LISTING PROGRAM

1. Program Power_control

```
#include <SoftwareSerial.h>

#include <Wire.h>

#include <LiquidCrystal_I2C.h>

#include "RTClib.h"

#include "EmonLib.h"


#define I2C_ADDR 0x3F // <<- Add your address here.

#define Rs_pin 0

#define Rw_pin 1

#define En_pin 2

#define BACKLIGHT_PIN 3

#define D4_pin 4

#define D5_pin 5

#define D6_pin 6

#define D7_pin 7


LiquidCrystal_I2C lcd(I2C_ADDR,En_pin,Rw_pin,Rs_pin,D4_pin,D5_pin,D6_pin,D7_pin);


RTC_DS1307 RTC;


EnergyMonitor emon1;                // Create an instance


int jam,menit,detik;
```

```
double Irms, daya, kwh;
unsigned long startMillis;
unsigned long endMillis;
int biaya;

SoftwareSerial mySerial(11, 10);
//String number = "08990739348";
//String number = "081271592198";
//String number = "081918995098";
String number = "089680643810";

void setup()
{
  mySerial.begin(9600);       // Setting Sim900 Serial
  Serial.begin(9600);        // Setting the baud rate of Serial Monitor (Arduino)
  emon1.current(1, 1);    // Current: input pin, calibration
  Wire.begin();
  RTC.begin();
  if (! RTC.isrunning())
  {
    Serial.println("RTC is NOT running!");
    //sets the RTC to the date & time this sketch was compiled
    RTC.adjust(DateTime(__DATE__, __TIME__));
  }
```

```
  lcd.begin (16,2); // <<-- our LCD is a 16x2, change for your LCD if needed
  // LCD Backlight ON
  lcd.setBacklightPin(BACKLIGHT_PIN,POSITIVE);
  lcd.setBacklight(HIGH);

  lcd.home (); // go home on LCD
  lcd.setCursor (0,0);
  lcd.print("Power Monitoring");
  lcd.setCursor (0,1);
  lcd.print("==Cometronica ==");

//  RTC.adjust(DateTime(F(__DATE__), F(__TIME__)));
//  RTC.adjust(DateTime(2017, 3, 24, 19, 15, 0));
  DateTime now = RTC.now();
  jam = now.hour();
  menit = now.minute();
  detik = now.second();

  startMillis = millis();

  mySerial.println("AT");
}

void loop()
{
```

```
sensor();
harga();
DateTime now = RTC.now();
display_lcd();
if (daya>=450)
{
  peringatan();
}
if (Serial.available()>0)
switch(Serial.read())
{
  case 'a':
    mySerial.println("AT");
    break;
  case 's':
    SendMessage();
    break;
  case 'r':
    RecieveMessage();
    break;
}

String buffer = readSIM900A();
if (buffer.startsWith("\r\n+CMT: "))
  {
```

```
    Serial.println("*** RECEIVED A SMS ***");

    // Remove first 51 characters

    buffer.remove(0, 52);

    int len = buffer.length();

    // Remove \r\n from tail

    buffer.remove(len - 2, 4);

    if (buffer == "Cek"){

      SendMessage();

      Serial.println("SMS OK");

    }

    Serial.println(len);

    Serial.println(buffer);

    Serial.println("*** END SMS ***");

   }

}
```

2. Program GSM

```
void SendMessage()

{

  DateTime now = RTC.now();

  mySerial.println("AT+CMGF=1");    //Sets the GSM Module in Text Mode

  delay(500);

  mySerial.println("AT+CMGS=\"" +number+ "\"\r"); // Replace x with mobile number

  delay(500);

  mySerial.print(now.hour(), DEC); mySerial.print(":");mySerial.print(now.minute(), DEC);
mySerial.print(":");mySerial.print(now.second(), DEC);

  mySerial.println(" Penggunaan Daya = ");mySerial.print(kwh);
```

```
  mySerial.println(", Total Biaya = Rp ");mySerial.print(biaya);

  delay(100);

  mySerial.println((char)26);// ASCII code of CTRL+Z

  delay(500);

  Serial.println("SMS Balas OK");

}


void peringatan()

{

  DateTime now = RTC.now();

  mySerial.println("AT+CMGF=1");    //Sets the GSM Module in Text Mode

  delay(500);

  mySerial.println("AT+CMGS=\"" +number+ "\"\r"); // Replace x with mobile number

  delay(500);

  mySerial.print(now.hour(), DEC); mySerial.print(":");mySerial.print(now.minute(), DEC);
mySerial.print(":");mySerial.print(now.second(), DEC);

  mySerial.println("== Daya Melebihi Kapasitas, Mohon Mengurangi Beban Pemakaian ==");

  delay(100);

  mySerial.println((char)26);// ASCII code of CTRL+Z

  delay(500);

  Serial.println("SMS Balas OK");

}


void RecieveMessage()

{

  mySerial.println("AT+CNMI=2,2,0,0,0"); // AT Command to receive a live SMS
```

```
  delay(1000);
 }

String readSIM900A()
{
   String buffer;
   while (mySerial.available())
   {
     char c = mySerial.read();
     buffer.concat(c);
     delay(10);
   }
   return buffer;
}
```

3. Program LCD

```
void display_lcd()
{
  DateTime now = RTC.now();
  lcd.clear();
  lcd.setCursor (0,0);
  lcd.print(kwh);lcd.print(" KwH");lcd.print(" ");lcd.print(daya,3); lcd.print(" W");

  lcd.setCursor (0,1);
  lcd.print(now.hour(), DEC); lcd.print(":");lcd.print(now.minute(), DEC);
lcd.print(":");lcd.print(now.second(), DEC);
  lcd.print(" ");lcd.print(Irms,3); lcd.print(" A");
```

```
  delay(100);
}
```

4. Program Sensor

```
void sensor()
{
  endMillis = millis();
  unsigned long waktu = endMillis - startMillis;
  Irms = emon1.calcIrms(1000);
  daya = Irms*220;
  kwh = kwh + ((double)Irms*((double)waktu/60/60/100));
  startMillis = millis();
  Serial.print(Irms,3);Serial.print(",");Serial.print(daya,3);Serial.print(",");
  Serial.print(kwh);Serial.print(",");
}

void harga()
{
  if (kwh <=30){
    biaya = kwh * 169;
  }
  else if (kwh >30 && kwh<=60){
    biaya = kwh * 360;
  }
  else if(kwh >60){
    biaya = kwh * 495;
```

```
  }

  Serial.println(biaya,2);

}
```