable);
        }
    }
}
ReportDataSource datasource = new ReportDataSource("DataSet1", mydatatable);

    ReportViewer1.LocalReport.DataSources.Add(datasource);

    catch (Exception ex)
    {
    }
    }
}
Appendix II

Questionnaire
Domestic Electricity Consumption Pattern analysis

Research Project – Msc In Information Technology

Faculty of Information Technology, University of Moratuwa

Electricity bill Account Number: ......................................................

Name of Account Holder: .................................................................

Occupation: .....................................................................................

House Type: Single Story/Two Story/Apartment/Annex/Other

1. Number of rooms available inside the house ........

2. How many people are living in the house during most of the year?

3. Children in the age of 0-6 years: .......... 7-12 years: .......... and 13-17 years: ........

4. Time that the family members spend at home during weekdays

Adults spending time in the home: All days: ...... Half days: ...... Only evenings and nights: ......

Children spending time in the home: All days: ......Half days: ...... Only evenings and nights: ......

5. Education level of family members up to

GCE O/L ...... Of persons डि.ए. 2/4 मास: .........

GCE A/L ...... Of persons डि.एल. 2/4 मास: .........

University ...... Of persons डि.एल. 2/4 मास: .........

6. What is the household’s total income per month .................. Rupees per month

7. Frequency of usage of the below mentioned appliances (If you don’t have such just leave it blank)

Please add ✓ mark inside the appropriate cage (if you are using any other equipments other than this please fill write inside the empty rows)
8. What are the estimated hours per day below appliances are consumed (If you are not using below equipments daily or monthly keep the cage empty)

<table>
<thead>
<tr>
<th>Appliance</th>
<th>No of hours per day</th>
<th>No of hours per month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refrigerator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heater</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kettle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Pump</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Washing machine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electric Oven</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rice Cooker</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hot Plate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fans</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9. How many incandescent bulbs are used in the household? Total ....

10. How many LED and Low energy light bulbs are used in household? Total ....

11. Do the members in your house turn off lights in rooms when they are not presence? □ Yes  □ No
12. Is it the energy efficiency or the price the most decisive factor when buying new home appliances? □ Energy Efficiency □ Price

13. Do you use daylight in daytime without using bulbs? □ Yes □ No

14. What is the sequence of ironing? (If iron is available only)
- Soft materials first and hard materials later □
- Hard materials first and soft materials later □
- There is no such special sequence □
- Other □ please specify

15. When ironing is done normally?
- Morning □
- Evening □
- Night □

16. What is the normal ironing time of the day? E.g. from 7pm to 8 pm

17. Do you iron wet clothes? □ Yes □ No

18. When you open the refrigerator (if refrigerator is available only)
- I open the refrigerator when I need to take each and every item □
- I decide about the things to be taken out from the refrigerator before open it □
- I do not decide about the things to be taken out from the refrigerator before open it □
- Other □ please specify

19. Do you normally keep food items inside the refrigerator in hot state? □ Yes □ No

20. Do you keep open the door of the refrigerator for a long time until you take the things out? □ Yes □ No

21. Are you sure refrigerator door is keep closed tightly □ Yes □ No

22. Is it an old one or new one (rough answer is needed) □ Old one □ New one

23. How many times per month inside the refrigerator is cleaned
□ Once a moth □ Twice a moth □ More than twice a moth
24. How do you decide the time to switch off the water pump?
- Water pumping is done for a certain duration and the pump is switched off after the particular duration.
- The pump is switched off after the tank is overflowed.
- There is a device which is automatically switches off the water pump after the water level has reached the required level.
- Other please specify

25. Do you normally wash a machine full or few items at one time?  □ Full   □ Few

26. Do you wash heavy weight bath sheets and towels to wash using washing machine?  □ Yes    □ No

27. Do you strive to reduce electricity consumption by applying conservation methods?  □ Yes   □ No

28. Do you know what are the steps can be taken to keep low electricity consumption?  □ Yes □ No

29. Do you like to improve your knowledge of actions that can be taken to keep low electricity consumption?  □ Yes □ No

30. Do you think your are having a lack of knowledge about the electricity conservation methods? □ Yes □ No

31. Do you have an idea how to calculate your bill related to the consumption unit? □ Yes □ No

32. Do you have any idea of unit blocks and block charges (e.g.0-30, 31-60, 60-90, etc)? □ Yes □ No

33. Do you know the meaning of KWh and how it is calculated? □ Yes □ No

34. Do you have any idea about the consumption units for a given period by looking at the meter? □ Yes □ No

35. Do you prefer smart meters? (Is usually an electronic device that records consumption of electric energy in intervals of an hour or less and communicates that information at least daily back to the utility (CEB) for monitoring and billing) □ Yes □ No
36. Do you have any idea about the tariff structure or tariff rates? □ Yes □ No

37. What do you think about the electricity bill according to the usage and the monthly income?
- Very High
- High
- Medium
- Low
- Very Low

38. What is the month of the year that you are consuming high electricity consumption? ...........................................................................................................................................

What is the reason for that? ....................................................................................................................................................

39. What are the methods that you are using to save electricity consumption at home? ..........................................................................................................................................................
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40. Any other comments or suggestions that you would like to provide, please mention below ..............................................................................................................................................................................